

STRUCTURAL ABBREVIATIONS

#	NUMBER OR POUNDS
AB	ANCHOR BOLT
ACI	AMERICAN CONCRETE INSTITUTE
ADDL	ADDITIONAL
ADJ	ADJACENT
AESS	ARCHITECTURALLY EXPOSED STRUCTURAL STEEL
AFF	ABOVE FINISH FLOOR
AISC	AMERICAN INSTITUTE OF STEEL CONSTRUCTION
ALT	ALTERNATE
ALUM	ALUMINUM
APA	AMERICAN PLYWOOD ASSOCIATION
ARCH	ARCHITECTURAL
ASTM	AMERICAN SOCIETY FOR TESTING AND MATERIALS
ASSY	ASSEMBLY
ATR	ALL THREAD ROD
ATR/A	ALL THREAD ROD WITH ADHESIVE
AWS	AMERICAN WELDING SOCIETY

B/	BOTTOM OF
BF	BRACED FRAME
BLDG	BUILDING
BLKG	BLOCKING
BM	BEAM
BN	BOUNDARY NAIL
BOT	BOTTOM
BRBF	BUCKLING RESTRAINED BRACED FRAME
BRNG	BEARING
BSMT	BASEMENT
BTWN	BETWEEN
BU	BUILT-UP

C	CAMBER OR CHANNEL (AMERICAN STANDARD)
CANT	CANTILEVER
CIP	CAST IN PLACE
CG	CENTER OF GRAVITY
CGS	CENTER OF GRAVITY OF (PRESTRESSING) STEEL
CJ	CONTROL OR CONSTRUCTION JOINT
CJP	COMPLETE JOINT PENETRATION
CL	CENTERLINE
CLG	CEILING
CLR	CLEARANCE; CLEAR
CLSM	CONTROLLED LOW STRENGTH MATERIAL
CMU	CONCRETE MASONRY UNIT
COL	COLUMN
CONC	CONCRETE
CONN	CONNECTION
CONST	CONSTRUCTION
CONT	CONTINUOUS
COORD	COORDINATE
CSA	CONCRETE SCREW ANCHOR

d	PENNY (NAIL)
db	NOMINAL BAR DIAMETER
DBA	DEFORMED BAR ANCHOR
DBL	DOUBLE
DBO	DESIGNED BY OTHERS
DEG	DEGREE
DEMO	DEMOLISH; DEMOLITION
DF/L	DOUGLAS FIR-LARCH
DIA	DIAMETER
DIAG	DIAGONAL
DIM	DIMENSION
DIST	DISTANCE
DL	DEAD LOAD
DN	DOWN
DTL	DETAIL
DWG	DRAWING

(E)	EXISTING
EA	EACH
EB	EXPANSION BOLT
EF	EACH FACE
EJ	EXPANSION JOINT
EL	ELEVATION
ELEC	ELECTRICAL
EN	EDGE NAIL
EQ	EQUAL; EARTHQUAKE
EW	EACH WAY
EXT	EXTERIOR
EXTD	EXTEND; EXTENDED

f _c	28 DAY CONC COMPRESSIVE STRENGTH
FF	FINISH FLOOR
FN	FIELD NAIL
FLR	FLOOR
FDN	FOUNDATION
FOC	FACE OF CONCRETE
FOM	FACE OF MASONRY
FOS	FACE OF STUD
FT	FEET
FTG	FOOTING

GA	GAUGE
GALV	GALVANIZED
GLB	GLUE LAMINATED BEAM
GWB	GYPSUM WALL BOARD

HDG	HOT-DIP GALVANIZED
HDR	HEADER
HF	HEM-FIR
HORIZ	HORIZONTAL
HSA	HEADED STUD ANCHOR
HSS	HOLLOW STRUCTURAL SECTION
HT	HEIGHT

ID	INSIDE DIAMETER
IN	INCH
INT	INTERIOR

JST	JOIST
JT	JOINT

K	KIP(S) (1,000 POUNDS)
KSI	KIPS PER SQUARE INCH

L OR 2L	ANGLE OR DOUBLE ANGLE
LF	LINEAR FOOT
LL	LIVE LOAD
LLBB	LONG LEGS BACK TO BACK
LLH	LONG LEG HORIZONTAL
LLV	LONG LEG VERTICAL
LONG	LONGITUDINAL
LVL	LAMINATED VENEER LUMBER
LWC	LIGHT WEIGHT CONCRETE

MAX	MAXIMUM
MC	MISCELLANEOUS CHANNEL
MECH	MECHANICAL
MF	MOMENT FRAME
MFR	MANUFACTURER
MEP	MECHANICAL, ELECTRICAL, PLUMBING
MIN	MINIMUM
MIR	MIRROR
MISC	MISCELLANEOUS
MSA	MASONRY SCREW ANCHOR

(N)	NEW
NIC	NOT IN CONTRACT
NOM	NOMINAL
NTE	NOT TO EXCEED
NTS	NOT TO SCALE

OC	ON CENTER
OD	OUTSIDE DIAMETER
OPP	OPPOSITE
OWJ	OPEN WEB JOIST

PAF	POWER-ACTUATED FASTENER
PC	PRECAST
PCF	POUNDS PER CUBIC FOOT
PERP	PERPENDICULAR
PJP	PARTIAL JOINT PENETRATION
PL	PLATE
PLF	POUNDS PER LINEAL FOOT
PLYWD	PLYWOOD
PSI	POUNDS PER SQUARE INCH
PSF	POUNDS PER SQUARE FOOT
PT	PRESSURE TREATED OR POST TENSIONED
PVC	POLYVINYL CHLORIDE

QTY	QUANTITY
RAD	RADIUS
REF	REFERENCE
RAD	REFERENCE ARCH DOCUMENTS
REINF	REINFORCING
REQD	REQUIRED
REV	REVISED, REVISION
RO	ROUGH OPENING

SC	SLIP CRITICAL
SER	STRUCTURAL ENGINEER OF RECORD
SHT	SHEET
SHTG	SHEATHING
SIM	SIMILAR
SLBB	SHORT LEGS BACK TO BACK
SMS	SHEET METAL SCREW
SOG	SLAB ON GRADE
SQ	SQUARE
SS	STAINLESS STEEL
SSL	SHORT SLOTTED (HOLES)
STD	STANDARD
STL	STEEL
SQ	SQUARE
SYM	SYMMETRICAL

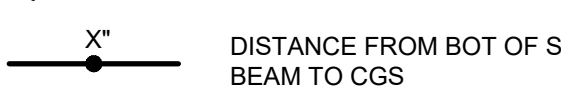
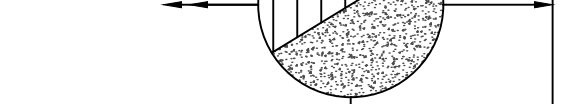
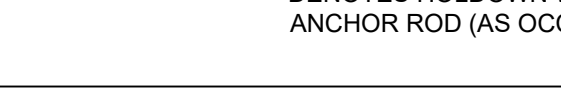
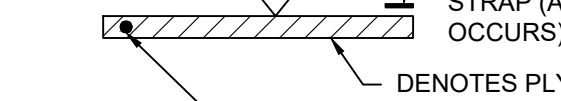
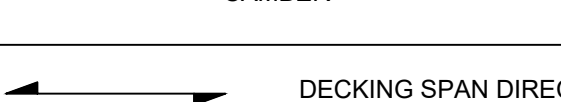
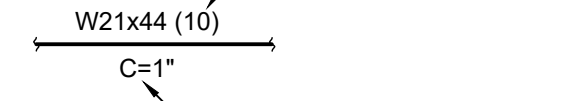
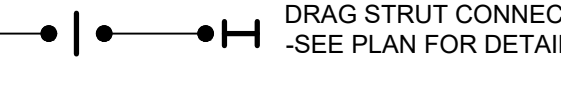
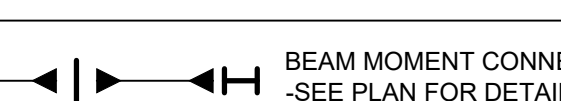
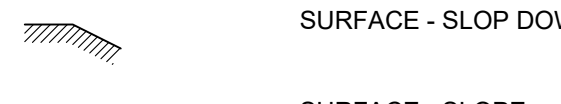
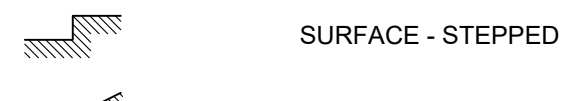
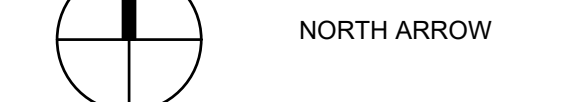
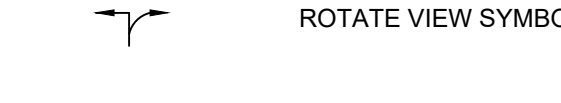
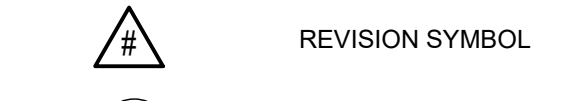
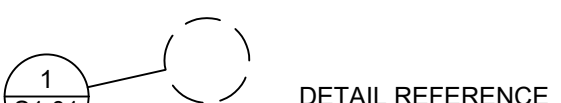
T&B	TOP AND BOTTOM
T&G	TONGUE AND GROVE
T/	TOP OF
TRANS	TRANSVERSE
TYP	TYPICAL

