

NYC Energy Code Compliance Worksheet

Project: 45 Broad Street
New York City, NY 10004
Block 25 Lot 7, 10

Owner: Madison 45 Broad Development, LLC
105 Madison Avenue
New York, NY 10016

Floor Area: 457,000 SQ. FT.


Space Type: Commercial - B and R-2

Code Reference: ASHRAE 90.1-2010 (NYC ECC 2014)

Climate Zone: 4A

Compliance Path (ASHRAE 90.1-2010): Prescriptive Path for Below Grade Wall Requirements
Performance Path- Chapter 11 - Energy Cost Budget Method for overall building energy code compliance

Professional Statement
"To the best of my knowledge, belief and personal judgement, these plans and specifications are in compliance with the 2014 New York City Energy Conservation Code."



BELOW GRADE WALLS/SLAB REQUIREMENTS

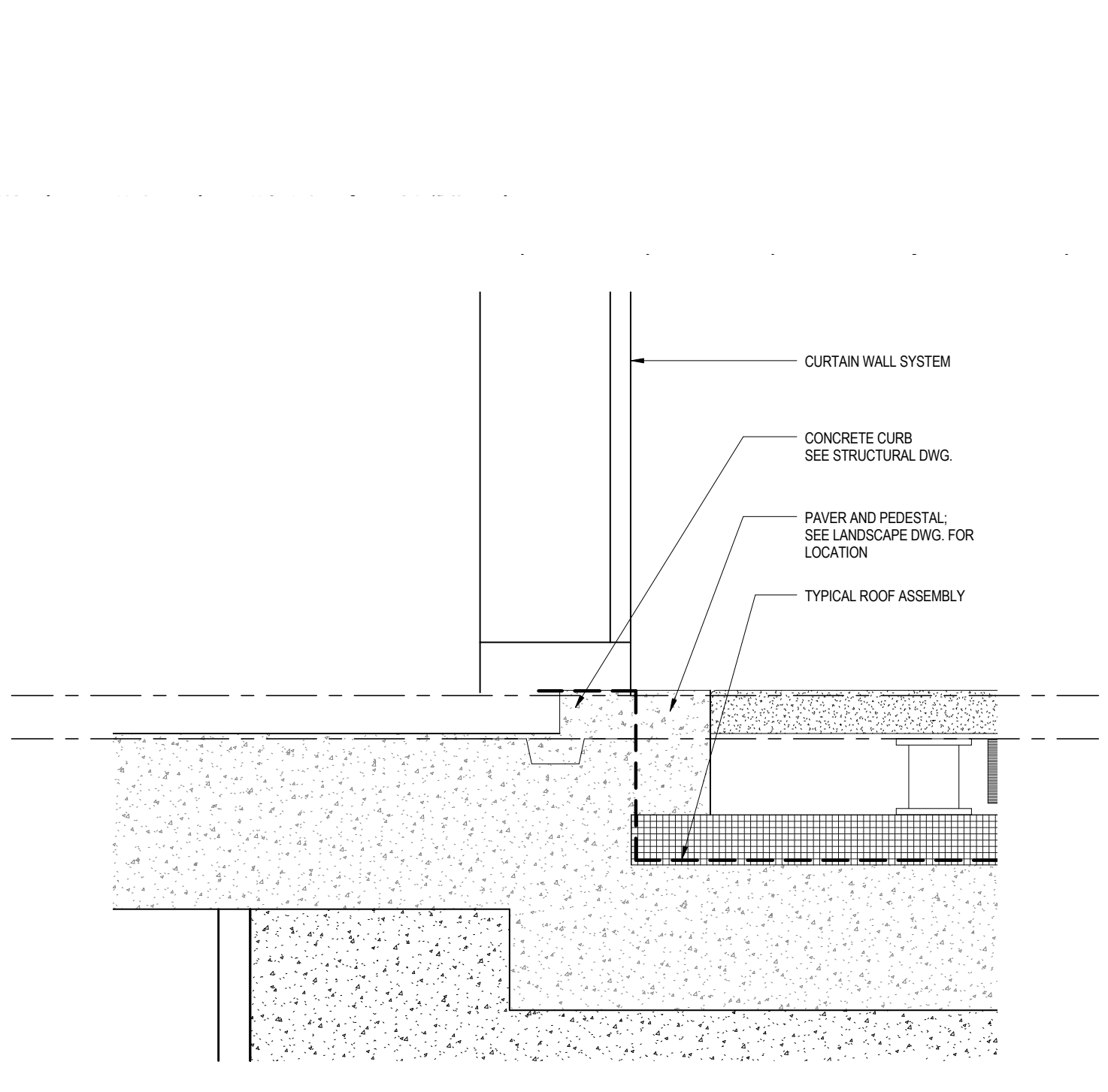
Document	Group R
ASHRAE 90.1-2010 Table 5.5.4	R-7.5 c.i.
ASHRAE 90.1-2010 Table 5.5.4	R-7.5 c.i.
ASHRAE 90.1-2010 Table 5.5.4	R-10 for 24 in.

ENERGY ANALYSIS: ASHRAE 90.1-2010 CHAPTER 5, CLIMATE ZONE 4A

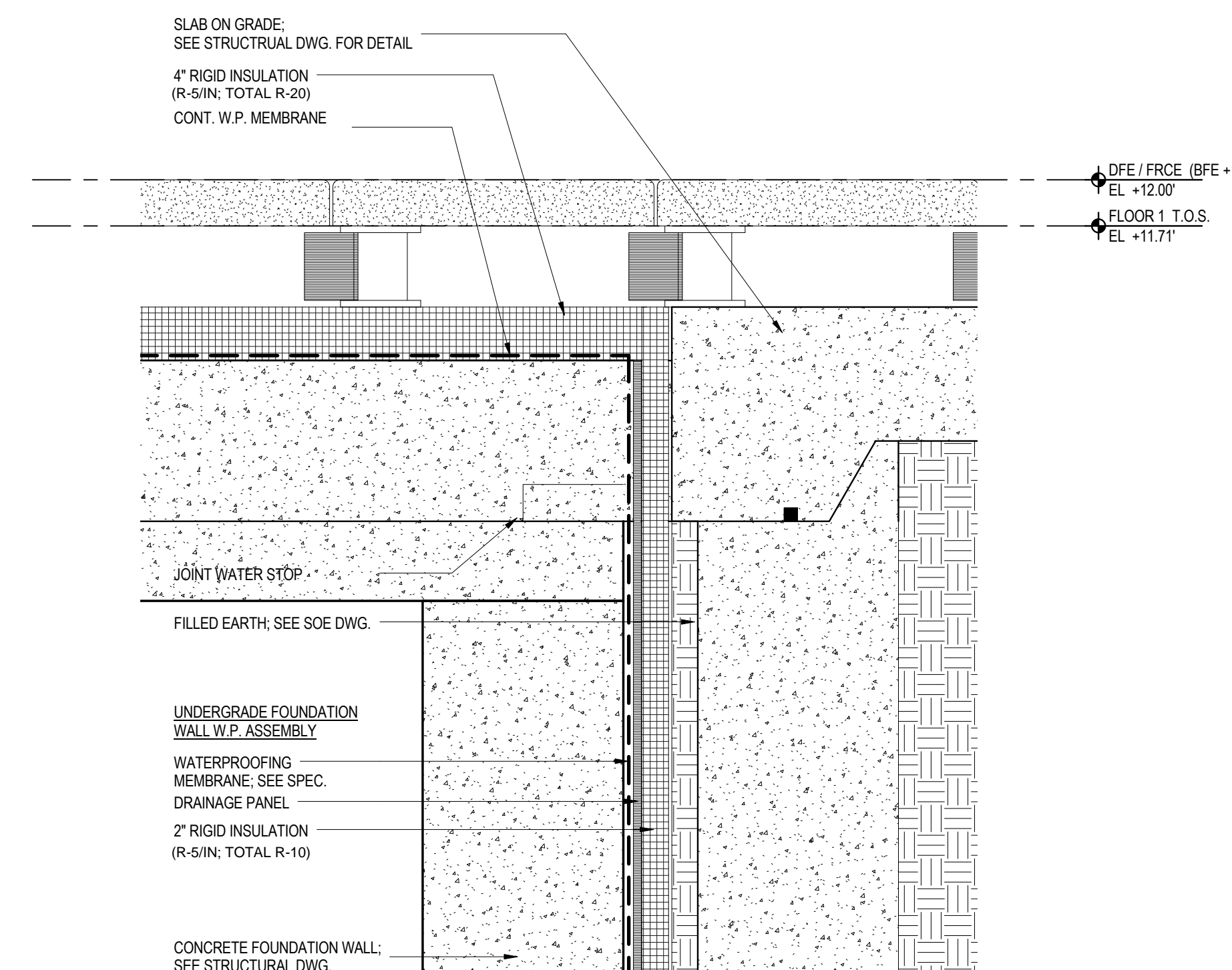
Citation	Application	Item Description	Proposed Design Value	Code Prescriptive Value Group R	Supporting Documentation
ASHRAE 90.1-2010 Chapter 5 Table 5.5.4	Below-Grade Wall	Secant Foundation Pile Wall, 9" concrete liner wall with 2" rigid insulation	R-10 c.i.	R-7.5 c.i.	A-4845
ASHRAE 90.1-2010 Chapter 5 Table 5.5.4	Below-Grade Wall	Foundation Wall with 2" rigid insulation	R-10 c.i.	R-7.5 c.i.	A-4904
ASHRAE 90.1-2010 Chapter 5 Table 5.5.4	Slab-On-Grade Floor (Exhaust)	2" rigid insulation below foundation slab	R-10 c.i.	R-10 for 24 in.	A-4904

Inspection/Test	Periodic (minimum)	Reference Standard (See ECC Chapter C5) or Other Criteria	ECC or Other Citation
IIA Envelope Inspections			
IIA1	As required during construction	Approved construction documents	C303.2.1, ASHRAE 90.1 - 5.8.1.7
IIA2	As required to verify each component of the enclosure	Approved construction documents	C303.1, C303.1.1, C303.2.1, C303.2.1.1, C303.2.1.2, ASHRAE 90.1 - 5.5, 5.6 or 11.1, 5.8.1

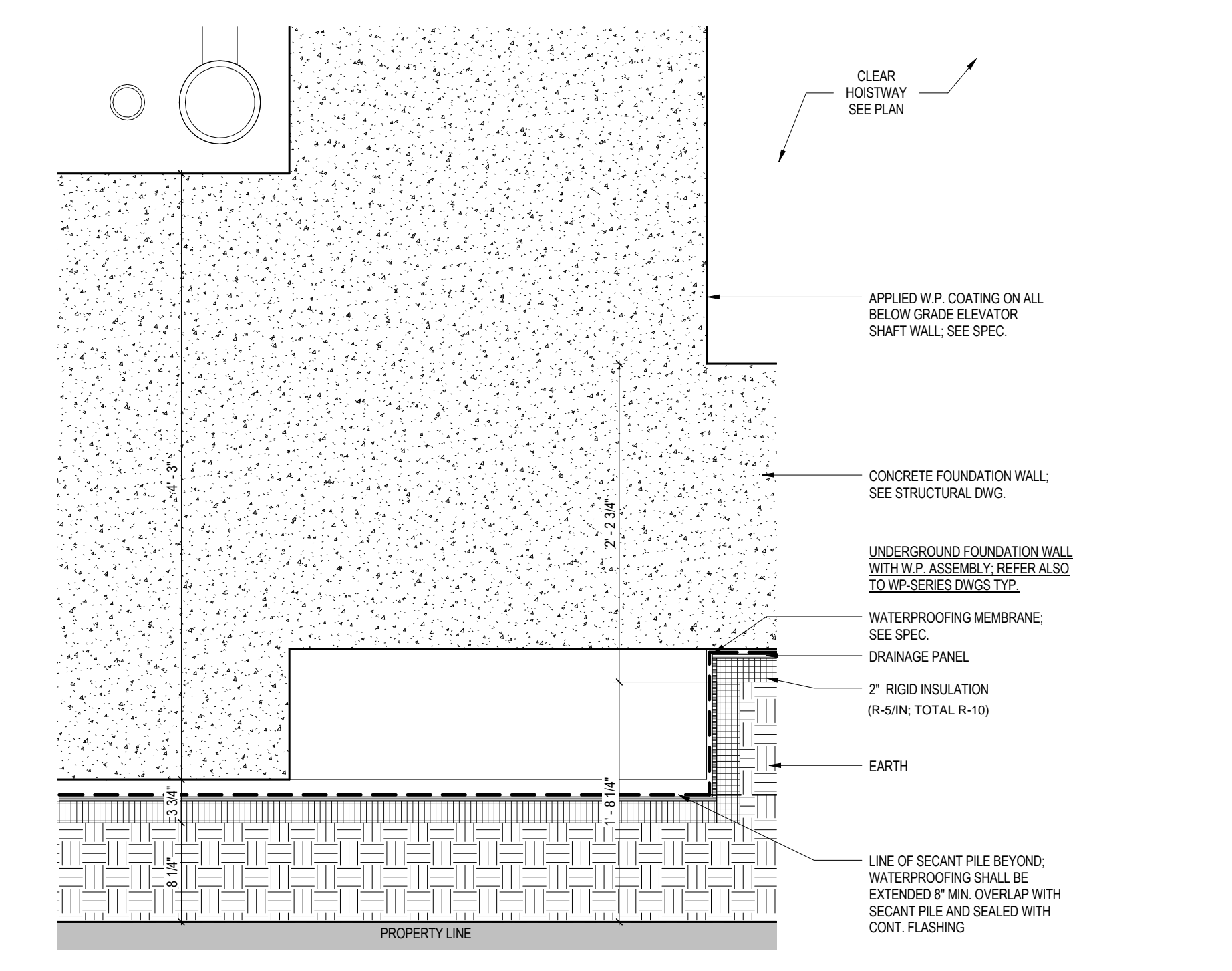
(i) Energy Analysis of Constructed Conditions. In accordance with Section 25-104.3 of the Administrative Code and section ECC 103.4, if constructed work differs from the last approved full energy analysis, an as-built energy analysis shall be submitted to the Department. Listing the actual values used in the building for all applicable Energy Code-regulated items and demonstrating that the building complies with the Energy Code. Such energy analysis shall be signed and sealed by a registered design professional. The program inspector shall certify that to the best of his or her knowledge and belief the building as built complies with each signed and sealed energy analysis and construction drawings for energy code compliance, where no trade-offs have been used among disciplines, more than one registered design professional may sign and seal the elements of the energy analysis. The energy analysis shall be approved or accepted by the Department prior to sign-off.



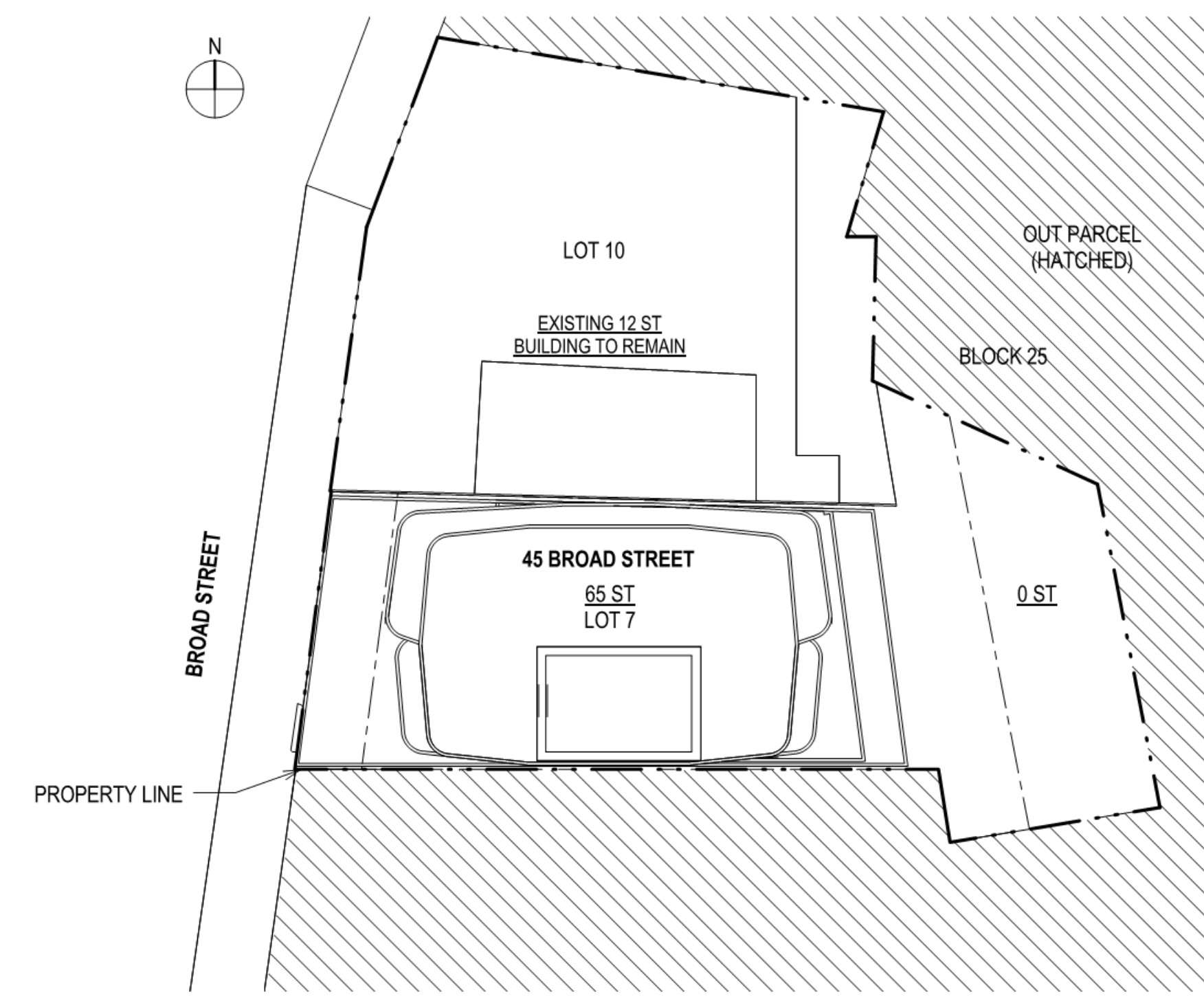
6 ENLARGED WALL DETAIL @ GROUND LEVEL
SCALE: NTS



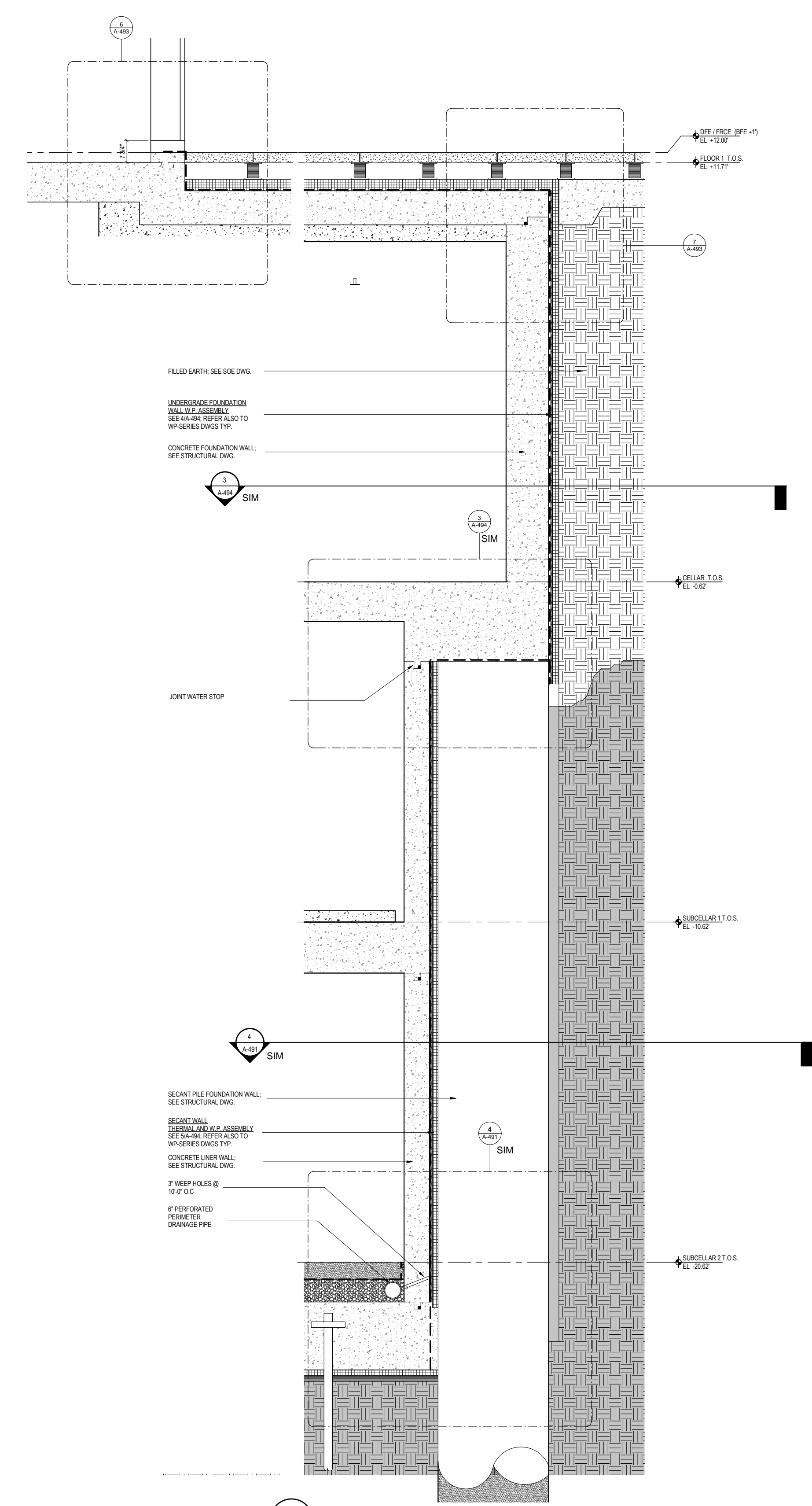
7 ENLARGED FOUNDATION WALL DETAIL AT REAR YARD
SCALE: NTS



