LETTING DATE 12-21-2021

RCB CULVERT REPLACEMENT
BRFN-057-1(32)--39-12

BUTLER Co.

INDEX OF SHEETS

IOWA DOT

Highway Division

PLANS OF PROPOSED IMPROVEMENT ON THE

PRIMARY ROAD SYSTEM

BUTLER COUNTY

RCB CULVERT REPLACEMENT

IA 57 bridge over Gran Creek 0.5 miles east of County Road T19

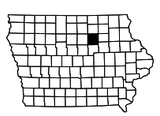
SCALES: As Noted

Refer to the Proposal Form for list of applicable specifications.

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

REVISIONS

TOTAL 24
PROJECT IDENTIFICATION NUMBER
17-12-057-010
PROJECT NUMBER
BRFN-057-1(32)--39-12
R.O.W. PROJECT NUMBER
STPN-057-1(33)--2J-12



For Project Location Map
Refer to Sheet No. A.02

DESIGN DATA RURAL

2021 AADT	1,500	V.P.D.
2041 AADT	1,600	V.P.D.
2041 DHV	170	V.P.H.
TRUCKS	20	%
Total Design ESALs	--	

INDEX OF SEALS

SHEET NO.	NAME	TYPE
A.1	Michael J. Janechek	Primary Signature Block

D4 PLAN – Date: Aug 24, 2021

PRELIMINARY PLANS

Subject to change by final design.

D5 PLAN – Date: Dec 20, 2019

FILE NO. 31685	ENGLISH	DESIGN TEAM IOWA DOT / SHIVE-HATTERY	BUTLER COUNTY	PROJECT NUMBER BRFN-057-1(32)--39-12	SHEET NUMBER A.1

8:00:15 AM 12/16/2019 mjanechek pw:\\projectwise.dot.int.lan:PWMain\Documents\Projects\1205701017\Design\SHT_12057032_A1.sht

IA 57 BRIDGE REPLACEMENT
STA.: 211+02
FHWA NO.: 16390
MAINT. NO.: 1216.4S057
GRAN CREEK 0.5 MILES EAST
OF COUNTY ROAD T19

LOCATION MAP SCALE
0 1 2 3
Miles

FILE NO. 31685	ENGLISH	DESIGN TEAM IOWA DOT / SHIVE-HATTERY	BUTLER COUNTY	PROJECT NUMBER BRFN-057-1(32)--39-12	SHEET NUMBER A.2

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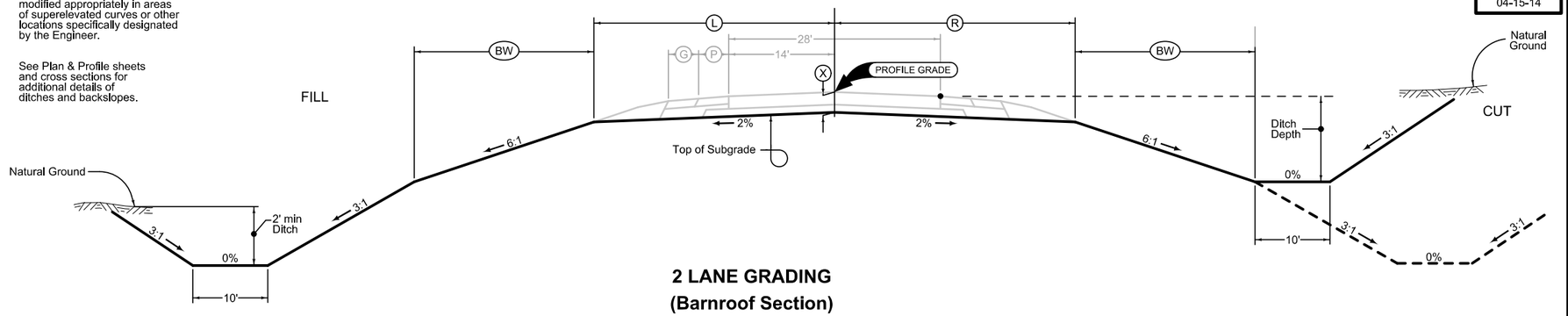
LOCATION			DIMENSIONS			
ROAD IDENTIFICATION	STATION TO STATION		(L) Feet	(R) Feet	(X) Inches	(BW) Feet
IA 57	210+11.58	212+70.18	31.11	31.11	21.0	14.91

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

See Plan & Profile sheets and cross sections for additional details of ditches and backslopes.



2 LANE GRADING
(Barnroof Section)

G_2_Grade_BR
04-15-14

FILE NO. 31685	ENGLISH	DESIGN TEAM IOWA DOT / SHIVE-HATTERY	BUTLER COUNTY	PROJECT NUMBER BRFN-057-1(32)--39-12	SHEET NUMBER B.1

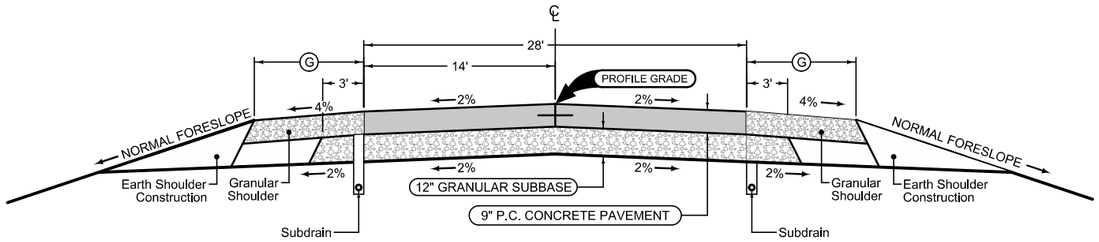
8:00:38 AM 12/16/2019 mjanechek pw:\\projectwise.dot.int.lan:PWMain\Documents\Projects\1205701017\Design\SHT_12057032_B1.sht

Granular Shoulder

		2_G_SR_ 10-19-10
STATION TO STATION		(G) Feet
210+11.58	212+50.00	6
212+50.00	212+70.18	6-1

Granular Shoulder

		2_G_SR_ 10-19-10
STATION TO STATION		(G) Feet
210+11.58	212+70.18	6



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

	2P_ 10-19-10
STATION TO STATION	
210+11.58	212+70.18

See Tab 100-24 or 100-25 for pavement quantities.

See Tab 112-9 for shoulder quantities.

IA 57

100-1D
10-18-05

PROJECT DESCRIPTION

This project involves the replacement of the IA 57 bridge over Gran Creek, 0.5 miles East of County Road T19, with a triple 10' x 12' RCB culvert.

100-0A
10-28-97

ESTIMATED ROADWAY QUANTITIES
(1 DIVISION PROJECT)

Item No.	Item Code	Item	Unit	Total	As Built Qty.

105-4
10-18-11

STANDARD ROAD PLANS

The following Standard Road Plans apply to construction work on this project.

Number	Date	Title
DR-303	10-17-17	Subdrains (Longitudinal)
DR-305	04-17-18	Subdrain Outlets (standard Subdrain, Pressure Release and Special)
EC-201	10-16-18	Silt Fence
EC-202	10-21-14	Floating Silt Curtain
EC-204	04-18-17	Perimeter and Slope Sediment Control Devices
EC-301	10-18-16	Rock Erosion Control (REC)
EW-101	10-17-17	Embankment and Rebuilding Embankments
EW-102	10-20-15	Allowable Placement of Unsuitable Soil in Embankments
PM-110	10-16-18	Line Types
PM-420	04-19-11	Two-Lane Roadway with no Turn Lanes (One-Way Stop Condition)
PV-101	10-16-18	Joints
TC-1	04-16-13	Work Not Affecting Traffic (Two-Lane or Multi-Lane)
TC-202	04-21-15	Work Within 15 ft of Traveled Way
TC-252	04-19-16	Routes Closed to Traffic

262-6
10-18-05

UTILITIES
(NOT A POINT 25 PROJECT)

This is NOT a POINT 25 project and is not subject to the provisions of IAC 761-115.25.

281-1
10-18-16

SECTION 404 PERMIT AND CONDITIONS

Construct this project according to the requirements of U.S. Army Corps of Engineers Nationwide, Permit No. 2021-14. A copy of thi spermit is available from the Iowa DOT website (http://www.envpermits.iowadot.gov/). The U.S. Army Corps of Engineers reserves the right to visit the site without prior notice.

SURVEY SYMBOLS

- CP Control Point
- WC Wild Card (Misc. Field Shot)
- C Centerline BL of Road (ML or SR)
- EP Edge of Paved Roads (ML or SR)
- EG Edge of Gravel Road
- BL Topo Breakline
- GR Ground Shot
- FW Wire Fence
- LUM Luminaire
- MIS Miscellaneous
- EL1C Electric Line Co. 1 - Quality C
- TPD Telephone Pedestal
- SI Sign
- GDL Guard Rail Steel
- CU Back of Curb
- BM Bench Mark
- TLNR Tree Line Right
- PPA Power Pole Co. 1
- EL1B Electric Line Co. 1 - Quality B
- TDC Tree Deciduous
- LC Lot Corner
- BCL Bridge Centerline
- TW Top of Water
- OUT Tile Outlet
- TL1C Telephone Line Co. 1 - Quality C
- FO1C Fiber Optic Co. 1 - Quality C
- ROW Right of Way Mark
- TL1B Telephone Line Co. 1 - Quality B
- D Centerline Draw or Stream (Down)
- BRG Bridge
- BBB Bottom of Bridge Beam
- TOP Top of Bridge Pier
- WL1C Water Line Co. 1 - Quality C

UTILITY LEGEND

Sub-Surface Utility Mapping Quality Level is in accordance with CI/ASCE 38-02 Standard Guidelines for the Collection and Depiction of Existing Subsurface Utility Data.

