

WEBSTER COUNTY

Bridge-Unspecified
BRF-144-0(006)--38-94

LETTING DATE
08/18/2026



PLANS OF PROPOSED IMPROVEMENT ON THE
PRIMARY ROAD SYSTEM
WEBSTER COUNTY
Bridge-Unspecified
East Buttrick Creek 2.2 mi S of IA 175

SCALES: As Noted

Refer to the Proposal Form for list of applicable specifications.

Value Engineering Saves. Refer to Article 1105.14 of the Specifications.



REVISIONS

TOTAL

PROJECT IDENTIFICATION NUMBER

22-94-144-010

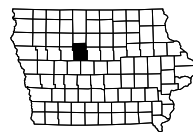
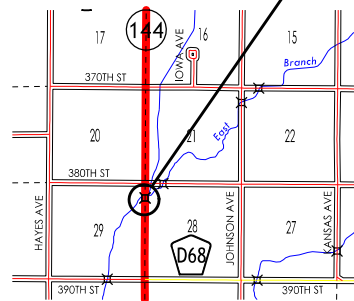
PROJECT NUMBER

BRF-144-0(006)--38-94

R.O.W. PROJECT NUMBER

STPN-144-0(007)--2J-94

PROJECT LOCATION



INDEX OF SEALS			
SHEET NO.	NAME	TYPE	BID QUANTITY SHEETS
A.1	Jeremy J. Vortherms	Primary Signature Block	C.1

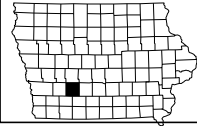
PRELIMINARY PLANS

Subject to change by final design.

D2 PLAN - Date: 8/7/2024

FIELD EXAM CHECKLIST

FIELD EXAM CHECKLIST



FIELD EXAM CHECKLIST

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FINAL PROJECT CONCEPT STATEMENT

IA 144 Bridge over East Buttrick Creek, 2.2 miles south of IA 175.

Webster County
BRF-144-0(6)--38-94
PIN: 22-94-144-010
Maint. No. 9432.2S144
FHWA No. 52340

Highway Division
Design Bureau

John Bartholomew, P.E.
515-239-1540

May 14, 2024

Webster County
BRF-144-0(6)--38-94
PIN: 22-94-144-010
Page 2

steel beams have corrosion. The substructure has cracking, spalling, and hollows. The bridge was designed for live loads below current standards. Due to the overall condition of the bridge, a replacement is recommended.

Pictures from SIIMS



2014



2014 - Looking north

I. STUDY AREA

A. Project Description

This project involves the replacement of the IA 144 bridge (Maint. No. 9432.2S144) over East Buttrick Creek, 2.2 miles south of IA 175.

The three alternatives considered were:

1. Replace with a twin 10 ft. x 10 ft. x 115 ft. reinforced concrete box (RCB) culvert utilizing an off-site detour. Estimated cost **\$1,007,400**.
2. Replace with an 80 ft. x 40 ft. pretensioned prestressed concrete beam bridge utilizing an off-site detour. Estimated cost \$1,290,200.
3. Replace with a 90 ft. x 40 ft. CCS bridge was considered but was dismissed due to higher costs and higher potential for conflicts between new and existing piling.

Alternative 1 is the preferred alternative due to cost savings and safety benefits. The estimated cost for alternative 1 is **\$1,007,400**.

B. Need for Project

This is a 54 ft. x 30 ft. steel beam bridge that was built in 1955 and was overlaid in 1983. The overlay has reached the end of its service life. The top of deck has unsound patches while the bottom of the deck has spalls, hollows, and leaching cracks. The

C. Present Facility

The existing structure is a 50 ft. x 30 ft., steel beam bridge constructed in 1955.

IA 144 in the project area is 20 ft. wide type B asphalt cement concrete with 8 ft. wide earth shoulders and 2:1 foreslopes, constructed in 1956. Type B asphalt cement concrete resurfacing of 1.5 in. over 1.5 in. of type B asphalt cement concrete base was accomplished in 1978 on a 22 ft. roadway with 3 ft. earth shoulders. In 2004 3 in. of milling occurred and 3 in. of cold in place recycled asphalt base was placed with 3 in. of type A asphalt cement concrete resurfacing. Per RAMS Road Analyzer the current roadway width is 22 ft. asphalt with 3 ft. earth shoulders.

D. Traffic Estimates

The 2027 construction year and 2047 design year average daily traffic estimates are 700 ADT with 26 % trucks and 800 ADT with 26 % trucks, respectively.

E. Sufficiency Ratings

IA 144 is classified as an "access route" and is a maintenance service level "C" roadway. The Bridge Condition Index is 60.5 and the Bridge Condition Rating is "Fair".

F. Access Control

Access rights will not be acquired for this project.

G. Crash History

During the five-year study period from January 1, 2018 through December 31, 2022, there were 0 crashes. IA 144 in the project area has a PCR of 0.02 and is listed as "negligible".

II. PROJECT CONCEPT

A. Feasible Alternatives

Alternative #1 - Replace with a twin 10 ft. x 10 ft. x 115 ft. reinforced concrete box (RCB) culvert utilizing off-site detour

The existing 50 ft. x 30 ft. steel I-beam bridge will be replaced with a twin 10 ft. x 10 ft. x 115 ft. reinforced concrete box (RCB) culvert placed at a 15 degree right ahead skew. The typical cross section will consist of a 24 ft. roadway with 8 ft. granular shoulders and 6:1/3:1 foreslopes. The existing bridge deck will be removed and new 9 in. pavement will be placed over 12 in. of modified subbase. A safety edge will be required following PV-3.

The roadway will be reconstructed on the existing vertical and horizontal alignment. The flow line of the box will be buried 1 ft. below the existing flow line in the channel. This will allow the bottom of the box to silt in and provide a natural bottom for fish passage. The existing ditches will need to be relocated to meet the inlet and outlet flowlines of the new RCB. Class E revetment will be placed at the ends of the RCB.

A channel realignment of approximately 190 ft. is required, see the reinforced concrete box culvert situation plan that is attached.

Apply erosion control and rural seeding and fertilizing to all disturbed areas.

It appears that right of way will be required for this alternative for channel realignment.

Contractor will maintain access to property entrances at all times.

Traffic will be maintained by an off-site detour.

Bridge Items	<u>Estimated Costs</u>
New Culvert	\$ 339,000
Bridge Removal	17,000
Revetment	6,000
Class 10 Channel Excavation	33,000
Mobilization - 10%	40,000
M & C - 15%	<u>87,000</u>
Bridge Costs	\$ 522,000
Right of Way - Program Amount and Channel Realignment	\$25,000

Roadway Items	
Removal of Pavement	6,900
PCC Pavement	45,000
Modified Subbase	17,800
Granular Shoulder	5,800
Embankment in place, contractor furnished	42,300
Excavation Class 13 Waste	8,100
Excavation Class 20	6,100
Flooded Backfill	7,400
Subdrain (Includes Outlets)	7,100
Guardrail Removal	1,900
Clearing and Grubbing	1,900
Seeding and Fertilizing	1,000
Erosion Control	50,000
Stream Mitigation	75,000
Traffic Control - 5%	23,000
Mobilization - 5%	23,000
M & C - 30%	<u>138,100</u>
Roadway Costs	\$ 460,400

Project Total **\$1,007,400**

Alternative #2 - Replace with an 80 ft. x 40 ft. pretensioned prestressed concrete beam bridge utilizing off-site detour

The existing 50 ft. x 30 ft. steel I-beam bridge will be replaced with an 80 ft. x 40 ft., pretensioned prestressed concrete beam (PPCB) bridge placed at a 15 degree right ahead skew.

