DESIGN NOTES:

1. DESIGN IS BASED ON PLANS BY PND ENGINEERS, INC., SR530 TRAFTON CREEK & SCHOOLYARD CREEK FISH PASSAGE, DATED FEBRUARY 25, 2020. IT IS ASSUMED THAT BACKFILL WITHIN THE REINFORCED SOIL MASS, METHODS OF CONSTRUCTION AND QUALITY OF MATERIALS CONFORM TO THE REQUIREMENTS OF THE PROJECT PLANS AND HILFIKER RETAINING WALLS.

2. ASSUMED SOIL CHARACTERISTICS (TO BE VERIFIED BY PROJECT ENGINEER):
   - WALL BACKFILL:
     - UNIT WEIGHT: 135 PCF
     - INTERNAL FRICTION ANGLE: 38°
     - COHESION: 0 PSF
   - RETAINED BACKFILL:
     - UNIT WEIGHT: 125 PCF
     - INTERNAL FRICTION ANGLE: 32°
     - COHESION: 0 PSF
   - FOUNDATION SOILS:
     - UNIT WEIGHT: 130 PCF
     - INTERNAL FRICTION ANGLE: 35°
     - COHESION: 0 PSF

3. ASSUMED DESIGN LOADS (TO BE VERIFIED BY PROJECT ENGINEER):
   SEISMIC: PEAK GROUND ACCELERATION COEFFICIENT,
   PGA: 0.310g
   SITE FACTOR, F_{PGA}=1.29
   SITE ADJUSTED PEAK GROUND ACCELERATION, A_S=0.40

   LIVE LOADS: SURCHARGE LOAD=250 PSF

4. WORST CASE FACTORED BEARING PRESSURE (TO BE APPROVED BY PROJECT ENGINEER):

STATIC	15,084 PSF
SEISMIC	27,597 PSF
SERVICE	10,644 PSF

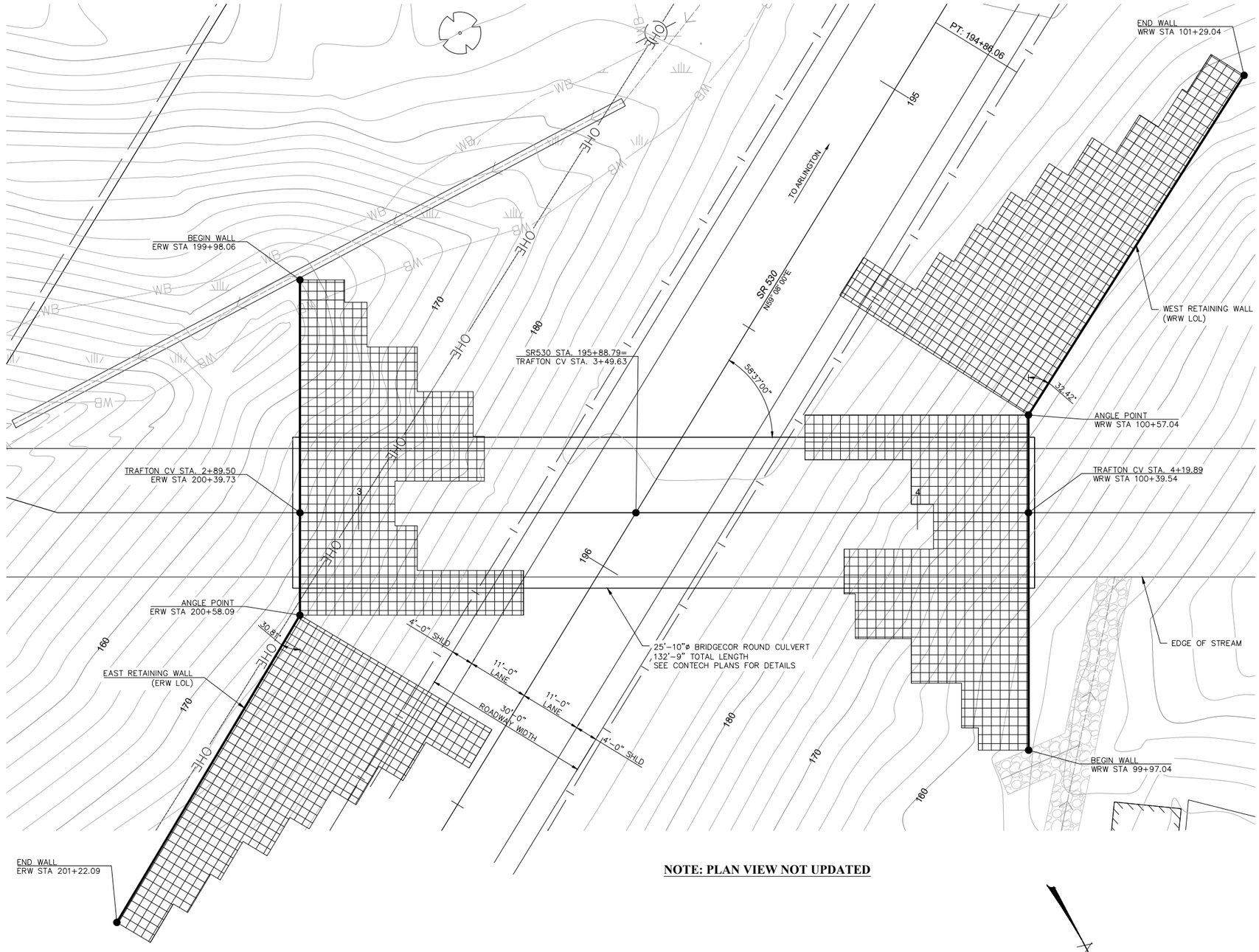
5. IF ACTUAL CHARACTERISTICS, GRADES OR DIMENSIONS OF SOILS DIFFER FROM THOSE LISTED ABOVE OR SHOWN ON THE PLANS, HILFIKER RETAINING WALLS AND PACIFIC AFFILIATES SHALL BE NOTIFIED TO VERIFY WALL DESIGN IS ADEQUATE FOR ACTUAL SOILS CONDITIONS.

