IOWA DEPARTMENT OF TRANSPORTATION

TO OFFICE: District 3

DATE: December 30, 2019

ATTENTION: Tony Lazarowicz

PROJECT: Sac County
BRFN-039-2(18)—39-81
PIN: 16-81-039-010

FROM: Taylor Theulen

OFFICE: Stanley Consultants, Inc.

SUBJECT: Project Concept Statement; (Final D0)

This project involves the replacement of the bridge (Maint. No. 8118.9S039) on IA 39 over Porter Creek, 2.4 miles south of Co Rd D59.

A project kick-off meeting was held on November 14, 2019. Those present included Shane Tymkowicz and Tony Lazarowicz from the District 3 Office; Jeremey Vortherms from the Project Management Bureau; Kevin Patel from the Design Bureau; Steve Seivert from the Bridges and Structures Bureau; and Taylor Theulen, Dean Bierwagen, Mark Werner, and Cole Prevost from Stanley Consultants.

Two alternatives were considered:

Alternative 1 – Replace existing bridge with a 143’ long twin 12’ x 10’ RCB culvert with an estimated cost of $762,700. Existing bridge superstructure removed.

Alternative 2 – Replace existing bridge with a 143’ long twin 12’ x 10’ RCB culvert with an estimated cost of $879,700. Existing bridge superstructure rehabbed.

Alternative 1 is the preferred alternative due to the lower project cost. Alternative 1 also provides a new pavement section which should have a longer service life before requiring maintenance when compared to Alternative 2.

This project is recommended for construction in FY 2023.

Cc:

C. Purcell
S. J. Megivern
M. Nop
D. R. Tebben
J. W. Laaser-Webb
E. C. Wright
N. M. Miller
B. E. Azeltine
S. J. Gent
J. Selmer
D. R. Claman
M. E. Khoda
D. Bishop
B. Dolan
D. Schultz
M. Wright
FHWA
M. J. Kennerly
J. S. Nelson
M. A. Swenson
K. Brink
W. A. Sorenson
M. E. Ross
C. C. Poole
B. D. Hofer
S. Anderson
K. K. Patel
J. Hauber
K. Olson
V. Brewer
T. Huju
M. K. Solberg
K. D. Nicholson
B. Walls
R. A. Younie
D. L. Newell
D. E. Sprengeler
A. A. Welch
M. J. Sankey
T. D. Crouch
P. C. Keen
S. Godbold
A. Abu-Hawash
S. Neubauer
M. Carlson
D. Manley
S. Tymkowicz

FINAL PROJECT CONCEPT STATEMENT

IA 39 – Bridge over Porter Creek, 2.4 miles south of Co Rd D59

Sac County
BRFN-039-2(18)—39-81
PIN: 16-81-039-010
Maint No. 8118.9S039
FHWA No. 46700

Taylor Theulen, P.E.
515-447-4402

December 6, 2019

I. STUDY AREA

A. Project Description

This project involves the replacement of the bridge (Maint. No. 8118.9S039) on IA 39 over Porter Creek, 2.4 miles south of Co Rd D59.

Two alternatives were considered:

Alternative 1 – Replace existing bridge with a 143’ long twin 12’ x 10’ RCB culvert with an estimated cost of $762,700. Existing bridge superstructure removed.

Alternative 2 – Replace existing bridge with a 143’ long twin 12’ x 10’ RCB culvert with an estimated cost of $879,700. Existing bridge superstructure rehabbed.

Need for Project

The existing structure is a 100 ft. long by 26 ft. wide Continuous I-Beam Bridge built in 1951 and is near the end of its useful life. Existing bridge was designed for H20-44 loading.

	
Looking North	Looking West

Present Facility

IA 39 is a two-lane roadway. The existing structure is a three span, 100 ft. long x 26 ft. wide Continuous I-Beam Bridge constructed in 1951 and rehabbed in 1985.

Existing roadway plans are not available for this segment of IA 39.

B. Traffic Estimates

The 2021 construction year and 2041 design year average daily traffic estimates are 2,900 ADT with 22% trucks and 3,100 ADT with 22% trucks, respectively.

C. Sufficiency Ratings

IA 39 is not a NHS route and is a State Highway. The federal bridge sufficiency rating is 80.3.

D. Access Control

Access rights will not be acquired for this project.

E. Crash History

During the five-year study period from 2015 through 2019, there were three crashes reported near the bridge. All three were property damage only crashes.

II. PROJECT CONCEPT

A. Feasible Alternatives

Preferred Alternative – Alternative #1

Replace existing bridge with a 143’ long twin 12’ x 10’ RCB culvert with a 30-degree skew aligning with existing stream (see attached drawing). Remove superstructure and replace with roadway.

The typical section of the pavement as it approaches the bridge is a 22 ft. roadway with 8 ft. granular shoulders and 4:1 foreslopes. The proposed typical section for this project will be a 24 ft. roadway with 8 ft. granular shoulders and 4:1 foreslopes.

The structure will be built under live traffic and then detoured offsite to complete the remaining work.

Right-of-way required for this project due to the extents of the culvert.

Culvert Items	Estimated Costs
Culvert (Twin 12' x 10' x 143')	$308,900
Headwalls (30 degree skew)	$100,900
Bridge Rehab	$22,800
Mobilization – 10%	$41,000
Contingency – 20%	$90,200
Culvert Costs	**$541,000**

Roadway Items	Estimated Costs
Removal of Guardrail	$4,000
Pavement, 10” PCC	$35,000
Granular Shoulders	$4,000
Contractor Furnished Fill	$80,000
Erosion Control	$10,000
Traffic Control – 5%	$10,000
Mobilization – 5%	$10,000
M & C – 30%	$45,900
Roadway Costs	**$198,900**
Project Total	**$762,700**

Alternative #2

Replace existing bridge with a 143’ long twin 12’ x 10’ RCB culvert with a 30-degree skew aligning with existing stream (see attached drawing). Rehab bridge deck and mill 3” and overlay 3” HMA.

The typical section of the pavement as it approaches the bridge is a 22 ft. roadway with 8 ft. granular shoulders and 4:1 foreslopes. The proposed typical section for this project will be a 24 ft. roadway with 8 ft. granular shoulders and 4:1 foreslopes.

The structure will be built under live traffic and then staged to complete the remaining work.

Right-of-way required for this project due to the extents of the culvert.

Culvert Items	Estimated Costs
Culvert (Twin 12' x 10' x 143')	$308,900
Headwalls (30 degree skew)	$100,900
Bridge Superstructure Removal	$22,800
Mobilization – 10%	$41,000
Contingency – 20%	$90,200
Culvert Costs	**$541,000**

Roadway Items	Estimated Costs
Removal of Guardrail	$4,000
3” Mill and HMA Overlay	$5,000
Granular Shoulders	$4,000
Contractor Furnished Fill	$70,000

Flowable Mortar	$130,000
Erosion Control	$10,000
Traffic Control – 5%	$10,000
Mobilization – 5%	$10,000
M & C – 30%	$72,900
Roadway Costs	**$315,900**
Project Total	**$879,700**

Other Alternatives Considered

An additional alternative to replace the existing bridge with a new bridge was discussed. The new bridge option would require more maintenance over the life of the structure and hydraulically does not require a bridge so the option was dismissed. No costs were developed for this alternative.

B. Detour Analysis
For a portion of the construction duration, IA 39 will be closed and an offsite detour will be utilized. The detour will follow County Road M35 north to County Road D59, then east to IA 39. Out of distance is 0.3 miles.

