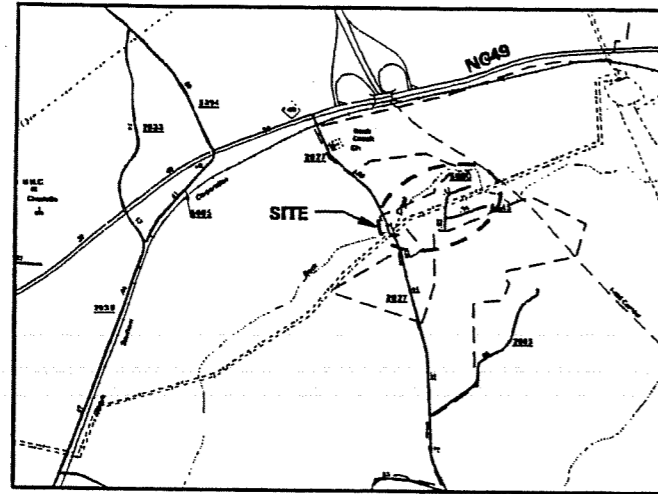


TIP#: R-2559WM



VICINITY MAP
NOT TO SCALE

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

MECKLENBURG COUNTY

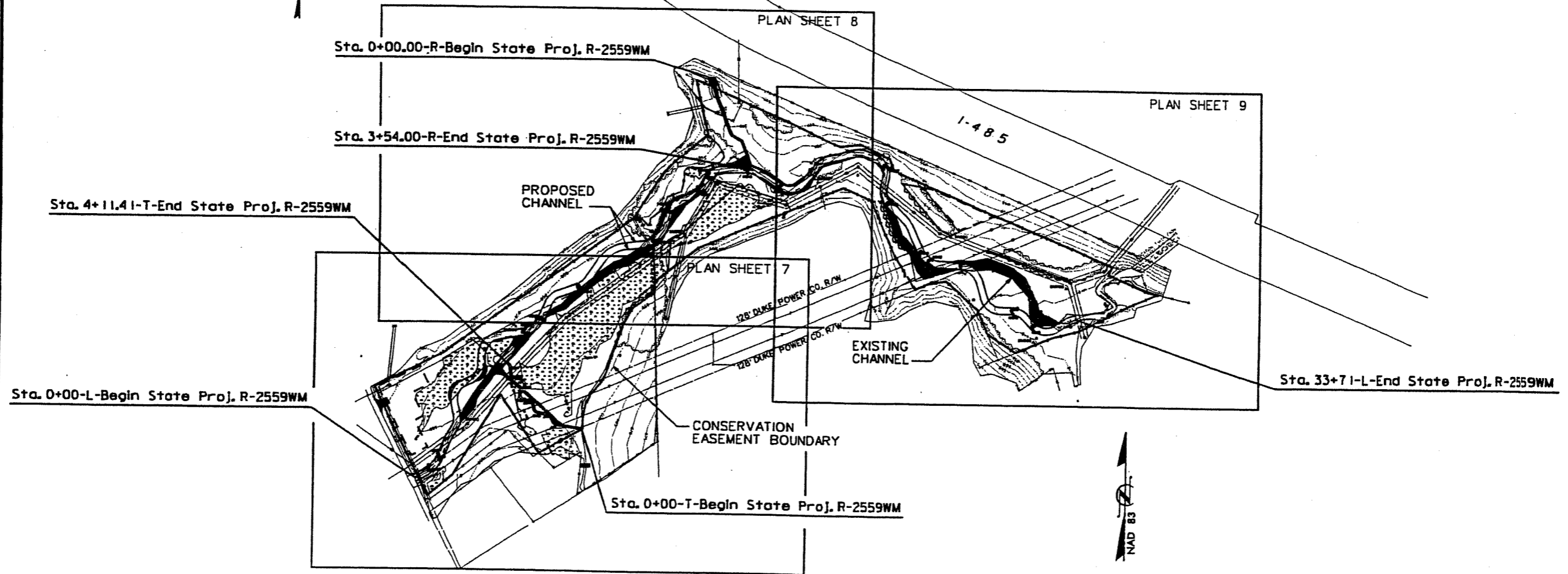
LOCATION: BACK CREEK STREAM RESTORATION/ENHANCEMENT

AS-BUILT

TYPE OF WORK:

- IN-STREAM STRUCTURES
- FLOODPLAIN GRADING / SCARIFICATION
- NEW CHANNEL CONSTRUCTION

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	R-2559WM	1	31
STATE PROJECT	P.A. NUMBER	DESCRIPTION	
34464.4.1		P.E.	
34464.4.2		RW	
34464.4.3		CONST.	

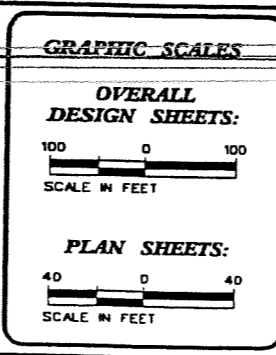


Final Plans 7/7/04
WBS#: 34464.4.3

SITE AREA: 20.1± ACRES

DESIGN DATA:

	L	T	R
STREAM CHANNEL TYPE:	E	E	B
STREAM LENGTH EXISTING:	3332± in. ft.	359± in. ft.	354± in. ft.
STREAM LENGTH PROPOSED:	3310± in. ft.	411± in. ft.	354± in. ft.
BANKFULL CROSS-SECTIONAL AREA:	53.3 sf.	4.8 sf.	2.3 sf.
BANKFULL WIDTH:	23.6 ft.	6.9 ft.	5.5 ft.
BANKFULL AVERAGE DEPTH:	2.3 ft.	0.7 ft.	0.4 ft.
WIDTH/DEPTH RATIO:	10.3	9.9	13.8



Prepared For:

NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION

No.	Revisions	Date

Prepared In the office of:

EcoScience Corporation
1501 Hargett St., Suite 301
Raleigh, North Carolina 27604
Ph: 919 838-1433
Fax: 919 838-1418

DATE: JUNE 2004

DESIGN ENGINEER: DAVID G. MODLIN, JR.

PROJECT MANAGER: W. GRANT LEWIS

7/7/04

INDEX OF SHEETS

1:	TITLE SHEET
1A:	INDEX OF SHEETS GENERAL NOTES CONSTRUCTION SEQUENCING MORPHOLOGICAL TABLE
1B:	CONVENTIONAL SYMBOLS - NCDOT
2-2B:	DETAIL SHEETS - NCDOT
2C:	ELEMENT SYMBOLOLOGY - ESC
2D-2E:	DETAIL SHEETS - ESC
2F:	NEW CHANNEL LINE DATA
2G:	RIFFLE AND POOL DATA TABLES
3:	SUMMARY OF QUANTITIES / SUMMARY OF EARTHWORK
4:	EXISTING CONDITIONS
5:	NEW CHANNEL LAYOUT
6:	OVERALL SITE PLAN
7-9:	PLAN SHEETS
10:	PROFILE SHEET
X1-XB:	STREAM CROSS-SECTIONS
EC1-EC4:	EROSION CONTROL PLANS

CONSTRUCTION SEQUENCING

Mobilize equipment and materials to the site.

Install construction entrance per erosion control plan.

Establish a staging area as depicted on the plans and mark construction equipment access locations with visible markers. Construction equipment shall be contained within the limits of construction access as depicted in the plans or specified by the engineer.

Install temporary erosion control measures.

Remove and dispose of existing fence and install fencing and gates as depicted in the plans and as directed by the engineer.

Begin floodplain grading, including excavation of bankfull benches at locations depicted in the plans and as directed by the engineer. Stockpile soil material in areas designated on the plans.

Install impervious dikes and pump-around system to pump stream discharge around the immediate work area.

Begin stream construction from station 0+00. Construction shall proceed in successive reaches with the upstream reach being completed prior to initiating construction of the adjacent downstream reach. Each reach shall be limited in length to work that can be completed within one day. Completion of a reach shall consist of channel construction, floodplain grading, in-stream structure installation, bed material installation, and erosion control measures. Construction shall be done in the dry, with the channel flow pumped around the reach under construction.

At the end of each day's construction work, the contractor shall seed all disturbed areas and cover the stream banks and bankfull benches with coir fiber matting. In addition, the contractor shall be responsible for maintaining all temporary erosion control measures on a daily basis throughout the construction process.

Once channel construction is complete, the contractor shall install channel plugs to direct stream flow into the new channel. The contractor shall then fill in the existing channel to the extent feasible and as directed by the engineer.

After all instream work is completed, the contractor shall remove temporary erosion control measures and temporary stream access and scarify any compacted areas as directed by the engineer. All portions of the site shall be stabilized with temporary erosion control measures.

MORPHOLOGICAL TABLE

BACK CREEK STREAM RESTORATION SITE Morphological Characteristics of Proposed Channel		
Variables	Proposed Reach Back Creek	
1 Stream Type	E4/S	
2 Drainage Area (mi ²)	3.7-4.1	
3 Bankfull Discharge (cfs)	250-300	
Dimension Variables (ft.)		
4 Bankfull Cross Sectional Area (Abkf)	56	
5 Bankfull Width (W _{bf})	Mean: 22.4	Range: 21.2-23.7
6 Bankfull Mean Depth (Dbkf)	Mean: 2.5	Range: 2.4-2.6
7 Bankfull Maximum Depth (D _{max})	Mean: 3.3	Range: 2.8-3.8
8 Pool Width (W _{pool})	Mean: 29.1	Range: 22.4-33.6
9 Maximum Pool Depth (D _{pool})	Mean: 4.3	Range: 3.5-7.5
10 Width of Floodprone Area (W _{fpa})	Mean: 230	Range: 114-297
Dimension Ratios		
11 Entrenchment Ratio (W _{fpa} /W _{bf})	Mean: 10.3	Range: 5.1-13.3
12 Width/Depth Ratio (W _{bf} /D _{bf})	Mean: 9	Range: 8-10
13 Max. D _{max} /D _{bf} Ratio	Mean: 1.3	Range: 1.1-1.6
14 Low Bank Height/Max. D _{bf} Ratio	Mean: 1.0	Range: 1.0-1.2
15 Pool Depth/Bankfull Mean Depth (D _{pool} /D _{bf})	Mean: 1.7	Range: 1.4-3.0
16 Pool width/Bankfull Width (W _{pool} /W _{bf})	Mean: 1.3	Range: 1.0-1.5
17 Pool Area/Bankfull Cross Sectional Area	Mean: 1.2	Range: 1.1-1.4
Pattern Variables		
18 Pool to Pool Spacing (L _{p-p})	Mean: 126	Range: 60-210
19 Meander Length (L _m)	Mean: 220	Range: 108-347
20 Belt Width (W _{belt})	Mean: 57	Range: 25-140
21 Radius of Curvature (R _c)	Mean: 58	Range: 43-100
22 Sinuosity (Sin)	1.5	
Pattern Ratios		
23 Pool to Pool Spacing/Bankfull Width (L _{p-p} /W _{bf})	Mean: 5.6	Range: 2.7-9.4
24 Meander Length/Bankfull Width (L _m /W _{bf})	Mean: 9.8	Range: 7.4-15.5
25 Meander Width Ratio (W _{belt} /W _{bf})	Mean: 2.5	Range: 1.1-6.3
26 Radius of Curvature/Bankfull Width (R _c /W _{bf})	Mean: 2.6	Range: 2.0-4.5
Profile Variables		
27 Average Water Surface Slope (S _{ave})	0.0034	
28 Valley Slope (S _{valley})	0.0051	
29 Riffle Slope (S _{riffle})	Mean: 0.005	Range: 0.0033-0.0079
30 Pool Slope (S _{pool})	Mean: 0.0017	Range: 0-0.003
Profile Ratios		
31 Riffle Slope/Water Surface Slope (S _{riffle} /S _{ave})	Mean: 1.5	Range: 1.0-2.3
32 Pool Slope/Water Surface Slope (S _{pool} /S _{ave})	Mean: 0.5	Range: 0.1-0.9

GENERAL NOTES

TOPOGRAPHIC SURVEY PERFORMED FOR NORTH CAROLINA DEPARTMENT OF TRANSPORTATION BY ESP ASSOCIATES, P. A. ALL WORK SHALL BE PERFORMED IN ACCORDANCE WITH THE FOLLOWING STANDARDS:

A) NORTH CAROLINA DEPARTMENT OF TRANSPORTATION "STANDARD SPECIFICATIONS FOR ROADS AND STRUCTURES, DATED JANUARY 2002, AND ANY SUPPLEMENTS THERETO ISSUED PRIOR TO THE DATE OF RECEIPT OF BIDS.

B) NORTH CAROLINA DEPARTMENT OF TRANSPORTATION "ROADWAY STANDARD DRAWINGS, ENGLISH" DATED JANUARY 2002, AND ANY SUPPLEMENTS ISSUED THERETO PRIOR TO THE DATE OF RECEIPT OF BIDS.

ALL CONSERVATION EASEMENT CORNER MARKERS SHALL BE PLACED BY OTHERS.

THE CONTRACTOR IS RESPONSIBLE FOR AVOIDING ANY DISTURBANCE OR DAMAGE TO EXISTING UTILITIES AND SHALL BE RESPONSIBLE FOR IMMEDIATELY REPAIRING ANY DAMAGES AT A COST INCIDENT TO THIS CONTRACT.

ALL FENCING, EXCEPT FOR STREAM CROSSINGS, SHALL BE WOVEN WIRE WITH 4" X 4" TREATED POSTS SET ON 14' CENTERS AS DETAILED IN NCDOT STANDARD DRAWING NO. 866.02. WOVEN WIRE SHALL BE OF HIGH TENSILE STEEL. GATES SHALL FOLLOW NCDOT STANDARD DRAWING NO. 866.04 FOR ALTERNATE CATTLE GATE. GATES INDICATED AS 16' SHALL CONSIST OF SINGLE 16' GATE WITH HINGE AND LATCH ASSEMBLIES AS APPROVED BY THE ENGINEER. BARBED WIRE FENCING FOR STREAM CROSSINGS SHALL CONFORM TO NCDOT STANDARD DRAWING NO. 866.02.

THE EXISTING CHANNEL SHALL BE FILLED TO THE MAXIMUM EXTENT FEASIBLE WITH MATERIAL EXCAVATED ON-SITE AND STOCKPILED ADJACENT TO REACHES OF CHANNEL OR DITCHES TO BE BACKFILLED.

THE CONTRACTOR MAY UTILIZE THE DESIGNATED STAGING AREA AND THE AREA INSIDE THE PROPOSED CONSERVATION EASEMENT FOR STAGING AND STOCKPILING EQUIPMENT AND MATERIALS.

THE STREAM SHALL BE CONSTRUCTED BY THE TYPICAL SECTIONS. THE GRADING CONTOURS ARE PROVIDED FOR REFERENCE ONLY.

PROJECT REFERENCE NO. R-2559WM	SHEET NO. 1A
PROJECT DESIGN ENGINEER NORTH CAROLINA PROFESSIONAL SEAL 8667 DAVID G. ANDERSON, P.E.	

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

CONVENTIONAL SYMBOLS

*S.U.E = SUBSURFACE UTILITY ENGINEER

ROADS & RELATED ITEMS

Edge of Pavement	-----
Curb	-----
Prop. Slope Stakes Cut	----- C
Prop. Slope Stakes Fill	----- F
Prop. Woven Wire Fence	○-----○
Prop. Chain Link Fence	□-----□
Prop. Barbed Wire Fence	◇-----◇
Prop. Wheelchair Ramp	WCP
Curb Cut for Future Wheelchair Ramp	CCP
Exist. Guardrail	-----
Prop. Guardrail	-----
Equality Symbol	⊕
Pavement Removal	XXXXXX

RIGHT OF WAY

Baseline Control Point	◆
Existing Right of Way Marker	△
Exist. Right of Way Line w/Marker	----- △
Prop. Right of Way Line with Proposed RW Marker (Iron Pin & Cap)	----- ▲
Prop. Right of Way Line with Proposed (Concrete or Granite) RW Marker	----- ⊙
Exist. Control of Access Line	----- ⊙
Prop. Control of Access Line	----- ⊙
Exist. Easement Line	----- E
Prop. Temp. Construction Easement Line	----- E
Prop. Temp. Drainage Easement Line	----- TDE
Prop. Perm. Drainage Easement Line	----- PDE

HYDROLOGY

Stream or Body of Water	-----
River Basin Buffer	----- RBB
Flow Arrow	→
Disappearing Stream	----- →
Spring	⊕
Swamp Marsh	⊕
Shoreline	-----
Falls, Rapids	-----
Prop. Lateral, Tail, Head Ditches	----- LTD

STRUCTURES

MAJOR	
Bridge, Tunnel, or Box Culvert	----- CONC
Bridge Wing Wall, Head Wall and End Wall	----- CONC WW

MINOR	
Head & End Wall	----- CONC HW
Pipe Culvert	----- =
Footbridge	----- <----->
Drainage Boxes	□ CB
Paved Ditch Gutter	-----

UTILITIES

Exist. Pole	•
Exist. Power Pole	•
Prop. Power Pole	•
Exist. Telephone Pole	•
Prop. Telephone Pole	•
Exist. Joint Use Pole	•
Prop. Joint Use Pole	•
Telephone Pedestal	⊕
UG Telephone Cable Hand Hold	⊕
Cable TV Pedestal	⊕
UG TV Cable Hand Hold	⊕
UG Power Cable Hand Hold	⊕
Hydrant	⊕
Satellite Dish	⊕
Exist. Water Valve	⊕
Sewer Clean Out	⊕
Power Manhole	⊕
Telephone Booth	⊕
Cellular Telephone Tower	⊕
Water Manhole	⊕
Light Pole	⊕
H-Frame Pole	⊕
Power Line Tower	⊕
Pole with Base	⊕
Gas Valve	⊕
Gas Meter	⊕
Telephone Manhole	⊕
Power Transformer	⊕
Sanitary Sewer Manhole	⊕
Storm Sewer Manhole	⊕
Tank; Water, Gas, Oil	⊕
Water Tank with Legs	⊕
Traffic Signal Junction Box	⊕
Fiber Optic Splice Box	⊕
Television or Radio Tower	⊕
Utility Power Line Connects to Traffic Signal Lines Cut Into the Pavement	----- TS

Recorded Water Line	-----
Designated Water Line (S.U.E.*)	-----
Sanitary Sewer	----- SS
Recorded Sanitary Sewer Force Main	----- FSS
Designated Sanitary Sewer Force Main(S.U.E.*)	----- FSS
Recorded Gas Line	-----
Designated Gas Line (S.U.E.*)	-----
Storm Sewer	-----
Recorded Power Line	-----
Designated Power Line (S.U.E.*)	-----
Recorded Telephone Cable	-----
Designated Telephone Cable (S.U.E.*)	-----
Recorded U/G Telephone Conduit	----- TC
Designated U/G Telephone Conduit (S.U.E.*)	----- TC
Unknown Utility (S.U.E.*)	----- TUTL
Recorded Television Cable	-----
Designated Television Cable (S.U.E.*)	-----
Recorded Fiber Optics Cable	-----
Designated Fiber Optics Cable (S.U.E.*)	-----
Exist. Water Meter	⊕
UG Test Hole (S.U.E.*)	⊕
Abandoned According to U/G Record End of Information	ATTUR E.O.I.

BOUNDARIES & PROPERTIES

State Line	-----
County Line	-----
Township Line	-----
City Line	-----
Reservation Line	-----
Property Line	-----
Property Line Symbol	PL
Exist. Iron Pin	⊕
Property Corner	⊕
Property Monument	⊕
Property Number	123
Parcel Number	6
Fence Line	-----
Existing Wetland Boundaries	----- WW & ISBW
High Quality Wetland Boundary	----- HLB
Medium Quality Wetland Boundaries	----- MQ WLB
Low Quality Wetland Boundaries	----- LQ WLB
Proposed Wetland Boundaries	----- WLB
Existing Endangered Animal Boundaries	----- EAB
Existing Endangered Plant Boundaries	----- EPB

BUILDINGS & OTHER CULTURE

Buildings	-----
Foundations	-----
Area Outline	-----
Gate	-----
Gas Pump Vent or UG Tank Cap	-----
Church	-----
School	-----
Park	-----
Cemetery	-----
Dam	-----
Sign	-----
Well	-----
Small Mine	-----
Swimming Pool	-----

TOPOGRAPHY

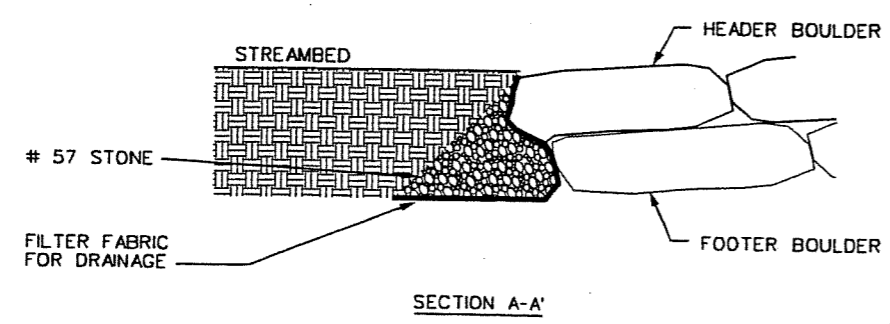
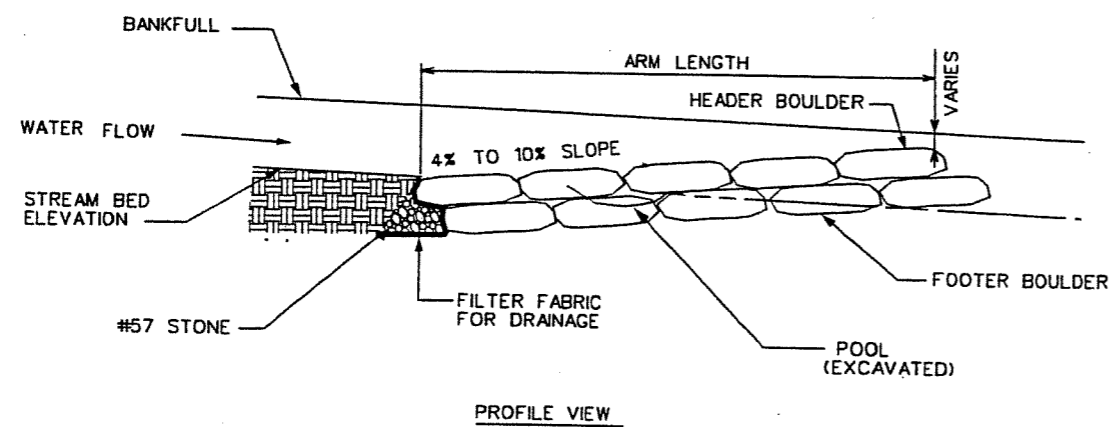
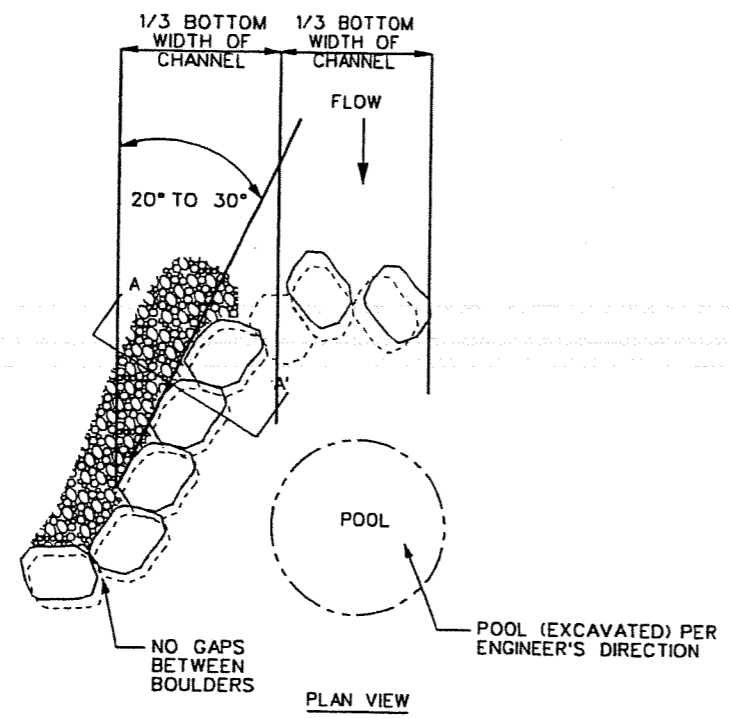
Loose Surface	-----
Hard Surface	-----
Change in Road Surface	-----
Curb	-----
Right of Way Symbol	R/W
Guard Post	⊕ GP
Paved Walk	-----
Bridge	-----
Box Culvert or Tunnel	-----
Ferry	-----
Culvert	-----
Footbridge	-----
Trail, Footpath	-----
Light House	-----

VEGETATION

Single Tree	⊕
Single Shrub	⊕
Hedge	-----
Woods Line	-----
Orchard	-----
Vineyard	-----

RAILROADS

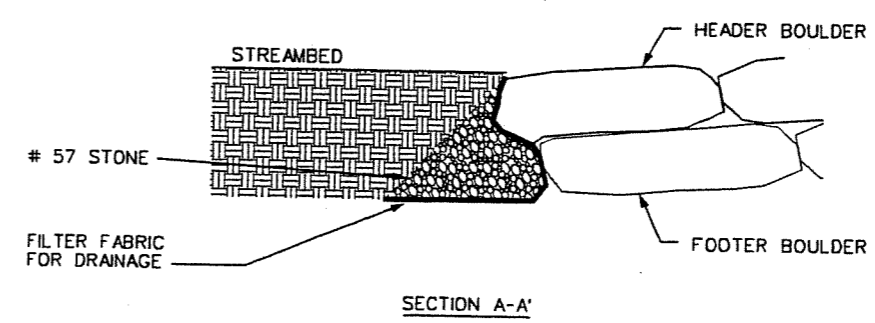
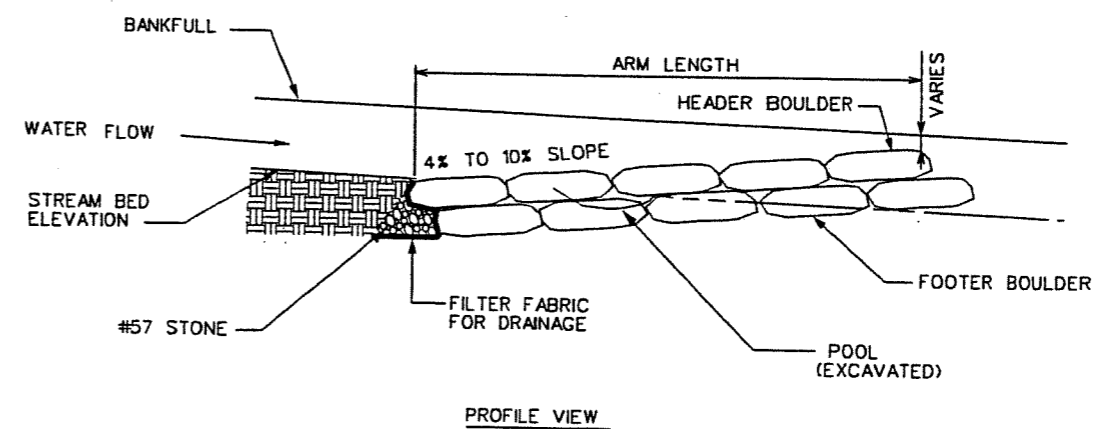
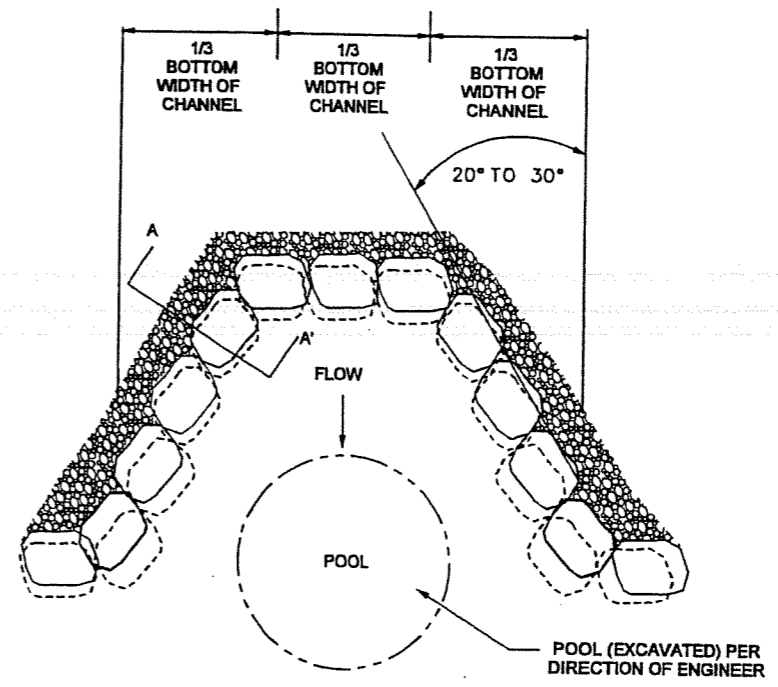
Standard Gauge	-----
RR Signal Milepost	-----
Switch	-----



- NOTES:
1. FILTER FABRIC TOED IN AND DRAPED ON UPSTREAM SIDE OF CROSS-VANE PRIOR TO BACKFILL.
 2. HEADER AND FOOTER BOULDERS ARE LARGE, ANGULAR BOULDERS APPROXIMATELY 48" L x 36" W x 24" D IN SIZE (SEE PROJECT SPECIAL PROVISIONS).