6. THE DESIGN REQUIRES A NON-SATURATED BACKFILL AND ASSUMES THE WATER TABLE DOES NOT AFFECT THE BEARING CAPACITY OF THE SOIL. SURFACE AND SUB-SURFACE DRAINAGE CONTROL MAY BE REQUIRED TO PREVENT SATURATION OF THE BACKFILL OR RELIEVE HYDROSTATIC PRESSURES. DRAINAGE CONTROL SHALL BE AS SPECIFIED IN THE PROJECT PLANS AND SPECIFICATIONS OR AS DIRECTED BY THE PROJECT ENGINEER.

7. IF THE WALL BACKFILL CONTAINS MORE THAN 50% BY WEIGHT SANDS AND FINES (PASSING THE NO. 4 SIEVE) GRAVEL OR OTHER METHODS AS APPROVED BY THE HILFIKER COMPANY SHALL BE USED TO CONTAIN THE BACKFILL AT THE FACE OF THE WALL.

8. DESIGN PROCEDURE: MECHANICALLY STABILIZED EARTH WALLS AND REINFORCED SOIL SLOPES, FHWA REPORT NO. FHWA-NHI-10-024. 2010 AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS.

9. ALL INFORMATION HEREON IS DERIVED FROM THE PROJECT PLANS, AND IS SUBJECT TO GEOMETRIC AND GEOTECHNICAL CONFIRMATION. THE APPLICABLE HILFIKER CONSTRUCTION GUIDE AND SPECIFICATIONS ARE AN INTEGRAL PART OF THIS SUBMITTAL.
   PROJECT PLANS: SR530 TRAFTON CREEK & SCHOOLYARD CREEK FISH PASSAGE, DATED FEBRUARY 25, 2020, BY PND ENGINEERS, INC.



NOTE: PLAN VIEW NOT UPDATED

PLAN VIEW
SCALE: 1"=20'

REVISIONS	BY
2 4-8-20	NM
3 6-30-20	NM
4 7-9-20	NM
5 7-21-20	NM

PACIFIC AFFILIATES
CONSULTING ENGINEERS
990 W. WATERFRONT DRIVE, EUREKA, CA 95501
TEL (707) 445-3001 • FAX (707) 445-3003

DESIGN NOTES AND WALL PLAN

MECHANICALLY STABILIZED EARTH WALL
FOR:
HILFIKER RETAINING WALLS
SR530 TRAFTON CREEK & SCHOOLYARD CREEK FISH PASSAGE
ARLINGTON, WA
PROJECT NO. HRW 191029BW

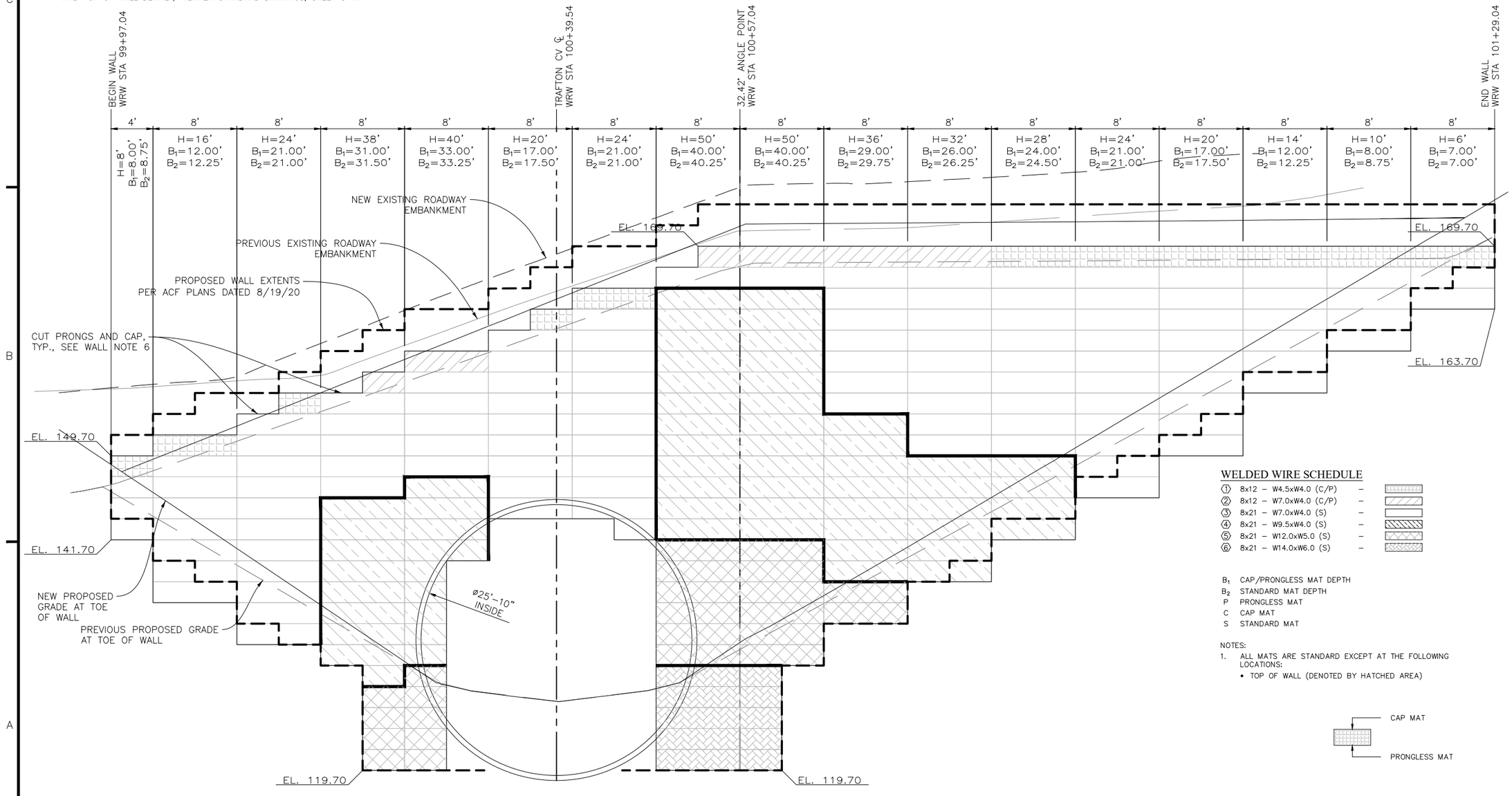
Date: JANUARY 20, 2020
Scale: AS NOTED
Drawn by: NM