Remark Abbreviations
QLA Quality Level A Highest guideline quality level
QLD Quality Level D Lowest guideline quality level

E(C)
MidAmerican Energy - Quality C
David Kline
319-231-4726
319-230-2781
dkline@midamerican.com

T(C)
Windstream Communications - Quality C
Terry Burke
641-787-2259
641-218-0198
Terry.r.burke@windstream.com

W(C)
Iowa Reginal Utility Assoc. - Quality C
Micheal Madren
641-792-7011
mmadren@irua.net

- LUM Luminaire
- TPD Telephone Pedestal
- PPA Power Pole MidAmerican Energy
- E(B) MidAmerican Energy - Quality B
- FO(C) Windstream Communications - Quality C

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
- C/A Access Control
- Property Line

PLAN AND PROFILE LEGEND AND SYMBOL INFORMATION SHEET

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

FILE NO. 31685	ENGLISH	DESIGN TEAM **IOWA DOT / SHIVE-HATTERY**	**BUTLER** COUNTY	PROJECT NUMBER **BRFN-057-1(32)--39-12**	SHEET NUMBER **D.1**

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Sect. No. 24

Washington TWP.
T-90N R-18W
SEC. 24 & 25

STA. 210+11.58
BEGIN PROJECT

EXISTING ROW

Guardrail to be salvaged to Allison Garage

STA. 212+70.18
END PROJECT

209 210 211 212 213 214

Pt Sta 212+15.20

+06 Ent. (UAC)

SIGN

REMOVE GUARDRAIL (TYP.)

EXISTING ROW

3:1 6:1

Skew 30 RT AH
35'x42.9'
Steel Beam
D.A.=5.2 sq.mi.
REMOVE

Build Triple 12'x10'x98' RCB Culvert
Skew 25°RT AH
Design No. 0122
Sta 211+02.50

0 FEET 20

Sect. No. 25

998 996 994 992 990 988 986 984 982 980 978 976 974 972 970

Tie In
Sta. 210+11.58
Elv. 983.62

983.62

+0.098%

VPI +12.026
Elv 983.72
K = 96
Len 100.00 ft

+1.141%

985.53

Tie In
Sta. 211+70.18
Elv. 985.53

+12 Lt.
979.06

+12 Rt.
974.50

-8.70% Lt. Ditch Grade

-19.54% Rt. Ditch Grade

+30 Rt.
970.90

+00 Rt.

+10 Lt.
970.50

+5.64% Rt. Ditch Grade

+75 Lt.
970.50

+7.20% Lt. Ditch Grade

+25 Lt.
974.10

+70 Rt.
980.50

Lt: U.A.C. | DG | Ditch Grade | Culvert | Culvert | Ditch Grade | U.A.C.
Rt: U.A.C. | Culvert | Ditch Grade | U.A.C.

983.63 983.65 983.67 983.71 983.79 983.91 984.07 984.27 984.50 984.73 984.95 985.18 985.41

+40 +60 +80 209 +20 +40 +60 +80 210 +20 +40 +60 +80 211 +20 +40 +60 +80 212 +20 +40 +60 +80 213 +20 +40 +60 +80 214 +20 +40

FILE NO. 31685	ENGLISH	DESIGN TEAM IOWA DOT / SHIVE-HATTERY	BUTLER COUNTY	PROJECT NUMBER BRFN-057-1(32)--39-12	SHEET NUMBER D.2

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Survey Information

Butler County
BRFN-057-1(32)-39-12
State Hwy 57 over Gran Creek
0.5mi E of Co Rd T19
PIN 17-12-057-010
Sap-08301

General Information

Measurement units for this survey are US survey feet. This survey is for proposed Bridge reconstruction and reconstruction of State Highway 57 over Gran Creek. Project datum and control information is provided by Shive-Hattery Inc. This project is a Terrain Model and Survey control. This survey request was for the State Highway 57 corridor and Gran Creek information.

Vertical Control

Vertical datum for this survey is NAVD88 (Computed using Geoid12A). Additional benchmarks were placed throughout the project using a Total Station setup relative to Pt. 1 and Pt. 2.

This survey observed 4 local area county Control Monuments with published NAVD88 heights to compare to local ground control:

Jones County Control mark GPS 20 has a published Elev. of 1016.05
Survey Elev. = 1016.05

Jones County Control mark GPS 19 has a published Elev. of 1085.87
Survey Elev. = 1085.81

Jones County Control mark GPS 116 has a published Elev. of 1038.76
Survey Elev. = 1038.62

Jones County Control mark GPS 124 has a published Elev. of 1015.25
Survey Elev. = 1015.19

Horizontal Control

(State Plane Coordinates)
The project coordinate system for this survey is Iowa Regional Coordinate System - Zone 5 (U.S. Survey Feet). This survey control is relative to IaRTN reference stations. IaRTN Reference Station coordinates are relative to the National Reference Station network datum: NAD83 (2011) for Epoch 2010.00. Coordinates were determined by IaRTN observations with appropriate occupation times. Additional control points were placed throughout the project using a Total Station setup relative to Pt. 1 and Pt. 2.

Alignment Information

The horizontal alignment for this survey is a retrace of As-built Plans No. FN-274, Design 161. Survey stationing was equated to the plan centerline of bridge at STA 211+07.1 and run back and ahead without equation throughout the survey.

Survey stationing relates to as built plan stationing as follows:

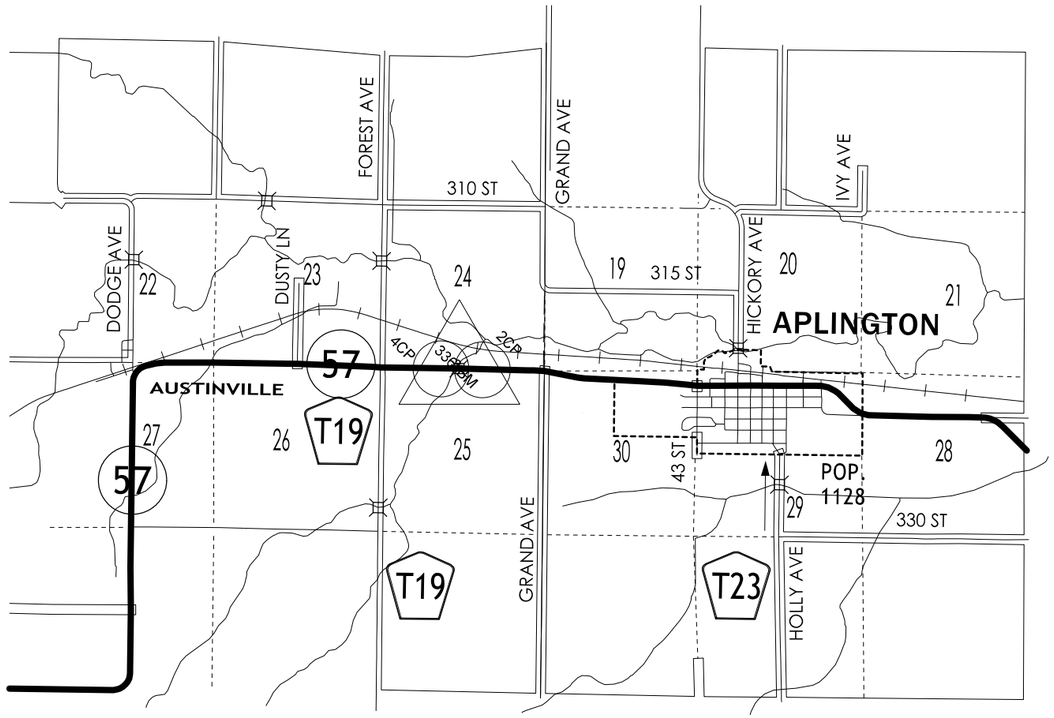
PI Sta. 185+62.75 Project No. FA-274

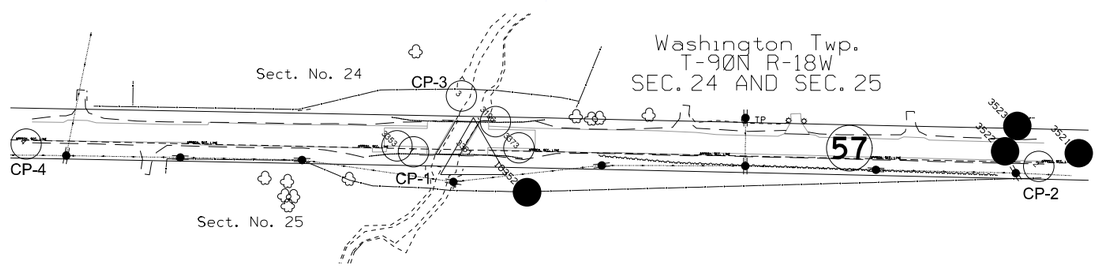
PI Sta 212+15.2 Project No. FA-274

POT Sta 224+57.5 Project No. FA-274

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 2010.00
VERT. DATUM: NAVD88
Ia. Regional Coordinate System Zone 5

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

HORIZONTAL AND VERTICAL PROJECT CONTROL COORDINATE LISTING

HORIZ. DATUM: NAD83(2011) EPOCH 2010.00

VERT. DATUM: NAVD88

Ia. Regional Coordinate System Zone 5

Point Name	Northing	Easting	Elevation	Feature Definition	Description
1	8877114.489	15320024.53	983.17	CP	TEMP CP
2	8877095.32	15320847.49	999.75	CP	CP
3	8877187.961	15320087.55	975.055	CP	TEMP CP
4	8877124.743	15319514.64	985.02	CP	CP
3196	8877154.214	15320132.41	984.766	CP	CX
3353	8877122.334	15320002.8	983.367	CP	CX
3361	8877109.606	15320103.4	984.644	BM	BM
3373	8877119.609	15320163.3	984.228	CP	CX
3521	8877112.656	15320900.14	1002.524	LC	IR PK
3522	8877115.109	15320803.15	998.918	LC	IR PK
3523	8877148.46	15320819.25	996.736	LC	IR PK
10352	8877061.244	15320173.98	980.066	LC	IR DOT ALUM CAP

ALIGNMENT COORDINATES

101-16
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		Station	Coordinates	
			Y (Northing)	X (Easting)		Y (Northing)	X (Easting)		Y (Northing)	X (Easting)		Y (Northing)	X (Easting)		Y (Northing)	X (Easting)		Y (Northing)	X (Easting)
ML057 (IA 57)																			
ML0571		205+78.88	8,877,141.14	15,319,553.57															
ML0573		212+15.20	8,877,130.70	15,320,189.81															
ML0574		217+69.82	8,877,116.62	15,320,744.24															

Butler	ROW: STPN-057-1(33)--2J-12				PIN	17-12-057-010														
	Gran Creek 0.5 mi E of Co Rd T19																			
		STATE			COUNTY			CITY				TEMP EASE		BORROW						
PARCEL NO	WNER NAM	FEE	EASE		FEE	EASE		FEE	EASE		EXCESS			FEE	T.E.	MITIGATION	OTHER	HOUSE	BUILDING(S)	A/C ONLY	TOTAL ACQ.
1	James Will	.28 AC											3498 SF								
2	Eckles Farr	.29 AC											3086 SF								
2 Parcels	"TOTALS	0.57 AC	0 AC		0 AC	0 AC		0 AC	0 AC		0 AC	0 AC		0 AC	0 AC	0 AC					
		0 SF		0 SF	0 SF		0 SF	0 SF		0 SF	0 SF		6584 SF								

NO ACCESS RIGHTS ARE TO BE ACQUIRED ON THIS PROJECT.