STREAM	ARM LENGTH (FT.)	TIE IN BELOW BANKFULL
L	25.0	0.5
T	7.0	0.3

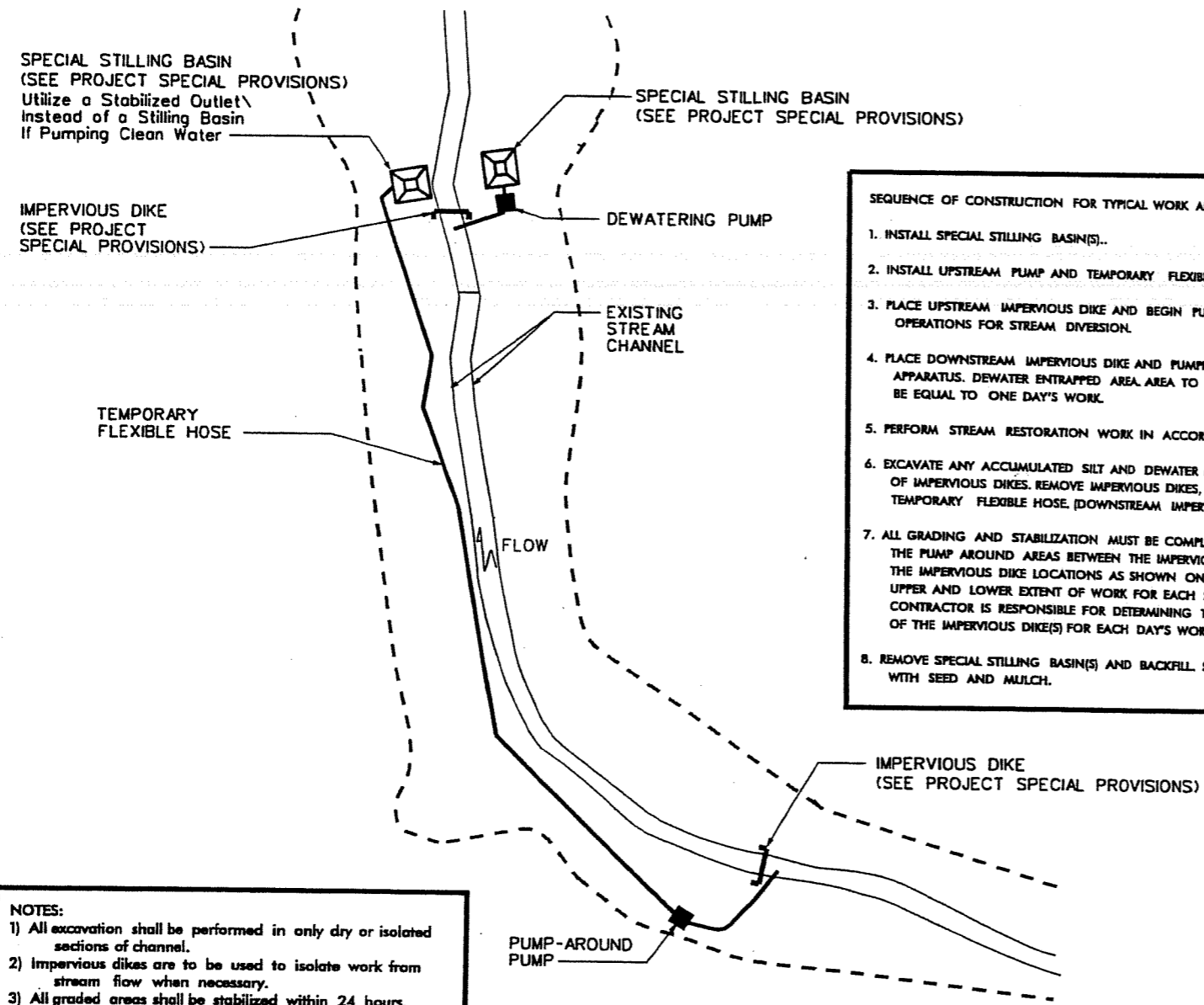
TYPICAL J-HOOK VANE



- NOTES:
1. FILTER FABRIC TOED IN AND DRAPED ON UPSTREAM SIDE OF CROSS-VANE PRIOR TO BACKFILL.
 2. HEADER AND FOOTER BOULDERS ARE LARGE, ANGULAR BOULDERS APPROXIMATELY 48" L x 36" W x 24" D IN SIZE.
 3. STEP CROSS-VANES ARE TYPICAL CROSS-VANES WITH AN ADDITIONAL ROCK SILL CONSTRUCTED WITH HEADER AND FOOTER STONES WHICH SEPARATE PRIMARY AND INTERMEDIATE POOLS.
 4. MODIFIED CROSS-VANES ARE TYPICAL CROSS-VANES WITH ONE ARM SHORTENED.

STREAM	ARM LENGTH (FT.)	TIE IN BELOW BANKFULL
L	25.0	0.5
T	7.0	0.3

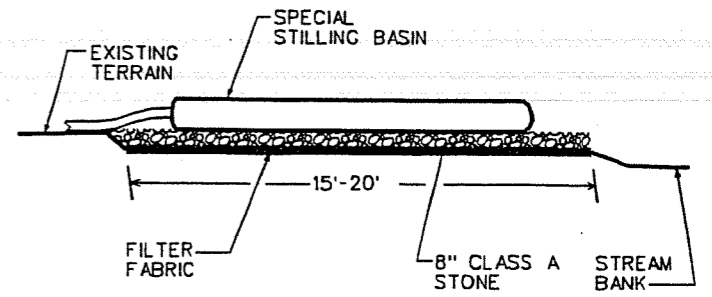
TYPICAL CROSS-VANE



- 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 TO BE DEWATERED SHALL BE EQUAL TO ONE DAY'S WORK.
 5. PERFORM STREAM RESTORATION 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 IN ONE 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.

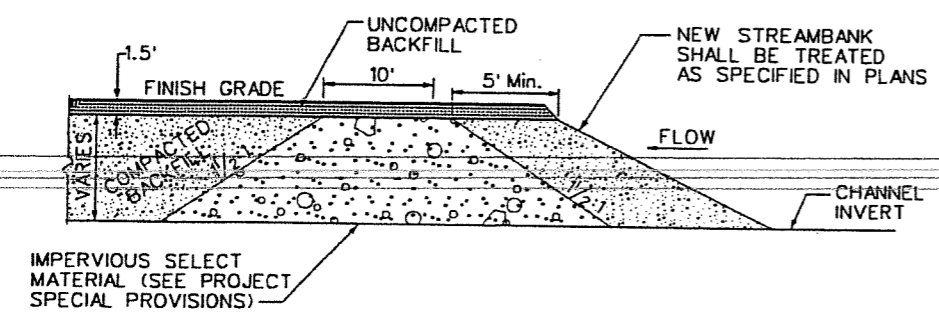
- NOTES:
- 1) All excavation shall be performed in only dry or isolated sections of channel.
 - 2) Impervious dikes are to be used to isolate work from stream flow when necessary.
 - 3) All graded areas shall be stabilized within 24 hours.
 - 4) Maintenance of stream flow operations shall be incidental to the work. This includes polyethylene sheeting, diversion pipes, pumps and hoses.
 - 5) Pumps and hoses shall be of sufficient size to dewater the work area.

TYPICAL PUMP-AROUND OPERATION

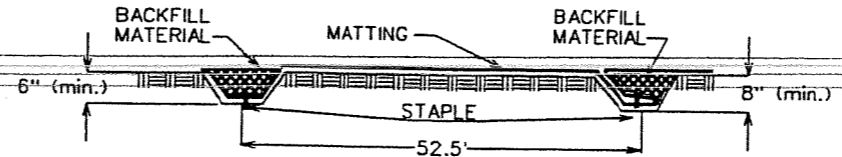


NOTE: PROVIDE STABILIZED OUTLET TO STREAMBANK.

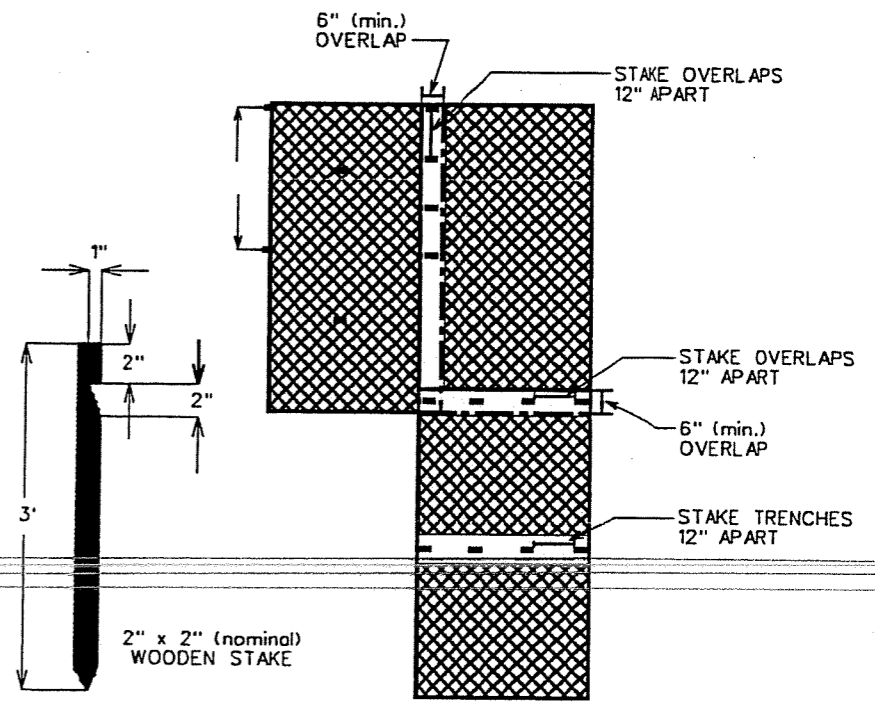
**SPECIAL STILLING BASIN
W/ROCK PAD**

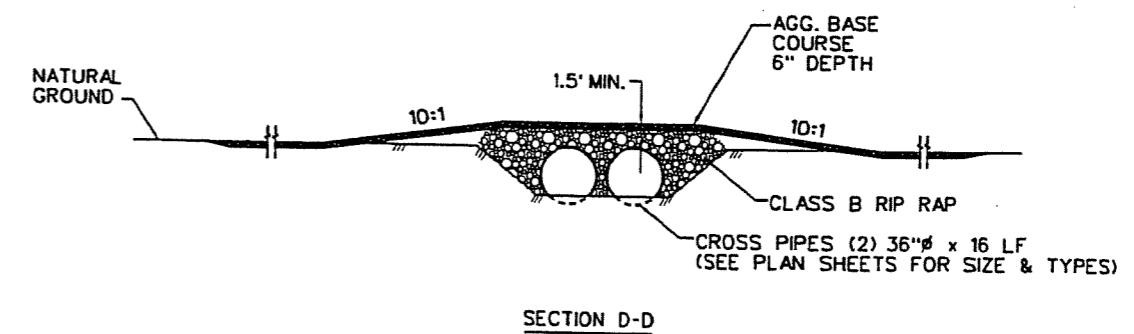
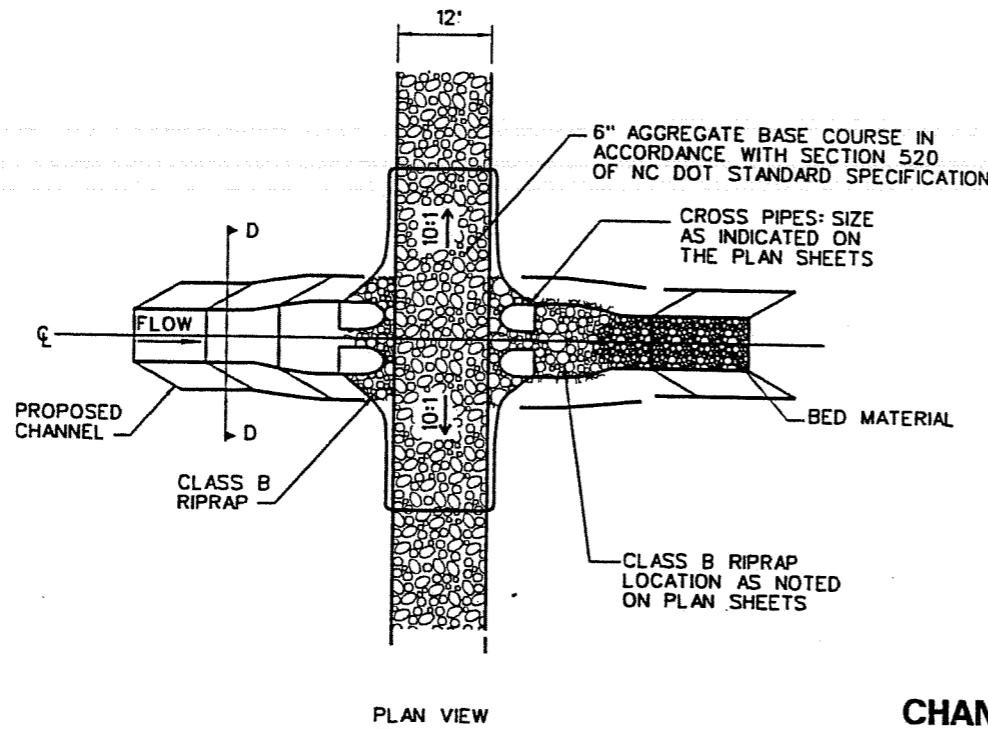


IMPERVIOUS CHANNEL BLOCK

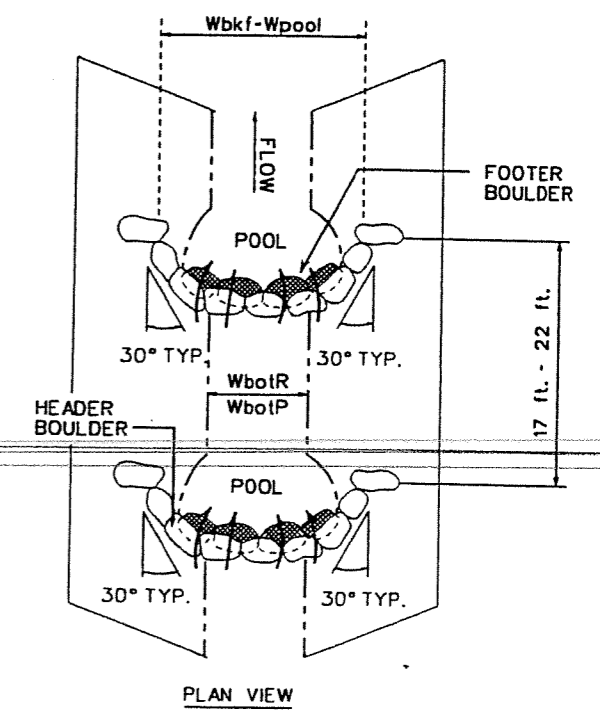
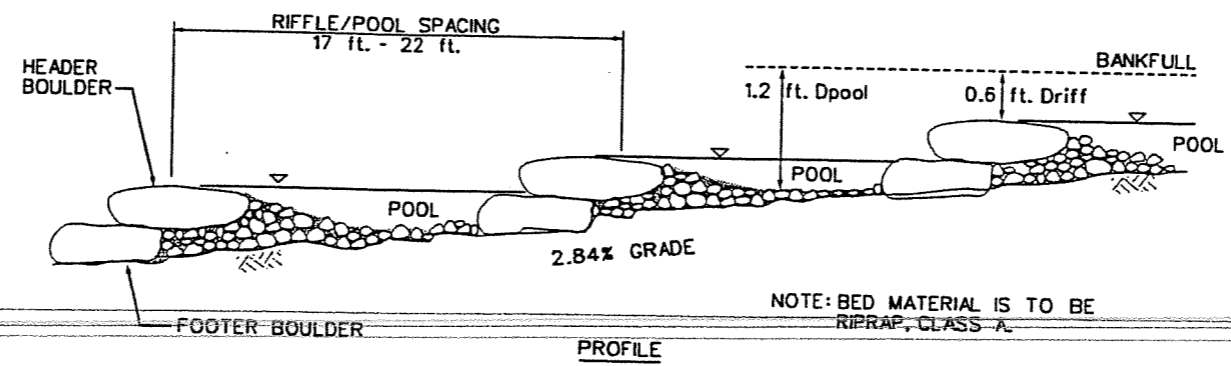
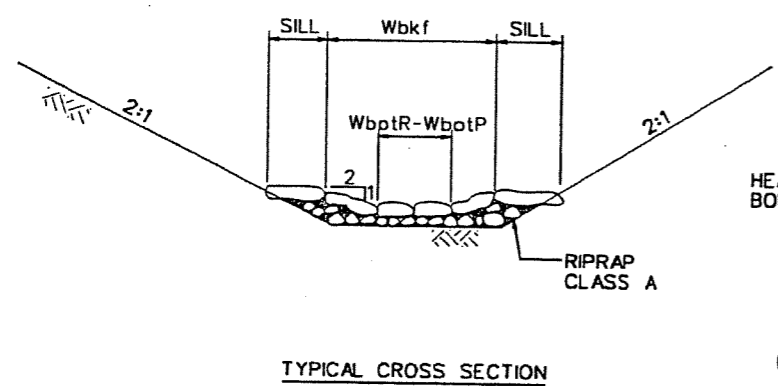


COIR FIBER MATTING DETAIL





CHANNEL CROSSING DETAIL



- NOTES:
1. COVER CHANNEL BED W/ RIPRAP, CLASS A.
 2. FILL VOIDS BETWEEN ANGULAR BOULDERS APPROXIMATELY 48"L x 36"W x 24"D IN SIZE W/ RIPRAP, CLASS A.
 3. RIPRAP, CLASS A INSTALLED TO A MINIMUM DEPTH OF 12 INCHES.
 4. THE CHANNEL SHALL BE LINED WITH FILTER FABRIC FOR DRAINAGE BEFORE INSTALLATION OF BED MATERIAL.

NOTE: BED MATERIAL IS TO BE RIPRAP, CLASS A.

STEP-POOL STRUCTURE
SEE TABLE 1, SHEET 2D.

ECOSCIENCE CORPORATION

ELEMENT SYMBOLOLOGY

TOPOGRAPHY & HYDROGRAPHY

MAJOR CONTOUR	
MINOR CONTOUR	
GRAVEL /DIRT ROAD	
PAVED ROAD	
WETLAND /SWAMP	
DIRECTION OF FLOW	
EXISTING STREAM	
EXISTING WETLAND BOUNDARY	
HIGH QUALITY WETLAND BOUNDARY	
MEDIUM QUALITY WETLAND BOUNDARY	
LOW QUALITY WETLAND BOUNDARY	
PROPOSED WETLAND BOUNDARY	
SPOT ELEVATION	

BUILDINGS & OTHER STRUCTURES

BUILDINGS	
WELL	
BRIDGE	
BOX CULVERT OR TUNNEL	
CULVERT	
BRIDGE WING WALL, HEAD WALL, AND END WALL	
HEAD AND END WALL	
PIPE CULVERT	
FOOTBRIDGE	
DRAINAGE BOXES	
EXISTING FENCE	
POWER POLE	
TELEPHONE POLE	
LIGHT POLE	
POWER LINE TOWER	
SANITARY SEWER MANHOLE	
STORM SEWER MANHOLE	
SANITARY SEWER	
STORM SEWER	
FOOTBRIDGE	
TRAIL, FOOTPATH	
RAIL ROAD	

PROPOSED FEATURES AND STRUCTURES

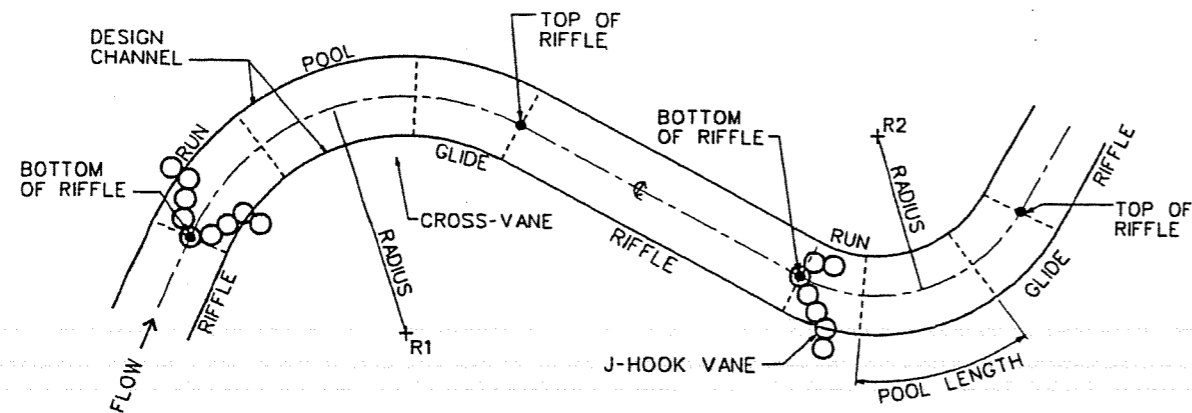
CROSS-VANE	
RADIUS OF CURVATURE CENTER MARK	
CHANNEL CROSSING	
MODIFIED CROSS-VANE	
J-HOOK VANE	
STEP CROSS-VANE	
TEMPORARY STAGING AREA, SOIL STOCKPILING	
NEW CHANNEL	
BORROW AREA	
CHANNEL BACKFILL	
GRADE CONTROL SILL	
MEANDER REVETMENT	
RIPRAP APRON	
IMPERVIOUS CHANNEL BLOCK	
TOP OF RIFFLE	
BOTTOM OF RIFFLE	
CONSTRUCTED BERM	
PROPOSED WOVEN WIRE FENCE	
PROPOSED BARBED WIRE FENCE	
PROPOSED MAJOR CONTOURS	
PROPOSED MINOR CONTOURS	
PROPOSED DIVERSION DITCH	
LIMITS OF CONSTRUCTION	
PROPOSED SAFETY FENCE	
PROPOSED ACCESS ROAD	

BOUNDARIES, PROPERTIES, AND EASEMENTS

COUNTY LINE	
CITY LINE	
PROPERTY LINE	
EXISTING IRON PIN	
RIGHT OF WAY	
PROPERTY MONUMENT	
PARCEL NUMBER	
BENCHMARK	
NCDOT MONUMENT	
UTILITY EASEMENT	
POWER LINE	
EXISTING EASEMENT	
PROPOSED CONSERVATION EASEMENT	

VEGETATION

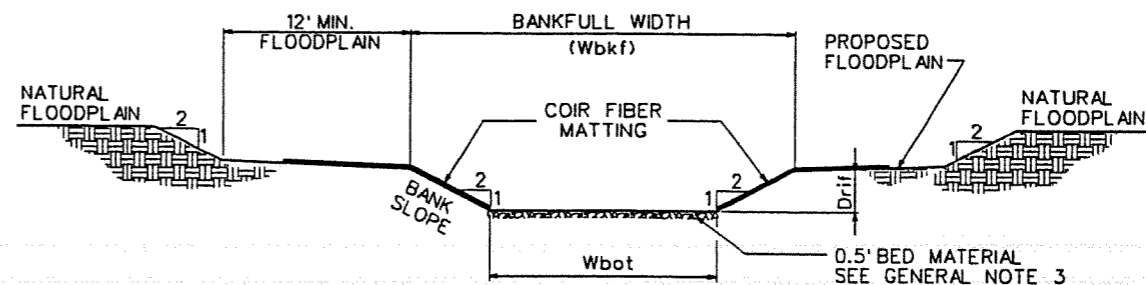
SINGLE TREE	
SINGLE SHRUB	
EXISTING WOODS LINE	
PROPOSED CLEARING LIMITS	



TYPICAL CHANNEL PLAN VIEW

NOTE:

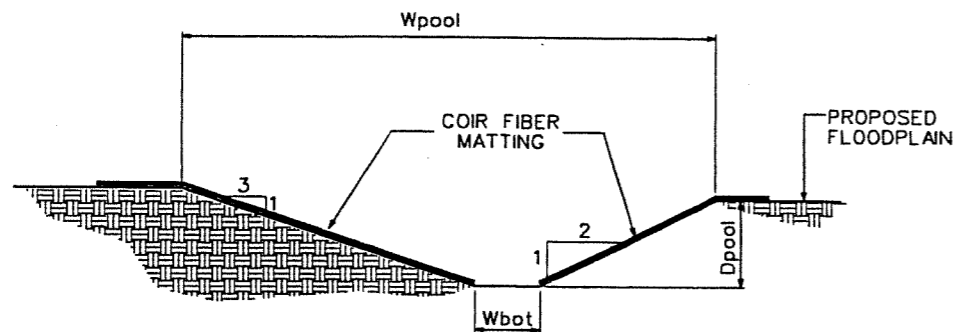
1. THE COORDINATES FOR EACH CENTER OF RADIUS (R), TOP OF RIFFLE (TR), AND BOTTOM OF RIFFLE (BR) ARE INDICATED ON SHEET 2G.



