

RCB CULV. REP. - TRIPLE BOX
BRFN-078-5(5)--39-58

LOUISA CO.

LETTING DATE
10-19-2021



Highway Division

PLANS OF PROPOSED IMPROVEMENT ON THE

PRIMARY ROAD SYSTEM

LOUISA COUNTY

RCB CULVERT REPLACEMENT - TRIPLE BOX

IA 78 CULVERT - HONEY CREEK 1.8 MI WEST OF US 61

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

25

PROJECT IDENTIFICATION NUMBER

17-58-078-010

PROJECT NUMBER

BRFN-078-5(5)--39-58

R.O.W. PROJECT NUMBER

STPN-078-5(6)--2J-58

INDEX OF SHEETS

No.	DESCRIPTION
A Sheets	Title Sheets
A.1	Title Sheet
A.2	Location Map Sheet
B Sheets	Typical Cross Sections and Details
B.1 - 2	Typical Cross Sections and Details
D Sheets	Mainline Plan and Profile Sheets
* D.1	Plan & Profile Legend & Symbol Information Sheet
* D.2	IA 78
G Sheets	Survey Sheets
G.1 - 2	Reference Ties and Bench Marks
G.3	Horizontal Control Tab. & Alignment Coordinantes
J Sheets	Traffic Control and Staging Sheets
* J.1	Traffic Control & Staging Legend & Symbol Info. Sheet
* J.2	Traffic Control Plan
V Sheets	Bridge and Culvert Situation Plans
* V.1	Cast in Place Culvert Situation Plans
* V.2	Precast Culvert Situation Plans
W Sheets	Mainline Cross Sections
W.1	Cross Sections Legend & Symbol Information Sheet
W.2 - 12	Mainline Cross Sections
	* Color Plan Sheets

For Project Location Map
Refer to Sheet A.2

D5 PLAN - Date: 09-20-2019

D4 PLAN - Date: 06-22-2021

Letting - Date: 10-19-2021

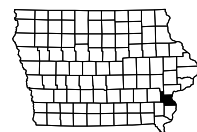
PRELIMINARY PLANS

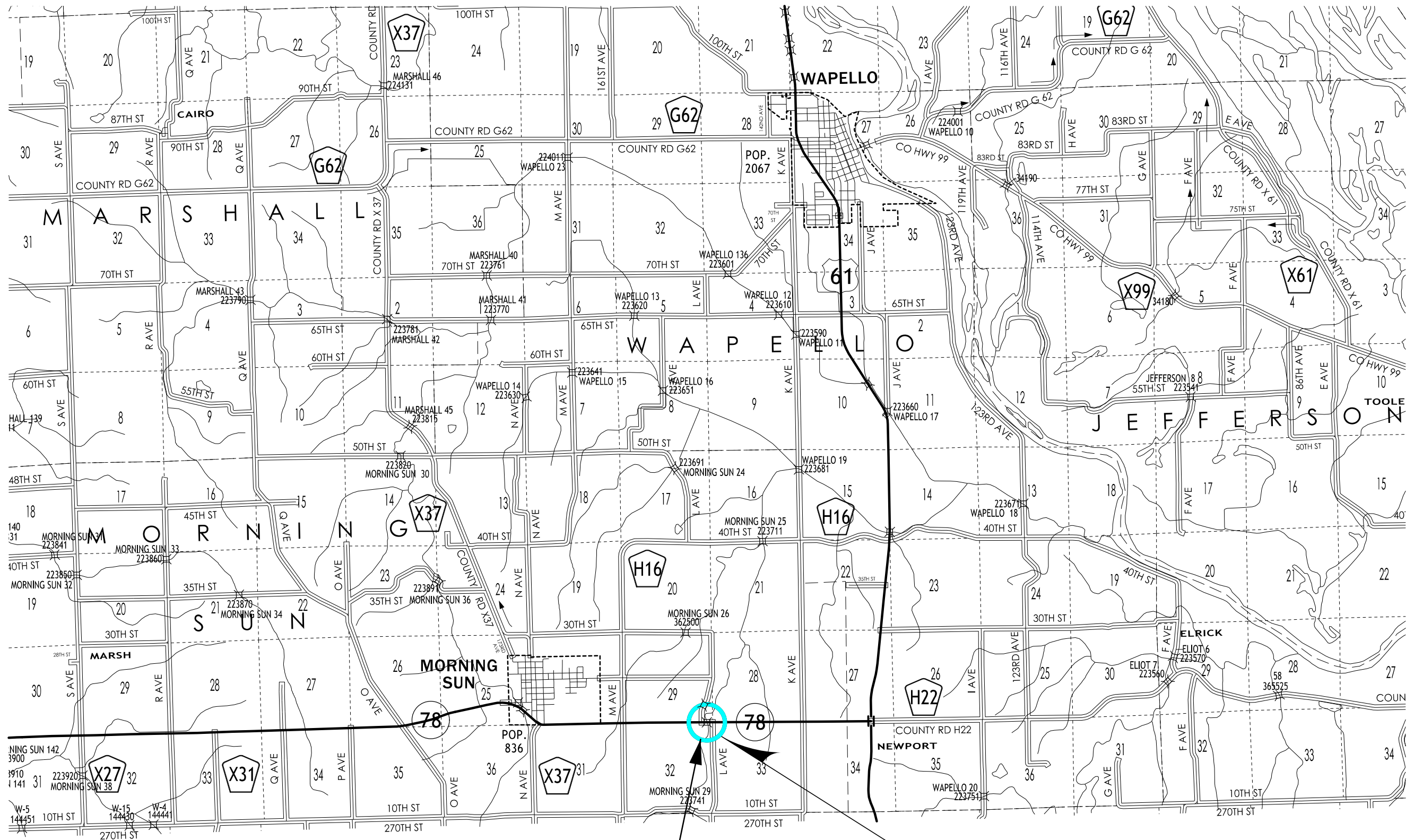
Subject to change by final design.

D3 PLAN - Date: MAY 17, 2019

DESIGN DATA RURAL			
2021	AADT	2300	V.P.D.
2041	AADT	2900	V.P.D.
2041	DHV	300	V.P.H.
	TRUCKS	12	%
	Total		
	Design ESALs	--	

INDEX OF SEALS		
SHEET NO.	NAME	TYPE
A.1	WADE D. HARRIS	Primary Signature Block





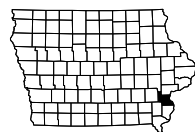
PROJECT LOCATION

IA 78 BRIDGE REPLACEMENT
 1.8 MILES WEST OF US 61
 EXISTING BRIDGE
 FHWA NO.: 34080
 MAINT. NO.: 5856.9S078
 STA.: 112+86.5

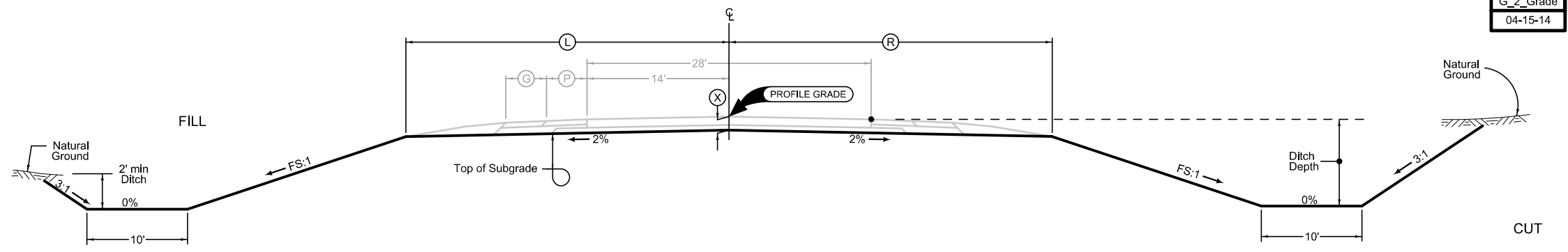
R-4W

R-3W

R-2W



LOCATION		DIMENSIONS			
ROAD IDENTIFICATION	STATION TO STATION	Ⓛ Feet	Ⓡ Feet	ⓧ Inches	FS
	111+28.15 - 114+43.15	26	26	15	4:1



Normal section shown may be modified appropriately in areas of superelevated curves or other locations specifically designated by the Engineer.

2 LANE GRADING

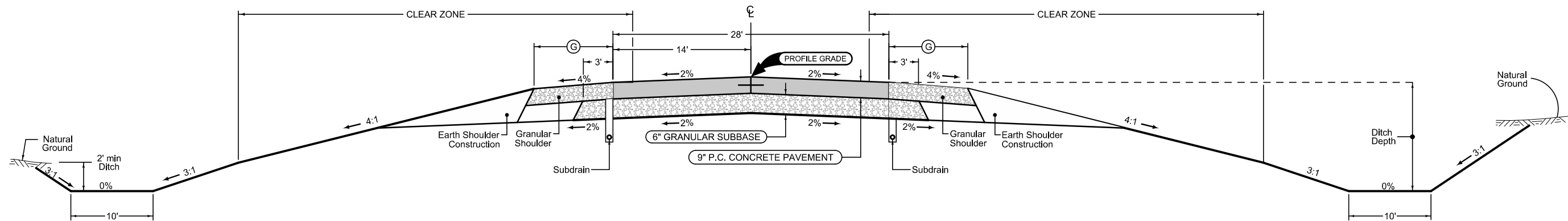
See plan & profile sheets and cross sections for additional details of ditches and backstops.

Granular Shoulder

2_G_SR_10-19-10		
STATION TO STATION		⊙ Feet
111+28.15	114+43.15	6

Granular Shoulder

2_G_SR_10-19-10		
STATION TO STATION		⊙ Feet
111+28.15	114+43.15	6



Mainline Jointing:
 Transverse joints: CD at 20' spacing
 Longitudinal joint: L-2

2P_10-19-10		
STATION TO STATION		
111+28.15	114+43.15	

See Tab 100-24 or 100-25 for pavement quantities.
 See Tab 112-9 for shoulder quantities.

