

# TEMPORARY EARTH RETENTION SYSTEMS

## NORTH TORREY PINES LIVING & LEARNING

### NEIGHBORHOOD - UCSD

### San Diego, CA

FOR:



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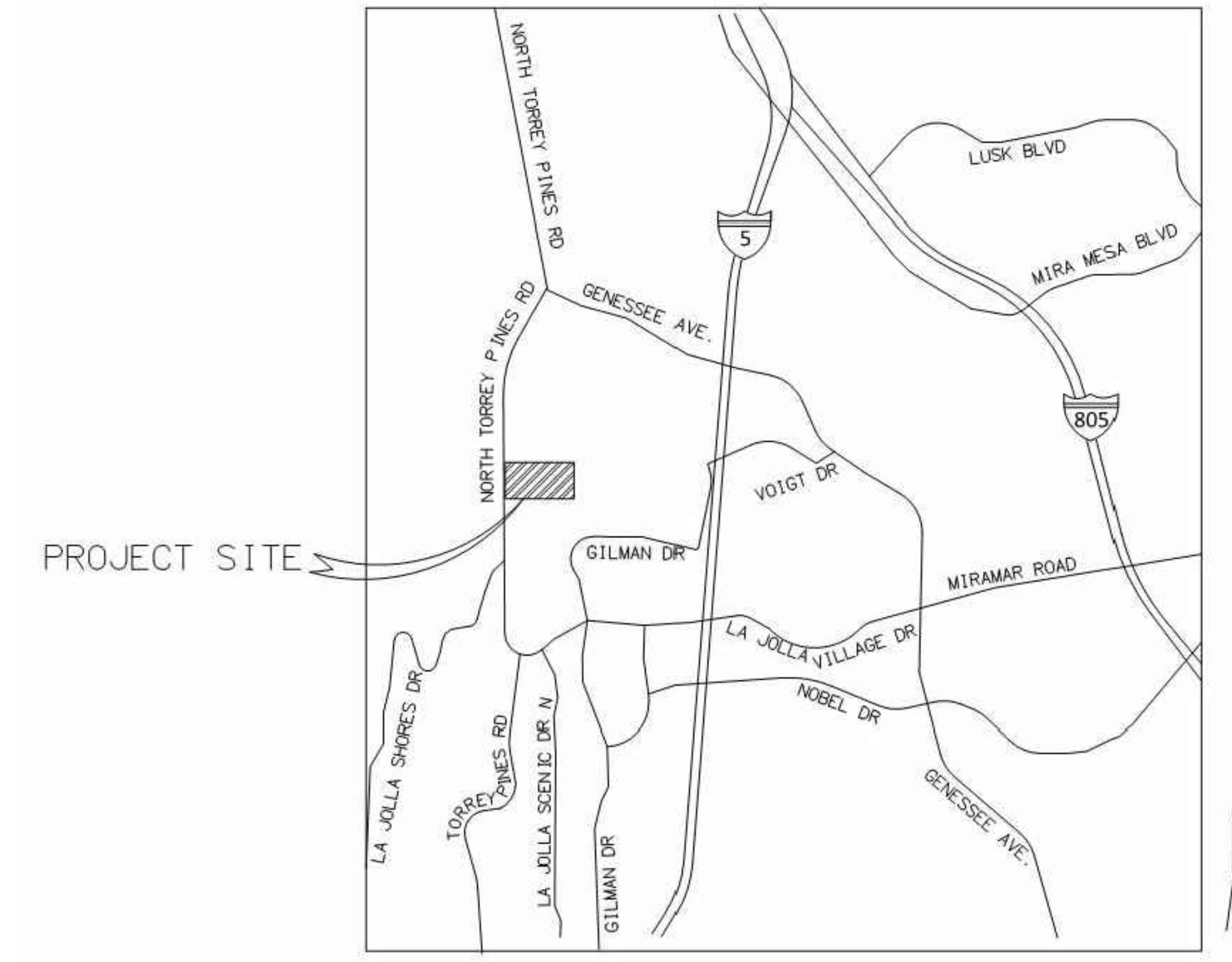
FROM:



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JOB NO. 180200

May 23, 2018

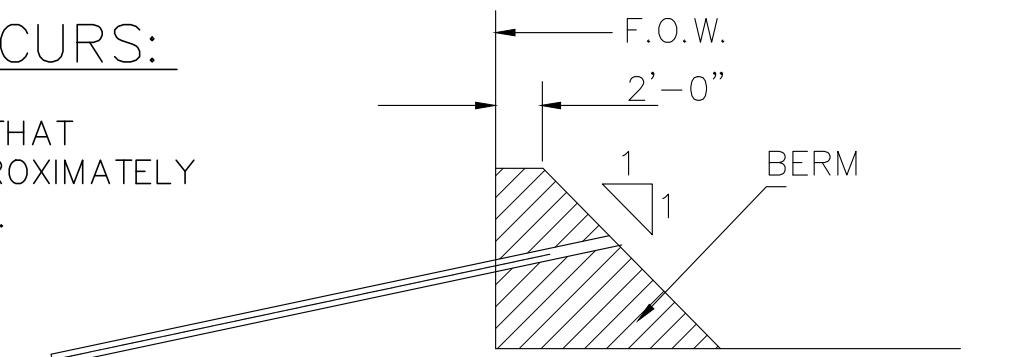


VICINITY MAP



EXCAVATION PROCEDURE FOR SOIL NAIL WALL IF SLOUGHING OCCURS:

THE GRADING AND EXCAVATION FOR THE PROPOSED RETAINING WALLS MUST BE COORDINATED SUCH THAT OVERBREAK IN THE SOIL BE MINIMIZED. THE EXCAVATION CONTRACTOR SHALL PROVIDE BENCHES APPROXIMATELY 20' WIDE IN LIFTS. THE ELEVATION OF THE PAD IS APPROXIMATELY 2' BELOW THE LEVEL OF THE SOIL.

CONSTRUCTION PROCEDURE FOR SOIL NAIL WALL:

1. LINES AND GRADES SHALL BE ESTABLISHED BY THE CONTRACTOR TO INSURE PROPER HORIZONTAL ALIGNMENT OF WALL AND LOCATION OF SOIL NAILS.
2. CONSTRUCTION PROCEDURES SHALL BE ESTABLISHED SUCH THAT EXCAVATIONS OF LIFTS WILL BE IMMEDIATELY FOLLOWED WITH THE INSTALLATION OF THE SOIL NAIL WALL. THE PURPOSE OF THIS TANDEM SEQUENCING IS TO INSURE THAT AN EXPOSED EXCAVATED EMBANKMENT WILL NOT GO UNSUPPORTED FOR LONGER THAN 24 HOURS. THE CONTRACTOR SHALL BASE HIS EXCAVATION PROCEDURES UPON THIS PREMISE.
3. EXCAVATION SHALL OCCUR IN VERTICAL LIFTS NOT TO EXCEED 6 FT. VERTICALLY IN EACH LIFT ACCORDING TO THE PROCEDURE DESCRIBED ABOVE AND SHALL PROCEED IN THE SAME TANDEM SEQUENCE OF EXCAVATION/INSTALLATION OF SHOTCRETE FACING AS DESCRIBED IN NOTES 1 AND 2.
4. DRILL HOLES TO THE DIAMETER AND LENGTH INDICATED. INSERT THE SOIL NAILS AND FILL HOLE WITH GROUT USING PVC TREMIE PIPE STARTING FROM THE BOTTOM OF THE HOLE.
5. SHOULD LOCALIZED OVERBREAK OCCUR IN THE SOIL, THE CAVITY CREATED IS TO BE FILLED WITH SHOTCRETE WITH ONE LAYER OF WIRE MESH FOR EVERY 6" THICKNESS OF SHOTCRETE.
6. PROVISIONS SHALL BE MADE TO ALLOW FOR 8" LAPING OF THE WELDED WIRE FABRIC AND 50 BAR DIA. LAP AT THE HORIZ. BARS. ALSO 50 BAR DIA. LAPS FOR REBAR, HORIZONTALLY AND AT ALL CORNERS.
7. THE CONTINUOUS WALER REBAR SHALL BE PLACED ALONG EACH ROW OF SOIL NAILS AND LOCATED DIRECTLY BEHIND THE PLATE WASHERS OF EACH SOIL NAIL. LAPING SHALL BE AT 40 BAR DIAMETERS.

