

**This electronic collection of documents is provided
for the convenience of the user
and is Not a Certified Document –**

**The documents contained herein were originally issued
and sealed by the individuals whose names and license
numbers appear on each page, on the dates appearing
with their signature on that page.**

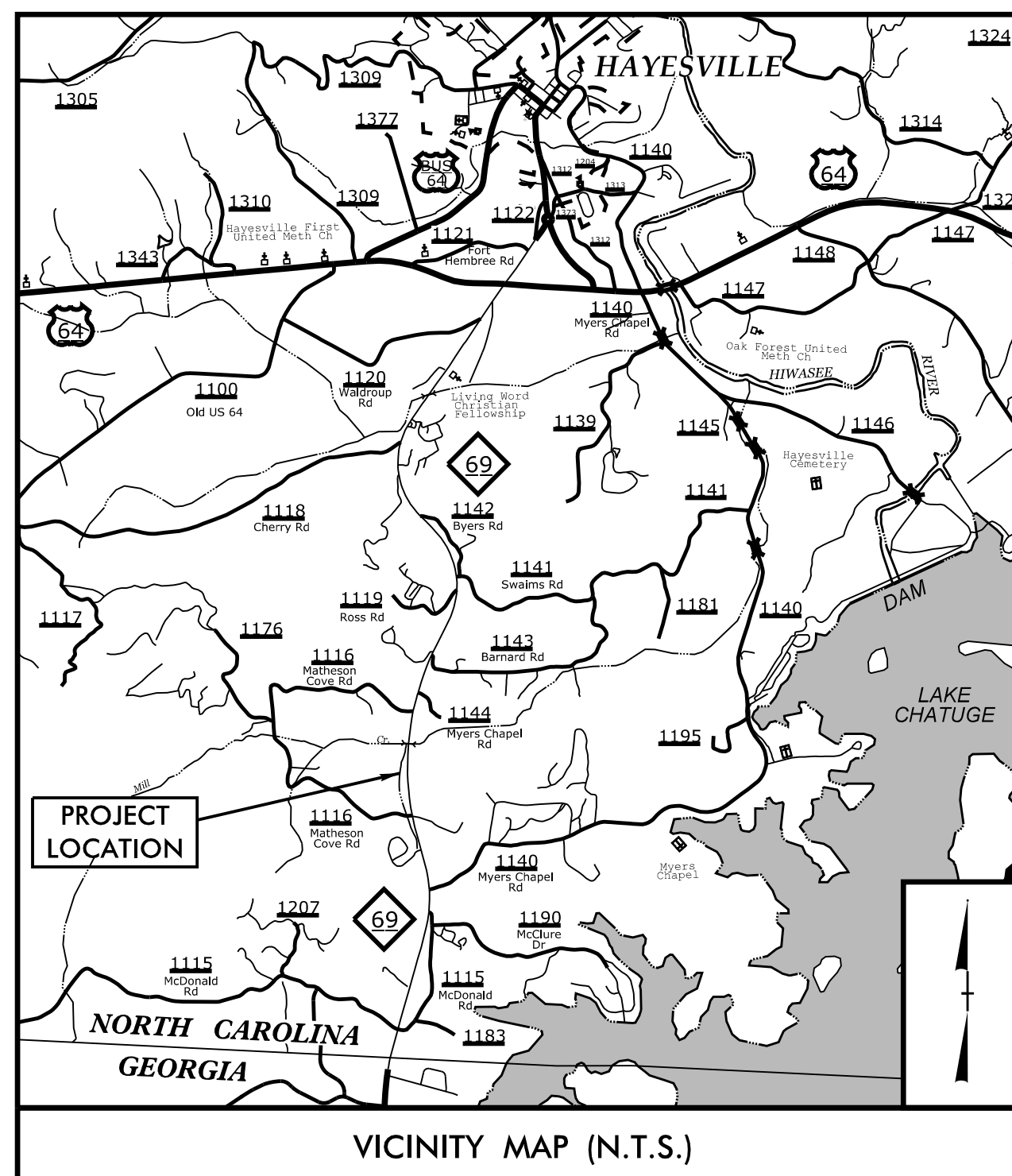
**This file or an individual page
shall not be considered a certified document.**

05/08/19

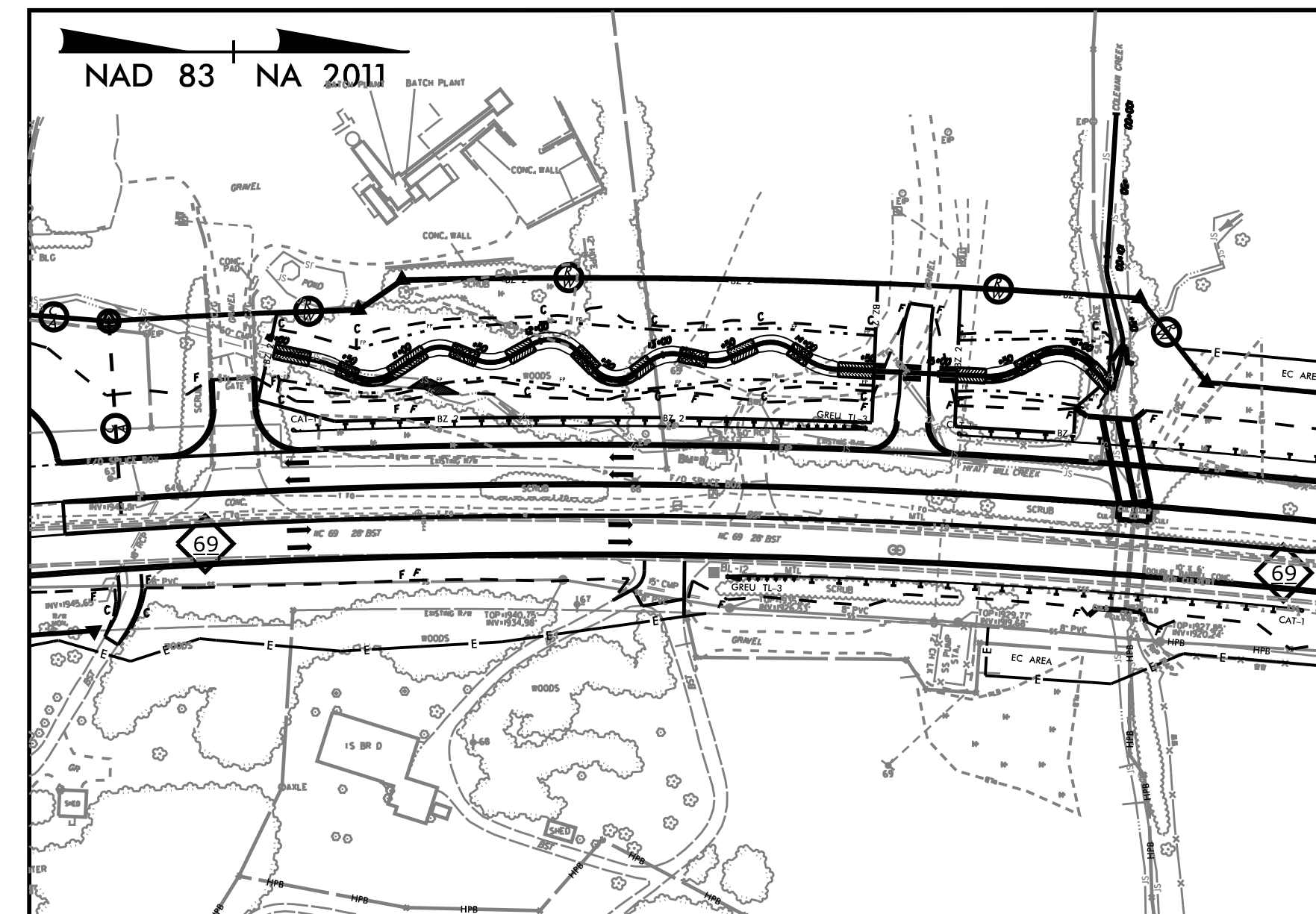
TIP PROJECT: A-0011C

CONTRACT:

See Sheet OSM-1A For Index of Sheets



VICINITY MAP (N.T.S.)



N.T.S.

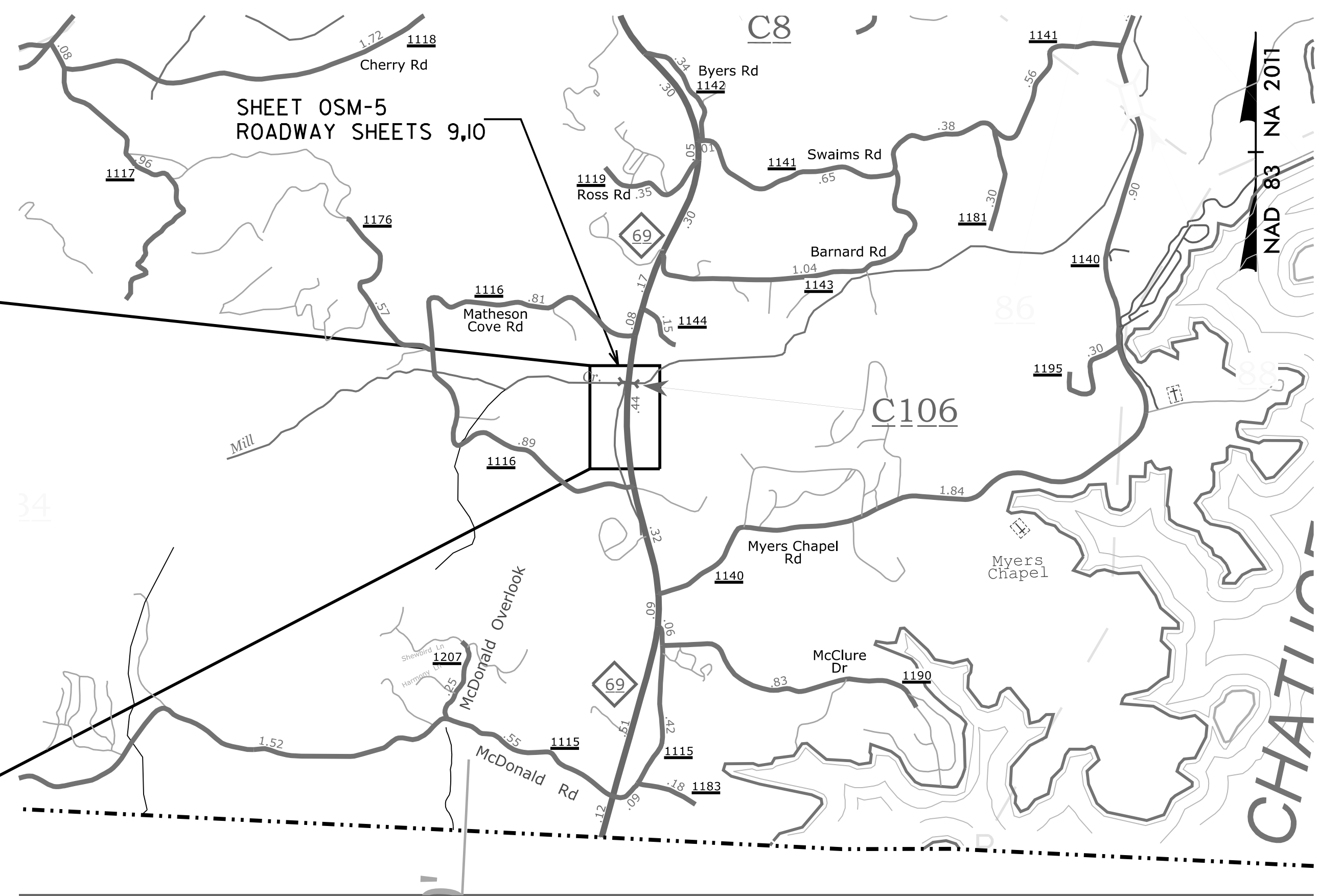
STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

**PLAN FOR ON-SITE MITIGATION
CLAY COUNTY**

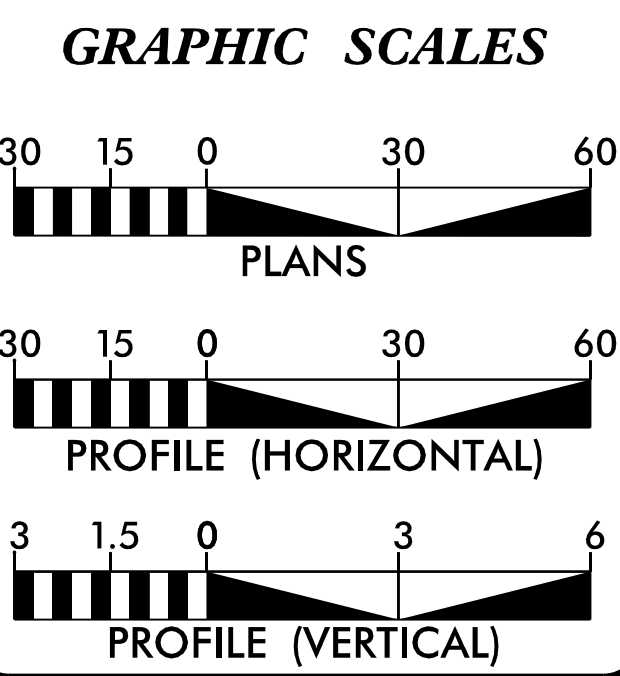
LOCATION: NC 69 FROM GEORGIA STATE LINE TO US 64

TYPE OF WORK: STREAM RELOCATION (GRADING & PLANTING)

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	A-0011C	OSM-1	28
STATE PROJ. NO.	F.A. PROJ. NO.	DESCRIPTION	
32574.1.FD7	APD-0069(007)	PE	
32574.2.4	APD-0069(007)	RW, UTILITIES	
32574.3.8	APD-0069(007)	CONSTRUCTION	



INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION
DOCUMENT NOT CONSIDERED FINAL
UNLESS ALL SIGNATURES COMPLETED



PROJECT LENGTH

LENGTH OF TIP PROJECT A-0011C
STREAM RELOCATION = 633 LF (0.12 MI.)

Prepared for Division 14 of the North Carolina Department of Transportation by:

MCCORMICK TAYLOR

2018 STANDARD SPECIFICATIONS

RIGHT OF WAY DATE: _____

LETTING DATE: _____

PROJECT ENGINEER

PROJECT DESIGN ENGINEER

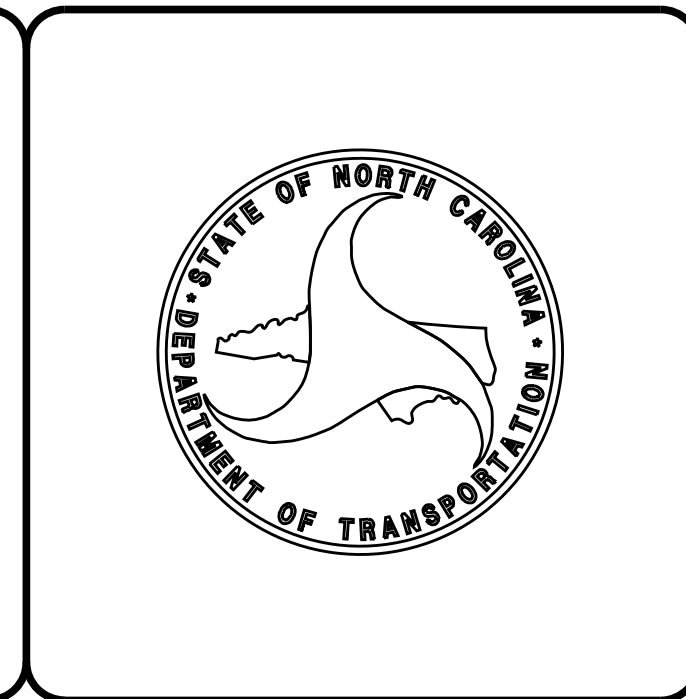
HYDRAULICS ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL
039644
ENGINEER
HAROLD J. DORSEY

8/6/2019

DocuSigned by:
Jim Dorsey
409959F15CBAC7...

SIGNATURE: _____ P.E.



8/17/19

REVISIONS

GENERAL NOTES:

1. ALL WORK SHALL BE PERFORMED IN ACCORDANCE WITH THE FOLLOWING STANDARDS:
 - A) NORTH CAROLINA DEPARTMENT OF TRANSPORTATION "STANDARD SPECIFICATIONS FOR ROADS AND STRUCTURES" DATED JANURAY 2018, AND ANY SUPPLEMENTS THERETO ISSUED PRIOR TO THE DATE OF RECEIPT OF BIDS.
 - B) NORTH CAROLINA DEPARTMENT OF TRANSPORTATION "ROADWAY STANDARD DRAWINGS" DATED 2018, AND ANY SUPPLEMENTS THERETO ISSUED PRIOR TO THE DATE OF RECEIPT OF BIDS.
 - C) NORTH CAROLINA DEPARTMENT OF TRANSPORTATION "CONSTRUCTION MANUAL".
2. 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 INCIDENTAL TO THIS CONTRACT.
3. THE ABANDONED SECTION OF THE CHANNEL SHALL BE FILLED IN CONJUNCTION WITH THE ROADWAY WIDENING AND WILL NOT BE COMPLETED AS PART OF THE STREAM RELOCATION.
4. A PRECONSTRUCTION CONFERENCE SHALL BE COORDINATED BY THE ENGINEER PER DIVISION 16 OF THE NCDOT CONSTRUCTION MANUAL.

SEQUENCE OF CONSTRUCTION

PHASE 1 (ACCESS, PERIMETER CONTROLS, AND STAGING AND STOCKPILE AREAS FOR STREAM RELOCATION)

1. ESTABLISH CONSTRUCTION LIMITS AND LOCATION OF NEW STREAM ALIGNMNET. ONLY CLEAR AND GRUB AS NECESSARY FOR INSTALLATION OF PERIMETER CONTROLS. STABILIZE ALL DISTURBED AREAS AT THE END OF EACH DAY. THE ENGINEER MUST INSPECT AND APPROVE ALL LAYOUT WORK BEFORE CONSTRUCTION MAY BEGIN.
2. MOBILIZE EQUIPMENT AND MATERIALS TO THE SITE.
3. INSTALL TEMPORARY CONSTRUCTION GRAVEL ENTRANCE/EXIT PER EROSION AND SEDIMENT CONTROL PLAN.
4. ESTABLISH STAGING AREAS AND MARK CONSTRUCTION EQUIPMENT ACCESS LOCATIONS WITH VISIBLE MARKERS. CONSTRUCTION EQUIPMENT SHALL BE CONTAINED WITHIN THE LIMITS OF CONSTRUCTION AS DEPICTED IN THE PLANS OR SPECIFIED BY THE ENGINEER.
5. INSTALL TEMPORARY PIPE, CONSTRUCTION ACCESS PATH AND TEMPORARY GRAVEL DRIVEWAY. INSTALL SILT FENCE WITHIN STOCKPILE AREAS.

PHASE 2 (INSTREAM WORK AREA STA 101+60 TO 101+85 AND COLEMAN CREEK, STA 14+25 TO STA 16+33)

6. INSTALL PUMP AROUND ON COLEMAN CREEK AS SHOWN ON THE EROSION AND SEDIMENT CONTROL PLAN (PREPARED BY OTHERS). INSTALL ROCK CROSS VANE ALONG COLEMAN CREEK FROM STA 101+60 TO 101+85.
7. WORKING FROM DOWNSTREAM TO UPSTREAM, BEGIN CONSTRUCTION OF RELOCATED STREAM STRUCTURES AND GRADING. ONLY OPEN AS MUCH CHANNEL AS MAY BE STABILIZED AT THE END OF EACH WORK DAY USING STONE IN STREAM OR MATTING FOR ADJACENT SLOPES. INSTALL PROPOSED 95" X 67" CORRUGATED STEEL ARCH PIPE, AND ENDWALLS ON NEW STREAM ALIGNMENT AS SHOWN ON THE ROADWAY PLANS (PREPARED BY OTHERS). BACKFILL DRIVEWAY AND PROVIDE STONE FOR ACCESS FOR TEMPORARY DRIVEWAY AS SHOWN ON THE EROSION AND SEDIMENT CONTROL PLAN (PREPARED BY OTHERS). DEWATER WORK AREA TO A SPECIAL STILLING BASIN WHEN EQUIPMENT IS ACTIVE IN CHANNEL. CONTINUE WORKING UPSTREAM TO COMPLETE INSTREAM WORK ON NEW ALIGNMENT UP TO STA 14+25.
8. WHEN ALL AREAS ARE STABILIZED AND WITH PERMISSION FROM THE ENGINEER, REMOVE TEMPORARY GRAVEL DRIVEWAY AND OPEN DRIVEWAY ACCESS OVER NEW STREAM CULVERT.

PHASE 3 (INSTREAM WORK AREA STA 11+09 TO STA 14+25)

9. INSTALL COIR FIBER WATTLE BARRIER AS SHOWN ON THE EROSION AND SEDIMENT CONTROL PLAN (PREPARED BY OTHERS). WORKING FROM DOWNSTREAM TO UPSTREAM, BEGIN CONSTRUCTION OF RELOCATED STREAM STRUCTURES AND GRADING STARTING AT STA 14+25. ONLY OPEN AS MUCH CHANNEL AS MAY BE STABILIZED AT THE END OF EACH WORK DAY USING STONE IN STREAM OR MATTING FOR ADJACENT SLOPES. DEWATER WORK AREA TO A SPECIAL STILLING BASIN WHEN EQUIPMENT IS ACTIVE IN CHANNEL. CONTINUE WORKING UPSTREAM TO COMPLETE INSTREAM WORK ON NEW ALIGNMENT UP TO STA 11+09.

PHASE 4 (INSTREAM WORK AREA STA 10+00 TO STA 11+09)





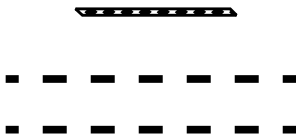
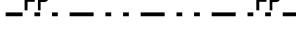


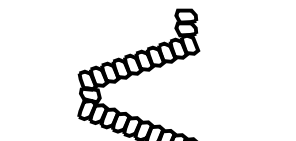
10. DURING A 3-DAY DRY WEATHER FORECAST FROM THE NATIONAL WEATHER SERVICE, ESTABLISH STREAM DIVERSION/PUMP AROUND FROM STA 10+00 (EX 60" CMP) TO EXISTING CHANNEL AS SHOWN ON THE EROSION AND SEDIMENT CONTROL PLAN (PREPARED BY OTHERS). COMPLETE CONSTRUCTION OF STREAM STRUCTURES AND GRADING TO BRING RELOCATED STREAM ONLINE. ONLY OPEN AS MUCH CHANNEL AS MAY BE STABILIZED AT THE END OF EACH WORK DAY USING STONE IN STREAM OR MATTING FOR ADJACENT SLOPES. DEWATER WORK AREA TO A SPECIAL STILLING BASIN WHEN EQUIPMENT IS ACTIVE IN CHANNEL. DURING NON-WORK HOURS, MAINTAIN STREAM FLOW TO EXISTING CHANNEL USING IMPERVIOUS DIKES AS NEEDED. CONTINUE WORKING UPSTREAM TO COMPLETE INSTREAM WORK ON NEW ALIGNMENT UP TO STA 10+00. THE CONTRACTOR SHALL RECEIVE APPROVAL FROM THE ENGINEER PRIOR TO DIRECTING FLOW INTO THE NEW STREAM.
11. UPON PERMANENT STABILIZATION AND WITH APPROVAL FROM THE ENGINEER, REMOVE PERIMETER CONTROLS AND CONSTRUCTION ACCESS ROAD EXCLUDING TEMPORARY DRIVEWAY ACCESS PATH. IMMEDIATELY STABILIZE ANY DISTURBED AREAS RESULTING FROM THIS WORK.

INDEX OF SHEETS







SHEET NUMBER	SHEET
OSM-1	TITLE SHEET
OSM-1A	INDEX OF SHEETS, CONSTRUCTION SEQUENCING AND GENERAL NOTES
OSM-1B	CONVENTIONAL PLAN SHEET SYMBOLS
OSM-2	TYPICAL SECTIONS
OSM-2A	DETAILS - WOOD DROP RIFFLE - RIFFLE GRADE CONTROL
OSM-2B	- ROCK CROSS VANE - ROCK TOE PROTECTION - STREAM PLUG
OSM-2C	- PUMP-AROUND OPERATION
OSM-2D	- MORPHOLOGICAL TABLE
OSM-3	SUMMARY OF QUANTITIES EARTHWORK SUMMARY
OSM-4	HORIZONTAL ALIGNMENT
OSM-5	PLAN SHEET
OSM-6	PROFILE SHEET
OSM-7-19	CROSS SECTIONS
OSM-20-22	REFORESTATION PLANS AND DETAILS

STREAM SYMBOLS





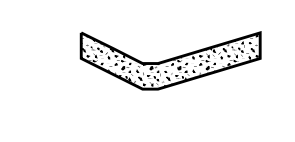
PLAN VIEW SYMBOLS

	RIFFLE GRADE CONTROL
	WOOD DROP RIFFLE
	ROCK TOE PROTECTION
	STREAM PLUG
	PROPOSED 95" x 67" PIPE ARCH CULVERT
	FLOODPLAIN LINE
	BUFFER ZONE
	BACKFILL EXISTING CHANNEL
	ROCK CROSS VANE


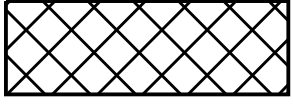
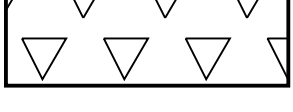
PROFILE SYMBOLS

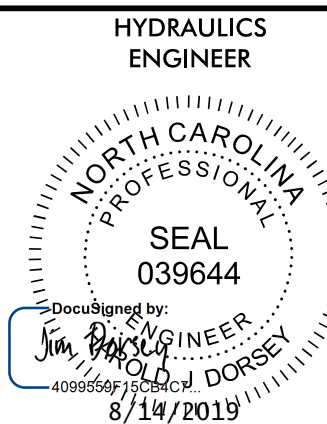

	EXISTING GROUND ELEVATION
	PROPOSED GROUND ELEVATION
	PROPOSED BANKFULL
	PROPOSED RIFFFLE GRADE CONTROL
	PROPOSED WOOD DROP RIFFLE
	PROPOSED CHANNEL SUBSTRATE MATERIAL

CROSS SECTION SYMBOLS

	EXISTING GROUND ELEVATION
	PROPOSED GROUND ELEVATION
	PROPOSED RIFFFLE GRADE CONTROL
	PROPOSED WOOD DROP RIFFLE
	PROPOSED CHANNEL SUBSTRATE MATERIAL

PLANTING SYMBOLS

	TYPE 1
	TYPE 2 - TREES AND SHRUBS
	TYPE 2 - EMBANKMENT SHRUBS

PROJECT REFERENCE NO. A-0011C	SHEET NO. OSM-1A
RW SHEET NO.	
	