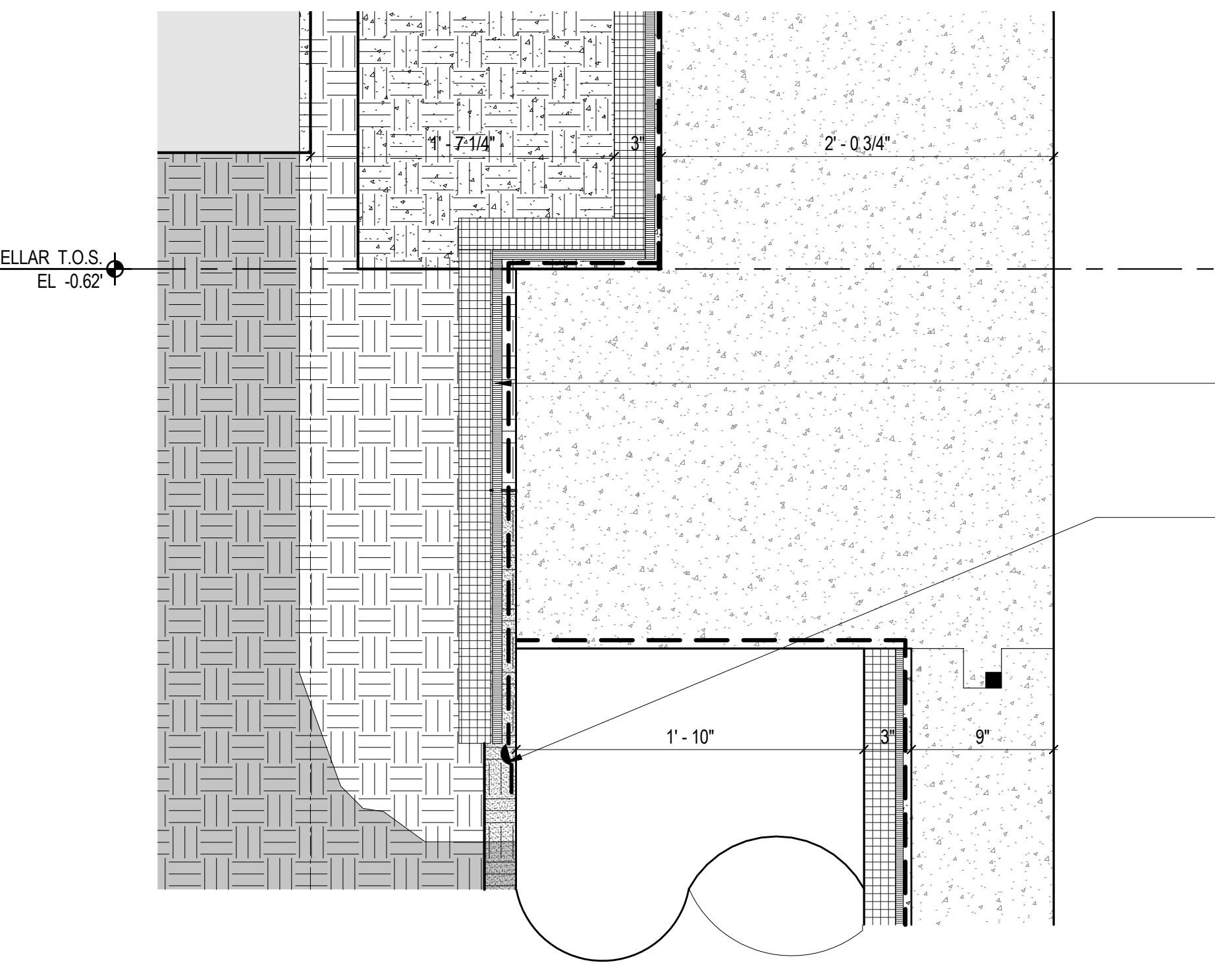
4 ENLARGED FOUNDATION WALL PLAN @ CELLAR LEVEL
SCALE: NTS



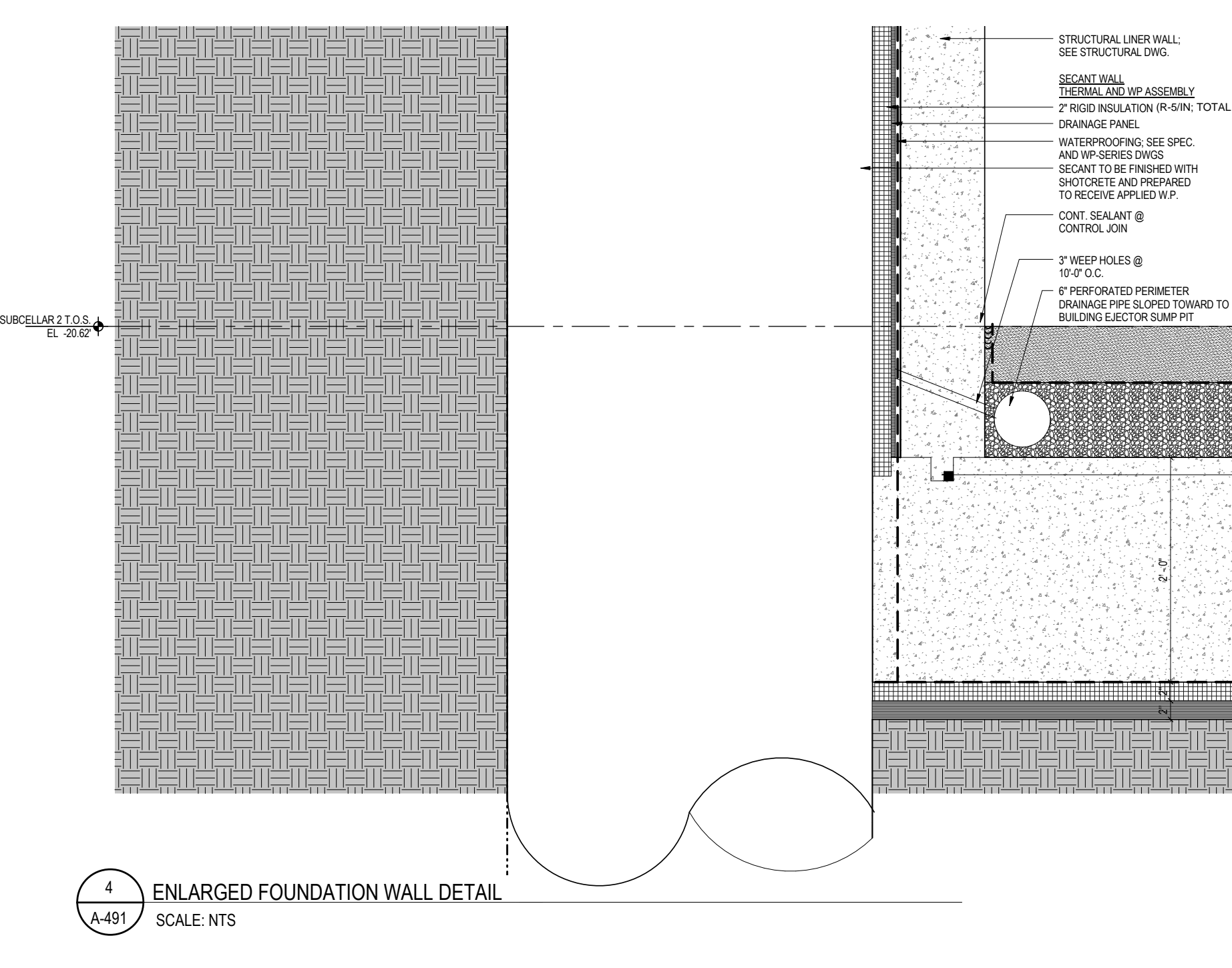
1 SITE PLAN
SCALE: NTS



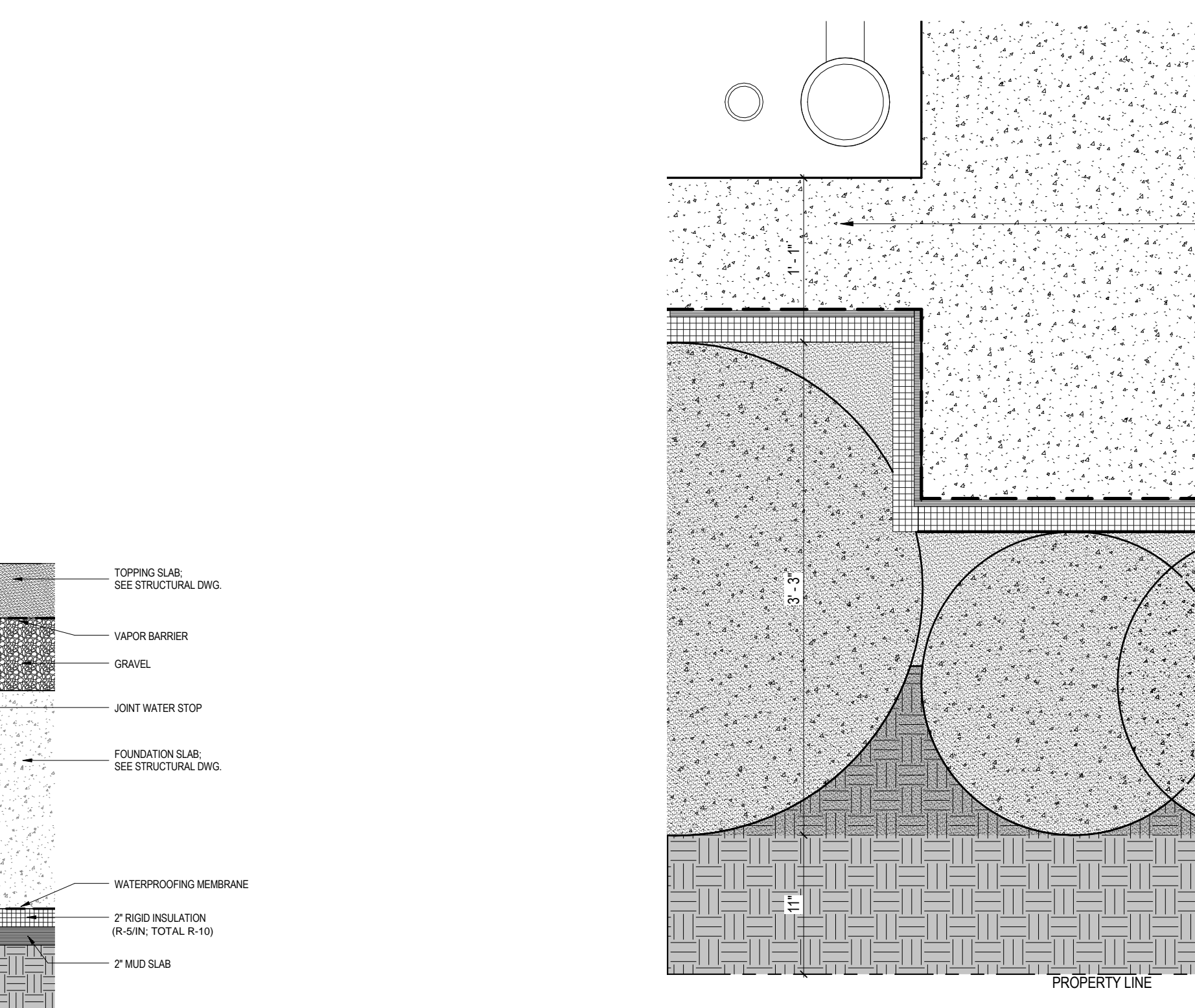
5 EAST FOUNDATION WALL SECTION
SCALE: NTS



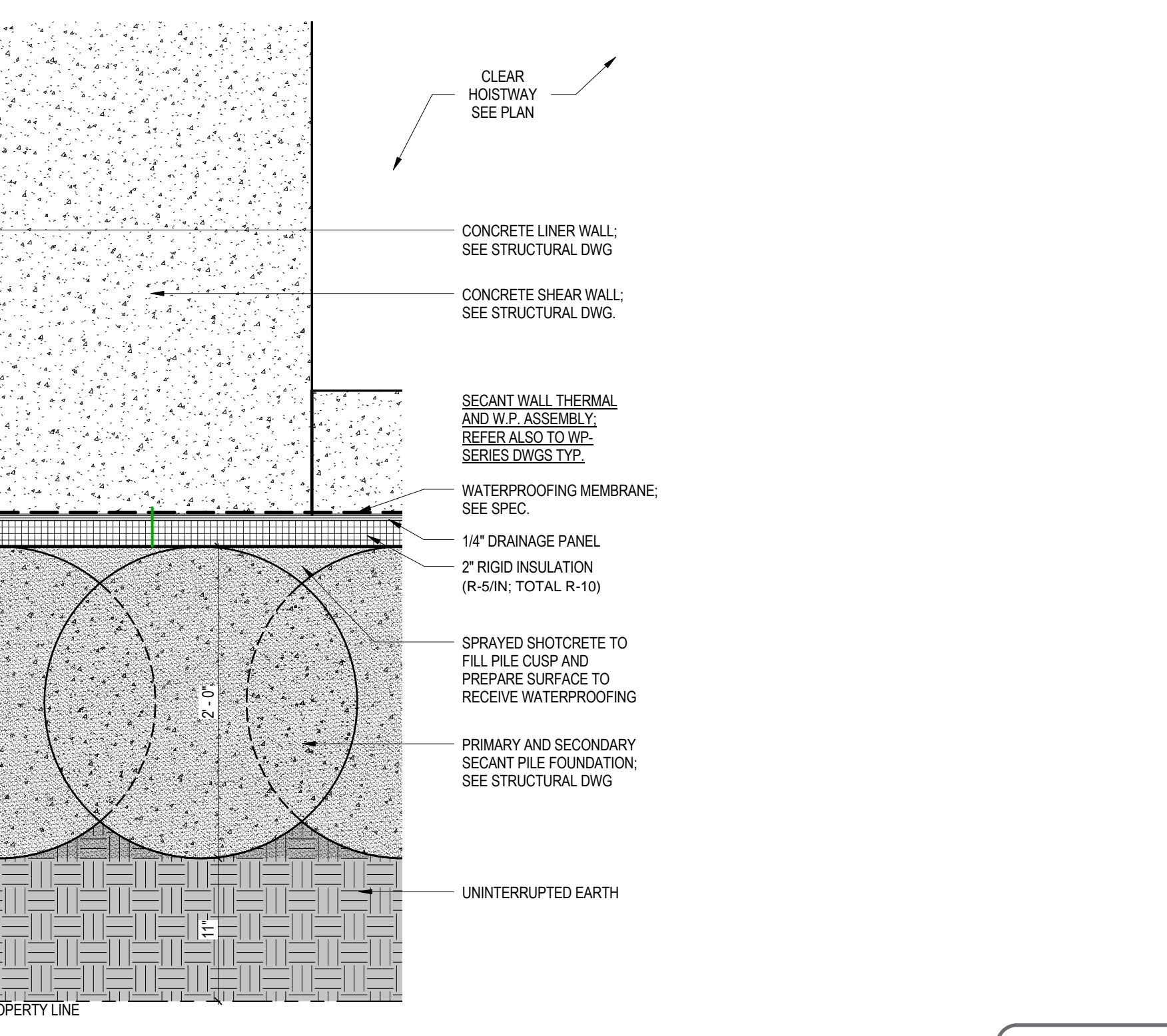
3 ENLARGED FOUNDATION DETAIL AT CELLAR LEVEL
SCALE: NTS



4 ENLARGED FOUNDATION WALL DETAIL
SCALE: NTS



5 ENLARGED SECANT PILE FOUNDATION PLAN DETAIL @ SUBCELLAR 1 LEVEL
SCALE: NTS



5 ENLARGED SECANT PILE FOUNDATION PLAN DETAIL @ SUBCELLAR 1 LEVEL
SCALE: NTS

45 BROAD STREET

NEW YORK NY 10004

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2017.03.03 60% CONSTRUCTION DOCUMENTS
2017.01.18 DESIGN DEVELOPMENT REVISIONS
2016.04.22 ISSUED FOR DESIGN DEVELOPMENT

CETRA RUDDY

NYC ENERGY COMPLIANCE

EN-003.00

PRELIMINARY - NOT FOR CONSTRUCTION

45 BROAD STREET NEW YORK NY 10004

Table with project information including architect (John A. Cetra), structural engineer (Madison 45 Broad Development, LLC), and other stakeholders.

1. CODES:

- 1.0 THE FOLLOWING CODES SHALL APPLY TO THE DESIGN, CONSTRUCTION, QUALITY CONTROL AND SAFETY AND STABILITY OF THE WORK PERFORMED ON THIS PROJECT. LATEST EDITIONS IN EFFECT AT THE TIME OF DESIGN SHALL BE USED UNLESS OTHERWISE NOTED.

2. DESIGN LOADS:

- 2.1 THE STRUCTURE HAS BEEN DESIGNED IN ACCORDANCE WITH THE CURRENT NEW YORK CITY BUILDING CODE (2014).
- 2.2 WIND DESIGN DATA: 2.2.1 BASIC WIND SPEED (3 SECOND GUST) =

Table with 2 columns: GEOTECHNICAL ENGINEER and ARCHITECT OF RECORD. Lists various engineering and construction standards and codes.

5. FOUNDATIONS - ROCK BEARING 40 TON/SF

- 5.1 GENERAL: FOUNDATIONS, FOUNDATION WALLS, FOUNDATION DRAINAGE, ETC. HAVE BEEN DESIGNED IN ACCORDANCE WITH THE RECOMMENDATIONS OF GEOTECHNICAL CONSULTANTS [LANGAN], REPORT ENTITLED [GEOTECHNICAL ENGINEERING STUDY FOR 45 BROAD STREET, NEW YORK, NY] DATED [12/20/2015]
- 5.2 SEE GEOTECHNICAL REPORT AND PROJECT SPECIFICATIONS FOR ADDITIONAL INFORMATION, AND FOR REQUIREMENTS FOR EXCAVATION, BACKFILLING, FILLING AND PREPARATION OF THE FOUNDATION AND SLAB-ON-GROUND SUBGRADE. REQUIREMENTS CONTAINED IN THE GEOTECHNICAL REPORT ARE PART OF THIS WORK.

3. INSPECTIONS:

Table with 2 columns: SPECIAL INSPECTIONS and NYC CODE REFERENCES. Lists inspection items like structural steel, concrete, and masonry with corresponding code references.

4. CONSTRUCTION - GENERAL

- 4.0 STRUCTURAL SEPARATIONS PER NYCBC 1617.3.2: AT ANY PROPERTY LINE NOT COMMON TO A PUBLIC WAY, "THE STRUCTURE SHALL BE SET BACK FROM THE PROPERTY LINE BY AT LEAST ONE INCH FOR EACH 50 FEET OF HEIGHT"
- 4.1 "SMALLER SETBACKS SHALL BE PERMITTED WHEN JUSTIFIED BY RATIONAL ANALYSIS BASED ON MAXIMUM EXPECTED GROUND MOTIONS"

6. FOUNDATION CONCRETE

- 6.1 ALL CONCRETE SHALL BE NORMAL WEIGHT CONTROLLED CONCRETE, UNLESS OTHERWISE NOTED, AND SHALL COMPLY WITH THE 2014 NEW YORK CITY BUILDING CODE AND WITH THE ACI BUILDING CODE (ACI 318), AS AMENDED BY THE 2014 NEW YORK CITY BUILDING CODE. THE CONTRACTOR SHALL SUBMIT CONCRETE MIX DESIGNS TO THE STRUCTURAL ENGINEER FOR APPROVAL PRIOR TO PLACING ANY CONCRETE.
- 6.2 CONTRACTOR SHALL MAKE HIMSELF THOROUGHLY FAMILIAR WITH THE SUPERSTRUCTURE DRAWINGS RELATED TO THE FOUNDATION CONTRACT INCLUDING BUT NOT LIMITED TO THE FOLLOWING: 1. FIRST FLOOR FRAMING PLAN AND SECTIONS.

7. SUPERSTRUCTURE CONCRETE

- 7.1 ALL CONCRETE SHALL BE NORMAL WEIGHT CONTROLLED CONCRETE, UNLESS OTHERWISE NOTED, AND SHALL COMPLY WITH THE 2014 NEW YORK CITY BUILDING CODE AND WITH THE ACI BUILDING CODE (ACI 318), AS AMENDED BY THE 2014 NEW YORK CITY BUILDING CODE. THE CONTRACTOR SHALL SUBMIT CONCRETE MIX DESIGNS TO THE STRUCTURAL ENGINEER FOR APPROVAL PRIOR TO PLACING ANY CONCRETE. CONCRETE STRENGTH AT 28 DAYS SHALL BE AS FOLLOWS, UNLESS OTHERWISE NOTED: [f_c (PSI)] [5,000+ PSI]
- 7.2 FOR SLABS ON GROUND, SOIL SUPPORTED OR FRAMED, SEE "FOUNDATION CONCRETE" NOTE 7.4.
- 7.3 NO CONCRETE SHALL BE PLACED UNTIL THE CONTRACTOR HAS INSTALLED ALL EMBEDDED PLATES, ANCHORS, INSERTS, DOVETAIL SLOTS, ETC. NECESSARY TO PROVIDE SUPPORT FOR WALLS, APPLIED FINISHES, PARTITIONS, PIPES, DUCTS, EQUIPMENT, ETC. AS REQUIRED BY THE ARCHITECTURAL, M.E.P., AND STRUCTURAL DRAWINGS.

8. STEEL REINFORCEMENT

- 8.1 DEFORMED STEEL REINFORCING BARS, INCLUDING STIRRUPS AND TIES, SHALL BE GRADE 60 WITH A MINIMUM TENSILE STRENGTH OF 90,000 PSI PER ASTM A615. HIGHER YIELD STRENGTHS MAY BE REQUIRED AT LOCATIONS DESIGNATED ON THE DRAWINGS, SUCH AS GRADE 75 PER ASTM A615 OR GRADE 80 PER ASTM A615 OR ASTM A706.
- 8.2 VERTICAL REINFORCEMENT IN COLUMNS AND/OR SHEARWALLS MAY BE SPECIFIED TO HAVE A YIELD STRENGTH OF 97 KSI, PURSUANT TO THE NEW YORK CITY DEPARTMENT OF BUILDINGS BULLETIN 2010-003. SEE THE COLUMN SCHEDULE AND/OR SHEARWALL DETAILS.
- 8.3 WELDED WIRE FABRIC SHALL CONFORM TO ASTM A185 AND ASTM A82.

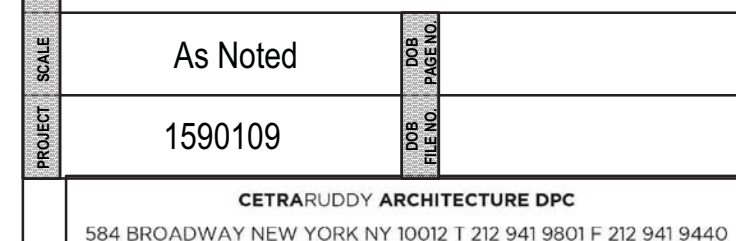
9. MASONRY

- 9.1 NOTES FOR MASONRY ARE CONTAINED ON THE TYPICAL MASONRY DETAILS DRAWING IN THE S-960 SERIES.

LEGEND:

Legend table with 2 columns: Symbol and Description. Lists symbols for wind bars, elevation indicators, footing marks, reinforcement types, and column designations.

Vertical sidebar containing project details, a 'PRELIMINARY - NOT FOR CONSTRUCTION' warning, the CetraRuddy logo, and a 'FO-001.00' stamp with approval information.

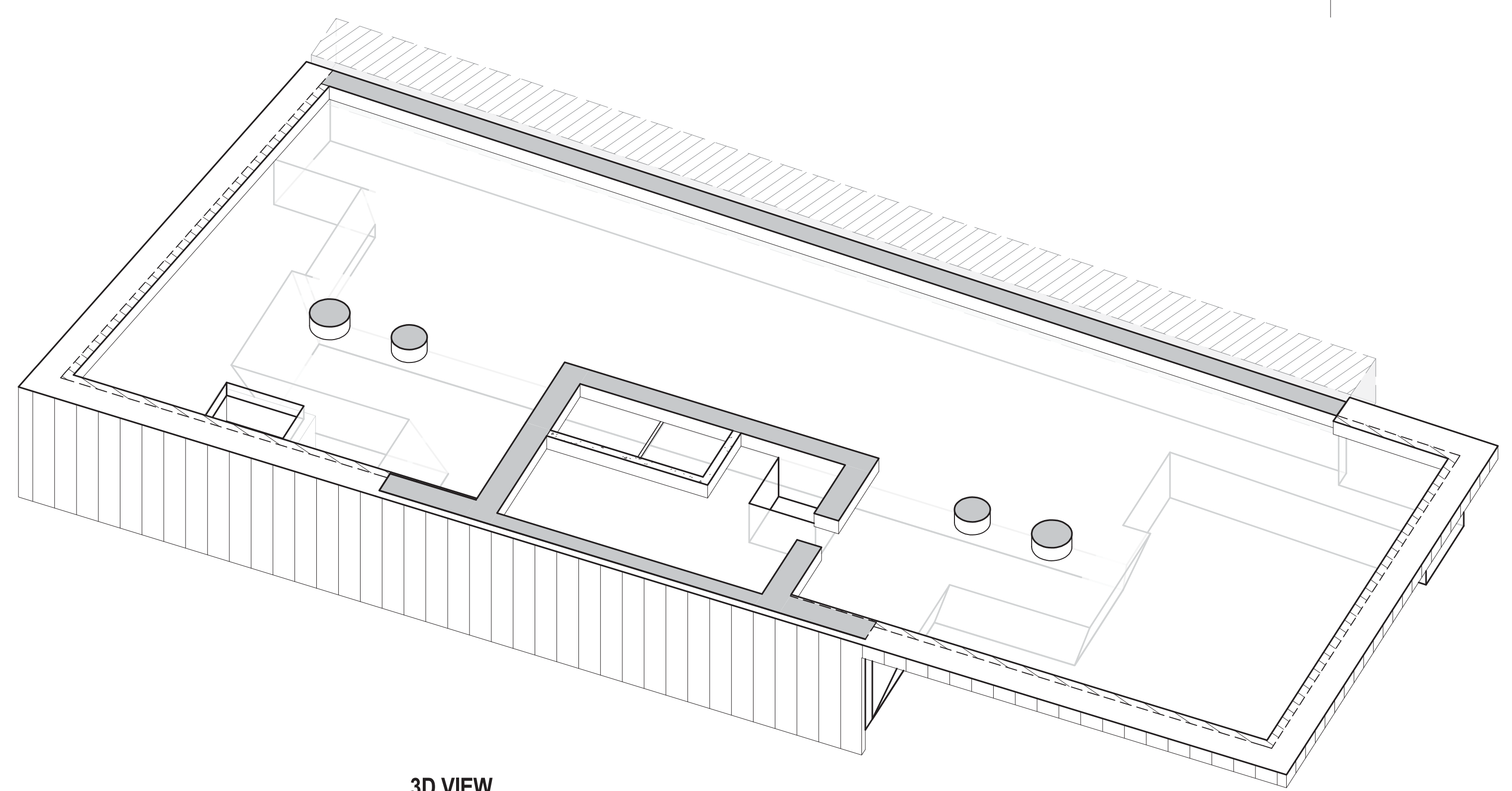
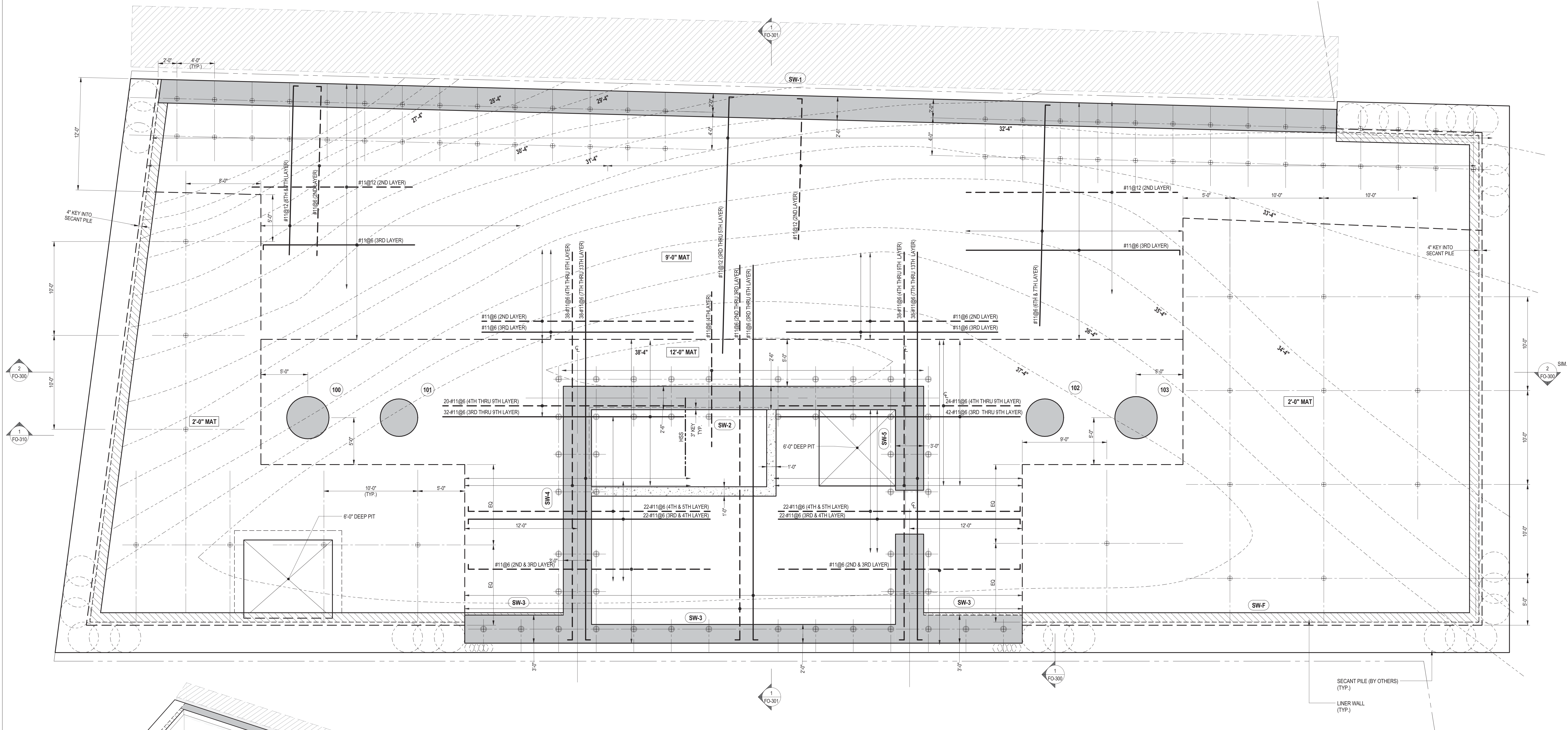