UNO	UNLESS NOTED OTHERWISE
URM	UNREINFORCED MASONRY
UT	ULTRASONIC TEST

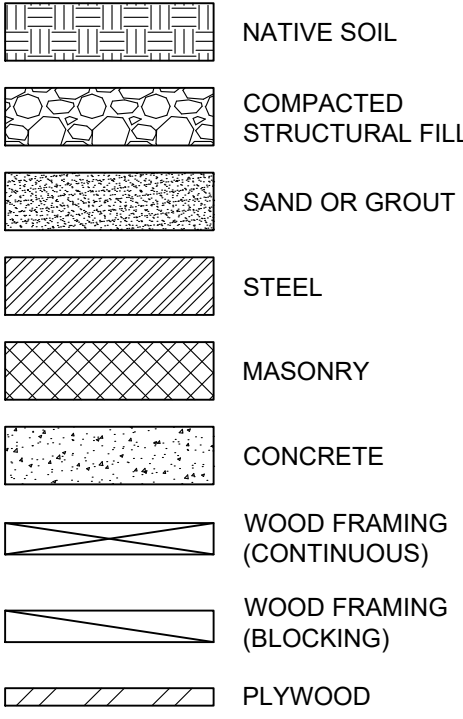
VERT	VERTICAL
VIF	VERIFY IN FIELD

W/	WITH
W/O	WITHOUT
WD	WOOD
WF	WIDE FLANGE
WP	WORK POINT
WTS	WELDED THREADED STUDS
WWR	WELDED WIRE REINFORCING

STRUCTURAL DRAWING SYMBOLS



MATERIAL SYMBOLS

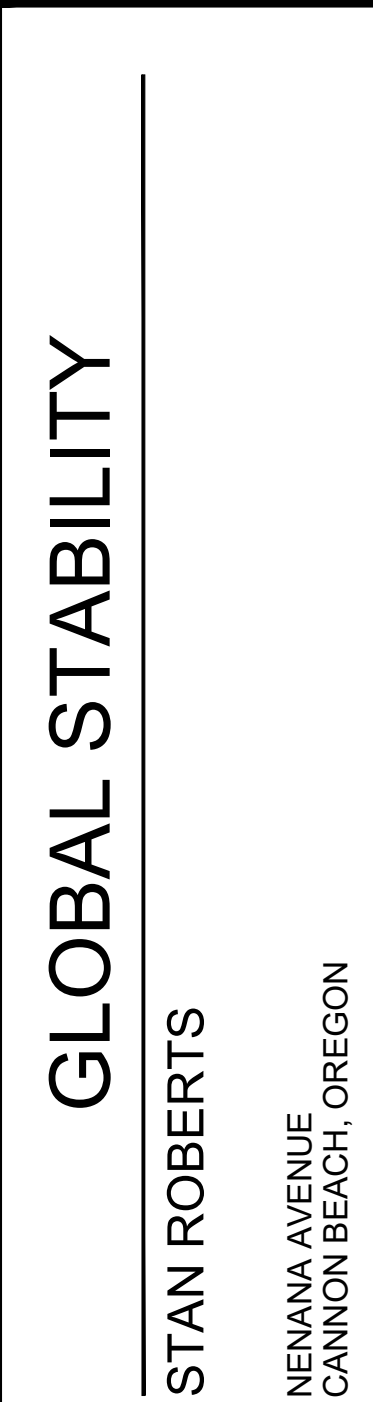


STRUCTURAL DRAWING INDEX

SHEET	DRAWING TITLE	RESIDENCE GLOBAL STABILITY
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S0.04	SPECIAL INSPECTION	●
S1.01	FOUNDATION PLAN	●
S5.01	CONCRETE DETAILS	●
S5.02	CONCRETE DETAILS	●

SCOPE OF WORK
THESE DRAWINGS ARE FOR THE PROPOSED GLOBAL STABILITY SUPPORT IN ACCORDANCE WITH GEOTECH SOLUTIONS, INC. THE GLOBAL STABILITY IS A GRADE BEAM SYSTEM SUPPORTED ON MICRO-PILES.

THIS PROJECT IS LOCATED IN A KNOWN ACTIVE LANDSLIDE. THE CITY HAS MADE ATTEMPTS TO STOP THE LANDSLIDE BUT REPORTEDLY IT CONTINUES TO MOVE, ALBEIT AT A MUCH SLOWER RATE. GIVEN THIS ADVANCED KNOWLEDGE, BUILDING IN AN ACTIVE LANDSLIDE CARRIES RISK THAT THERE WILL BE GREATER THAN NORMAL MAINTENANCE OVER TIME.



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MCE PROJECT NO: 200209

ISSUE DATE: 10.14.20

REV.	DATE	DESCRIPTION

SHEET CONTENT
COVER SHEET

SHEET
S0.01

STRUCTURAL NOTES:

GENERAL NOTES

THE CONTRACTOR IS RESPONSIBLE FOR VERIFICATION AND CORRELATION OF ALL ITEMS AND WORK NECESSARY FOR COMPLETION OF THE PROJECT AS INDICATED BY THE CONTRACT DOCUMENTS. SHOULD ANY QUESTION ARISE REGARDING THE CONTRACT DOCUMENTS OR SITE CONDITIONS, THE CONTRACTOR SHALL REQUEST INTERPRETATION AND CLARIFICATION FROM THE ENGINEER BEFORE BEGINNING THE PROJECT. THE ABSENCE OF SUCH REQUEST SHALL SIGNIFY THAT THE CONTRACTOR HAS REVIEWED AND FAMILIARIZED HIMSELF WITH ALL ASPECTS OF THE PROJECT AND HAS COMPLETE COMPREHENSION THEREOF. THE CONTRACTOR SHALL BE RESPONSIBLE FOR CONFORMANCE TO ALL SAFETY REGULATIONS DURING CONSTRUCTION.

THE CONTRACT DRAWINGS AND SPECIFICATIONS REPRESENT THE FINISHED STRUCTURE. UNLESS OTHERWISE SPECIFICALLY NOTED, THEY DO NOT INDICATE THE METHOD OF CONSTRUCTION OR CONSTRUCTION LOADS. ONLY THE CONTRACTOR SHALL PROVIDE ALL METHODS, DIRECTION AND RELATED EQUIPMENT NECESSARY TO PROTECT THE STRUCTURE, WORKMEN AND OTHER PERSONS AND PROPERTY DURING CONSTRUCTION. THE CONTRACTOR SHALL, AT THEIR OWN EXPENSE, ENGAGE PROPERLY QUALIFIED PERSONS TO DETERMINE WHERE AND HOW TEMPORARY PRECAUTIONARY MEASURES SHALL BE USED AND INSPECT SAME IN THE FIELD. ANY MATERIAL NOT AS SPECIFIED OR IMPROPER MATERIAL INSTALLATION OR WORKMANSHIP SHALL BE REMOVED AND REPLACED WITH SPECIFIED MATERIAL IN A WORKMANLIKE MANNER AT THE CONTRACTOR'S EXPENSE.

THESE PLANS, SPECIFICATIONS, ENGINEERING AND DESIGN WORK ARE INTENDED SOLELY FOR THE PROJECT SPECIFIED HEREIN. MILLER CONSULTING ENGINEERS DISCLAIMS ALL LIABILITY IF THESE PLANS AND SPECIFICATIONS OR THE DESIGN, ADVICE AND INSTRUCTIONS ATTENDANT THERETO ARE USED ON ANY PROJECT OR AT ANY LOCATION OTHER THAN THE PROJECT AND LOCATION SPECIFIED HEREIN. OBSERVATION VISITS TO THE JOB SITE AND SPECIAL INSPECTIONS ARE NOT PART OF THE STRUCTURAL ENGINEER'S RESPONSIBILITY UNLESS THE CONTRACT DOCUMENTS SPECIFY OTHERWISE.

NON-STRUCTURAL PORTIONS OF PROJECT, INCLUDING BUT NOT LIMITED TO PLUMBING, FIRE SUPPRESSION, ELECTRICAL, MECHANICAL, LAND USE, SITE PLANNING, EROSION CONTROL FLASHING AND WATER-PROOFING ARE BEYOND THE SCOPE OF THESE DRAWINGS AND ARE PROVIDED BY OTHERS.

TEMPORARY SHORING

WHEREVER SHORING IS REQUIRED, THE CONTRACTOR SHALL BE RESPONSIBLE FOR PROVIDING A SHORING SYSTEM THAT PREVENTS SETTLEMENT AND/OR DAMAGE TO EXISTING FACILITIES AND PROTECTS PERSONNEL, THE PUBLIC, AND THE BUILDING AS REQUIRED. THE CONTRACTOR SHALL ALSO BE RESPONSIBLE FOR PROTECTING STREETS, WALKWAYS, UTILITIES, IMPROVEMENTS AND EXCAVATION AGAINST LOSS OF GROUND OR CAVING OF EMBANKMENTS DURING CONSTRUCTION, AS REQUIRED. THE CONTRACTOR SHALL LOCATE THE SHORING SYSTEM CLEAR WITHOUT OBSTRUCTION OF THE PERMANENT STRUCTURE AND TO PERMIT CONSTRUCTION TO PROCEED.

BUILDING CODE

ALL PHASES OF THE WORK SHALL CONFORM TO THE 2019 OREGON STRUCTURAL SPECIALTY CODE, BASED ON THE 2018 INTERNATIONAL BUILDING CODE (IBC), INCLUDING ALL REFERENCE STANDARDS, UNLESS NOTED OTHERWISE.

SPECIAL INSPECTION / STRUCTURAL OBSERVATION

SPECIAL INSPECTION AND/OR TESTING IS REQUIRED IN ACCORDANCE WITH IBC SECTION 1704. THE CONTRACTOR SHALL PROVIDE SUFFICIENT NOTICE TO ALLOW SCHEDULING OF SPECIAL INSPECTION. IT IS THE OWNER'S RESPONSIBILITY TO PROVIDE SPECIAL INSPECTION AND TESTING BY A QUALIFIED THIRD PARTY, SUCH AS A TESTING AGENCY REVIEWED BY THE ENGINEER.

REFERENCE THE SPECIAL INSPECTION TABLE ON SHEET S0.04 FOR ITEMS REQUIRING SPECIAL INSPECTION, TESTING, AND STRUCTURAL OBSERVATION.

STRUCTURAL DESIGN CRITERIA

LIVE LOAD REDUCTION FOR BEAMS AND COLUMNS WAS NOT USED. DESIGN FOR MECHANICAL LOADS INCLUDES ONLY THOSE INDICATED ON STRUCTURAL DRAWINGS. THE FOLLOWING ARE THE DESIGN REQUIREMENTS:

STRUCTURAL DESIGN CRITERIA SOIL DESIGN DATA		
ALLOWABLE BEARING PRESSURE		1500 PSF
RESTRAINED WALL ACTIVE PRESSURE		55 PCF
UNRESTRAINED WALL ACTIVE PRESSURE		35 PCF
SEISMIC PRESSURE		7.5H2 APPLIED AT 0.6H
COEFFICIENT OF FRICTION		0.3500
PASSIVE LATERAL RESISTANCE		250 PCF

FOUNDATION CRITERIA

CONTRACTOR SHALL VERIFY SOIL CONDITIONS AT THE FOOTINGS AND MAKE ANY NECESSARY CORRECTIONS IN ACCORDANCE WITH THE GEOTECHNICAL REPORTS. ALL FOUNDATION ELEMENTS SHALL BE SUPPORTED IN ACCORDANCE WITH THE GEOTECHNICAL REPORT DATED JUNE 6, 2020 BY GEOTECH SOLUTIONS INC. STRUCTURAL FILL MATERIAL AND PLACEMENT SHALL COMPLY WITH THE PROVISIONS SPECIFIED IN THE GEOTECHNICAL REPORT.

