DESIGN NOTES

1. Design is based on the assumption that the methods of construction and quality of materials conform to the requirements of Hilfiker Retaining Walls.

2. Soil Characteristics:

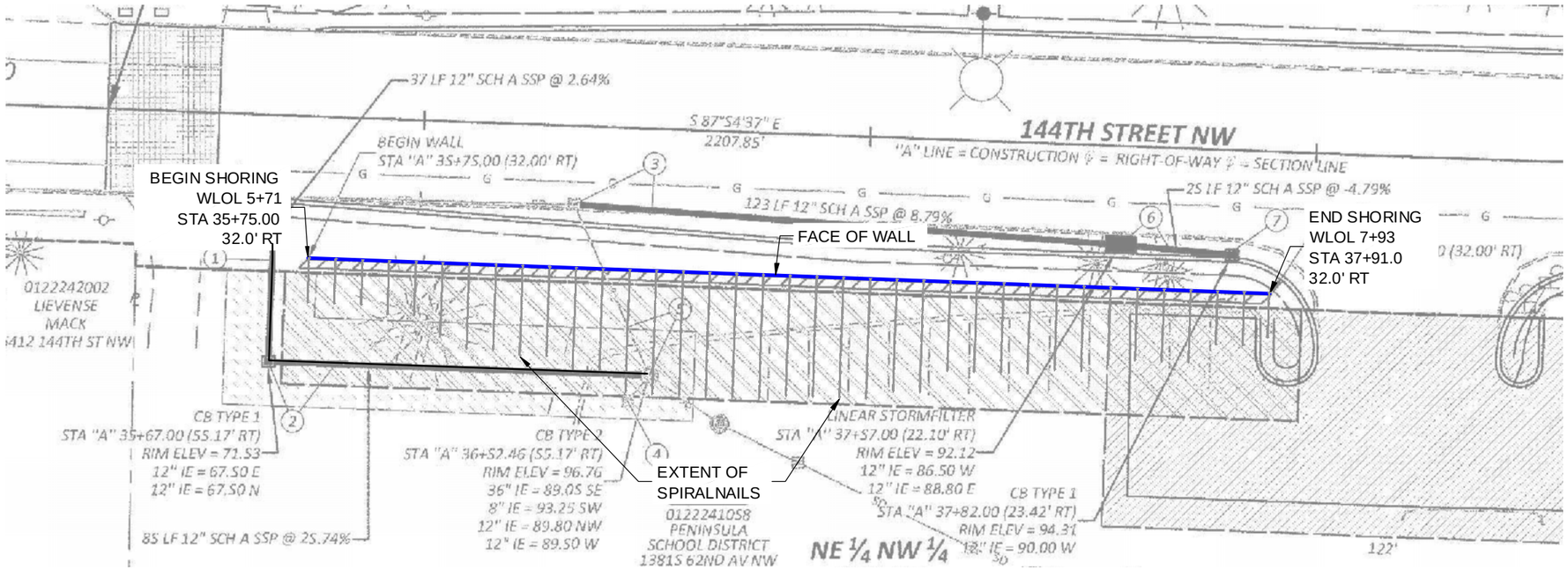
SN - Retained Soils
Unit Weight: 125 pcf
Internal Friction Angle: 34°
Cohesion = 75 psf
Bond Stress = Varies per Pullout Testing Results

If actual characteristics, grades or dimensions of soil materials differ from those listed above or shown on the plans, the Spriralnail Engineer shall be notified to evaluate the need to redesign.

3. Design Procedure:
Geotechnical Engineering Circular No. 7 - Soil Nail Walls
FHWA Report No. FHWA0-IF-03-017.

4. Conflicts between the trusswall panels, pillasters or spiralnails and obstructions are resolved in the field by any combination of the following:
a) Trimming the vertical truss wall panel wires and or bending vertical & horizontal wires to accommodate the penetration through the facing
b) Trimming the bottom part of the pilaster
c) Slight Re-orientation of the spiralnail angle or direction. If re-orientation of the pilaster or nails is more than one foot from the planned location, confirmation of the change shall be approved by CES.

5. This design is intended to be responsible for the internal stability of the retaining wall only, and not for global stability or foundation bearing capacity. CES is not responsible for job site drainage, safety and fall protection provisions including compliance with OSHA regulations, nor the Competent Person designated for daily inspection.



PLAN VIEW
SCALE: 1" = 30'

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HW 190118EN

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	7-09-19	KLC	Revised per 6.18.19 Email Plan Check