IA 78

SURVEY SYMBOLS

- BBB Bottom of Bridge Beam
- BD Bridge Deck
- BL Topo Breakline
- BRG Bridge
- C Centerline BL of Road (ML or SR)
- CP Control Point
- ← DU Centerline Draw or Stream (Up)
- EG Edge of Gravel Road
- EP Edge of Paved Roads (ML or SR)
- FO1B Fiber Optic Co. 1 - Quality B
- × FW Wire Fence
- GDL Guard Rail Steel
- GR Ground Shot
- MIS Miscellaneous
- PIP Pipe Culvert
- PPA Power Pole Co. 1
- RR Centerline of Railroad Tracks
- SIGN
- SI Sign
- TW Top of Water
- WC Wild Card (Misc. Field Shot)
- RET Retaining Walls
- EL1B Electric line Co. 1 - Quality B

UTILITY LEGEND

- Windstream under ground Fiber Optic - Quality C
- PPA Power Pole
- Overhead Electric Line - Quality B

PLAN VIEW COLOR LEGEND OF PLAN AND PROFILE SHEETS

LINEWORK		Design Color No.	
Green	(2)	Existing Topographic Features and Labels	
Blue	(1)	Proposed Alignment, Stationing, Tic Marks, and Alignment Annotation	
Magenta	(5)	Existing Utilities	
SHADING		Design Color No.	
Yellow	(4)	Highlight for Critical Notes or Features	
Red	(3)	Delineates Restricted Areas	
Lavender	(9)	Temporary Pavement Shading	
Gray, Light	(48)	Proposed Pavement Shading	
Gray, Med	(80)	Proposed Granular Shading	
Gray, Dark	(112)	Proposed Grade and Pave Shading "In conjunction with a paving project"	
Brown, Light	(236)	Grading Shading	
Tan	(8)	Proposed Sidewalk Shading	
Blue, Light	(230)	Proposed Sidewalk Landing Shading	
Pink	(11)	Proposed Sidewalk Ramp Shading	

PROFILE VIEW COLOR LEGEND OF PLAN AND PROFILE SHEETS

LINEWORK		Design Color No.	
Green	(2)	Existing Ground Line Profile	
Blue	(1)	Proposed Profile and Annotation	
Magenta	(5)	Existing Utilities	
Blue, Light	(230)	Proposed Ditch Grades, Left	
Black	(0)	Proposed Ditch Grades, Median	
Rust	(14)	Proposed Ditch Grades, Right	

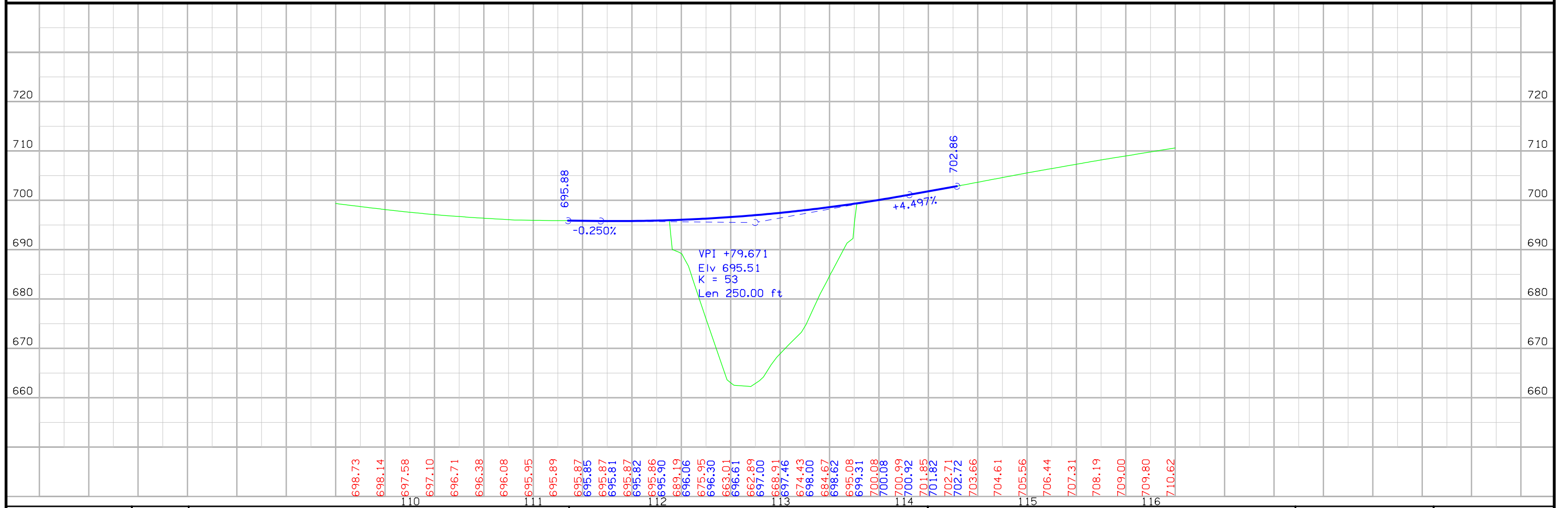
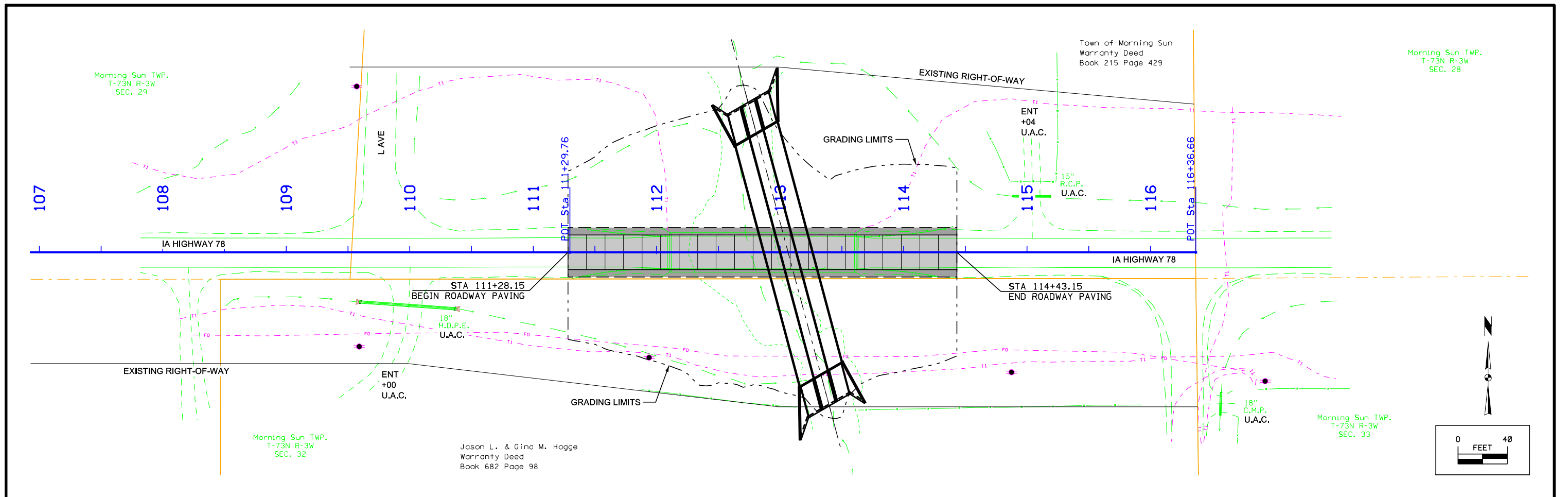
- Reference Point
- Station
- Survey Line
- Section Corner
- Ground Line Intercept
- Saw Cut
- Guardrail
- Trench Drain
- HighTension Cable Guardrail
- Sheet Pile
- Pavement Removal
- Clearing & Grubbing Area

RIGHT-OF-WAY LEGEND

- Proposed Right-of-Way
- Existing Right of Way
- Existing and Proposed Right-of-Way
- Easement and Existing Right-of-Way
- Easement (Temporary)
- Easement
- Access Control
- Property Line

PLAN AND PROFILE LEGEND AND SYMBOL INFORMATION SHEET

(COVERS SHEET SERIES D, E, F, & K)



Survey Information

County: Louisa
SAP 913.1
PIN: 17-58-078-010
Project Number: BRFN-078-5(5)--39-58
Location: Honey Creek 1.8 mi W of US 61
Type of Work: Bridge-Unspecified
Project Directory: 5807801017

General Information

Measurement units for this survey are US survey feet. This survey is for proposed bridge replacement on Hwy 78 in Louisa County. Project datum and control information is provided by Design Survey Office. This project is a full DTM survey.

Vertical Control

Vertical datum for this survey is NAVD88 (Computed using Geoid12A). Benchmarks were placed throughout the project using post processed static observations relative to laRTN Base Network. A minimum of 6hrs of data was simultaneously collected on each of these primary control points.

Des Moines Co GPS Control Pt. 231 was checked for vertical tolerance. The vertical difference is about 0.1 ft.
Van Buren County Control Pt. 161 was checked for vertical tolerance. The vertical difference is about 0.1 ft.

Horizontal Control

The project coordinate system for this survey is laRCS Zone 14 (U.S. Survey Feet). This survey control is relative to laRTN reference stations. laRTN Reference Station coordinates are relative to the National Reference Station network datum: NAD83 (2011) for Epoch 2010.00.

Des Moines Co GPS Control Pt. 231 was checked for horizontal tolerance. The horizontal difference is about 0.1 ft.
Des Moines Co GPS Control Pt. 244 was checked for horizontal tolerance. The horizontal difference is about 0.1 ft.

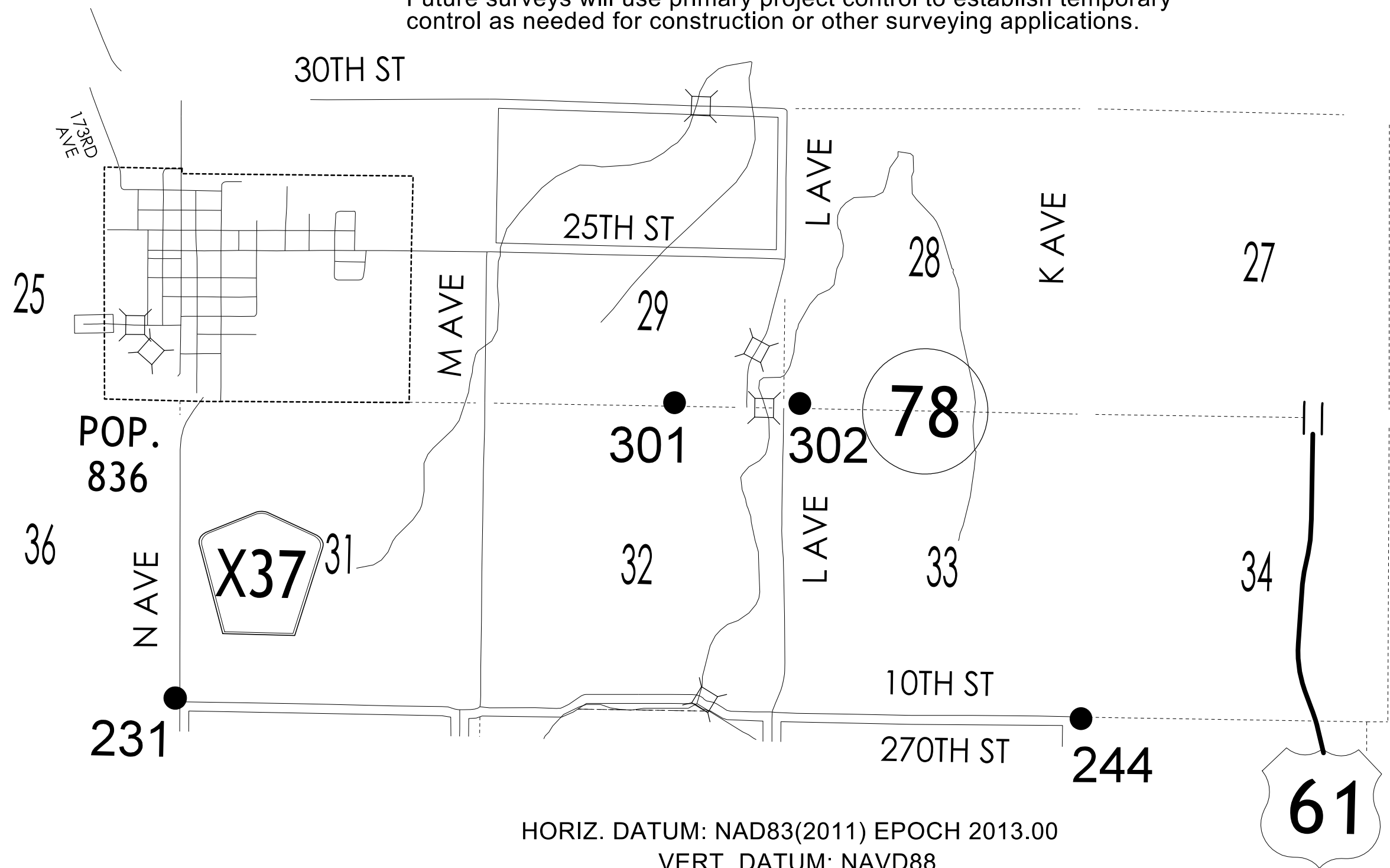
Point Name	Northing	Easting	Elevation	Feature Definition
244	6499964.17	24514319.10	747.58	BM Des Moines Co GPS Control Pt. Berntsen Top Security Rod Monument with a 2-1/2" dia. domed survey cap and permanent magnet encased in a 5" dia. PVC pipe with a NGS style aluminum access cover. 30ft S of 270th St, 160ft E of 140th Av. Near the NW corner Sec 3 T72N R3W.
231	6500326.83	24498396.85	764.11	BM Des Moines Co GPS Control Pt. Berntsen Top Security Rod Monument with a 2-1/2" dia. domed survey cap and permanent magnet encased in a 5" dia. PVC pipe with a NGS style aluminum access cover. 50ft N of 270th St, 80ft W of Morning Sun Rd. Near the SE corner of Sec 36 T73N R4W.
301	6505519.39	24507173.36	733.23	Feno1 Monument stamped #1. 59.5ft N. of centerline IA78, 18ft E. of service power pole, and 253ft E. of centerline drive leading N. 4in below the surface.
302	6505504.80	24509375.81	730.77	Feno2 Monument stamped #2. 89.5ft N. of centerline IA78 and 213ft W. of centerline of drive #14912 leading N. 4in below the surface.