C. Recommendations
It is recommended the present structure be replaced as described in the Preferred Alternative discussion above.

D. Construction Sequence
It is anticipated all work on this project will be awarded to one prime contractor.

E. ADA Accommodations
There are no bike paths or sidewalks adjacent to IA 39; therefore, no ADA accommodations are planned in conjunction with this project.

F. Special Considerations
Right-of-Way will be required for this project.

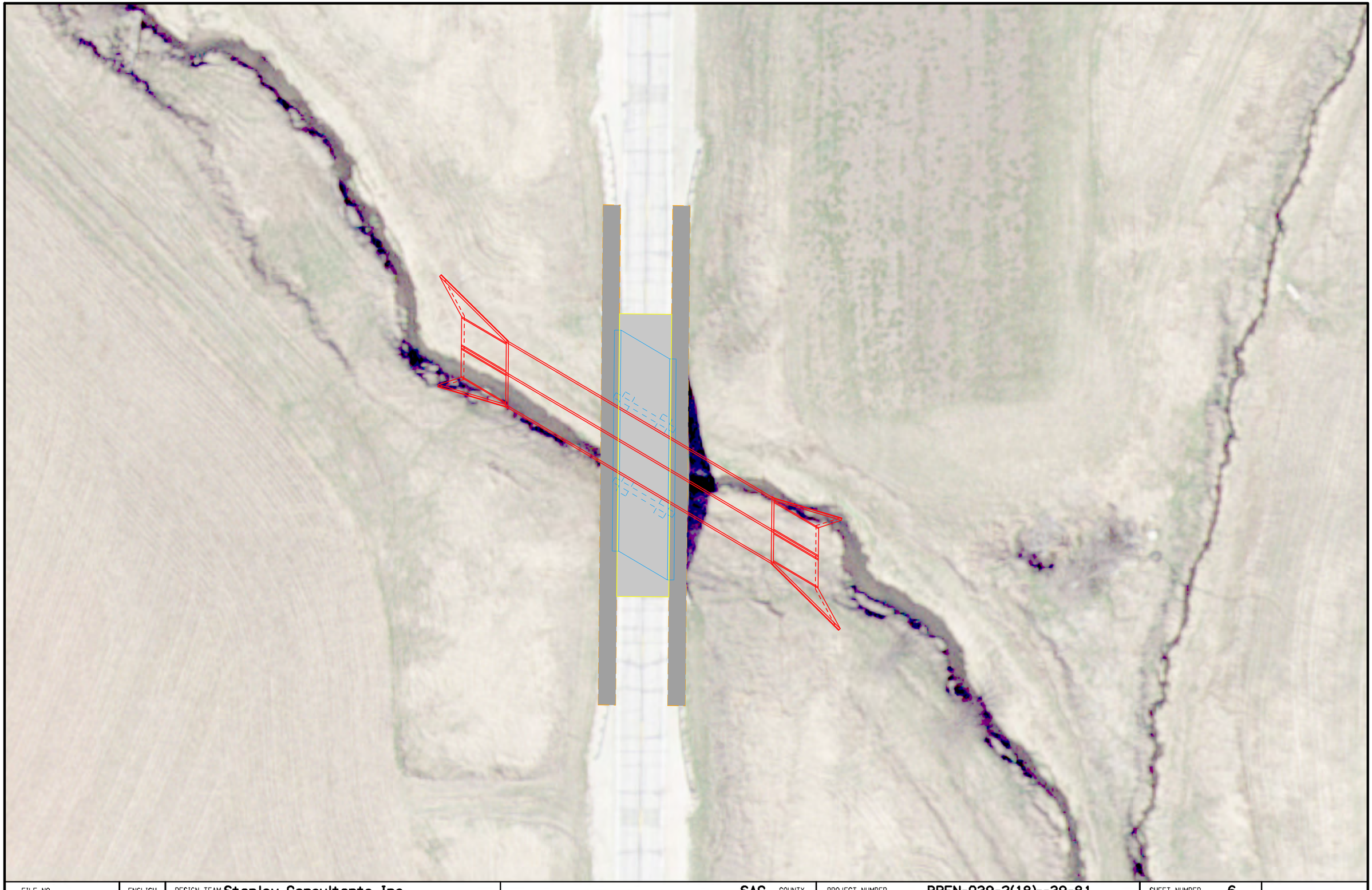
The District will lead utility coordination. There is a conduit attached to the east side of the bridge.

Location and Environment Bureau has not yet reviewed this project to determine if a Section 404 Permit will be required.

The District cultural resources manager has not yet completed a cultural resources review on this project.

G. Program Status
Site data has been developed by Stanley Consultants. This project is listed in the 2020-2024 Iowa Transportation Improvement Program with $535,000 for replacement in FY 2021. Costs for this project may be eligible for bridge replacement funds.

Following pages include a map of the county and location of project area with the proposed detour route shown and the concept drawing.



FILE NO.	ENGLISH	DESIGN TEAM Stanley Consultants Inc.	SAC COUNTY	PROJECT NUMBER BRFN-039-2(18)--39-81	SHEET NUMBER 6