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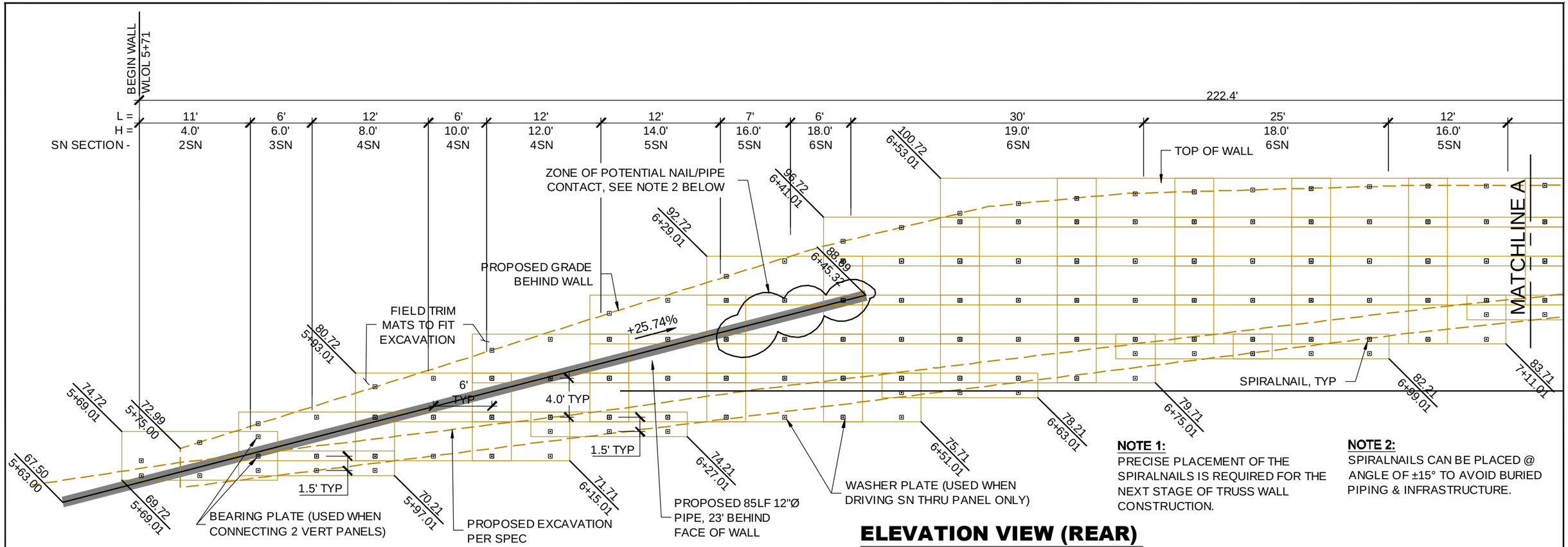
144th St NW
SPIRALNAIL SHORING & TRUSS WALL

WALL PLAN VIEW
& GENERAL NOTES

PROJECT 19-037
DATE 06-15-19
DESIGN KLC
DRAWN KLC

SHT 1 OF 8



NOTE 1:
PRECISE PLACEMENT OF THE SPIRALNAILS IS REQUIRED FOR THE NEXT STAGE OF TRUSS WALL CONSTRUCTION.

NOTE 2:
SPIRALNAILS CAN BE PLACED @ ANGLE OF ±15° TO AVOID BURIED PIPING & INFRASTRUCTURE.

ELEVATION VIEW (REAR)

SCALE: 1" = 10'

SPIRALNAIL LENGTH & INCLINATION ANGLE	
Wall Section	Spiralnail Quantity-Length & Inclination Angle (Top to Bottom)
2 SN SECTION 4' Wall Height	3 - 10'@ 0° (6' o.c.)
3 SN SECTION 6' Wall Height	3 - 10'@ 0° (6' o.c.)
3 SN SECTION 8' Wall Height	3 - 12'@ 0° (6' o.c.)
4 SN SECTION 10' Wall Height	4 - 16'@ 0° (6' o.c.)
4 SN SECTION 12' Wall Height	4 - 19'@ 0° (6' o.c.)

SPIRALNAIL LENGTH & INCLINATION ANGLE	
Wall Section	Spiralnail Quantity-Length & Inclination Angle (Top to Bottom)
5 SN SECTION 14' Wall Height	5 - 20'@ 0° (6' o.c.)
5 SN SECTION 16' Wall Height	5 - 25'@ 0° (6' o.c.)
6 SN SECTION 18' Wall Height	2 - 28'@ 0° (6' o.c.) 4 - 27'@ 0° (6' o.c.)
6 SN SECTION 19' Wall Height	6 - 28'@ 0° (6' o.c.)

NOTE:
If within a section there are LESS nails required (shorter than the max allowed height), nails may be eliminated from the bottom up.

If within a section there are MORE nails required than called out, the extra nails are to be as long as called out in the section requirement.

SPIRALNAIL LOCATION
SPIRALNAILS ARE ARRANGED ON A VARIABLE VERTICAL PATTERN & HORIZONTAL (6' TYP) PATTERN, VARIATIONS OCCUR AS THE SHORING SLOPES UP OR DOWN.

EXISTING INFRASTRUCTURE
PIPING, UTILITIES, OR ANY OTHER UNDERGROUND ITEMS OR INFRASTRUCTURES MAY OR MAY NOT BE SHOWN. SPIRALNAILS WERE LOCATED ON THESE PLANS AS COULD BE BEST DETERMINED WTIH THE INFORMATION PROVIDED. PRECISE LOCATIONS SHALL BE ASCERTAINED IN THE FIELD PRIOR TO DRAWING APPROVAL AND CONFIRMED BY OTHERS. DESIGN APPROVAL WARRANTS NEITHER HILFIKER NOR CES WILL BE LIABLE FOR ANY DAMAGE CAUSED BY SPIRALNAIL INSTALLATIONS PERFORMED IN ACCORDANCE WITH THESE PLANS. CALL USA PRIOR TO ANY EXCAVATION OR NAIL INSTALLATION.

