DESIGN NOTES

1. Design is based on the assumption that backfill within the reinforced soil mass, methods of construction and quality of materials conform to the requirements of Hilfiker Retaining Walls.

2. Assumed Soil Characteristics:

   Welded Wire Wall (WWW) Backfill:
   - Unit Weight: 135 pcf
   - Internal Friction Angle: 36°
   - Cohesion = 0 psf

   Retained Backfill:
   - Unit Weight: 130 pcf
   - Internal Friction Angle: 33°
   - Cohesion = 0 psf

   Foundation Soils:
   - Unit Weight: 130 pcf
   - Internal Friction Angle: 33°
   - Cohesion = 0 psf

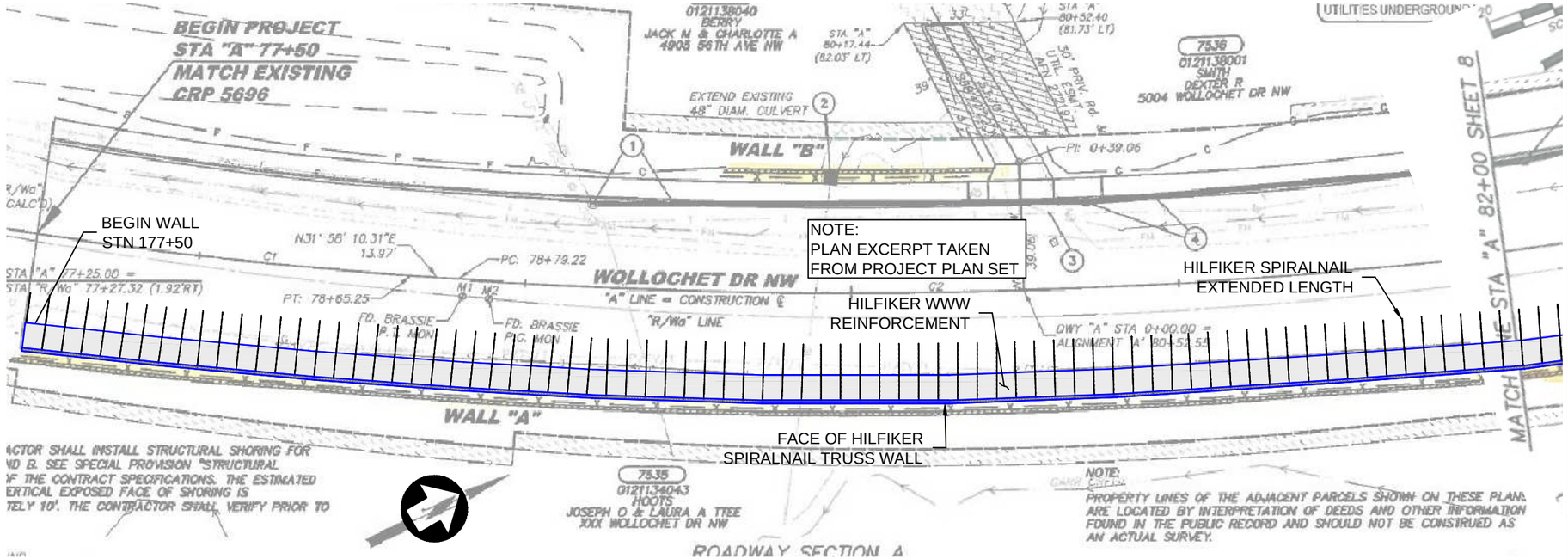
   Applied Bearing Pressure - applied at 4' (WWW) Height - 817 psf .
   Live Load (LL) Traffic Surcharge - 250 psf

   SN - Retained Soils
   - Unit Weight: 125 pcf
   - Internal Friction Angle: 32°
   - Cohesion = 0 psf
   - Bond Stress = 15 psi
   - **Loading** - Traffic Surcharge - (LL) = 250 psf

   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.
   (WWW) Mechanically Stabilized Earth walls and Reinforced Soil Slopes, FHWA report No. FHWA-NHI-00-043.

4. Reference Drawings:
   - Plan Change No. 9 By Pierce County Public Works and Utilities Dated Feb. 28, 2013
   - Civil Plans - Pierce County Public Works Department, Wollochet Dr NW to Fillmore Dr NW CRP 5542 by Brian Stacy Dated 2-16-12..
   - Geo-Report By Landau Associates, Summary of Supplemental Geotechnical Engineering Services Wollochet Drive NW East Bay Drive NW to Fillmore Drive NW - DRP 5542 Piece County, Washington, Dated April 21, 2008.



WOLLOCHET DRIVE - PLAN VIEW

SCALE: 1" = 40'

5. 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 Ontiveros & Associates, Inc.

6. 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. Ontiveros & Associates 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.

SPIRALNAIL LOCATION
SPIRALNAILS ARE ARRANGED ON A VARIABLE VERTICAL PATTERN & 6' HORIZONTAL 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 ONTIVEROS WILL BE LIABLE FOR ANY DAMAGE CAUSED BY SPIRALNAIL INSTALLATIONS PERFORMED IN ACCORDANCE WITH THESE PLANS. CALL USA 1-800-424-5555 PRIOR TO ANY EXCAVATION OR NAIL INSTALLATION.

