

DESIGN SPECIFICATIONS

THIS STRUCTURE CONFORMS TO THE "LRFD BRIDGE DESIGN SPECIFICATIONS" ADOPTED BY THE AMERICAN ASSOCIATION OF STATE HIGHWAY AND TRANSPORTATION OFFICIALS, 9TH EDITION - 2020 AND THE ODOT BRIDGE DESIGN MANUAL, 2020.

DESIGN DATA

CONCRETE CLASS QC1 WITH QC/QA: COMPRESSIVE STRENGTH 4.0 KSI (CIP WALL FACING, DRILLED SHAFTS)
EPOXY COATED STEEL REINFORCEMENT: MINIMUM YIELD STRENGTH 60 KSI (CIP WALL FACING)
STRUCTURAL STEEL: ASTM A709 GRADE 50 - YIELD STRENGTH 50 KSI STEEL
PILES: CMS 711.01 AND ASTM A572 - YIELD STRENGTH 50 KSI
WELDED STUD SHEAR CONNECTORS: CMS 513.22 AND ASTM A108 - ULTIMATE TENSILE STRENGTH 65 KSI

ITEM 530 SPECIAL- RETAINING WALL, TIMBER LAGGING

THIS WORK CONSISTS OF FURNISHING AND PLACING TIMBER LAGGING BETWEEN THE SOLDIER PILES AS TEMPORARY SUPPORT FOR THE RETAINED SOIL. FURNISH TIMBER LAGGING CONSISTING OF CONSTRUCTION GRADE, UNTREATED HARDWOOD WITH A MINIMUM THICKNESS OF 3 INCHES FOR THE 6 FOOT PILE SPACING AND 6 INCHES FOR THE 10 FOOT PILE SPACING. TO PERMIT DRAINAGE, PROVIDE ¼ TO ½-INCH SPACES BETWEEN LAGGING BOARDS USING ¾-INCH THICK SPACER BLOCKS OR OTHER MEANS ACCEPTABLE TO THE ENGINEER. PLACE THE LAGGING BOARDS BETWEEN THE FLANGES OF THE SOLDIER PILES AND BEARING AGAINST THE FLANGES ON THE EXPOSED SIDE OF THE WALL SO THAT THE SOLDIER PILE FLANGE OVERLAPS THE END OF THE LAGGING BY AT LEAST 2 INCHES AT BOTH ENDS OF THE LAGGING BOARDS. PERFORM EXCAVATION FOR PLACEMENT OF THE LAGGING IN SUCH A MANNER THAT THE LAGGING IS TIGHT AGAINST THE EXCAVATION CUT FACE. BACKFILL ANY VOIDS BEHIND THE LAGGING WITH A SUITABLE COMPACTED GRANULAR MATERIAL CONFORMING TO C&MS 703.16.C ACCEPTABLE TO THE ENGINEER. THE COST OF ANY SUCH BACKFILLING REQUIRED, INCLUDING MATERIAL, PLACEMENT AND COMPACTION, IS INCIDENTAL TO THE COST OF LAGGING.

THE DEPARTMENT WILL PAY FOR TIMBER LAGGING AT THE CONTRACT UNIT PRICE PER SQUARE FOOT FOR ITEM 530 SPECIAL- RETAINING WALL, TIMBER LAGGING.

ITEM 513, WELDED STUD SHEAR CONNECTORS, AS PER PLAN

WELD HEADED STEEL STUDS TO THE FLANGES OF THE SOLDIER PILE IN ORDER TO CONNECT THE CAST-IN-PLACE CONCRETE WALL FACING TO THE SOLDIER PILE. ATTACH HEADED STUDS ACCORDING TO C&MS 513.22 AND AS SHOWN IN THE PLANS. THE CONTRACTOR MAY ATTACH THE STUDS EITHER BEFORE PLACING THE SOLDIER PILE IN THE DRILLED HOLE OR AFTER EXCAVATING IN FRONT OF THE WALL. PROTECT THE HEADED STUDS FROM DAMAGE UNTIL THE CONCRETE WALL FACING IS POURED. REPAIR OR REPLACE DAMAGED HEADED STUDS AT NO EXPENSE TO THE DEPARTMENT.

ITEM 512, SEALING OF CONCRETE SURFACES (NON-EPOXY)

ALL EXPOSED NEW CONCRETE SURFACES OF THE RETAINING WALL SHALL BE SEALED WITH A CLEAR NON-EPOXY SEALER.

ITEM 866 - RETAINING WALL, MISC.: TIEBACKS

THIS WORK CONSISTS OF FURNISHING, INSTALLING AND TESTING PERMANENT TIEBACKS FOR THE SOLDIER PILE RETAINING WALL SYSTEM, WHICH ARE TO BE CONSTRUCTED IN ACCORDANCE WITH SUPPLEMENTAL SPECIFICATION 866 "GROUND ANCHORS" AND IN REASONABLE CLOSE CONFORMITY WITH THE LINES, GRADES, DESIGN, AND DIMENSIONS SHOWN ON THE PLANS.

PROVIDE PERMANENT CASING CONFORMING TO ASTM A 53 AT THE ANCHOR HEAD. API GRADE N-80 CASING WITH FLUSH JOINT THREADED CONNECTION TO ASTM A 53 PIPE MAY BE USED FOR THE REMAINDER OF THE CASING.

PROVIDE ANCHOR TENDONS CONSISTING OF 7-WIRE UNCOATED STRANDS CONFORMING TO ASTM A 416 9(INCLUDING S1) WITH LOW-RELAXATION WIRE CONFORMING TO ASTM A 421, GRADE 270.

PROVIDE PERFORMANCE, PROOF, AND CREEP TESTING OF ANCHORS AND INDICATE TESTING REQUIREMENTS AND RESULTS IN ACCORDANCE WITH SUPPLEMENTAL SPECIFICATION 866 THE SPECIAL PROVISIONS. FOR ANCHORS THAT FAIL TEST REQUIREMENTS, REPLACE ANCHORS OR MODIFY THE STRUCTURE TO MEET ALL DESIGN CODES AND REQUIREMENTS IN ACCORDANCE WITH SUPPLEMENTAL SPECIFICATION 866.

ENSURE INTIMATE CONTACT BETWEEN EXCAVATION FACE AND THE BACK FACE OF TIMBER LAGGING PRIOR TO STRESSING ANCHOR.