THE DESIGN CONTAINED ON THESE DRAWINGS IS BASED ON INFORMATION PROVIDED BY THE OWNER. ON THE BASIS OF THIS INFORMATION, THE HILFIKER COMPANY HAS DESIGNED, AND IS RESPONSIBLE FOR THE INTERNAL STABILITY OF THE STRUCTURE ONLY. EXTERNAL STABILITY, INCLUDING FOUNDATION AND SLOPE STABILITY, IS THE RESPONSIBILITY OF THE OWNER.

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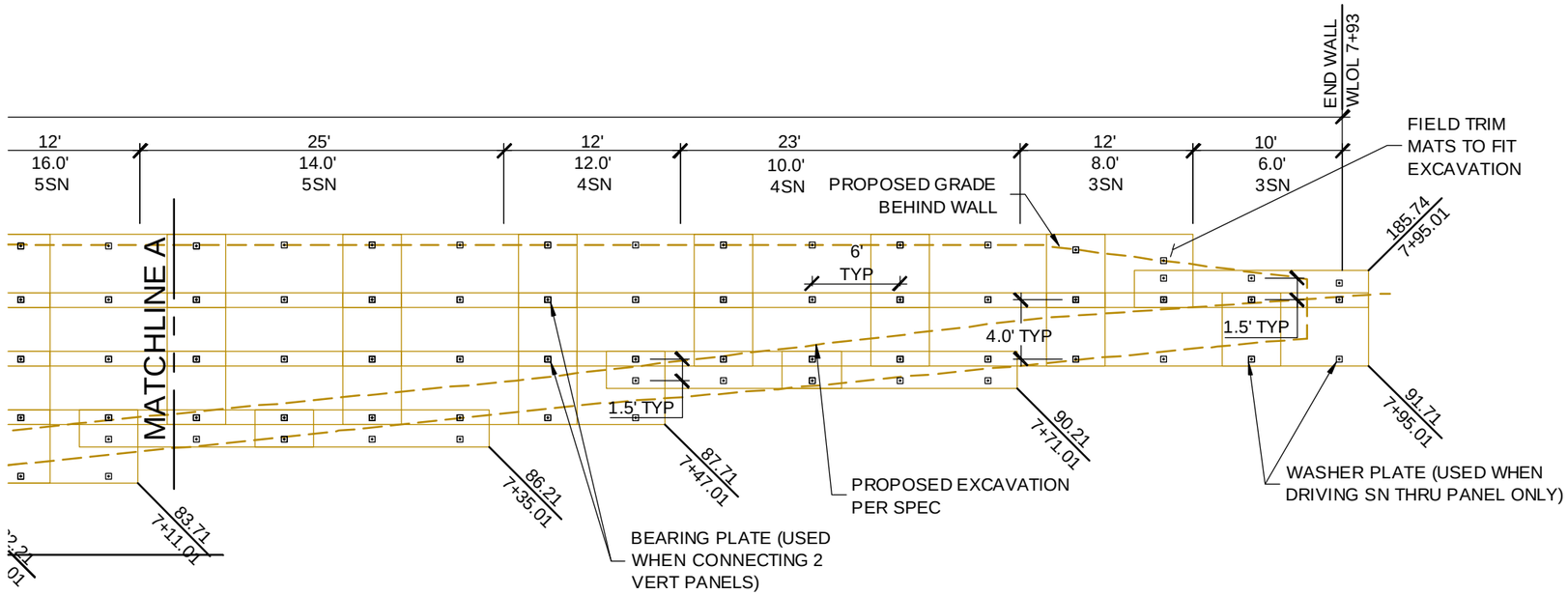
144th St NW
SPIRALNAIL SHORING & TRUSS WALL

SHORING ELEVATION VIEW

PROJECT 19-037
DATE 06-15-19
DESIGN KLC
DRAWN KLC

SHT 2 OF 8



ELEVATION VIEW (REAR CONT'D)

SCALE: 1" = 10'

SPIRALNAIL LENGTH & INCLINATION ANGLE	
Wall Section	Spiralnail Quantity- Length & Inclination Angle (Top to Bottom)
2 SN SECTION 4' Wall Height	3 - 10'@ 0° (6' o.c.)
3 SN SECTION 6' Wall Height	3 - 10'@ 0° (6' o.c.)
3 SN SECTION 8' Wall Height	3 - 12'@ 0° (6' o.c.)
4 SN SECTION 10' Wall Height	4 - 16'@ 0° (6' o.c.)
4 SN SECTION 12' Wall Height	4 - 19'@ 0° (6' o.c.)

SPIRALNAIL LENGTH & INCLINATION ANGLE	
Wall Section	Spiralnail Quantity- Length & Inclination Angle (Top to Bottom)
5 SN SECTION 14' Wall Height	5 - 20'@ 0° (6' o.c.)
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SPIRALNAIL LOCATION

SPIRALNAILS ARE ARRANGED ON A VARIABLE VERTICAL PATTERN & HORIZONTAL (6' TYP) PATTERN, VARIATIONS OCCUR AS THE SHORING SLOPES UP OR DOWN.

