

09/08/2026

TIP PROJECT: 18314.1045999.3.3

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

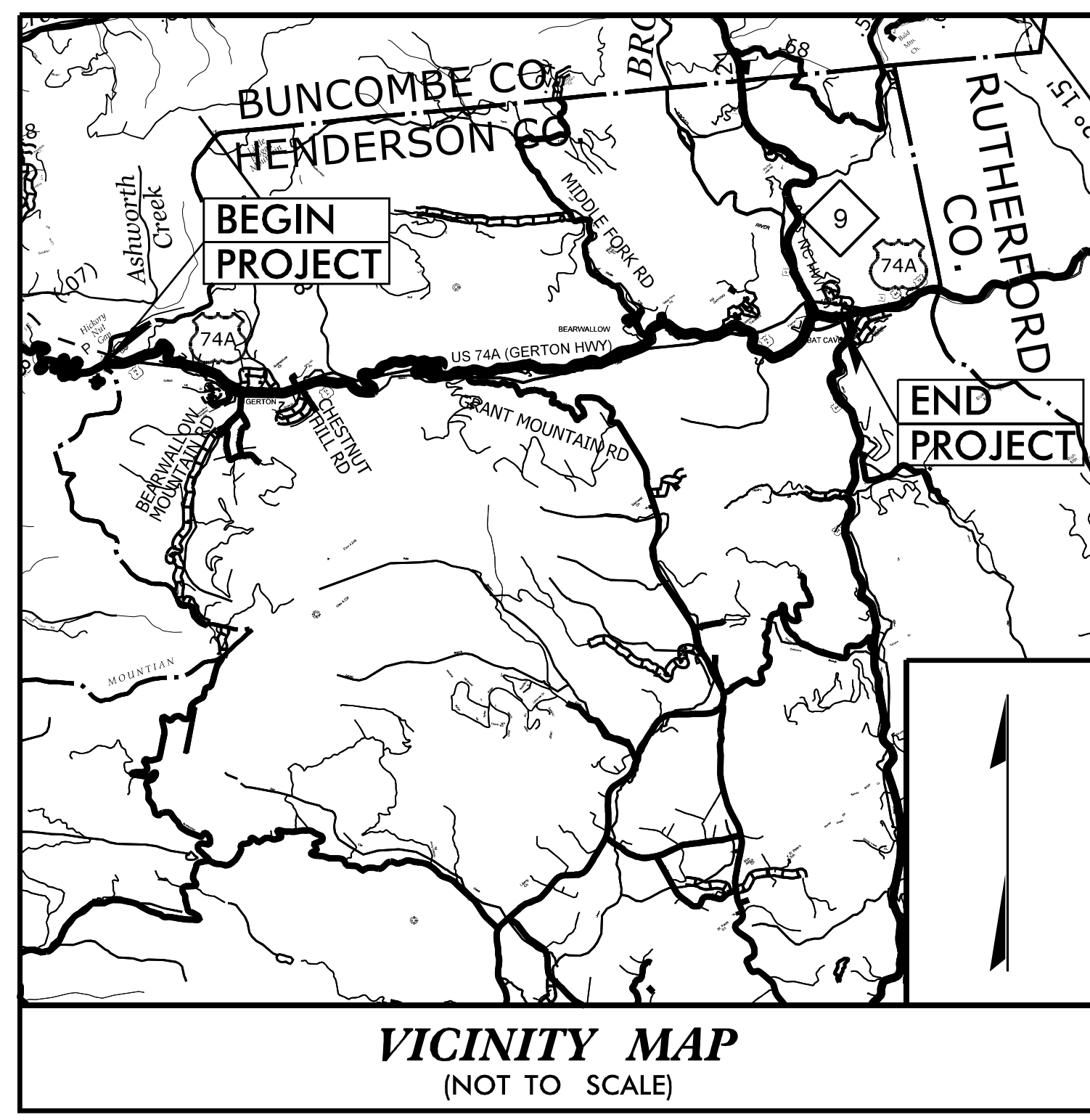
HENDERSON COUNTY

LOCATION: US 74A (GERTON HWY) FROM WEST OF SR 1693 (BEARWALLOW MOUNTAIN RD) TO US 64 (CHIMNEY ROCK RD)

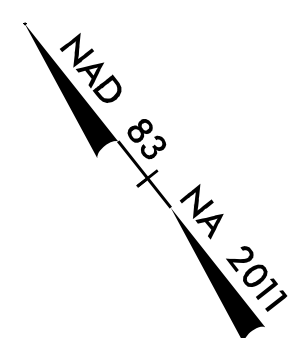
TYPE OF WORK: GRADING, PAVING, DRAINAGE, AND STRUCTURES

WORK PACKAGE #3: SR 1693 (BEARWALLOW MOUNTAIN ROAD) TO SR 1602 (GRANT MOUNTAIN ROAD)

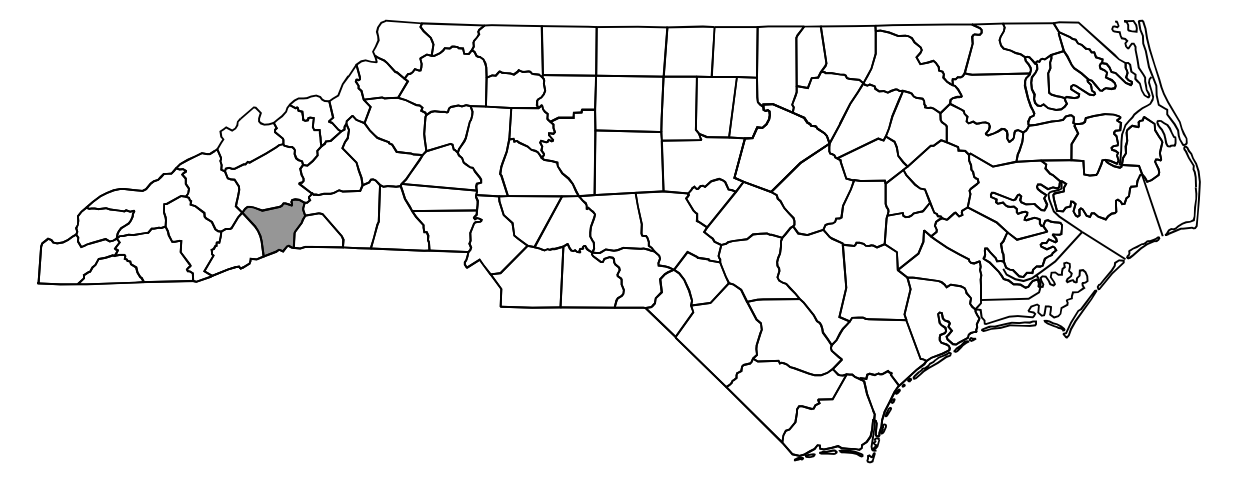
STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	18314.1045999.3.3	1	
STATE PROJ. NO.	F.A. PROJ. NO.	DESCRIPTION	
-----	N/A	P.E.	
18314.1045999.2.3	N/A	ROW	
18314.1045999.3.3	N/A	CONST	



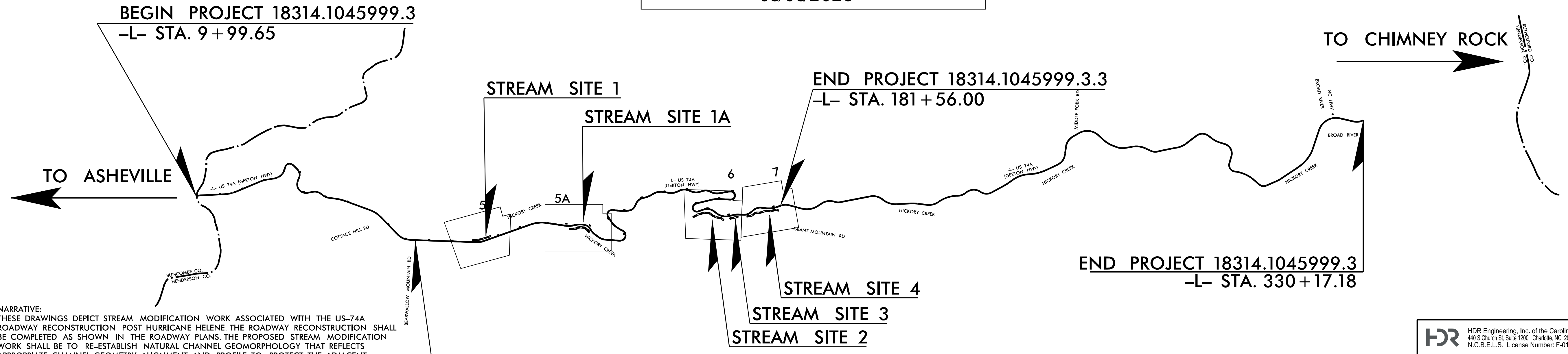
WP#3 RFC PLANS



**WORK PACKAGE #3
RFC STREAM RELOCATION PLANS
05/08/2026**



SHEET	SHEET NO.
TITLE SHEET.....	1
ALIGNMENT DATA.....	2D-1 THRU 2D-1A
TYPICAL SECTIONS.....	2D-2
STREAM DETAILS SHEET.....	2D-3 THRU 2D-4
PLAN & PROFILE SHEETS.....	5-7
CROSS SECTIONS.....	X-1 THRU X-113

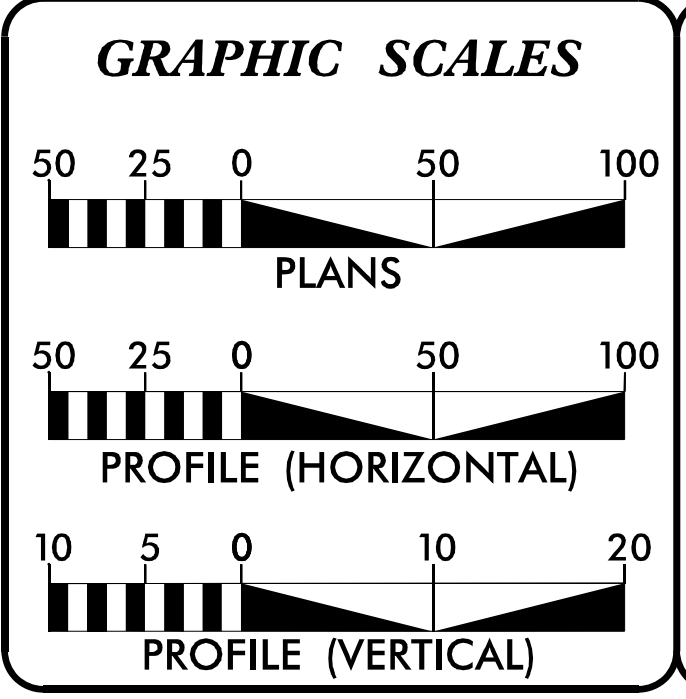


NARRATIVE:
THESE DRAWINGS DEPICT STREAM MODIFICATION WORK ASSOCIATED WITH THE US-74A ROADWAY RECONSTRUCTION POST HURRICANE HELENE. THE ROADWAY RECONSTRUCTION SHALL BE COMPLETED AS SHOWN IN THE ROADWAY PLANS. THE PROPOSED STREAM MODIFICATION WORK SHALL BE TO RE-ESTABLISH NATURAL CHANNEL GEOMORPHOLOGY THAT REFLECTS APPROPRIATE CHANNEL GEOMETRY, ALIGNMENT, AND PROFILE TO PROTECT THE ADJACENT ROADWAY EMBANKMENT FROM FURTHER EROSION AND INSTABILITY. THE INTENT OF THE PROPOSED STREAM WORK IS TO UTILIZE AND RECONFIGURE EXISTING NATIVE MATERIAL ON-SITE TO ACHIEVE THE PROPOSED DESIGN AS CLOSELY AS PRACTICABLE ADJUSTMENTS TO CHANNEL ALIGNMENT, PROFILE, AND GEOMETRY MAY BE MADE IN THE FIELD BY THE ENGINEER TO ACCOMMODATE EXISTING SITE CONDITIONS AND ENSURE STABILITY AND FUNCTIONALITY OF THE STREAM SYSTEM. PRIORITY SHOULD BE PLACED ON ACHIEVING LONG-TERM CHANNEL AND ROADWAY STABILITY, UTILIZING NATIVE MATERIAL, AND MINIMIZING DISTURBANCE TO SURROUNDING AREAS DURING CONSTRUCTION.



PENTABLE: NCDOT_pshpfl.tbl
USER: KCLATTERBU
DATE: 5/8/2026
TIME: 9:24:23 AM

CONTRACT:



DESIGN DATA

2022 =	1,500
ADT 2040 =	3,000
T =	8 %
V =	40 MPH
FUNC CLASS =	MINOR ARTERIAL

PROJECT LENGTH

LENGTH ROADWAY WORK PACKAGE #3 =	2.167 MILES
TOTAL LENGTH TIP PROJECT US-74A =	6.064 MILES

HDR Prepared in the Office of:
HDR Engineering, Inc. of the Carolinas
440 S Church St, Suite 1200, Charlotte, NC 28202
N.C.B.E.L.S. License Number: F-0116

2024 STANDARD SPECIFICATIONS

RIGHT OF WAY DATE: _____

LETTING DATE: _____

PHILLIP E. ROGERS, PE
PROJECT ENGINEER

MATTHEW J. WERDER, PE
PROJECT DESIGN ENGINEER

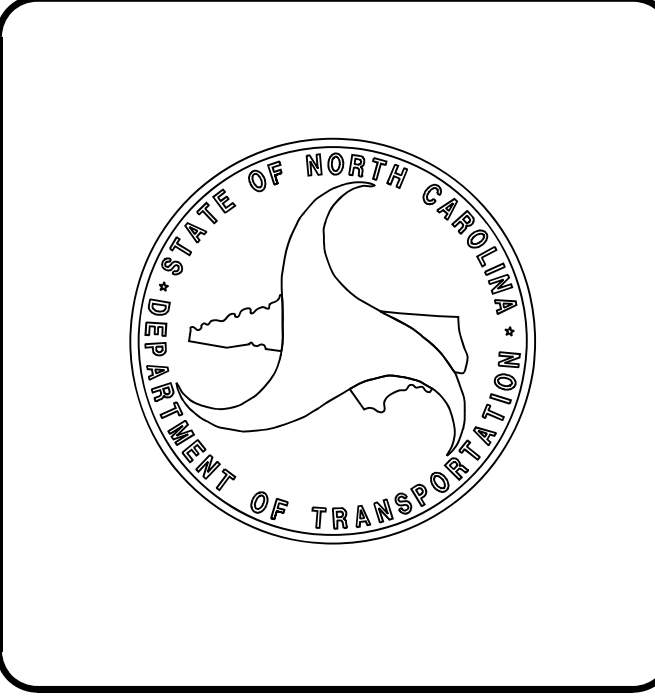
NATHAN R. TANNER, PE
NCDOT CONTACT

HYDRAULICS ENGINEER

Katie M. Clatterbuck
Date: 2026.05.08
10:18:55-04'00"
SIGNATURE: _____ P.E.

ROADWAY DESIGN ENGINEER

SIGNATURE: _____ P.E.



6/2/2024

STREAM SITE 1 ALIGNMENT DATA

Chain SS1 contains: SS1 CUR SS1-1 CUR SS1-2 CUR SS1-3 CUR SS1-4 SS3 SS2

Beginning chain SS1 description

Point SS1 N 645,517.7642 E 1,004,334.8507 Sta 0+00.00

Curve Data: Delta = 15° 01' 18.36" (LT), Degree = 93° 53' 36.22", Length = 15.9987, Radius = 61.0222, External = 0.5281, Long Chord = 15.9530, Mid. Ord. = 0.5236, P.C. Station = 0+93.71 N 645,455.6062 E 1,004,402.2780, P.T. Station = 0+99.71 N 645,451.1643 E 1,004,408.9862, C.C. = 0+96.71 N 645,502.0436 E 1,004,442.6760, Back = S 41° 28' 03.58" E, Ahead = S 56° 29' 21.93" E, Chord Bear = S 48° 58' 42.75" E

Curve Data: Delta = 8° 47' 25.84" (LT), Degree = 146° 27' 48.03", Length = 3.0068, Radius = 6.0019, Long Chord = 3.0150, Mid. Ord. = 0.1150, P.C. Station = 2+28.21 N 645,383.8620 E 1,004,518.4504, P.T. Station = 2+31.20 N 645,382.8379 E 1,004,521.2774, C.C. = 2+29.70 N 645,419.6189 E 1,004,534.8012, Back = S 61° 17' 47.90" E, Ahead = S 70° 05' 13.75" E, Chord Bear = S 65° 41' 36.81" E

Curve Data: Delta = 3° 22' 12.14" (RT), Degree = 112° 10' 33.84", Length = 1.5005, Radius = 3.0002, External = 0.0221, Long Chord = 2.9988, Mid. Ord. = 0.0221, P.C. Station = 3+26.20 N 645,350.2692 E 1,004,610.5199, P.T. Station = 3+29.20 N 645,349.2055 E 1,004,613.3247, C.C. = 3+27.70 N 645,302.0638 E 1,004,593.8434, Back = S 70° 55' 01.82" E, Ahead = S 67° 32' 49.68" E, Chord Bear = S 69° 13' 55.75" E

Curve Data: Delta = 7° 16' 28.10" (LT), Degree = 80° 50' 35.20", Length = 8.9953, Radius = 70.8728, External = 0.1430, Long Chord = 8.9922, Mid. Ord. = 0.1428, P.C. Station = 4+05.21 N 645,320.9658 E 1,004,683.8919, P.T. Station = 4+09.70 N 645,310.8770 E 1,004,688.2636, C.C. = 4+07.45 N 645,388.6488 E 1,004,705.3920, Back = S 68° 44' 23.51" E, Ahead = S 76° 00' 51.61" E, Chord Bear = S 72° 22' 37.56" E

Curve Data: Delta = 16° 57' 18.71" (RT), Degree = 77° 04' 26.33", Length = 21.9990, Radius = 74.3387, External = 0.8213, Long Chord = 21.9188, Mid. Ord. = 0.8123, P.C. Station = 0+83.03 N 642,928.1375 E 1,008,422.1620, P.T. Station = 0+92.47 N 642,927.2649 E 1,008,431.6770, C.C. = 0+87.75 N 642,996.9889 E 1,008,438.0725, Back = S 89° 12' 56.29" E, Ahead = S 84° 45' 38.85" E, Chord Bear = S 76° 59' 17.57" E

STREAM SITE 2 ALIGNMENT DATA

Chain SS2 contains: S21 S22 CUR SS2-1 CUR SS2-2 CUR SS2-3 CUR SS2-4 CUR SS2-5 CUR SS2-6 CUR SS2-7 S24 S25 S26 S27

Beginning chain SS2 description

Point S21 N 642,944.0590 E 1,008,342.6810 Sta 0+00.00

Curve Data: Delta = 15° 32' 42.56" (LT), Degree = 81° 49' 54.15", Length = 18.9959, Radius = 70.8728, External = 0.1430, Long Chord = 18.9383, Mid. Ord. = 0.6433, P.C. Station = 0+83.03 N 642,928.1375 E 1,008,422.1620, P.T. Station = 0+92.47 N 642,927.2649 E 1,008,431.6770, C.C. = 0+87.75 N 642,996.9889 E 1,008,438.0725, Back = S 89° 12' 56.29" E, Ahead = S 84° 45' 38.85" E, Chord Bear = S 76° 59' 17.57" E