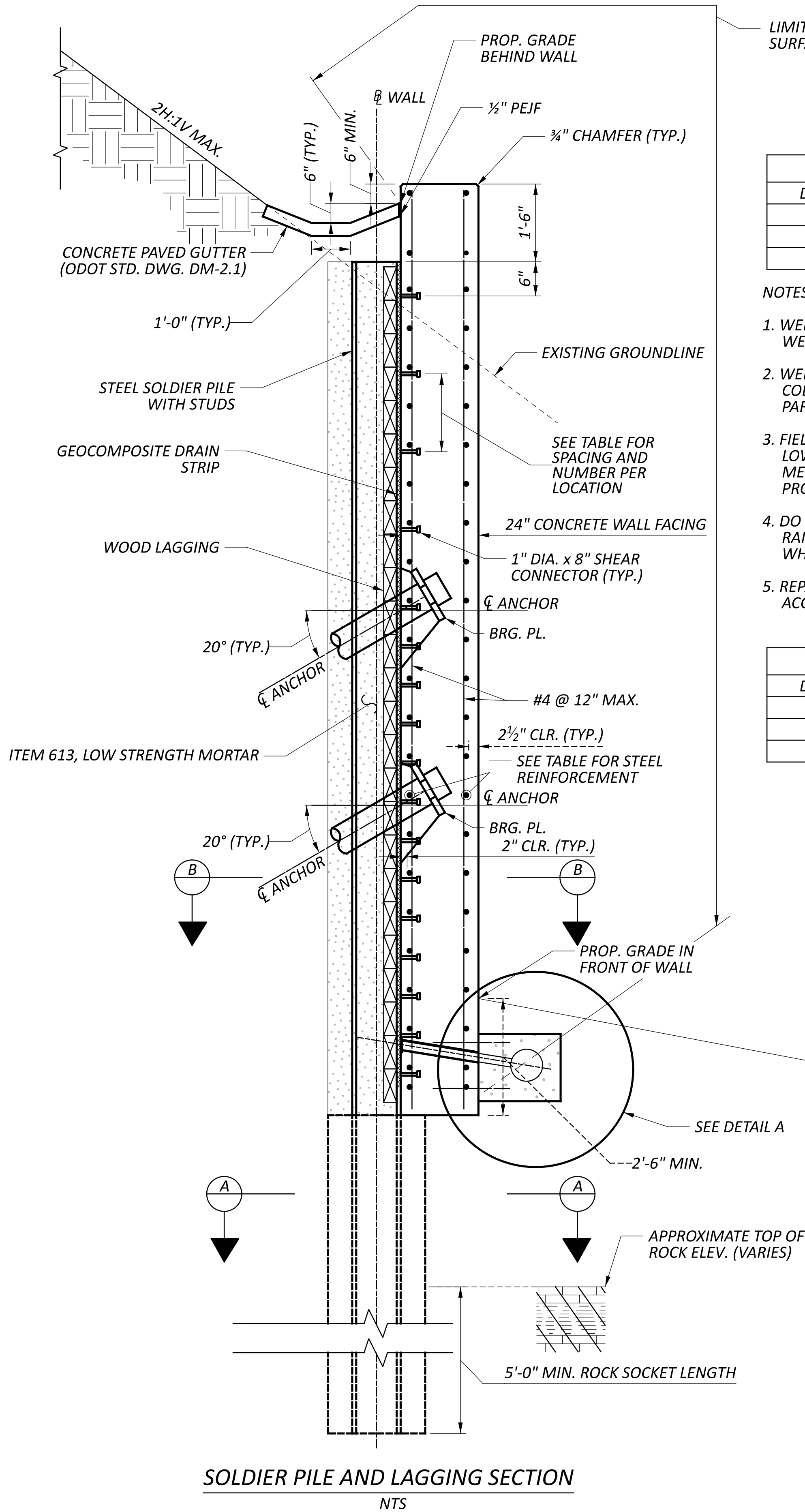
GRIND AND FINISH ANCHOR OPENINGS TO A SMOOTH CONDITION.

TIEBACKS WILL BE MEASURED PER EACH TIEBACK AUTHORIZED AND ACCEPTED. THIS ITEM WILL BE PAID FOR AT THE CONTRACT PRICE PER EACH AND INCLUDES ALL LABOR, EQUIPMENT, MATERIALS AND INCENDINTALS NECESSARY TO COMPLETE THIS WORK.

PILE NUMBER	ELEVATION						
	TPE	RFGE	FFGE	PTE	EST. ROCK	ANCHOR 1	ANCHOR 2
1	851.46	850.96	850.22	811.86	816.86	---	---
2	851.46	850.96	848.86	811.28	816.69	---	---
3	851.46	850.96	845.86	810.69	815.69	---	---
4	851.46	850.96	842.86	810.11	815.11	---	---
5	851.46	850.96	839.86	809.52	814.52	840.96	---
6	851.46	850.96	836.86	808.94	813.94	840.96	---
7	851.46	850.96	833.86	808.35	813.35	840.96	---
8	851.46	850.96	830.86	807.76	812.76	840.96	---
9	851.46	850.96	827.86	807.17	812.17	840.96	830.96
10	851.46	850.96	823.16	806.19	811.19	840.96	830.96
11	851.46	850.96	821.37	805.60	810.60	840.96	830.96
12	851.46	850.96	823.84	805.01	810.01	840.96	830.96
13	851.46	850.96	826.84	804.42	809.42	840.96	830.96
14	851.46	850.96	829.82	803.83	808.83	840.96	---
15	851.46	850.96	832.79	803.24	808.24	840.96	---
16	851.46	850.96	835.75	802.65	807.65	840.96	---
17	851.46	850.96	838.72	802.06	807.06	840.96	---
18	851.46	850.96	841.09	801.47	806.47	---	---
19	851.46	850.96	843.39	800.88	805.88	---	---
20	851.46	850.96	845.70	800.29	805.29	---	---
21	851.46	850.96	848.01	799.70	804.70	---	---
22	851.46	850.43	849.10	799.11	804.11	---	---
ELEVATIONS ARE SUBJECT TO CHANGE UPON FINAL WALL CONFIGURATION AND GRADING AS DEVELOPED BY ODOT.							

NOTES:
TPE - TOP OF PILE ELEVATION
RFGE - REAR FACE GRADE ELEVATION
FFGE - FRONT FACE GRADE ELEVATION

PTE - PILE TIP ELEVATION
EST. ROCK - APPROXIMATE TOP OF ROCK



SOLDIER PILE AND LAGGING SECTION

NTS

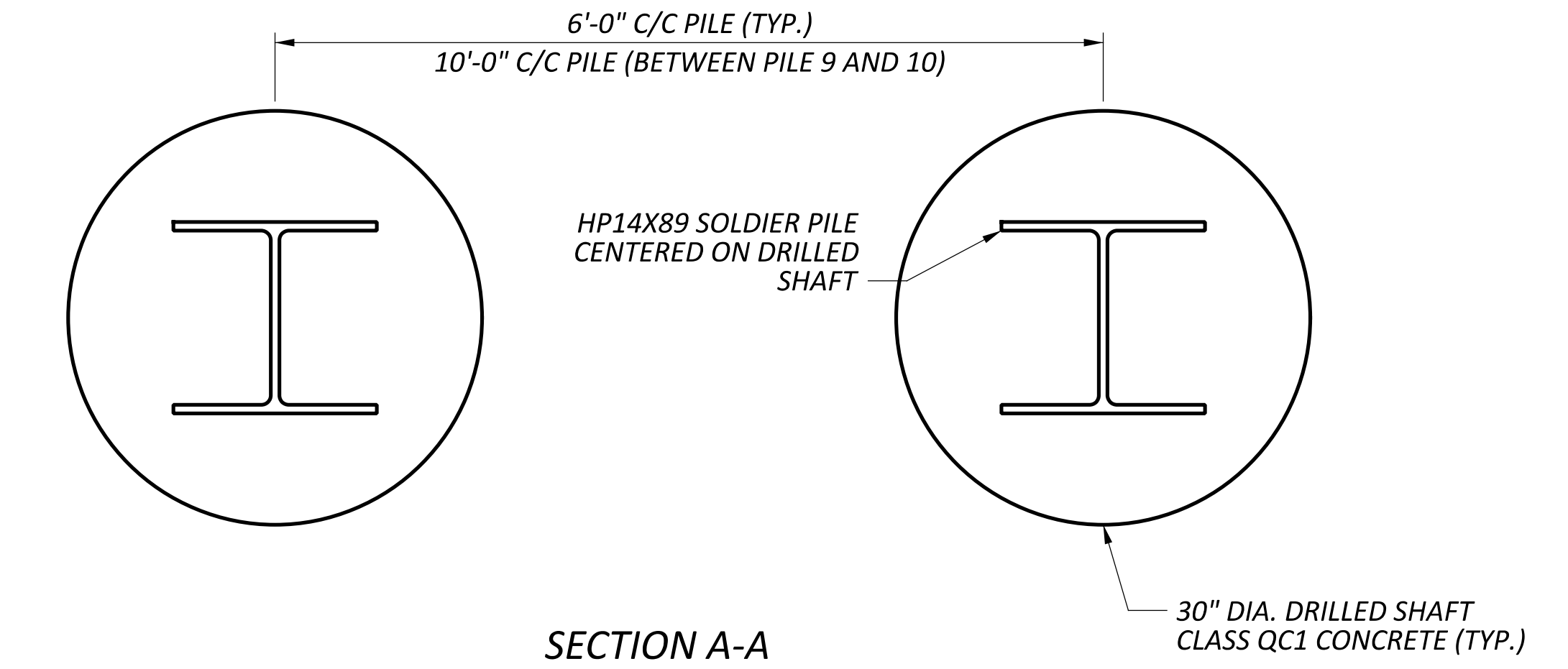
LIMITS OF SEALING OF CONCRETE SURFACES (EPOXY-URETHANE)