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED	
	

STATE OF NORTH CAROLINA, DIVISION OF HIGHWAYS CONVENTIONAL PLAN SHEET SYMBOLS

BOUNDARIES AND PROPERTY:

State Line	-----
County Line	-----
Township Line	-----
City Line	-----
Reservation Line	-----
Property Line	-----
Existing Iron Pin	○ EP
Computed Property Corner	-----x
Property Monument	□ EDM
Parcel/Sequence Number	⑫③
Existing Fence Line	-x-x-x-
Proposed Woven Wire Fence	○
Proposed Chain Link Fence	□
Proposed Barbed Wire Fence	◇
Existing Wetland Boundary	-MLB-
Proposed Wetland Boundary	-MLB-
Existing Endangered Animal Boundary	-EAB-
Existing Endangered Plant Boundary	-EPB-
Existing Historic Property Boundary	-HPB-
Known Contamination Area: Soil	☠-s-☠
Potential Contamination Area: Soil	☠-s-☠
Known Contamination Area: Water	☠-w-☠
Potential Contamination Area: Water	☠-w-☠
Contaminated Site: Known or Potential	☠☠

BUILDINGS AND OTHER CULTURE:

Gas Pump Vent or U/G Tank Cap	○
Sign	○
Well	♀
Small Mine	⊗
Foundation	□
Area Outline	□
Cemetery	⊕
Building	□
School	□
Church	□
Dam	▬

HYDROLOGY:

Stream or Body of Water	-----
Hydro, Pool or Reservoir	□
Jurisdictional Stream	-JS-
Buffer Zone 1	-BZ 1-
Buffer Zone 2	-BZ 2-
Flow Arrow	←
Disappearing Stream	→
Spring	○
Wetland	⊥
Proposed Lateral, Tail, Head Ditch	▬
False Sump	▽

RAILROADS:

Standard Gauge	-----
RR Signal Milepost	○ MILEPOST 35
Switch	□ SWITCH
RR Abandoned	-----
RR Dismantled	-----

RIGHT OF WAY & PROJECT CONTROL:

Secondary Horiz and Vert Control Point	◆
Primary Horiz Control Point	○
Primary Horiz and Vert Control Point	●
Exist Permanent Easement Pin and Cap	◇
New Permanent Easement Pin and Cap	◆
Vertical Benchmark	⊗
Existing Right of Way Marker	△
Existing Right of Way Line	-----
New Right of Way Line	-----
New Right of Way Line with Pin and Cap	-----
New Right of Way Line with Concrete or Granite R/W Marker	-----
New Control of Access Line with Concrete C/A Marker	-----
Existing Control of Access	-----
New Control of Access	-----
Existing Easement Line	-----E
New Temporary Construction Easement	-----E
New Temporary Drainage Easement	-----TDE
New Permanent Drainage Easement	-----PDE
New Permanent Drainage / Utility Easement	-----DUE
New Permanent Utility Easement	-----PUE
New Temporary Utility Easement	-----TUE
New Aerial Utility Easement	-----AUE

ROADS AND RELATED FEATURES:

Existing Edge of Pavement	-----
Existing Curb	-----
Proposed Slope Stakes Cut	-----C
Proposed Slope Stakes Fill	-----F
Proposed Curb Ramp	-----
Existing Metal Guardrail	-----
Proposed Guardrail	-----
Existing Cable Guiderail	-----
Proposed Cable Guiderail	-----
Equality Symbol	⊕
Pavement Removal	-----

VEGETATION:

Single Tree	☼
Single Shrub	☼

Note: Not to Scale *S.U.E. = Subsurface Utility Engineering

Hedge	-----
Woods Line	-----
Orchard	-----
Vineyard	-----

EXISTING STRUCTURES:

MAJOR:	
Bridge, Tunnel or Box Culvert	-----
Bridge Wing Wall, Head Wall and End Wall	-----
MINOR:	
Head and End Wall	-----
Pipe Culvert	-----
Footbridge	-----
Drainage Box: Catch Basin, DI or JB	-----
Paved Ditch Gutter	-----
Storm Sewer Manhole	-----
Storm Sewer	-----

UTILITIES:

POWER:	
Existing Power Pole	-----
Proposed Power Pole	-----
Existing Joint Use Pole	-----
Proposed Joint Use Pole	-----
Power Manhole	-----
Power Line Tower	-----
Power Transformer	-----
U/G Power Cable Hand Hole	-----
H-Frame Pole	-----
U/G Power Line LOS B (S.U.E.*)	-----
U/G Power Line LOS C (S.U.E.*)	-----
U/G Power Line LOS D (S.U.E.*)	-----

TELEPHONE:

Existing Telephone Pole	-----
Proposed Telephone Pole	-----
Telephone Manhole	-----
Telephone Pedestal	-----
Telephone Cell Tower	-----
U/G Telephone Cable Hand Hole	-----
U/G Telephone Cable LOS B (S.U.E.*)	-----
U/G Telephone Cable LOS C (S.U.E.*)	-----
U/G Telephone Cable LOS D (S.U.E.*)	-----
U/G Telephone Conduit LOS B (S.U.E.*)	-----
U/G Telephone Conduit LOS C (S.U.E.*)	-----
U/G Telephone Conduit LOS D (S.U.E.*)	-----
U/G Fiber Optics Cable LOS B (S.U.E.*)	-----
U/G Fiber Optics Cable LOS C (S.U.E.*)	-----
U/G Fiber Optics Cable LOS D (S.U.E.*)	-----

WATER:

Water Manhole	-----
Water Meter	-----
Water Valve	-----
Water Hydrant	-----
U/G Water Line LOS B (S.U.E.*)	-----
U/G Water Line LOS C (S.U.E.*)	-----
U/G Water Line LOS D (S.U.E.*)	-----
Above Ground Water Line	-----

TV:

TV Pedestal	-----
TV Tower	-----
U/G TV Cable Hand Hole	-----
U/G TV Cable LOS B (S.U.E.*)	-----
U/G TV Cable LOS C (S.U.E.*)	-----
U/G TV Cable LOS D (S.U.E.*)	-----
U/G Fiber Optic Cable LOS B (S.U.E.*)	-----
U/G Fiber Optic Cable LOS C (S.U.E.*)	-----
U/G Fiber Optic Cable LOS D (S.U.E.*)	-----

GAS:

Gas Valve	-----
Gas Meter	-----
U/G Gas Line LOS B (S.U.E.*)	-----
U/G Gas Line LOS C (S.U.E.*)	-----
U/G Gas Line LOS D (S.U.E.*)	-----
Above Ground Gas Line	-----

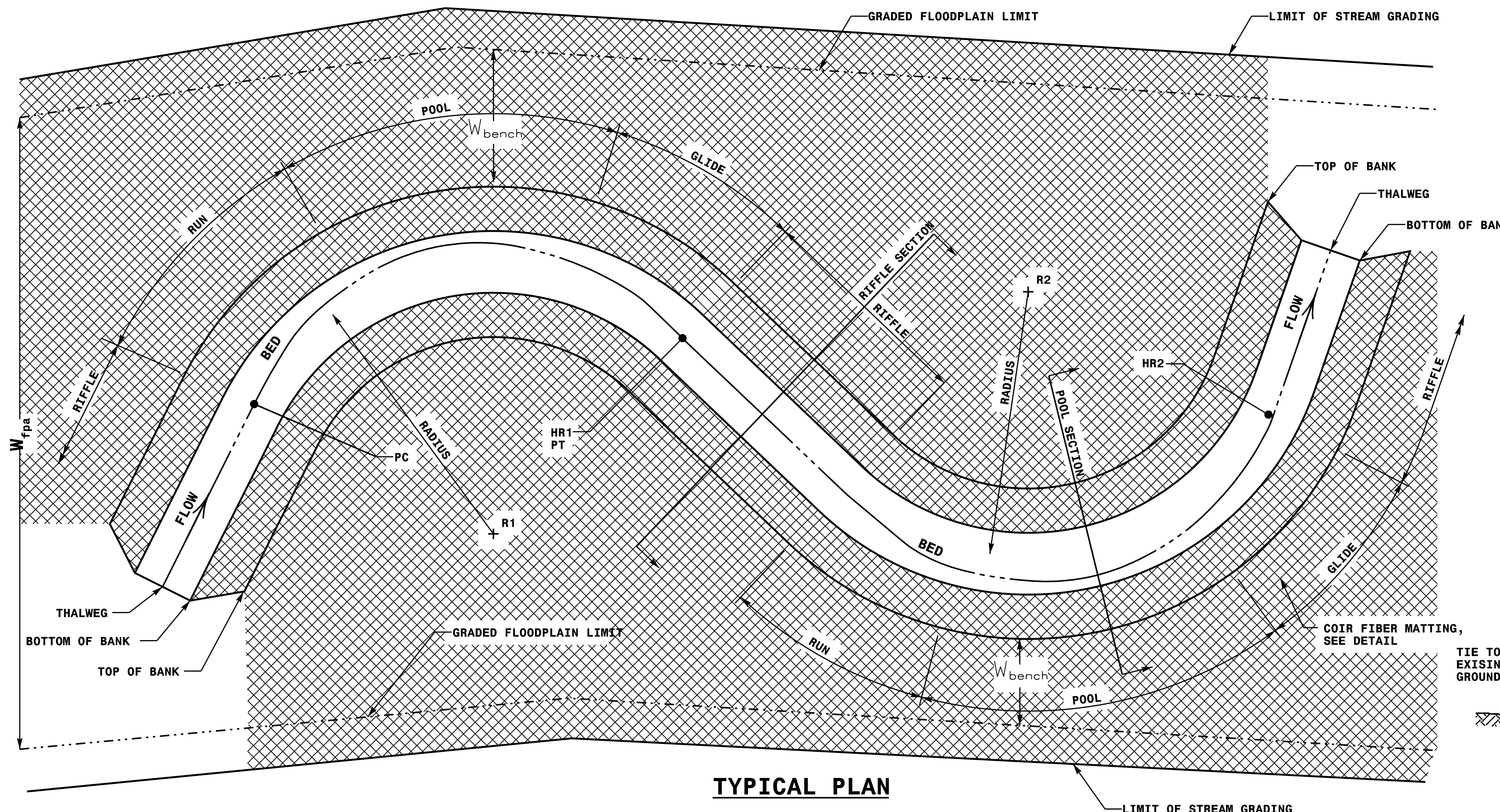
SANITARY SEWER:

Sanitary Sewer Manhole	-----
Sanitary Sewer Cleanout	-----
U/G Sanitary Sewer Line	-----
Above Ground Sanitary Sewer	-----
SS Forced Main Line LOS B (S.U.E.*)	-----
SS Forced Main Line LOS C (S.U.E.*)	-----
SS Forced Main Line LOS D (S.U.E.*)	-----

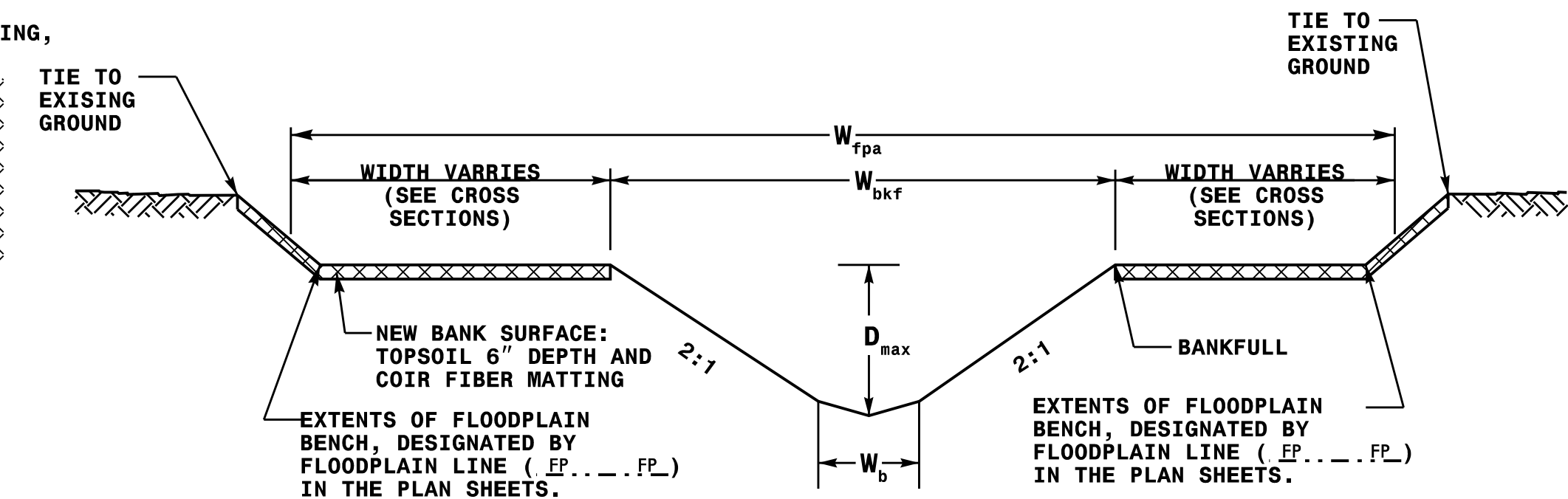
MISCELLANEOUS:

Utility Pole	-----
Utility Pole with Base	-----
Utility Located Object	-----
Utility Traffic Signal Box	-----
Utility Unknown U/G Line LOS B (S.U.E.*)	-----
U/G Tank; Water, Gas, Oil	-----
Underground Storage Tank, Approx. Loc.	-----
A/G Tank; Water, Gas, Oil	-----
Geoenvironmental Boring	-----
U/G Test Hole LOS A (S.U.E.*)	-----
Abandoned According to Utility Records	-----
End of Information	-----

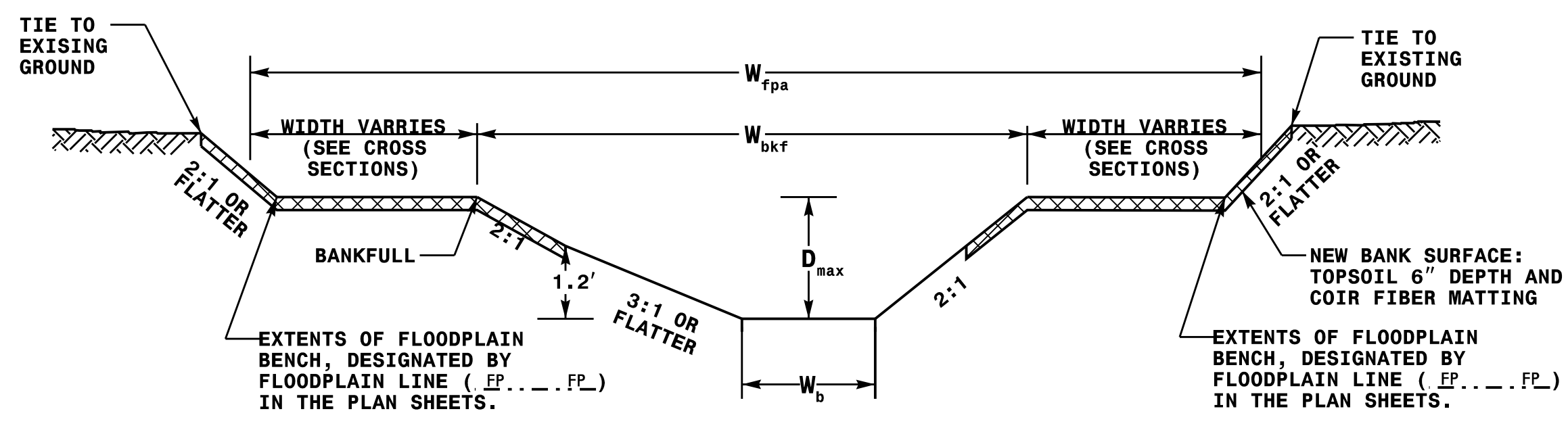
PROJECT REFERENCE NO. A-0011C	SHEET NO. OSM-2
RW SHEET NO.	
HYDRAULICS ENGINEER	
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED	



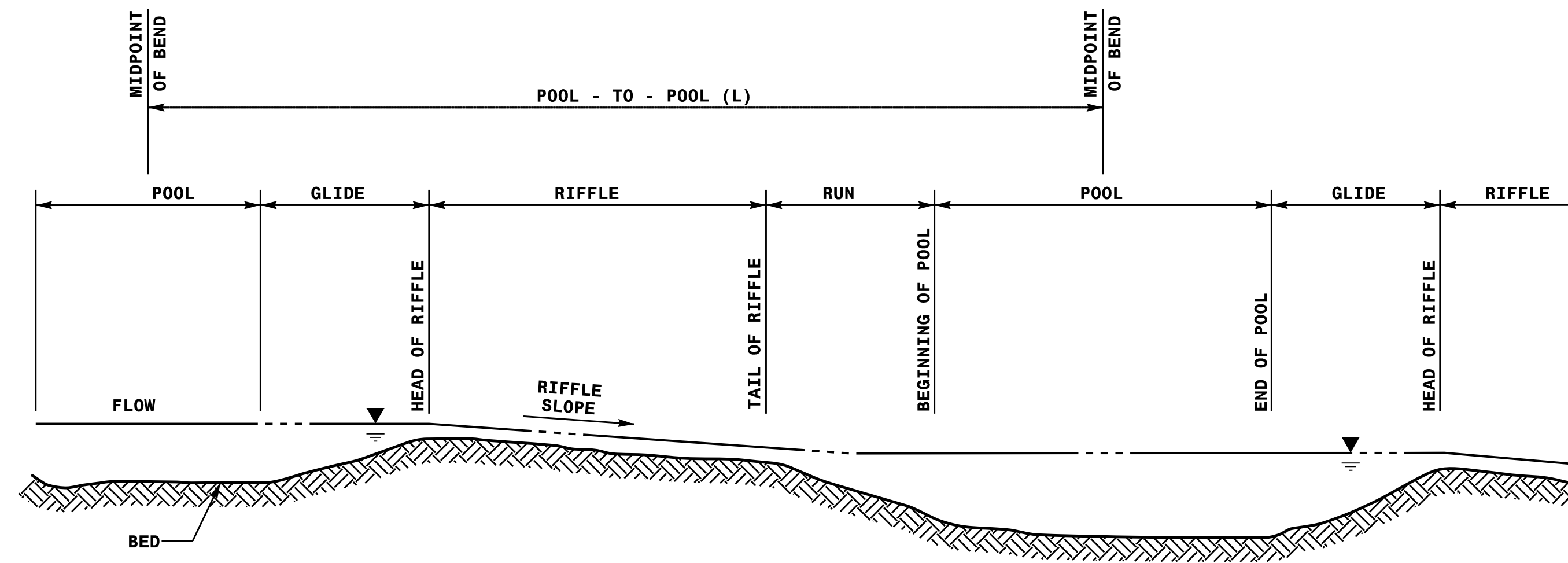
TYPICAL PLAN



TYPICAL RIFFLE WITH BANKFULL BENCH



TYPICAL POOL WITH BANKFULL BENCH



TYPICAL PROFILE

CHANNEL TYPICAL DETAIL

NOT TO SCALE

- NOTES:**
- 1) THE COORDINATES FOR EACH CENTER OF RADIUS (EX. "R1", "R2") AND EACH HEAD OF RIFFLE ("HR1", "HR2") ARE INDICATED ON THE PLAN SHEETS.
 - 2) SEE CROSS SECTIONS FOR CHANNEL AND FLOODPLAIN DIMENSIONS AT SPECIFIC LOCATIONS.
 - 3) SEE DETAILS, PLAN SHEET, AND CROSS SECTIONS FOR LOCATIONS OF PROPOSED STRUCTURES AND CHANNEL TREATMENTS. PROPOSED STRUCTURES AND CHANNEL TREATMENTS DETERMINE THE EXTENT OF TOPSOIL AND COIR FIBER MATTING ALONG THE STREAM BANKS.

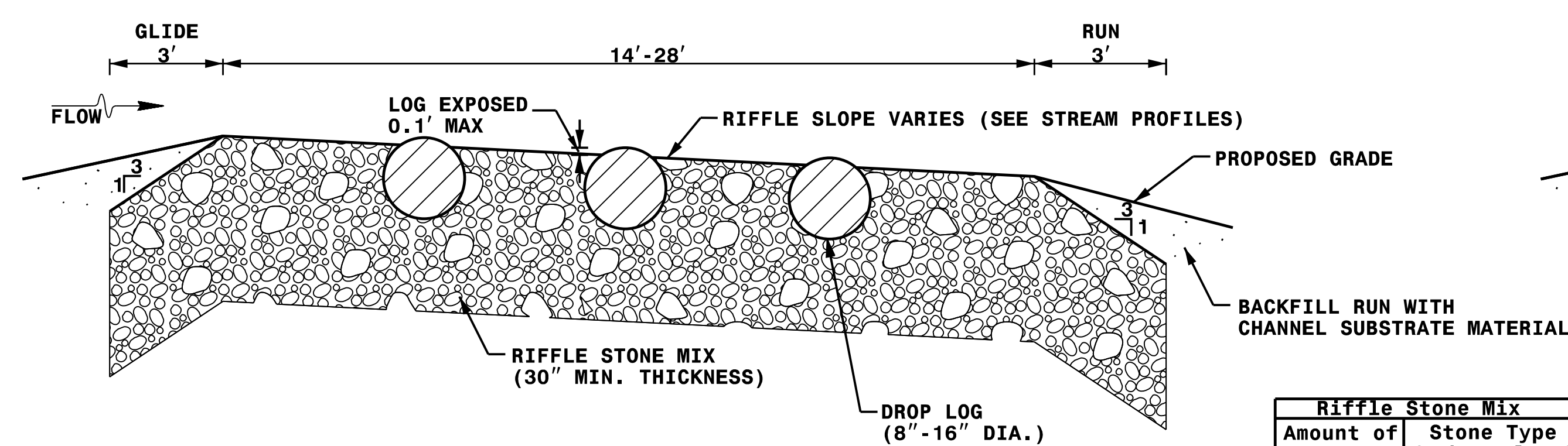
W_{bkf}	=	BANKFULL WIDTH
D_{max}	=	MAXIMUM DEPTH
W_b	=	BOTTOM WIDTH
W_{fpa}	=	FLOOD PRONE AREA WIDTH

	RIFFLE			POOL			Width/Depth RATIO		
	W_{bkf}	D_{max}	W_b	W_{fpa}	W_{bkf}	D_{max}		W_b	
HYATT MILL CREEK	10.0	1.2	6.0	SEE CROSS SECTIONS	11.0	2.2	0.6	SEE CROSS SECTIONS	11.6

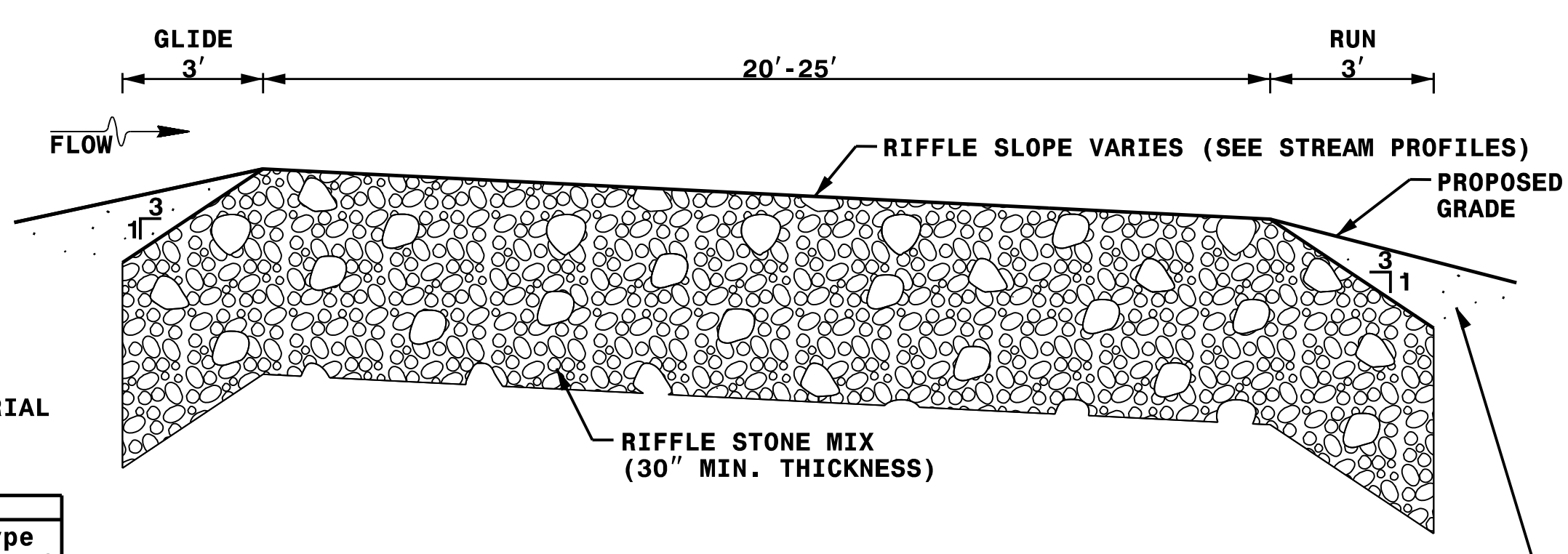
REVISIONS

8/17/99

PROJECT REFERENCE NO. A-0011C	SHEET NO. OSM-2A
RW SHEET NO.	
HYDRAULICS ENGINEER	
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED	