Alignment Information

The horizontal alignment for this survey was provided by the IDOT district 5 land survey office in Fairfield, Iowa.

CONTROL POINT VICINITY MAP

This map is a guide to the vicinity of the primary project control points
 Primary control is for use with RTK base stations and for RTN validation.
 Future surveys will use primary project control to establish temporary
 control as needed for construction or other surveying applications.



HORIZ. DATUM: NAD83(2011) EPOCH 2013.00

VERT. DATUM: NAVD88

1a. Regional Coordinate System Zone 14

Coordinate listing from next sheet will be used with 1aRTN for monument
 recovery. No other reference ties are given.

HORIZONTAL AND VERTICAL PROJECT CONTROL COORDINATE LISTING

HORIZ. DATUM: NAD83(2011) EPOCH 2013.00

VERT. DATUM: NAVD88

Ia. Regional Coordinate System Zone 14

Point Name	Northing	Easting	Elevation	Feature Definition
244	6499964.17	24514319.10	747.58	BM Des Moines Co GPS Control Pt. Berntsen Top Security Rod Monument with a 2-1/2" dia. domed survey cap and permanent magnet encased in a 5" dia. PVC pipe with a NGS style aluminum access cover. 30ft S of 270th St, 160ft E of 140th Av. Near the NW corner Sec 3 T72N R3W.
231	6500326.83	24498396.85	764.11	BM Des Moines Co GPS Control Pt. Berntsen Top Security Rod Monument with a 2-1/2" dia. domed survey cap and permanent magnet encased in a 5" dia. PVC pipe with a NGS style aluminum access cover. 50ft N of 270th St, 80ft W of Morning Sun Rd. Near the SE corner of Sec 36 T73N R4W.
301	6505519.39	24507173.36	733.23	Feno1 Monument stamped #1. 59.5ft N. of centerline IA78, 18ft E. of service power pole, and 253ft E. of centerline drive leading N. 4in below the surface.
302	6505504.80	24509375.81	730.77	Feno2 Monument stamped #2. 89.5ft N. of centerline IA78 and 213ft W. of centerline of drive #14912 leading N. 4in below the surface.

ALIGNMENT COORDINATES










This Data Entry Sheet fills Tab 101-16 effective 10-20-09

Name	Location	Point on Tangent		Begin Spiral		Begin Curve		Simple Curve PI or Master PI of SCS		End Curve		End Spiral				
		Station	Coordinates		Station	Coordinates		Station	Coordinates		Station	Coordinates		Station	Coordinates	
			Y (Northing)	X (Easting)		Y (Northing)	X (Easting)		Y (Northing)	X (Easting)		Y (Northing)	X (Easting)		Y (Northing)	X (Easting)
ML0781	IA 78							90+07.90	6505474.11	24506467.16						
ML0783	IA 78							111+29.76	6505431.17	24508588.59						
ML0784	IA 78							116+36.66	6505420.92	24509095.38						

**CROSS SECTION VIEW COLOR LEGEND
OF TRAFFIC CONTROL AND STAGING SHEETS**

SHADING	Design Color No.	
Green, Light	(225)	Existing Pavement Shading
Gray, Light	(48)	Previously Constructed Pavement Shading
Gray, Med	(80)	Previously Constructed Granular Surface Shading
Blue, Light	(230)	Proposed Pavement Shading
Lavender	(9)	Temporary Pavement Shading
Brown, Med	(237)	Future Proposed Pavement Shading

**CROSS SECTION VIEW PATTERN AND SYMBOL LEGEND
OF TRAFFIC CONTROL AND STAGING SHEETS**





















	Pavement Removal		Proposed Granular Shoulder
	Proposed Granular Subbase		Temporary Shoulder
	Proposed Special Backfill		Existing Shoulder Strengthening
	Temporary Barrier Rail		Permanent Barrier Rail
			Channelizing Device

PLAN VIEW COLOR LEGEND OF TRAFFIC CONTROL AND STAGING SHEETS

LINEWORK	Design Color No.	
Green	(2)	Existing Topographic Features and Labels
Magenta	(5)	Pavement Marking Call Outs
Blue	(1)	Proposed Alignment, Stationing, Tic Marks, and Alignment Annotation
Yellow	(4)	Pavement Markings, Yellow
Off White	(254)	Pavement Markings, White
Violet	(15)	Temporary barrier rail, Unpinned
Flush Orange	(228)	Temporary barrier rail, Pinned

SHADING	Design Color No.	
Green, Light	(225)	Existing Pavement Shading
Gray, Light	(48)	Previously Constructed Pavement Shading
Gray, Med	(80)	Proposed Granular Surface Shading
Gray, Med	(80)	Previously Constructed Granular Surface Shading
Blue, Light	(230)	Proposed Pavement Shading
Lavender	(9)	Temporary Pavement Shading
Brown, Light	(236)	Proposed Grading Limits Shading
Pink, Dark	(13)	Proposed MSE or CIP Wall Shading
Red	(3)	Proposed Bridge Shading and Sign Trusses
Black w/Gray, Light Fill	(0,48)	Previously Constructed Structure

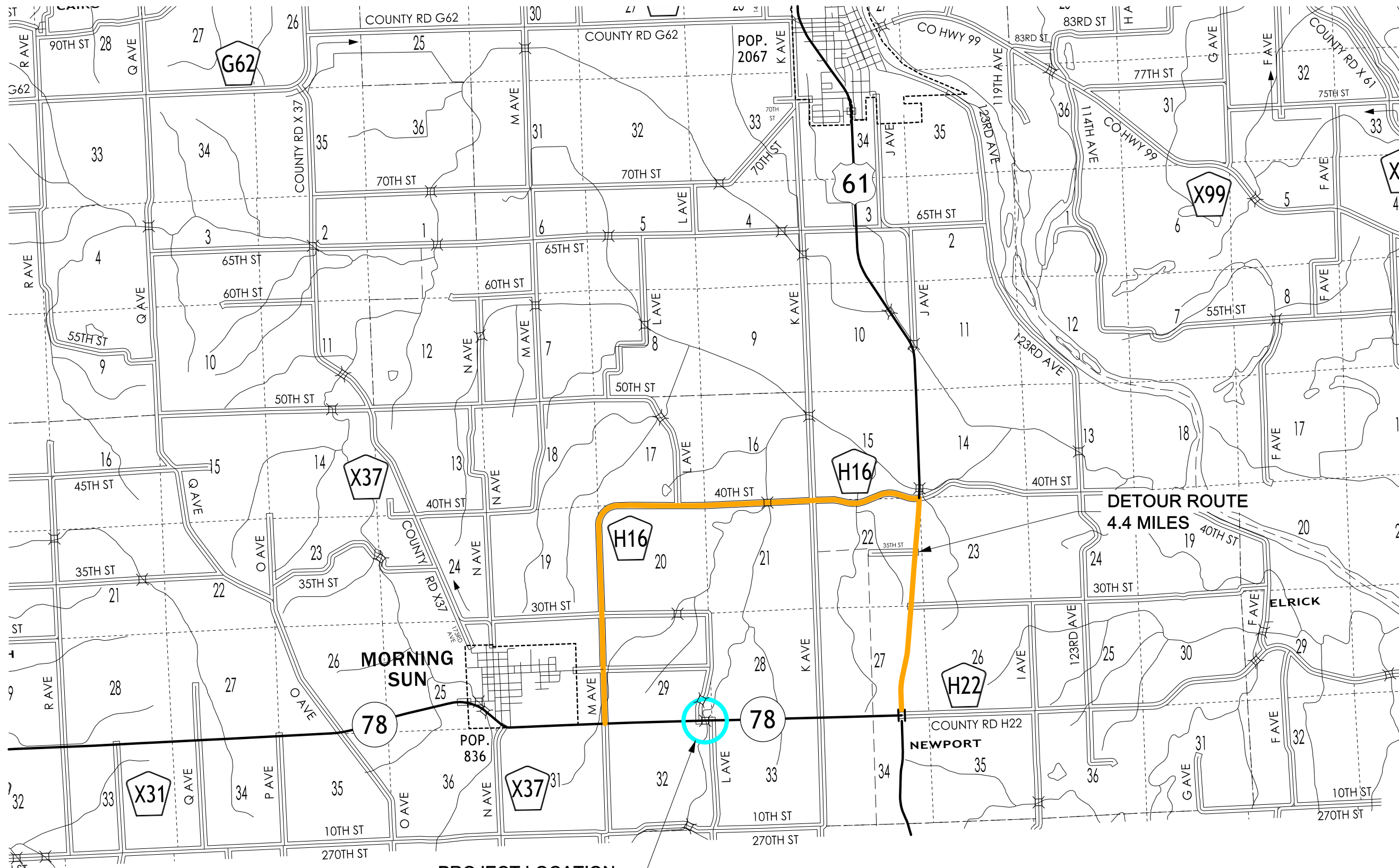
**PLAN VIEW PATTERN AND SYMBOL LEGEND
OF TRAFFIC CONTROL AND STAGING SHEETS**

	Channelizing Device		Crash Cushion (Temp or Perm)
	Drum		Traffic Signal
	Temporary Lane Separator		Flagger
	Tubular Marker		Temporary Floodlighting
	Channelizer Marker		Traffic Sign
	Concrete Barrier Marker		Type III Barricade
	Delineator		Type A Warning Light
	Temporary Barrier Rail		Direction of Traffic
	Pavement Removal		Safety Closure
	Sand Barrel Layout		Lane Identification

NOTE: Device spacing according to Standard Road Plans unless specifically dimensioned.