WASHINGTON TWP
T90N R18W
SEC 24

TEMPORARY EASEMENT
TO SHAPE

1

JAMES AND JANELLE WILLIS

211+05
℄158′

211+05
℄125′

210+00.28(EX.R/W COR.)
℄60′ EX R/W

206 207 208 209 210 212 213 214 215 216 217

℄ IA 57

1

JAMES AND JANELLE WILLIS

212+11
℄158′

212+11
℄125′

212+65±
℄45′

N

210+00.30(EX.R/W COR.)
℄69′± EX R/W

212+78
℄41′±EX R/W

212+62
℄72′

209+70
℄135′

210+84
℄137′

210+12
℄140′

210+30
℄184′

2

ECKLES FARM INC.

WASHINGTON TWP
T90N R18W
SEC 25

TEMPORARY EASEMENT
TO SHAPE

0 100
FEET

Right of Way Design Information
THIS SHEET INCLUDED FOR INFORMATION ONLY

ROW Team: ATINKEN /JLARSON
ROW #: STPN-057-1(33)--2J-12
Plan Date: 1/28/20
Color Legend:
- **Property Lines**
- **Temporary Easement**
- **Permanent Acquisition**

FILE NO.	ENGLISH	DESIGN TEAM	IOWA DOT / SHIVE-HATTERY	BUTLER	COUNTY	PROJECT NUMBER	BRFN-057-1(32)--39-12	SHEET NUMBER	H.1

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108-26A
08-01-08

STAGING NOTES

Stage 1:
With traffic using detour, remove and replace bridge over Gran Creek with culvert.

Stage 2:
Reopen IA 57 to normal traffic pattern, using flaggers when needed.

108-23A
08-01-08

TRAFFIC CONTROL PLAN

1) While bridge and approaches are being removed and replaced with RCB culvert, traffic on IA 57 shall be maintained via an off-site detour. Detours are furnished, maintained and removed by District 6 DOT. Road closures traffic control shall be furnished, maintained and removed by the contractor.

2) Contractor shall furnish, install, maintain, and remove road closure signage and barricades. These functions are included in the Traffic Control Bid Item.

108-25
10-21-14

511 TRAVEL RESTRICTIONS

Route	Direction	County	Location Description	Feature Crossed	Object Type	Maint. Bridge No., Structure ID, or FHWA No.	Type of Restriction	Existing Measurement	Construction Measurement	Construction Measurement as Signed	Projected As Built Measurement	Remarks
			No Travel Restrictions Expected									

111-01
04-17-12

COORDINATED OPERATIONS

Other work in progress during the same period of time will include the construction of the projects listed. Coordinate operations with those of other contractors working within the same area.

Project	Type of Work
None Provided	

PROJECT LOCATION

DETOUR ROUTE
8.5 MILES

LOCATION MAP SCALE
0 2 4 6
Miles

DETOUR ROUTE
(BY DISTRICT)

FRANKLIN CO.
BUTLER CO.
GRUNDY CO.
HARDIN CO.

AUSTINVILLE
APLINGTON
PARKERSBURG
POP. 1128
POP. 1870

WASHINGTON
PLEASANT VALLEY
GERMAN

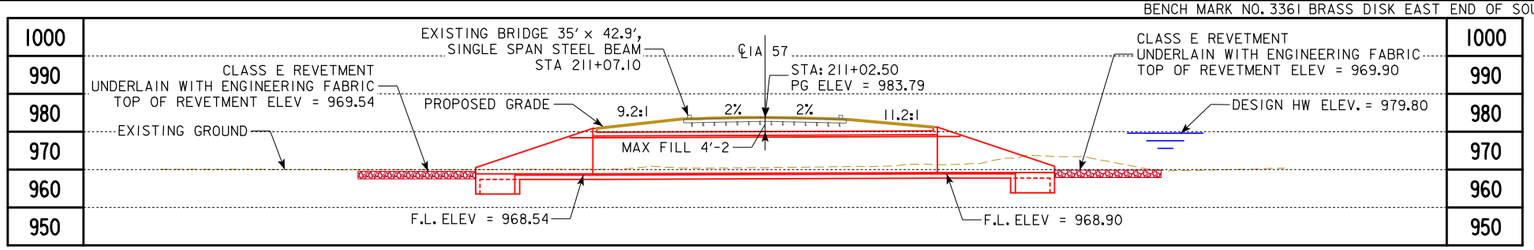
R-18W
R-17W

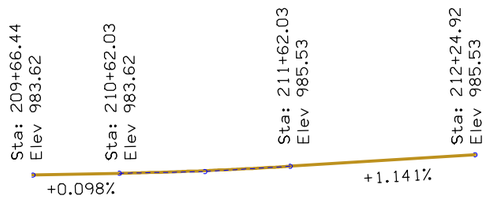
Beaver Creek
North Fork
Middle Fork

FILE NO. 31685	ENGLISH	DESIGN TEAM IOWA DOT / SHIVE-HATTERY	BUTLER COUNTY	PROJECT NUMBER BRFN-057-1(32)--39-12	SHEET NUMBER J.2

8:00:20 AM 12/16/2019 mjanechek pw:\\projectwise.dot.int.lan:PWMain\Documents\Projects\1205701017\Design\SHT_12057032_A1.sht

BENCH MARK NO. 3361 BRASS DISK EAST END OF SOUTH BRIDGE CURB. ELEV. = 984.23

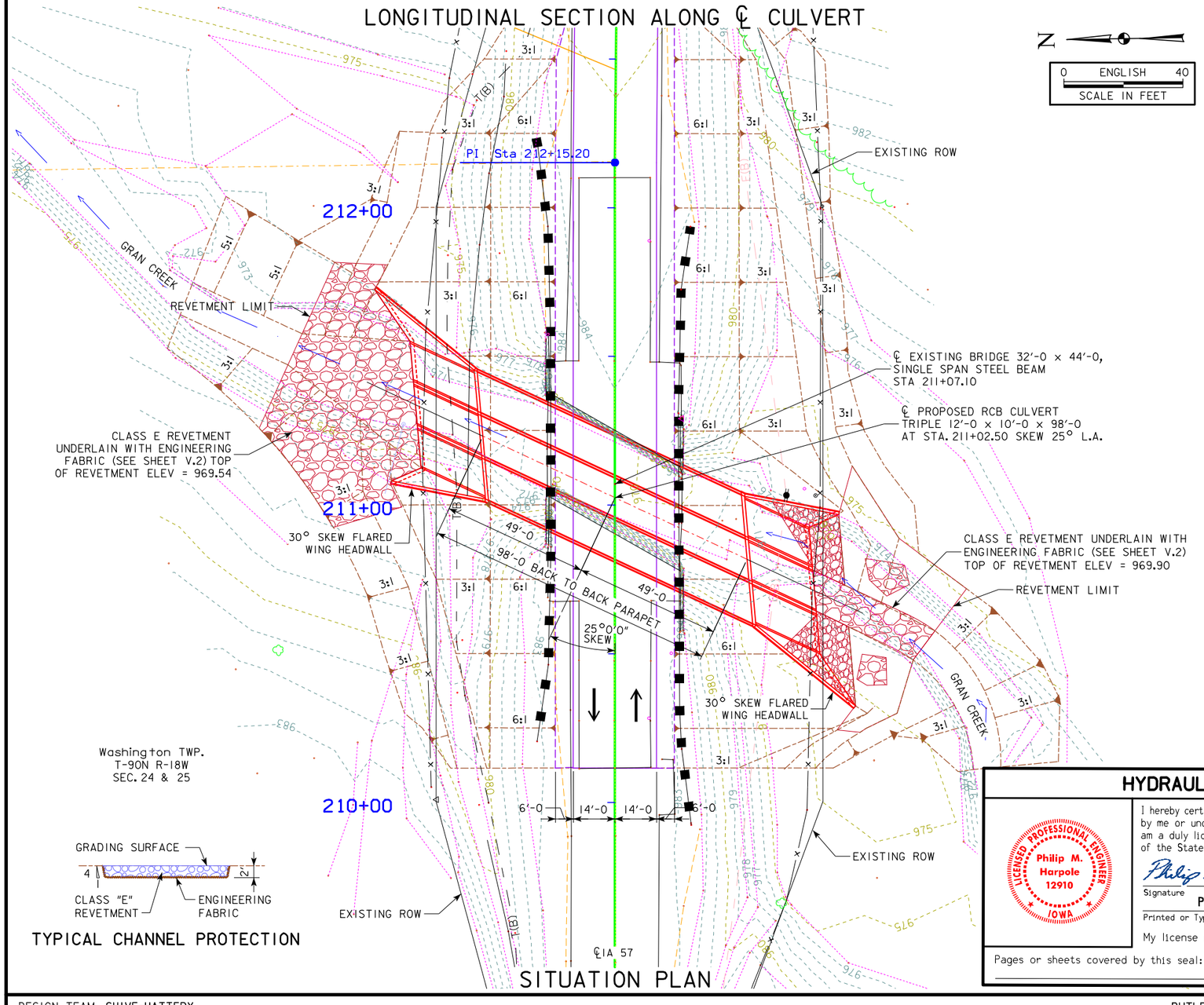




VPI Sta: 211+12.03
Elev 983.72
Len 100.00 ft

PROPOSED PROFILE GRADE IA 57

LONGITUDINAL SECTION ALONG ℄ CULVERT



SITUATION PLAN

TYPICAL CHANNEL PROTECTION

HYDRAULIC DATA

DRAINAGE AREA = 5.2 SQ. MI.
Q_{50} = 2,740 CFS
HW ELEV. = 979.80
STREAM SLOPE = 10.0 FT./MI.
Q_{100} = 3270 CFS HW = 981.10
Q_{500} = 4710 CFS HW = 983.70

NOTES:

1. EXISTING 32′-0 x 44′-0 STEEL BEAM BRIDGE DESIGN NO. 161.
2. DRAINAGE THROUGH EXISTING CULVERT/CHANNEL MUST BE MAINTAINED THROUGHOUT CONSTRUCTION.
3. FLOW LINE OF CULVERT NOMINALLY BURIED 1.0 FOOT.