PROFILE VIEW

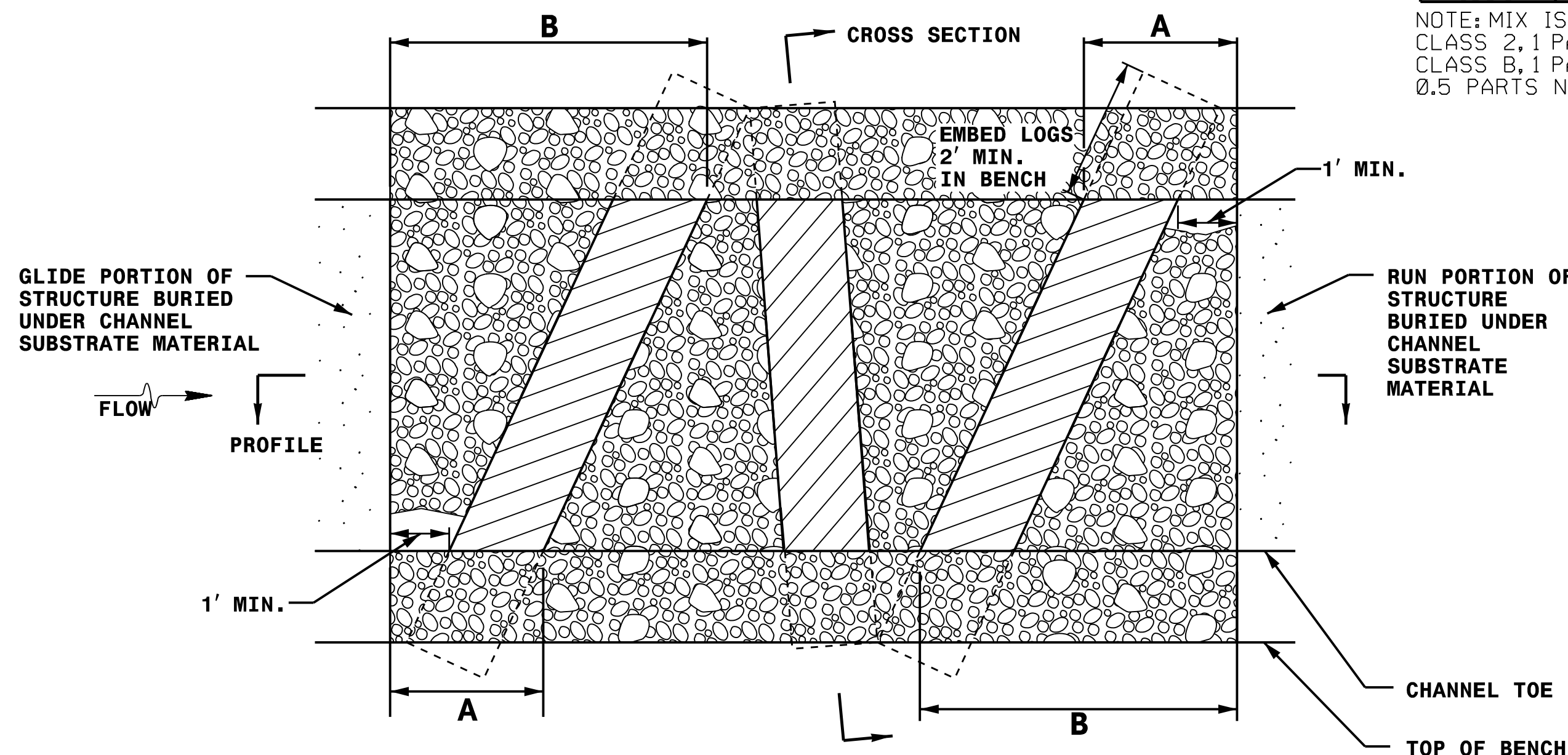


PROFILE VIEW

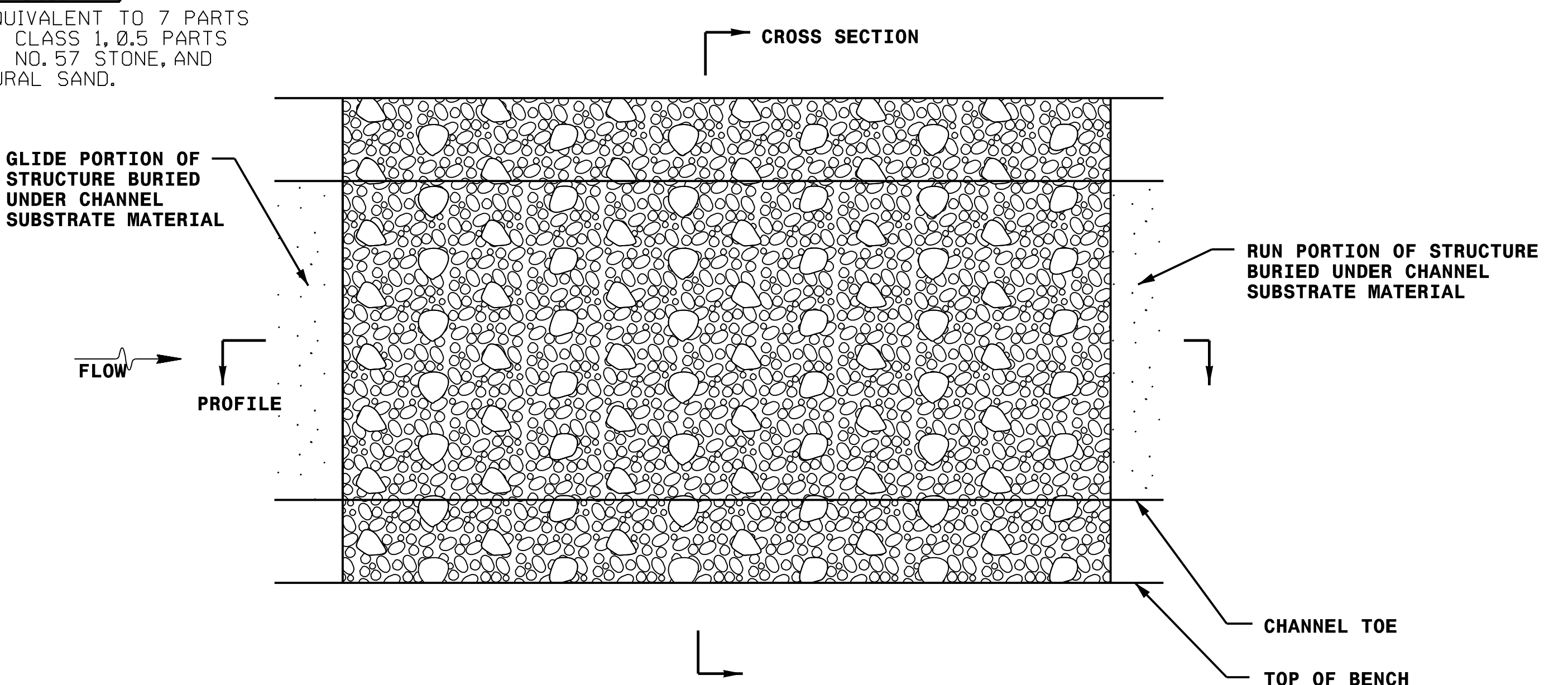
Riffle Stone Mix	
Amount of Stone (%)	Stone Type (% by Volume)
70%	Class 2
10%	Class 1
5%	Class B
10	NO. 57
5	NATURAL SAND
100%	Total

NOTE: MIX IS EQUIVALENT TO 7 PARTS CLASS 2, 1 PART CLASS 1, 0.5 PARTS CLASS B, 1 PART NO. 57 STONE, AND 0.5 PARTS NATURAL SAND.

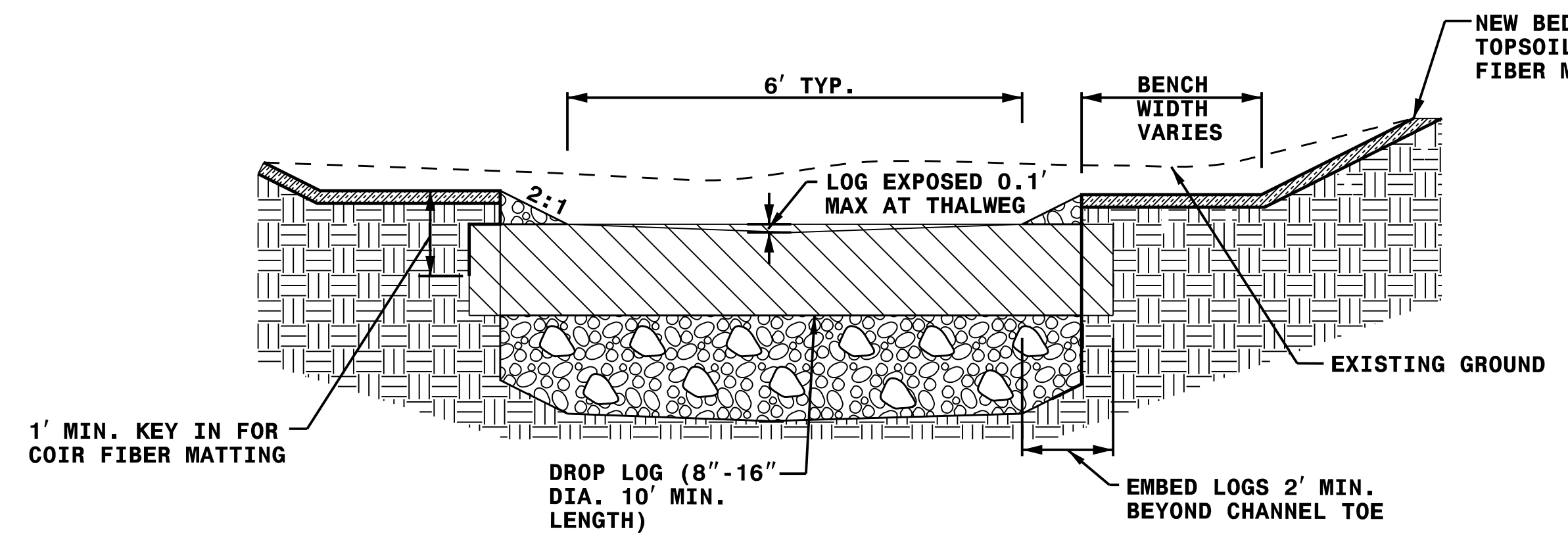
BACKFILL RUN WITH CHANNEL SUBSTRATE MATERIAL



PLAN VIEW



PLAN VIEW



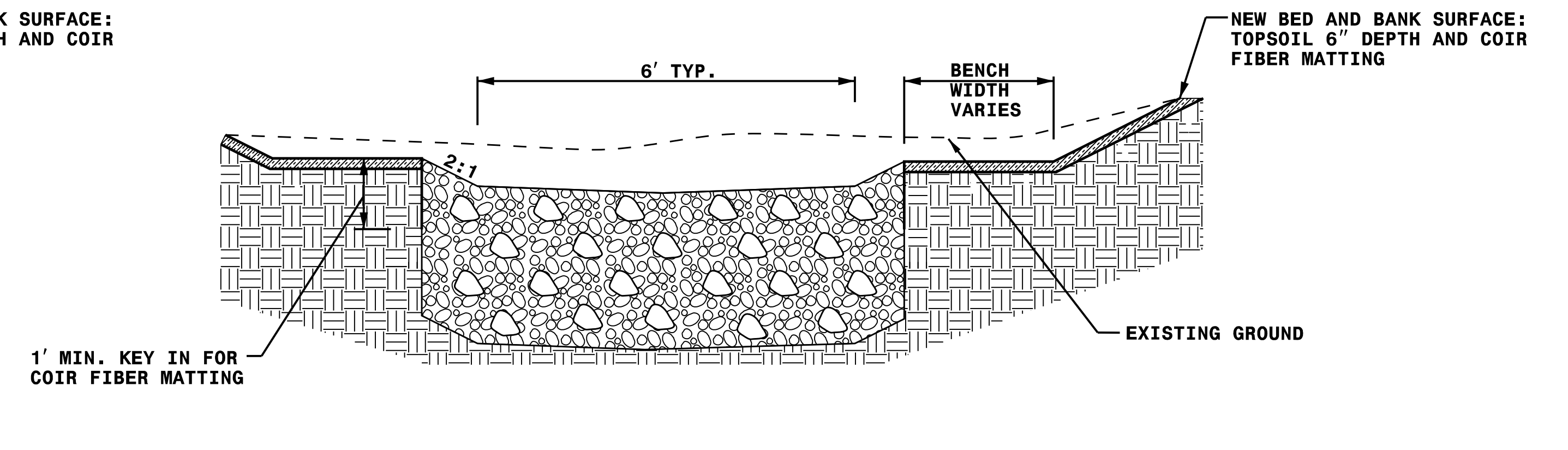
CROSS SECTION

WOOD DROP RIFFLE DETAIL

NOT TO SCALE

- NOTES:
- 1) FURNISH AND INSTALL A WELL-GRADED RIFFLE MIX TO MINIMIZE VOIDS. ENSURE THAT THE RIFFLE MIX IS WELL MIXED.
 - 2) FURNISH NATURAL SAND MEETING SIZE REQUIREMENTS OF 2S FINE AGGREGATE
 - 3) BANK AND BENCH DIMENSIONS VARY, SEE CROSS SECTIONS FOR DIMENSIONS AT EACH INDIVIDUAL STRUCTURE.
 - 4) DROP LOG TO CONSIST OF HARDWOOD SPECIES APPROVED BY THE ENGINEER.

DROP LOGS			
STATION FROM	STATION TO	A	B
10+46	10+60	2.5	5
11+33	11+52	3.5	6.5
12+27	12+46	3.5	6.5
13+12	13+31	3.5	6.5
13+93	14+08	2.5	5
15+56	15+72	3	5.5



CROSS SECTION

RIFFLE GRADE CONTROL DETAIL

NOT TO SCALE

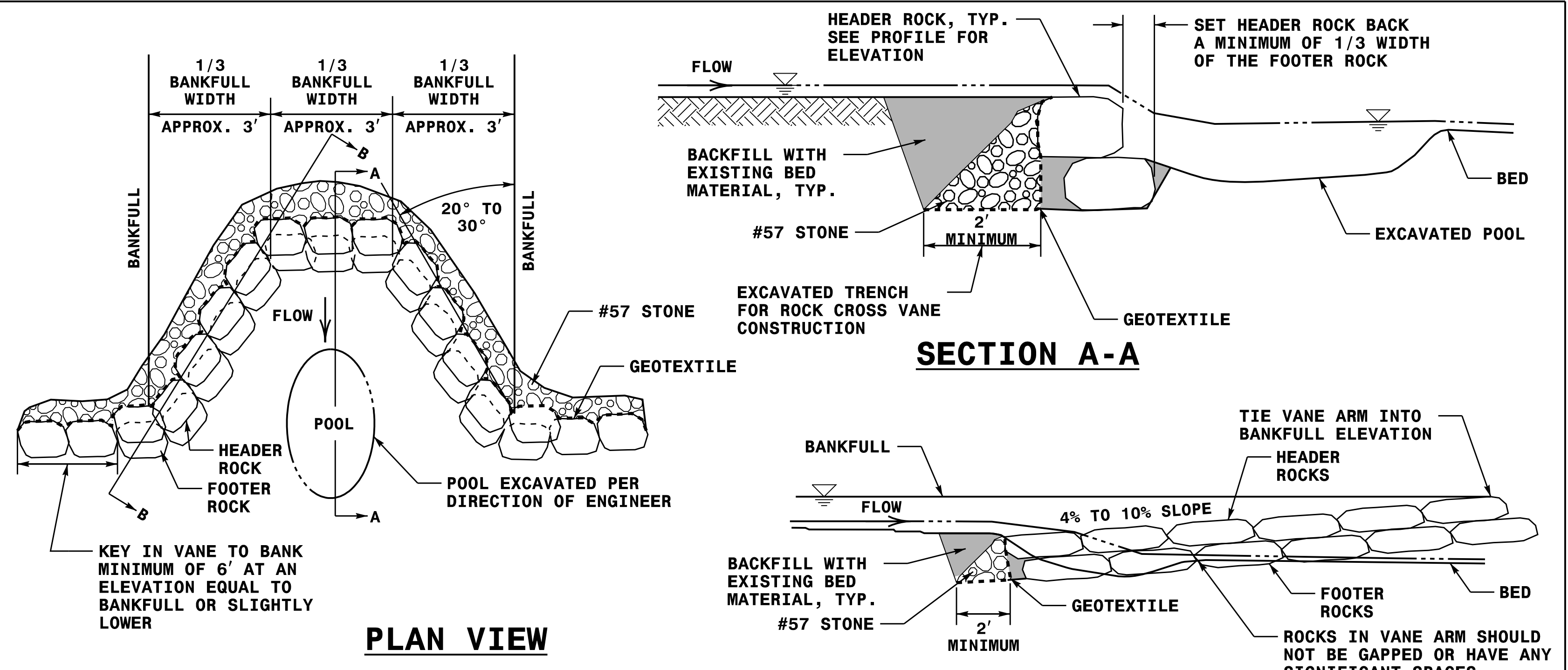
- NOTES:
- 1) FURNISH AND INSTALL A WELL-GRADED RIFFLE MIX TO MINIMIZE VOIDS. ENSURE THAT THE RIFFLE MIX IS WELL MIXED.
 - 2) FURNISH NATURAL SAND MEETING SIZE REQUIREMENTS OF 2S FINE AGGREGATE
 - 3) BANK AND BENCH DIMENSIONS VARY, SEE CROSS SECTIONS FOR DIMENSIONS AT EACH INDIVIDUAL STRUCTURE.
 - 4) DROP LOG TO CONSIST OF HARDWOOD SPECIES APPROVED BY THE ENGINEER.

REVISIONS

8/17/99

REVISIONS

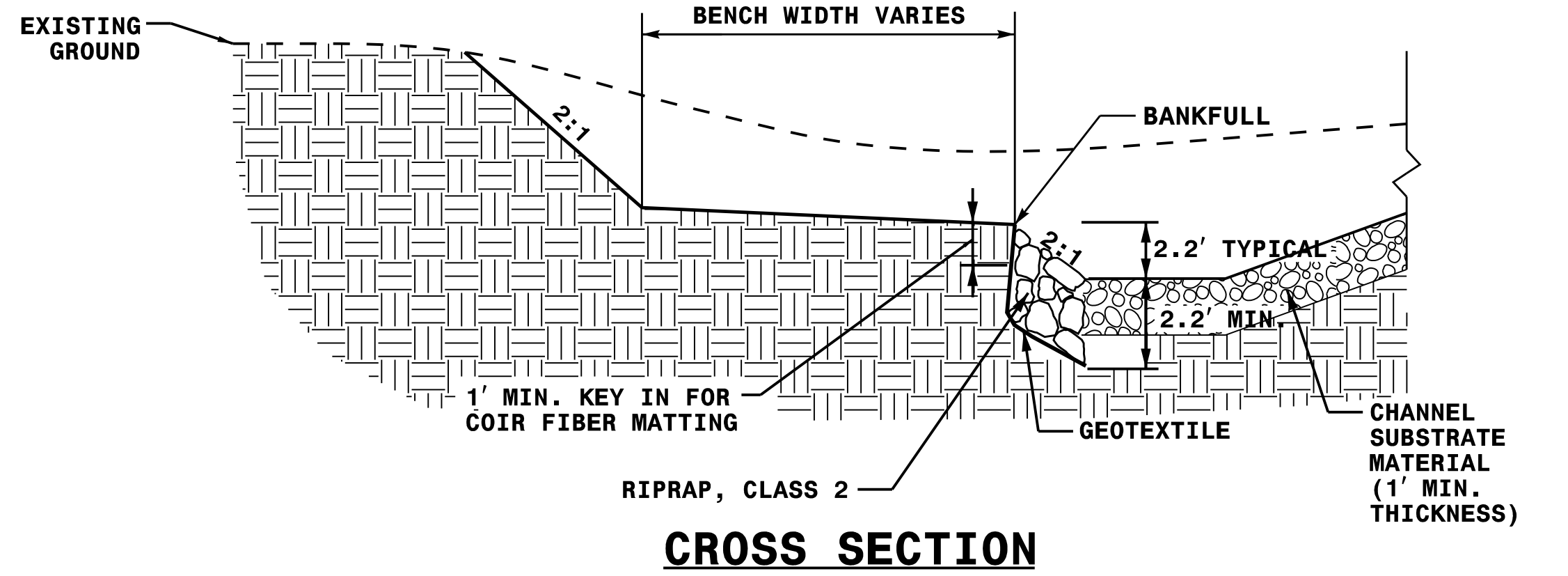
PROJECT REFERENCE NO. A-0011C	SHEET NO. OSM-2B
RW SHEET NO.	
HYDRAULICS ENGINEER	
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED	



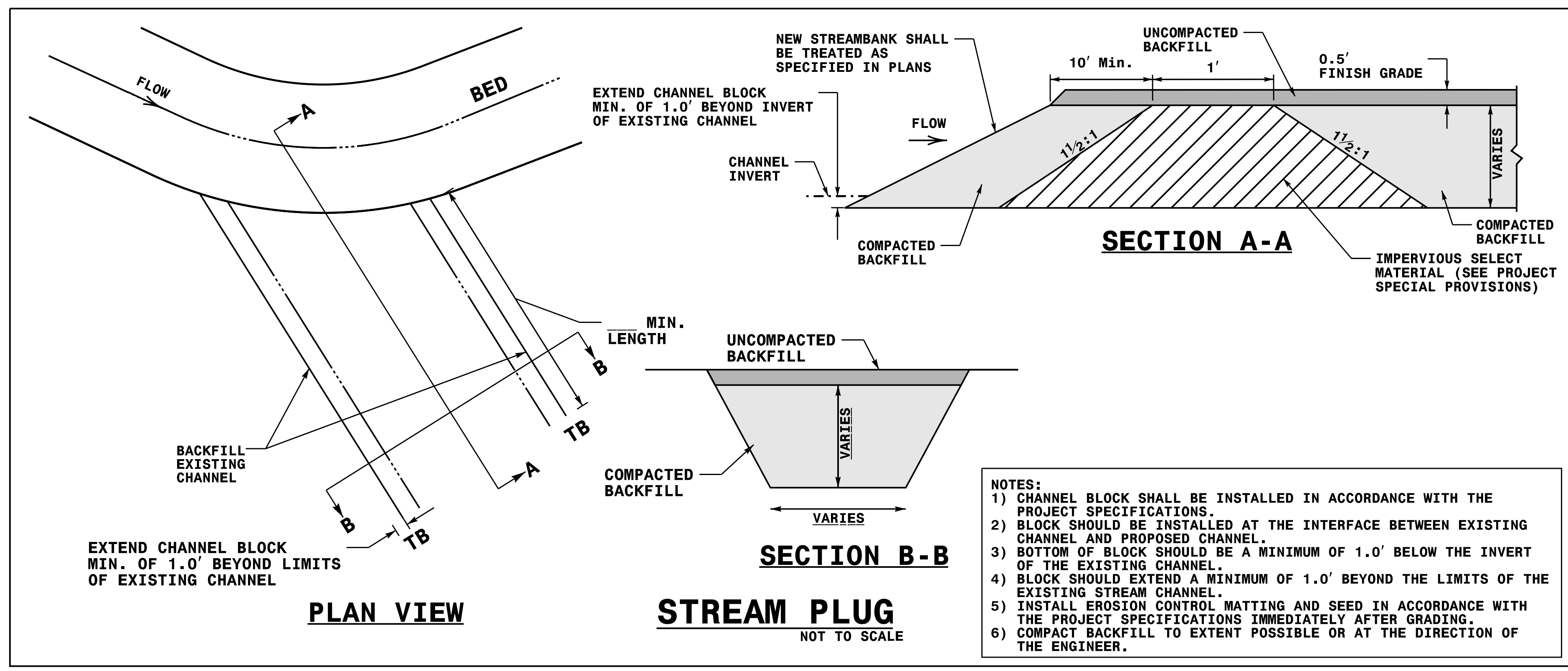
BOULDER DIMENSIONS (FT)			
STATION	HEIGHT	WIDTH	LENGTH
101+64	1.5' - 2'	2.5' - 3'	3.5 - 4'

ROCK CROSS VANE DETAIL
NOT TO SCALE

- NOTES:
- 1) DEEPEST PART OF POOL TO BE IN LINE WITH WHERE VANE ARM TIES INTO BANKFULL.
 - 2) DO NOT EXCAVATE POOL TOO CLOSE TO FOOTER BOULDERS.
 - 3) CLASS "A" STONE CAN BE USED TO REDUCE VOIDS BETWEEN HEADERS AND FOOTERS.
 - 4) COMPACT BACKFILL TO EXTENT POSSIBLE OR AT THE DIRECTION OF THE ENGINEER.
 - 5) POOL DEPTH SHOULD BE 2 TO 3 TIMES BANKFULL DEPTH.



