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PLANS OF PROPOSED IMPROVEMENT ON THE

# URBAN ROAD SYSTEM BLACK HAWK COUNTY

## RCB Culvert Replacement - Triple Box

In the city of Hudson  
On Butterfield Rd., Over Drainage  
S11 T88 R14

Refer to the Proposal Form for list of applicable specifications.

Value Engineering Saves. Refer to Article 1105.13 of the Specifications.

This project is covered by Iowa DNR Floodplain Construction Permit No. 2025-0780FP-01

### Standard Road Plans

Standard Road Plans are listed on Sheet C.2

### English Culvert Standards

English Culvert Standards are listed on Sheet V.1

### Revisions

	TOTAL
	19
PROJECT IDENTIFICATION NUMBER	
52879	
PROJECT NUMBER	
BROS-3577(609)--8J-07	
R.O.W. PROJECT NUMBER	
-	
PROJECT DIRECTORY NUMBER	
-	

### Design Data Rural

2021 AADT 260 V.P.D.  
2045 AADT 320 V.P.D.



### Index of Seals

Sheet No.	Name	Type
A.1	Mark Durbahn	Roadway Design
V.2	Daniel Kimball	Hydraulic Design

PROFESSIONAL ENGINEER

MARK DURBAHN

1315Z

IOWA

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.

*Mark Durbahn* 3/17/26

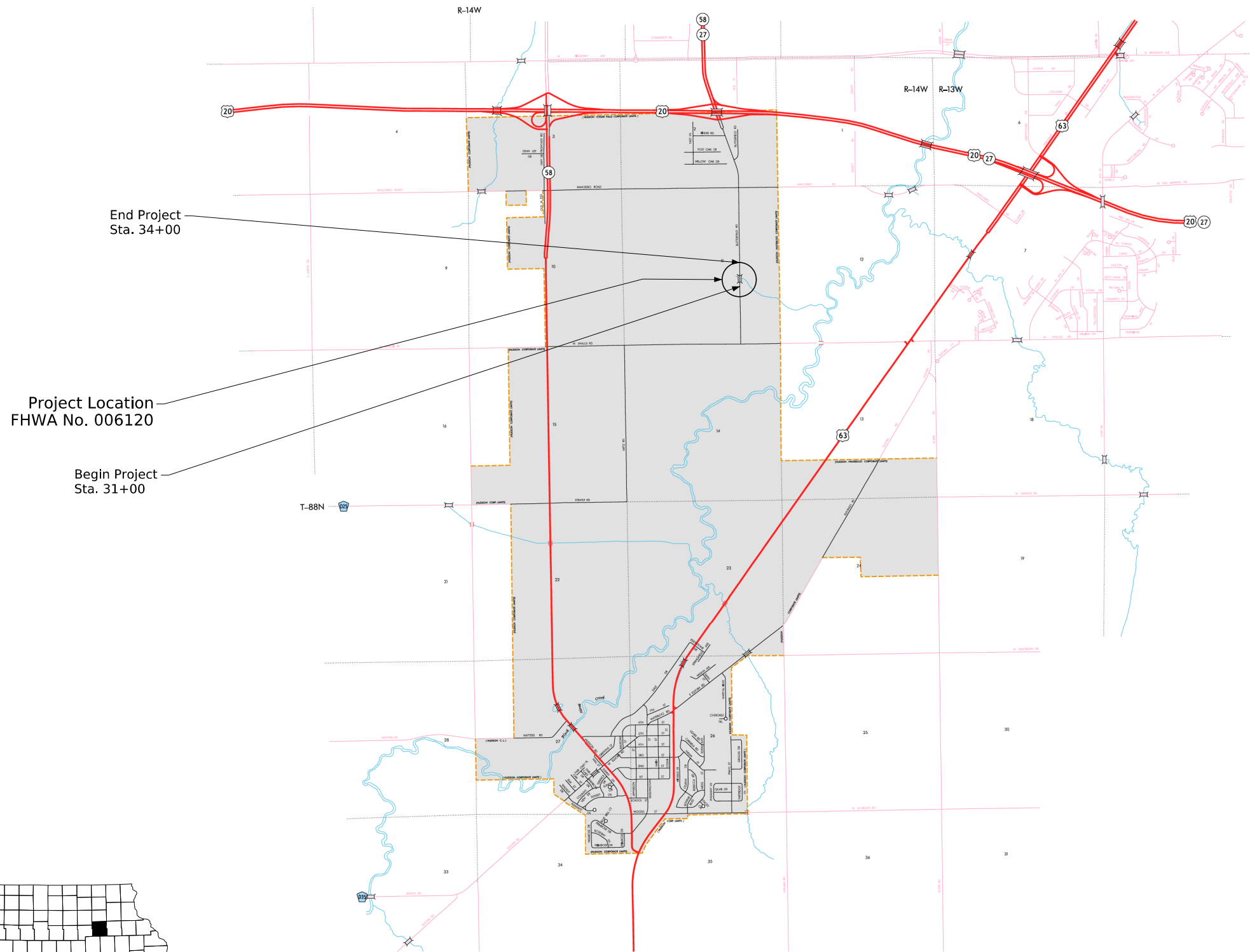
Signature MARK DURBAHN Date

Printed or Typed Name

My license renewal date is December 31, 2026

Pages or sheets covered by this seal: All Sheets

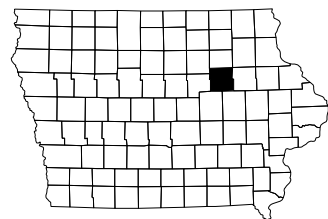




Project Location  
FHWA No. 006120

Begin Project  
Sta. 31+00

End Project  
Sta. 34+00



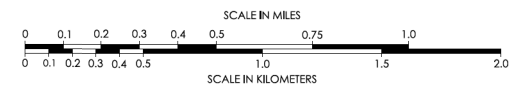
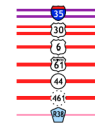
**Black Hawk County Location Map**

Not To Scale



**LEGEND**

- INTERSTATE ROUTE
- FREEWAY OR EXPRESSWAY ROUTE
- U.S. NUMBERED ROUTE
- BUSINESS ROUTE
- STATE NUMBERED ROUTE
- UNSIGNED ROUTE
- COUNTY NUMBERED ROUTE
- SECONDARY ROAD OR ADJOINING CITY STREET
- CITY STREET
- PARK, INSTITUTION, OR FEDERAL ROAD
- RAILROAD
- CORPORATION LINE
- SECTION LINE
- CUL-DE-SAC
- SECTION, TOWNSHIP & RANGE NUMBERS

