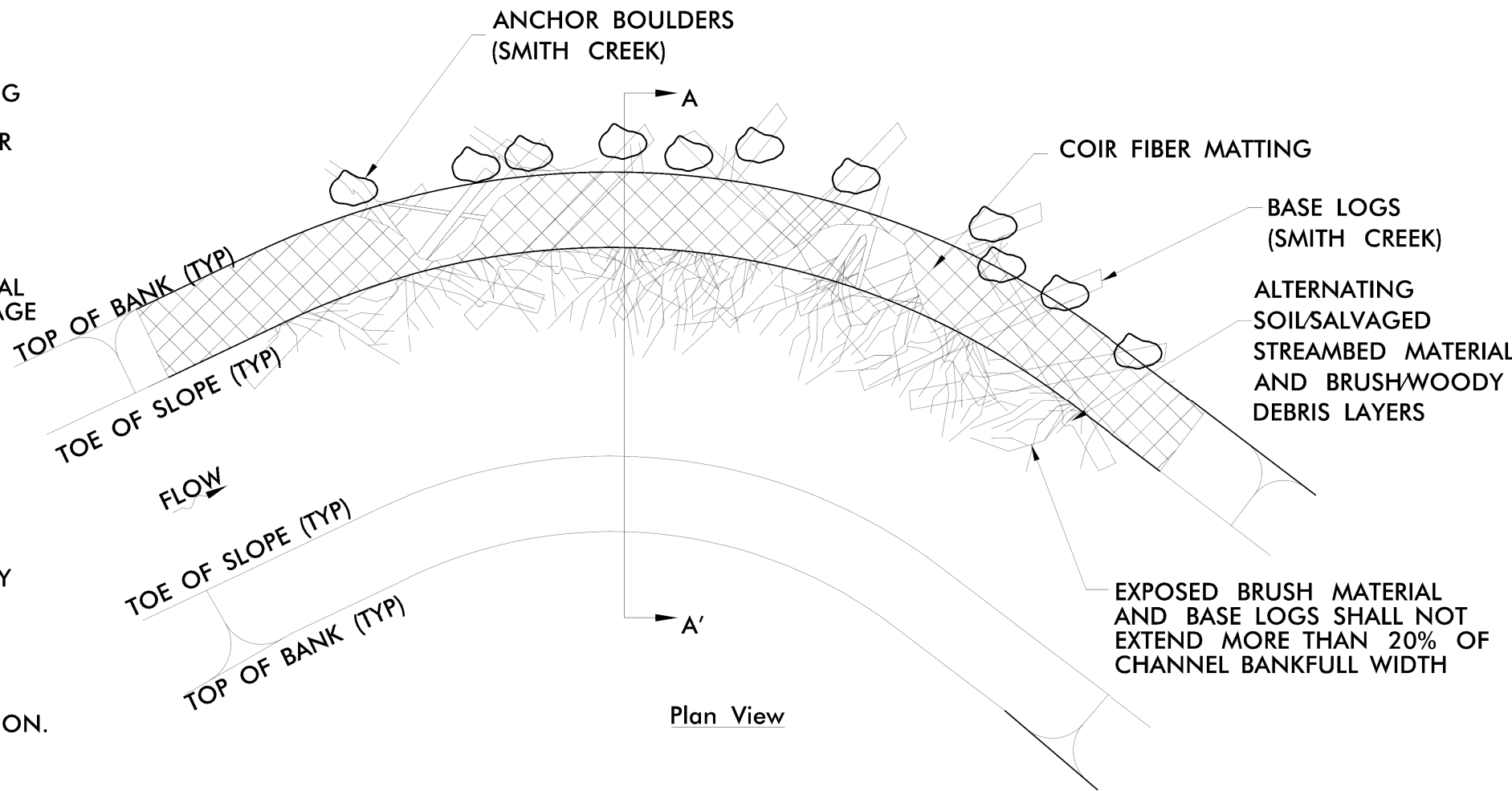


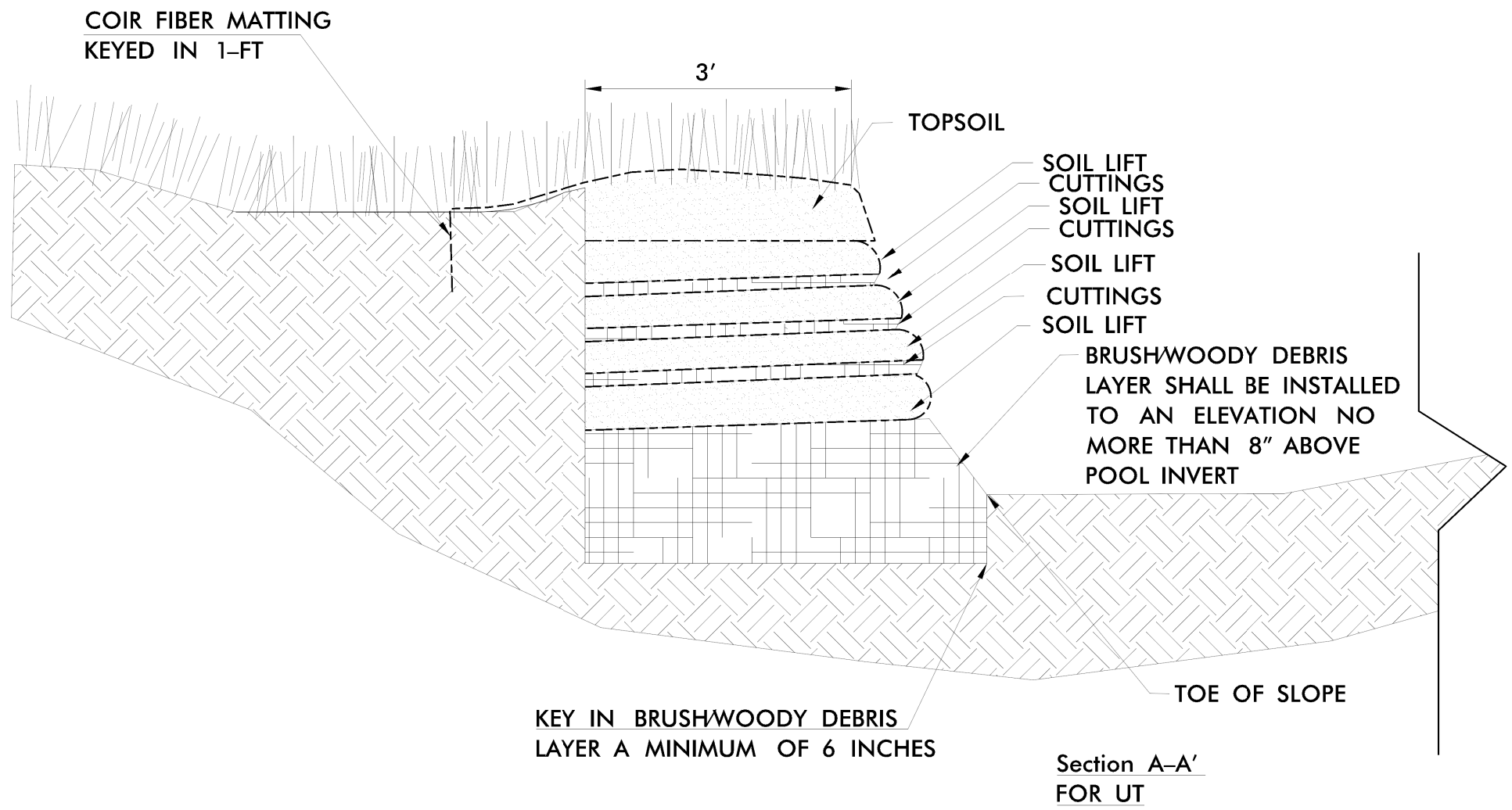
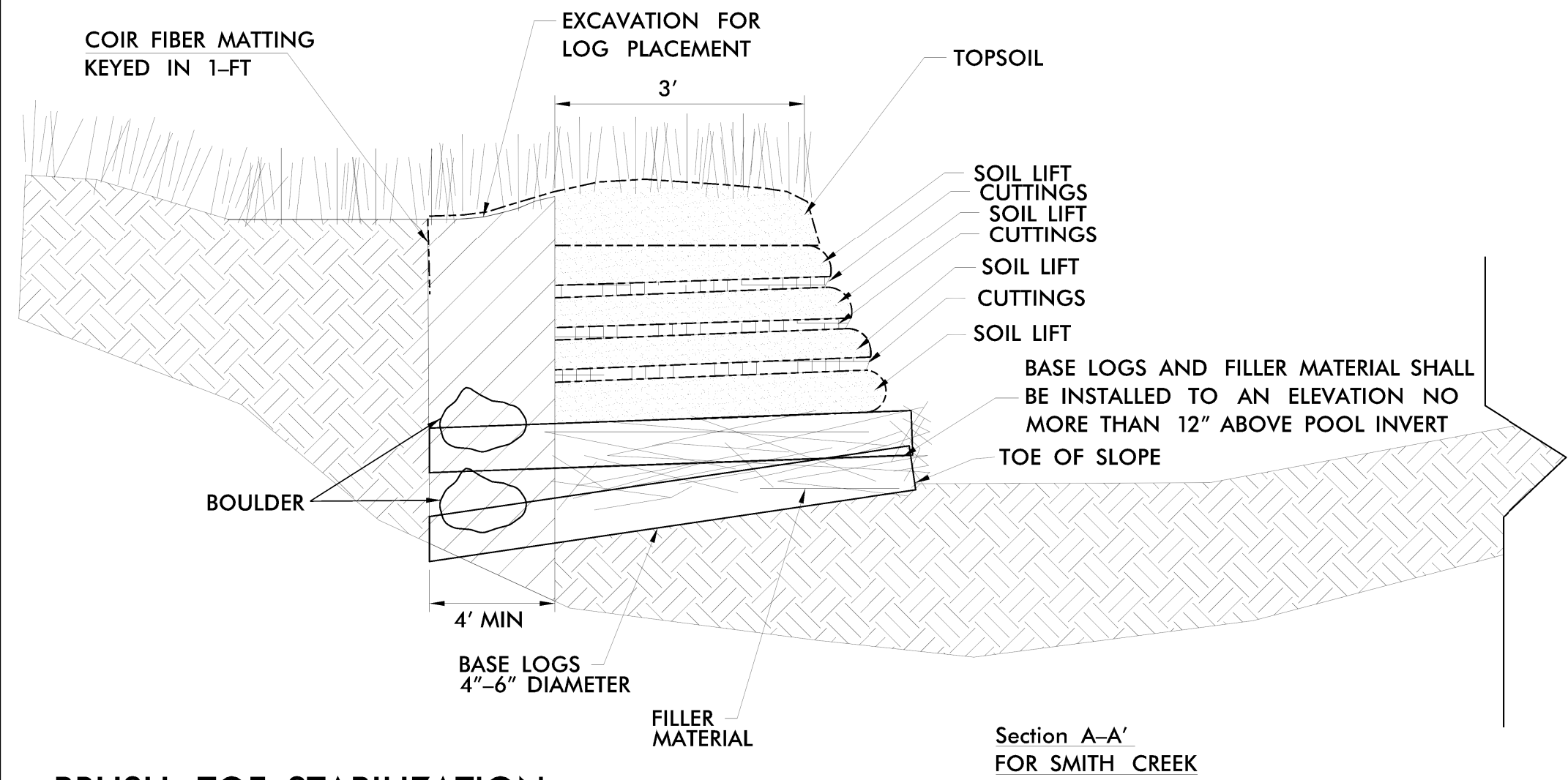
NOTES FOR SMITH CREEK:

1. OVEREXCAVATE 7' OUTSIDE OF TOP OF BANK(BANKFULL).
2. INSTALL BASE LOGS (DIAMETER OF 4"-6") IN A CRISS CROSS PATTERN. LOGS SHALL BE INSTALLED WITH AN ANGLE OF 15-25 DEGREES BETWEEN THE BANK AND INSIDE OF THE PROTRUDING LOG MEASURED FROM THE CONVERGENCE OF BANK TANGENT TO THE INSIDE OF LOG TANGENT. UTILIZE ANCHOR BOULDERS TO HOLD BASE LOGS IN PLACE. BACKFILL AND COMPACT SOIL OVER LOGS AND BOULDERS OUTSIDE OF THE TOP OF BANK (BANKFULL).
3. INSTALL FILLER MATERIAL WHICH CONSISTS OF SMALL LOGS, LIMBS, TREE TOPS AND BRUSH PERPENDICULAR TO BANK ON TOP OF THE BASE LOGS.
4. TOP FILLER MATERIAL WITH COIR FIBER MATTING AND 12-16 INCHES OF SOIL. TAMP SOIL MATERIAL AND USE A FORM TO DEVELOP THE SOIL LIFT. AVOID HEAVY COMPACTION TO PREVENT DAMAGE TO THE BASE LOGS. THE FIRST FINISHED SOIL LIFT SHALL BE A MINIMUM OF 8 INCHES THICK. USE U SHAPED WIRE TO ANCHOR MATTING.
5. INSTALL A LAYER OF LIVE CUTTINGS WHICH CONSISTS OF FACINES BUNDLES/LIVE CUTTINGS THAT INCLUDE EASY TO ROOT SPECIES SUCH AS WILLOW, DOGWOOD, AND POPLAR. THIS LAYER SHOULD BE A MINIMUM OF 3 INCHES THICK.
6. INSTALL SOIL LIFT A MINIMUM OF 6" THICK AFTER COMPACTION.
7. ALTERNATE LIFTS OF LIVE CUTTINGS, 3 INCHES MINIMUM, AND SOIL LIFTS, 6 INCHES MINIMUM, TO WITHIN 6" OF INVERT ELEVATION OF THE DOWNSTREAM RIFFLE. THE NUMBER OF LIFTS WILL VARY BASED ON SITE CONDITIONS.
8. INSTALL COIR FIBER MATTING OVER THE FINAL SOIL LIFT WITH AN AMPLE AMOUNT OF MATTING OVERHANGING TO WRAP OVER THE TOPSOIL LAYER ONCE IT IS PLACED.
9. INSTALL TOPSOIL OVER FINAL SOIL LIFT LAYER TO ACHIEVE FINISHED GRADE AT BANKFULL ELEVATION.
10. PREPARE SEEDBED, APPLY SEED, AND WRAP COIR FIBER MATTING OVER THE FINISHED TOPSOIL, ANCHOR MATTING WITH 2" WOODEN STAKES AND KEY INTO EXISTING BANK.