SYSTEMTIME SYSTEMDATE USERNAME DGNSPEC

HIGHWAY AND TRANSPORTATION MAP

SAC COUNTY
IOWA

Prepared By

IOWA DOT

SYSTEMS PLANNING BUREAU
Phone: (515) 239-1664
WWW.IOWADOT.GOV/MAPS

In Cooperation With
United States
Department of Transportation

JANUARY 1, 2019

MILES 0 1 2 3 4
KILOMETERS 0 1 2 3 4 5 6

8 - 1 - 19

LEGEND

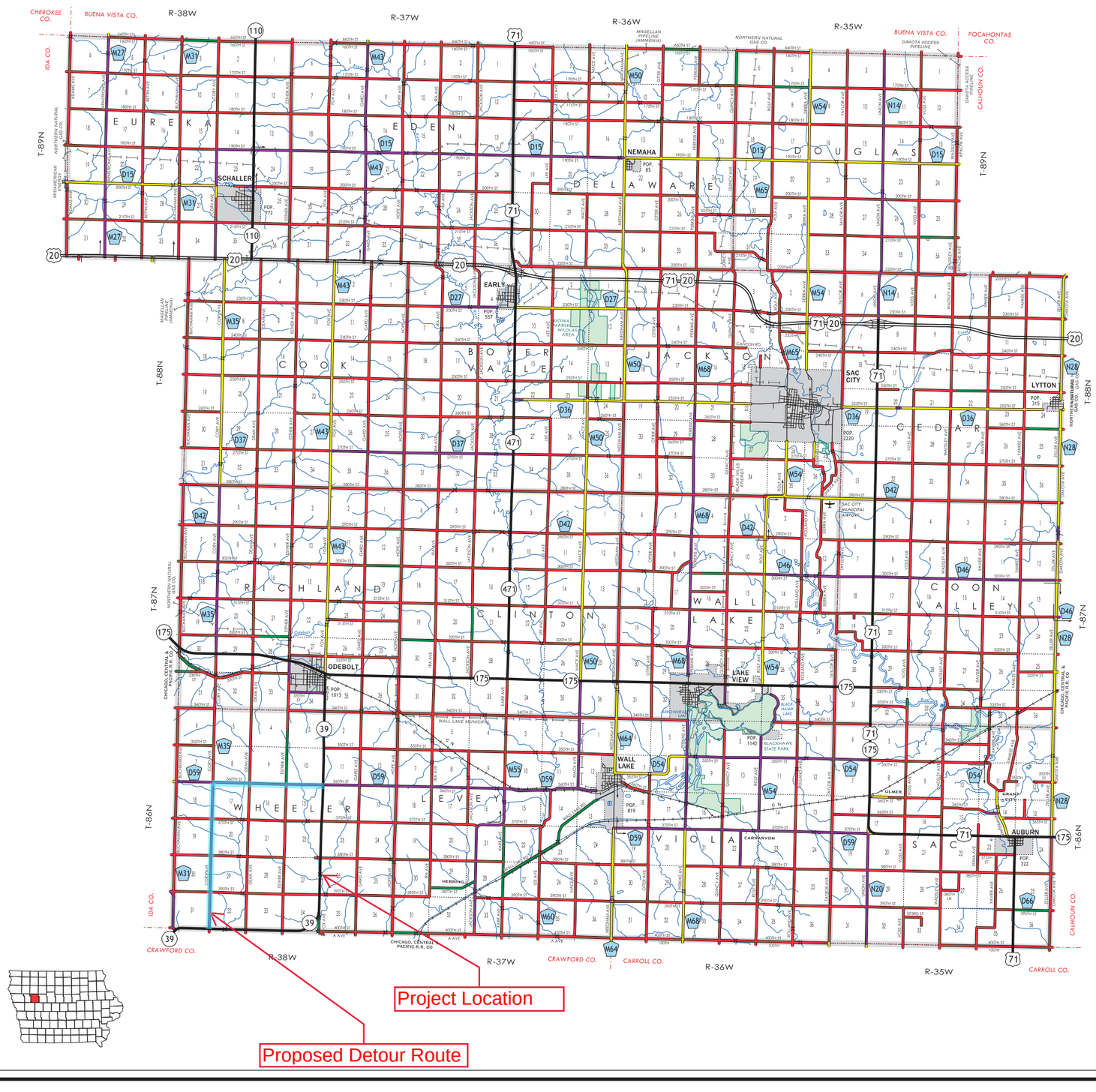
- INTERSTATE HIGHWAY
- PRIMARY HIGHWAY-DIVIDED
- PRIMARY HIGHWAY
- PORTLAND CEMENT CONCRETE ROAD
- ASPHALT ROAD
- BITUMINOUS ROAD
- GRAVEL ROAD
- EARTHEN ROAD

- INTERSTATE HIGHWAY 80
- UNITED STATES HIGHWAY 65
- STATE HIGHWAY 237
- COUNTY HIGHWAY D27

- RAILROAD
- PIPELINE
- AIRPORT
- HYDROLOGY
- BRIDGE

- STATE BOUNDARY
- COUNTY BOUNDARY
- CORPORATE BOUNDARY
- TOWNSHIP LINE
- SECTION LINE
- ROAD NAMES
- UNINCORPORATED PLACE ELWOOD

- STATE PARKS
- STATE INSTITUTIONS
- FEDERAL LAND



81

RCB CULVERT REPLACEMENT - TWIN BOX
BRFN-039-2(18)--39-81
SAC Co.

LETTING DATE 01-18-2023

IOWA DOT

Highway Division

PLANS OF PROPOSED IMPROVEMENT ON THE

PRIMARY ROAD SYSTEM

SAC COUNTY

RCB CULVERT REPLACEMENT - TWIN BOX

IA 39 OVER PORTER CREEK 2.4 MI S OF CO RD D59

SCALES: As Noted

Refer to the Proposal Form for list of applicable specifications.

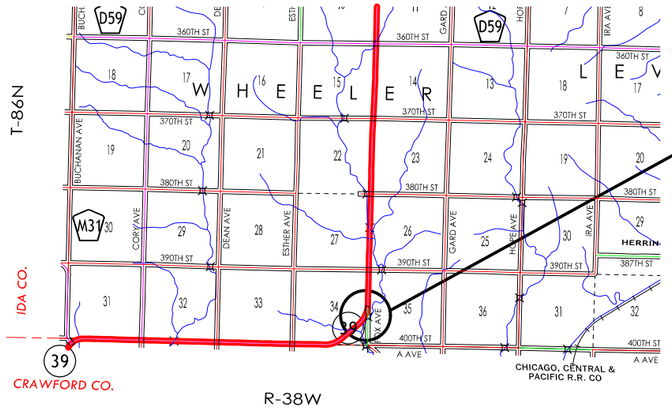
Value Engineering Saves. Refer to Article 1105.14 of the Specifications.

IOWA ONE CALL
1-800-292-8989 | 811
www.iowaonecall.com

REVISIONS

	TOTAL
	15
PROJECT IDENTIFICATION NUMBER	
16-81-039-010	
PROJECT NUMBER	
BRFN-039-2(18)--39-81	
R.O.W. PROJECT NUMBER	
STPN-039-2(19)--2J-81	

INDEX OF SHEETS



Project Location
Sta. 1081+60
Reference Location 19.8

DESIGN DATA RURAL

2021 AADT	2,900	V.P.D.
2041 AADT	3,100	V.P.D.
20-- DHV	--	V.P.H.
TRUCKS	22	%
Total Design ESALs	4,400,000	

INDEX OF SEALS

SHEET NO.	NAME	TYPE
A.1	Taylor R. Theulen	Primary Signature Block

PRELIMINARY PLANS

Subject to change by final design.

D2 PLAN – Date: 01/31/2020

FILE NO. xxxxx	ENGLISH	DESIGN TEAM Stanley Consultants Inc.	SAC COUNTY	PROJECT NUMBER BRFN-039-2(18)--39-81	SHEET NUMBER A.1

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Roadway	**IA 39**			
PIN Number	16-81-039-010		**Submittal Date**	
Project Number	BRFN-039-2(18)—39-81			**Approval Date**
District	District 3	**Assistant District Engineer**	Shane Tymkowicz	
County	SAC		**or**	
Route	IA 39	**Office Director**		
Location	Over Porter Creek 2.4 Miles S of Co Rd D59			
Work Type	RCB Culvert Replacement - Twin Box			
Segment Manager				
Designer	Stanley Consultants, Inc.			

Design Manual Section 1C-1
Last Updated: 05-26-17

Rural Two-Lane Highways (Rural Arterials)

Design Element		Preferred	Acceptable	Project Values
Design speed (mph)		60	50	60
Maximum superelevation rate (Refer to Section 2A-2)		6%	8%	6%
Design lane width (ft)		12	12	12
Full depth paved width (ft)		14	12	12
Right turn lane (ft)		12	10	12
Climbing Lane (ft)		12	12	12
Left turn lane (ft)		12	10	12
Pavement cross-slope (on tangent sections)	Through lanes	2%	1.5% minimum, 2% maximum	2%
	Auxiliary and turn lanes	3%	3% maximum	3%
	Crown break at centerline	4%	4% maximum	4%
Shoulder cross-slope (on tangent sections)		4%	Shoulder cross-slope cannot be less than the adjacent lane, 6% max for paved or granular shoulders, 8% max for earth shoulders	4%
Curb type (Refer to Section 3C-2)	Design speed = 50 or 55 mph	6-inch sloped	6-inch standard	N/A
	Design speed ≥ 60 mph	4-inch sloped	6-inch sloped	N/A
Foreslope (For fill areas greater than 40 ft, contact the Soils Design Section for assistance)	Adjacent to shoulder	10:1 for 4' then 6:1	3:1	4:1
	Beyond standard ditch depth and design clear zone	3.5:1	3:1	3:1
	Curbed roadways	2%	not steeper than 3:1	N/A
Backslope (For cut areas greater than 25 feet, contact the Soils Design Section for assistance with backslope benches.)		3:1	2.5:1	3:1
Transverse Slopes	w/ drainage structures	8:1	6:1	8:1
	w/o drainage structures	10:1	6:1	10:1
Ditches (Refer to Section 3G-1)	Outside ditch (depth x width) (ft)	5 x 10	--	5 x 10
Bridge width—new*	Bridge length ≤ 200 ft	design lane widths + effective shoulder widths	design lane widths + effective shoulder widths	N/A
	Bridge length > 200 ft	design lane widths + effective shoulder widths	design lane width + 4' right and left of the design lane widths	N/A
Bridge width—existing*		design lane widths + no less than 2 ft left and right	design lane widths + 2 ft. offset left and right	30
Vertical clearance (ft) (above lanes, shoulders and 25 feet left and right of the center of railroad tracks)	Over primary	16.5	16	N/A
	Over non-primary	16.5 at interchange locations, 15 at all other locations	14	N/A
	Over railroad	23.3	23.3	N/A
	Sign trusses and pedestrian bridges	17.5	17	N/A
Structural Capacity		Contact Office of Bridges and Structures	Contact Office of Bridges and Structures	N/A
Level of Service		B	B	B

