Traffic Safety Improvement Program

Site Specific Applications

FY 2018

Received by August 15, 2016

Site Specific
FY 2018

Applications listed in order received.

Page No.	Applicant	Title/Subject	$ $ $		
			Project	Safety	Request
4	Iowa DOT – District 1	IA 141 & NW 121st St East of Granger – Offset right turn lane	225,000	225,000	225,000
26	Iowa DOT – District 1	US 69 from Jewel Dr to SCL of Ames – Add a center turn lane	867,000	500,000	500,000
56	City of Council Bluffs	Traffic Signal at 32nd Ave & Manawa Centre Cr	191,000	164,200	164,200
72	Clarke County	Co Rd R45/Starline Ave paved shoulders and rumble strips	1,400,000	1,400,000	500,000
85	City of Ottumwa	S Marion St & 2nd St W – Install a Mini Roundabout	209,259	209,259	209,259
101	City of Ottumwa	N Ferry St & Albia Rd – Install a Roundabout	719,075	719,075	500,000
117	City of Ottumwa	N Ferry St & Richmond Ave – Install a Mini Roundabout	288,150	288,150	288,150
133	Buchanan County	Co Rd D16/Otterville Blvd - Construct 10ft shoulder and flatten foreslopes	1,117,030	871,430	500,000
163	City of Coralville	US 6 & Jones Blvd/Westcor Dr – Install Traffic Signals	353,000	328,000	328,000
182	City of Des Moines	Hubbell Ave Signal modifications	12,600,000	12,600,000	500,000
200	Iowa DOT – District 2	US 18/IA 122 From N 20th St to Willow Creek Ct in Clear Lake Intersection Improvements	713,000	713,000	500,000
221	City of Ankeny	Ankeny Blvd (US 69) & First St – Intersection Improvements	628,800	559,800	500,000
247	Washington County	Co Rd W61 From Spruce Ave to River St – PCC Overlay, Paved Shoulders, Rumble Strips	2,395,518	500,000	500,000
261	City of Tiffin	US 6 & Park Rd – Install a Roundabout	1,979,693.60	1,466,439.70	500,000

Site Specific
(Continued)

Page No.	Applicant	Title/Subject	$ $ $		
			Project	Safety	Request
279	Lee County	Co Rd J40 – Paved Shoulders and Edgeline Rumbles	503,184	503,184	500,000
297	Lee County	Co Rd X23 – Paved Shoulders and Edgeline Rumbles	539,769	539,769	500,000
315	Cedar County	Co Rd X54 – Shoulder Safety Project	385,000	385,000	385,000
325	City of Fort Dodge	First Ave South and South Fifteen St Corridors – Two-way left turn lane and right turn lanes	1,309,000	512,500	500,000
353	City of Eldridge	S 1st St & E Iowa Ave and Midblock of 5th Ave Pedestrian Signals	120,525	120,525	120,525
370	City of Ames	S Duff Ave & S 16th St – Turn Lane Improvements	722,000	495,000	495,000
405	City of Waukee	SE Boone Dr & SE Olson Dr – Install a Mini Roundabout	185,450	185,450	185,450
422	City of Waukee	US 6 & Alice's Rd – Intersection Improvements	3,350,000	695,000	500,000
446	City of Dubuque	Grandview Ave & University Ave – Install a Roundabout	964,842	964,842	500,000
476	Montgomery County	Co Rd H34 from Q Ave to US 71 – Pavement Widening	1,205,000	789,000	500,000
491	Hamilton County	Co Rd D46 & Co Rd R27 Intersection Reconstruction	1,425,000	175,000	175,000
	Totals	**25 Projects**	**$ 34,396,295.60**	**$ 25,909,623.70**	**$ 10,075,584**

Application for TRAFFIC SAFETY FUNDS

GENERAL INFORMATION **DATE:** 7/7/16

Location / Title of Project IA 141 & NW 121st East of Granger

Applicant Iowa DOT District 1

Contact Person Gary Kretlow Jr Title Traffic Tech

Complete Mailing Address 1020 S. 4th St

Ames, IA 50010

Phone 515-239-1199 E-Mail gary.kretlowjr@dot.iowa.gov
(Area Code)

If more than one highway authority is involved in this project, please indicate and fill in the information below (use additional sheets if necessary).