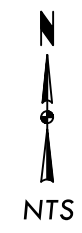
**TRAFFIC CONTROL
AND
STAGING
LEGEND AND SYMBOL
INFORMATION SHEET**

(COVERS SHEET SERIES J)



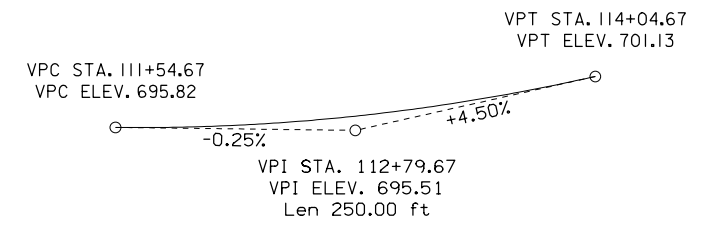
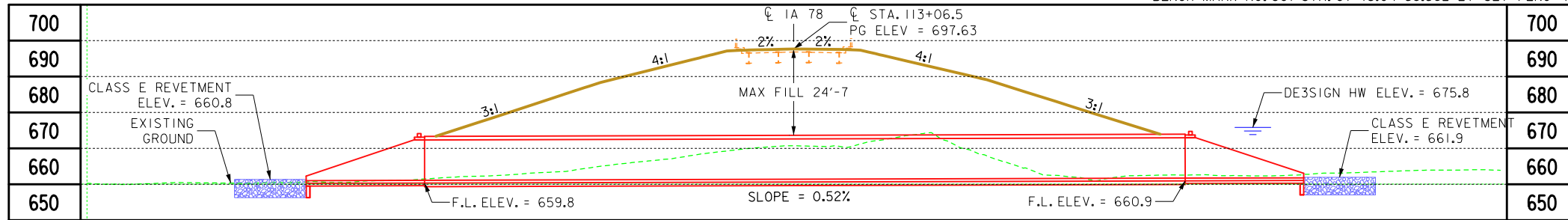
DETOUR ROUTE
4.4 MILES

DETOUR ROUTE

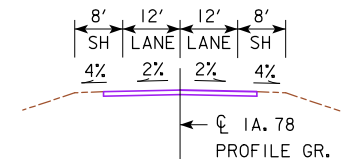


PROJECT LOCATION

CO.



PROPOSED PROFILE GRADE IA 78



TYPICAL APPROACH SECTION

- NOTES:**
- EXISTING 150'x26' CONTINUOUS I-BEAM BRIDGE DESIGN NO. 1250.
 - DRAINAGE THROUGH EXISTING/CULVERT CHANNEL MUST BE MAINTAINED THROUGHOUT CONSTRUCTION.
 - FLOW LINE OF CULVERT NOMINALLY BURIED 1.0 FOOT.
 - SEDIMENT REDUCTION WEDGES WILL BE NEEDED AT THE INLET OF THE CULVERT.

HYDRAULIC DATA

DRAINAGE AREA = 6.46 SQ.MI.
 Q₅₀ = 2,940 CFS
 HW ELEV. = 675.8
 STREAM SLOPE = 23.3 FT./MI.
 Q₁₀₀ = 3,500 cfs
 Q₅₀₀ = 5,000 cfs

UTILITIES LEGEND:

- FO — FIBER OPTIC LINE MEDIACOM
- E1 — OVERHEAD ELECTRIC ALLIANT ENERGY
- T1 — TELEPHONE LINE MUTUAL TELE CO OF MORNING SUN

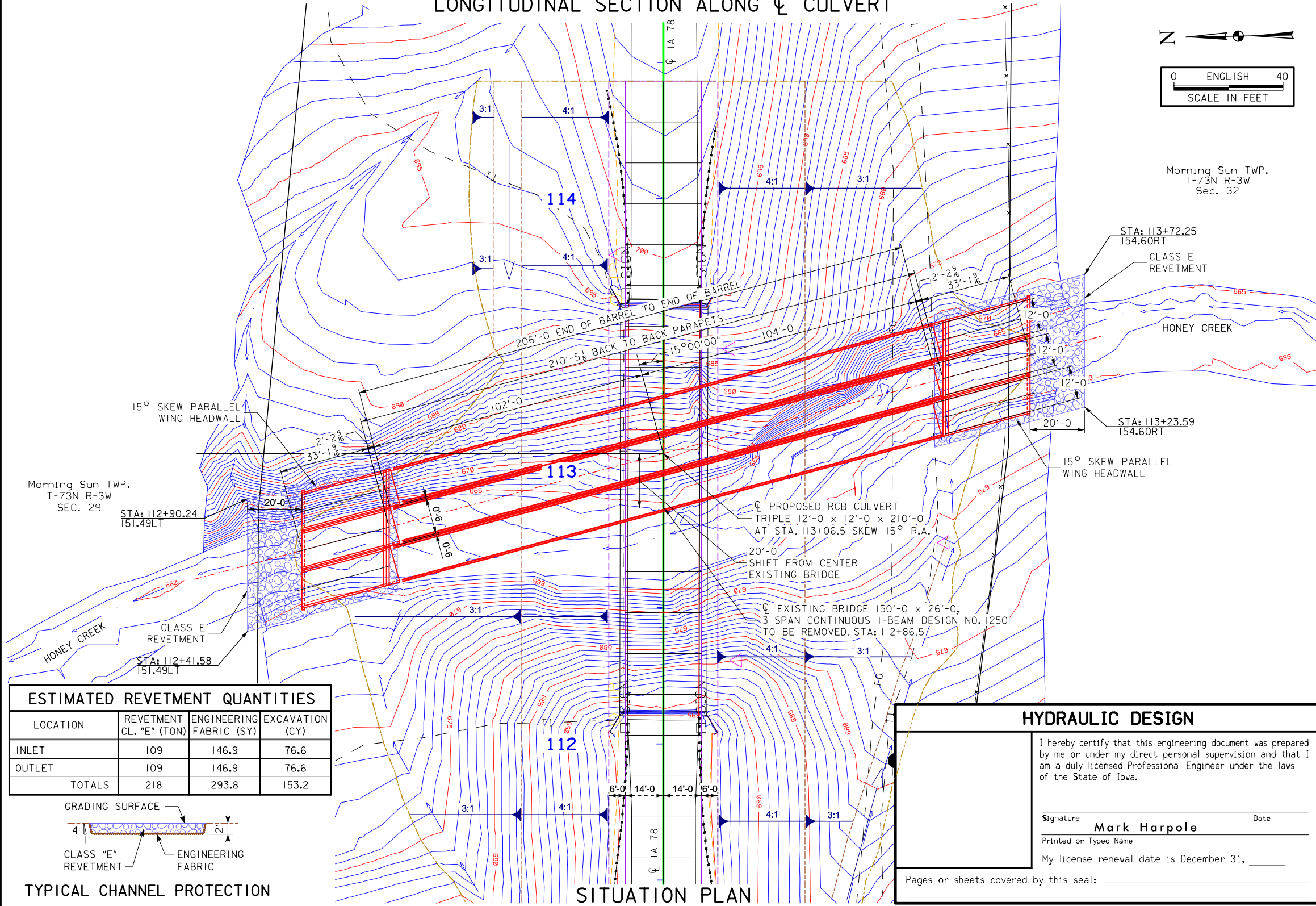
LOCATION

IA78 OVER HONEY CREEK
 (OTTER ON DRAFT DOC)
 T-73N R-3W
 SECTION 29
 MORNING SUN TOWNSHIP
 LOUISA COUNTY
 FHWA NO. 34080
 BRIDGE MAINT. NO. 5856.9S078
 LATITUDE 41.088325°
 LONGITUDE -91.218283°

TRAFFIC ESTIMATE

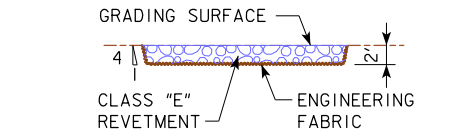
2021 AADT	2290	V.P.D.
2041 AADT	2880	V.P.D.
2041 DHV		V.P.H.
TRUCKS	12	%
TOTAL DESIGN ESALS		

LONGITUDINAL SECTION ALONG CL CULVERT



ESTIMATED REVETMENT QUANTITIES

LOCATION	REVETMENT CL. "E" (TON)	ENGINEERING FABRIC (SY)	EXCAVATION (CY)
INLET	109	146.9	76.6
OUTLET	109	146.9	76.6
TOTALS	218	293.8	153.2



TYPICAL CHANNEL PROTECTION

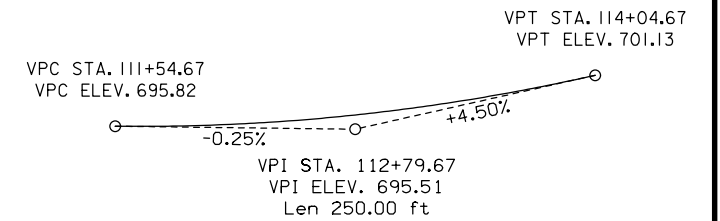
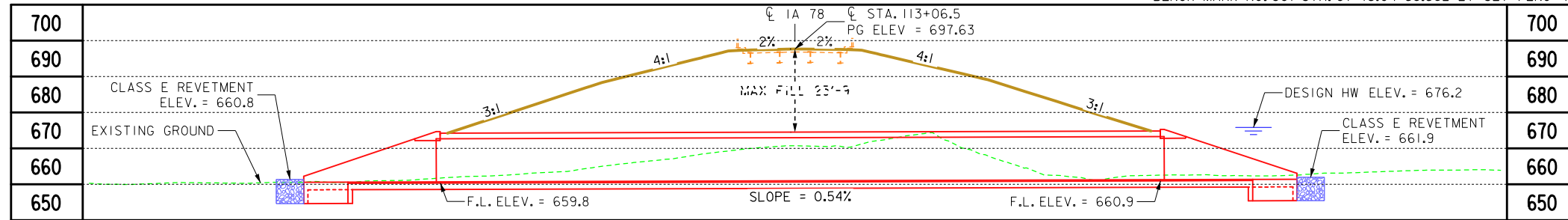
HYDRAULIC DESIGN

I hereby certify that this engineering document was prepared by me or under my direct personal supervision and that I am a duly licensed Professional Engineer under the laws of the State of Iowa.

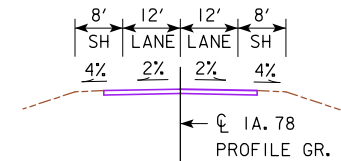
Signature Mark Harpole Date _____
 Printed or Typed Name
 My license renewal date is December 31, _____

Pages or sheets covered by this seal: _____

DESIGN FOR 15° SKEW R.A.
TRIPLE 12'-0 X 12'-0 X 210'-0
PRECAST RCB CULVERT
SITUATION PLAN
 STATION 113+06.5 MAY 2019
LOUISA COUNTY
 IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION
 DESIGN SHEET NO. _____ OF 2 FILE NO. 31699 DESIGN NO. 121



PROPOSED PROFILE GRADE
IA 78



TYPICAL APPROACH SECTION

NOTES:

- EXISTING 150'x26' CONTINUOUS I-BEAM BRIDGE DESIGN NO. 1250.
- DRAINAGE THROUGH EXISTING CULVERT/CHANNEL MUST BE MAINTAINED THROUGHOUT CONSTRUCTION.
- FLOW LINE OF CULVERT NOMINALLY BURIED 1.0 FOOT.
- SEDIMENT REDUCTION WEDGES WILL BE NEEDED AT THE INLET OF THE CULVERT.