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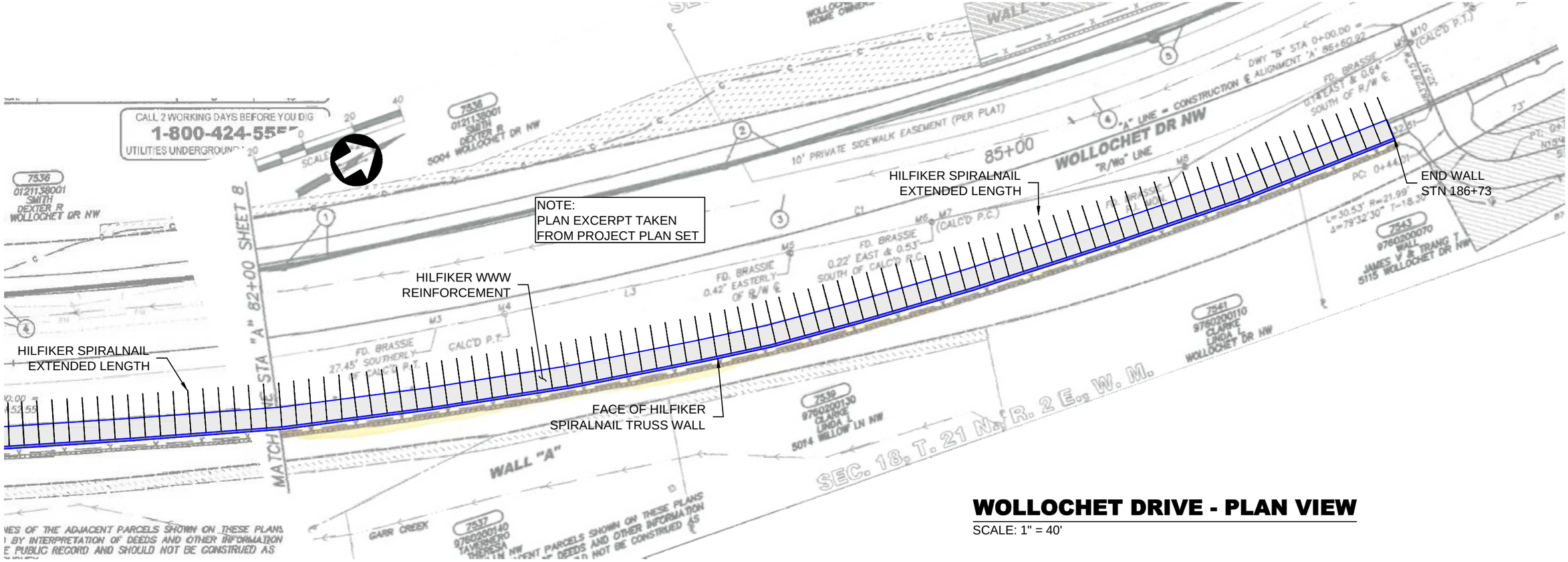
WOLLOCHET DRIVE NW
PIERCE COUNTY
SPIRALNAIL TRUSS SYSTEM

GENERAL NOTES AND PLAN VIEW

PROJECT 13-024
DATE 04-19-13
DESIGN KLC
DRAWN KLC

SHT 1 OF 8

P:\13-024 HW – Wollochet Drive\HW – Wollochet NW.dwg – Last Saved 4/22/2013 9:25 AM



WOLLOCHET DRIVE - PLAN VIEW

SCALE: 1" = 40'

EXISTING INFRASTRUCTURE

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SPIRALNAIL LOCATION

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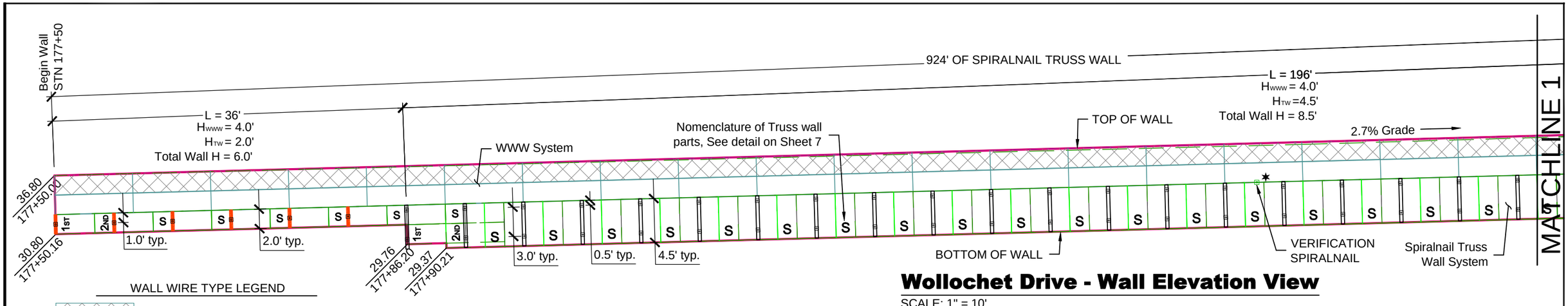
WOLLOCHET DRIVE NW
PIERCE COUNTY
SPIRALNAIL TRUSS SYSTEM