SHEET NUMBER
S-1

JOB NUMBER
19-2597

WALL NOTES:

1. ALL WIRE TO BE HOT DIPPED GALVANIZED (2.0 OZ/SF, ASTM A-123).
2. DESIGN SERVICE LIFE IS 75 YEARS.
3. ALL MATS SHOWN ARE STANDARD WIDTH (8 FT) OR HALF WIDTH (4 FT), WHICH ARE FIELD CUT OUT OF A STANDARD MAT.
4. BOTTOM OF WALL CAN BE STEPPED UP PROVIDED TWO FOOT EMBEDMENT OF TOE IS MAINTAINED AND FOUNDATION STEP IS APPROVED BY GEOTECHNICAL ENGINEER OF RECORD.
5. TOP OF WALL CAN BE STEPPED DOWN PROVIDED A MINIMUM SLOPE OF 1.5H:1V IS MAINTAINED TO DESIGN FINISH GRADE.
6. WHERE TOP OF STANDARD MAT IS EXPOSED AND WILL BE CAPPED, CUT PRONGS OFF PER "RETURN MATS AND TOP OF WALL DETAIL", HILFIKER STANDARD DRAWINGS, SHEET S-7.



WEST WALL ELEVATION
SCALE: 1"=10'-0"

WELDED WIRE SCHEDULE

①	8x12 – W4.5xW4.0 (C/P)	–
②	8x12 – W7.0xW4.0 (C/P)	–
③	8x21 – W7.0xW4.0 (S)	–
④	8x21 – W9.5xW4.0 (S)	–
⑤	8x21 – W12.0xW5.0 (S)	–
⑥	8x21 – W14.0xW6.0 (S)	–

B_1 CAP/PRONGLESS MAT DEPTH
B_2 STANDARD MAT DEPTH
P PRONGLESS MAT
C CAP MAT
S STANDARD MAT

NOTES:
1. ALL MATS ARE STANDARD EXCEPT AT THE FOLLOWING LOCATIONS:
   - TOP OF WALL (DENOTED BY HATCHED AREA)

REVISIONS	BY
3 6-30-20	NM
4 7-9-20	NM
5 7-21-20	NM
6 9-18-20	NM

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CONSULTING ENGINEERS
990 W. WATERFRONT DRIVE, EUREKA, CA 95501
TEL (707) 445-3001 • FAX (707) 445-3003

WEST WALL ELEVATION

MECHANICALLY STABILIZED EARTH WALL
FOR:
HILFIKER RETAINING WALLS
SR 530 TRAFTON CREEK & SCHOOLYARD CREEK FISH PASSAGE
SNOHOMISH COUNTY, WA
PROJECT NO. HRW 191029SW