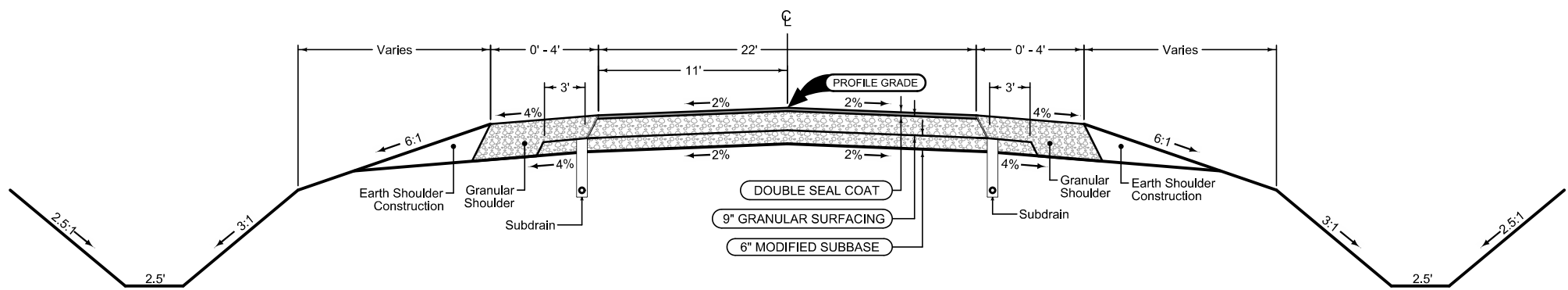


**HIGHWAY AND STREET MAP  
OF**

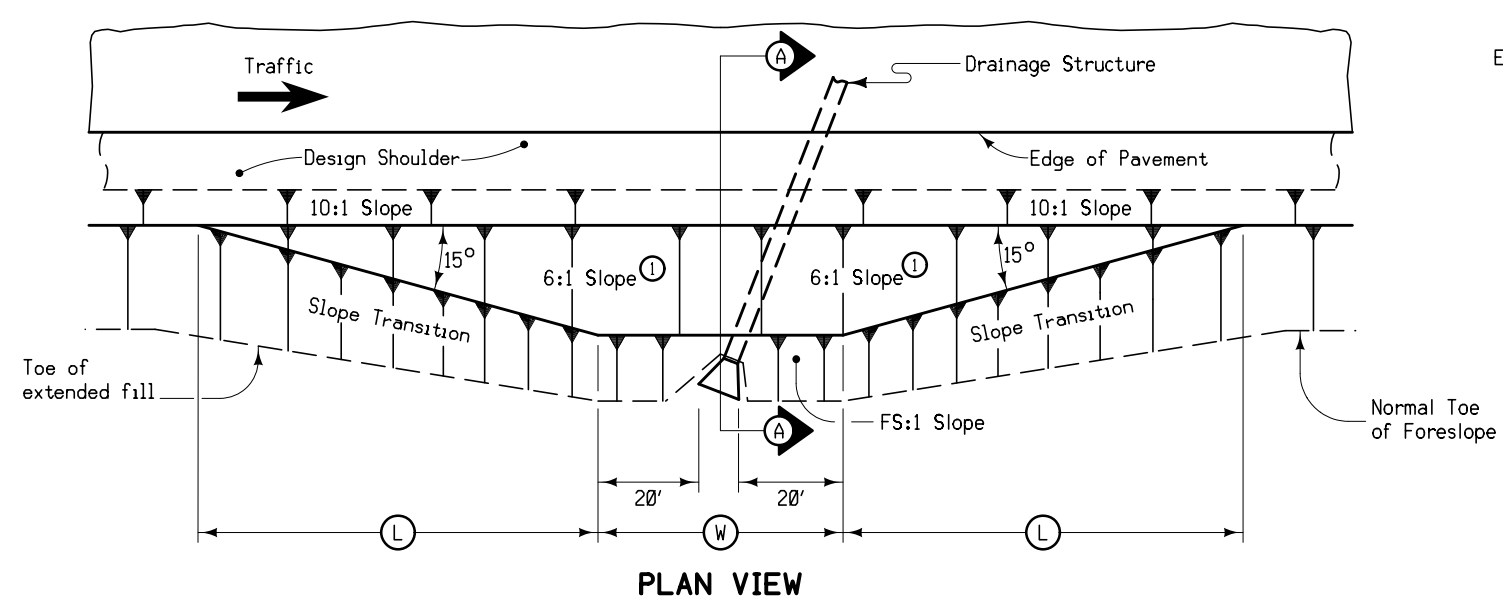
**HUDSON  
IOWA**

PREPARED BY  
IOWA DEPARTMENT OF TRANSPORTATION  
TRANSPORTATION DEVELOPMENT DIVISION  
SYSTEMS PLANNING BUREAU  
PHONE (515) 239-1664  
IN COOPERATION WITH  
UNITED STATES DEPARTMENT OF TRANSPORTATION  
FEDERAL HIGHWAY ADMINISTRATION

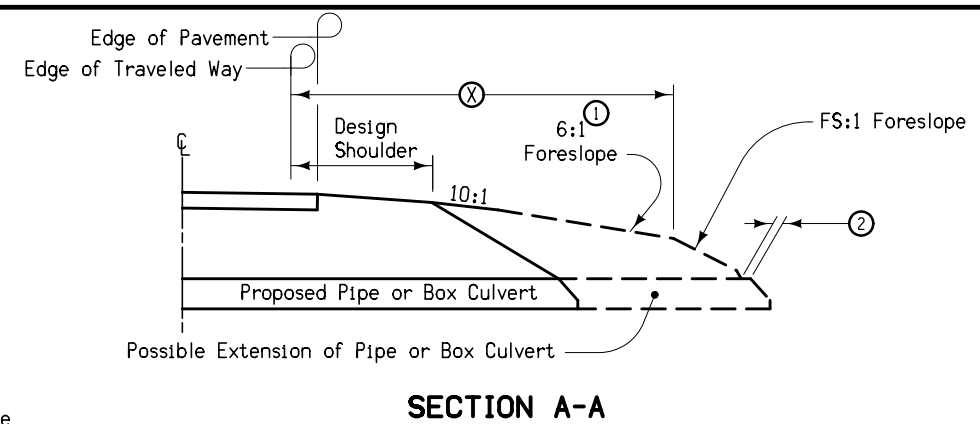




**Typical Proposed Section**  
**Station 31+00 - 34+00**



**PLAN VIEW**



**SECTION A-A**

STRUCTURE LOCATION		W	L	X	FS
STATION ③	SIDE	Feet	Feet	Feet	
31+96.21	BOTH	81.1	19.0	10.0	3:1

**BARNROOF FORESLOPE AT  
 SKEWED DRAINAGE STRUCTURE**

- At locations where an extended or newly constructed drainage structure extends beyond the normal foreslope cover, flatten as indicated so as to cover the structure. Minimum earth cover is 6 inches.
- ① Slope may be flatter than 6:1.
  - ② 6 inch minimum for pipe installations or to top of headwall on RCB.
  - ③ At  $\mathcal{C}$  of roadway.
  - W = Pipe or RCB opening width plus 20 feet each side.

DESIGNER INFO **4312**  
**MODIFIED**



100 01D 8/15/22
PROJECT DESCRIPTION
This project involves the construction of a Triple 12' x 6' RCB Culvert on Butterfield Road over a Drainage Ditch leading to Black Hawk Creek within the Hudson, IA city limits.

108 23A 8/15/22
TRAFFIC CONTROL PLAN
Before construction begins, traffic will be closed on Butterfield Road at the construction site. Use Standard Road Plan TC-252 for road closure details and signage.

ESTIMATED PROJECT QUANTITIES (1 DIVISION PROJECT)						100-1A
Item No.	Item Code	Item	Unit	Total	As Built Qty.	
1	2102-2710070	EXCAVATION, CLASS 10, ROADWAY AND BORROW	CY	1108.0		
2	2102-2710090	EXCAVATION, CLASS 10, WASTE	CY	621.0		
3	2102-2713090	EXCAVATION, CLASS 13, WASTE	CY	234.0		
4	2105-8425015	TOPSOIL, STRIP, SALVAGE AND SPREAD	CY	590.0		
5	2107-0425020	COMPACTING BACKFILL ADJACENT TO BRIDGES, CULVERTS OR STRUCTURES	CY	24.6		
6	2107-0875100	COMPACTION WITH MOISTURE CONTROL	CY	307.6		
7	2115-0100000	MODIFIED SUBBASE	CY	155.6		
8	2121-7425010	GRANULAR SHOULDERS, TYPE A	TON	122.5		
9	2123-7450000	SHOULDER CONSTRUCTION, EARTH	STA	6.00		
10	2307-0025005	AGGREGATE, ROADWAY COVER, 1/2 IN.	TON	20.2		
11	2307-0600456	BINDER BITUMEN, CRS-2P	GAL	477		
12	2312-8260051	GRANULAR SURFACING ON ROAD, CLASS A CRUSHED STONE	TON	346.5		
13	2315-8275025	SURFACING, DRIVEWAY, CLASS A CRUSHED STONE	TON	25.0		
14	2401-6745625	REMOVAL OF EXISTING BRIDGE	LS	1.00		
15	2402-0425040	FLOODED BACKFILL	CY	60.0		
16	2402-2720000	EXCAVATION, CLASS 20	CY	1147.2		
17	2402-3825025	GRANULAR MATERIAL FOR BLANKET	CY	134.4		
18	2403-0100020	STRUCTURAL CONCRETE (RCB CULVERT)	CY	243.1		
19	2404-7775000	REINFORCING STEEL	LB	38255		
20	2418-0000010	TEMPORARY STREAM DIVERSION	EACH	1		
21	2422-0360024	APRONS, UNCLASSIFIED, 24 IN. DIA.	EACH	2		
22	2422-1722024	CULVERT, UNCLASSIFIED ENTRANCE PIPE, 24 IN. DIA.	LF	50.0		
23	2503-0200036	REMOVE STORM SEWER PIPE LESS THAN OR EQUAL TO 36 IN.	LF	54.0		
24	2504-0150408	SANITARY SEWER FORCE MAIN, TRENCHED, POLYVINYL CHLORIDE PIPE (PVC), 8 IN.	LF	145.0		
25	2507-3250005	ENGINEERING FABRIC	SY	134.3		
26	2507-6800061	REVTMENT, CLASS E	TON	101.7		
27	2519-4200090	REMOVAL AND REINSTALLATION OF FENCE, VARIOUS	LF	460.0		
28	2524-6765210	REMOVAL OF TYPE A SIGN ASSEMBLY	EACH	2		
29	2528-2518000	SAFETY CLOSURE	EACH	2		
30	2528-8445110	TRAFFIC CONTROL	LS	1.00		
31	2533-4980005	MOBILIZATION	LS	1.00		
32	2601-2638352	SLOPE PROTECTION, WOOD EXCELSIOR MAT	SQ	116		
33	2601-2640350	SPECIAL DITCH CONTROL, WOOD EXCELSIOR MAT	SQ	27		
34	2601-2643413	TURF REINFORCEMENT MAT, TYPE 3	SQ	14		
35	2602-0000320	PERIMETER AND SLOPE SEDIMENT CONTROL DEVICE, 20 IN. DIA.	LF	850.0		
36	2602-0000351	REMOVAL OF PERIMETER AND SLOPE OR DITCH CHECK SEDIMENT CONTROL DEVICE	LF	1540.0		
37	2602-0000370	DITCH CHECK SEDIMENT CONTROL DEVICE, 20 IN. DIA.	LF	690.0		