TYPICAL RIFFLE CROSS-SECTION

GENERAL NOTES:

1. CONSTRUCTION OF THE PROPOSED CHANNEL SHALL INCLUDE EXCAVATION OF THE CHANNEL SECTIONS AT THE LOCATIONS DEPICTED ON THE PLAN SHEETS.
2. MATERIAL EXCAVATED FROM THE PROPOSED CHANNEL SHALL BE STOCKPILED AT LOCATIONS DEPICTED ON THE PLAN SHEETS, AND SHALL BE UTILIZED TO FILL THE ABANDONED CHANNEL REACH. BACKFILL MATERIAL SHALL BE COMPACTED TO THE SATISFACTION OF THE ENGINEER.
3. CONTRACTOR SHALL PROVIDE CLASS A EROSION CONTROL STONE SUBSTRATE MATERIAL FOR PROPOSED RIFFLES. SUBSTRATE SHALL BE COMPACTED TO THE SATISFACTION OF THE ENGINEER.



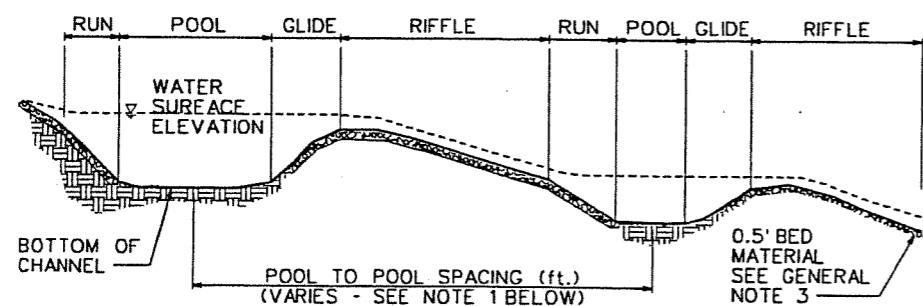
TYPICAL POOL CROSS-SECTION

NOTE:

1. POOL SHOWN FOR LEFT TYPICAL POOL; REVERSE FOR RIGHT TYPICAL POOL

TABLE 1 - CROSS-SECTION DIMENSIONS

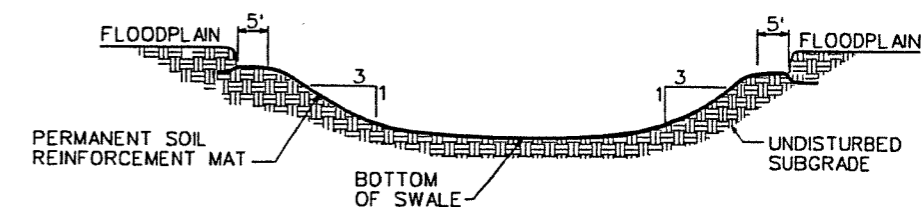
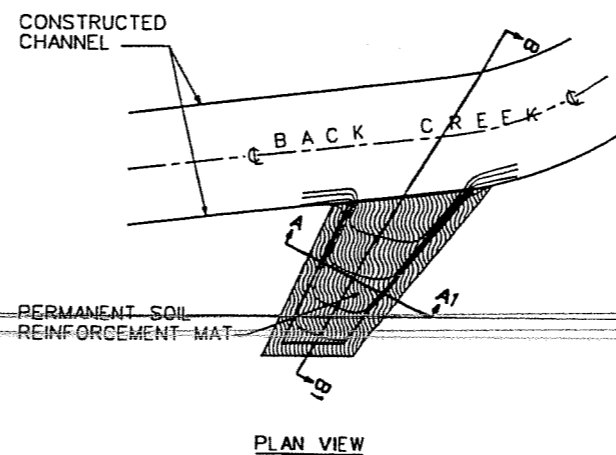
STREAM	REACH	Wbkf (ft.)	Wbot (ft.) Riffle	Drift (ft.)	Wpool (ft.)	Wbot (ft.) Pool	Dpool (ft.)	Width/Depth Ratio
L	Sta. 0+00 - Sta. 10+25	23.2	11.2	3.0	27.8	5.3	4.5	10.5
L	Sta. 10+25 - Sta. 19+90	23.7	11.7	3.0	28.4	5.9	4.5	10.6
L	Sta. 19+90 - Sta. 29+50	23.7	11.5	3.1	28.4	5.4	4.6	10.4
L	Sta. 29+50 - Sta. 33+70	23.8	11.4	3.1	28.6	5.1	4.7	10.4
T	Sta. 0+00 - Sta. 4+11	6.9	3.1	0.95	8.3	1.3	1.4	9.9
R	Sta. 0+00 - Sta. 1+90	5.5	3.1	0.6	5.5	0.7	1.2	11.7
R	Sta. 1+90 - Sta. 3+54	4.9	2.5	0.6	5.9	1.1	0.9	11.0



TYPICAL CHANNEL PROFILE

NOTES:

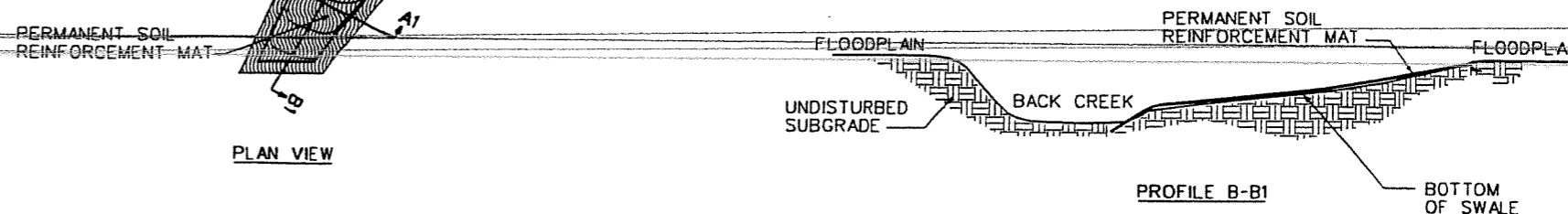
1. POOL TO POOL SPACING (L_{p-p}) IS MEASURED FROM MIDPOINT OF POOL BEND TO MIDPOINT OF THE DOWNSTREAM POOL BEND.



NOTE:

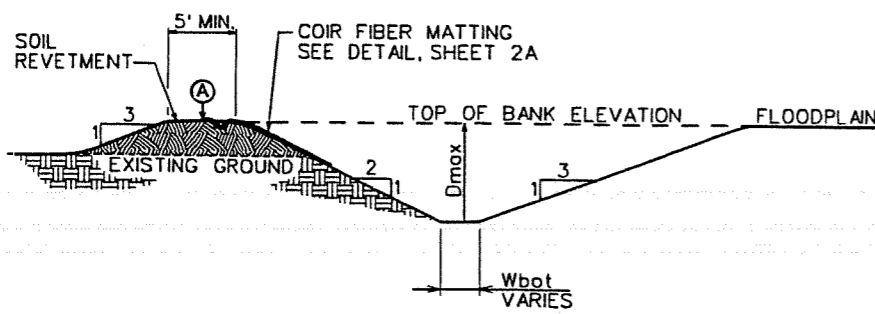
1. BOTTOM OF SWALE TO TIE TO NEW CHANNEL CENTERLINE ELEVATION

CROSS-SECTION A-A1



PROFILE B-B1

PERMANENT SOIL REINFORCEMENT MAT

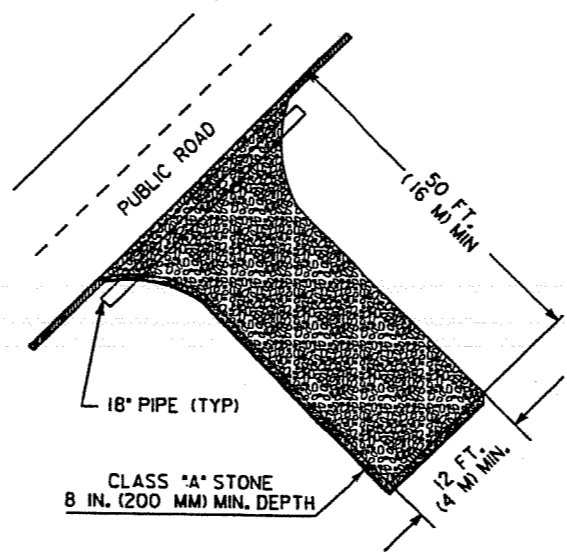


TYPICAL POOL

MEANDER REVETMENT DATA

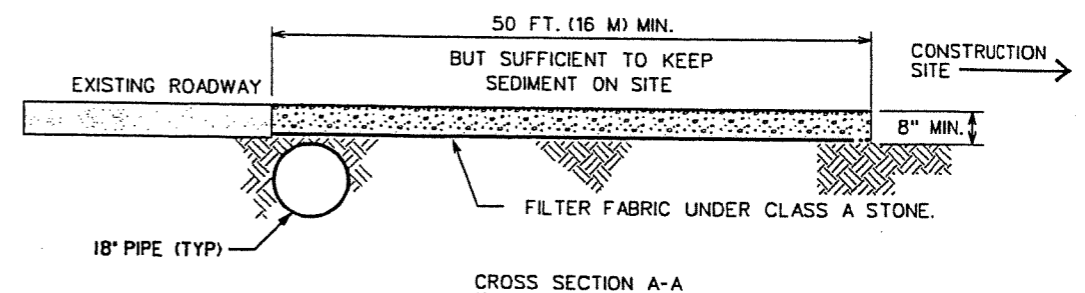
LOCATION	STATION	ELEVATION AT PT. A
POOL 5 OUTER BEND	03+23	648.91
	03+96	648.82
POOL 6 OUTER BEND	04+35	648.65
	04+95	648.58
POOL 12 OUTER BEND	12+62	646.27
	13+68	646.10

MEANDER REVETMENT

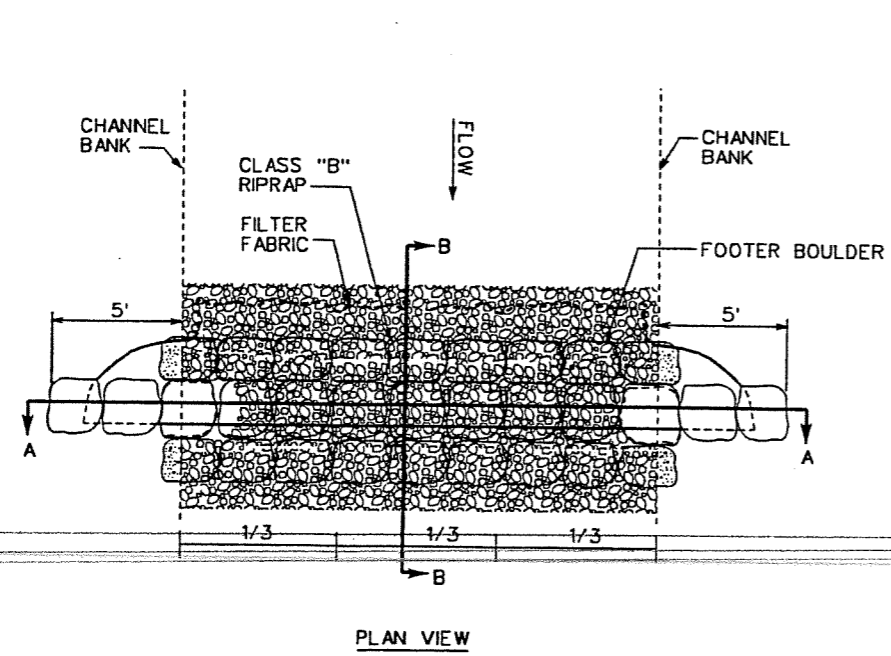


- NOTES:
- TURNING RADIUS SUFFICIENT TO ACCOMMODATE LARGE TRUCKS SHALL BE PROVIDED.
 - ENTRANCE(S) SHOULD BE LOCATED TO PROVIDE FOR UTILIZATION BY ALL CONSTRUCTION VEHICLES.
 - MUST BE MAINTAINED IN A CONDITION WHICH WILL PREVENT TRACKING OR DIRECT FLOW OF MUD ONTO STREETS. PERIODIC TOPDRESSING WITH STONE WILL BE NECESSARY.
 - ANY MATERIAL TRACKED ONTO THE ROADWAY MUST BE CLEANED UP IMMEDIATELY.
 - GRAVEL CONSTRUCTION ENTRANCE SHALL BE LOCATED AT ALL POINTS OF INGRESS AND EGRESS UNTIL SITE IS STABILIZED. FREQUENT CHECKS OF THE DEVICE AND TIMELY MAINTENANCE MUST BE PROVIDED.
 - NUMBER AND LOCATION OF CONSTRUCTION ENTRANCES TO BE DETERMINED BY THE ENGINEER

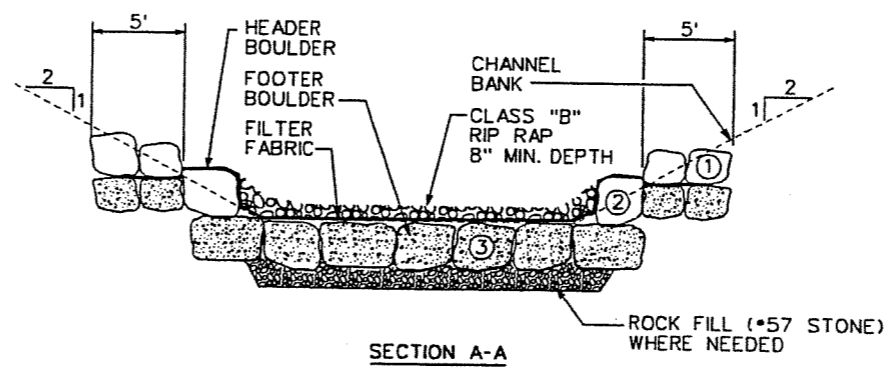
NOTE: FILTER FABRIC TO BE PLACED BENEATH STONE



PERMANENT CONSTRUCTION ENTRANCE

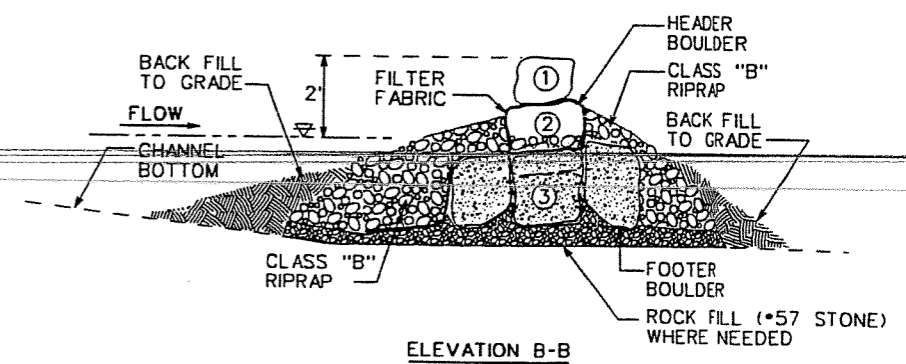


PLAN VIEW



SECTION A-A

- NOTES:
- FOR STATIONING AND ELEVATIONS OF EACH STRUCTURE, SEE SHEET 1D.
 - HEADER AND FOOTER STONES ARE LARGE ANGULAR BOULDERS APPROXIMATELY 48"L x 36"W x 24"D IN SIZE.



ELEVATION B-B

TYPICAL RIPRAP GRADE CONTROL SILL

POOL CURVE DATA

STREAM L

<p style="text-align: center;">1</p> <p>PI Sta 00+45.08 D = 14' 41" 12.66" (LT) L = 14.99' T = 7.59' R = 58.00' PC Sta 00+37.58 PT Sta 00+52.57</p>	<p style="text-align: center;">6</p> <p>PI Sta 04+62.51 D = 60' 51" 39.00" (LT) L = 54.77' T = 29.96' R = 51.00' PC Sta 04+35.43 PT Sta 04+89.60</p>	<p style="text-align: center;">11</p> <p>PI Sta 11+44.93 D = 48' 47" 36.69" (RT) L = 102.19' T = 54.30' *R = 120.00' 104.00' PC Sta 10+93.84 PT Sta 11+96.03</p>	<p style="text-align: center;">16</p> <p>PI Sta 18+88.19 D = 35' 06" 04.50" (RT) L = 49.01' T = 25.30' R = 80.00' PC Sta 17+63.68 PT Sta 18+12.69</p>	<p style="text-align: center;">20</p> <p>PI Sta 24+29.19 D = 55' 52" 23.38" (LT) L = 52.83' T = 39.04' R = 54.26' PC Sta 24+02.77 PT Sta 24+55.60</p>	<p style="text-align: center;">25</p> <p>PI Sta 31+42.17 D = 46' 13" 26.89" (RT) L = 52.44' T = 27.74' R = 65.00' PC Sta 31+15.95 PT Sta 31+68.39</p>
<p style="text-align: center;">2</p> <p>PI Sta 00+96.41 D = 24' 47" 22.15" (LT) L = 26.16' T = 13.31' R = 60.00' PC Sta 00+83.33 PT Sta 01+09.49</p>	<p style="text-align: center;">7</p> <p>PI Sta 05+79.74 D = 78' 45" 11.21" (RT) L = 94.84' T = 56.52' *R = 69.00' 56.00' PC Sta 05+32.32 PT Sta 06+27.16</p>	<p style="text-align: center;">12</p> <p>PI Sta 13+11.71 D = 65' 09" 22.62" (LT) L = 113.72' T = 75.09' R = 100.00' PC Sta 12+54.85 PT Sta 13+68.57</p>	<p style="text-align: center;">17</p> <p>PI Sta 19+41.30 D = 81' 25" 30.46" (LT) L = 95.04' T = 58.67' R = 65.56' PC Sta 18+93.78 PT Sta 19+88.82</p>	<p style="text-align: center;">21</p> <p>PI Sta 25+60.11 D = 19' 42" 34.27" (RT) L = 25.80' T = 13.03' R = 75.00' PC Sta 25+47.21 PT Sta 25+73.01</p>	<p style="text-align: center;">26</p> <p>PI Sta 32+57.19 D = 81' 45" 57.83" (LT) L = 92.76' T = 56.27' R = 65.00' PC Sta 32+10.81 PT Sta 33+03.57</p>
<p style="text-align: center;">3</p> <p>PI Sta 01+87.93 D = 09' 00" 59.33" (RT) L = 11.80' T = 5.91' R = 75.00' PC Sta 01+82.03 PT Sta 01+93.83</p>	<p style="text-align: center;">8</p> <p>PI Sta 07+45.38 D = 56' 35" 27.64" (LT) L = 74.08' T = 40.31' R = 75.00' PC Sta 07+08.34 PT Sta 07+82.41</p>	<p style="text-align: center;">13</p> <p>PI Sta 14+62.76 D = 41' 48" 47.89" (RT) L = 47.71' T = 26.99' R = 65.29' PC Sta 14+38.90 PT Sta 14+86.61</p>	<p style="text-align: center;">18</p> <p>PI Sta 20+95.62 D = 35' 53" 38.24" (RT) L = 42.80' T = 24.70' R = 77.04' PC Sta 20+74.22 PT Sta 21+17.02</p>	<p style="text-align: center;">22</p> <p>PI Sta 27+10.55 D = 62' 16" 44.34" (LT) L = 86.96' T = 48.33' R = 80.00' PC Sta 26+67.08 PT Sta 27+54.03</p>	<p style="text-align: center;">75</p> <p>PI Sta 01+73.20 D = 65' 31" 08.60" (RT) L = 25.16' T = 14.16' R = 22.00' PC Sta 01+60.60 PT Sta 01+85.76</p>
<p style="text-align: center;">4</p> <p>PI Sta 02+49.51 D = 43' 12" 40.24" (LT) L = 49.02' T = 25.74' R = 65.00' PC Sta 02+25.00 PT Sta 02+74.02</p>	<p style="text-align: center;">9</p> <p>PI Sta 08+79.61 D = 44' 51" 55.64" (RT) L = 50.24' T = 26.42' R = 64.00' PC Sta 08+54.49 PT Sta 09+04.73</p>	<p style="text-align: center;">14</p> <p>PI Sta 15+81.39 D = 31' 49" 35.51" (LT) L = 37.66' T = 19.37' R = 66.76' PC Sta 15+62.56 PT Sta 16+00.22</p>	<p style="text-align: center;">19a</p> <p>PI Sta 22+30.91 D = 36' 52" 59.46" (RT) L = 51.76' T = 26.87' R = 80.00' PC Sta 22+05.03 PT Sta 22+56.78</p>	<p style="text-align: center;">23</p> <p>PI Sta 28+71.67 D = 70' 16" 52.97" (RT) L = 98.13' T = 56.31' R = 80.00' PC Sta 28+22.61 PT Sta 29+20.74</p>	<p style="text-align: center;">78</p> <p>PI Sta 03+04.85 D = 117' 40" 15.54" (LT) L = 45.24' T = 36.38' R = 22.00' PC Sta 02+82.23 PT Sta 03+27.47</p>
<p style="text-align: center;">5</p> <p>PI Sta 03+59.63 D = 74' 12" 18.46" (RT) L = 77.71' T = 45.38' R = 60.00' PC Sta 03+20.77 PT Sta 03+98.48</p>	<p style="text-align: center;">10</p> <p>PI Sta 09+93.48 D = 34' 53" 25.51" (LT) L = 45.67' T = 23.57' R = 75.00' PC Sta 09+70.64 PT Sta 10+16.32</p>	<p style="text-align: center;">15</p> <p>PI Sta 16+55.48 D = 60' 03" 30.50" (RT) L = 64.42' T = 37.85' R = 61.35' PC Sta 16+23.27 PT Sta 16+87.69</p>	<p style="text-align: center;">19b</p> <p>PI Sta 23+22.67 D = 77' 19" 46.83" (RT) L = 73.69' T = 48.03' R = 54.56' PC Sta 22+85.82 PT Sta 23+59.51</p>	<p style="text-align: center;">24</p> <p>PI Sta 30+43.47 D = 73' 24" 29.14" (LT) L = 77.79' T = 44.96' R = 60.32' PC Sta 30+04.57 PT Sta 30+82.36</p>	<p style="text-align: center;">79</p> <p>PI Sta 03+55.91 D = 82' 17" 13.45" (RT) L = 24.42' T = 14.85' R = 17.00' PC Sta 03+43.70 PT Sta 03+68.12</p>

RIFFLE BEARING DATA

STREAM L				STREAM T			
(0) N 62° 15' 39.68" E	(9) N 68° 57' 44.63" E	(18) N 77° 19' 28.35" E	(26) N 54° 25' 34.08" E	(10) N 78° 37' 28.95" W	(19) S 65° 47' 32.19" E	(20) S 44° 20' 08.74" E	(T0) N 78° 37' 28.95" W
(1) N 47° 34' 27.02" E	(10) N 34° 04' 19.12" E	(19a) S 65° 47' 32.19" E		(T1) N 80° 23' 11.38" W	(19b) S 11° 32' 14.64" W		(T5) N 16° 13' 58.65" W
(2) N 22° 47' 04.87" E	(11) N 82° 51' 55.81" E	(20) S 44° 20' 08.74" E		(T2) N 80° 39' 09.91" W			(T6) N 82° 32' 01.88" W
(3) N 31° 48' 04.20" E	(12) N 17° 42' 33.19" E			(T3) N 26° 57' 26.33" W			(T7) N 38° 28' 59.44" E
(4) N 11° 24' 36.04" W	(13) N 59° 31' 21.08" E			(T4) N 81° 45' 07.25" W			(T8) N 79° 11' 16.10" W
(5) N 62° 47' 42.42" E	(14) N 27° 41' 45.57" E						(T9) N 03° 05' 57.35" E
(6) N 01° 56' 03.42" E	(15) N 87° 45' 16.07" E						
(7) N 80° 41' 14.63" E	(16) S 57° 08' 39.43" E						
(8) N 24° 05' 47.99" E	(17) N 41° 25' 50.11" E						

STREAM T

T1 AND T2 NOT APPLICABLE

<p style="text-align: center;">73</p> <p>PI Sta 00+93.95 D = 53' 41" 43.58" (RT) L = 17.90' T = 9.76' R = 19.00' PC Sta 00+85.00 PT Sta 01+02.90</p>	<p style="text-align: center;">76</p> <p>PI Sta 02+11.20 D = 66' 18" 03.23" (LT) L = 17.40' T = 9.80' R = 15.00' PC Sta 02+02.50 PT Sta 02+19.90</p>
<p style="text-align: center;">74</p> <p>PI Sta 01+28.11 D = 54' 47" 40.92" (LT) L = 18.17' T = 9.85' R = 18.97' PC Sta 01+19.02 PT Sta 01+37.19</p>	<p style="text-align: center;">77</p> <p>PI Sta 02+52.72 D = 121' 01" 01.32" (RT) L = 39.94' T = 33.33' R = 19.00' PC Sta 02+32.75 PT Sta 02+72.69</p>
<p style="text-align: center;">75</p> <p>PI Sta 01+73.20 D = 65' 31" 08.60" (RT) L = 25.16' T = 14.16' R = 22.00' PC Sta 01+60.60 PT Sta 01+85.76</p>	<p style="text-align: center;">78</p> <p>PI Sta 03+04.85 D = 117' 40" 15.54" (LT) L = 45.24' T = 36.38' R = 22.00' PC Sta 02+82.23 PT Sta 03+27.47</p>

STREAM R

R1 THROUGH R9

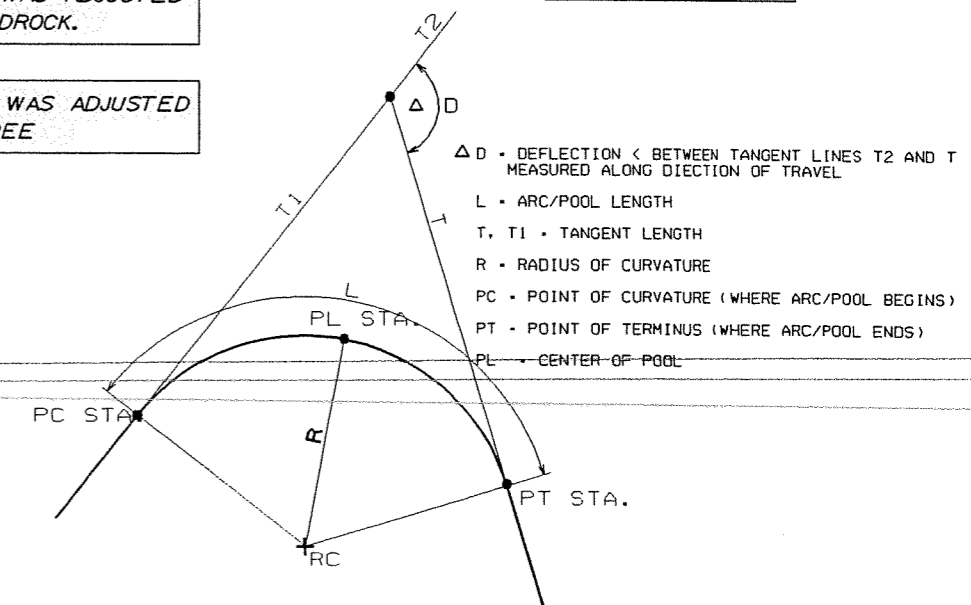
NOTE:

1. POOLS R1-R9 REPRESENT POOL-STEP STRUCTURE.
POOL CURVE DATA AND RIFFLE BEARING DATA
NOT APPLICABLE.

*R11 RADIUS WAS ADJUSTED
DUE TO BEDROCK.