PLAN VIEW

PROJECT 13-024
DATE 04-19-13
DESIGN KLC
DRAWN KLC

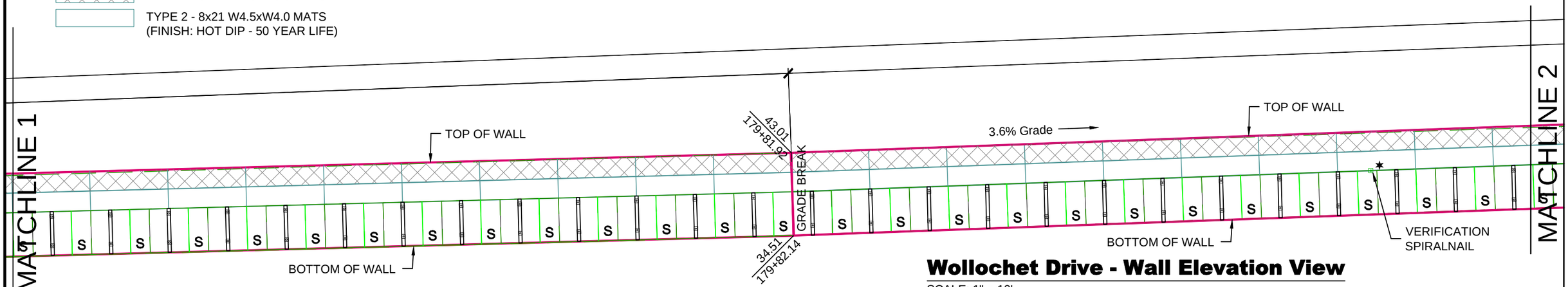
SHT 2 OF 8

P:\13-024 HW - Wollochet Drive\HW - Wollochet NW.dwg - Last Saved 4/22/2013 8:25 AM



Wollochet Drive - Wall Elevation View

SCALE: 1" = 10'



Wollochet Drive - Wall Elevation View

SCALE: 1" = 10'

REQUIRED QUANTITIES				
WALL NAME	TRUSS FACING (SF)	PILASTERS		SPIRALNAILS
TRUSS WALL	3102	(25) 2"	(105) 4.5'	(235) 18'
TOTALS	3102	25	105	235

SUPPLIED QUANTITIES:

TW - WALL AREA:	3102 SQ. FT.
WWW -WALL AREA:	3696 SQ.FT
TOTAL NUMBER OF 18' SPIRALNAILS = 235	

SPIRALNAIL LENGTH & INCLINATION ANGLE - UNDER WWW	
Wall Section	Spiralnail Quantity- Length & Inclination Angle (Top to Bottom)
1-SN SECTION H_{TW} = 2' Max	(1) - 18'@ 25° (6' o.c.) Horizontal Spacing
2-SN SECTION H_{TW} = 4.5' Max	(1) - 18'@ 25° (1) - 18'@15° (6' o.c.) Horizontal Spacing

WELDED WIRE WALL PARAMETERS		
Height of Wall (H_{WWW}) ft	Length of Cap & Prongless Mats (B_1) ft	Base Length of Mats (B_2) ft
≤'4	8'	8.75'
Cap & Top Mats (B1) are 8x12 W4.5x3.5 WWR (Type 1) Standard Mats (B2) are 8x21 W4.5x4.0 WWR (Type 2)		
Finish: Hot Dip - 50 Year Service Life		

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WOLLOCHET DRIVE NW
PIERCE COUNTY
SPIRALNAIL TRUSS SYSTEM

ELEVATION VIEW

PROJECT 13-024
DATE 04-19-13
DESIGN KLC
DRAWN KLC

SHT 3 OF 8

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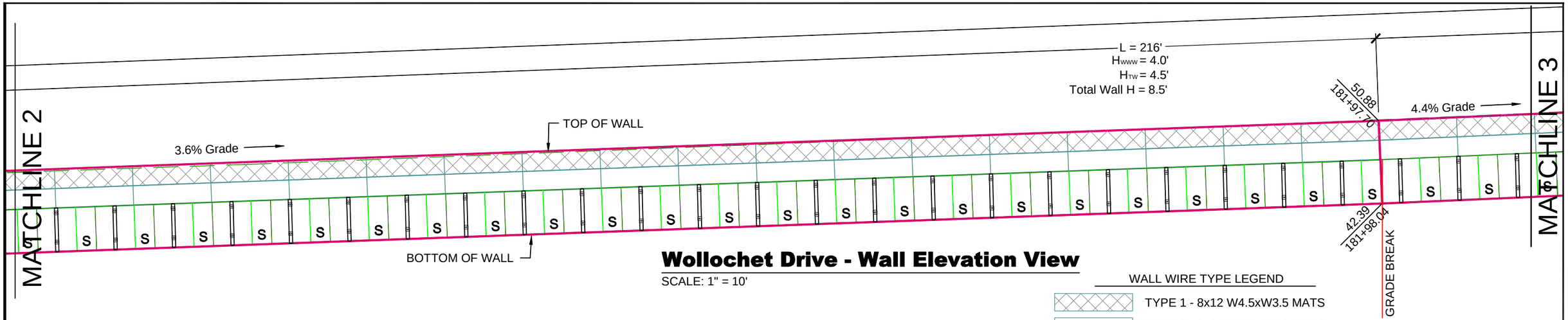


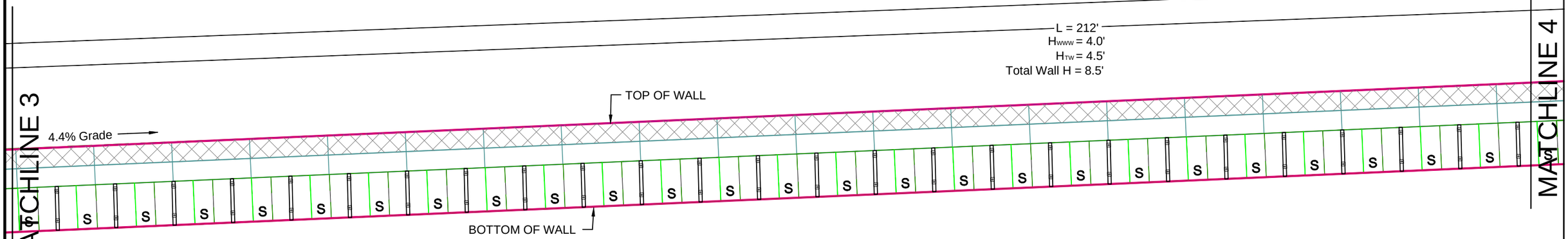
Wollochet Drive - Wall Elevation View

SCALE: 1" = 10'