HYDRAULIC DATA

DRAINAGE AREA = 6.46 SQ.MI.
 Q_{50} = 2,940 CFS
 HW ELEV. = 676.2
 STREAM SLOPE = 23.3 FT./MI.
 Q_{100} = 3,500 cfs
 Q_{500} = 5,000 cfs

UTILITIES LEGEND:

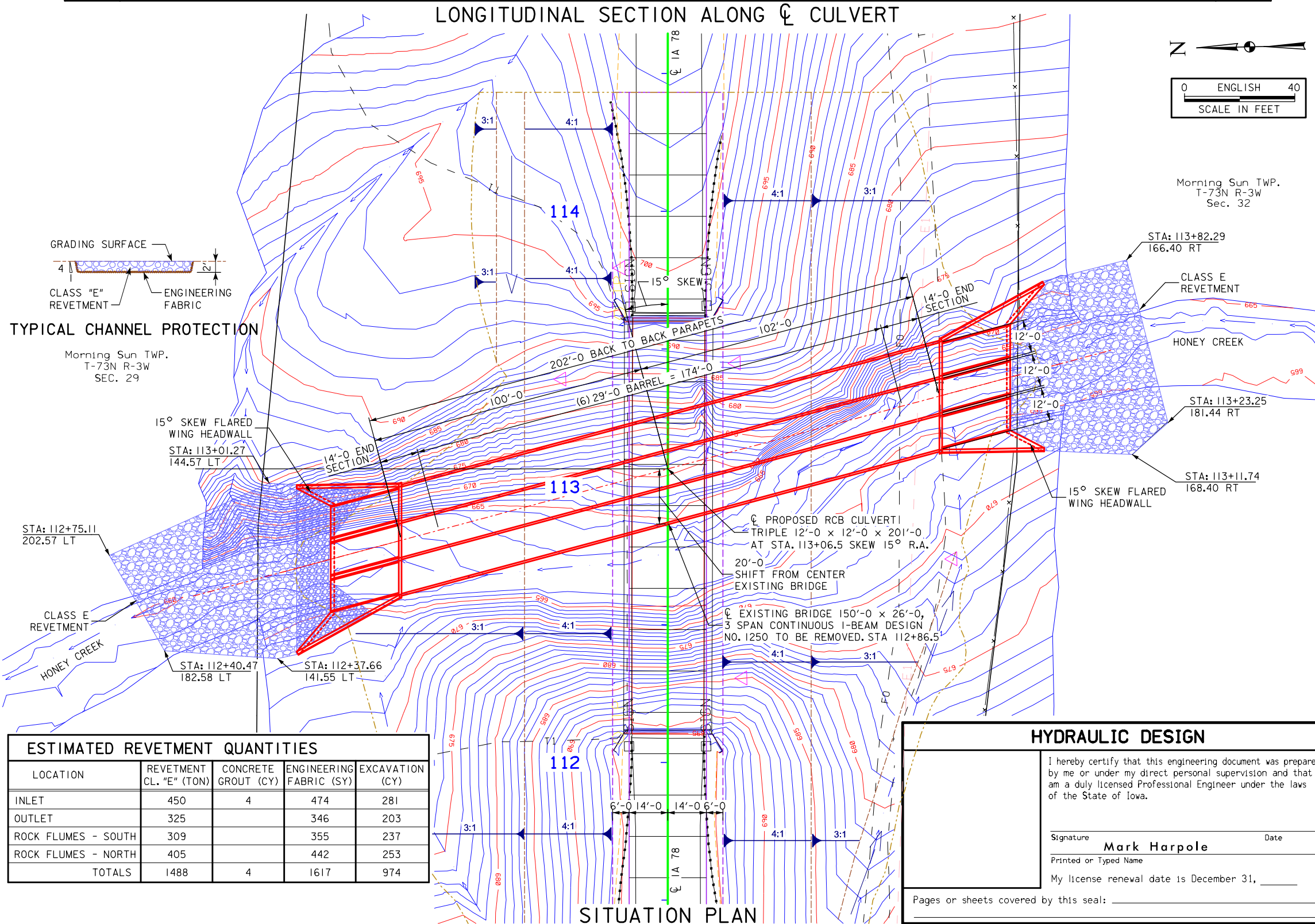
- FO — FIBER OPTIC LINE — MEDIACOM
- E1 — OVERHEAD ELECTRIC — ALLIANT ENERGY
- T1 — TELEPHONE LINE — MUTUAL TELE CO OF MORNING SUN

LOCATION

IA78 OVER HONEY CREEK
 (OTTER ON DRAFT DOC)
 T-73N R-3W
 SECTION 29
 MORNING SUN TOWNSHIP
 LOUISA COUNTY
 FHWA NO. 34080
 BRIDGE MAINT. NO. 5856.9S078
 LATITUDE 41.088325°
 LONGITUDE -91.218283°

TRAFFIC ESTIMATE

2021 AADT	2290	V.P.D.
2041 AADT	2880	V.P.D.
2041 DHV		V.P.H.
TRUCKS	12	%
TOTAL DESIGN ESALS		



TYPICAL CHANNEL PROTECTION

Morning Sun TWP.
 T-73N R-3W
 SEC. 29

LOCATION	REVETMENT CL. "E" (TON)	CONCRETE GROUT (CY)	ENGINEERING FABRIC (SY)	EXCAVATION (CY)
INLET	450	4	474	281
OUTLET	325		346	203
ROCK FLUMES - SOUTH	309		355	237
ROCK FLUMES - NORTH	405		442	253
TOTALS	1488	4	1617	974

HYDRAULIC DESIGN

I hereby certify that this engineering document was prepared by me or under my direct personal supervision and that I am a duly licensed Professional Engineer under the laws of the State of Iowa.

Signature Mark Harpole Date _____

Printed or Typed Name

My license renewal date is December 31, _____

Pages or sheets covered by this seal: _____

DESIGN FOR 15° SKEW R.A.
TRIPLE 12'-0 X 12'-0 X 202'-0
CAST IN PLACE RCB CULVERT

SITUATION PLAN

STATION 113+06.5 MAY 2019

LOUISA COUNTY

IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION
 DESIGN SHEET NO. _____ OF 2 FILE NO. 31699 DESIGN NO. 121

LINE STYLE LEGEND OF CROSS SECTION SHEETS (ROAD)

- - - - - - Existing Ground Line
- Proposed Template
- Proposed Topsoil Placement
- - - - - Additional Topsoil Removal
- Subgrade Treatment
- - - - - Granular Shoulder
- Pavement
- - - - - Existing Pipe\R/CB
- Proposed Pipe\R/CB
- Proposed Dike
- All Elements Associated with Proposed Entrances

LINE STYLE LEGEND OF CROSS SECTION SHEETS (SOILS)

- TS————— Topsoil (Class 10)
- SLOPE DRESSING — Slope Dressing Only
- CL 10————— Class 10 Materials
- SEL L0————— Select Loams And Clay-Loams
- SEL SA————— Select Sand
- UNS A————— Unsuitable Type A Disposal
- UNS B————— Unsuitable Type B Disposal
- UNS C————— Unsuitable Type C Disposal
- SHALE————— Shale
- WASTE————— Waste
- B&W LS————— Broken and Weathered Rock
- ROCK————— Solid Rock
- Boulders

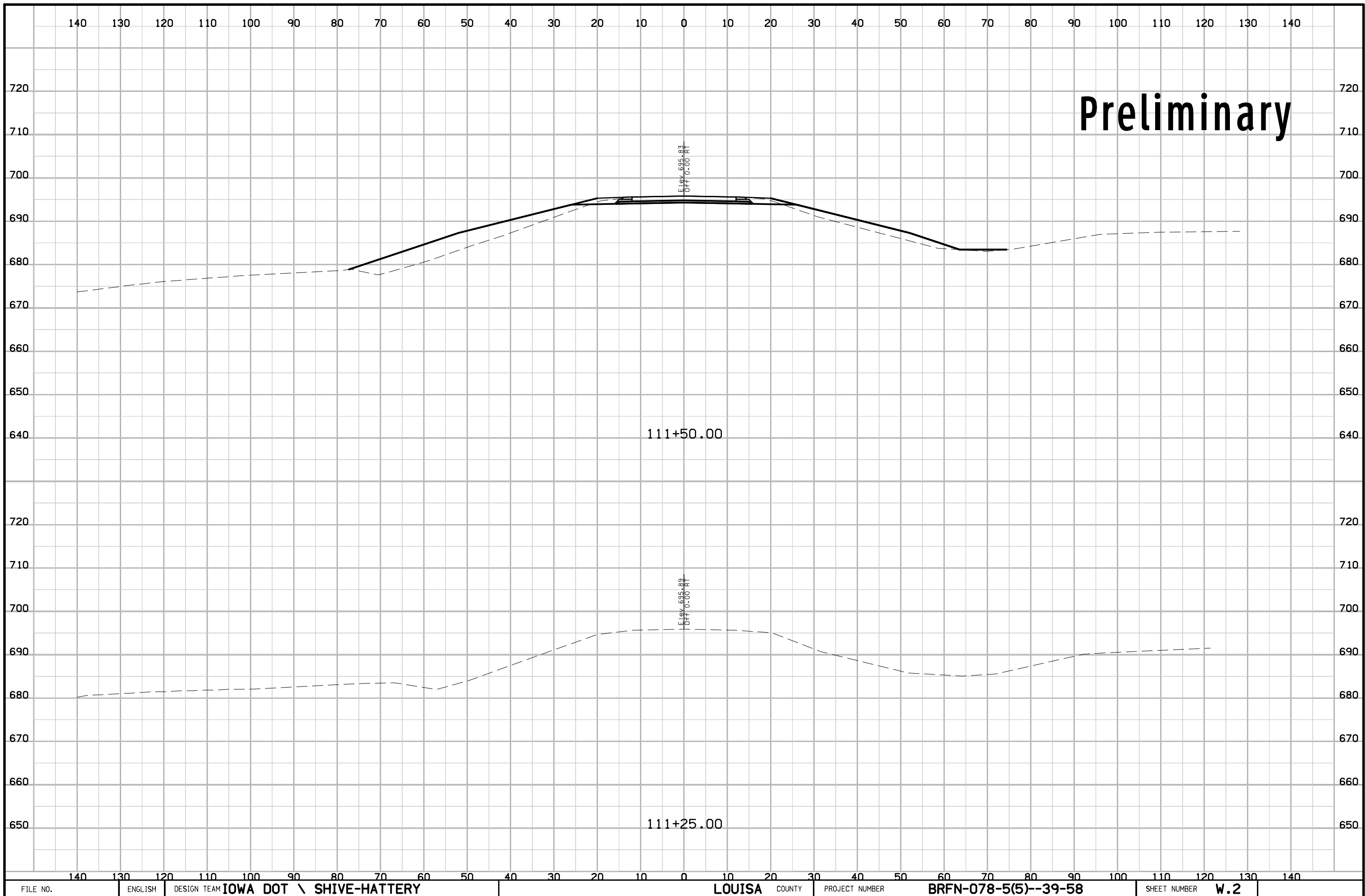
Note: All layer lines and descriptions identify layers above the line.

Note: Vertical or near vertical lines connecting soil layers at edges of cross sections are only for the purpose of calculating template quantities and do not depict soil stratification.