*FHWA notification via email is required if acceptable critera is not met on the NHS system (No formal design exeption is required)

Design year ADT =	3100

Design Manual Section 1C-1
Last Updated: 05-26-17

Effective Shoulder Width and Type for Two-Lane Highways

Preferred (values shown in feet)			Acceptable (values shown in feet)			Project Values
	Rural Roadways	Urban Roadways		Rural Roadways	Urban Roadways	
Turn lanes with shoulders	6	6	Turn lanes with shoulders	6	0	N/A
Turn lanes with curbs	6	See Section 3C-2	Turn lanes with curbs	6	0	N/A
	Effective Shoulder Width	Paved Width		Effective Shoulder Width	Paved Width	
Climbing Lanes	6	4	Climbing Lanes	4	0	N/A
Two-Lane Highways	Effective Shoulder Width	Paved Width	Two-Lane Highways	Effective Shoulder Width	Paved Width	
Routes where bicycles are to be accommodated	10	10	Design year ADT > 2000 vpd	8	2*	8' granular
On roadways approaching urban areas (due to increased bike traffic)	10	10				
On all curves with a superelevation rate of 7.0% or greater	10	10				
On roadways with design year ADT > 5000	10	6	Design year ADT between 400 - 2000 vpd	6	2*	
On all other NHS	10	4				
On non-NHS routes with design year ADT > 3000	10	4	Design year ADT < 400 vpd	4	2*	
On non-NHS routes with design year ADT < 3000	8	2*				

*Requires safety edge-Refer to Section 3C-6

Curbs should be located beyond the outer edge of the effective shoulder width in rural areas

Refer to Section 3C-2 for curb offsets in urban areas

Notes:

Roadway Design Speed (mph) =	60

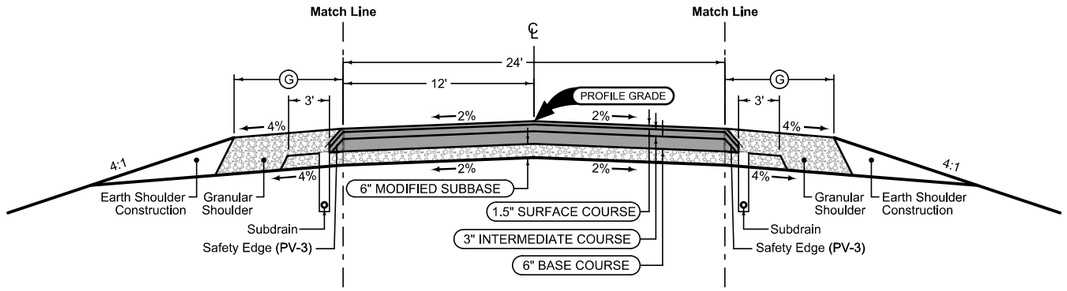
Design Manual Section 1C-1
Last Updated: 05-26-17

Design Criteria for High Speed Roadways

Design Element			Preferred Criteria, Design Speed, mph						Acceptable Criteria, Design Speed, mph						Project Values
			50	55	60	65	70	75	50	55	60	65	70	75	
Stopping sight distance (ft) (Refer to Section 6D-1)			425	495	570	645	730	820	425	495	570	645	730	820	570
Minimum horizontal curve radius (ft) (Refer to Sections 2A-2 and 2A-3)	Method 5 superelevation and side friction distribution	e_{max} = 6%	833	1060	1330	1660	2040	2500	833	1060	1330	1660	2040	2500	1330
		e_{max} = 8%	--	--	--	--	--	--	758	960	1200	1480	1810	2210	--
Minimum vertical curve length (ft) (Refer to Section 2B-1)			150	165	180	195	210	225	150	165	180	195	210	225	180
Minimum rate of vertical curvature (K) (Refer to Section 2B-1)	crest vertical curves		84	114	151	193	247	312	84	114	151	193	247	312	151
	sag vertical curves	roadways without fixed-source lighting	96	115	136	157	181	206	96	115	136	157	181	206	136
		roadways with fixed-source lighting	96	115	136	157	181	206	54	66	78	91	106	121	136
Minimum gradient (%)	(Refer to Section 2B-1)		0.5						0.3% with a curb, 0.0% without a curb						0.3
Maximum gradient (%) (Refer to Section 2B-1)		Urban roadways	4		3				7	6	6	–	–	–	3
		Rural roadways							5	5	4	4	4	4	3
		Interstates							5	5	4	4	4	4	3
Clear zone			See "Preferred Clear Zone" table in Section 8A-2						See "Acceptable Clear Zone" table in Section 8A-2						26

Granular Shoulder with Safety Edge

2_G_ 04-21-20		
STATION TO STATION		(G) Feet
1080+65.00	1082+55.00	8



2H_ 04-21-20	
STATION TO STATION	
1080+65.00	1082+55.00

Granular Shoulder with Safety Edge

2_G_ 04-21-20		
STATION TO STATION		(G) Feet
1080+65.00	1082+55.00	8

FILE NO. xxxxx	ENGLISH	DESIGN TEAM Stanley Consultants Inc.	SAC COUNTY	PROJECT NUMBER BRFN-039-2(18)--39-81	SHEET NUMBER B.1

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100-1D
10-18-05

PROJECT DESCRIPTION

This project involves the replacement of the bridge (Maint. No. 8118.9S039) on IA 39 over Porter Creek, 2.4 miles south of Co Rd D59.

100-1A
07-15-97

ESTIMATED PROJECT QUANTITIES
(1 DIVISION PROJECT)

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

100-4A
10-29-02

ESTIMATE REFERENCE INFORMATION

Item No.	Item Code	Description

105-4
10-18-11

STANDARD ROAD PLANS

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

Number	Date	Title
EC-201	10-15-19	Silt Fence
EC-303	04-16-19	Stabilized Construction Entrance
EC-502	04-21-15	Seeding in Rural Areas
PV-3	04-16-19	Safety Edge
PV-101	04-21-20	Joints
TC-1	10-15-19	Work Not Affecting Traffic (Two-Lane or Multi-Lane)
TC-252	04-21-20	Routes Closed to Traffic

232-3A
04-16-19

EROSION CONTROL
(RURAL SEEDING)

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.

232-11
04-16-19

EROSION CONTROL
(STABILIZING CROP SEEDING)

If outside of permanent seeding dates in Section 2601 of the Standard Specifications, or if required by a storm water permit, place stabilizing crop, fertilizer, and mulch on the disturbed area as follows:

Place seed and fertilize according to the requirements of Article 2601.03,C,1 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 incidental to mobilization and will not be paid for separately.