ESTIMATE REFERENCE INFORMATION			100-4A
Item No.	Item Code	Description	
1	2102-2710070	EXCAVATION, CLASS 10, ROADWAY AND BORROW See Tab. 107-28, the B-Sheets and T-Sheets for locations and details.	
2	2102-2710090	EXCAVATION, CLASS 10, WASTE See Tab. 107-28, the B-Sheets and T-Sheets for locations and details.	
3	2102-2713090	EXCAVATION, CLASS 13, WASTE Bid quantity covers excavated asphaltic, granular and shoulder material unsuitable for backfill. See Tab. 107-28 and the T-Sheets for further information.	
4	2105-8425015	TOPSOIL, STRIP, SALVAGE AND SPREAD Refer to the T-Sheets. Quantity computed from on the basis of the depths of 9" strip and 6" place.	
5 - 6	2107-0425020 2107-0875100	COMPACTING BACKFILL ADJACENT TO BRIDGES, CULVERTS OR STRUCTURES COMPACTION WITH MOISTURE CONTROL See Tab. 104-14, Standard Road Plan DR-111 and the V-Sheets.	
7	2115-0100000	MODIFIED SUBBASE See Typical Sections in the B-Sheets for locations and details. Any crushing operations will be reviewed and approved by the Engineer.	
8	2121-7425010	GRANULAR SHOULDERS, TYPE A Refer to the B-Sheets, the D-Sheets and Tab. 112-09 for locations and details.	
9	2123-7450000	SHOULDER CONSTRUCTION, EARTH See B-Sheets for details. Excess topsoil may be used as material for construction if not under pavement.	
10	2307-0025005	AGGREGATE, ROADWAY COVER, 1/2 IN. Roadway cover aggregate to be used with the seal coat applications. See typical sections in the B-Sheets for locations and details. Quantity estimated based a first coat application rate of 30 LBS/SY and a second coat application rate of 25 LBS/SY.	
11	2307-0600456	BINDER BITUMEN, CRS-2P Binder to be used with the seal coat application. See typical sections in the B-Sheets for locations and details. Quantity estimated based a first coat application rate of 0.35 GAL/SY and a second coat application rate of 0.30 GAL/SY.	
12	2312-8260051	GRANULAR SURFACING ON ROAD, CLASS A CRUSHED STONE Refer to the typical sections in the B-Sheets and D-Sheets for locations and details. Quantity estimated at 140 LBS/CF.	
13	2315-8275025	SURFACING, DRIVEWAY, CLASS A CRUSHED STONE Refer to Tab. 102-03 and the D-Sheets for locations and details.	
14	2401-6745625	REMOVAL OF EXISTING BRIDGE Lump sum bid item includes all work for removal and off-site disposal of the existing structure. All salvageable material and unsalvageable material shall become the property of the Contractor and shall be removed from the site by the contractor. The existing structure shall be removed to an elevation at least 1 foot below finished groundline and to the extent that it will not interfere with the new construction. Removal of scheduled items shall be in accordance with Section 2401 of the Standard Specifications. Testing for asbestos, lead, chromium, and cadmium was completed. No asbestos was found but they suspect asbestos-containing materials may be present beneath subsurface. Lead was present within the paint sample at 26% concentration by weight. Chromium was also present at 0.039% concentration by weight.	
15	2402-0425040	FLOODED BACKFILL Refer to Tab. 104-14, Standard Road Plan DR-111 and the V-Sheets.	
16	2402-2720000	EXCAVATION, CLASS 20 Includes filling and compacting low areas around proposed culvert. Includes excavation necessary to place granular working blanket.	
17	2402-3825025	GRANULAR MATERIAL FOR BLANKET Granular material shall be in accordance with Section 4118 of the Standard Specifications. Includes 134.4 CY for working blanket.	
18 - 19	2403-0100020 2404-7775000	STRUCTURAL CONCRETE (RCB CULVERT) REINFORCING STEEL Refer to the V-Sheets and Standard Culvert Plans. Certified Plant Inspection will be required for the structural concrete bid item.	
20	2418-0000010	TEMPORARY STREAM DIVERSION Construct temporary stream diversion according to Standard Road Plan EW-402.	
21 - 22	2422-0360024 2422-1722024	APRONS, UNCLASSIFIED, 24 IN. DIA. CULVERT, UNCLASSIFIED ENTRANCE PIPE, 24 IN. DIA. Refer to Tab. 102-03, Standard Road Plan EW-501 and the D-Sheets for locations and details.	
23	2503-0200036	REMOVE STORM SEWER PIPE LESS THAN OR EQUAL TO 36 IN. Bid quantity includes the removal of the existing entrance culvert at approximate Sta. 32+40. See D-Sheets.	



ESTIMATE REFERENCE INFORMATION			100-4A
Item No.	Item Code	Description	
24	2504-0150408	SANITARY SEWER FORCE MAIN, TRENCHED, POLYVINYL CHLORIDE PIPE (PVC), 8 IN. Bid quantity included for relocation of the sanitary force main on the west side of Butterfield Road. PVC pipe shall be AWWA C900. Bends and fittings required for relocation to provide clearance from the proposed box culvert is included as incidental to this bid item. Contractor shall coordinate with the City of Hudson prior to construction.	
25 - 26	2507-3250005 2507-6800061	ENGINEERING FABRIC REVTMENT, CLASS E Refer to the D-Sheets, RR-Sheets, V-Sheets, and Tab. 104-14 for locations and details. Revetment quantity estimated at 110 LBS/CF.	
27	2519-4200090	REMOVAL AND REINSTALLATION OF FENCE, VARIOUS Bid quantity includes 415 LF of three-rail white fence (west grading) and 45 LF of steel fence panels (east grading) disturbed during construction activities. Contractor shall coordinate with the property owners prior to removal and reinstallation. Any damaged fencing shall be replaced in kind at the expense of the contractor.	
28	2524-6765210	REMOVAL OF TYPE A SIGN ASSEMBLY Refer to the D-Sheets for locations and details. This item is for the removal of Type A sign assemblies, including the sign panels, sign brackets, supporting structures and hardware. Contractor shall carefully dismantle each sign assembly. Sign panels, posts, brackets and hardware shall become property of the Contractor. All holes resulting from removal of post shall be filled level with the adjacent grade with backfill material conforming to the Standard Specifications. Measurement: The Engineer will count the number of sign assemblies removed. Payment: The Contractor will be paid the contract unit price for each sign assembly removed.	
29	2528-2518000	SAFETY CLOSURE See Tab. 108-13A for locations and details.	
30	2528-8445110	TRAFFIC CONTROL Refer to Traffic Control Plan in the C-Sheets.	
31	2533-4980005	MOBILIZATION -	
32	2601-2638352	SLOPE PROTECTION, WOOD EXCELSIOR MAT Refer to Tab. 100-22 and the RR-Sheets for locations and details. Refer to Standard Road Plan EC-103.	
33	2601-2640350	SPECIAL DITCH CONTROL, WOOD EXCELSIOR MAT Refer to Tab. 110-22 and the RR-Sheets for locations and details. Refer to Standard Road Plan EC-101.	
34	2601-2643413	TURF REINFORCEMENT MAT, TYPE 3 Refer to Tab. 110-22 and the RR-Sheets for locations and details. Refer to Standard Road Plan EC-104.	
35 - 37	2602-0000320 2602-0000351 2602-0000370	PERIMETER AND SLOPE SEDIMENT CONTROL DEVICE, 20 IN. DIA. REMOVAL OF PERIMETER AND SLOPE OR DITCH CHECK SEDIMENT CONTROL DEVICE DITCH CHECK SEDIMENT CONTROL DEVICE, 20 IN. DIA. Refer to Tab. 100-19. The tabulation includes estimated locations for placement of "Perimeter and Slope Sediment Control Device, 20 in. dia." and "Ditch Check Sediment Control Device, 20 in. dia." to address erosion to be encountered during construction on slopes and ditches. Verify the specific locations with the Engineer prior to beginning placement. Bid item includes 25% additional quantity for field adjustments and replacements. Use Perimeter and Slope Sediment Control and Ditch Check Sediment Devices fabricated using wood excelsior.	

STANDARDS			105_04 4/21/26
The following Standards apply to construction work on this project.			
Number	Date	Title	
DR-111	04-17-18	Box Culvert (Backfill)	
EC-101	04-19-16	Wood Excelsior Mat for Ditch Protection	
EC-103	04-21-15	Wood Excelsior Mat for Slope Protection	
EC-104	04-17-18	Turf Reinforced Mat (TRM)	
EC-204	10-19-21	Perimeter, Slope and Ditch Check Sediment Control Devices	
EC-502	04-21-15	Seeding in Rural Areas	
EW-402	04-18-17	Temporary Stream Diversion	
EW-501	10-17-23	Rural Entrance	
TC-1	10-15-19	Work Not Affecting Traffic (Two-Lane or Multi-Lane)	
TC-252	10-21-25	Routes Closed to Traffic	

INDEX OF TABULATIONS			111_25 4/21/26
Tabulation	Tabulation Title	Sheet No.	
100_01A	ESTIMATED PROJECT QUANTITIES	C.1	
100_01D	PROJECT DESCRIPTION	C.1	
100_04A	ESTIMATE REFERENCE INFORMATION	C.1 - C.2	
100_19	PERIMETER AND SLOPE SEDIMENT CONTROL DEVICE	C.4	
100_22	ROLLED EROSION CONTROL	C.4	
102_03	ACCESS POINTS AND SAFETY RAMPS	C.2	
104_04	ROADWAY ITEMS FOR DRAINAGE STRUCTURES INSTALLED BY CULVERT CONTRACTOR	C.3	
105_04	STANDARD ROAD PLANS	C.2	
108_13A	SAFETY CLOSURES	C.3	
108_23A	TRAFFIC CONTROL PLAN	C.1	
111_25	INDEX OF TABULATIONS	C.2	
112_09	SHOULDERS	C.3	
232_03A	EROSION CONTROL (RURAL SEEDING)	C.4	
232_03C	EROSION CONTROL (NATIVE GRASS SEEDING)	C.4	
281_03	STORM WATER BEST MANAGEMENT PRACTICES	C.4	

102\_03

10/15/24

ACCESS POINTS AND SAFETY RAMPS

Refer to Cross-Sections

Length of Unclassified Pipe calculated is based on using Corrugated Metal Pipe.

(1) Refer to MI-210.

(2) Refer to EW-501.

(3) Refer to EW-501 or EW-502.

\*Predetermined for access point not constructed with this project.