*RT RADIUS WAS ADJUSTED
TO MISS TREE

* AS-BUILT



STREAM T RIFFLE DATA

Riffle ID	Northing	Easting	Station	Elevation	Riffle ID	Northing	Easting	Station	Elevation	Length	Slope
TTR2	570616.939	1491206.934	0+70	652.14	TBR2	570619.375	1491192.134	0+85	651.73	15.0000	0.0270
TTR3	570629.524	1491178.196	1+03	651.64	TBR3	570644.530	1491170.564	1+20	651.19	16.8359	0.0270
TTR4	570654.721	1491156.354	1+38	651.03	TBR4	570658.081	1491133.171	1+61	650.40	23.4248	0.0270
TTR5	570673.704	1491115.205	1+86	650.18	TBR5	570690.444	1491110.331	2+04	649.71	17.4355	0.0270
TTR6	570701.130	1491097.833	2+21	649.55	TBR6	570702.799	1491085.094	2+34	649.20	12.8479	0.0270
TTR7	570733.261	1491072.455	2+74	648.96	TBR7	570741.290	1491078.838	2+84	648.67	10.2566	0.0270
TTR8	570776.636	1491065.781	3+30	648.45	TBR8	570779.681	1491049.837	3+46	648.01	16.2324	0.0270
TTR9	570797.299	1491036.050	3+70	647.87	TBR9	570808.259	1491036.644	3+81	647.57	10.9765	0.0270
TTR10	570832.486	1491021.869	4+11	647.41							

STREAM T POOL DATA

RADIUS ID	NORTHING	EASTING	RADIUS (FT)
R3T	570638.137	1491195.132	19.0
R4T	570635.942	1491153.645	19.0
R5T	570679.854	1491136.328	22.0
R6T	570686.251	1491095.929	15.0
R7T	570721.647	1491087.493	19.0
R8T	570755.027	1491061.654	22.0
R9T	570795.330	1491053.025	17.0
R10T	570809.675	1491011.716	25.0

TRIBUTARY -R-

RIFFLE ID	STATION	ELEVATION	SLOPE
TR10	1+93	644.90	
BR10	2+16	643.75	0.05
TR11	2+38	643.74	
BR11	2+54	643.13	0.038
TR12	2+54	643.10	
BR12	2+84	642.60	0.023
TR13	3+12	642.50	
BR13	3+40	642.00	0.018

* AS-BUILT NOTES

STREAM L POOL DATA

Radius ID	Northing	Easting	Radius (ft)
R1	570496.260	1490716.334	58.0
R2	570532.040	1490720.415	81.7
R3	570538.650	1490875.441	59.5
R4	570633.494	1490787.842	65.0
R5	570703.974	1490901.138	60.0
R6	570819.640	1490883.358	51.0
R7	570858.289	1491004.732	* 56.0
R8	571013.527	1491061.535	75.0
R9	571016.431	1491215.102	64.0
R10	571169.828	1491226.723	75.0
R11	571124.795	1491431.677	* 104.8
R12	571350.398	1491462.722	100.0
R13	571343.614	1491634.028	65.3
R14	571497.079	1491634.508	66.8
R15	571456.428	1491757.801	61.3
R16	571440.805	1491836.654	80.0
R17	571519.119	1491983.686	65.6
R18	571486.306	1492144.600	77.0
R19A	571502.765	1492231.276	80.0
R19B	571512.344	1492272.473	54.6
R20	571452.746	1492371.185	54.3
R21	571296.8712	1492342.7673	75.0
R22	571278.4880	1492521.7038	80.0
R23	571115.0197	1492581.5451	80.0
R24	571100.872	1492732.206	60.3
R25	570975.574	1492765.861	65.0
R26	571034.949	1492889.045	65.0
R27	570947.566	1492994.632	67.5

*RADIUS R7 ADJUSTED TO MISS TREE AND R11 ADJUSTED DUE TO BEDROCK.

STREAM R STRUCTURE DATA TABLE

STRUCTURE ID	TYPE	STATION	NORTHING	EASTING	ELEVATION
SP1	STEP/POOL	0+22	N/A	N/A	651.15
SP2	STEP/POOL	0+44	N/A	N/A	650.48
SP3	STEP/POOL	0+60	N/A	N/A	649.81
SP4	STEP/POOL	0+79	N/A	N/A	649.14
SP5	STEP/POOL	1+01	N/A	N/A	648.31
SP6	STEP/POOL	1+18	N/A	N/A	647.81
SP7	STEP/POOL	1+37	N/A	N/A	647.14
SP8	STEP/POOL	1+55	N/A	N/A	* 646.56 646.86
SP9	EXISTING	1+73	N/A	N/A	646.24

STRUCTURE DATA TABLE

STRUCTURE ID	TYPE	STATION	NORTHING	EASTING	ELEVATION
CV1	CROSS-VANE	00+53	570453.5270	1490755.5503	646.52
CV2	CROSS-VANE	01+19	570504.1192	1490797.2418	646.43
MCV1	MODIFIED CROSS VANE	07+08	570939.5154	1491073.6714	644.90
RS1	GRADE CONTROL SILL	07+89	570982.9062	149129.9993	644.81
JH1	J-HOOK VANE	09+71	571099.8273	1491253.6474	644.09
JH6	J-HOOK VANE	00+85	570619.3750	149192.1335	651.73
JH7	J-HOOK VANE	01+20	570644.5305	149110.5638	651.19
* CV3	CROSS-VANE	01+61	570658.0812	149113.715	650.40
* MCV	MODIFIED CROSS VANE	02+04	570690.4443	149110.3307	649.71
* CV4	CROSS-VANE	02+34	570702.7993	1491085.0935	649.20
* MCV	MODIFIED CROSS VANE	02+74	570733.261	149107.2.455	648.96
* CV5	CROSS-VANE	03+46	570779.6812	1491049.8365	648.01
* MCV	MODIFIED CROSS VANE	03+81	570808.2593	1491036.6437	647.57
* CV7	CROSS-VANE	13+12	571279.6705	1491533.4079	* 643.48 643.69
* MCV	MODIFIED CROSS-VANE	13+25	571365.3592	149157.2.4656	* 642.81 643.21
MCV3	MODIFIED CROSS-VANE	14+39	571439.4229	1491668.1621	* 642.09 642.39
MCV4	MODIFIED CROSS-VANE	14+49	571486.9535	1491704.5897	642.09
MCV5	MODIFIED CROSS-VANE	15+63	571520.7433	1491833.5183	641.48
* MCV6	MODIFIED CROSS-VANE	17+64	571463.8460	1491948.4374	640.77
JH2	J-HOOK VANE	18+94	N/A	N/A	N/A
* BSV1	STEP CROSS-VANE	N/A	N/A	N/A	648.85
* BSV2	STEP CROSS-VANE	N/A	N/A	N/A	647.18
* BSV3	STEP CROSS-VANE	N/A	N/A	N/A	646.80
* BSV4	STEP CROSS-VANE	N/A	N/A	N/A	645.80
* BRSA	GRADE CONTROL SILL	N/A	N/A	N/A	644.46
* MCV	MODIFIED CROSS VANE	N/A	N/A	N/A	* 644.58 640.31
MCV7	MODIFIED CROSS-VANE	23+21	571549.5327	1492312.3910	* 640.10 638.65
RS3	GRADE CONTROL SILL	24+56	571414.7845	1492332.4129	* 639.0
* MCV	MODIFIED CROSS VANE	26+64	571245.1514	1492448.9806	* 637.24 637.44
* JH3	J-HOOK VANE	27+07	571212.3599	149247.6.8807	637.17
* MCV8	MODIFIED CROSS VANE	27+26	571194.9030	1492585.8633	636.55
* JH4	J-HOOK VANE	28+20	571040.5732	149265.8236	635.65
* MCV	MODIFIED CROSS-VANE	31+16	570989.9528	1492842.1371	635.25
MCV9	MODIFIED CROSS VANE	32+11			
* JH5	J-HOOK VANE				
MCV	MODIFIED CROSS-VANE				

STRUCTURES LOCATED AS DEPICTED IN PLAN SHEETS AND AS APPROVED BY ENGINEER.
 STRUCTURES BSV1,BSV2,BSV3 & BSV4 WERE DELETED DUE TO BEDROCK.
 STRUCTURES JH3,JH4 & JH5 WERE CHANGE TO MODIFIED CROSS VANE.
 STRUCTURES CV3,CV4,CV5,RS2,CV6 & CV7 WERE CHANGE TO MODIFIED CROSS VANE.

STREAM L RIFFLE DATA

Riffle ID	Northing	Easting	Station	Elevation	Riffle ID	Northing	Easting	Station	Elevation	Length	Slope
TR0	570427.4327	1490710.0665	00+00	646.62	BR0	570444.9250	1490743.3293	00+38	646.53	37.58	0.0025
TR1	570453.5270	1490755.5503	00+53	646.52	BR1	570474.2825	1490778.2598	00+83	646.44	30.77	0.0026
TR2	570504.1192	1490797.2418	01+19	646.43	BR2	570557.7370	1490819.0677	01+77	646.29	57.89	0.0024
TR3	570572.8437	1490826.7165	02+05	646.27	BR3	570599.2407	1490843.0843	02+25	646.18	19.50	0.0045
TR4	570646.3532	1490851.5573	02+74	646.12	BR4	570692.1040	1490842.3240	03+21	645.91	46.67	0.0045
TR5	570757.3365	1490873.7080	03+98	645.82	BR5	570774.2824	1490906.6742	04+35	645.65	37.07	0.0045
TR6	570817.9193	1490934.3292	04+90	645.58	BR6	570860.6179	1490935.7713	05+32	645.41	42.72	0.0039
TR7	570926.3796	1490993.5663	06+27	645.29	BR7	570939.5154	1491073.6714	07+08	644.90	81.17	0.0048
TR8	570982.9062	1491129.9993	07+82 = 07+89	644.81	BR8	571042.4505	1491156.6302	08+55	644.48	65.23	0.0050
TR9	571076.1645	1491192.1335	09+05	644.42	BR9	571099.8273	1491253.6474	09+71	644.09	65.91	0.0050
TR10	571127.8111	1491288.8486	10+16	644.01	BR10	571192.0217	1491332.2755	10+94	643.62	77.52	0.0051
TR11	571243.8656	1491416.7712	11+96	643.49	BR11	N/A	N/A	12+55	643.27	58.82	0.0038
TR12	571319.9796	1491557.9756	13+69	643.20	BR12	571365.3592	1491572.4656	14+16 = 14+39	642.81	47.64	0.0061
TR13	571400.8966	1491602.7004	14+87	642.92	BR13	571439.4229	1491668.1621	15+63	642.59	75.96	0.0060
TR14	571466.3521	1491693.7759	16+00	642.25	BR14	571486.9535	1491704.5897	16+24	642.09	23.27	0.0070
TR15	571517.7738	1491757.8109	16+88	642.01	BR15	571520.7433	1491833.5183	17+64	641.48	75.77	0.0070
TR16	571508.0084	1491880.0551	18+13	641.42	BR16	571463.8460	1491948.4374	18+94	640.77	81.40	0.0080
TR17	571477.4536	1492034.2975	19+89	640.65	BR17	571541.2483	1492090.5993	20+74	639.97	85.09	0.0080
TR18	571562.4525	1492132.9176	21+22	639.91	BR18	571580.7792	1492213.5627	22+05	639.25	82.70	0.0080
TR19	571505.8440	1492326.6425	23+60	639.20	BR19	571463.4605	1492317.9913	24+03	638.20	43.26	0.0080
TR20	571414.7845	1492332.4129	24+56	638.65	BR20	571349.2866	1492396.4110	25+47	638.20	91.57	0.0080
TR21	571328.1244	1492410.9454	25+73	638.20	BR21	571245.1514	1492448.9806	26+64	637.44	91.28	0.0068
TR22	571199.6847	1492573.8556	27+26	637.11	BR22	571194.9030	1492585.8633	28+20	636.55	68.58	0.0082
TR23	571137.9074	1492658.2012	29+18	636.42	BR23	571084.1075	1492674.2646	29+74 = 30+05	636.02	56.15	0.0071
TR24	571040.5541	1492732.2403	30+82	635.92	BR24	571040.5732	1492765.8236	31+16	635.65	33.58	0.0080
TR25	571020.5693	1492812.7683	31+68	635.59	BR25	570989.9528	1492842.1371	32+11	635.25	42.43	0.0080
TR26	570982.0805	1492926.8595	33+04	635.14	BR26	571002.4676	1492955.3625	33+39	634.86	35.04	0.0080
TR27	571014.3225	1492984.6402	33+71	634.82							

BENCHMARK DESCRIPTION TABLE

LABEL	TYPE	ELEVATION	NORTHING	EASTING
BL-5	NCDOT CAPPED REBAR-PERMANENT MONUMENT	649.66	570767.0770	1490929.5710
BL-6	NCDOT CAPPED REBAR-PERMANENT MONUMENT	647.65	571135.7180	1491285.7050
BL-7	NCDOT CAPPED REBAR-PERMANENT MONUMENT	648.96	571290.2190	1491482.0690
BL-8	NCDOT CAPPED REBAR-PERMANENT MONUMENT	646.29	571376.0330	1491873.1600
BL-9	NCDOT CAPPED REBAR-PERMANENT MONUMENT	643.28	571513.4600	1492185.0560
BL-10	NCDOT CAPPED REBAR-PERMANENT MONUMENT	641.67	571297.6060	1492531.6600
BL-11	NCDOT CAPPED REBAR-PERMANENT MONUMENT	640.42	571104.6480	1492980.9510
BL-12	NCDOT CAPPED REBAR-PERMANENT MONUMENT	666.30	571246.8870	1493195.4690


SUMMARY OF QUANTITIES

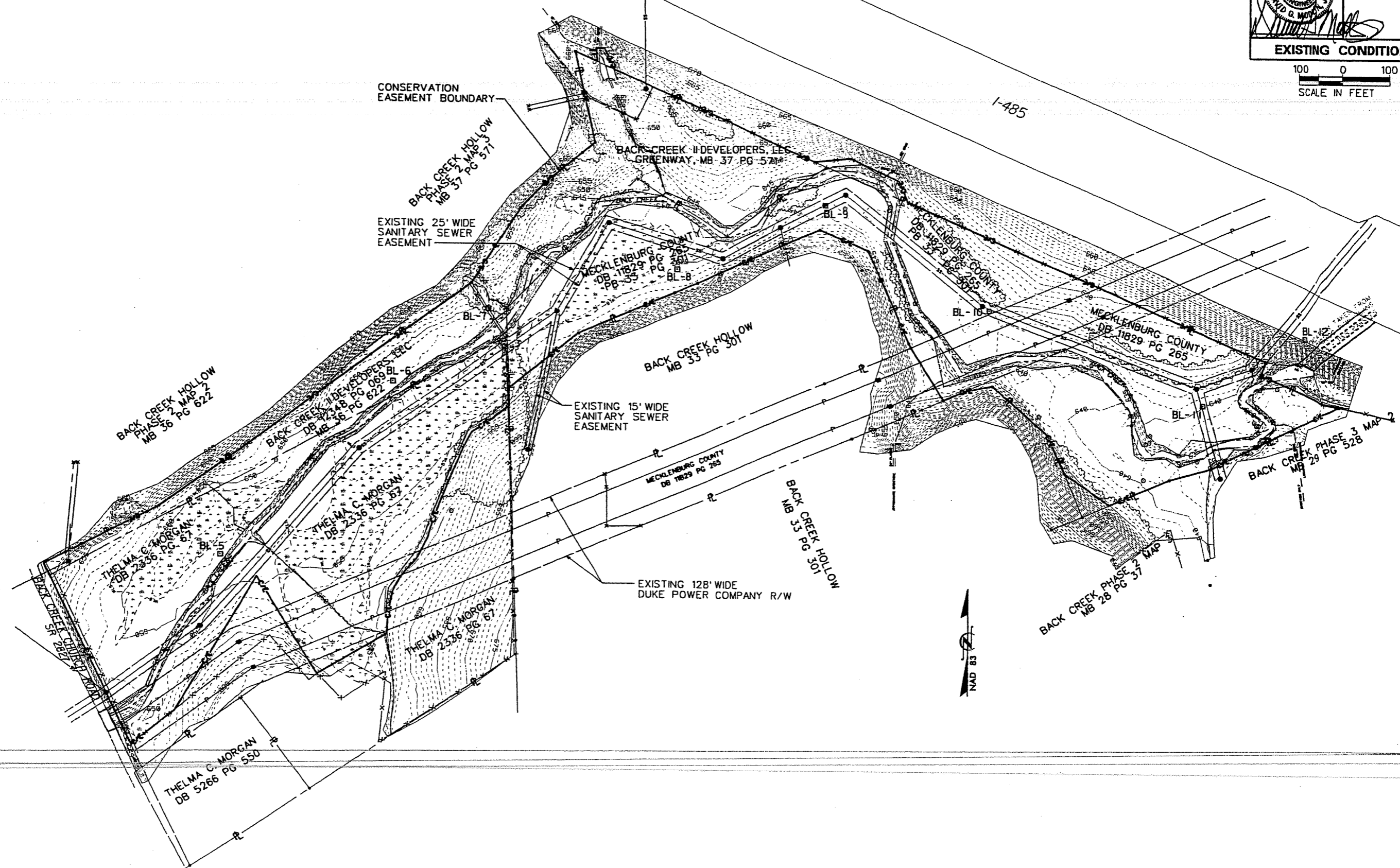
Section	Item	Quantity	Units
800	Mobilization	1	LS
SP	Construction Surveying	1	LS
SP	Grading	1	LS
802	Fence Removal and Disposal	660	LF
866	Woven Wire Fence, 47" Fabric	7044	LF
866	4-strand Barbed Wire Fence	216	LF
866	4" Timber Fence Posts, 8' Long	827	EA
866	16' Single Gates	2	EA
866	12' Single Gates	2	EA
1110	Work Zone Signs	68	SF
1032	18-inch Corrugated Metal Pipe	28	LF
1032	36-inch Aluminized Pipe	32	LF
1042	Filter Fabric for Drainage	3010	SY
1605	Temporary Silt Fence	2925	LF
1610	Stone for Erosion Control, Class A	56	TON
1610	Stone for Erosion Control, Class B	241	TON
1610	#57 Stone	409	TON
1610	ABC Stone	54	TON
1610	Sediment Control Stone	100	TON
1615	Temporary Mulching	27	ACR
1620	Seed for Temporary Seeding	1000	LB
1620	Fertilizer for Temporary Seeding	4	TON
1630	Silt Excavation	170	CY
1660	Seeding and Mulching	26	ACR
1661	Seed for Repair Seeding	250	LB
1661	Fertilizer for Repair Seeding	0.75	TON
1662	Seed for Supplemental Seeding	650	LB
1665	Fertilizer Topdressing	19.25	TON
SP	Safety Fence	1870	LF
SP	Special Stilling Basin	4	EA
SP	Temporary Stream Diversion	1	LS
SP	Impervious Select Material	579	CY
SP	Channel Substrate Material, Rip-Rap, Class A	1211	TON
SP	Coir Fiber Matting	12314	SY
SP	Permanent Soil Reinforcement Mat	107	SY
SP	Boulder, Header/Footer	2734	TON
SP	Rip Rap-Class B	219	TON
SP	Rip Rap-Class A	33	TON
SP	Disking	18	ACR

SUMMARY OF EARTHWORK

BACK CREEK LOCATION						Xsection	Total Cut		EXCAVATION	Total Fill			FILL	BORROW	WASTE	
							sq ft	cu ft		sq ft	cu ft	cu ft + %				
0	+	00	TO	1	+	00	0+00	16	0	8.8	0					
1	+	00	TO	2	+	00	1+00	34.8	2540.0	94	0.0	440.0	616	23	0	71
2	+	00	TO	3	+	00	2+00	74.6	5470.0	203	0.0	0.0	0	0	0	203
3	+	00	TO	4	+	00	3+00	48.9	6175.0	229	67.8	3390.0	4746	176	0	53
4	+	00	TO	5	+	00	4+00	54.5	5170.0	191	75.3	7155.0	10017	371	180	0
5	+	00	TO	6	+	00	5+00	48.6	5155.0	191	0.0	3785.0	5271	195	4	0
6	+	00	TO	7	+	00	6+00	123.8	8620.0	319	0.0	0.0	0	0	0	319
7	+	00	TO	8	+	00	7+00	83.7	10375.0	384	71.3	3565.0	4991	185	0	199
8	+	00	TO	9	+	00	8+00	30.1	5690.0	211	22.4	4685.0	6559	243	32	0
9	+	00	TO	10	+	00	9+00	78.8	5445.0	202	40.4	3140.0	4396	163	0	39
10	+	00	TO	11	+	00	10+00	54.9	6685.0	248	40.9	4065.0	5691	211	0	37
11	+	00	TO	12	+	00	11+00	156.0	10545.0	391	80.0	6045.0	8463	313	0	77
12	+	00	TO	13	+	00	12+00	198.0	17700.0	656	45.6	6280.0	8792	326	0	330
13	+	00	TO	14	+	00	13+00	28.0	11300.0	419	54.5	5005.0	7007	260	0	159
14	+	00	TO	15	+	00	14+00	2.6	1530.0	57	0.0	2725.0	3815	141	85	0
15	+	00	TO	16	+	00	15+00	2.8	270.0	10	16.1	805.0	1127	42	32	0
16	+	00	TO	17	+	00	16+00	3.3	305.0	11	13.8	1495.0	2083	78	66	0
17	+	00	TO	18	+	00	17+00	2.4	285.0	11	12.8	1330.0	1862	69	58	0
18	+	00	TO	19	+	00	18+00	0.0	120.0	4	34.0	2340.0	3276	121	117	0
19	+	00	TO	20	+	00	19+00	41.5	2075.0	77	5.1	1955.0	2737	101	25	0
20	+	00	TO	21	+	00	20+00	39.1	4030.0	149	0.0	255.0	357	13	0	136
21	+	00	TO	22	+	00	21+00	56.3	4770.0	177	0.0	0.0	0	0	0	177
22	+	00	TO	23	+	00	22+00	30.9	4360.0	161	0.0	0.0	0	0	0	161
23	+	00	TO	24	+	00	23+00	24.3	2760.0	102	1.0	50.0	70	3	0	100
24	+	00	TO	25	+	00	24+00	29.7	2700.0	100	0.0	50.0	70	3	0	97
25	+	00	TO	26	+	00	25+00	75.5	5260.0	195	56.5	2825.0	3955	146	0	48
26	+	00	TO	27	+	00	26+00	125.0	10025.0	371	41.2	4885.0	6839	253	0	118
27	+	00	TO	28	+	00	27+00	47.1	8605.0	319	36.9	3905.0	5467	202	0	116
28	+	00	TO	29	+	00	28+00	42.1	4460.0	165	38.7	3780.0	5292	186	31	0
29	+	00	TO	30	+	00	29+00	100.0	7105.0	263	34.4	3655.0	5117	190	0	74
30	+	00	TO	31	+	00	30+00	171.1	13555.0	502	115.3	7485.0	10479	388	0	114
31	+	00	TO	32	+	00	31+00	111.0	14105.0	522	49.1	8220.0	11508	426	0	96
32	+	00	TO	33	+	00	32+00	64.8	8780.0	326	104.9	7700.0	10780	399	74	0
33	+	00	TO	33	+	71	33+00	48.6	5670.0	210	115.7	11030.0	15442	572	362	0
SUBTOTAL								0.0	1725.3	64	0.0	4107.4	5750	213	149	0
WASTE / (-BORROW)								2049	203375	7532	1183	116132	162585	6022	1214	2725
PROJECT TOTALS										7532				6022		1511
SAY										7600				6100		1500

APPROXIMATE QUANTITIES ONLY, UNCLASSIFIED EXCAVATION, BORROW EXCAVATION, FINE GRADING AND CLEARING AND GRUBBING WILL BE PAID FOR AT THE CONTRACT LUMP SUM PRICE FOR "GRADING." A SHRINKAGE FACTOR OF 1.4 WAS ASSUMED.