ROCK TOE PROTECTION
NOT TO SCALE



- NOTES:
- 1) CHANNEL BLOCK SHALL BE INSTALLED IN ACCORDANCE WITH THE PROJECT SPECIFICATIONS.
 - 2) BLOCK SHOULD BE INSTALLED AT THE INTERFACE BETWEEN EXISTING CHANNEL AND PROPOSED CHANNEL.
 - 3) BOTTOM OF BLOCK SHOULD BE A MINIMUM OF 1.0' BELOW THE INVERT OF THE EXISTING CHANNEL.
 - 4) BLOCK SHOULD EXTEND A MINIMUM OF 1.0' BEYOND THE LIMITS OF THE EXISTING STREAM CHANNEL.
 - 5) INSTALL EROSION CONTROL MATTING AND SEED IN ACCORDANCE WITH THE PROJECT SPECIFICATIONS IMMEDIATELY AFTER GRADING.
 - 6) COMPACT BACKFILL TO EXTENT POSSIBLE OR AT THE DIRECTION OF THE ENGINEER.

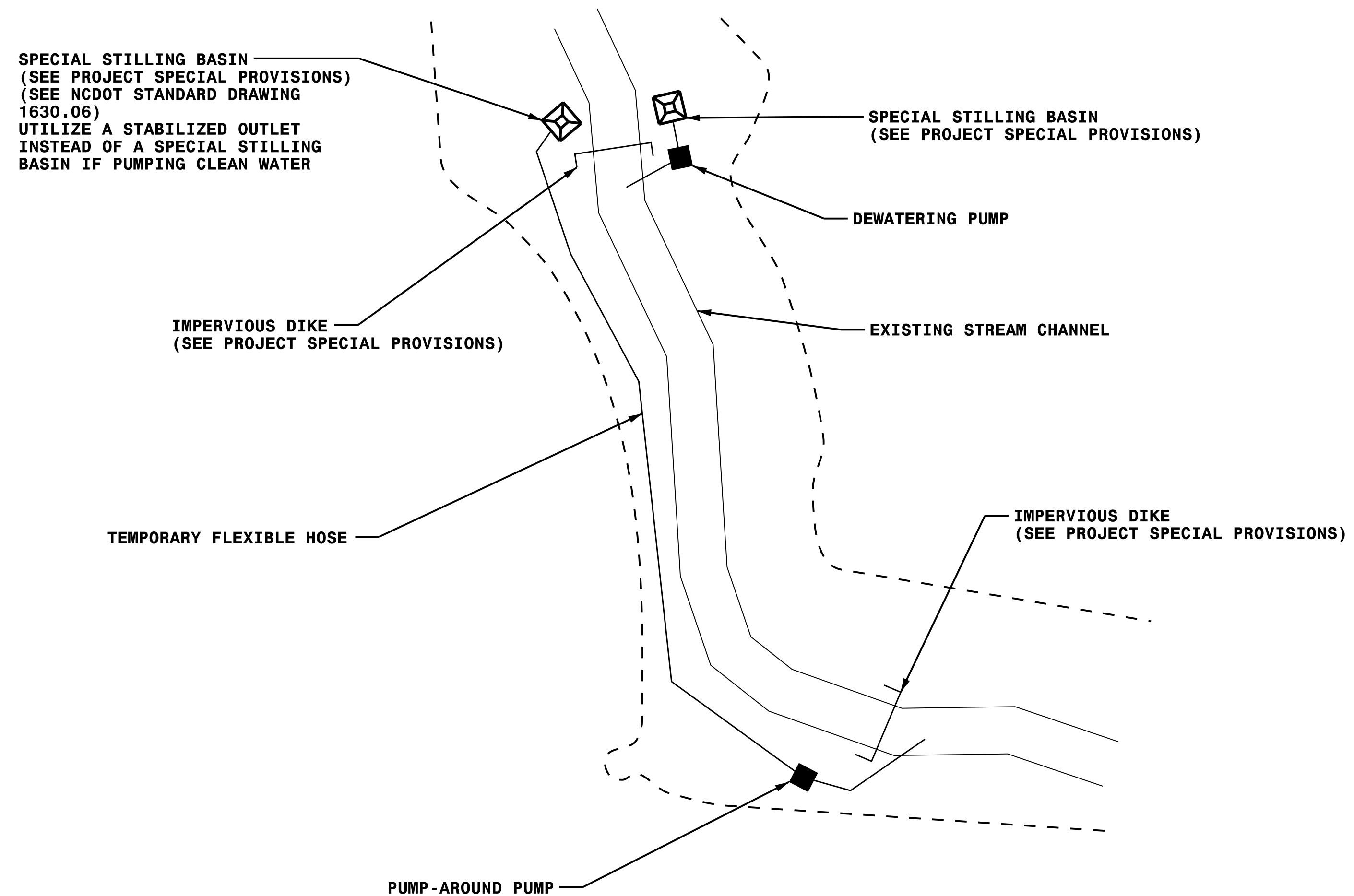
STREAM PLUG
NOT TO SCALE

PROJECT REFERENCE NO. A-0011C	SHEET NO. OSM-2C
RW SHEET NO.	
HYDRAULICS ENGINEER	
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED	

- 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.

- SEQUENCE OF CONSTRUCTION FOR PUMP AROUND OPERATION**
1. INSTALL SPECIAL STILLING BASIN(S).
 2. INSTALL UPSTREAM PUMP AND TEMPORARY FLEXIBLE HOSE.
 3. PLACE UPSTREAM IMPERVIOUS DIKE AND BEGIN PUMPING OPERATIONS FOR STREAM DIVERSION.
 4. PLACE DOWNSTREAM IMPERVIOUS DIKE AND PUMPING APPARATUS. DEWATER ENTRAPPED AREA. AREA TO BE DEWATERED SHALL BE EQUAL TO ONE DAY'S WORK.
 5. 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 THE 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.

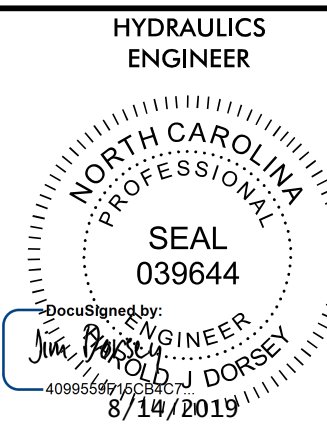

EXAMPLE OF PUMP-AROUND OPERATION



Variable		Existing		Proposed Design		Reference Reach 1		Reference Reach 2	
1	Stream Type	C4		C4		C4b		C4	
2	Drainage Area (sq mi)	0.35		0.35		0.31		0.41	
3	Bankfull Width (ft)	Mean:	8.7	Mean:	10.0	Mean:	9.9	Mean:	9.6
		Range:	8.6 8.8	Range:	-- --	Range:	-- --	Range:	-- --
4	Bankfull Mean Depth (ft)	Mean:	1.0	Mean:	0.9	Mean:	0.9	Mean:	0.7
		Range:	0.8 1.2	Range:	-- --	Range:	-- --	Range:	-- --
5	Width-to-Depth Ratio	Mean:	8.1	Mean:	11.6	Mean:	10.7	Mean:	13.0
		Range:	5.5 10.6	Range:	-- --	Range:	-- --	Range:	-- --
6	Bankfull Cross-Sectional Area (sq ft)	Mean:	8.0	Mean:	8.6	Mean:	9.1	Mean:	7.0
		Range:	7.3 8.6	Range:	-- --	Range:	-- --	Range:	-- --
7	Bankfull Mean Velocity (ft/s)	Mean:	5.7	Mean:	4.7	Mean:	4.9	Mean:	3.9
		Range:	4.8 6.5	Range:	-- --	Range:	-- --	Range:	-- --
8	Bankfull Discharge (cfs)	Mean:	45.3	Mean:	40.6	Mean:	44.9	Mean:	27.3
		Range:	35.1 55.5	Range:	-- --	Range:	-- --	Range:	-- --
9	Bankfull Max Depth (ft)	Mean:	1.5	Mean:	1.2	Mean:	1.2	Mean:	1.0
		Range:	1.3 1.7	Range:	-- --	Range:	-- --	Range:	-- --
10	Ratio of Bankfull Max Depth to Bankfull Mean Depth	Mean:	1.5	Mean:	1.4	Mean:	1.3	Mean:	1.4
		Range:	1.4 1.6	Range:	-- --	Range:	-- --	Range:	-- --
11	Ratio of Low Bank Height to Bankfull Max Depth	Mean:	0.8	Mean:	1.0	Mean:	1.0	Mean:	1.0
		Range:	0.6 1.0	Range:	-- --	Range:	-- --	Range:	-- --
12	Width of Flood-Prone Area (ft)	Mean:	27.7	Mean:	37.4	Mean:	23.8	Mean:	31.1
		Range:	22.7 32.7	Range:	30.4 45.4	Range:	-- --	Range:	-- --
13	Entrenchment Ratio	Mean:	3.7	Mean:	3.7	Mean:	2.4	Mean:	3.3
		Range:	2.6 4.8	Range:	3.0 4.5	Range:	-- --	Range:	-- --
14	Meander Length (ft)	Mean:	88	Mean:	81	Mean:	93	Mean:	48
		Range:	44 123	Range:	68 89	Range:	-- --	Range:	37 55
15	Ratio of Meander Length to Bankfull Width	Mean:	10.1	Mean:	8.1	Mean:	9.4	Mean:	5.0
		Range:	5.0 14.3	Range:	6.8 8.9	Range:	-- --	Range:	3.9 5.7
16	Radius of Curvature (ft)	Mean:	17	Mean:	28	Mean:	22	Mean:	21
		Range:	6 36	Range:	20 40	Range:	19 25	Range:	17 28
17	Ratio of Radius of Curvature to Bankfull Width	Mean:	1.9	Mean:	2.8	Mean:	2.2	Mean:	2.2
		Range:	0.7 4.2	Range:	2.0 4.0	Range:	1.9 2.5	Range:	1.7 2.9
18	Belt Width (ft)	Mean:	20	Mean:	26	Mean:	36	Mean:	26
		Range:	15 24	Range:	19 32	Range:	27 44	Range:	23 31
19	Meander Width Ratio	Mean:	2.3	Mean:	2.6	Mean:	3.6	Mean:	2.7
		Range:	1.7 2.8	Range:	1.9 3.2	Range:	2.8 4.4	Range:	2.4 3.2
20	Sinuosity	Mean:	1.04	Mean:	1.08	Mean:	1.21	Mean:	1.22
		Range:	-- --	Range:	-- --	Range:	-- --	Range:	-- --
21	Valley Slope (ft/ft)	Mean:	0.020	Mean:	0.017	Mean:	0.026	Mean:	0.014
		Range:	-- --	Range:	-- --	Range:	-- --	Range:	-- --
22	Average Slope (ft/ft)	Mean:	0.017	Mean:	0.016	Mean:	0.022	Mean:	0.011
		Range:	-- --	Range:	-- --	Range:	-- --	Range:	-- --
23	Riffle Slope (ft/ft)	Mean:	0.042	Mean:	0.030	Mean:	0.051	Mean:	0.049
		Range:	0.019 0.069	Range:	0.026 0.035	Range:	0.005 0.088	Range:	0.012 0.112
24	Ratio of Riffle Slope to Average Slope	Mean:	2.5	Mean:	1.9	Mean:	2.3	Mean:	4.5
		Range:	1.1 4.1	Range:	1.6 2.2	Range:	0.2 4.0	Range:	1.1 10.2
25	Pool Slope (ft/ft)	Mean:	0.008	Mean:	0.004	Mean:	0.005	Mean:	0.004
		Range:	0.000 0.031	Range:	0.000 0.006	Range:	0.004 0.005	Range:	0.002 0.006
26	Ratio of Pool Slope to Average Slope	Mean:	0.5	Mean:	0.3	Mean:	0.2	Mean:	0.3
		Range:	0.0 1.8	Range:	0.0 0.4	Range:	0.2 0.2	Range:	0.1 0.5
27	Maximum Pool Depth (ft)	Mean:	1.8	Mean:	2.2	Mean:	1.3	Mean:	1.1
		Range:	-- --	Range:	-- --	Range:	-- --	Range:	-- --
28	Ratio of Pool Depth to Average Bankfull Depth	Mean:	1.8	Mean:	2.6	Mean:	1.4	Mean:	1.6
		Range:	1.5 2.3	Range:	-- --	Range:	-- --	Range:	-- --
29	Pool Width (ft)	Mean:	6.5	Mean:	11.0	Mean:	9.8	Mean:	6.6
		Range:	-- --	Range:	-- --	Range:	-- --	Range:	-- --
30	Ratio of Pool Width to Bankfull Width	Mean:	0.7	Mean:	1.1	Mean:	1.0	Mean:	0.7
		Range:	0.7 0.8	Range:	-- --	Range:	-- --	Range:	-- --
31	Pool Area (sq ft)	Mean:	8.0	Mean:	13.6	Mean:	8.7	Mean:	4.8
		Range:	-- --	Range:	-- --	Range:	-- --	Range:	-- --
32	Ratio of Pool Area to Bankfull Area	Mean:	1.0	Mean:	1.6	Mean:	1.0	Mean:	0.7
		Range:	0.9 1.1	Range:	-- --	Range:	-- --	Range:	-- --
33	Pool to Pool Spacing (ft)	Mean:	70.0	Mean:	43.2	Mean:	54.0	Mean:	22.2
		Range:	23.5 107.5	Range:	37.0 50.5	Range:	-- --	Range:	9.5 37.0
34	Ratio of Pool to Pool Spacing to Bankfull Width	Mean:	8.0	Mean:	4.3	Mean:	5.5	Mean:	2.3
		Range:	2.7 12.5	Range:	3.7 5.1	Range:	-- --	Range:	1.0 3.9

* There is a 100 ft radius curve where the proposed alignment transitions into the existing alignment at the upstream limits. This curve isn't included in the table since it skews the Meander Length, Radius of Curvature, and Belt Width results based on the majority of the

PROJECT REFERENCE NO. A-0011C	SHEET NO. OSM-2D
RW SHEET NO.	
HYDRAULICS ENGINEER	
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED	

PROJECT REFERENCE NO. A-0011C	SHEET NO. OSM-3
RW SHEET NO.	
HYDRAULICS ENGINEER 	
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED	
	

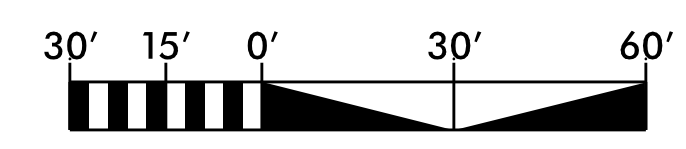
SUMMARY OF QUANTITIES

SUMMARY OF EARTHWORK FOR MITIGATION

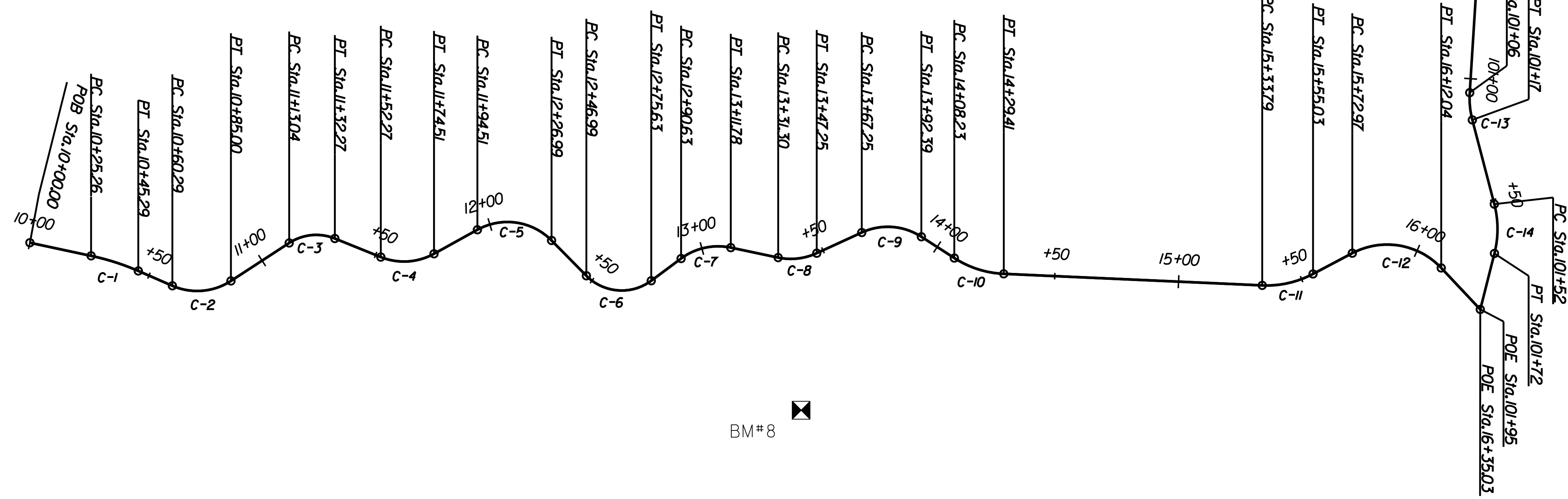
DESCRIPTION	SECTION	QUANTITY	UNIT	ITEM DESCRIPTION
1077000000-E	SP	53	TON	NO. 57 STONE
3628000000-E	876	44	TON	RIPRAP, CLASS 1
3635000000-E	876	378	TON	RIPRAP, CLASS 2
3642000000-E	876	1	TON	RIPRAP, CLASS A
3649000000-E	876	22	TON	RIPRAP, CLASS B
3651000000-E	SP	20	TON	BOULDERS
3656000000-E	876	131	SY	GEOTEXTILE FOR DRAINAGE
6037000000-E	SP	2416	SY	COIR FIBER MAT
6084000000-E	1660	1	ACR	SEEDING AND MULCHING
6126000000-E	SP	1	ACR	STREAMBANK REFORESTATION
6132000000-N	SP	18	EA	LOGS
6133000000-N	SP	1	LS	SURVEYING FOR MITIGATION
6133000000-N	SP	1	LS	SITE GRADING FOR MITIGATION
6133000000-N	SP	1	LS	DIVERSION PUMPING
6138000000-E	SP	5	CY	IMPERVIOUS SELECT MATERIAL
6150000000-E	SP	90	TON	CHANNEL SUBSTRATE MATERIAL
6150000000-E	SP	18	TON	NATURAL SAND
6900000000-E	SP	361	CY	TOPSOIL

MITIGATION UNCLASSIFIED EXCAV. (CU. YD.)	MITIGATION EMBANKMENT	MITIGATION BORROW (CU. YD.)	MITIGATION WASTE (CU. YD.)
2428	14	0	2414

PROJECT REFERENCE NO. A-0011C	SHEET NO. OSM-4
RW SHEET NO.	
HYDRAULICS ENGINEER	
<p>DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED</p>	



- | | | | | | | |
|---|--|---|---|---|--|---|
| <p>C-1
PI Sta 10+35.31
Δ = 1° 28' 21.7" (RT)
D = 57' 17" 44.8"
L = 20.02'
T = 10.05'
R = 100.00'</p> | <p>C-2
PI Sta 10+7.376
Δ = 56° 38' 22.9" (LT)
D = 229' 10" 59.2"
L = 247'
T = 13.47'
R = 25.00'</p> | <p>C-3
PI Sta 11+23.47
Δ = 55° 04' 43.6" (RT)
D = 286' 28" 44.0"
L = 19.23'
T = 10.43'
R = 20.00'</p> | <p>C-4
PI Sta 11+64.19
Δ = 50° 58' 34.4" (LT)
D = 229' 10" 59.2"
L = 22.24'
T = 11.92'
R = 25.00'</p> | <p>C-5
PI Sta 12+13.50
Δ = 74° 25' 27.5" (RT)
D = 229' 10" 59.2"
L = 32.47'
T = 18.98'
R = 25.00'</p> | <p>C-6
PI Sta 12+64.39
Δ = 82° 03' 23.6" (LT)
D = 286' 28" 44.0"
L = 28.64'
T = 17.40'
R = 20.00'</p> | <p>C-7
PI Sta 13+01.89
Δ = 48° 28' 48.0" (RT)
D = 229' 10" 59.2"
L = 21.15'
T = 11.26'
R = 25.00'</p> |
| <p>C-8
PI Sta 13+39.56
Δ = 36° 33' 34.4" (LT)
D = 229' 10" 59.2"
L = 15.95'
T = 8.26'
R = 25.00'</p> | <p>C-9
PI Sta 13+81.00
Δ = 57° 36' 08.4" (RT)
D = 229' 10" 59.2"
L = 25.13'
T = 13.74'
R = 25.00'</p> | <p>C-10
PI Sta 14+19.08
Δ = 30° 20' 00.7" (LT)
D = 143' 14" 22.0"
L = 21.18'
T = 10.84'
R = 40.00'</p> | <p>C-11
PI Sta 15+44.67
Δ = 30° 25' 41.4" (LT)
D = 143' 14" 22.0"
L = 21.24'
T = 10.88'
R = 40.00'</p> | <p>C-12
PI Sta 15+95.83
Δ = 74° 36' 28.8" (RT)
D = 190' 59" 09.4"
L = 39.06'
T = 22.86'
R = 30.00'</p> | <p>C-13
PI Sta 101+11.21
Δ = 18° 11' 51.5" (LT)
D = 163' 42" 09.2"
L = 11.2'
T = 5.61'
R = 35.00'</p> | <p>C-14
PI Sta 101+62.12
Δ = 28° 48' 42.3" (RT)
D = 143' 14" 23.0"
L = 20.1'
T = 10.27'
R = 40.00'</p> |



REVISIONS

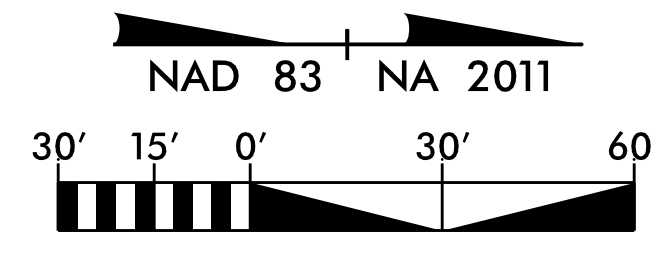
	Station	Northing	Easting	Bearings	Radius
POB=	100+00	492402.9370	555098.7879	S 86°24'08" E	
PC=	101+06	492396.3089	555204.2049	S 86°24'08" E	
PI =	101+11	492395.9572	555209.7992	N 75°24'00" E	
CC		492431.2400	555206.4012		35.00'
PT=	101+17	492397.3701	555215.2236	N 75°24'00" E	
PC=	101+52	492406.2226	555249.2088	N 75°24'00" E	
PI =	101+62	492408.8125	555259.1517	S 75°47'17" E	
CC		492367.5142	555259.2915		40.00'
PT=	101+72	492406.2900	555269.1118	S 75°47'17" E	
POE=	101+95	492400.5648	555291.7178	S 75°47'17" E	

	Station	Northing	Easting	Bearings	Radius
POB=	10+00	491815.4160	555264.7930	N 12°03'43" E	
PC=	10+25	491840.1229	555270.0726	N 12°03'43" E	
PI =	10+35	491849.9465	555272.1718	N 23°32'05" E	
CC		491819.2259	555367.8648		100.00'
PT=	10+45	491859.1564	555276.1829	N 23°32'05" E	
PC=	10+60	491872.9086	555282.1725	N 23°32'05" E	
PI =	10+74	491885.2603	555287.5520	N 33°06'18" W	
CC		491882.8912	555259.2520		25.00'
PT=	10+85	491896.5456	555280.1938	N 33°06'18" W	
PC=	11+13	491920.0359	555264.8778	N 33°06'18" W	
PI =	11+23	491928.7719	555259.1818	N 21°58'26" E	
CC		491930.9594	555281.6312		20.00'
PT=	11+32	491938.4431	555263.0841	N 21°58'26" E	
PC=	11+52	491956.9902	555270.5677	N 21°58'26" E	
PI =	11+64	491968.0424	555275.0272	N 29°00'09" W	
CC		491966.3447	555247.3839		25.00'
PT=	11+75	491978.4659	555269.2488	N 29°00'09" W	
PC=	11+95	491995.9579	555259.5519	N 29°00'09" W	
PI =	12+13	492012.5616	555250.3474	N 45°25'19" E	
CC		492008.0791	555281.4169		25.00'
PT=	12+27	492025.8864	555263.8699	N 45°25'19" E	
PC=	12+47	492039.9240	555278.1157	N 45°25'19" E	
PI =	12+64	492052.1389	555290.5118	N 36°38'05" W	
CC		492054.1699	555264.0781		20.00'
PT=	12+76	492066.1041	555280.1272	N 36°38'05" W	
PC=	12+91	492078.1410	555271.1766	N 36°38'05" W	
PI =	13+02	492087.1738	555264.4598	N 11°50'43" E	
CC		492093.0587	555291.2380		25.00'