WALL WIRE TYPE LEGEND

TYPE 1 - 8x12 W4.5xW3.5 MATS

TYPE 2 - 8x21 W4.5xW4.0 MATS
(FINISH: HOT DIP - 50 YEAR LIFE)



Wollochet Drive - Wall Elevation View

SCALE: 1" = 10'

SPIRALNAIL LENGTH & INCLINATION ANGLE - UNDER WWW	
Wall Section	Spiralnail Quantity- Length & Inclination Angle (Top to Bottom)
1-SN SECTION H_{TW} = 2' Max	(1) - 18'@ 25° (6' o.c.) Horizontal Spacing
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Cap & Top Mats (B1) are 8x12 W4.5x3.5 WWR (Type 1)
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Finish: Hot Dip - 50 Year Service Life

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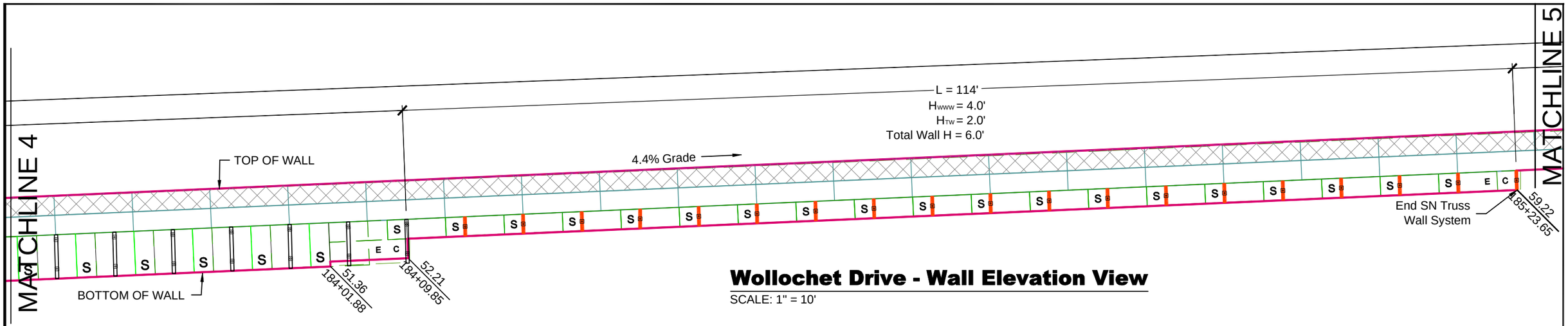
WOLLOCHET DRIVE NW
PIERCE COUNTY
SPIRALNAIL TRUSS SYSTEM

ELEVATION VIEW

PROJECT	13-024
DATE	04-19-13
DESIGN	KLC
DRAWN	KLC

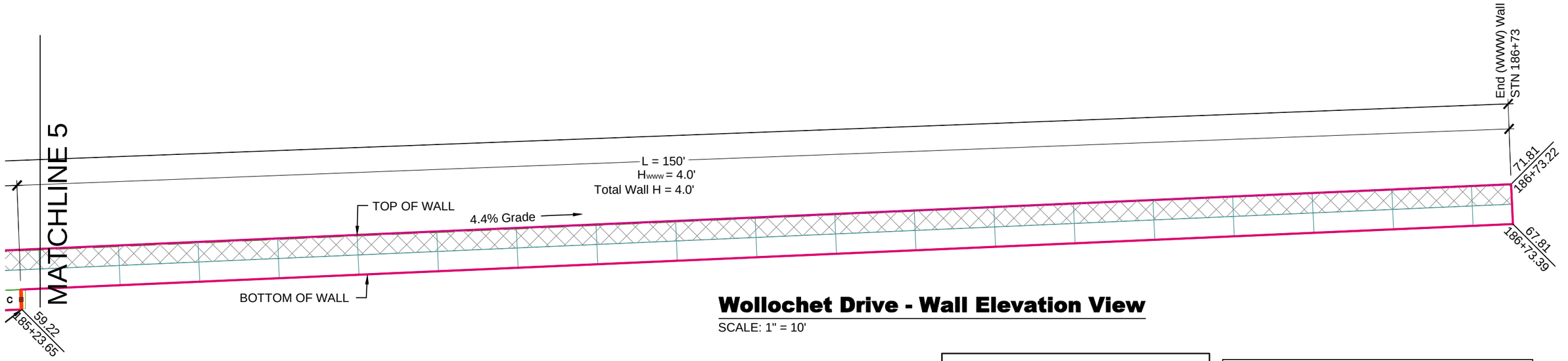
SHT 4 OF 8

P:\13-024 HW - Wollochet Drive\HW - Wollochet NW.dwg - Last Saved 4/22/2013 9:25 AM



Wollochet Drive - Wall Elevation View

SCALE: 1" = 10'