NOTES FOR UT

1. OVEREXCAVATE 3' OUTSIDE OF TOP OF BANK(BANKFULL).
2. INSTALL A DENSE LAYER OF BRUSHWOODY DEBRIS, WHICH SHALL CONSIST OF SMALL LOGS, LIMBS, TREE TOPS AND BRUSH COLLECTED ON-SITE. HIGHLY COMPACT BRUSHWOODY DEBRIS LAYER. THIS LAYER SHALL BE INSTALLED TO AN ELEVATION NO MORE THAN 8" ABOVE THE POOL INVERT AND A MINIMUM OF 6 INCHES THICK.
3. TOP BRUSHWOODY DEBRIS LAYER WITH COIR FIBER MATTING AND 8-12 INCHES OF SOIL. TAMP SOIL MATERIAL AND WRAP WITH MATTING TO DEVELOP SOIL LIFT. AVOID HEAVY COMPACTION TO PREVENT DAMAGE TO THE BRUSHWOODY DEBRIS. FINISHED SOIL LIFT SHALL BE A MINIMUM OF 6 INCHES THICK. USE U SHAPED WIRE TO ANCHOR MATTING.
4. INSTALL A LAYER OF LIVE CUTTINGS WHICH CONSISTS OF FACINES BUNDLES/LIVE CUTTINGS THAT INCLUDE EASY TO ROOT SPECIES SUCH AS WILLOW, DOGWOOD, AND POPLAR. THIS LAYER SHOULD BE A MINIMUM OF 3 INCHES THICK.
5. INSTALL SOIL LIFT A MINIMUM OF 6" THICK AFTER COMPACTION.
6. ALTERNATE LIFTS OF LIVE CUTTINGS, 3 INCHES MINIMUM, AND SOIL LIFTS, 6 INCHES MINIMUM, TO WITHIN 6" OF INVERT ELEVATION OF THE DOWNSTREAM RIFFLE. THE NUMBER OF LIFTS WILL VARY BASED ON SITE CONDITIONS.
8. INSTALL COIR FIBER MATTING OVER THE FINAL SOIL LIFT WITH AN AMPLE AMOUNT OF MATTING OVERHANGING TO WRAP OVER THE TOPSOIL LAYER ONCE IT IS PLACED.
9. INSTALL TOPSOIL OVER FINAL SOIL LIFT LAYER TO ACHIEVE FINISHED GRADE AT BANKFULL ELEVATION.
10. PREPARE SEEDBED, APPLY SEED, AND WRAP COIR FIBER MATTING OVER THE FINISHED TOPSOIL, ANCHOR MATTING WITH 2" WOODEN STAKES AND KEY INTO EXISTING BANK.



BRUSH TOE STABILIZATION

BTS

Brush Toe Stabilization Stationing			
Smith Creek			
Structure Number	Station (-P Smith-)	Length	Side
1	18+05 TO 18+50	53.4	LT
2	18+68 TO 19+70	114.5	RT
3	20+35 TO 21+21	99.2	RT
4	23+37 TO 24+06	80.4	LT
5	24+33 TO 24+81	57	RT
6	27+49 TO 27+83	37.2	RT
UT			
7	10+76 TO 11+11	42.9	RT
8	11+21 TO 11+45	28.1	LT
9	11+59 TO 11+88	35.5	RT

U-6187

OSM-026

NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
DAVIE COUNTY



ENVIRONMENTAL ANALYSES UNIT

HYDRAULIC DESIGN
ENGINEER

NORTH CAROLINA
PROFESSIONAL
ENGINEER
SEAL
033180
WANDA LOUISE SAUER

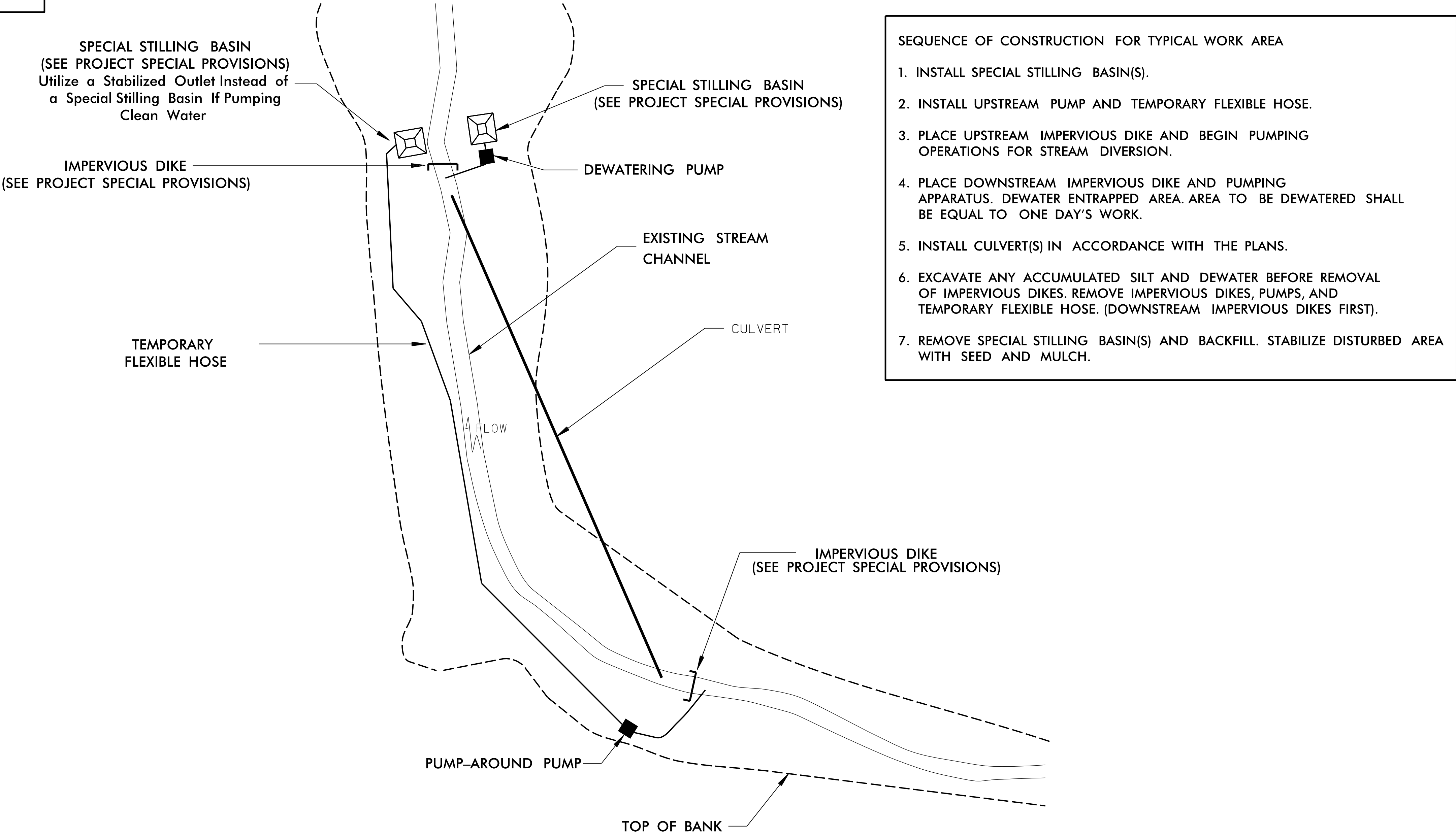
PREPARED BY

VHB Engineering NC, P.C. (C-3705)
940 Main Campus Drive, Suite 500
Raleigh, NC 27606

DOCUMENT NOT CONSIDERED FINAL
UNLESS ALL SIGNATURES COMPLETED

EXAMPLE OF PUMP-AROUND OPERATION

- NOTES:
- 1) All excavation shall be performed in only dry or isolated areas of the work zone.
 - 2) Impervious dikes are to be used to isolate work from stream flow when necessary.
 - 3) Maintenance of stream flow operations shall be incidental to the work. This includes polyethylene sheeting, diversion pipes, pumps and hoses.
 - 4) Pumps and hoses shall be of sufficient size to dewater the work area.



- SEQUENCE OF CONSTRUCTION FOR TYPICAL WORK AREA
1. INSTALL SPECIAL STILLING BASIN(S).
 2. INSTALL UPSTREAM PUMP AND TEMPORARY FLEXIBLE HOSE.
 3. PLACE UPSTREAM IMPERVIOUS DIKE AND BEGIN PUMPING OPERATIONS FOR STREAM DIVERSION.
 4. PLACE DOWNSTREAM IMPERVIOUS DIKE AND PUMPING APPARATUS. DEWATER ENTRAPPED AREA. AREA TO BE DEWATERED SHALL BE EQUAL TO ONE DAY'S WORK.
 5. INSTALL CULVERT(S) IN ACCORDANCE WITH THE PLANS.
 6. EXCAVATE ANY ACCUMULATED SILT AND DEWATER BEFORE REMOVAL OF IMPERVIOUS DIKES. REMOVE IMPERVIOUS DIKES, PUMPS, AND TEMPORARY FLEXIBLE HOSE. (DOWNSTREAM IMPERVIOUS DIKES FIRST).
 7. REMOVE SPECIAL STILLING BASIN(S) AND BACKFILL. STABILIZE DISTURBED AREA WITH SEED AND MULCH.

U-6187

OSM-02H

NORTH CAROLINA

DEPARTMENT OF TRANSPORTATION

DAVIE COUNTY

ENVIRONMENTAL ANALYSES UNIT

HYDRAULIC DESIGN
ENGINEER

NORTH CAROLINA

PROFESSIONAL

SEAL
033180

ENGINEER

WANDA LOUISE SALTER

PREPARED BY

VHB Engineering NC, P.C. (C-3705)
540 Main Campus Drive, Suite 500
Raleigh, NC 27616

DOCUMENT NOT CONSIDERED FINAL
UNLESS ALL SIGNATURES COMPLETED

MORPHOLOGICAL DATA

MORPHOLOGICAL MEASUREMENTS TABLE

SMITH CREEK ENHANCEMENT
-P SMITHCREEK- Reach 1 Sta. 10 + 00.00 to Sta. 14 + 80.70

Variables	Existing Channel	Proposed Reach	USGS Station	Reference Reach
1.Stream type	64	64		E4
2.Drainage area	088	088		067
3.Bankfull width	Mean: 13.8 Range: 13.4-14.1	Mean: 16.7 Range: 1.1		Mean: 13.7 Range: 1.4
4.Bankfull mean depth	Mean: 1.3 Range: 1.0-1.6	Mean: 1.1 Range: 1.0-1.2		Mean: 1.4 Range: 1.0-1.6
5.Width/depth ratio	Mean: 10.6 Range: 9.8-11.4	Mean: 15.2 Range: 14.0-16.4		Mean: 9.8 Range: 8.0-11.6
6.Bankfull cross-sectional area	Mean: 17.7 Range: 17.2-18.2	Mean: 18.5 Range: 18.0-19.0		Mean: 9.8 Range: 9.0-10.6
7.Bankfull mean velocity	Mean: 5.3 Range: 5.0-5.5	Mean: 5.0 Range: 4.8-5.2		Mean: 2.8 Range: 2.6-3.0
8.Bankfull discharge,cf s	Mean: 93.5 Range: 90.3-94.9	Mean: 93 Range: 90.0-96.0		Mean: 50.0 Range: 45.0-55.0
9.Bankfull max depth	Mean: 1.8 Range: 1.6-1.9	Mean: 1.6 Range: 1.4-1.8		Mean: 1.7 Range: 1.6-1.8
10.Width of floodprone area	Mean: 24.5 Range: 13.7-45.7	Mean: 225.0 Range: 22.2		Mean: 22.2 Range: 22.2
11.Entrenchment ratio	Mean: 3.8 Range: 1.5-6.0	Mean: 22.2 Range: 22.2		Mean: 22.2 Range: 22.2
12.Meander length	Mean: 73.6 Range: 49.0-99.0	Mean: 73.6 Range: 49.0-99.0		Mean: 73.6 Range: 49.0-99.0
13.Ratio of meander length to bankfull width	Mean: 5.4 Range: 3.6-7.2	Mean: 5.4 Range: 3.6-7.2		Mean: 5.4 Range: 3.6-7.2
14.Radius of curvature	Mean: 57.9 Range: 20.0-76.0	Mean: 57.9 Range: 20.0-76.0		Mean: 57.9 Range: 20.0-76.0
15.Ratio of radius of curvature to bankfull width	Mean: 4.2 Range: 1.5-5.5	Mean: 4.2 Range: 1.5-5.5		Mean: 4.2 Range: 1.5-5.5
16.Belt width	Mean: 25.0 Range: 20.0-35.0	Mean: 25.0 Range: 20.0-35.0		Mean: 25.0 Range: 20.0-35.0
17.Meander width ratio	Mean: 1.8 Range: 1.5-2.5	Mean: 1.8 Range: 1.5-2.5		Mean: 1.8 Range: 1.5-2.5
18.Sinuosity (stream length/valley length)	Mean: 1.1 Range: 1.1	Mean: 1.1 Range: 1.1		Mean: 1.1 Range: 1.1
19.Valley slope	Mean: 0.0095 Range: 0.0095	Mean: 0.0095 Range: 0.0095		Mean: 0.0280 Range: 0.0280
20.Average slope	Mean: 0.0086 Range: 0.0086	Mean: 0.0086 Range: 0.0086		Mean: 0.0 Range: 0.0
21.Pool slope	Mean: 0.0 Range: 0.0	Mean: 0.0 Range: 0.0		Mean: 0.0 Range: 0.0
22.Ratio of pool slope to average slope	Mean: 0.0 Range: 0.0	Mean: 0.0 Range: 0.0		Mean: 0.0 Range: 0.0
23.Maximum pool depth	Mean: 2.2 Range: 1.8-2.5	Mean: 2.2 Range: 1.8-2.5		Mean: 2.2 Range: 1.8-2.5
24.Ratio of pool depth to average bankfull depth	Mean: 1.7 Range: 1.7	Mean: 1.7 Range: 1.7		Mean: 1.7 Range: 1.7
25.Pool width	Mean: 12.4 Range: 10.8-14.0	Mean: 12.4 Range: 10.8-14.0		Mean: 12.4 Range: 10.8-14.0
26.Ratio of pool width to bankfull width	Mean: 0.9 Range: 0.9	Mean: 0.9 Range: 0.9		Mean: 0.9 Range: 0.9
27.Pool to pool spacing	Mean: 64.7 Range: 38.0-96.0	Mean: 64.7 Range: 38.0-96.0		Mean: 64.7 Range: 38.0-96.0
28.Ratio of pool to pool spacing to bankfull width	Mean: 4.7 Range: 2.8-7.0	Mean: 4.7 Range: 2.8-7.0		Mean: 4.7 Range: 2.8-7.0
29.Ratio of lowest bank height to bankfull height (or max bankfull depth)	Mean: 2.1 Range: 1.6-2.5	Mean: 1.0 Range: 1.0		Mean: 1.0 Range: 1.0