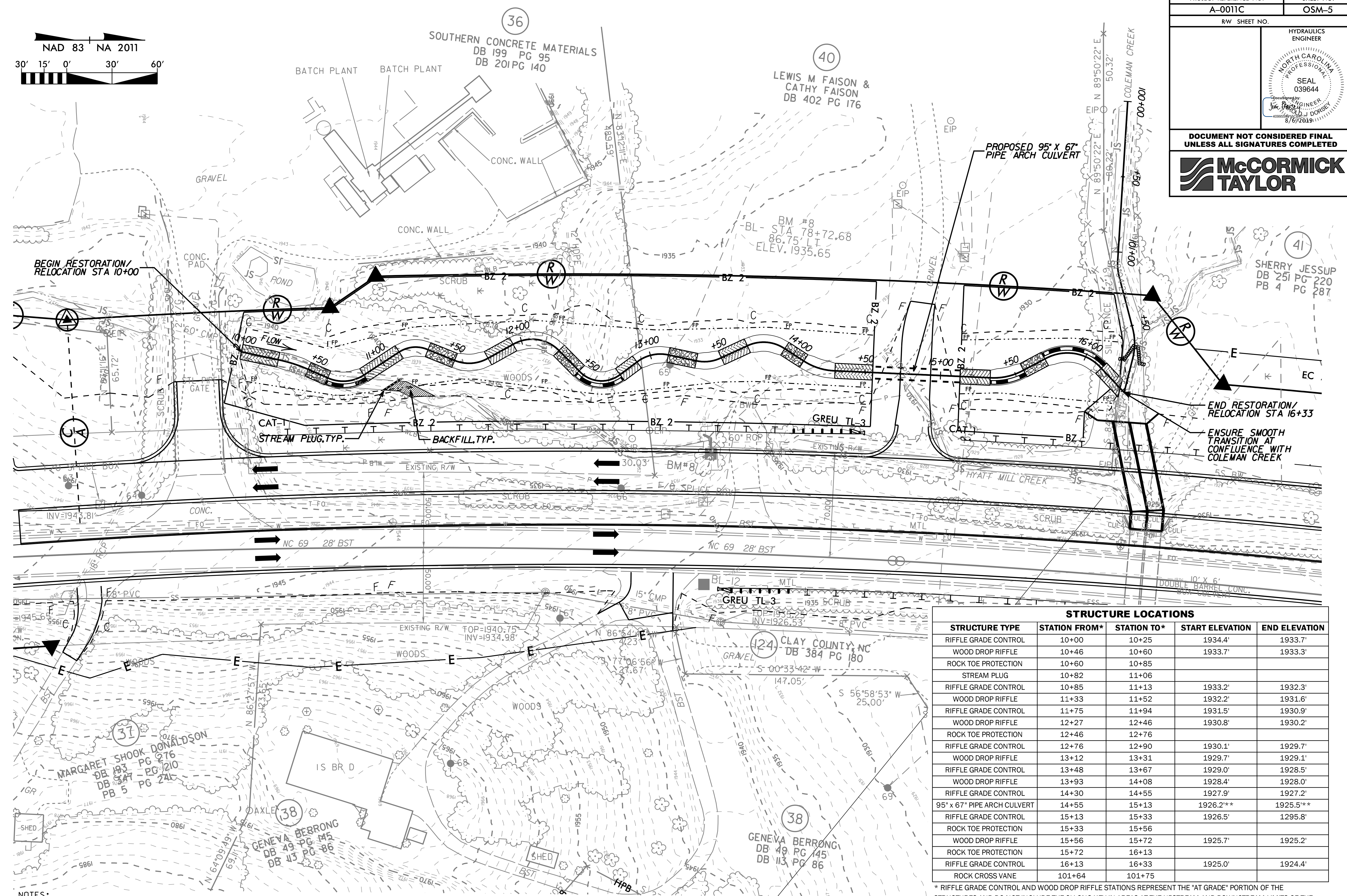
	Station	Northing	Easting	Bearings	Radius
PT=	13+12	492098.1905	555266.7704	N 11°50'43" E	
PC=	13+31	492117.2922	555270.7767	N 11°50'43" E	
PI =	13+40	492125.3745	555272.4719	N 24°42'51" W	
CC		492122.4240	555246.3091		25.00'
PT=	13+47	492132.8763	555269.0192	N 24°42'51" W	
PC=	13+67	492151.0444	555260.6573	N 24°42'51" W	
PI =	13+81	492163.5300	555254.9109	N 32°53'17" E	
CC		492161.4967	555283.3675		25.00'
PT=	13+92	492175.0717	555262.3741	N 32°53'17" E	
PC=	14+08	492188.3788	555270.9790	N 32°53'17" E	
PI =	14+19	492197.4839	555276.8667	N 2°33'17" E	
CC		492210.0988	555237.3897		40.00'
PT=	14+29	492208.3159	555277.3499	N 2°33'17" E	
PI =	14+54	492233.2911	555278.4642	N 2°33'17" E	
PI =	15+12	492291.2335	555281.0493	N 2°33'17" E	
PC=	15+34	492312.5929	555282.0023	N 2°33'17" E	
PI =	15+45	492323.4604	555282.4872	N 27°52'25" W	
CC		492314.3758	555242.0421		40.00'
PT=	15+55	492333.0767	555277.4013	N 27°52'25" W	
PC=	15+73	492348.9332	555269.0151	N 27°52'25" W	
PI =	15+96	492369.1385	555258.3288	N 46°44'04" E	
CC		492362.9589	555295.5345		30.00'
PT=	16+12	492384.8044	555274.9731	N 46°44'04" E	
POE=	16+35	492400.5648	555291.7178	N 46°44'04" E	

Benchmark	Northing	Easting	Elevation	Description
BM7	491218	555482	1959.43	CHISELED 'X' ON CONC HW
BM8	492127	555332	1935.65	CHISELED 'X' ON CONC HW
BM9	493082	555480	1960.73	PAINTED BOLT ON FH

THE LOCALIZED COORDINATE SYSTEM DEVELOPED FOR THIS PROJECT IS BASED ON THE STATE PLANE COORDINATES ESTABLISHED BY NCDOT FOR MONUMENT "GPS 105" WITH NAD 83/NA 2011 STATE PLANE GRID COORDINATES OF NORTHING: 494294.9050(ft), EASTING: 555946.2770(ft). THE AVERAGE COMBINED GRID FACTOR USED ON THIS PROJECT (GROUND TO GRID) IS: 0.999792861. ALL LINEAR DISTANCES ARE LOCALIZED HORIZONTAL DISTANCES. THE VERTICAL DATUM IS BASED ON NCDOT MONUMENT "GPS 105" (ELEV. 2000.22 FT.) (NAVD 1988).



PROJECT REFERENCE NO. A-0011C	SHEET NO. OSM-5
RW SHEET NO.	
HYDRAULICS ENGINEER	
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED	



REVISIONS

NOTES:
1. SEE SHEET OSM-4 FOR BASELINE INFORMATION.

2. ROADWAY AND STRUCTURE INFORMATION PROVIDED ON THIS SHEET IS FOR INFORMATION PURPOSES ONLY. SEE ROADWAY PLANS (PREPARED BY OTHERS) FOR PROPOSED ROADWAY AND STRUCTURE INFORMATION.

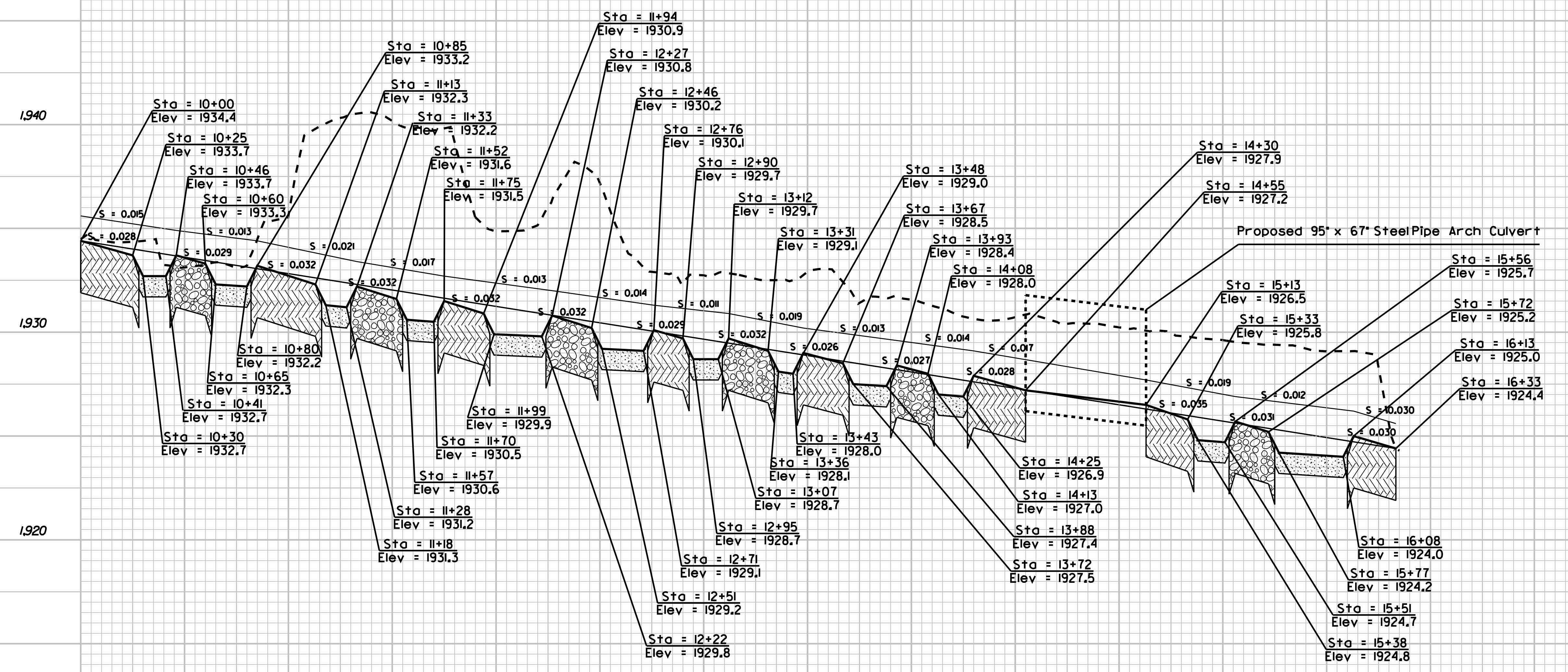
STRUCTURE LOCATIONS				
STRUCTURE TYPE	STATION FROM*	STATION TO*	START ELEVATION	END ELEVATION
RIFFLE GRADE CONTROL	10+00	10+25	1934.4'	1933.7'
WOOD DROP RIFFLE	10+46	10+60	1933.7'	1933.3'
ROCK TOE PROTECTION	10+60	10+85		
STREAM PLUG	10+82	11+06		
RIFFLE GRADE CONTROL	10+85	11+13	1933.2'	1932.3'
WOOD DROP RIFFLE	11+33	11+52	1932.2'	1931.6'
RIFFLE GRADE CONTROL	11+75	11+94	1931.5'	1930.9'
WOOD DROP RIFFLE	12+27	12+46	1930.8'	1930.2'
ROCK TOE PROTECTION	12+46	12+76		
RIFFLE GRADE CONTROL	12+76	12+90	1930.1'	1929.7'
WOOD DROP RIFFLE	13+12	13+31	1929.7'	1929.1'
RIFFLE GRADE CONTROL	13+48	13+67	1929.0'	1928.5'
WOOD DROP RIFFLE	13+93	14+08	1928.4'	1928.0'
RIFFLE GRADE CONTROL	14+30	14+55	1927.9'	1927.2'
95' x 67' PIPE ARCH CULVERT	14+55	15+13	1926.2'**	1925.5'**
RIFFLE GRADE CONTROL	15+13	15+33	1926.5'	1295.8'
ROCK TOE PROTECTION	15+33	15+56		
WOOD DROP RIFFLE	15+56	15+72	1925.7'	1925.2'
ROCK TOE PROTECTION	15+72	16+13		
RIFFLE GRADE CONTROL	16+13	16+33	1925.0'	1924.4'
ROCK CROSS VANE	101+64	101+75		

* RIFFLE GRADE CONTROL AND WOOD DROP RIFFLE STATIONS REPRESENT THE "AT GRADE" PORTION OF THE STRUCTURES AND DO NOT INCLUDE THE 3' LONG KEY-IN AREAS AT THE UPSTREAM AND DOWNSTREAM LIMITS OF THE STRUCTURES.

** PROPOSED 95' x 67' PIPE ARCH CULVERT INVERT ELEVATIONS PROVIDED IN TABLE REPRESENT THE 1' BURIED DEPTH OF THE PIPE ARCH CULVERT. AT GRADE ELEVATIONS OF THE CHANNEL BED ARE 1927.2' AND 1926.5'.

5/14/19

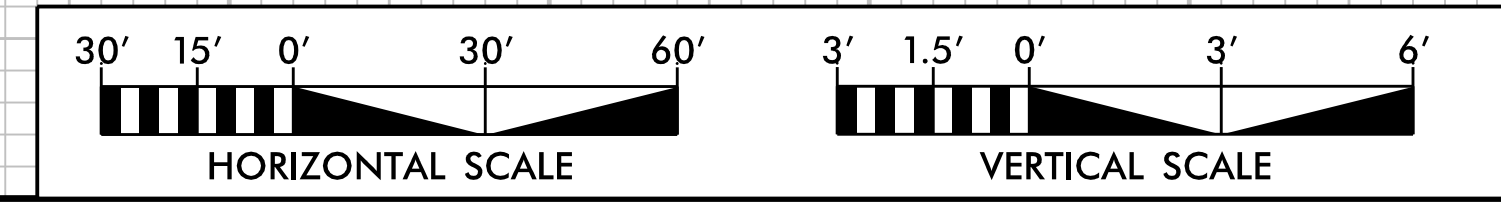
PROJECT REFERENCE NO. A-001C	SHEET NO. OSM-6
HYDRAULICS ENGINEER	
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED	

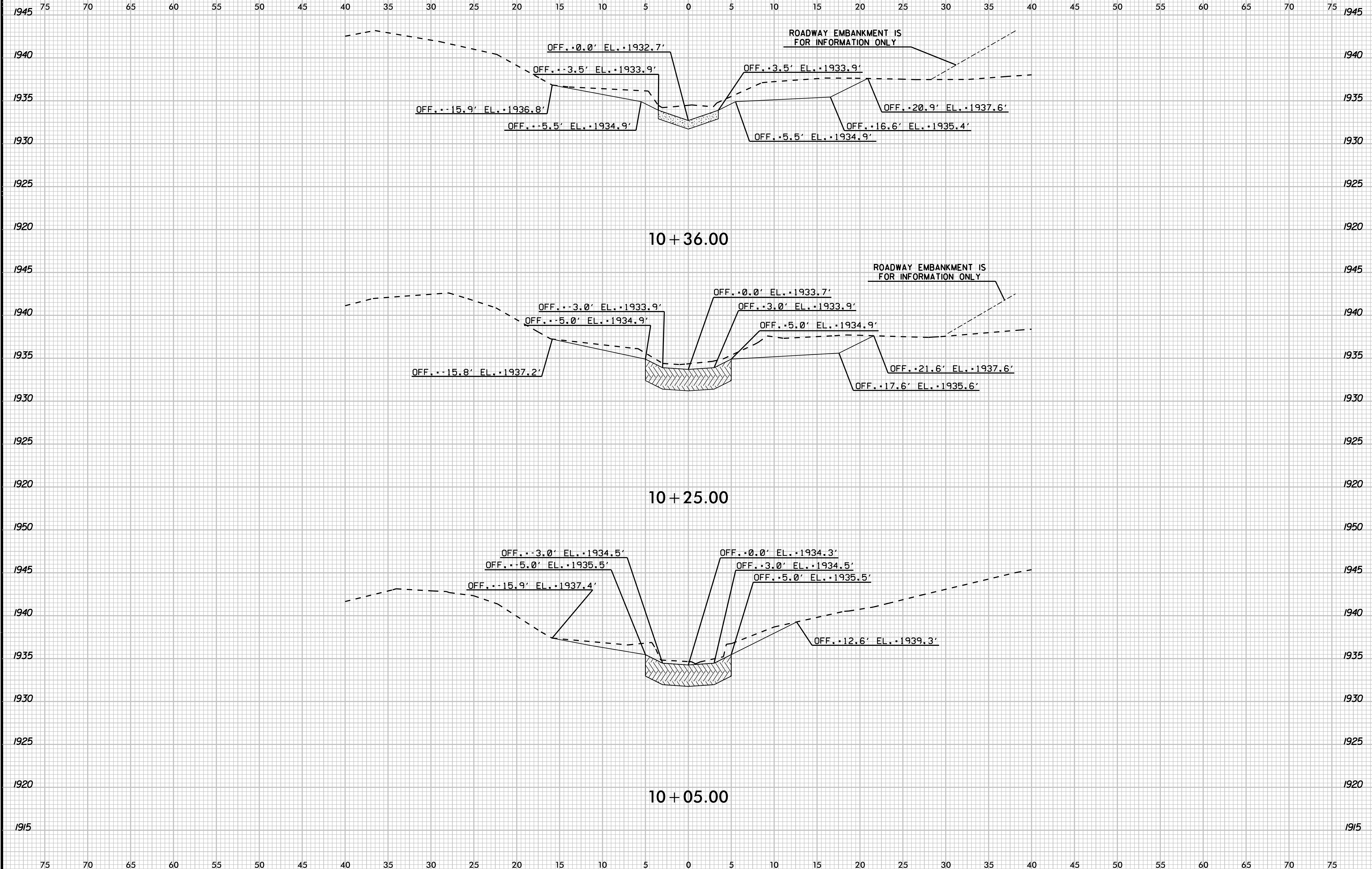
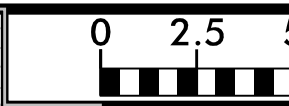


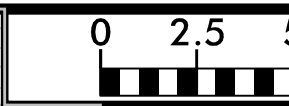
Proposed 95' x 67' Steel Pipe Arch Culvert

1,910

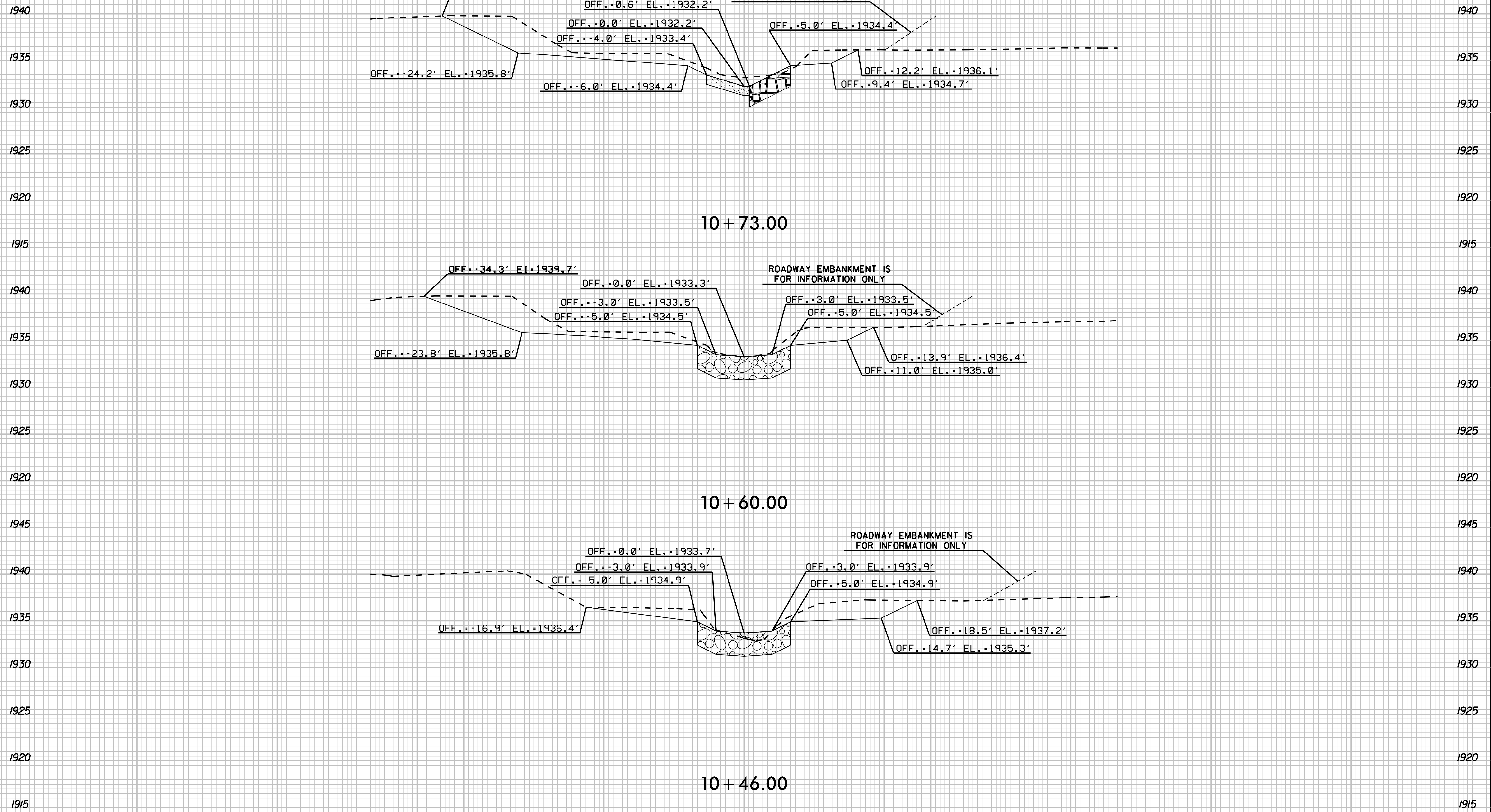
1,900 10+00 11+00 12+00 13+00 14+00 15+00 16+00





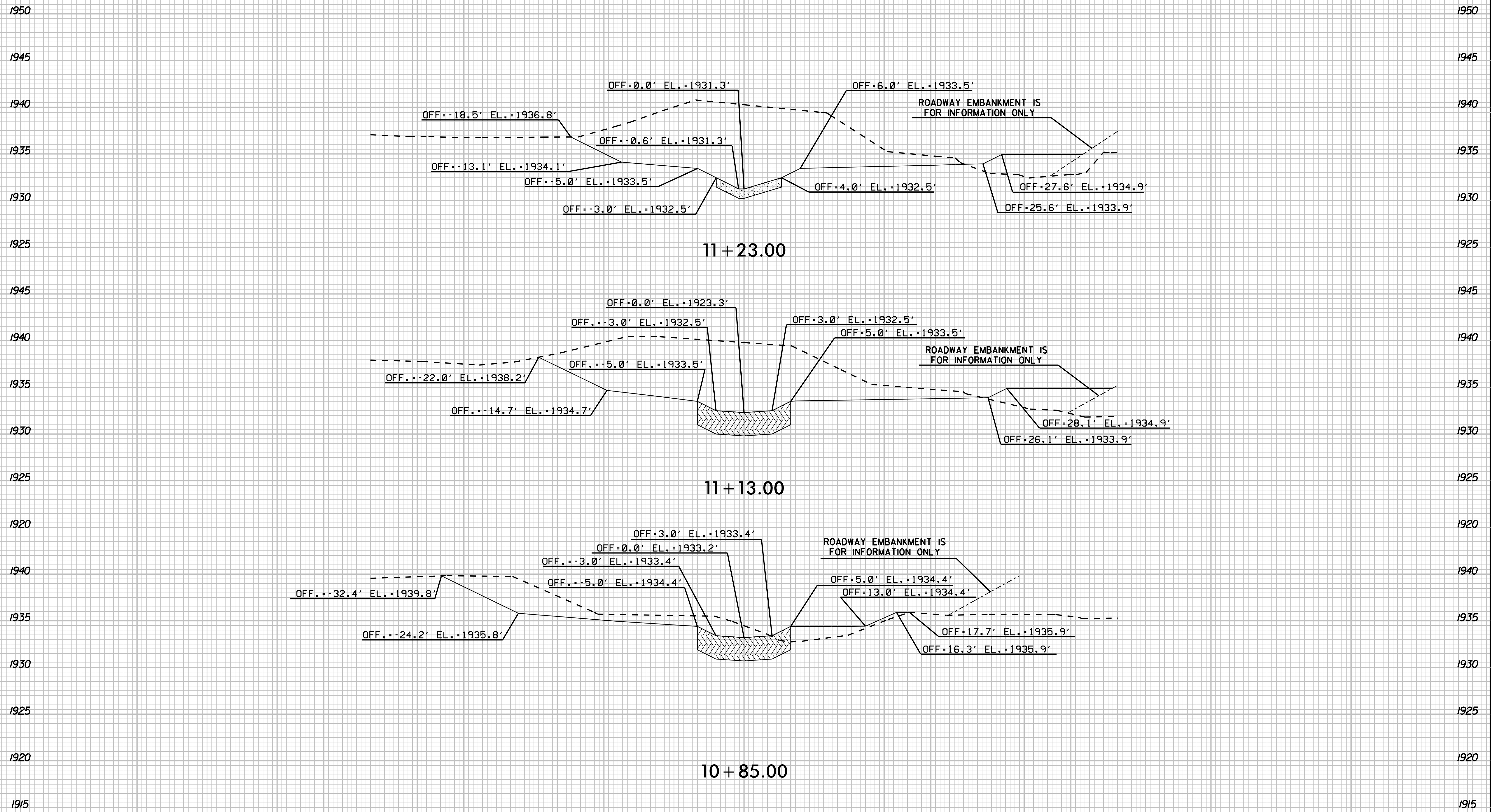


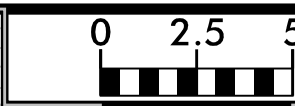
75 70 65 60 55 50 45 40 35 30 25 20 15 10 5 0 5 10 15 20 25 30 35 40 45 50 55 60 65 70 75