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KIRK L. CESARETTI
STATE OF WASHINGTON
44942
REGISTERED
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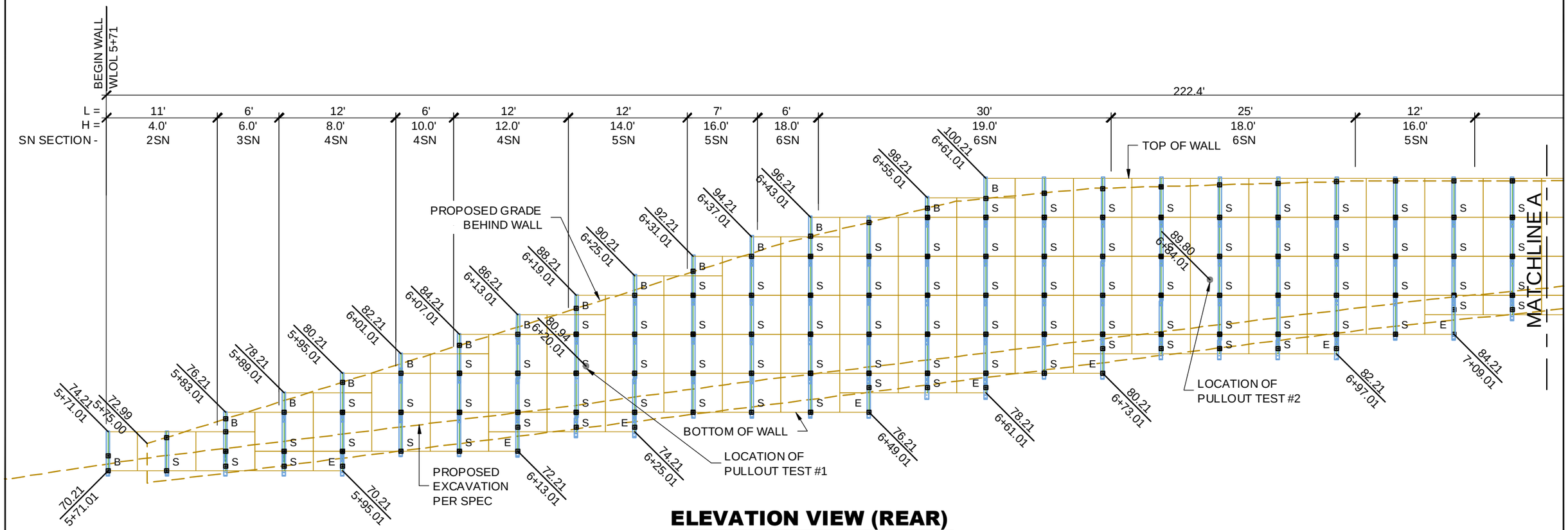
144th St NW
SPIRALNAIL SHORING & TRUSS WALL

SHORING ELEVATION VIEW (CONT'D)

PROJECT	19-037
DATE	06-15-19
DESIGN	KLC
DRAWN	KLC

SHT 3 OF 8



ELEVATION VIEW (REAR)

SCALE: 1" = 10'

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STATE OF WASHINGTON
KIRK L. CESARETTI
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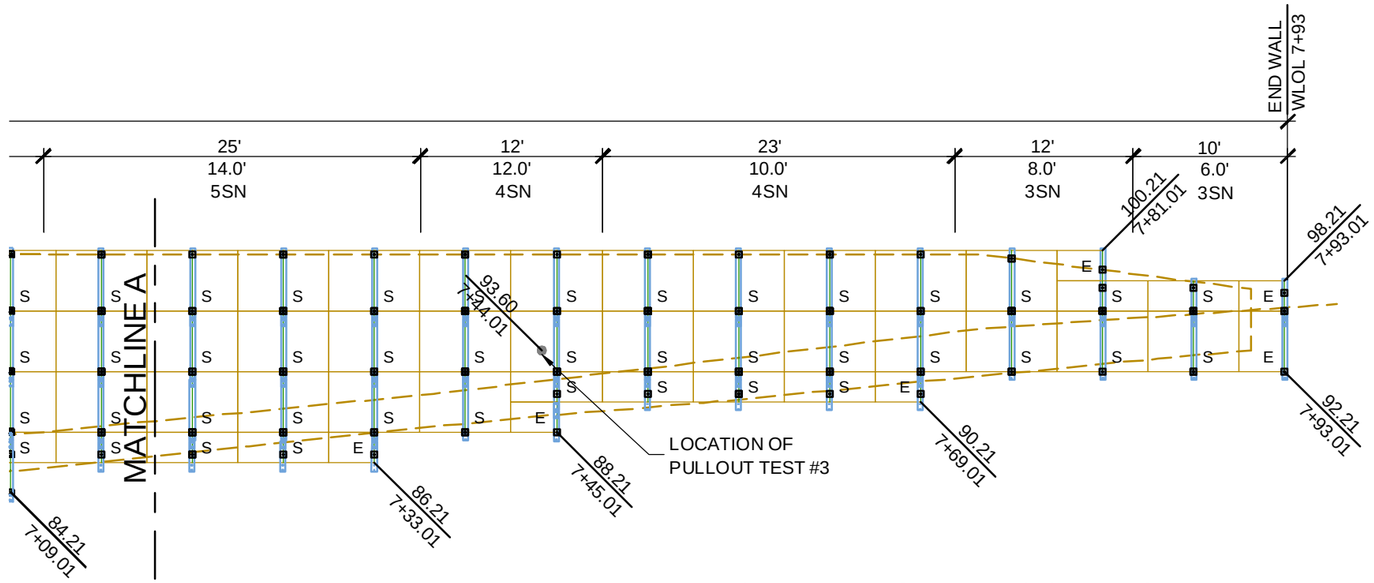
144th St NW
SPIRALNAIL SHORING & TRUSS WALL