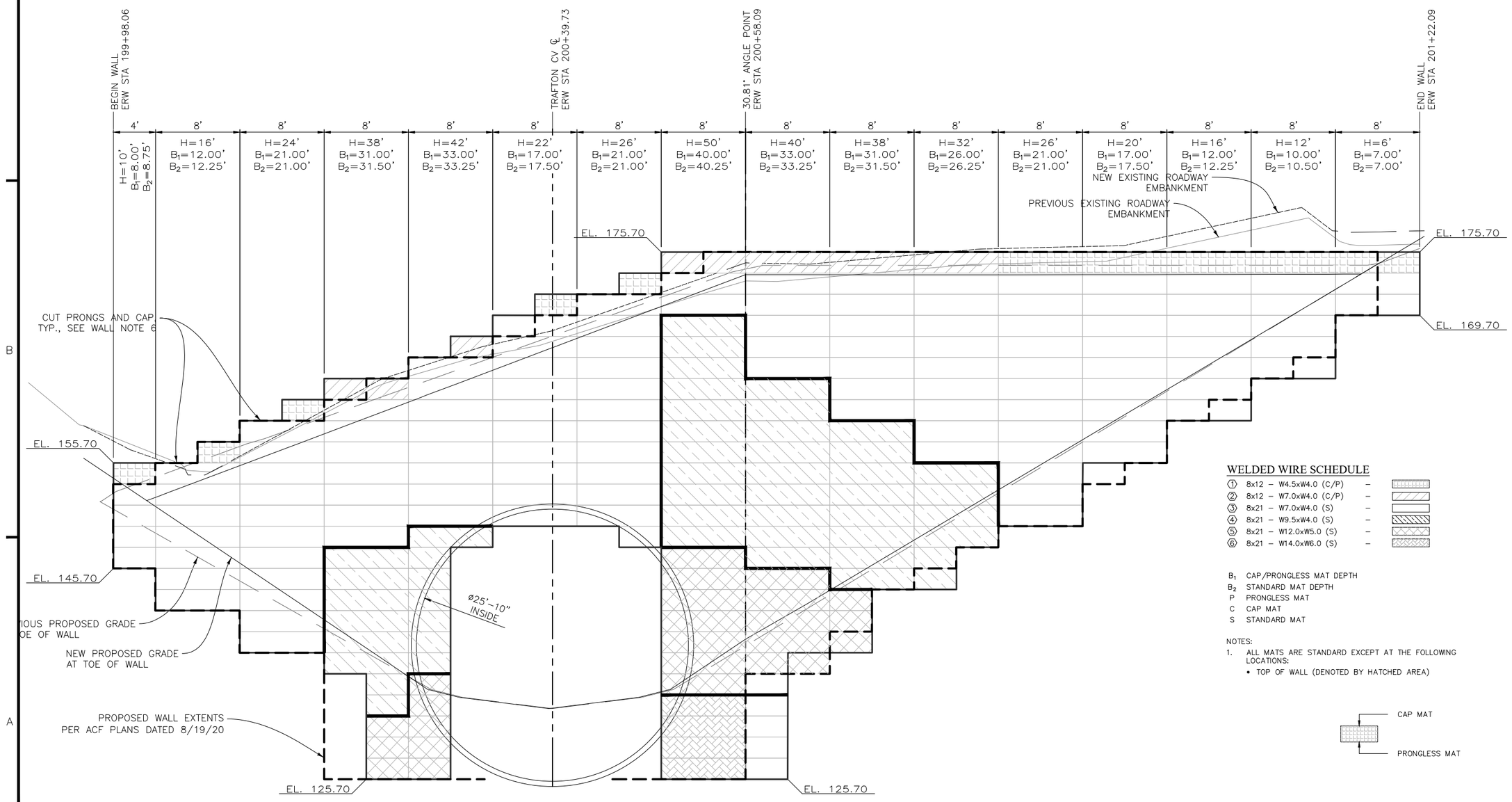
Date: JANUARY 20, 2020
Scale: AS NOTED
Drawn by: NM

SHEET NUMBER S-2

JOB NUMBER 19-2597

WALL NOTES:

1. ALL WIRE TO BE HOT DIPPED GALVANIZED (2.0 OZ/SF, ASTM A-123).
2. DESIGN SERVICE LIFE IS 75 YEARS.
3. ALL MATS SHOWN ARE STANDARD WIDTH (8 FT) OR HALF WIDTH (4 FT), WHICH ARE FIELD CUT OUT OF A STANDARD MAT.
4. BOTTOM OF WALL CAN BE STEPPED UP PROVIDED TWO FOOT EMBEDMENT OF TOE IS MAINTAINED AND FOUNDATION STEP IS APPROVED BY GEOTECHNICAL ENGINEER OF RECORD.
5. TOP OF WALL CAN BE STEPPED DOWN PROVIDED A MINIMUM SLOPE OF 1.5H:1V IS MAINTAINED TO DESIGN FINISH GRADE.
6. WHERE TOP OF STANDARD MAT IS EXPOSED AND WILL BE CAPPED, CUT PRONGS OFF PER "RETURN MATS AND TOP OF WALL DETAIL", HILFIKER STANDARD DRAWINGS, SHEET S-7.



EAST WALL ELEVATION

SCALE: 1"=10'-0"

WELDED WIRE SCHEDULE

⟨1⟩	8x12 – W4.5xW4.0 (C/P)	–
⟨2⟩	8x12 – W7.0xW4.0 (C/P)	–
⟨3⟩	8x21 – W7.0xW4.0 (S)	–
⟨4⟩	8x21 – W9.5xW4.0 (S)	–
⟨5⟩	8x21 – W12.0xW5.0 (S)	–
⟨6⟩	8x21 – W14.0xW6.0 (S)	–

B_1 CAP/PRONGLESS MAT DEPTH
B_2 STANDARD MAT DEPTH
P PRONGLESS MAT
C CAP MAT
S STANDARD MAT

NOTES:
1. ALL MATS ARE STANDARD EXCEPT AT THE FOLLOWING LOCATIONS:
   - TOP OF WALL (DENOTED BY HATCHED AREA)

CAP MAT
PRONGLESS MAT

REVISIONS		BY
3	6-30-20	NM
4	7-9-20	NM
5	7-21-20	NM
6	9-18-20	NM

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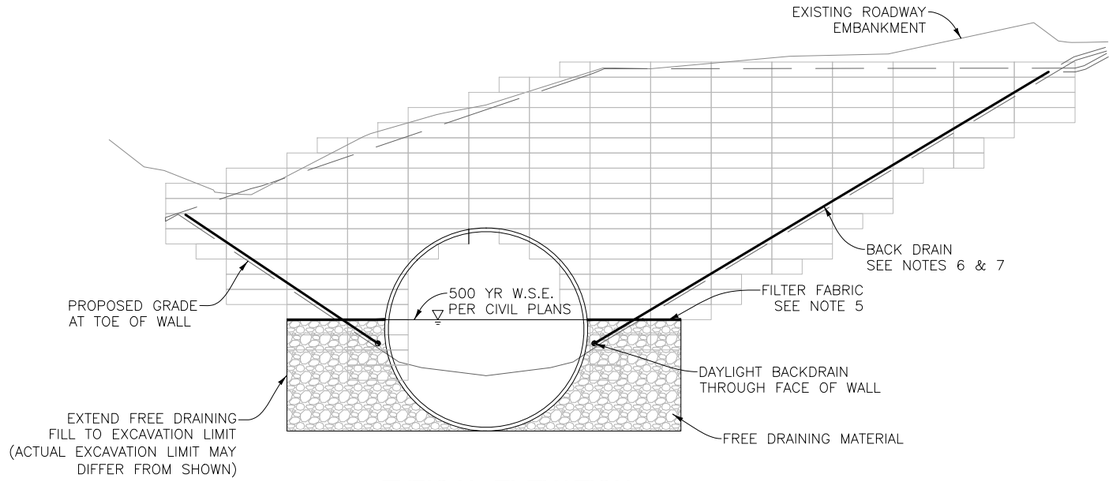
EAST WALL ELEVATION