281-1
10-18-16

SECTION 404 PERMIT AND CONDITIONS

Construct this project according to the requirements of U.S. Army Corps of Engineers _____, Permit No. _____. A copy of this permit 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.

281-3
10-17-17

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:

232-3C
04-16-19

EROSION CONTROL
(NATIVE GRASS SEEDING)

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 debearded 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.

232-10
04-18-17

EMERALD ASH BORER

Any living, dead, cut or fallen material of the ash (Fraxinus spp.) including trees, nursery stock, logs, firewood, stumps, roots, branches, and composted or uncomposted ash chips can be freely moved within the yellow areas of the most recent Federal EAB Quarantine & Authorized Transit.

https://www.aphis.usda.gov/plant_health/plant_pest_info/emerald_ash_b/downloads/eab_quarantine_map.pdf.

Obtain appropriate Compliance Agreements from USDA APHIS PPQ prior to moving any of the above listed ash articles to areas outside the yellow zone on the map.

For questions, concerns, and general assistance, contact:

USDA APHIS PPQ, Iowa office, 515-414-3295

Or

Iowa Department of Agriculture & Land Stewardship
515-725-1470
Entomology@IowaAgriculture.gov

SURVEY SYMBOLS

- BCL Bridge Centerline
- BD Bridge Deck
- BRG Bridge
- C Centerline BL of Road (ML or SR)
- CP Control Point
- ENP Edge Paved Entrance & Park Lot
- ENT Centerline BL of Entrance
- ENU Edge Unpaved Entrance & Parking
- GDL Guard Rail Steel
- LIN Miscellaneous Line
- PI Tangent Point
- POT Point on Tangent
- SBR Size of Bridge
- SCR Section Corner
- SNP Unpaved Shoulder

UTILITY LEGEND

No utilities information was collected for this project. There is a pipe running along the outside edge of the east wheel guard of the bridge which was electronically located which could have a utility inside.

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)

FILE NO. xxxxx	ENGLISH	DESIGN TEAM **Stanley Consultants Inc.**	**SAC** COUNTY	PROJECT NUMBER **BRFN-039-2(18)--39-81**	SHEET NUMBER **D.1**

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1079 1080 1081 1082 1083 1084

℄ IA 39

Sta. 1080+65.00
Begin Construction

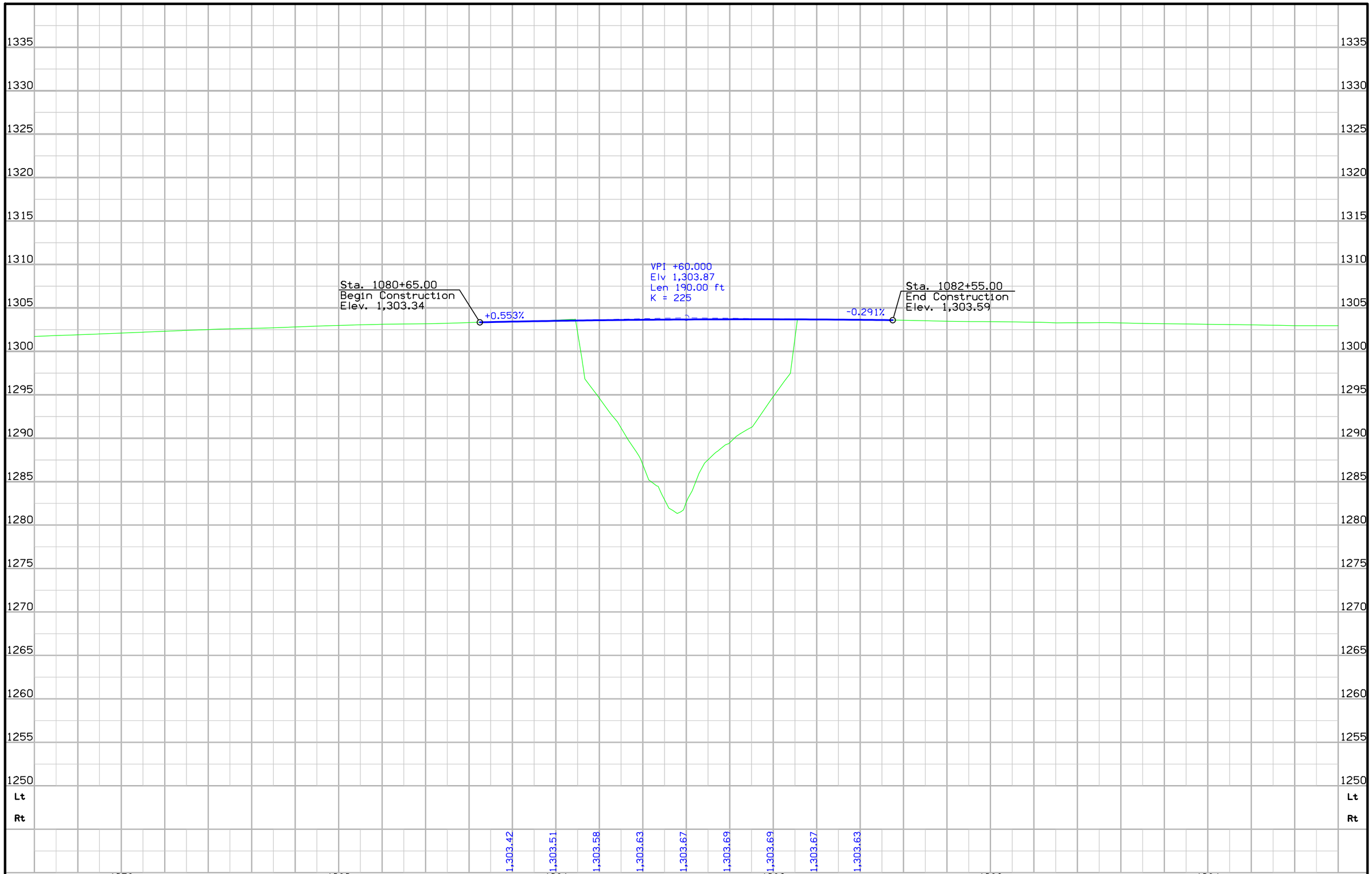
Sta. 1082+55.00
End Construction

0 FEET 20

IA 39

FILE NO. xxxxx	ENGLISH	DESIGN TEAM Stanley Consultants Inc.	SAC COUNTY	PROJECT NUMBER BRFN-039-2(18)--39-81	SHEET NUMBER D.2

9:56:18 AM 1/31/2020 8725 pw:\\projectwise.dot.int.lan:PWMain\Documents\Projects\8103901016\Design\CADD\SHT\SHT_81039018_D01.dgn



FILE NO. xxxxx	ENGLISH	DESIGN TEAM Stanley Consultants Inc.	SAC COUNTY	PROJECT NUMBER BRFN-039-2(18)--39-81	SHEET NUMBER D.3

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Survey Information

SAC County
BRFN-039-2(18)—39-81
HIGHWAY 39 OVER PORTER CREEK
PIN 00-00-000-000
Sap-000

Party Personnel

Matt Fouts- Surveyor/PLS
Brandon Wood- Survey Technician
Ethan Fangmeier- Survey Technician
Nick Hollatz- Survey Technician
Wade Gjersvik- Survey Technician
Patrick Barber- Survey Senior Technician

Date(s) of Survey
Begin Date 11/25/2019
End Date 12/04/2019

General Information

Measurement units for this survey are US survey feet. This survey is for Preliminary/Engineering for the proposed bridge replacement on Iowa Highway 39 over Porter Creek and 0.4 miles south of 380th Street. This project is a Full Field Survey.