SOIL NAIL TESTING PROCEDURES:

1. PROOF TEST 5% OF THE SOIL NAILS AND AT LEAST ONE @ EACH ROW PER "TEST SOIL NAIL DETAIL". SEE ELEVATIONS FOR SUGGESTED LOCATION OF PROOF TEST SOIL NAILS.
2. SOIL NAILS SHALL NOT BE TESTED UNTIL ANCHOR LENGTH GROUT HAS ATTAINED A MINIMUM STRENGTH OF 1500 PSI. A MINIMUM 48 HOURS OF WAITING PERIOD SHALL OCCUR BEFORE TESTING THE NAILS. THE TEST MAY BE PERFORMED BEFORE THAT TIME IF THE CONTRACTOR SUBMITS COMPRESSIVE STRENGTH TEST RESULTS VERIFYING THAT THE NAIL GROUT AND SHOTCRETE MIXES BEING USED WILL PROVIDE THE SPECIFIED COMPRESSIVE STRENGTH.
3. TESTING SEQUENCE
  - a. ALL TEST SOIL NAILS ARE SACRIFICIAL SOIL NAILS AND HAVE A MINIMUM BOND LENGTH OF 10'-0". AT NO TIME THE TEST LOAD MAY EXCEED 90% OF THE YIELD STRENGTH OF THE NAIL.
  - b. PROOF TEST SHALL BE CONDUCTED BY MEASURING THE TEST LOAD APPLIED TO THE TEST SOIL NAIL AND THE SOIL NAIL END MOVEMENT DURING INCREMENTAL LOADING IN ACCORDANCE WITH THE LOADING SCHEDULE.
  - c. APPLY ALIGNMENT LOAD AND RECORD TEST SOIL NAIL POSITION. MOVEMENT OF THE END OF TEST SOIL NAIL SHALL BE MEASURED AND RECORDED TO THE NEAREST 0.001 INCH AT EACH INCREMENT OF LOAD, INCLUDING THE ENDING ALIGNMENT LOAD, RELATIVE TO AN INDEPENDENTLY FIXED REFERENCE POINT.
  - d. INCREASE SOIL NAIL LOAD IN PROGRESSIVE STEPS IN ACCORDANCE WITH THE FOLLOWING SCHEDULE.

PROOF TEST LOADING SCHEDULE:

$$AL = 0.05M \quad M = (\mu \times L \times \pi \times D) / 2.0 \quad (FS) = 27.5 \text{ KIPS}$$

WHERE:  
 $\mu = 0.314$   
 $\mu = 24 \text{ PSI} \text{ (TO BE VERIFIED)}$   
 $L = 10'-0" \text{ MIN.}$   
 $D = 6"$

(AL=ALIGNMENT LOAD)  
(M =DESIGN LOAD)

- e. EACH INCREMENT OF LOAD SHALL BE APPLIED IN LESS THAN 1 MINUTE AND HELD FOR AT LEAST 1 MINUTE. BUT NOT MORE THAN 2 MINUTES, EXCEPT THAT LOAD EQUAL TO 1.5M SHALL BE HELD FOR 10 MINUTES. DURING THE LOAD HOLD, THE MOVEMENT OF THE END OF THE SOIL NAIL SHALL BE MEASURED AT 1, 2, 3, 4, 5 AND 10 MINUTES. THE OBSERVATION PERIOD FOR THE LOAD HOLD SHALL START WHEN THE PUMP BEGINS TO APPLY THE INCREMENT OF LOAD FROM 1.25M TO 1.5M. THE DIAL GAUGE SHOULD BE ZEROED AT THE ALIGNMENT LOAD AND CAPABLE OF MEASURING TO THE NEAREST 0.001 IN. IF THE MOVEMENT MEASURED BETWEEN ONE MINUTE AND 10 MINUTES AT THE LOAD IS LESS THAN 0.04", THE THE TEST NAIL IS DEEMED SUCCESSFUL. IF THE MOVEMENT EXCEEDS 0.04" FOR THE 10 MINUTES DURATION, THE LOAD SHALL BE MAINTAINED FOR AN ADDITIONAL 50 MINUTES, TOTAL MOVEMENT SHALL BE MEASURED AT 15, 20, 25, 30, 45 AND 50 MINUTES. THE TOTAL MOVEMENT FOR THE ENTIRE 1 HR. SHALL NOT EXCEED 0.08". MINIMUM MOVEMENT MUST AT LEAST EQUAL 80% OF THE ELASTIC DEFORMATION IN THE UNBONDED LENGTH.

4. AT LEAST TWO VERIFICATION TESTS IS TO BE PERFORMED PER EACH TYPE OF SOIL STRATA.

VERIFICATION TEST LOADING SCHEDULE:

$$AL = 0.05M \quad M = (\mu \times L \times \pi \times D) / 2.0 \quad (FS) = 27.5 \text{ KIPS}$$

WHERE:  
 $\mu = 0.314$   
 $\mu = 24 \text{ PSI} \text{ (TO BE VERIFIED)}$   
 $L = 10'-0" \text{ MIN.}$   
 $D = 6"$

(AL=ALIGNMENT LOAD)  
(M =DESIGN LOAD)

5. THE VALUE OF M IS LINEARLY DEPENDENT ON THE CROUTED LENGTH, L. THE GIVEN VALUE OF M IS ONLY FOR BONDED LENGTH L=10 FT. FOR OTHER VALUES OF L, AS MEASURED IN THE FIELD, THE VALUE OF M NEEDS TO BE ADJUSTED ACCORDINGLY.
6. TESTING RESULTS NEED TO BE SUBMITTED TO PB&A FOR REVIEW AND APPROVAL.

PROCEDURE IN CASE OF A TEST NAIL FAILURE:

1. REVIEW THE DRILLING AND GROUTING PROCEDURE OF THE ALREADY INSTALLED FAILED SOIL NAIL. PLACE TWO NEW TEST SOIL NAILS APPROXIMATELY 6 FEET AWAY ON BOTH SIDES OF THE FAILED TEST SOIL NAIL. APPLY MODIFIED GROUTING AND DRILLING METHOD IF APPLICABLE.
2. TEST THE NEWLY INSTALLED TEST SOIL NAILS. IF THEY PASS THE TEST CONTINUE USING THE MODIFIED GROUTING AND DRILLING METHOD.
3. IF THE NEWLY INSTALLED TEST SOIL NAILS FAIL, THE ENGINEER OF RECORD OF THE EARTH RETENTION SYSTEM IS TO EVALUATE THE RESULTS AND DETERMINE THE APPROPRIATE REMEDIAL ACTION.