MECHANICALLY STABILIZED EARTH WALL
FOR:
HILFIKER RETAINING WALLS
SR330 TRAFTON CREEK & SCHOOLYARD CREEK FISH PASSAGE
ARCATA, CALIFORNIA
PROJECT NO. HRW 19102918W

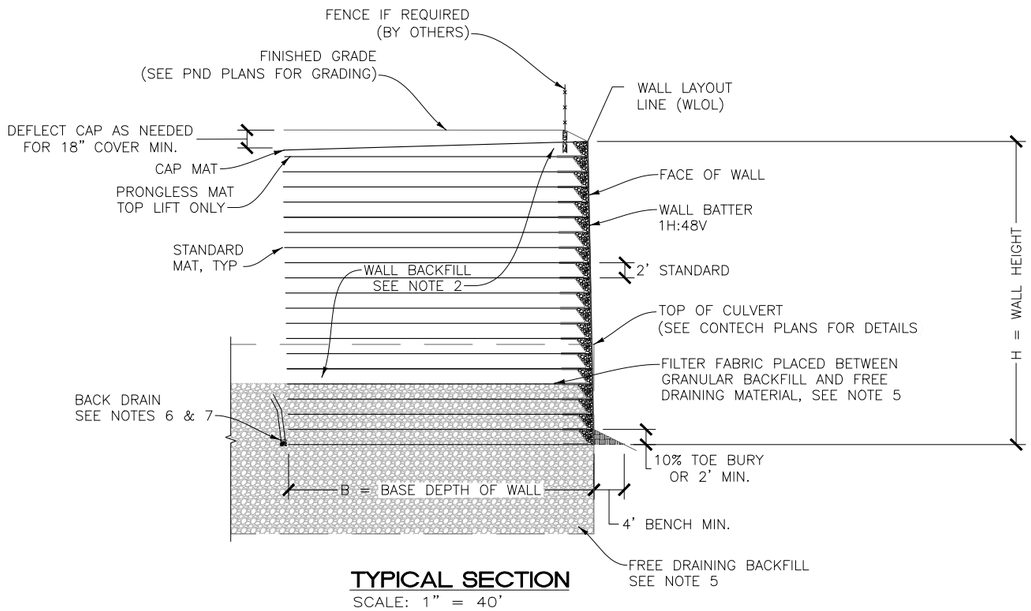
Date: JANUARY 20, 2020
Scale: AS NOTED
Drawn by: NM

SHEET NUMBER
S-3

JOB NUMBER
19-2597



TYPICAL ELEVATION
SCALE: 1" = 20'



TYPICAL SECTION
SCALE: 1" = 40'

PROJECT-SPECIFIC NOTES:

1. REFERENCE DRAWINGS: BASED ON DRAWINGS FROM P.N.D. ENGINEERS, INC. SR530 TRAFTON CREEK & SCHOOLYARD CREEK FISH PASSAGE. DATED 2/25/20.

2. IT IS ASSUMED THAT ALL MATERIALS, BACKFILL AND CONSTRUCTION METHODS FOR HILFIKER M.S.E. WALLS WILL CONFORM TO HILFIKER'S SPECIFICATIONS. WALL BACKFILL IN REINFORCED ZONE SHALL CONFORM TO SECTION 9-03.14(4) OF WASHINGTON 2020 STANDARD SPECIFICATIONS, WITH EXCEPTION OF FREE DRAINING MATERIAL ZONE PER NOTE 5 BELOW. SEE SECTION 6-13 OF WASHINGTON 2020 STANDARD SPECIFICATIONS FOR COMPACTION REQUIREMENTS.

3. ALL INFORMATION HEREON IS DERIVED FROM THE REFERENCE DRAWINGS, AND IS SUBJECT TO GEOMETRIC AND GEOTECHNICAL CONFIRMATION. THE APPLICABLE HILFIKER CONSTRUCTION GUIDE AND SPECIFICATIONS ARE AN INTEGRAL PART OF THIS SUBMITTAL.

4. HILFIKER RETAINING WALLS SHALL BE RESPONSIBLE ONLY FOR THE INTERNAL STABILITY OF THE RETAINING WALL, AND NOT FOR GLOBAL STABILITY OR FOUNDATION BEARING CAPACITY. THE OWNER/CONTRACTOR SHALL BE RESPONSIBLE FOR ALL JOB SITE DRAINAGE, SAFETY AND FALL PROTECTION PROVISIONS FOR WORKERS IN COMPLIANCE WITH OSHA AND ANY OTHER APPLICABLE REQUIREMENTS.

5. FREE DRAINING MATERIAL SHALL BE PLACED FROM BOTTOM OF EXCAVATION TO THE HEIGHT OF THE 500 YEAR W.S.E. AS SHOWN ON THE CIVIL PLANS. FREE DRAINING MATERIAL SHALL CONSIST OF ANGULAR (CRUSHED) MATERIAL MEETING REQUIREMENTS OF SECTION 9-03.12(4) OF WASHINGTON 2020 STANDARD SPECIFICATIONS. FREE DRAINING MATERIAL WILL REQUIRE FILTER FABRIC (MIRIFI 140N OR EQUIVALENT) TO MINIMIZE POTENTIAL FOR MIGRATION OF FINES. FREE DRAINING FILL MATERIAL SHALL BE PLACED AND COMPACTED IN ACCORDANCE WITH SECTION 6-13 OF WASHINGTON 2020 STANDARD SPECIFICATIONS.