Line No.	Station	Side	Access Type	Descriptor	Case	Curb Type	Curb Length (1) (LF)	Width (FT)	PR (1) (2) (FT)	SR (2) (FT)	Pipe Culvert (H) (3) (FT)	Pipe Culvert Size (3) (IN)	Culvert Length (3) (LF)	Pipe Culvert Lt. (3) (LF)	Pipe Culvert Rt. (3) (LF)	Culvert Aprons (3) (No.)	Driveway Surface Type	Driveway Surface Area (SY)	Driveway Surfacing Material (TON)	Remarks
1.0	32+40.00	Right	D		1			30.0		15.0	3.6	24.0	50.0	32.20	29.80	2	Granular	147.3	25.000	



104\_04

8/15/22

ROADWAY ITEMS FOR DRAINAGE STRUCTURES INSTALLED BY CULVERT CONTRACTOR

\* Not a Bid Item

(1) Backfill according to DR-111

Location	Design No.	Size	Kind	Dike Lt.	Dike Rt.	Dike Station	Dike Top Elevation	Dike Type	Compacting Backfill Adjacent (CY)	Compaction w/ Moisture Control (CY)	Compaction w/ Moisture and Density (CY)	Floodable Backfill* (A) (CY)	Porous Backfill* (B) (CY)	Flooded Backfill (1) (A+B) (CY)	Excavation Type	Excavation Quantity (CY)	Revetment Type	Revetment Quantity (TONS)	Engineering Fabric (SY)	Remarks
31+96.27		12' x 6' x 44'	RCB						24.6	307.6		111.8	2.2	114.0			Class E	101.700	134.3	

SHOULDERS																					112_09 4/21/26
(1) Lane(s) to which the shoulder is adjacent. (2) See Typ. 7156, 7157, or 7158. (3) Bid Item. (4) Applies only for Paved Shoulders constructed on project with existing granular shoulders. (5) Bid Item. Typ. 7156, 7157, or 7158. (6) Does not include shrink. (7) Paved shoulder thickness specified in Remarks. (8) Subbase type specified in Remarks.																					
Roadway Identification	Direction of Travel (1)	Station From	Station To	Side	P Width (FT)	P SG Width (2) (FT)	G Width (FT)	L Length (FT)	Class 13 Excavation (CY)(3)(4)	HMA (TON)	HMA (TON/ STA)	Binder (TONS)	Paved Shoulder (3) (SY)	Pavement Scarification (SY)	Polymer Grid (SY)	Granular Shoulder (3) (TON)	Granular Shoulder (TON/STA)	Shoulder Const. Alt (3) (STA)	Shoulder Const. Alt HMA (6) (CY)	Shoulder Const. Alt PCC (6) (CY)	Remarks
Butterfield Rd	NB	31+00.00	31+50.00	Right			0.0 to 4.0	50.00								6.125	12.250	0.50			
Butterfield Rd	SB	31+00.00	31+50.00	Right			0.0 to 4.0	50.00								6.125	12.250	0.50			
Butterfield Rd	NB	31+50.00	33+50.00	Right			4.0	200.00								49.000	24.500	2.00			
Butterfield Rd	SB	31+50.00	33+50.00	Right			4.0	200.00								49.000	24.500	2.00			
Butterfield Rd	NB	33+50.00	34+00.00	Right			4.0 to 0.0	50.00								6.125	12.250	0.50			
Butterfield Rd	SB	33+50.00	34+00.00	Right			4.0 to 0.0	50.00								6.125	12.250	0.50			
Total:																122.5		6			

SAFETY CLOSURES				108_13A 3/27/25
Refer to Section 2528 of the Standard Specifications				
Station	Road Closure Qty.	Hazard Closure Qty.	Remarks	
31+00.00	1		South Project Limits	
34+00.00	1		North Project Limits	
Total:		2		



ROLLED EROSION CONTROL											100_22 8/15/22
Refer to EC-101, EC-103 and EC-104.											
Line No.	Road Identification	Station From	Station To	Side	Length (FT)	Width (FT)	TRM Type (EC-104)	TRM Quantity (Squares)	Slope Protection (EC-103) (Squares)	Special Ditch Control (EC-101) (Squares)	Remarks
1.0	Butterfield Rd	31+00.00	32+00.00	Left	89.0	30.0	Type 3	8.0	19.0		SW Ditch, Width Listed is Approximate
2.0	Butterfield Rd	31+00.00	32+00.00	Right	62.0	30.0	Type 3	6.0	13.0		SE Ditch. Width Listed is Approximate
3.0	Butterfield Rd	32+00.00	34+00.00	Left	175.0	35.0			41.0	15.0	NW Ditch. Width Listed is Approximate
4.0	Butterfield Rd	32+00.00	34+00.00	Right	130.0	30.0			43.0	12.0	NE Ditch. Width Listed is Approximate
Total:								14	116	27	

232_03A 9/28/22
EROSION CONTROL (RURAL SEEDING)
Area to be seeded is estimated to be less than 1 acre. If the contractor determines the area exceeds 2 acres, notify the Engineer. Approved quantity in excess of 2 acres will be paid for as extra work according to Article 1109.03,B of the Standard Specifications.
Following the completion of work in a disturbed area and according to the seeding dates in Section 2601 of the Standard Specifications, place seed, fertilizer, and mulch on the disturbed area lying 8 feet adjacent to shoulder and median as follows:
Place seed and fertilize according to the requirements of Article 2601.03,C,3 and Section 4169 of the Standard Specifications.
Place mulch according to the requirements of Articles 2601.03,E,2,a and 4169.07,A of the Standard Specifications.
Preparing the seedbed, furnishing and applying seed, fertilizer, and mulch are all incidental to mobilization and will not be paid for separately.

281_03 11/9/23
STORM WATER BEST MANAGEMENT PRACTICES
When the following best management practices are used, they are intended to account for disturbed areas where storage volume cannot be provided:
Perimeter and Slope Sediment Control Device, 20 in. dia.

232_03C 8/28/24
EROSION CONTROL (NATIVE GRASS SEEDING)
Area to be seeded is estimated to be less than 1 acre. If the Contractor determines the area exceeds 2 acres, notify the Engineer. Approved quantity in excess of 2 acres will be paid for as extra work according to Article 1109.03,B of the Standard Specifications.
Following the completion of work in a disturbed area and according to the seeding dates in Section 2601 of the Standard Specifications, place seed and mulch on the disturbed area lying 8 feet or more beyond the shoulder as follows:
SEED MIX: Big bluestem (Andropogon geradii) 6 lbs. PLS/Acre (7.0 kg/ha) Indiangrass (Sorghastrum nutans) 6 lbs. PLS/Acre (7.0 kg/ha) Little bluestem (Schizachyrium scoparium) 6 lbs. PLS/Acre (7.0 kg/ha) Partridge Pea (Chamaecrista fasciculata) 4 lbs. PLS/Acre (4.5 kg/ha) Sideoats grama (Bouteloua curtipendula) 4 lbs. PLS/Acre (4.5 kg/ha) Canada wildrye (Elymus canadensis) 2 lbs. PLS/Acre (2.2 kg/ha) Switchgrass (Panicum virgatum) 1 lbs. PLS/Acre (1.1 kg/ha) Oats (Avena sativa) 32 lbs./Acre (36.0 kg/ha)
Furnish Big bluestem, Indiangrass, Canada wildrye and Little bluestem that is bearded or equal to facilitate the application of seed.
Furnish seed certified as Source Identified Class (Yellow Tag) Source G0-Iowa. Oats are excluded from this requirement. Place seed according to the requirements of Article 4169.02 of the Standard Specifications.
Place mulch according to the requirements of Articles 2601.03,E,2,a and 4169.07,A of the Standard Specifications.
Preparing the seedbed, furnishing and applying seed and mulch are incidental to mobilization and will not be paid for separately.

PERIMETER AND SLOPE SEDIMENT CONTROL DEVICE							100_19 10/15/24
Possible Standards: EC-204							
Line No.	Station From	Station To	Side	Sediment Control Device Type	Diameter Size	Length (LF)	Remarks
1.0	31+00.00	34+00.00	Left	Perimeter and Slope	20 inch	340.00	
2.0	31+00.00	34+00.00	Right	Perimeter and Slope	20 inch	340.00	
3.0	31+00.00	31+85.00	Left	Ditch Check	20 inch	120.00	SW Ditch Check, 17' Spacing
4.0	31+00.00	31+85.00	Right	Ditch Check	20 inch	130.00	SE Ditch Check, 13' Spacing
5.0	32+20.00	34+00.00	Left	Ditch Check	20 inch	170.00	NW Ditch Check, 35' Spacing
6.0	32+20.00	34+00.00	Right	Ditch Check	20 inch	130.00	NE Ditch Check, 45' Spacing
Total:						1230	



SURVEY SYMBOLS

	Interstate Highway Symbol		Septic Tank
	U.S. Highway Symbol		Cistern
	Iowa Highway Symbol		L.P. Gas Tank (No Footing)
	County Road Highway Symbol		Underground Storage Tank
	Evergreen Tree		Latrine
	Deciduous Tree		Satellite TV Dish
	Fruit Tree		Water Hook Up
	Shrub (Bushes)		Radio Tower
	Timber		Tower Anchor
	Hedge		Guardrail (Beam or Cable)
	Stump		Guard Post (one or two)
	Swamp		Guard Post (over two)
	Rock Outcrop		Filler Pipe
	Broken Concrete		Gas Valve
	Revetment (Rip Rap)		Water Valve
	Cemetery		Speed Limit Sign
	Grave		Mile Marker Post
	Cave		Sign
	Sink Hole		Traffic Signal Control Box
	Board Fence		Rail Road Signal Control Box
	Chain Link or Security Fence		Telephone Switch Box
	Wire Fence		Electric Box
	Terrace		
	Earth Dam or Dike (Existing)		
	Tile Outlet		
	Edge of Water		
	Existing Drainage		
	Right of Way Rail or Lot Corner		
	Concrete Monument		
	Well		
	Windmill		
	Beehive Intake		
	Existing Intake		
	Existing Utility Access (Manhole)		
	Fire Hydrant		
	Water Hydrant (Rural)		