TRUSS WALL ELEVATION VIEW

PROJECT	19-037
DATE	06-15-19
DESIGN	KLC
DRAWN	KLC

SHT 4 OF 8



ELEVATION VIEW (REAR CONT'D)

SCALE: 1" = 10'

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HW 190118EN

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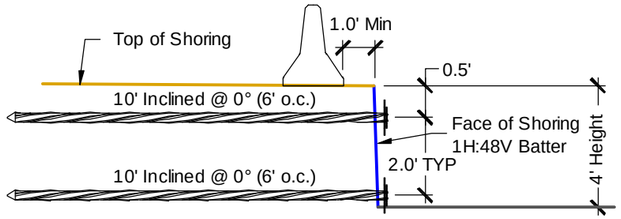
144th St NW
SPIRALNAIL SHORING & TRUSS WALL

TRUSS WALL ELEVATION VIEW (CONT'D)

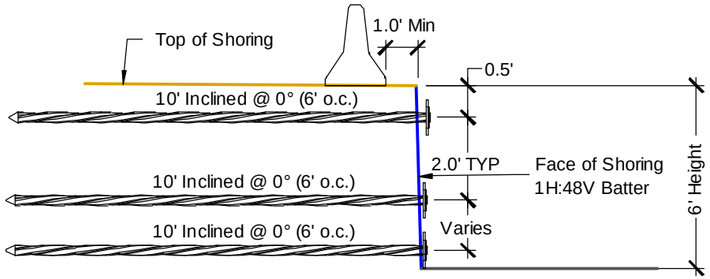
PROJECT 19-037
DATE 06-15-19
DESIGN KLC
DRAWN KLC

SHT 5 OF 8



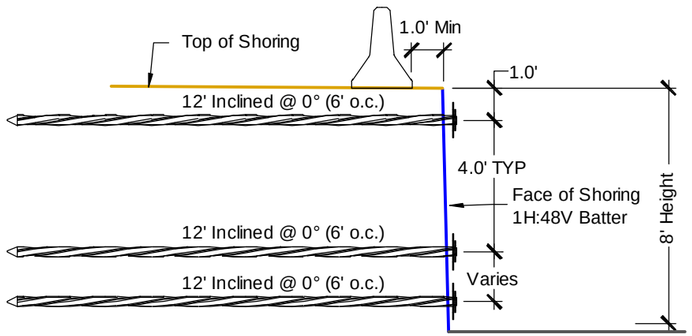
2SN (4'H)

SCALE: 1" = 5'



3SN (6'H)

SCALE: 1" = 5'

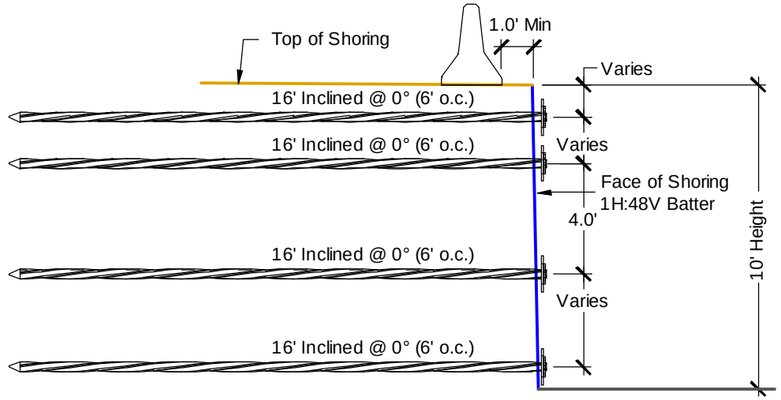


3SN (8'H)

SCALE: 1" = 5'

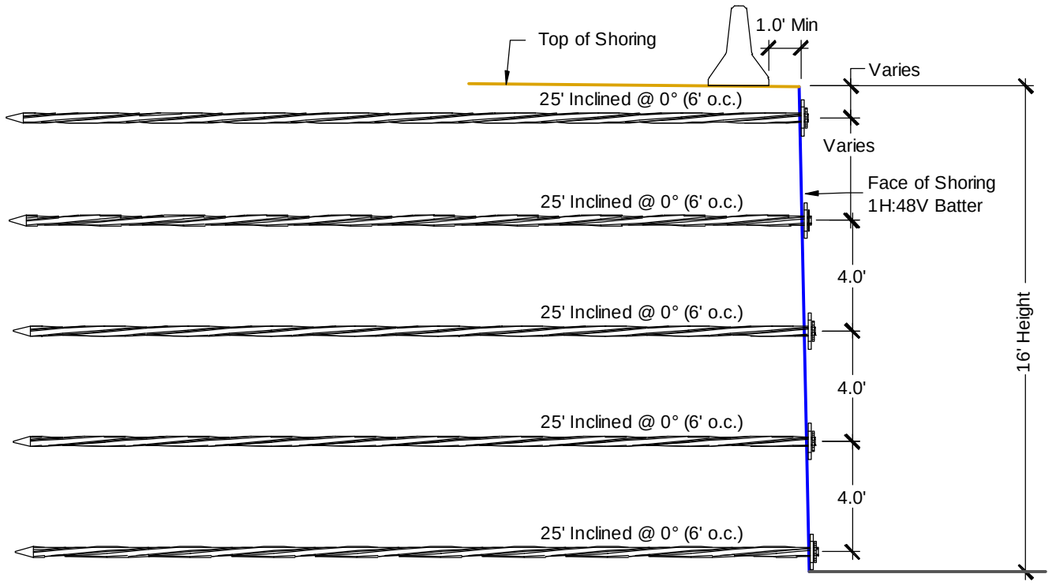
NOTE:
THE CROSS SECTIONS SHOWN ARE REPRESENTATIVE, NOT ALL CROSS SECTIONS ARE SHOWN. ALL SECTIONS FOLLOW THE SAME BASIC GEOMETRY AS SHOWN. SEE TABLES ON SHT 2 & 3 FOR SPIRALNAIL LENGTHS AND INCLINATION ANGLE.