6. BACKDRAIN SYSTEM SHALL CONSIST OF A 6-INCH PERFORATED PVC PIPE SURROUNDED BY AT LEAST 1 CUBIC FOOT OF FREE DRAINING MATERIAL MEETING SECTION 9-03.12(4) OF WASHINGTON 2020 STANDARD SPECIFICATIONS, WRAPPED IN MIRAFI 140N FILTER FABRIC (OR EQUIVALENT).

7. BACKDRAIN GRADIENT SHALL NOT BE LESS THAN 1% WHEN POSSIBLE. PROVIDE DRAIN OUTLETS THROUGH FACE OF WALL AND EXTEND TO DAYLIGHT.

REVISIONS		BY
3	6-30-20	NM
4	7-9-20	NM
5	7-21-20	NM
6	9-18-20	NM

PACIFIC AFFILIATES
CONSULTING ENGINEERS
990 W. WATERFRONT DRIVE, EUREKA, CA 95501
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TYPICAL WALL SECTION

MECHANICALLY STABILIZED EARTH WALL
FOR:
HILFIKER RETAINING WALLS
SR530 TRAFTON CREEK & SCHOOLYARD CREEK FISH PASSAGE
ARLINGTON, WA
PROJECT NO. HRW 19102SBW

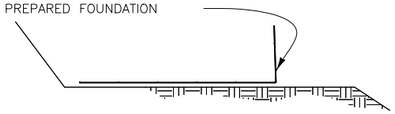
Date: JANUARY 20, 2020
Scale: AS NOTED | Drawn by: NM

SHEET NUMBER
S-4

JOB NUMBER
19-2597

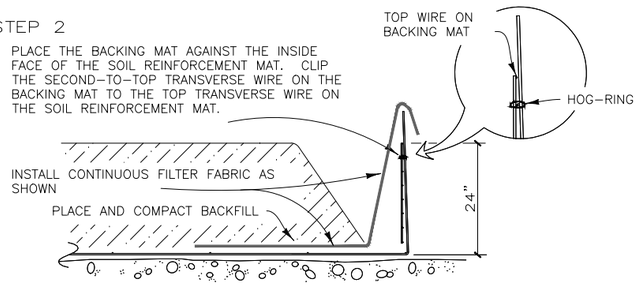
STEP 1

PLACE THE FIRST COURSE OF SOIL REINFORCEMENT MATS ON PREPARED FOUNDATION



STEP 2

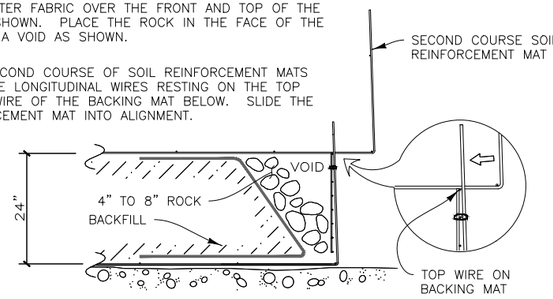
PLACE THE BACKING MAT AGAINST THE INSIDE FACE OF THE SOIL REINFORCEMENT MAT. CLIP THE SECOND–TO–TOP TRANSVERSE WIRE ON THE BACKING MAT TO THE TOP TRANSVERSE WIRE ON THE SOIL REINFORCEMENT MAT.



STEP 3

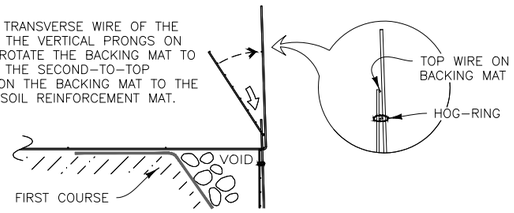
BRING THE FILTER FABRIC OVER THE FRONT AND TOP OF THE BACKFILL AS SHOWN. PLACE THE ROCK IN THE FACE OF THE WALL. LEAVE A VOID AS SHOWN.

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.

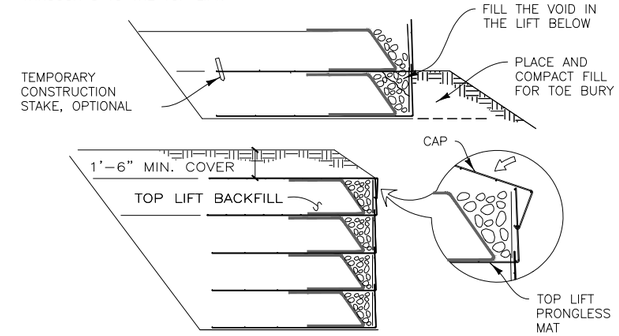


CONSTRUCTION SEQUENCE

NOT TO SCALE

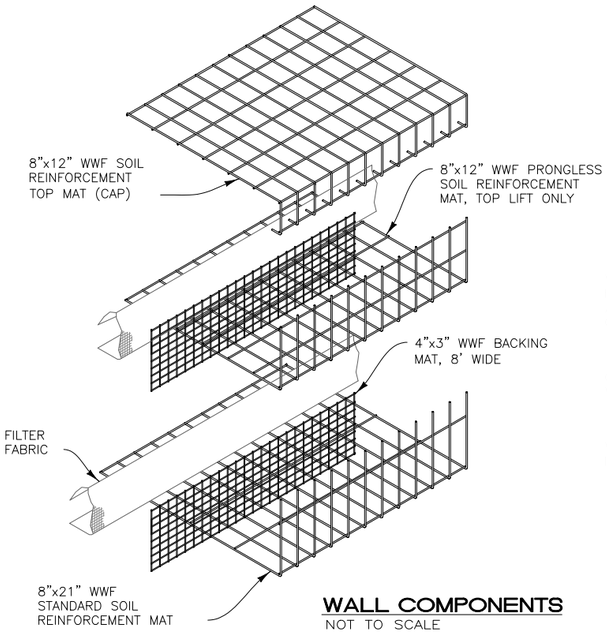
STEP 5

INSTALL THE FILTER FABRIC AS IN STEPS 2 AND 3. PLACE AND COMPACT THE BACKFILL AND ROCK TO THE BASE ELEVATION OF THE NEXT MAT. REPEAT STEPS 2 THROUGH 5 TO THE TOP LIFT.