UTILITY LEGEND

	Sanitary Sewer Force Main City of Hudson Rick Andorf 319-988-3600 ra14479@gmail.com
	Underground Fiber Optic CenturyLink Sadie Hull 918-547-0147 sadie.hull@lumen.com

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.		Transparency
Pink, Dark	(13)		Temporary Pavement Shading 50%
Yellow	(4)		Proposed Pavement Shading 50%
Orange	(6)		Proposed Granular Shading 50%
Orange	(70)		Proposed Shoulder Granular Shading 50%
Yellow	(68)		Proposed Shoulder Paved Full Depth Shading 50%
Yellow	(132)		Proposed Shoulder Paved Partial Depth Shading 50%
Brown, Light	(236)		Grading Shading 50%
Orange, Light	(134)		Proposed Granular Entrance Shading 50%
Yellow	(220)		Proposed Paved Entrance Shading 50%
Tan	(8)		Proposed Sidewalk Shading 50%
Blue, Light	(230)		Proposed Sidewalk Landing Shading 50%
Pink	(11)		Proposed Sidewalk Ramp Shading 50%
Red	(3)		Proposed Structure Shading 50%
Red	(3)		Delineates Restricted Areas 0%

PROFILE VIEW COLOR LEGEND OF PLAN AND PROFILE SHEETS

LINEWORK	Design Color No.		
Green	(10)		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	
	Survey Line	
	Station	
	Section Corner	
	Ground Line Intercept	
	Saw Cut	
	Guardrail	
	Trench Drain	
	HighTension Cable Guardrail	
	Sheet Pile	
	Pavement Removal	

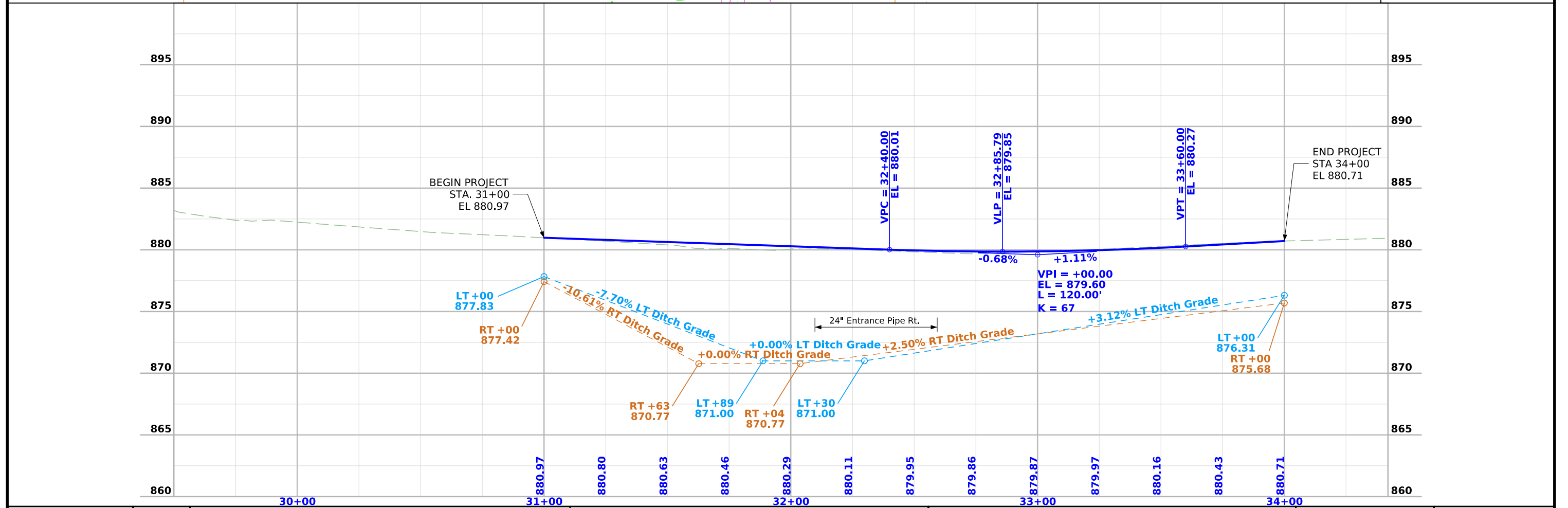
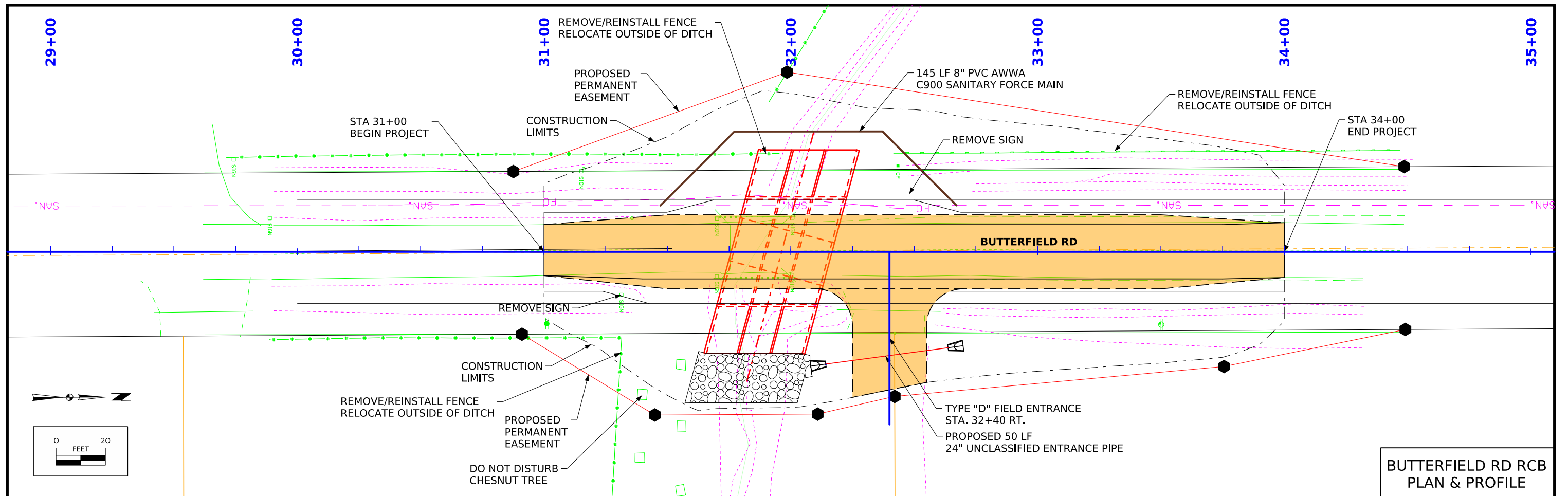
RIGHT-OF-WAY LEGEND

	Proposed Right-of-Way Symbol
	Proposed Right-of-Way Line
	Existing Right of Way
	Existing and Proposed Right-of-Way
	Easement and Existing Right-of-Way
	Easement (Temporary) Symbol
	Easement (Temporary) Line
	Easement
	C/A Access Control
	Property Line Symbol
	Property Line

PLAN AND PROFILE  
LEGEND AND SYMBOL  
INFORMATION SHEET





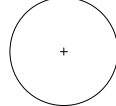
(COVERS SHEET SERIES D, E, F, & K)












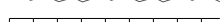





















LINE STYLE LEGEND OF LANDSCAPE SHEETS	
LINESTYLE	Design Element
-----	Living Snow Fence Single Row
- - - - -	Living Snow Fence Double Row
_____	Mechanical Edge

















CELL LEGEND OF LANDSCAPE SHEETS		
CELL	Design Element	Plant Diameter
	Clearing	
	Proposed Shrub	6 FT
	Proposed Understory Tree	12 FT
	Proposed Conifer Tree	18 FT
	Proposed Overstory Tree	30 FT

PATTERN LEGEND OF LANDSCAPE SHEETS	
	Brush Clearing
	Clearing & Grubbing
	Spray Area

LINE STYLE LEGEND OF EROSION CONTROL SHEETS	
LINESTYLE	Design Element
	Silt Fence
	Perimeter and Slope Sediment Control Device (9")
	Perimeter and Slope Sediment Control Device (12")
	Perimeter and Slope Sediment Control Device (20")
	Open-Throat Curb Intake Sediment Filter
	Concentrated Flow
	Rock Check and Rock Check Dam
	Sheet Flow

CELL LEGEND OF EROSION CONTROL SHEETS	
CELL	Design Element
	Temporary Sediment Control basin
	Erosion Control for Circular Intake or Manhole Well
	Erosion Control for Rectangular Intake or Manhole Well
	Grate Intake Sediment Filter Bag
	Silt Basin
	Silt Fence Tail
	Stormwater Drainage Basin Discharge Point