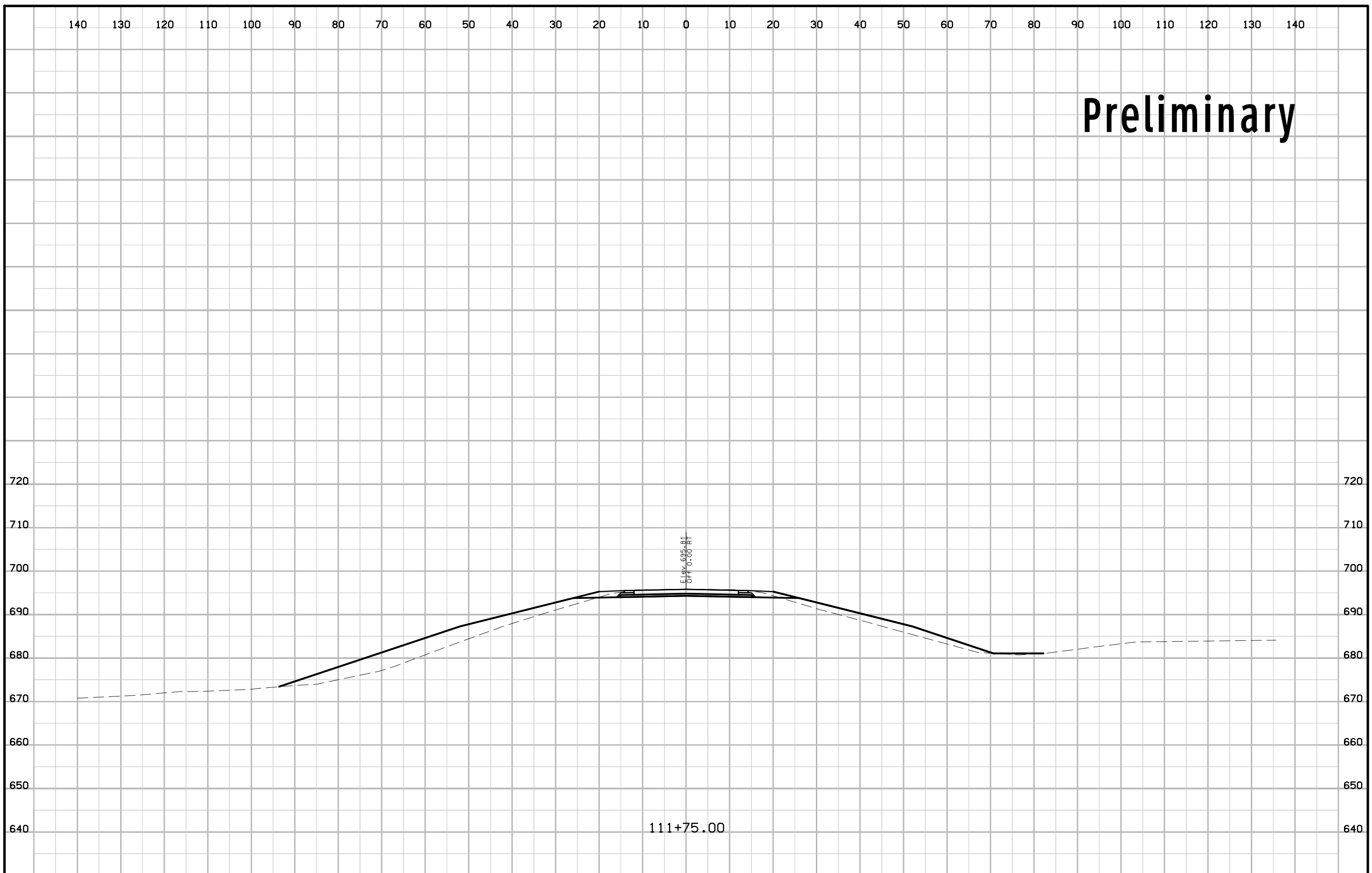
SYMBOL LEGEND OF CROSS SECTION SHEETS

- Existing ROW
|
Existing Right-of-Way Limit
- Proposed ROW
|
Proposed Right-of-Way Limit
- Temporary ROW
|
Temporary Right-of-Way Limit

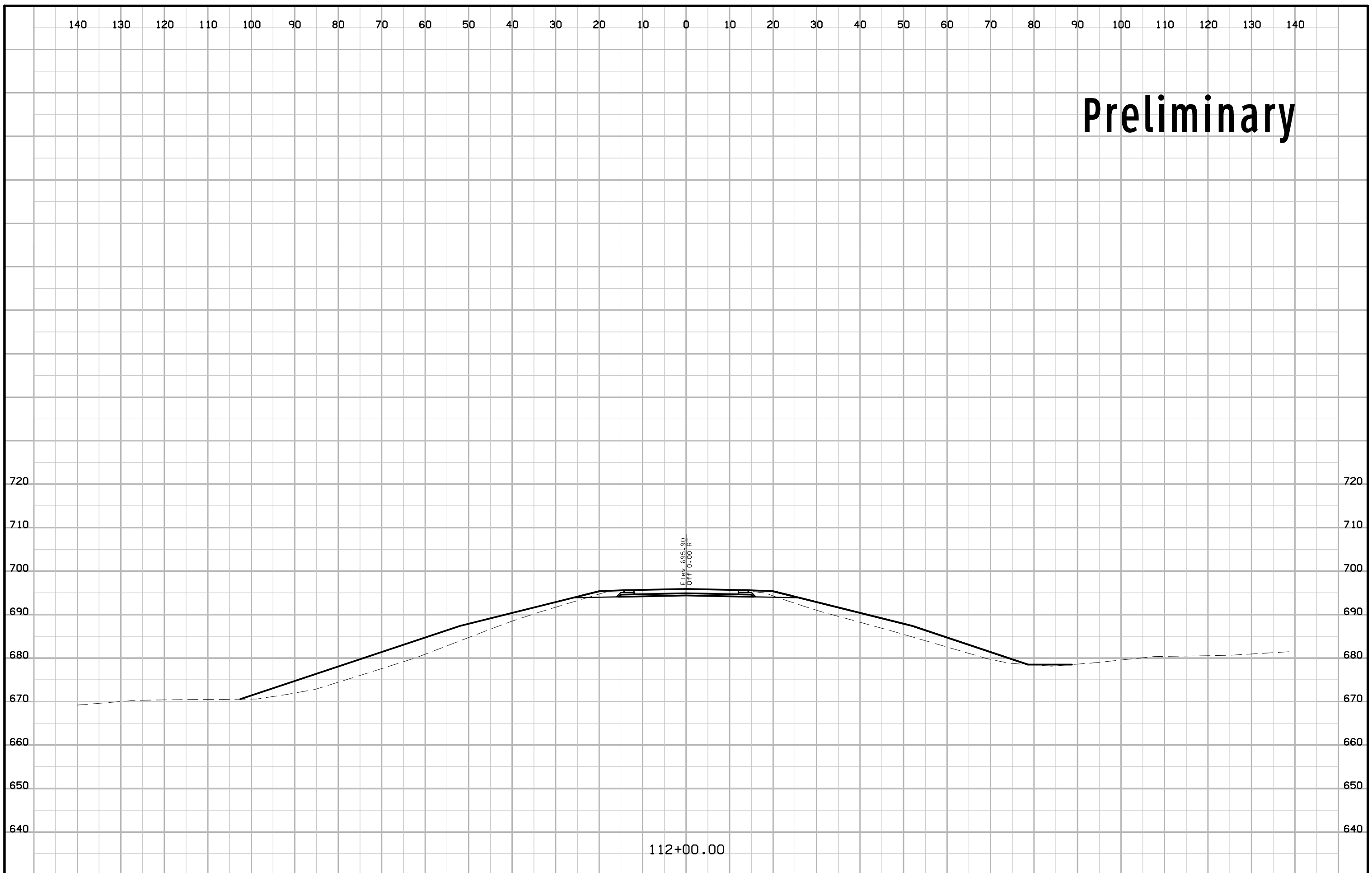
**CROSS SECTION
LEGEND AND SYMBOL
INFORMATION SHEET
(COVERS SHEET SERIES W, X, Y, & Z)**