Curve Data: Delta = 16° 57' 18.71" (RT), Degree = 77° 04' 26.33", Length = 21.9990, Radius = 74.3387, External = 0.8213, Long Chord = 21.9188, Mid. Ord. = 0.8123, P.C. Station = 0+83.03 N 642,928.1375 E 1,008,422.1620, P.T. Station = 0+92.47 N 642,927.2649 E 1,008,431.6770, C.C. = 0+87.75 N 642,996.9889 E 1,008,438.0725, Back = S 89° 12' 56.29" E, Ahead = S 84° 45' 38.85" E, Chord Bear = S 76° 59' 17.57" E

Curve Data: Delta = 16° 57' 18.71" (RT), Degree = 77° 04' 26.33", Length = 21.9990, Radius = 74.3387, External = 0.8213, Long Chord = 21.9188, Mid. Ord. = 0.8123, P.C. Station = 0+83.03 N 642,928.1375 E 1,008,422.1620, P.T. Station = 0+92.47 N 642,927.2649 E 1,008,431.6770, C.C. = 0+87.75 N 642,996.9889 E 1,008,438.0725, Back = S 89° 12' 56.29" E, Ahead = S 84° 45' 38.85" E, Chord Bear = S 76° 59' 17.57" E

STREAM SITE 2 ALIGNMENT DATA (CONTINUED)

Curve from PT SS2-2 to PC SS2-3 S 61° 42' 10.59" E Dist 116.9998

Curve SS2-3: P.I. Station 2+97.51 N 642,863.5821 E 1,008,623.6312, Delta = 13° 45' 03.55" (RT), Degree = 76° 23' 39.74", Length = 18.0000, Radius = 75.0000, External = 0.5453, Long Chord = 17.9558, Mid. Ord. = 0.5394, P.C. Station = 2+88.47 N 642,867.4051 E 1,008,615.4356, P.T. Station = 3+06.47 N 642,857.9204 E 1,008,630.8932, C.C. = 2+97.51 N 642,799.4365 E 1,008,583.7297, Back = S 51° 14' 27.39" E, Ahead = S 51° 14' 27.39" E, Chord Bear = S 58° 06' 59.16" E

Curve from PT SS2-3 to PC SS2-4 S 50° 16' 12.64" E Dist 76.9993

Curve SS2-4: P.I. Station 4+06.16 N 642,793.5809 E 1,008,706.8263, Delta = 33° 40' 34.33" (RT), Degree = 79° 23' 39.74", Length = 22.6983, Radius = 44.0520, External = 0.3954, Long Chord = 22.6983, Mid. Ord. = 0.3954, P.C. Station = 3+83.46 N 642,808.7050 E 1,008,689.9008, P.T. Station = 4+27.55 N 642,771.6097 E 1,008,712.5252, C.C. = 4+06.16 N 642,752.7793 E 1,008,639.9276, Back = S 48° 13' 01.63" E, Ahead = S 14° 32' 27.30" E, Chord Bear = S 31° 22' 44.47" E

Curve from PT SS2-4 to PC SS2-5 S 14° 32' 27.30" E Dist 71.9180

Curve SS2-5: P.I. Station 5+09.02 N 642,692.7920 E 1,008,733.1358, Delta = 14° 30' 53.75" (LT), Degree = 76° 23' 39.74", Length = 9.5511, Radius = 19.0000, External = 0.6657, Long Chord = 9.4992, Mid. Ord. = 0.6609, P.C. Station = 4+99.46 N 642,701.9953 E 1,008,730.5817, P.T. Station = 5+18.46 N 642,684.5226 E 1,008,737.9150, C.C. = 5+15.30 N 642,722.0512 E 1,008,802.8504, Back = S 15° 30' 36.93" E, Ahead = S 30° 01' 39.68" E, Chord Bear = S 22° 46' 03.80" E

Curve from PT SS2-5 to PC SS2-6 S 30° 44' 06.52" E Dist 75.0000

Curve SS2-6: P.I. Station 6+04.02 N 642,610.8208 E 1,008,781.3606, Delta = 14° 32' 46.57" (LT), Degree = 69° 15' 27.81", Length = 10.5583, Radius = 21.0031, External = 0.6586, Long Chord = 10.5000, Mid. Ord. = 0.6467, P.C. Station = 5+93.46 N 642,620.0572 E 1,008,776.2453, P.T. Station = 6+14.47 N 642,603.1652 E 1,008,786.6318, C.C. = 6+14.47 N 642,660.1379 E 1,008,848.6161, Back = S 26° 58' 43.21" E, Ahead = S 43° 31' 29.78" E, Chord Bear = S 36° 15' 06.30" E

Curve from PT SS2-6 to PC SS2-7 S 41° 51' 51.87" E Dist 59.9999

Curve SS2-7: P.I. Station 6+97.12 N 642,541.2841 E 1,008,843.4186, Delta = 33° 36' 04.44" (RT), Degree = 76° 21' 57.62", Length = 22.5531, Radius = 44.0003, External = 0.3452, Long Chord = 22.5531, Mid. Ord. = 0.3452, P.C. Station = 6+74.47 N 642,558.4817 E 1,008,828.6739, P.T. Station = 7+18.47 N 642,518.8002 E 1,008,846.1823, C.C. = 6+74.47 N 642,509.6468 E 1,008,771.7149, Back = S 40° 36' 31.61" E, Ahead = S 7° 00' 27.17" E, Chord Bear = S 23° 48' 29.39" E

Curve from PT SS2-7 to S24 S 7° 27' 52.56" E Dist 46.0872

Point S24 N 642,473.1036 E 1,008,852.1697 Sta 7+64.56

Curve from S24 to S25 S 19° 16' 39.69" E Dist 2.7815

Point S25 N 642,470.4780 E 1,008,853.0880 Sta 7+67.34

Curve from S25 to S26 S 8° 32' 04.19" E Dist 14.4268

Point S26 N 642,456.2110 E 1,008,855.2290 Sta 7+81.76

Curve from S26 to S27 S 3° 46' 54.44" E Dist 29.8239

Point S27 N 642,426.4520 E 1,008,857.1961 Sta 8+11.59

STREAM SITE 3 ALIGNMENT DATA

Chain SS3 contains: SS3 S32 CUR SS3-1 CUR SS3-2 CUR SS3-3 CUR SS3-4 CUR SS3-5 CUR SS3-6 CUR SS3-7 S33 S34 CUR SS3-8 CUR SS3-9 CUR SS3-10 CUR SS3-11 S35

Beginning chain SS3 description

Point S31 N 642,407.6722 E 1,008,952.6603 Sta 0+00.00

Curve from S31 to S32 N 60° 41' 44.52" E Dist 25.1962

Point S32 N 642,420.2593 E 1,008,974.4873 Sta 0+25.20

Curve from S32 to PC SS3-1 N 84° 53' 32.78" E Dist 0.9999

Curve SS3-1: P.I. Station 0+28.20 N 642,420.4397 E 1,008,977.4821, Delta = 4° 32' 12.47" (RT), Degree = 113° 25' 29.06", Length = 2.0010, Radius = 3.9998, External = 0.0396, Long Chord = 2.0010, Mid. Ord. = 0.0396, P.C. Station = 0+26.20 N 642,420.3493 E 1,008,975.4832, P.T. Station = 0+30.20 N 642,420.3728 E 1,008,979.4819, C.C. = 0+28.20 N 642,369.8867 E 1,008,977.7913, Back = N 87° 22' 52.07" E, Ahead = S 89° 04' 53.46" E, Chord Bear = N 89° 38' 58.31" E

Curve from PT SS3-1 to PC SS3-2 S 89° 23' 01.85" E Dist 1.0000

STREAM SITE 3 ALIGNMENT DATA (CONTINUED)

Curve SS3-2: P.I. Station 0+32.20 N 642,420.3612 E 1,008,981.4820, Delta = 2° 49' 36.45" (LT), Degree = 141° 20' 25.51", Length = 1.0002, Radius = 40.5374, External = 0.0123, Long Chord = 1.9998, Mid. Ord. = 0.0123, P.C. Station = 0+31.20 N 642,420.3620 E 1,008,980.4818, P.T. Station = 0+33.20 N 642,420.4097 E 1,008,982.4810, C.C. = 0+33.20 N 642,460.8994 E 1,008,980.5146, Back = S 89° 57' 13.28" E, Ahead = N 87° 13' 10.27" E, Chord Bear = N 88° 37' 58.50" E

Curve from PT SS3-2 to PC SS3-3 N 87° 19' 59.33" E Dist 2.0000

Curve SS3-3: P.I. Station 0+35.25 N 642,420.7964 E 1,008,988.5235, Delta = 22° 43' 02.39" (RT), Degree = 283° 49' 20.35", Length = 4.0553, Radius = 20.2762, External = 0.4033, Long Chord = 3.9517, Mid. Ord. = 0.3954, P.C. Station = 0+35.20 N 642,420.5028 E 1,008,984.4789, P.T. Station = 0+43.20 N 642,419.5052 E 1,008,992.3678, C.C. = 0+43.20 N 642,400.3685 E 1,008,985.9403, Back = N 85° 50' 54.48" E, Ahead = S 71° 26' 03.25" E, Chord Bear = S 82° 47' 34.37" E

Curve from PT SS3-3 to PC SS3-4 S 82° 47' 34.37" E Dist 10.9740

Curve SS3-4: P.I. Station 0+48.22 N 642,417.9681 E 1,008,997.1470, Delta = 12° 40' 41.84" (RT), Degree = 126° 47' 13.65", Length = 5.0203, Radius = 45.1997, External = 0.2780, Long Chord = 4.9793, Mid. Ord. = 0.2780, P.C. Station = 0+43.20 N 642,419.5052 E 1,008,992.3678, P.T. Station = 0+53.20 N 642,415.4196 E 1,009,001.4724, C.C. = 0+53.20 N 642,376.4948 E 1,008,976.5318, Back = S 72° 10' 17.39" E, Ahead = S 59° 29' 35.55" E, Chord Bear = S 65° 49' 56.47" E

Curve from PT SS3-4 to PC SS3-5 S 58° 52' 12.69" E Dist 10.9740

Curve SS3-5: P.I. Station 0+68.69 N 642,407.4092 E 1,009,014.7358, Delta = 8° 09' 30.87" (LT), Degree = 90° 23' 26.96", Length = 4.5206, Radius = 63.3867, External = 0.1610, Long Chord = 4.5206, Mid. Ord. = 0.1606, P.C. Station = 0+64.17 N 642,409.7462 E 1,009,010.8661, P.T. Station = 0+73.20 N 642,405.6449 E 1,009,018.8979, C.C. = 0+73.20 N 642,464.0052 E 1,009,043.6357, Back = S 58° 52' 12.69" E, Ahead = S 67° 01' 43.50" E, Chord Bear = S 62° 56' 58.12" E

Curve from PT SS3-5 to PC SS3-6 S 66° 29' 19.07" E Dist 10.9999

Curve SS3-6: P.I. Station 0+89.20 N 642,399.2393 E 1,009,033.5604, Delta = 2° 35' 14.33" (RT), Degree = 25° 52' 23.32", Length = 5.0000, Radius = 10.0000, External = 0.0595, Long Chord = 9.9992, Mid. Ord. = 0.0564, P.C. Station = 0+84.20 N 642,401.2567 E 1,009,028.9846, P.T. Station = 0+94.20 N 642,397.0174 E 1,009,038.0406, C.C. = 0+94.20 N 642,198.6272 E 1,008,935.6488, Back = S 66° 12' 29.43" E, Ahead = S 63° 37' 35.09" E, Chord Bear = S 64° 54' 52.26" E

Curve from PT SS3-6 to PC SS3-7 S 64° 54' 52.26" E Dist 10.9999

Curve SS3-7: P.I. Station 1+00.70 N 642,394.1603 E 1,009,043.8791, Delta = 0° 40' 14.57" (RT), Degree = 5° 09' 33.60", Length = 6.5001, Radius = 13.0000, External = 0.1100, Long Chord = 6.4999, Mid. Ord. = 0.1090, P.C. Station = 0+94.20 N 642,397.0174 E 1,009,038.0406, P.T. Station = 1+07.20 N 642,391.2350 E 1,009,049.6837, C.C. = 1+07.20 N 641,399.5225 E 1,008,549.9081, Back = S 63° 55' 29.28" E, Ahead = S 63° 15' 14.71" E, Chord Bear = S 63° 35' 21.99" E

Curve from PT SS3-7 to S33 S 63° 06' 42.08" E Dist 15.0000

Point S33 N 642,384.4512 E 1,009,063.0620 Sta 1+22.20

Curve from S33 to S34 S 63° 39' 38.42" E Dist 39.9980

Point S34 N 642,386.7047 E 1,009,098.9076 Sta 1+62.20

Curve from S34 to PC SS3-8 S 64° 40' 15.95" E Dist 5.0000

Curve SS3-8: P.I. Station 1+72.20 N 642,362.4051 E 1,009,107.9443, Delta = 7° 14' 54.28" (RT), Degree = 77° 14' 54.28", Length = 5.0074, Radius = 9.9996, External = 0.1688, Long Chord = 9.9921, Mid. Ord. = 0.1685, P.C. Station = 1+67.20 N 642,364.5656 E 1,009,103.4269, P.T. Station = 1+77.20 N 642,360.6715 E 1,009,112.7110, C.C. = 1+77.20 N 642,431.4778 E 1,009,135.4278, Back = S 64° 26' 25.60" E, Ahead = S 72° 09' 53.98" E, Chord Bear = S 68° 19' 09.79" E

Curve from PT SS3-8 to PC SS3-9 S 72° 09' 53.98" E Dist 6.9999

Curve SS3-9: P.I. Station 1+89.20 N 642,357.3424 E 1,009,124.1839, Delta = 5° 29' 02.56" (RT), Degree = 54° 59' 21.21", Length = 5.0039, Radius = 10.0002, External = 0.0479, Long Chord = 9.9964, Mid. Ord. = 0.1196, P.C. Station = 1+84.20 N 642,358.7650 E 1,009,119.3864, P.T. Station = 1+94.20 N 642,355.4678 E 1,009,128.8234, C.C. = 1+94.20 N 642,258.5965 E 1,009,089.6835, Back = S 73° 29' 00.03" E, Ahead = S 67° 59' 57.47" E, Chord Bear = S 70° 44' 28.75" E

STREAM SITE 3 ALIGNMENT DATA (CONTINUED)

Curve SS3-10: P.I. Station 2+00.77 N 642,353.1296 E 1,009,134.9643, Delta = 20° 47' 38.33" (RT), Degree = 158° 59' 05.73", Length = 6.5710, Radius = 12.9975, External = 0.3512, Long Chord = 6.5978, Mid. Ord. = 0.3512, P.C. Station = 1+94.20 N 642,355.4678 E 1,009,128.8234, P.T. Station = 2+07.19 N 642,348.7636 E 1,009,139.8752, C.C. = 2+07.19 N 642,321.9986 E 1,009,116.0798, Back = S 69° 09' 19.42" E, Ahead = S 48° 21' 41.09" E, Chord Bear = S 58° 45' 30.26" E

Curve from PT SS3-10 to PC SS3-11 S 48° 21' 41.09" E Dist 10.9999

Curve SS3-11: P.I. Station 2+11.00 N 642,346.0407 E 1,009,142.5402, Delta = 1° 22' 52.13" (LT), Degree = 18° 07' 32.17", Length = 3.8101, Radius = 7.6199, External = 0.0230, Long Chord = 3.8101, Mid. Ord. = 0.0230, P.C. Station = 2+07.19 N 642,348.7636 E 1,009,139.8752, P.T. Station = 2+14.81 N 642,343.3827 E 1,009,145.2701, C.C. = 2+14.81 N 642,369.8679 E 1,009,165.7839, Back = S 44° 23' 03.18" E, Ahead = S 45° 45' 55.30" E, Chord Bear = S 45° 04' 29.24" E

Curve from PT SS3-11 to S35 S 45° 31' 14.96" E Dist 39.9154

Point S35 N 642,315.4160 E 1,009,173.7500 Sta 2+54.73

Ending chain SS3 description

STREAM SITE 4 ALIGNMENT DATA

Chain SS4 contains: ETW325 ETW326 ETW327 S40 CUR SS4-1 CUR SS4-2 CUR SS4-3 CUR SS4-4 CUR SS4-5 CUR- SS4-6 S41 ETW363 ETW364 ETW365 ETW366 ETW367

Beginning chain SS4 description

Point ETW325 N 642,243.3320 E 1,009,263.4020 Sta 0+00.00

Curve from ETW325 to ETW326 S 23° 42' 48.44" E Dist 6.9847

Point ETW326 N 642,236.9370 E 1,009,266.2110 Sta 0+06.98

Curve from ETW326 to ETW327 N 67° 19' 54.88" E Dist 4.9352

Point ETW327 N 642,238.8390 E 1,009,270.7650 Sta 0+11.92

Curve from ETW327 to S40 N 80° 01' 05.62" E Dist 15.8398

Point S40 N 642,241.5846 E 1,009,286.3650 Sta 0

6/2/2026

STREAM SITE 1A ALIGNMENT DATA

Chain SS1A contains:
SS100 SS101 CUR SS1A-1 CUR SS1A-2 CUR SS1A-3 CUR SS1A-4 CUR SS1A-5 CUR
SS1A-6
SS102 CUR SS1A-7 CUR SS1A-8 CUR SS1A-9 CUR SS1A-10 CUR SS1A-11 CUR
SS1A-12 CUR -
SS1A-13 SS103 SS104

Beginning chain SS1A description

Point SS100 N 644,398,6217 E 1,006,126,4466 Sta 0+00.00
Course from SS100 to SS101 S 46° 10' 49.05" E Dist 24.7572

Point SS101 N 644,381,4800 E 1,006,144,3094 Sta 0+24.76
Course from SS101 to PC SS1A-1 S 56° 09' 49.58" E Dist 8.0000

Curve SS1A-1
P.I. Station 0+34.76 N 644,375,9263 E 1,006,152,6330
Delta = 11° 07' 06.47" (RT)
Degree = 277° 57' 09.47"
Tangent = 2.0064
Length = 4.0011
Radius = 20.6135
External = 0.0974
Long Chord = 3.9939
Mid. Ord. = 0.0970
P.C. Station 0+32.76 N 644,377,0254 E 1,006,150,9545
P.T. Station 0+36.76 N 644,374,9241 E 1,006,154,0680
C.C. N 644,359,7804 E 1,006,139,6617
Back = S 56° 46' 53.23" E
Ahead = S 45° 39' 46.76" E
Chord Bear = S 51° 13' 19.99" E

Course from PT SS1A-1 to PC SS1A-2 S 48° 00' 47.53" E Dist 4.9997

Curve SS1A-2
P.I. Station 0+54.27 N 644,363,5048 E 1,006,167,6649
Delta = 6° 50' 35.67" (LT)
Degree = 27° 22' 52.31"
Tangent = 12.5111
Length = 24.9925
Radius = 209,2523
External = 0.3737
Long Chord = 24.9776
Mid. Ord. = 0.3730
P.C. Station 0+41.76 N 644,371,1795 E 1,006,157,7843
P.T. Station 0+66.75 N 644,357,0620 E 1,006,178,3896
C.C. N 644,536,4357 E 1,006,286,1467
Back = S 52° 09' 42.40" E
Ahead = S 59° 00' 18.07" E
Chord Bear = S 55° 35' 00.24" E