SOIL NAIL SCHEDULES:

SCHEDULE 1 (MAX HEIGHT = 18'-0")		
ROW#	NAIL LENGTH (FT)	SIZE
1(TOP)	15	#7
2	10	#7
3	10	#7

SCHEDULE 2 (MAX HEIGHT = 21'-0")		
ROW#	NAIL LENGTH (FT)	SIZE
1(TOP)	15	#7
2	15	#7
3	10	#7
4	10	#7

SCHEDULE 3 (MAX HEIGHT = 26'-0")		
ROW#	NAIL LENGTH (FT)	SIZE
1	25	#7
2	20	#7
3	15	#7
4	15	#7
5	10	#7

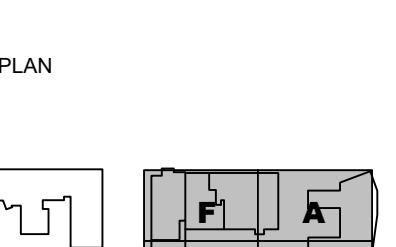
SCHEDULE 4 (MAX HEIGHT = 31'-0")		
ROW#	NAIL LENGTH (FT)	SIZE
1(TOP)	30	#7
2	25	#7
3	20	#7
4	20	#7
5	15	#7
6	10	#7

SCHEDULE 5 (MAX HEIGHT = 36'-0")		
ROW#	NAIL LENGTH (FT)	SIZE
1(TOP)	30	#8
2	30	#8
3	30	#8
4	20	#8
5	20	#8
6	15	#8
7	15	#8

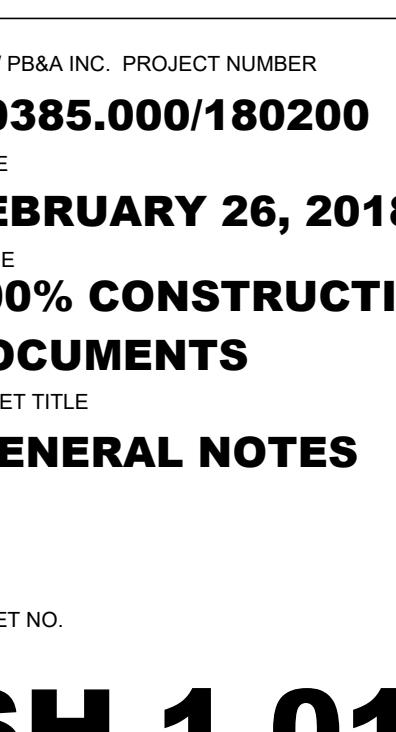
SCHEDULE 6 (MAX HEIGHT = 41'-0")		
ROW#	NAIL LENGTH (FT)	SIZE
1(TOP)	35	#9
2	35	#9
3	33	#9
4	30	#8
5	25	#8
6	20	#8
7	15	#8
8	10	#8

SCHEDULE 7 (MAX HEIGHT = 23'-0" W/ BUILDING)		
ROW#	NAIL LENGTH (FT)	SIZE
1(TOP)	30	#8
2	25	#8
3	25	#8
4	20	#8
5	15	#8

WALL PROPERTIES	
MAX. HOR. SPACING	5 FT

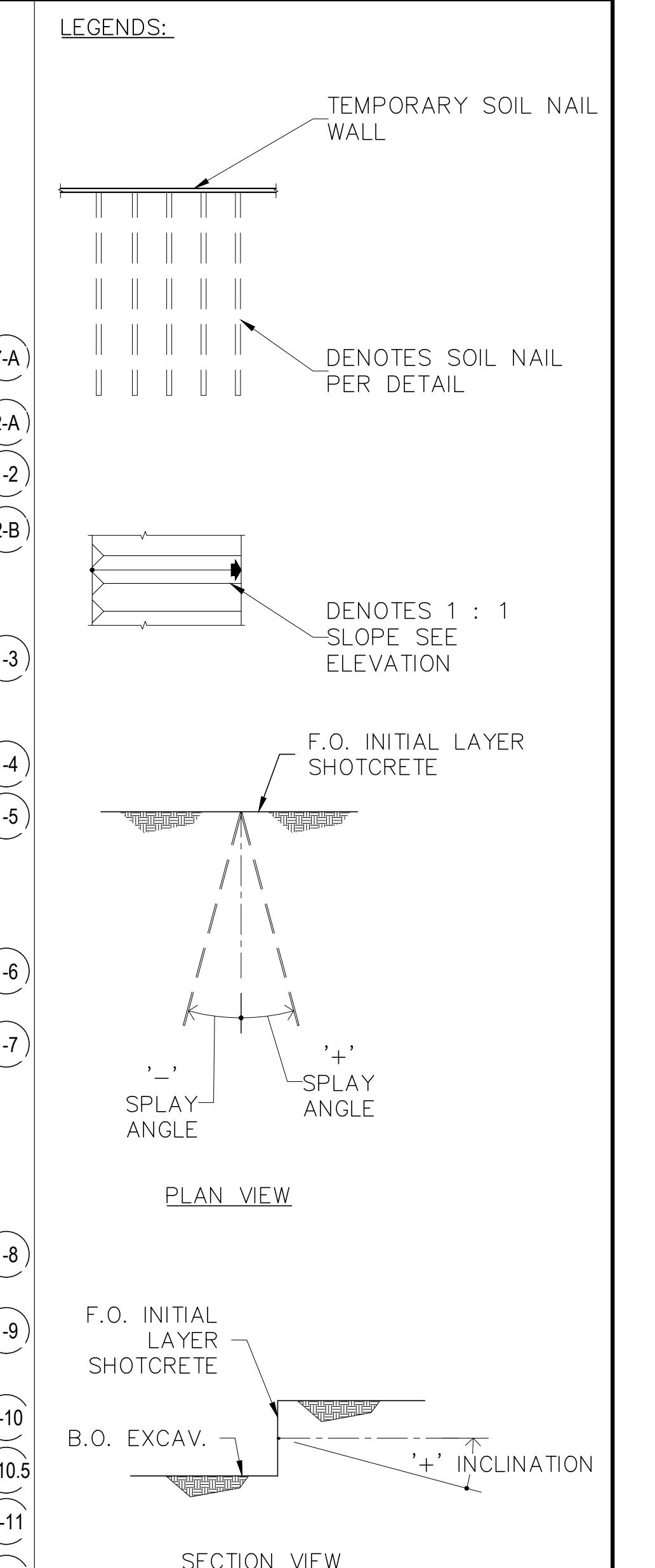


REVISION  
NO. DESCRIPTION DATE



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SH-1.01

**NORTH TORREY PINES  
LIVING & LEARNING  
NEIGHBORHOOD**

**NOTE:**

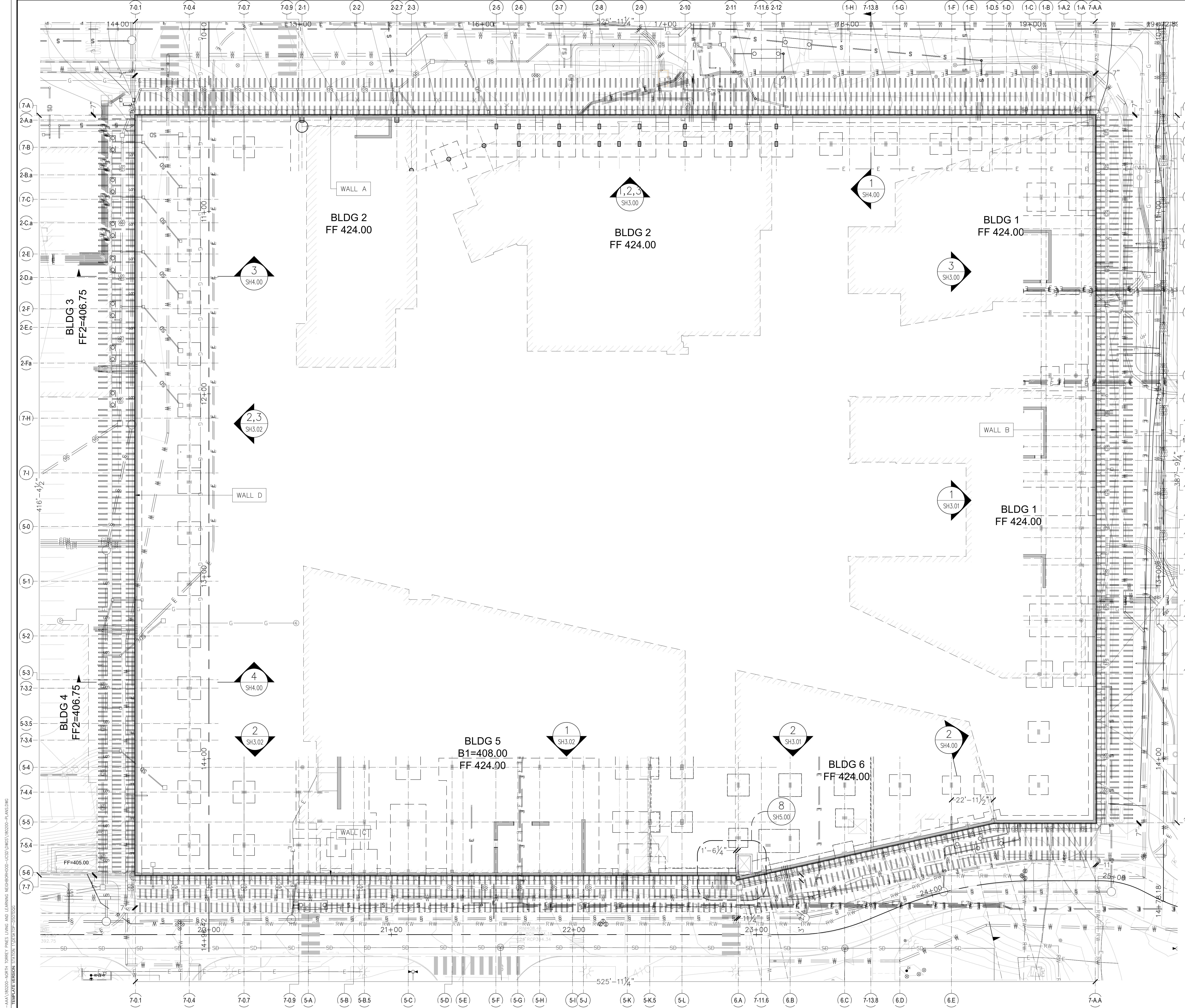
- 1) FOR TOP AND BOTTOM OF SHORING WALL SEE ELEVATIONS, SH3.00.
- 2) INCLINATION ANGLE, SPLAY ANGLE AND NAIL ELEVATION OF SOIL NAILS AT BENDS ARE TO BE ADJUSTED IN THE FIELD NOT TO INTERFERE WITH EACH OTHERS.