PROJECT REFERENCE NO. R-2559WM	SHEET NO. 4
PROJECT DESIGN ENGINEER 7/6/04	
	
EXISTING CONDITIONS	



I-485

BACK CREEK HOLLOW
MB 33 PG 301

EXISTING 15' WIDE
SANITARY SEWER
EASEMENT

EXISTING 128' WIDE
DUKE POWER COMPANY R/W

BACK CREEK HOLLOW
MB 29 PG 528

BACK CREEK HOLLOW
MB 28 PG 37

BACK CREEK HOLLOW
PHASE 1 MAP 1
MB 36 PG 622

BACK CREEK II DEVELOPERS, LLC
DB 2448 PG 672

THELMA C. MORGAN
DB 2336 PG 53

THELMA C. MORGAN
DB 2336 PG 67

THELMA C. MORGAN
DB 5266 PG 550

BACK CREEK II DEVELOPERS, LLC
GREENWAY, MB 37 PG 571

MECKLENBURG COUNTY
DB 11829 PG 265

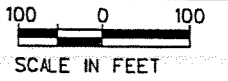
MECKLENBURG COUNTY
DB 1829 PG 265

MECKLENBURG COUNTY
DB 11829 PG 265

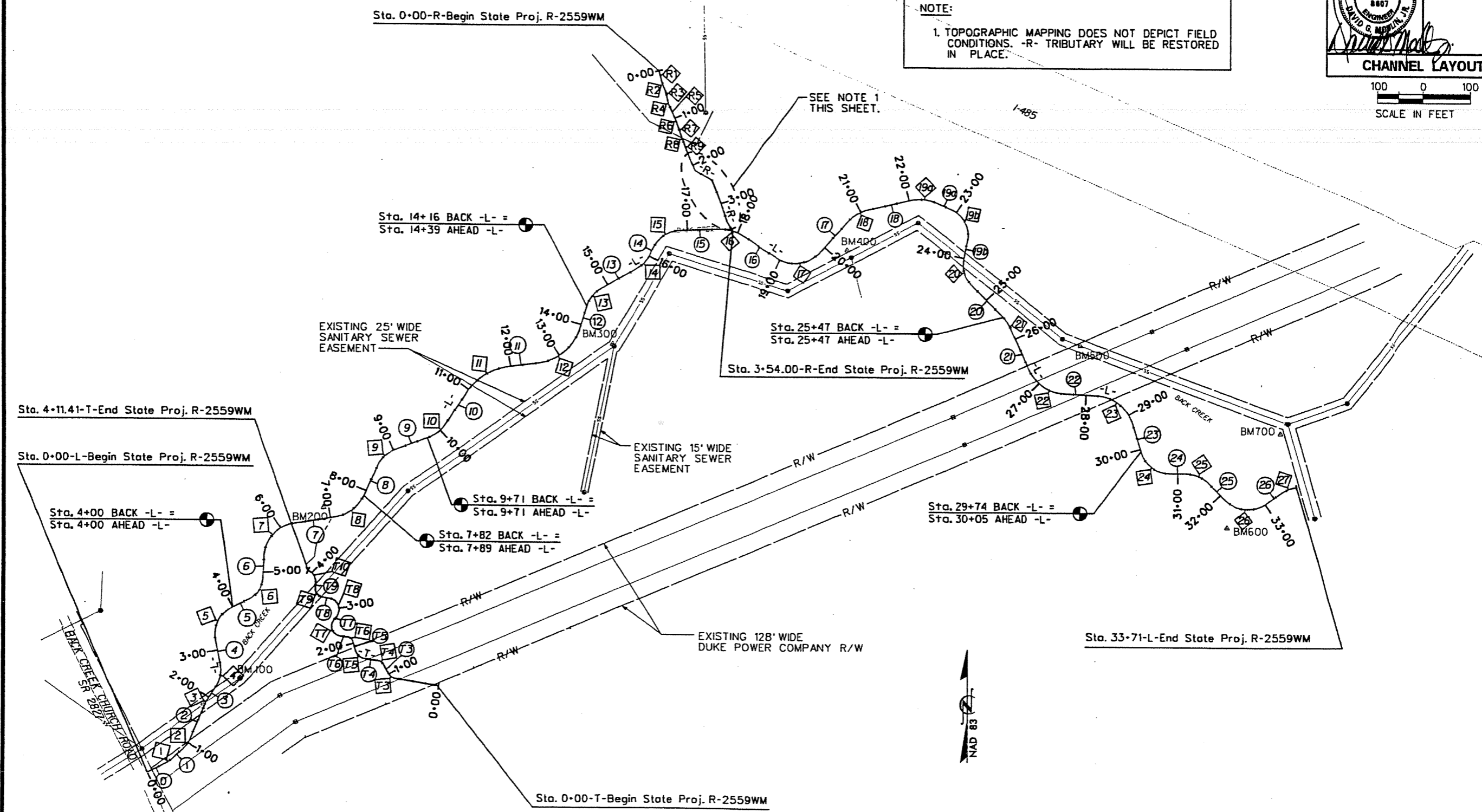
BACK CREEK HOLLOW
MB 29 PG 528



BACK CREEK HOLLOW
MB 28 PG 37

NAD 83

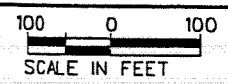


NOTE:
1. TOPOGRAPHIC MAPPING DOES NOT DEPICT FIELD CONDITIONS. -R- TRIBUTARY WILL BE RESTORED IN PLACE.

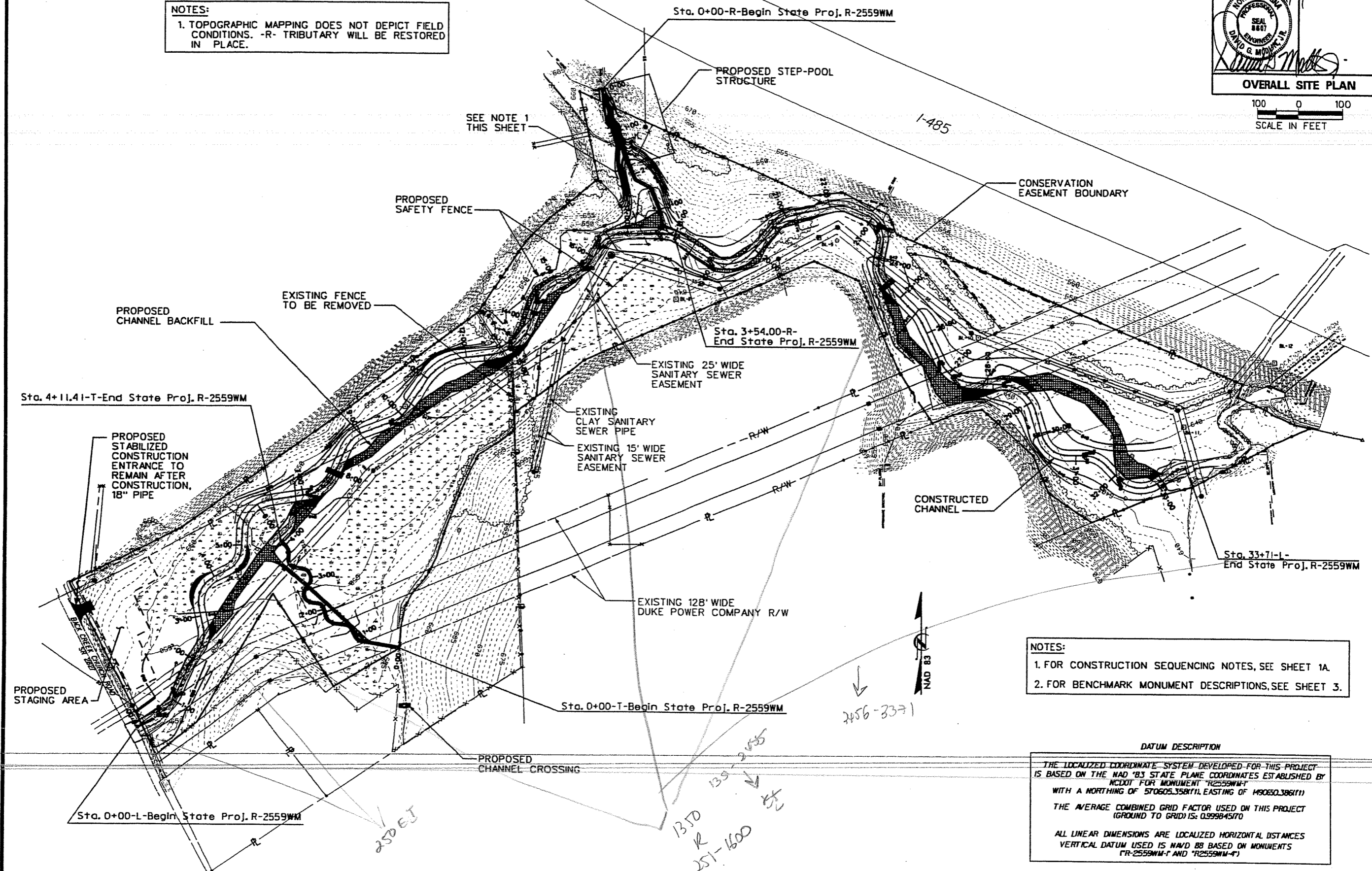


-  NEW CHANNEL RIFFLE LOCATION
-  NEW CHANNEL POOL LOCATION

NOTE:
FOR RIFFLE BEARING AND POOL CURVE DATA, SEE SHEET 2F.



NOTES:
1. TOPOGRAPHIC MAPPING DOES NOT DEPICT FIELD CONDITIONS. -R- TRIBUTARY WILL BE RESTORED IN PLACE.



NOTES:
1. FOR CONSTRUCTION SEQUENCING NOTES, SEE SHEET 1A.
2. FOR BENCHMARK MONUMENT DESCRIPTIONS, SEE SHEET 3.

DATUM DESCRIPTION
THE LOCALIZED COORDINATE SYSTEM DEVELOPED FOR THIS PROJECT IS BASED ON THE NAD '83 STATE PLANE COORDINATES ESTABLISHED BY NCDOT FOR MONUMENT 'R2559WM-1' WITH A NORTHING OF 570605.358(11), EASTING OF 490650.386(11). THE AVERAGE COMBINED GRID FACTOR USED ON THIS PROJECT (GROUND TO GRID) IS: 0.999845170. ALL LINEAR DIMENSIONS ARE LOCALIZED HORIZONTAL DISTANCES. VERTICAL DATUM USED IS NAVD 88 BASED ON MONUMENTS ('R-2559WM-1' AND 'R2559WM-4').

Handwritten notes:
1350 R 251-1600
135-2555
250 EJ

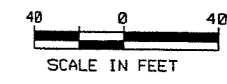
Handwritten note:
2456-3371

AS BUILT

NOTES:

1. TOPOGRAPHIC MAPPING DOES NOT DEPICT FIELD CONDITIONS. -R- TRIBUTARY WILL BE RESTORED IN PLACE.
2. BACK CREEK RIFFLES 12 THROUGH 16 WILL BE BACKFILLED TO DESIGN ELEVATION AND GRADE.
3. FOR RIFFLE BEARING AND POOL CURVE DATA, SEE SHEET 2F.
4. FOR STREAM RIFFLE DATA, STREAM POOL DATA AND STRUCTURE TABLE, SEE SHEET 2G.

PROJECT REFERENCE NO. R-2559WM	SHEET NO. 8
PROJECT DESIGN ENGINEER NORTH CAROLINA PROFESSIONAL ENGINEERS DAVID G. HOULDER, P.E. SINCE 1987	



AS BUILT NOTES

DUE TO BEDROCK BEING ENCOUNTERED AT STA. 12+25 THAT CAUSED THE DESIGN ELEVATION TO BE RAISED BY 0.85 FEET, THE FOLLOWING ADJUSTMENTS WERE MADE TO THE CHANNEL:

BOULDER TOE PROTECTION INSTALLED FROM APPROXIMATELY STA. 12+50 TO 13+00 RT. -L-

RADIUS II ADJUSTED TO 104 FEET AND BR II SHIFTED SOUTH 14 FEET

MCV 2 MOVED TO STA. 13+25 AT ELEVATION 643.69

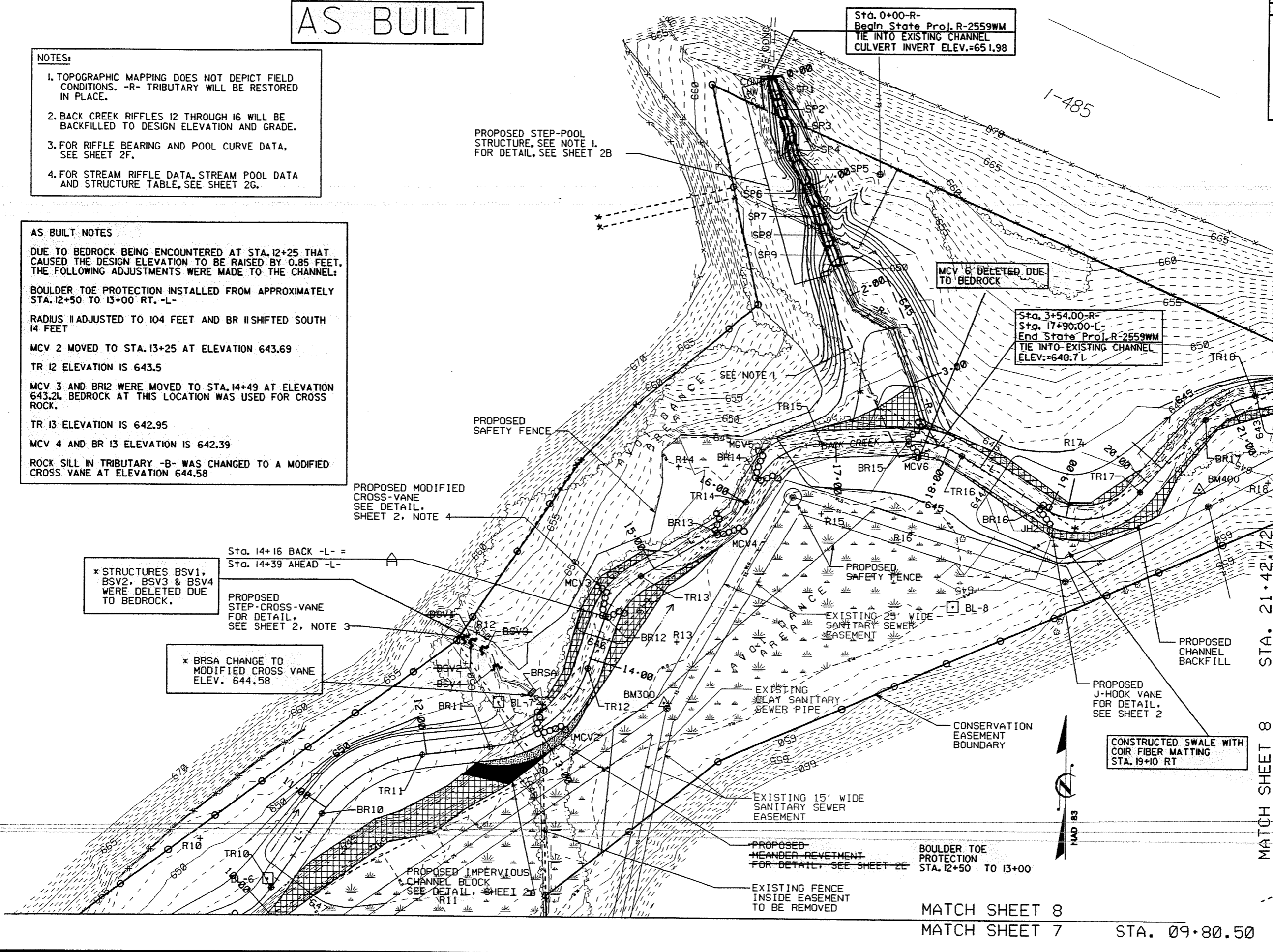
TR 12 ELEVATION IS 643.5

MCV 3 AND BR12 WERE MOVED TO STA. 14+49 AT ELEVATION 643.21. BEDROCK AT THIS LOCATION WAS USED FOR CROSS ROCK.

TR 13 ELEVATION IS 642.95

MCV 4 AND BR 13 ELEVATION IS 642.39

ROCK SILL IN TRIBUTARY -B- WAS CHANGED TO A MODIFIED CROSS VANE AT ELEVATION 644.58

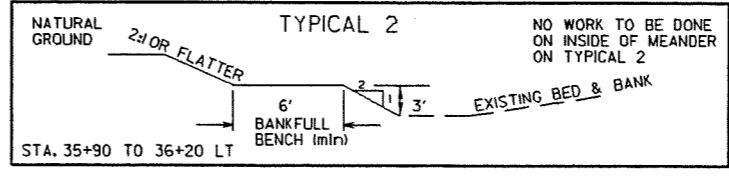
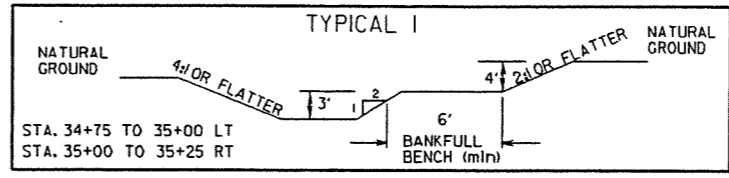


MATCH SHEET 8
MATCH SHEET 7
STA. 21+42.72
STA. 09+80.50

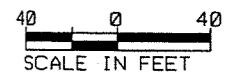
DO NOT DISTURB EXISTING NORTHSIDE BANK.
RESTORE IN PLACE OR MOVE SOUTHWARD.

* AS-BUILT NOTES

I-485



PROJECT REFERENCE NO. R-2559WM	SHEET NO. 9
PROJECT DESIGN ENGINEER	

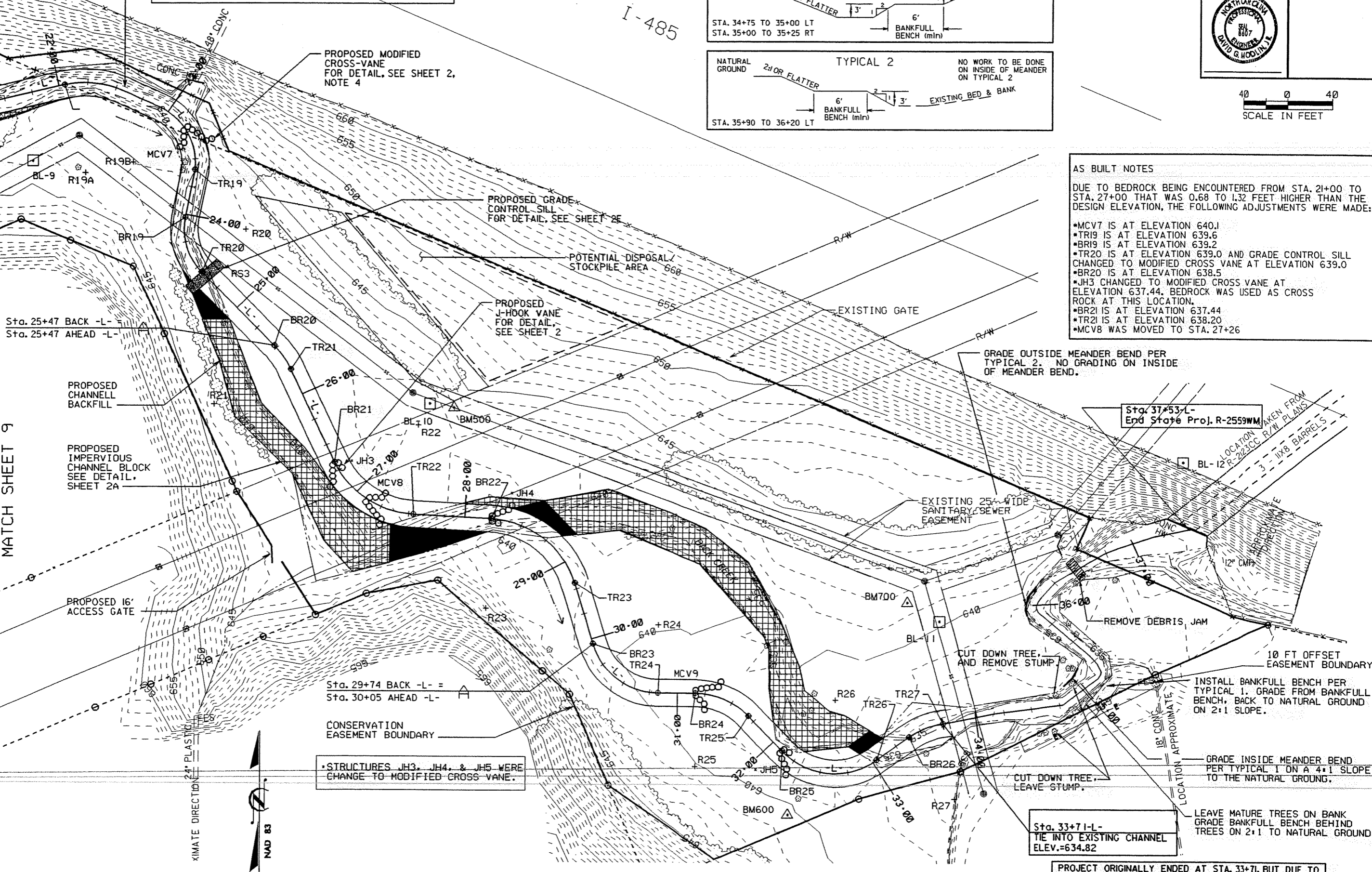


AS BUILT NOTES

DUE TO BEDROCK BEING ENCOUNTERED FROM STA. 21+00 TO STA. 27+00 THAT WAS 0.68 TO 1.32 FEET HIGHER THAN THE DESIGN ELEVATION, THE FOLLOWING ADJUSTMENTS WERE MADE:

- * MCV7 IS AT ELEVATION 640.1
- * TR19 IS AT ELEVATION 639.6
- * BR19 IS AT ELEVATION 639.2
- * TR20 IS AT ELEVATION 639.0 AND GRADE CONTROL SILL CHANGED TO MODIFIED CROSS VANE AT ELEVATION 639.0
- * BR20 IS AT ELEVATION 638.5
- * JH3 CHANGED TO MODIFIED CROSS VANE AT ELEVATION 637.44. BEDROCK WAS USED AS CROSS ROCK AT THIS LOCATION.
- * BR21 IS AT ELEVATION 637.44
- * TR21 IS AT ELEVATION 638.20
- * MCV8 WAS MOVED TO STA. 27+26

MATCH SHEET 8 STA. 21+42.72
MATCH SHEET 9



Sta. 25+47 BACK -L-
Sta. 25+47 AHEAD -L-

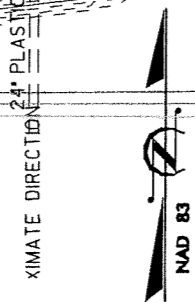
PROPOSED CHANNEL BACKFILL
PROPOSED IMPERVIOUS CHANNEL BLOCK
SEE DETAIL, SHEET 2A

PROPOSED 16' ACCESS GATE

Sta. 29+74 BACK -L- =
Sta. 30+05 AHEAD -L-

CONSERVATION EASEMENT BOUNDARY

* STRUCTURES JH3, JH4, & JH5 WERE
CHANGE TO MODIFIED CROSS VANE.



GRADE OUTSIDE MEANDER BEND PER
TYPICAL 2. NO GRADING ON INSIDE
OF MEANDER BEND.

Sta. 37+53-L-
End State Proj. R-2559WM

EXISTING 25' WIDE
SANITARY SEWER
EASEMENT

CUT DOWN TREE,
AND REMOVE STUMP.