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WOLLOCHET DRIVE NW
PIERCE COUNTY
SPIRALNAIL TRUSS SYSTEM

ELEVATION VIEW

PROJECT 13-024
DATE 04-19-13
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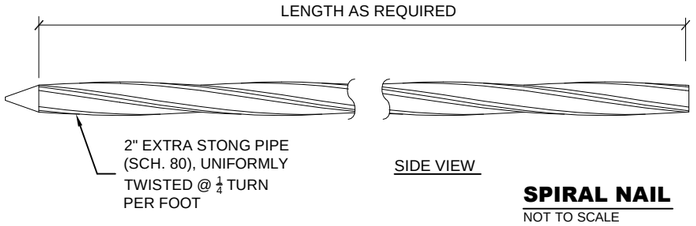
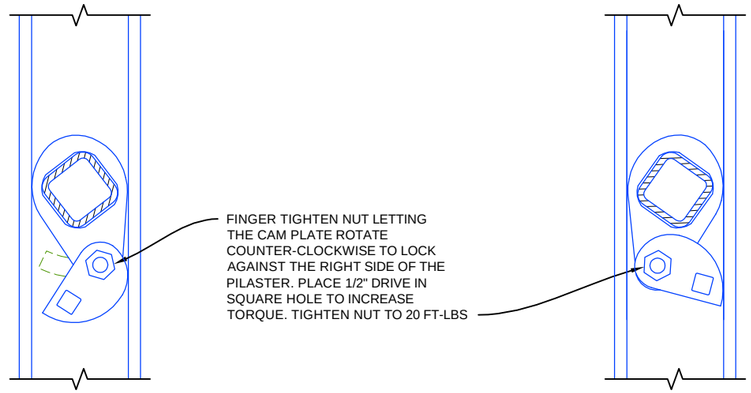
SHT 5 OF 8

P:\13-024 HW - Wollochet Drive\HW - Wollochet NW.dwg - Last Saved 4/22/2013 9:25 AM



SPIRAL NAIL
NOT TO SCALE



CAM LOCK LOCKING DETAIL
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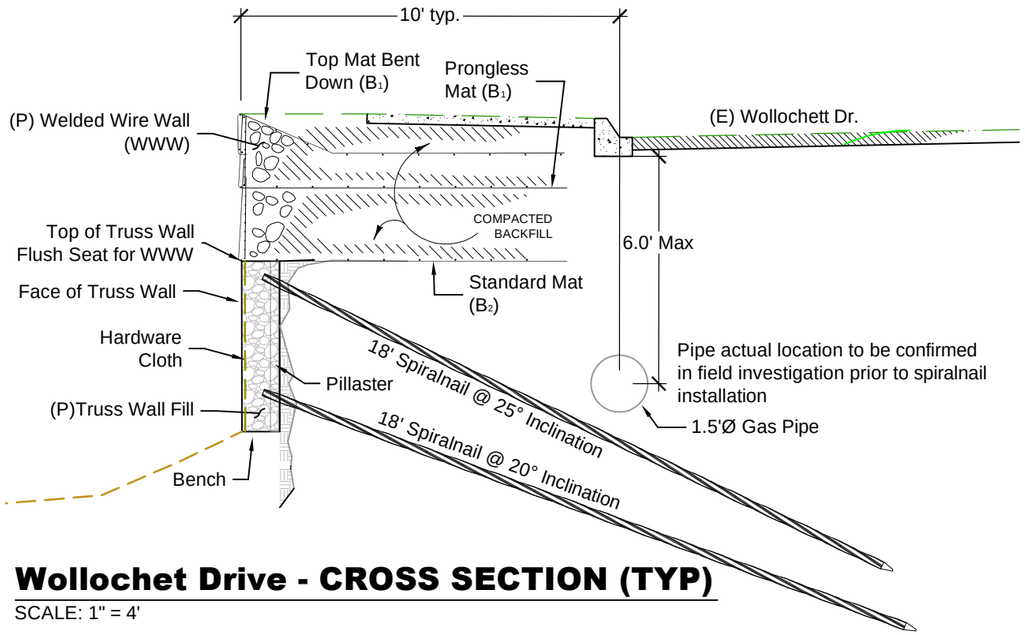
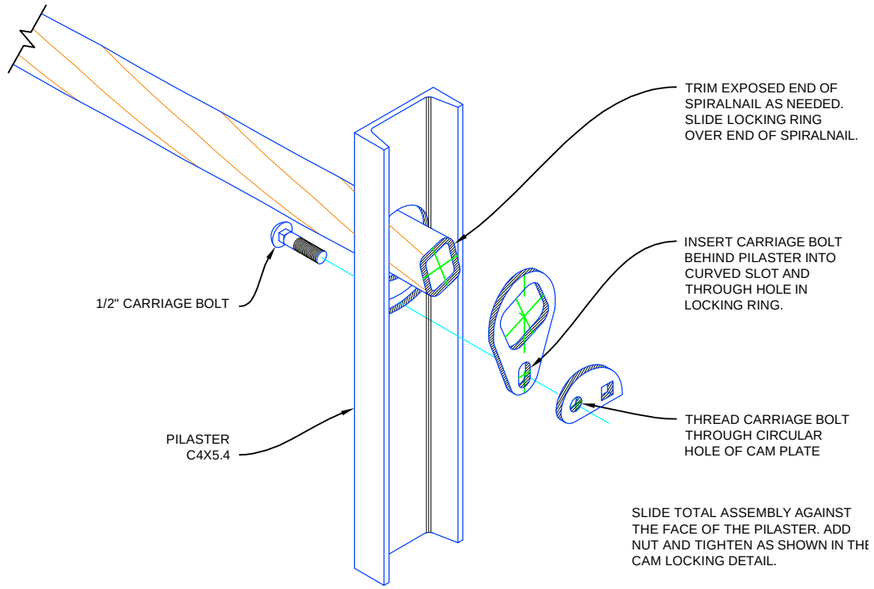


Wollochet Drive - CROSS SECTION (TYP)
SCALE: 1" = 4'



CAM LOCK ASSEMBLY
NOT TO SCALE

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WOLLOCHET DRIVE NW
PIERCE COUNTY
SPIRALNAIL TRUSS SYSTEM
CROSS SECTION & SN DETAILS