\* TOLERANCE FOR LOCATION OF SOILNAIL =  $\pm 1' - 0''$

\* TOLERANCE FOR INCLINATION OF SOILNAIL =  $\pm 5'$

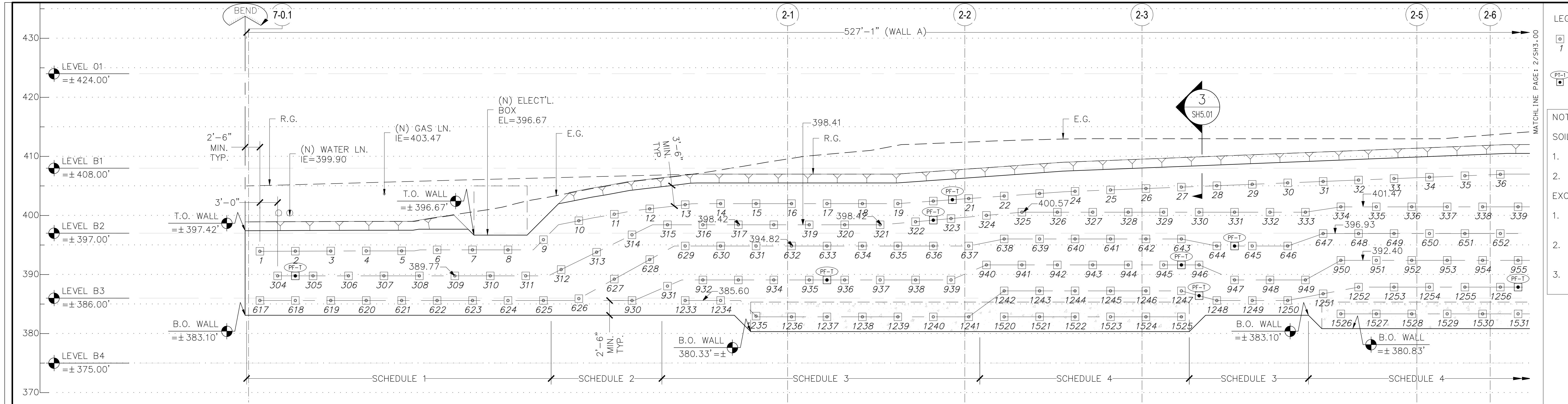
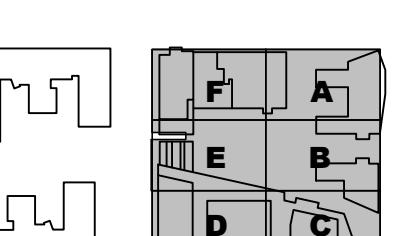
**ABBREVIATION:**

B.O.	BOTTOM OF
DIA.	DIAMETER
EL.	ELEVATION
E.W.	EACH WAY
F.O.	FACE OF
O.C.	ON CENTER
O.G.	ORIGINAL GRADE
P.L.	PROPERTY LINE
R.G.	RE-GRADE
T.O.	TOP OF
U.N.W.	UNLESS NOTED OTHERWISE
V.I.F.	VERIFY IN FIELD
(E)	EXISTING
(N)	NEW

**SHORING PLAN**

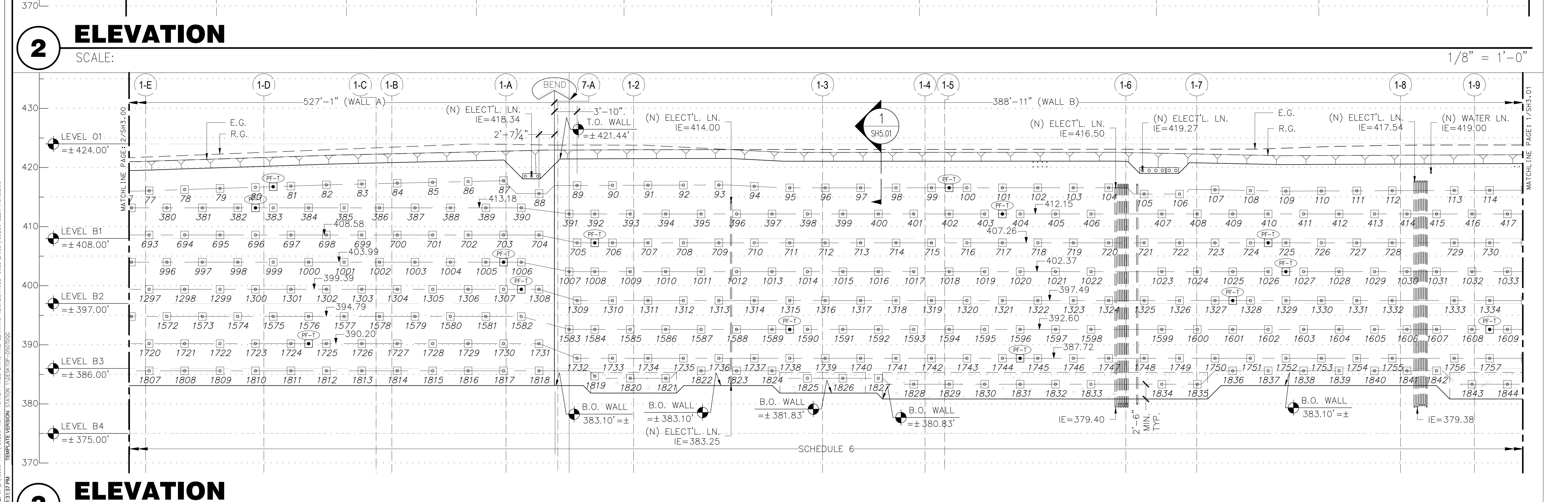
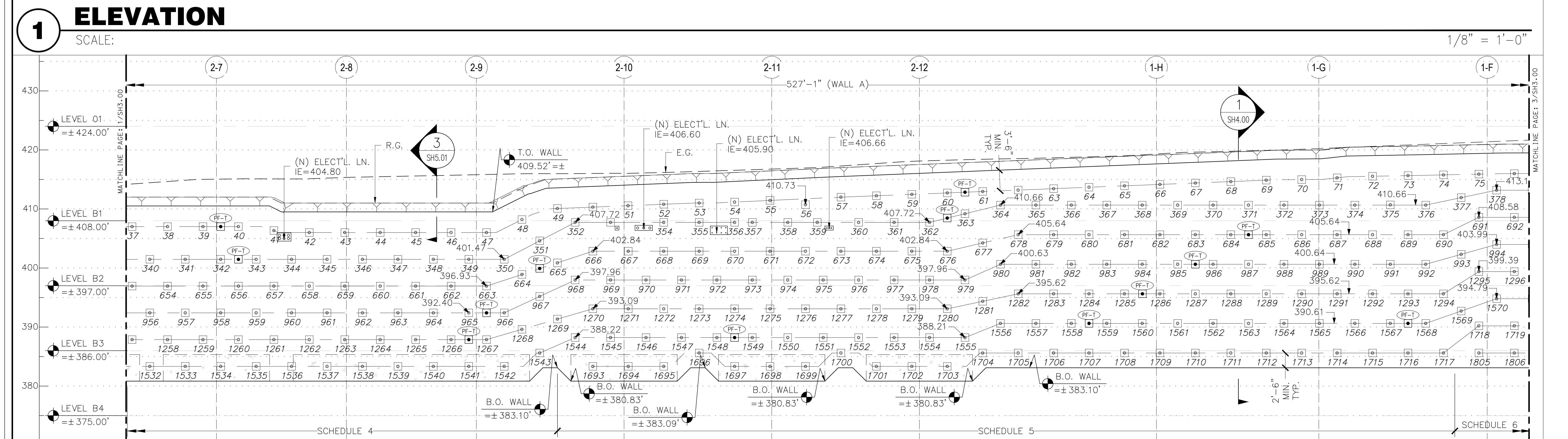
SCALE:

**SH2.00**



LEGEND:  
 SOIL NAIL  
 PROOF TEST NAIL

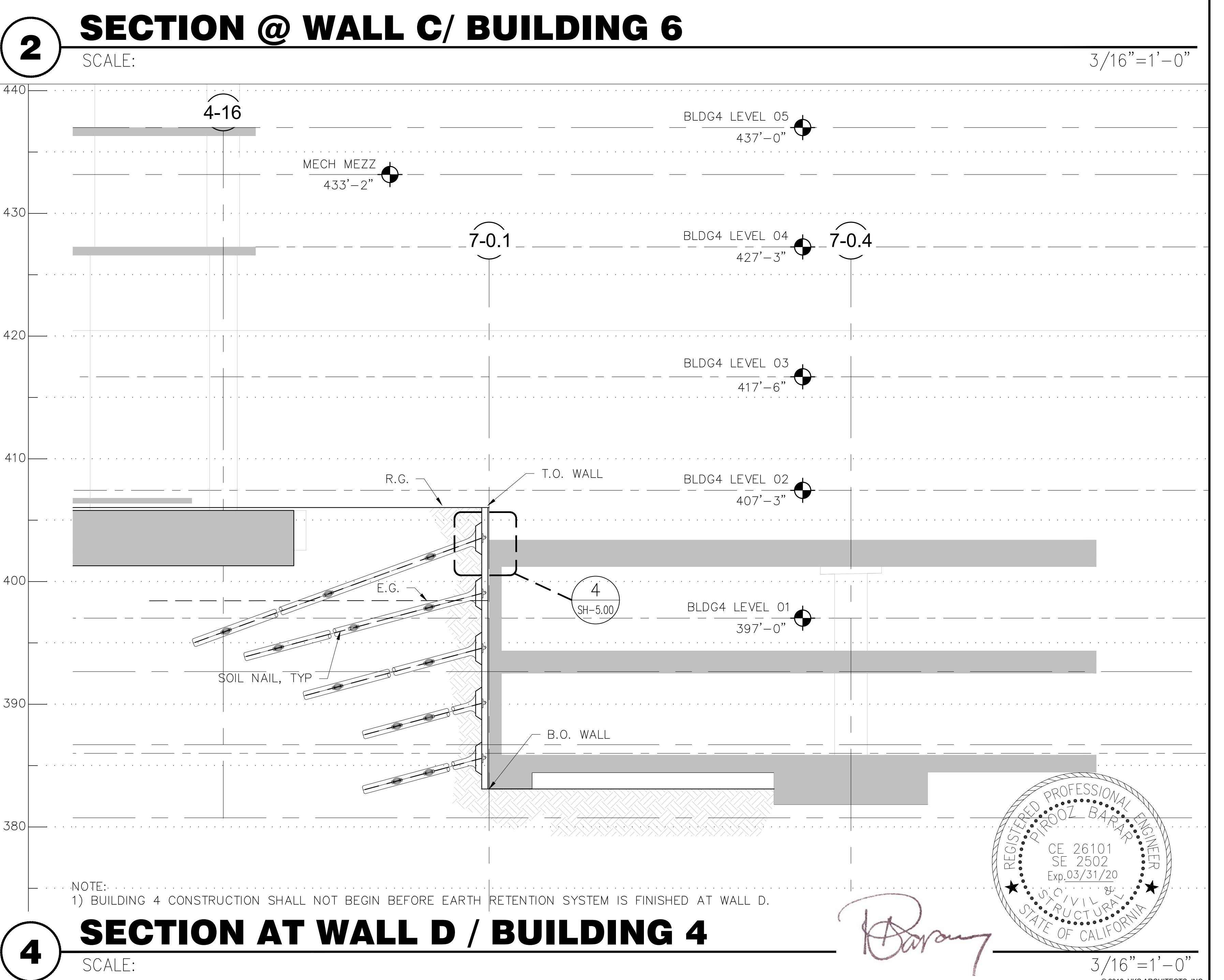
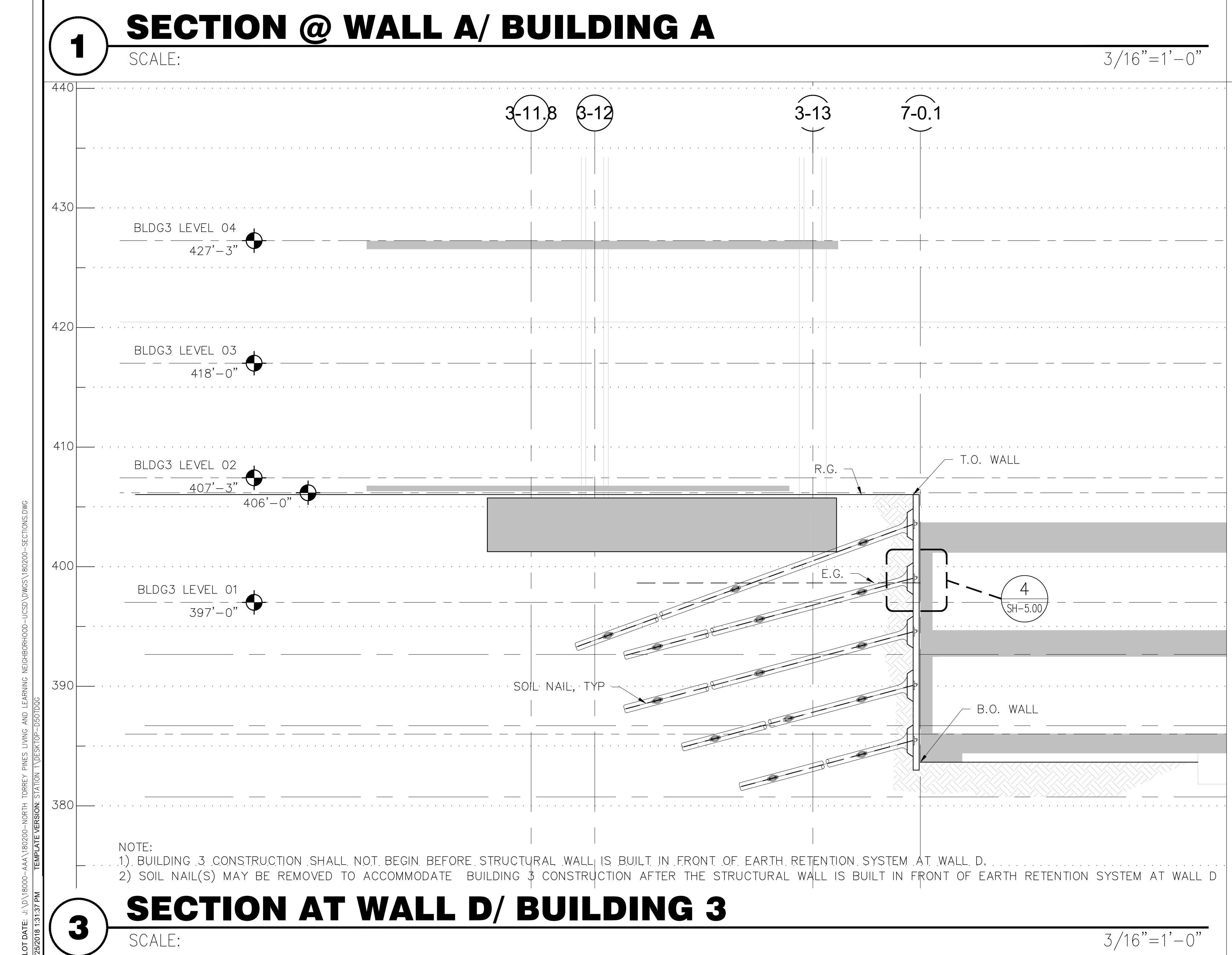
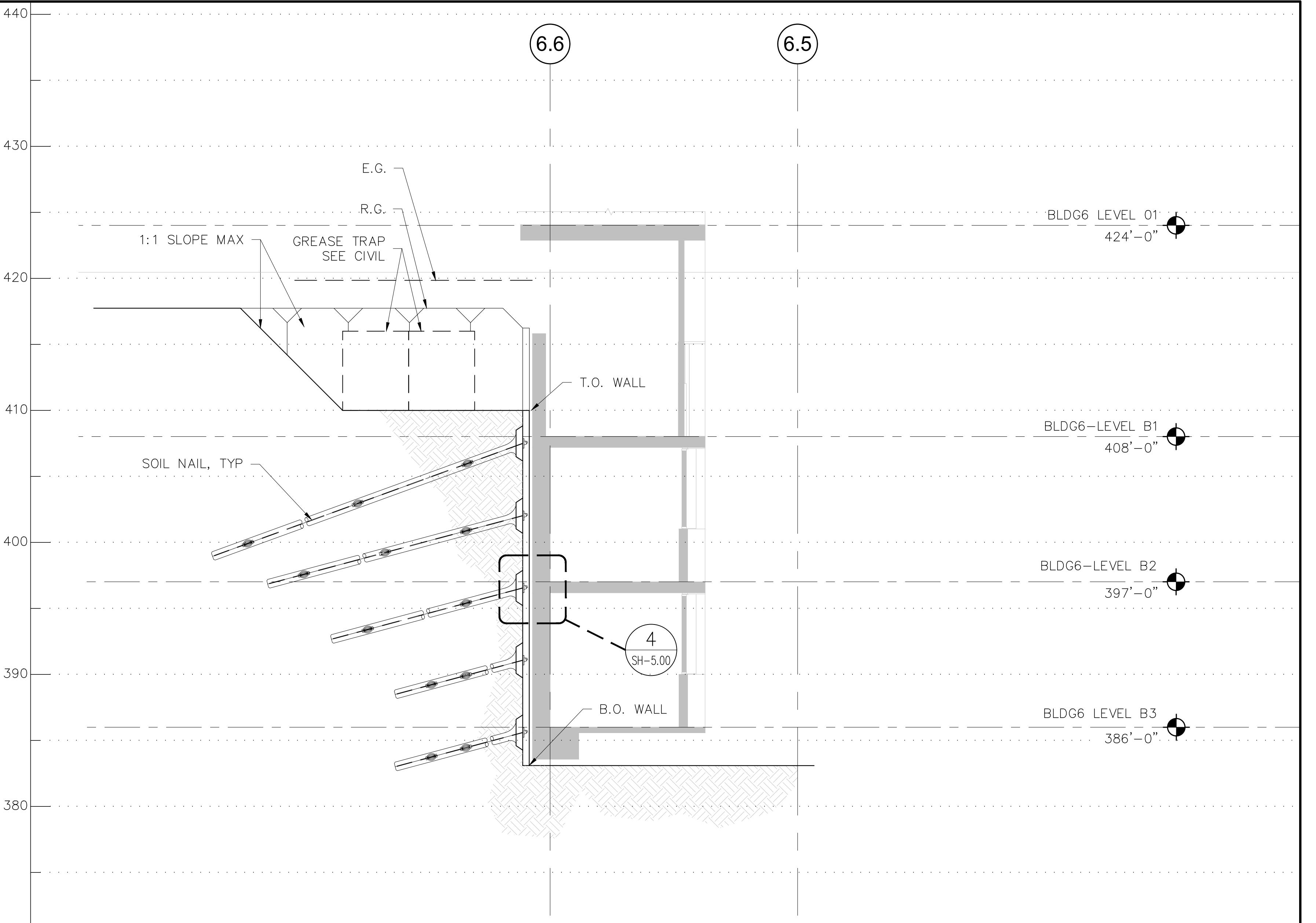
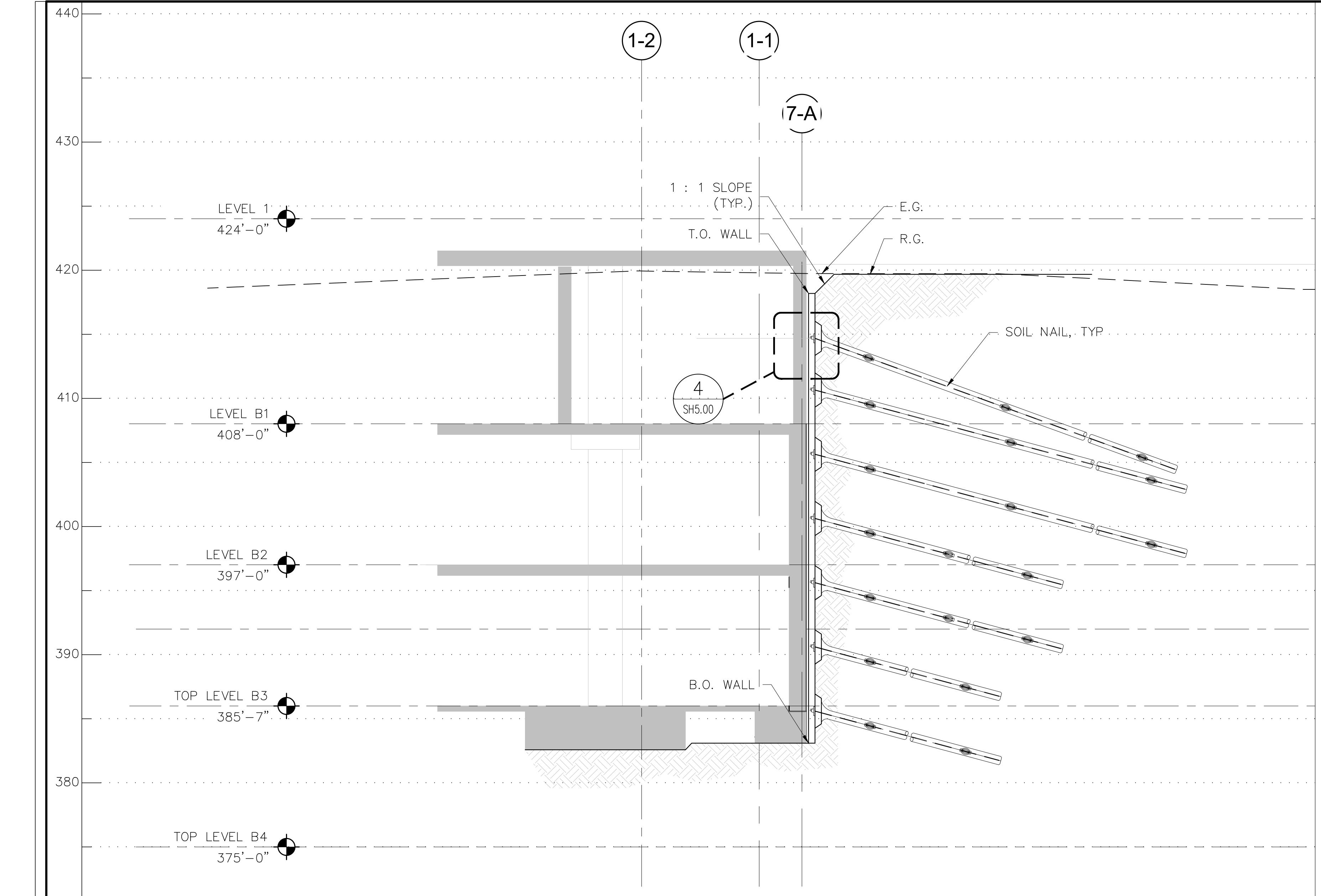
NOTE:  
SOIL NAIL ANGLES:  
1. FIRST TOP ROW NAILS ARE 20°  
2. REST OF ROWS ARE 15°  
EXCEPT:  
1. TOP ROW NAILS @ 89 THRU 92, 96 THRU 120 AND 140 THRU 152 ARE 17°.  
2. TOP ROW NAILS @ 93 THRU 95, 136 THRU 139 AND 153 THRU 160 ARE 23°.  
3. SECOND ROW NAILS @ 442 THRU 454 ARE 20°