PRELIMINARY - NOT FOR CONSTRUCTION

45 BROAD STREET

NEW YORK NY 10004

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3D VIEW

1 FOUNDATION PLAN

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

- NOTES:**
- TOP OF SLAB ELEVATION TO BE -20'-7 1/2" U.O.N. ON PLAN THUS []
 - SLAB TO BE XX" THICK U.O.N. ON PLAN THUS []
 - MAT REINFORCEMENT TO BE: #11@8 T&B E.W. FOR 2'-0" MAT
 #11@8 TOP E.W. 1ST LAYER FOR 9'-0" & 12'-0" MAT
 #11@12 TOP E.W. 2ND LAYER FOR 9'-0" & 12'-0" MAT
 #11@8 BOTTOM E.W. 1ST LAYER FOR 9'-0" & 12'-0" MAT
 - PILE CAPS TO BE CENTERED ON COLLUMS OR WALLS U.O.N.
 - FOR GENERAL NOTES, ABBREVIATIONS AND LEGEND SEE DWG FO-001.
 - FOR FOUNDATION TYPICAL DETAILS SEE FO-200 SERIES DRAWINGS.
 - FOR FOUNDATION SECTIONS SEE FO-300 SERIES DRAWINGS.
 - FOR LINK BEAM SCHEDULE AND SHEARWALL DETAILS SEE S-840 SERIES DRAWINGS.
 - FOR COLUMN AND BUTTRESS SIZES, REINFORCEMENT AND DETAILS SEE S-990 SERIES DRAWINGS.

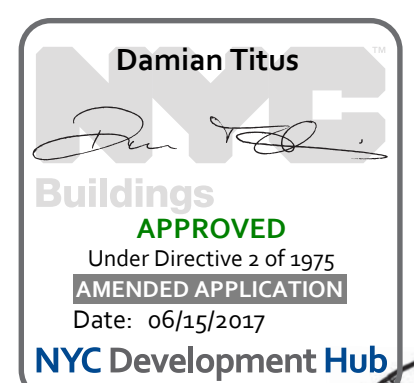
- LEGEND:**
- INDICATES 615R ROCK ANCHOR
 - INDICATES 240R ROCK ANCHOR
 - INDICATES ELEVATION OF TOP OF SOUND ROCK CONTOURS (NAD83). CONTOURS ARE BASED ON INTERPOLATION BETWEEN BORING LOCATIONS AND MAY VARY IN THE FIELD. FOR ADDITIONAL INFORMATION SEE GEOTECH REPORT BY LANGAN.

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2016.04.22 ISSUED FOR DESIGN DEVELOPMENT 1



FOUNDATION (CELLAR 3) PLAN



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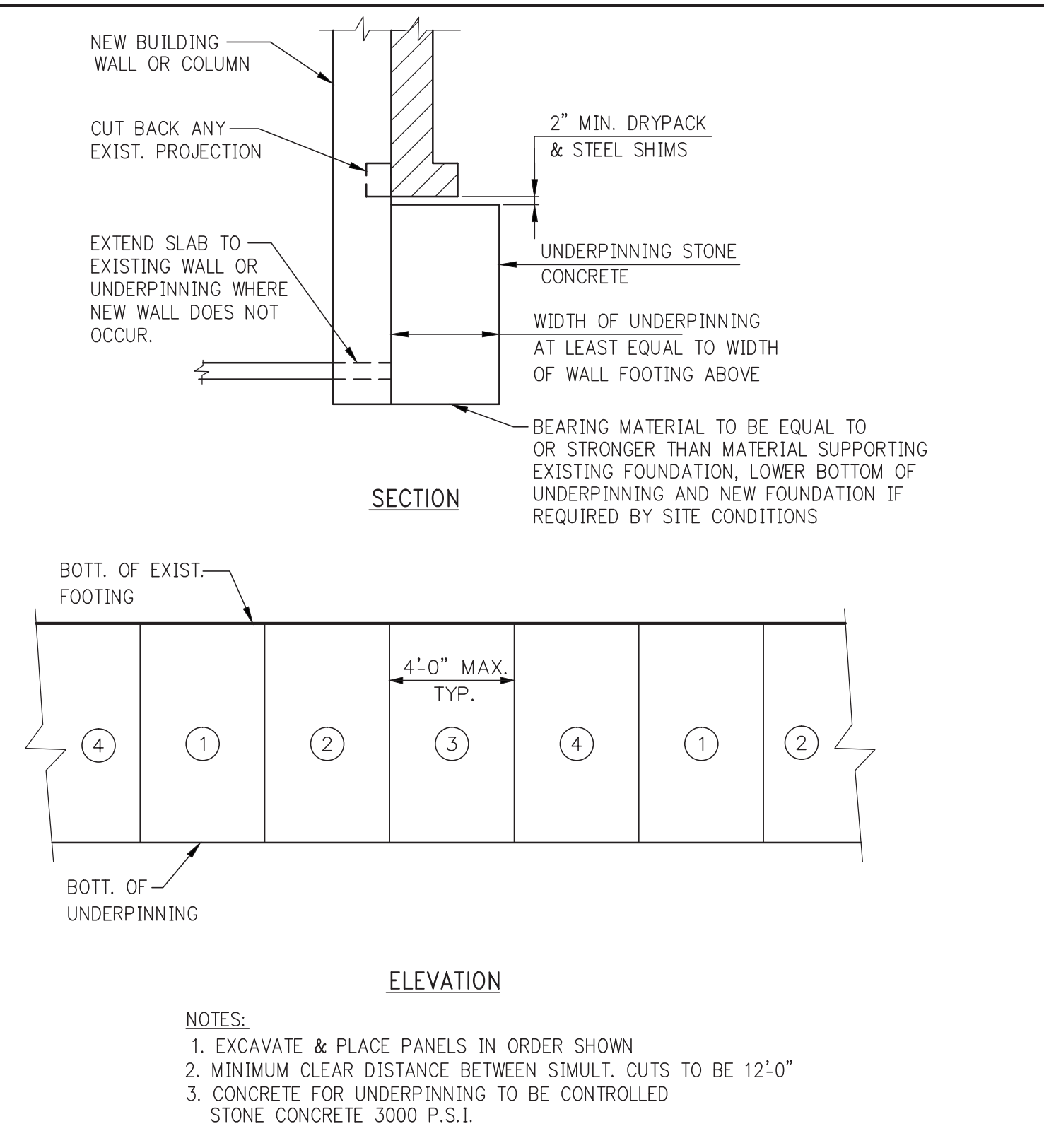
As indicated
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Veronica Design, LLC 44-02 Elventh St, Suite 203 Long Island City, NY 11101 212.600.0033	BuroHappold Engineering 100 Broadway New York, NY 10005 212.334.2025



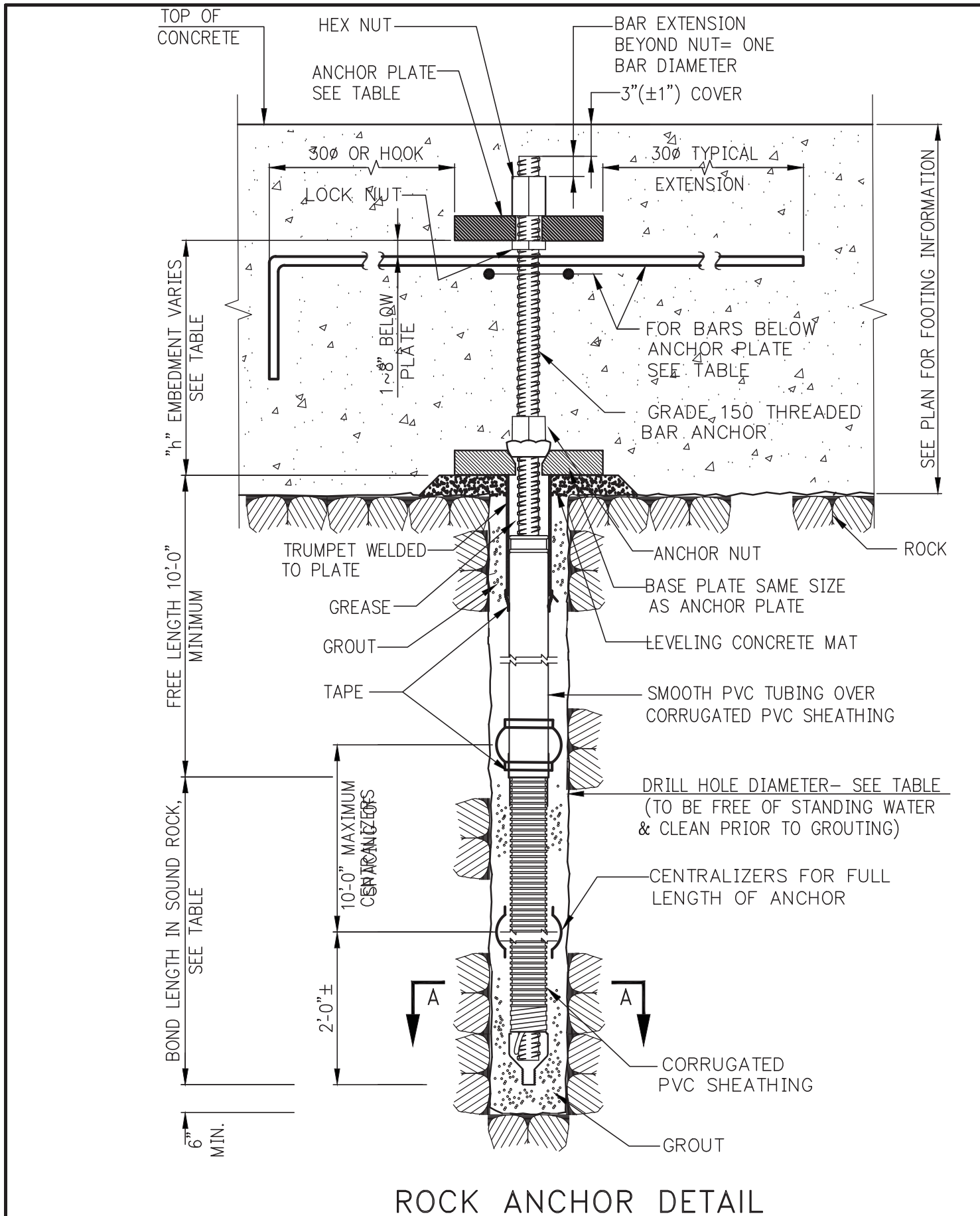
SUGGESTED UNDERPINNING DETAIL

NOTES:
 1. EXCAVATE & PLACE PANELS IN ORDER SHOWN
 2. MINIMUM CLEAR DISTANCE BETWEEN SMALL CUTS TO BE 12'-0"
 3. CONCRETE FOR UNDERPINNING TO BE CONTROLLED STONE CONCRETE 3000 P.S.I.

1. THIS DETAIL IS REPRESENTATIVE OF ONE METHOD OF UNDERPINNING UNDER PARTICULAR CIRCUMSTANCES. THE CONTRACTOR MUST EVALUATE THIS PROJECT AND DETERMINE EXACT METHODS AND PROCEDURES TO BE FOLLOWED.
 2. CONTRACTOR'S UNDERPINNING DESIGN ENGINEER SHALL BE A REGISTERED PROFESSIONAL ENGINEER IN THE STATE OF NEW YORK AND SHALL REVIEW ALL AVAILABLE BORING DATA AND EXISTING CONDITIONS TO DETERMINE THE NECESSITY OF PRELOADING AND/OR JACKING TO PROTECT ADJACENT STRUCTURES PRIOR TO COMMENCEMENT OF UNDERPINNING OPERATIONS.
 3. THE CONTRACTOR'S PROFESSIONAL ENGINEER SHALL FILE WITH THE BUILDING DEPARTMENT THE SELECTED PROCEDURE.

ADJACENT FOOTINGS ON ROCK AT DIFFERENT ELEVATIONS
 FOR ROCK CAPACITY = 20 TONS PER SQ. FT. OR HIGHER.

NOTES:
 THIS DETAIL IS SUBJECT TO THE INTEGRITY OF THE ROCK AND PITCH OF ROCK SEAMS AND MAY BE MODIFIED DUE TO SITE CONDITIONS. MAXIMUM HEIGHT DIFFERENTIAL TO BE DETERMINED BY GEOTECHNICAL ENGINEER WHEN ACTUAL ROCK CONDITION IS OBSERVED.



ROCK ANCHOR GENERAL NOTES

- ROCK ANCHORS SHALL BE IN CONFORMANCE WITH LATEST P11 (POST-TENSIONING INSTITUTE) RECOMMENDATIONS FOR PRESTRESSED ROCK AND SOIL ANCHORS, FOR SIZES AND LOCATIONS SEE FOUNDATION DRAWINGS.
- ALL ROCK ANCHORS SHALL BE GRADE 150 THREADED BARS CONFORMING TO ASTM A-722. THREADED BARS SHALL BE PROVIDED WITH SHOP FABRICATED DOUBLE CORROSION PROTECTION. THREADED BARS, ANCHORAGE'S, CENTRALIZERS, ACCESSORIES, CORROSION PROTECTION SYSTEM, ETC. SHALL BE PROVIDED BY SAS STRESSTEEL OR APPROVED EQUAL.
- THREADED BARS SHALL BE ENCAPSULATED WITH HIGH STRENGTH PVC CORRUGATED SHEATHING (COMPRESSIVE STRENGTH = 7000 PSI) AND SHALL BE PRE-ROUTED BY THE MANUFACTURER.
- PLATES SHALL CONFORM TO ASTM A-36, UNLESS GRADE 50 IS CALLED FOR IN THE DETAILS.
- ANCHOR NUTS AND COUPLERS SHALL BE CAPABLE OF DEVELOPING 100% OF THE ULTIMATE STRENGTH OF THE THREADED BAR.
- CARE MUST BE TAKEN NOT TO DAMAGE THE TENDONS. KEEP ALL COMPONENTS OF THE SYSTEM FREE OF DIRT OR OTHER DELETERIOUS SUBSTANCES.
- DO NOT WELD IN THE VICINITY OF THE THREADED BARS.
- DO NOT USE ANCHORS AS A GROUND FOR WELDING.
- THE FIRST THREE ANCHORS INSTALLED, AND TEN PER CENT OF REMAINING ANCHORS, SHALL BE PERFORMANCE TESTED. ALL OTHER ANCHORS SHALL BE PROOF TESTED. ALL TESTS SHALL BE PERFORMED USING A CALIBRATED CENTER HOLE JACK.
- PERFORMANCE TESTS SHALL BE MADE BY CYCLICALLY AND INCREMENTALLY LOADING AND UNLOADING THE ANCHOR IN ACCORDANCE WITH THE FOLLOWING SCHEDULE, WHERE AL= ALIGNMENT LOAD AND P= DESIGN LOAD:
 10.1 AL, 25P
 10.2 AL, 25P, 50P
 10.3 AL, 25P, 50P, 75P
 10.4 AL, 25P, 50P, 75P, 1.00P
 10.5 AL, 25P, 50P, 75P, 1.00P, 1.20P
 10.6 AL, 25P, 50P, 75P, 1.00P, 1.20P, 1.33P (TEST LOAD)
- HOLD 1.33P FOR CREEP TEST. RECORD MOVEMENTS AT EACH INCREMENT USING A DIAL INDICATOR CAPABLE OF READING INCREMENTS OF .001 INCH, ALL IN CONFORMANCE WITH P11 RECOMMENDATIONS. REDUCE LOAD TO "TRANSFER LOAD" (1.00 P) AND LOCK OFF ANCHOR NUT AT "TRANSFER LOAD"
- PROOF TESTS SHALL BE MADE BY INCREMENTALLY LOADING THE ANCHOR: AL, 25P, 50P, 75P, 1.00P, 1.20P, 1.33P (TEST LOAD), TEN MINUTE HOLD) RECORD MOVEMENTS AT EACH INCREMENT IN CONFORMANCE WITH P11 RECOMMENDATIONS. REDUCE LOAD TO "TRANSFER LOAD" (1.00 P) AND LOCK OFF ANCHOR NUT AT "TRANSFER LOAD"
- CONTRACTOR SHALL SUBMIT ANCHOR SHOP DRAWING(S) FOR APPROVAL PRIOR TO COMMENCING ANCHOR INSTALLATION. SHOP DRAWING(S) SHALL CONTAIN ANCHOR DETAILS, AND INSTALLATION AND TESTING PROCEDURES.

TABLE OF REINFORCEMENT ADDED BELOW ANCHOR PLATES

ROCK ANCHOR BAR DIA.	ADD'L REINF. PROVIDED
UP TO 1 1/8"	2-#7 E.W.
2 1/4"	2-#9 E.W.
2 1/2"	2-#10 E.W.
3"	2-#11 E.W.

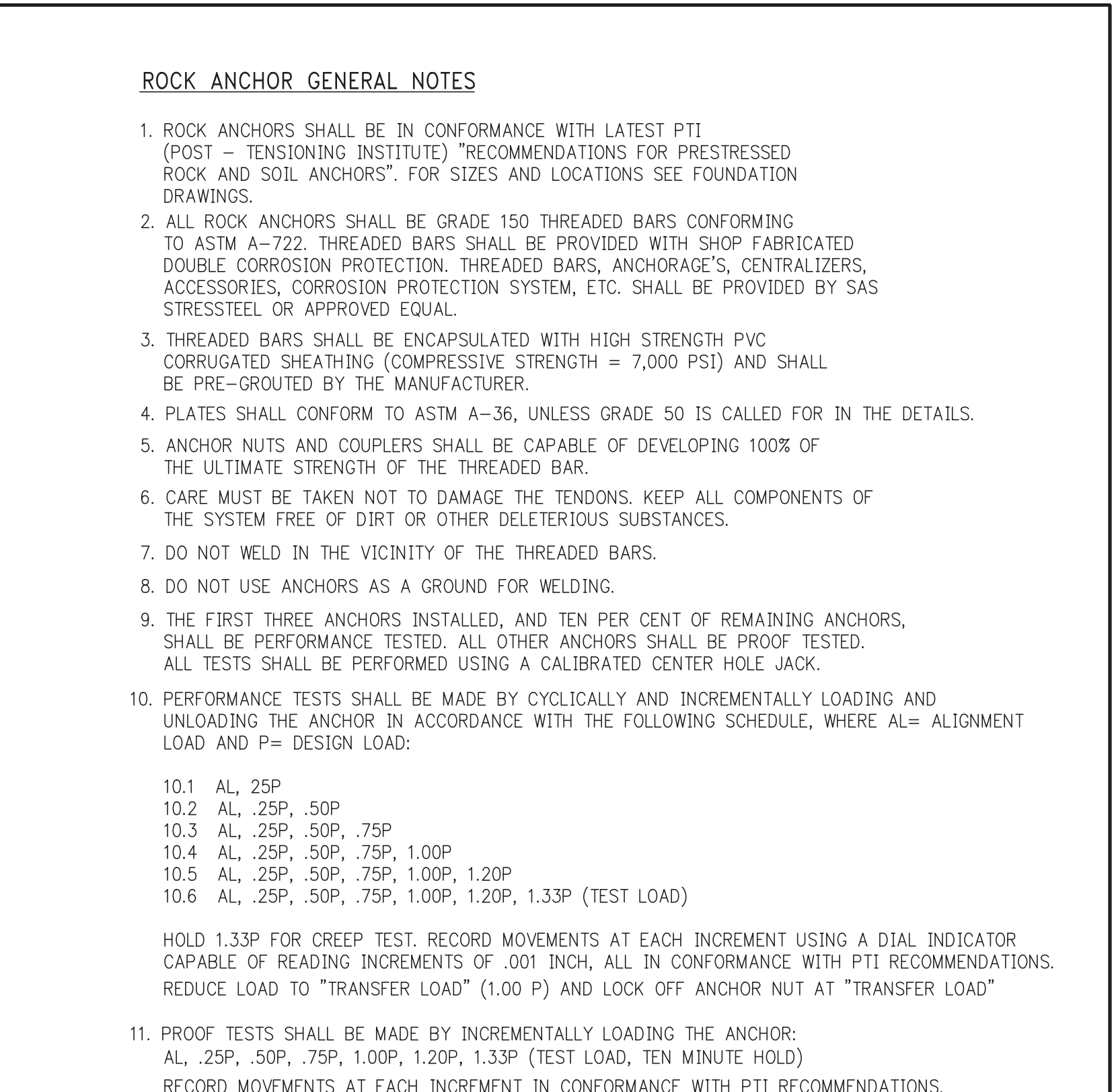
TABLE FOR DOUBLE CORROSION PROTECTION ROCK ANCHORS

THREADED BAR DIAMETER	DESIGN LOAD (KIPS)	ANCHOR PLATE (Fy=36 ksi)	MINIMUM DRILL HOLE DIAMETER SEE NOTE 1	MINIMUM BOND LENGTH SEE NOTE 2	MINIMUM EMBEDMENT IN FOOTING "t"
1 1/8"	240*	9 1/2" x 9 1/2" x 2 1/2"	5 1/2"	25'-0"	1'-4"
3"	615*	15" x 15" x 3"	8"	40'-0"	VAR.

NOTES FOR CORROSION PROTECTION TABLE:

- MINIMUM DRILL HOLE DIAMETER ASSUMES COUPLERS ARE NOT REQUIRED. HOLE DIAMETER MAY INCREASE DUE TO USE OF COUPLERS OR ROCK CONDITION.
- ACTUAL BOND LENGTH TO BE DETERMINED BY GEOTECHNICAL CONSULTANT FROM BORINGS AND ROCK SAMPLES. GROUP ACTION EFFECTS ARE TO BE CONSIDERED.
- PLATES FOR LARGE DIAMETER BARS TO BE SUPPLIED BY MANUFACTURER, SUBJECT TO ENGINEER'S APPROVAL. GRADE 50 MAY BE USED AT MANUFACTURER'S OPTION.
- MAXIMUM OFFSET 1" OR "C" MAY BE INCREASED IF MINIMUM EMBEDMENT "t" IS ALSO INCREASED BY AT LEAST THE SAME AMOUNT. PROJECT DESIGNER IS TO ESTABLISH NEW DIMENSIONS.