PROJECT 13-024
DATE 04-19-13
DESIGN KLC
DRAWN KLC

SHT 6 OF 8

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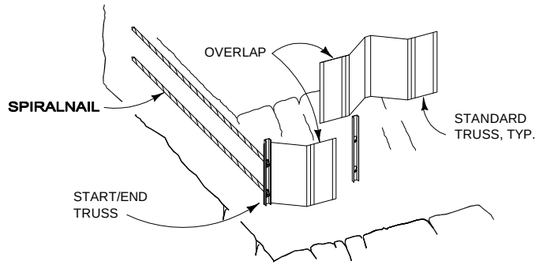
CONSTRUCTION SEQUENCE

STEP 1

IF PREPARED SOIL WILL SUPPORT PILASTERS, POSITION PILASTERS EVERY SIX FEET ALONG WALL LAYOUT LINE AND SET BOTTOM OF PILASTER INTO GROUND PER PROJECT PLANS.

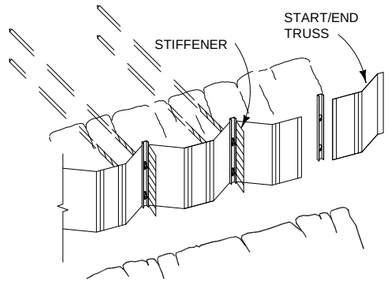
IF PILASTERS CANNOT BE PRE-POSITIONED, PLACE START/END TRUSS ON PREPARED SLOPE FIRST THEN POSITION THE PILASTER CHANNEL AGAINST THE EDGE OF THE TRUSS AND SET BOTTOM OF PILASTER INTO GROUND PER PROJECT PLANS. DRIVE SPIRALNAILS THROUGH THE PILASTER INTO THE SOIL. PLACE CAM LOCK ON EACH SPIRALNAIL AND TIGHTEN TO TORQUE SPECIFICATIONS.



STEP 2

IF PILASTERS HAVE NOT BEEN PRE-POSITIONED, POSITION NEXT PILASTER AND SET INTO GROUND. PLACE THE STANDARD TRUSS BEHIND PILASTER AND OVERLAP PANEL AGAINST THE START/END TRUSS USING ZIP TIES OR TIE WIRE TO SECURE TRUSS IN PLACE. DRIVE IN SPIRALNAILS AND LOCK WITH CAM LOCKS.

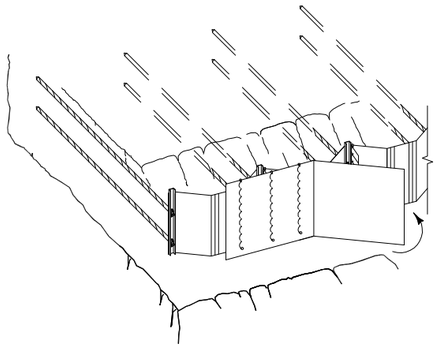
CONTINUE ADDING STANDARD TRUSSES ALONG WALL ENDING AT FINAL PILASTER WITH A START/END TRUSS



STEP 3

POSITION START/END TRUSS, ADD PILASTER IF NEEDED, DRIVE IN SPIRALNAILS AND LOCK IN PLACE WITH CAM LOCKS.

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



STEP 4

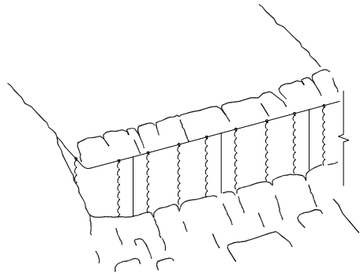
TO BEGIN FACING THE WALL, CENTER EDGES OF A FACING PANEL ON TRUSS OVERLAP. SPIRAL THE ENDS OF OVERLAP AND THE STIFFENER TO FACE PANEL.

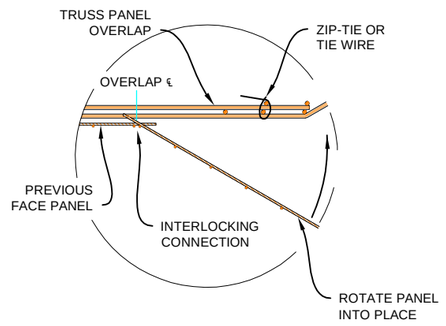
INSERT PRONGS OF SUBSEQUENT FACE PANELS BEHIND FINAL TRANSVERSE WIRE ON PREVIOUS FACING AND ROTATE INTO PLACE TO FORM INTERLOCKING CONNECTION.
SEE ENLARGED DETAIL.

STEP 5

FOR CLOSURE FACING AT EACH END OF WALL, BEND FACING PANEL PER PROJECT PLANS AND INSERT END OF PANEL AGAINST PREVIOUS FACING. FIELD FIT OPPOSITE END AND TRIM AS NEEDED AGAINST SLOPE. SPIRAL FACING TO START/END TRUSS PANEL AND TO STIFFENER. SEE END OF WALL TREATMENT DETAIL, THIS SHEET.

FILL AREA BEHIND WALL WITH BACKFILL PER PROJECT PLANS. COMPACT SOIL AGAINST FACE OF WALL FOR TOE BURY.