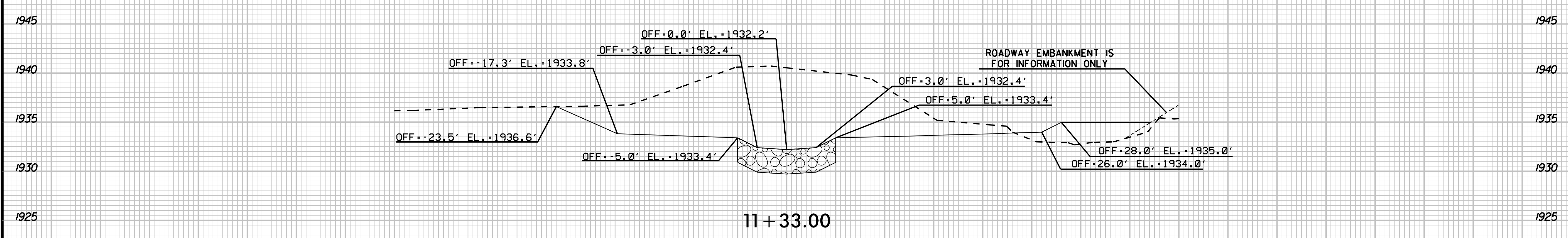
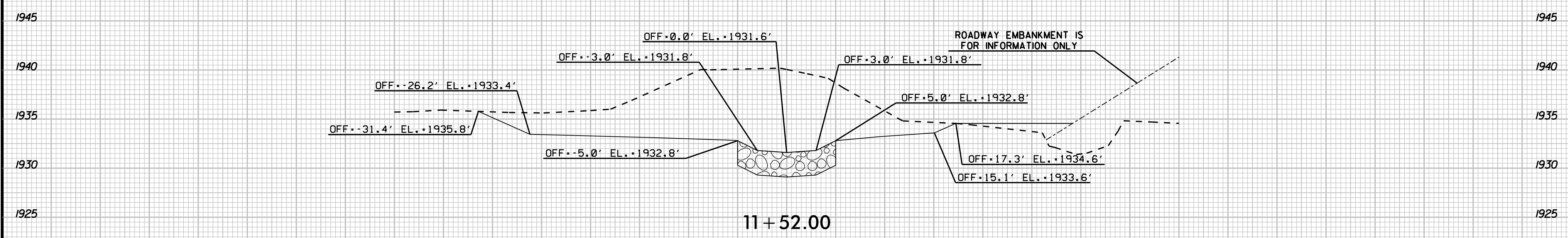
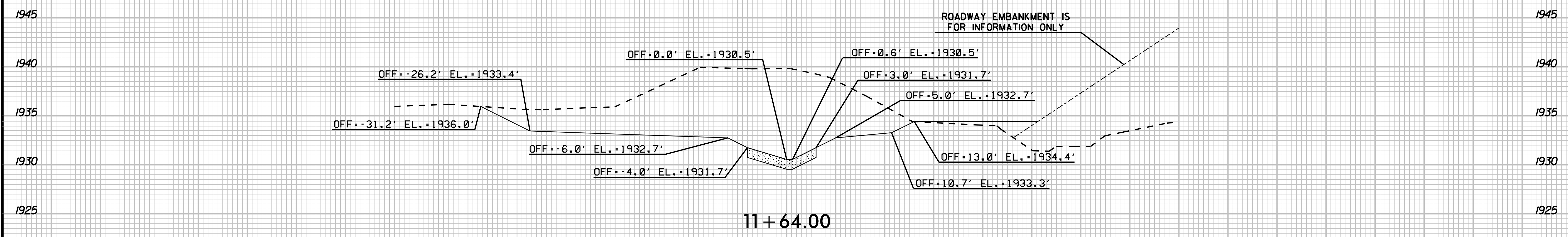
75 70 65 60 55 50 45 40 35 30 25 20 15 10 5 0 5 10 15 20 25 30 35 40 45 50 55 60 65 70 75

75 70 65 60 55 50 45 40 35 30 25 20 15 10 5 0 5 10 15 20 25 30 35 40 45 50 55 60 65 70 75

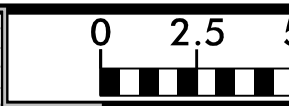




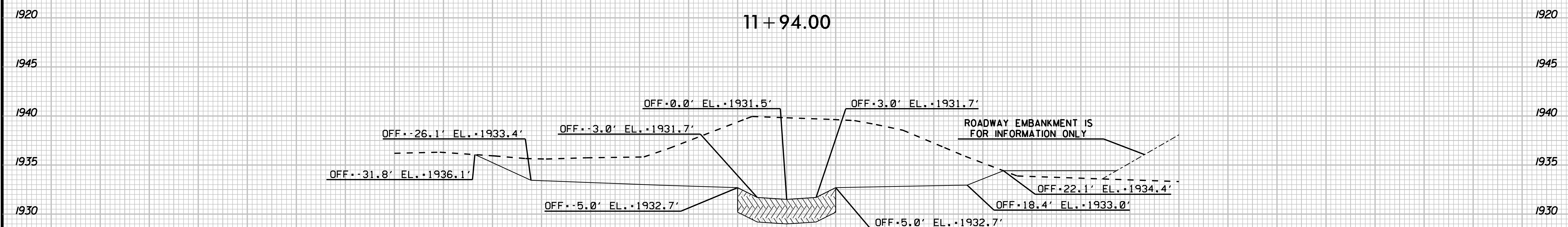
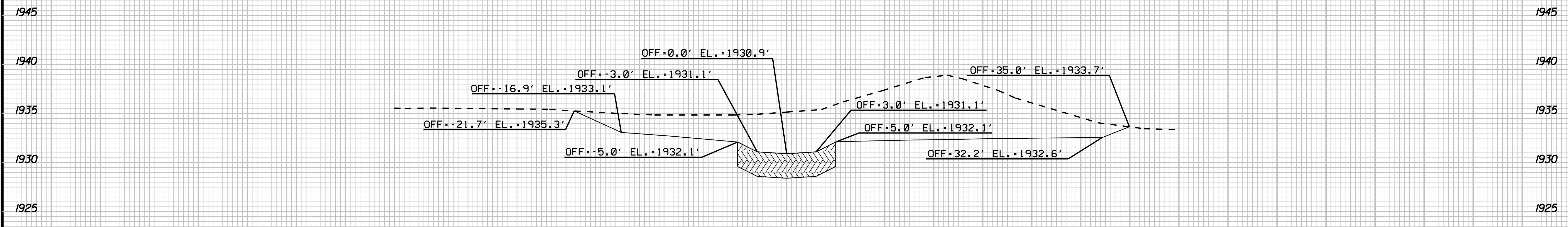
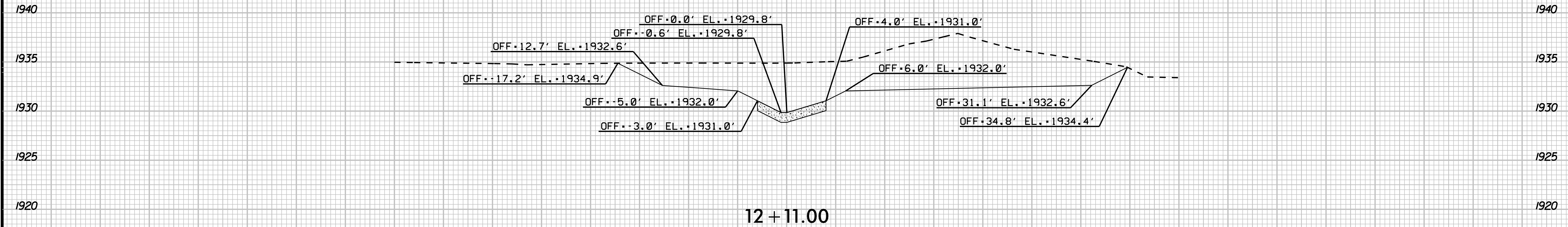
75 70 65 60 55 50 45 40 35 30 25 20 15 10 5 0 5 10 15 20 25 30 35 40 45 50 55 60 65 70 75



75 70 65 60 55 50 45 40 35 30 25 20 15 10 5 0 5 10 15 20 25 30 35 40 45 50 55 60 65 70 75

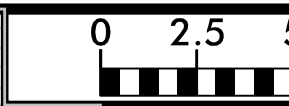


75 70 65 60 55 50 45 40 35 30 25 20 15 10 5 0 5 10 15 20 25 30 35 40 45 50 55 60 65 70 75

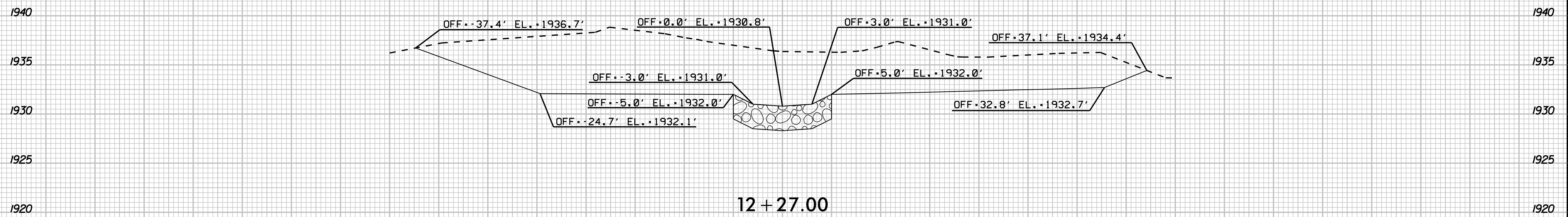
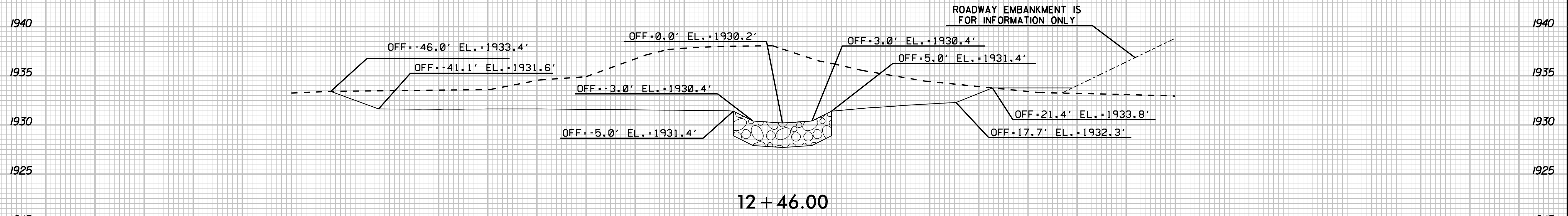
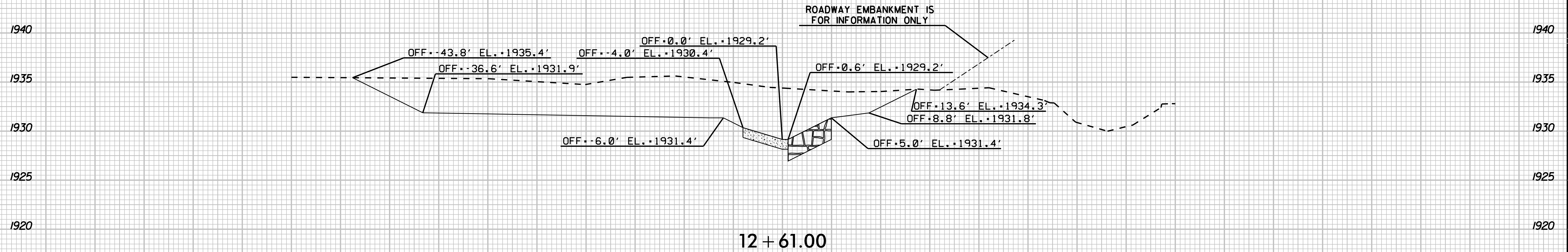


1940 1935 1930 1925 1920

75 70 65 60 55 50 45 40 35 30 25 20 15 10 5 0 5 10 15 20 25 30 35 40 45 50 55 60 65 70 75

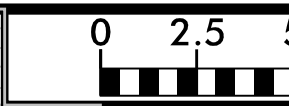


75 70 65 60 55 50 45 40 35 30 25 20 15 10 5 0 5 10 15 20 25 30 35 40 45 50 55 60 65 70 75



75 70 65 60 55 50 45 40 35 30 25 20 15 10 5 0 5 10 15 20 25 30 35 40 45 50 55 60 65 70 75

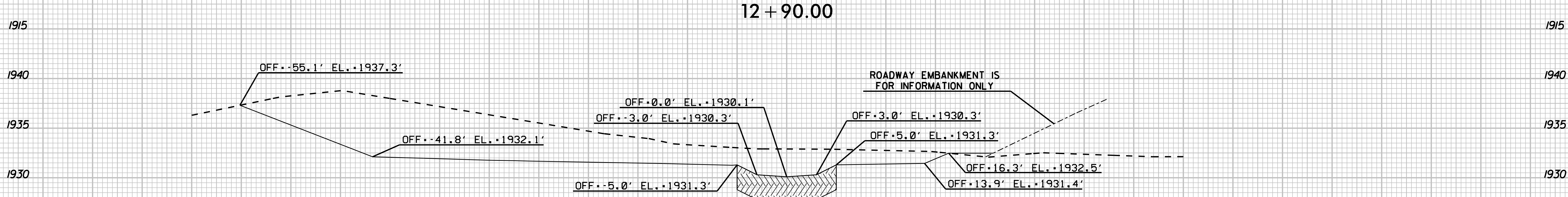
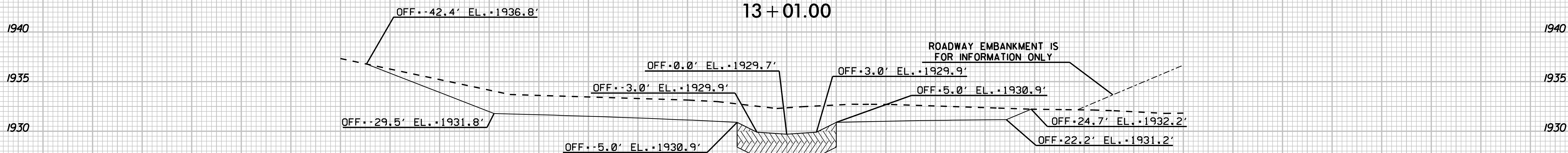
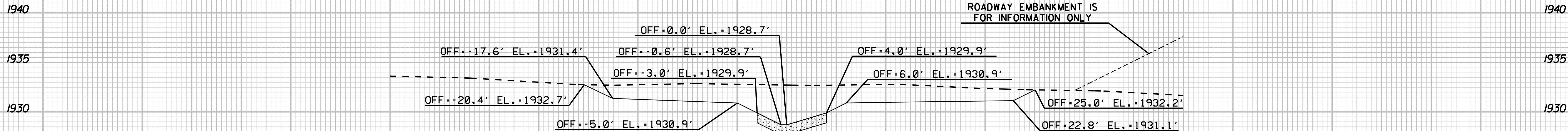
6/23/16



PROJ. REFERENCE NO.
A-001C

SHEET NO.
OSM-13

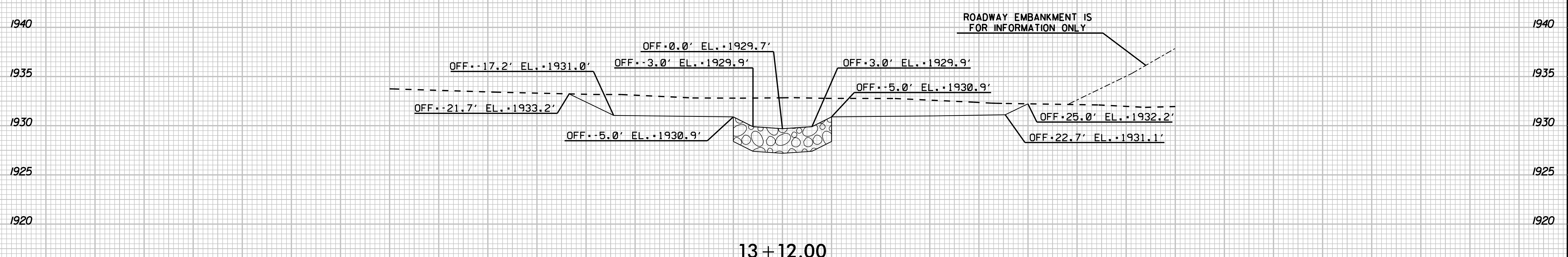
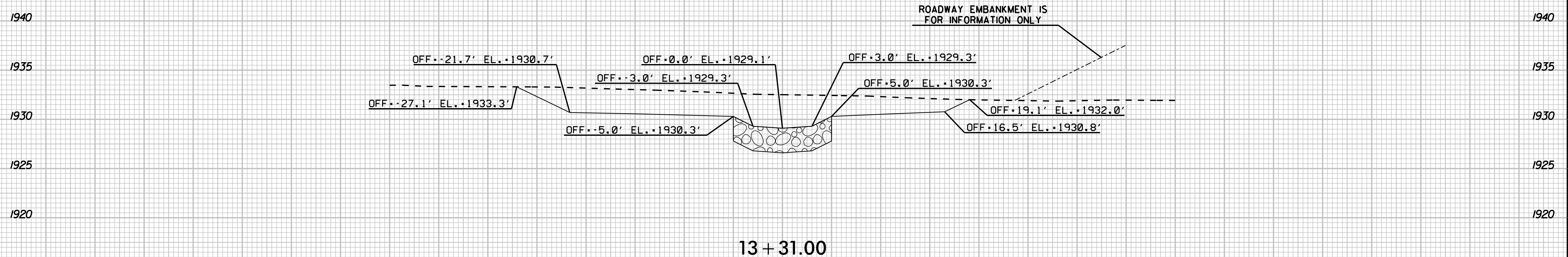
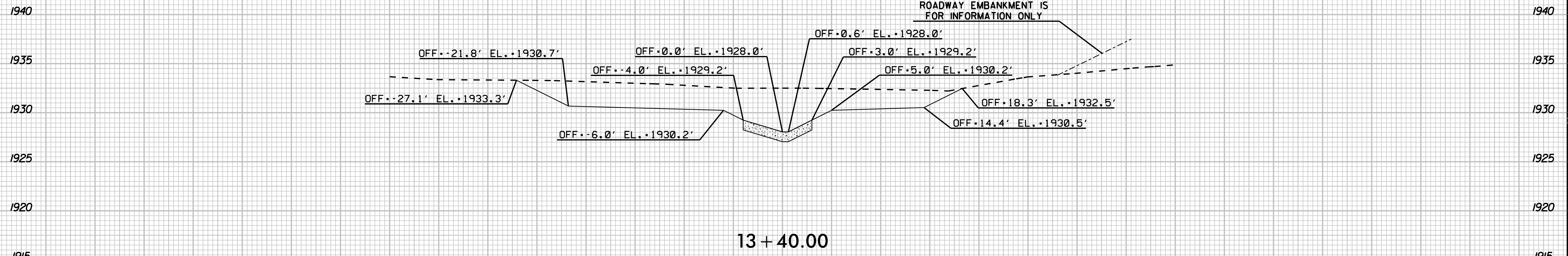
75 70 65 60 55 50 45 40 35 30 25 20 15 10 5 0 5 10 15 20 25 30 35 40 45 50 55 60 65 70 75



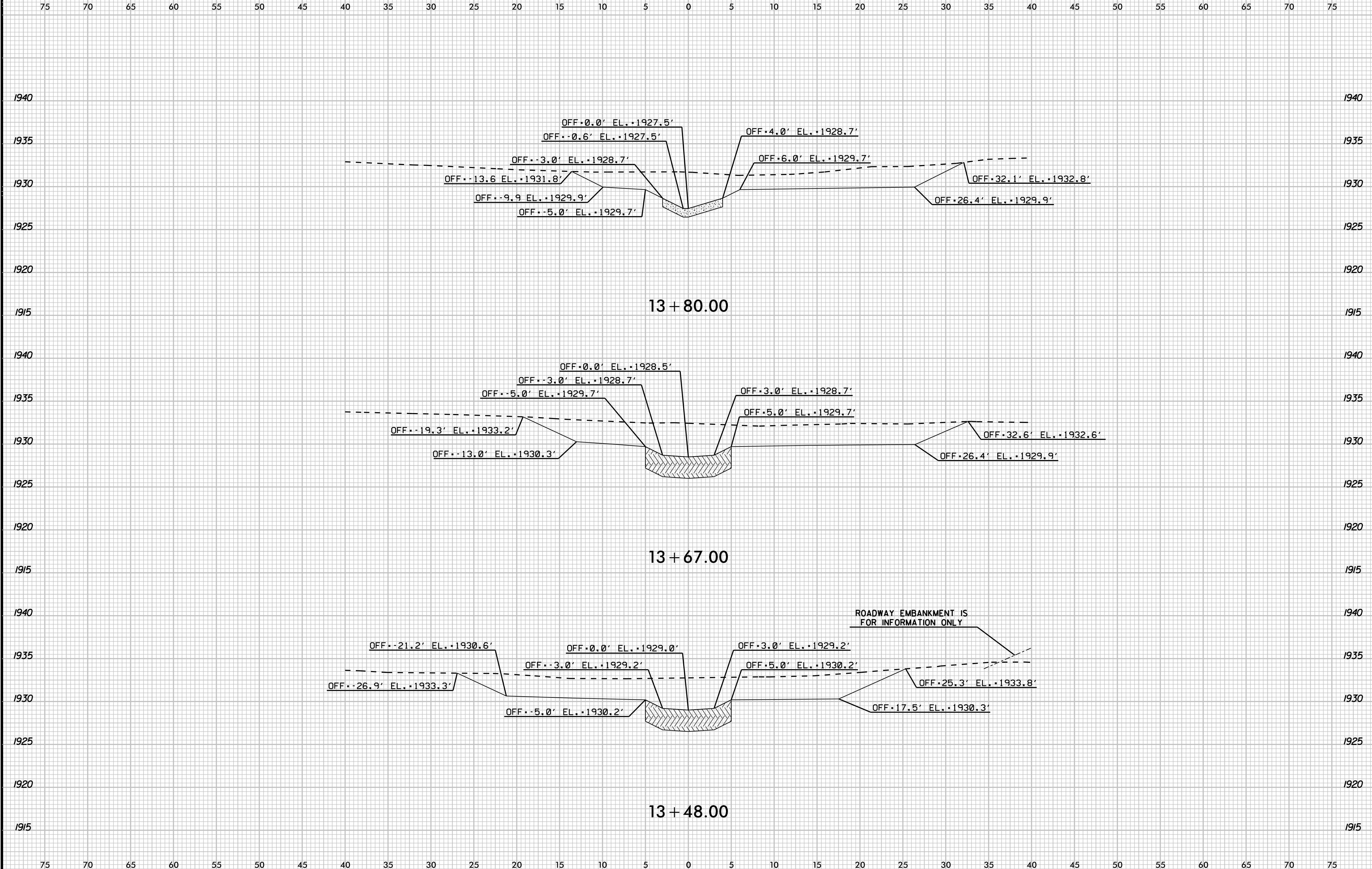
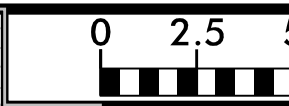
12 + 76.00

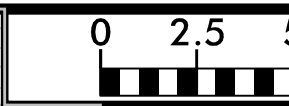
75 70 65 60 55 50 45 40 35 30 25 20 15 10 5 0 5 10 15 20 25 30 35 40 45 50 55 60 65 70 75

75 70 65 60 55 50 45 40 35 30 25 20 15 10 5 0 5 10 15 20 25 30 35 40 45 50 55 60 65 70 75