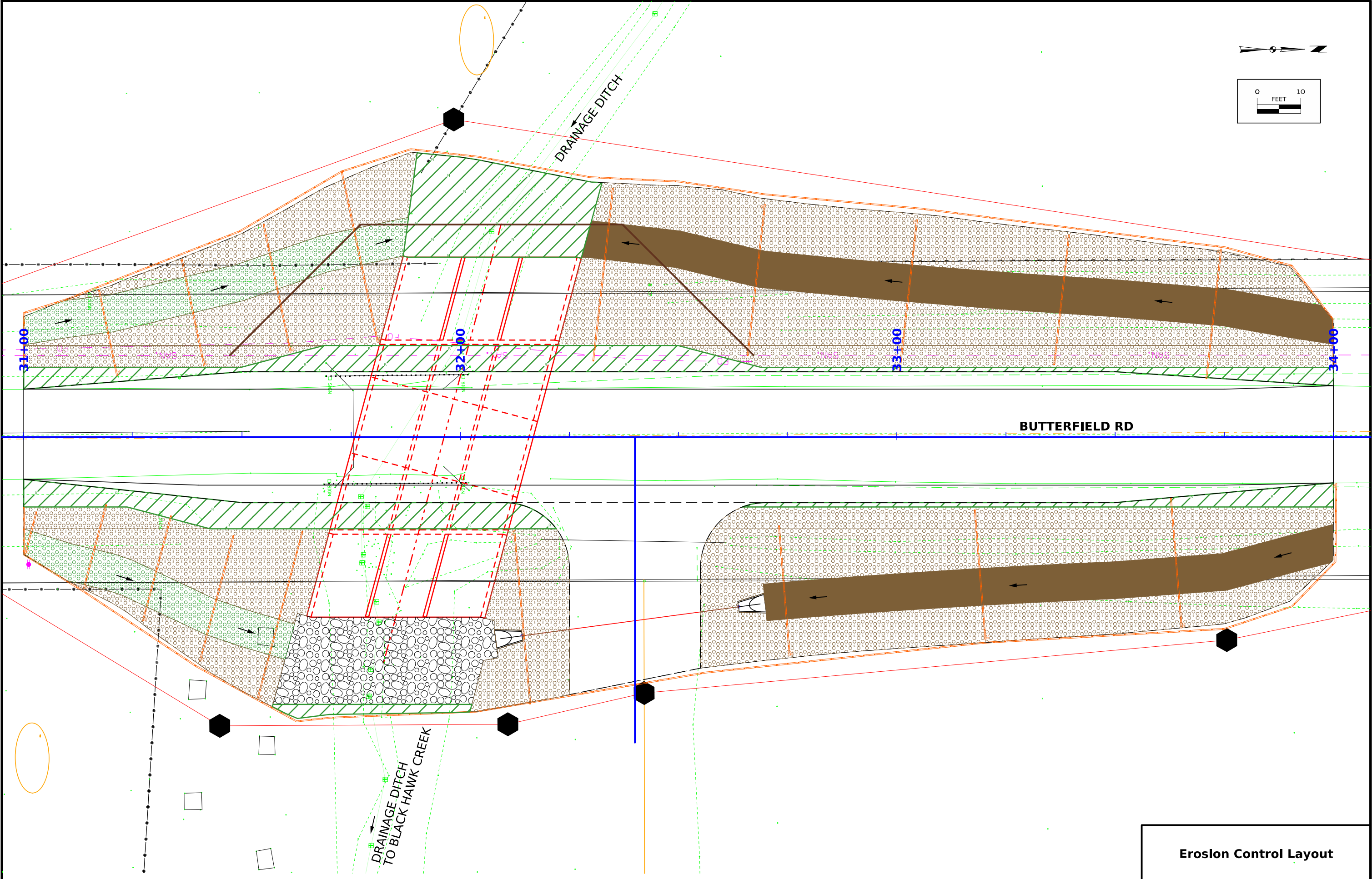
PLAN VIEW COLOR LEGEND OF EROSION CONTROL SHEETS				
LINEWORK	Design Color No.			
Green	(2)		Existing Topographic Features and Labels	
Blue	(1)		Proposed Alignment, Stationing, Tic Marks, and Alignment Annotation	
Magenta	(5)		Existing Utilities	
Black	(0)		Permanent Erosion Control Features	
Blaze Orange	(222)		Temporary Erosion Control Features	
SHADING	Design	Color No.	Transparency	
Citron	(234)		Mulching, All Types	50%
Light Brown	(238)		Special Ditch Control, Wood Excelsior Mat	0%
Grass Green	(233)		8FT Mow Strip	50%
Red	(3)		Delineates Restricted Areas	0%

PATTERN LEGEND OF EROSION CONTROL SHEETS			
	Seeding and Fertilizing		Turf Reinforcement Mat Type 1
	Seeding and Fertilizing (Rural)		Turf Reinforcement Mat Type 2
	Seeding and Fertilizing (Urban)		Turf Reinforcement Mat Type 3
	Native Grass Seeding		Turf Reinforcement Mat Type 4
	Salt Tolerant Seeding		Slope Protection, Wood Excelsior Mat
	Wetland Grass Seeding		Transition Mat
	Wildflower Seeding		Rock Features, Permanent
	Sodding		Rock Features, Temporary

EROSION CONTROL  
LEGEND AND SYMBOL  
INFORMATION SHEET

(COVERS SHEET SERIES R)





**Erosion Control Layout**











General Notes:

It is the intent of this design to construct a Triple 12' x 6' x 44'-0" Reinforced Concrete Box culvert skewed 15° Left Ahead at Station 31+96.27.

The lump sum bid for "Removal of Existing Bridge" shall include all work for removal and disposal of the existing bridge. All salvageable material and unsalvageable material shall become the property of the Contractor and shall be removed from the site by the Contractor. The existing structure shall be removed to an elevation at least 1 foot below finished groundline and the the extent that it will not interfere with the new construction.

Removals shall be in accordance with Section 2401, of the Standard Specifications.

Faint lines on plans indicate existing structure.

Utility Companies and Municipalities whose facilities are shown on the plans or known to be within the construction limits shall be notified by the Contractor of the construction starting date.

The RCB culvert sections are designed for HL-93 live load and earth fills of 3.9 feet.

Except for dowel bars 5r1, longitudinal reinforcing is not to extend thru the construction joints.

All slab and floor reinforcing steel is to be supported at intervals of not more than 3'-0" in either direction as outlined in the Standard Specifications.

Excess Class 20 Excavation material suitable for backfilling shall be stockpiled at the construction site, as directed by the Engineer.

Class 20 Excavation material unsuitable for backfilling shall be disposed of in a manner that will leave the site in a neat condition.

When de-watering presents a problem for placing the curtain walls as detailed, alternate methods such as steel sheet pile and precast concrete walls may be approved but at no additional cost. The Culvert Contractor is to submit to the Engineer for approval complete drawings of the propsoed curtain wall alternate before beginning construction.

The cast in place box culvert shall be built to the dimensions and specifications shown in these plans.

All reinforcing bars and bars noted as dowels supplied for this structure shall be deformed reinforcement unless otherwise noted or shown.

The roadway will be closed to traffic during construction. See traffic control plan note.

A scrape sample was taken from an area of this bridge to get an indication of the existence of and level of total lead and total chromium. Analysis of total lead on this sample was 26% lead concentration by weight. Analysis of total chromium on this sample was 0.039% chromium concentration by weight. These analyses show the existence of these two toxic constituents. Levels indicated by these tests could create conditions above regulatory limits for health and safety requirements. No other constituents were analyzed. The Bidder should not rely on the Iowa DOT's testing and analysis for any purpose other than as an indication of the existence of these two toxic constituents.

Specifications:

See Culvert Standard "TRRCB G2-20" for "Specifications" Note.

Design Stresses:

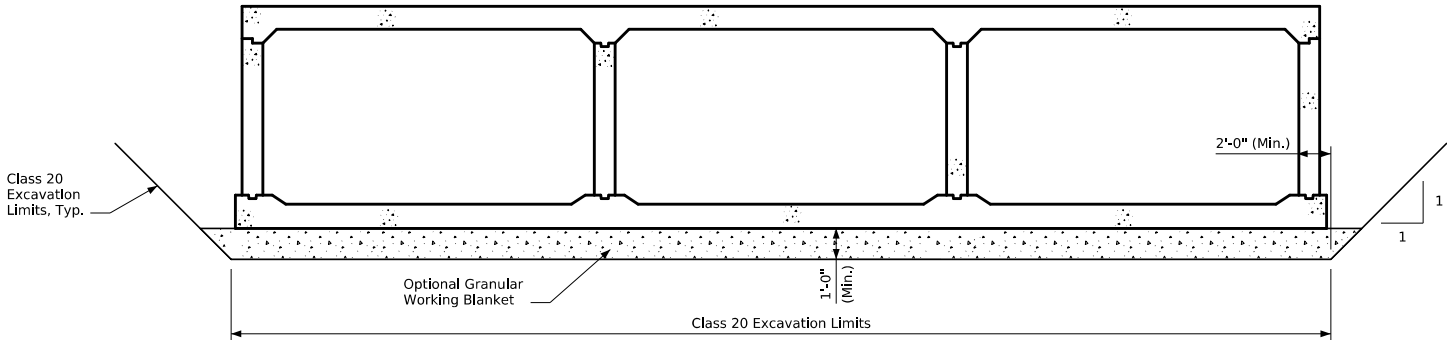
See Culvert Standard "TRRCB G2-20" for "Design Stresses" Note.

English Culvert Standards		
Standard	Issued	Revised
TRRCB G 1-20	07-2020	
TRRCB G 2-20	07-2020	
TRRCB G 3-20	07-2020	
TRRCB 12-6-20	07-2020	
TRPWH 15-1-20	07-2020	
TRPWH 15-2-20	07-2020	
TRPWH 15-3-20	07-2020	
TRPWH 15-4-20	07-2020	
TRPWH 15-5-20	07-2020	
TRPWH 15-6-20	07-2020	

Traffic Control Plan
The roadway will be closed to thru traffic. Refer to the Traffic Control Plan shown elsewhere in these plans.