WELDED STUD SHEAR CONNECTOR SPACINGS		
DEPTH FROM TOP OF PILE	NUMBER PER ROW	C/C SPACING
0' - 10'	3	12"
10' - 20'	3	8"
20' - 30'+	3	4"

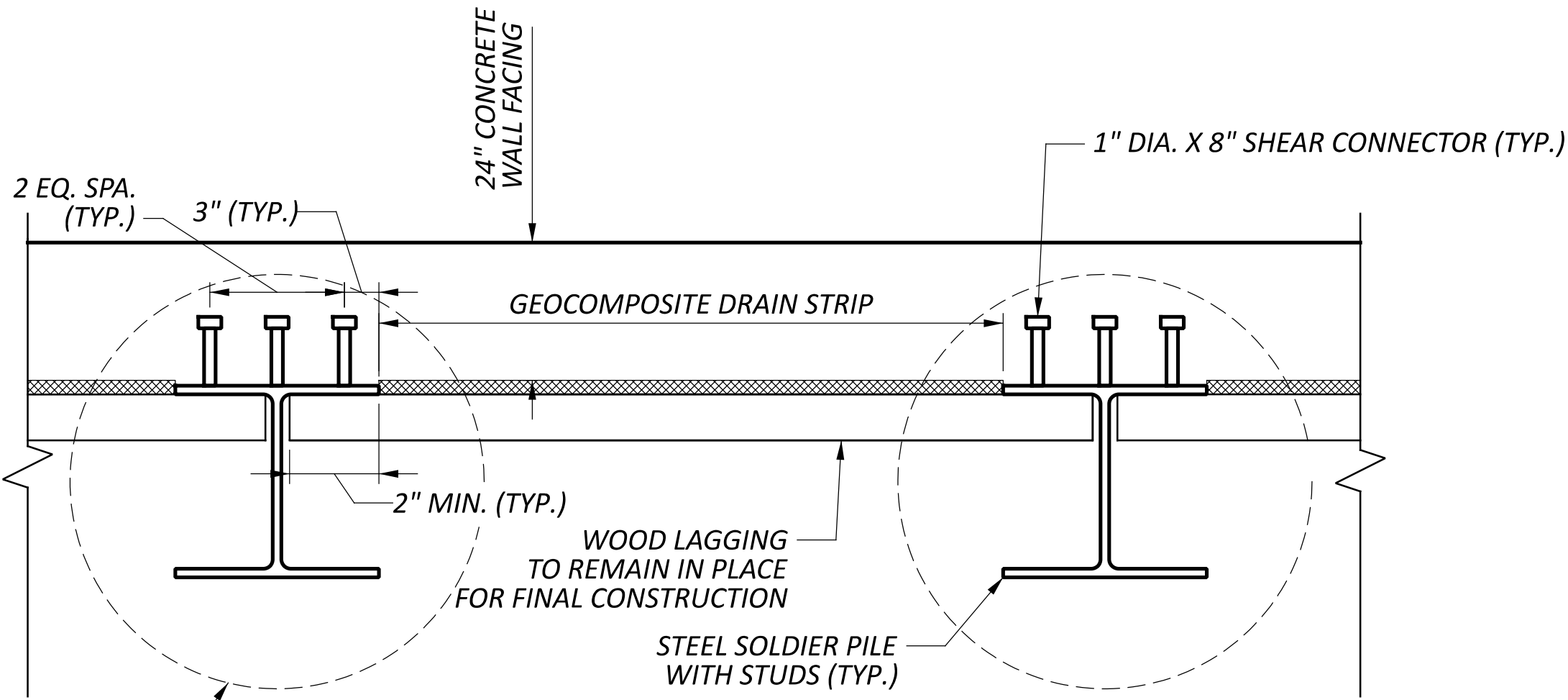
NOTES:

- WELD SHEAR STUDS IN ACCORDANCE WITH AASHTO/AWS D1.5 BRIDGE WELDING CODE SECTIONS 7.5.5 AND 7.6.
- WELDING SPECIFICATIONS: ANSI/AASHTO/AWS/D1.5 BRIDGE WELDING CODE. USE QUALIFIED WELDERS IN ACCORDANCE WITH AWS D1.5 SECTION 5 PART B. FOLLOW D1.1 FOR TUBULAR (API OR ASTM A53) MATERIAL.
- FIELD WELDING OF STEEL: USE THE SHIELDED METAL ARC PROCESS AND LOW HYDROGEN ELECTRODES WHICH ARE COMPATIBLE WITH THE BASE METAL AS SPECIFIED, AND IN ACCORDANCE WITH AN APPROVED WELD PROCEDURE SPECIFICATION.
- DO NOT WELD WHEN SURFACES TO BE WELDED ARE MOIST OR EXPOSED TO RAIN, ARE EXPOSED TO INCLEMENT CONDITIONS THAT SNOW OR WIND, OR WHEN WELDERS WILL ADVERSELY AFFECT THE QUALITY OF THE WORK.
- REPAIR EPOXY COATED SURFACES DAMAGED DURING CONSTRUCTION IN ACCORDANCE WITH CMS 509.09.