The typical cross section adjacent to the bridge approach will consist of a 22 ft. roadway with 3 ft. granular shoulders and 3:1 foreslopes.

This bridge will be constructed on the existing vertical and horizontal alignment. New bridge approaches will be constructed. The existing guardrail will be replaced with new guardrail and the shoulders will be paved 20 ft. beyond the ends of the guardrail. Class 10 will be necessary to flatten the existing foreslopes and to construct the new guardrail blisters. Class E revetment will be placed under the bridge for slope protection. New bridge end drains will be constructed on the north ends of the bridge.

Contractor will maintain access to property entrances at all times.

The entrance on the southeast quadrant is not able to be relocated, a crash cushion will need to be used in place of guardrail.

Apply erosion control and rural seeding and fertilizing to all disturbed areas.

It appears that right of way will be required for this project, it is programmed for \$12,000.

Traffic will be maintained by an off-site detour.

Bridge Items	<u>Estimated Costs</u>
New Bridge	\$ 484,000
Bridge Removal	17,000
Revetment	16,000
Mobilization - 10%	52,000
M & C - 15%	<u>114,000</u>
Bridge Costs	\$ 683,000
 Right of Way – Program Amount	 \$12,000

Roadway Items

Bridge Approaches	\$141,200
Removal of Pavement	8,100
Excavation Class 13 Waste	19,000
Guardrail (Includes Removal)	17,600
Crash Cushion	25,400
Paved Shoulders for Guardrail	58,200
Class 10 for Guardrail Blisters	25,400
Bridge End Drains	9,300
Clearing and Grubbing	1,900
Seeding and Fertilizing	1,000
Erosion Control	50,000
Traffic Control - 5%	29,800
Mobilization - 5%	29,800
M & C - 30%	<u>178,500</u>
Roadway costs	\$ 595,200

Project Total **\$1,290,200**

B. Detour Analysis

IA 144 will be closed and an offsite detour will be utilized. It is anticipated the detour will be in place for approximately 90 days. The detour would follow IA 175 east to County Road P46, then south to County Road D68, then west returning to IA 144. Out of distance travel is 6 miles. The total distance user cost is anticipated to be \$108,000. The cost for county road maintenance will be \$4,400 as calculated by the Gas Tax Method. Detour signing costs will be \$10,000. Detour signing will be maintained by contractor.

C. Recommendations

It is recommended that the present structure be replaced, as described in Alternative No. 1. The estimated cost of alternative 1 is **\$1,007,400**.

D. Construction Sequence

It is anticipated that all work on this project will be awarded to one prime contractor. The Bridges and Structures Bureau will coordinate the plan preparation with assistance from the Design Bureau.

E. ADA Accommodations

There are no bike paths or sidewalks adjacent to IA 144; therefore, no ADA accommodations are planned in conjunction with this project.

F. Special Considerations

This will not be a traffic critical project.

The ABC Rating Score of 24 is less than the first stage filter threshold of 50, therefore this bridge will be constructed using traditional methods.

No bike path or sidewalk will be required as part of this project.

Waterway is not on a state water trail or paddling route.

Right of Way appears to be required for this project it is programmed for \$12,000.

Detour signing will be maintained by contractor.

The Location and Environment Bureau has reviewed this project and Stream Mitigation estimated at \$75,000 would be required for Alternative 1. A 404 permit will be required for both alternatives.

G. Program Status

Site data has been developed by the Design Bureau. This project is listed in the 2024-2028 Iowa Transportation Improvement Program, with \$12,000 programmed for right of way in FY 2027, and \$1,172,000 for replacement in FY 2027. Costs for this project may be eligible for bridge replacement funds. A schedule of events will be developed following approval of the Project Concept.

JEB:hsr



Webster County
 PIN: 22-94-144-010
 Project Number: BRF-144-0(6)--38-94
 Location: East Buttrick Creek 2.2 mi S of IA 175
 Type of Work: Bridge Replacement
 Project Directory: 9414401022
 FHWA No.: 52340
 Maint. No.: 9432.2S144

Webster County BRF-144-0(6)--38-94 East Buttrick Creek

52340

East Buttrick Creek



Webster County
 PIN: 22-94-144-010
 Project Number: BRF-144-0(6)--38-94
 Location: East Buttrick Creek 2.2 mi S of IA 175
 Type of Work: Bridge Replacement
 Project Directory: 9414401022
 FHWA No.: 52340
 Maint. No.: 9432.2S144

PROPOSED DETOUR ROUTE


Project Site

Webster County BRF-144-0(6)--38-94 East Buttrick Creek

Utilities

MIDLAND POWER COOPERATIVE
Dan Kyle
5153864111
dklye@midlandpower.coop

WEBSTER CALHOUN COOP TELEPHONE
Daryl Promes
5153523151
dpromes@wccta.com

XENIA RURAL WATER DISTRICT
Laird Van Dee
5156762117
lvandee@xeniawater.org

Bridge Bureau Attachment for Concept Statement

Date: August 4, 2023
By: Foth - Tom Ciha
Location: IA 144 over East Buttrick Creek

County: Webster County
Phase No.: BRF-144-0(6)--38-94
Project Code: 22-94-144-010

1. Regulatory/Coordination
 - a. Iowa DNR Flood Plain permit = No
 - b. Iowa DNR Sovereign Lands permit = No
 - c. Local Record of Coordination = Yes
 - d. Flood Insurance Study = No, Zone A
 - e. Drainage District = Yes, Drainage District No. 2. Shape file is available.
 - f. Corps of Engineers Section 408 = No
 - g. State Water Trail or Paddling Route = No
2. Hydrologic/Hydraulic Analysis/RIDB Dataset
 - a. Design discharges determined = Yes (USGS SIR 2015-5055, StreamStats)
 - b. Hydraulic analysis done = Yes with LiDAR and Iowa Bridge Backwater Program. A HEC-RAS model will be completed with survey.
 - c. Riverine Infrastructure Database (RIDB) = Yes, DA > 10 sq. mi. RIDB name = EastButtrickC_8.5
 - d. Project development hydraulic analysis will comply with the RIDB Guidelines at a minimum.
3. Structure/Roadway Layout Considerations
 - a. Roadway profile grade raise is not anticipated.
4. Special construction issues
 - a. Proposed piling at west end of north abutment may need to be shifted to avoid existing concrete sheet pile.
5. Special survey = No
6. Aesthetic enhancements = No
7. Other
 - a. A short off-site detour is available utilizing county paved routes. Staging does not appear reasonable for the bridge replacement.

Special Survey:

None

~ 1 ~

Hydraulic Data

RIDB: Not Applicable
 Drainage Area = 25.4 Sq. Mi.
 Stream Slope (HGL) = 23.07 Ft./Mi.
 Avg. Low Water Stage = ????