MORPHOLOGICAL MEASUREMENTS TABLE

SMITH CREEK RESTORATION
-P SMITHCREEK- Reach 2 Sta. 17 + 27.70 to Sta. 28 + 12

Variables	Existing Channel	Proposed Reach	USGS Station	Reference Reach
1.Stream type	64	64		E4
2.Drainage area	103	103		067
3.Bankfull width	Mean: 12.6 Range: 1.5	Mean: 17.0 Range: 1.2		Mean: 13.7 Range: 1.4
4.Bankfull mean depth	Mean: 1.5 Range: 1.0-2.0	Mean: 1.2 Range: 1.0-1.4		Mean: 1.4 Range: 1.0-1.6
5.Width/depth ratio	Mean: 8.4 Range: 7.0-9.8	Mean: 13.7 Range: 12.0-15.4		Mean: 9.8 Range: 8.0-11.6
6.Bankfull cross-sectional area	Mean: 19.3 Range: 17.7-20.9	Mean: 21.1 Range: 19.3-22.9		Mean: 9.8 Range: 9.0-10.6
7.Bankfull mean velocity	Mean: 5.2 Range: 5.0-5.4	Mean: 4.7 Range: 4.5-4.8		Mean: 2.8 Range: 2.6-3.0
8.Bankfull discharge,cf s	Mean: 100.8 Range: 96.9-104.4	Mean: 98.7 Range: 95.8-101.1		Mean: 50.0 Range: 45.0-55.0
9.Bankfull max depth	Mean: 2.0 Range: 1.7-2.3	Mean: 2.0 Range: 1.7-2.3		Mean: 1.7 Range: 1.6-1.8
10.Width of floodprone area	Mean: 17.7 Range: 14.1-20.0	Mean: 237.0 Range: 23.0		Mean: 22.2 Range: 22.2
11.Entrenchment ratio	Mean: 1.5 Range: 1.5	Mean: 22.2 Range: 22.2		Mean: 22.2 Range: 22.2
12.Meander length	Mean: 97.6 Range: 54.0-150.0	Mean: 157.4 Range: 136.0-183.0		Mean: 73.6 Range: 49.0-99.0
13.Ratio of meander length to bankfull width	Mean: 7.7 Range: 4.3-11.9	Mean: 9.3 Range: 8.0-10.8		Mean: 5.4 Range: 3.6-7.2
14.Radius of curvature	Mean: 45.6 Range: 10.0-180.0	Mean: 51.2 Range: 40.0-64.0		Mean: 57.9 Range: 20.0-76.0
15.Ratio of radius of curvature to bankfull width	Mean: 3.6 Range: 0.8-14.3	Mean: 3.0 Range: 2.4-3.8		Mean: 4.2 Range: 1.5-5.5
16.Belt width	Mean: 23.9 Range: 15.0-32.0	Mean: 51.0 Range: 34.0-65.0		Mean: 25.0 Range: 20.0-35.0
17.Meander width ratio	Mean: 1.9 Range: 1.2-2.5	Mean: 3.0 Range: 2.0-3.8		Mean: 1.8 Range: 1.5-2.5
18.Sinuosity (stream length/valley length)	Mean: 1.1 Range: 1.1	Mean: 1.2 Range: 1.2		Mean: 1.1 Range: 1.1
19.Valley slope	Mean: 0.0079 Range: 0.0079	Mean: 0.0082 Range: 0.0082		Mean: 0.0280 Range: 0.0280
20.Average slope	Mean: 0.0072 Range: 0.0072	Mean: 0.00680 Range: 0.00680		Mean: 0.0 Range: 0.0
21.Pool slope	Mean: 0.0 Range: 0.0	Mean: 0.0 Range: 0.0		Mean: 0.0 Range: 0.0
22.Ratio of pool slope to average slope	Mean: 0.0 Range: 0.0	Mean: 0.0 Range: 0.0		Mean: 0.0 Range: 0.0
23.Maximum pool depth	Mean: 3.0 Range: 2.0	Mean: 4.0 Range: 3.2		Mean: 2.2 Range: 1.8-2.5
24.Ratio of pool depth to average bankfull depth	Mean: 2.0 Range: 2.0	Mean: 3.2 Range: 2.0		Mean: 1.7 Range: 1.7
25.Pool width	Mean: 10.2 Range: 8.0	Mean: 21.0 Range: 1.2		Mean: 12.4 Range: 10.8-14.0
26.Ratio of pool width to bankfull width	Mean: 0.8 Range: 0.8	Mean: 1.2 Range: 1.2		Mean: 0.9 Range: 0.9
27.Pool to pool spacing	Mean: 80.1 Range: 31.0-264.0	Mean: 91.4 Range: 77.0-116.0		Mean: 64.7 Range: 38.0-96.0
28.Ratio of pool to pool spacing to bankfull width	Mean: 6.4 Range: 2.5-21.0	Mean: 5.4 Range: 4.5-6.8		Mean: 4.7 Range: 2.8-7.0
29.Ratio of lowest bank height to bankfull height (or max bankfull depth)	Mean: 2.7 Range: 2.7	Mean: 1.0 Range: 1.0		Mean: 1.0 Range: 1.0

MORPHOLOGICAL MEASUREMENTS TABLE

UT RESTORATION
-P UT- Sta. 10 + 00.00 to Sta. 13 + 55.85

Variables	Existing Channel	Proposed Reach	USGS Station	Reference Reach
1.Stream type	64	64		E4
2.Drainage area	013	013		022
3.Bankfull width	Mean: 4.1 Range: 1.1	Mean: 6.0 Range: 0.6		Mean: 13.7 Range: 1.4
4.Bankfull mean depth	Mean: 1.1 Range: 1.0-1.2	Mean: 0.6 Range: 0.6-0.6		Mean: 1.4 Range: 1.0-1.6
5.Width/depth ratio	Mean: 3.7 Range: 3.7	Mean: 10.0 Range: 10.0		Mean: 9.8 Range: 8.0-11.6
6.Bankfull cross-sectional area	Mean: 4.6 Range: 4.6	Mean: 3.6 Range: 3.6		Mean: 9.8 Range: 9.0-10.6
7.Bankfull mean velocity	Mean: 5.0 Range: 5.0	Mean: 6.2 Range: 6.2		Mean: 2.8 Range: 2.6-3.0
8.Bankfull discharge,cf s	Mean: 23.0 Range: 22.9-24.9	Mean: 22.0 Range: 21.4-22.8		Mean: 50.0 Range: 45.0-55.0
9.Bankfull max depth	Mean: 1.6 Range: 1.6	Mean: 1.2 Range: 1.2		Mean: 1.7 Range: 1.6-1.8
10.Width of floodprone area	Mean: 6.9 Range: 6.3-7.5	Mean: 214.0 Range: 21.4		Mean: 22.2 Range: 22.2
11.Entrenchment ratio	Mean: 3.6 Range: 3.6	Mean: 22.2 Range: 22.2		Mean: 22.2 Range: 22.2
12.Meander length	Mean: 51.1 Range: 44.8-57.5	Mean: 74.3 Range: 64.0-81.0		Mean: 73.6 Range: 49.0-99.0
13.Ratio of meander length to bankfull width	Mean: 12.5 Range: 10.9-14.0	Mean: 12.5 Range: 10.9-14.0		Mean: 5.4 Range: 3.6-7.2
14.Radius of curvature	Mean: 10.5 Range: 4.0-23.0	Mean: 21.7 Range: 18.0-25.0		Mean: 57.9 Range: 20.0-76.0
15.Ratio of radius of curvature to bankfull width	Mean: 2.6 Range: 1.0-5.6	Mean: 2.6 Range: 1.0-5.6		Mean: 4.2 Range: 1.5-5.5
16.Belt width	Mean: 10.6 Range: 5.0-17.0	Mean: 28.0 Range: 18.0-35.0		Mean: 25.0 Range: 20.0-35.0
17.Meander width ratio	Mean: 2.6 Range: 1.2-4.1	Mean: 2.6 Range: 1.2-4.1		Mean: 1.8 Range: 1.5-2.5
18.Sinuosity (stream length/valley length)	Mean: 1.1 Range: 1.1	Mean: 1.2 Range: 1.2		Mean: 1.1 Range: 1.1
19.Valley slope	Mean: 0.0151 Range: 0.0151	Mean: 0.0120 Range: 0.0120		Mean: 0.0280 Range: 0.0280
20.Average slope	Mean: 0.01375 Range: 0.01375	Mean: 0.0239 Range: 0.0239		Mean: 0.0 Range: 0.0
21.Pool slope	Mean: 0.0 Range: 0.0	Mean: 0.0 Range: 0.0		Mean: 0.0 Range: 0.0
22.Ratio of pool slope to average slope	Mean: 0.0 Range: 0.0	Mean: 0.0 Range: 0.0		Mean: 0.0 Range: 0.0
23.Maximum pool depth	Mean: N/A Range: N/A	Mean: 2.5 Range: 2.5		Mean: 2.2 Range: 1.8-2.5
24.Ratio of pool depth to average bankfull depth	Mean: 0.0 Range: 0.0	Mean: 0.0 Range: 0.0		Mean: 1.7 Range: 1.7
25.Pool width	Mean: 0.0 Range: 0.0	Mean: 10.0 Range: 10.0		Mean: 12.4 Range: 10.8-14.0
26.Ratio of pool width to bankfull width	Mean: 0.0 Range: 0.0	Mean: 0.0 Range: 0.0		Mean: 0.9 Range: 0.9
27.Pool to pool spacing	Mean: 33.0 Range: 18.0-49.0	Mean: 0.0 Range: 0.0		Mean: 64.7 Range: 38.0-96.0
28.Ratio of pool to pool spacing to bankfull width	Mean: 0.0 Range: 0.0	Mean: 0.0 Range: 0.0		Mean: 4.7 Range: 2.8-7.0
29.Ratio of lowest bank height to bankfull height (or max bankfull depth)	Mean: 1.3 Range: 1.3	Mean: 1.0 Range: 1.0		Mean: 1.0 Range: 1.0

U-6187

OSM-02i

NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
DAVIE COUNTY

ENVIRONMENTAL ANALYSES UNIT

HYDRAULIC DESIGN
ENGINEER

PREPARED BY

VHB Engineering NC, P.C. (C-3705)
940 Main Campus Drive, Suite 500
Raleigh, NC 27616

DOCUMENT NOT CONSIDERED FINAL
UNLESS ALL SIGNATURES COMPLETED

Smith Creek Structure Invert Table				
Structure Number	Structure Type	Station (-P Smith-)	Invert Elevation (ft)	Bankfull Elevation (ft)
1	Boulder Rock and Roll Riffle	20+16 TO 20+36	754.1	756.1
2	Constructed Riffle	21+04 TO 21+41	753.5	755.5
3	Rock Cross Vane	21+41	753.2	755.2
4	Constructed Riffle	24+04 TO 24+30	751.4	753.4
5	Rock Cross Vane	25+81	750.2	752.2
6	Rock Cross Vane	26+76	749.1	751.1
7	Constructed Riffle	27+59 TO 27+76	748.0	750.0
8	Stream Crossing Type II (At-Grade)	27+85	747.8	749.8
UT1 Structure Invert Table				
9	Constructed Riffle	10+00 TO 10+25	763.1	764.3
10	Constructed Riffle	11+45 TO 11+59	759.6	760.8
11	Boulder Rock and Roll Riffle	12+20 TO 12+39	757.8	759.0
12	Constructed Riffle	12+69 TO 12+90	756.7	757.9
13	Rock Cross Vane	12+86	756.3	757.5
14	Rock Cross Vane	13+05	755.3	756.5
15	Constructed Riffle	13+25 TO 13+46	754.3	755.5

U-6187

OSM-02J

NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
DAVIE COUNTY



ENVIRONMENTAL ANALYSES UNIT

HYDRAULIC DESIGN
ENGINEER

NORTH CAROLINA
PROFESSIONAL
ENGINEER
SEAL
033180
WANDA LOUISE SALTER

PREPARED BY


vhb
VHB Engineering, Inc., P.C. (C-3705)
940 Main Campus Drive, Suite 500
Raleigh, NC 27616