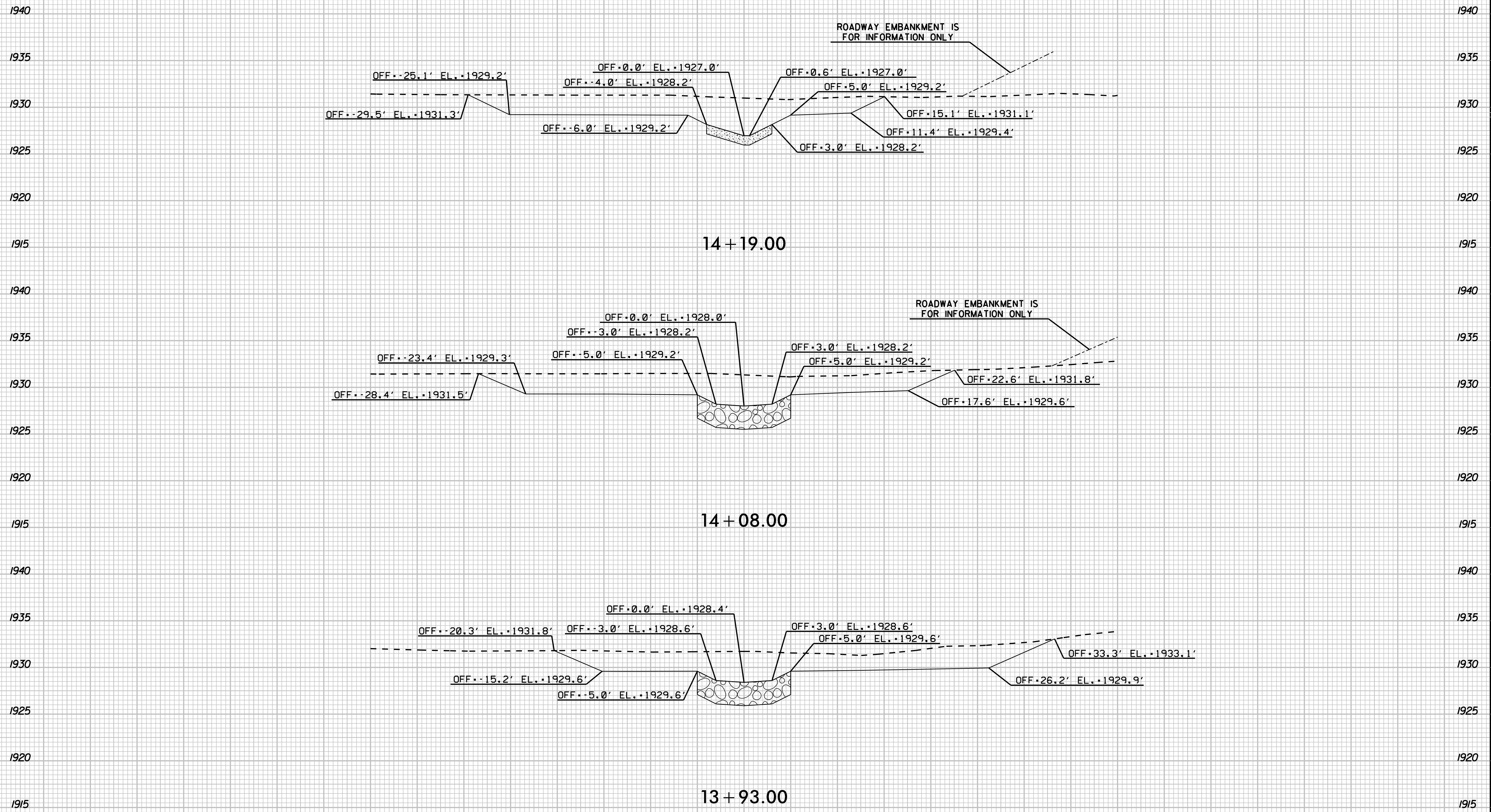


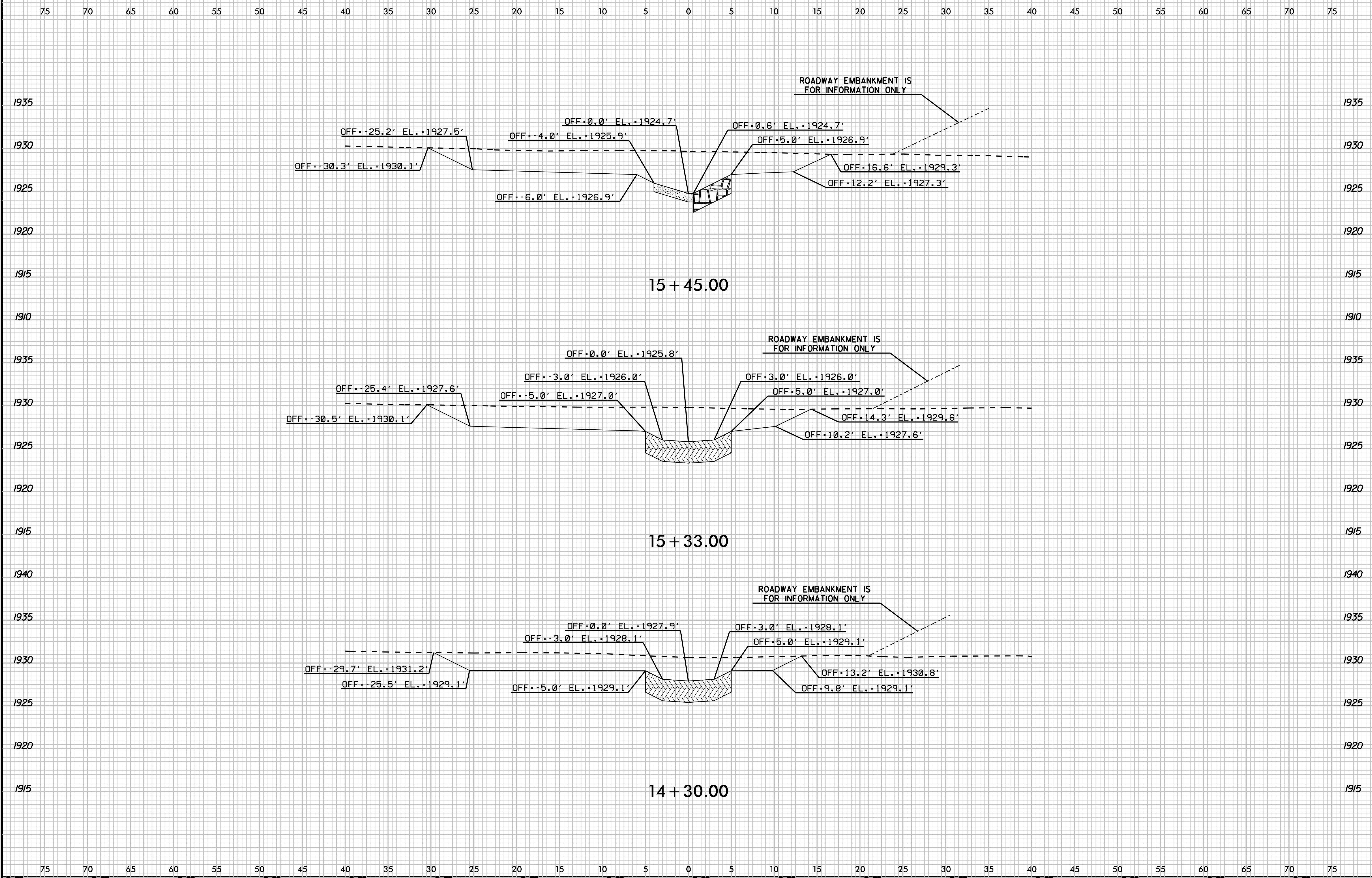
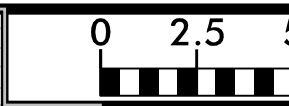
75 70 65 60 55 50 45 40 35 30 25 20 15 10 5 0 5 10 15 20 25 30 35 40 45 50 55 60 65 70 75

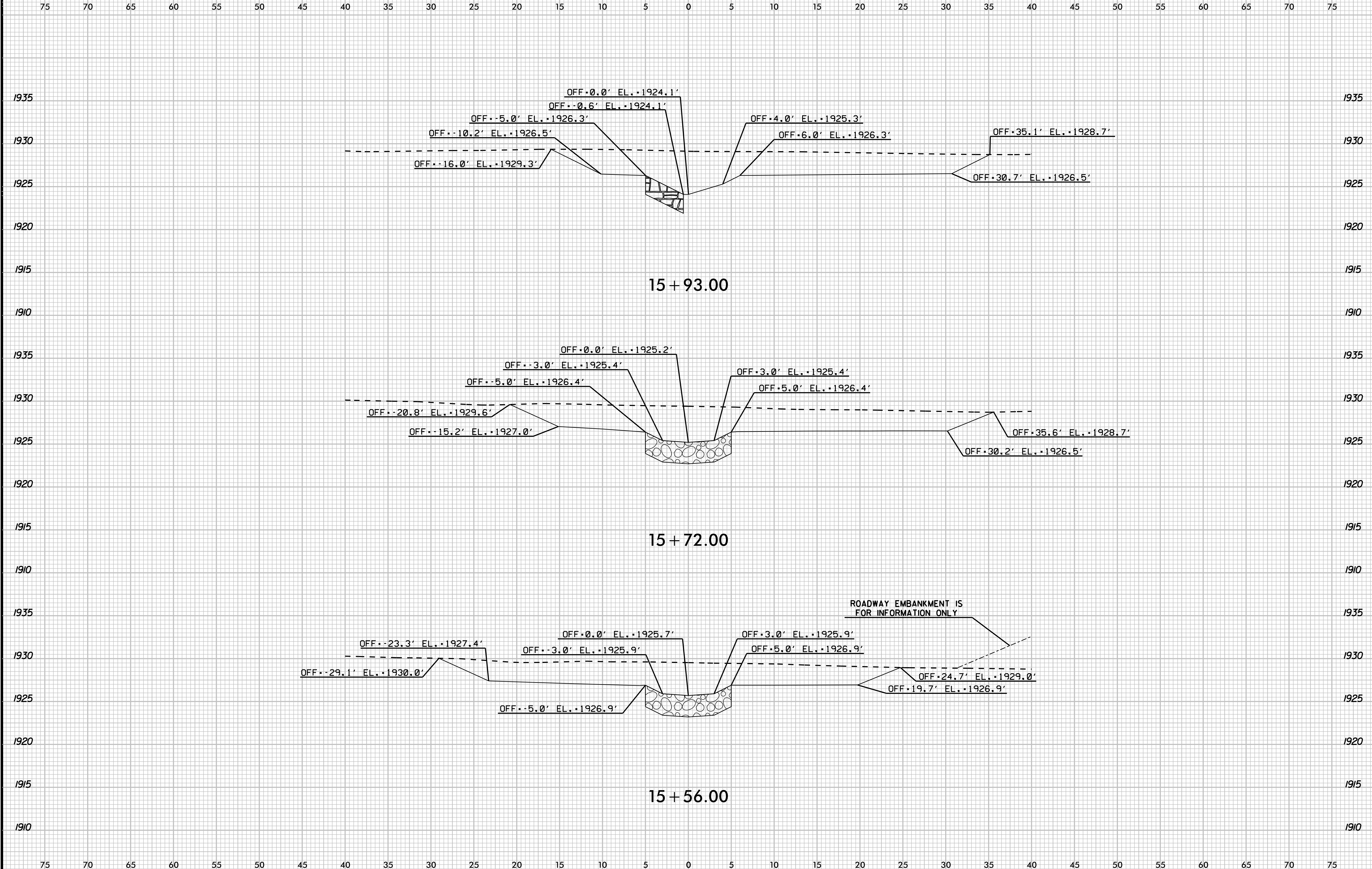
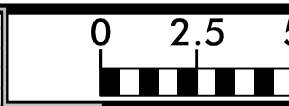




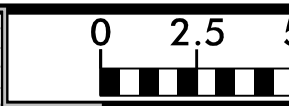
75 70 65 60 55 50 45 40 35 30 25 20 15 10 5 0 5 10 15 20 25 30 35 40 45 50 55 60 65 70 75







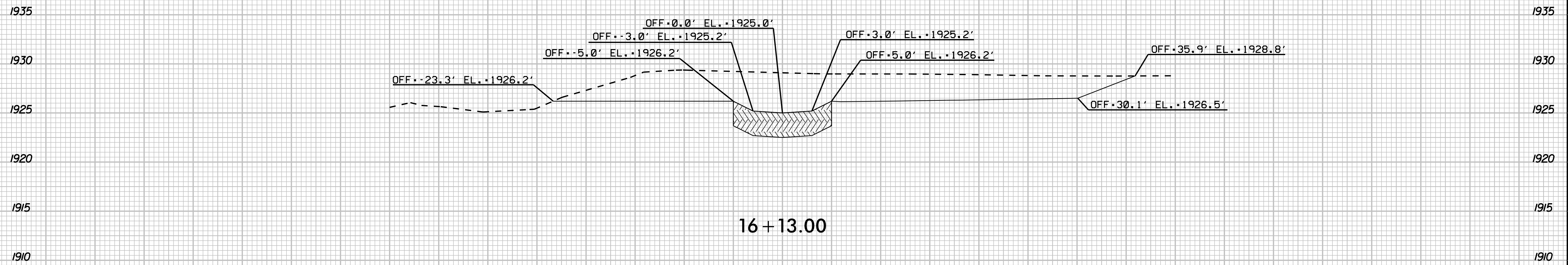
6/23/16



PROJ. REFERENCE NO.
A-001C

SHEET NO.
OSM-19

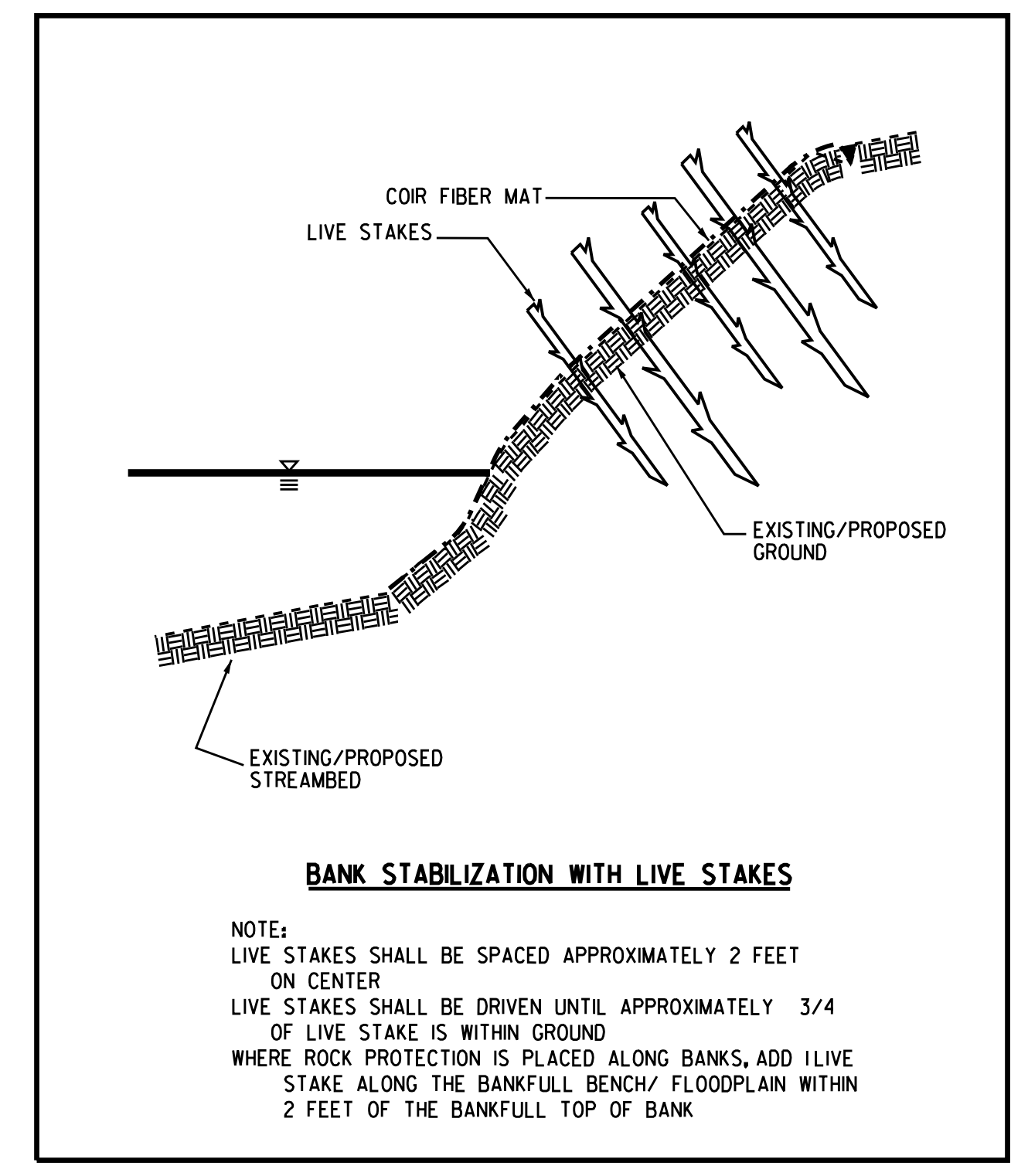
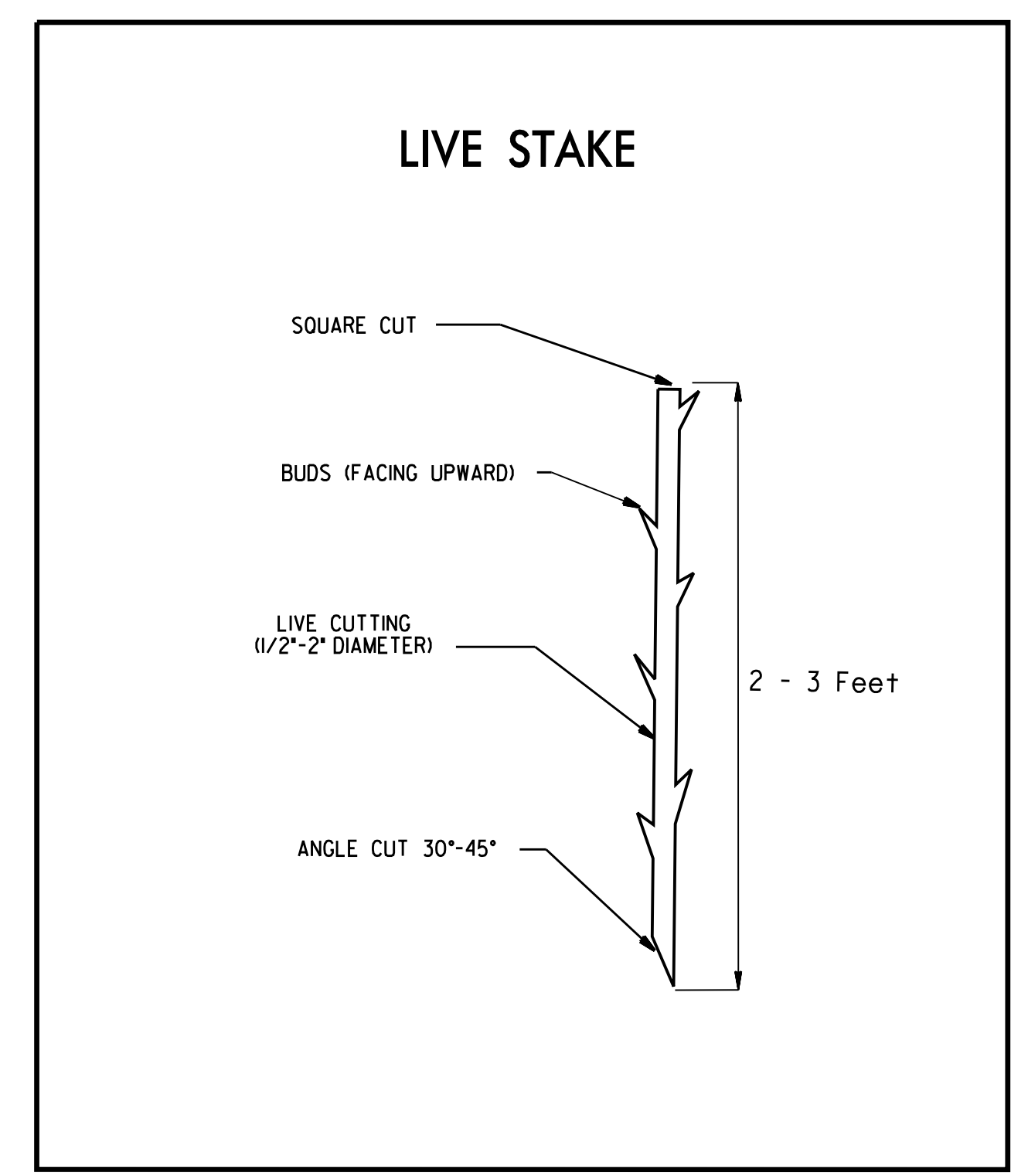
75 70 65 60 55 50 45 40 35 30 25 20 15 10 5 0 5 10 15 20 25 30 35 40 45 50 55 60 65 70 75



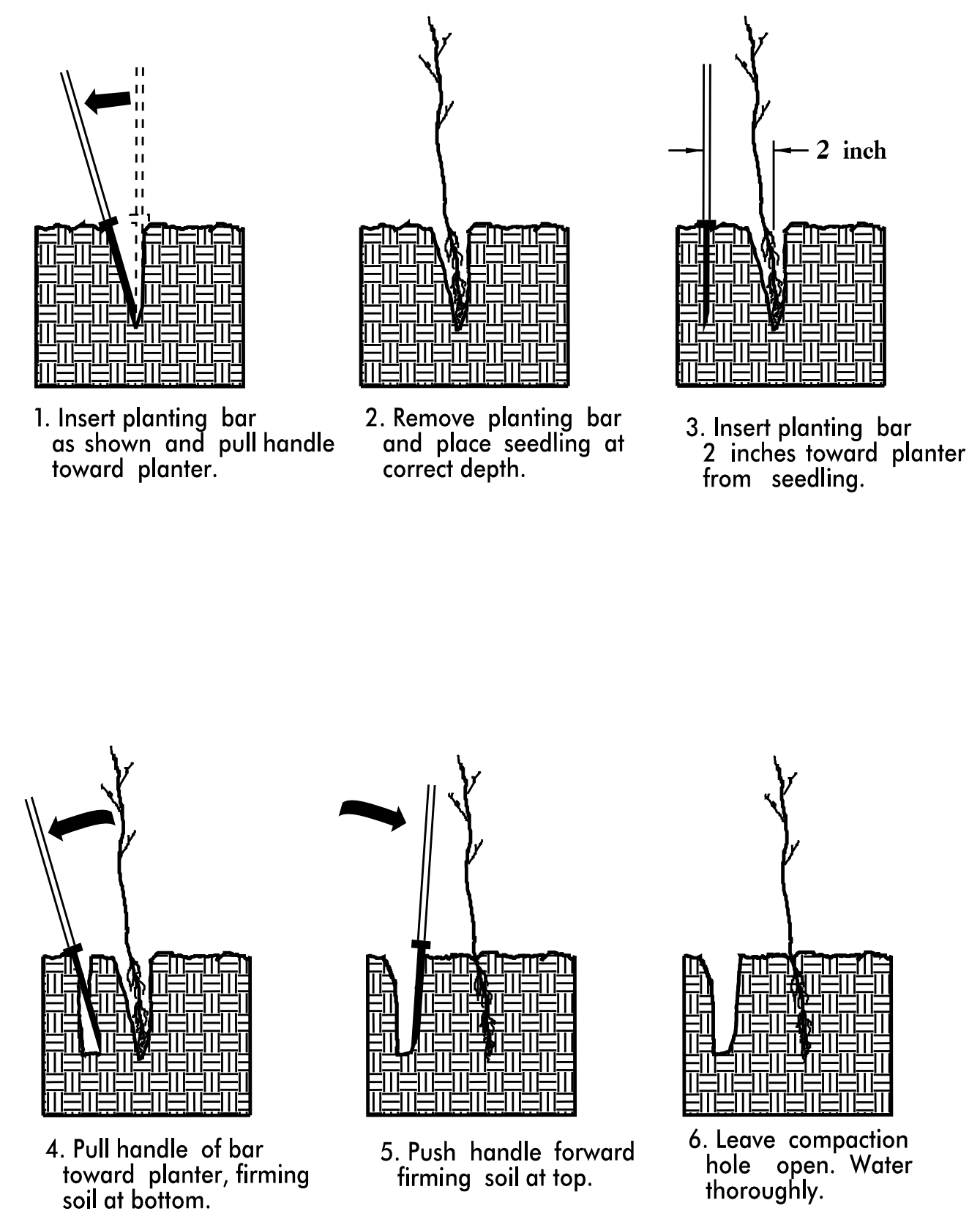
75 70 65 60 55 50 45 40 35 30 25 20 15 10 5 0 5 10 15 20 25 30 35 40 45 50 55 60 65 70 75

PLANTING DETAILS

LIVE STAKES PLANTING DETAIL



BAREROOT PLANTING DETAIL DIBBLE PLANTING METHOD USING THE KBC PLANTING BAR

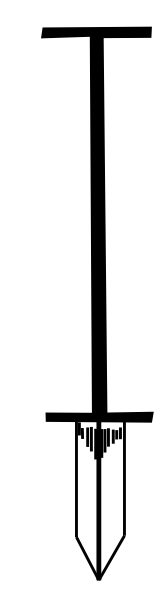


PLANTING NOTES:

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



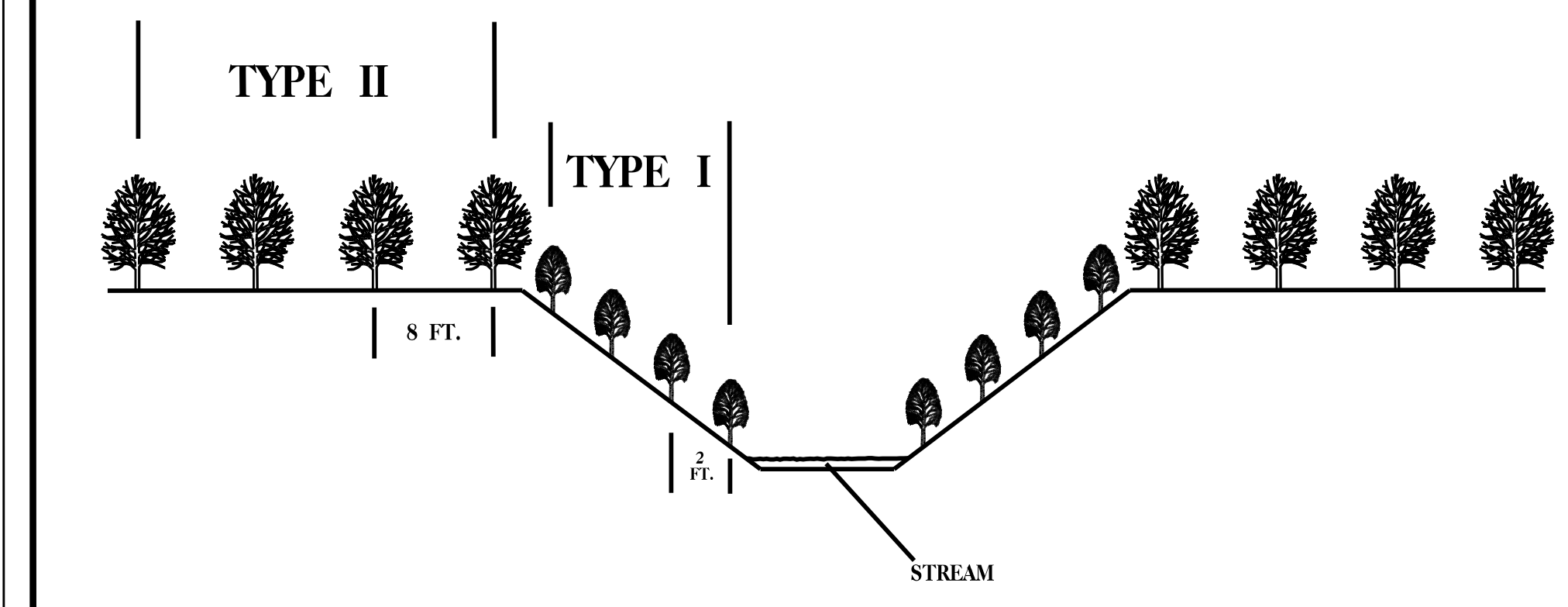
KBC PLANTING BAR
Planting bar shall have a blade with a triangular cross section, and shall be 12 inches long, 4 inches wide and 1 inch thick at center.