Curve SS1A-3
P.I. Station 0+81.77 N 644,349,7650 E 1,006,191,5151
Delta = 6° 48' 54.84" (RT)
Degree = 22° 43' 03.92"
Tangent = 15.0176
Length = 29.9997
Radius = 252,2070
External = 0.4487
Long Chord = 29.9820
Mid. Ord. = 0.4459
P.C. Station 0+69.75 N 644,357,0620 E 1,006,178,3896
P.T. Station 0+96.75 N 644,340,9619 E 1,006,203,6820
C.C. N 644,136,6295 E 1,006,055,8420
Back = S 60° 55' 42.62" E
Ahead = S 54° 06' 47.68" E
Chord Bear = S 57° 31' 15.15" E

Course from PT SS1A-3 to PC SS1A-4 S 54° 32' 54.96" E Dist 24.0000

Curve SS1A-4
P.I. Station 1+29.25 N 644,322,2672 E 1,006,230,2716
Delta = 4° 51' 54.02" (RT)
Degree = 28° 36' 58.77"
Tangent = 8.5054
Length = 17.0006
Radius = 200,2187
External = 0.1806
Long Chord = 16.9855
Mid. Ord. = 0.1804
P.C. Station 1+20.75 N 644,327,0416 E 1,006,223,2326
P.T. Station 1+37.75 N 644,316,9130 E 1,006,236,8803
C.C. N 644,161,3430 E 1,006,110,8427
Back = S 55° 51' 06.44" E
Ahead = S 50° 59' 12.42" E
Chord Bear = S 53° 25' 05.43" E

Course from PT SS1A-4 to PC SS1A-5 S 51° 14' 58.98" E Dist 11.9998

Curve SS1A-5
P.I. Station 1+66.00 N 644,299,1711 E 1,006,258,8621
Delta = 24° 48' 04.97" (LT)
Degree = 77° 31' 56.39"
Tangent = 16.2487
Length = 31.9984
Radius = 73,8992
External = 1.7653
Long Chord = 31.7393
Mid. Ord. = 1.7241
P.C. Station 1+49.75 N 644,309,4020 E 1,006,246,2388
P.T. Station 1+81.74 N 644,295,1789 E 1,006,274,6128
C.C. N 644,366,8130 E 1,006,292,7691
Back = S 50° 58' 33.59" E
Ahead = S 75° 46' 38.56" E
Chord Bear = S 63° 22' 36.08" E

Course from PT SS1A-5 to PC SS1A-6 S 81° 21' 03.90" E Dist 30.9983

Curve SS1A-6
P.I. Station 2+19.82 N 644,289,3965 E 1,006,312,2580
Delta = 22° 11' 40.45" (RT)
Degree = 158° 32' 23.39"
Tangent = 7.0365
Length = 13.9994
Radius = 36,1397
External = 0.6886
Long Chord = 13.9120
Mid. Ord. = 0.6757
P.C. Station 2+12.74 N 644,290,5174 E 1,006,305,2586
P.T. Station 2+26.74 N 644,285,7147 E 1,006,318,3153
C.C. N 644,254,8324 E 1,006,299,5440
Back = S 80° 54' 06.93" E
Ahead = S 68° 42' 26.48" E
Chord Bear = S 69° 48' 16.70" E

Course from PT SS1A-6 to SS102 S 59° 05' 25.60" E Dist 15.5926

Point SS102 N 644,277,7050 E 1,006,331,6935 Sta 2+42.33
Course from SS102 to PC SS1A-7 S 59° 20' 45.62" E Dist 10.0000

Curve SS1A-7
P.I. Station 2+59.85 N 644,268,9394 E 1,006,346,8670
Delta = 11° 11' 32.52" (RT)
Degree = 74° 36' 24.02"
Tangent = 7.5249
Length = 15.0019
Radius = 76,7971
External = 0.3678
Long Chord = 14.9780
Mid. Ord. = 0.3660
P.C. Station 2+52.33 N 644,272,6094 E 1,006,340,2961
P.T. Station 2+67.33 N 644,264,0667 E 1,006,352,6011
C.C. N 644,205,5456 E 1,006,302,8710
Back = S 60° 50' 06.44" E
Ahead = S 49° 35' 33.92" E
Chord Bear = S 55° 14' 20.18" E

Course from PT SS1A-7 to PC SS1A-8 S 48° 12' 54.03" E Dist 52.9948

STREAM SITE 1A ALIGNMENT DATA (CONTINUED)

Curve SS1A-8
P.I. Station 3+32.35 N 644,220,5427 E 1,006,400,9046
Delta = 9° 24' 23.16" (RT)
Degree = 38° 11' 32.16"
Tangent = 12.0274
Length = 24.0007
Radius = 146,1915
External = 0.4939
Long Chord = 23.9738
Mid. Ord. = 0.4923
P.C. Station 3+20.33 N 644,228,7543 E 1,006,392,1167
P.T. Station 3+44.33 N 644,211,0053 E 1,006,408,2324
C.C. N 644,121,9375 E 1,006,292,3061
Back = S 46° 56' 31.26" E
Ahead = S 37° 32' 08.10" E
Chord Bear = S 42° 14' 19.68" E

Curve SS1A-9
P.I. Station 3+53.38 N 644,203,8477 E 1,006,413,7816
Delta = 15° 35' 35.61" (RT)
Degree = 86° 37' 18.80"
Tangent = 9.0567
Length = 18.0015
Radius = 66,1447
External = 0.8172
Long Chord = 17.9460
Mid. Ord. = 0.8115
P.C. Station 3+44.33 N 644,211,0053 E 1,006,408,2324
P.T. Station 3+62.33 N 644,195,4620 E 1,006,417,2025
C.C. N 644,170,4774 E 1,006,355,9580
Back = S 37° 47' 10.17" E
Ahead = S 22° 11' 34.55" E
Chord Bear = S 29° 59' 22.36" E

Course from PT SS1A-9 to PC SS1A-10 S 19° 25' 46.33" E Dist 31.9887

Curve SS1A-10
P.I. Station 4+03.83 N 644,156,2182 E 1,006,430,6973
Delta = 7° 38' 53.12" (RT)
Degree = 40° 15' 01.02"
Tangent = 9.5148
Length = 19.0013
Radius = 142,3488
External = 0.3176
Long Chord = 18.9872
Mid. Ord. = 0.3169
P.C. Station 3+94.32 N 644,165,2949 E 1,006,427,8435
P.T. Station 4+13.32 N 644,146,8424 E 1,006,432,3177
C.C. N 644,122,6002 E 1,006,292,0483
Back = S 17° 27' 12.40" E
Ahead = S 9° 48' 19.29" E
Chord Bear = S 13° 37' 45.84" E

Curve SS1A-11
P.I. Station 4+28.32 N 644,132,1532 E 1,006,435,3590
Delta = 1° 35' 11.94" (RT)
Degree = 5° 17' 20.11"
Tangent = 15.0007
Length = 29.9995
Radius = 1,083,3172
External = 0.1039
Long Chord = 29.9896
Mid. Ord. = 0.1038
P.C. Station 4+13.32 N 644,146,8424 E 1,006,432,3177
P.T. Station 4+43.32 N 644,117,3855 E 1,006,437,9925
C.C. N 643,927,2009 E 1,005,371,5002
Back = S 11° 41' 51.94" E
Ahead = S 10° 48' 40.00" E
Chord Bear = S 10° 54' 15.97" E

Curve SS1A-12
P.I. Station 4+51.96 N 644,109,1312 E 1,006,440,5619
Delta = 24° 58' 14.66" (RT)
Degree = 146° 45' 17.19"
Tangent = 8.6449
Length = 17.0153
Radius = 39,0419
External = 0.9457
Long Chord = 16.8809
Mid. Ord. = 0.9233
P.C. Station 4+43.32 N 644,117,3855 E 1,006,432,3177
P.T. Station 4+60.33 N 644,100,5639 E 1,006,439,4065
C.C. N 644,105,7818 E 1,006,400,7149
Back = S 17° 17' 24.65" E
Ahead = S 7° 40' 50.01" W
Chord Bear = S 4° 48' 17.32" E

Curve SS1A-13
P.I. Station 4+88.36 N 644,092,5455 E 1,006,438,9999
Delta = 11° 36' 15.49" (RT)
Degree = 72° 34' 43.95"
Tangent = 8.0287
Length = 16.0023
Radius = 78,9428
External = 0.4072
Long Chord = 15.9749
Mid. Ord. = 0.4051
P.C. Station 4+60.33 N 644,100,5639 E 1,006,439,4065
P.T. Station 4+75.33 N 644,084,7732 E 1,006,436,9874
C.C. N 644,104,5617 E 1,006,360,5650
Back = S 2° 54' 10.17" W
Ahead = S 14° 31' 01.68" W
Chord Bear = S 8° 42' 35.92" W

Course from PT SS1A-13 to SS103 S 12° 17' 53.61" W Dist 29.0000

Point SS103 N 644,056,4387 E 1,006,430,8104 Sta 5+05.33
Course from SS103 to SS104 S 0° 15' 54.88" W Dist 34.2103

Point SS104 N 644,022,2287 E 1,006,430,6520 Sta 5+39.54

Ending chain SS1A description

REVISIONS

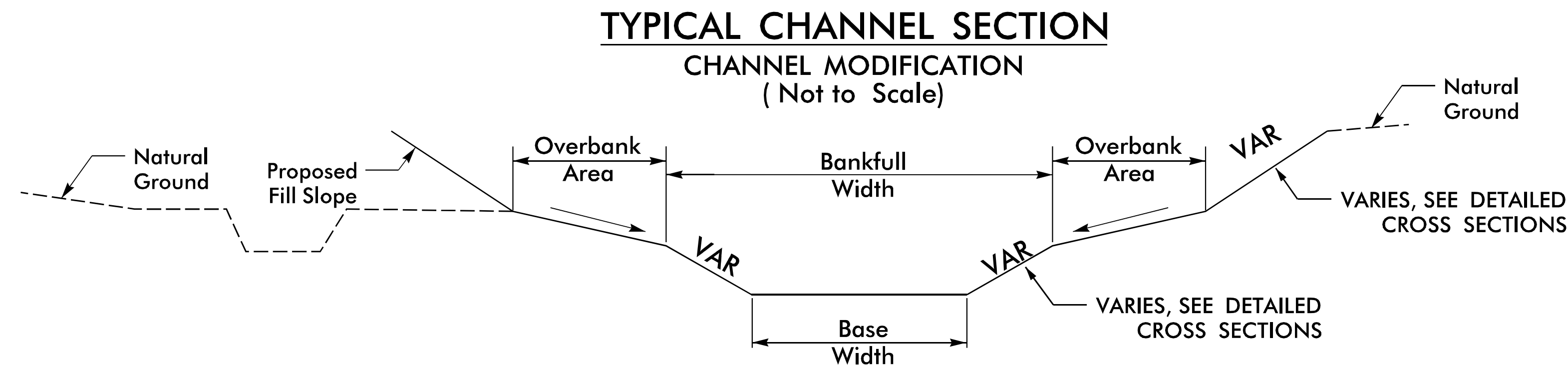
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NORTH CAROLINA PROFESSIONAL SEAL 058750
KATIE M. CLATTERBUK ENGINEER
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DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED
HDR HDR Engineering, Inc. of the Carolinas
555 Fayetteville St, Suite 900 Raleigh, N.C. 27601
N.C.B.E.L.S. License Number: F-0116

SEE SHEETS NO. 5 FOR -STREAM SITE 1- PROFILE
SEE SHEETS NO. 6-6a FOR -STREAM SITE 2 & 3- PROFILE
SEE SHEETS NO. 7 FOR -STREAM SITE 4- PROFILE

TYPICAL CHANNEL SECTION

VARIABLE	STATION - STATION
STREAM SITE 1	79+20.46 - 83+59.46
STREAM SITE 1A	100+70.04 - 106+17.12
STREAM SITE 2	162+12.67 - 168+83.89
STREAM SITE 3	169+93.93 - 171+91.12
STREAM SITE 4	173+54.26 - 180+72.80



NOTES:

- WHERE SUITABLE SOIL MATERIAL EXISTS FOR PLANT GROWTH, OVERBANK AREAS AND HIGHER ELEVATION SLOPES SHALL BE SEEDED WITH RIPARIAN BUFFER SEED MIX. BIOENGINEERING LIVESTAKING SHALL BE PROVIDED AS SHOWN ON PLANS AND IN ALL AREAS WHERE EXISTING TREES ARE REMOVED.

Permanent Riparian Seed Mix (20 lbs/acre w/ cover crop*)

Botanical Name	Common Name	Percentage of Mix	Seed (lbs./acre)
<i>Sorghastrum nutans</i>	Indiangrass	24	4.8
<i>Panicum virgatum</i>	Switchgrass	23	4.6
<i>Andropogon gerardii</i>	Big Bluestem	20.8	4.2
<i>Elymus virginicus</i>	Virginia Wild Rye	20	4
<i>Helopsis helianthoides</i>	Oxeye Sunflower	3	0.6
<i>Rudbeckia hirta</i>	Black-eyed Susan	3	0.6
<i>Asclepias incarnata</i>	Swamp Milkweed	2	0.4
<i>Monarda fistulosa</i>	Wild Bergamot	1.2	0.2
<i>Helianthus angustifolius</i>	Narrowleaf Sunflower	1	0.2
<i>Aster umbellatus</i>	Flat Topped White Aster	0.5	0.1
<i>Eupatorium perfoliatum</i>	Boneset	0.5	0.1
<i>Solidago nemoralis</i>	Gray Goldenrod	0.5	0.1
<i>Vernonia noveboracensis</i>	New York Ironweed	0.5	0.1

*For a cover crop, use either grain rye (30lbs/acre; 1 Sept to 31 Apr) or Japanese Millet (10 lbs/acre; 1 May to 31 Aug).

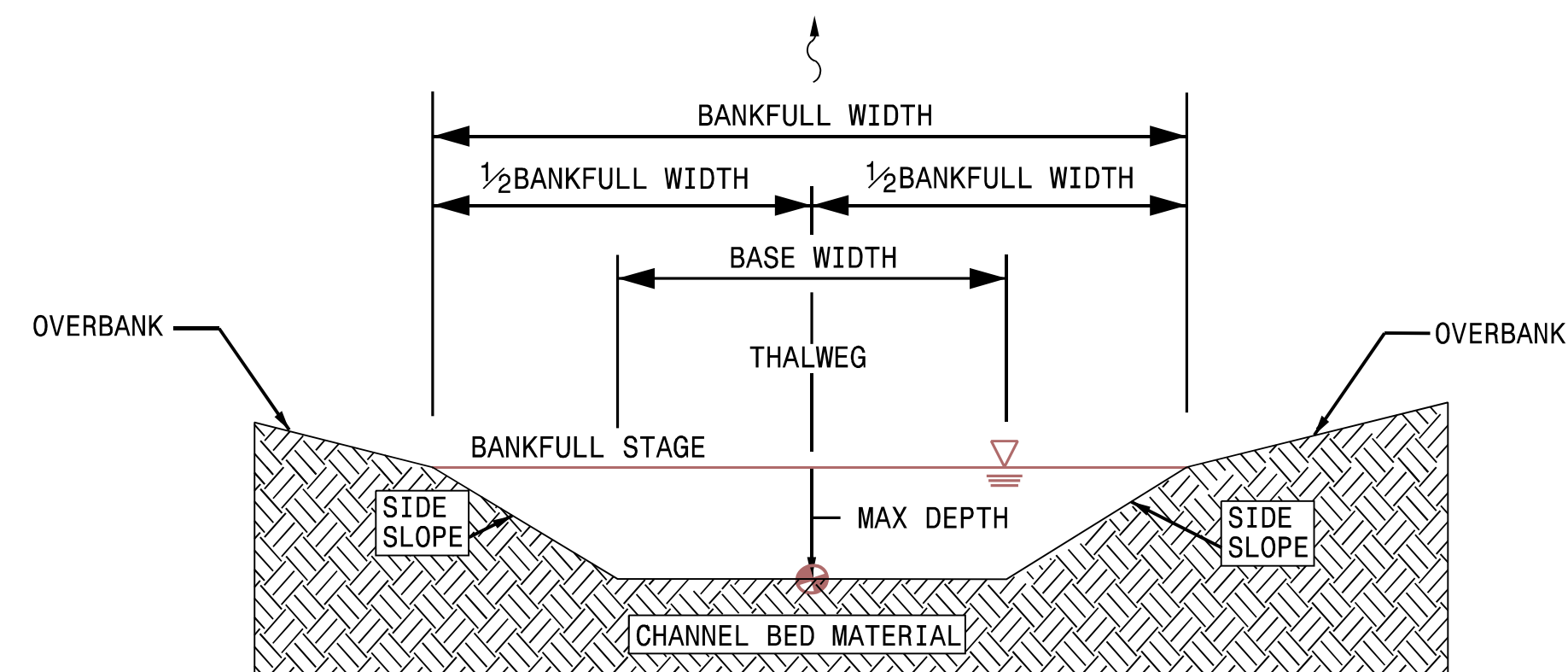
NOTES:

- CONTRACTOR MAY USE ERNST NC MOUNTAINS RIPARIAN (ERNMX-304) SEED MIX SHOWN IN THE TABLE OR APPROVED EQUAL.

TYPICAL SECTION - RIFFLE

SCALE: NTS
ALL UNITS ARE IN FEET

VARIABLE	STREAM SITE 1	STREAM SITE 1A	STREAM SITE 2	STREAM SITE 3	STREAM SITE 4
BANKFULL WIDTH	25	27	27	29	29
BASE WIDTH	12	12	12	13	13
MAXIMUM DEPTH	2.2	2.5	2.6	2.7	2.7
SIDE SLOPE (H:V)	3:1	3:1	3:1	3:1	3:1



THALWEG (DEEPEST POINT IN CROSS SECTION)
IS LOCATED IN CENTER OF CHANNEL IN A RIFFLE.

- NOTES:**
- ALL CROSS SECTIONS ARE SHOWN LOOKING IN THE (DOWNSTREAM) DIRECTION.
 - - GRADE POINT IS THE ELEVATION SHOWN ON PROFILE.
 - ALL SHARP CORNERS SHOULD BE ROUNDED
 - CONSTRUCT CHANNEL BED USING LOCAL MATERIAL CONSISTING OF GRAVEL, COBBLE, AND BOULDERS. LARGEST LOCAL MATERIAL SHOULD BE UTILIZED IN THE OVERBANK AREA.