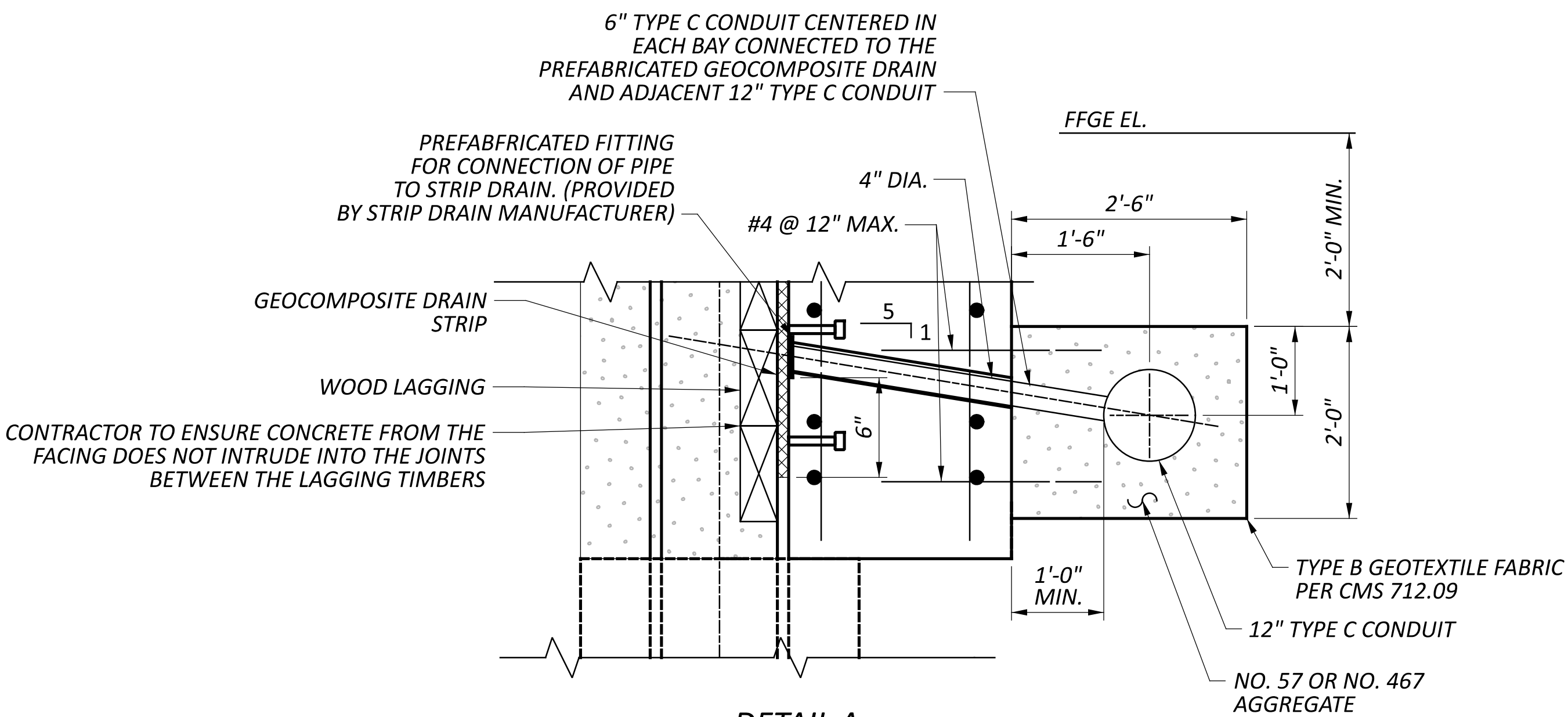
TRANSVERSE STEEL REINFORCEMENT SIZE AND SPACINGS	
DEPTH FROM TOP OF PILE	SIZE AND C/C SPACING
0' - 10'	#8 @ 12"
10' - 20'	2-#8 BAR BUNDLE @ 8"
20' - 30'+	2-#8 BAR BUNDLE @ 4"