Vertical Control

Vertical datum for this survey is relative to NAVD88, Geoid 12BUS.

Vertical positions were established by static observations and post processed using concurrent observations from the IaRTN Sac City and Denison reference stations. Static observations were also collected on NGS Monument DP4454 with results shown below. Additional benchmarks were established with a standard level loop relative to CP2.

DP4454 (NGS Second Order Class I) has a published Elev. Of 1285.66
Survey Elev. = 1285.57

Horizontal Control

The project coordinate system is the Iowa Regional Coordinate System, Zone 4. Horizontal datum is NAD83 (2011) for Epoch 2010.00. The projection parameters for Zone 4 of the IaRCS is defined below:

Lambert Conformal Conic Projection North American Datum of 1983
Origin Lat: 42°32'00"N
Origin Central Meridian: 94°50'00"W
Central Meridian Scale: 1.000045
False Northing: 8,600,000
False Easting: 14,500,000

Horizontal positions for site control were established by static observations and post processed using concurrent observations from the IaRTN Sac City and Denison reference stations

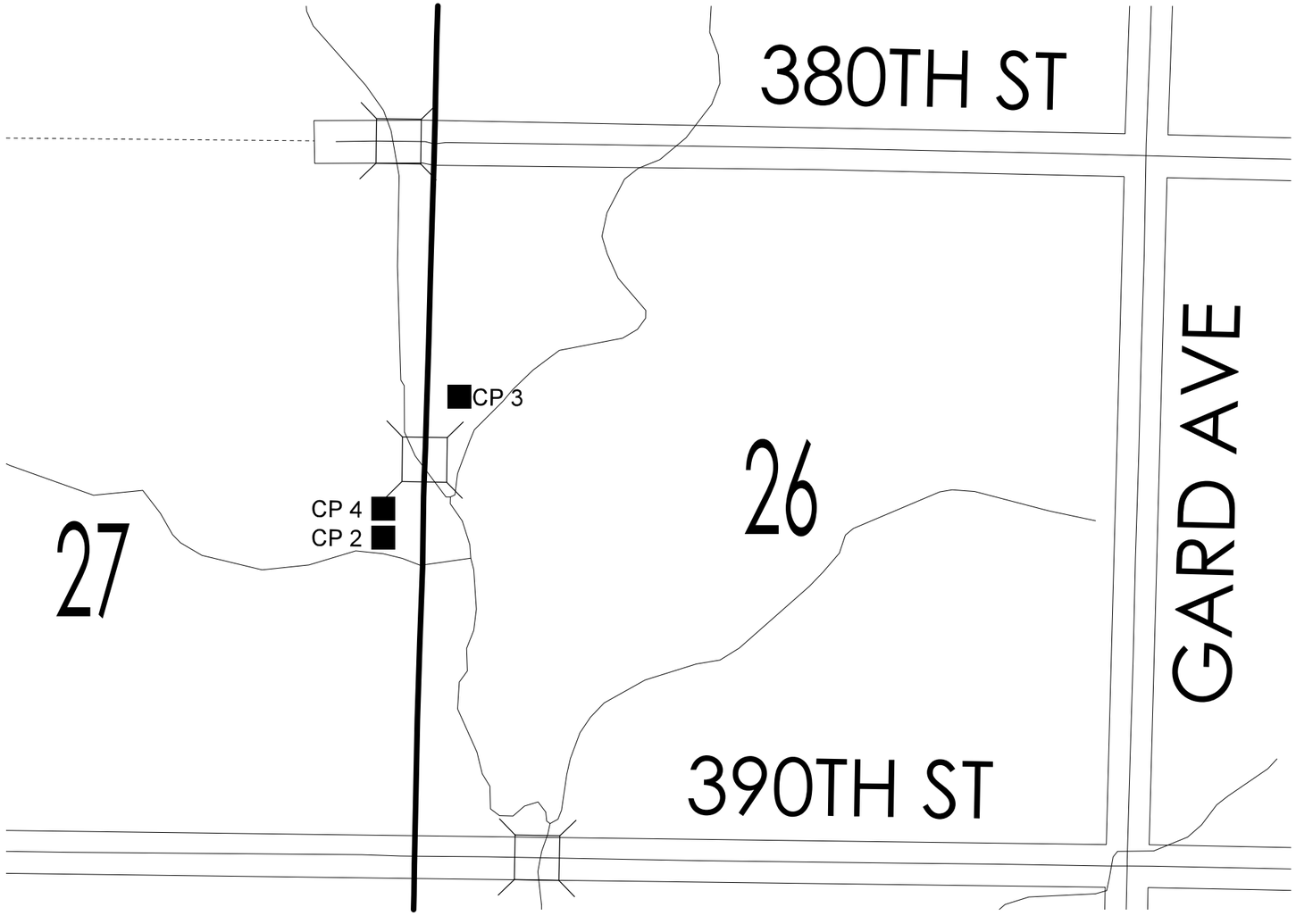
Alignment Information

The horizontal alignment for this survey is a retrace of As-built Plans No. F-412(5). Survey stationing was equated to the plan at STA 1076+72.3 and run back and ahead without equation throughout the survey.

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 4

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

FILE NO. xxxxx	ENGLISH	DESIGN TEAM Stanley Consultants Inc.	SAC COUNTY	PROJECT NUMBER BRFN-039-2(18)--39-81	SHEET NUMBER G.2

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HORIZONTAL AND VERTICAL PROJECT CONTROL COORDINATE LISTING

HORIZ. DATUM: NAD83(2011) EPOCH 2010.00

VERT. DATUM: NAVD88

Ia. Regional Coordinate System Zone 4

Point Name	Northing	Easting	Elevation	Feature Definition	Description
CP2	8490435.08	14388231.80	1298.08	CP/BM	5/8" REBAR NORTH END OF THE SECOND FIELD DRIVE SOUTH OF BRIDGE AND WEST OF HIGHWAY 39
CP3	8491450.38	14388292.70	1302.86	CP/BM	5/8" REBAR EAST OF HIGHWAY 39 IN LINE WITH MILE MARKER 19
CP4	8490780.80	14388233.41	1302.04	CP/BM	5/8" REBAR NORTH END OF FIRST FIELD DRIVE SOUTH OF BRIDGE AND WEST OF HIGHWAY 39

ALIGNMENT COORDINATES

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)
C1	IA 39	1077+60.00	8490526.68	14388260.32															
C2	IA 39	1085+60.00	8491326.64	14388268.61															

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

108-23A
08-01-08

TRAFFIC CONTROL PLAN

Detour - County Road M35 north to County Road D59, then east to IA 39.