SECTION A-A
 RECOMMENDED GROUT MIX
 1 BAG - PORTLAND CEMENT TYPE III
 5 GALLONS - POTABLE WATER
 1/2 LB. SIKKA ENTRAPLAST "N"



MINIMUM HORIZONTAL WALL REINFORCEMENT REQUIRED AT EACH FACE

T = WALL THICKNESS	HORIZONTAL REINFORCEMENT
UP TO 10"	#4@18 E.F.
11" TO 12"	#4@16 E.F.
13" TO 16"	#4@12 E.F.
17" TO 20"	#4@10 OR #5@15 E.F.
21" TO 22"	#4@9 OR #5@12 E.F.
23" TO 24"	#4@8 OR #5@12 E.F.
OVER 24"	SEE PLANS AND SECTIONS

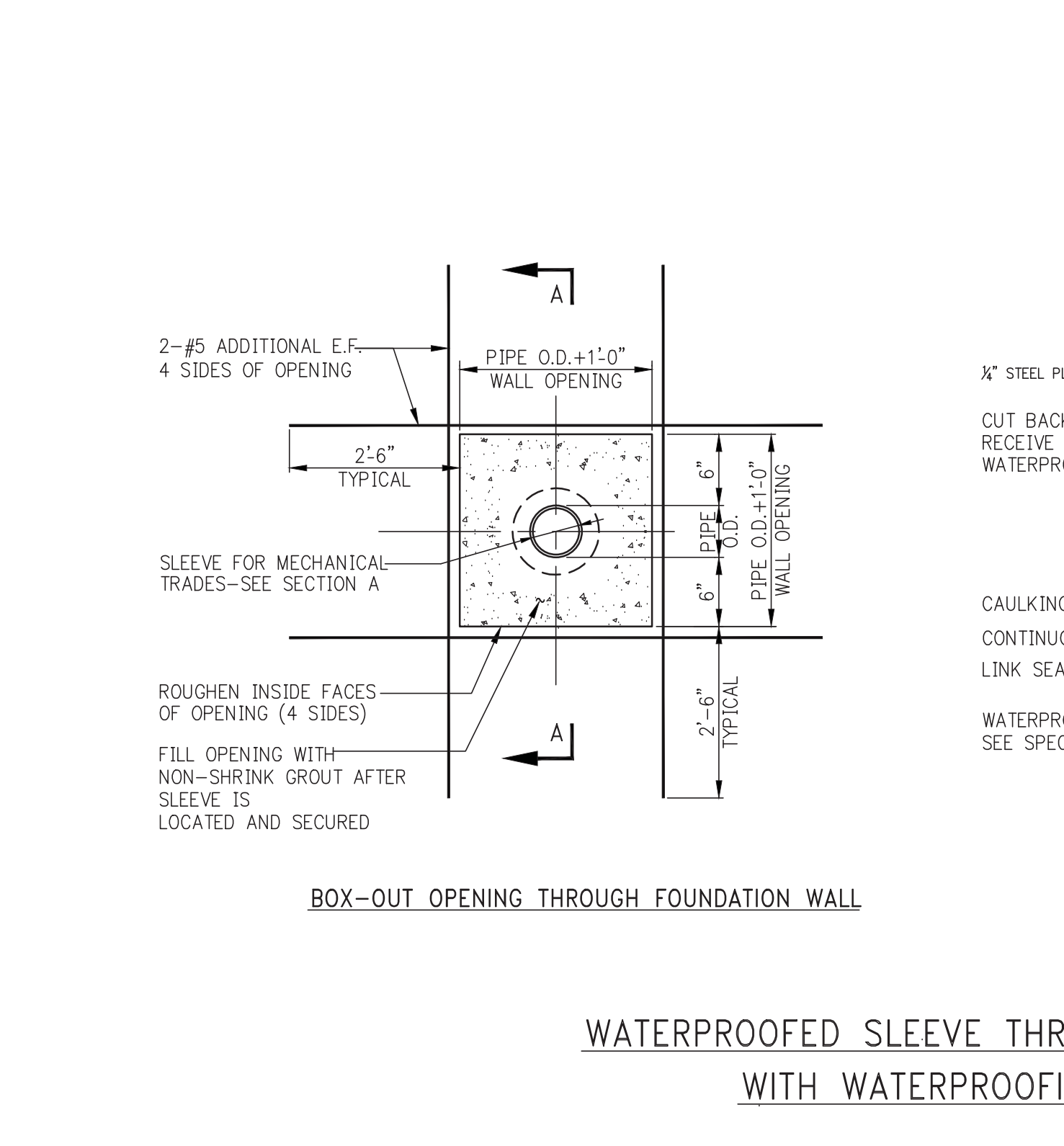
FOUNDATION WALL ELEVATION SHOWING REINFORCEMENT AT OPENINGS AND MISCELLANEOUS DETAILS

NOTES:
 VERTICAL CONSTRUCTION JOINT IN WALL IS NOT SHOWN HERE - SEE TYPICAL CONSTRUCTION JOINT DETAIL.

NOTES:

- ADD #5 BARS (HORIZ. & VERT.) AT ALL FOUR EDGES OF OPENINGS. AREA OF ADDED BARS AT EACH EDGE TO BE EQUAL TO ONE HALF OF AREA OF INTERRUPTED BARS IN THE CORRESPONDING DIRECTION. PROVIDE A MINIMUM OF 1-#5 E.F.
- WHERE TOP EDGE OF OPENING IS LESS THAN 2'-6" FROM TOP OF WALL ADD 1-#7 E.F. (IN LINE OF #5) OVER OPENING. PROVIDE #1 L1 STIRRUPS @ 8" - EXTEND INTO SLAB WITH 2" COVER AT TOP OF STIRRUPS.
- AT UTILITY ACCESS OPENINGS WHICH ARE TO BE FILLED IN WITH CONCRETE, PROVIDE DOWELS PROJECTING 1'-0" INTO OPENING. EITHER EXTEND HORIZONTAL AND VERTICAL WALL REINFORCEMENT, OR ADD #4@24 E.F. DOWELS x2'-6" LONG.
- FOR ACTUAL OPENING SIZES AND LOCATIONS, SEE PLANS, SECTIONS, ARCHITECTURAL DWGS., AND MEP DWGS. SUBMIT SHOP DRAWINGS WITH WALL ELEVATIONS SHOWING ALL OPENINGS AND REINFORCEMENT.
- PROVIDE FOOTING OR CONCRETE MUD SLAB TO SUPPORT WALL FORMS AND NET CONCRETE. SEE FOUNDATION SECTIONS ON FS-300 SERIES DRAWINGS FOR ADDITIONAL DETAILS.

SCHEMATIC SECTION AT TOP OF WALL



BOX-OUT OPENING THROUGH FOUNDATION WALL

2-#5 ADDITIONAL E.F. 4 SIDES OF OPENING
 PIPE O.D. 11'-0" WALL OPENING
 2'-6" TYPICAL
 SLEEVE FOR MECHANICAL TRADES-SEE SECTION A
 ROUGHEN INSIDE FACES OF OPENING (4 SIDES)
 FILL OPENING WITH NON-SHRINK GROUT AFTER SLEEVE IS LOCATED AND SECURED

SECTION A-A
 1" PROJECTION FOR SLEEVE
 STANDARD STEEL PIPE SLEEVE AS REQUIRED
 WALL OPENING
 CAULKING 1/2" DEEP CONTINUOUS SEAL WELD LINK SEAL
 WATERPROOFING-SEE SPECIFICATIONS
 INSIDE FACE OF WALL
 TAMPED LEAD 1/2" DEEP
 CAULKING 1/2" DEEP

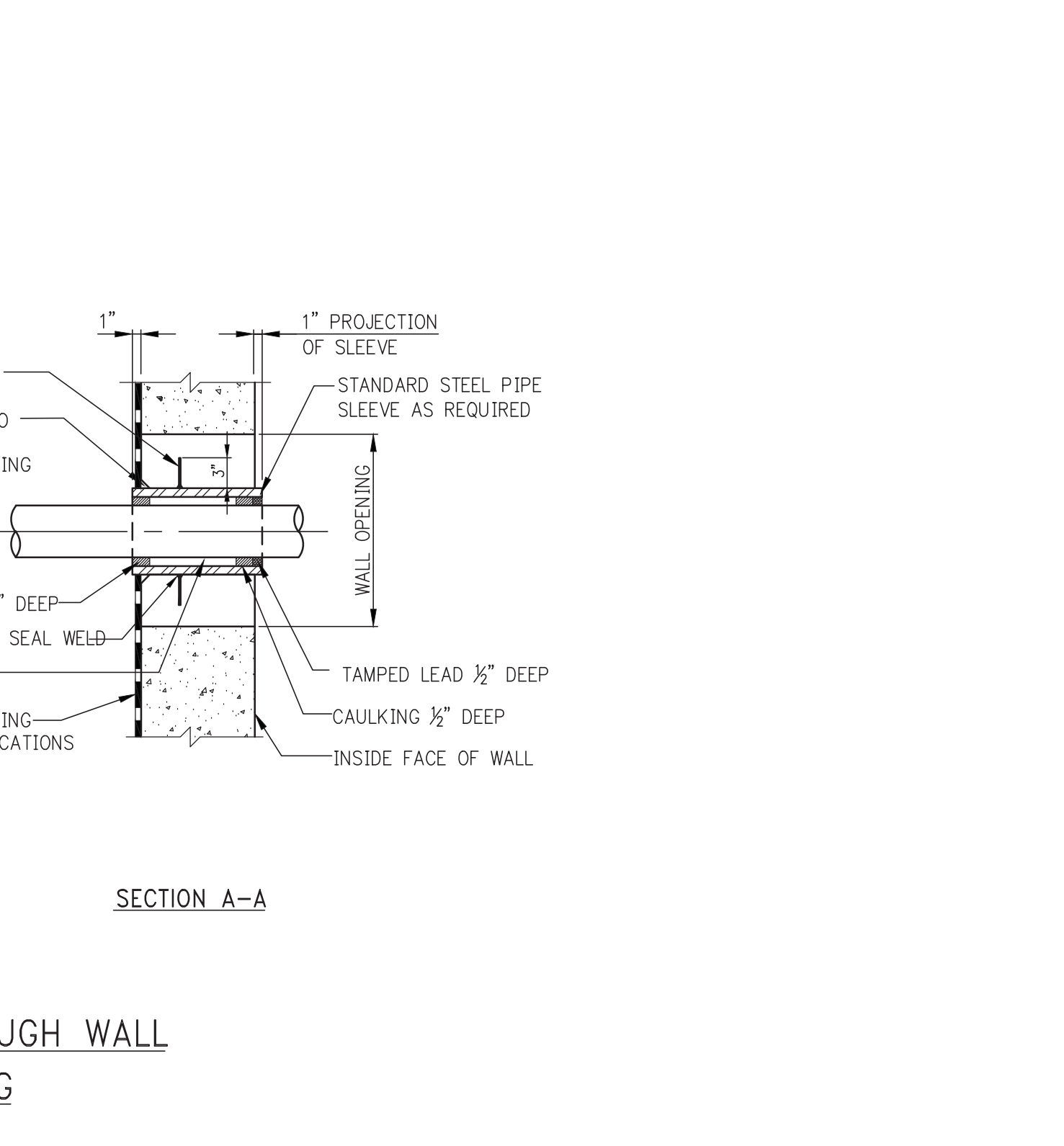
WATERPROOFED SLEEVE THROUGH WALL WITH WATERPROOFING

#4@12 X 3'-0" IN ADDITION TO NORMAL WALL REINFORCEMENT
 BENTONITE ROPE IN KEY (LOCATE ON SIDE CLOSER TO OUTSIDE FACE)
 POUR (A)
 POUR (B)
 OUTSIDE FACE OF WALL
 2" KEY
 HORIZONTAL REINFORCEMENT CONTINUOUS THROUGH JOINT

ALTERNATIVE-POUR GAP
 #4@12 X 4'-0" IN ADDITION TO NORMAL WALL REINFORCEMENT
 POUR GAP
 BENTONITE ROPE IN KEY
 2'-6" MINIMUM LAP SPACES-ALL HORIZ. REIN.
 1'-6" MINIMUM
 2" KEY
 EXTEND ALL HORIZONTAL REINFORCEMENT INTO POUR GAP

VERTICAL CONSTRUCTION JOINT IN FOUNDATION WALL

NOTES:
 1. CONSTRUCTION JOINTS IN WALLS SHALL BE LOCATED AT LEAST FOUR FEET FROM FACE OF SUPPORTING PIER, FOOTING, PILE CAP, ETC. OR FROM WALL OPENING.
 2. MAXIMUM SPACING BETWEEN JOINTS SHALL BE FORTY FEET UNLESS NOTED OTHERWISE ON THE FOUNDATION DRAWINGS.
 3. CONCRETE SHALL NOT BE PLACED IN THE POUR GAP UNTIL 24 HOURS AFTER PLACEMENT OF THE MOST RECENT ADJACENT SECTION.
 4. FOR JOINTS IN SHEARWALLS SEE DETAILS IN FS-400 OR S-400 SERIES.

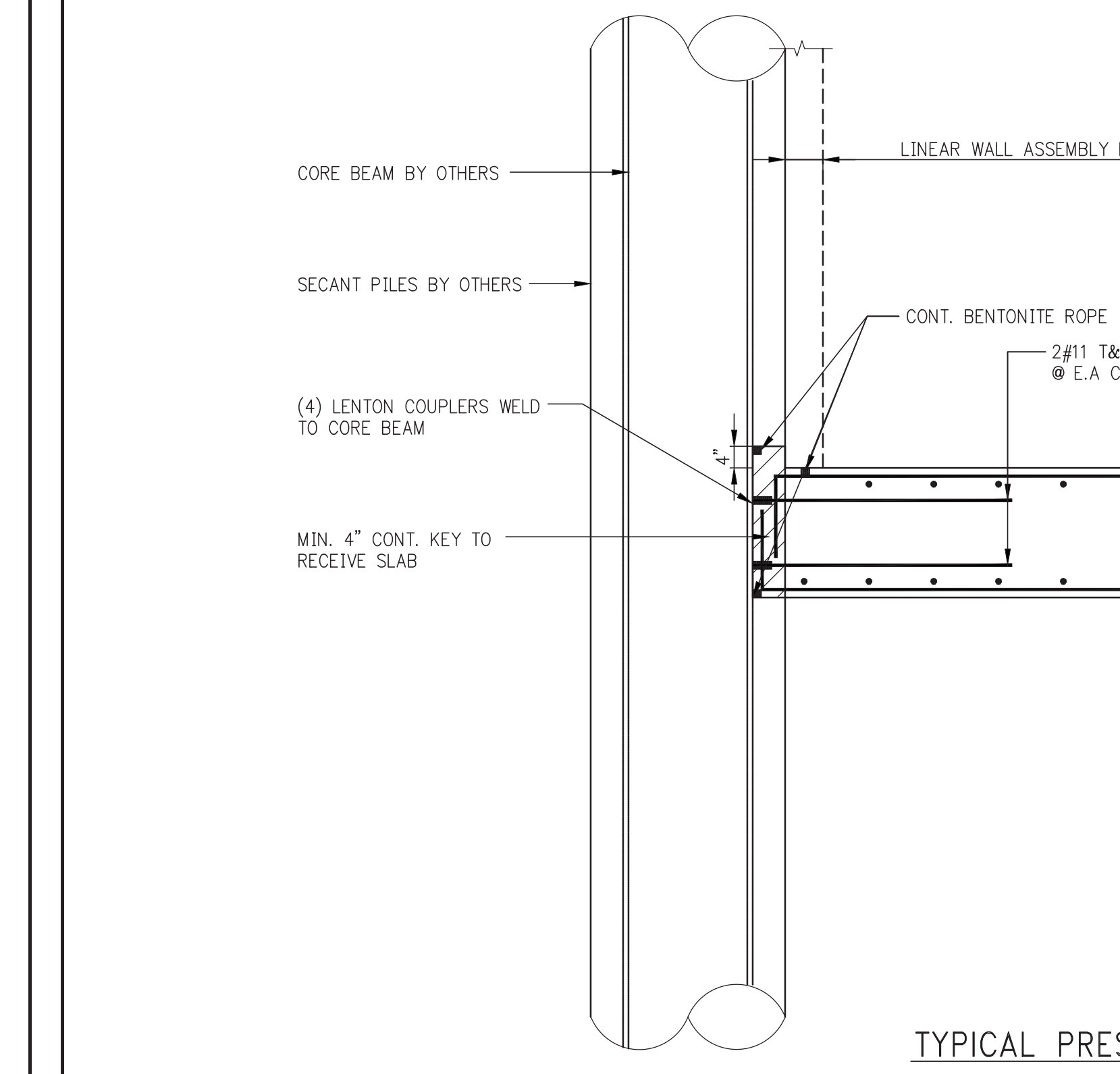


TYPICAL PRESSURE SLAB DETAIL

CORE BEAM BY OTHERS
 SECANT PILES BY OTHERS
 CONT. BENTONITE ROPE
 2-#1 T&B @ E.A. CORE BEAM
 FOR REIN. SEE PLAN
 MIN. 4" CONT. KEY TO REACTIVE SLAB
 FOR SLAB THICKNESS SEE PLAN

STEPPED FOUNDATION WALL FOOTING ON ROCK
 (DOES NOT APPLY TO SHEARWALLS)

FOOTING REINFORCEMENT AS DEFINED ON FOUNDATION PLANS AND DETAILS. LOCATE ONE BAR IN EACH CORNER AS SHOWN
 SEE LAP SPICE TABLES
 CONTINUOUS BOTTOM WALL REINFORCEMENT 2-#7 MINIMUM. PLANS & DETAILS MAY REQUIRE HEAVIER REINFORCEMENT
 AT MULTIPLE STEPS, MAXIMUM STEP = 3'-0" MINIMUM STEP = 1'-0"
 SLOPE ROCK TO STEEPEST SLOPE ROCK CAN HOLD (VERTICAL IS OK.)
 LEVEL PORTION TO BE TWO TIMES THE VERTICAL STEP DIMENSION
 FOR FOOTING THICKNESS & WIDTH SEE FOUNDATION PLANS & DETAILS



TYPICAL FOUNDATION DETAILS

5-4 1/2" CONDUITS
 FOUNDATION REIN. SEE PLAN
 CELLAR SLAB
 #4@12 3" CLEAR

TYPICAL CONC. ENCASED ELECTRICAL CONDUITS BANK

NOTE:
 FOR LOCATION OF BANK SEE ELECTRICAL APPROVED UNDER DIRECTIVE 2 OF 1995 INTERDISCIPLINARY COORDINATION Date: 06/25/2017
 NYC Development Hub