SPIRALNAIL INCLINATION
SPIRALNAILS MAYBE DRIVEN FROM 0° TO 20° TO AVOID UTILITIES OR INFRASTRUCTURE.



4SN (10'H)

SCALE: 1" = 5'



5SN (16'H)

SCALE: 1" = 5'

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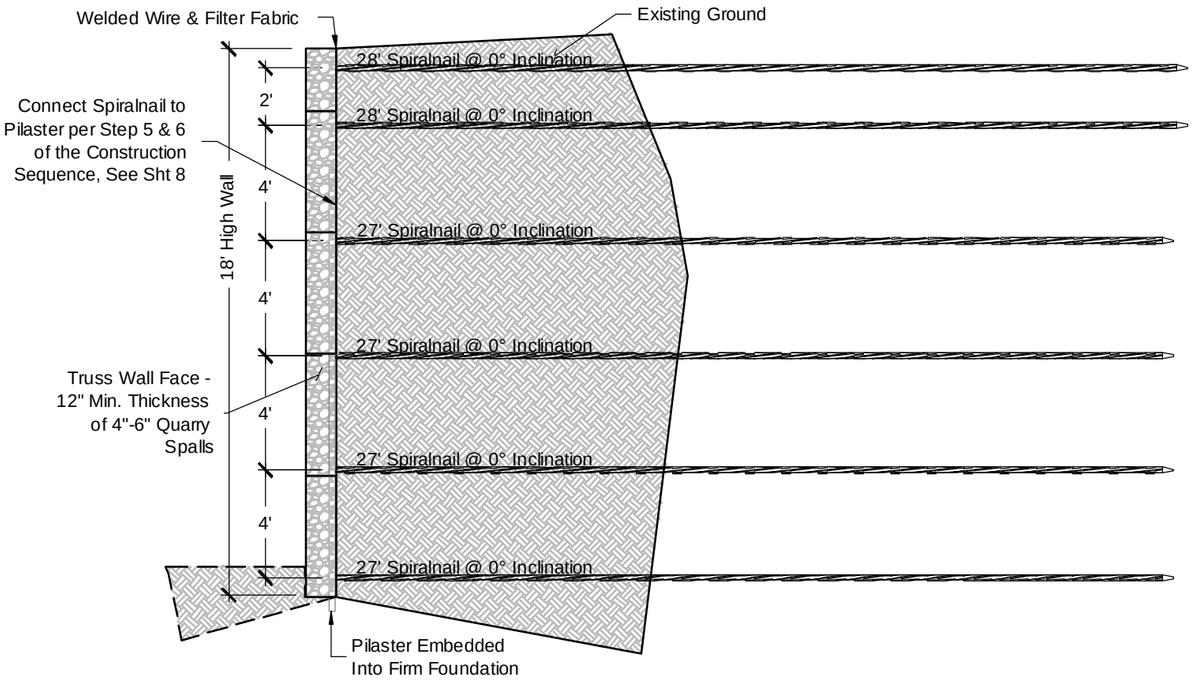
62nd Ave NW / 144th St NW
SPIRALNAIL SHORING & TRUSS WALL

SHORING CROSS SECTIONS

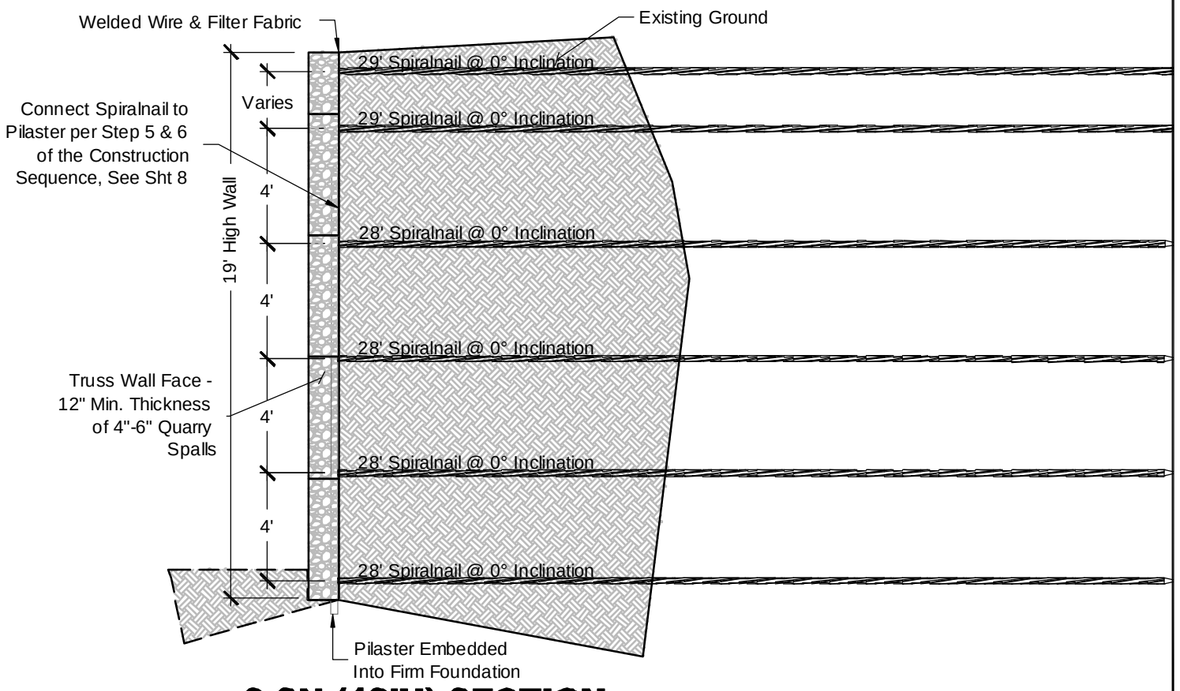
PROJECT	19-007
DATE	06-05-19
DESIGN	KLC
DRAWN	KLC