REGISTERED PROFESSIONAL ENGINEER  
CE 26101  
SE 2502  
Exp. 03/31/20

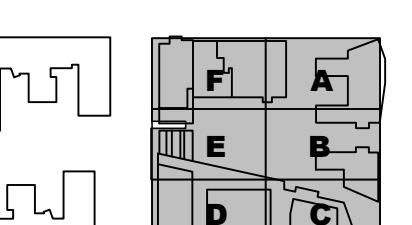




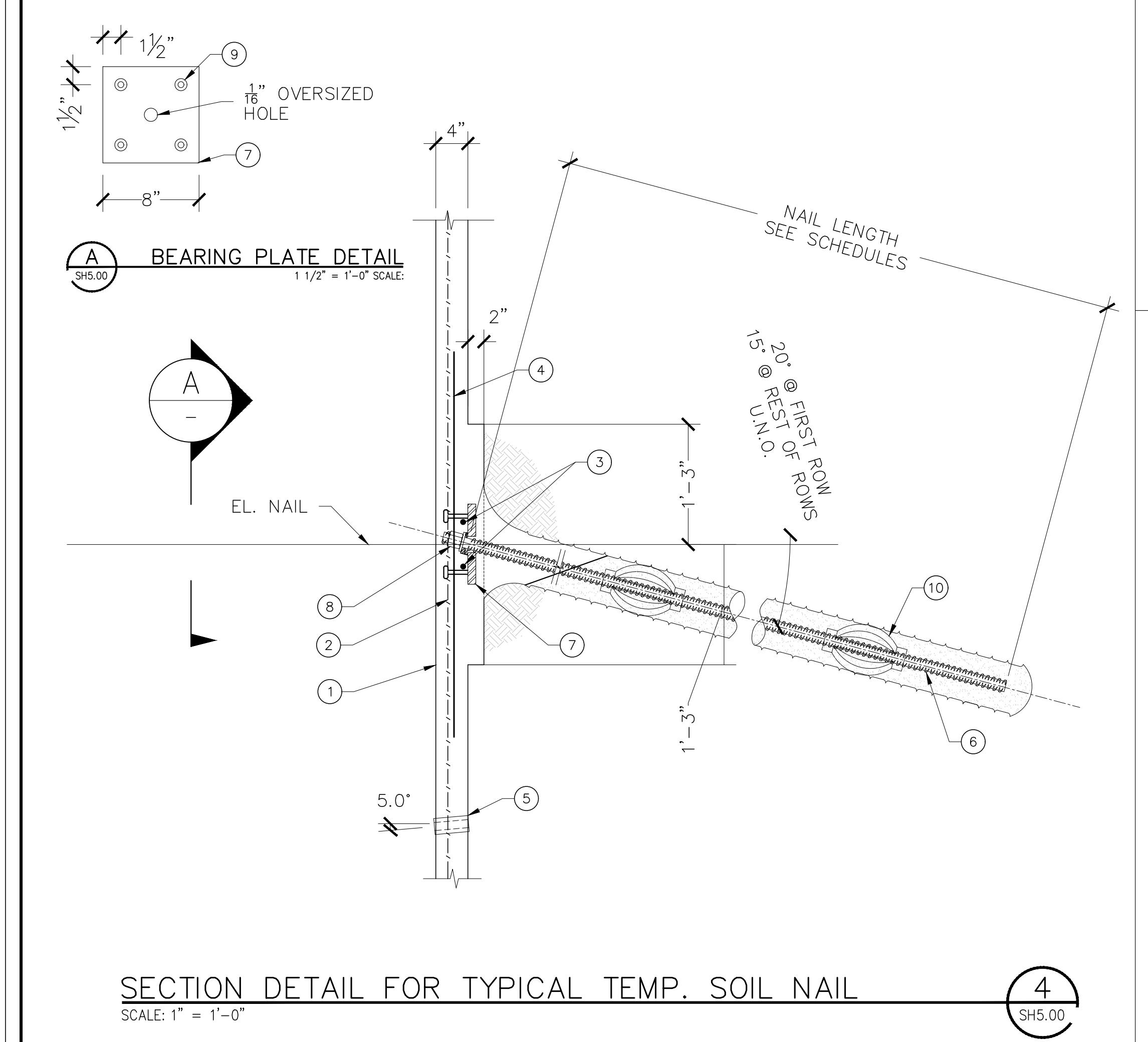
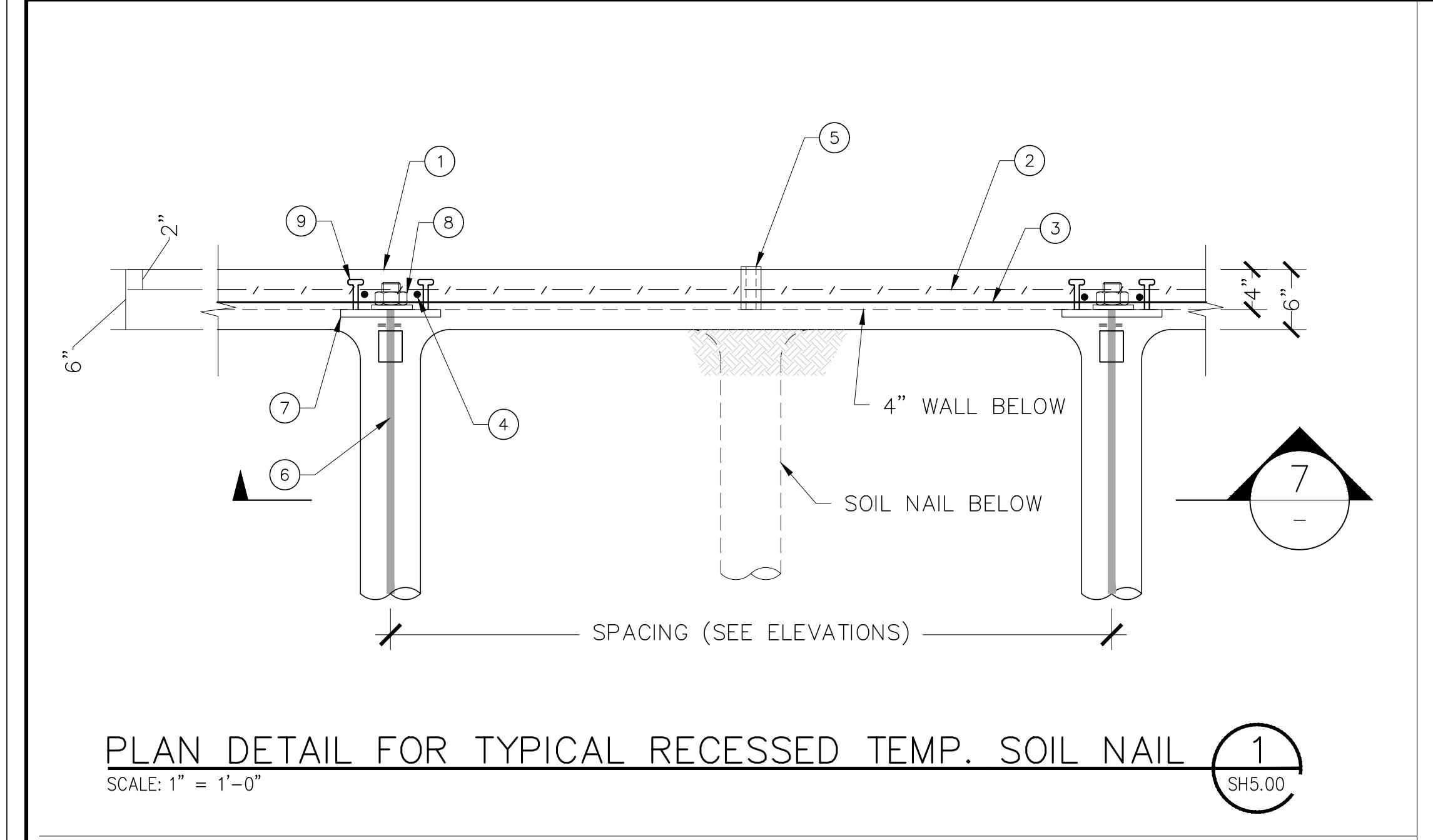
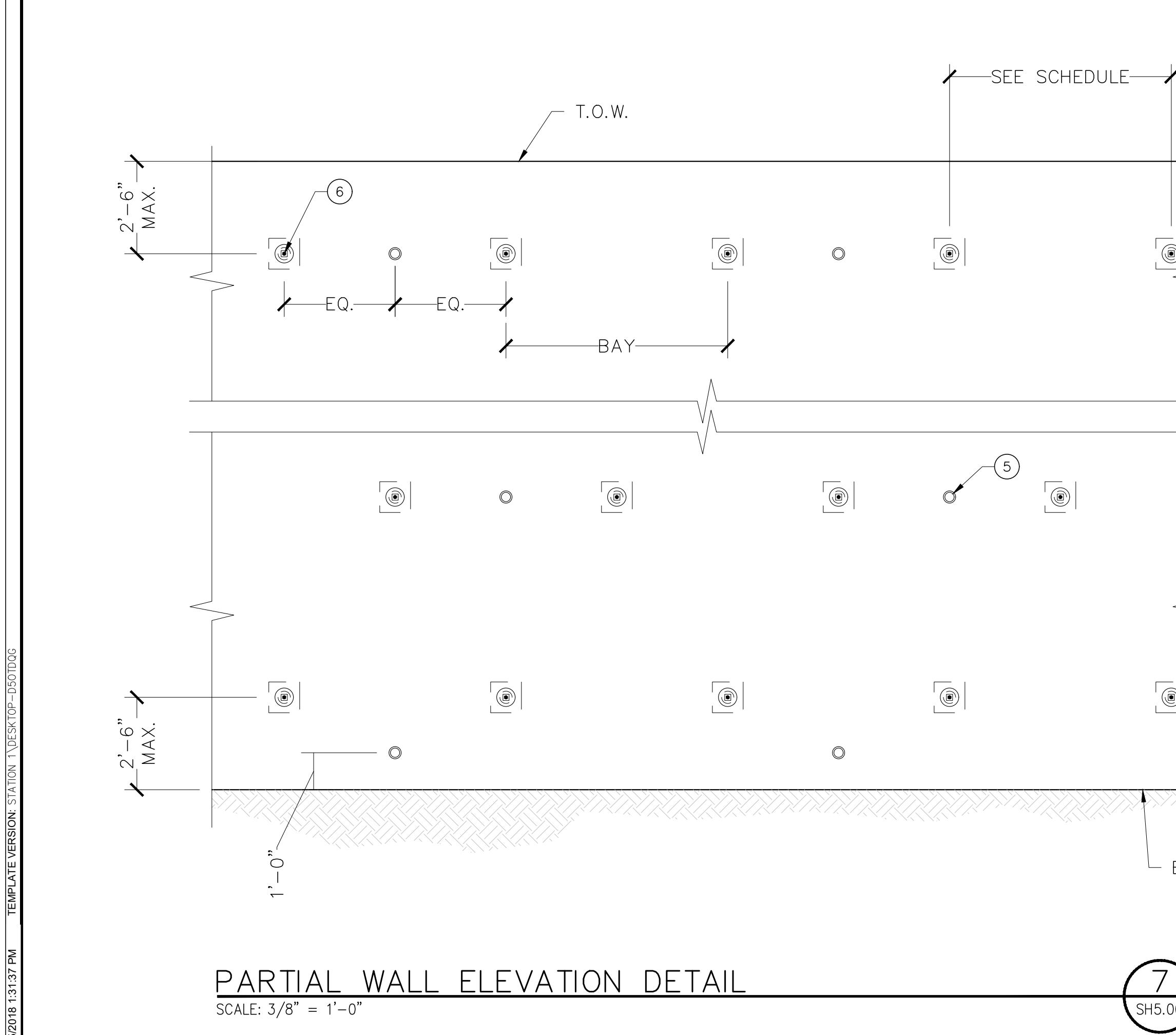


**NORTH TORREY PINES  
LIVING & LEARNING  
NEIGHBORHOOD**OWNER  
UNIVERSITY OF CALIFORNIA SAN DIEGO  
LA JOLLA, CALIFORNIA 92093INTERIM REVIEW ONLY  
These documents are incomplete and  
are released for interim review only and  
are not intended for regulatory approval,  
permit, or construction purposes.  
Architect: XXXXXX  
Arch. Reg. No.: XXXXX  
Date: XXXXX/XXXX

KEY PLAN

REVISION  
NO. DESCRIPTION DATEHKS/PB&A INC. PROJECT NUMBER  