CETRARUDDY

2016-04-22 ISSUED FOR DESIGN DEVELOPMENT 1

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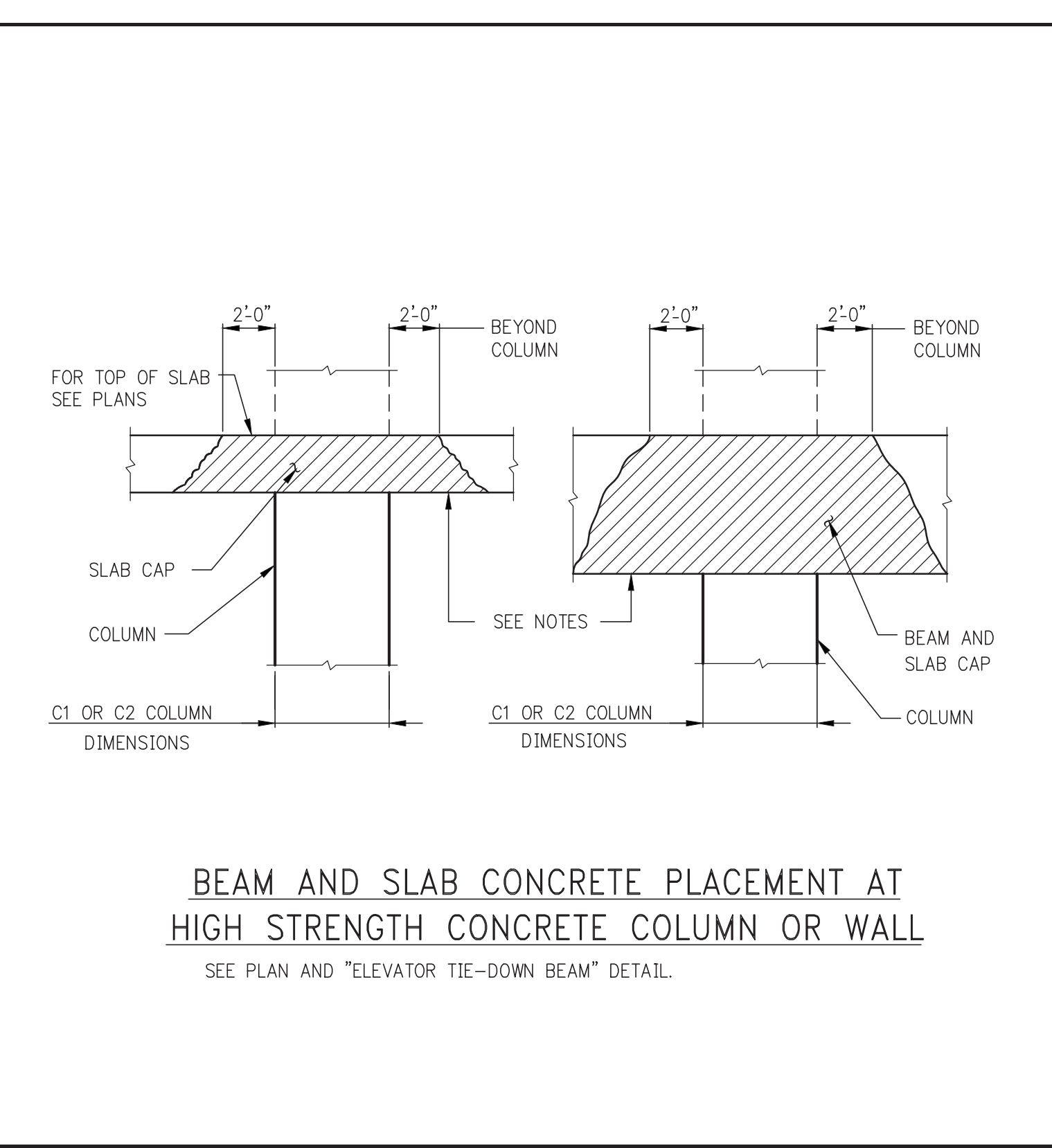
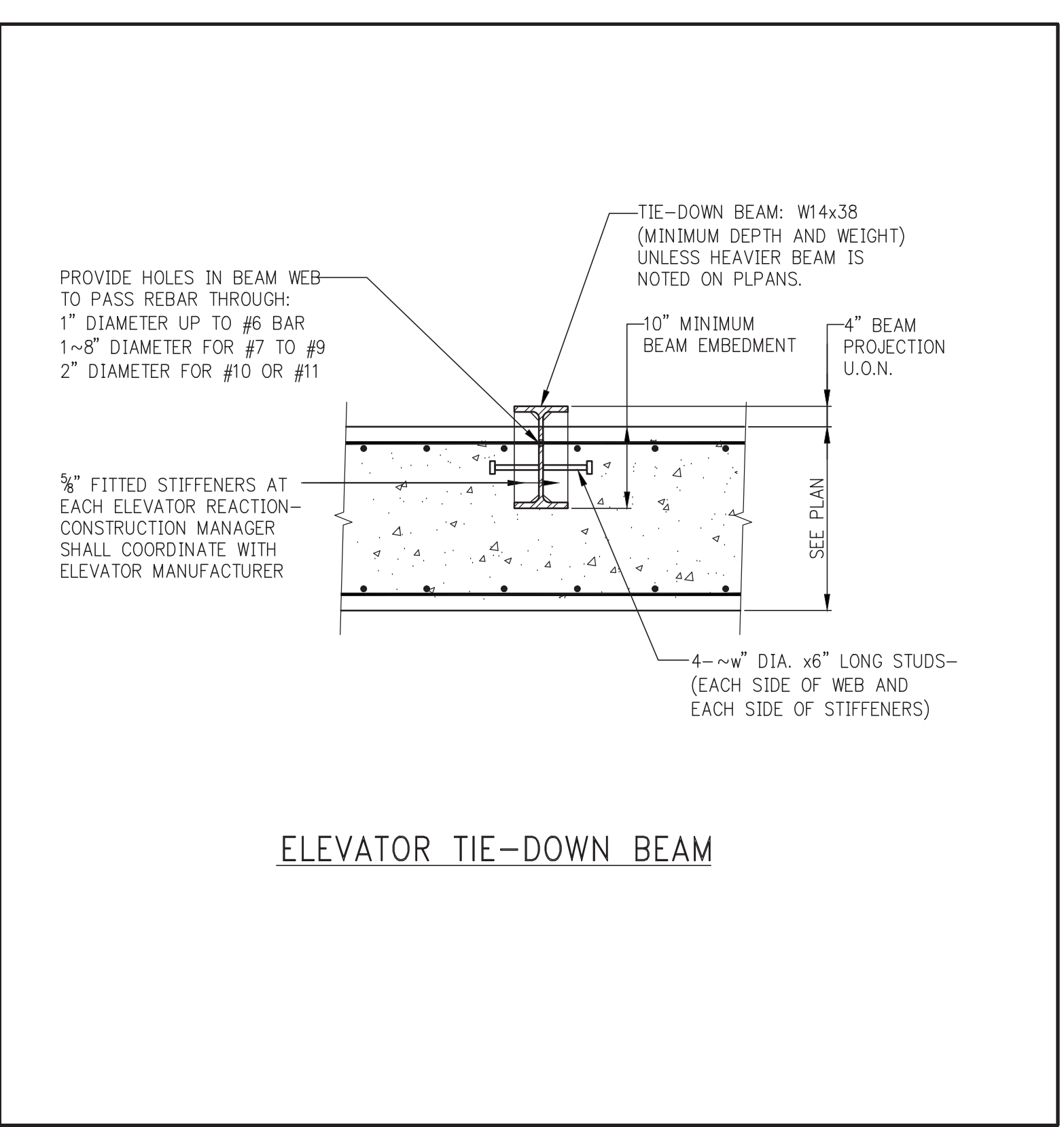
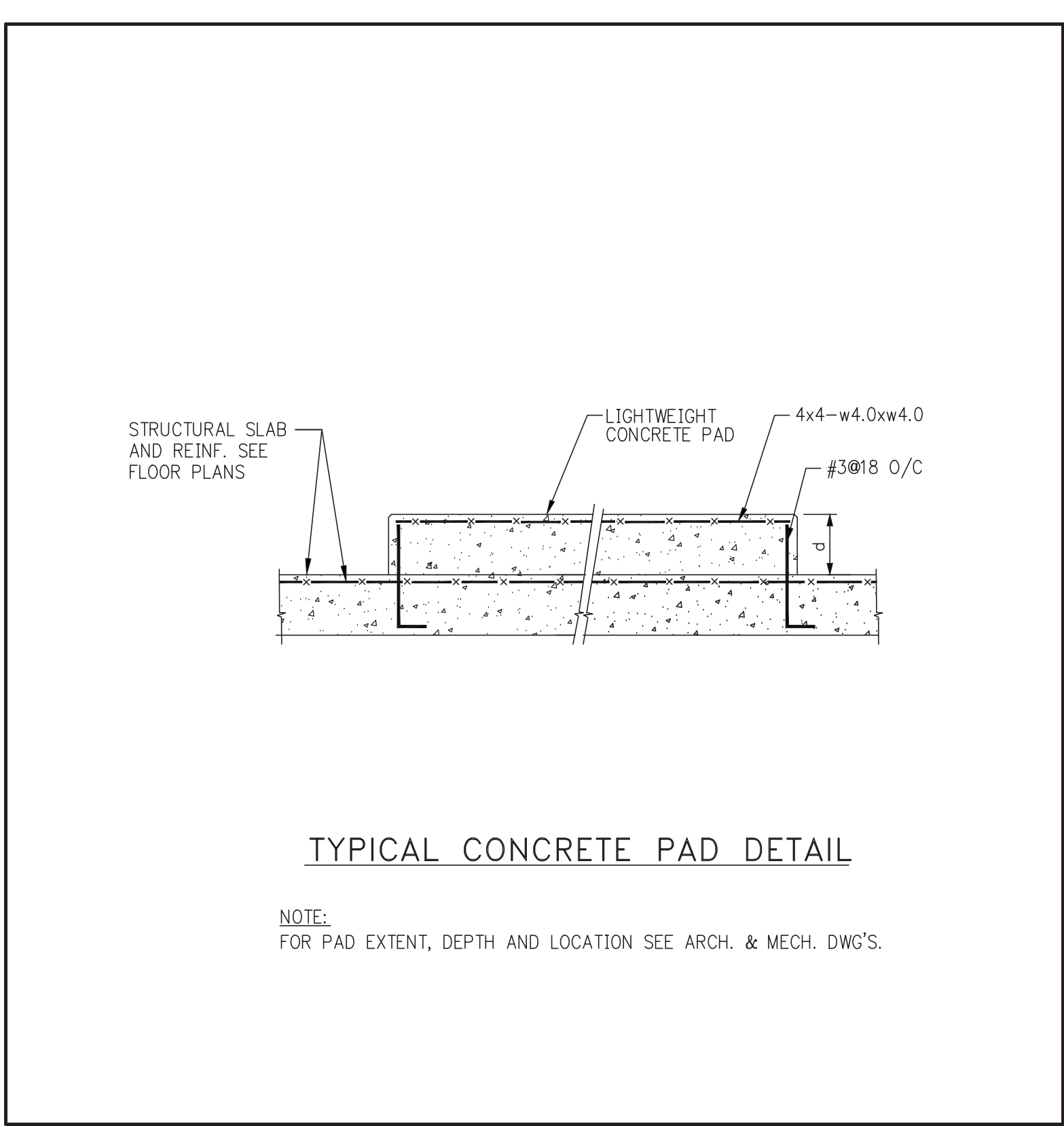
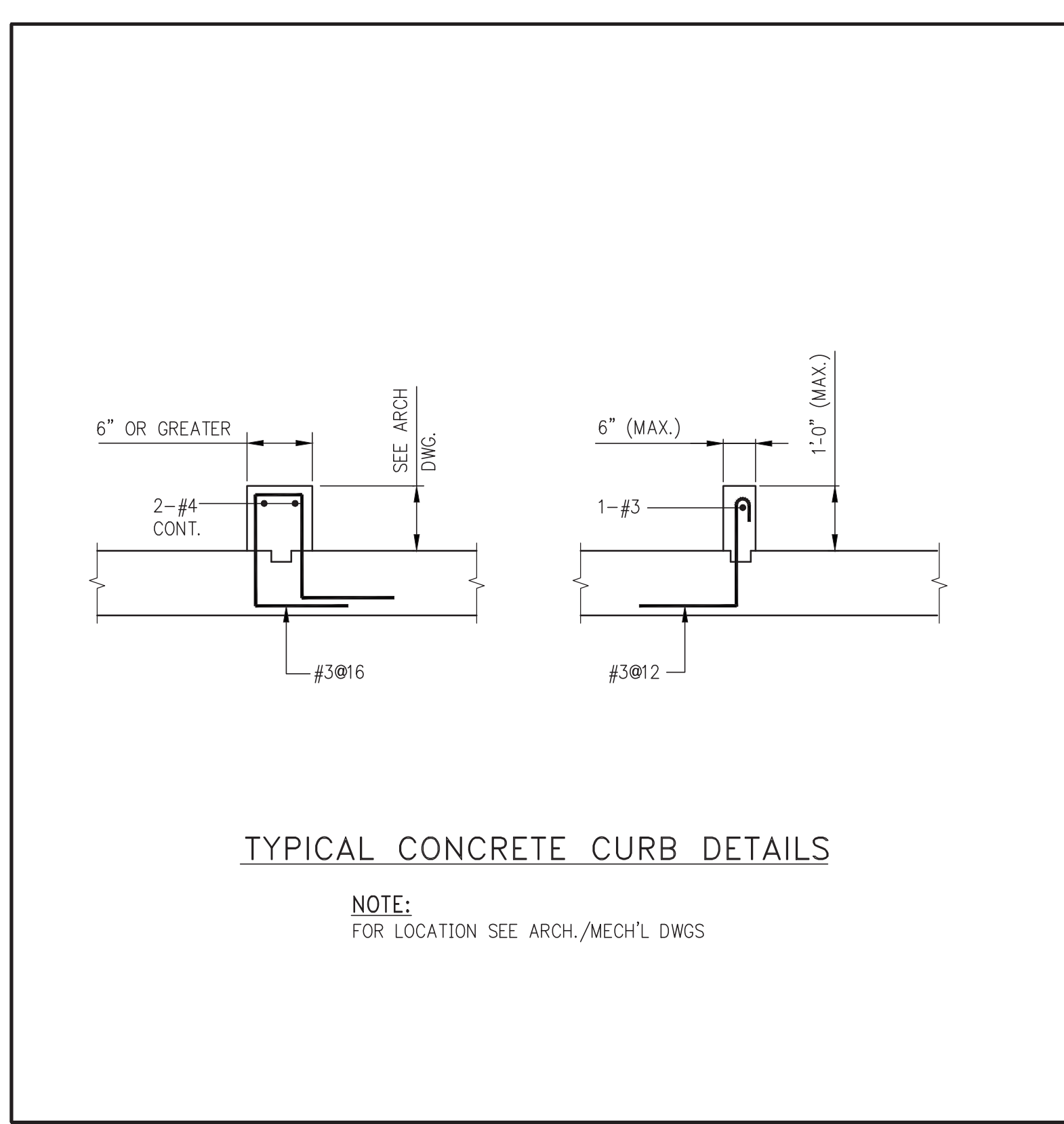
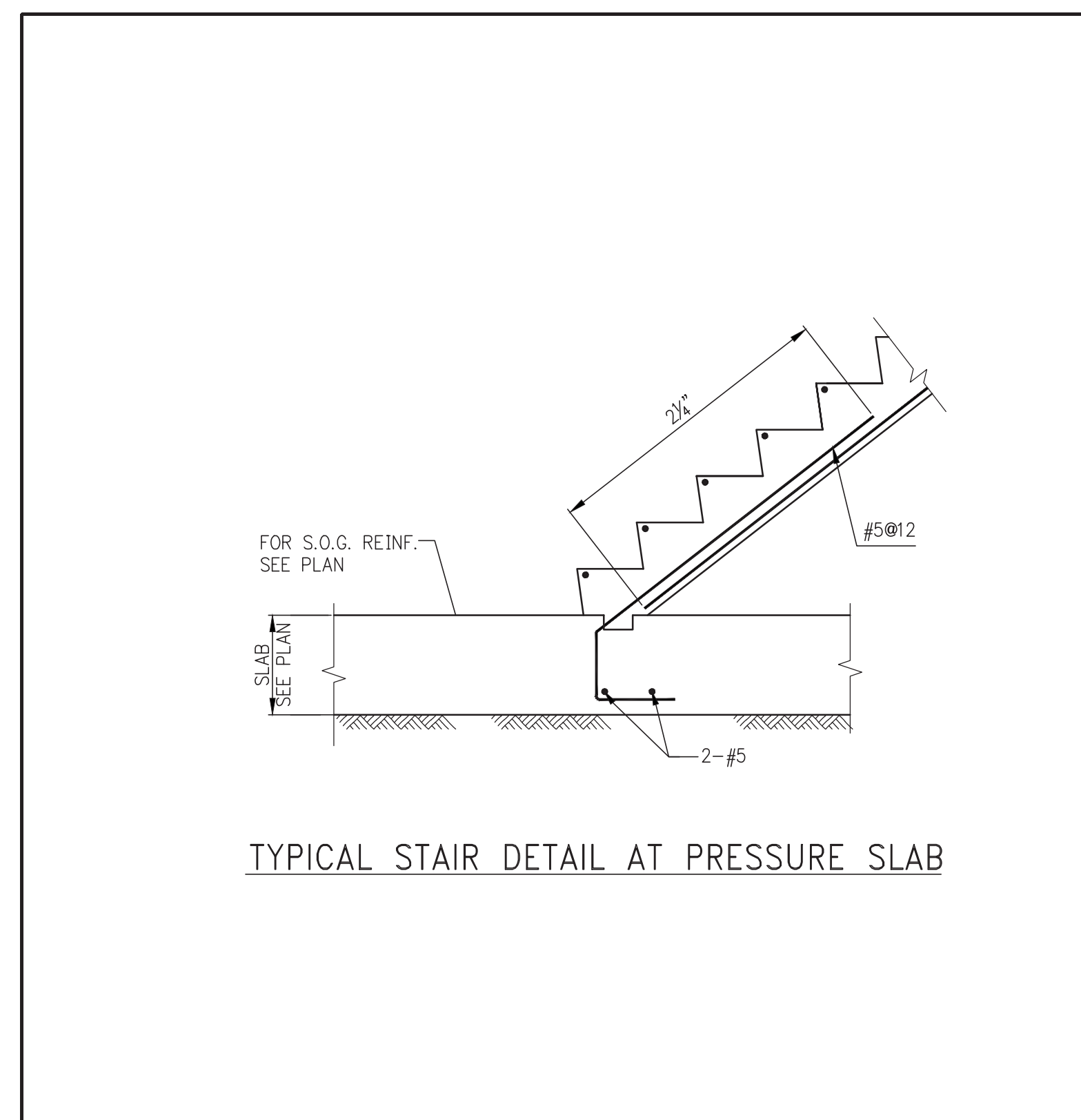
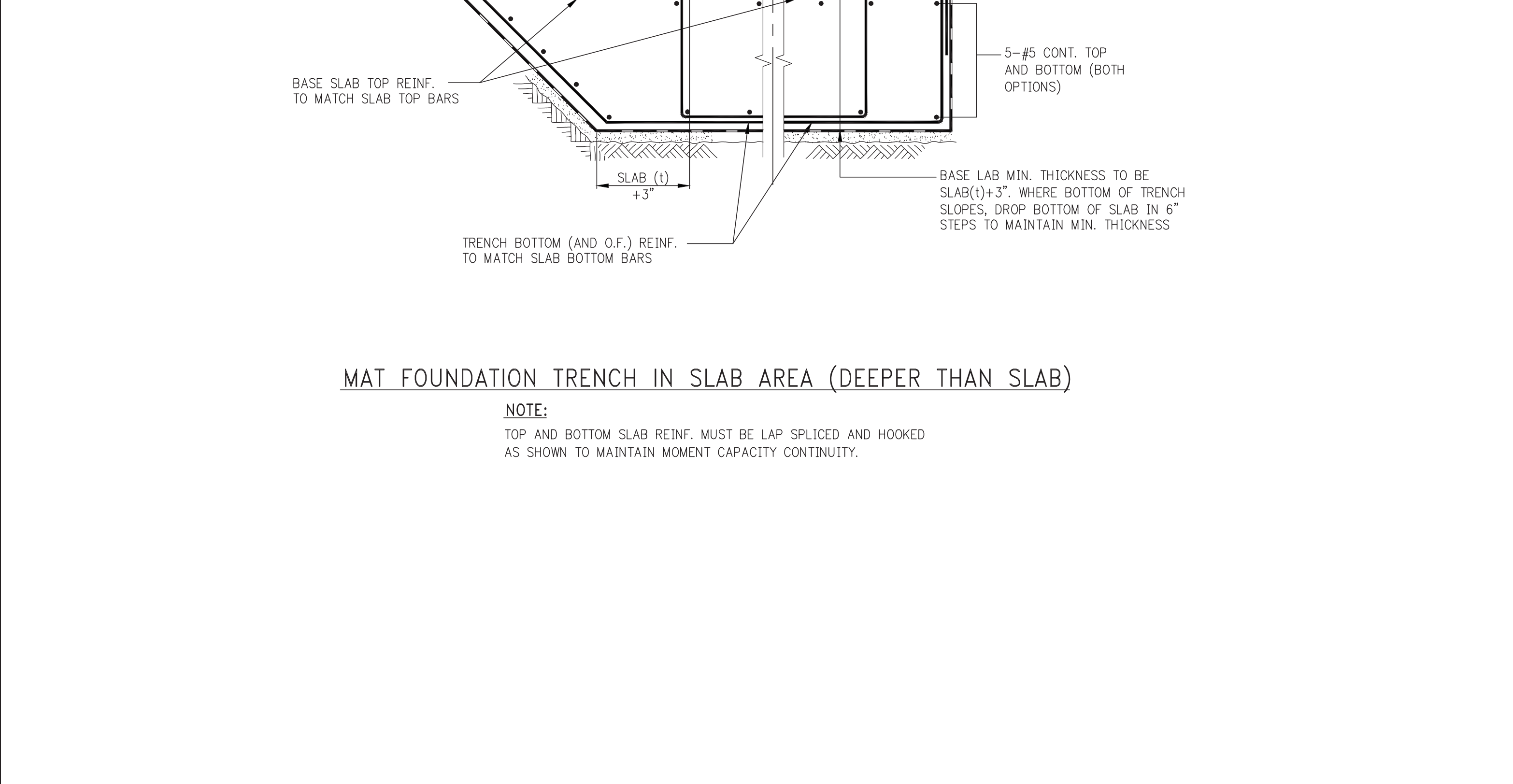
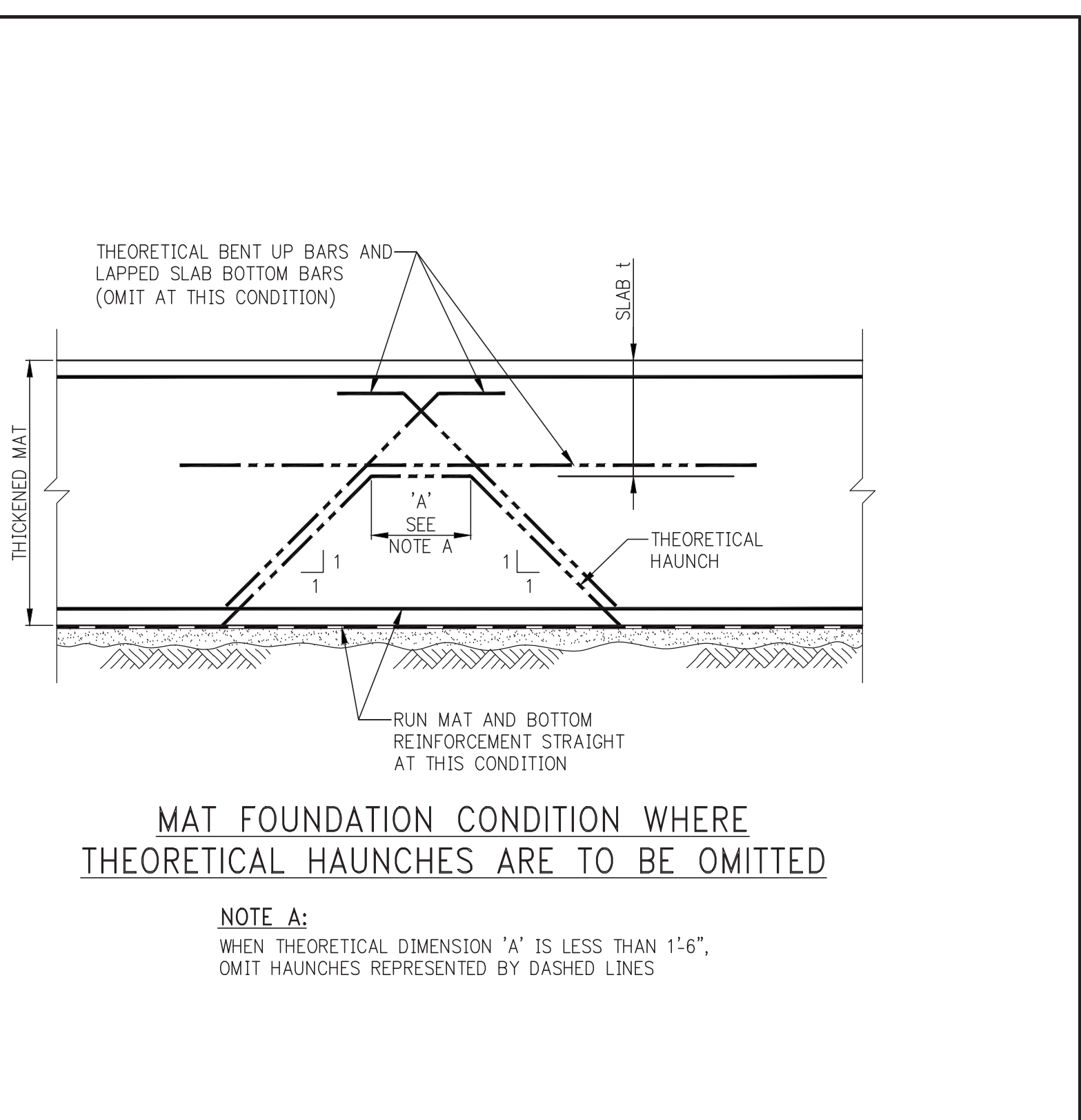
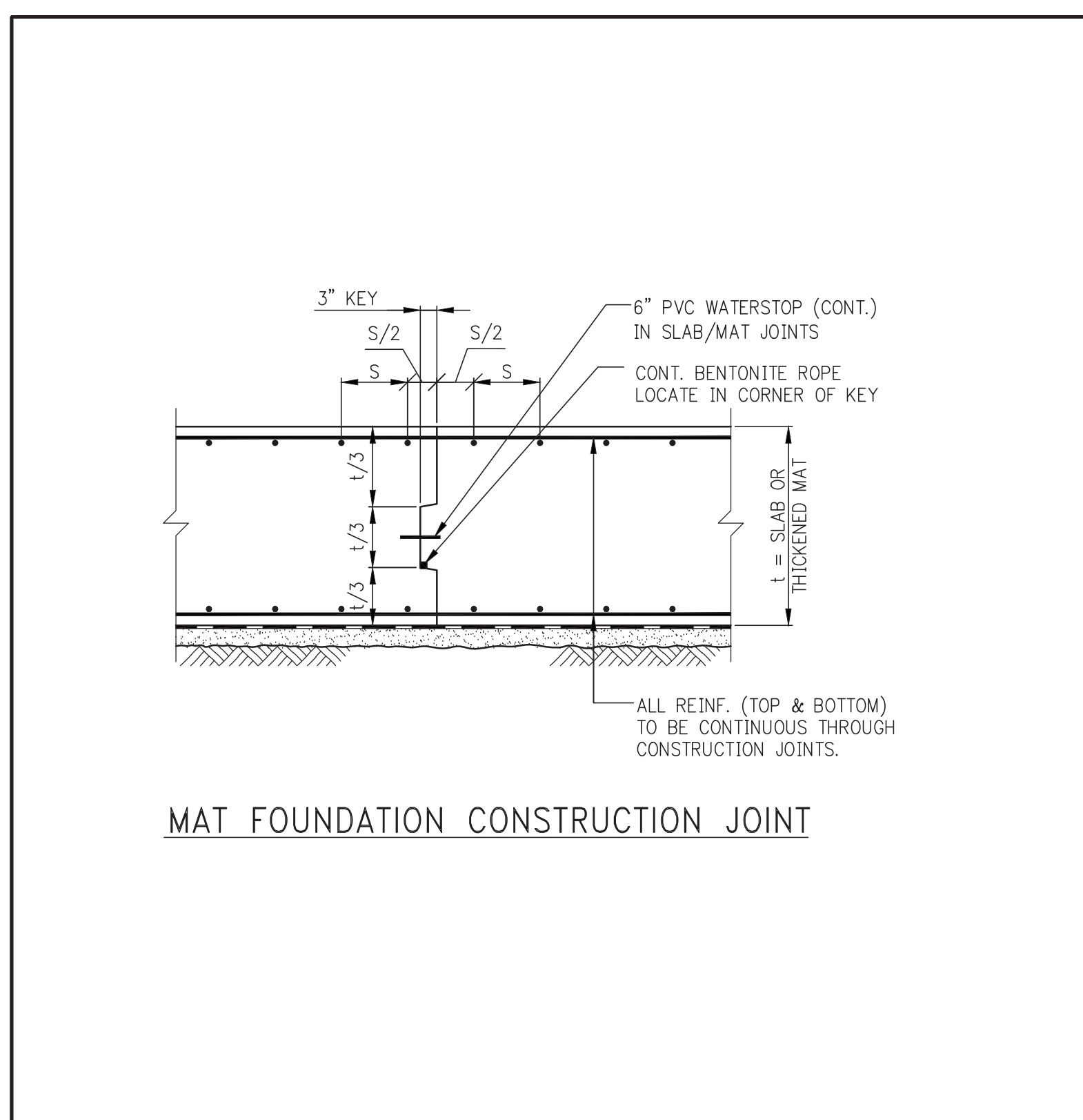
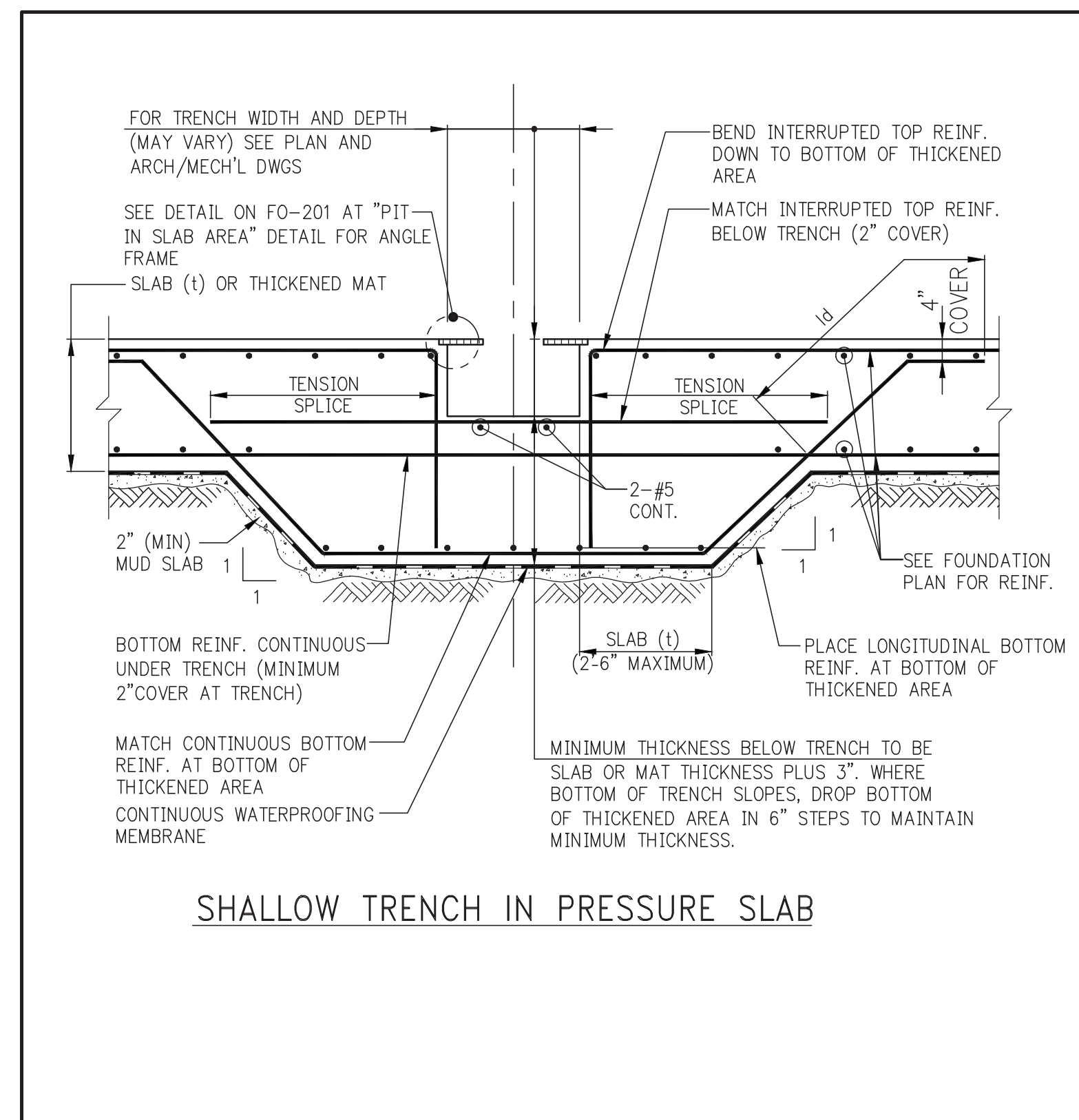
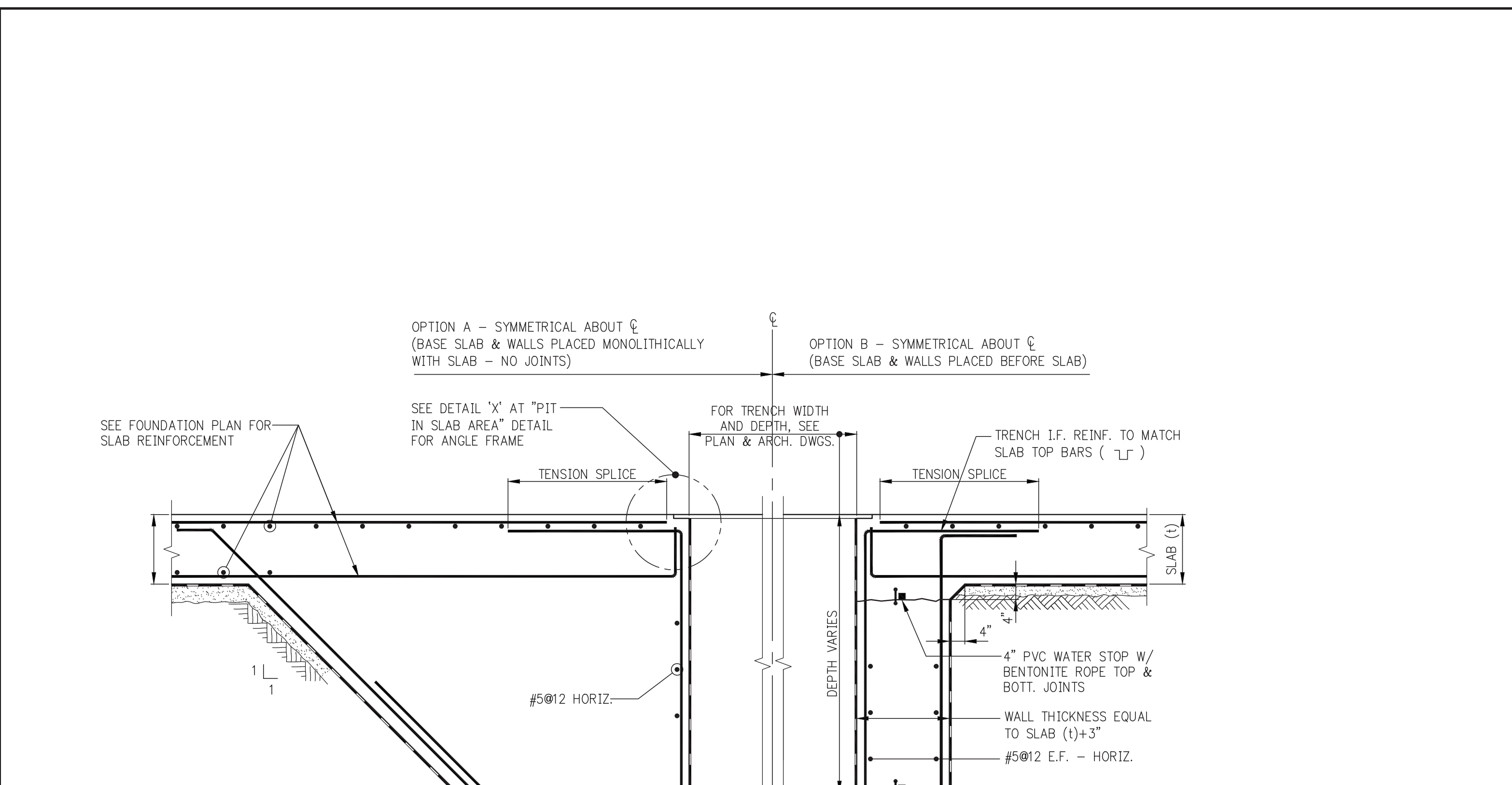
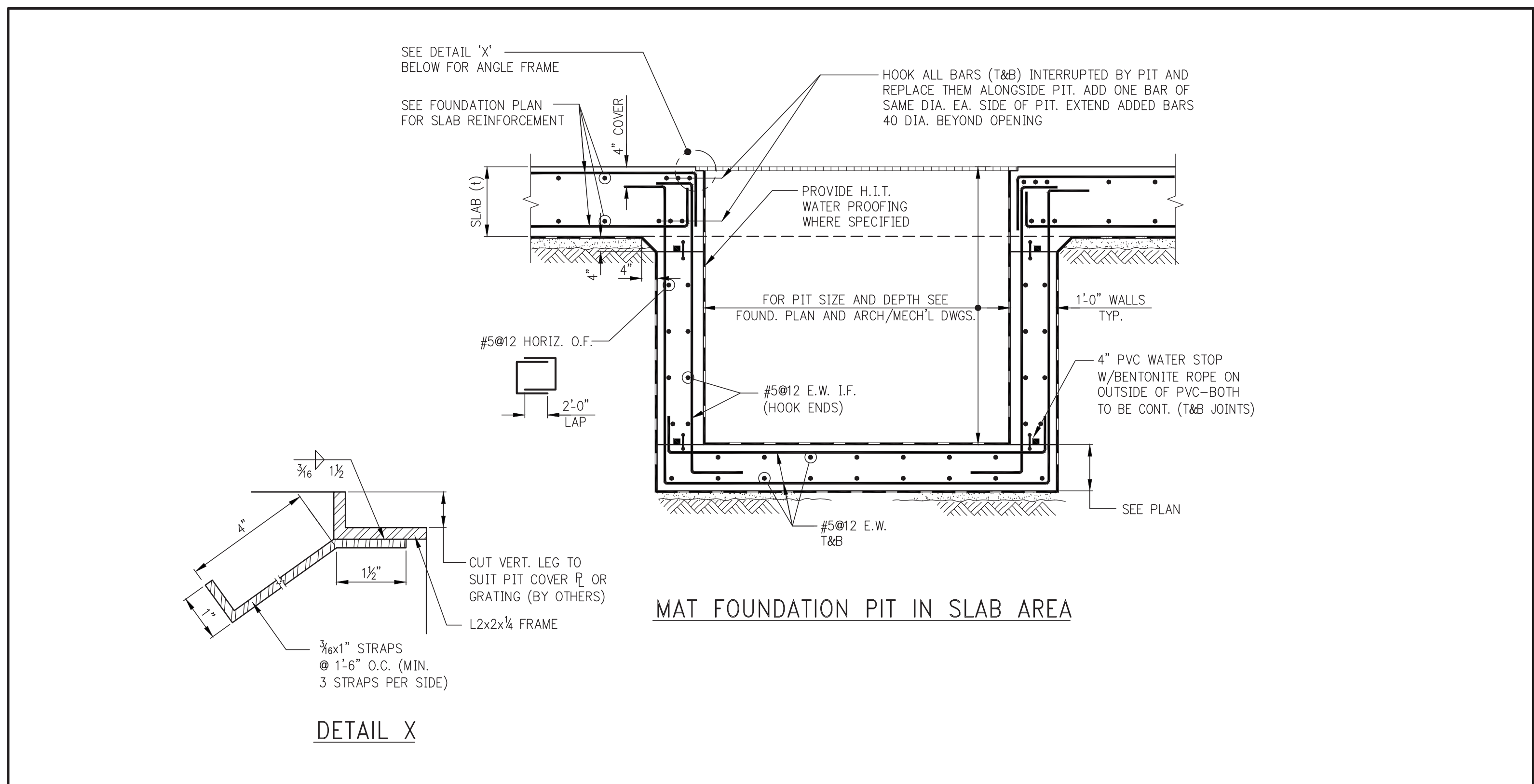
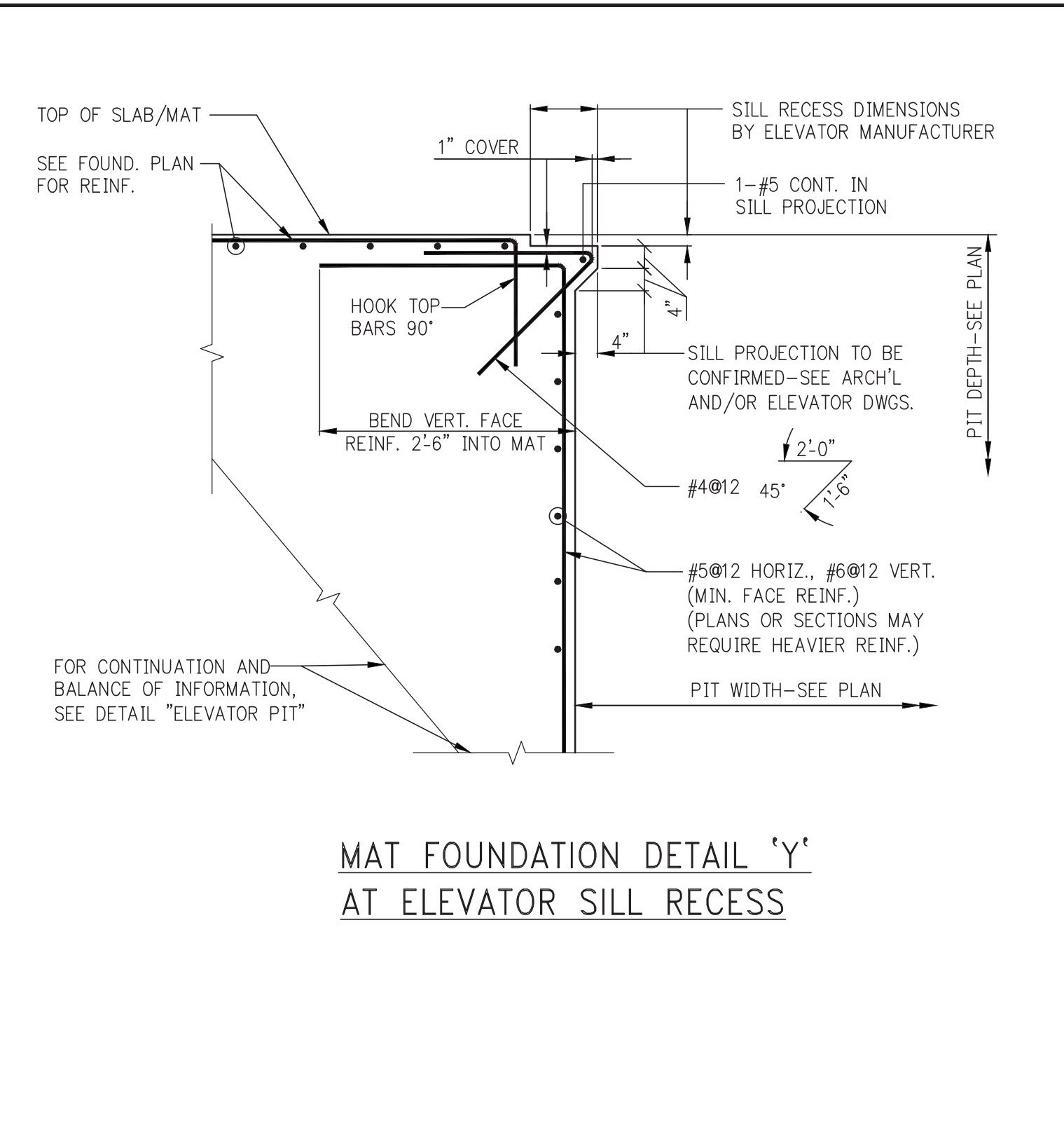
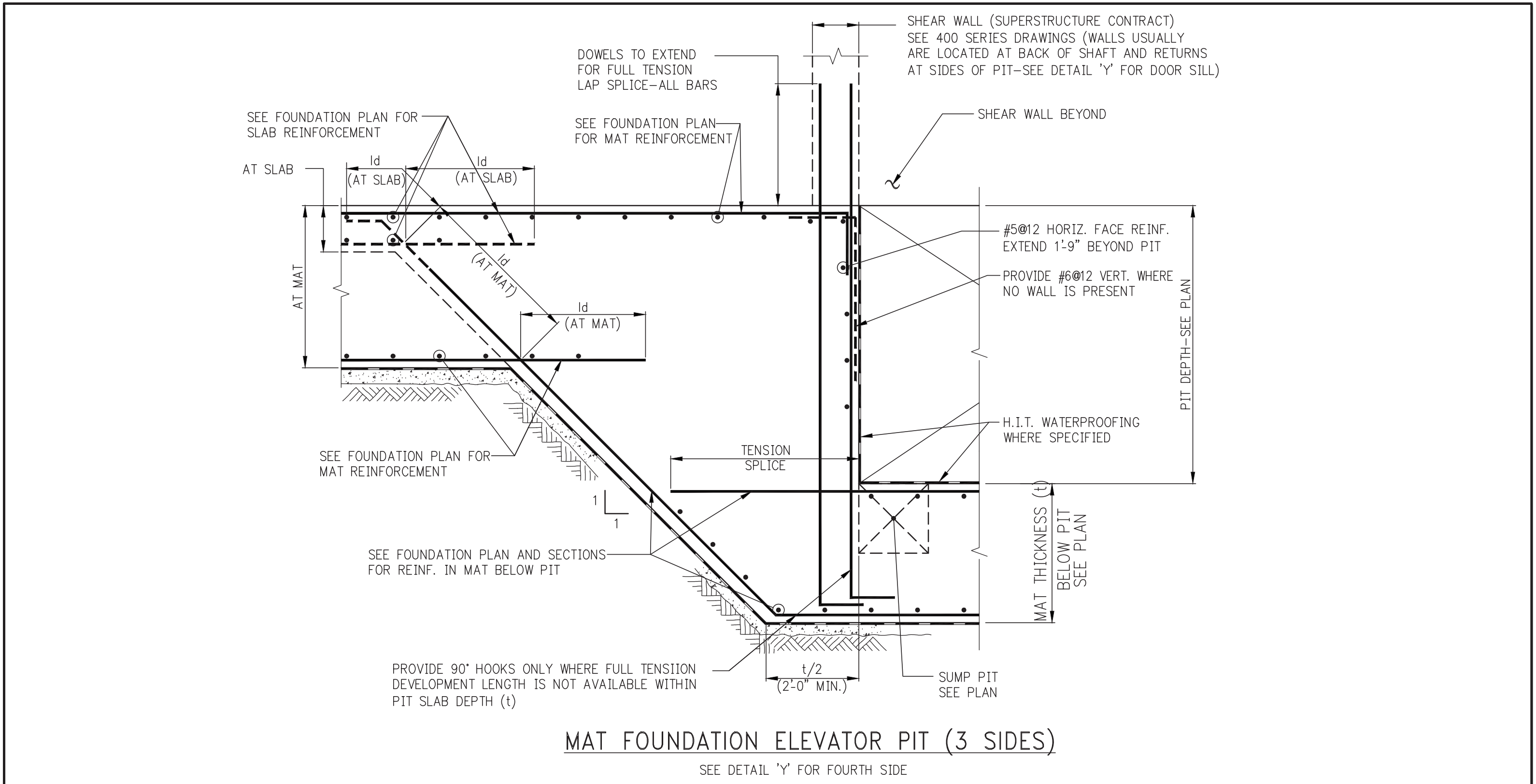
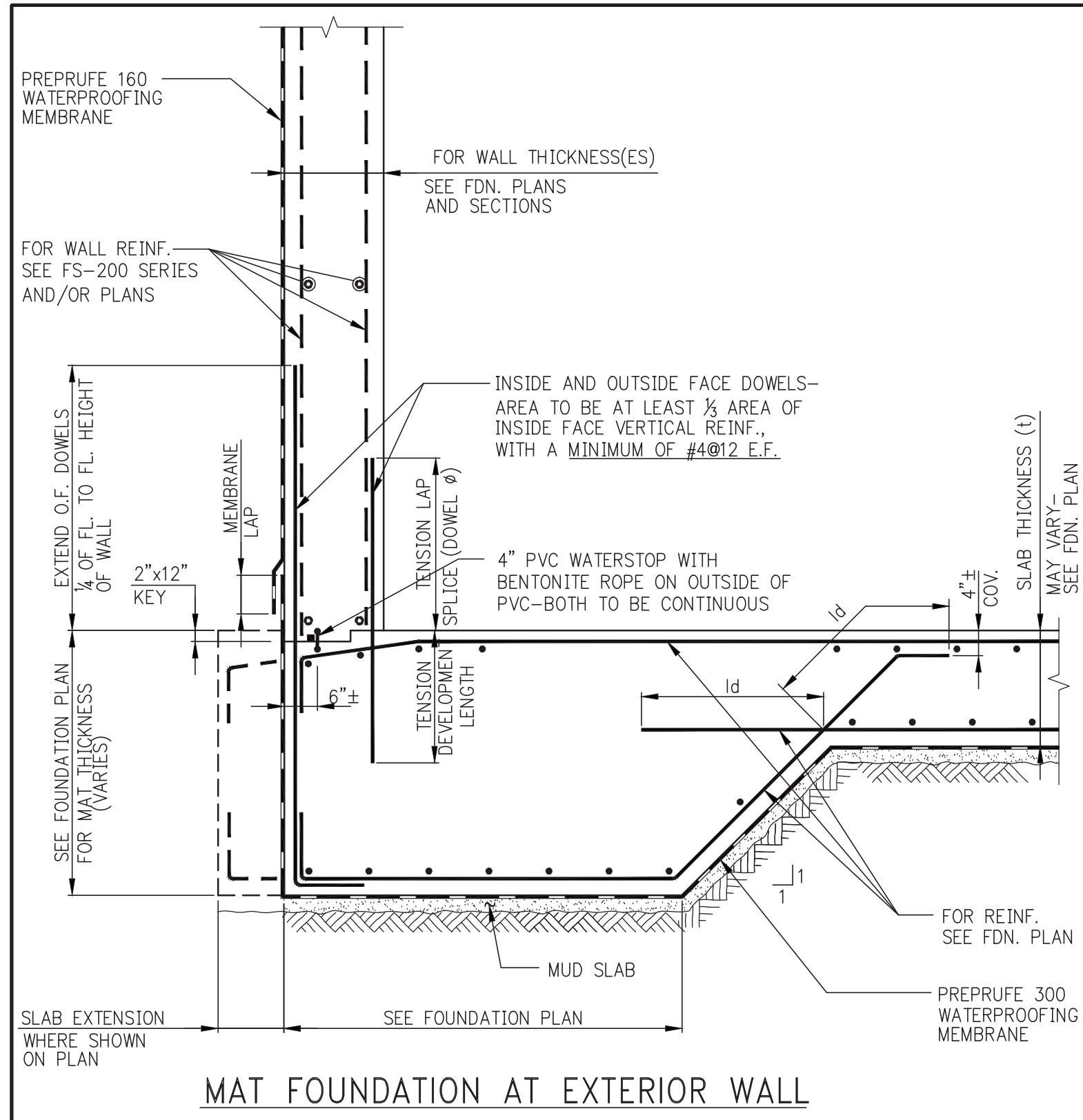
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NOTES:

- IN CONFORMANCE WITH 10.13 OF ACI 318-89 (10.15 IN 2002 CODE), USE THIS DETAIL WHEN THE SPECIFIED STRENGTH IN COLUMN/WALL IS GREATER THAN 1.4 TIMES THAT SPECIFIED FOR THE FLOOR SYSTEM.
- CAP SHALL BE NORMAL-WEIGHT STONE CONCRETE, EQUAL IN STRENGTH TO THAT SPECIFIED FOR THE COLUMN/WALL. CAP SHALL EXTEND BEYOND COLUMN/WALL IN ALL DIRECTIONS AS SHOWN ABOVE.
- CAP CONCRETE SHALL NOT BE PLACED OVER THE COLUMN/WALL UNTIL COLUMN/WALL CONCRETE IS NO LONGER PLASTIC, BUT IN NO CASE LESS THAN TWO HOURS AFTER COLUMN/WALL CONCRETE PLACEMENT HAS BEEN COMPLETED.
- THE BALANCE OF CONCRETE IN SLAB AND BEAMS SHALL BE PLACED WHILE CAP CONCRETE IS STILL IN A WORKABLE PLASTIC CONDITION, BEFORE INITIAL SET. RETEMPERING OF CONCRETE WILL NOT BE PERMITTED.
- IN LIEU OF PLACING TWO DIFFERENT STRENGTHS OF CONCRETE WITHIN THE SAME FLOOR SYSTEM, THE CONTRACTOR MAY ELECT (AT NO ADDITIONAL COST TO THE OWNER) TO PLACE ONE STRENGTH THROUGHOUT THE ENTIRE FLOOR. THE MINIMUM FLOOR CONCRETE STRENGTH REQUIRED BY ACI CODE WOULD BE 0.75 TIMES THE SPECIFIED STRENGTH OF CONCRETE IN THE COLUMNS/WALLS, UP TO 10,000 PSI COLUMNS/WALL CONCRETE.
- WHEN COLUMN/WALL CONCRETE STRENGTH EXCEEDS 10,000 PSI, THE CAP DETAILS SHOWN ABOVE MUST BE FOLLOWED, USING CAPS OF SAME CONCRETE STRENGTH AS IN COLUMNS/WALLS, AND THE STRENGTH SPECIFIED ON THE DRAWINGS FOR THE BALANCE OF THE FLOOR SYSTEM.