RETAINING STRUCTURES

ALL RETAINING STRUCTURES, I.E.: RETAINING WALLS AND BASEMENT WALLS SHALL HAVE ADEQUATE DRAINAGE TO PREVENT HYDROSTATIC PRESSURES.

CONCRETE

MIXING, BATCHING, TRANSPORTING, PLACING AND CURING OF CONCRETE SHALL BE IN ACCORDANCE WITH THE AMERICAN CONCRETE INSTITUTE, ACI 318, ACI 301 AND IBC CHAPTER 19.

CONCRETE MIX DESIGNS SHALL MEET THE FOLLOWING REQUIREMENTS:

CONCRETE MIX DESIGN REQUIREMENTS			
MEMBER TYPE/LOCATION	COMPRESSIVE STRENGTH AT 28 DAYS, F'C (PSI)	MAXIMUM AGGREGATE SIZE	MAXIMUM W/CM RATIO
GRADE BEAMS/COLUMNS/PILE CAPS	5000	3/4"	0.50
BASEMENT/RETAINING/FOUNDATIONS ON WALLS	5000	1"	0.50
EXTERIOR SLABS ON GRADE / MAT FOUNDATION	4500	1"	0.45

CONCRETE USED IN ELEVATED BEAMS SHALL HAVE A SHRINKAGE LIMIT OF 0.045% AT 28 DAYS AS MEASURED IN ACCORDANCE WITH ASTM C157. SUBMIT LABORATORY TEST RESULTS FOR APPROVAL PRIOR TO CONSTRUCTION.

ALL EXTERIOR CONCRETE SUBJECT TO FREEZE/THAW CYCLES, AND/OR CONTINUOUS MOISTURE OR DEICING CHEMICALS, INCLUDING SIDEWALKS, SLABS AND WALLS, SHALL HAVE A MAXIMUM W/CM RATIO OF 0.45 AND A MINIMUM COMPRESSIVE STRENGTH AT 28 DAYS, F'C = 4500 PSI, AND SHALL MEET THE FOLLOWING AIR CONTENT REQUIREMENTS:

CONCRETE MIX AIR CONTENT REQUIREMENTS		
MAXIMUM AGGREGATE SIZE	CONCRETE SUBJECT TO FREEZE/THAW CYCLES	CONCRETE SUBJECT TO CONTINUOUS MOISTURE AND/OR DEICING CHEMICALS
3/4"	5%	6%
1"	4.5%	6%

THE AIR-ENTRAINING ADMIXTURE SHALL CONFORM TO ASTM C260. ALL CONCRETE WITH REINFORCEMENT SHALL HAVE NO CHLORINE OR CHLORIDES. NO WATER MAY BE ADDED TO THE CONCRETE IN THE FIELD UNLESS SPECIFICALLY APPROVED IN WRITING BY THE CONCRETE SUPPLIER IN CONJUNCTION WITH THE APPROVED CONCRETE MIX DESIGN.

SLEEVES, OPENINGS, CONDUIT, AND OTHER EMBEDDED ITEMS NOT SHOWN ON THE STRUCTURAL DRAWINGS SHALL BE REVIEWED BY THE STRUCTURAL ENGINEER BEFORE PLACING CONCRETE.

WHERE NEW CONCRETE IS PLACED AGAINST EXISTING CONCRETE, THE EXISTING CONCRETE SURFACE SHALL BE CLEANED AND ROUGHENED TO A MINIMUM 1/4" AMPLITUDE.

DESIGN OF FORMWORK, SHORING AND RE-SHORING DESIGN IS THE RESPONSIBILITY OF THE CONTRACTOR AND SHALL CONFORM TO THE MOST RECENT EDITION OF ACI 347R.

CONCRETE REINFORCING STEEL

ALL REINFORCING STEEL SHALL BE DEFORMED BARS PER ASTM A615 OR A706, GRADE 60 UNLESS NOTED OTHERWISE.

ALL REINFORCING STEEL SHALL BE SUPPORTED ON WELL-CURED CONCRETE BLOCKS, PLASTIC CHAIRS OR APPROVED METAL CHAIRS, AS SPECIFIED BY THE CRSI MANUAL OF STANDARD PRACTICE, MSP-1 AND SECURELY TIED IN PLACE WITH #16 ANNEALED IRON WIRE PRIOR TO PLACING CONCRETE. REINFORCING STEEL SHALL BE DETAILED IN ACCORDANCE WITH THE "ACI MANUAL OF STANDARD PRACTICE FOR DETAILING REINFORCED CONCRETE STRUCTURES," ACI 315. BAR LENGTHS DETAILED ARE OUT TO OUT AND DO NOT INCLUDE ALLOWANCE FOR HOOKS OR BENDS.

WELDING OR TACK WELDING OF REINFORCING BARS TO OTHER BARS OR EMBEDDED STEEL ITEMS IS PROHIBITED EXCEPT WHERE SPECIFICALLY APPROVED BY THE ENGINEER. WHERE WELDING IS APPROVED, REINFORCING STEEL SHALL CONFORM TO ASTM A706, AND WELDING SHALL BE PERFORMED BY AWS CERTIFIED WELDERS USING E9018 OR APPROVED

ELECTRODES. WELDING PROCEDURES SHALL CONFORM TO THE REQUIREMENTS OF AWS D1.4.

UNLESS NOTED OTHERWISE, CAST-IN-PLACE CONCRETE COVER OVER REINFORCING STEEL SHALL BE AS FOLLOWS:

CONCRETE COVER (UNLESS NOTED OTHERWISE)					
BAR SIZE	CONCRETE CAST AGAINST EARTH	CONCRETE EXPOSED TO EARTH/WEATHER	SLABS & JOISTS	WALLS	BEAMS & COLUMNS (TIES, STIRRUPS, SPIRALS)
#5 & SMALLER	3"	1 1/2"	TOP BARS: 3/4"	1"	1 1/2"
#6 TO #11		2"	BOTTOM BARS: 1"		
#14 & #18			1 1/2"		

SPECIFIED CONCRETE COVER SHALL BE MAINTAINED TO ALL REINFORCEMENT AT CONCRETE REVEALS AND INSETS. SHOP DRAWINGS SHOWING CONCRETE REVEALS AND OTHER INSETS SHALL BE SUBMITTED FOR REVIEW.

REINFORCING BARS SHALL BE LAP SPliced PER THE TABLE ON SHEET S0.04. AT THE CONTRACTOR'S OPTION, MECHANICAL COUPLINGS MAY BE USED FOR ANY BAR SIZE AND AT ANY LOCATION, PROVIDED A CURRENT ICC-ES REPORT DEMONSTRATES THE COUPLING CAN ACHIEVE A MINIMUM TENSILE STRENGTH OF 125 PERCENT OF THE SPECIFIED YIELD STRENGTH OF THE BAR AND 100 PERCENT OF THE SPECIFIED TENSILE STRENGTH OF THE SPliced BAR.

HEADED BARS OR TERMINATORS SHALL BE PROVIDED WHERE INDICATED ON THE DRAWINGS OR AT THE CONTRACTOR'S OPTION FOR CONGESTED AREAS OF REINFORCEMENT SUBJECT TO THE ENGINEER'S APPROVAL. HEADED BARS OR TERMINATORS SHALL MEET THE REQUIREMENTS OF ACI 318 AND ASTM A970 AND HAVE A CURRENT ICC-ES REPORT.

AT EACH RE-ENTRANT CORNER IN SLABS, PROVIDE ONE #4 X 4'-0" DIAGONALLY CENTERED ON THE CORNER AT EACH LAYER OF REINFORCING STEEL.

FOR WALLS WITH #5 REINFORCING STEEL AND SMALLER, PROVIDE 2'-6" X 2'-6" REINFORCING STEEL CORNER BARS OF SAME SIZE AND SPACING AS HORIZONTAL BARS. CONTINUE HORIZONTAL WALL REINFORCING THROUGH PILASTERS, COLUMNS AND INTERSECTING WALLS. PROVIDE A MINIMUM OF ONE #5 X 5'-0" FOR SINGLE LAYER REINFORCING AND TWO #5 X 5'-0" FOR DOUBLE LAYER REINFORCING DIAGONALLY CENTERED AT EACH CORNER OF ALL WALL OPENINGS. ADDITIONALLY, PROVIDE A MINIMUM OF ONE #5 FOR SINGLE LAYER REINFORCING AND TWO #5 FOR DOUBLE LAYER REINFORCING ON ALL SIDES OF OPENING EXTENDING A MINIMUM OF 2'-6" BEYOND THE OPENING.

DEEP FOUNDATIONS

WESTERN PILE STABILITY IMPROVEMENT SYSTEM

PAIRED (ONE BATTERED DOWN TO THE WEST, ONE DOWN TO THE EAST) 7-INCH DIAMETER, 0.45 WALL THICKNESS API N80 CASING ENCLOSED IN A GROUT COLUMN (AND WITH A GROUT FILLED INTERIOR). THESE PILES WILL NEED TO BE INCLINED AT 30 DEGREES FROM VERTICAL TO ALLOW FOR MOBILIZATION OF AXIAL STRENGTH AND REDUCTION IN BENDING. THESE PAIRINGS MUST BE SPACED NO GREATER THAN 6 FEET ON CENTER FOR THE FULL N-S WIDTH OF THE PROPERTY (AS MOVEMENT DIRECTION IS NOT ORTHOGONAL E-W). THE HEADS CAN BE TWO FEET APART, WITH THE PILES DOWN TO THE EAST SET WEST OF THE OPPOSING PILES (A STAGGERED OVERLAP). IT MUST BE NOTED THAT OVERALL STABILITY IS DEPENDENT ON THE LOWER WATER LEVEL CONDITIONS MAINTAINED BY THE SYSTEM OF HORIZONTAL DRAINS EMPLOYED AND CLEANED BY THE CITY.

PILES SHALL BE DRILLED AT LEAST 10 FEET INTO HARD SILTSTONE (ESTIMATED NEAR ELEVATION 10 FEET) TO PROVIDE ENOUGH BOND TO RESIST LATERAL SLIDE FORCES.