DOCUMENT NOT CONSIDERED FINAL
UNLESS ALL SIGNATURES COMPLETED

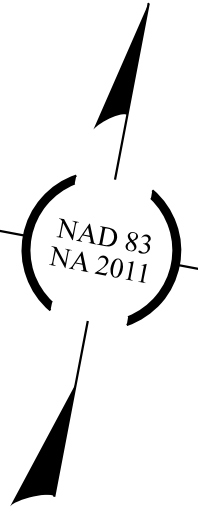
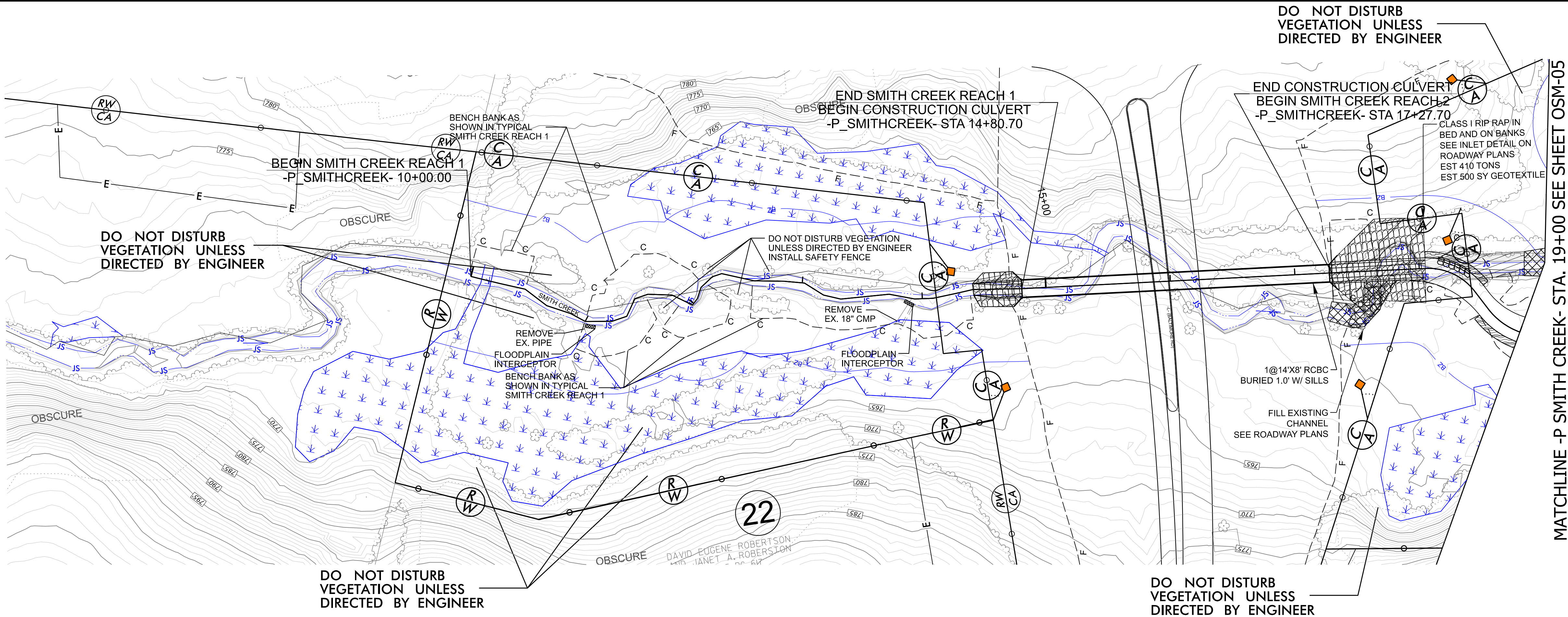
U-6187 ONSITE STREAM MITIGATION SUMMARY OF QUANTITIES					
Description	Section	Item Description	Quantity	Unit Measure	Pay Unit
0000100000-N	800	MOBILIZATION	1	LS	LS
0000400000-N	SP	SURVEYING FOR MITIGATION	1	LS	LS
-	SP	SITE GRADING FOR MITIGATION	1	LS	LS
1077000000-E	1005	#57 STONE	225	TON	TON
3628000000-E	876	RIP RAP, CLASS I	185	TON	TON
3635000000-E	876	RIP RAP, CLASS II	15	TON	TON
3642000000-E	876	RIP RAP, CLASS A	10	TON	TON
3649000000-E	876	RIP RAP, CLASS B	300	TON	TON
3651000000-E	SP	BOULDERS	430	TON	TON
3656000000-E	876	GEOTEXTILE TYPE 2	1,155	SY	SY
6000000000-E	1605	TEMPORARY SILT FENCE	7,245	LF	LF
6006000000-E	1610	EROSION CONTROL STONE, CLASS A	75	TON	TON
6009000000-E	1610	EROSION CONTROL STONE, CLASS B	75	TON	TON
6012000000-E	1610	SEDIMENT CONTROL STONE	60	TON	TON
6015000000-E	1615	TEMPORARY MULCHING	20	ACR	ACR
6018000000-E	1620	SEED FOR TEMPORARY SEEDING	1,300	LB	LB
6021000000-E	1620	FERTILIZER FOR TEMPORARY SEEDING	7	TON	TON
6029000000-E	SP	SAFETY FENCE	2,500	LF	LF
6030000000-E	1630	SILT EXCAVATION	90	CY	CY
6037000000-E	1629	COIR FIBER MAT	11,200	SY	SY
6042000000-E	1632	1/4" HARDWARE CLOTH	170	LF	LF
6046000000-E	1636	TEMPORARY PIPE FOR STREAM CROSSING (60")	40	LF	LF
6070000000-N	1339	SPECIAL STILLING BASIN	6	Each	Each
6071030000-E	1640	COIR FIBER BAFFLE	30	LF	LF
6084000000-E	1660	SEEDING AND MULCHING	18	ACR	ACR
6087000000-E	1660	MOWING	12	ACR	ACR
6090000000-E	1661	SEED FOR REPAIR SEEDING	200	LB	LB
6093000000-E	1661	FERTILIZER FOR REPAIR SEEDING	1	TON	TON
6096000000-E	1662	SEED FOR SUPPLEMENTAL SEEDING	425	LB	LB
6108000000-E	1665	FERTILIZER TOPDRESSING	13	TON	TON
6111000000-E	SP	IMPERVIOUS DIKE	200	LF	LF
6114500000-N	1667	SPECIALIZED HAND MOWING	10	MHR	MHR
6117000000-N	1675	RESPONSE FOR EROSION CONTROL	25	EA	EA
6135000000-E	SP	GENERIC EROSION CONTROL ITEM - DISKING	2	ACR	ACR
6135000000-E	SP	GENERIC EROSION CONTROL ITEM - RIPPING	2	ACR	ACR
0995000000-E	340	PIPE REMOVAL	180	LF	LF
-	SP	BRUSH TOE STABILIZATION	604	LF	LF
-	SP	LIVE PLANT MATERIAL - 12" DIAMETER BUNDLES	315	EA	EA
6900000000-E	SP	TOPSOIL	60	CY	CY
-	SP	CHANNEL SUBSTRATE MATERIAL	37	TON	TON
-	SP	IMPERVIOUS SELECT MATERIAL	700	CY	LS
6133000000-N	SP	DIVERSION PUMPING FOR STREAM RESTORATION	1	LS	LS
3503000000-E	866	WOVEN WIRE FENCE, 47" FABRIC	4,900	LF	LF
3509000000-E	866	4" TIMBER FENCE POSTS, 7'-6" LONG	322	EA	EA
3515000000-E	866	5" TIMBER FENCE POSTS, 8'-0" LONG	52	EA	EA
3564000000-E	866	SINGLE GATES, 4'-10" HIGH, 12' WIDE, 12' OPENING	7	EA	EA

Summary of Earthwork for Mitigation			
Mitigation Unclassified Excavation (CU.YD.)	Mitigation Borrow (CU.YD.)	Mitigation Embankment (CU.YD.)	Mitigation Waste (CU.YD.)
6,500	0	0	3,300

U-6187 DSM-03
NORTH CAROLINA DEPARTMENT OF TRANSPORTATION DAVIE COUNTY

ENVIRONMENTAL ANALYSES UNIT
HYDRAULIC DESIGN ENGINEER

PREPARED BY  vhb Engineering Inc. P.C. (C-3705) 940 Main Campus Drive, Suite 500 Raleigh, NC 27606
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED



U-6187

OSM-04

NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
DAVIE COUNTY

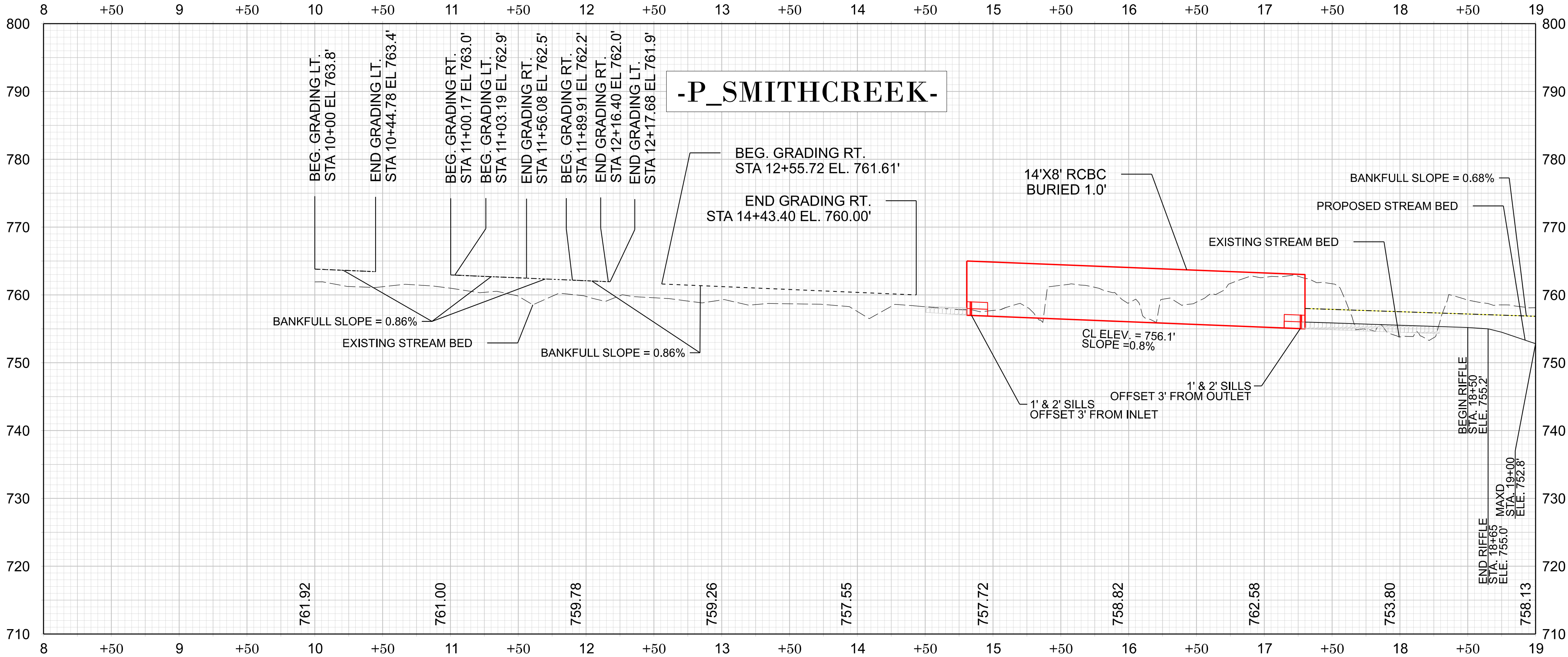
ENVIRONMENTAL ANALYSES UNIT
HYDRAULIC DESIGN
ENGINEER