REMOVE DEBRIS, JAM

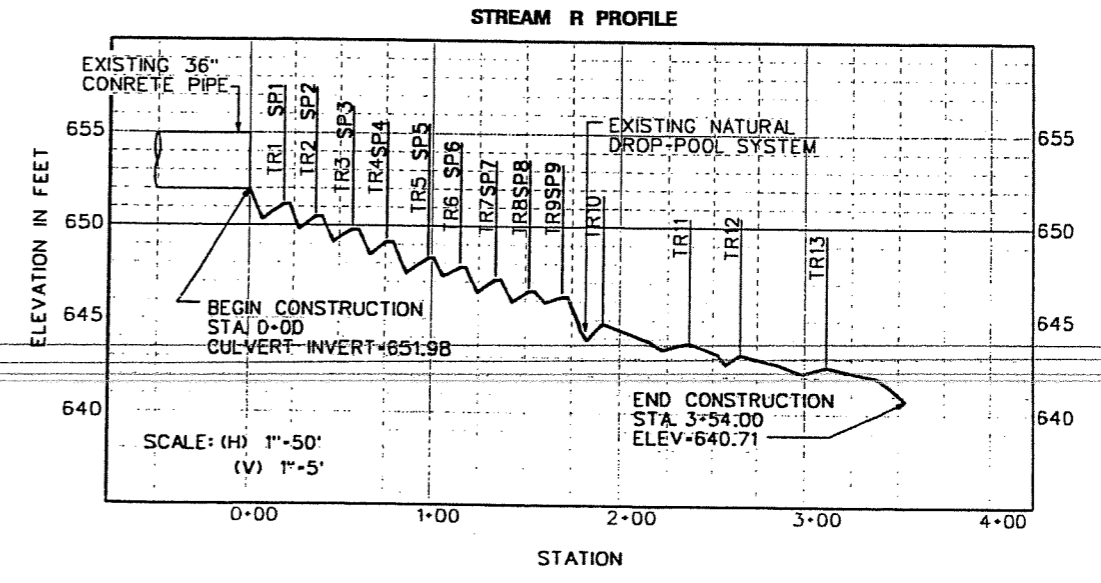
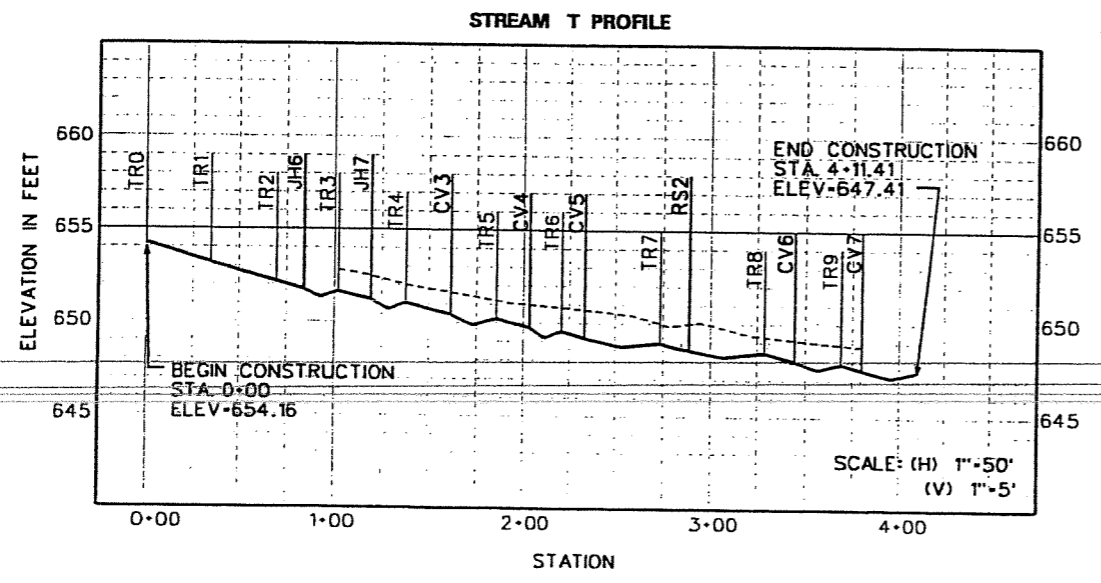
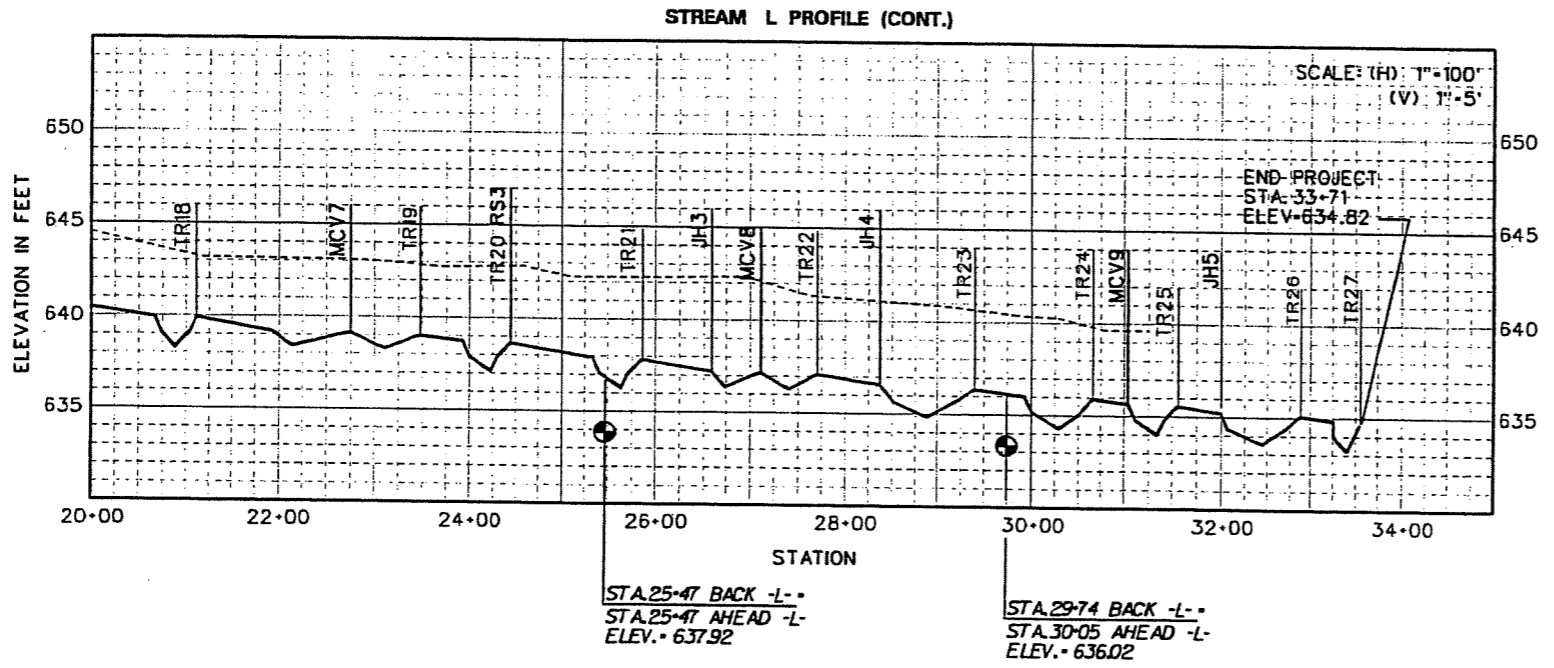
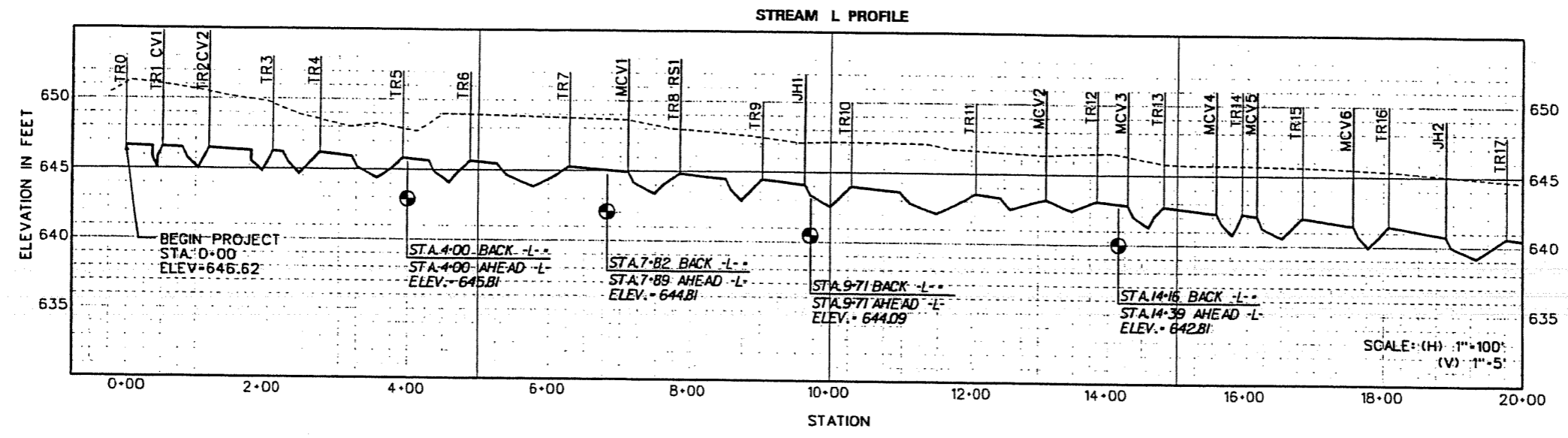
10 FT OFFSET
EASEMENT BOUNDARY

INSTALL BANKFULL BENCH PER
TYPICAL 1. GRADE FROM BANKFULL
BENCH, BACK TO NATURAL GROUND
ON 2:1 SLOPE.

GRADE INSIDE MEANDER BEND
PER TYPICAL 1 ON A 4:1 SLOPE
TO THE NATURAL GROUND.

Sta. 33+71-L-
TIE INTO EXISTING CHANNEL
ELEV.=634.82

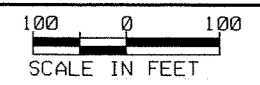
PROJECT ORIGINALLY ENDED AT STA. 33+71, BUT DUE TO
INSTABILITY DOWNSTREAM, THE WORK SHOWN ABOVE
WAS PERMITTED TO STA. 37+53.



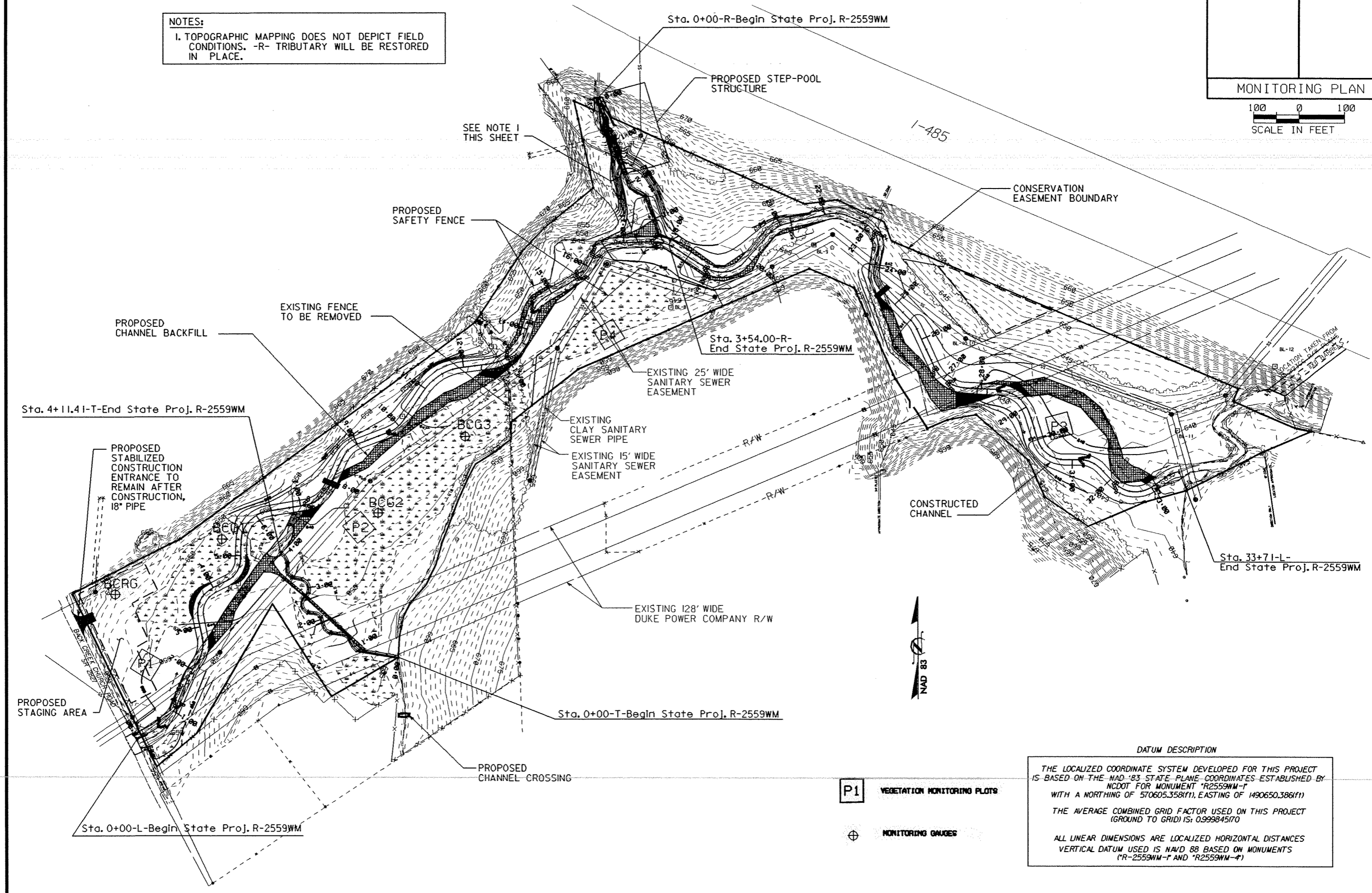
TR0	TOP OF RIFFLE
CV1	CROSS-VANE
JH1	J-HOOK VANE
RS1	ROCK SILL
MCV1	MODIFIED CROSS-VANE
SP5	STEP-POOL STRUCTURE
CF1	CHANNEL FORD

VEGETATION PLOTS AND MONITORING GAUGE LOCATIONS

PROJECT REFERENCE NO. R-2559WM	SHEET NO. 11
PROJECT DESIGN ENGINEER	
MONITORING PLAN	



NOTES:
I. TOPOGRAPHIC MAPPING DOES NOT DEPICT FIELD CONDITIONS. -R- TRIBUTARY WILL BE RESTORED IN PLACE.



- P1 VEGETATION MONITORING PLOTS
- + MONITORING GAUGES

DATUM DESCRIPTION

THE LOCALIZED COORDINATE SYSTEM DEVELOPED FOR THIS PROJECT IS BASED ON THE NAD '83 STATE PLANE COORDINATES ESTABLISHED BY NCDOT FOR MONUMENT 'R2559WM-T' WITH A NORTHING OF 570605.358(ft), EASTING OF 1490650.386(ft). THE AVERAGE COMBINED GRID FACTOR USED ON THIS PROJECT (GROUND TO GRID) IS: 0.999845170.

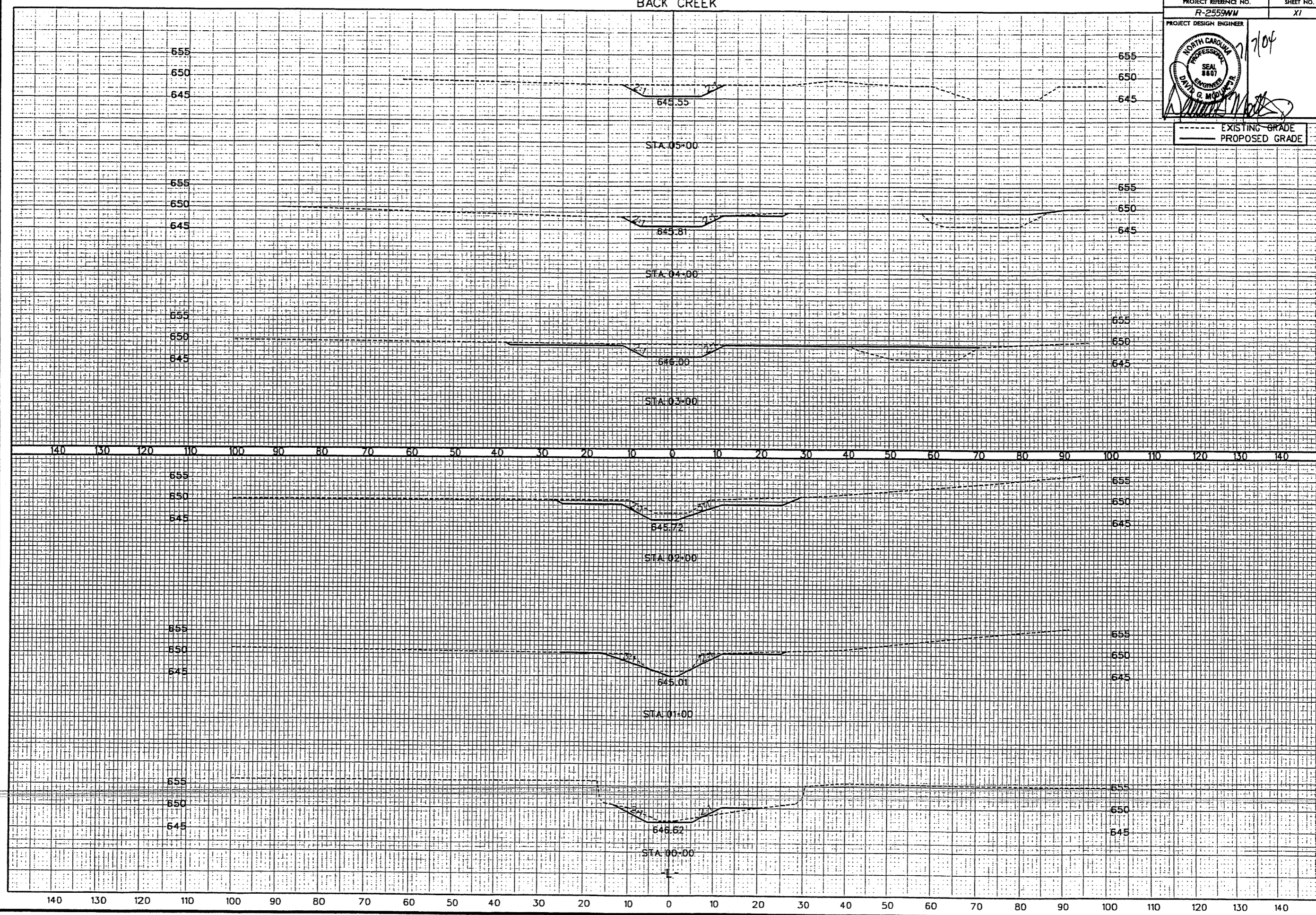
ALL LINEAR DIMENSIONS ARE LOCALIZED HORIZONTAL DISTANCES. VERTICAL DATUM USED IS NAD 88 BASED ON MONUMENTS ('R-2559WM-T' AND 'R2559WM-F').

BACK CREEK


PROJECT REFERENCE NO. R-2559WM SHEET NO. XI

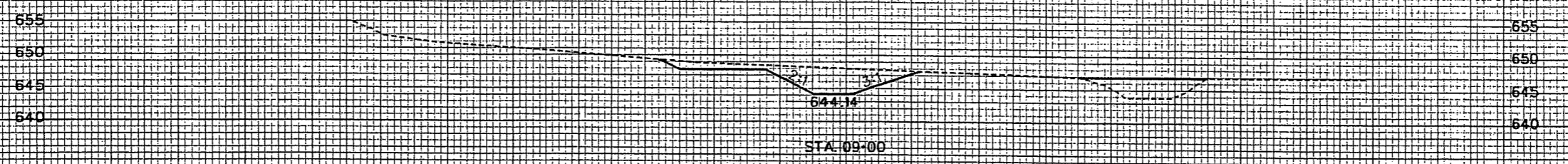
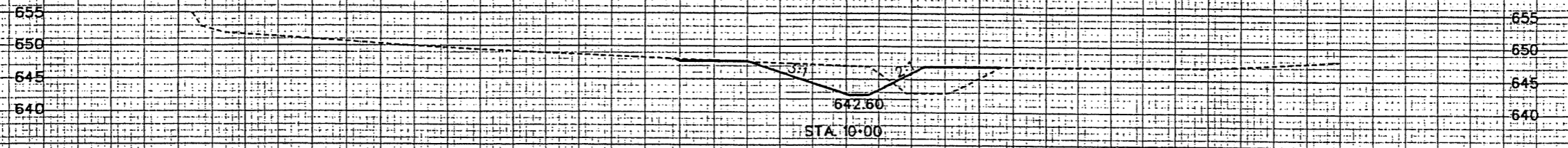
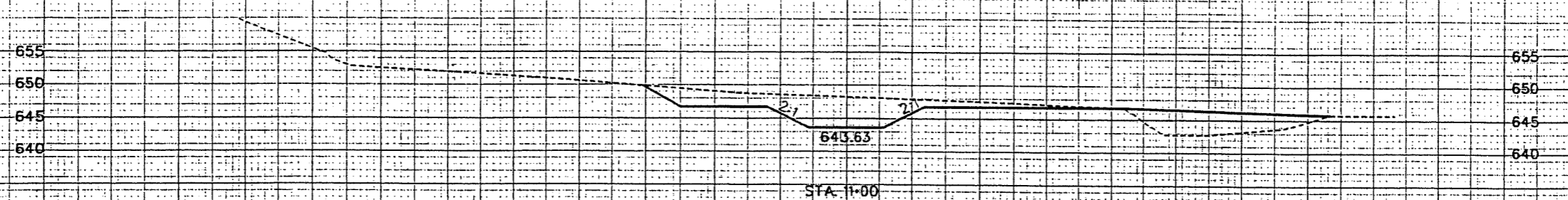
PROJECT DESIGN ENGINEER
NORTH CAROLINA PROFESSIONAL SEAL 8607
DWAYNE G. MOULDER, P.E.
7104

--- EXISTING GRADE
— PROPOSED GRADE

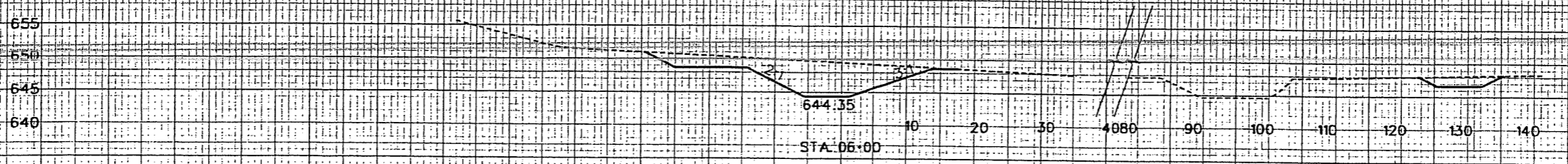
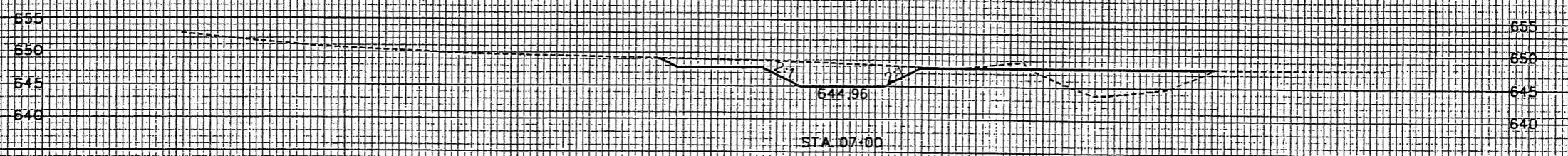
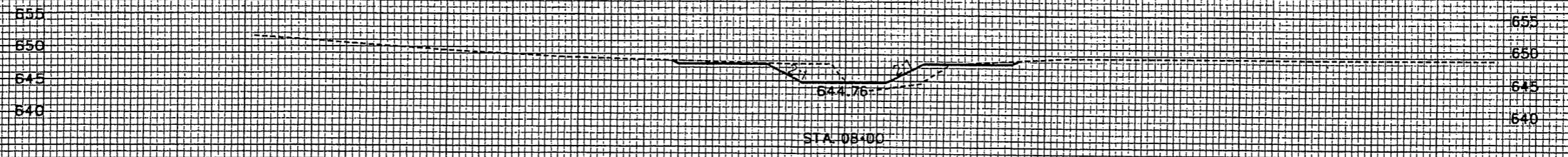


BACK CREEK

PROJECT REFERENCE NO. R-2559WM	SHEET NO. X2
PROJECT DESIGN ENGINEER 2/7/04	
	
EXISTING GRADE PROPOSED GRADE	



140 130 120 110 100 90 80 70 60 50 40 30 20 10 0 10 20 30 40 50 60 70 80 90 100 110 120 130 140



140 130 120 110 100 90 80 70 60 50 40 30 20 10 0 10 20 30 40 50 60 70 80 90 100 110 120 130 140