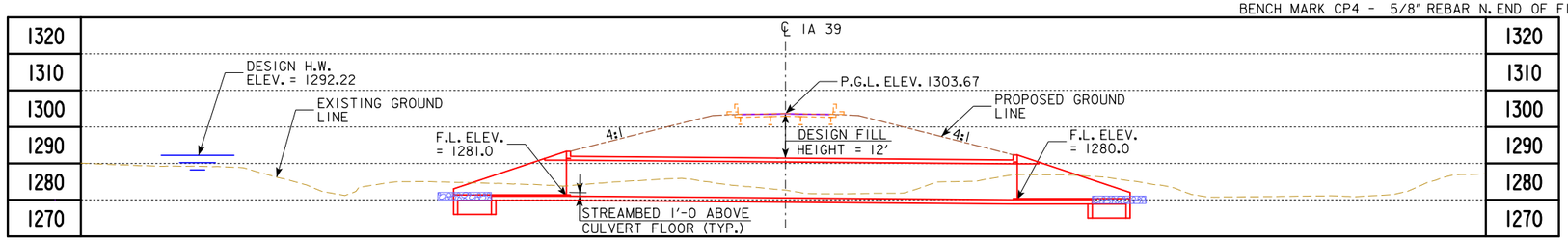
111-01
04-17-12

COORDINATED OPERATIONS

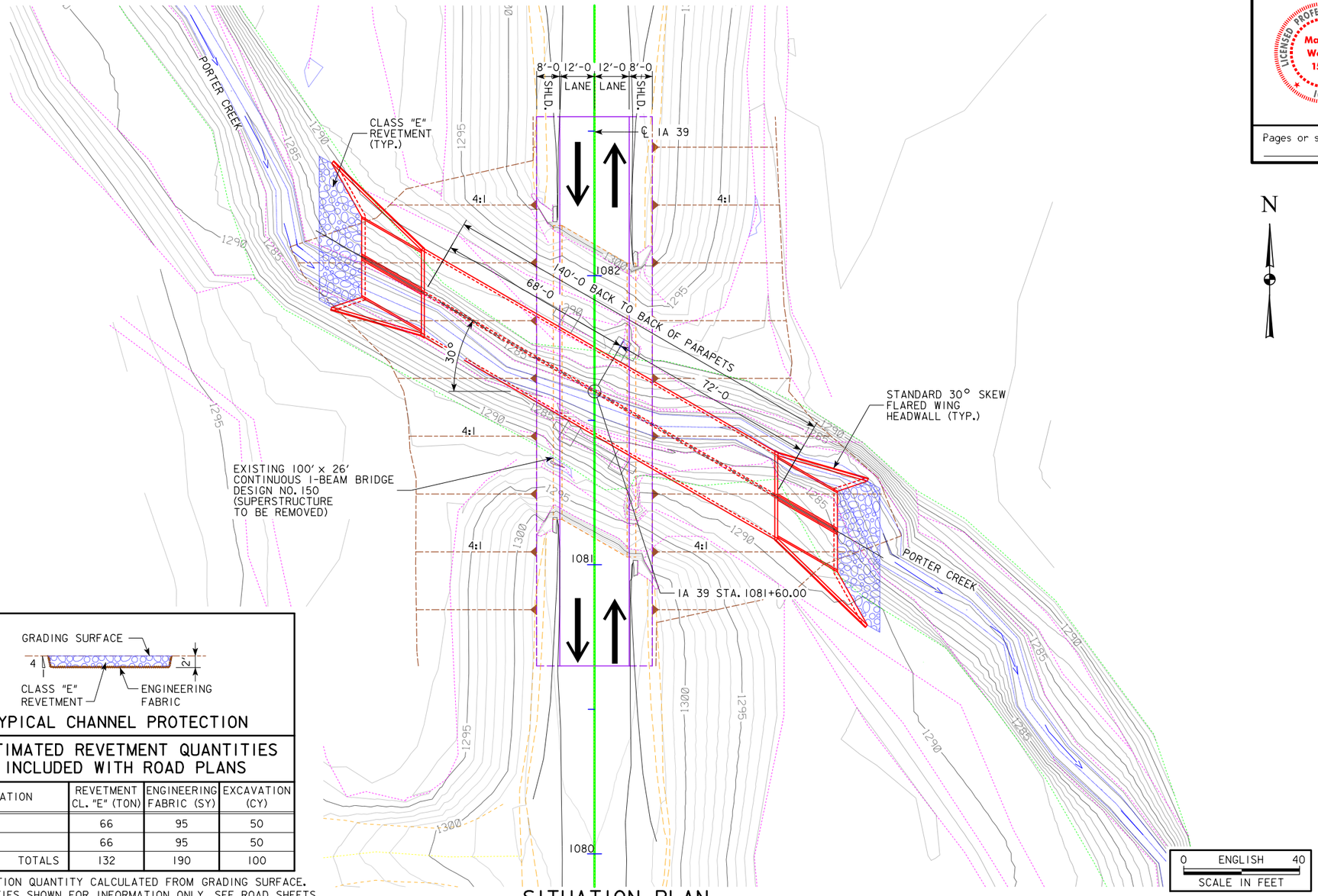
Other work in progress during the same period of time will include the construction of the projects listed. Coordinate operations with those of other contractors working within the same area.

Project	Type of Work
None	

BENCH MARK CP4 - 5/8" REBAR N. END OF FIRST FIELD DRIVE S. OF BRIDGE/W. OF IA 39 - N:8490780.80, E:14388233.41, ELEV. 1302.04



LONGITUDINAL SECTION ALONG ℄ CULVERT



SITUATION PLAN

TYPICAL CHANNEL PROTECTION

ESTIMATED REVETMENT QUANTITIES INCLUDED WITH ROAD PLANS

LOCATION	REVETMENT CL. "E" (TON)	ENGINEERING FABRIC (SY)	EXCAVATION (CY)
INLET	66	95	50
OUTLET	66	95	50
TOTALS	132	190	100

EXCAVATION QUANTITY CALCULATED FROM GRADING SURFACE.
QUANTITIES SHOWN FOR INFORMATION ONLY. SEE ROAD SHEETS.

0 ENGLISH 40
SCALE IN FEET

HYDRAULIC DATA

DRAINAGE AREA = 4,269 ACRES
Q_{50} = 1,936 CFS
HW ELEV. = 1292.22
STREAM SLOPE = 27.1 FT./MI.

+0.553% -0.291%
VPI STA = 1081+60 VC = 190'
VPI ELEV = 1303.87

PROPOSED PROFILE GRADE IA 39

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.

LICENSED PROFESSIONAL ENGINEER
Mark D. Werner
15418
IOWA

Signature Date
Mark D. Werner
Printed or Typed Name

My license renewal date is December 31, 2021

Pages or sheets covered by this seal:

N

NOTES:

ALL UNITS ARE IN FEET UNLESS NOTED OTHERWISE.

DRAINAGE WILL NEED TO BYPASS CULVERT DURING CONSTRUCTION.

FLOWLINE ELEVATION AT CULVERT FLOOR. HYDRAULIC ANALYSIS ASSUMES STREAMBED 1'-0 ABOVE CULVERT FLOOR.

THE NEED FOR CAMBER AND BELL JOINTS TO BE DETERMINED AFTER REVIEW OF SOILS REPORT.

ROADWAY WILL BE CLOSED TO TRAFFIC DURING CULVERT CONSTRUCTION.

UTILITIES LEGEND:

SYMBOL - TYPE - COMPANY NAME
-OR-
NO KNOWN UTILITIES
-OR-
UTILITY SURVEY NOT CONDUCTED

LOCATION

IA 39 OVER PORTER CREEK
T-86N R-38W
SECTION 26 & 27
WHEELER TOWNSHIP
SAC COUNTY
FHWA NO. ?
BRIDGE MAINT. NO. 8118.9S039
LATITUDE 42.233306°
LONGITUDE -95.245886°

TRAFFIC ESTIMATE

2021 AADT	2,900	V.P.D.
2041 AADT	3,100	V.P.D.
TRUCKS	22	%
TOTAL DESIGN ESALs	4,400,000	

DESIGN FOR 30° SKEW (L.A.)