Co-Applicant(s) _____

Contact Person _____ Title _____

Complete Mailing Address _____

_____

Phone _____ E-Mail _____
(Area Code)

PLEASE COMPLETE THE FOLLOWING PROJECT INFORMATION:

Application Type

- Site Specific ☒
- Traffic Control Device ☐
- Safety Study ☐

Funding Amount

Total Safety Cost	$ 225,000
Total Project Cost	$ 225,000
Safety Funds Requested	$ 225,000

Does this project appear on a Safety Improvement Candidate List or is there a safety study recommendation for this project? ☒Yes – Explain #4 expressway intersection

Intersection or Spot Benefit / Cost Safety Analysis

Rev. 5/14

Iowa DOT Office of Traffic & Safety

County: Polk Prepared by: Gary Kretlow Date Prepared: Aug 24, 2015

Intersection: NW 121st and IA 141

Improvement

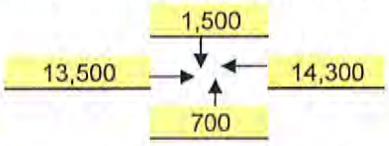
Proposed Improvement(s): Offset right turn lane for westbound IA 141

$ 225,000	Estimated Improvement Cost, **EC**	15	Est. Improvement Life, years, **Y**
	Other Annual Cost (after initial year), **AC**	20	Crash Reduction Factor (integer), **CRF**
$ -	Present Value Other Annual Costs, **OC**	4.0%	Discount Rate (time value of $), **INT**
	$$OC = \frac{AC}{INT}\left(1 - \frac{1}{(1+INT)^Y}\right)$$	$ 225,000	Present Value Cost, **COST** = EC + OC

Traffic Volume Data

Source: Iowa Department of Transportation 2012 Date of traffic count

Daily Entering Vehicles by Approach (or AADT / 2)



10,950,000	Current Annual Entering Veh., **AEV** = DEV * 365
40,376	veh / day, Final Year DEV, **FDEV**
189.36	MEV, Total Million Entering Veh. Over life of Project, **TMEV**
2.0%	Projected Traffic Growth (0%-10%), **G**
30,000	Current Daily Entering Vehicles, **DEV**

$$TMEV = \frac{AEV}{-G}\left(1 - \left(\frac{1+G}{1}\right)^Y\right) \Big/ 10^6$$

Crash Data

2011 First full year --> 2015 Last full year 5.0 years, Time Period, **T**

Additional months values as of May 2014

0	Fatal Crashes	0	Fatalities @	$4,500,000	$ -
		4	Major Injuries @	$325,000	$ 1,300,000
10	Injury Crashes	5	Minor Injuries @	$65,000	$ 325,000
		1	Possible Injuries @	$35,000	$ 35,000
13	Property Damage Only		(assumed cost per crash)	$7,400	$ 170,200
		-OR-	enter all Property Costs of all crashes:		
23	Total Crashes, **TA**		Total $ Loss, **LOSS**		$ 1,830,200

4.60	Current Crashes / Year, **AA** = TA / T	0.42	Crashes / MEV, Crash Rate, **CR** CR = TA x 10^6 / (DEV x 365 x T)
$ 79,574	Cost per Crash, **AVC** = LOSS / TA	$ 924,936	Present Value of Avoided Crashes, **BENEFIT**
79.5	Total Expected Crashes, **TECR** = CR x TMEV		
0.92	Crashes Avoided First Year **AAR** = AA x CRF / 100		
$ 73,208	Crash Costs Avoided in First Year, AAR x AVC		
15.9	Total Avoided Crashes, TECR x CRF/ 100		

$$BEN. = \frac{AVC \times AAR}{(INT - G)}\left(1 - \left(\frac{1+G}{1+INT}\right)^Y\right)$$

Benefit / Cost Ratio

Benefit : Cost = $924,936 : $225,000 = **4.11** : 1

IA 141 & NW 121st in Polk County TSF Application (Offset Right Turn Lane)

1. Existing Conditions

IA 141 WB has an existing 550'+- right turn lane built in 2006. *Figure 1* shows the location map of the study intersection.

2. Proposed Concept

Based on the review of existing conditions and accidents, the following intersection specific improvement of offsetting the right turn lane by widening the existing pavement is recommended to enhance safety.

3. Justification

This expressway intersection has been on the District 1 Top Ten list for most dangerous intersections for the last several years. By offsetting this turn lane it will open the sight triangle for much better visibility to help reduce accidents.

4. Cost Estimate and Proposed Funding Sources

The cost of the proposed improvements is estimated at $225,000.00. *Refer to Figure 3.* It is proposed to fund 100% of the cost of the project with TSIP funds.

Actual costs of the improvements may vary as detailed plans are prepared, and costs shown represent current dollars as of the report date. The most likely funding source for the recommended improvements is TSF funds or Traffic Safety Improvement Program (TSIP). Further information on potential funding sources is available on the Iowa DOT website at http://www.iowadot.gov/fundguid.htm.