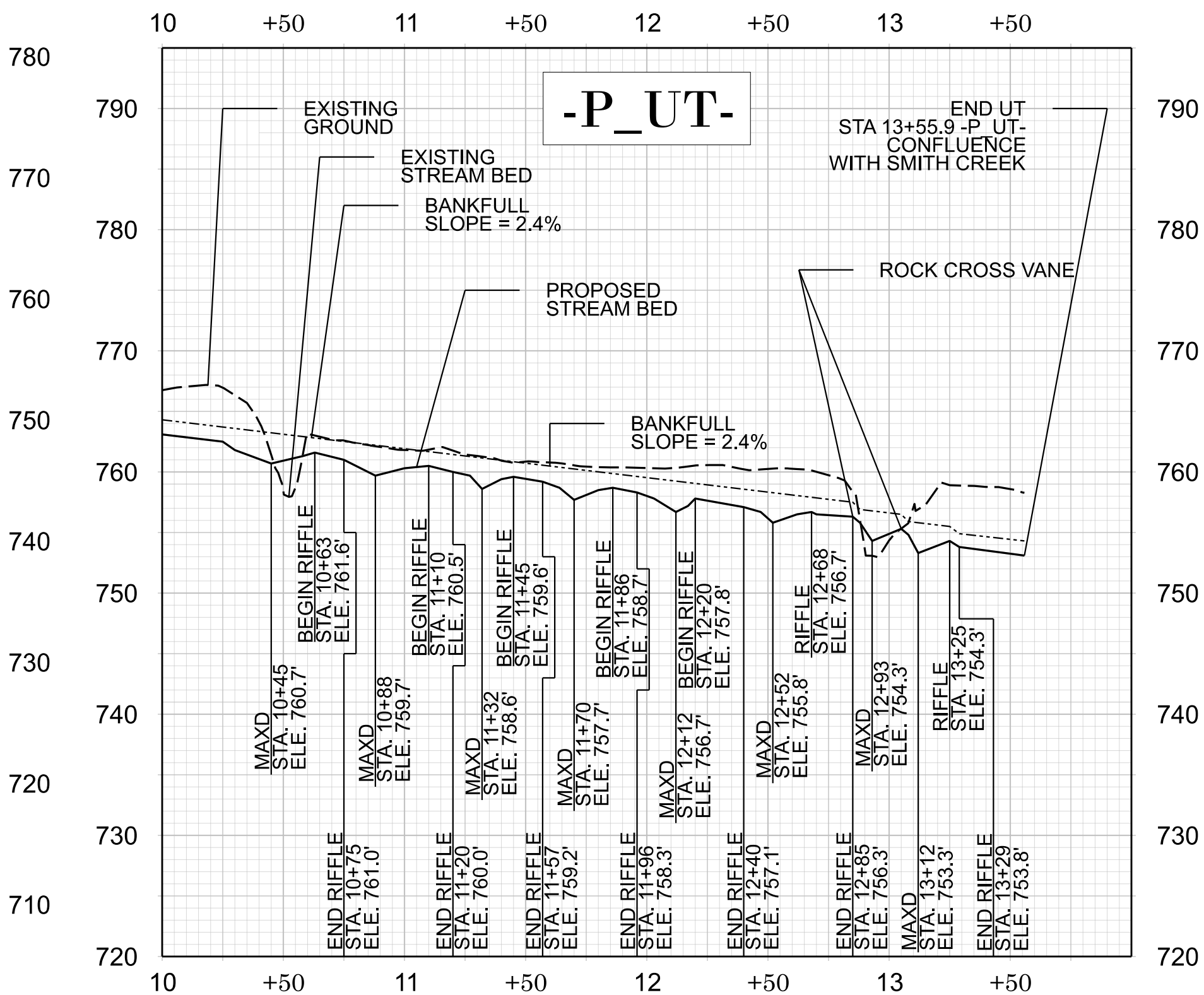
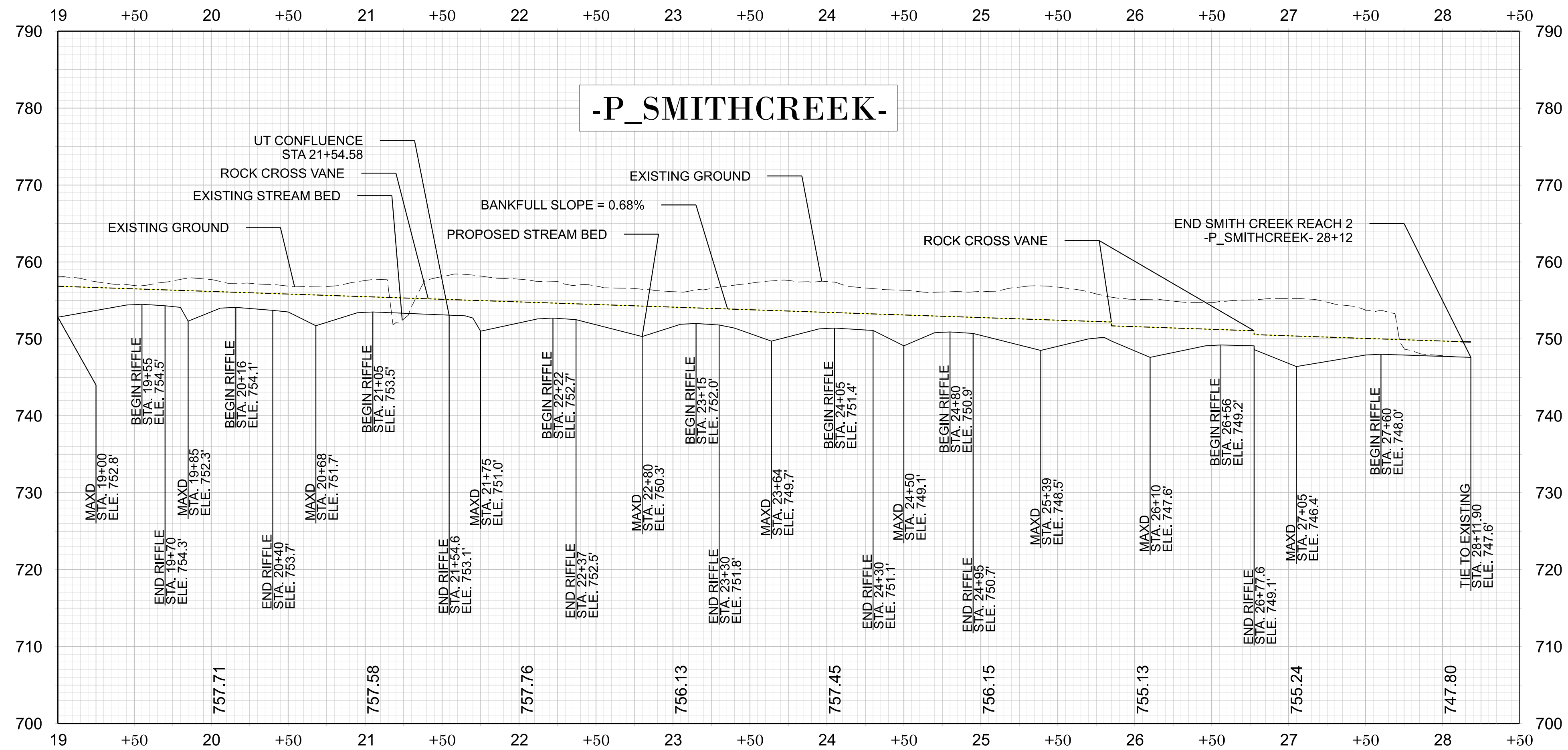
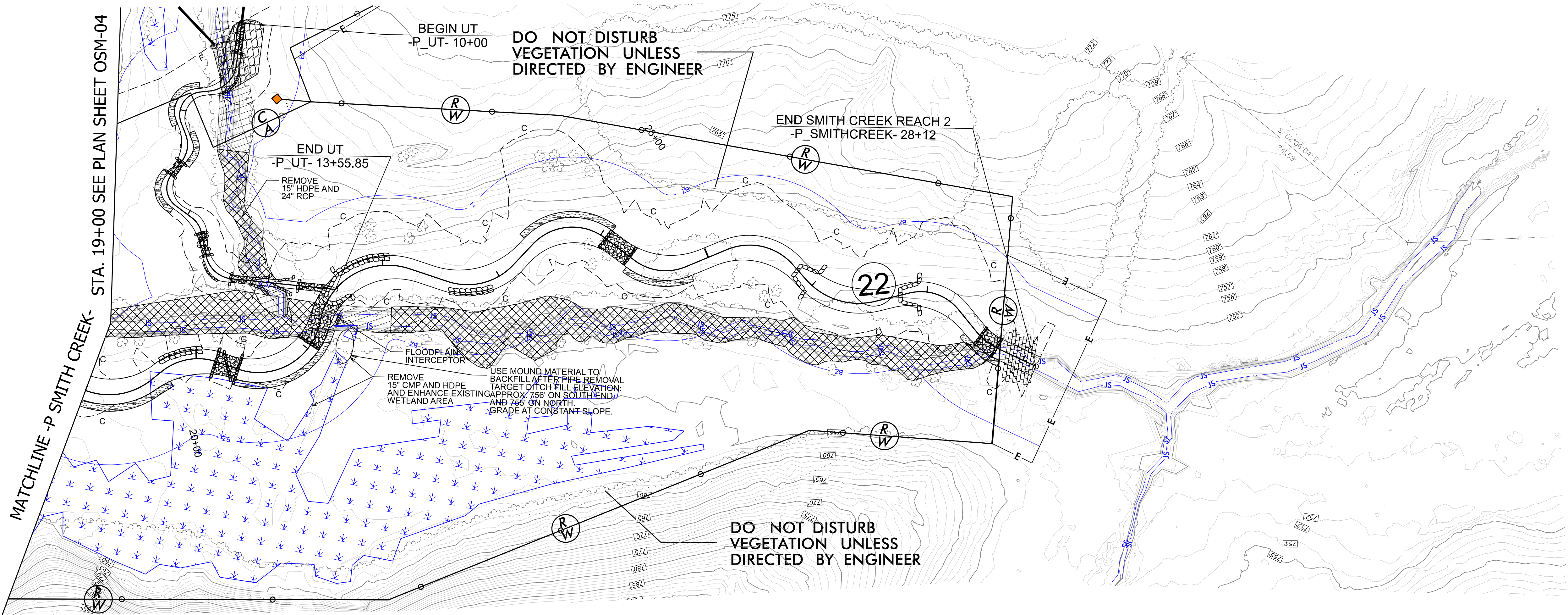
NORTH CAROLINA
PROFESSIONAL
SEAL
033180
ENGINEER
WANDA LOUISE SALLER

PREPARED BY
vhb
VHB Engineering NC, P.C. (C-3705)
540 Main Campus Drive, Suite 500
Raleigh, NC 27606