SECTION A-A



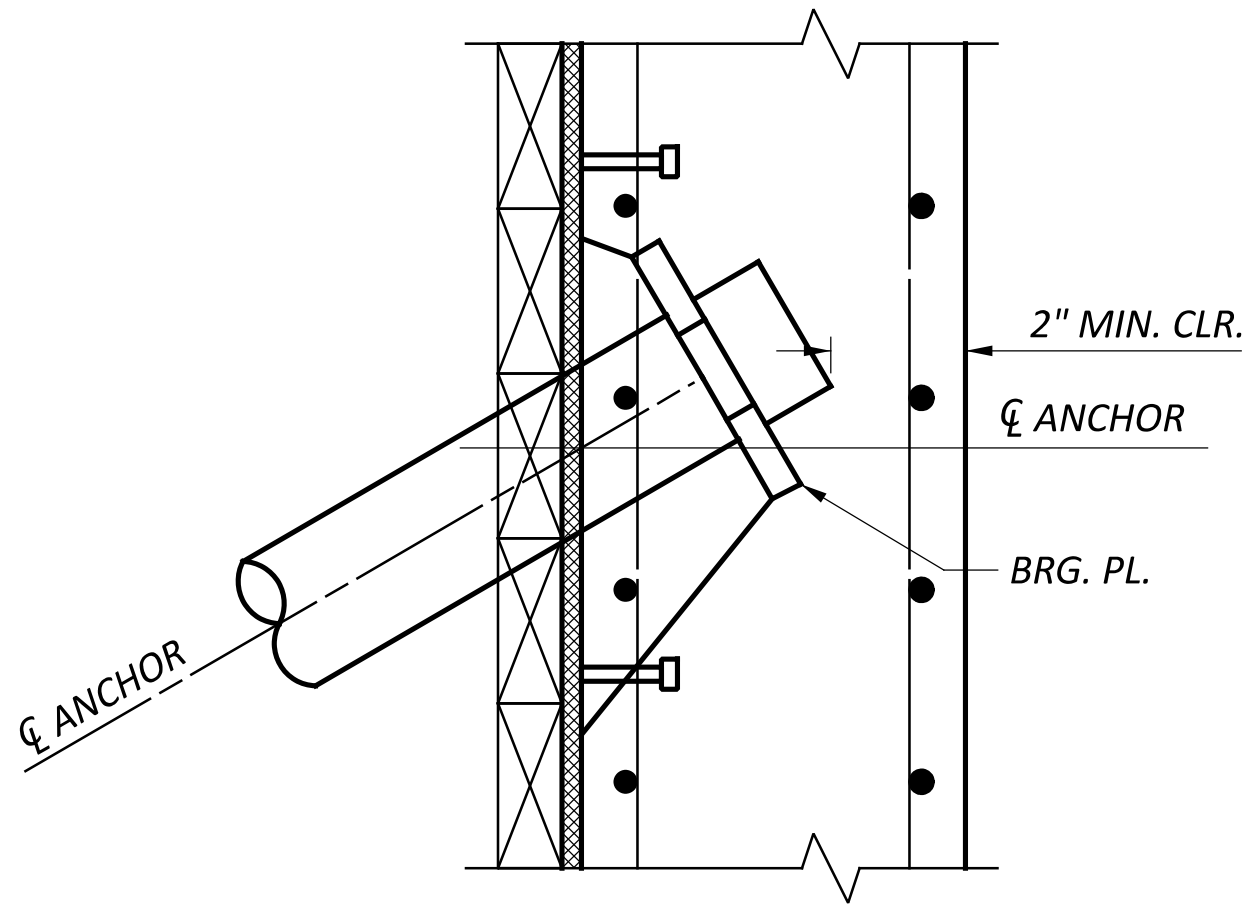
SECTION B-B



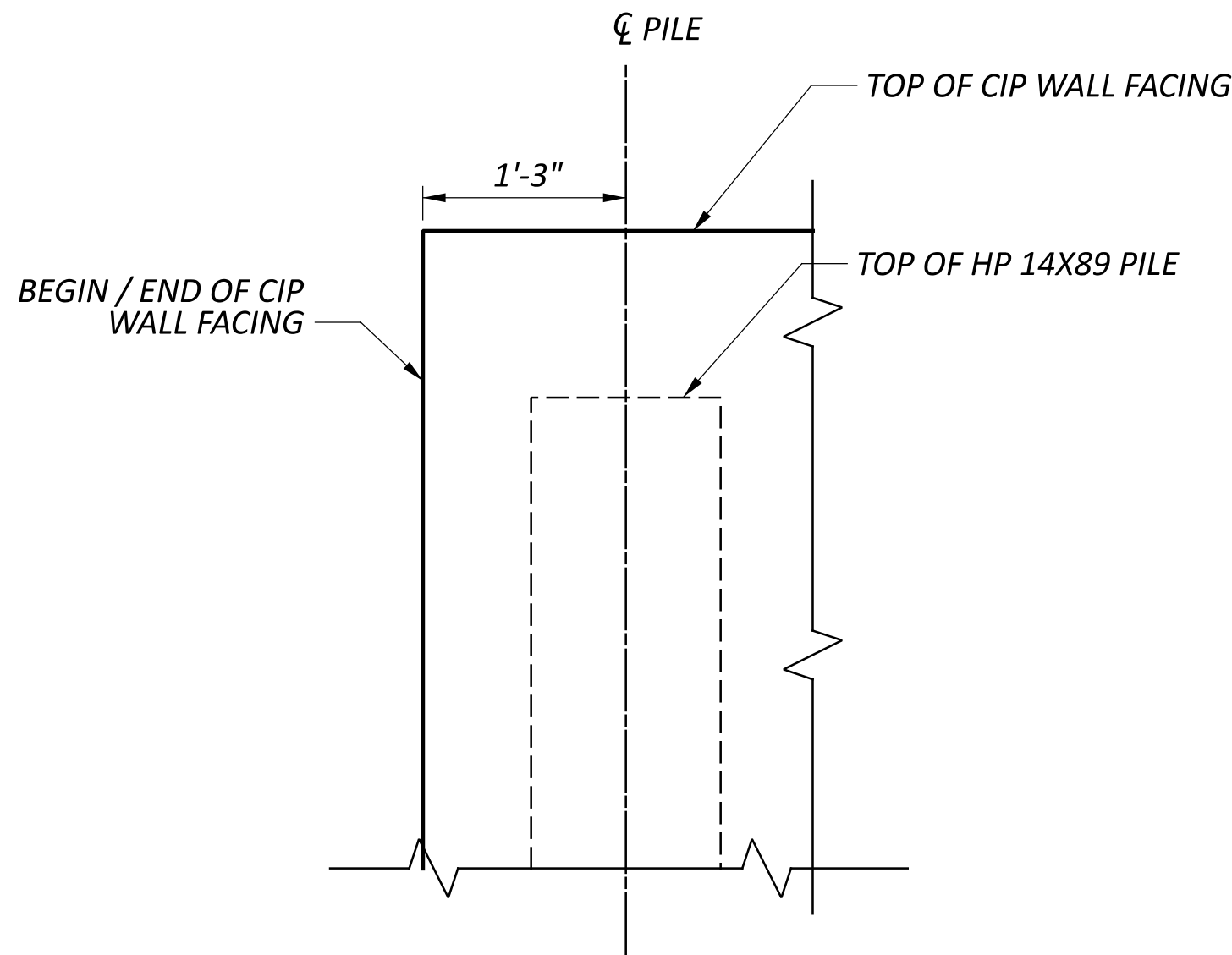
DETAIL A

NOTES:

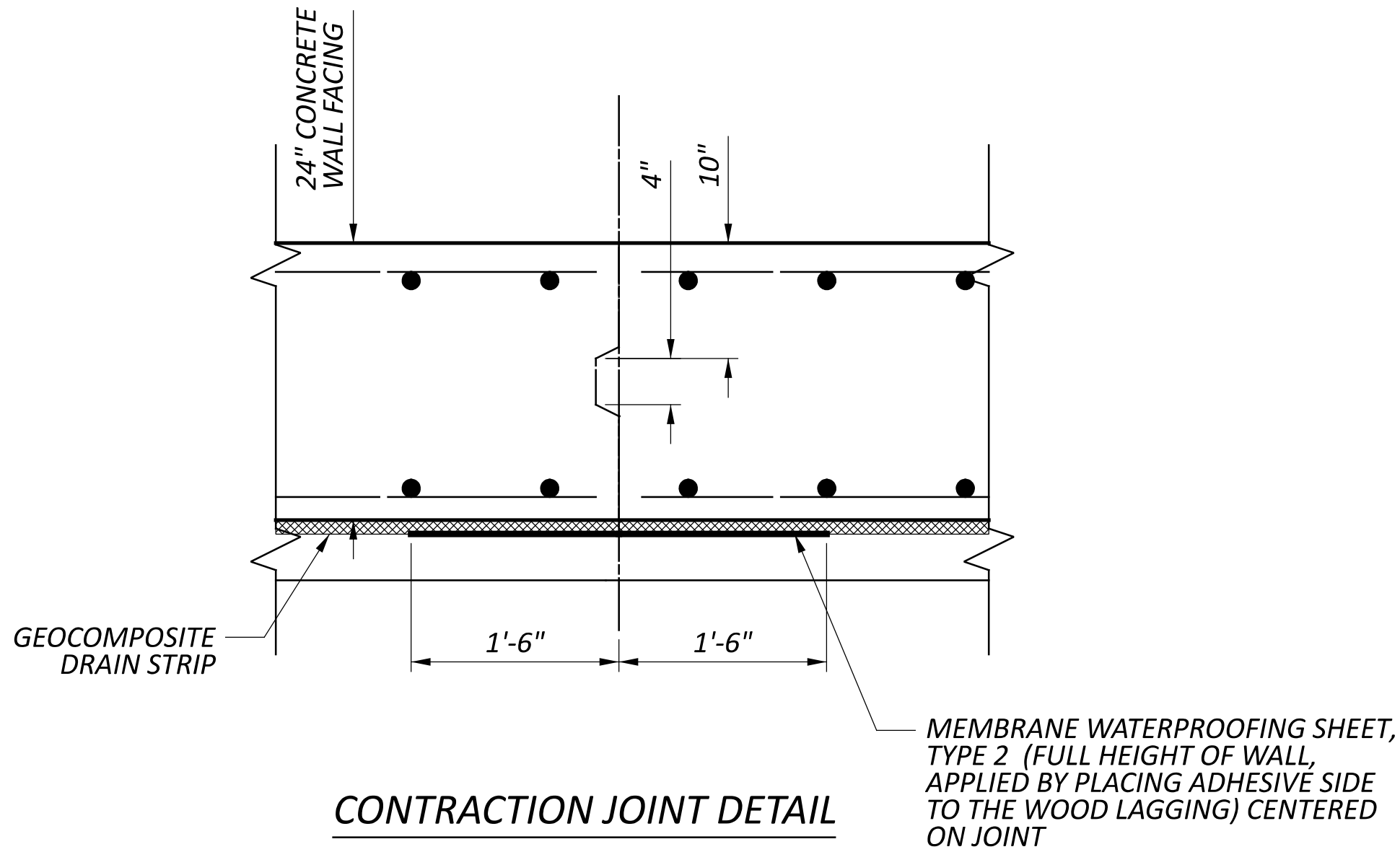
- PREFABRICATED GEOCOMPOSITE DRAIN SHALL BE IN ACCORDANCE WITH CMS 518.