Summary of Concrete Quantities				
Location	Footing	Walls	Slab	Total
12' x 6' Headwall 15° Skew (2 Required)	2 @ 41.7	2 @ 8.4	2 @ 3.6	107.4
13'-0" End Section (2 Required)	2 @ 16.9	2 @ 8.0	2 @ 15.1	80.2
18'-0" Barrel Section (1 Required)	1 @ 23.4	1 @ 11.1	1 @ 21.0	55.5
Total (Cu. Yds.)	140.6	44.0	58.5	243.1

Summary of Reinforcing Steel		
Location	Quantity	Total
12' x 6' Headwall 15° Skew (2 Required)	2 @ 6,773	13,546
13'-0" End Section (2 Required)	2 @ 7,300.5	14,601.0
18'-0" Barrel Section (1 Required)	1 @ 10,108.4	10,108.4
Total (Lbs.)		38255.4



Standard Excavation Detail

Design For 15 Degree LA

Triple 12' x 6' x 44'

Cast In Place RCB Culvert

General Notes

STA. 31+96.27 (Butterfield Rd)

Hudson, Black Hawk County

IOWA DEPARTMENT OF TRANSPORTATION

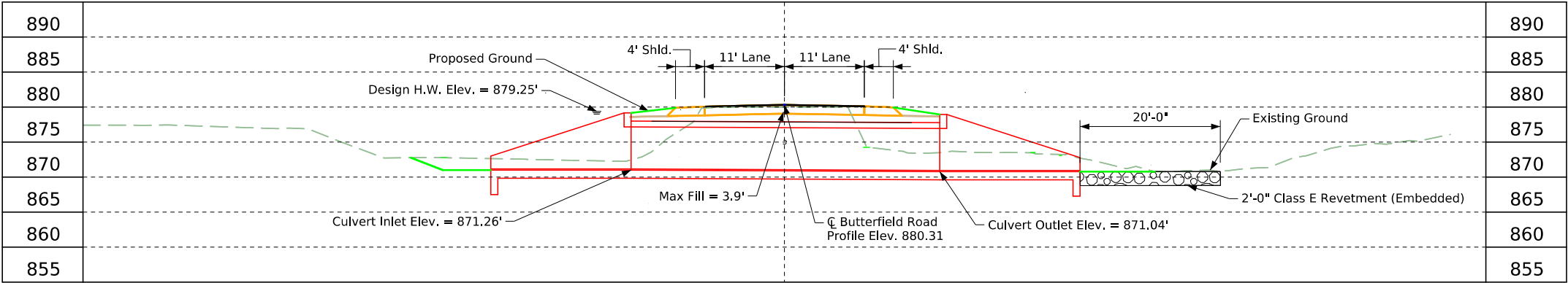
Design No. Design Sheet No. 1 of 2 FHWA No. 006120



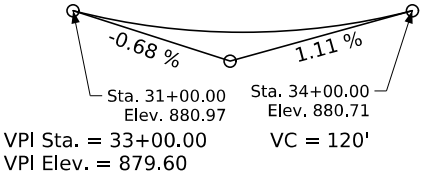
Control Point: CP10  
Northing: 8826739.533  
Easting: 15448244.21  
Elevation: 883.152  
Description: BM CUT X IN  
CONC. POST

**Location**  
Butterfield Rd Over Creek  
T-88N R-14W  
Section 11  
Black Hawk Township  
Black Hawk County  
FHWA No. 006120  
Latitude 42.449027°  
Longitude -92.441645°

**Hydraulic Data**  
RIDB: Not Applicable  
Drainage Area = 2.32 Sq.mi  
Stream Slope = 39.6 Ft./Mi.  
Q<sub>50</sub> = 1,770 cfs  
HW Elev. = 879.25  
Exit Velocity = 8.19 fps  
Q<sub>100</sub> = 2,110 cfs  
HW Elev. = 880.31  
Exit Velocity = 9.18 fps



Longitudinal Section Along  $\text{\textcircled{C}}$  Culvert

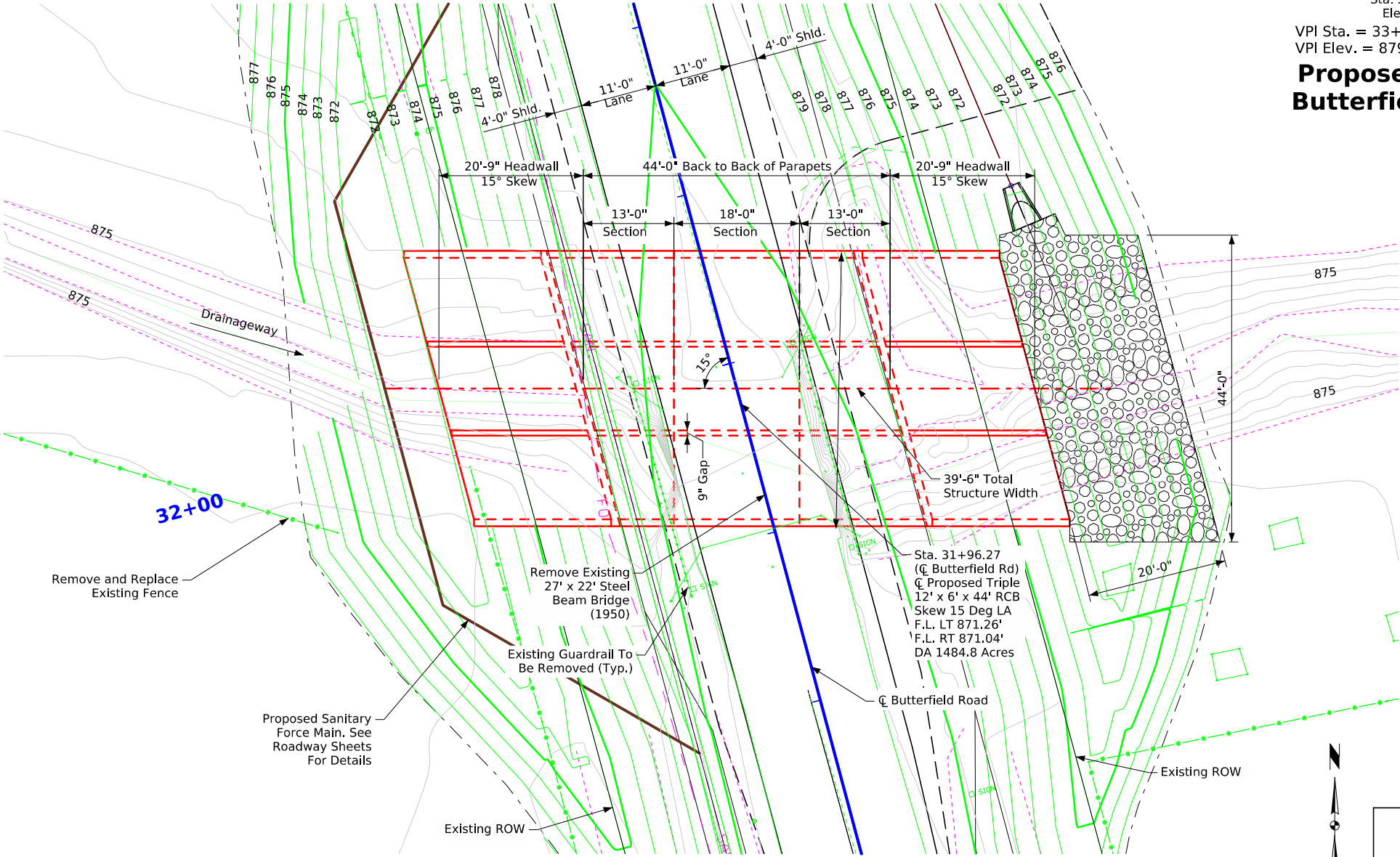


Proposed Profile Grade  
Butterfield Rd = 880.31'

**Design Notes:**  
This design is for the replacement of the existing 27' x 22' Steel Beam Bridge.

**Utilities Note:**  
Utilities shown on this sheet are for information only. See Road Design sheets for utility information.

**General Utility Symbols:**  
E - Electric Line  
G - Gas Line  
SAN. - Sanitary Sewer  
T - Telephone Line  
W - Water Line  
FO - Fiber Optic Line  
GHP - Gas High Pressure  
ST S - Storm Sewer  
TV - TV  
● - Power Poles



Situation Plan

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: *Dan Kimball* Date: **3-17-26**

Printed or Typed Name: **DANIEL D. KIMBALL**

My license renewal date is December 31, 2026

Pages or sheets covered by this seal: Hydraulics - This Sheet

Design For 15 Degree LA

**Triple 12' x 6' x 44'**

**Cast In Place RCB Culvert**

**Situation Plan**

STA. 31+96.27 ( $\text{\textcircled{C}}$  Butterfield Rd)

**Hudson, Black Hawk**

IOWA DEPARTMENT OF TRANSPORTATION

Design Sheet No. 2 of 2      FHWA/Asset 006120



CROSS SECTION VIEW COLOR LEGEND			
Design Color No.	Feature	Design Color No.	Feature
Aggregate		Grading	
(64)	Choke Stone	(8)	Behind Curb Cut
(42)	Engineering Fabric	(6)	Granular
(8)	Flooded Backfill	(13)	Granular Back Fill
(92)	Macadam Stone	(48)	Rock Undercut
(20)	Modified	(8)	Shoulder Earth Fill
(12)	Plowing Shaping	(2)	Side Slopes
(14)	Porous Backfill	(226)	Side Slopes Dressing
(8)	Revetment Class A	Substrata	
(6)	Revetment Class B	(128)	Boulder
(62)	Revetment Class C	(209)	Boulder Removed
(188)	Revetment Class D	(48)	Broken Weathered
(28)	Revetment Class E	(210)	Broken Weathered Removed
(12)	Shoulder Special Backfill	(3)	Core Out
(12)	Special Backfill	(115)	Core Out Remove Only
(20)	Subbase	(195)	Core Out Remove and Replace
(20)	Subbase Lower	(203)	Existing Pavement
(20)	Subbase Upper	(184)	Existing Pavement Remove Only
(118)	Subgrade Treatment	(200)	Existing Pavement Remove and Replace
Asphalt		(6)	Loam
(207)	HMA Base Course	(211)	Loam Removed
(207)	HMA Interim Course	(80)	Rock
(207)	HMA Surface Course	(212)	Rock Removed
Bridge		(4)	Select Sand
(0)	Bridge	(214)	Select Sand Removed
Concrete		(3)	Shale
(0)	Barrier Concrete	(215)	Shale Removed
(0)	Barrier Concrete Footing	(10)	Topsoil
(0)	Curb Gutter	(2)	Topsoil Remove Only
(48)	Flowable Mortar	(4)	Topsoil Remove and Replace
(0)	Median Concrete	Unsuitable / Waste	
(0)	PCC Pavement	(3)	Unsuitable Type A
(0)	Sidewalk	(216)	Unsuitable Type A Removed
Existing		(13)	Unsuitable Type B
(0)	Existing Pavement	(217)	Unsuitable Type B Removed
Shoulder		(11)	Unsuitable Type C
(209)	Shoulder HMA	(218)	Unsuitable Type C Removed
(0)	Shoulder PCC	(3)	Waste
(6)	Shoulder Granular	(219)	Waste Removed
Structural			
(112)	Noise Wall		
(112)	Noise Wall Footing		
(112)	Retaining Wall Back		
(112)	Retaining Wall Back Excavate		
(112)	Retaining Wall Face		
(112)	Retaining Wall Front Excavate		
(112)	Retaining Wall Front Footing		
(112)	Retaining Wall MSE Gutter		
(112)	Retaining Wall Reinforced Earth		