DOCUMENT NOT CONSIDERED FINAL
UNLESS ALL SIGNATURES COMPLETED
PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

LEGEND

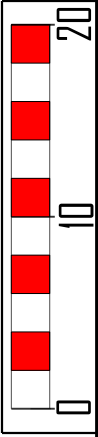
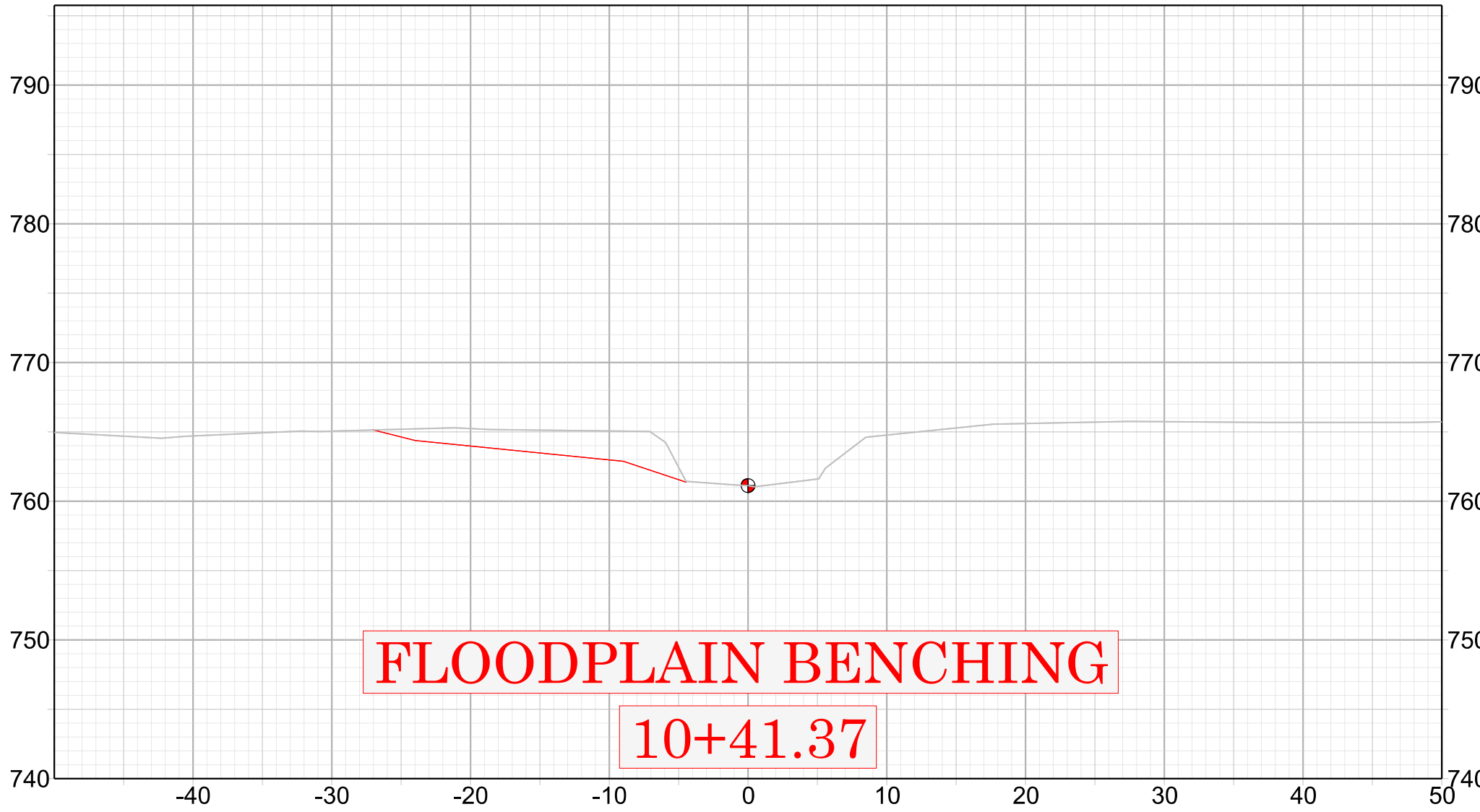
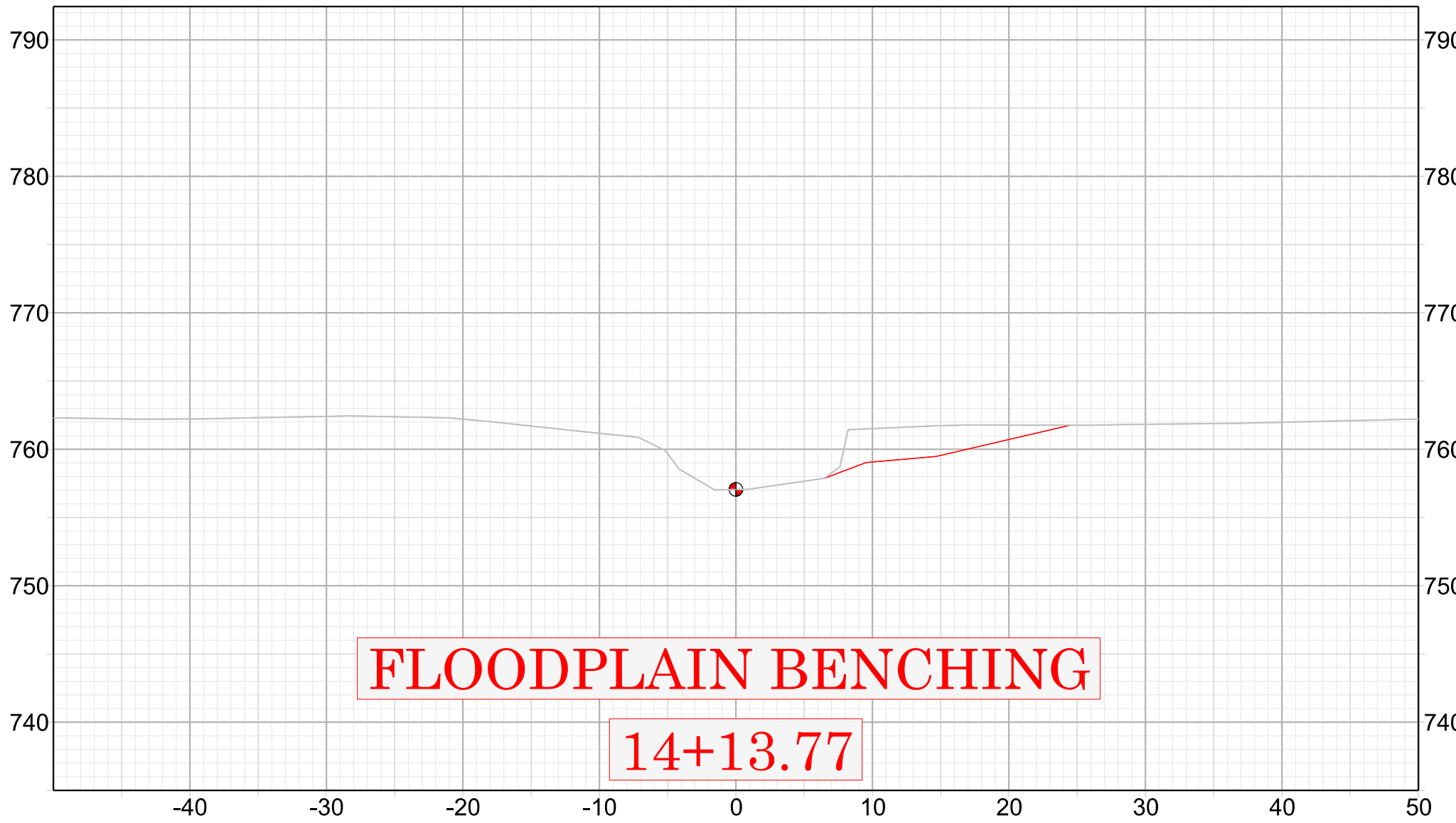
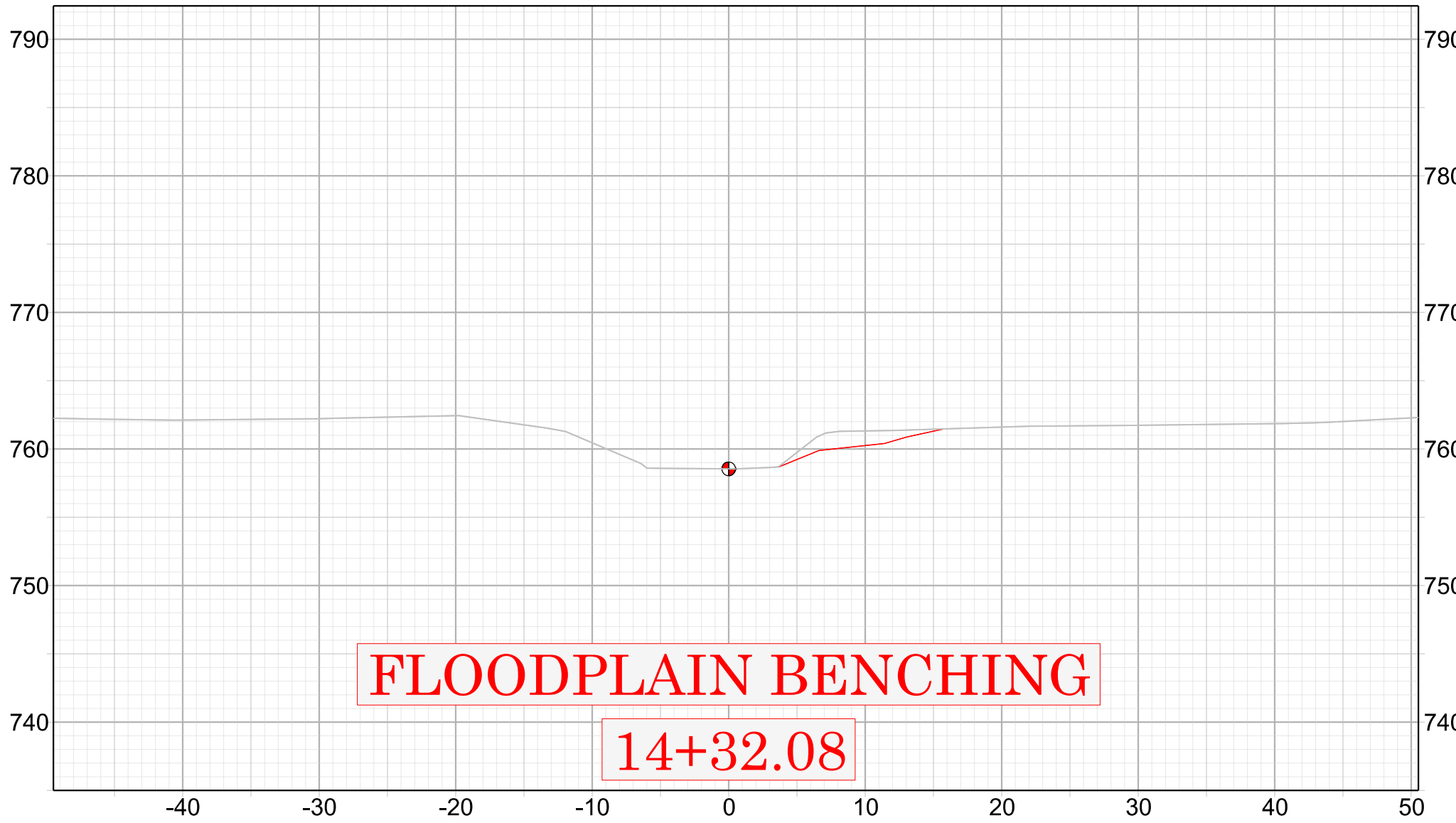






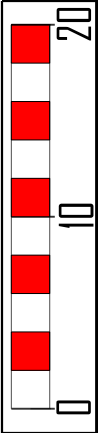
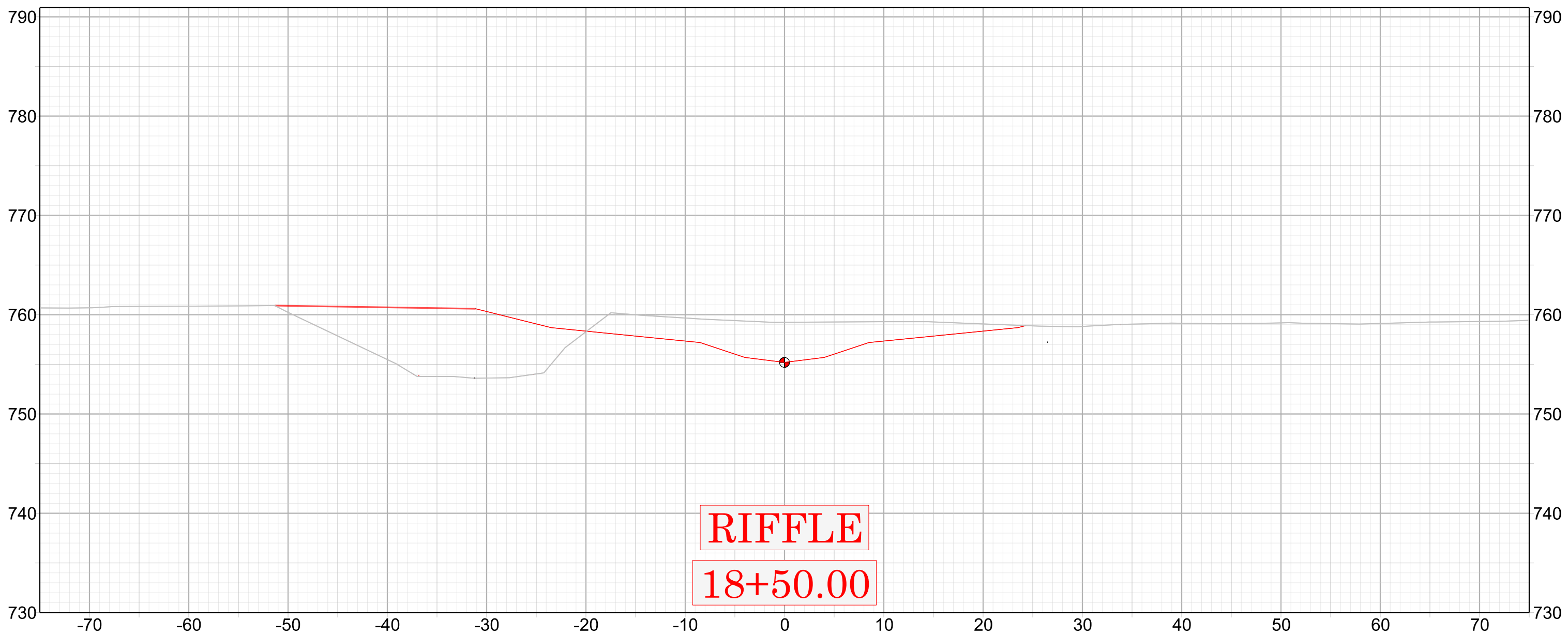
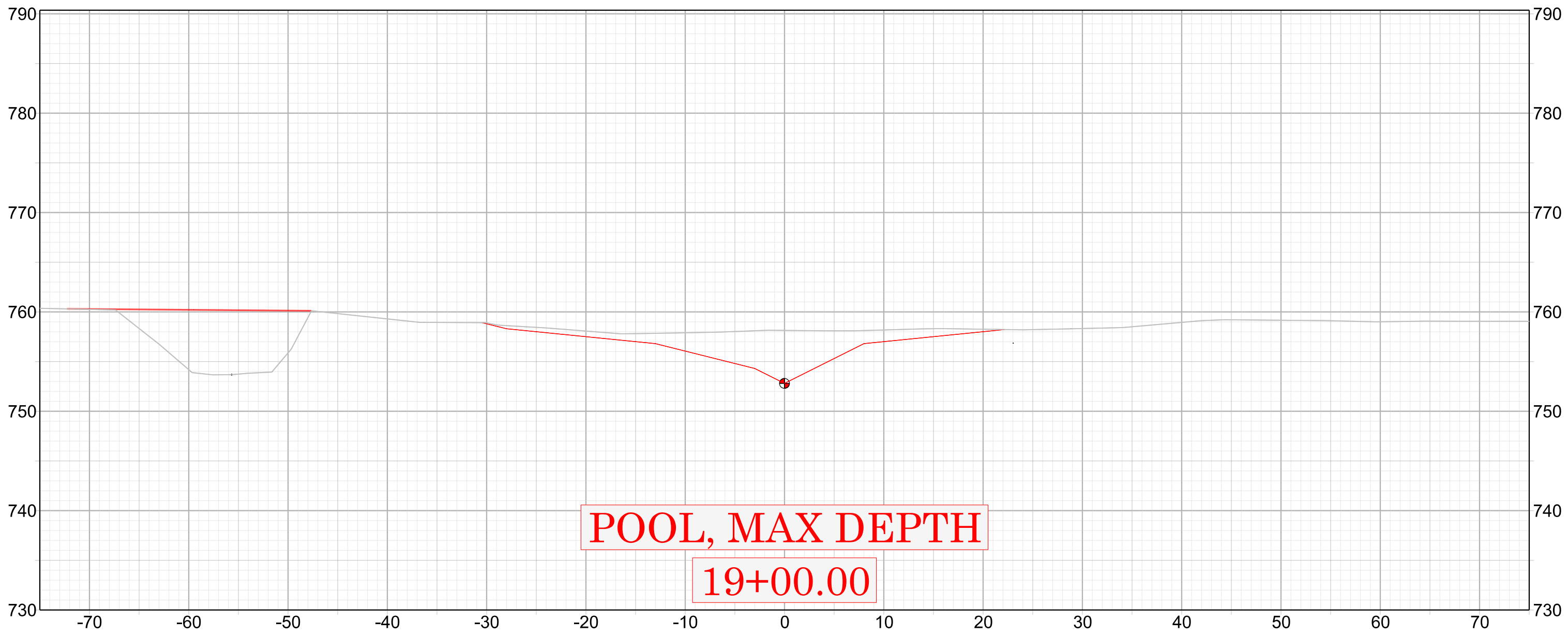
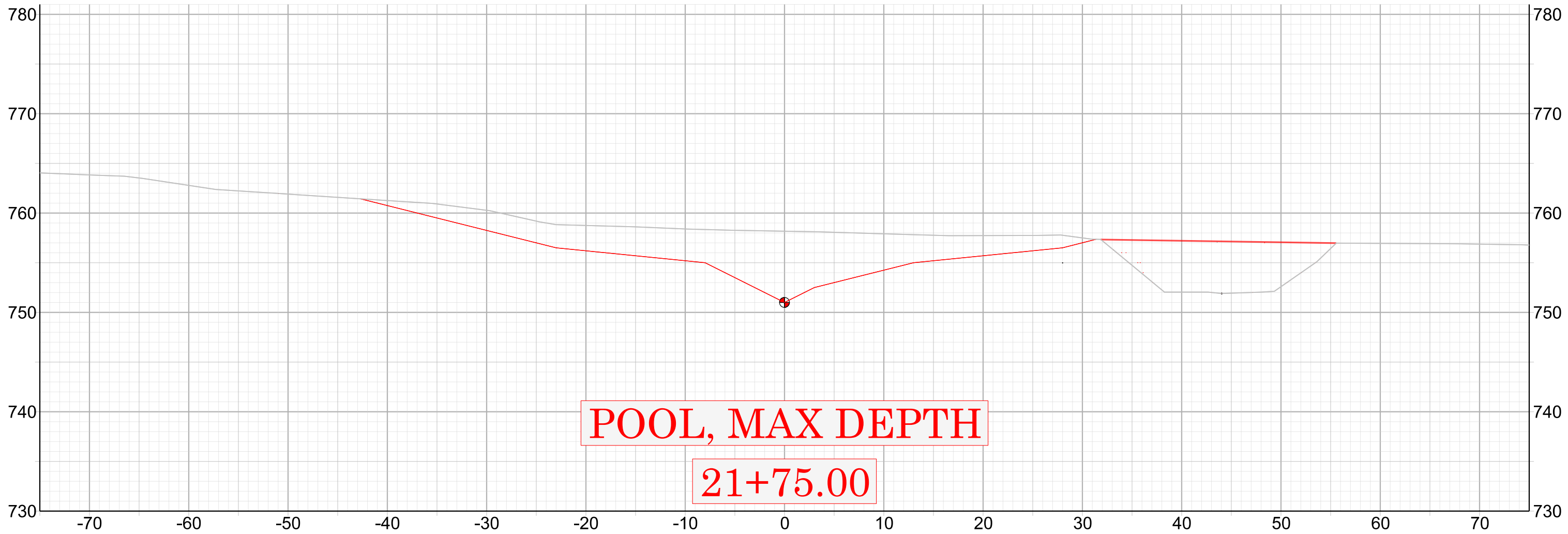
NAD NC IV
83 GRID
NA 2011