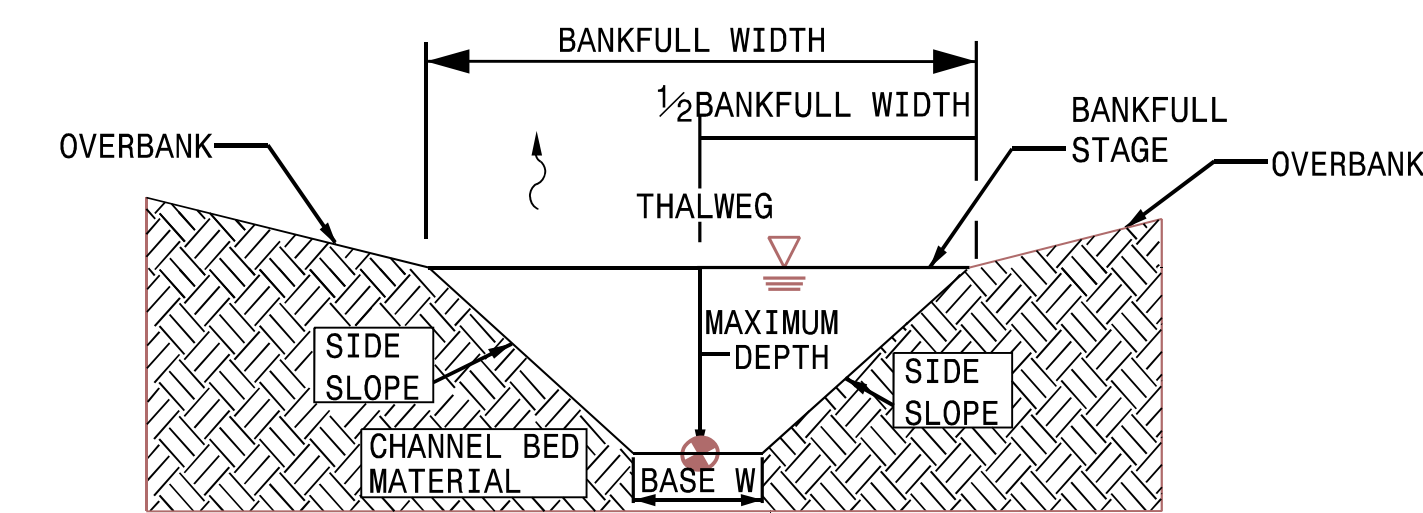
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	cfs	gpm
SS1	199	89300
SS1A	265	119000
SS2	303	136200
SS3	315	141500
SS4	315	141500

Parameter	Unit	Stream Site									
		SS1		SS1A		SS2		SS3		SS4	
		Min	Max	Min	Max	Min	Max	Min	Max	Min	Max
Rifle Slope	%	-2	-6	-2	-10	-4	-6	-3	-6	-2	-6
Run Slope	%	-12	-25	-20	-45	-15	-30	-10	-25	-12	-25
Pool Slope	%	2	5	2	5	2	5	2	5	2	5
Glide Slope	%	6	15	5	15	12	25	6	15	6	15
Rifle Length	Ft	20	30	10	20	10	20	25	35	25	35
Pool Length	Ft	15	25	8	15	8	15	20	30	20	30

TYPICAL SECTION - POOL

SCALE: NTS
ALL UNITS ARE IN FEET

VARIABLE	STREAM SITE 1	STREAM SITE 1A	STREAM SITE 2	STREAM SITE 3	STREAM SITE 4
BANKFULL WIDTH	28	30	30	32	32
BASE WIDTH	11.5	11.6	11.5	12.6	12.6
MAX DEPTH	3.2	3.6	3.7	3.8	3.8
SIDE SLOPE (H:V)	2.5:1	2.5:1	2.5:1	2.5:1	2.5:1



THALWEG (DEEPEST POINT IN A CROSS SECTION)
IS LOCATED IN THE MIDDLE OF THE BASE WIDTH.

- NOTES:**
- ALL CROSS SECTIONS ARE SHOWN LOOKING IN THE (DOWNSTREAM) DIRECTION.
 - - GRADE POINT IS THE ELEVATION SHOWN ON PROFILE.
 - ALL SHARP CORNERS SHOULD BE ROUNDED
 - CONSTRUCT CHANNEL BED USING LOCAL MATERIAL CONSISTING OF GRAVEL, COBBLE, AND BOULDERS. LARGEST LOCAL MATERIAL SHOULD BE UTILIZED IN THE OVERBANK AREA.

NOTES:

- PROVIDED RANGES ARE ALLOWABLE ADJUSTMENTS FROM SPECIFIED DESIGN PARAMETERS DURING IN-FIELD ADJUSTMENTS AS APPROVED BY ENGINEER.

6/2/2026

REVISIONS

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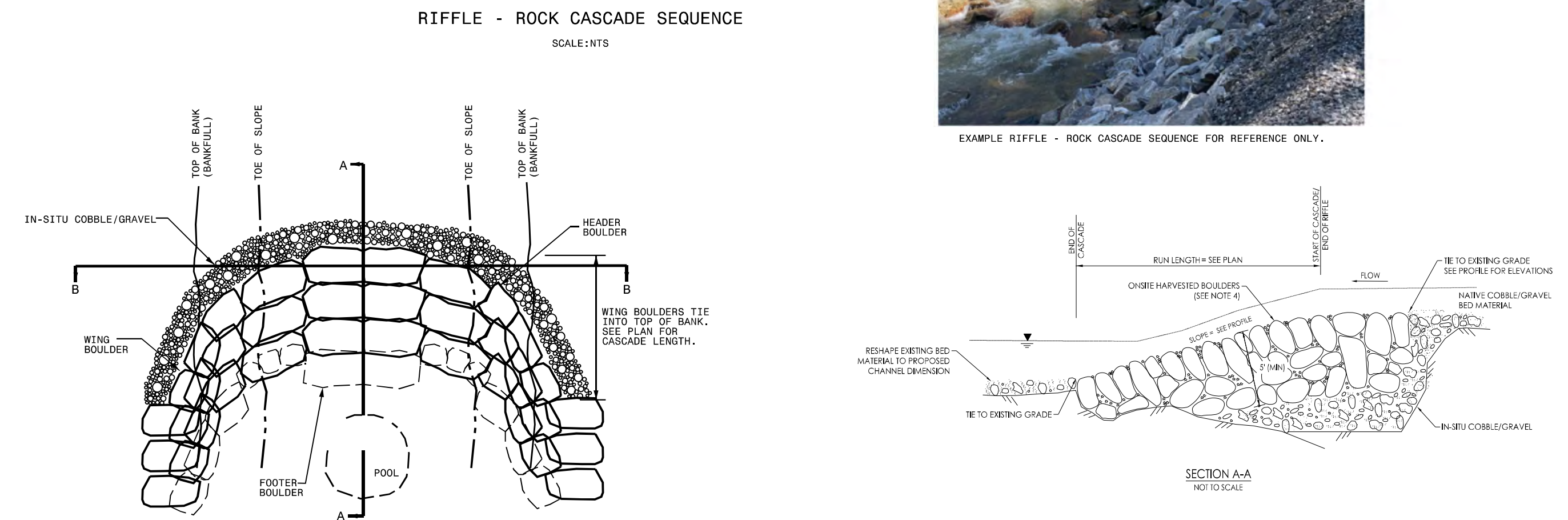
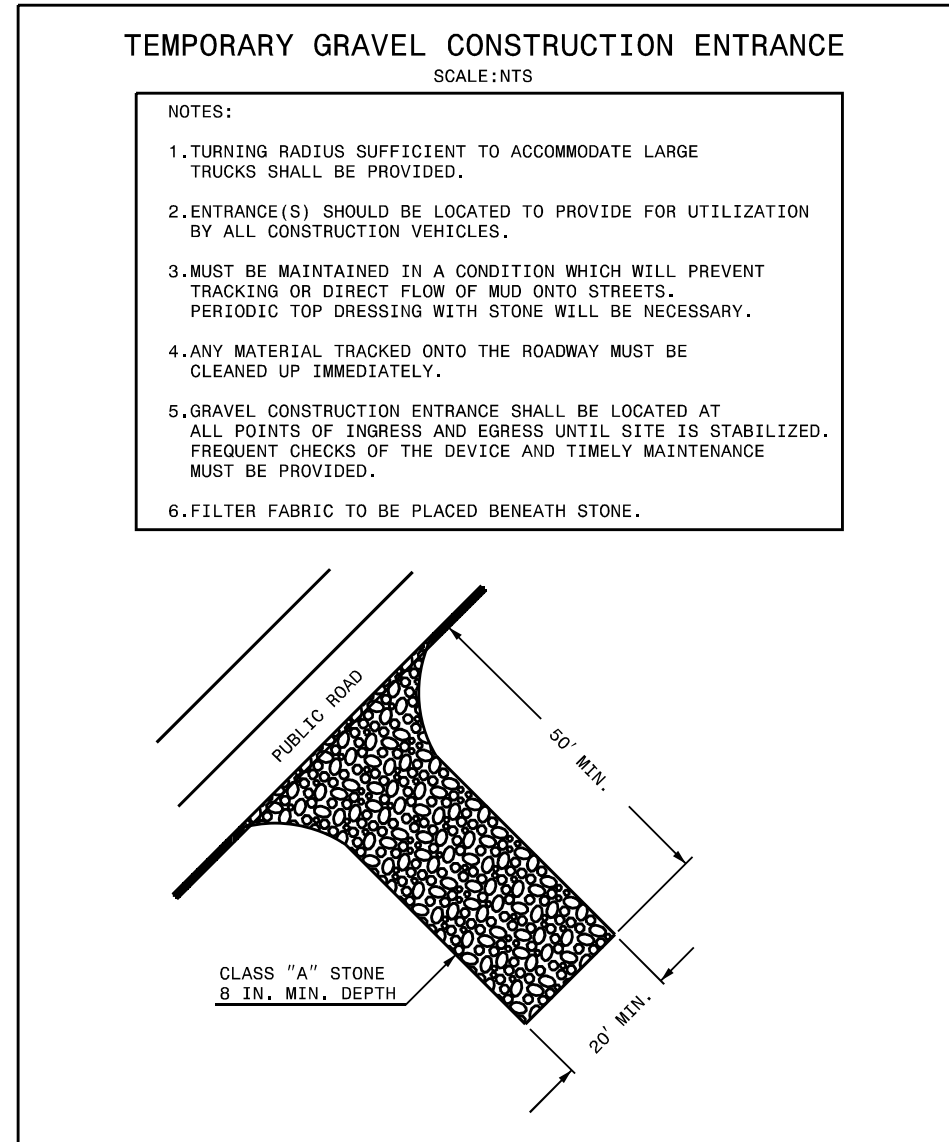
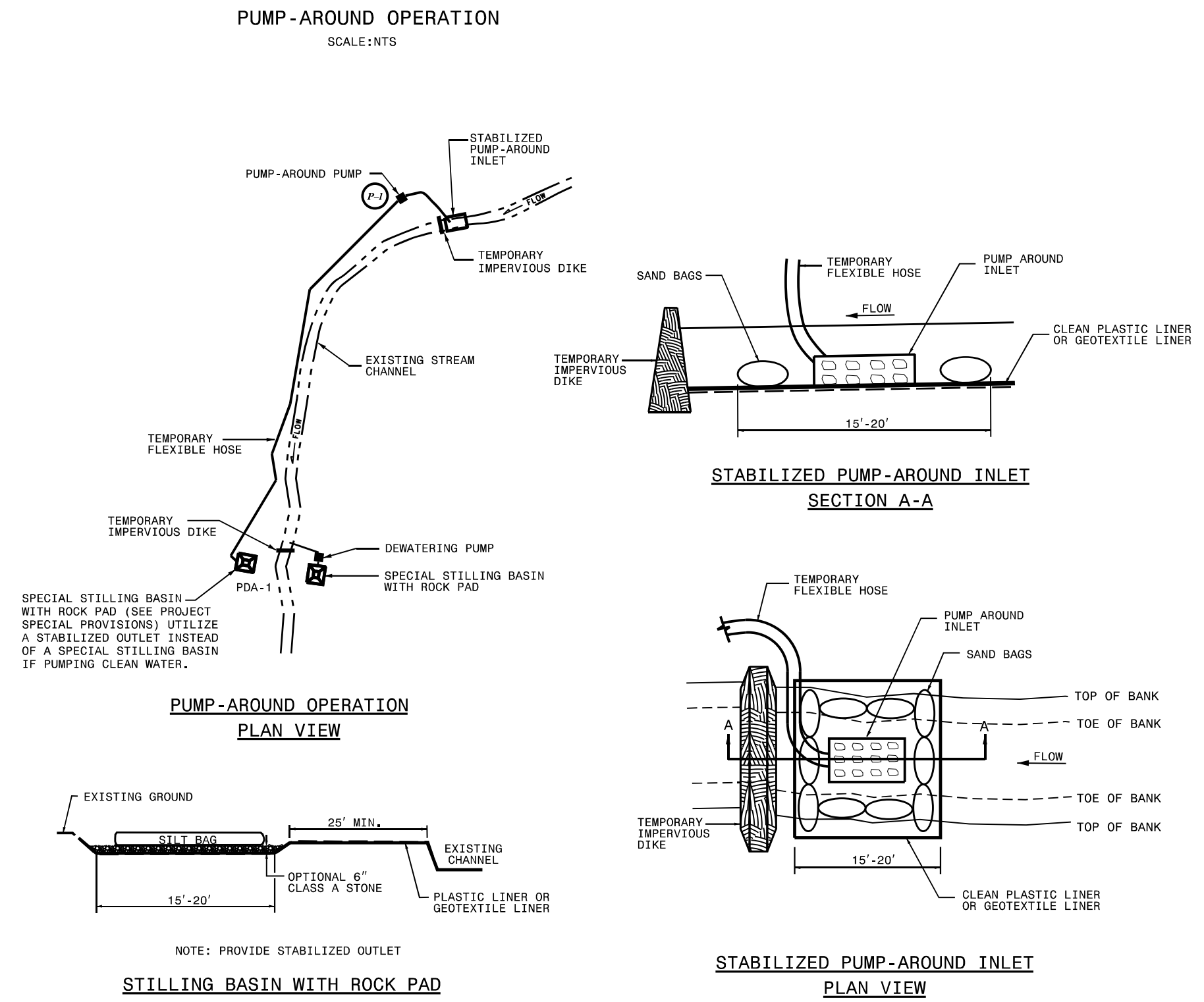
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ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

**DOCUMENT NOT CONSIDERED FINAL
UNLESS ALL SIGNATURES COMPLETED**

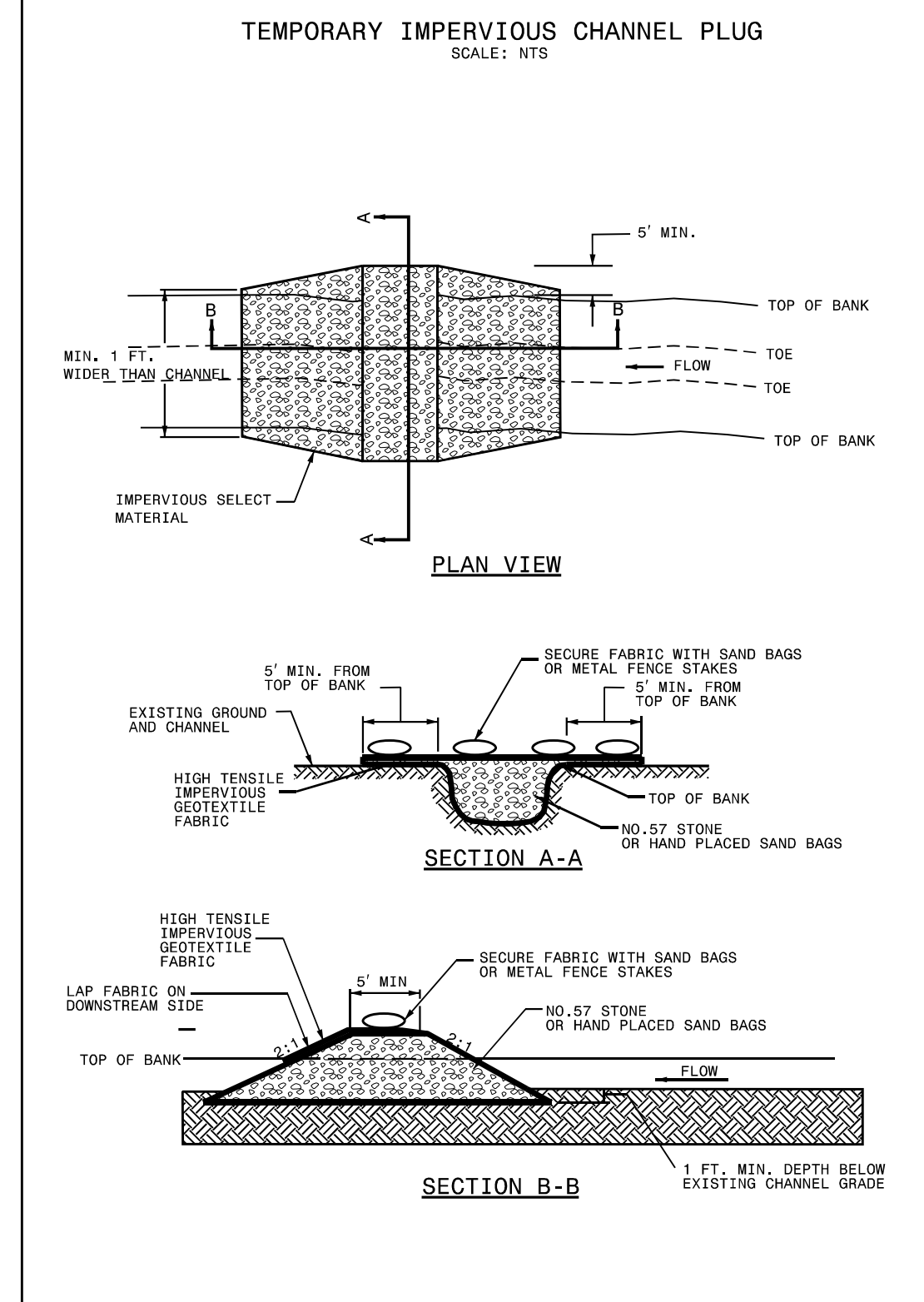
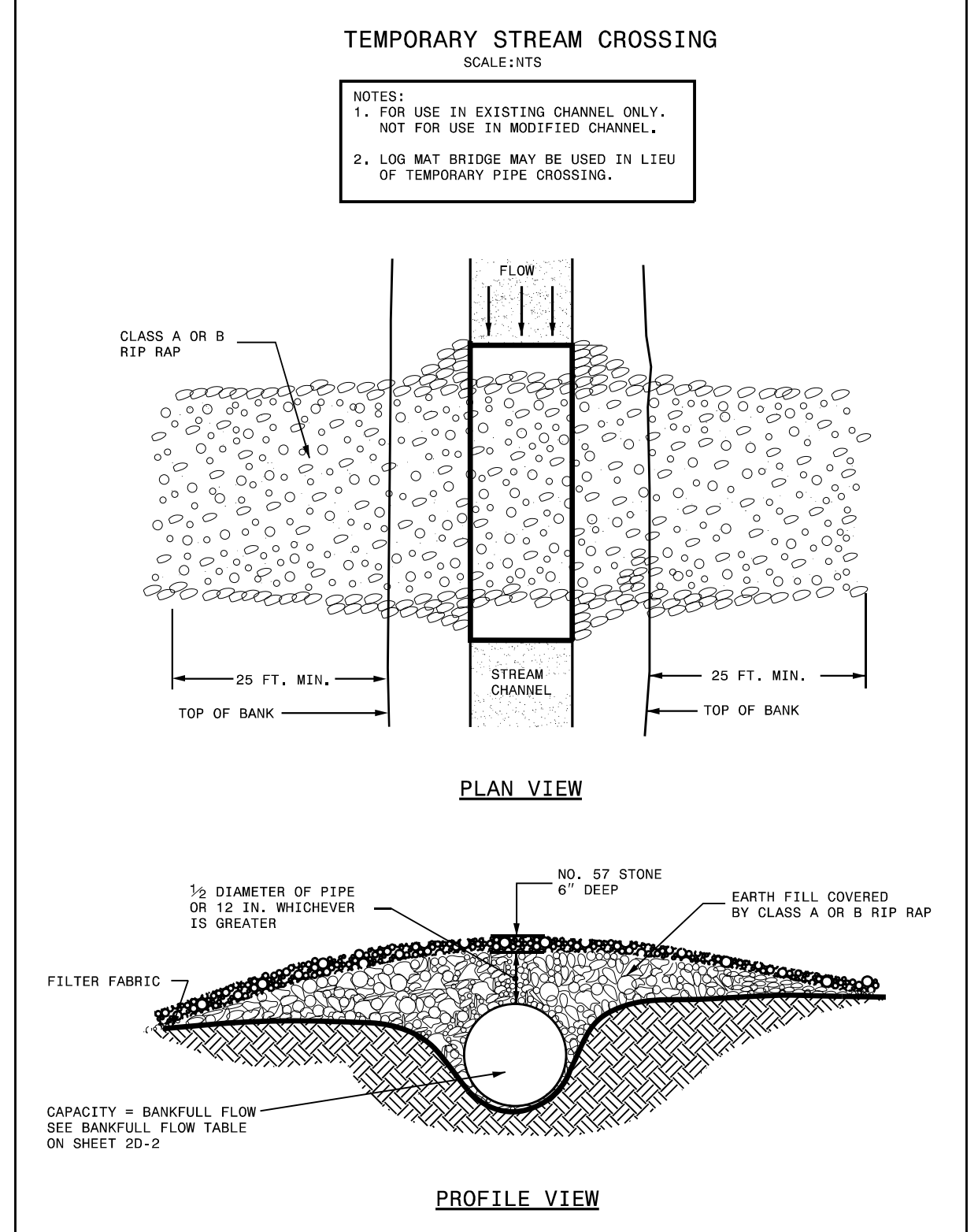
HDR HDR Engineering, Inc. of the Carolinas
555 Fayetteville St, Suite 900 Raleigh, N.C. 27601
N.C.B.E.L.S. License Number: F-0116