Q₅₀ = 1,620 cfs
 Stage = 1120.70
 Channel Low Beam = 1124.94
 Avg. Bridge Velocity = 7.29 fps

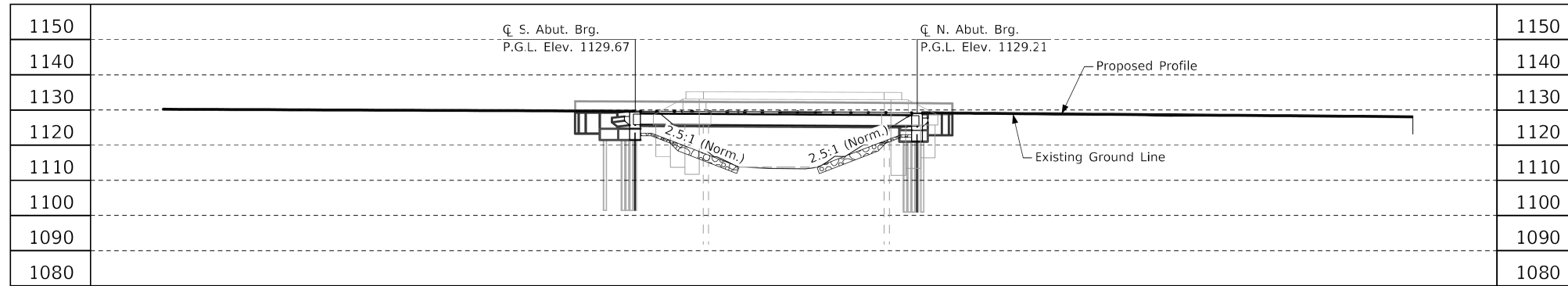
Q₁₀₀ = 1,910 cfs
 Stage = 1120.94
 Operational Low Beam = ????
 Backwater = 0.96 Ft.
 Avg. Bridge Velocity = 8.15 fps

Q₂₀₀ = 2,220 cfs
 Stage = 1121.18
 Calculated Design Scour = ????

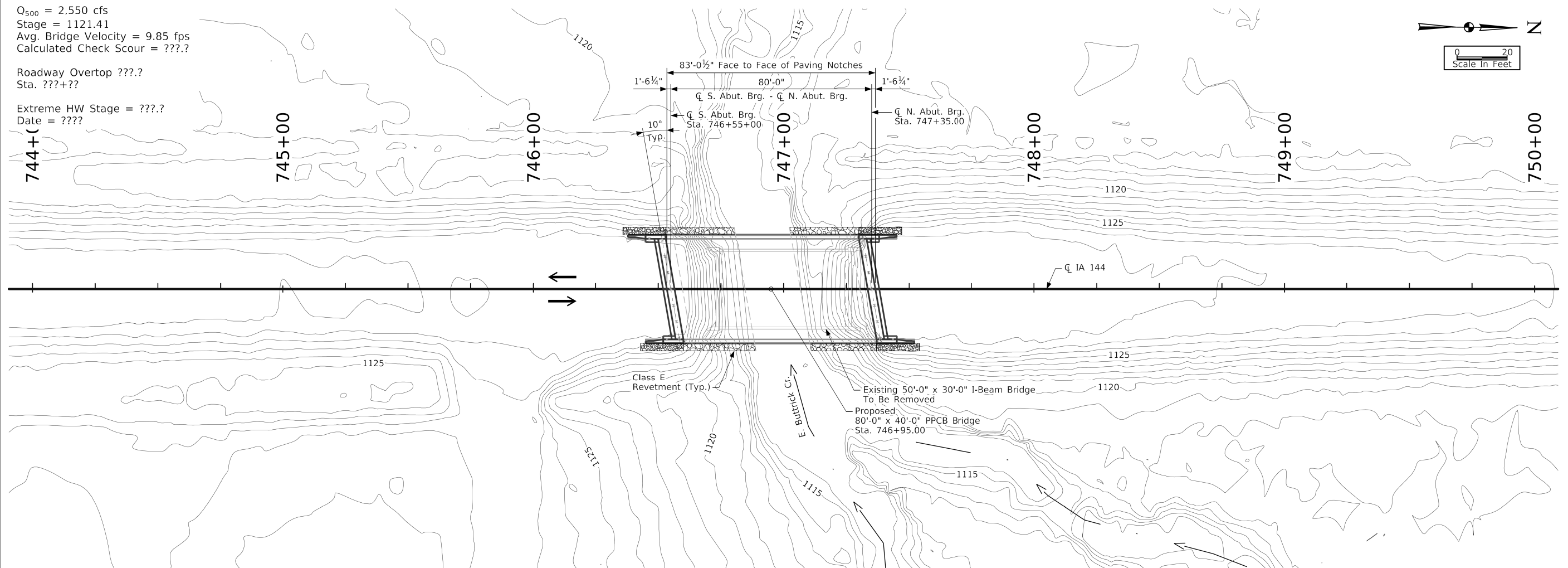
Q₅₀₀ = 2,550 cfs
 Stage = 1121.41
 Avg. Bridge Velocity = 9.85 fps
 Calculated Check Scour = ????

Roadway Overtop ????
 Sta. ???+??

Extreme HW Stage = ????
 Date = ????



BRG TSL Longitudinal Section Along CL Approach Roadway



Situation Plan

Traffic Estimate

2022 AADT	670 V.P.D.
20?? AADT	??? V.P.D.
20?? DHV	??? V.P.H.
TRUCKS	29 %
Total	???
Design ESALS	???

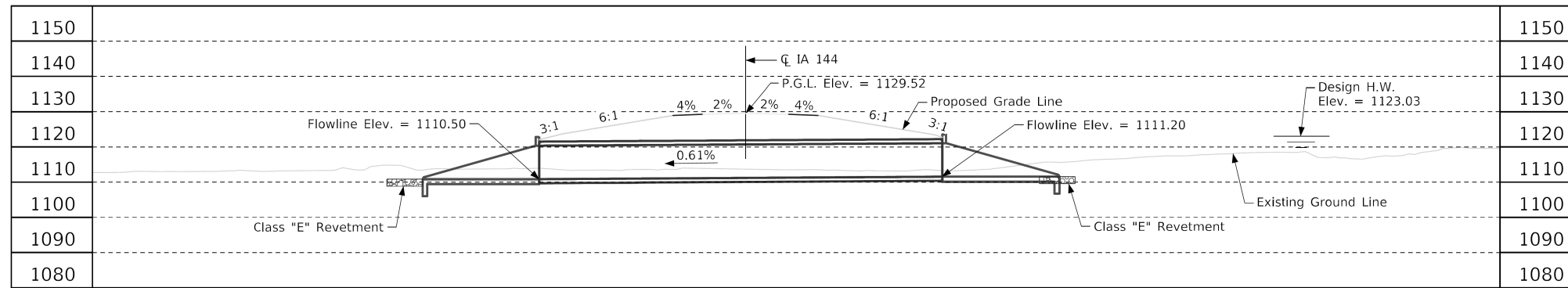
Location

IA 144 over East Buttrick Creek
 T-86N R-29W
 Sections 28 & 29
 Lost Groove Township
 Webster County
 FHWA No. 52341
 Bridge Maint. No. 9432.2S144
 Latitude 42.236551°
 Longitude -94.242690°

Design For 10 Degree RA
80'-0" x 40'-0" Prestressed Concrete Beam Bridge
 Situation Plan
 STA. 746+95.00 (IA 44) Turn-in Date: Aug 2023
Webster County
 IOWA DEPARTMENT OF TRANSPORTATION
 Design No. ?? Design Sheet No. 1 of 1 FHWA No. 52341

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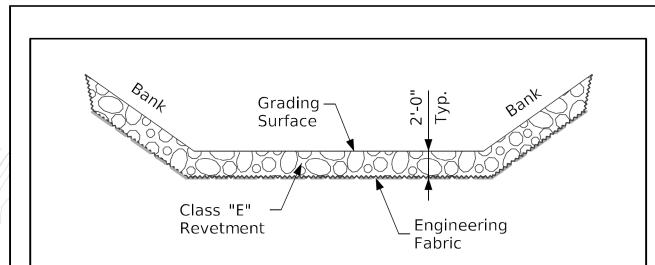


Longitudinal Section Along ζ Culvert

Note:
Flowline of culvert has been set 1' below streambed.