-SMITHCREEK R1-



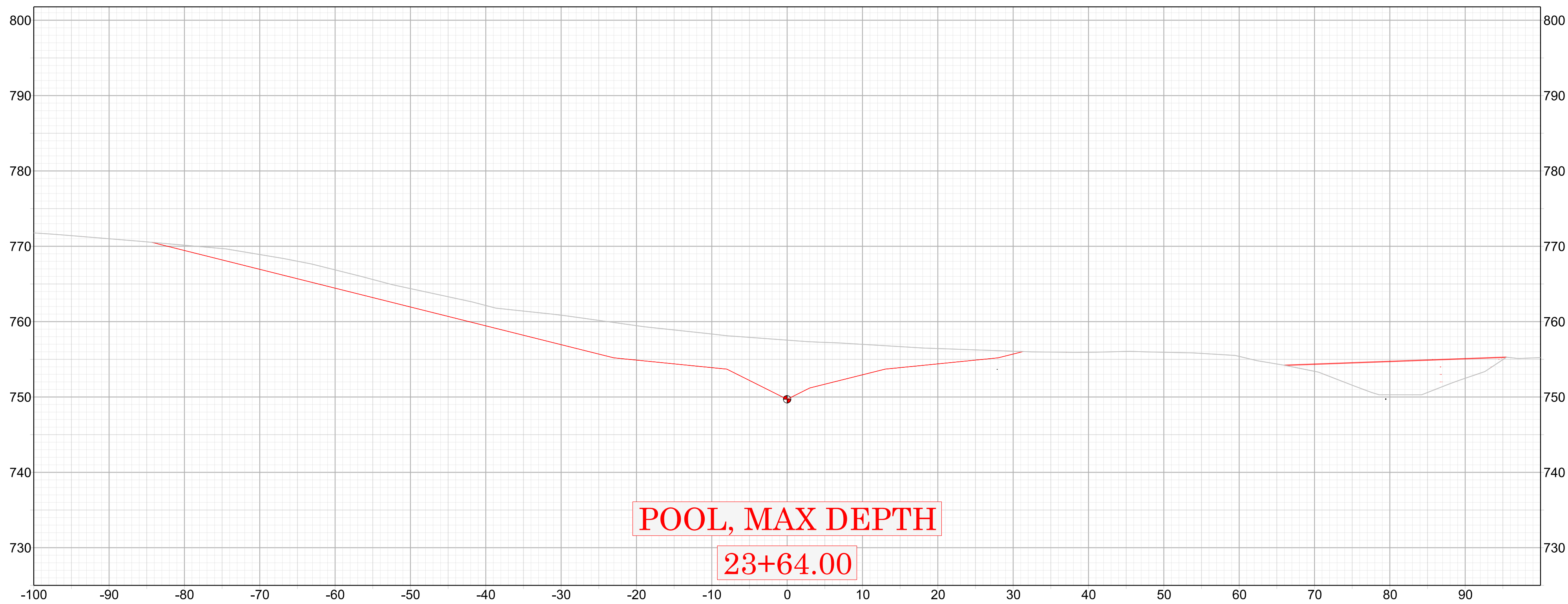
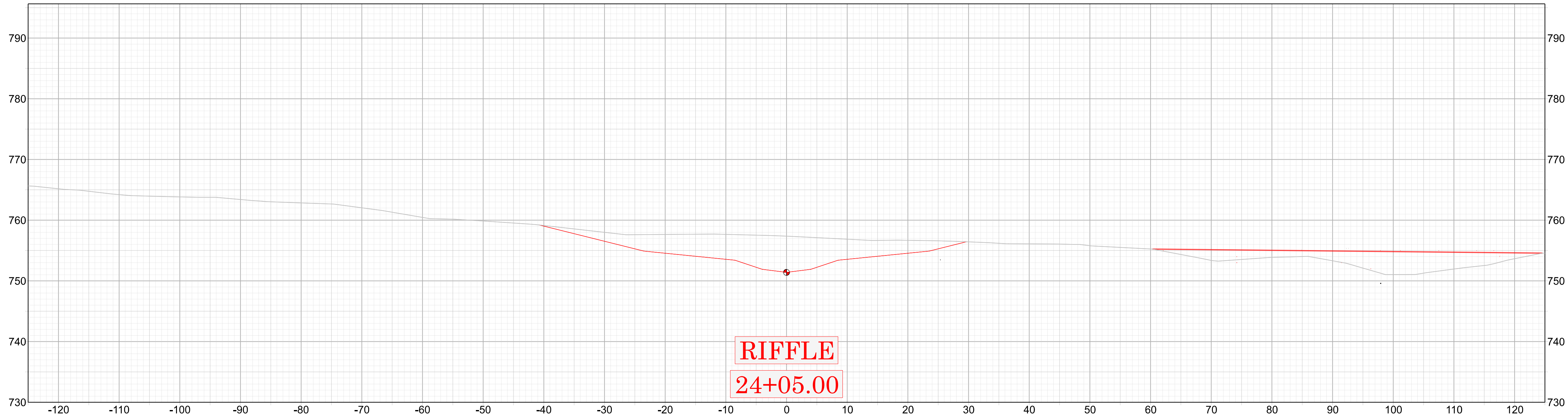
CSW-X-01

-SMITHCREEK R2-

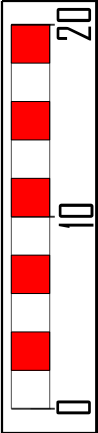
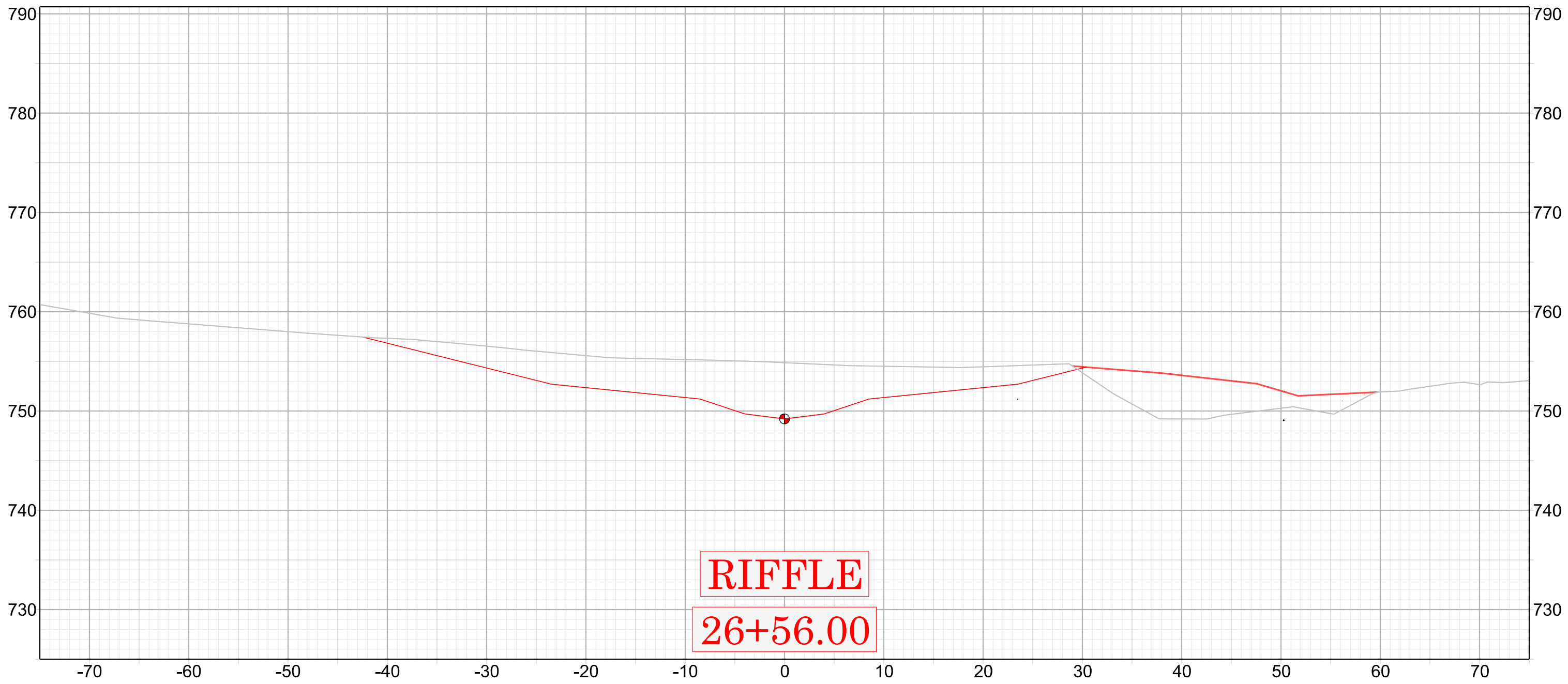