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 AN AVERAGE OF 2 FT. ON CENTER, APPROXIMATELY 10890 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.
- NOTE: TYPE 1 AND TYPE 2 STREAMBANK REFORESTATION SHALL BE PAID FOR AS "STREAMBANK REFORESTATION"

STREAMBANK REFORESTATION TYPICAL



STREAMBANK REFORESTATION

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

TYPE 1		
50% SALIX NIGRA	BLACK WILLOW	2 ft - 3 ft LIVE STAKES
50% CORNUS AMOMUM	SILKY DOGWOOD	2 ft - 3 ft LIVE STAKES
TYPE 2		
TREES AND SHRUBS		
12.5% PINUS VIRGINIANA	VIRGINIA PINE	12 in - 18 in BR
12.5% ROBINIA PSEUDOACACIA	BLACK LOCUST	12 in - 18 in BR
12.5% PLATANUS OCCIDENTALIS	SYCAMORE	12 in - 18 in BR
12.5% ACER RUBRUM	RED MAPLE	12 in - 18 in BR
12.5% CORNUS AMOMUM	SILKY DOGWOOD	12 in - 18 in BR
12.5% LINDERA BENZOIN	SPICEBUSH	12 in - 18 in BR
12.5% VIBURNUM DENTATUM	SOUTHERN ARROWWOOD	12 in - 18 in BR
12.5% CORYLUS AMERICANA	AMERICAN HAZELNUT	12 in - 18 in BR
EMBANKMENT SHRUBS		
25% CORNUS RACEMOSA	GRAY DOGWOOD	12 in - 18 in BR
25% HAMAMELIS VIRGINIANA	AMERICAN WITCHHAZEL	12 in - 18 in BR
25% VIBURNUM DENTATUM	SOUTHERN ARROWWOOD	12 in - 18 in BR
25% SAMBUCUS RACEMOSA	RED ELDERBERRY	12 in - 18 in BR

SEE PLAN SHEETS FOR AREAS TO BE PLANTED

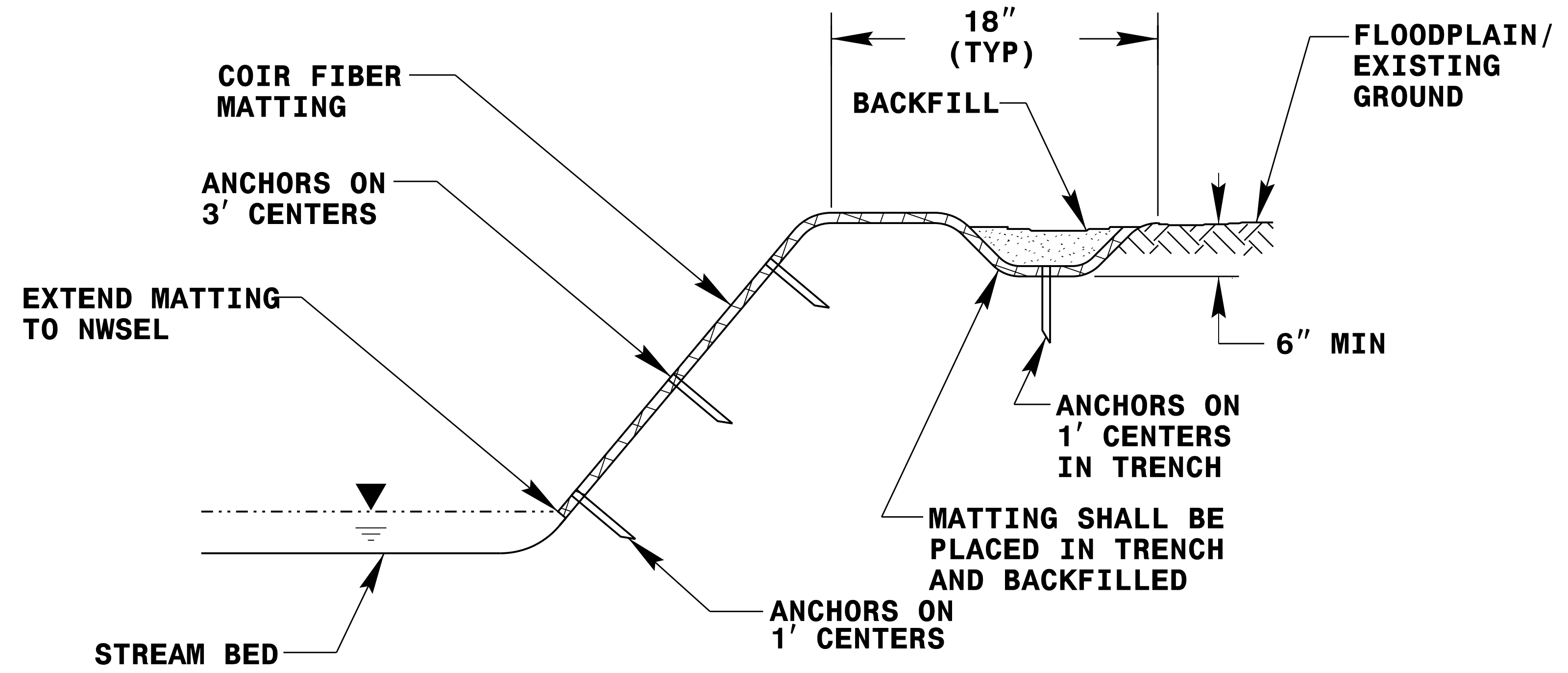
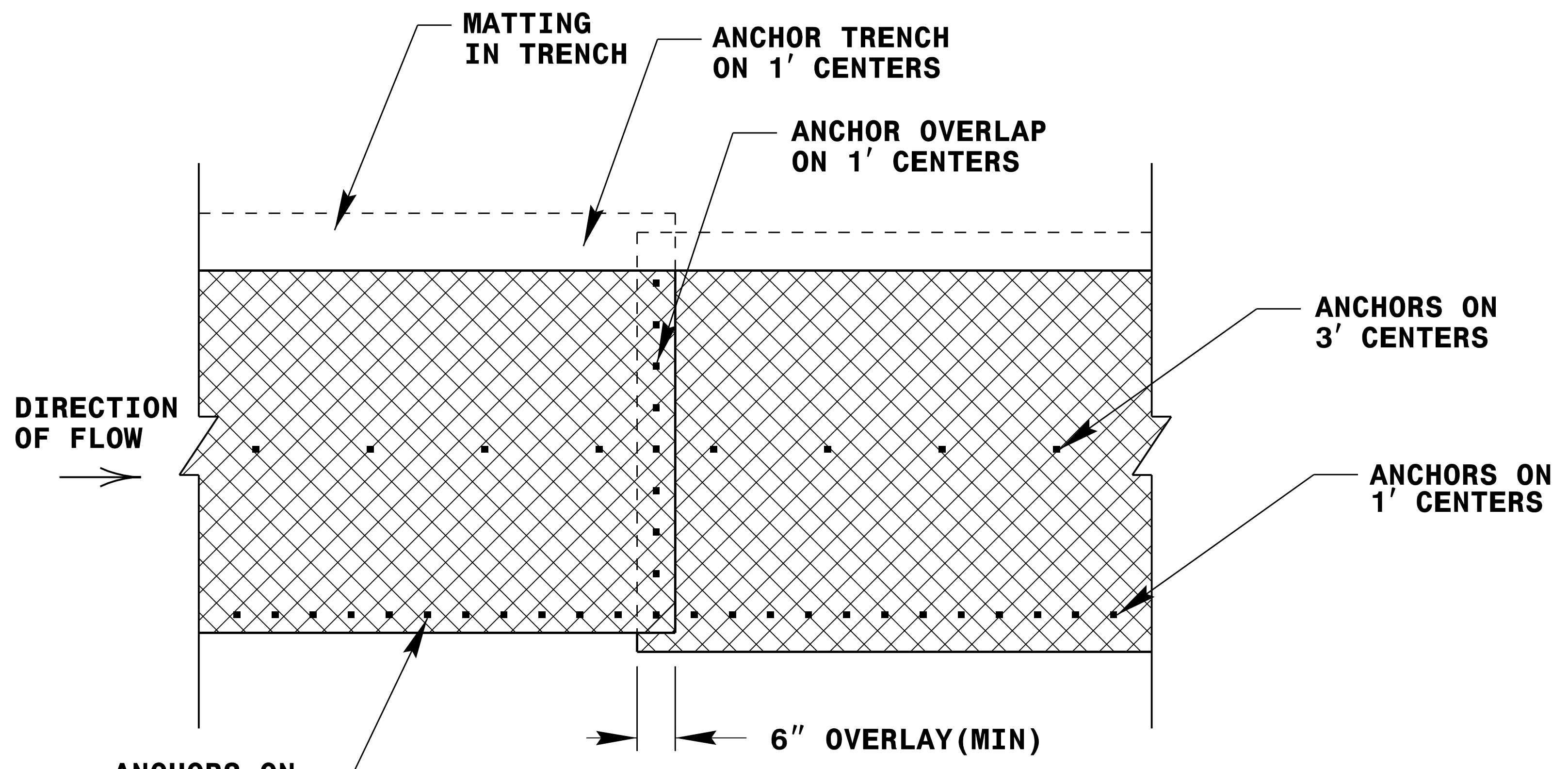
STREAMBANK REFORESTATION

DETAIL SHEET 1 OF 2

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

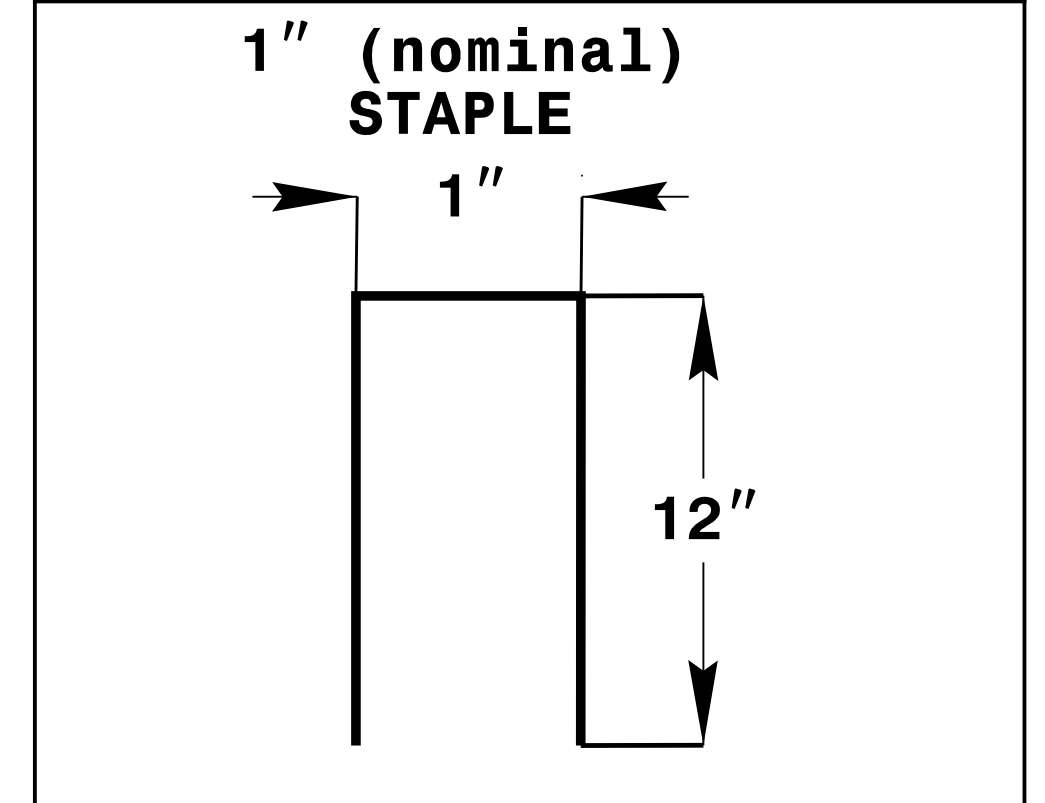
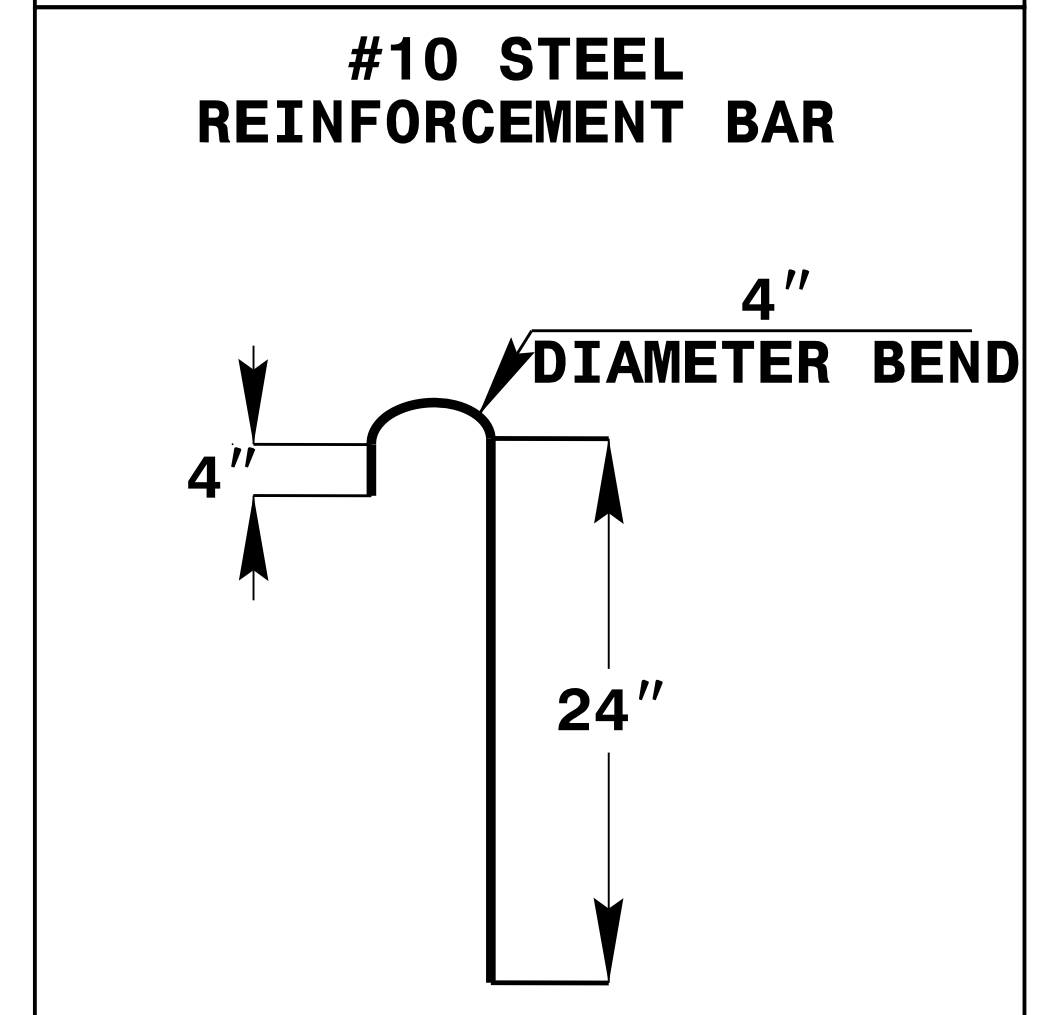
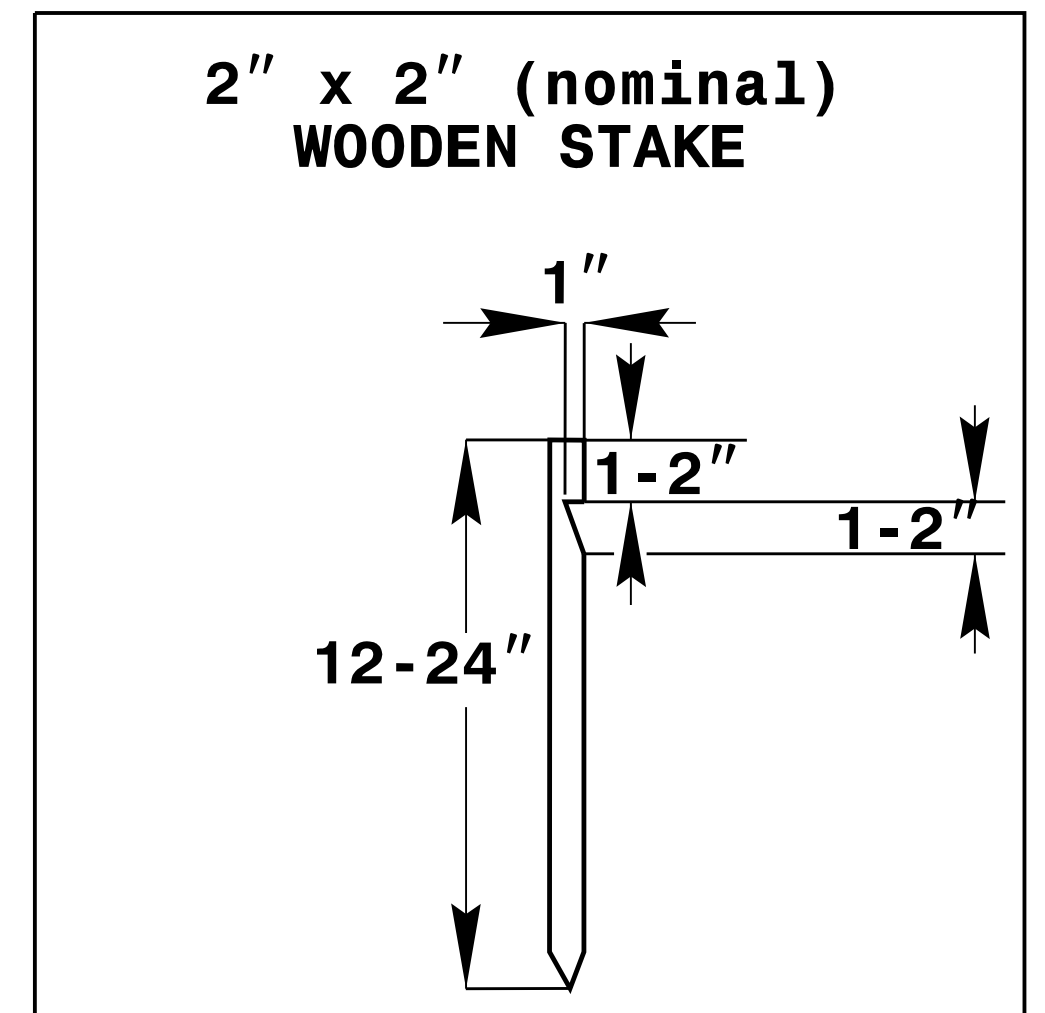
PROJECT REFERENCE NO. A-0011C	SHEET NO. OSM-20
RW SHEET NO.	
HYDRAULICS ENGINEER	
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED	

PROJECT REFERENCE NO. A-0011C	SHEET NO. OSM-21
RW SHEET NO.	
HYDRAULICS ENGINEER	
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED	



COIR FIBER MATTING DETAIL

NOT TO SCALE

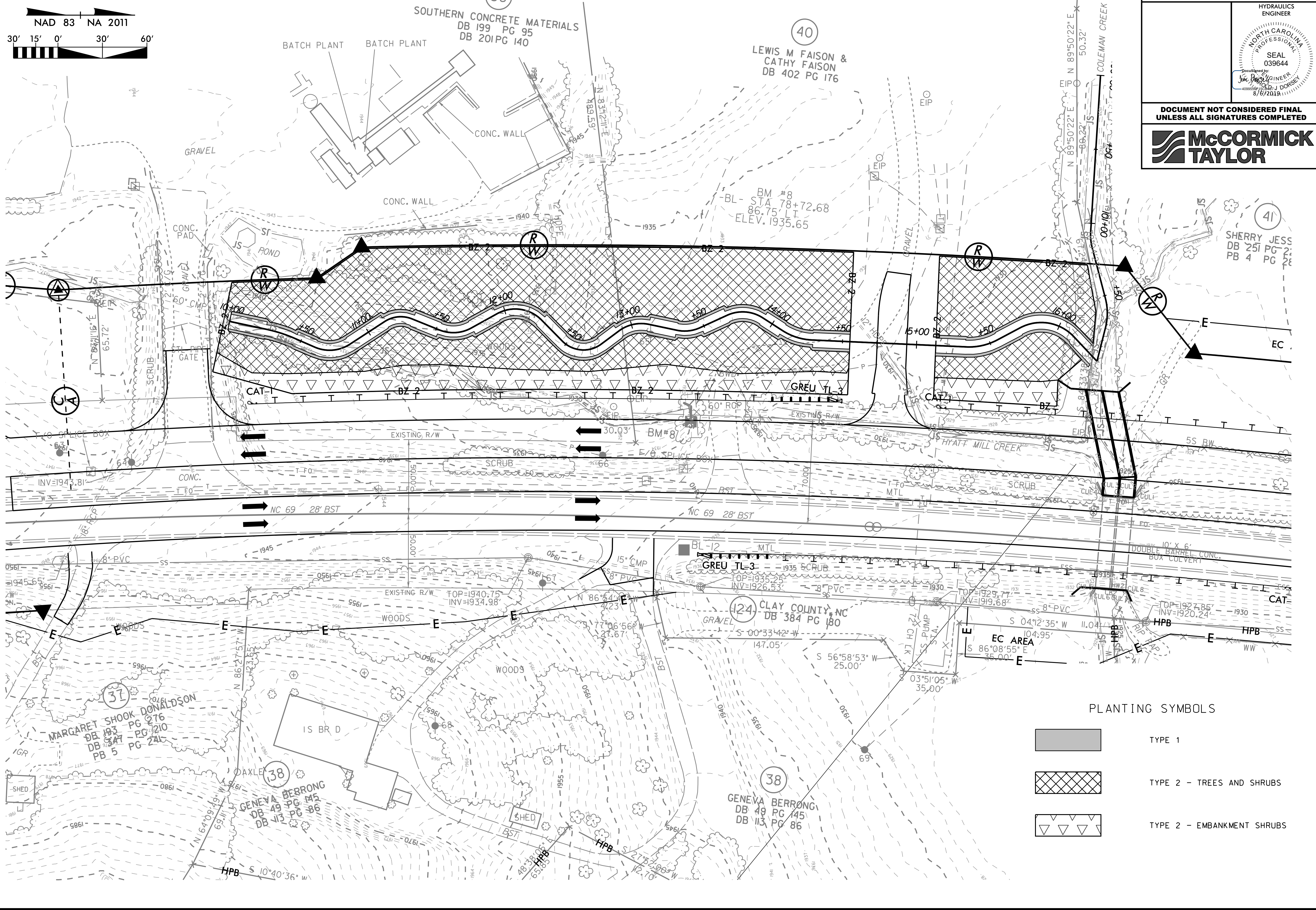
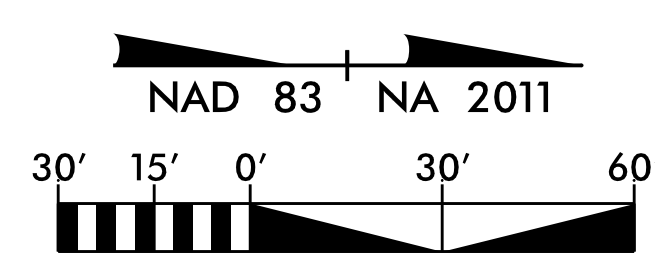


ANCHOR OPTIONS

STREAMBANK REFORESTATION

DETAIL SHEET 2 OF 2

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



REVISIONS

8/17/99