Hydraulic Data

RIDB: Not Applicable
 Drainage Area = 25.4 Sq.Mi.
 $Q_{50} = 1620$ cfs
 $Q_{100} = 1910$ cfs
 Design HW Elev., $Q_{100} = 1123.03$
 Stream Slope = 23.07 Ft./Mi.



Typical Channel Protection

Estimated Revetment Quantities Included With Road Plans

Location	Revetment Class "E" (Ton)	Engineering Fabric (SY)	CL. 10 Channel Excavation (CY)
Inlet	58	54	36
Outlet	58	54	36
Totals	116	108	72

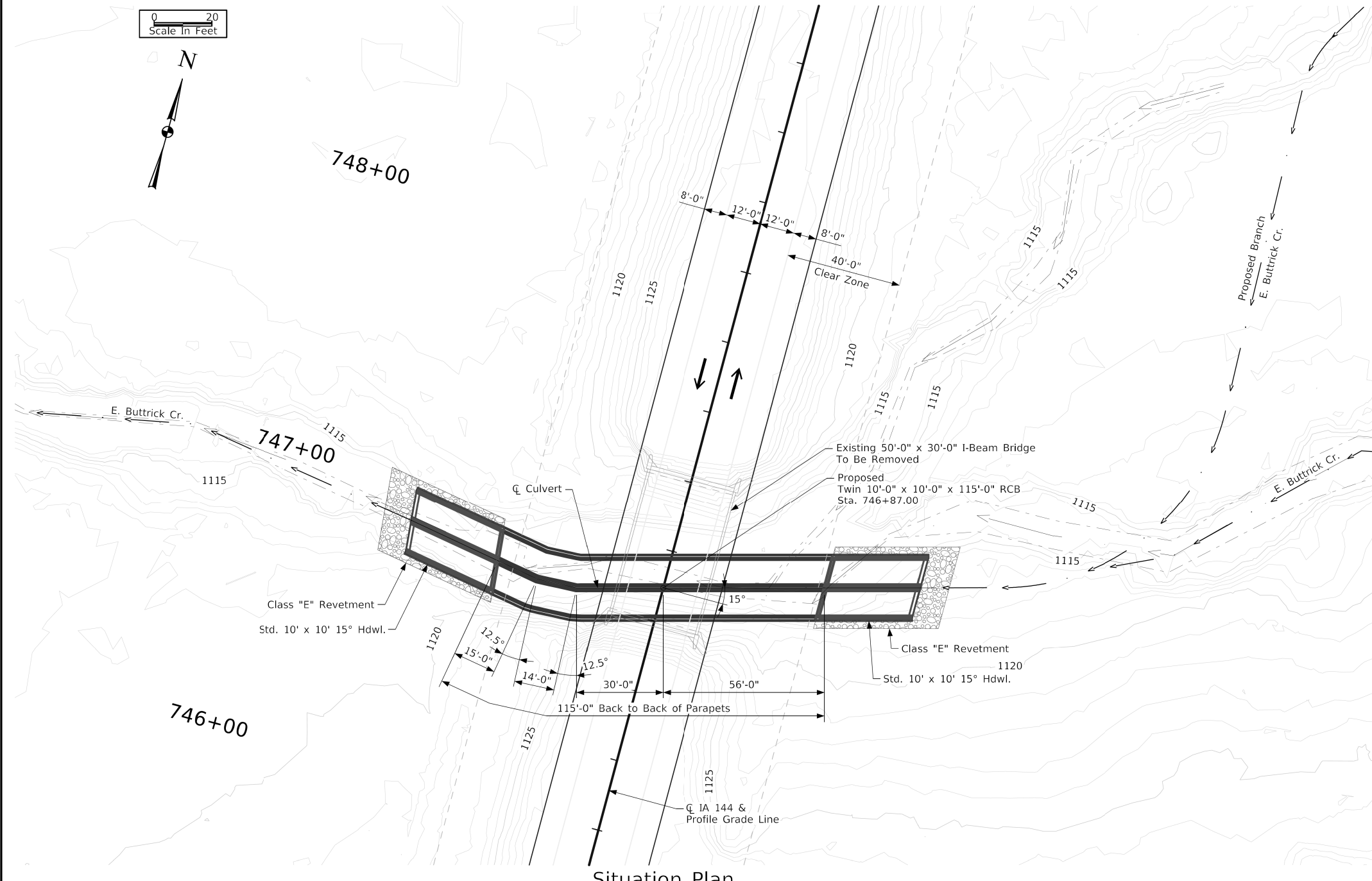
Excavation quantity calculated from grading surface. Excavation quantity is for embedded revetment core out only, and does not include excavation to the grading surface. Excavation quantity to the grading surface is determined by Road Design and included in the Road Plans.
 Quantities shown for information only. See Road Sheets.

Traffic Estimate

2022 AADT	670 V.P.D.
20?? AADT	??? V.P.D.
20?? DHV	??? V.P.H.
TRUCKS	29 %
Total Design ESALS	???

Location

IA 144 over East Buttrick Creek
 T-86N R-29W
 Sections 28 & 29
 Lost Grove Township
 Webster County
 FHWA No. 52341
 Bridge Maint. No. 9432.2S144
 Latitude 42.236551°
 Longitude -94.242690°