UTILITIES LEGEND:

— — FO(B) —	FIBER OPTIC LINE	WINDSTREM COMM
— E(B) — —	OVERHEAD ELECTRIC	MIDAMERICAN ENERGY
— T(B) — —	TELEPHONE LINE	WINDSTREAM COMM

UTILITIES SHOWN ON THIS SHEET ARE FOR INFORMATION ONLY, SEE ROAD DESIGN SHEETS FOR FINAL UTILITY INFORMATION.

LOCATION

IA 57 OVER GRAN CREEK
T-90N R-18W
SECTION 24 & 25
WASHINGTON TOWNSHIP
BUTLER COUNTY
FHWA NO. 16391
BRIDGE MAINT. NO. 1216.4S057
LATITUDE 42.585308°
LONGITUDE -92.918063°

TRAFFIC ESTIMATE

2021 AADT	1500	V.P.D.
2041 AADT	1600	V.P.D.
2041 DHV	170	V.P.H.
TRUCKS	20	%

PRELIMINARY

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.

Philip M. Harpole — 11-22-2019
Signature — Date

Philip M Harpole
Printed or Typed Name

My license renewal date is December 31, 2019

Pages or sheets covered by this seal: V.1 – V.3

DESIGN FOR 25° SKEW L.A.

TRIPLE 12′-0 X 10′-0 X 98′-0 CAST IN PLACE RCB CULVERT

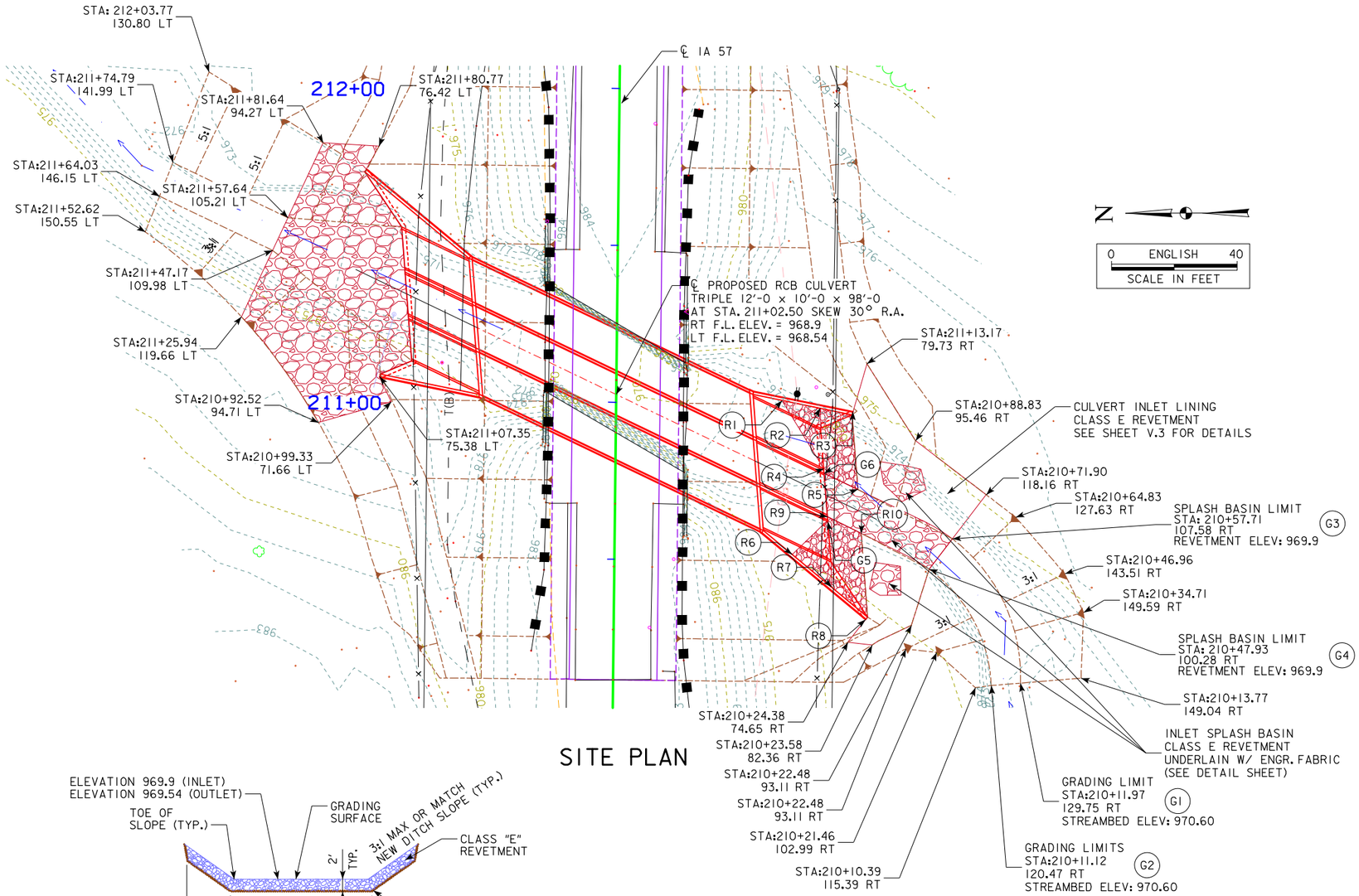
SITUATION PLAN

STATION 211+02.50 — NOVEMBER 2019

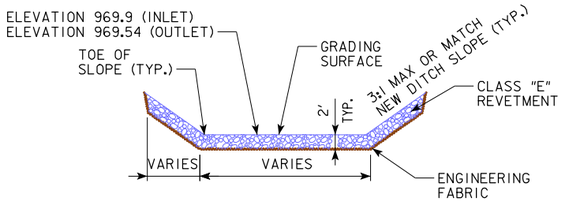
BUTLER COUNTY
IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION

DESIGN SHEET NO. 1 OF 6 — FILE NO. 31685 — DESIGN NO. 122

DESIGN TEAM SHIVE-HATTERY | BUTLER COUNTY | PROJECT NUMBER BRFN-057-1(32)--39-12 | SHEET NUMBER V.1



SITE PLAN



CLASS E REVETMENT
INLET AND OUTLET SPLASH BASIN

CHANNEL GRADING CONTROL:

(G1) TOE OF SLOPE; BEGIN CHANNEL GRADING.

(G2) TOE OF SLOPE; BEGIN CHANNEL GRADING.

(G3) TOE OF SLOPE OF SPLASH BASIN; BEGIN CHANNEL GRADING.

(G4) TOE OF SLOPE OF SPLASH BASIN; BEGIN CHANNEL GRADING.

(G5) STA: 210+62.78, 67.82 RT., TOE OF SLOPE OF SPLASH BASIN; END CHANNEL GRADING, TOP OF REVETMENT EL. 969.9

(G6) STA: 210+78.12, 66.48 RT., TOE OF SLOPE OF SPLASH BASIN; END CHANNEL GRADING, TOP OF REVETMENT EL. 969.9

REVETMENT LAYOUT:

(R1) END CULVERT INLET LINING AT FACE WALL, RCB HDWL. STA: 211+01.18, 52.8 RT., EL. 969.9

(R2) CULVERT INLET LINING, STA: 210+98.83, 64.97 RT., EL. 972.9

(R3) BEGIN CULVERT INLET LINING, STA: 210+97.91, 75.42 RT., EL. 969.9

(R4) CULVERT INLET LINING, STA: 210+79.66, 66.35 RT., EL. 969.9

(R5) BEGIN CULVERT INLET LINING, STA: 210+73.18, 7.29 RT., EL. 969.9

(R6) END CULVERT INLET LINING AT FACE WALL, RCB HDWL. STA: 210+52.16, 56.58 RT., EL. 969.9

(R7) CULVERT INLET LINING, STA: 210+41.91, 69.22 RT., EL. 972.9

(R8) BEGIN CULVERT INLET LINING, STA: 210+31.64, 80.17 RT., EL. 969.9

(R9) CULVERT INLET LINING, STA: 210+64.32, 67.68 RT., EL. 969.9

(R10) BEGIN CULVERT INLET LINING, STA: 210+59.13, 78.52 RT., EL. 969.9

NOTE: ALL REVETMENT ELEVATIONS ARE TO TOP OF ROCK (GRADING SURFACE).

PRELIMINARY

DESIGN FOR 25° SKEW L.A.