Damian Titus
CAP DETAILS
APPROVED
Under Directive 2 of 2015
INTERDISCIPLINARY PRACTICE
Date: 06/25/2017
NYC Development Hub

2016-04-22 ISSUED FOR DESIGN DEVELOPMENT 1

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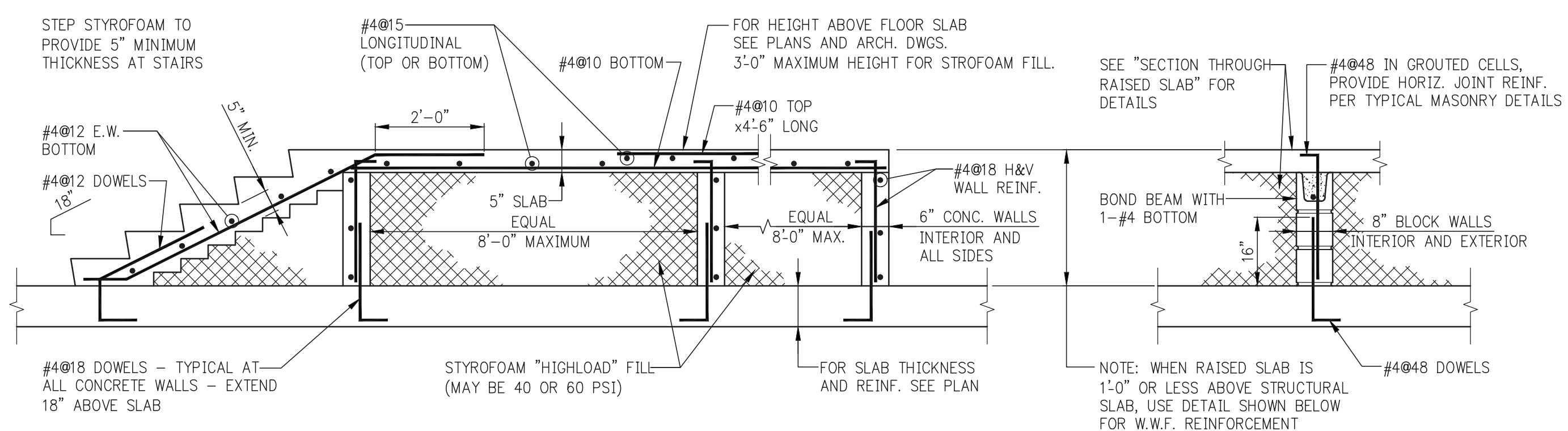
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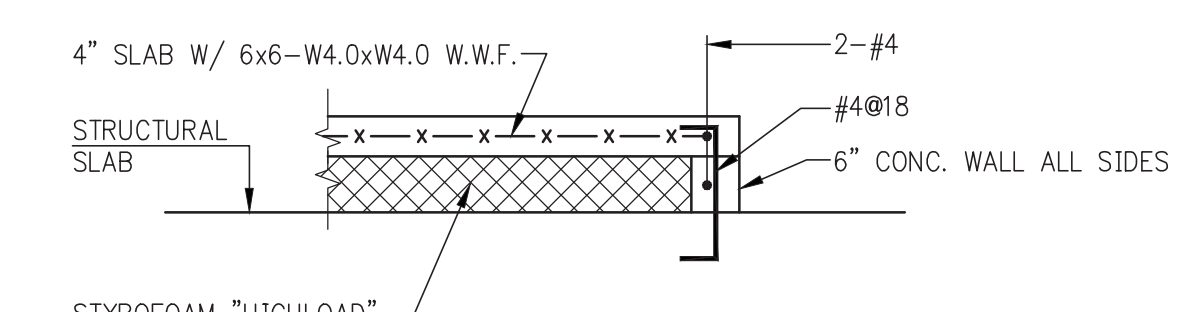
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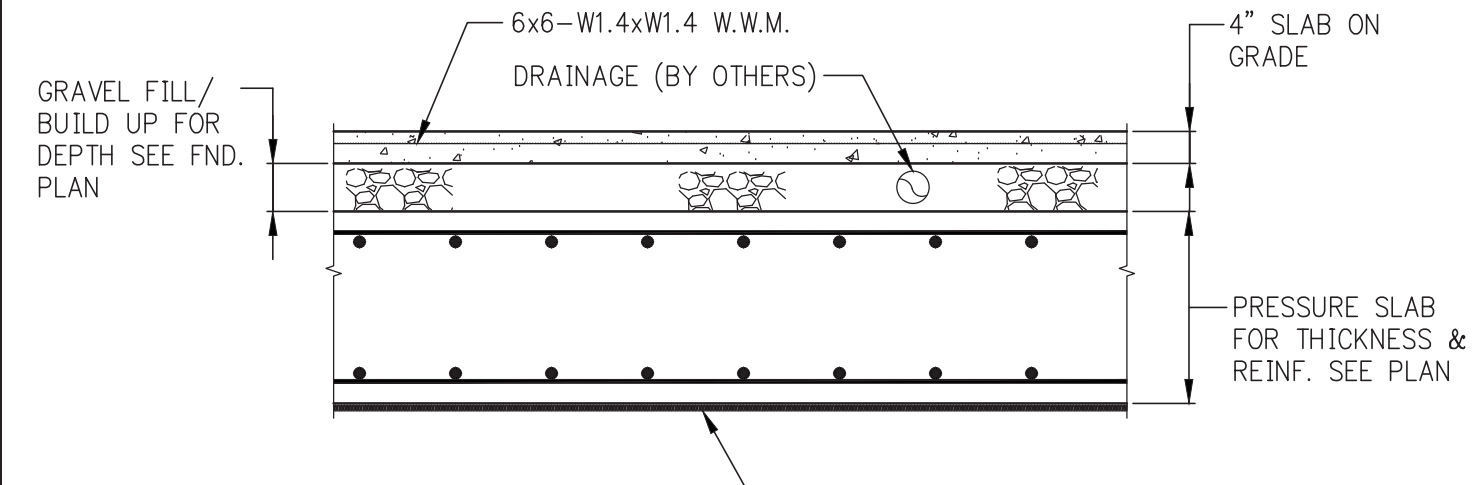


SECTION THROUGH RAISED SLAB FORMED WITH STYROFOAM
RAISED SLAB - ALTERNATIVE SUPPORTING WALL

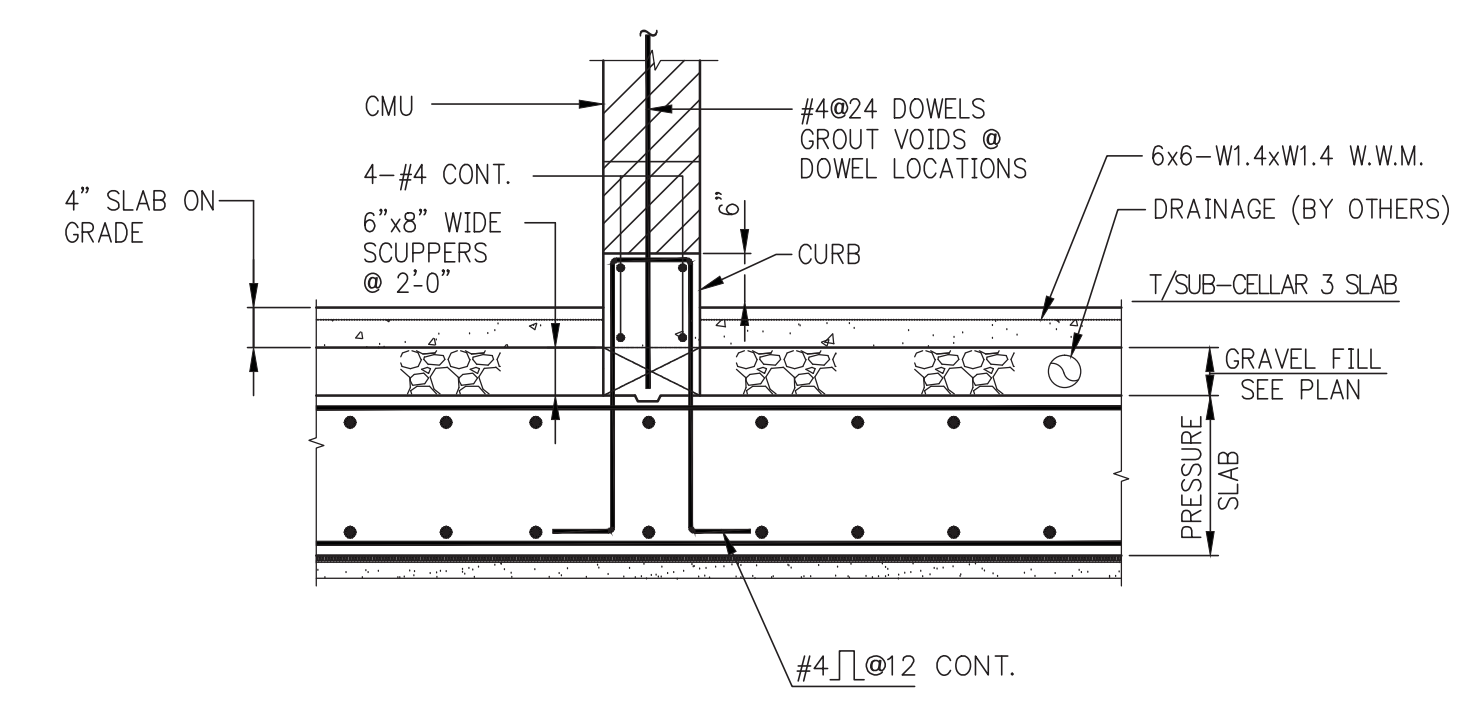
NOTES:
 1. FOR STAIR TREADS, RISERS, AND WIDTH SEE ARCH. DWGS.
 2. WHEN REQUIRED HEIGHT OF RAISED SLAB EXCEEDS 3'-0" USE STEEL DECK FORMS ALTERNATIVE.
 (STEEL DECK FORMED SLABS HAVE NO HEIGHT RESTRICTIONS, MINIMUM OR MAXIMUM)



RAISED SLAB - 1'-0" OR LESS IN HEIGHT ABOVE STRUCTURAL SLAB

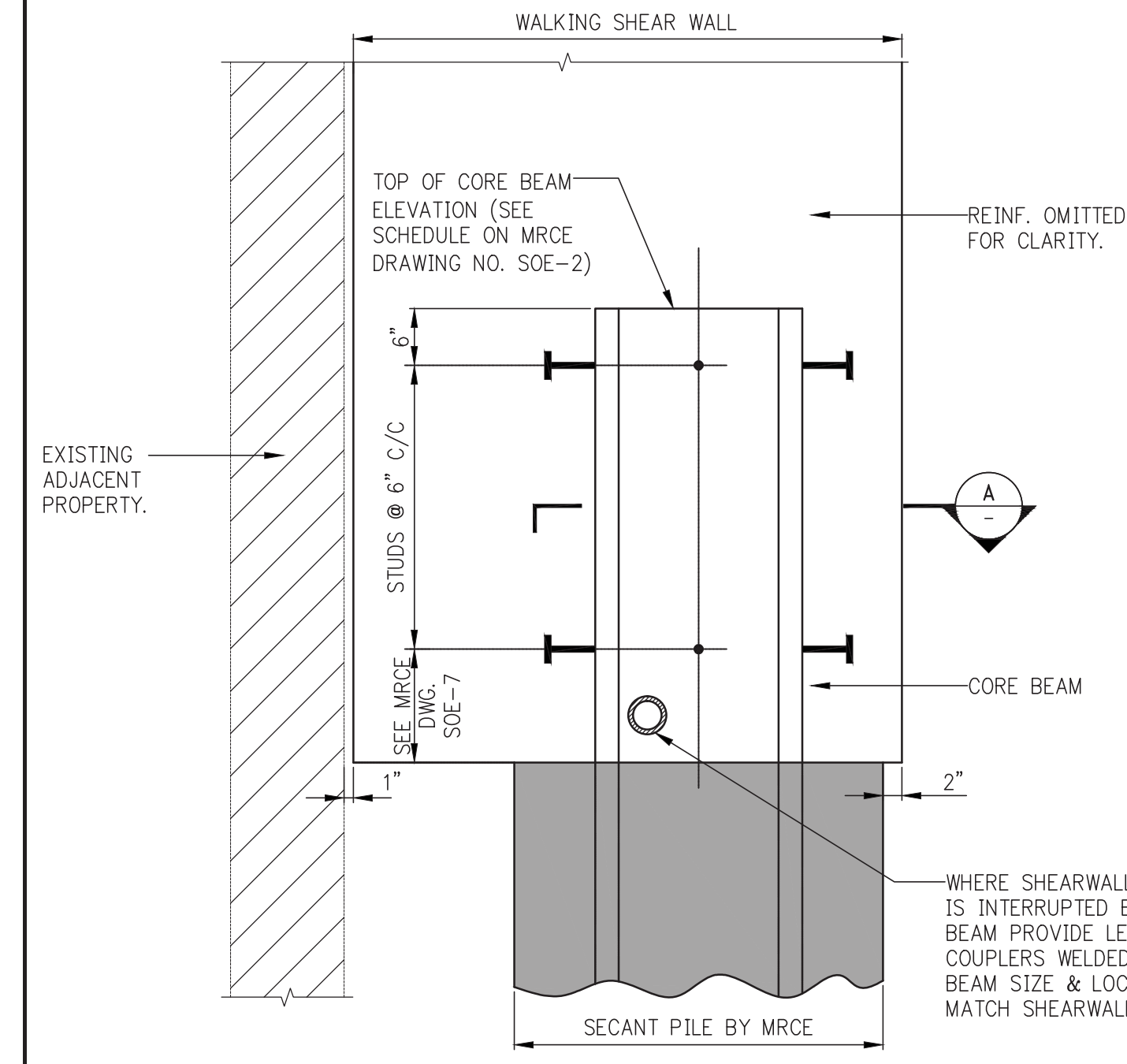


TYPICAL DOUBLE SLAB CONSTRUCTION



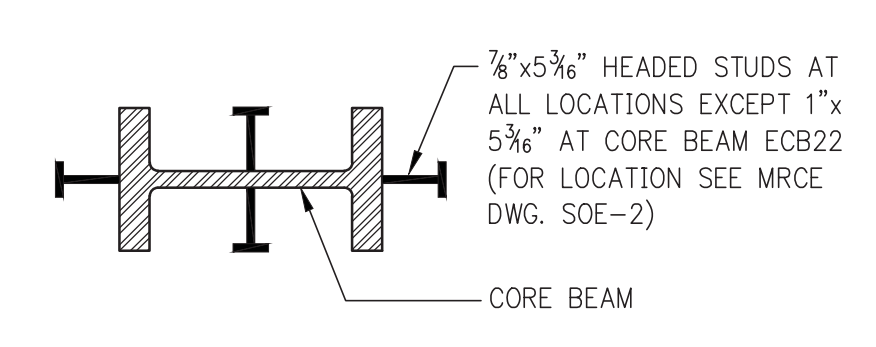
TYPICAL CONCRETE CURB/CMU WALL DETAIL AT DOUBLE SLAB CONSTRUCTION

NOTE:
 1. FOR LOCATION SEE ARCH. DWGS.
 2. USE SAME DETAIL AT BASE OF CONCRETE WALLS IN THE CELLAR.



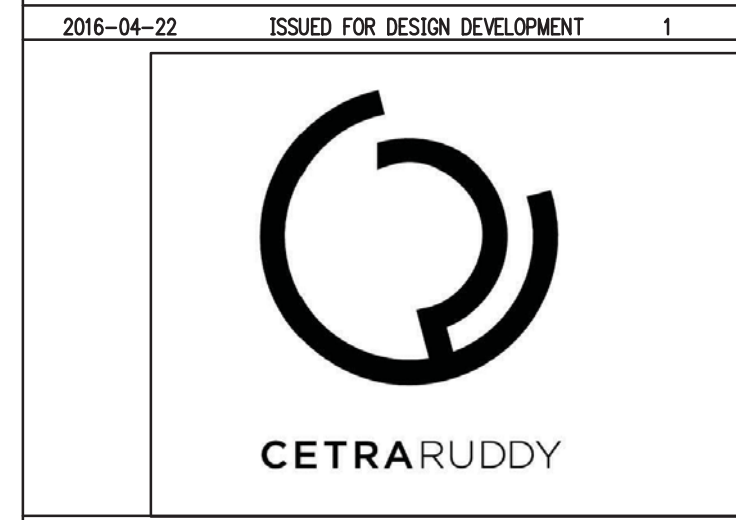
TYPICAL CORE BEAM DEVELOPMENT DETAIL AT SHEAR WALL/ SECANT PILE INTERFACE

NOTES:
 1. FOR BALANCE OF INFO, SEE MRCE DWG. SOE-7



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

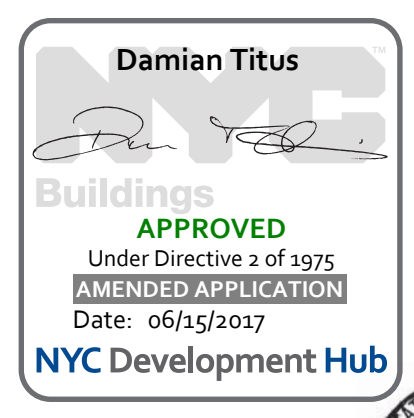
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TYPICAL FOUNDATION DETAILS

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TABLE #5
DEVELOPMENT LENGTHS FOR BARS IN COMPRESSION (LENGTHS IN INCHES)

BAR SIZE	f _y = 60,000 PSI			f _y = 75,000 PSI			f _y = 80,000 PSI		
	CONC. f _c (IN PSI)	CONC. f _c (IN PSI)	CONC. f _c (IN PSI)	CONC. f _c (IN PSI)	CONC. f _c (IN PSI)	CONC. f _c (IN PSI)	CONC. f _c (IN PSI)	CONC. f _c (IN PSI)	
#3	3,000	4,000	5,000 OR MORE	3,000	4,000	5,000 OR MORE	3,000	4,000	5,000 OR MORE
#4	12	12	12	12	12	12	12	12	12
#5	12	12	12	12	12	12	12	12	12
#6	12	12	12	12	12	12	12	12	12
#7	12	12	12	12	12	12	12	12	12
#8	12	12	12	12	12	12	12	12	12
#9	12	12	12	12	12	12	12	12	12
#10	12	12	12	12	12	12	12	12	12
#11	12	12	12	12	12	12	12	12	12
#12	12	12	12	12	12	12	12	12	12

TABLE #4
COMPRESSION LAP SPLICES (LENGTHS IN INCHES)

BAR SIZE	GRADE OF REINFORCEMENT		
	60 KSI (30 DIA.)	75 KSI (44 DIA.)	80 KSI (48 DIA.)
#3	12	17	18
#4	15	22	24
#5	19	28	30
#6	23	35	36
#7	27	39	42
#8	30	44	48
#9	34	50	54
#10	38	56	61
#11	43	62	68

1. LAP SPLICES ARE NOT PERMITTED USE MECHANICAL CONNECTIONS OR WELDED SPLICES FOR #4 AND #8, PER ACI 318 (12.14.3).
 2. LAP SPLICES OF #14 AND #18 BARS TO #11 AND SMALLER BARS ARE PERMITTED PER ACI 318 (12.16.2).
 3. FOR BARS OF DIFFERENT SIZE, USE LARGER DEVL. LENGTH OF SMALLER BAR (TABLE #5) OR DEVELOPMENT LENGTH OF LARGER BAR (FROM TABLE #5) PER ACI 318 (12.16.2).

NOTE:
TABLE #4 APPLIES FOR NORMALWEIGHT CONCRETE WITH f_c = 3,000 PSI OR GREATER.

TABLE #3
TENSION DEVELOPMENT LENGTHS FOR STANDARD END HOOKS (LENGTHS IN INCHES)

BAR SIZE	CONCRETE STRENGTH (PSI)							
	3,000	4,000	5,000	6,000	7,000	8,000	9,000	10,000
#3	9	7	6	6	6	6	6	6
#4	11	10	9	8	7	7	7	6
#5	14	12	11	10	9	9	8	8
#6	17	15	13	12	11	10	10	9
#7	19	17	15	14	13	12	11	11
#8	22	19	17	16	15	14	13	12
#9	25	22	19	18	16	15	15	14
#10	28	24	22	20	19	17	16	16
#11	31	27	24	22	21	19	18	17
#12	37	32	29	27	25	23	22	21
#18	50	43	39	35	33	31	29	27

NOTES:
 1. TABLE 3 CONFORMS TO ACI 318-2002 (AND 2005). TABULATED VALUES ARE BASED UPON ACI 12.5.2, ASSUMING GRADE 60 REINFORCEMENT AND NORMALWEIGHT CONCRETE.
 2. PER ACI 12.5.3 a), FOR #11 AND SMALLER BARS, IF COVER TO BAR IS 2 1/2 INCHES OR MORE, AND FOR 90 DEGREE HOOK WITH COVER ON BAR EXTENSION BEYOND HOOK NOT LESS THAN 7 INCHES, A MODIFICATION FACTOR OF 0.7 MAY BE APPLIED. MINIMUM l_{dh} SHALL NOT BE LESS THAN 8db NOR 6 INCHES.

TABLE #2
TENSION DEVELOPMENT LENGTHS (L_d) (IN INCHES)

TABLE 2.A: 3/4" COVER TO OUTER LAYER BARS OUTER LAYER DEVELOPMENT LENGTHS									TABLE 2.C: 1 1/2" COVER TO OUTER LAYER BARS OUTER LAYER DEVELOPMENT LENGTHS								
BAR SIZE	CONCRETE STRENGTH (PSI)								BAR SIZE	CONCRETE STRENGTH (PSI)							
	3,000	4,000	5,000	6,000	7,000	8,000	9,000	10,000		3,000	4,000	5,000	6,000	7,000	8,000	9,000	10,000
#3	12	12	12	12	12	12	12	12	#3	12	12	12	12	12	12	12	12
#4	16	14	13	12	12	12	12	12	#4	13	12	12	12	12	12	12	12
#5	24	21	19	17	16	15	14	13	#5	16	14	13	13	13	13	13	13
#6	33	28	25	23	22	20	18	18	#6	20	17	15	15	15	15	15	15
#7	53	46	41	37	35	32	31	29	#7	32	28	25	23	21	20	19	18
#8	66	57	51	46	43	40	38	36	#8	41	36	32	29	27	25	24	23
#9	79	69	61	56	52	49	46	43	#9	50	44	39	36	33	31	29	28
#10	93	81	72	66	61	57	54	51	#10	60	52	47	43	40	37	35	33
#11	108	94	84	76	71	66	62	59	#11	71	61	55	50	46	43	41	39

**TABLE 2.B: 3/4" COVER TO OUTER LAYER BARS
INNER LAYER DEVELOPMENT LENGTHS**

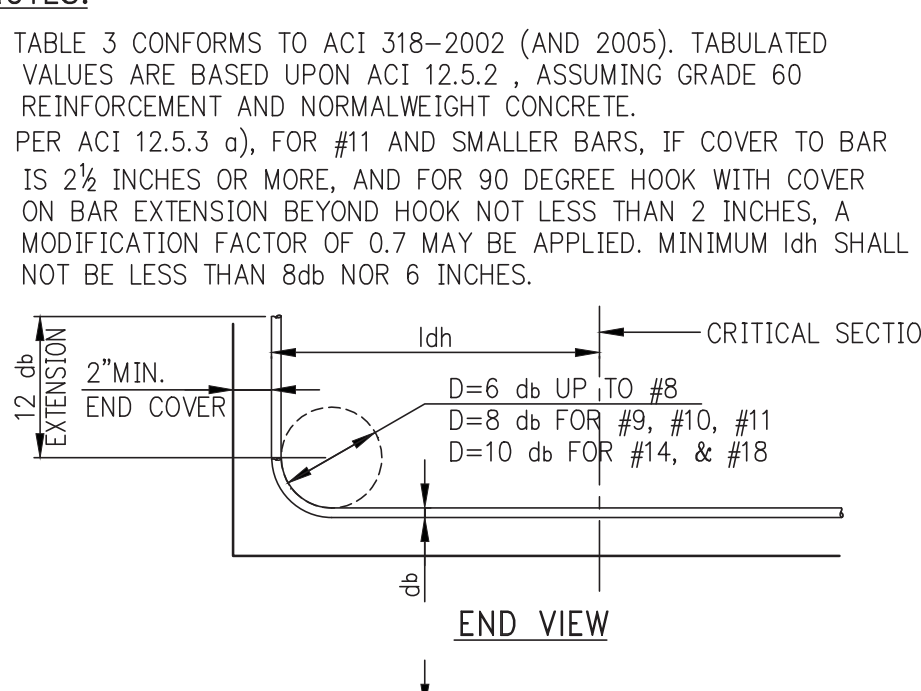
BAR SIZE	CONCRETE STRENGTH (PSI)								BAR SIZE	CONCRETE STRENGTH (PSI)							
	3,000	4,000	5,000	6,000	7,000	8,000	9,000	10,000		3,000	4,000	5,000	6,000	7,000	8,000	9,000	10,000
#3	12	12	12	12	12	12	12	12	#3	12	12	12	12	12	12	12	12
#4	13	12	12	12	12	12	12	12	#4	13	12	12	12	12	12	12	12
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#7	37	32	29	26	24	23	22	20	#7	29	25	22	20	19	18	18	18
#8	47	41	36	33	31	29	27	26	#8	33	28	25	23	22	20	20	20
#9	57	50	44	41	38	35	33	31	#9	41	35	31	29	27	25	23	23
#10	68	59	53	48	45	42	40	38	#10	49	42	38	35	32	30	28	27
#11	80	69	62	57	52	49	46	44	#11	58	50	45	41	38	35	33	32

TABLE #1:
TENSION LAP SPLICE LENGTHS (CLASS B MINIMUM)

TABLE 1.A: 3/4" COVER TO OUTER LAYER BARS OUTER LAYER LAP LENGTHS (IN INCHES)									TABLE 1.C: 1 1/2" COVER TO OUTER LAYER BARS OUTER LAYER LAP LENGTHS (IN INCHES)								
BAR SIZE	CONCRETE STRENGTH (PSI)								BAR SIZE	CONCRETE STRENGTH (PSI)							
	3,000	4,000	5,000	6,000	7,000	8,000	9,000	10,000		3,000	4,000	5,000	6,000	7,000	8,000	9,000	10,000
#3	16	16	16	16	16	16	16	16	#3	16	16	16	16	16	16	16	16
#4	21	20	20	20	20	20	20	20	#4	20	20	20	20	20	20	20	20
#5	31	27	24	24	24	24	24	24	#5	24	24	24	24	24	24	24	24
#6	43	37	33	30	29	29	29	29	#6	29	29	29	29	29	29	29	29
#7	69	60	53	49	45	42	40	38	#7	42	37	34	34	34	34	34	34
#8	85	74	66	60	56	52	49	47	#8	53	46	41	39	39	39	39	39
#9	103	89	80	73	67	63	59	56	#9	66	57	51	46	44	44	44	44
#10	121	105	94	86	79	74	70	66	#10	79	68	61	56	51	49	49	49
#11	140	122	109	99	92	86	81	77	#11	92	80	72	65	60	57	54	54