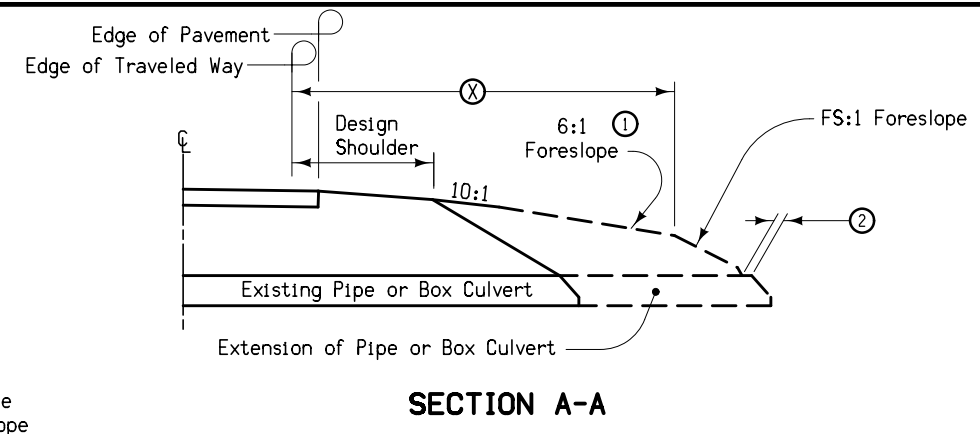
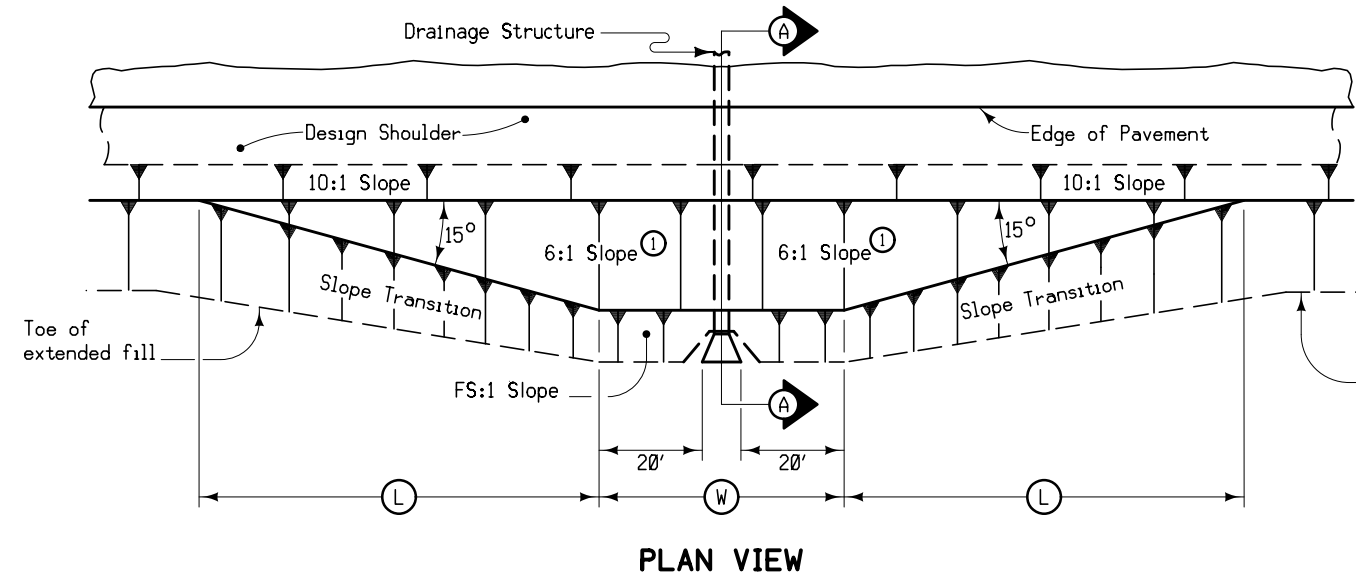


Situation Plan

Design For 15 Degree RA
Twin 10'-0" x 10'-0" x 115'-0" Reinforced Concrete Box Culvert
 Situation Plan
 STA. 746+87.00 (IA 144) Turn-in Date: Dec 2023
Webster County
 IOWA DEPARTMENT OF TRANSPORTATION
 Design No. ?? Design Sheet No. 1 of 1 FHWA/Asset ??

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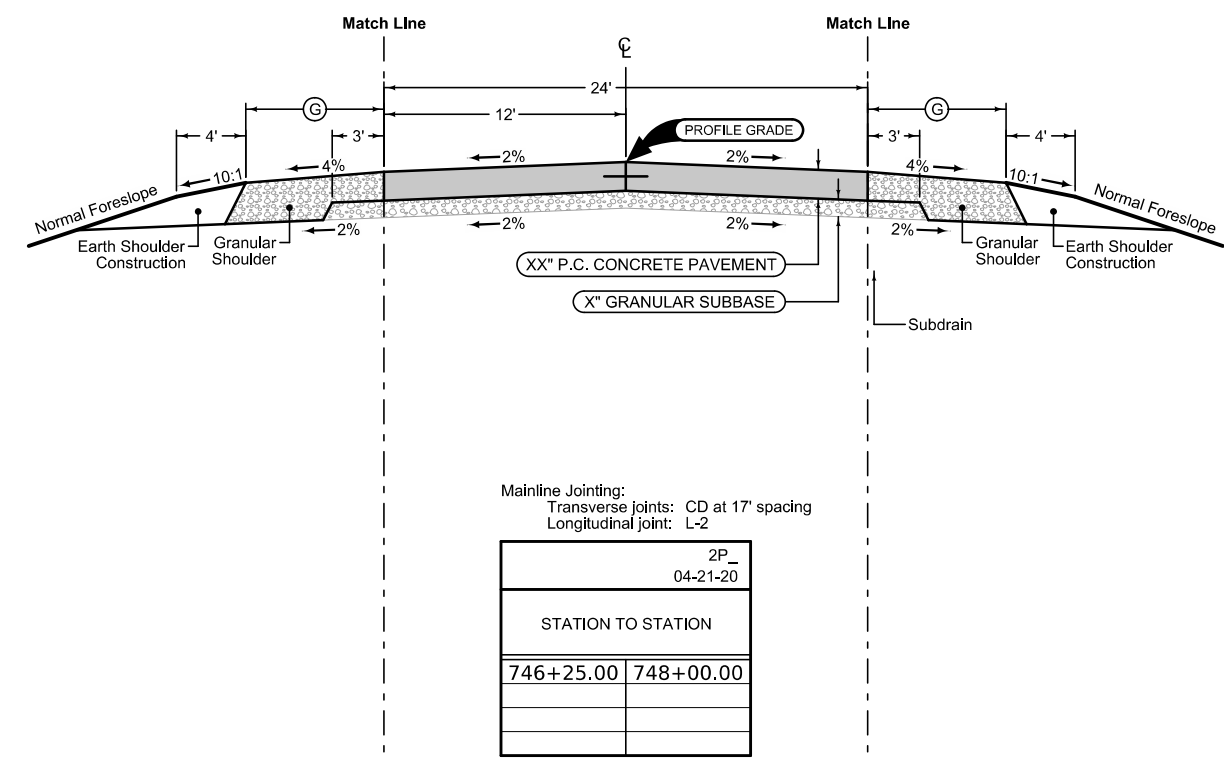
- Notes:
- At locations where an extended or newly constructed drainage structure extends beyond the normal foreslope cover, flatten the foreslope as indicated so as to cover the structure. Minimum earth cover is 6".
 - ① Slope may be flatter than 6:1.
 - ② 6" Minimum for pipe installations or to top of headwall on R.C.B.
 - Ⓜ = Pipe or R.C.B. opening width plus 20 feet each side.