TRIPLE 12'-0 X 10'-0 X 98'-0 CAST IN PLACE RCB CULVERT

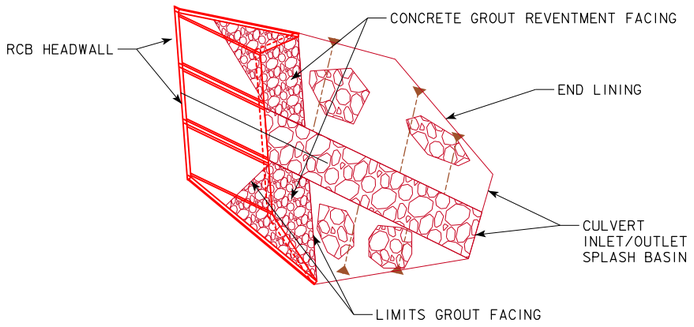
SITUATION PLAN - SITE

STATION 211+02.50 NOVEMBER 2019

BUTLER COUNTY
IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION

DESIGN SHEET NO. 2 OF 6 FILE NO. 31685 DESIGN NO. 122

DESIGN TEAM SHIVE-HATTERY | BUTLER COUNTY | PROJECT NUMBER BRFN-057-1(32)--39-12 | SHEET NUMBER V.2



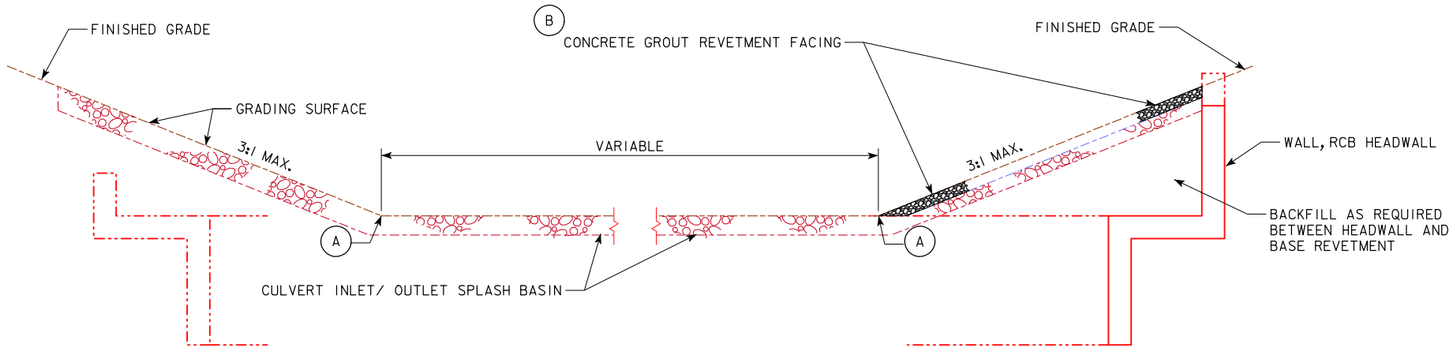
LINING PLAN ADJACENT TO HEADWALL

ESTIMATED REVETMENT QUANTITIES				
LOCATION	REVETMENT CL. "E" (TON)	CONCRETE GROUT (CY)	ENGINEERING FABRIC (SY)	EXCAVATION (CY)
INLET	312	16	324	213
OUTLET	341		357	162
TOTALS	653	16	681	375

EXCAVATION QUANTITY CALCULATED FROM GRADING SURFACE.

REVETMENT ESTIMATED AT 1.6 TON/CY

CONCRETE GROUT FOR REVETMENT ESTIMATED AT 0.20 CY/SY.



LINING ADJACENT TO HEADWALL

LINING WITHIN HEADWALL LIMITS

SECTION THRU INLET/OUTLET LINING

(A) TOE OF SPLASH BASIN

(B) CONCRETE GROUT FOR REVETMENT FACING. THE PURPOSE OF THE GROUT IS TO FILL SURFACE VOIDS TO MINIMIZE SUBSTRATE FOR VEGETATIVE GROWTH. APPLY TO REVETMENT SIDE AND END SLOPES WITHIN LIMITS OF RCB HEADWALL AS SHOWN.

GROUT PENETRATION TO 2/3 OF THE ROCK BLANKET DEPTH IS REQUIRED. FINISH THE GROUT SO THAT FACE STONES ARE LEFT EXPOSED FOR NO MORE THAN 3 IN.

DETAILS

PRELIMINARY

DESIGN FOR 25° SKEW L.A.

TRIPLE 12'-0 X 10'-0 X 98'-0 CAST IN PLACE RCB CULVERT

DETAILS

STATION 211+02.50 NOVEMBER 2019

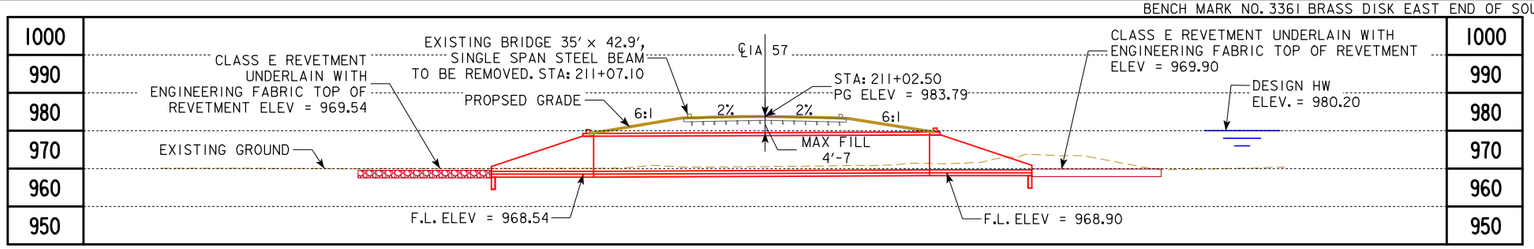
BUTLER COUNTY

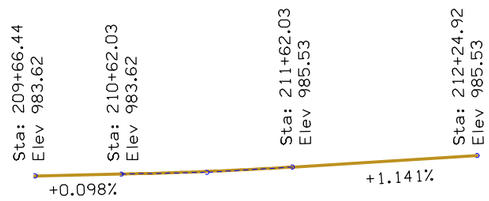
IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION

DESIGN SHEET NO. 3 OF 6 FILE NO. 31685 DESIGN NO. 122

DESIGN TEAM SHIVE-HATTERY | BUTLER COUNTY | PROJECT NUMBER BRFN-057-1(32)--39-12 | SHEET NUMBER V.3

BENCH MARK NO. 3361 BRASS DISK EAST END OF SOUTH BRIDGE CURB. ELEV. = 984.23

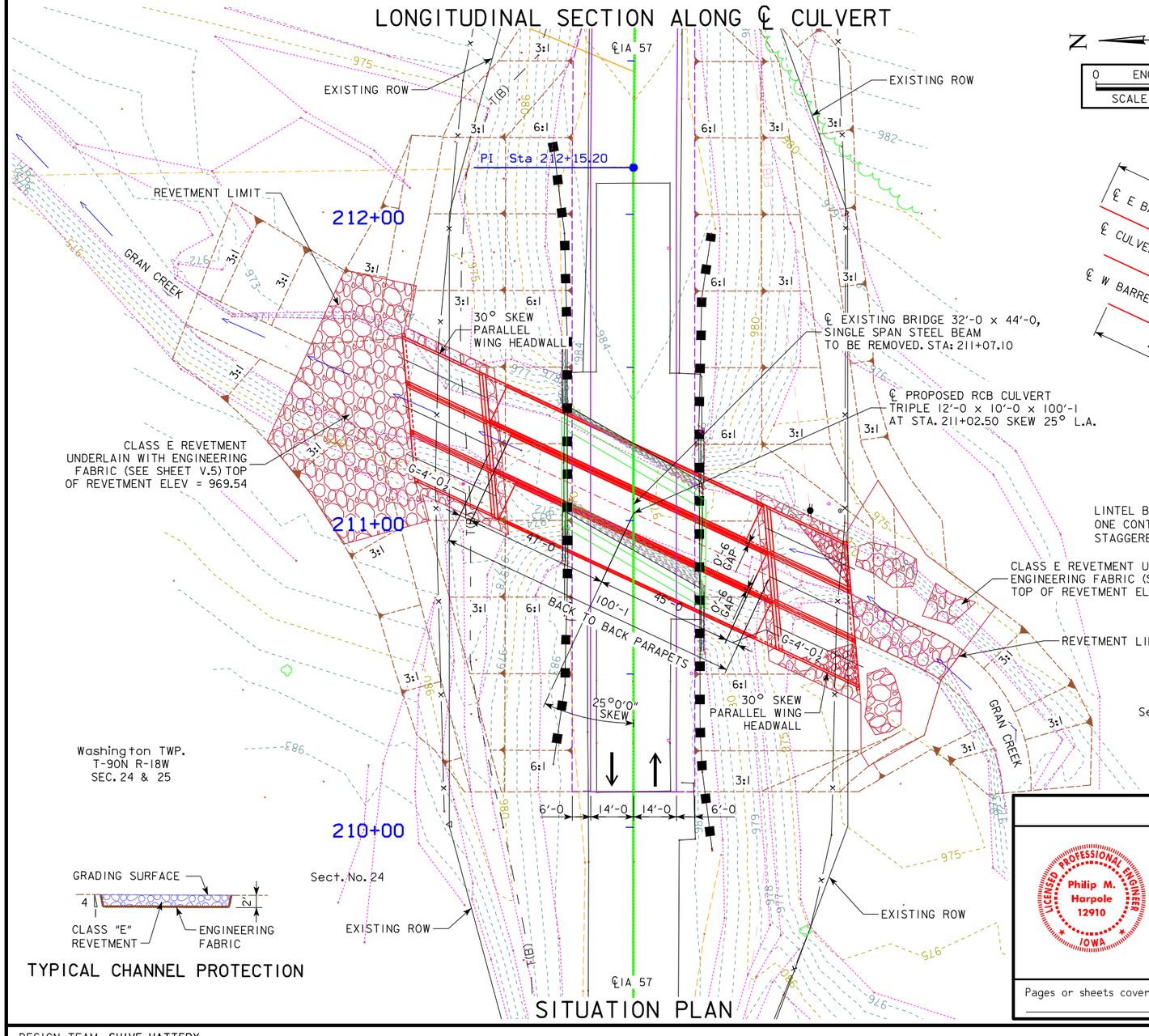




VPI Sta: 211+12.03
Elev 983.72
Len 100.00 ft

PROPOSED PROFILE GRADE IA 57

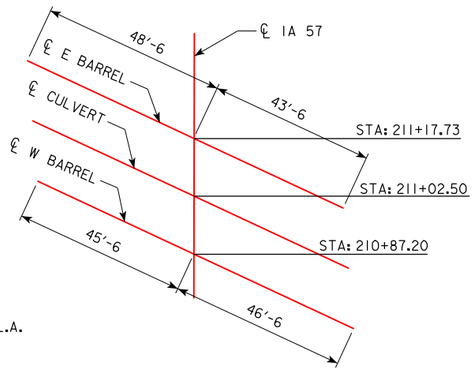
LONGITUDINAL SECTION ALONG ℄ CULVERT



SITUATION PLAN

N

0 ENGLISH 40
SCALE IN FEET



BARREL LAYOUT

LINTEL BEAM AND CURTAIN WALLS SHALL FORM ONE CONTINUOUS LINE AND SHALL NOT BE STAGGERED OR OFFSET

TYPICAL CHANNEL PROTECTION

HYDRAULIC DATA

DRAINAGE AREA = 5.2 SQ. MI.
Q_{50} = 2,740 CFS
HW ELEV. = 980.20
STREAM SLOPE = 10.0 FT./MI.
Q_{100} = 3270 CFS HW = 981.60
Q_{500} = 4710 CFS HW = 984.10

NOTES:

1. EXISTING 32'-0 x 44'-0 STEEL BEAM BRIDGE DESIGN NO. 161.
2. DRAINAGE THROUGH EXISTING CULVERT/CHANNEL MUST BE MAINTAINED THROUGHOUT CONSTRUCTION.
3. FLOW LINE OF CULVERT NOMINALLY BURIED 1.0 FOOT.

UTILITIES LEGEND:

— — FO(B) —	FIBER OPTIC LINE	WINDSTREM COMM
— E(B) — —	OVERHEAD ELECTRIC	MIDAMERICAN ENERGY
— T(B) — —	TELEPHONE LINE	WINDSTREAM COMM

UTILITIES SHOWN ON THIS SHEET ARE FOR INFORMATION ONLY, SEE ROAD DESIGN SHEETS FOR FINAL UTILITY INFORMATION.

LOCATION

IA 57 OVER GRAN CREEK
T-90N R-18W
SECTION 24 & 25
WASHINGTON TOWNSHIP
BUTLER COUNTY
FHWA NO. 16391
BRIDGE MAINT. NO. 1216.4S057
LATITUDE 42.585308°
LONGITUDE -92.918063°

TRAFFIC ESTIMATE

2021 AADT	1500	V.P.D.
2041 AADT	1600	V.P.D.
2041 DHV	170	V.P.H.
TRUCKS	20	%

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.

Philip M. Harpole 11-22-2019
Signature Date

Philip M Harpole
Printed or Typed Name

My license renewal date is December 31, 2019

Pages or sheets covered by this seal: V.4 – V.6

LICENSED PROFESSIONAL ENGINEER
Philip M. Harpole
12910
IOWA

PRELIMINARY

DESIGN FOR 25° SKEW L.A.

TRIPLE 12'-0 X 10'-0 X 100'-1 PRECAST RCB CULVERT

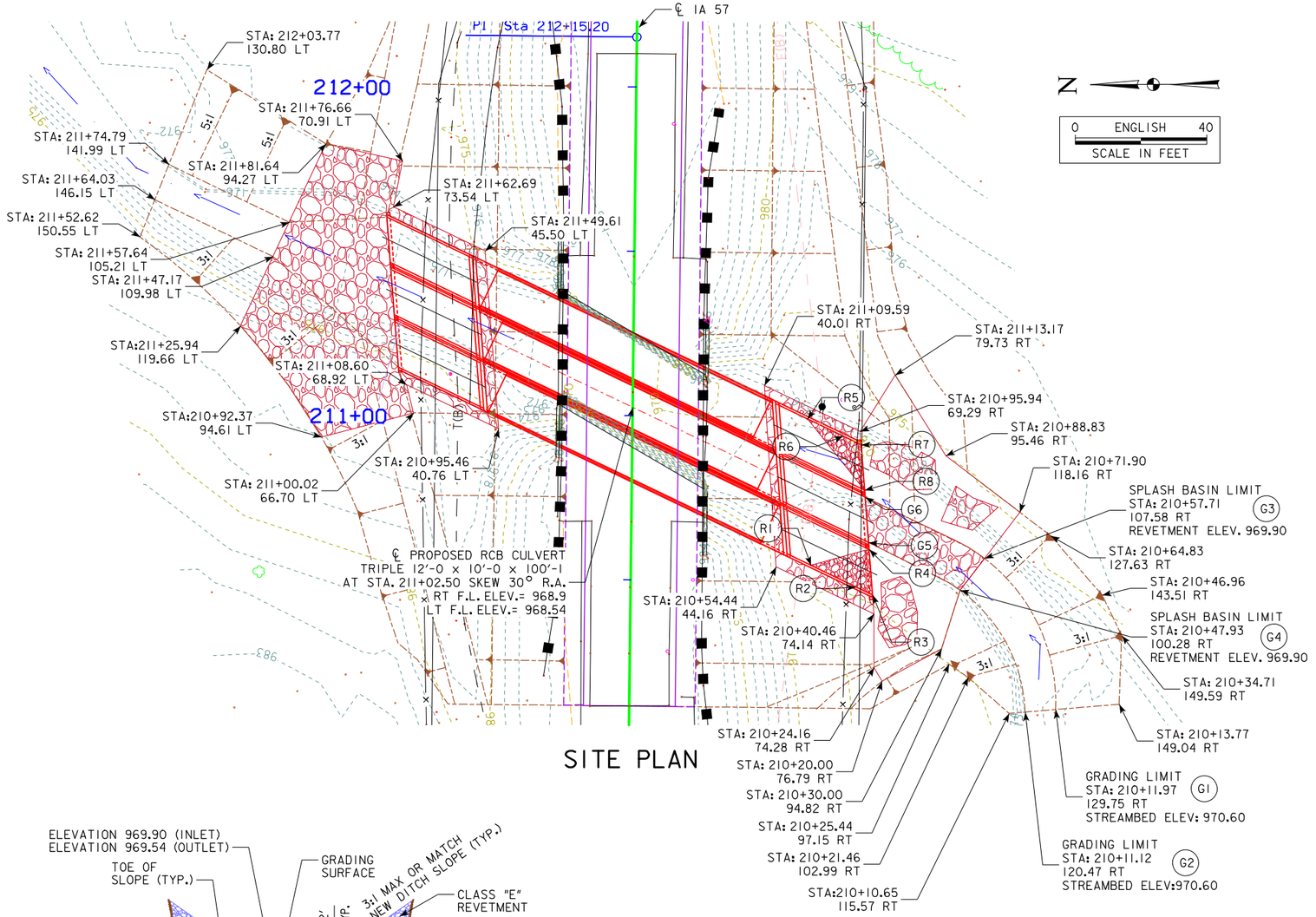
SITUATION PLAN

STATION 211+02.50 NOVEMBER 2019

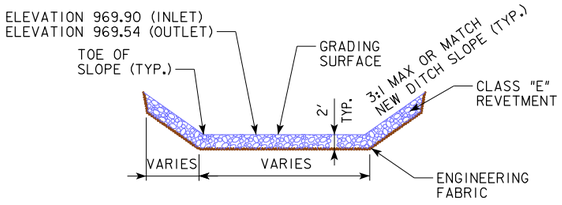
BUTLER COUNTY
IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION

DESIGN SHEET NO. 4 OF 6 FILE NO. 31685 DESIGN NO. 122

DESIGN TEAM SHIVE-HATTERY | BUTLER COUNTY | PROJECT NUMBER BRFN-057-1(32)--39-12 | SHEET NUMBER V.4



SITE PLAN



CLASS E REVETMENT
INLET AND OUTLET SPLASH BASIN

CHANNEL GRADING CONTROL:

- (G1) TOE OF SLOPE; BEGIN CHANNEL GRADING.
- (G2) TOE OF SLOPE; BEGIN CHANNEL GRADING.
- (G3) TOE OF SLOPE OF SPLASH BASIN; BEGIN CHANNEL GRADING.
- (G4) TOE OF SLOPE OF SPLASH BASIN; BEGIN CHANNEL GRADING.
- (G5) STA: 210+62.16, 72.24 RT., TOE OF SLOPE OF SPLASH BASIN; END CHANNEL GRADING, TOP OF REVETMENT EL. 969.90
- (G6) STA: 210+75.96, 71.04 RT., TOE OF SLOPE OF SPLASH BASIN; END CHANNEL GRADING, TOP OF REVETMENT EL. 969.90

REVETMENT LAYOUT:

- (R1) END CULVERT INLET LINING AT FACE WALL, RCB HDWL. STA: 210+55.05, 54.76 RT., EL. 969.90
- (R2) CULVERT INLET LINING, STA: 210+48.58, 68.47 RT., EL. 972.90
- (R3) BEGIN CULVERT INLET LINING, STA: 210+46.24, 73.64 RT., EL. 969.90
- (R4) CULVERT INLET LINING, STA: 210+60.05, 72.43 RT, EL. 969.90
- (R5) BEGIN CULVERT INLET LINING, STA: 210+99.53, 53.23 RT., EL. 969.90
- (R6) END CULVERT INLET LINING AT FACE WALL, RCB HDWL. STA: 210+94.46, 64.10 RT, EL. 972.90
- (R7) CULVERT INLET LINING, STA: 210+91.87, 69.64 RT, EL. 969.90
- (R8) BEGIN CULVERT INLET LINING, STA: 210+78.07, 70.85 RT., EL. 969.90

NOTE: ALL REVETMENT ELEVATIONS ARE TO TOP OF ROCK (GRADING SURFACE).