SHT 6 OF 8



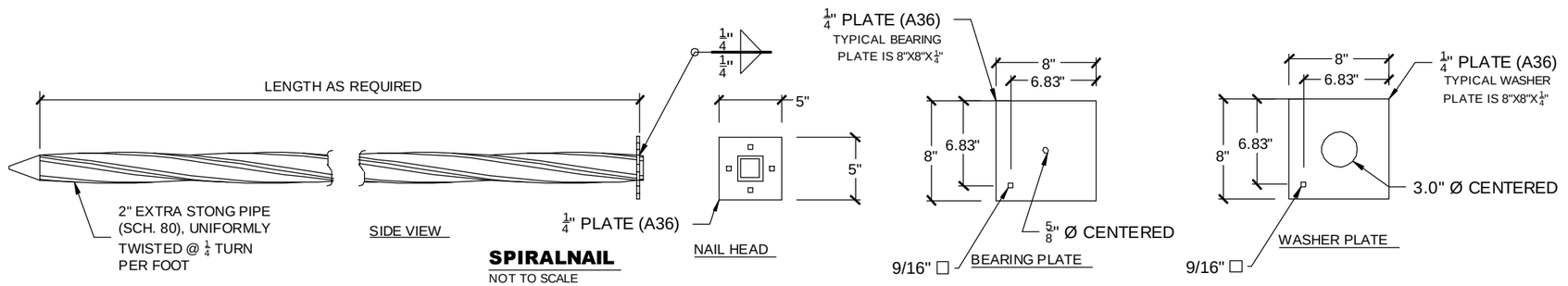
6 SN (18'H) SECTION

SCALE: 1" = 5'



6 SN (19'H) SECTION

SCALE: 1" = 5'



KIRK L. CESARETTI — STATE OF WASHINGTON — 44942 — REGISTERED PROFESSIONAL ENGINEER

HW 190118EN

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144th St NW
SPIRALNAIL SHORING & TRUSS WALL

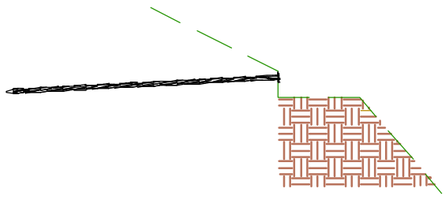
CROSS SECTIONS & DETAILS

PROJECT	19-037
DATE	06-15-19
DESIGN	KLC
DRAWN	KLC

SHT 7 OF 8

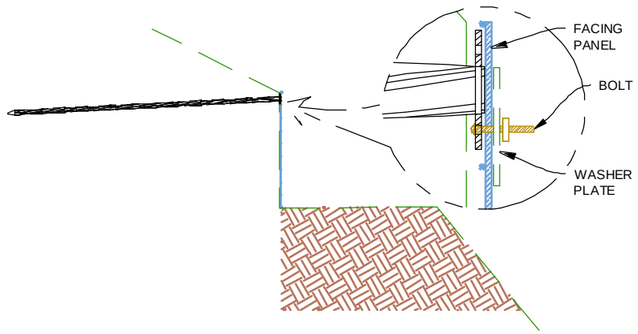
STEP 1

EXCAVATE TOP OF WALL AND DRIVE FIRST LAYER OF SPIRALNAILS USING HILFIKER SPIRALNAIL HAMMER

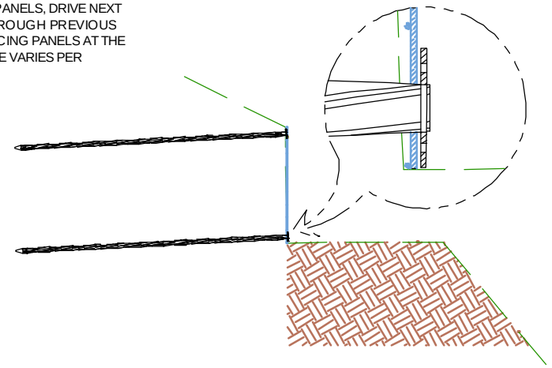


STEP 2

EXCAVATE DOWN 5' AND PLACE LAYER OF FACING PANELS. ATTACH TOP OF FACING PANELS TO PREVIOUS LAYER OF SPIRALNAIL HEADS WITH BOLTS AND PLATE WASHERS.