STRUCTURE LOCATION		Ⓜ	Ⓛ	Ⓧ	ⓕ
STATION	SIDE	Feet	Feet	Feet	Feet

BARNROOF FORESLOPE AT DRAINAGE STRUCTURE

Granular Shoulder

1R_G_ 10-19-10		
BEGIN STATION	END STATION	ⓐ Feet
744+75.00	749+25.00	4



Granular Shoulder

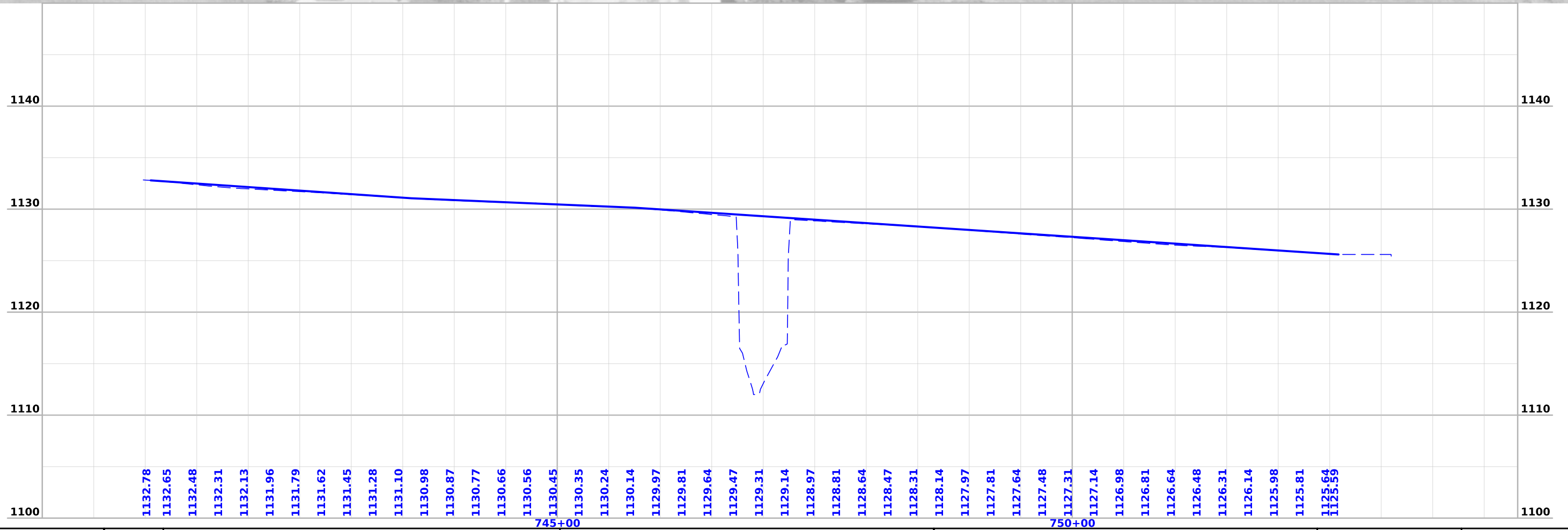
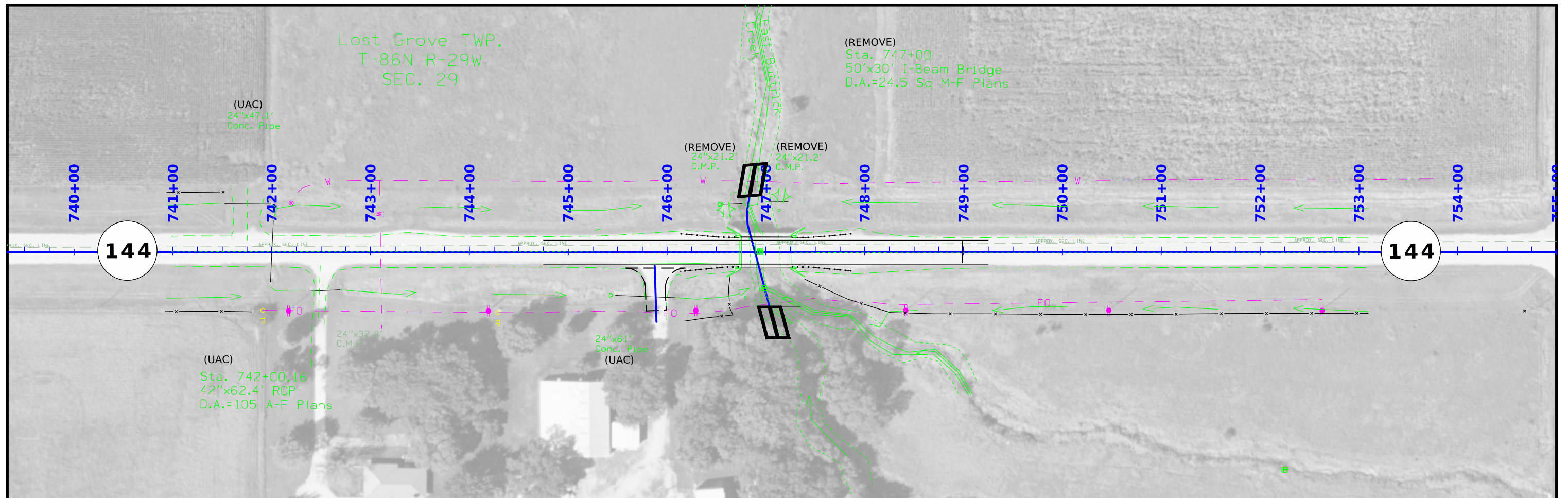
1R_G_ 10-19-10		
BEGIN STATION	END STATION	ⓐ Feet
744+75.00	749+25.00	4

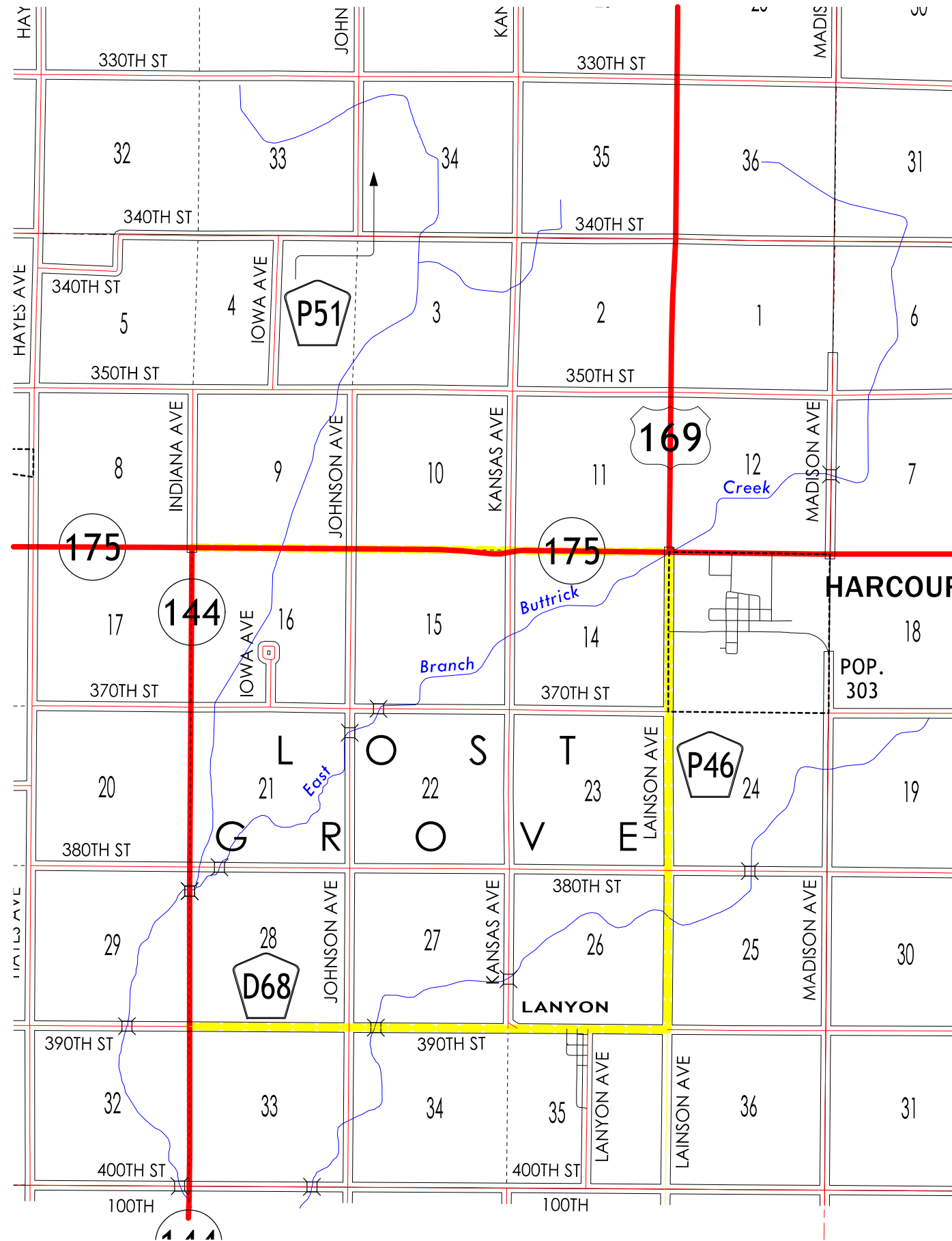
Mainline Jointing:
Transverse joints: CD at 17' spacing
Longitudinal joint: L-2