- SEQUENCE OF CONSTRUCTION FOR TYPICAL WORK AREA
1. INSTALL SPECIAL STILLING BASIN(S).
 2. INSTALL STABILIZED PUMP AROUND INLET, 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. PERFORM STREAM MODIFICATION WORK 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. ALL GRADING AND STABILIZATION MUST BE COMPLETED AT THE END OF EACH WORK DAY WITHIN THE PUMP AROUND AREAS BETWEEN THE IMPERVIOUS DIKES. THE IMPERVIOUS DIKE LOCATIONS AS SHOWN ON THIS SHEET ONLY SHOW THE UPPER AND LOWER EXTENT OF WORK FOR EACH STREAM SEGMENT. THE CONTRACTOR IS RESPONSIBLE FOR DETERMINING THE LOCATION OF THE IMPERVIOUS DIKE(S) FOR EACH DAY'S WORK.
 8. REMOVE SPECIAL STILLING BASIN(S) AND BACKFILL. STABILIZE DISTURBED AREA WITH SEED AND MULCH.

- NOTES:
1. ALL EXCAVATION SHALL BE PERFORMED IN ONLY DRY OR ISOLATED SECTIONS OF CHANNEL.
 2. IMPERVIOUS DIKES ARE TO BE USED TO ISOLATE WORK FROM STREAM FLOW WHEN NECESSARY.
 3. SAND BAGS SHALL BE FILLED WITH CLEAN MASONRY SAND OR CLEAN #57 STONE.
 4. ALL GRADED AREAS SHALL BE STABILIZED WITHIN 24 HOURS.
 5. MAINTENANCE OF STREAM FLOW OPERATIONS SHALL BE INCIDENTAL TO THE WORK. THIS INCLUDES POLYETHYLENE SHEETING, DIVERSION PIPES, PUMPS AND HOSES.
 6. PUMPS AND HOSES SHALL BE OF SUFFICIENT SIZE TO DEWATER THE WORK AREA.
 7. SIDESLOPES OF RESTORED CHANNEL SHALL BE MATTED PRIOR TO TURNING WATER INTO CHANNEL. SEE TYPICAL MATTING LOCATION DETAIL.
 8. CONTRACTOR IS RESPONSIBLE FOR DETERMINING & ADJUSTING THE PROPER SIZED PUMP. SEE BANKFULL CHANNEL FLOW TABLE PROVIDED ON SHEET 2D-2 FOR GUIDANCE.
 9. WATER PUMPED FROM EXCAVATIONS SHALL BE DISCHARGED INTO A GEOTEXTILE SILT BAG AND SHALL PROVIDE MEASURES TO PREVENT DISCHARGE FROM EXCEEDING 10 NTU'S. CONTRACTOR MAY UTILIZE FLOCCULANTS TO SETTLE OUT PARTICLES.



- NOTES:
1. DIMENSIONS ARE APPROXIMATE AND MAY BE SUBJECT TO CHANGE BASED ON FIELD CONDITIONS AND THE DIRECTION OF THE ENGINEER AND/OR THE CLIENT REPRESENTATIVE.
 2. CONSTRUCT CASCADE STRUCTURE BEGINNING AT THE DOWNSTREAM END AND MOVING IN THE UPSTREAM DIRECTION.
 3. PLACE BOULDERS SO THEY ARE TOUCHING AND ORIENTED WITH THEIR DOWNSTREAM END PITCHED UP INTO THE FLOW AS SHOWN.
 4. BOULDERS SHALL BE SOURCED ON SITE WITH SIZE DIMENSIONS MEETING THE MINIMUM RANGE OF 24" - 48" (D), NON-NATIVE CLASS VII AND LARGER ALPINE AND BOULDERS CAN BE USED IN NON-EXPOSED LOWER LAYERS OF THE IN-STREAM CONSTRUCTION WHEN A SUFFICIENT AMOUNT OF ON-SITE HARVESTED BOULDERS ARE NOT AVAILABLE.

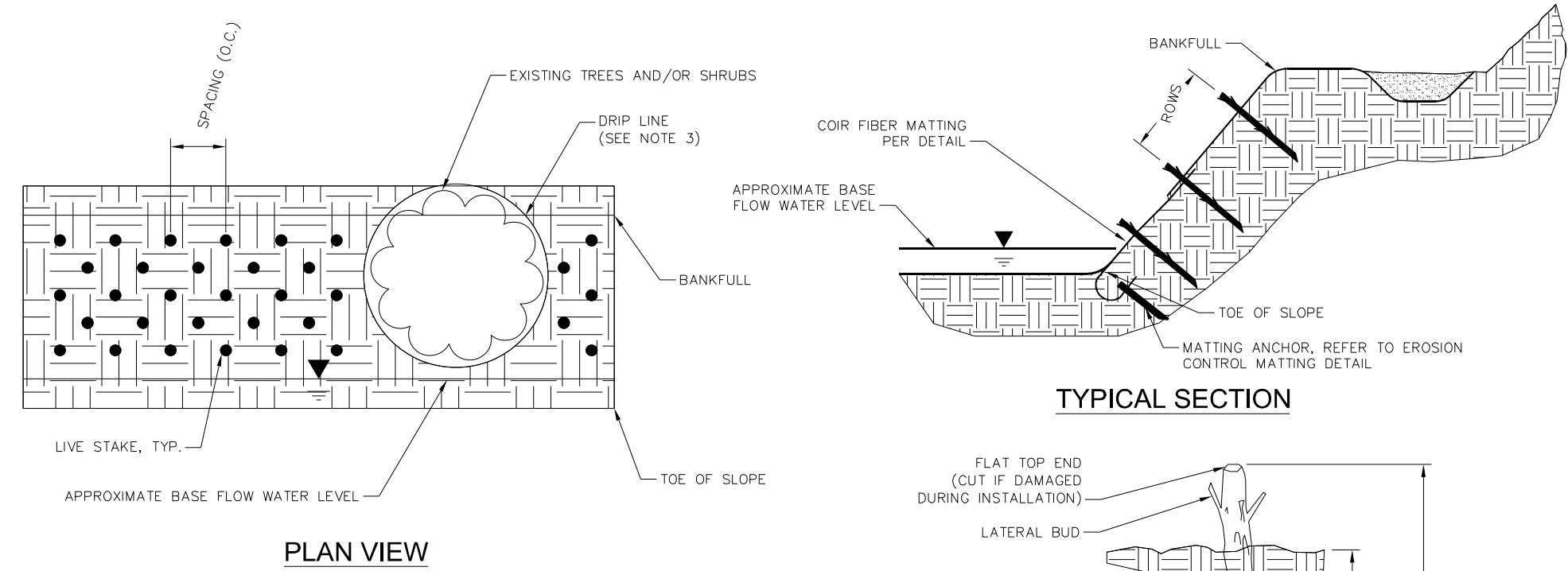


REVISIONS

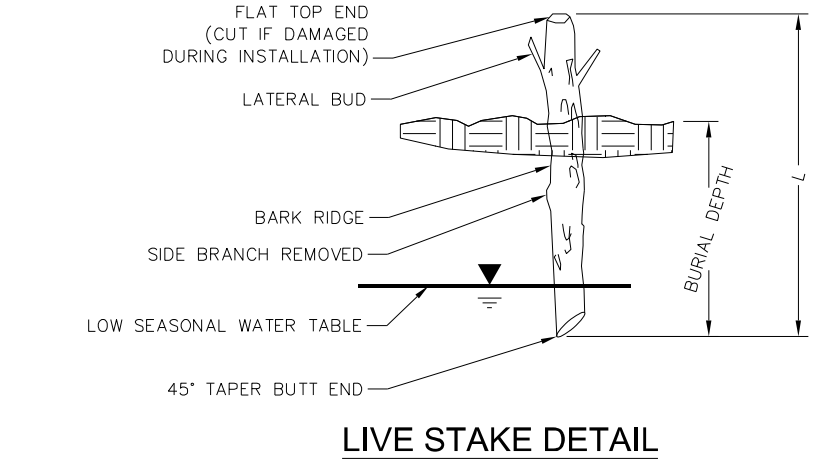
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 DATE: 5/8/2026
 TIME: 9:24:58 AM

6/2/2019

PROJECT REFERENCE NO. 18314.1045039	SHEET NO. 2D-4
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED	
HDR Engineering, Inc. of the Carolinas 555 Fayetteville St. Suite 900 Raleigh, N.C. 27601 N.C.B.E.L.S. License Number: F-0116	



Live Stakes			
Botanical Name	Common Name	Stratum	Percent of Total Livestakes by Stream Site
<i>Cornus amomum</i>	Silky Dogwood	Shrub	25
<i>Salix nigra</i>	Black Willow	Shrub	30
<i>Salix sericea</i>	Silky Willow	Shrub	30
<i>Sambucus canadensis</i>	Elderberry	Shrub	15

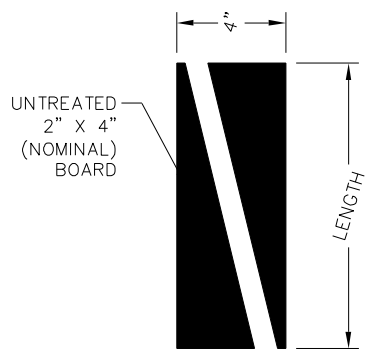
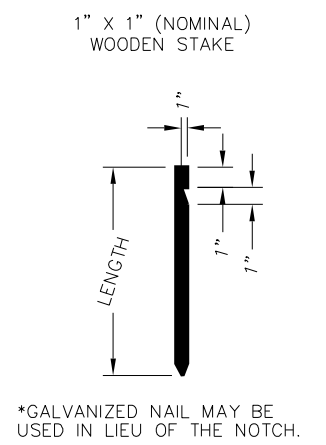
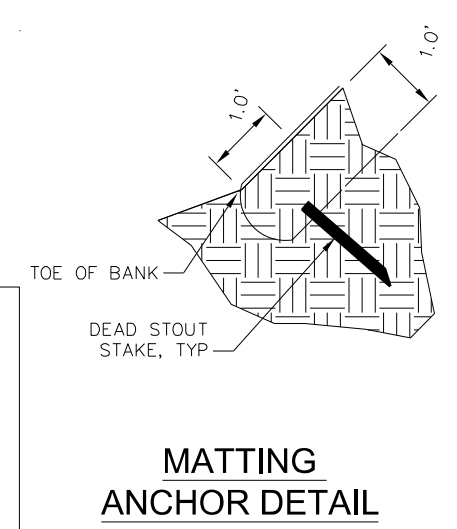


DESIGN VARIABLES	
DIAMETER	1/2" - 2"
LENGTH	2' - 3'
BURIAL DEPTH	4/5L
SPACING (D.C.)	3'
ROWS ¹	SEE PLANS
PLACEMENT OF 1ST ROW FROM TOE OF SLOPE	0.5'

- NOTES:**
- LIVE STAKES SHALL BE INSTALLED ON FINISHED STREAM BANKS. "FINISHED" GENERALLY REFERS TO ANY AND/OR ALL OF THE FOLLOWING AS SPECIFIED BY THE DESIGNER:
 - GRADED
 - PREPARED (ROTO-TILLED, RAKED, AND AMENDED),
 - SEEDED,
 - MULCHED, AND
 - COVERED WITH EROSION CONTROL MATTING.
 - LIVE STAKES SHALL BE FASHIONED FROM DORMANT CUTTINGS OF WOODY PLANT SPECIES (TREES AND SHRUBS) IN ACCORDANCE WITH THE PLANTING TABLE THIS SHEET OR APPROVED EQUAL.
 - LIVE STAKES SHALL NOT BE PLACED WITHIN THE DRIP LINE OF ANY EXISTING TREES AND/OR SHRUBS THAT REMAIN ON THE BANKS.
 - LIVE STAKES SHALL NOT BE PLANTED WITHIN 5 FEET OF HEADWALL, WINGWALL, OR OTHER INFRASTRUCTURE.
 - DETAILED HANDLING, PREPARATION, AND INSTALLATION GUIDELINES FOR LIVE STAKES SHALL BE SPECIFIED BY THE DESIGNER, INCLUDING:
 - LIVE STAKES MAY BE STORED UP TO 10 DAYS IN WATER.
 - ALL LATERAL BRANCHES SHALL BE CAREFULLY REMOVED FROM THE WOODY CUTTINGS PRIOR TO INSTALLATION.
 - LIVE STAKES SHALL BE DRIVEN INTO THE GROUND USING A "DEAD BLOW" PLASTIC HAMMER, BY CREATING A PILOT HOLE AND SLIPPING THE STAKE INTO IT, OR WITH THE USE OF A HYDRAULIC INJECTION SYSTEM. SOIL SHALL BE FIRMLY PACKED AROUND THE HOLE AFTER INSTALLATION.
 - SPLIT OR OTHERWISE DAMAGED LIVE STAKES SHALL NOT BE USED.

¹ ROWS SHOULD BE EQUALLY SPACED WITHIN THE IDENTIFIED PLANTING AREAS SHOWN ON THE PLANS.
NOT TO SCALE

- NOTES:**
- THE SLOPE AND/OR STREAM BANK SHALL BE PREPARED (GRADED, TILLED, SMOOTHED, ETC.) AND SEEDED AND MULCHED AS SPECIFIED BY THE DESIGNER PRIOR TO THE PLACEMENT OF THE MATTING.
 - THE MATTING SHALL BE INSTALLED SO AS TO NOT BE IN TENSION, BUT BE PLACED NEATLY, FLUSH AGAINST THE SOIL, AND WITH NO GAPS OR WRINKLES.
 - MATTING SHALL BE NEATLY SECURED AROUND ANY PROJECT STRUCTURES, STRUCTURE ARMS, AND/OR SILLS TO PREVENT ANY LOOSE OR FRAYED EDGES.
 - THERE SHALL BE NO LOOSE ENDS OR UNSECURED MATTING ON THE COMPLETED WORK.



MATTING ANCHOR DETAIL

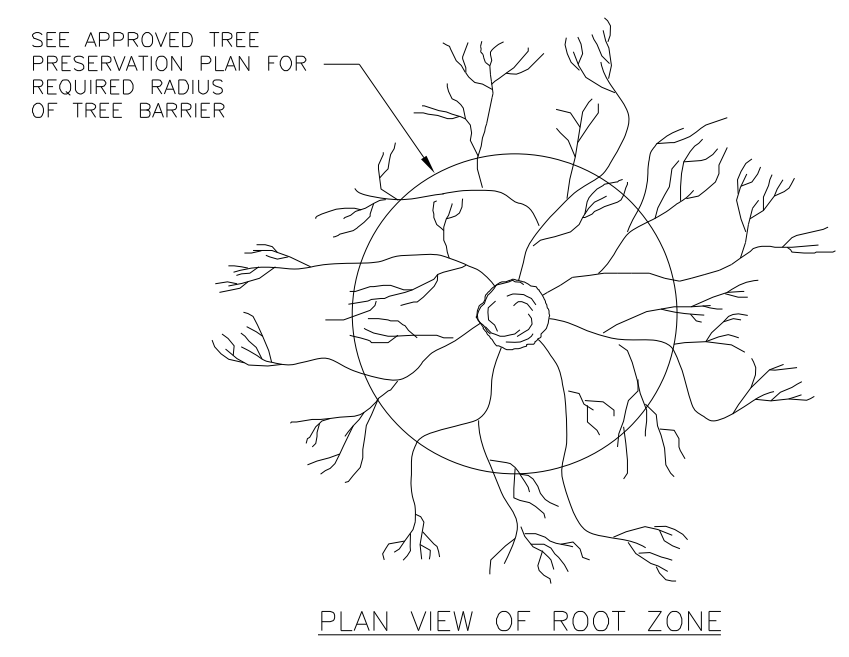
STAKE - OPTION 1

DEAD STOUT STAKE - OPTION 2

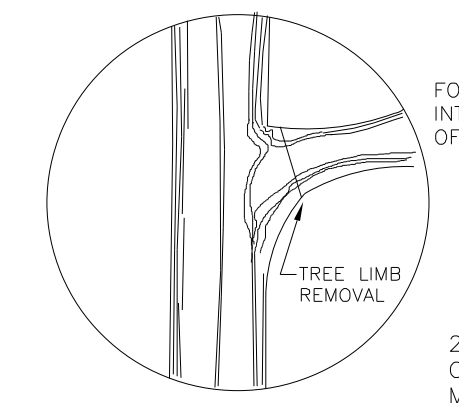
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COIR MATTING BANK STABILIZATION

LIVE STAKING



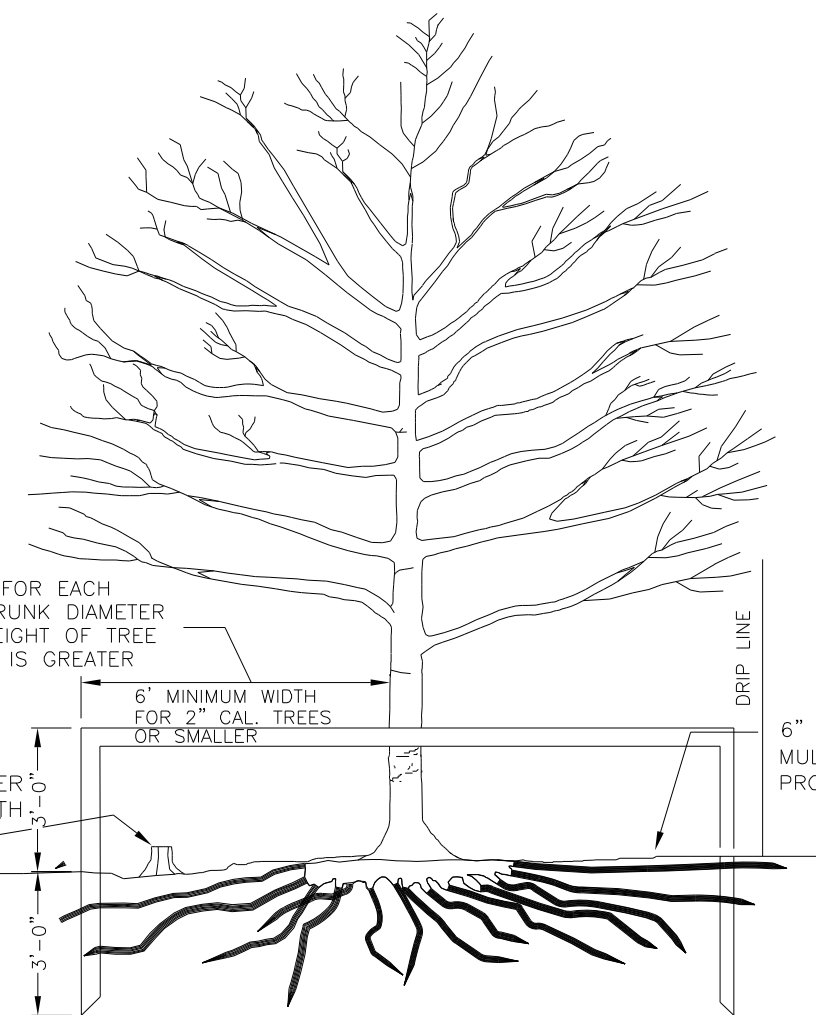
TREE PROTECTION



FOR PRUNING SEE INTERNATIONAL SOCIETY OF ARBORICULTURE SPECS.