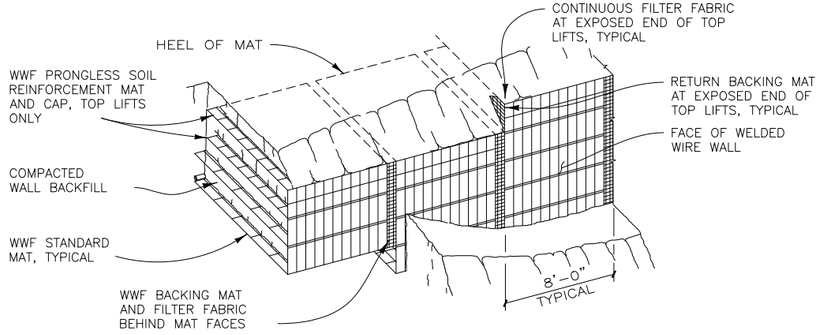
STEP 6: TOP LIFT

PLACE THE TOP LIFT PRONGLESS MAT, BACKING MAT AND FILTER FABRIC. PLACE AND COMPACT BACKFILL AND ROCK IN THE TOP LIFT. HOOK THE CAP OVER THE MIDDLE TRANSVERSE WIRE ON THE PRONGLESS MAT, AND ROTATE INTO PLACE. PLACE AND COMPACT COVER OVER TOP MAT TO 1'–6" MINIMUM DEPTH.



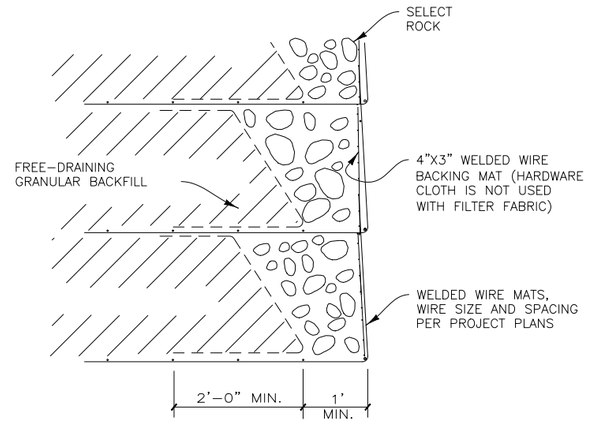
WALL COMPONENTS

NOT TO SCALE



PICTORIAL ELEVATION

NOT TO SCALE



SECTION

ROCK FACING DETAIL

NOT TO SCALE

REVISIONS		BY
3	6–30–20	NM
4	7–9–20	NM
5	7–21–20	NM
6	9–18–20	NM

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CONSULTING ENGINEERS
990 W. WATERFRONT DRIVE, EUREKA, CA 95501
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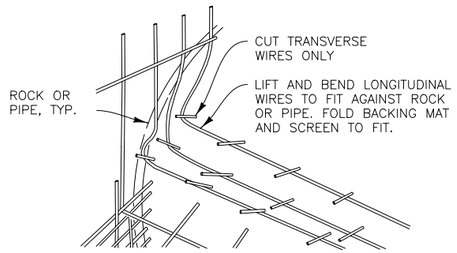
STANDARD HILFIKER DETAILS

MECHANICALLY STABILIZED EARTH WALL FOR:
HILFIKER RETAINING WALLS
SR550 TRAFTON CREEK & SCHOOLYARD CREEK FISH PASSAGE
ARLINGTON, WA
PROJECT NO. HRW 19102SBW