VERTICAL SUPPORT PILES

GROUTED MICRO-PILES SHALL BE IN ACCORDANCE WITH THE APPROVED GEOTECHNICAL REPORT. 6-INCH DIAMETER GROUTED TITAN 40/16 MICROPILES SHALL BE USED. EMBEDMENT MUST REACH THE REQUIRED 10 FEET PAST THE SHEAR ZONE AND BE AT OR BELOW ELEVATION 10 FEET. FOR THE PRECEDING PILE AN ALLOWABLE CAPACITY OF 53 KIPS MAY BE USED FOR DESIGN. ALL PILES MUST BE CONNECTED WITH GRADE BEAMS IN THE EAST-WEST DIRECTION ROUGHLY PERPENDICULAR TO THE SLOPE. FOR RESISTANCE TO LATERAL LOADS, 5 KIPS CAN BE USED FOR THESE VERTICAL PILES.

GROUT

GROUT SHALL BE A CEMENT GROUT MADE FROM EITHER TYPE I, II, III, OR V PORTLAND CEMENT CONFORMING TO ASTM C150. GROUT MIX SHALL PROVIDE A STRENGTH OF AT LEAST 3,000 PSI AT TIME OF ANCHOR TESTING.

GLOBAL STABILITY

STAN ROBERTS

NEVANA AVENUE
CANNON BEACH, OREGON

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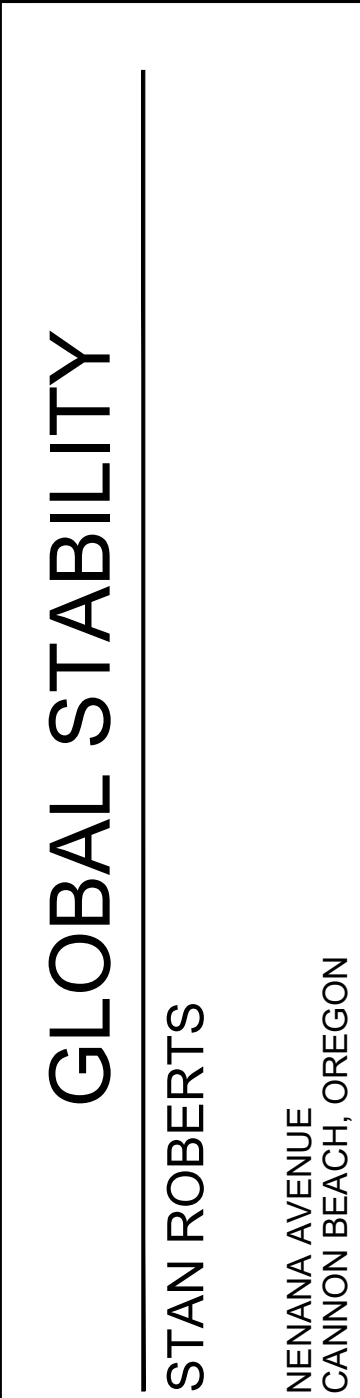
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SHEET CONTENT

STRUCTURAL NOTES

SHEET

S0.02



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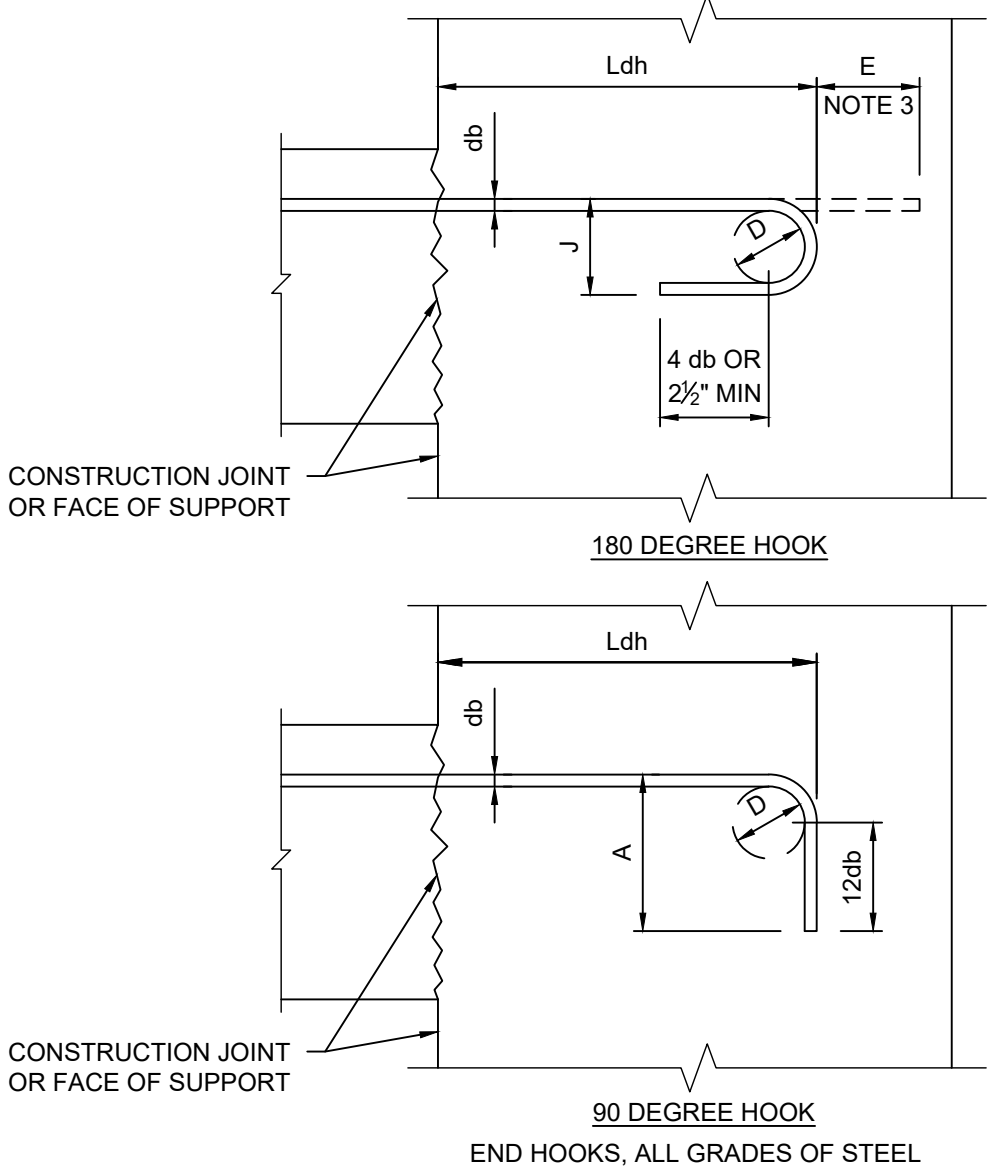
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SHEET CONTENT
STRUCTURAL NOTES

SHEET
S0.03

ASTM STANDARD REINFORCING BARS			
BAR SIZE DESIGNATION	NOMINAL DIMENSIONS		
	DIAMETER (in.)	AREA (in. ²)	MASS (lb/ft)
#3	0.375	0.11	0.376
#4	0.500	0.20	0.668
#5	0.625	0.31	1.043
#6	0.750	0.44	1.502
#7	0.875	0.60	2.044
#8	1.000	0.79	2.670
#9	1.128	1.00	3.400
#10	1.270	1.27	4.303
#11	1.410	1.56	5.313
#14	1.693	2.25	7.65
#18	2.257	4.00	13.6

1. ASTM A615 GRADE 40 IS LIMITED TO BAR SIZES #3 THROUGH #6
2. CHECK AVAILABILITY WITH LOCAL SUPPLIERS FOR BAR SIZES #14 AND #18



TYPICAL LAP SPLICE LENGTH SCHEDULE										
BAR SIZE	f _c = 2500 PSI		f _c = 3000 PSI		f _c = 4000 PSI		f _c = 5000 PSI		f _c = 6000 PSI	
	CASE 1	CASE 2	CASE 1	CASE 2	CASE 1	CASE 2	CASE 1	CASE 2	CASE 1	CASE 2
#3	24	36	22	32	19	28	17	25	16	23
#4	32	47	29	43	25	37	23	34	21	31
#5	39	59	36	54	31	47	28	42	26	38
#6	47	71	43	65	37	56	34	50	31	46
#7	69	103	63	94	54	81	49	73	44	67
#8	78	117	72	107	62	93	56	83	51	76
#9	88	132	81	121	70	105	63	94	57	86
#10	100	149	91	136	79	118	71	106	64	96
#11	110	165	101	151	87	131	78	117	71	107
#14	102 *	153 *	93 *	140 *	81 *	121 *	72 *	108 *	66 *	99 *
#18	136 *	204 *	124 *	186 *	107 *	161 *	96 *	144 *	88 *	132 *

TYPICAL TOP BAR LAP SPLICE LENGTH SCHEDULE										
BAR SIZE	f _c = 2500 PSI		f _c = 3000 PSI		f _c = 4000 PSI		f _c = 5000 PSI		f _c = 6000 PSI	
	CASE 1	CASE 2	CASE 1	CASE 2	CASE 1	CASE 2	CASE 1	CASE 2	CASE 1	CASE 2
#3	32	47	29	42	25	37	23	33	21	30
#4	42	62	38	56	33	49	30	45	28	41
#5	51	77	47	71	41	62	37	55	34	50
#6	62	93	56	85	49	73	45	65	41	60
#7	90	134	82	123	71	106	64	95	58	88
#8	102	153	94	140	81	121	73	108	67	99
#9	115	172	106	158	91	137	82	123	75	112
#10	130	194	119	177	103	154	93	138	84	125
#11	143	215	132	197	114	171	102	153	93	140
#14	133 *	199 *	121 *	182 *	106 *	158 *	94 *	141 *	86 *	129 *
#18	177 *	266 *	162 *	242 *	140 *	210 *	125 *	188 *	115 *	172 *

* NO LAP LENGTHS ALLOWED, NUMERICAL VALUES ARE FOR DEVELOPMENT LENGTH ONLY

NOTES:

1. DIMENSIONS ARE IN INCHES
2. CASE 1 AND 2 ARE DEFINED AS FOLLOWS
BEAMS OR COLUMNS: CASE 1: COVER ≥ db AND c-c SPACING ≥ 2 db
CASE 2: COVER < db AND c-c SPACING < 2 db
ALL OTHERS: CASE 1: COVER ≥ db AND c-c SPACING ≥ 3 db
CASE 2: COVER < db AND c-c SPACING < 3 db
3. TOP BARS ARE HORIZONTAL BARS WITH MORE THAN 12" OF CONCRETE CAST BELOW THE BARS.