TWIN 12' X 10' X 140'-0 REINFORCED CONCRETE BOX CULVERT

SITUATION PLAN

STATION 1081+60 JANUARY 2020

SAC COUNTY
IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION

DESIGN SHEET NO. 1 OF 2 FILE NO. ? DESIGN NO. ?

DESIGN TEAM Stanley Consultants Inc. | SAC COUNTY | PROJECT NUMBER BRFN-039-2(18)--39-81 | SHEET NUMBER V.1

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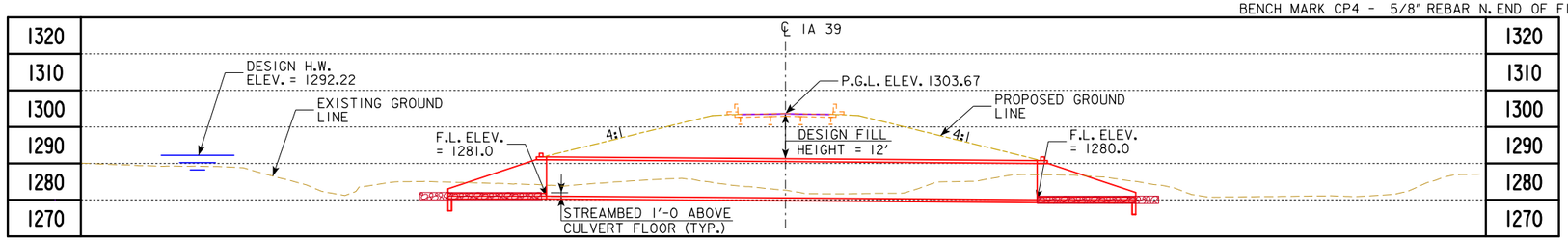
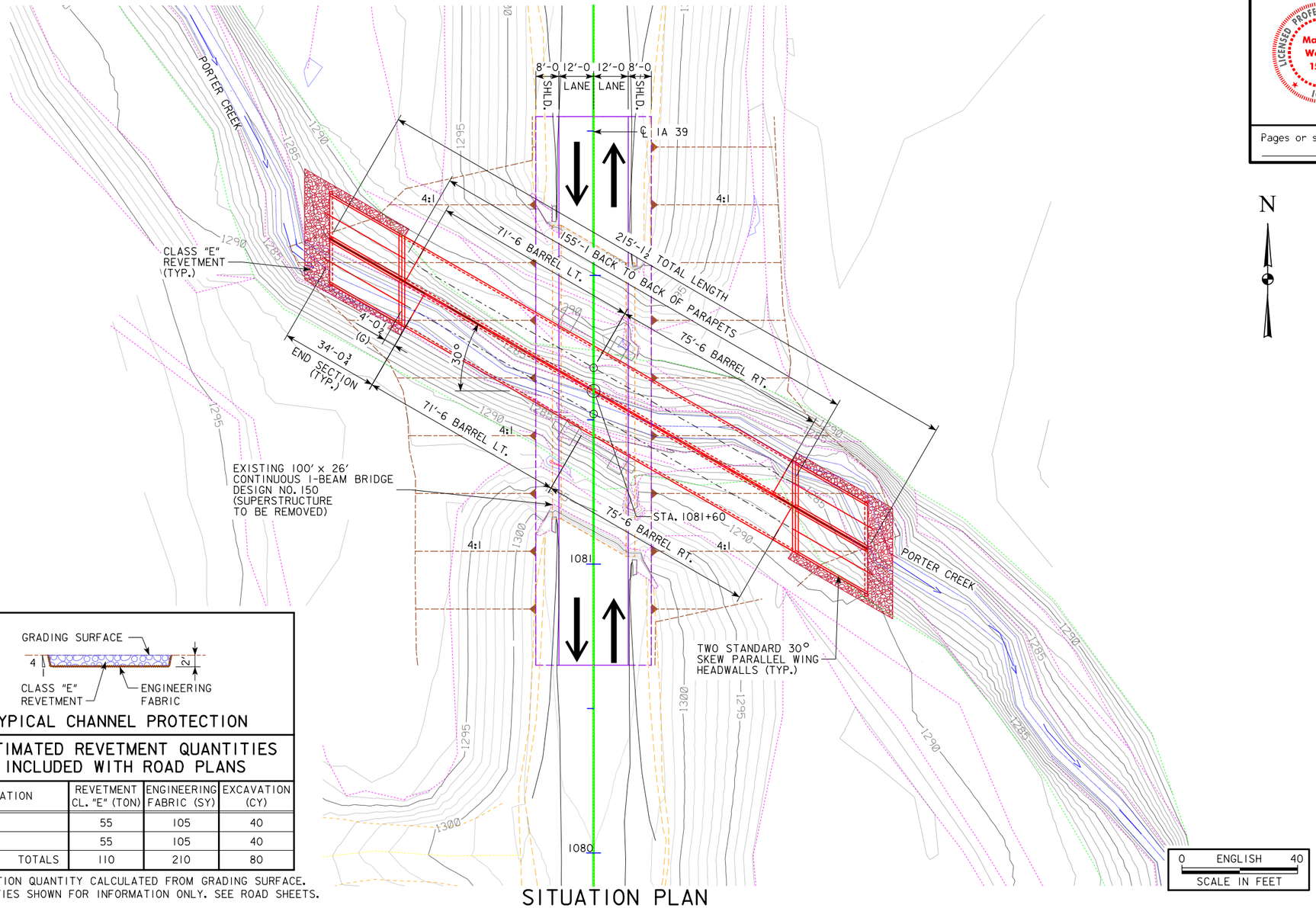
BENCH MARK CP4 - 5/8" REBAR N. END OF FIRST FIELD DRIVE S. OF BRIDGE/W. OF IA 39 - N:8490780.80, E:14388233.41, ELEV. 1302.04



LONGITUDINAL SECTION ALONG ℄ CULVERT



SITUATION PLAN

TYPICAL CHANNEL PROTECTION

ESTIMATED REVETMENT QUANTITIES INCLUDED WITH ROAD PLANS

LOCATION	REVETMENT CL. "E" (TON)	ENGINEERING FABRIC (SY)	EXCAVATION (CY)
INLET	55	105	40
OUTLET	55	105	40
TOTALS	110	210	80

EXCAVATION QUANTITY CALCULATED FROM GRADING SURFACE.
QUANTITIES SHOWN FOR INFORMATION ONLY. SEE ROAD SHEETS.

HYDRAULIC DATA

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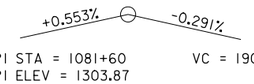
Q_{50} = 1,936 CFS
HW ELEV. = 1292.22
STREAM SLOPE = 27.1 FT./MI.



VPI STA = 1081+60 VC = 190'
VPI ELEV = 1303.87

PROPOSED PROFILE GRADE IA 39

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.

LICENSED PROFESSIONAL ENGINEER — Mark D. Werner — 15418 — IOWA

Signature Date

Mark D. Werner

Printed or Typed Name

My license renewal date is December 31, 2021

Pages or sheets covered by this seal: _____

N

NOTES:

ALL UNITS ARE IN FEET UNLESS NOTED OTHERWISE.

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TWIN 12' X 10' X 155'-1 PRECAST CONCRETE BOX CULVERT

SITUATION PLAN

STATION 1081+60 JANUARY 2020

SAC COUNTY

IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION

DESIGN SHEET NO. 2 OF 2 FILE NO. ? DESIGN NO. ?

DESIGN TEAM Stanley Consultants Inc. | SAC COUNTY | PROJECT NUMBER BRFN-039-2(18)--39-81 | SHEET NUMBER V.2

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