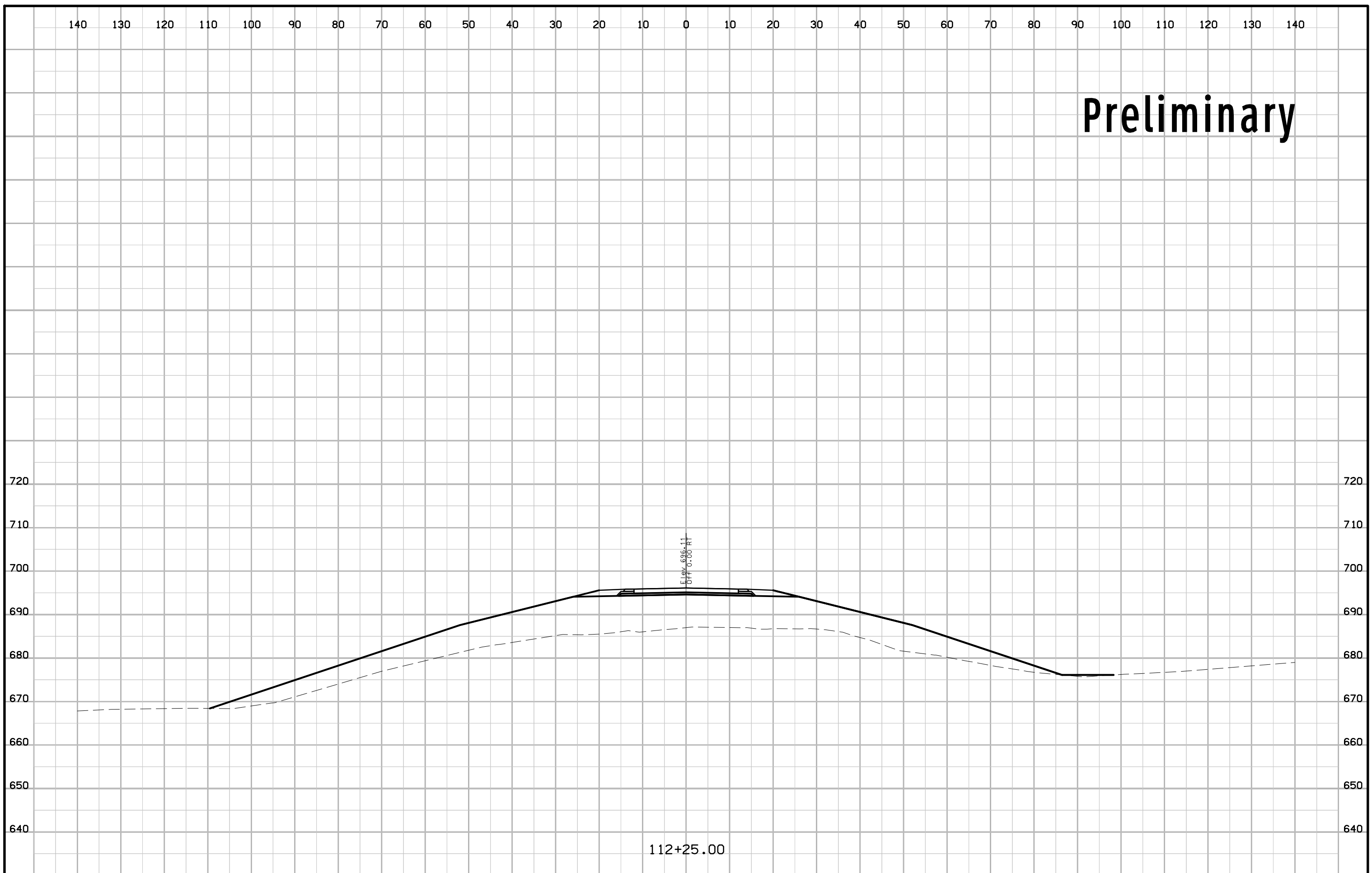
Preliminary



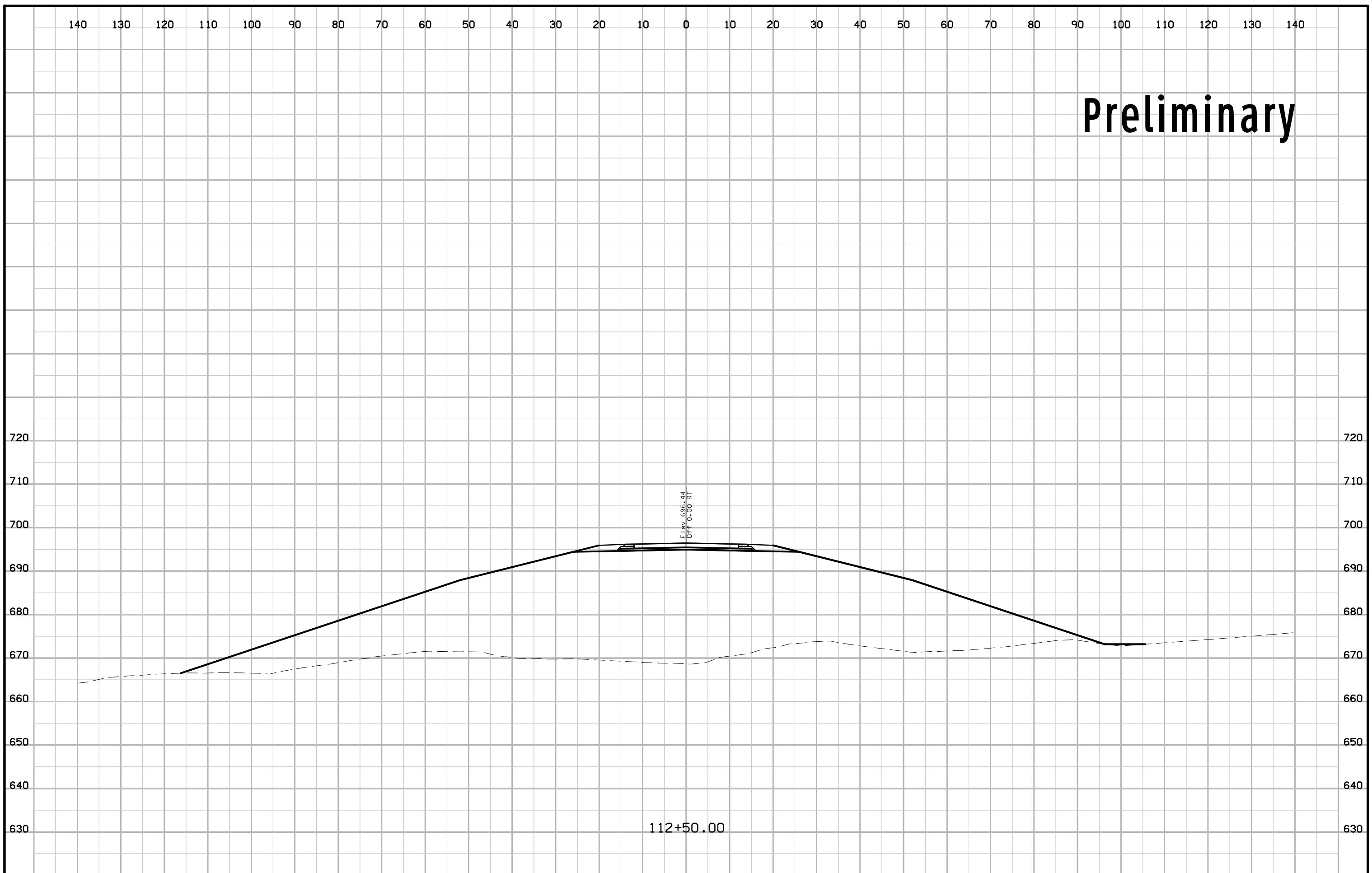
Preliminary



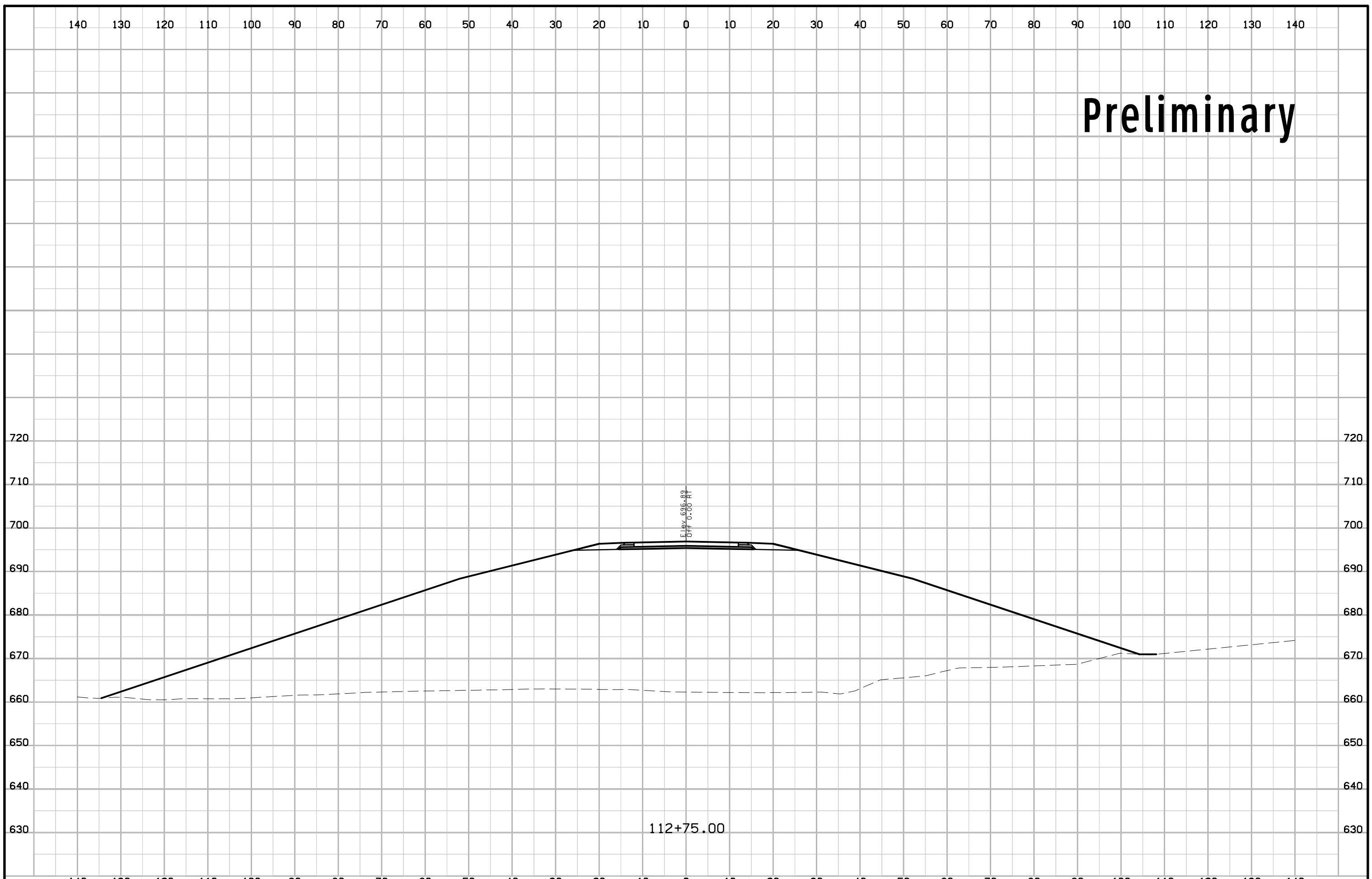
Preliminary



Preliminary

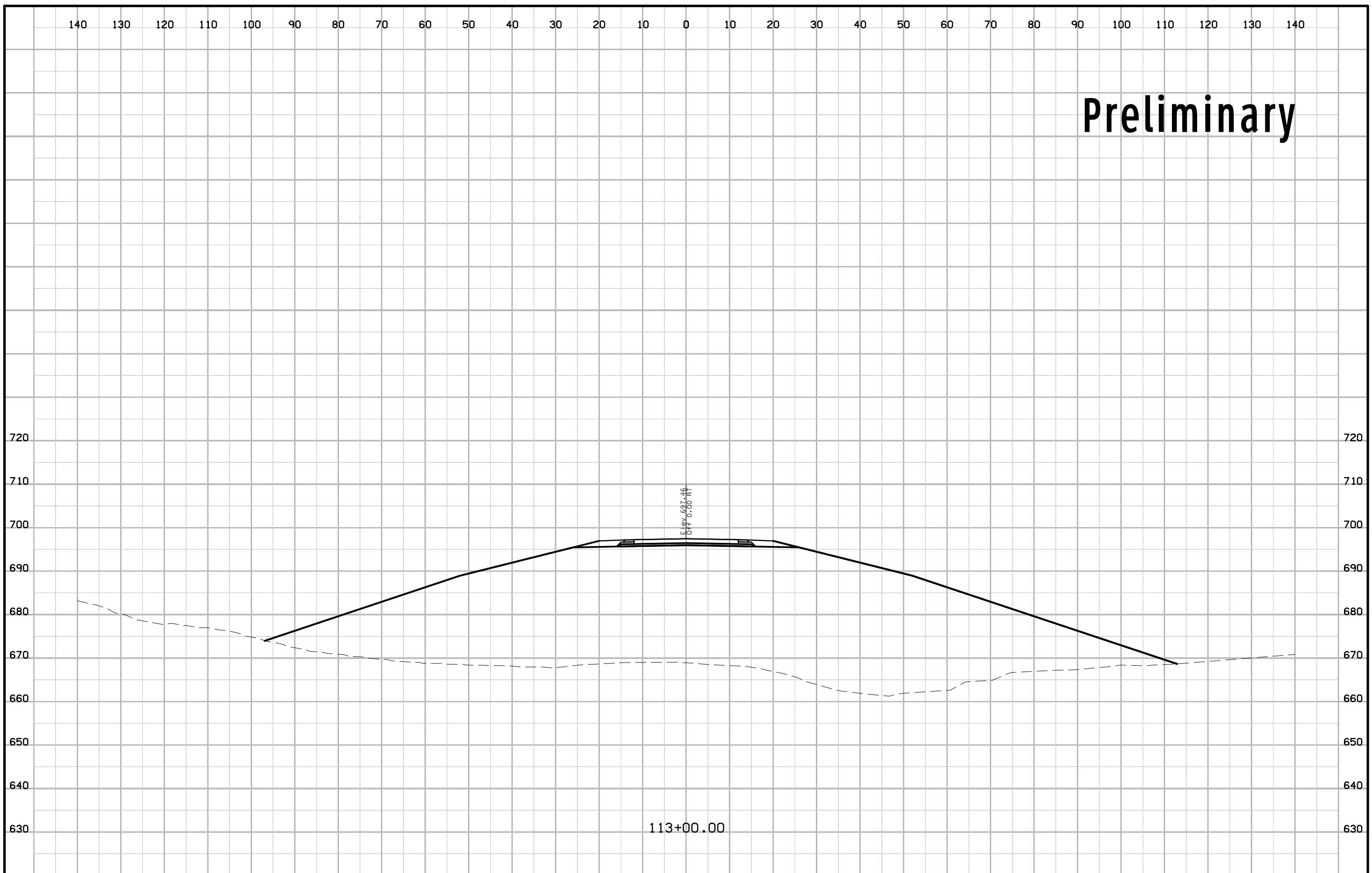


Preliminary