TYPICAL REBAR LAP SPLICE LENGTH SCHEDULE

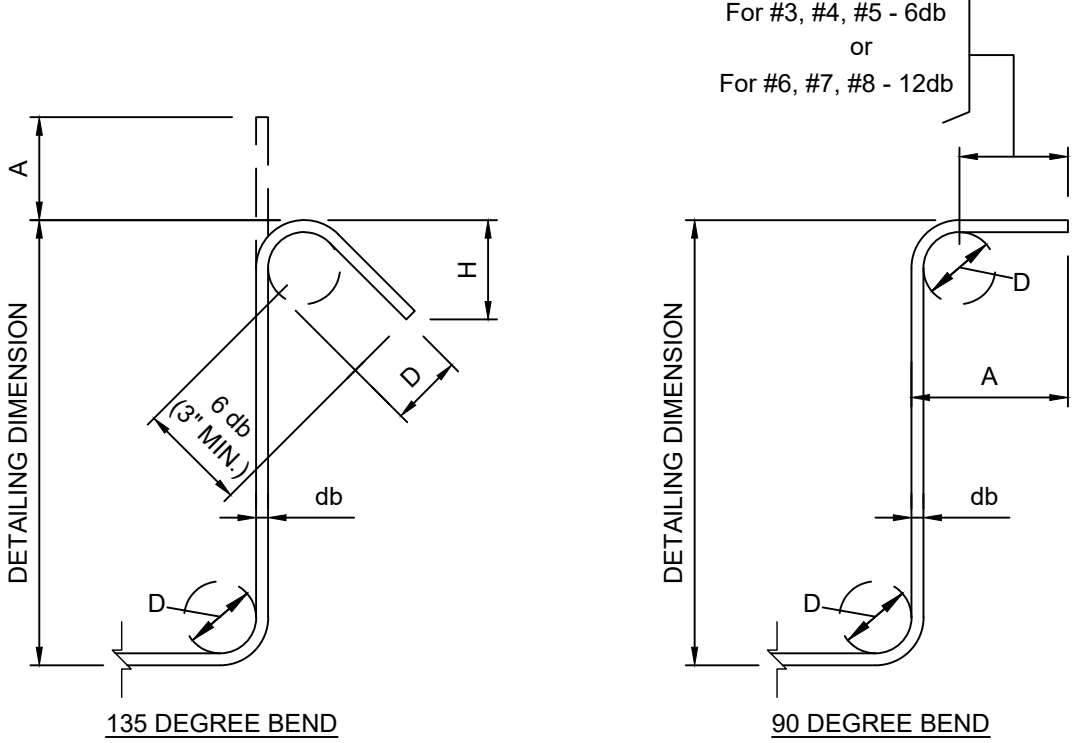
NTS

1 STANDARD REBAR DIMENSIONS

1 1/2" = 1'-0"

STIRRUP HOOKS (TIE BENDS SIMILAR)				
BAR SIZE	D	90°		135°
		A	A	H*
#3	1 1/2"	4"	4 1/4"	3"
#4	2"	4 1/2"	4 1/2"	3"
#5	2 1/2"	6"	5 1/2"	3 3/4"
#6	4 1/2"	1'-0"	8"	4 1/2"
#7	5 1/4"	1'-2"	9"	5 1/4"
#8	6"	1'-4"	10 1/2"	6"

* H DIMENSION IS APPROXIMATE



2 STIRRUP HOOKS AND TIE BENDS

1 1/2" = 1'-0"

3 STANDARD HOOKS AND EMBEDMENT

1 1/2" = 1'-0"

4 S0.03

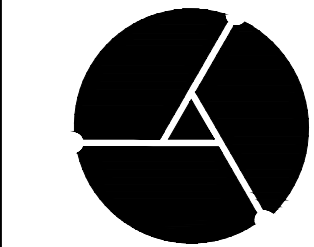
NTS

SPECIAL INSPECTION

TABLE 1 REQUIRED GEOTECHNICAL SPECIAL INSPECTIONS					
SYSTEM or MATERIAL	INSPECTION				REMARKS
	IBC CODE REFERENCE	CODE or STANDARD REFERENCE	FREQUENCY		
			Continuous	Periodic	
MICROPILES					
INSTALLATION	1707.1000	GEOTECHNICAL REPORT	X		BY GEOTECH SOLUTIONS INC SPECIAL INSPECTIONS APPLY TO TENDON TYPE AND SIZE, CORROSION PROTECTION, DEPTH OF EMBEDMENT, BONDED LENGTH, TYPE OF GROUT USED

TABLE 2 REQUIRED STRUCTURAL SPECIAL INSPECTIONS					
SYSTEM or MATERIAL	INSPECTION				REMARKS
	IBC CODE REFERENCE	CODE or STANDARD REFERENCE	FREQUENCY		
			Continuous	Periodic	
FABRICATORS CONCRETE					
INSPECTION OF ANCHORS INSTALLED IN HARDENED CONCRETE	"1909.1 TABLE 1705.3"	"ACI 318: 3.8.6, 8.1.3, 21.1.8"		X	SPECIAL INSPECTIONS APPLY TO ANCHOR PRODUCT NAME, TYPE, AND DIMENSIONS, HOLE DIMENSIONS, COMPLIANCE WITH DRILL BIT REQUIREMENTS, CLEANLINESS OF THE HOLE AND ANCHOR, ADHESIVE EXPIRATION DATE, ANCHOR/ADHESIVE INSTALLATION, ANCHOR EMBEDMENT, AND TIGHTENING TORQUE
REINFORCING STEEL PLACEMENT	"1705.3 1910.4 1901.3.2"	"ACI 318: 3.5 ACI 318: 7.1-7.7"		X	"TOLERANCES AND REINFORCING PLACEMENT PER ACI 7.5; SPACING LIMITS FOR REINFORCING ACI 7.6 PROTECTION OF REINFORCEMENT PER ACI 7.7 "
PLACEMENT OF BOLTS INSTALLED IN CONCRETE WHERE ALLOWABLE LOADS HAVE BEEN INCREASED OR WHERE STRENGTH DESIGN IS USED	"TABLE 1705.3 1908.5 1909.1" *TABLE 1705.3	"ACI 318: 1.3.2 C ACI 318: 8.1.3 ACI 318: 21.1.8 ACI 318 - APPENDIX D "		X	ALL BOLTS VISUALLY INSPECTED
VERIFYING USE OF REQUIRED MIX DESIGN(S)	"TABLE 1705.3 1904 1904.2 1910.2 1910.3"	"ACI 318: CHAPTER 4 ACI 318: 5.2-5.4"		X	
CONCRETE PLACEMENT	"TABLE 1705.3"	"ACI 318: 1.3.2 D ACI 318: 5.9 - 5.10"	X		
CONCRETE/SHOTCRETE CURING	"TABLE 1705.3 1910.9.1-3"	ACI 318: 5.11-5.13		X (a)	
VERIFICATION OF IN-SITU CONCRETE PRIOR TO REMOVAL OF FORMS AND SHORES FROM ELEVATED BEAMS AND STRUCTURAL SLABS	"TABLE 1705.3"	ACI 318: 6.2		X (a)	
VERIFICATION OF FORMWORK	"TABLE 1705.3"	ACI 318: 6.1.1		X (a)	SPECIAL INSPECTIONS APPLY TO SHAPE, LOCATION AND DIMENSIONS OF THE CONCRETE MEMBER BEING FORMED

TABLE 5 REQUIRED TESTING for SPECIAL INSPECTIONS					
SYSTEM or MATERIAL	TESTING				REMARKS
	IBC CODE REFERENCE	CODE or STANDARD REFERENCE	FREQUENCY		
			Continuous	Periodic	
GEOTECHNICAL					
GEOTECHNICAL ENGINEER TO PERFORM TESTING OF COMPACTED FILL MATERIALS FILL IN-PLACE DENSITY OR PREPARED SUBGRADE DENSITY	1803.0000				TESTING PER GEOTECHNICAL REPORT
	1705.6000	VARIES: CLASSIFICATION AND TESTING OF CONTROLLED FILL MATERIALS		X (a)	BY THE GEOTECHNICAL ENGINEER
MATERIAL VERIFICATION				X (a)	BY THE GEOTECHNICAL ENGINEER
CONCRETE					
AT THE TIME FRESH CONCRETE IS SAMPLED TO FABRICATE SPECIMENS FOR STRENGTH TESTS, PERFORM SLUMP AND AIR CONTENT TESTS, AND DETERMINE THE TEMPERATURE OF THE CONCRETE	"TABLE 1705.3"	"ASTM C 172 ASTM C 31 ACI 318: 5.6, 5.8"	X		"FABRICATE SPECIMENS AT TIME FRESH CONCRETE IS PLACED ONCE EACH DAY FOR A GIVEN CLASS OF CONCRETE, OR NO LESS THAN ONCE FOR EACH 150 YDS OF CONCRETE, OR NO LESS THAN ONCE FOR EACH 5,000 FT2 OF SURFACE AREA FOR SLABS/WALLS. ONCE EACH SHIFT FROM IN-PLACE WORK OR FROM TEST PANEL AND MINIMUM ONE SPECIMEN FOR EACH 50 CUBIC YARDS. ""PRECONSTRUCTION TESTS AS REQUIRED PER THE BUILDING OFFICIAL.""
CONCRETE STRENGTH	"TABLE 1705.3"	ASTM C39	X		
CONCRETE SLUMP	"TABLE 1705.3"	ASTM C143	X		
CONCRETE AIR CONTENT		ASTM C231	X		
CONCRETE TEMPERATURE		ASTM C1064	X		



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GLOBAL STABILITY

STAN ROBERTS

NENANA AVENUE
CANNON BEACH, OREGON

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LINE IS 2 INCHES
AT FULL SCALE
(IF NOT 2" - SCALE ACCORDINGLY)

DRAWN BY: BCH
CHECKED BY: EFW

MCE PROJECT NO: 200209

ISSUE DATE: 10.14.20

DESCRIPTION					
DATE					
REV.					

SHEET CONTENT
STRUCTURAL NOTES

SHEET
S0.04

THESE DRAWINGS HAVE BEEN DIGITALLY SIGNED IN ACCORDANCE WITH OREGON ADMINISTRATIVE RULE 820-025-0010. A DIGITAL SIGNATURE WATERMARK ON PAGE S0.01 INDICATES THIS SHEET IS PART OF AN ELECTRONICALLY SIGNED DOCUMENT.