Date: JANUARY 20, 2020
Scale: AS NOTED
Drawn by: NM

SHEET NUMBER
S-5

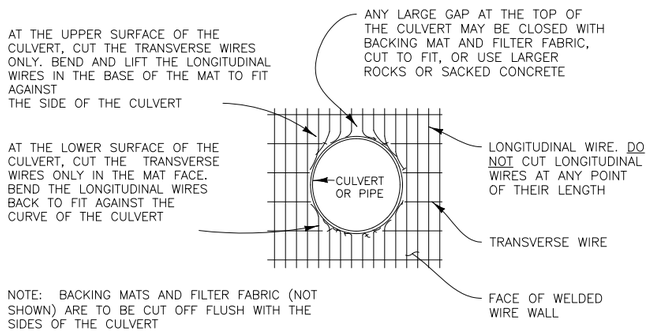
JOB NUMBER
19-2597



PICTORIAL

FITTING MATS TO OBSTRUCTION

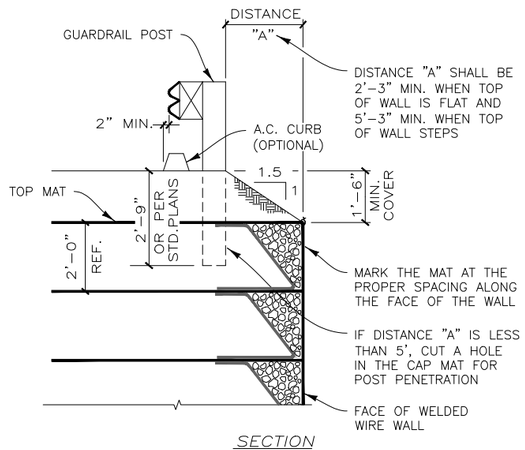
NOT TO SCALE



ELEVATION

CULVERT THRU WALL FACE

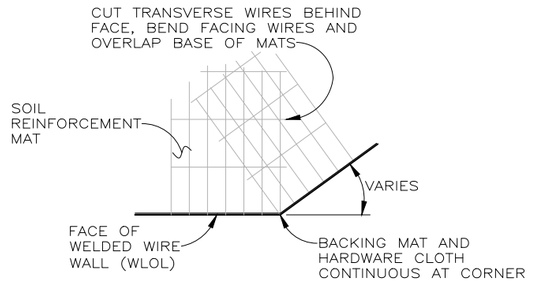
NOT TO SCALE



SECTION

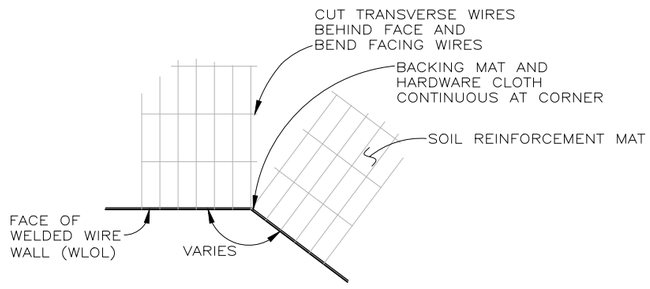
GUARDRAIL DETAIL

NOT TO SCALE
(FENCE DETAIL SIMILAR)



CONVEX ANGLE

NOT TO SCALE



CONCAVE ANGLE

NOT TO SCALE

REVISIONS		BY
3	6-30-20	NM
4	7-9-20	NM
5	7-21-20	NM
6	9-18-20	NM

PACIFIC AFFILIATES
CONSULTING ENGINEERS
990 W. WATERFRONT DRIVE, EUREKA, CA 95501
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STANDARD HILFIKER DETAILS

MECHANICALLY STABILIZED EARTH WALL
FOR:
HILFIKER RETAINING WALLS
58530 TRAFTON CREEK & SCHOOLYARD
CREEK FISH PASSAGE
ARCATA, CALIFORNIA
PROJECT NO. HRW 19102SW

Date: JANUARY 20, 2020
Scale: AS NOTED
Drawn by: NM

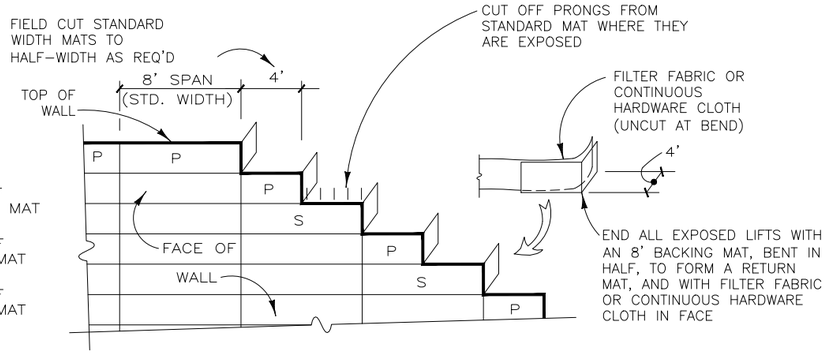
SHEET NUMBER
S-6

JOB NUMBER
19-2597

LEGEND

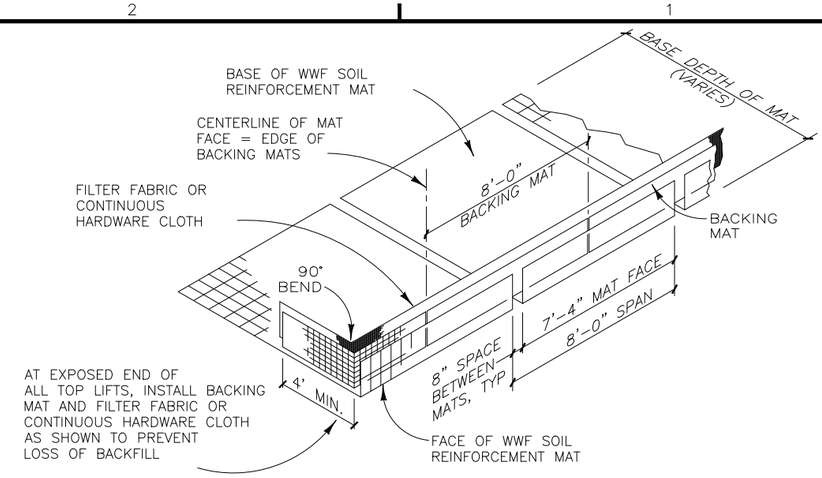
(THIS DETAIL ONLY)

P	8"x12" WWF PRONGLESS MAT
S	8"X21" WWF STANDARD MAT
	8"X21" WWF STANDARD MAT



RETURN MATS AND TOP OF WALL DETAIL

NOT TO SCALE



ISOMETRIC VIEW

WELDED WIRE WALL COMPONENTS WITH RETURN MAT

NOT TO SCALE

REVISIONS		BY
3	6-30-20	NM
4	7-9-20	NM
5	7-21-20	NM
6	9-18-20	NM

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STANDARD HILFIKER DETAILS

MECHANICALLY STABILIZED EARTH WALL FOR HILFIKER RETAINING WALLS
SR530 TRAFTON CREEK & SCHOOLYARD CREEK FISH PASSAGE
ARLINGTON, WA
PROJECT NO. HRW 19102981W

Date: JANUARY 20, 2020

Scale: AS NOTED

Drawn by: NM

SHEET NUMBER S-7

JOB NUMBER 19-2597