5. Proposed Schedule

The project is proposed for letting in year 2017 with construction to be completed by end of 2018. Right of way may be required. There is also an entrance on the east side of NW 121st north of IA 141 that may require relocation.

Figure 1: <u>Location Map</u>

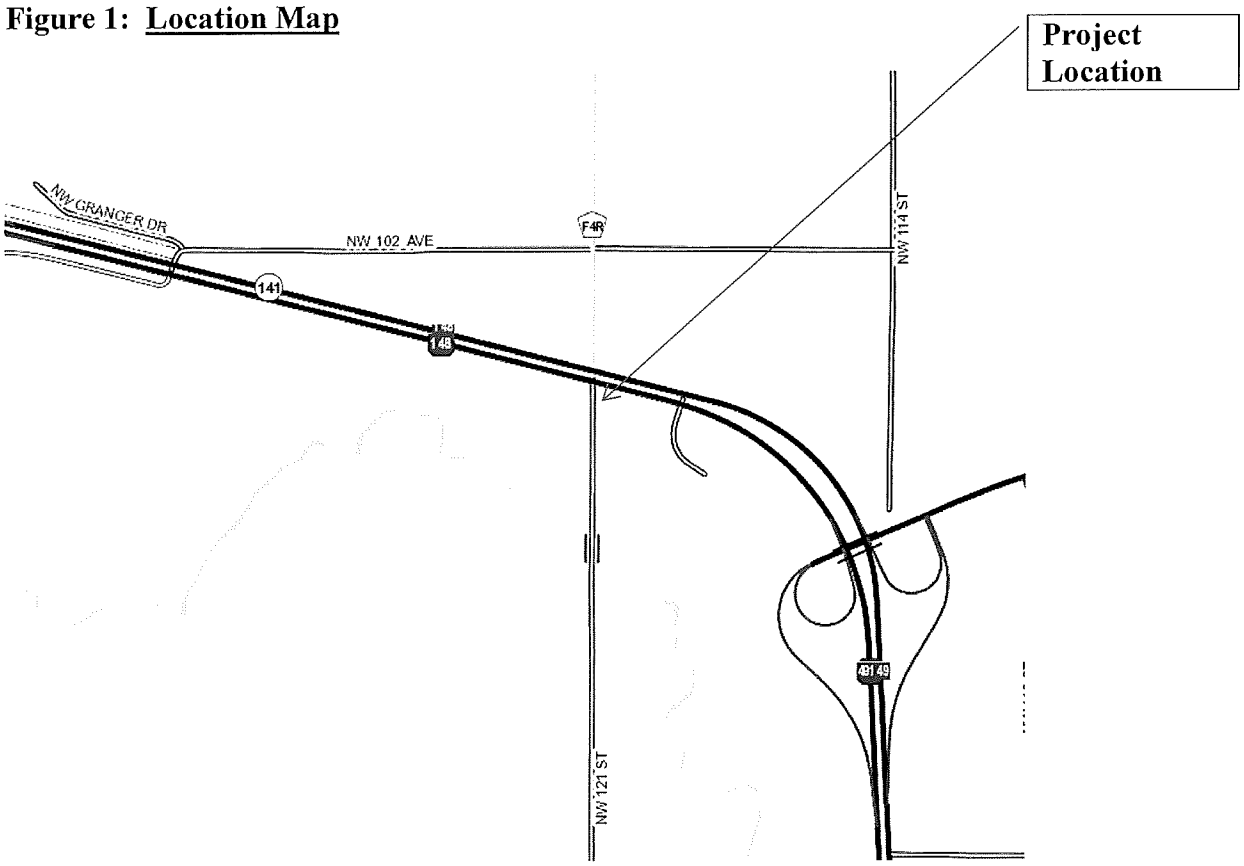


Figure 2: <u>5-Year Crash Summary</u>

Crash reports for a five year period from January 2011 through December 2015 were reviewed. Crash history was gathered from the Iowa DOT's crash database. *CMAT* and *SAVER* crash analysis software were used to analyze crash data. Table 1 below summarizes the crash history at the intersection and shows the crash diagram. The calculated crash rates are based on the 2012 traffic count data. Summaries of crash history and collision diagrams of the intersections are included in the appendix.

The crash rate is 0.83 crashes per million entering vehicles (MEV). The state average of similar facilities is 0.8 crashes per MEV. Of the 23 crashes, 14 crashes were caused by failure to yield from a stop sign. This intersection has been on the SICL list for quite a few years.