WALL FACING DETAIL AT TIE BACK ANCHOR

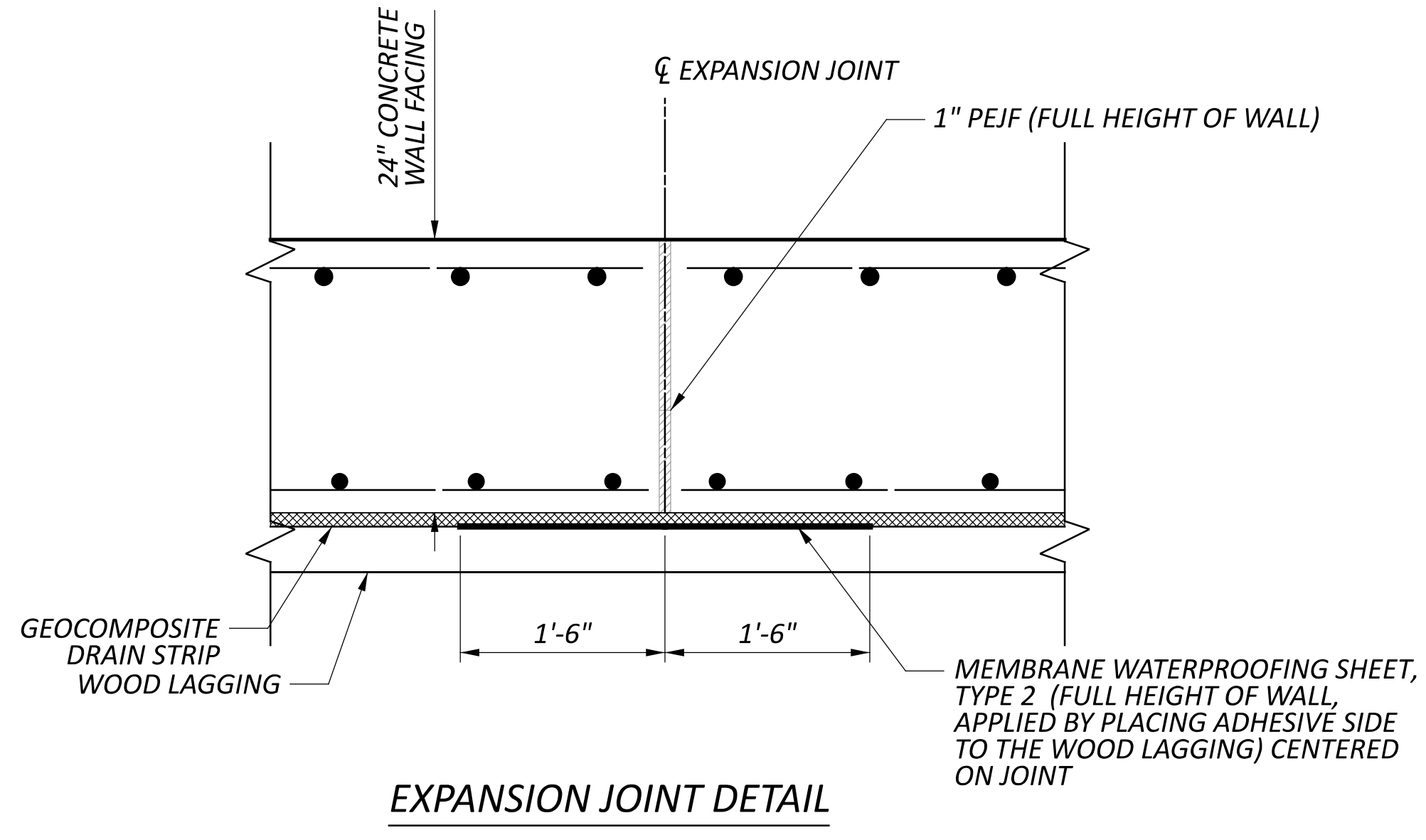


PARTIAL WALL ELEVATION



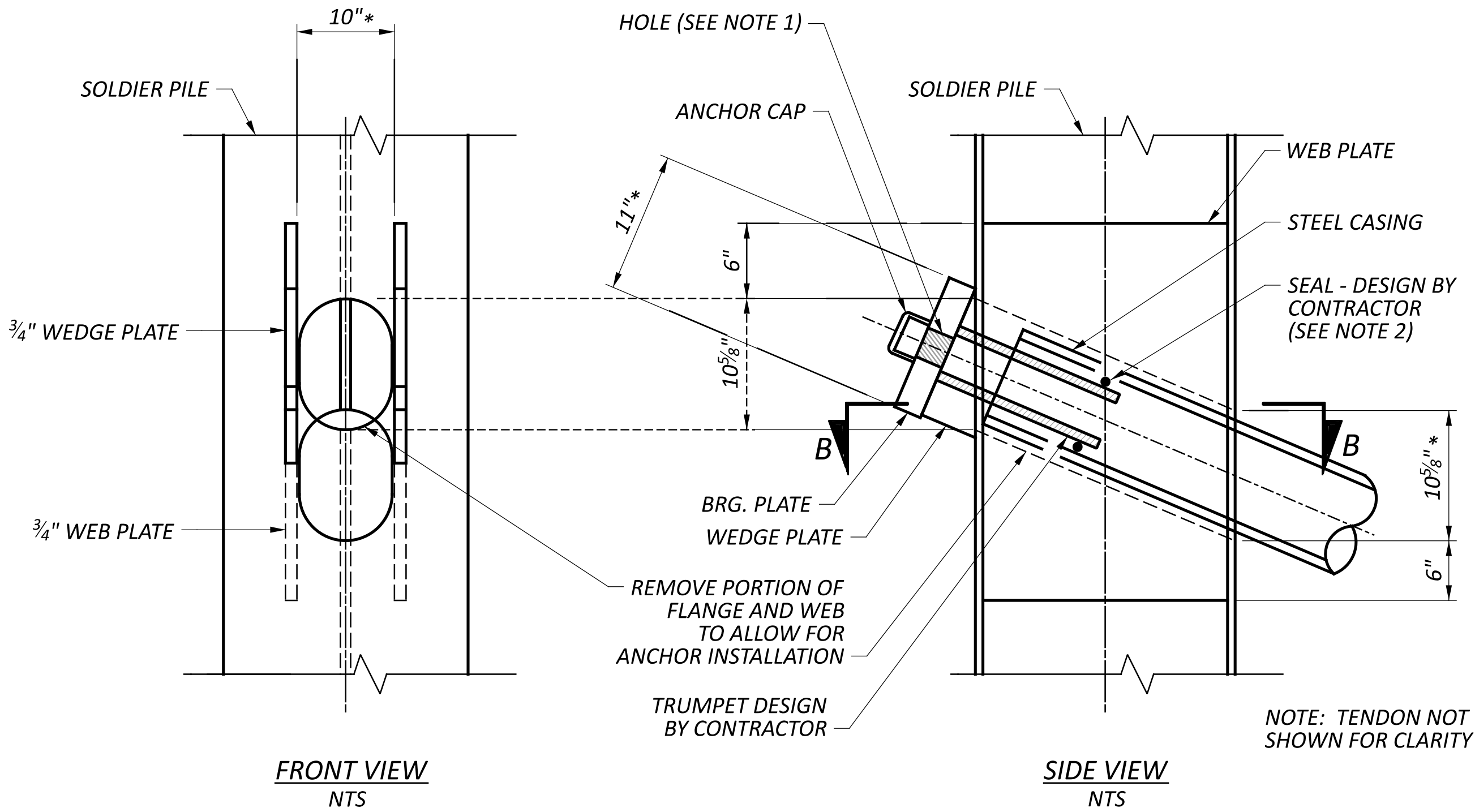
CONTRACTION JOINT DETAIL

SPACED EVERY 30' MINIMUM IN MIDSPAN OF BAY
(DO NOT PLACE IN BAY BETWEEN PILE 9 AND PILE 10)