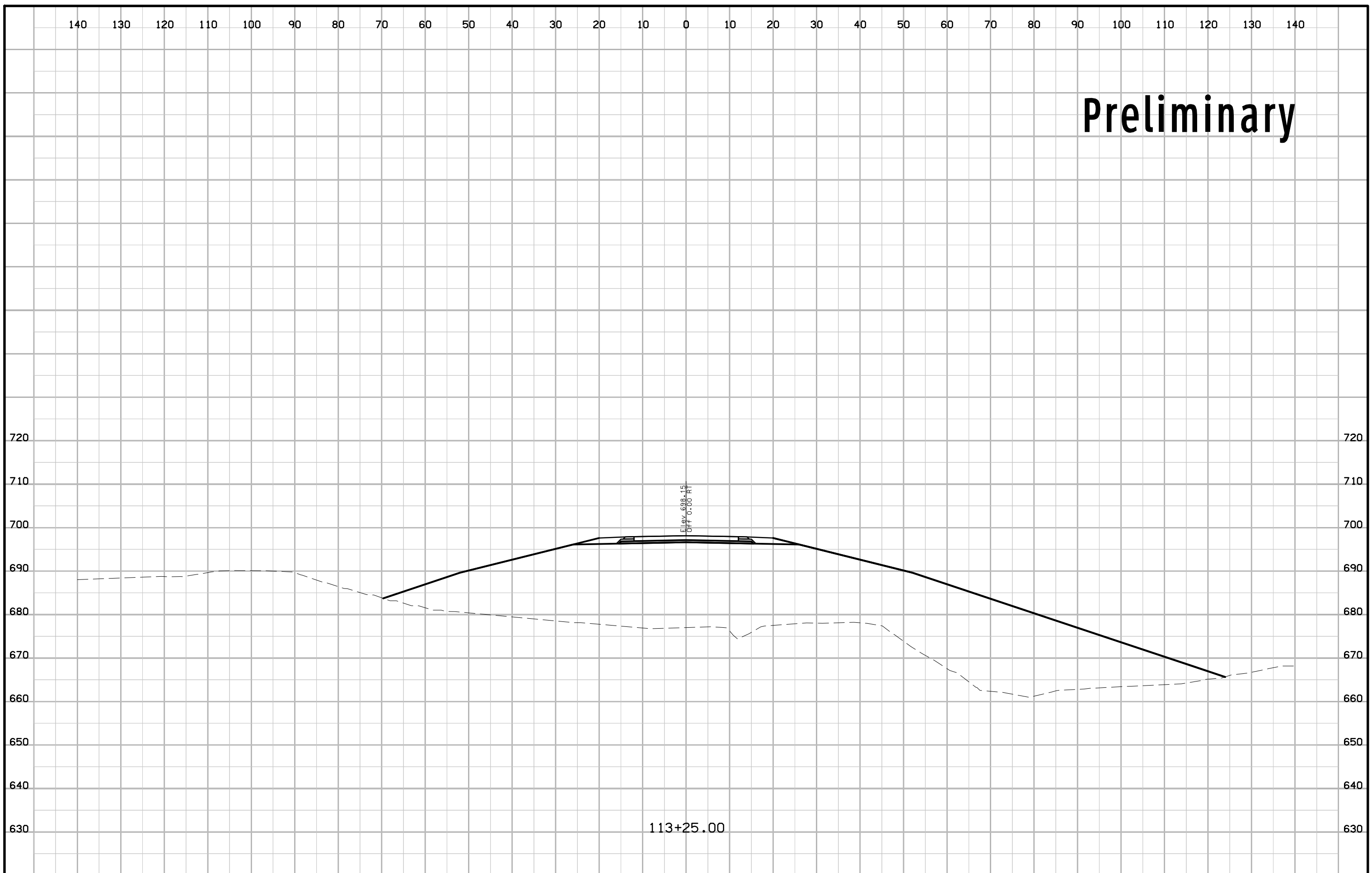


112+75.00

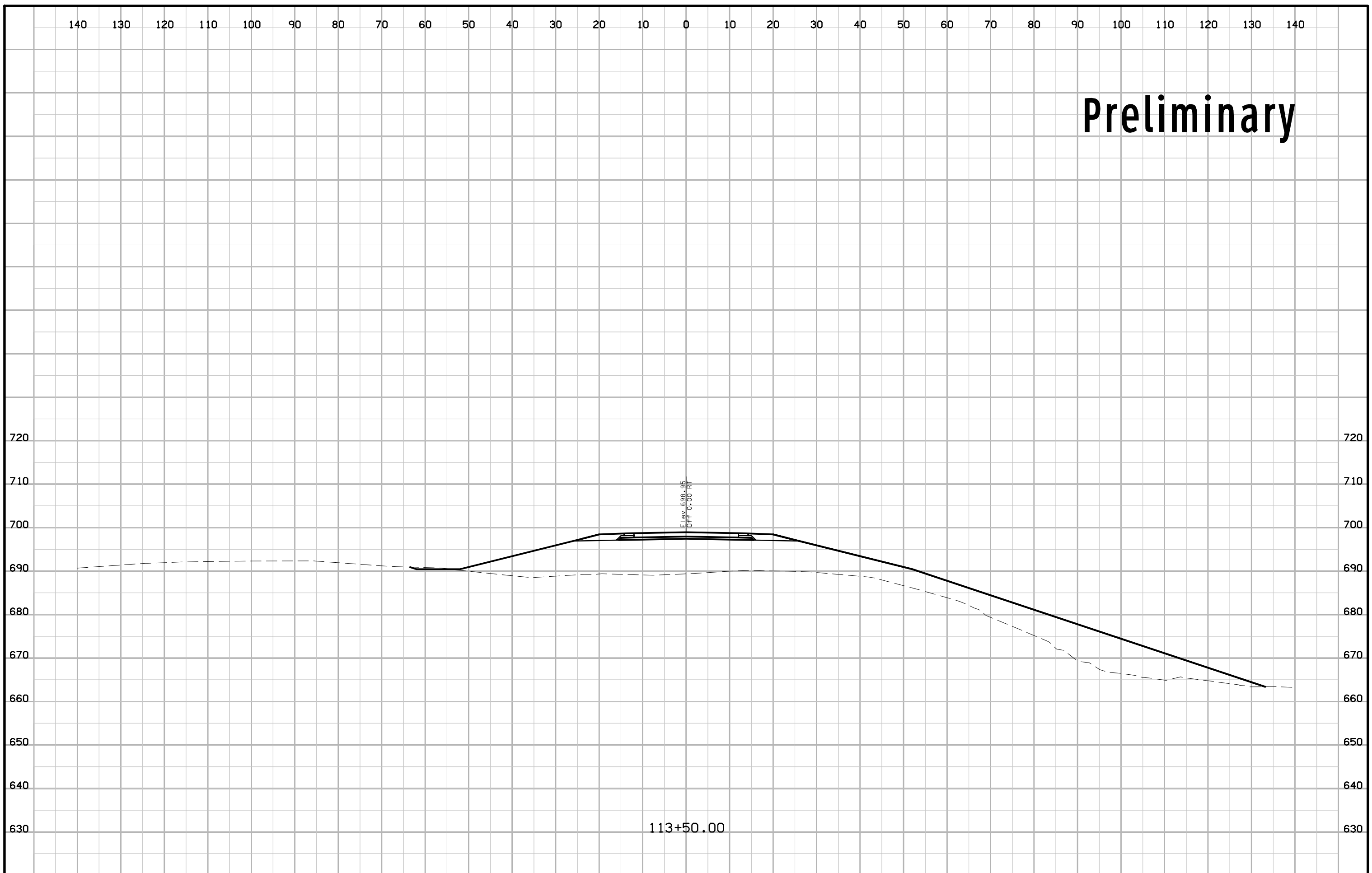
Preliminary



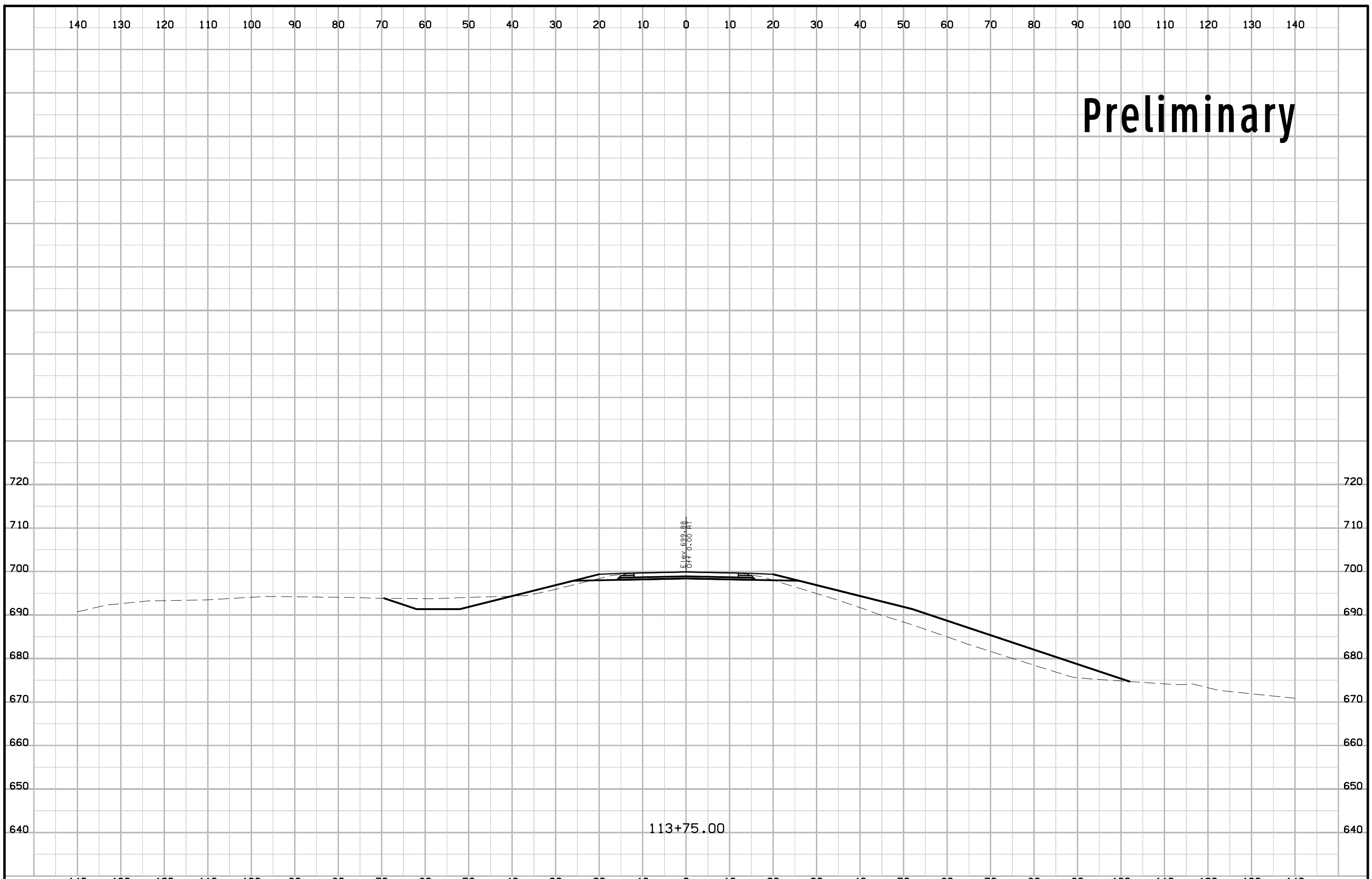
Preliminary



Preliminary



Preliminary



113+75.00

Elev. 699.88
Off 0.00 RT

Preliminary