-L-

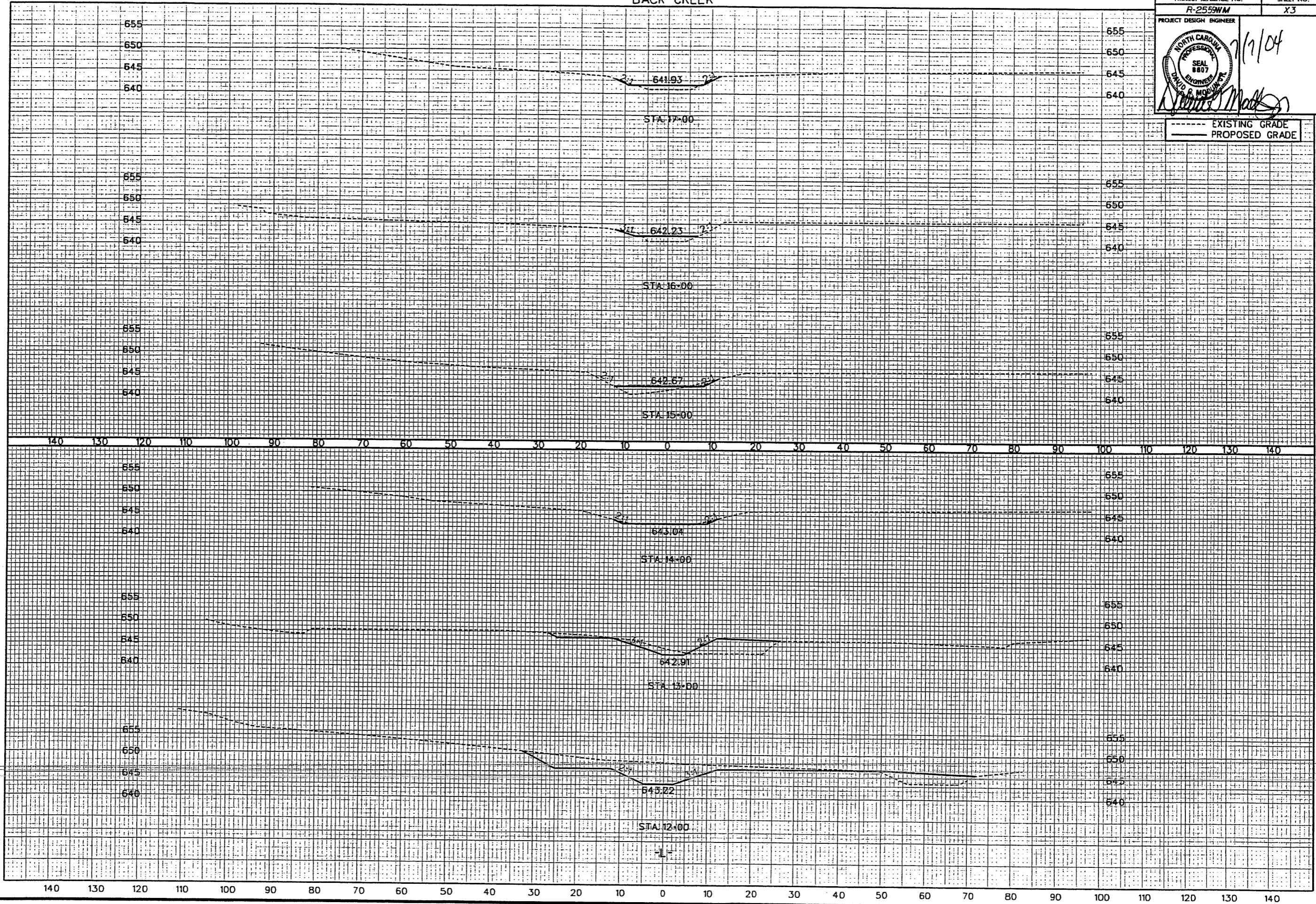
BACK CREEK

PROJECT REFERENCE NO. R-2559NM SHEET NO. X3

PROJECT DESIGN ENGINEER



EXISTING GRADE
PROPOSED GRADE

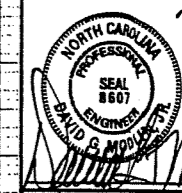


BACK CREEK

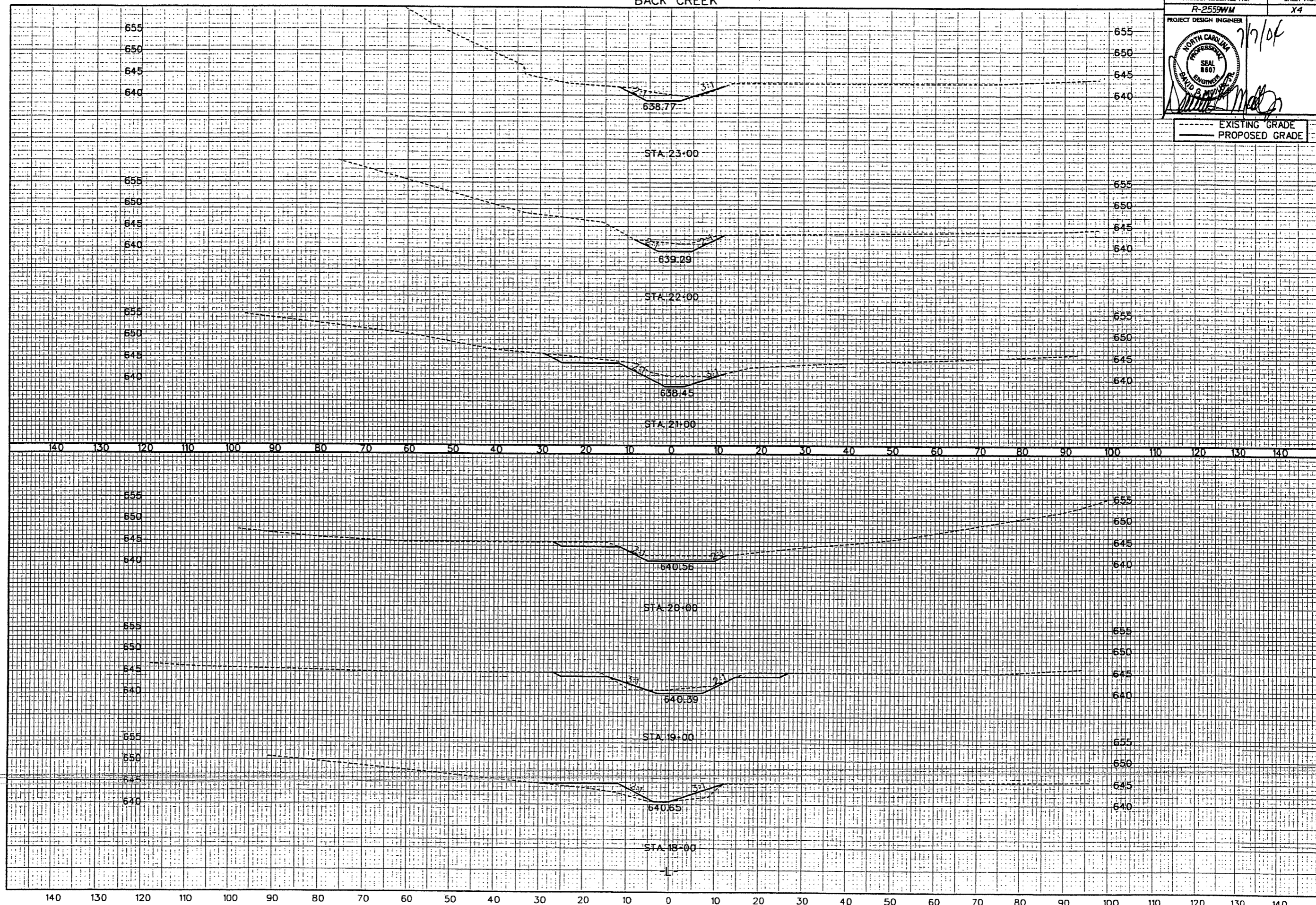
PROJECT REFERENCE NO. SHEET NO.

R-2559WM X4


PROJECT DESIGN ENGINEER



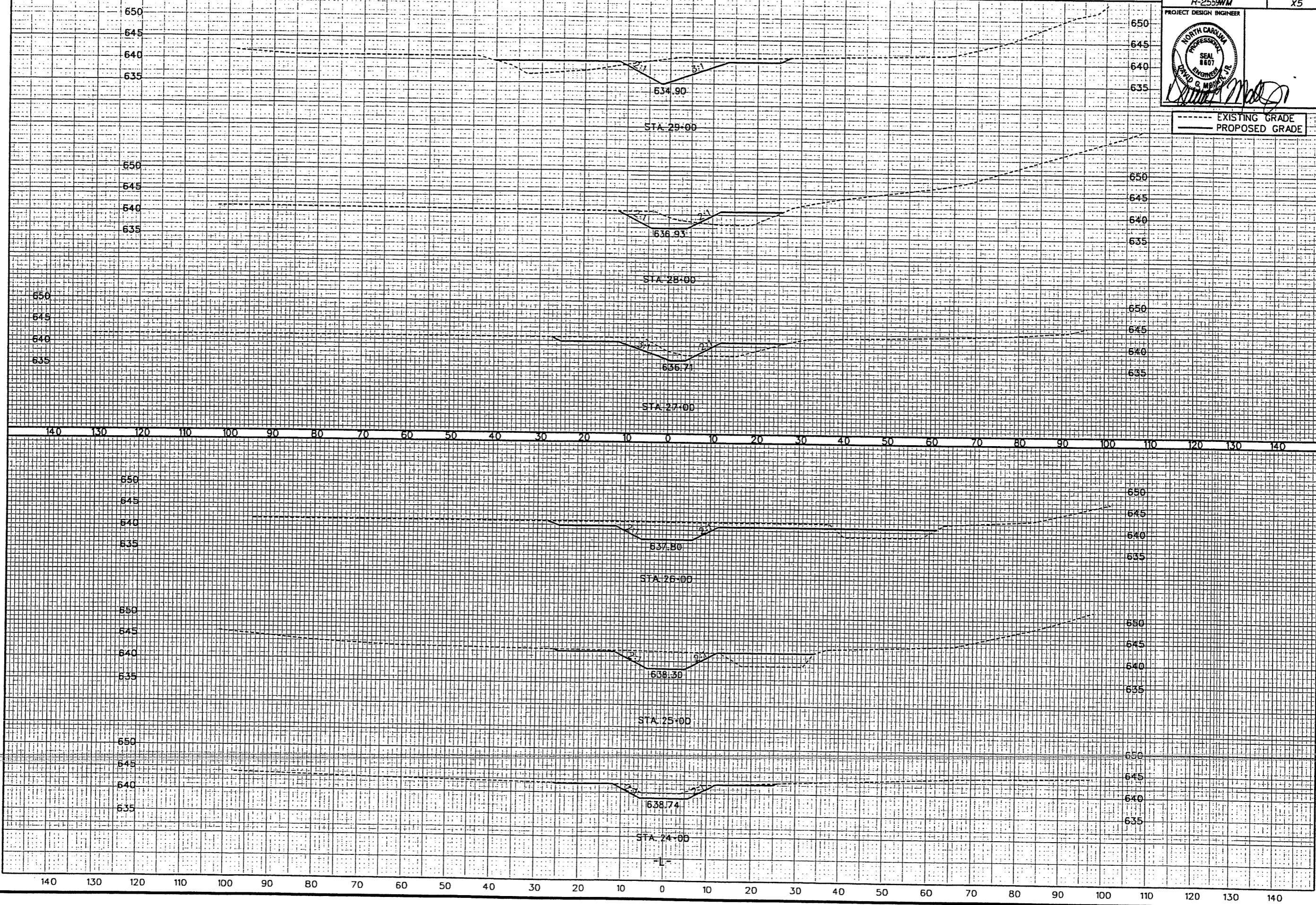
--- EXISTING GRADE
— PROPOSED GRADE




BACK CREEK

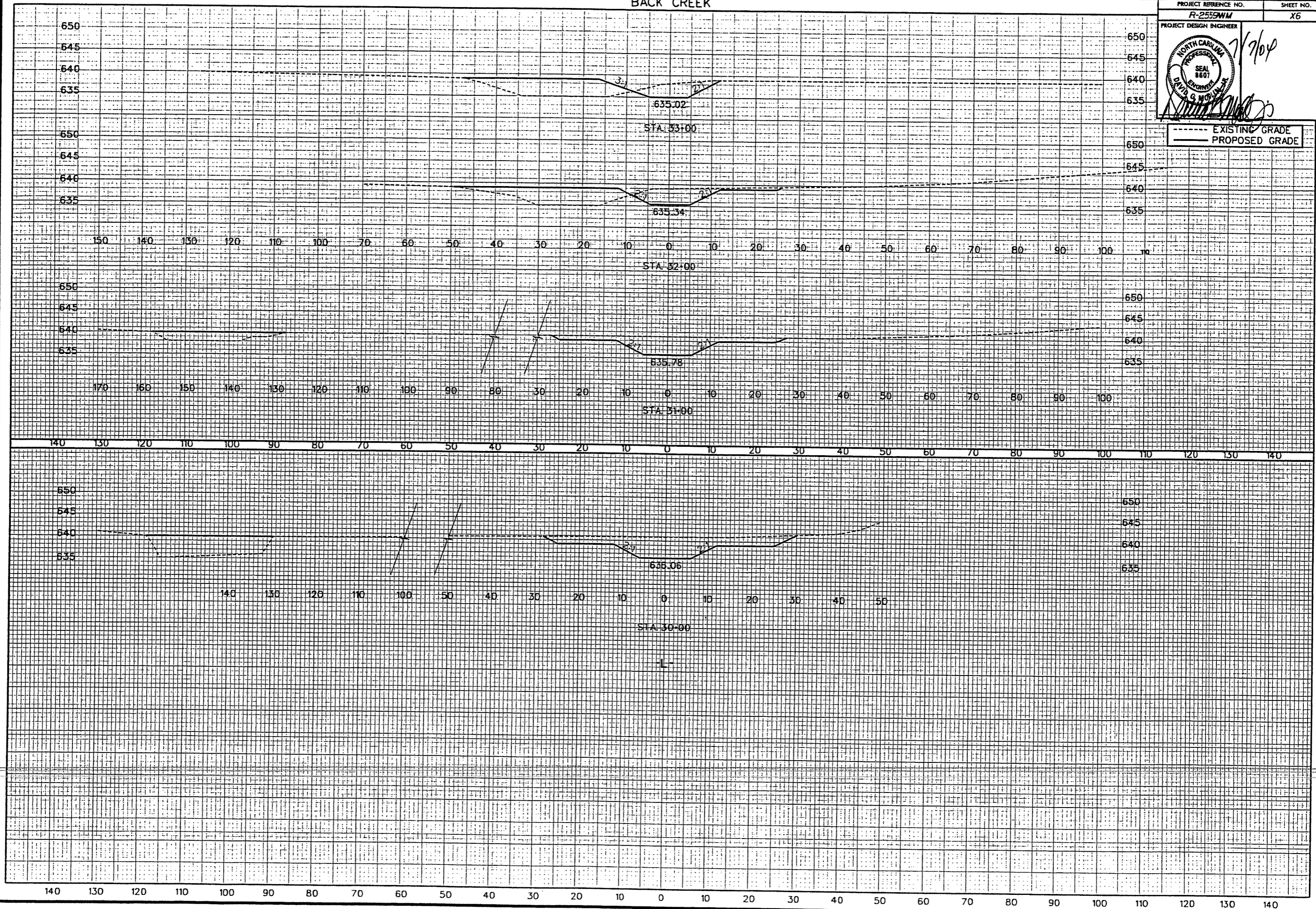
PROJECT REFERENCE NO.	SHEET NO.
R-2559WM	X5
PROJECT DESIGN ENGINEER	
	

--- EXISTING GRADE
— PROPOSED GRADE



BACK CREEK

PROJECT REFERENCE NO. R-2559WM	SHEET NO. X6
PROJECT DESIGN ENGINEER 7/7/04 	

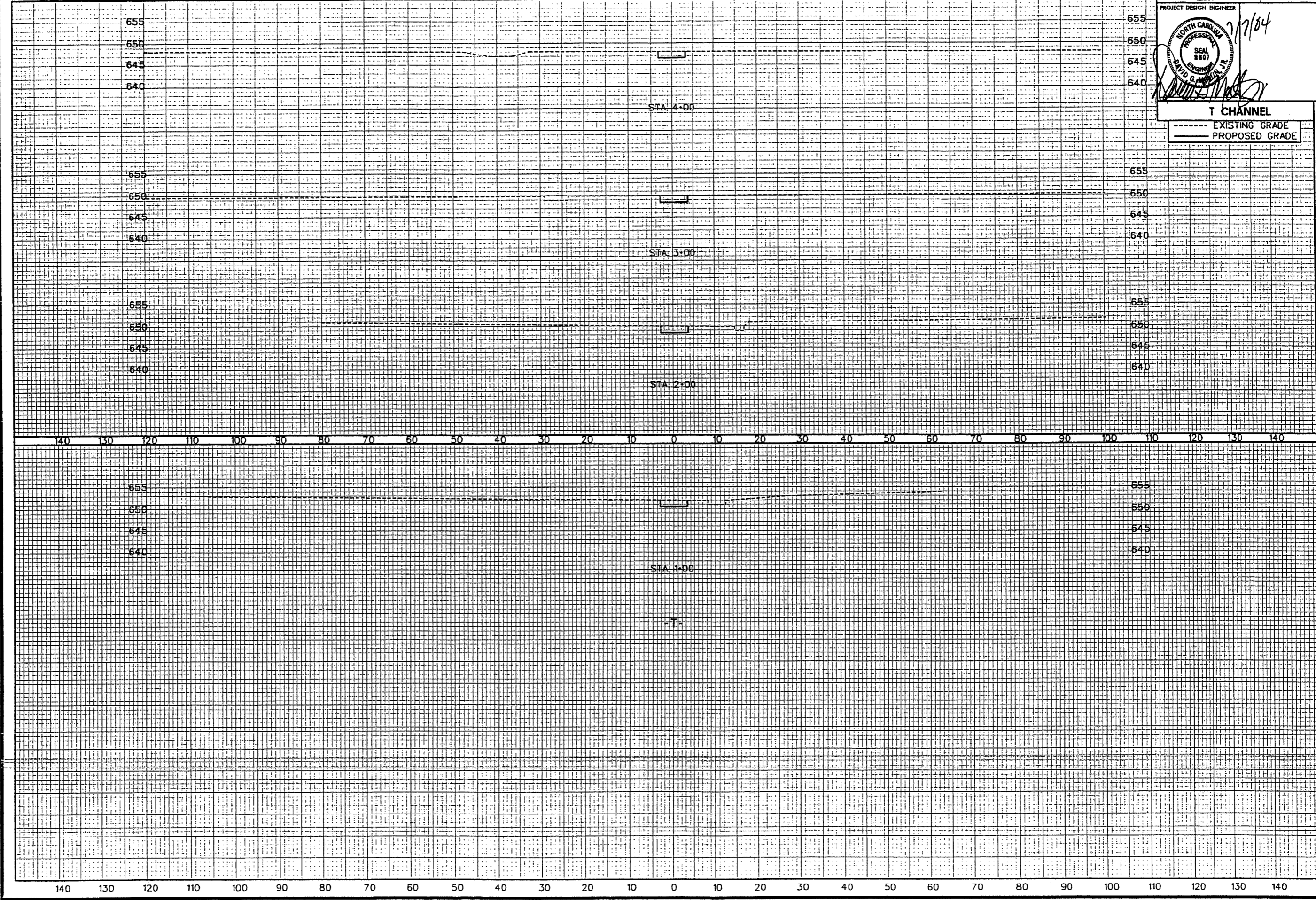


MORGAN TRIBUTARY

PROJECT REFERENCE NO. R-2559WM SHEET NO. X7

PROJECT DESIGN ENGINEER
NORTH CAROLINA PROFESSIONAL SEAL 6607
DAVID G. ANDERSON, JR.
2/7/04

T CHANNEL
--- EXISTING GRADE
— PROPOSED GRADE



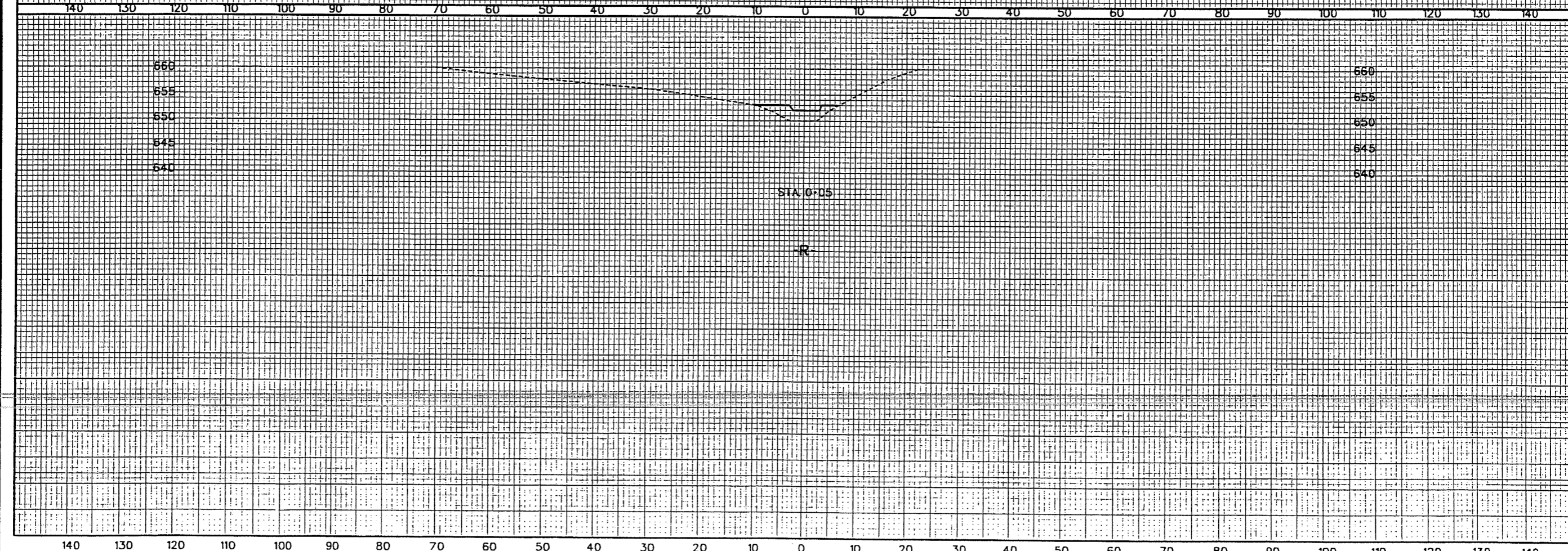
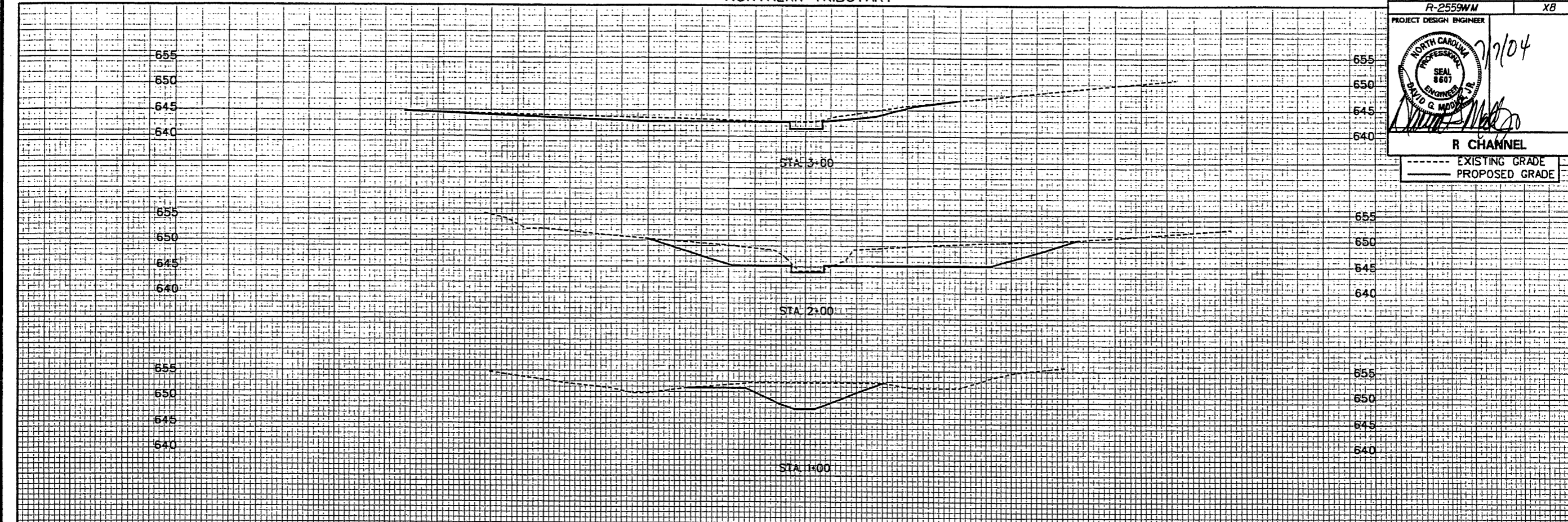
140 130 120 110 100 90 80 70 60 50 40 30 20 10 0 10 20 30 40 50 60 70 80 90 100 110 120 130 140

NORTHERN TRIBUTARY

PROJECT REFERENCE NO. R-2559WM SHEET NO. XB

PROJECT DESIGN ENGINEER
NORTH CAROLINA PROFESSIONAL SEAL 8607
DAVID G. MOORE, JR.
7/20/04

R CHANNEL
--- EXISTING GRADE
— PROPOSED GRADE



WBS#: 34464.4.3 **TIP#: R-2559WM**

STATE OF NORTH CAROLINA
 DIVISION OF HIGHWAYS

 PLAN FOR PROPOSED
 HIGHWAY EROSION CONTROL

MECKLENBURG COUNTY

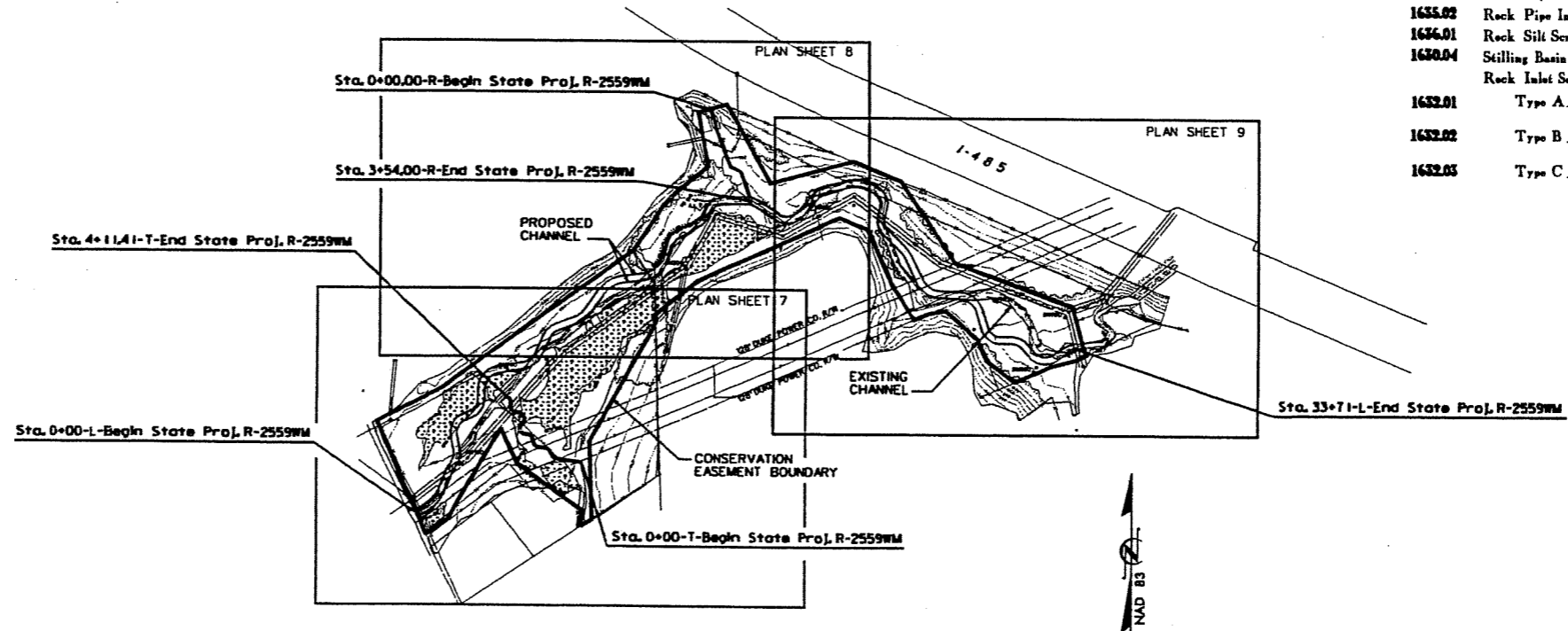
LOCATION: BACK CREEK STREAM RESTORATION/ENHANCEMENT

**TYPE OF WORK: IN-STREAM STRUCTURES, FLOODPLAIN GRADING/
SCARIFICATION AND NEW CHANNEL CONSTRUCTION**

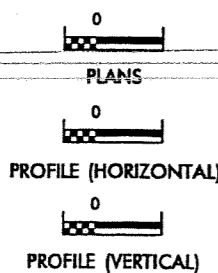
STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	R-2559WM	EC-1	
STATE PROJECT NO.	S.A. PROJECT NO.	DESCRIPTION	
34464.4.1		P.E.	
34464.4.2		RW	
34464.4.3		CONST.	