FOOTING SCHEDULE						
MARK	PLAN SIZE	THICKNESS	BOTTOM REINFORCING	TOP REINFORCING	SHEAR TIES	NOTES
F1	NOT USED					
F2	NOT USED					
F3	NOT USED					
F4	2'-6"x CONT	2'-6"	(5) #6 LONG	(7) #6 LONG	#4 AT 6" OC UNO	
F5	2'-6"x CONT	4'-6"	(5) #6 LONG	(7) #6 LONG	#4 AT 6" OC UNO	

- GENERAL NOTES
- [XXX.X] INDICATES TOP OF FOOTING ELEVATION
 - S-S INDICATES FOOTING STEP PER 2/S5.01

KEYNOTES	
1	NOT USED
2	NOT USED
3	NOT USED
4	EXTEND GRADE BEAM TO WITHIN 1'-0" OF NORTH AND SOUTH PROPERTY LINE PER 1/S5.01



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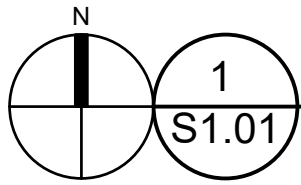
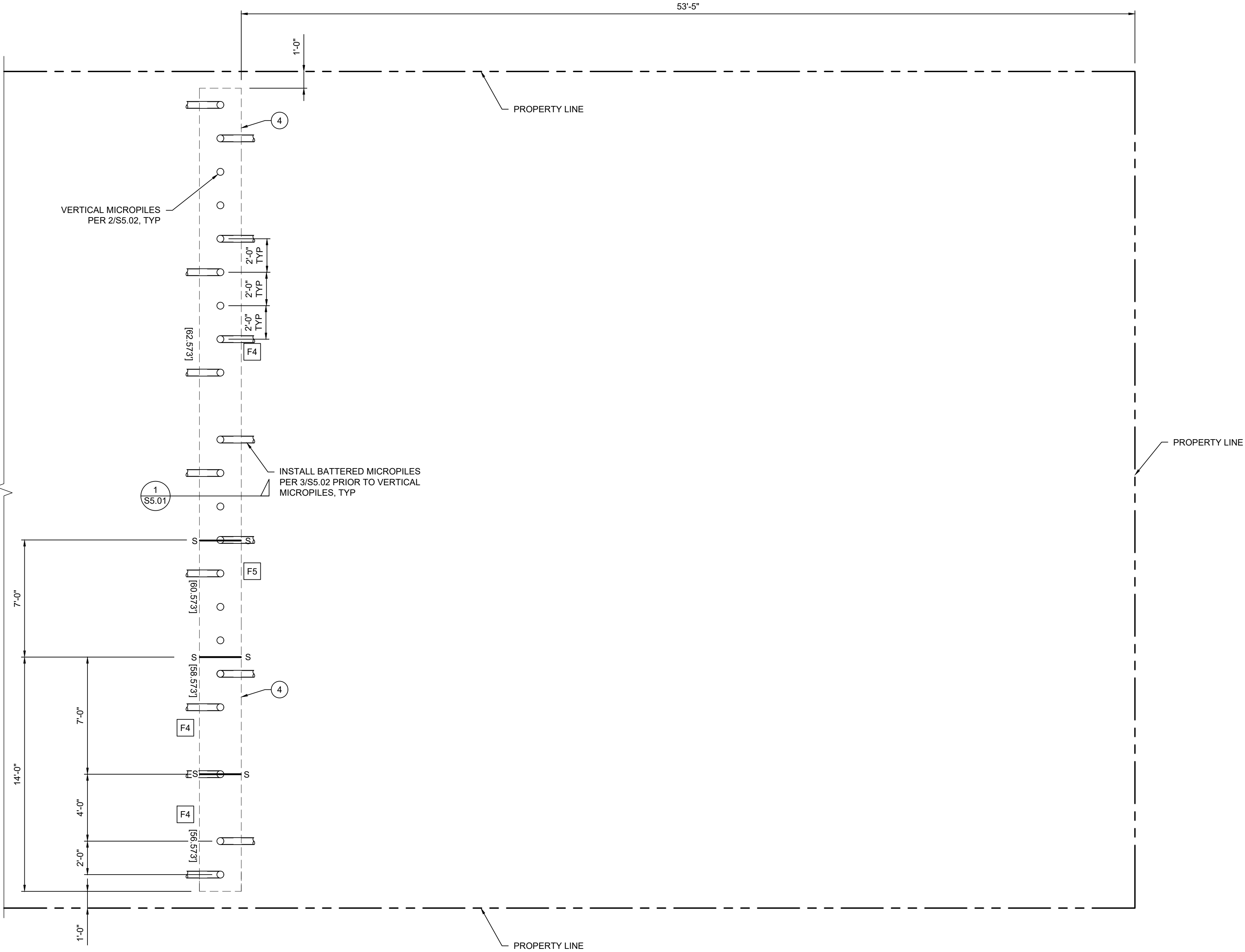
MCE PROJECT NO: 200209

ISSUE DATE: 10.14.20

REV.	DATE	DESCRIPTION

SHEET CONTENT
FOUNDATION PLAN

SHEET
S1.01



FOUNDATION / SITE PLAN

1/4" = 1'-0"