PRELIMINARY

DESIGN FOR 25° SKEW L.A.

TRIPLE 12'-0 X 10'-0 X 100'-1 PRECAST RCB CULVERT

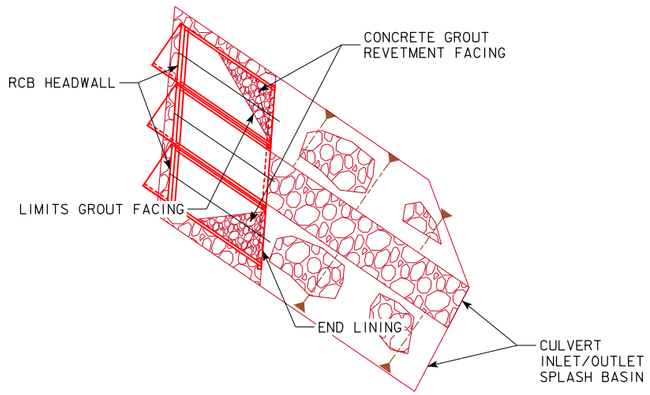
SITUATION PLAN - SITE

STATION 211+02.50 NOVEMBER 2019

BUTLER COUNTY
IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION

DESIGN SHEET NO. 5 OF 6 FILE NO. 31685 DESIGN NO. 122

DESIGN TEAM SHIVE-HATTERY	BUTLER COUNTY	PROJECT NUMBER BRFN-057-1(32)--39-12	SHEET NUMBER V.5



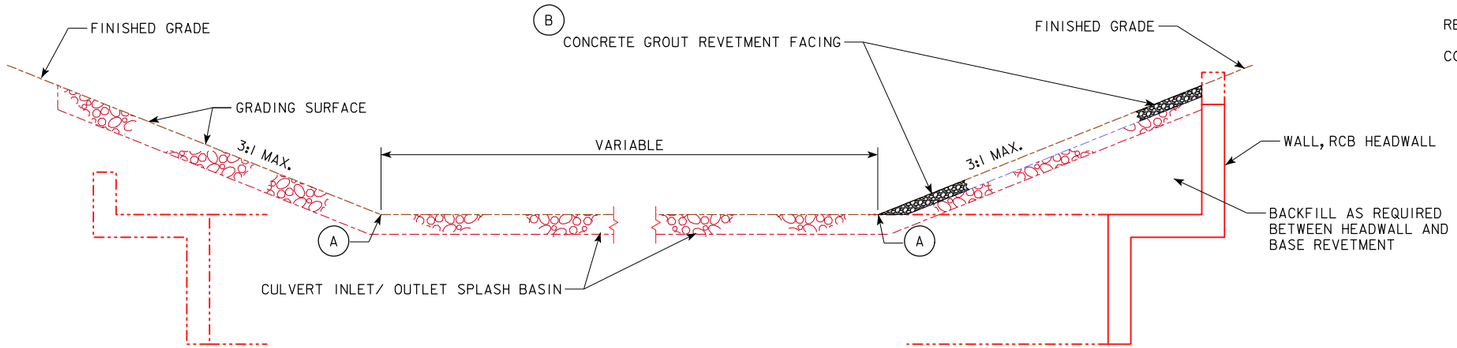
LINING PLAN ADJACENT TO HEADWALL

ESTIMATED REVETMENT QUANTITIES				
LOCATION	REVETMENT CL. "E" (TON)	CONCRETE GROUT (CY)	ENGINEERING FABRIC (SY)	EXCAVATION (CY)
INLET	230	5	231	137
OUTLET	185		223	132
TOTALS	415	5	454	269

EXCAVATION QUANTITY CALCULATED FROM GRADING SURFACE.

REVETMENT ESTIMATED AT 1.6 TON/CY

CONCRETE GROUT FOR REVETMENT ESTIMATED AT 0.20 CY/SY.



LINING ADJACENT TO HEADWALL

LINING WITHIN HEADWALL LIMITS

SECTION THRU INLET/OUTLET LINING

(A) TOE OF SPLASH BASIN

(B) CONCRETE GROUT FOR REVETMENT FACING. THE PURPOSE OF THE GROUT IS TO FILL SURFACE VOIDS TO MINIMIZE SUBSTRATE FOR VEGETATIVE GROWTH. APPLY TO REVETMENT SIDE AND END SLOPES WITHIN LIMITS OF RCB HEADWALL AS SHOWN.

GROUT PENETRATION TO 2/3 OF THE ROCK BLANKET DEPTH IS REQUIRED. FINISH THE GROUT SO THAT FACE STONES ARE LEFT EXPOSED FOR NO MORE THAN 3 IN.

DETAILS

PRELIMINARY

DESIGN FOR 25° SKEW L.A.

TRIPLE 12'-0 X 10'-0 X 100'-1 PRECAST RCB CULVERT

DETIALS

STATION 211+02.50 NOVEMBER 2019

BUTLER COUNTY

IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION

DESIGN SHEET NO. 6 OF 6 FILE NO. 31685 DESIGN NO. 122

DESIGN TEAM SHIVE-HATTERY | BUTLER COUNTY | PROJECT NUMBER BRFN-057-1(32)--39-12 | SHEET NUMBER V.6

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\RCB
- Proposed Pipe\RCB
- 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 LO — 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

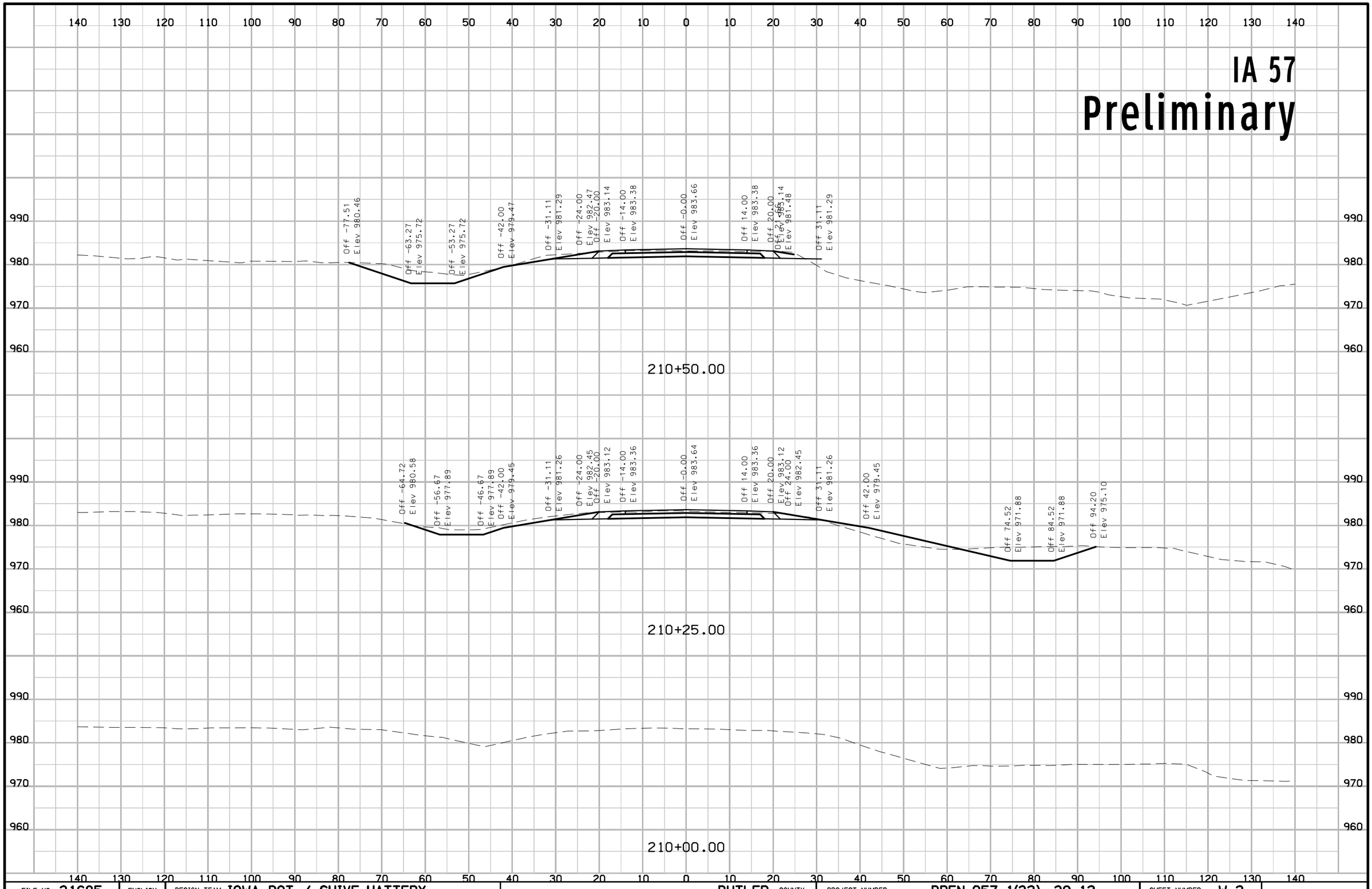
Temporary ROW — Temporary Right-of-Way Limit

CROSS SECTION LEGEND AND SYMBOL INFORMATION SHEET

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

FILE NO. 31685	ENGLISH	DESIGN TEAM IOWA DOT / SHIVE-HATTERY	BUTLER COUNTY	PROJECT NUMBER BRFN-057-1(32)--39-12	SHEET NUMBER W.1