EROSION AND SEDIMENT CONTROL MEASURES

Sta. #	Description	Symbol
	Reforestation	
1630.05	Temporary Silt Ditch	
1630.05	Temporary Diversion	
1605.01	Temporary Silt Fence	
1606.01	Special Sediment Control Fence	
1632.01	Temporary Berms and Slope Drains	
1630.01	Riser Basin	
1630.02	Silt Basin Type B	
1633.01	Temporary Rock Silt Check Type-A	
1633.02	Temporary Rock Silt Check Type-B	
1634.01	Temporary Rock Sediment Dam Type-A	
1634.02	Temporary Rock Sediment Dam Type-B	
1635.01	Rock Pipe Inlet Sediment Trap Type-A	
1635.02	Rock Pipe Inlet Sediment Trap Type-B	
1636.01	Rock Silt Screen	
1630.04	Stilling Basin	
	Rock Inlet Sediment Trap:	
1632.01	Type A	
1632.02	Type B	
1632.03	Type C	



GRAPHIC SCALE



ROADSIDE ENVIRONMENTAL UNIT
DIVISION OF HIGHWAYS
STATE OF NORTH CAROLINA

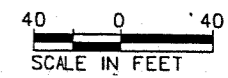
Prepared in the Office of:
ROADSIDE ENVIRONMENTAL UNIT
 1 South Wilmington St.
 Raleigh, NC 27611
2002 STANDARD SPECIFICATIONS

Roadway Standard Drawings

The following roadway English standards as appear in "Roadway Standard Drawings" - Roadway Design Unit - N.C. Department of Transportation - Raleigh, N.C., dated January 20, 2002 and the latest revision thereto are applicable to this project and by reference hereby are considered a part of these plans.

- 1605.01 Temporary Silt Fence
- 1633.01 Temporary Rock Silt Check Type A
- 1636.01 Rock Silt Screen

PROJECT REFERENCE NO. R-2559WM	SHEET NO. EC-2/CONST.7
PROJECT DESIGN ENGINEER	



MATCH SHEET 8
MATCH SHEET 7 STA. 09+80.50

PROPOSED
MODIFIED CROSS-VANE
SEE DETAIL, SHEET 2
NOTE 4

PROPOSED PERMANENT
SOIL REINFORCEMENT MAT
SEE DETAIL, SHEET 2D

Sta. 4+11.41-T-
End State Proj. R-2559WM
TIE INTO EXISTING GRADE
ELEV.=647.41

Sta. 4+00 BACK -L- =
Sta. 4+00 AHEAD -L-

PROPOSED
MEANDER REVETMENT
SEE DETAIL, SHEET 2A

PROPOSED
STABILIZED
CONSTRUCTION
ENTRANCE TO
REMAIN AFTER
CONSTRUCTION,
18" PIPE.
SEE DETAIL,
SHEET 2E.

PROPOSED 16'
ACCESS GATE

PROPOSED
STAGING AREA

EXISTING 25' WIDE
SANITARY SEWER
EASEMENT

Sta. 0+00-L-
Begin State Proj. R-2559WM
TIE INTO EXISTING CHANNEL
ELEV.=646.62

PROPOSED
CROSS-VANE
SEE DETAIL, SHEET 2



PROPOSED 12'
ACCESS GATE

Sta. 0+00-T-
Begin State Proj. R-2559WM
TIE INTO EXISTING CHANNEL
ELEV.=654.16
SEE NOTE 2.

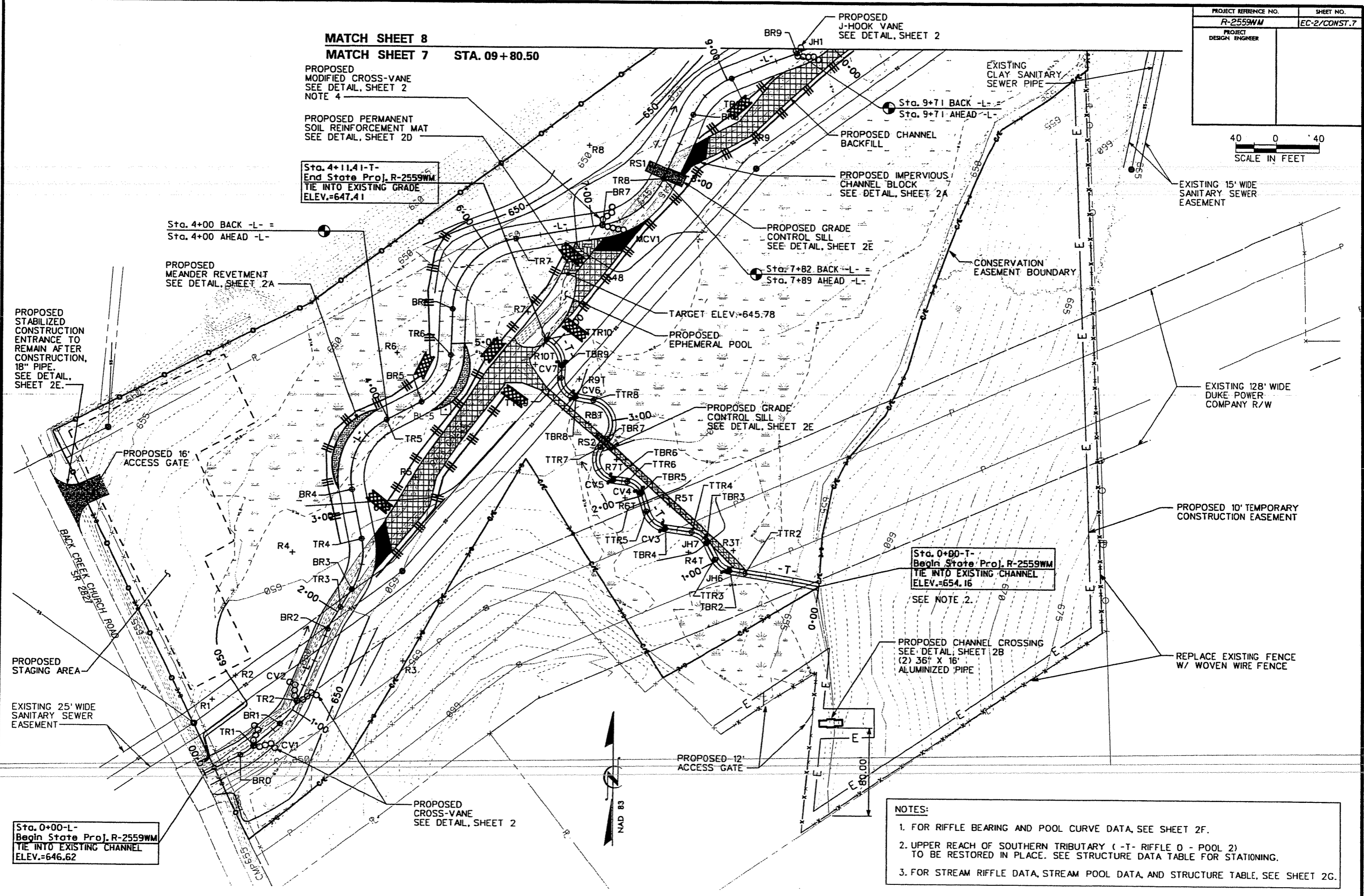
PROPOSED CHANNEL CROSSING
SEE DETAIL, SHEET 2B
(2) 36" X 16"
ALUMINIZED PIPE

EXISTING 128' WIDE
DUKE POWER
COMPANY R/W

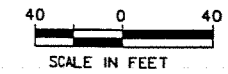
PROPOSED 10' TEMPORARY
CONSTRUCTION EASEMENT

REPLACE EXISTING FENCE
W/ WOVEN WIRE FENCE

- NOTES:**
1. FOR RIFFLE BEARING AND POOL CURVE DATA, SEE SHEET 2F.
 2. UPPER REACH OF SOUTHERN TRIBUTARY (-T- RIFFLE 0 - POOL 2) TO BE RESTORED IN PLACE. SEE STRUCTURE DATA TABLE FOR STATIONING.
 3. FOR STREAM RIFFLE DATA, STREAM POOL DATA, AND STRUCTURE TABLE, SEE SHEET 2G.



PROJECT REFERENCE NO.	SHEET NO.
R-2559WM	EC-3/CONST. 8
PROJECT DESIGN ENGINEER	

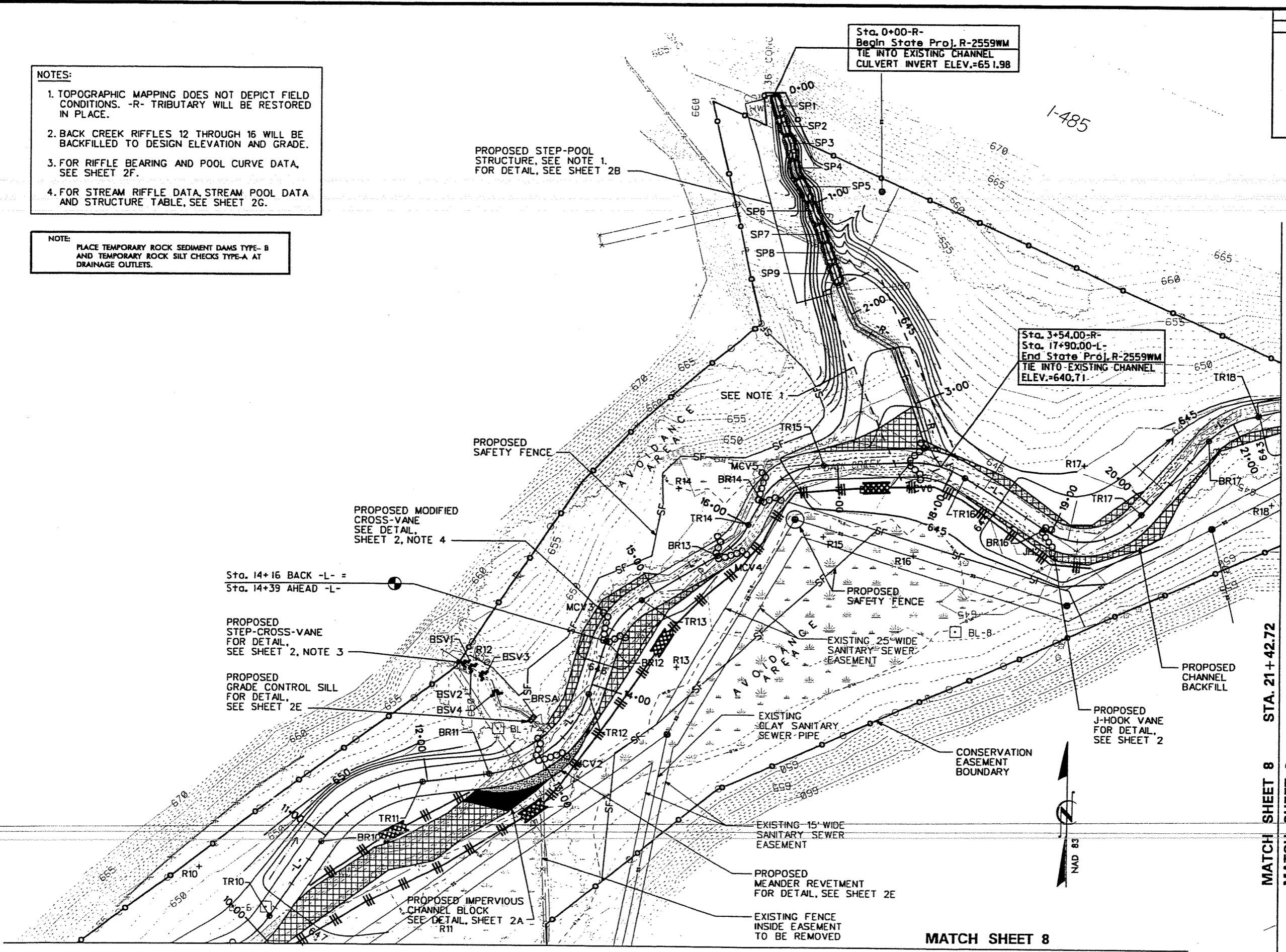


- NOTES:**
1. TOPOGRAPHIC MAPPING DOES NOT DEPICT FIELD CONDITIONS. -R- TRIBUTARY WILL BE RESTORED IN PLACE.
 2. BACK CREEK RIFFLES 12 THROUGH 16 WILL BE BACKFILLED TO DESIGN ELEVATION AND GRADE.
 3. FOR RIFFLE BEARING AND POOL CURVE DATA, SEE SHEET 2F.
 4. FOR STREAM RIFFLE DATA, STREAM POOL DATA AND STRUCTURE TABLE, SEE SHEET 2G.

NOTE:
PLACE TEMPORARY ROCK SEDIMENT DAMS TYPE-B AND TEMPORARY ROCK SILT CHECKS TYPE-A AT DRAINAGE OUTLETS.

Sta. 0+00-R-
Begin State Proj. R-2559WM
TIE INTO EXISTING CHANNEL
CULVERT INVERT ELEV.=651.98

Sta. 3+54.00-R-
Sta. 17+90.00-L-
End State Proj. R-2559WM
TIE INTO EXISTING CHANNEL
ELEV.=640.71



Sta. 14+16 BACK -L- =
Sta. 14+39 AHEAD -L-

PROPOSED
STEP-CROSS-VANE
FOR DETAIL,
SEE SHEET 2, NOTE 3

PROPOSED
GRADE CONTROL SILL
FOR DETAIL,
SEE SHEET 2E

PROPOSED IMPERVIOUS
CHANNEL BLOCK
SEE DETAIL, SHEET 2A
R11

EXISTING 15'-WIDE
SANITARY SEWER
EASEMENT

PROPOSED MEANDER
REVETMENT
FOR DETAIL, SEE SHEET 2E

EXISTING FENCE
INSIDE EASEMENT
TO BE REMOVED

MATCH SHEET 8

MATCH SHEET 7

STA. 09 + 80.50

STA. 21 + 42.72

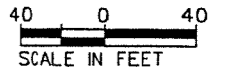
MATCH SHEET 8
MATCH SHEET 9

PROJECT REFERENCE NO.	SHEET NO.
R-2559WM	EC-4/CONST.9
PROJECT DESIGN ENGINEER	

1-485

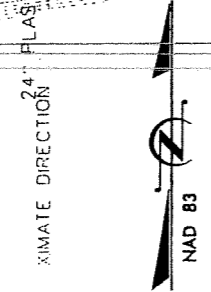
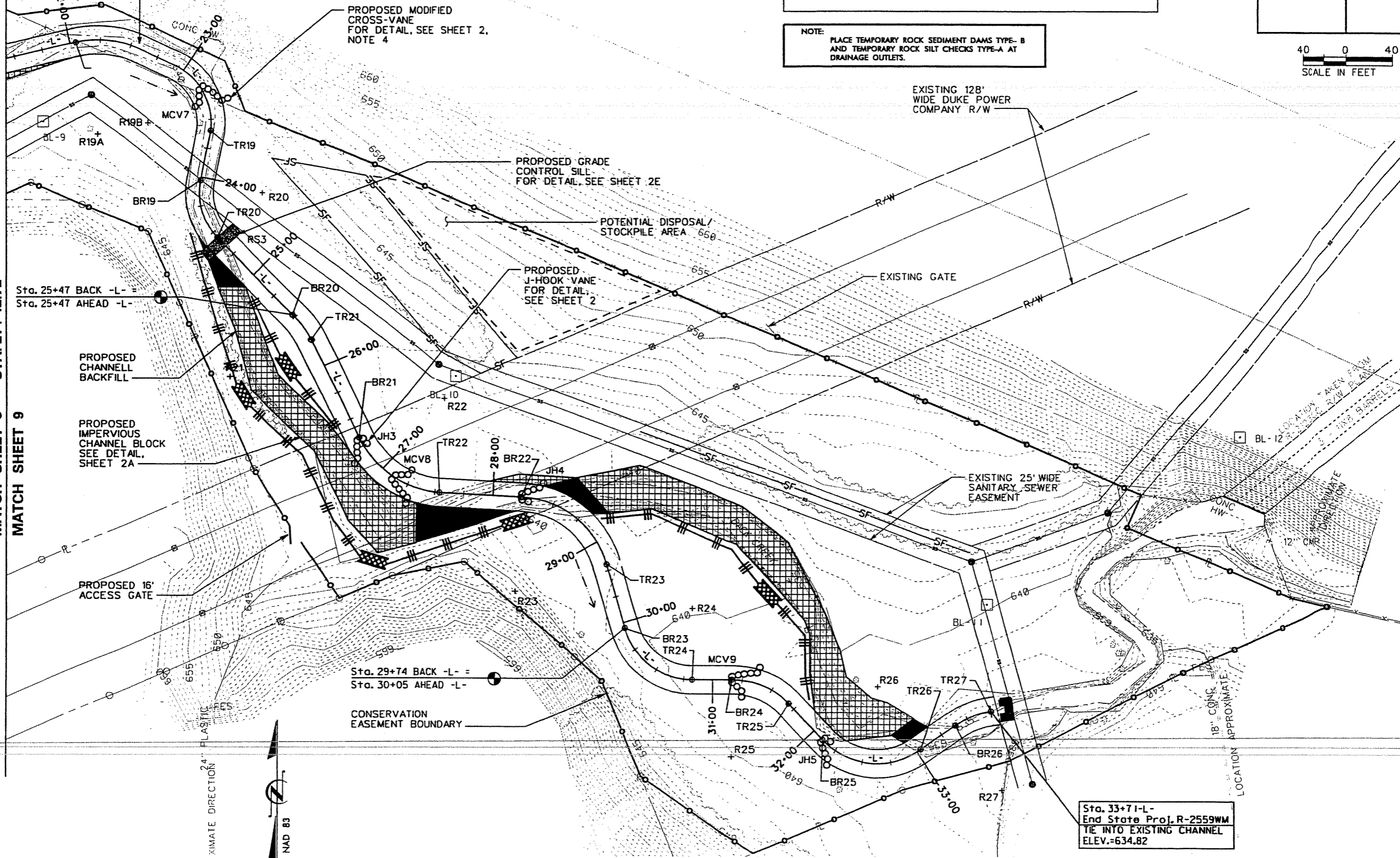
NOTES:
 1. FOR RIFFLE BEARING AND POOL CURVE DATA, SEE SHEET 2F.
 2. FOR STREAM RIFFLE DATA, STREAM POOL DATA AND STRUCTURE TABLE, SEE SHEET 2G.

NOTE:
 PLACE TEMPORARY ROCK SEDIMENT DAMS TYPE-B AND TEMPORARY ROCK SILT CHECKS TYPE-A AT DRAINAGE OUTLETS.



DO NOT DISTURB EXISTING NORTHSIDE BANK.
 RESTORE IN PLACE OR MOVE SOUTHWARD.

MATCH SHEET 8 STA. 21+42.72
 MATCH SHEET 9



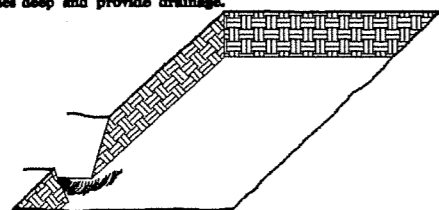
Sta. 33+71.1-L-
 End State Proj. R-2559WM
 TIE INTO EXISTING CHANNEL
 ELEV.=634.82

PLANTING DETAILS

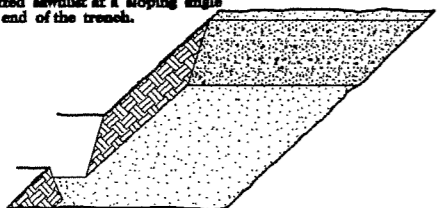
SEEDLING / LINER BAREROOT PLANTING DETAIL

HEALING IN

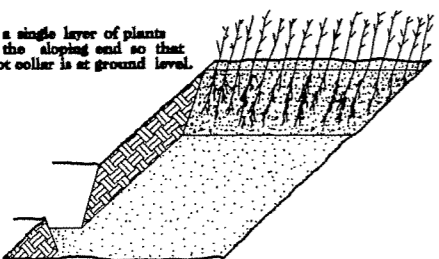
1. Locate a healing-in site in a shady, well protected area.
2. Excavate a flat bottom trench 12 inches deep and provide drainage.



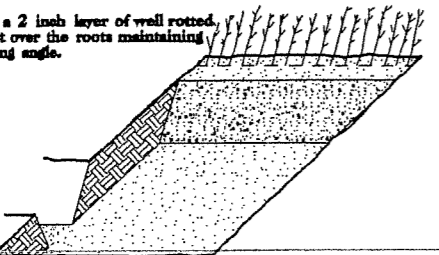
3. Backfill the trench with 2 inches of well rotted sawdust. Place a 2 inch layer of well rotted sawdust at a sloping angle at one end of the trench.



4. Place a single layer of plants against the sloping end so that the root collar is at ground level.

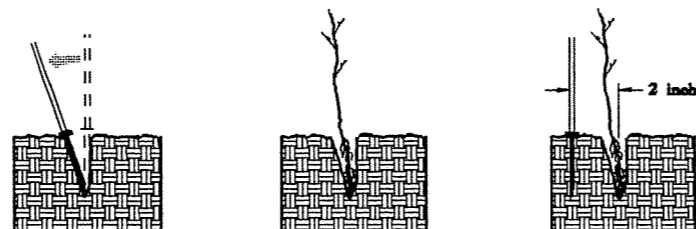


5. Place a 2 inch layer of well rotted sawdust over the roots maintaining a sloping angle.

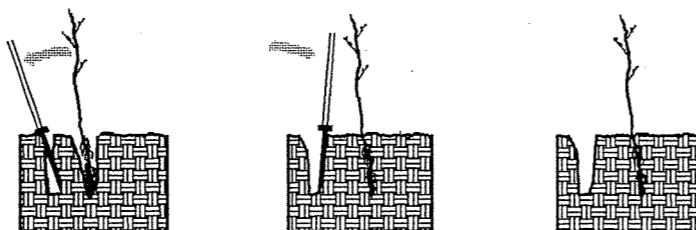


6. Repeat layers of plants and sawdust as necessary and water thoroughly.

DIBBLE PLANTING METHOD USING THE KBC PLANTING BAR



1. Insert planting bar as shown and pull handle toward planter.
2. Remove planting bar and place seedling at correct depth.
3. Insert planting bar 2 inches toward planter from seedling.



4. Pull handle of bar toward planter, firming soil at bottom.
5. Push handle forward firming soil at top.
6. Leave compaction hole open. Water thoroughly.

PLANTING NOTES:

PLANTING BAG
During planting, seedlings shall be kept in a moist canvas bag or similar container to prevent the root systems from drying.



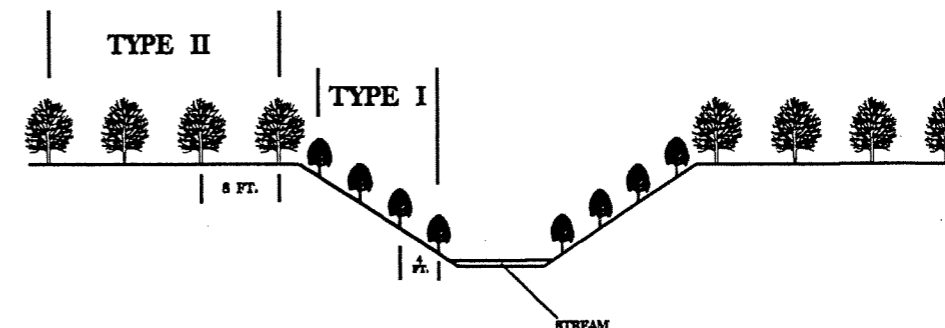
KBC PLANTING BAR
Planting bar shall have a blade with a triangular cross section, and shall be 12 inches long, 4 inches wide and 1 inch thick at center.



ROOT PRUNING
All seedlings shall be root pruned, if necessary, so that no roots extend more than 10 inches below the root collar.

- TYPE 1 STREAMBANK REFORESTATION SHALL BE PLANTED 3 FT. TO 5 FT. ON CENTER, RANDOM SPACING, AVERAGING 4 FT. ON CENTER, APPROXIMATELY 2724 PLANTS PER ACRE.
- TYPE 2 STREAMBANK REFORESTATION SHALL BE PLANTED 6 FT. TO 10 FT. ON CENTER, RANDOM SPACING, AVERAGING 8 FT. ON CENTER, APPROXIMATELY 680 PLANTS PER ACRE.

STREAMBANK REFORESTATION TYPICAL



STREAMBANK REFORESTATION

MIXTURE, TYPE, SIZE, AND FURNISH SHALL CONFORM TO THE FOLLOWING:

TYPE 1

50% SALIX NIGRA	BLACK WILLOW	24 in - 36 in	Live stakes
50% CORNUS AMOMUM	SILKY DOGWOOD	24 in - 36 in	Live stakes

TYPE 2

16.6% PLATANUS OCCIDENTALIS	SYCAMORE	12 in - 18 in	BR
16.6% QUERCUS FALCATA	CHERRYBARK OAK	12 in - 18 in	BR
16.6% FRAXINUS PENNSYLVANICA	GREEN ASH	12 in - 18 in	BR
16.6% BETULA NIGRA	RIVER BIRCH	12 in - 18 in	BR
16.6% QUERCUS MICHAUXII	SWAMP CHESTNUT OAK	12 in - 18 in	BR
16.6% QUERCUS PHELLOS	WILLOW OAK	12 in - 18 in	BR

STREAMBANK REFORESTATION

DETAIL SHEET

N.C.D.O.T. - ROADSIDE ENVIRONMENTAL UNIT