NOTES:

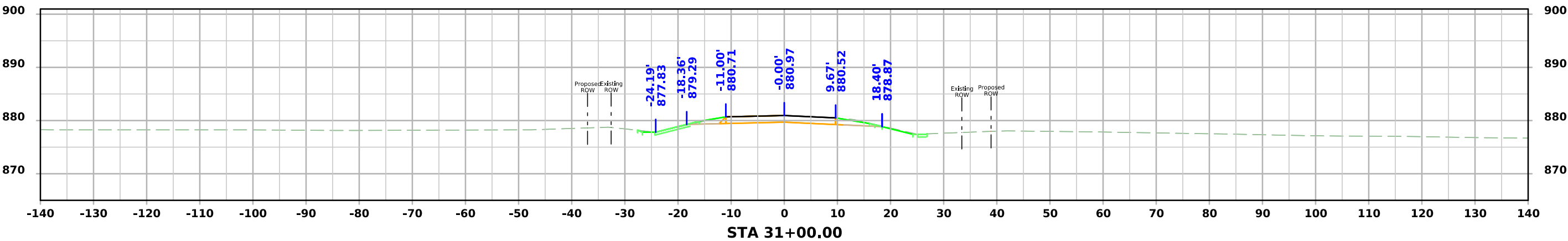
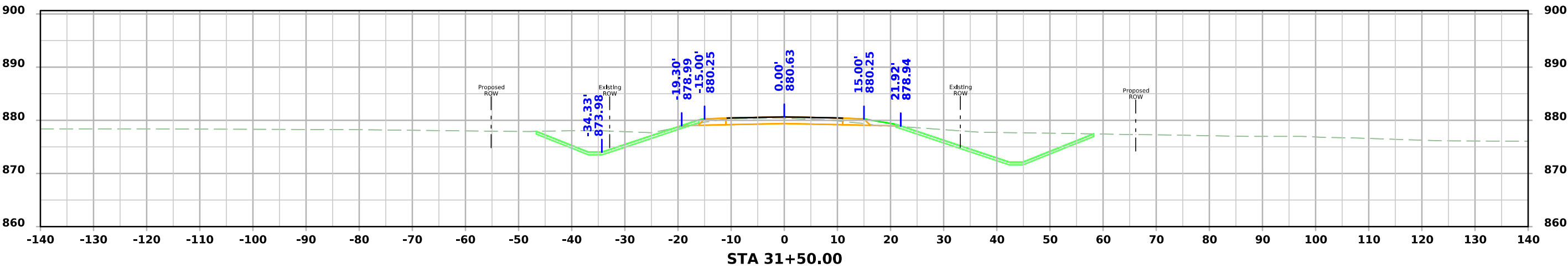
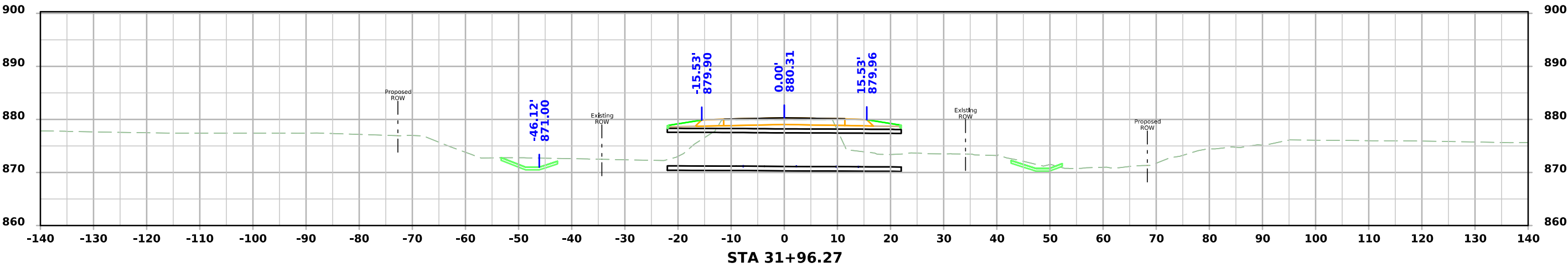
NOTES:

CROSS SECTIONS  
LEGEND AND INFORMATION SHEET

(COVERS SHEET SERIES W, X, Y, & Z)

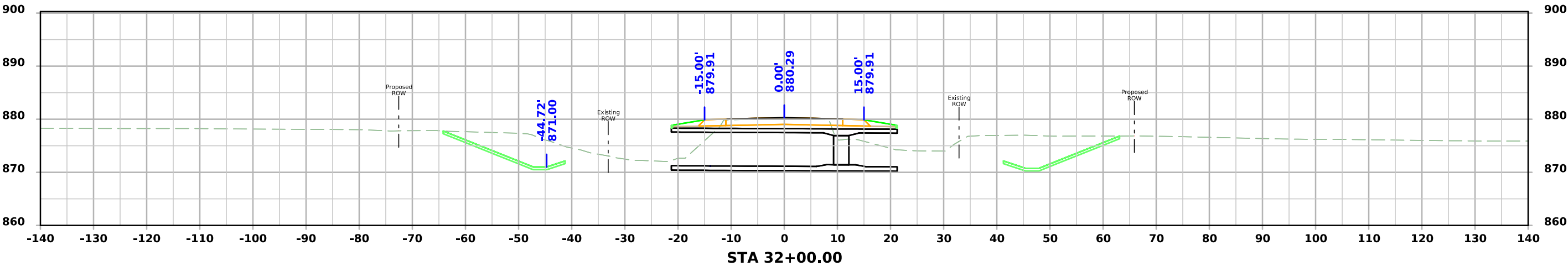
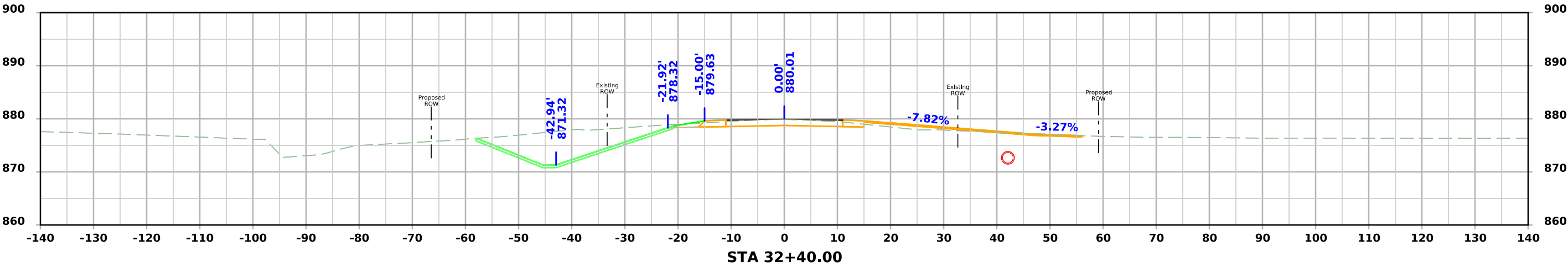
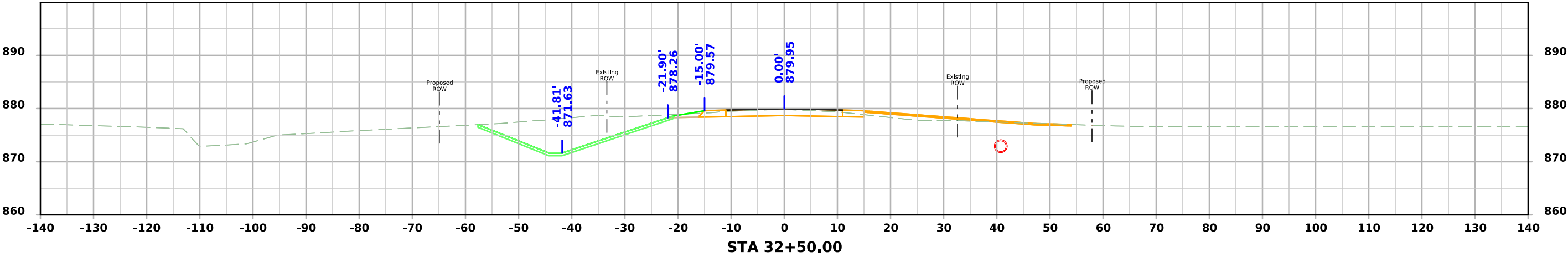


BUTTERFIELD RD





BUTTERFIELD RD





# BUTTERFIELD RD