2P_ 04-21-20	
STATION TO STATION	
746+25.00	748+00.00

Lost Grove TWP.
T-86N R-29W
SEC. 29

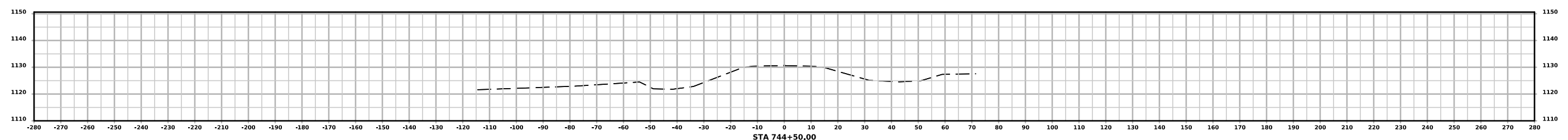
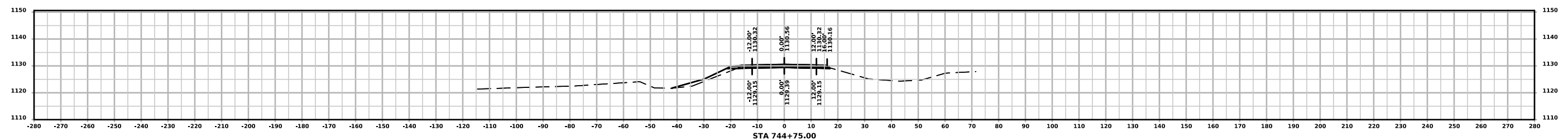
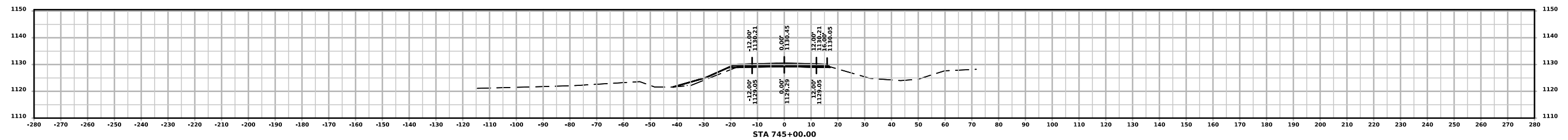
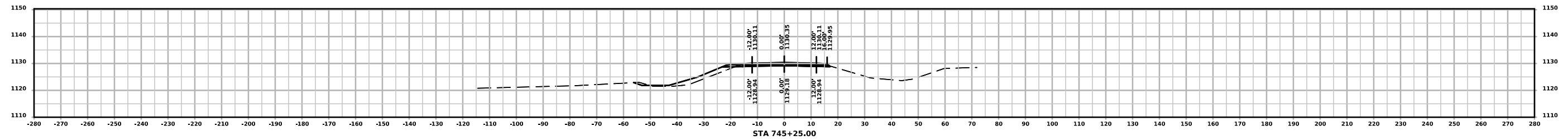
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Sta. 747+00
50'x30' I-Beam Bridge
D.A.=24.5 Sq M-F Plans



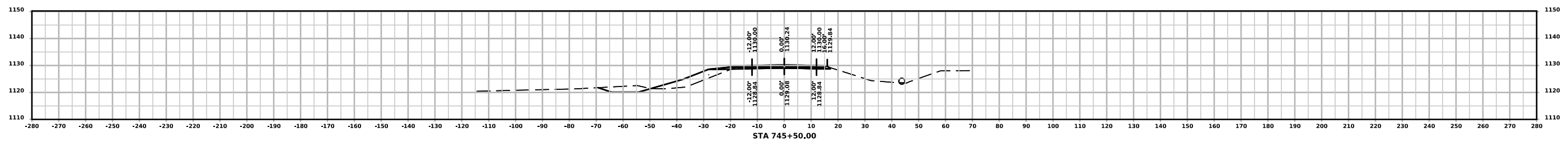
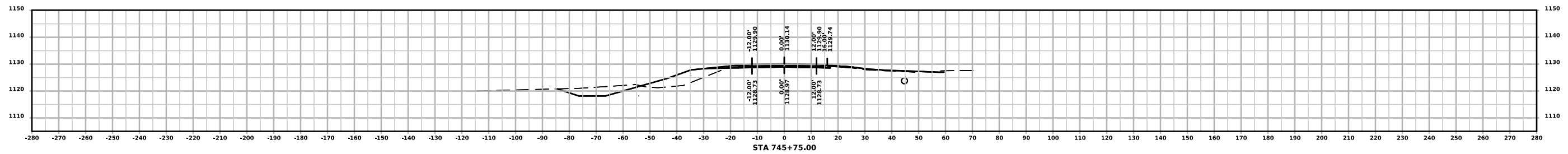
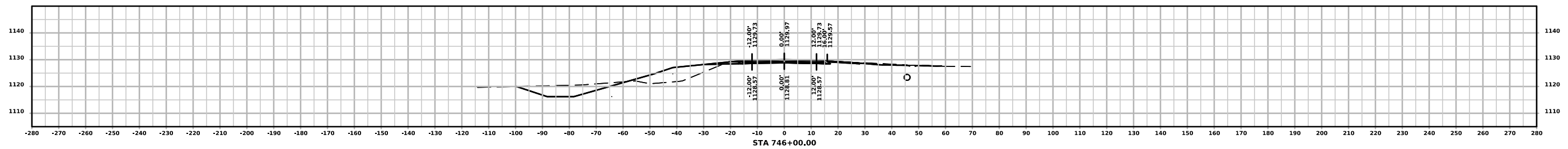
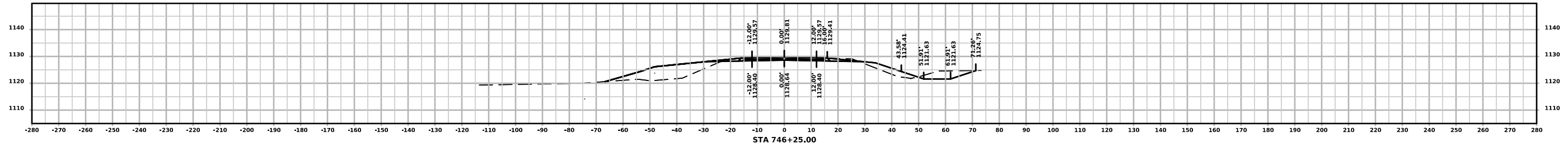