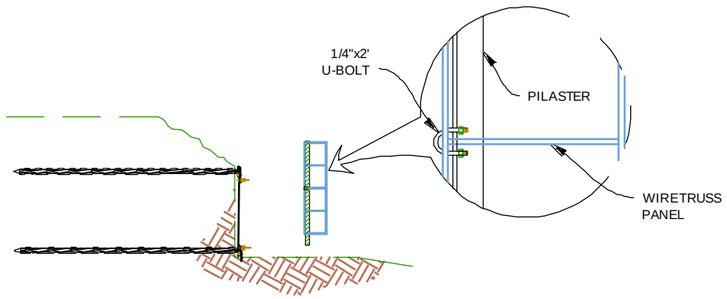


TO SECURE BOTTOM OF PANELS, DRIVE NEXT LAYER OF SPIRALNAILS THROUGH PREVIOUS LAYER OF WIRE MESH FACING PANELS AT THE REQUIRED ANGLE. (ANGLE VARIES PER PROJECT PLANS.)



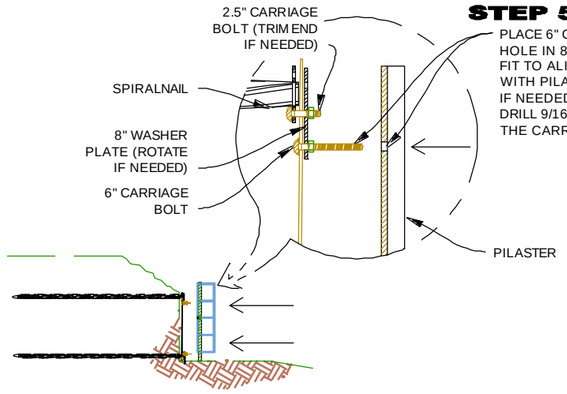
STEP 4

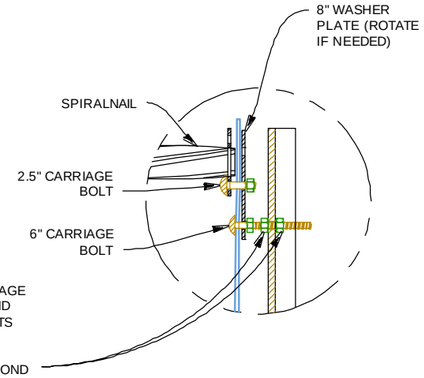
ATTACH WIRETRUSS PANEL TO BACK OF PILASTER WITH U-BOLT USING FACTORY DRILLED HOLES. DETAIL, THIS SHEET.



STEP 5

PLACE 6" CARRIAGE BOLT THROUGH HOLE IN 8" WASHER PLATE FOR BEST FIT TO ALIGN 6" CARRIAGE BOLTS WITH PILASTER. ROTATE WASHER PLATE IF NEEDED FOR BETTER ALIGNMENT. DRILL 9/16" HOLE IN PILASTER FOR THE CARRIAGE BOLTS.





STEP 6

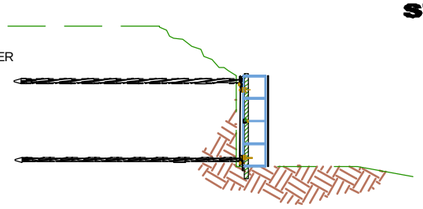
PUT SECOND NUT ONTO 6" CARRIAGE BOLTS, FIT WIRETRUSS PANEL AND PILASTER SO THAT ENDS OF BOLTS SLIP THROUGH DRILLED HOLES.

ADD THIRD NUT AND ADJUST SECOND AND THIRD NUTS SO THAT PILASTER IS HELD FIRMLY IN PLACE.

TOP DOWN SPIRALNAIL CONSTRUCTION SEQUENCE

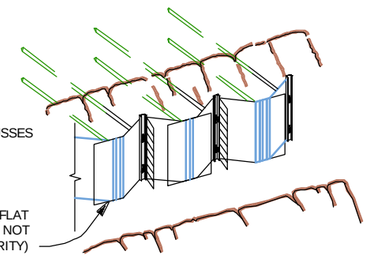
STEP 7

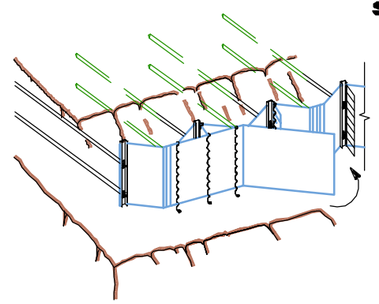
CONTINUE ADDING PILASTERS AND STANDARD TRUSSES ALONG WALL ENDING AT FINAL PILASTER WITH A START/END TRUSS



STEP 8

SPIRAL STIFFENERS ONTO STANDARD TRUSSES AT WIRE ON RIGHT SIDE OF PILASTER.





STEP 9

TO BEGIN FACING THE WALL, CENTER EDGES OF A FACING PANEL ON TRUSS OVERLAP. SPIRAL THE ENDS OF OVERLAP AND THE STIFFENER TO FACE PANEL.

PLACE NEXT FACE PANEL END-TO-END WITH PREVIOUS PANEL. SPIRAL TO TRUSS PANELS AS SHOWN.

HW 190118EN

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CONSTRCUTION SEQUENCE & DETAILS

PROJECT	19-037
DATE	06-15-19
DESIGN	KLC
DRAWN	KLC
SHT	8 OF 8