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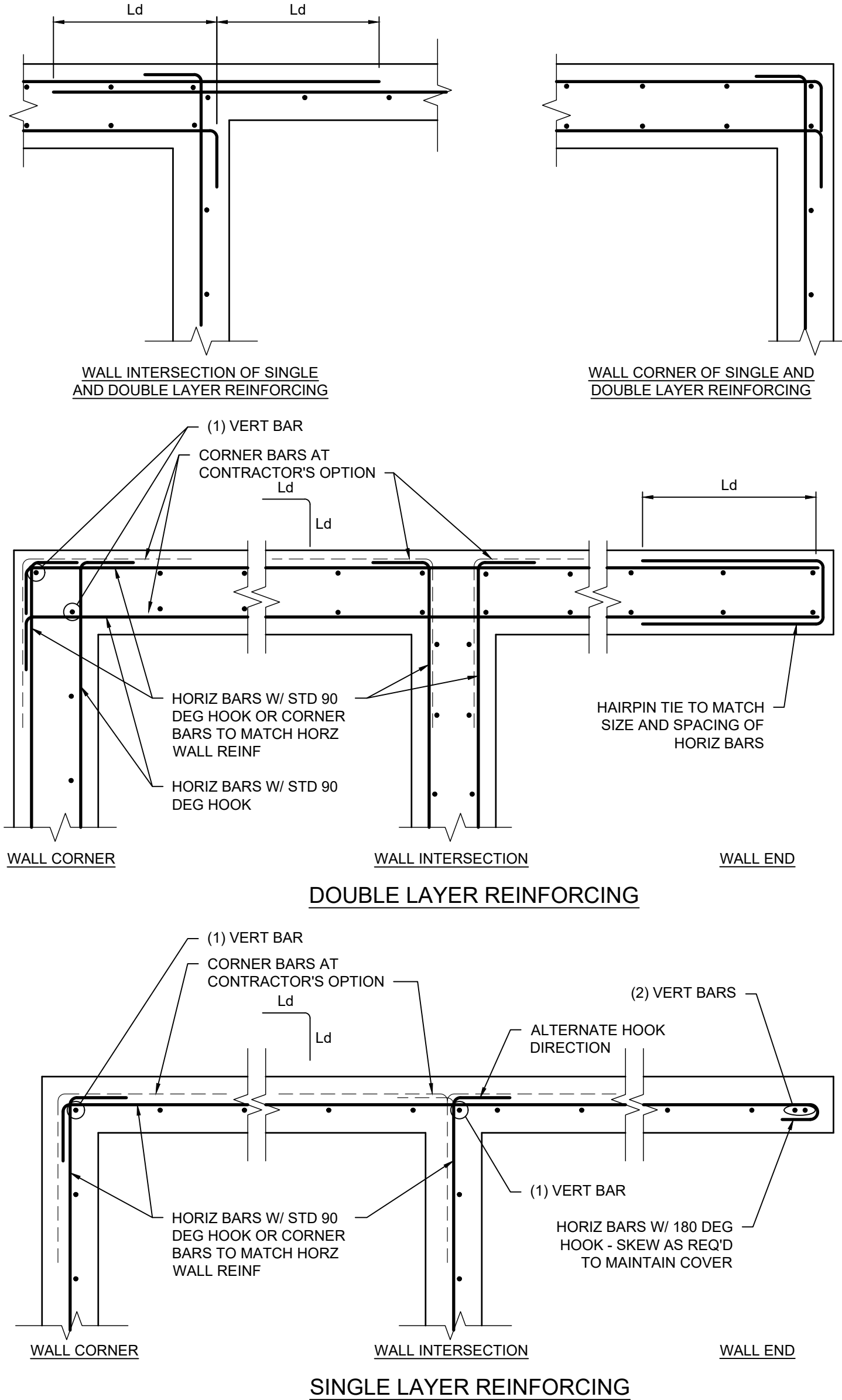
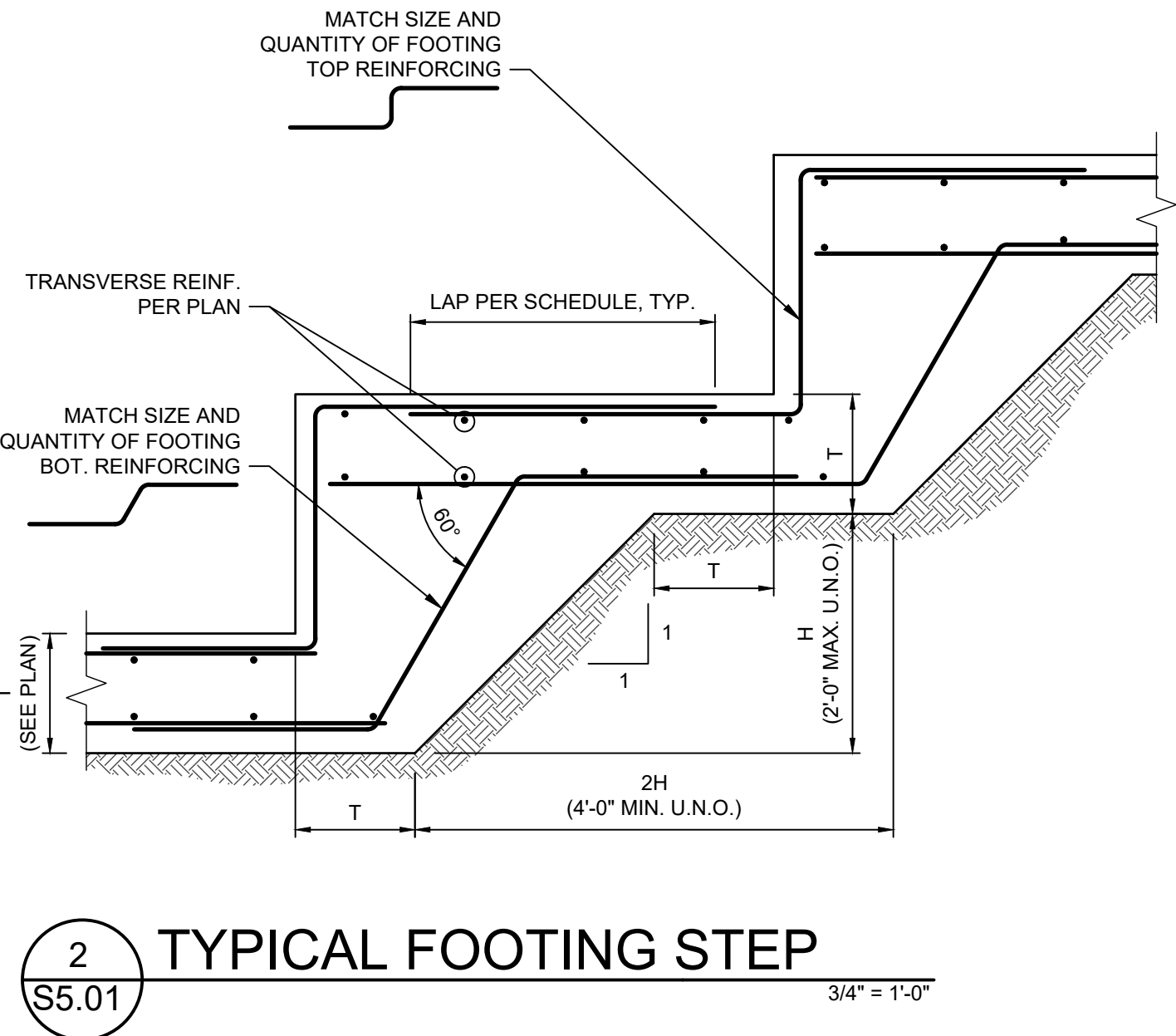
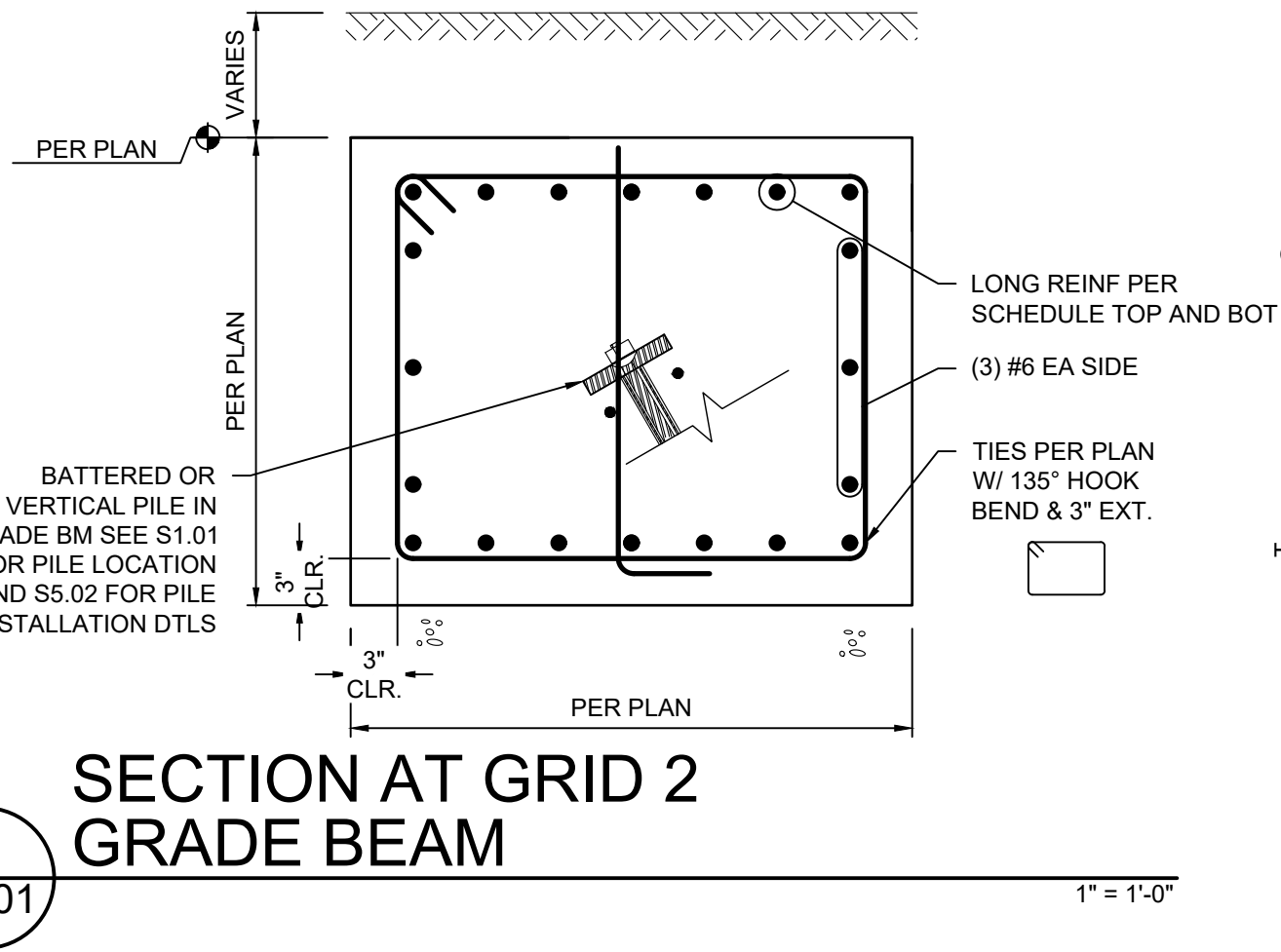
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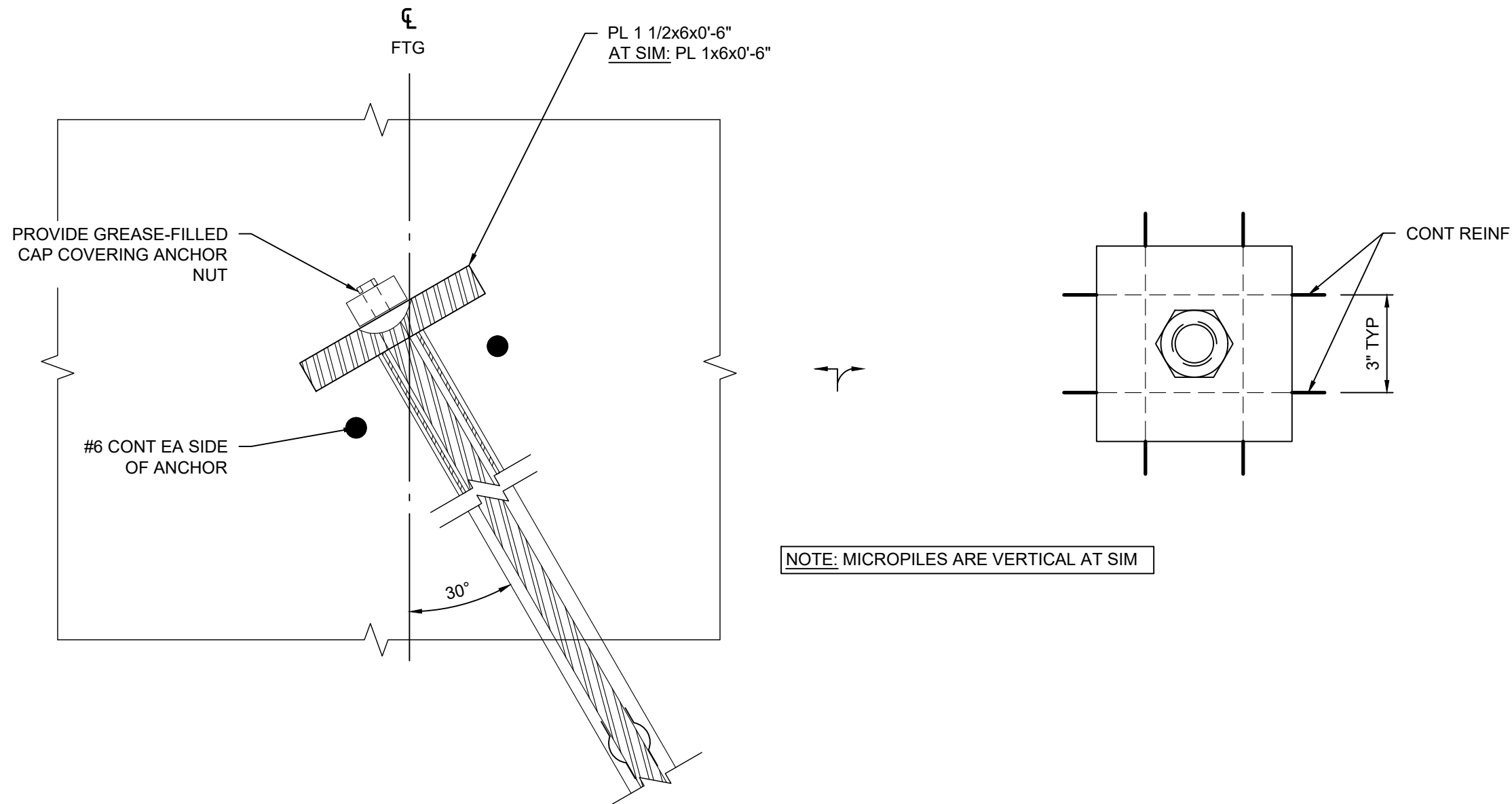
ISSUE DATE: 10.14.20