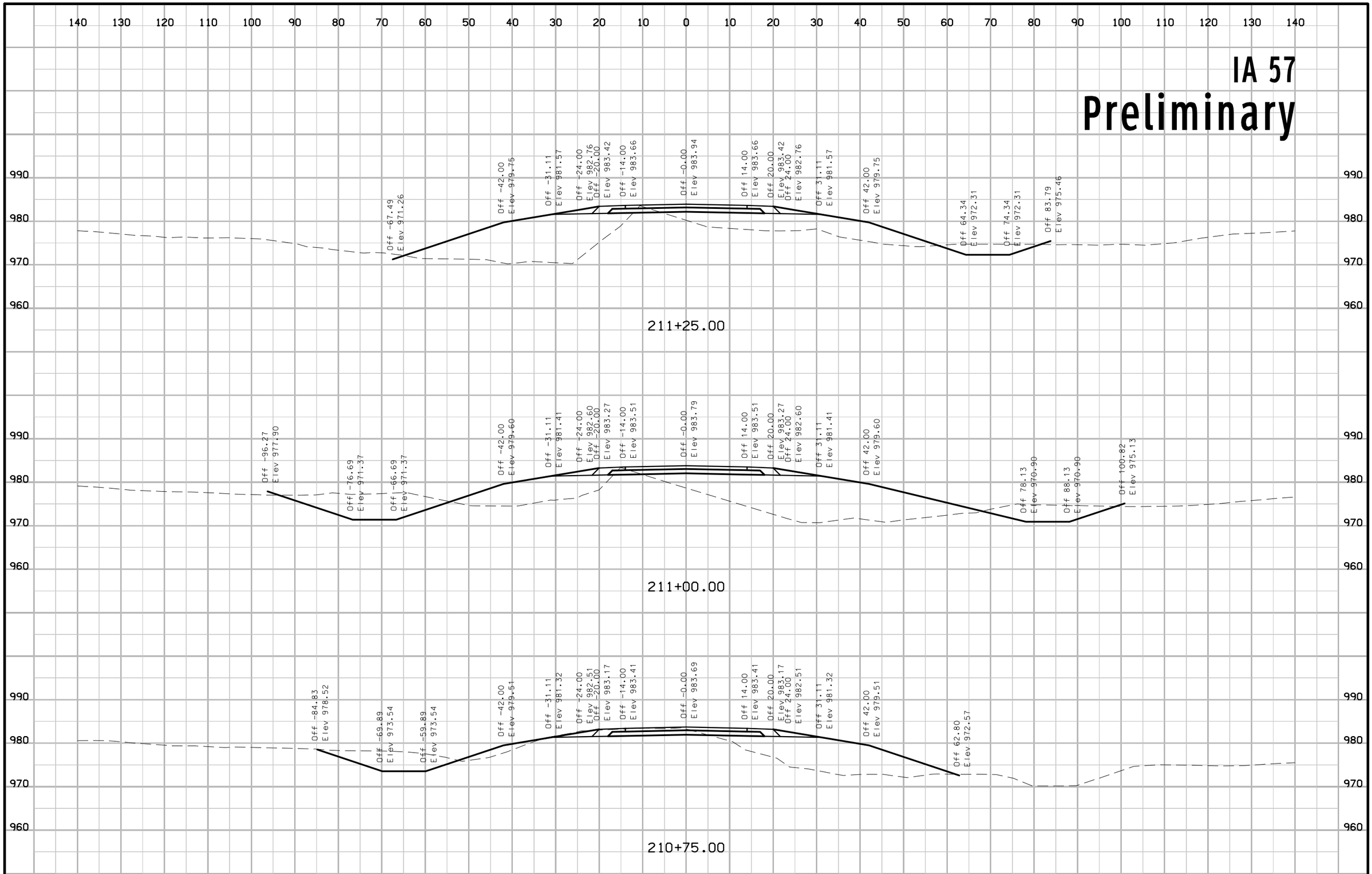
IA 57
Preliminary



FILE NO. 31685	ENGLISH	DESIGN TEAM IOWA DOT / SHIVE-HATTERY	BUTLER COUNTY	PROJECT NUMBER BRFN-057-1(32)--39-12	SHEET NUMBER W.2

8:02:50 AM 12/16/2019 mjanechek pw:\\projectwise.dot.int.lan:PWMain\Documents\Projects\1205701017\Design\SHT_12057032_W2.sht

IA 57
Preliminary

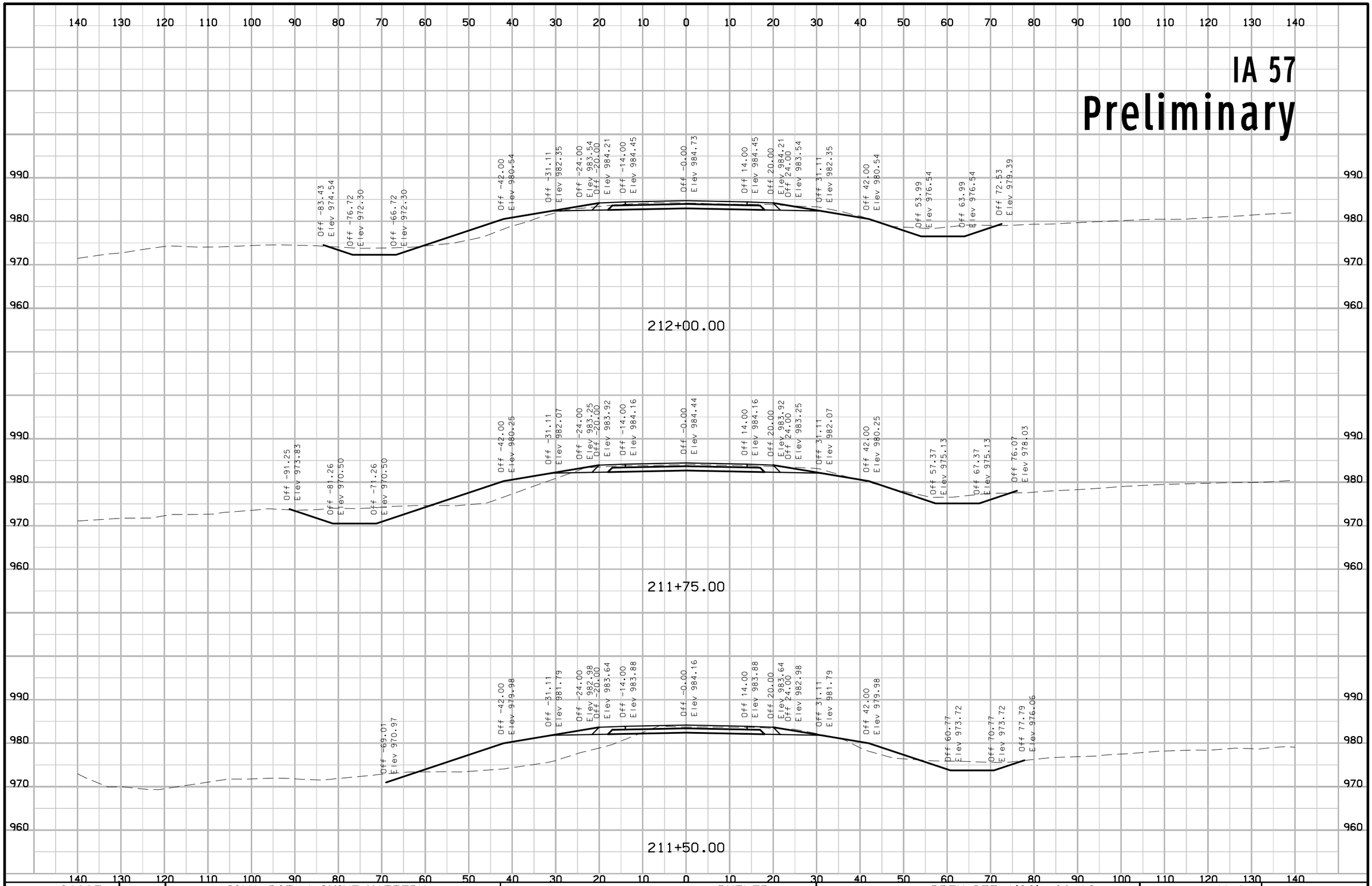


FILE NO. 31685	ENGLISH	DESIGN TEAM IOWA DOT / SHIVE-HATTERY	BUTLER COUNTY	PROJECT NUMBER BRFN-057-1(32)--39-12	SHEET NUMBER W.3

8:02:52 AM 12/16/2019 mjanechek pw:\\projectwise.dot.int.lan:PWMain\Documents\Projects\1205701017\Design\SHT_12057032_W2.sht

IA 57

Preliminary



FILE NO. 31685	ENGLISH	DESIGN TEAM IOWA DOT / SHIVE-HATTERY	BUTLER COUNTY	PROJECT NUMBER BRFN-057-1(32)--39-12	SHEET NUMBER W.4

8:02:54 AM 12/16/2019 mjanechek pw:\\projectwise.dot.int.lan:PWMain\Documents\Projects\1205701017\Design\SHT_12057032_W2.sht

IA 57

Preliminary

212+75.00

Off -43.99
Elev 978.11

Off -27.33
Elev 984.11

Off -20.00
Elev 984.78

Off -14.00
Elev 985.02

Off -0.00
Elev 985.30

Off 14.00
Elev 985.02

Off 20.00
Elev 984.78

Off 24.00
Elev 984.11

Off 31.11
Elev 982.92

Off 42.00
Elev 981.11

Off 47.28
Elev 979.35

Off 57.28
Elev 979.35

Off 70.33
Elev 983.70

212+50.00

Off -31.11
Elev 982.64

Off -21.66
Elev 984.49

Off -20.00
Elev 984.73

Off -14.00
Elev 984.73

Off -0.00
Elev 985.01

Off 14.00
Elev 984.73

Off 20.00
Elev 984.49

Off 24.00
Elev 983.82

Off 31.11
Elev 982.64

Off 42.00
Elev 980.82

Off 50.66
Elev 977.94

Off 60.66
Elev 977.94

Off 71.84
Elev 981.67

212+25.00

FILE NO. 31685	ENGLISH	DESIGN TEAM IOWA DOT / SHIVE-HATTERY	BUTLER COUNTY	PROJECT NUMBER BRFN-057-1(32)--39-12	SHEET NUMBER W.5

8:02:55 AM 12/16/2019 mjanechek pw:\\projectwise.dot.int.lan:PWMain\Documents\Projects\1205701017\Design\SHT_12057032_W2.sht