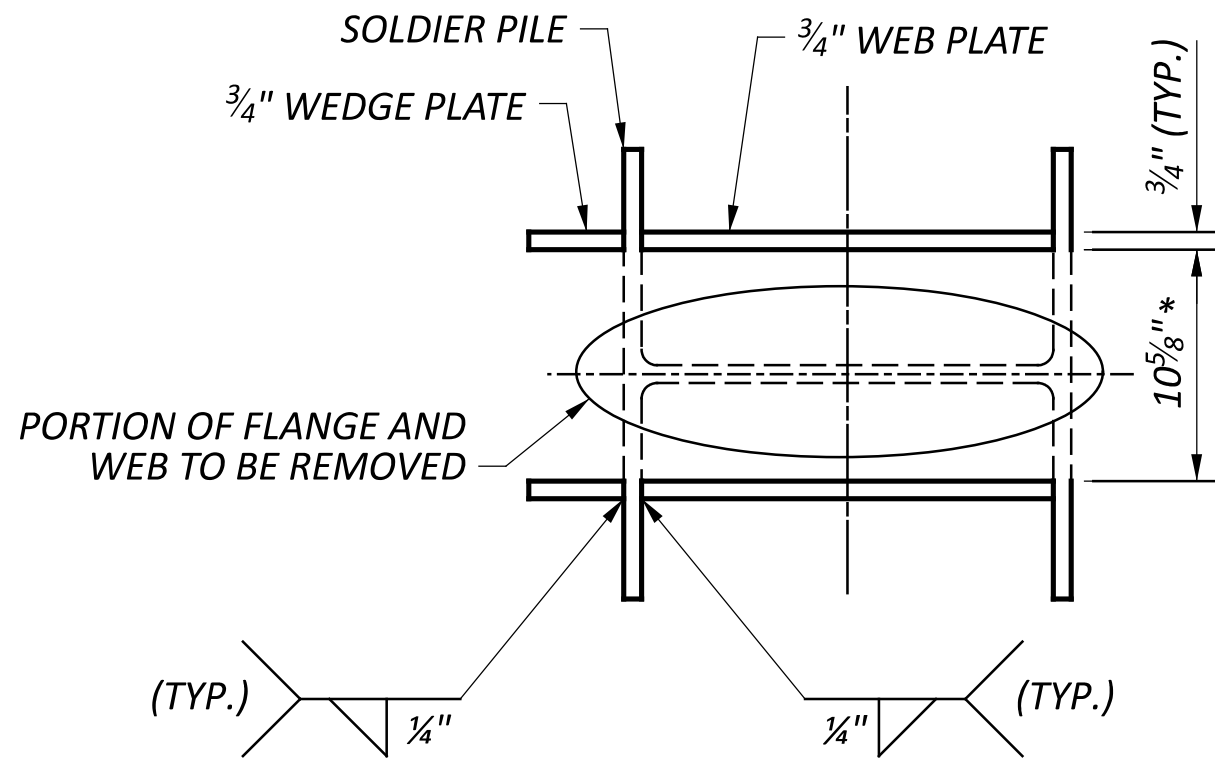
EXPANSION JOINT DETAIL

SPACED EVERY 90' MINIMUM IN MIDSPAN OF BAY
(DO NOT PLACE IN BAY BETWEEN PILE 9 AND PILE 10)



FRONT VIEW
NTS

SIDE VIEW
NTS



SECTION B-B
NTS

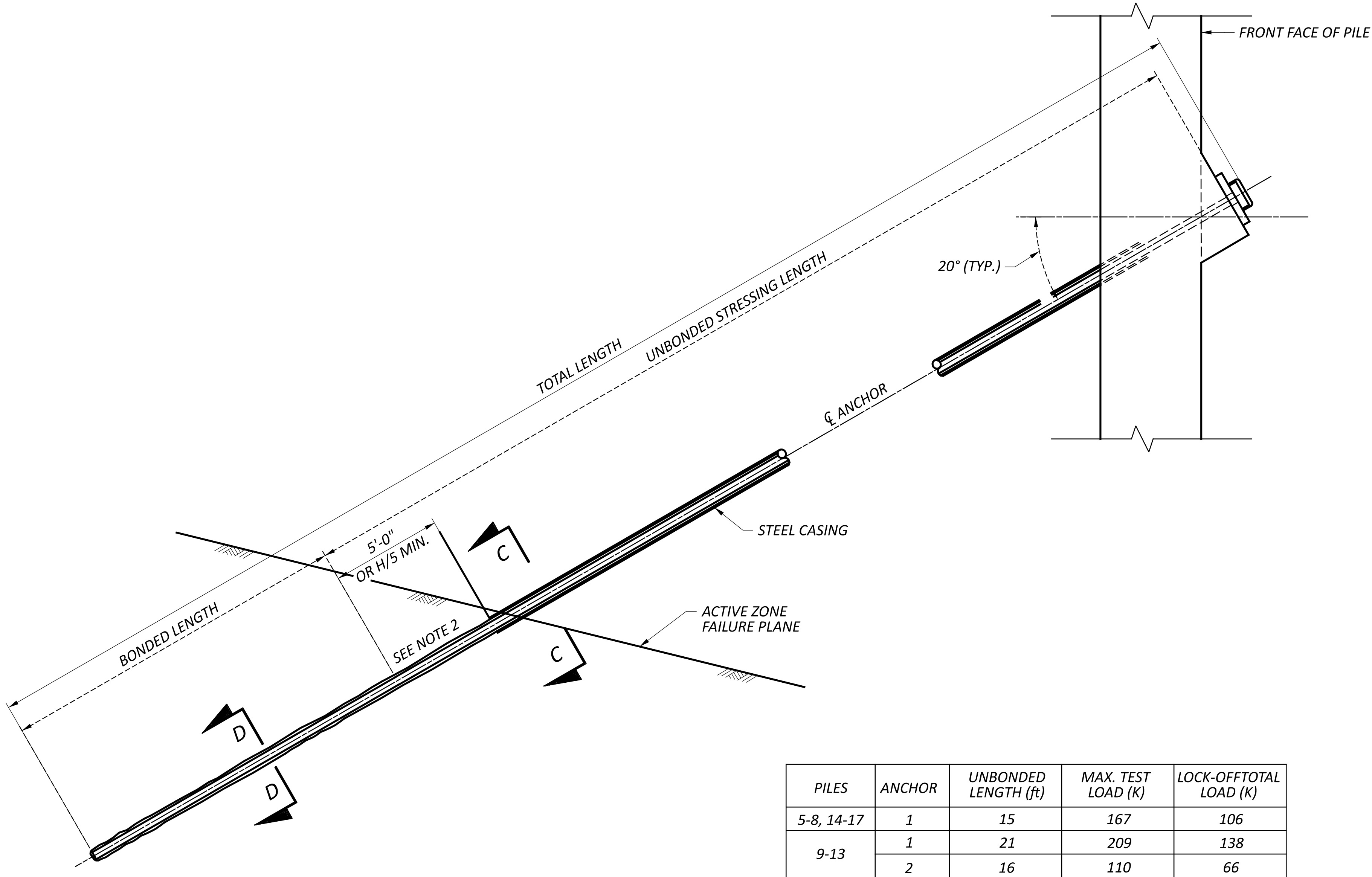
THRU-PILE CONNECTION
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NOTES:

* - SPACING AS REQUIRED BY ANCHOR TRUMPET AND STEEL CASING. 10" DIA. OPENING ASSUMED. ADJUST AS REQUIRED BY ANCHOR CAP AND TRUMPET DESIGN.