REV.	DATE	DESCRIPTION

SHEET CONTENT
CONCRETE DETAILS

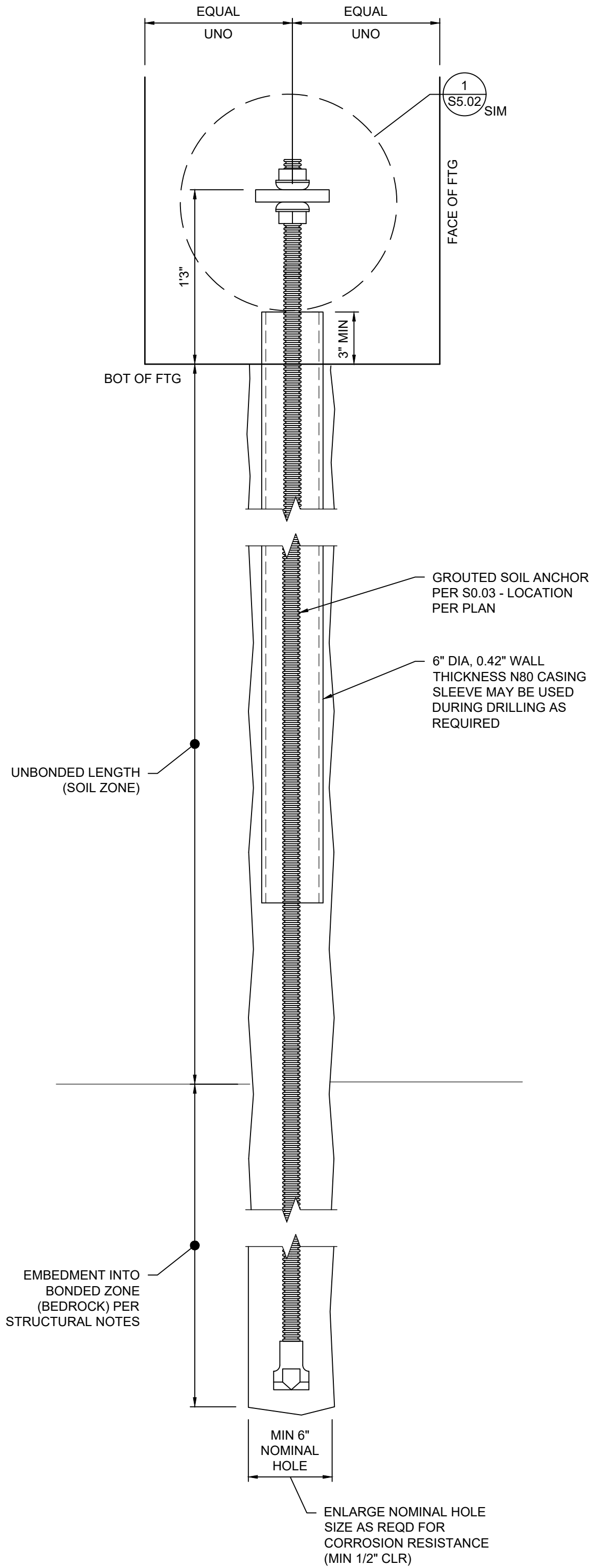
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S5.01





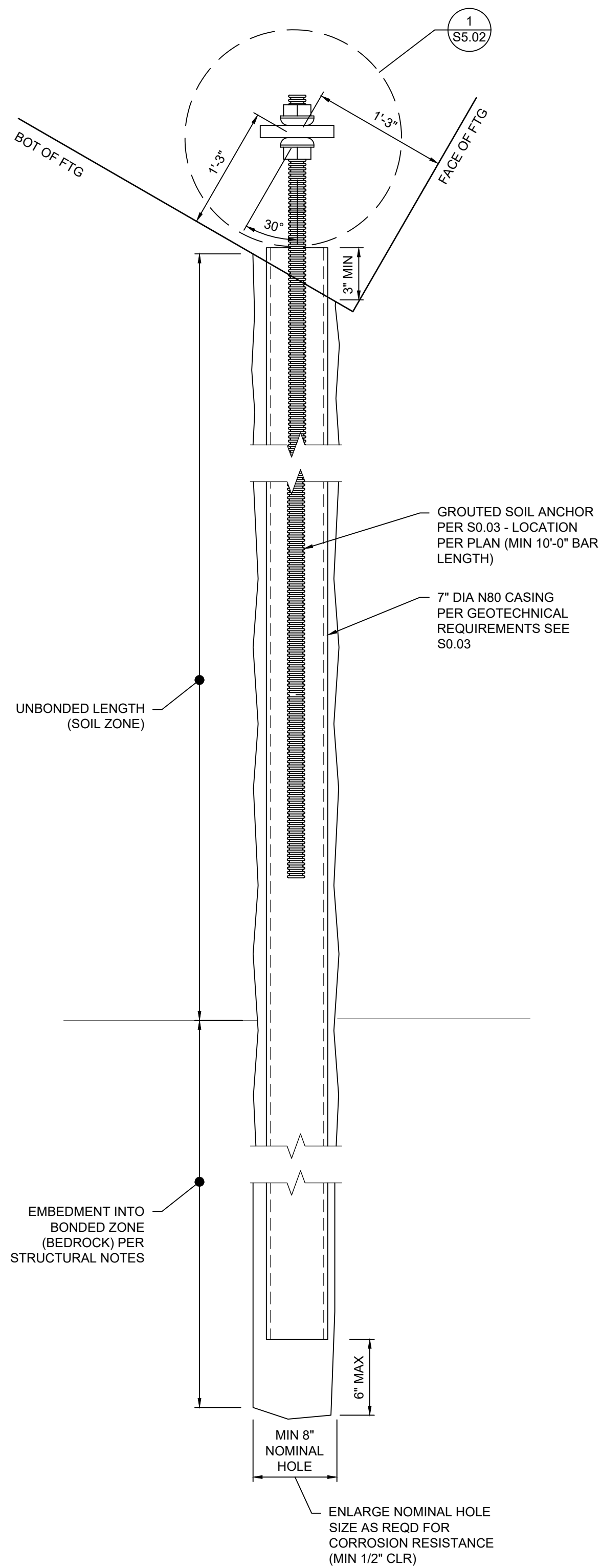
1
S5.02 MICROPILE AT GRADE BEAM

3" = 1'-0"



2
S5.02 VERTICAL MICROPILE

1 1/2" = 1'-0"



3
S5.02 BATTERED MICROPILE GLOBAL STABILITY

1 1/2" = 1'-0"



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REV.	DATE	DESCRIPTION

SHEET CONTENT
CONCRETE DETAILS

SHEET
S5.02



STRUCTURAL CALCULATIONS

**Global Stability Grade Beam
2150 S Hemlock Street, Cannon Beach, Oregon**

**October 14, 2020
Project No. 200209**

1 pages

Principal Checked:



***** LIMITATIONS *****

Miller Consulting Engineers, Inc. was retained in a limited capacity for this project. This design is based upon information provided by the client, who is solely responsible for accuracy of same. No responsibility and or liability is assumed by or is to be assigned to the engineer for items beyond that shown on these sheets.

Scope of Work:

The following calculations are for the connection of the of the stability piles to the stability grade beam. Stability loads have been provided in the geotechnical report by Geotech Solutions Inc.

Check Punching Shear in Concrete:**WESTERN STABILITY PILE**

Depth to Failure Surface, d=	15	in	
d/2=	7.5	in	=15/2
b1=	6	in	Bearing plate width
b1=	6	in	Bearing plate length
W=	21	in	=6+7.5*2
L=	18	in	
β =	1.17		=21/18 L/W
b ₀ =	78	in	=21*2+18*2 perimeter of critical section for 2-way shear in slab
λ =	1		normal weight concrete
f' _c =	5000	psi	
α s=	20		Conservatively assumes corner column
V _c =	448.31	k	=(2+4/1.17)*(1*(5000 psi ^{0.5})*78 in*15 in)/1000
V _c =	324.56	k	=(2+20*7.5 in/78 in)*(1*(5000 psi ^{0.5})*78 in*15 in)/1000
V _c =	330.93	k	=4*1*5000 psi ^{0.5} *78 in*15 in/1000
Controlling V _c =	324.56	k	
ϕ =	0.75		
ϕ V _c =	243.42	k	=0.75*324.56 k
Applied Tension, T=	217.60	k	=1.6*136
Capacity=	0.89	<1.0 OK	=217.6/243.42

Use anchor embedded 15 in deep into footing with f'_c= 5000 psi

Check Base Plate Based on LRFD Loads:

Material: A36 Steel

F _y =	36	ksi	
LRFD Applied Bearing, w =	36.270	k/in	=217.6 k/(6 in)
Moment arm, a1 =	2.29	in	=(6 in-1.42 in)/2
Load Factor =	1		
Moment, M =	95.102	k-in	=36.27 k*2.29 in*1
Plate thickness =	1 1/2	in	
effective width, b =	6.00	in	width of plate
Z =	3.375	in ³	=6 in*(1.5 in) ² /4
ϕ M _n =	109.35	k-in	=36 ksi*3.375 in ³ *0.9
	95.102	< 109.35	OK

Use PL 1.5" x 6" wide

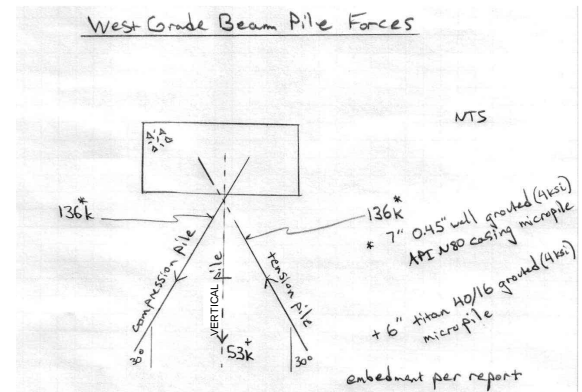
Check development of casing:

-try developing the casing over 10' with the shaft:

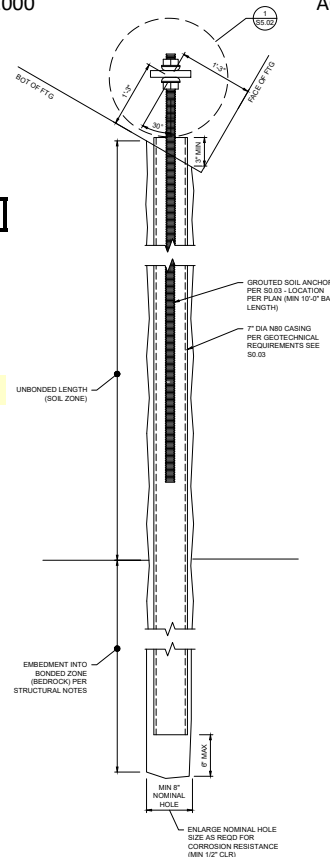
Area of splice: $\pi \times 6" \times 10' \times 12" = 2261 \text{ in}^2$

Bond capacity: 200 psi x 2261 = 452 kips

FOS of splice: 452 / 218 = 2.1 <OK>



Loading Per Geotech Report



BATTERED MICROPILE
GLOBAL STABILITY

3
S5.02

1 1/2" x 1 1/2"



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Project Name **Global Stability Grade Beam** Project # **200209**
 Location **2150 S HEMLOCK ST CANNON BEACH, OREGON**
 Client **STAN ROBERTS**

By **EWA** Ck'd **ERW** Date **10-14-2020** Page **1** of **1**