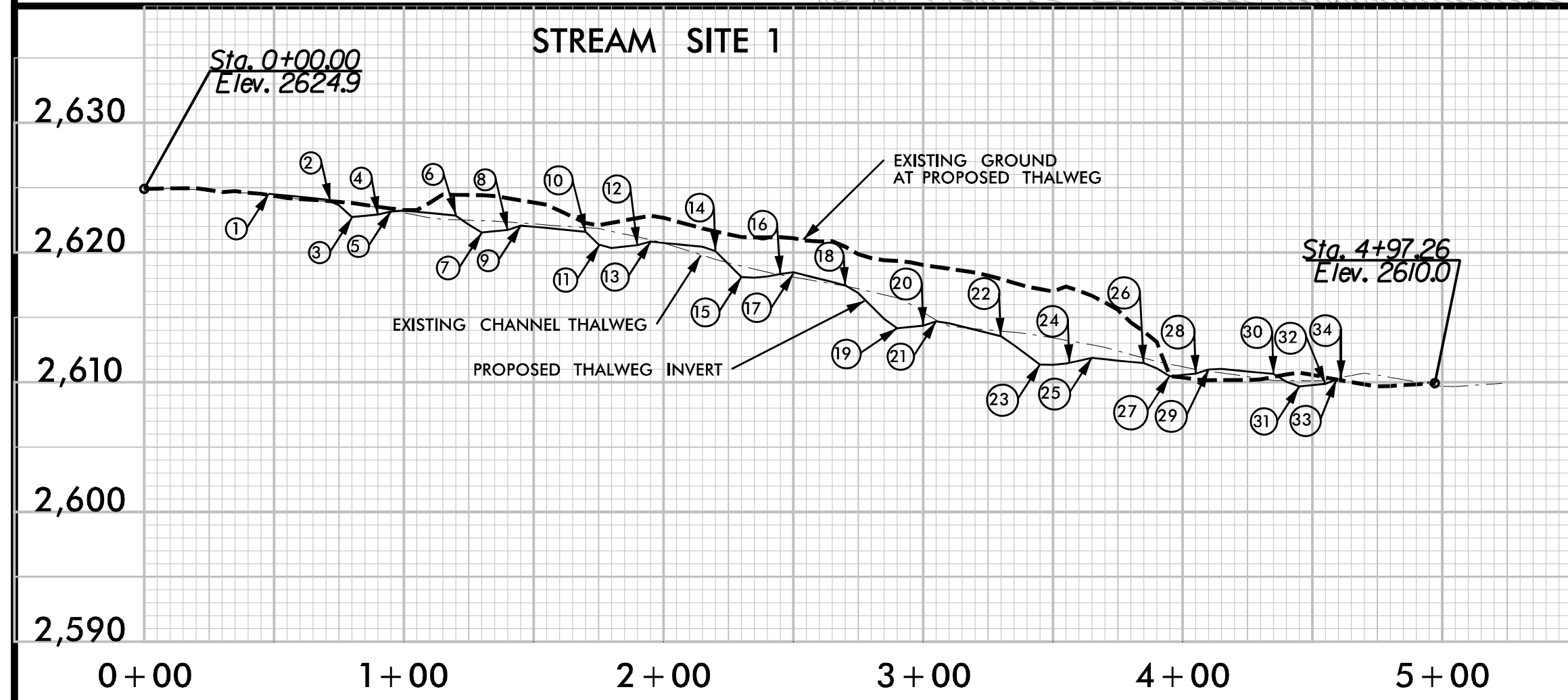
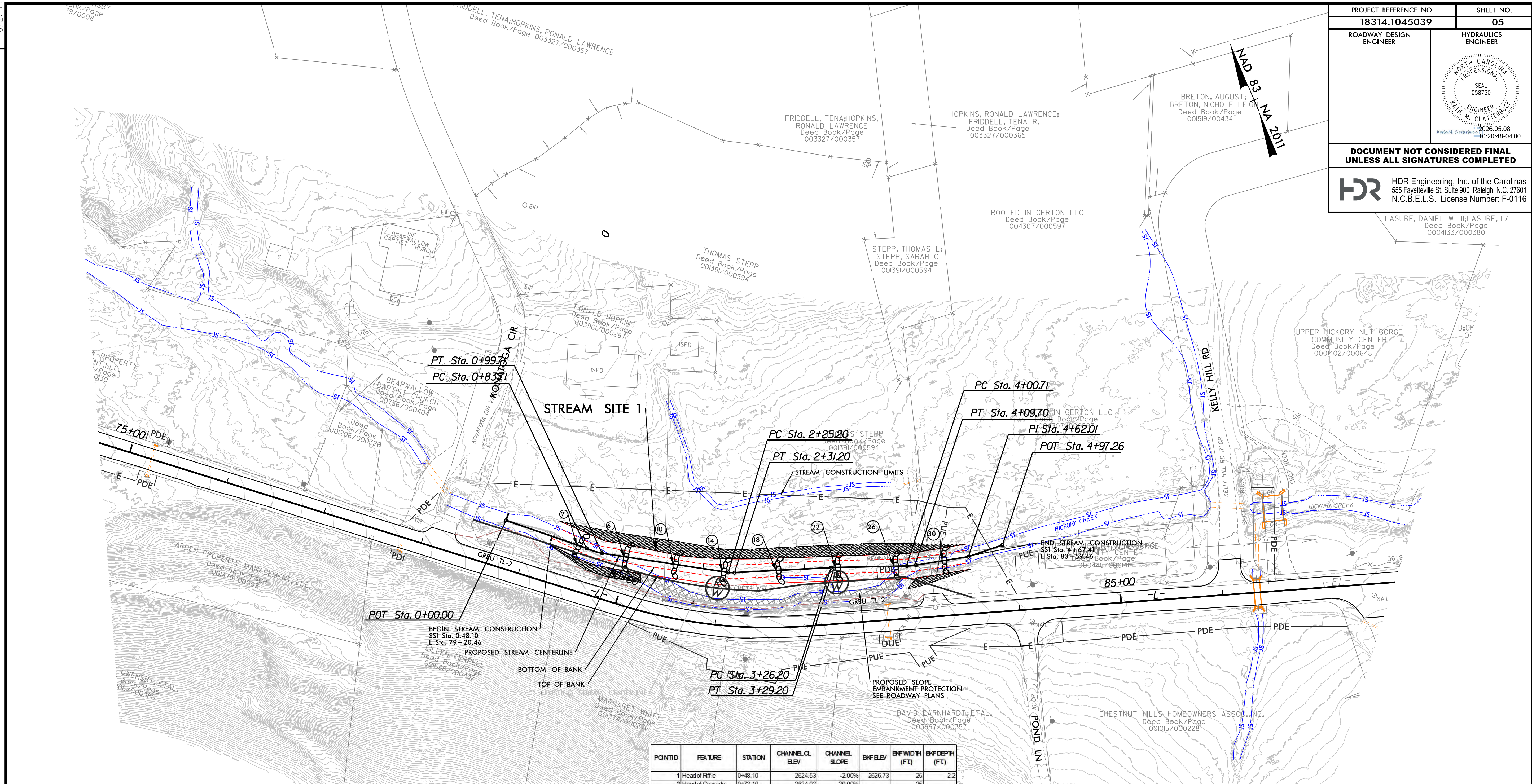
DEAD TREES AND SCRUB OR UNDER-GROWTH SHALL BE CUT FLUSH WITH ADJACENT GRADE. NO GRUBBING ALLOWED UNDER DRIP LINE.

2"x4" STANDARDS + 1"x4" RAILS OR ORANGE SAFETY FENCING MAY BE USED.



- NOTES:**
- REMOVE ALL BARRIERS UPON COMPLETION OF PROJECT.

6" BARK MULCH, PLACE BARK MULCH AT AREAS NOT PROTECTED BY BARRIER.



POINTID	FEATURE	STATION	CHANNEL CL. ELEV	CHANNEL SLOPE	BF ELEV	BF WIDTH (FT)	BF DEPTH (FT)
1	Head of Riffle	0+48.10	2624.53	-2.00%	2626.73	25	2.2
2	Head of Cascade	0+73.10	2624.03	-20.00%		25	
3	Mid Pool	0+79.60	2622.73	2.00%	2625.93	28	3.2
4	Glide	0+92.60	2622.99	8.00%		28	
5	Head of Riffle	0+96.60	2623.31	-2.00%	2625.51	25	2.2
6	Head of Cascade	1+21.60	2622.81	-20.00%		25	
7	Mid Pool	1+28.10	2621.51	2.00%	2624.71	28	3.2
8	Glide	1+41.10	2621.77	8.00%		28	
9	Head of Riffle	1+45.10	2622.09	-2.00%	2624.29	25	2.2
10	Head of Cascade	1+70.10	2621.59	-20.00%		25	
11	Mid Pool	1+76.60	2620.29	2.00%	2623.49	28	3.2
12	Glide	1+89.60	2620.55	8.00%		28	
13	Head of Riffle	1+93.60	2620.97	-2.00%	2623.07	25	2.2
14	Head of Cascade	2+18.60	2620.37	-20.00%		25	
15	Mid Pool	2+30.60	2617.97	2.00%	2621.17	28	3.2
16	Glide	2+43.60	2618.23	9.00%		28	
17	Head of Riffle	2+47.60	2618.59	-5.00%	2620.79	25	2.2
18	Head of Cascade	2+72.60	2617.34	-20.00%		25	
19	Mid Pool	2+88.60	2614.14	2.00%	2617.34	28	3.2
20	Glide	3+01.60	2614.40	9.00%		28	
21	Head of Riffle	3+05.60	2614.76	-5.00%	2616.96	25	2.2
22	Head of Cascade	3+30.60	2613.51	-15.00%		25	
23	Mid Pool	3+45.60	2611.26	2.00%	2614.46	28	3.2
24	Glide	3+58.60	2611.52	10.00%		28	
25	Head of Riffle	3+62.60	2611.92	-2.00%	2614.12	25	2.2
26	Head of Cascade	3+87.60	2611.42	-15.00%		25	
27	Mid Pool	3+94.10	2610.45	2.00%	2613.65	28	3.2
28	Glide	4+07.10	2610.71	10.00%		28	
29	Head of Riffle	4+11.10	2611.11	-2.00%	2613.31	25	2.2
30	Head of Cascade	4+36.10	2610.61	-15.00%		25	
31	Mid Pool	4+42.60	2609.63	2.00%	2612.83	28	3.2
32	Glide	4+55.60	2609.99	10.00%		28	
33	Head of Riffle	4+59.60	2610.29	-4.00%	2612.49	25	2.2
34	Tie-in	4+61.91	2610.20			25	

LEGEND:
 BIOENGINEERING LIVE STAKING AREA

NOTE:
 1. ENGINEER MAY MAKE CHANNEL ALIGNMENT AND PROFILE ADJUSTMENTS IN THE FIELD BASED ON SITE CONDITIONS INCLUDING EXISTING STREAM CROSSING STRUCTURES.
 2. PRIVATE BRIDGES AND CULVERTS TO BE DESIGNED IN SEPARATE PROJECTS AND NOT INCLUDED ON THESE PLANS.

SEE SHEET 2D-1 FOR STREAM ALIGNMENT DATA

REVISIONS

6/2/2019

**DOCUMENT NOT CONSIDERED FINAL
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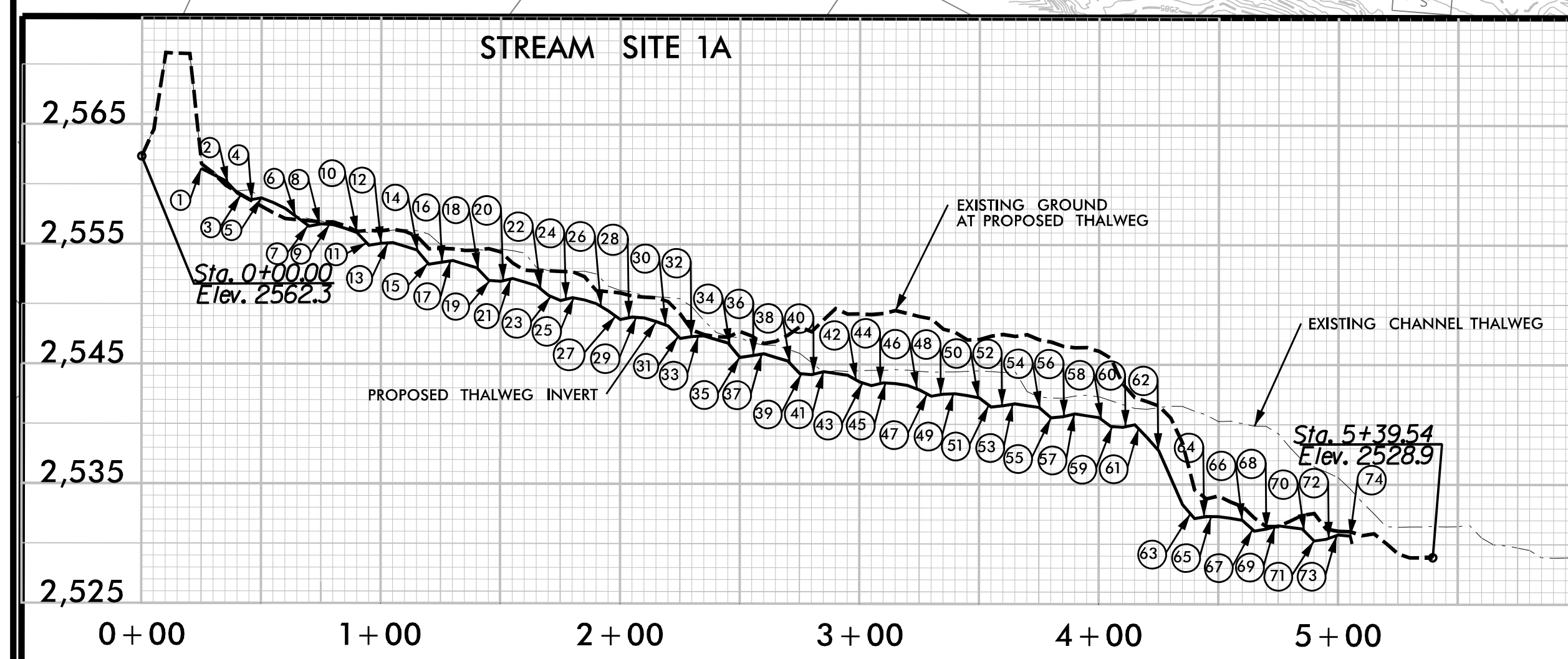
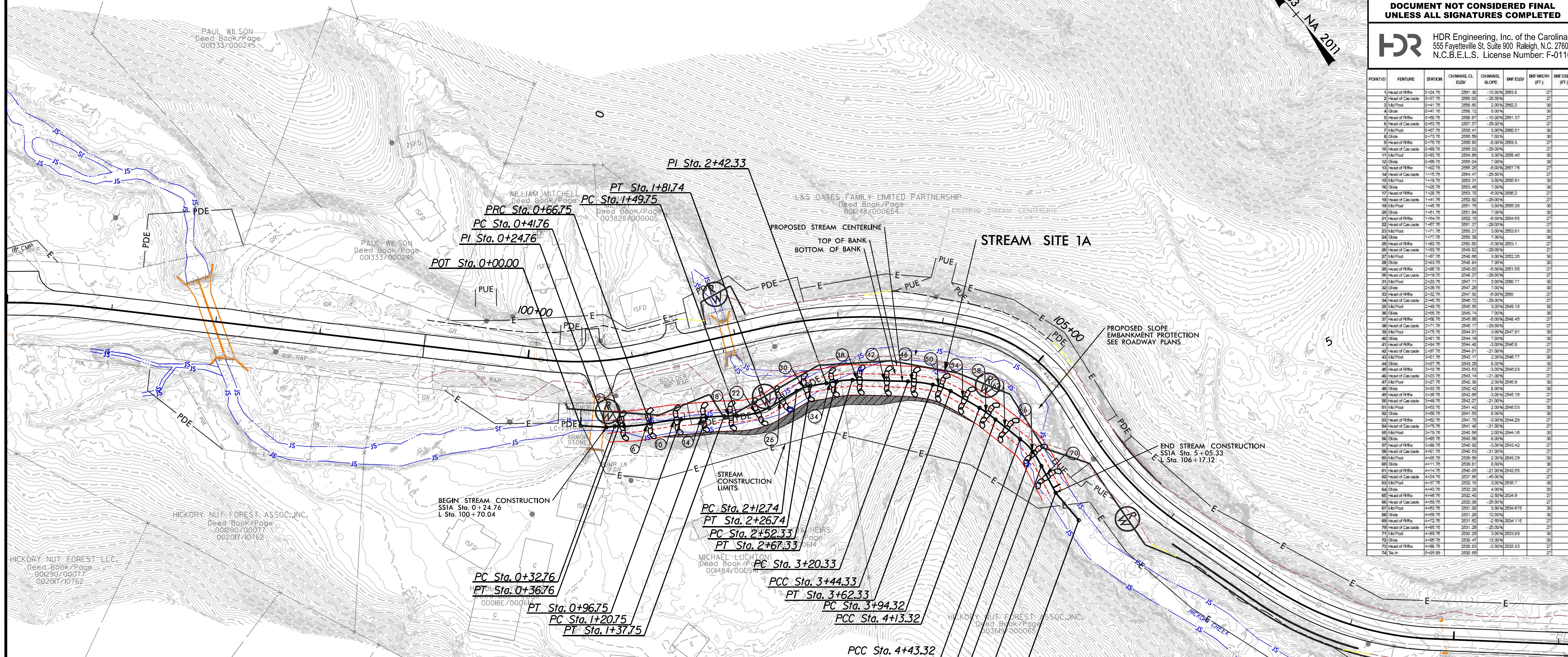
HDR HDR Engineering, Inc. of the Carolinas
555 Fayetteville St. Suite 900 Raleigh, N.C. 27601
N.C.B.E.L.S. License Number: F-0116