INTERLOCK CONNECTION DETAIL
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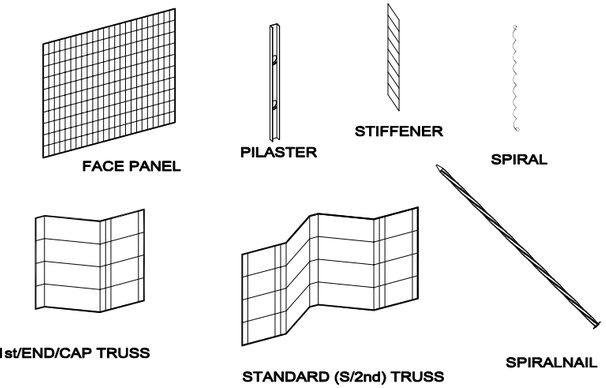
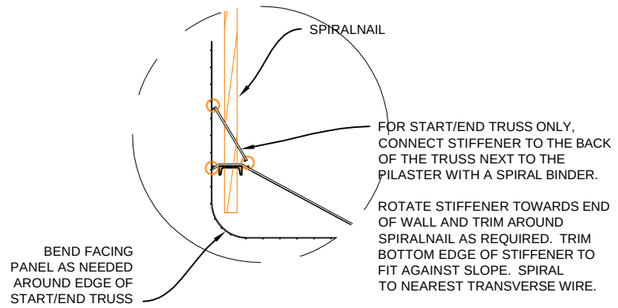


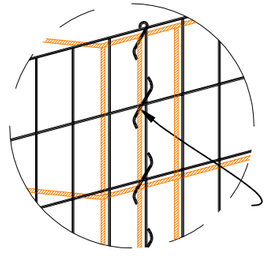
WALL COMPONENTS
NOT TO SCALE

GENERIC COMPONENTS SHOWN
FOR ILLUSTRATION PURPOSES ONLY

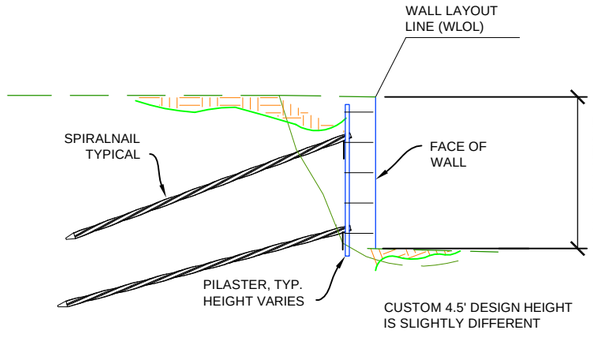


END OF WALL TREATMENT
NOT TO SCALE

SPIRAL BINDER IS TO BE PLACED SO THAT IT ENCIRCLES BOTH THE HORIZONTAL AND VERTICAL WIRES AND PASSES IN FRONT OF THE HORIZONTAL WIRE IN THE FACE OF WALL AT EACH INTERSECTION.



SPIRAL BINDER ATTACHMENT
NOT TO SCALE



GENERIC SECTION
SCALE: 1"=5'

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WOLLOCHET DRIVE NW
PIERCE COUNTY
SPIRALNAIL TRUSS SYSTEM

TRUSS SYSTEM DETAILS

PROJECT	13-024
DATE	04-19-13
DESIGN	KLC
DRAWN	KLC

SHT 7 OF 8

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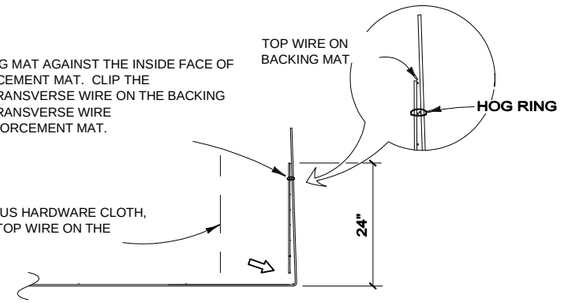
STEP 1

PLACE THE FIRST COURSE OF SOIL REINFORCEMENT MATS ON PREPARED FOUNDATION

STEP 2

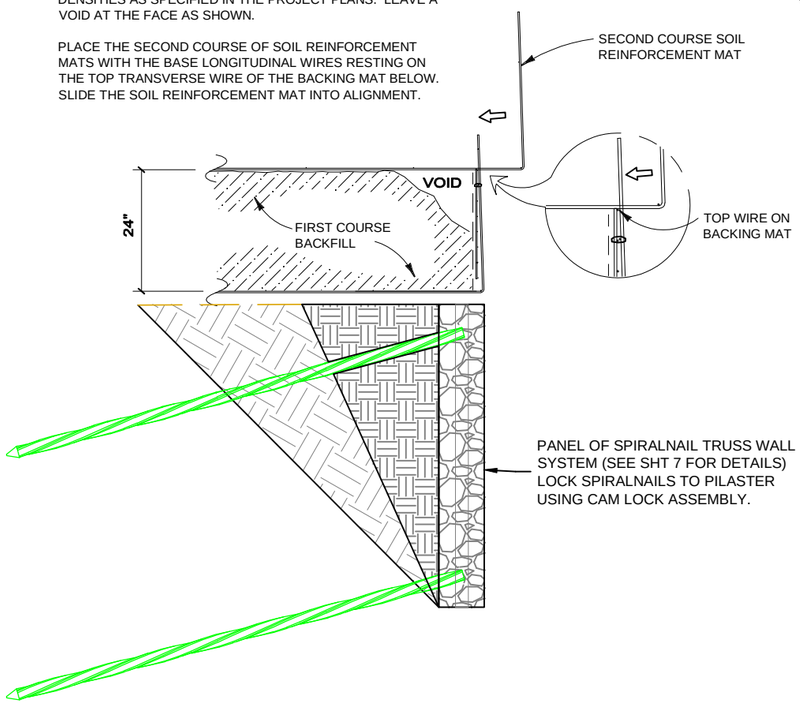
PLACE THE BACKING MAT AGAINST THE INSIDE FACE OF THE SOIL REINFORCEMENT MAT. CLIP THE SECOND-TO-TOP TRANSVERSE WIRE ON THE BACKING MAT TO THE TOP TRANSVERSE WIRE ON THE SOIL REINFORCEMENT MAT.