DSM-X-02

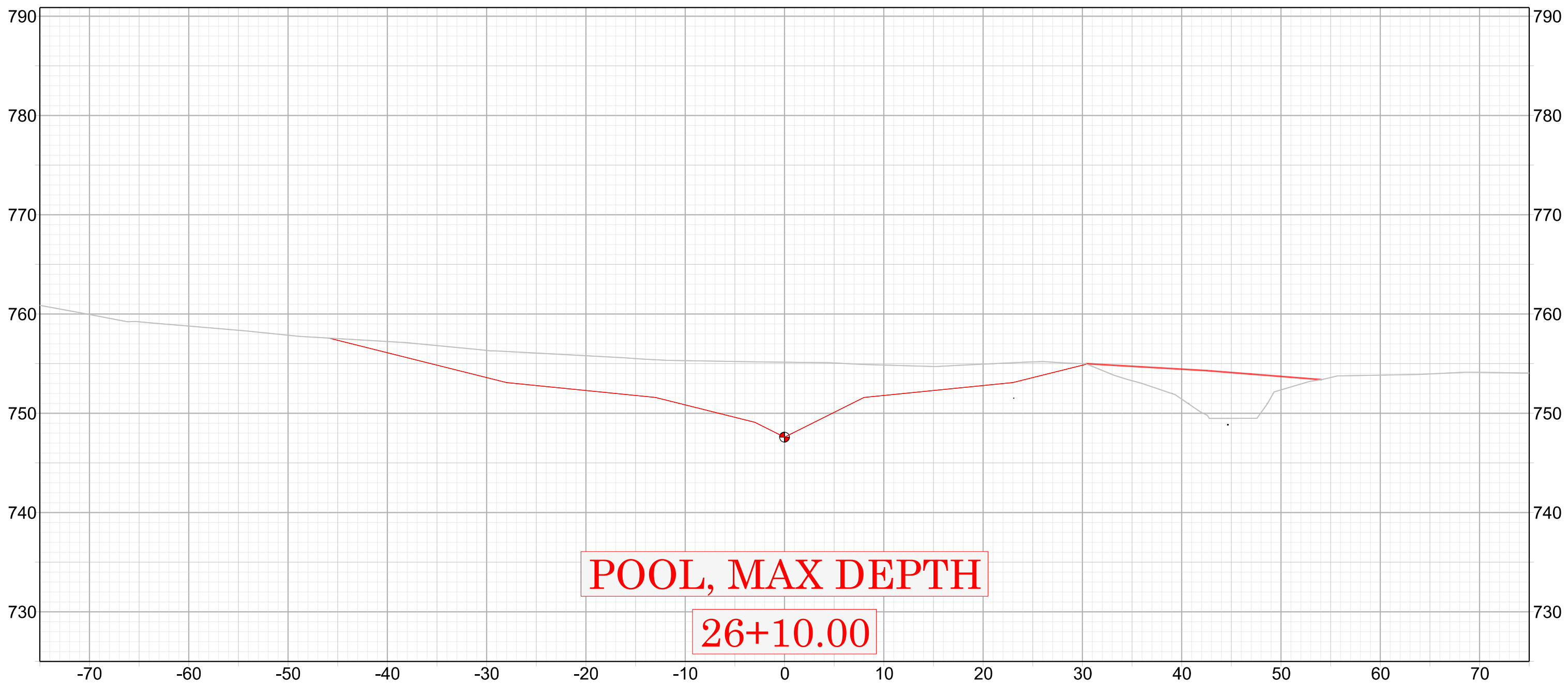
-SMITHCREEK R2-



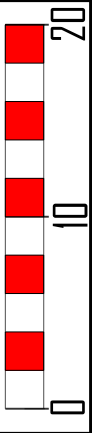
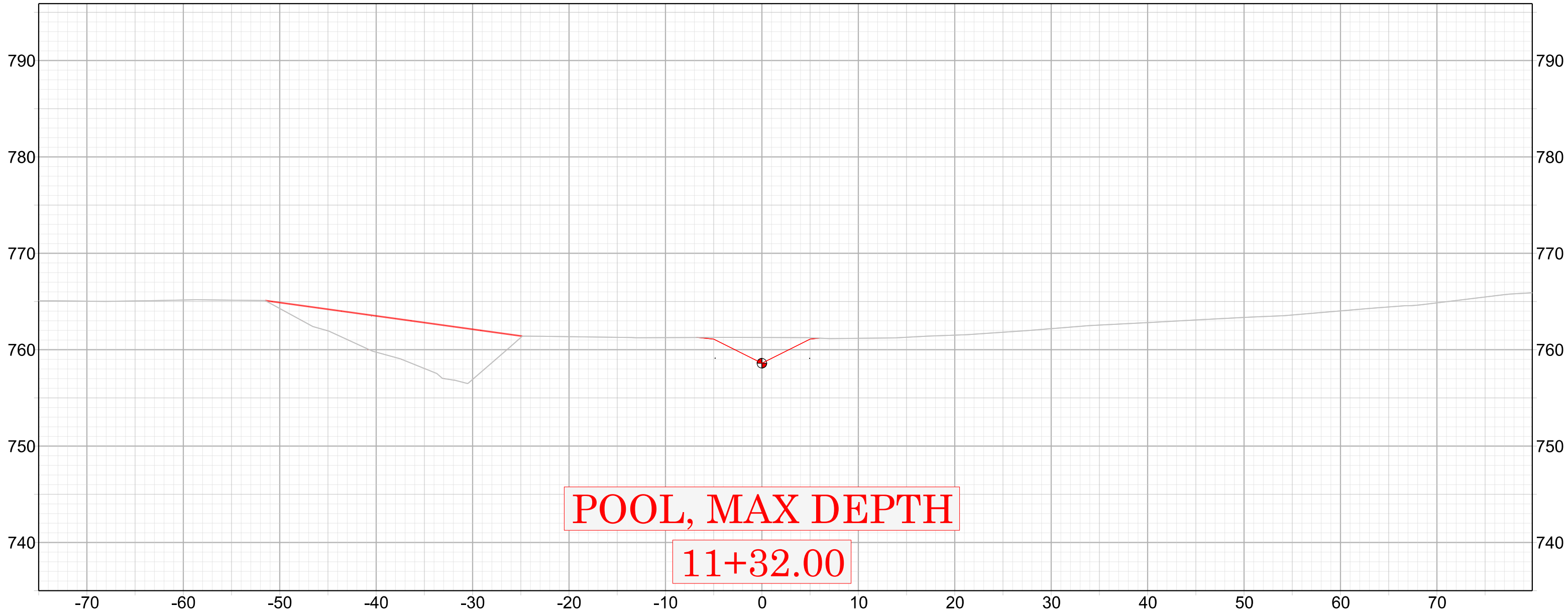
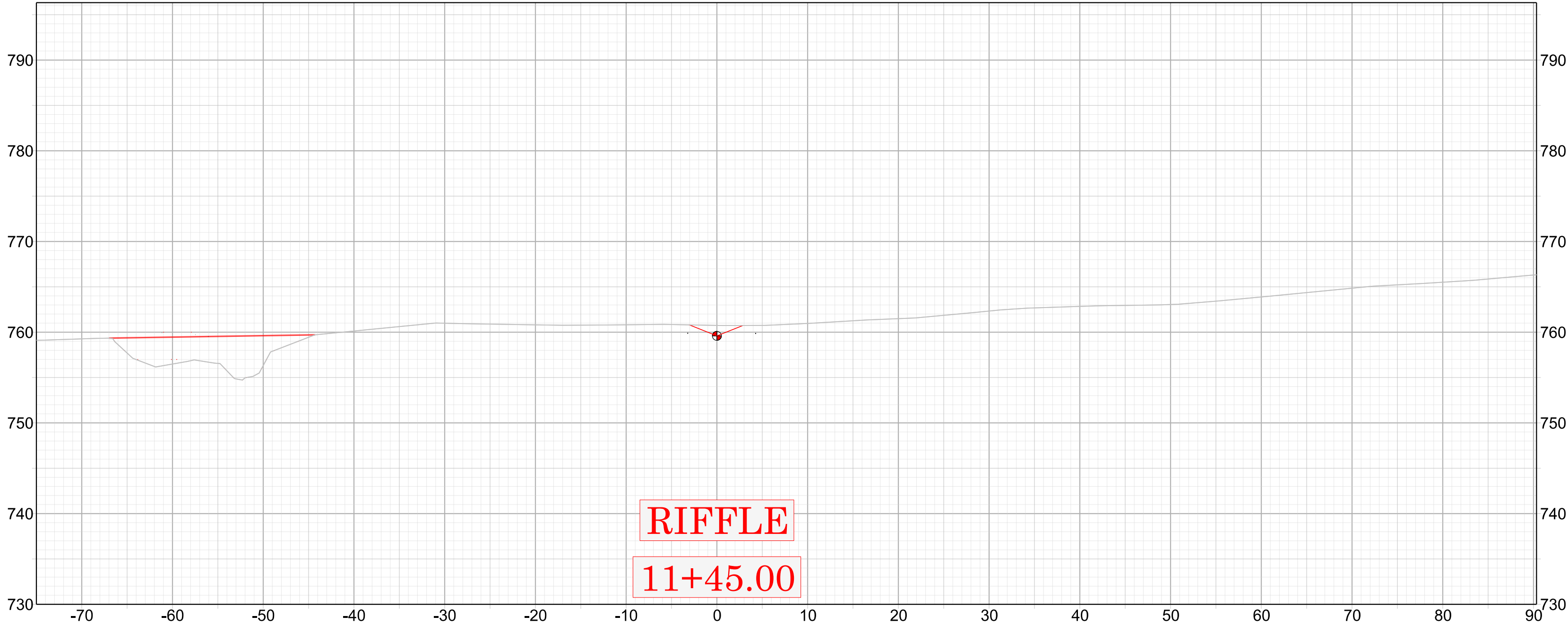
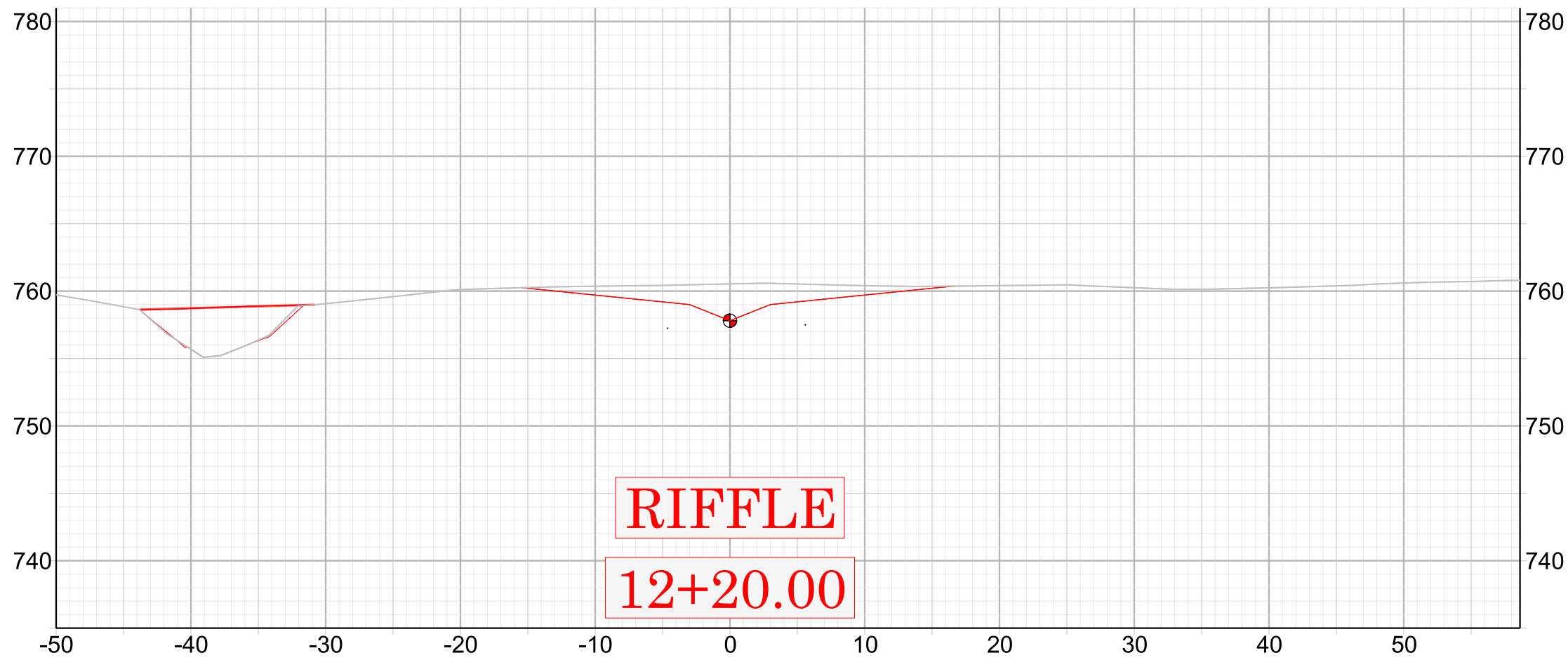
-SMITHCREEK R2-



DSM-X-04

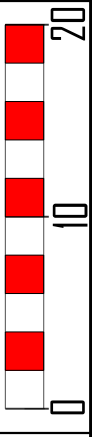
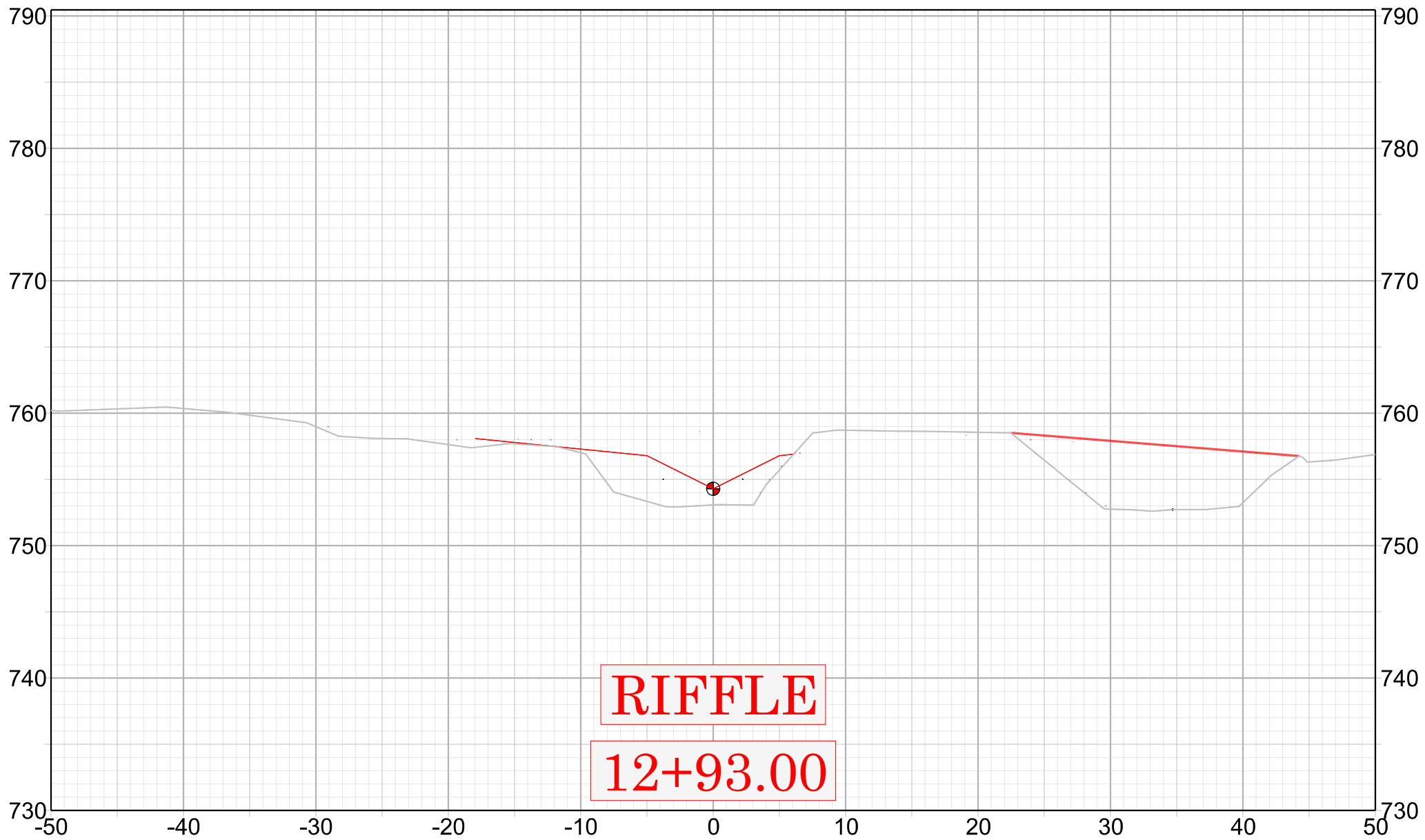


-UT-



DSM-X-05

-UT-



CSM-X-06