POINT ID	FEATURE	STATION	CHANNEL CL. ELEV.	CHANNEL SLOPE	BNF ELEV.	BNF WIDTH (FT)	BNF DEPTH (FT)
1	Head of Riffle	0+04.70	2561.30	-10.00%	2563.8	27	2.0
2	Head of Cascade	0+07.70	2560.00	-30.00%		27	
3	Mid Pool	0+41.70	2569.00	2.00%	2562.2	30	3.0
4	Grise	0+47.70	2568.70	8.00%		30	
5	Head of Riffle	0+50.70	2558.87	-10.00%	2561.37	27	2.5
6	Head of Cascade	0+53.70	2567.27	-29.00%		27	
7	Mid Pool	0+67.70	2555.41	3.00%	2560.11	30	3.0
8	Grise	0+73.70	2559.86	7.00%		30	
9	Head of Riffle	0+78.70	2566.50	-5.00%	2563.3	27	2.5
10	Head of Cascade	0+88.70	2556.02	-29.00%		27	
11	Mid Pool	0+93.70	2556.66	3.00%	2558.46	30	3.0
12	Grise	0+96.70	2556.04	7.00%		30	
13	Head of Riffle	1+02.70	2555.25	-5.00%	2557.75	27	2.5
14	Head of Cascade	1+15.70	2554.47	-28.00%		27	
15	Mid Pool	1+18.70	2553.31	3.00%	2550.91	30	3.0
16	Grise	1+26.70	2563.48	7.00%		30	
17	Head of Riffle	1+28.70	2553.70	-5.00%	2556.2	27	2.5
18	Head of Cascade	1+41.70	2552.35	-29.00%		27	
19	Mid Pool	1+46.70	2551.70	3.00%	2550.35	30	3.0
20	Grise	1+47.70	2551.70	7.00%		30	
21	Head of Riffle	1+54.70	2552.15	-5.00%	2554.65	27	2.5
22	Head of Cascade	1+67.70	2551.37	-29.00%		27	
23	Mid Pool	1+71.70	2550.21	3.00%	2553.81	30	3.0
24	Grise	1+67.70	2550.21	7.00%		30	
25	Head of Riffle	1+80.70	2550.00	-5.00%	2553.1	27	2.5
26	Head of Cascade	1+93.70	2548.82	-29.00%		27	
27	Mid Pool	1+97.70	2548.82	3.00%	2552.28	30	3.0
28	Grise	2+03.70	2548.84	7.00%		30	
29	Head of Riffle	2+08.70	2548.05	-5.00%	2551.55	27	2.5
30	Head of Cascade	2+19.70	2547.27	-28.00%		27	
31	Mid Pool	2+23.70	2547.11	3.00%	2550.71	30	3.0
32	Grise	2+28.70	2547.28	7.00%		30	
33	Head of Riffle	2+32.70	2547.45	-5.00%	2550	27	2.5
34	Head of Cascade	2+45.70	2546.72	-29.00%		27	
35	Mid Pool	2+48.70	2546.56	3.00%	2548.16	30	3.0
36	Grise	2+50.70	2546.17	7.00%		30	
37	Head of Riffle	2+56.70	2546.58	-5.00%	2548.48	27	2.5
38	Head of Cascade	2+71.70	2546.17	-29.00%		27	
39	Mid Pool	2+75.70	2544.01	3.00%	2547.61	30	3.0
40	Grise	2+81.70	2544.42	7.00%		30	
41	Head of Riffle	2+84.70	2544.40	-3.00%	2546.9	27	2.5
42	Head of Cascade	2+87.70	2544.01	-21.00%		27	
43	Mid Pool	3+01.70	2543.17	-2.00%	2546.77	30	3.0
44	Grise	3+07.70	2543.25	8.00%		30	
45	Head of Riffle	3+10.70	2543.63	-3.00%	2545.03	27	2.5
46	Head of Cascade	3+23.70	2543.48	-21.00%		27	
47	Mid Pool	3+27.70	2543.30	2.00%	2546.9	30	3.0
48	Grise	3+33.70	2542.42	8.00%		30	
49	Head of Riffle	3+38.70	2542.65	-3.00%	2545.16	27	2.5
50	Head of Cascade	3+48.70	2542.21	-21.00%		27	
51	Mid Pool	3+53.70	2541.43	2.00%	2545.03	30	3.0
52	Grise	3+59.70	2541.55	8.00%		30	
53	Head of Riffle	3+62.70	2541.70	-3.00%	2544.29	27	2.5
54	Head of Cascade	3+75.70	2541.40	-21.00%		27	
55	Mid Pool	3+79.70	2540.56	2.00%	2544.16	30	3.0
56	Grise	3+85.70	2540.68	8.00%		30	
57	Head of Riffle	3+88.70	2540.50	-3.00%	2543.42	27	2.5
58	Head of Cascade	4+01.70	2540.53	-21.00%		27	
59	Mid Pool	4+05.70	2539.68	2.00%	2543.29	30	3.0
60	Grise	4+11.70	2539.81	8.00%		30	
61	Head of Riffle	4+14.70	2540.05	-21.00%	2542.65	27	2.5
62	Head of Cascade	4+24.70	2537.65	-45.00%		27	
63	Mid Pool	4+27.70	2532.10	3.00%	2536.7	30	3.0
64	Grise	4+43.70	2532.20	4.00%		30	
65	Head of Riffle	4+46.70	2532.40	-2.50%	2534.9	27	2.5
66	Head of Cascade	4+55.70	2532.08	-29.00%		27	
67	Mid Pool	4+83.70	2531.08	3.00%	2534.876	30	3.0
68	Grise	4+89.70	2531.26	12.00%		30	
69	Head of Riffle	4+92.70	2531.65	-2.50%	2534.115	27	2.5
70	Head of Cascade	4+85.70	2531.26	-25.00%		27	
71	Mid Pool	4+89.70	2530.25	3.00%	2533.88	30	3.0
72	Grise	4+88.70	2530.47	12.00%		30	
73	Head of Riffle	4+96.70	2530.83	-2.00%	2533.33	27	2.5
74	Mid Pool	5+08.89	2530.85			27	

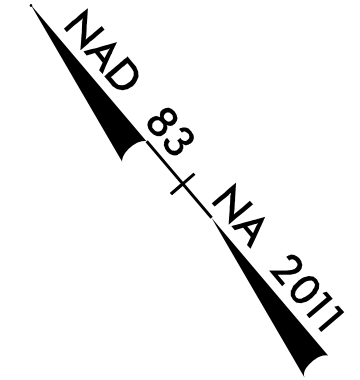
LEGEND:
 BIOENGINEERING LIVE STAKING AREA

NOTE:
 1. ENGINEER MAY MAKE CHANNEL ALIGNMENT AND PROFILE ADJUSTMENTS IN THE FIELD BASED ON SITE CONDITIONS INCLUDING EXISTING STREAM CROSSING STRUCTURES.
 2. PRIVATE BRIDGES AND CULVERTS TO BE DESIGNED IN SEPARATE PROJECTS AND NOT INCLUDED ON THESE PLANS.

SEE SHEET 2D-1A FOR STREAM ALIGNMENT DATA

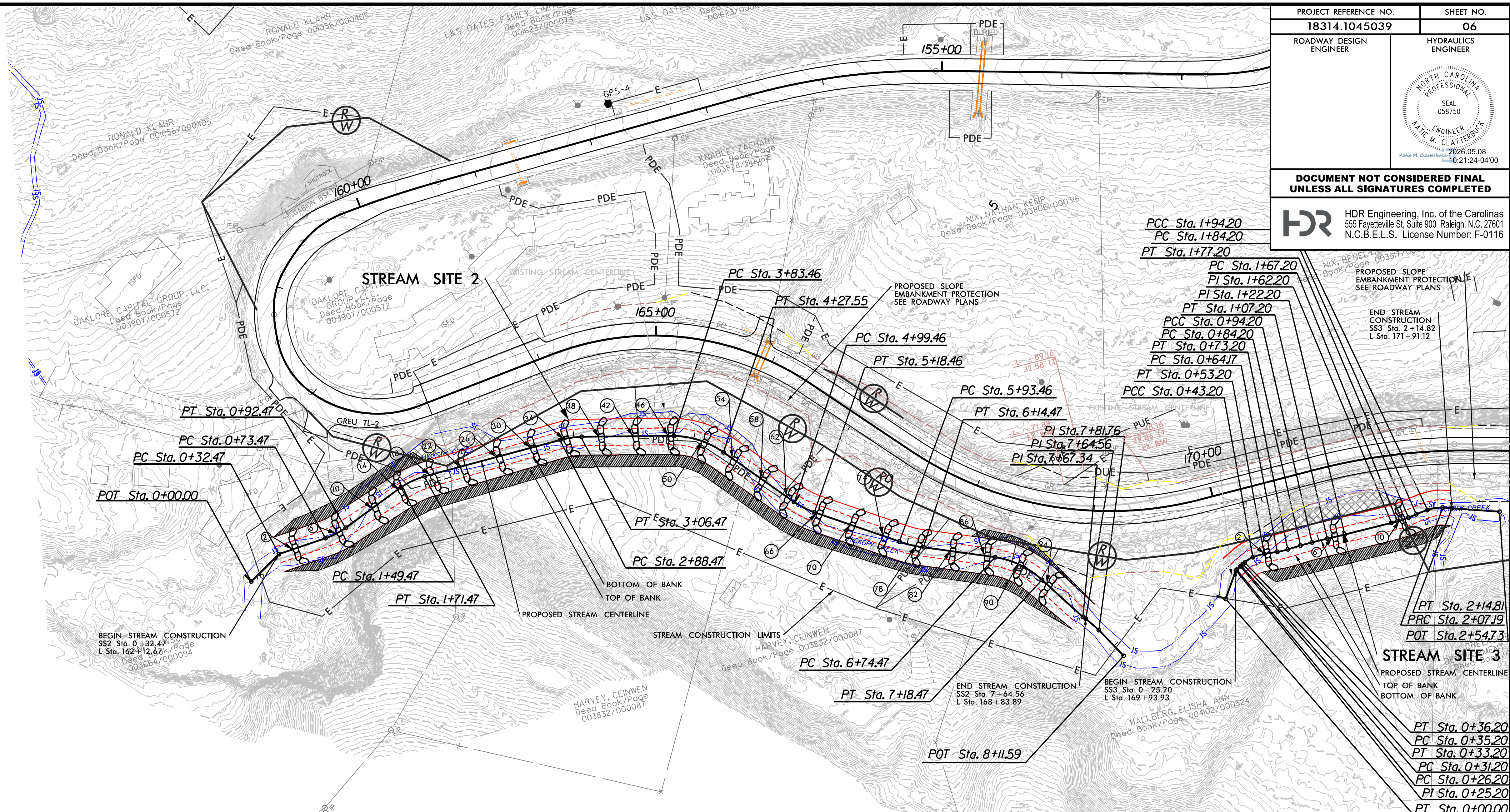


6/2/2019



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LEGEND:
 BIOENGINEERING LIVE STAKING AREA



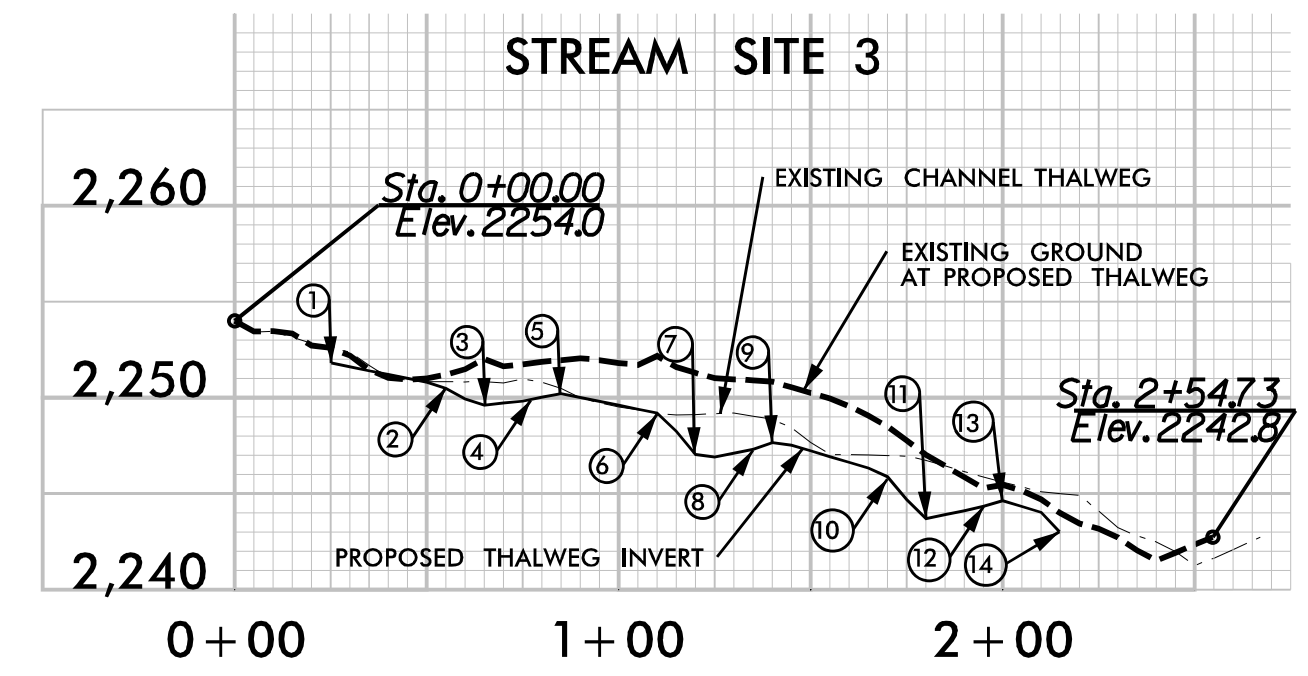
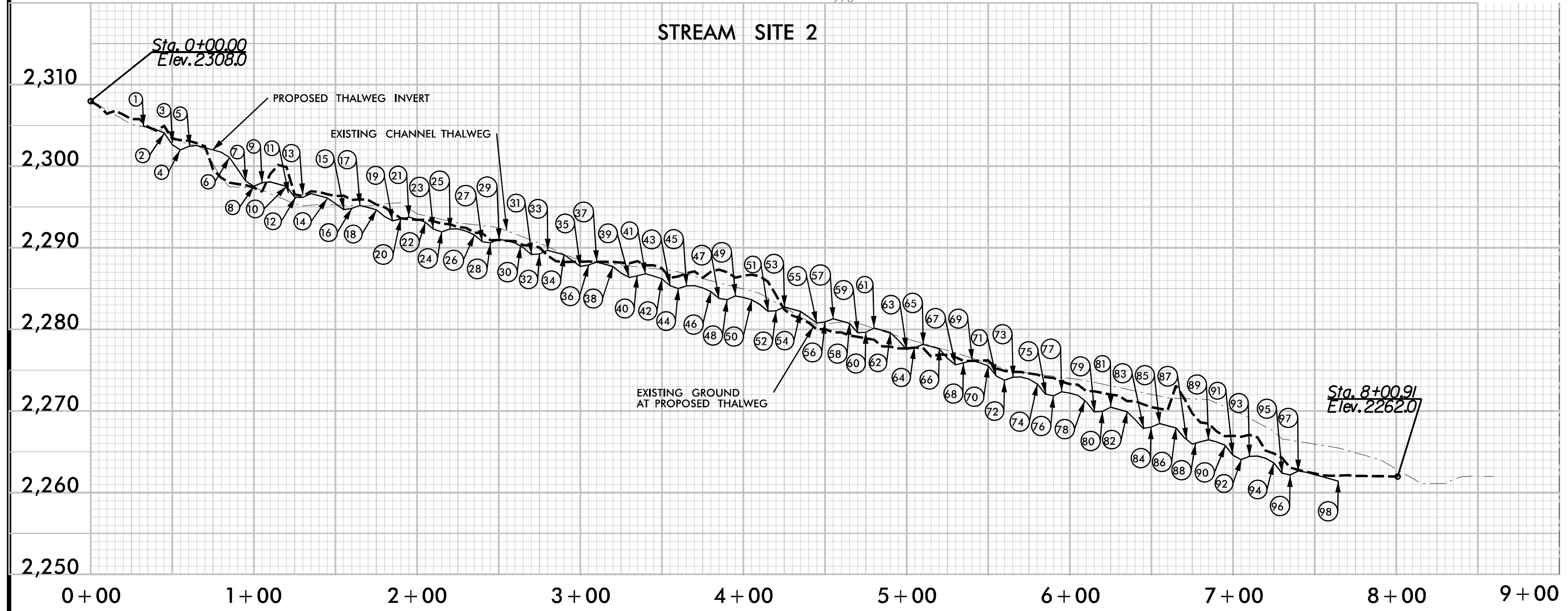
PROJECT REFERENCE NO. 18314.1045039	SHEET NO. 06
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

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HDR HDR Engineering, Inc. of the Carolinas
 555 Fayetteville St. Suite 900 Raleigh, N.C. 27601
 N.C.B.E.L.S. License Number: F-0116

REVISIONS

PLOT DRIVER: NCDOT_color_eng_50.plt
 USER: KCLATTERBU
 DATE: 5/8/2026
 TIME: 9:25:36 AM
 FILE: \



SEE SHEET 2D-1 FOR STREAM ALIGNMENT DATA
 SEE SHEET 06A FOR PROFILE POINT TABLES

PROJECT REFERENCE NO. 18314.1045039	SHEET NO. 06A
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
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STREAM SITE 2