STEP 3

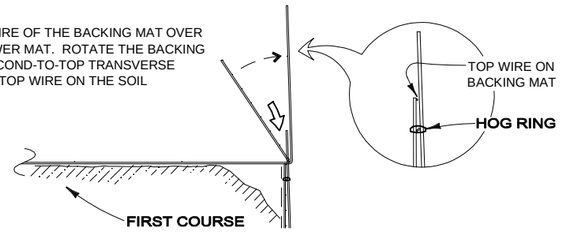
PLACE AND COMPACT THE BACKFILL IN LAYERS AND DENSITIES AS SPECIFIED IN THE PROJECT PLANS. LEAVE A VOID AT THE FACE AS SHOWN.

PLACE THE SECOND COURSE OF SOIL REINFORCEMENT MATS WITH THE BASE LONGITUDINAL WIRES RESTING ON THE TOP TRANSVERSE WIRE OF THE BACKING MAT BELOW. SLIDE THE SOIL REINFORCEMENT MAT INTO ALIGNMENT.



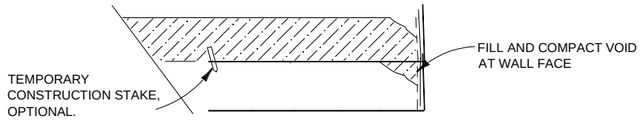
STEP 4

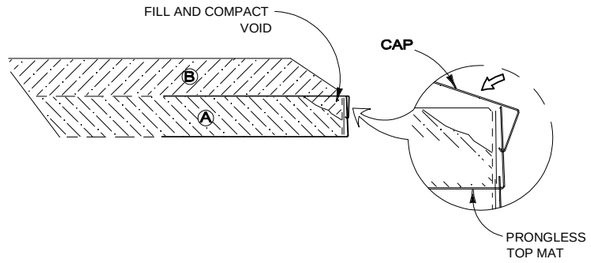
HOOK THE BOTTOM TRANSVERSE WIRE OF THE BACKING MAT OVER THE VERTICAL PRONGS ON THE LOWER MAT. ROTATE THE BACKING MAT TO VERTICAL AND CLIP THE SECOND-TO-TOP TRANSVERSE WIRE ON THE BACKING MAT TO THE TOP WIRE ON THE SOIL REINFORCEMENT MAT.



STEP 5

INSTALL THE CONTINUOUS HARDWARE CLOTH. PLACE AND COMPACT THE BACKFILL TO THE BASE ELEVATION OF THE NEXT MAT. REPEAT STEPS 3 THROUGH 5 TO THE TOP LIFT.



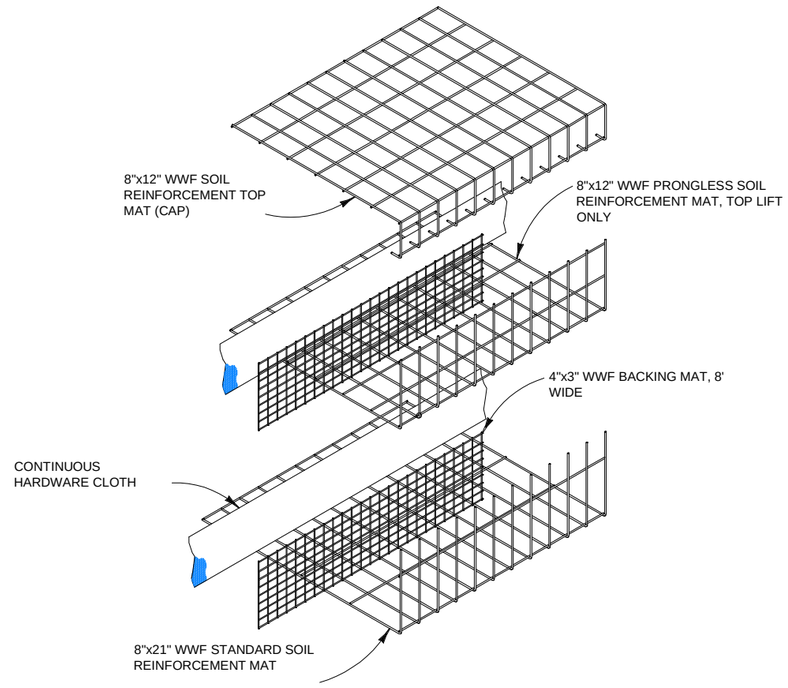


STEP 6: TOP LIFT

PLACE THE TOP LIFT PRONGLESS MAT, BACKING MAT AND CONTINUOUS HARDWARE CLOTH. PLACE AND COMPACT BACKFILL IN AREA "A". HOOK THE CAP OVER THE MIDDLE TRANSVERSE WIRE ON THE PRONGLESS MAT, AND ROTATE INTO PLACE. BACKFILL "B" TO 1'-6" MIN. COVER OVER THE CAP.

CONSTRUCTION SEQUENCE

NOT TO SCALE



WALL COMPONENTS

NOT TO SCALE

HRW 120731AN

REV.NO.	DATE	BY	DESCRIPTION
	04 /19/13	KLC	Intial Electronic (.pdf) Release

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WOLLOCHET DRIVE NW
PIERCE COUNTY
SPIRALNAIL TRUSS SYSTEM

WELDED WIRE WALL DETAILS

PROJECT	13-024
DATE	04-19-13
DESIGN	KLC
DRAWN	KLC

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