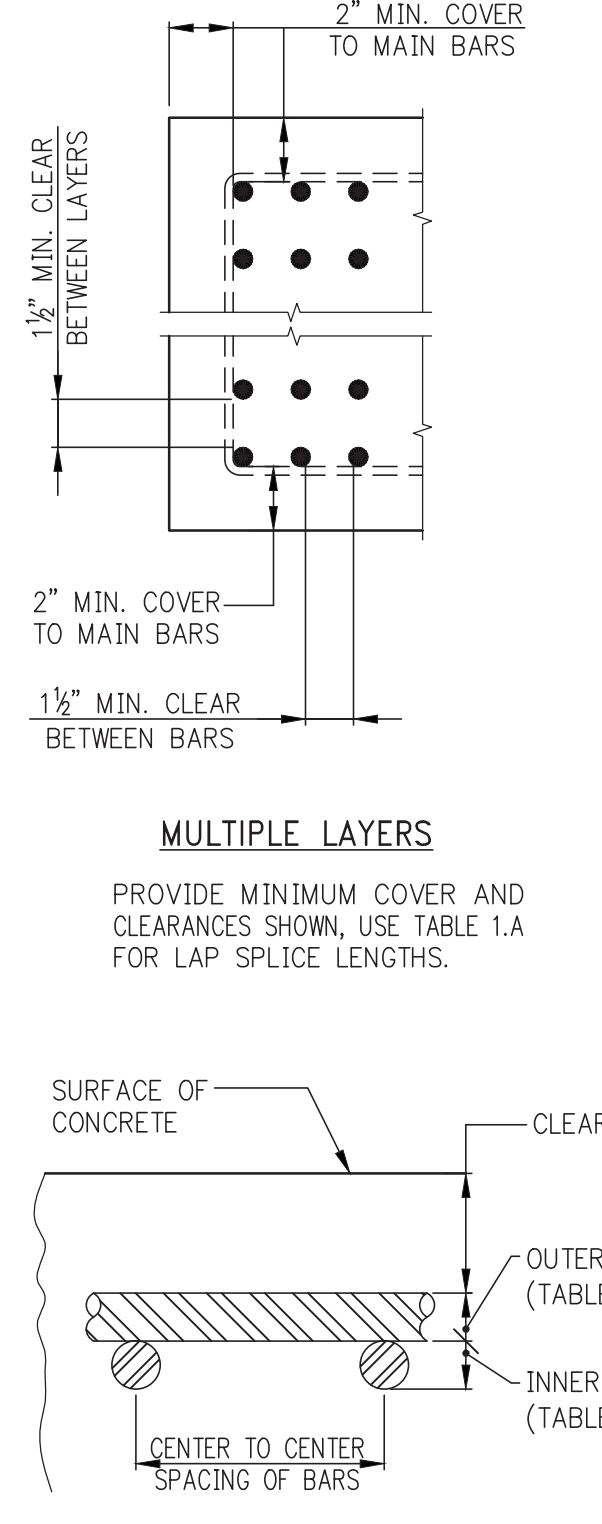
**TABLE 1.B: 3/4" COVER TO OUTER LAYER BARS
INNER LAYER LAP LENGTHS (IN INCHES)**

BAR SIZE	CONCRETE STRENGTH (PSI)								BAR SIZE	CONCRETE STRENGTH (PSI)							
	3,000	4,000	5,000	6,000	7,000	8,000	9,000	10,000		3,000	4,000	5,000	6,000	7,000	8,000	9,000	10,000
#3	16	16	16	16	16	16	16	16	#3	16	16	16	16	16	16	16	16
#4	20	20	20	20	20	20	20	20	#4	20	20	20	20	20	20	20	20
#5	24	24	24	24	24	24	24	24	#5	24	24	24	24	24	24	24	24
#6	30	29	29	29	29	29	29	29	#6	29	29	29	29	29	29	29	29
#7	48	42	38	34	34	34	34	34	#7	37	34	34	34	34	34	34	34
#8	61	53	47	43	40	39	39	39	#8	43	39	39	39	39	39	39	39
#9	75	65	58	53	49	46	44	44	#9	53	46	44	44	44	44	44	44
#10	89	77	69	63	58	55	51	49	#10	64	55	49	49	49	49	49	49
#11	104	90	81	74	68	64	60	57	#11	75	65	58	54	54	54	54	54



- NOTES FOR TENSION DEVELOPMENT LENGTHS (L_d)**
- REINFORCEMENT IS UNCOATED, WITH F_y=60,000 PSI.
 - CONCRETE IS NORMAL WEIGHT (144-150#/C.F.).
 - FOR "TOP" BAR DEVELOPMENT LENGTHS ("TOP" IS DEFINED BY ACI 318 AS HAVING MORE THAN 12 INCHES OF FRESH CONCRETE CAST BELOW THE BAR), TABULATED LENGTHS MUST BE MULTIPLIED BY 1.3.
 - LENGTHS TABULATED MUST BE MULTIPLIED BY THE FOLLOWING MODIFICATION FACTORS:
 - a. LIGHTWEIGHT CONCRETE1.3
 - b. EPOXY-COATED BARS:
 - 1.) BARS WITH COVER < 3db, OR WITH CLEAR SPACING < 6db...1.5 FOR BOTTOM & VERTICAL BARS,
 - 1.3 FOR "TOP" BARS
 - 2.) ALL OTHER CONDITIONS1.2
 - * FOR EPOXY-COATED "TOP" BARS THE MAXIMUM FOR COMBINED FACTORS = 1.7
 - WHERE TENSION DEVELOPMENT LENGTH (L_d) IS REQUIRED ON PLANS OR IN DETAILS, SEE TENSION DEVELOPMENT LENGTH TABLES.
 - CLASS A LAP SPLICE LENGTHS ARE EQUAL TO TENSION DEVELOPMENT LENGTHS (L_d). APPLY APPROPRIATE MODIFICATION FACTORS TO CLASS A SPLICE LENGTHS.

- NOTES FOR TENSION LAP SPLICES**
- REINFORCEMENT IS UNCOATED, WITH F_y=60,000 PSI.
 - CONCRETE IS NORMAL WEIGHT (144-150#/C.F.).
 - FOR "TOP" BAR SPLICE LENGTHS ("TOP" IS DEFINED BY ACI 318 AS HAVING MORE THAN 12 INCHES OF FRESH CONCRETE CAST BELOW THE BAR), TABULATED LENGTHS MUST BE MULTIPLIED BY 1.3.
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PRELIMINARY - NOT FOR CONSTRUCTION

2016-04-22 ISSUED FOR DESIGN DEVELOPMENT 1

CETRARUDDY

TYPICAL FOUNDATION DETAILS

FO-203.00

As Noted
1590109

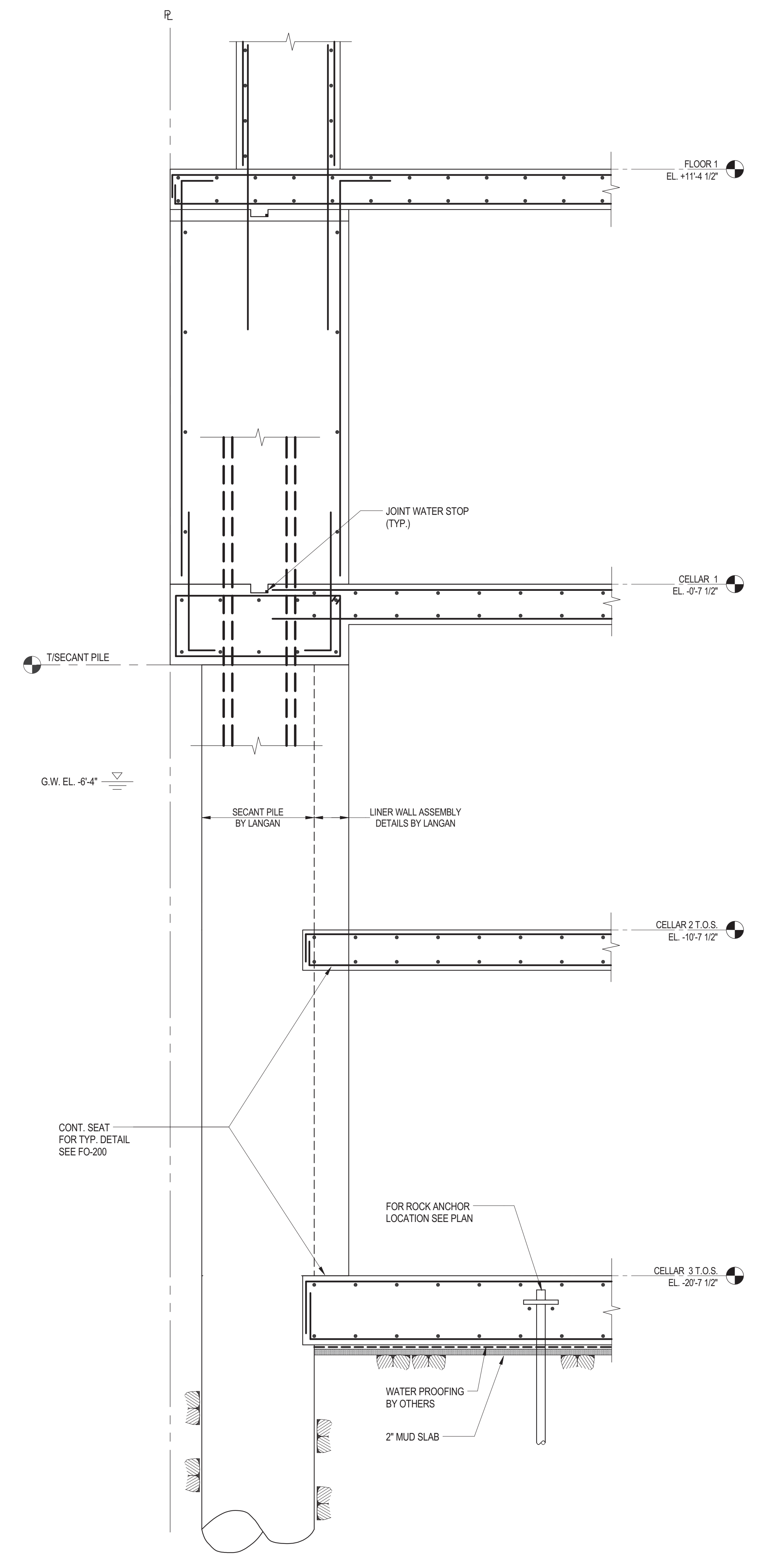
CETRARUDDY ARCHITECTURE PC
581 BROADWAY NEW YORK NY 10012 212 941 9801 F 212 941 9400
WWW.CETRARUDDY.COM

Damian Titus
Building APPROVED
Under Directive 2 of 2015
INTERSTATE APPLICATION
Date: 06/25/2017
NYC Development Hub

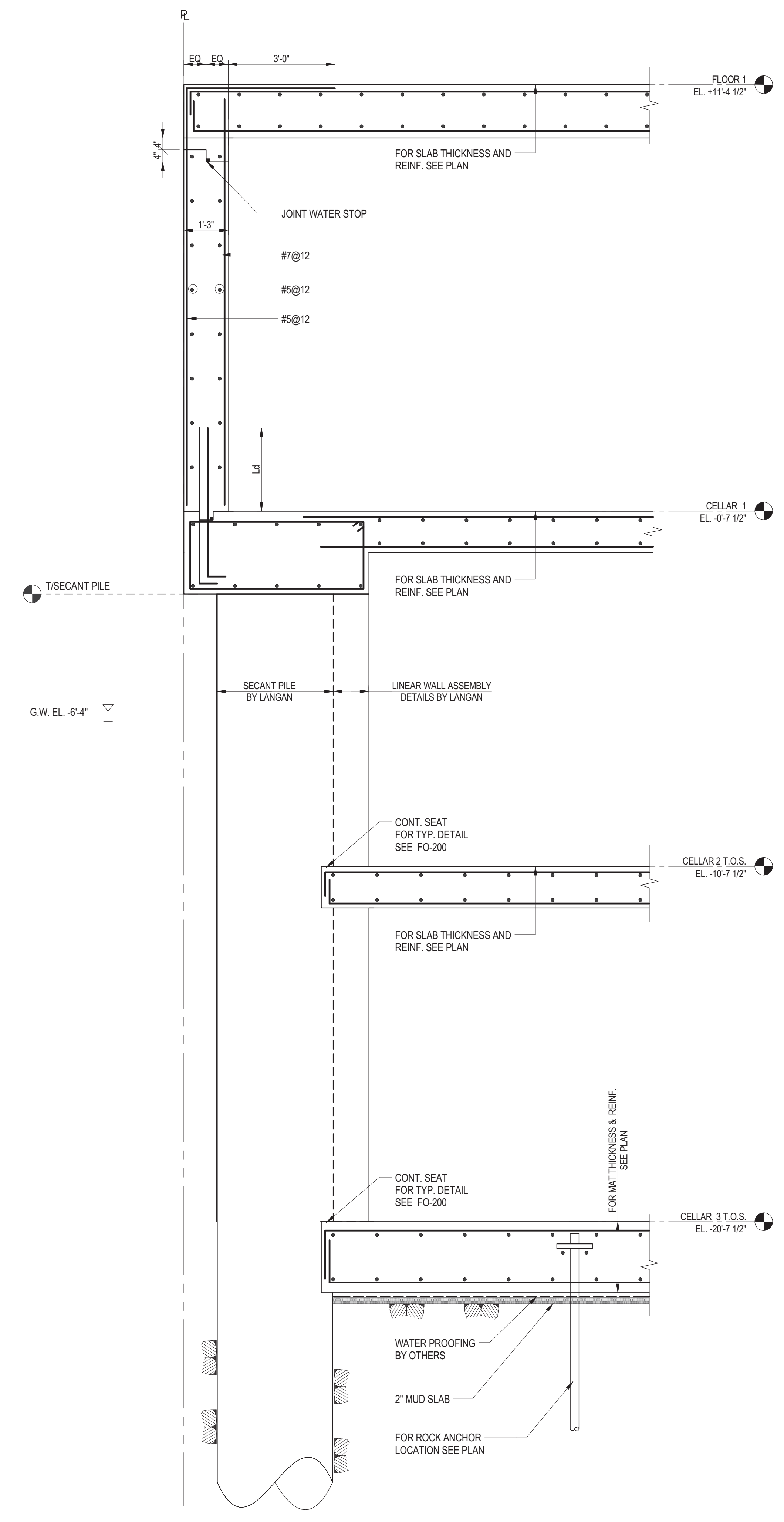
45 BROAD STREET

NEW YORK NY 10004

ARCHITECT John A. Cetra State of New York Registered Architect No. 018861 CetraRuddy Architecture DPC 504 Broadway Suite 401 New York, NY 10012 212.541.9001	OWNER Madison 45 Broad Development, LLC 105 Madison Avenue New York, NY 10019
STRUCTURAL ENGINEER WSP Group 229 East 45th Street, 3rd Fl New York, NY 10017 212.687.8888	MECHANICAL ENGINEER Barthelemy Engineering 100 Broadway New York, NY 10005 212.234.2025
GEOTECHNICAL ENGINEER LANGAN 21 Penn Plaza 260 West 31st Street, 8th Fl New York, NY 10001 212.478.5400	LANDSCAPE ARCHITECT Ventresca Design, LLC 44-02 Eleventh St, Suite 203 Long Island City, NY 11101 212.600.0023
GENERAL CONTRACTOR Ventresca Design, LLC 44-02 Eleventh St, Suite 203 Long Island City, NY 11101 212.600.0023	GENERAL CONTRACTOR Barthelemy Engineering 100 Broadway New York, NY 10005 212.234.2025



1 SECTION
 FO-300 SCALE: 1/2" = 1'-0"



2 SECTION
 FO-300 SCALE: 1/2" = 1'-0"

PRELIMINARY - NOT FOR CONSTRUCTION

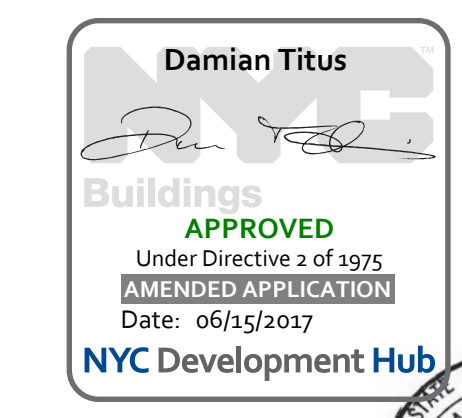
2016.04.22 ISSUED FOR DESIGN DEVELOPMENT 1



FOUNDATION SECTIONS 1

FO-300.00

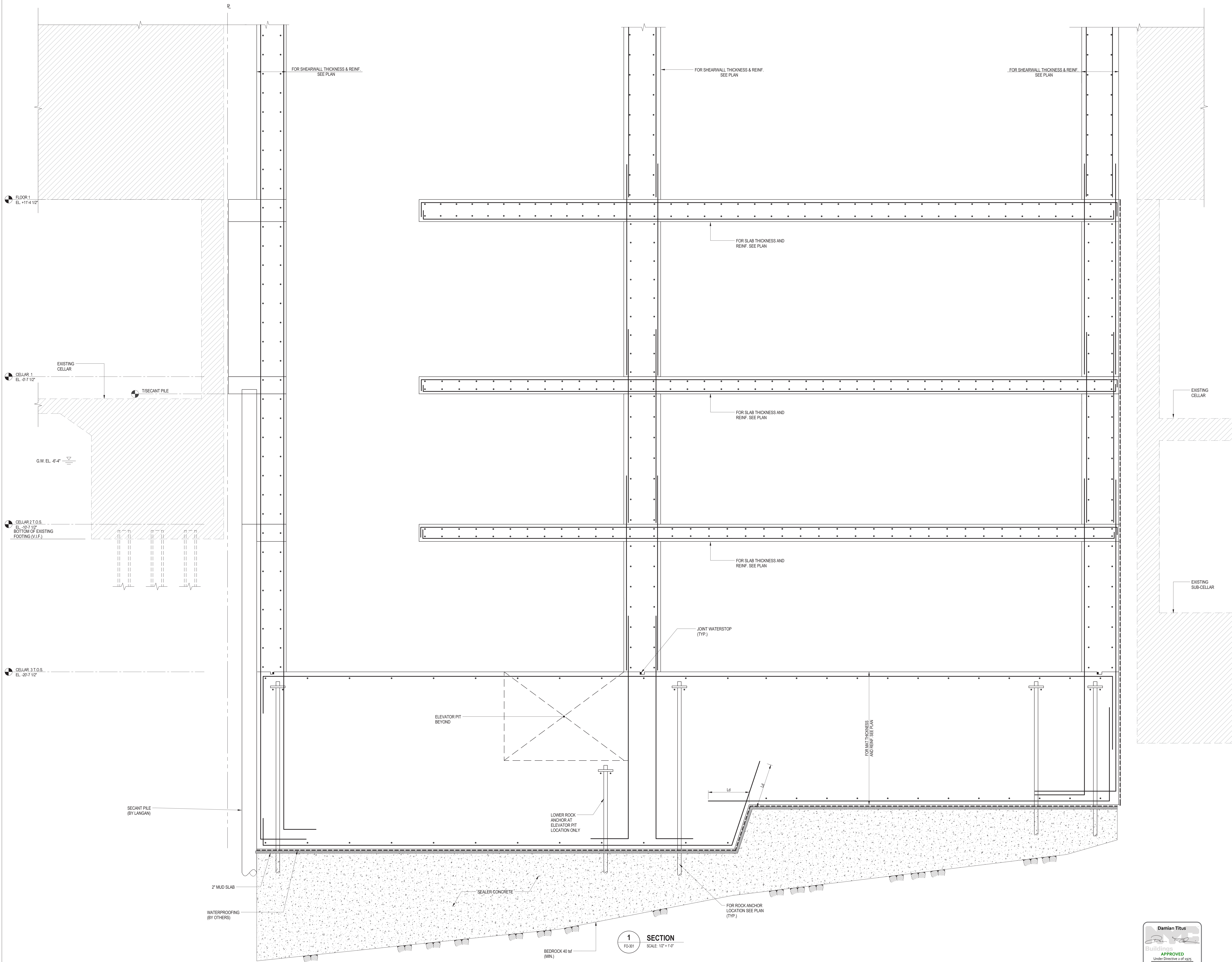
1/2" = 1'-0"
 1590109



45 BROAD STREET

NEW YORK NY 10004

ARCHITECT: John A. Cetra State of New York Registered Architect No. 018861 CetraRuddy Architecture DPC 504 Broadway Suite 401 New York, NY 10012 212.541.9001	OWNER: Madison 45 Broad Development, LLC 105 Madison Avenue New York, NY 10019
ENGINEERING: WSP Group 228 East 45th Street, 3rd Fl New York, NY 10017 212.687.8888	INSPECTION: BurdickEngineering 101 Broadway New York, NY 10005 212.234.2025
GEOTECHNICAL ENGINEER: LANGAN 21 Penn Plaza 290 West 31st Street, 8th Fl New York, NY 10001 212.478.5400	FOUNDATION ENGINEER: BurdickEngineering 101 Broadway New York, NY 10005 212.234.2025
UPPER DESIGNER: Ventresca Design, LLC 44-02 Eleventh St, Suite 203 Long Island City, NY 11101 212.600.0023	FOUNDATION CONSULTANT: BurdickEngineering 101 Broadway New York, NY 10005 212.234.2025



1 SECTION
 FO-301 SCALE: 1/2" = 1'-0"

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2016.04.22 ISSUED FOR DESIGN DEVELOPMENT 1



FOUNDATION SECTIONS 2

Damian Titus
 Building APPROVED
 Under Directive 2 of 2015
 INTEROFFICIAL APPLICATION
 Date: 06/25/2017
 NYC Development Hub

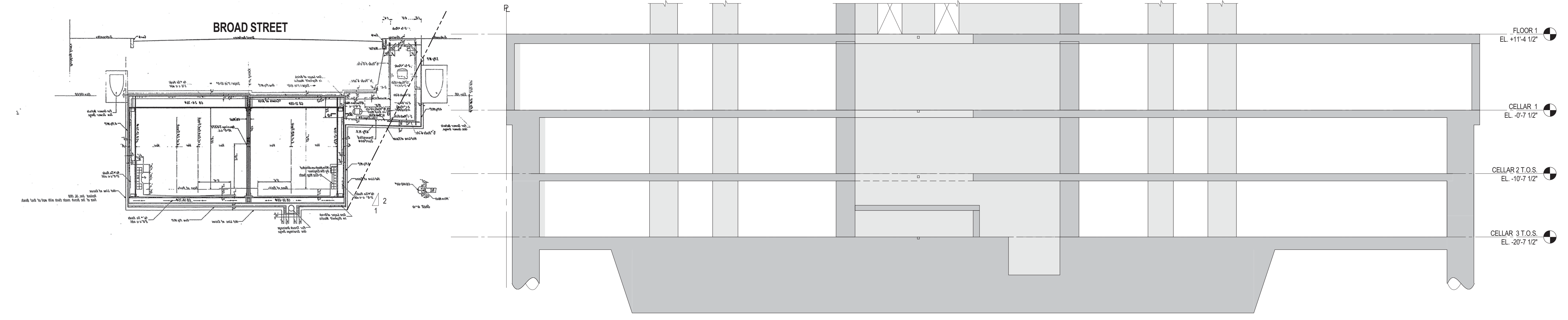


FO-301.00

1/2" = 1'-0"
 1590109

45 BROAD STREET

NEW YORK NY 10004



1 SECTION
FO310 SCALE: 1/8" = 1'-0"

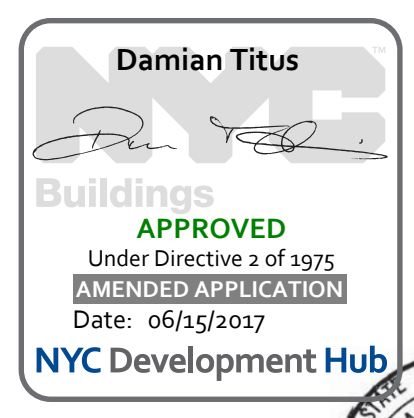
ARCHITECT John A. Cetra State of New York Registered Architect No. 018861 CetraRuddy Architecture DPC 504 Broadway Suite 401 New York, NY 10012 212.541.9001	CLIENT Madison 45 Broad Development, LLC 105 Madison Avenue New York, NY 10019
STRUCTURAL ENGINEER WSP Group 229 East 45th Street, 3rd Fl New York, NY 10017 212.687.9888	METALLIC FABRICATOR BurdickEngineering 100 Broadway New York, NY 10005 212.234.2025
GENERAL CONTRACTOR LANGAN 21 Penn Plaza 100 West 31st Street, 8th Fl New York, NY 10001 212.478.5400	UNDERGROUND CONTRACTOR BurdickEngineering 100 Broadway New York, NY 10005 212.234.2025
UNDERGROUND DESIGNER Ventresca Design, LLC 44-02 Eleventh St, Suite 203 Long Island City, NY 11101 212.600.0020	UNDERGROUND CONTRACTOR BurdickEngineering 100 Broadway New York, NY 10005 212.234.2025

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2016.04.22 ISSUED FOR DESIGN DEVELOPMENT 1



MTA SECTIONS



FO-310.00

1/8" = 1'-0"
1590109