POINTID	FEATURE	STATION	CHANNEL CL. ELEV	CHANNEL SLOPE	BKF ELEV	BKF WIDTH (FT.)	BKF DEPTH (FT.)
1	Head of Rffle	0+32.47	2304.90	-5.00%	2307.5	27	2.6
2	Head of Cascade	0+44.47	2304.24	-29.00%		27	
3	Mid Pool	0+52.47	2301.32	3.00%	2305.62	30	3.7
4	Glide	0+59.47	2302.10	21.00%		30	
5	Head of Rffle	0+61.47	2302.73	-5.50%	2305.33	27	2.6
6	Head of Cascade	0+83.47	2301.52	-29.00%		27	
7	Mid Pool	0+97.47	2297.46	3.00%	2301.16	30	3.7
8	Glide	1+03.47	2297.64	21.00%		30	
9	Head of Rffle	1+06.47	2298.27	-5.50%	2300.87	27	2.6
10	Head of Cascade	1+20.47	2297.50	-29.00%		27	
11	Mid Pool	1+25.47	2296.05	3.00%	2299.75	30	3.7
12	Glide	1+31.47	2296.23	15.00%		30	
13	Head of Rffle	1+34.47	2296.68	-5.50%	2299.28	27	2.6
14	Head of Cascade	1+46.47	2296.02	-17.00%		27	
15	Mid Pool	1+54.47	2294.66	3.00%	2298.36	30	3.7
16	Glide	1+60.47	2294.84	15.00%		30	
17	Head of Rffle	1+63.47	2295.29	-5.50%	2297.89	27	2.6
18	Head of Cascade	1+75.47	2294.63	-17.00%		27	
19	Mid Pool	1+83.47	2293.27	3.00%	2296.97	30	3.7
20	Glide	1+89.47	2293.45	15.00%		30	
21	Head of Rffle	1+92.47	2293.90	-5.50%	2296.5	27	2.6
22	Head of Cascade	2+04.47	2293.24	-17.00%		27	
23	Mid Pool	2+12.47	2291.88	3.00%	2295.58	30	3.7
24	Glide	2+18.47	2292.06	15.00%		30	
25	Head of Rffle	2+21.47	2292.51	-5.50%	2295.11	27	2.6
26	Head of Cascade	2+33.47	2291.85	-17.00%		27	
27	Mid Pool	2+41.47	2290.49	3.00%	2294.19	30	3.7
28	Glide	2+47.47	2290.67	15.00%		30	
29	Head of Rffle	2+50.47	2291.12	-5.50%	2293.72	27	2.6
30	Head of Cascade	2+62.47	2290.46	-17.00%		27	
31	Mid Pool	2+70.47	2289.10	3.00%	2292.8	30	3.7
32	Glide	2+76.47	2289.28	15.00%		30	
33	Head of Rffle	2+79.47	2289.73	-5.50%	2292.33	27	2.6
34	Head of Cascade	2+91.47	2289.07	-17.00%		27	
35	Mid Pool	2+99.47	2287.71	3.00%	2291.41	30	3.7
36	Glide	3+05.47	2287.89	15.00%		30	
37	Head of Rffle	3+08.47	2288.34	-5.50%	2290.94	27	2.6
38	Head of Cascade	3+20.47	2287.68	-17.00%		27	
39	Mid Pool	3+28.47	2286.32	3.00%	2290.02	30	3.7
40	Glide	3+34.47	2286.50	15.00%		30	
41	Head of Rffle	3+37.47	2286.95	-5.50%	2289.55	27	2.6
42	Head of Cascade	3+49.47	2286.29	-17.00%		27	
43	Mid Pool	3+57.47	2284.93	3.00%	2288.63	30	3.7
44	Glide	3+63.47	2285.11	15.00%		30	
45	Head of Rffle	3+66.47	2285.56	-5.50%	2288.16	27	2.6
46	Head of Cascade	3+78.47	2284.90	-17.00%		27	
47	Mid Pool	3+86.47	2283.54	3.00%	2287.24	30	3.7
48	Glide	3+92.47	2283.72	15.00%		30	
49	Head of Rffle	3+95.47	2284.17	-5.50%	2286.77	27	2.6
50	Head of Cascade	4+07.47	2283.51	-17.00%		27	
51	Mid Pool	4+15.47	2282.15	3.00%	2285.85	30	3.7
52	Glide	4+21.47	2282.33	15.00%		30	
53	Head of Rffle	4+24.47	2282.78	-5.50%	2285.38	27	2.6
54	Head of Cascade	4+36.47	2282.12	-17.00%		27	
55	Mid Pool	4+44.47	2280.76	3.00%	2284.46	30	3.7
56	Glide	4+50.47	2280.94	15.00%		30	
57	Head of Rffle	4+53.47	2281.39	-5.50%	2283.99	27	2.6
58	Head of Cascade	4+65.47	2280.73	-29.00%		27	
59	Mid Pool	4+70.47	2279.40	4.00%	2283.10	30	3.7
60	Glide	4+76.47	2279.72	16.00%		30	
61	Head of Rffle	4+79.47	2280.20	-5.50%	2282.8	27	2.6
62	Head of Cascade	4+91.47	2279.54	-25.00%		27	
63	Mid Pool	4+99.47	2277.54	4.00%	2281.24	30	3.7
64	Glide	5+05.47	2277.78	16.00%		30	
65	Head of Rffle	5+08.47	2278.25	-5.50%	2280.86	27	2.6
66	Head of Cascade	5+20.47	2277.60	-25.00%		27	
67	Mid Pool	5+28.47	2275.60	4.00%	2279.3	30	3.7
68	Glide	5+34.47	2275.84	16.00%		30	
69	Head of Rffle	5+37.47	2276.32	-5.50%	2278.92	27	2.6
70	Head of Cascade	5+49.47	2275.66	-25.00%		27	
71	Mid Pool	5+57.47	2273.66	4.00%	2277.36	30	3.7
72	Glide	5+63.47	2273.90	16.00%		30	
73	Head of Rffle	5+66.47	2274.38	-5.50%	2276.98	27	2.6
74	Head of Cascade	5+78.47	2273.72	-25.00%		27	
75	Mid Pool	5+86.47	2271.72	4.00%	2275.42	30	3.7
76	Glide	5+92.47	2271.96	16.00%		30	
77	Head of Rffle	5+95.47	2272.44	-5.50%	2275.04	27	2.6
78	Head of Cascade	6+07.47	2271.78	-25.00%		27	
79	Mid Pool	6+15.47	2269.78	4.00%	2273.48	30	3.7
80	Glide	6+21.47	2270.02	16.00%		30	
81	Head of Rffle	6+24.47	2270.50	-5.50%	2273.1	27	2.6
82	Head of Cascade	6+36.47	2269.84	-25.00%		27	
83	Mid Pool	6+44.47	2267.84	4.00%	2271.54	30	3.7
84	Glide	6+50.47	2268.08	16.00%		30	
85	Head of Rffle	6+53.47	2268.56	-5.50%	2271.16	27	2.6
86	Head of Cascade	6+65.47	2267.90	-25.00%		27	
87	Mid Pool	6+73.47	2265.90	4.00%	2269.6	30	3.7
88	Glide	6+79.47	2266.14	16.00%		30	
89	Head of Rffle	6+82.47	2266.62	-5.50%	2269.22	27	2.6
90	Head of Cascade	6+94.47	2265.96	-25.00%		27	
91	Mid Pool	7+02.47	2263.96	4.00%	2267.66	30	3.7
92	Glide	7+08.47	2264.20	16.00%		30	
93	Head of Rffle	7+11.47	2264.68	-5.50%	2267.28	27	2.6
94	Head of Cascade	7+23.47	2264.02	-25.00%		27	
95	Mid Pool	7+31.47	2262.02	4.00%	2265.72	30	3.7
96	Glide	7+37.47	2262.26	16.00%		30	
97	Head of Rffle	7+40.47	2262.74	-5.50%	2265.34	27	2.6
98	Tie-In	7+64.56	2261.42			27	

STREAM SITE 3

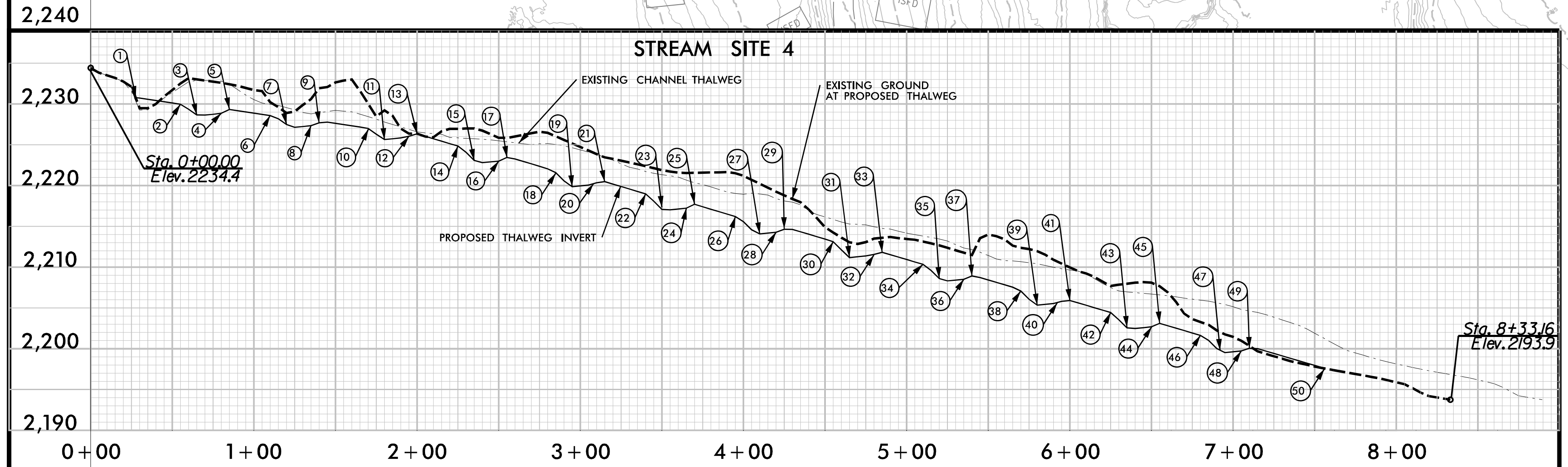
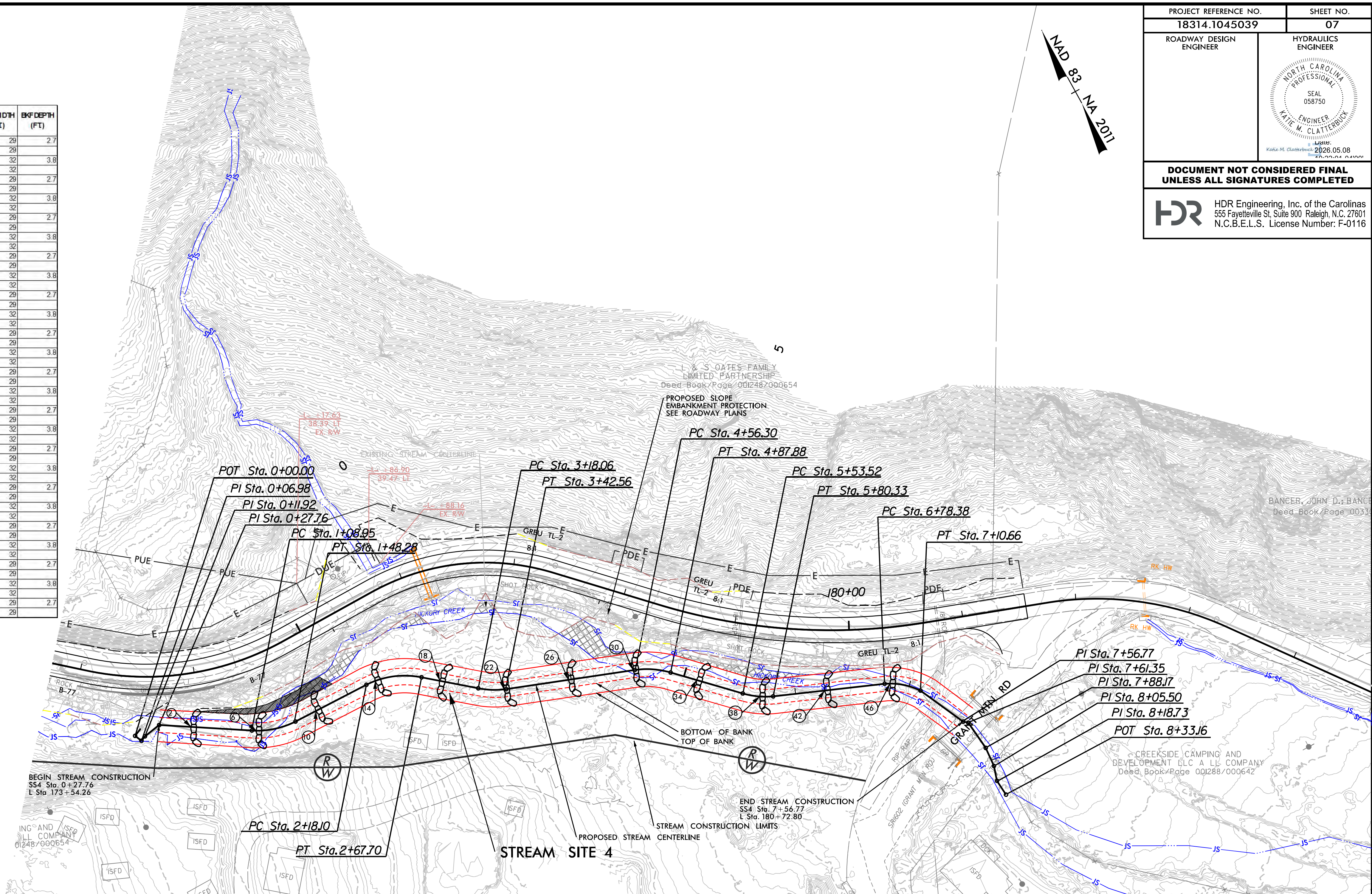
POINTID	FEATURE	STATION	CHANNEL CL. ELEV	CHANNEL SLOPE	BKF ELEV	BKF WIDTH (FT.)	BKF DEPTH (FT.)
1	Head of Rffle	0+25.20	2251.80	-4.00%	2254.50	29	2.7
2	Head of Cascade	0+53.20	2250.68	-11.00%		29	
3	Mid Pool	0+63.20	2249.58	2.00%	2253.38	32	3.8
4	Glide	0+78.20	2249.88	8.00%		32	
5	Head of Rffle	0+83.20	2250.28	-4.00%	2252.98	29	2.7
6	Head of Cascade	1+11.20	2249.16	-24.00%		29	
7	Mid Pool	1+21.20	2246.76	4.00%	2250.56	32	3.8
8	Glide	1+36.20	2247.36	8.00%		32	
9	Head of Rffle	1+41.20	2247.76	-6.00%	2250.46	29	2.7
10	Head of Cascade	1+69.20	2246.08	-24.00%		29	
11	Mid Pool	1+79.20	2243.68	4.00%	2247.48	32	3.8
12	Glide	1+94.20	2244.28	8.00%		32	
13	Head of Rffle	1+99.20	2244.68	-6.00%	2247.38	29	2.7
14	Tie-In	2+14.82	2243.74			29	

REVISIONS

NOTE:
 1. ENGINEER MAY MAKE CHANNEL ALIGNMENT AND PROFILE ADJUSTMENTS IN THE FIELD BASED ON SITE CONDITIONS INCLUDING EXISTING STREAM CROSSING STRUCTURES.
 2. PRIVATE BRIDGES AND CULVERTS TO BE DESIGNED IN SEPARATE PROJECTS AND NOT INCLUDED ON THESE PLANS.

POINTID	FEATURE	STATION	CHANNEL CL. ELEV	CHANNEL SLOPE	BKF/ELEV	BKF WIDTH (FT)	BKF DEPTH (FT)
1	Head of Riffle	0+27.76	2230.80	-3.00%	2233.5	29	2.7
2	Head of Cascade	0+55.76	2229.96	-14.00%		29	
3	Mid Pool	0+65.76	2228.56	2.00%	2232.36	32	3.8
4	Glide	0+79.76	2228.84	10.00%		32	
5	Head of Riffle	0+84.76	2229.34	-3.00%	2232.04	29	2.7
6	Head of Cascade	1+12.76	2228.50	-14.00%		29	
7	Mid Pool	1+22.76	2227.10	2.00%	2230.9	32	3.8
8	Glide	1+36.76	2227.38	10.00%		32	
9	Head of Riffle	1+41.76	2227.88	-3.00%	2230.58	29	2.7
10	Head of Cascade	1+68.76	2227.04	-14.00%		29	
11	Mid Pool	1+79.76	2225.64	2.00%	2229.44	32	3.8
12	Glide	1+83.76	2225.92	10.00%		32	
13	Head of Riffle	1+88.76	2226.42	-6.00%	2229.12	29	2.7
14	Head of Cascade	2+26.76	2224.74	-20.00%		29	
15	Mid Pool	2+36.76	2223.74	2.00%	2226.54	32	3.8
16	Glide	2+50.76	2223.02	10.00%		32	
17	Head of Riffle	2+55.76	2223.52	-8.00%	2226.22	29	2.7
18	Head of Cascade	2+83.76	2221.84	-20.00%		29	
19	Mid Pool	2+93.76	2219.84	2.00%	2223.64	32	3.8
20	Glide	3+07.76	2220.12	10.00%		32	
21	Head of Riffle	3+12.76	2220.62	-6.00%	2223.32	29	2.7
22	Head of Cascade	3+40.76	2218.94	-20.00%		29	
23	Mid Pool	3+50.76	2216.94	2.00%	2220.74	32	3.8
24	Glide	3+64.76	2217.22	10.00%		32	
25	Head of Riffle	3+69.76	2217.72	-6.00%	2220.42	29	2.7
26	Head of Cascade	3+97.76	2216.04	-20.00%		29	
27	Mid Pool	4+07.76	2214.04	2.00%	2217.84	32	3.8
28	Glide	4+21.76	2214.32	10.00%		32	
29	Head of Riffle	4+26.76	2214.82	-5.90%	2217.52	29	2.7
30	Head of Cascade	4+54.76	2213.17	-20.00%		29	
31	Mid Pool	4+64.76	2211.17	2.00%	2214.968	32	3.8
32	Glide	4+78.76	2211.45	9.00%		32	
33	Head of Riffle	4+83.76	2211.90	-5.90%	2214.588	29	2.7
34	Head of Cascade	5+11.76	2210.25	-20.00%		29	
35	Mid Pool	5+21.76	2208.25	2.00%	2212.046	32	3.8
36	Glide	5+35.76	2208.53	9.00%		32	
37	Head of Riffle	5+40.76	2208.98	-5.90%	2211.676	29	2.7
38	Head of Cascade	5+68.76	2207.32	-20.00%		29	
39	Mid Pool	5+78.76	2205.32	2.00%	2209.124	32	3.8
40	Glide	5+92.76	2205.60	9.00%		32	
41	Head of Riffle	5+97.76	2206.05	-5.90%	2208.754	29	2.7
42	Head of Cascade	6+25.76	2204.40	-20.00%		29	
43	Mid Pool	6+35.76	2202.40	2.00%	2206.202	32	3.8
44	Glide	6+49.76	2202.68	9.00%		32	
45	Head of Riffle	6+54.76	2203.13	-5.90%	2205.832	29	2.7
46	Head of Cascade	6+82.76	2201.48	-20.00%		29	
47	Mid Pool	6+92.76	2199.48	2.00%	2203.28	32	3.8
48	Glide	7+06.76	2199.76	9.00%		32	
49	Head of Riffle	7+11.76	2200.21	-5.90%	2202.91	29	2.7
50	Tie-in	7+56.77	2197.55			29	

LEGEND:
 BIOENGINEERING LIVE STAKING AREA



SEE SHEET 2D-1 FOR STREAM ALIGNMENT DATA

PLOT DRIVER: NCDOT_pdf_color_eng_50.plt
 USER: KCLATTERBU
 FILE: \PENTABLE1_US-744_CMGC_STREAM.HDI
 DATE: 5/8/2026
 TIME: 9:25:55 AM

REVISIONS

6/2/2019