**20385.000/180200**DATE  
**FEBRUARY 26, 2018**ISSUE  
**100% CONSTRUCTION  
DOCUMENTS**  
SHEET TITLE  
**DETAILS**

SHEET NO.

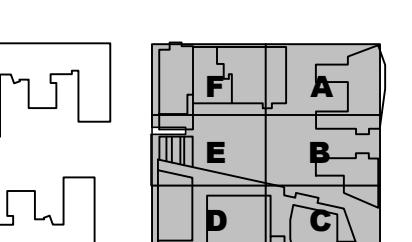
**SH5.00**SECTION DETAIL FOR TYPICAL TEMP. SOIL NAIL (4)  
SCALE: 1" = 1'-0"  
SH5.00PLOT DATE: 3/13/18 PM  
EMULATE ENSOR STATION: 180200-JAH-A  
180200-MAA-JAH-180200-180200-DETAILED.DWG

180200-180200-DETAILED.DWG

180200-

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permit, or construction purposes.  
Architect: XXXXXX  
Arch. Reg. No.: XXXXX  
Date: XXXXX/XXXX

KEY PLAN

REVISION  
NO. DESCRIPTION DATE

**REGISTERED PROFESSIONAL ENGINEER  
PIPER BARAR**  
CE 26101  
SE 2502  
Exp. 03/31/20  
CIVIL &  
STRUCTURAL  
STATE OF CALIFORNIA

SHEET NO. *R. Baran***SH5.01**