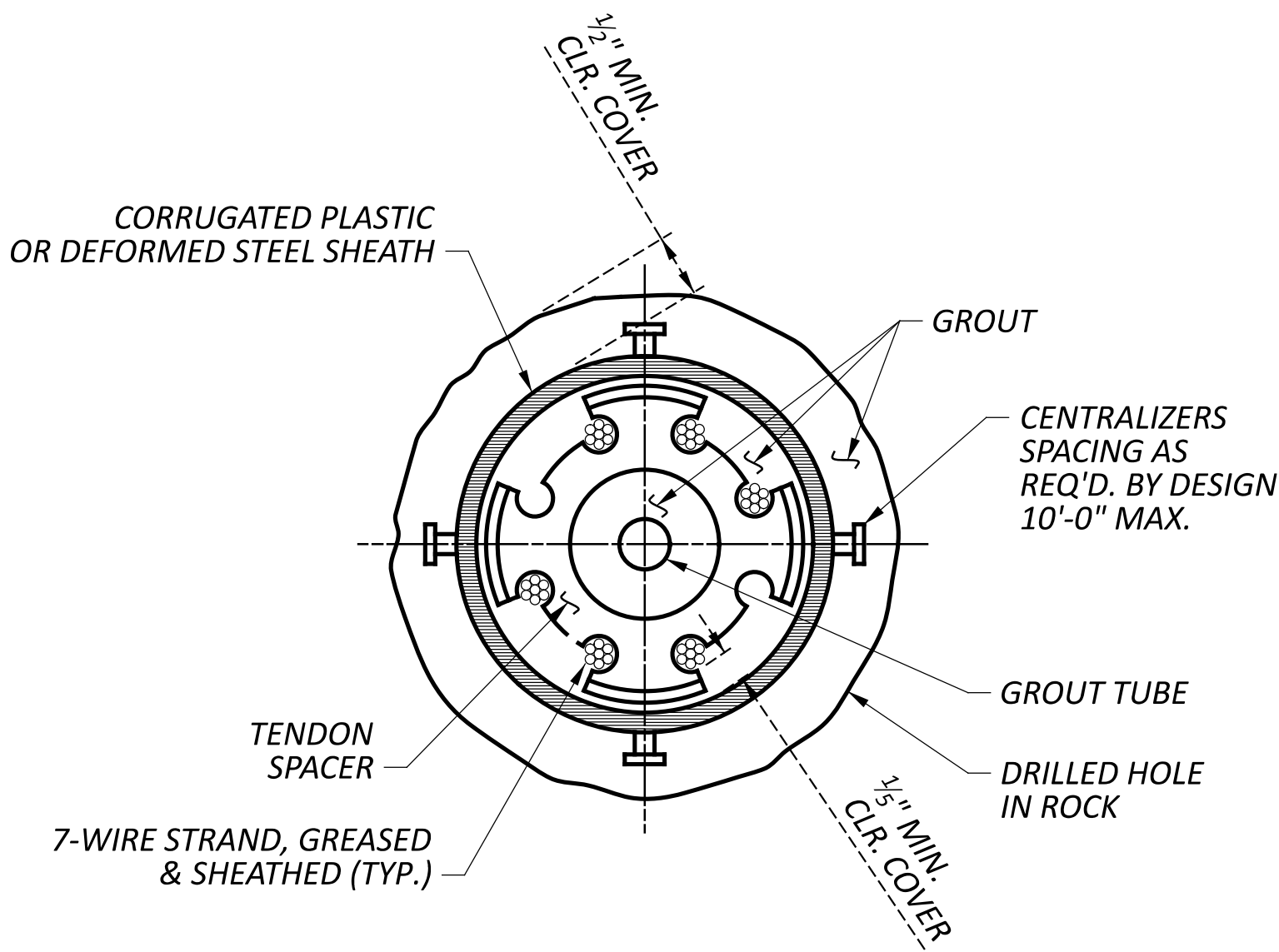
1. HOLE DIAMETER IN BEARING PLATE WILL BE DEPENDENT ON THE SELECTED ANCHORHEAD BY MANUFACTURER.

2. PROVIDE A WATERTIGHT SEAL BETWEEN TRUMPET AND STEEL CASING FOR ANCHOR DESIGNS WITH PERMANENT STEEL CASINGS. PROVIDE A WATERTIGHT SEAL BETWEEN TRUMPET AND PLASTIC SHEATH FOR ANCHOR DESIGNS WITHOUT PERMANENT STEEL CASINGS.



PILES	ANCHOR	UNBONDED LENGTH (ft)	MAX. TEST LOAD (K)	LOCK-OFF TOTAL LOAD (K)
5-8, 14-17	1	15	167	106
9-13	1	21	209	138
	2	16	110	66

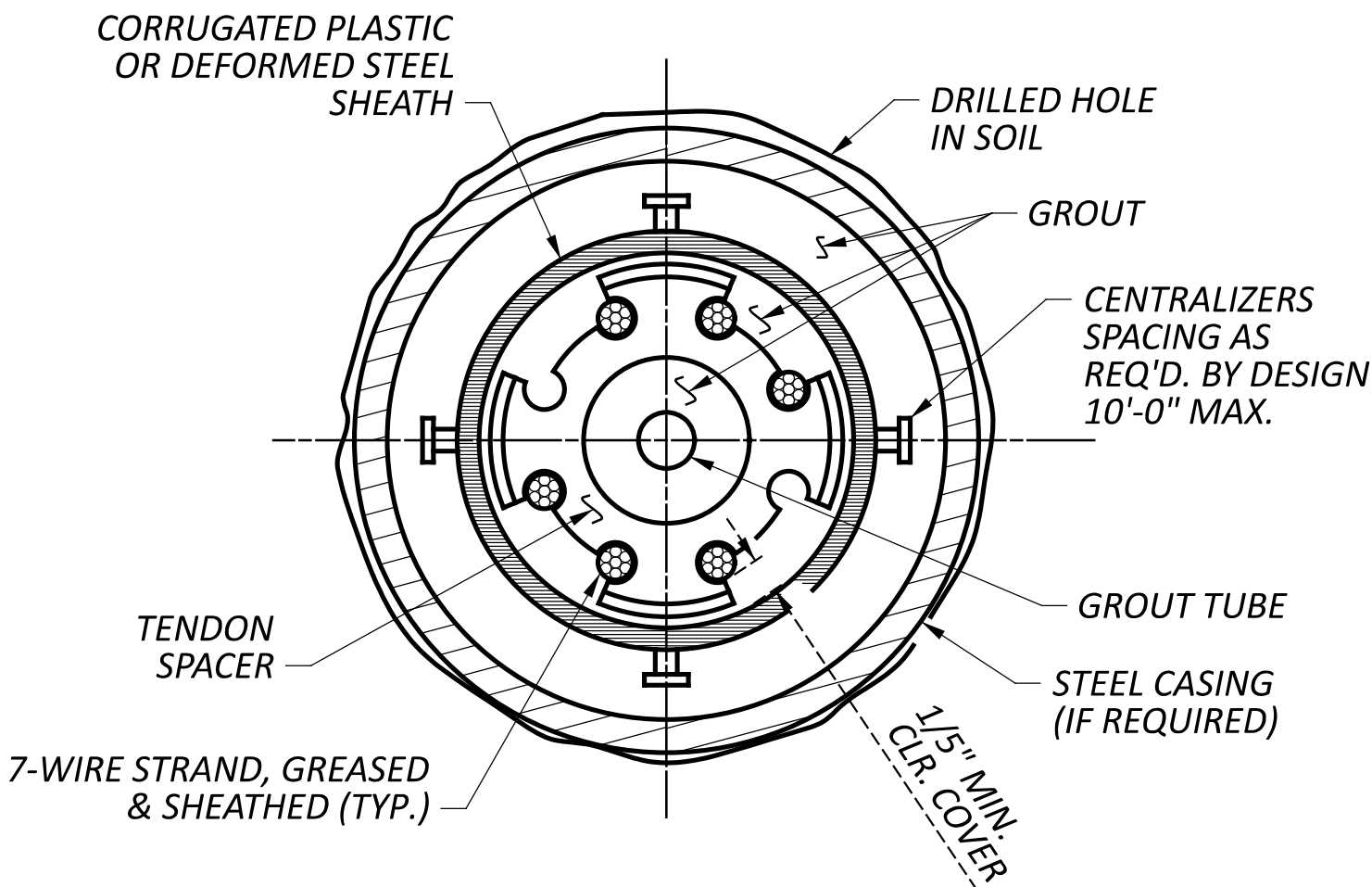
STANDARD ANCHOR



SECTION D-D

STRAND TENDON
BONDED LENGTH
NTS

- NOTES:
1. LOCATE UPPER CENTRALIZER A MAXIMUM OF 5' FROM THE TOP OF THE TENDON BOND LENGTH. LOCATE LOWER CENTRALIZER 1' FROM THE BOTTOM OF THE TENDON BOND LENGTH.
 2. H = DESIGN HEIGHT OF THE WALL.



SECTION C-C

STRAND TENDON
UNBONDED STRESSING LENGTH
WITH PERMANENT STEEL CASING
NTS