 DETOUR ROUTE

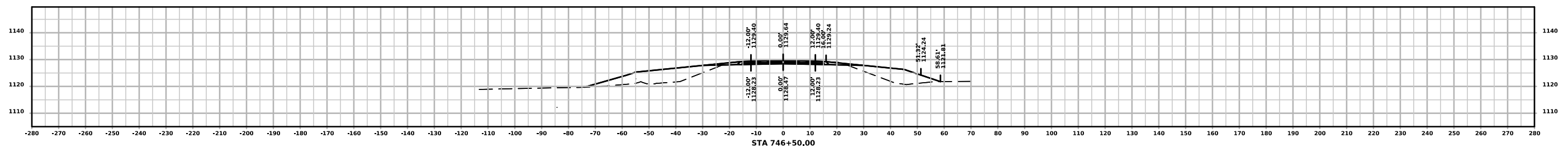
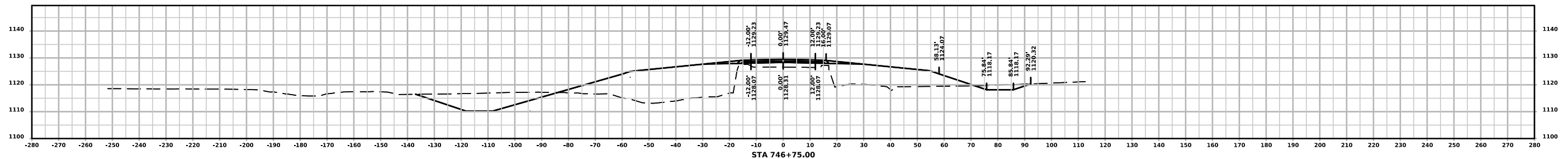
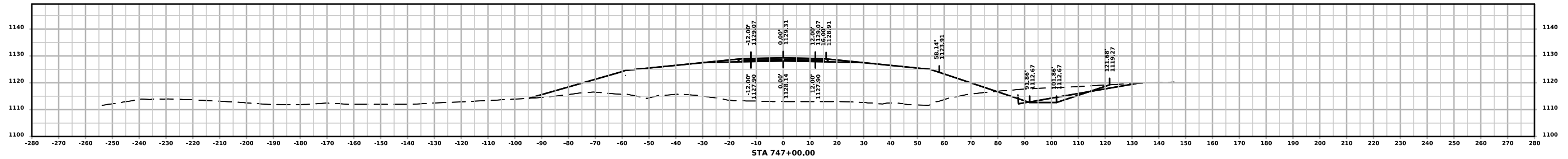
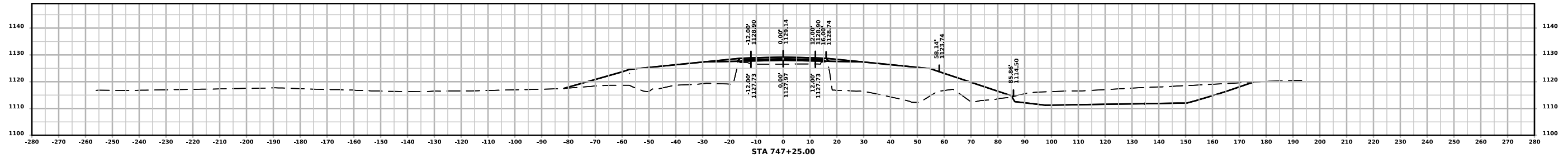
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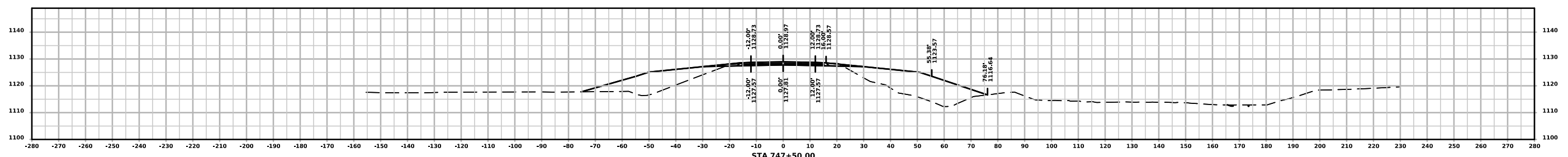
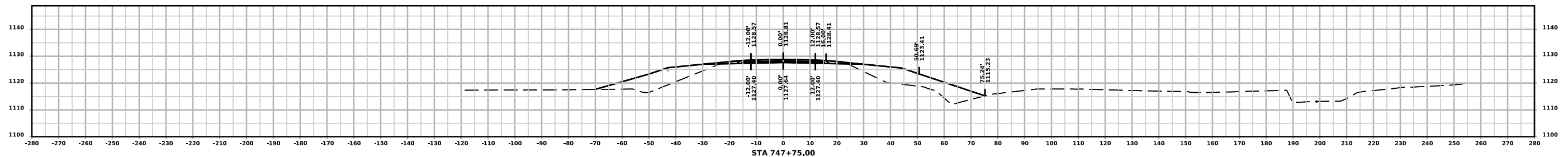
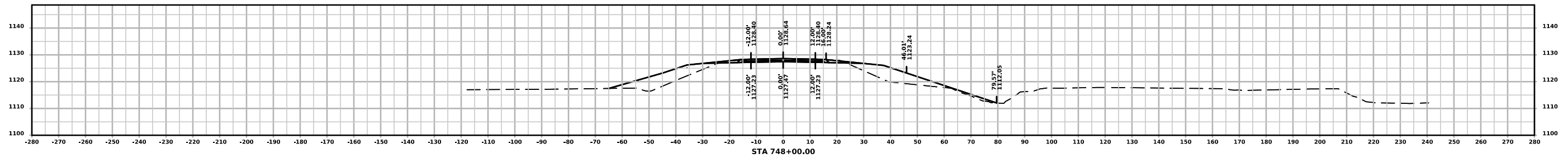
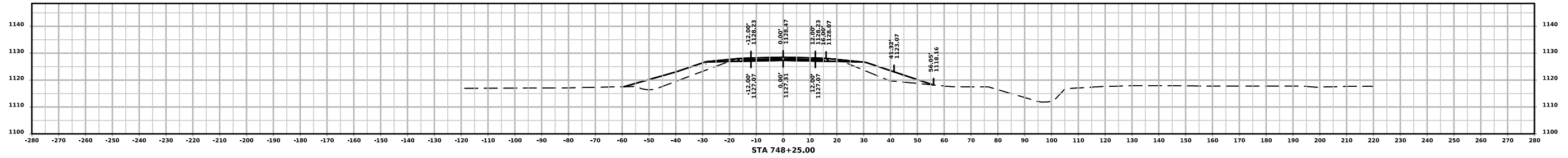
ML - IA144



ML - IA144



ML - IA144



ML - IA144