Analysis Years: 2011 [3], 2012 [4], 2013 [7], 2014 [6], 2015 [3]

Crash Summary:

Fatal	–
Major Injury	4
Minor Injury	5
Possible/Unknown	1
PDO	13
Total Crashes	23

Injury Summary:

Fatal	–
Major Injury	5
Minor Injury	9
Possible	4
Unknown	–
Total Injuries	18

TOT Property Damage: $183,500

AVG Property Damage: $7,978

Surface Condition Summary:

Dry	19
Wet	–
Ice	1
Snow	–
Slush	–
Sand/Dirt/Oil/Gravel	–
Water	–
Other	–
Unknown	1
Not Reported	2
Total Crashes	23

IA 141 & Co. Rd. F4R/NW 121 st.

2011 - 2015 Reportable Crashes

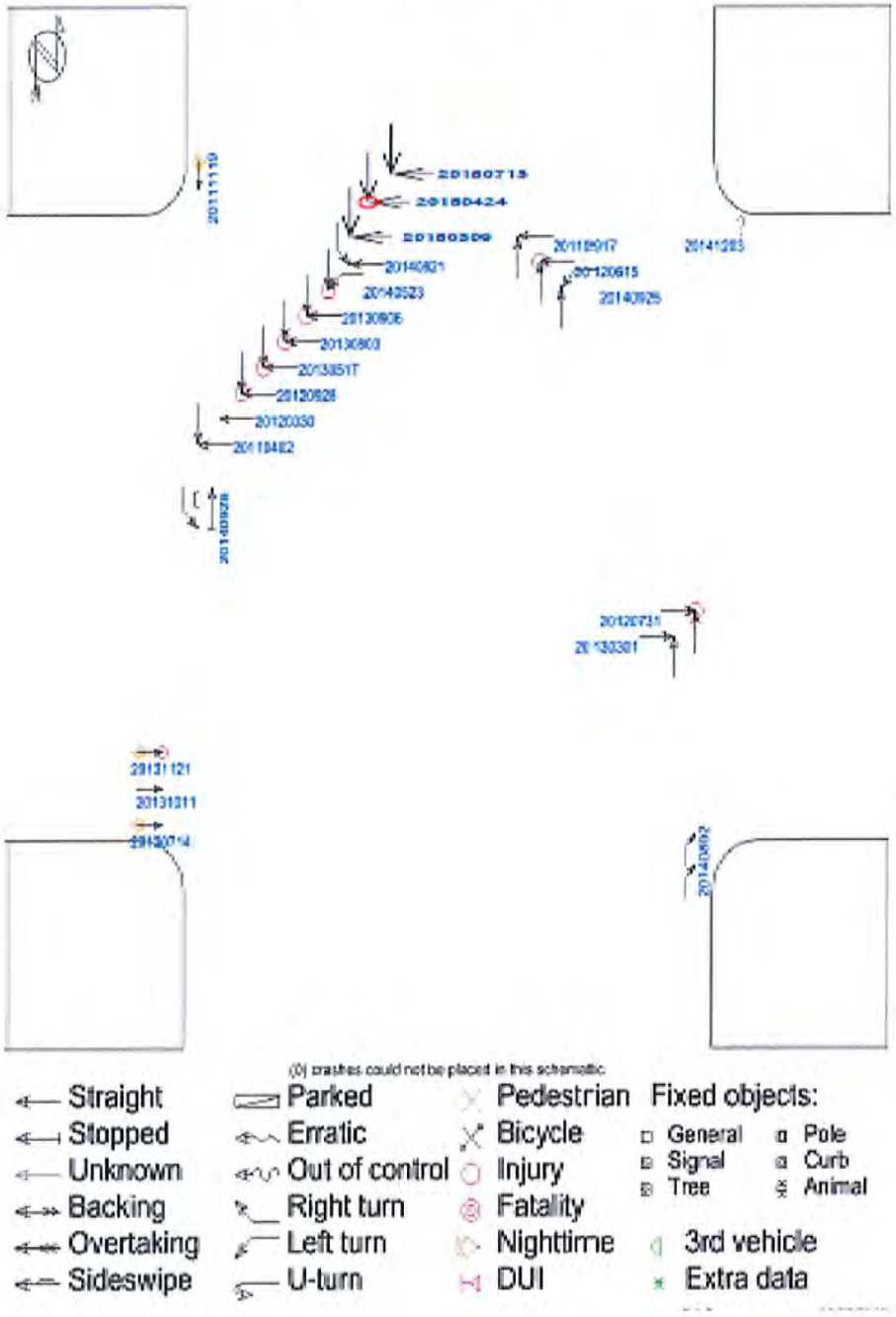


Figure 3: Cost Estimate

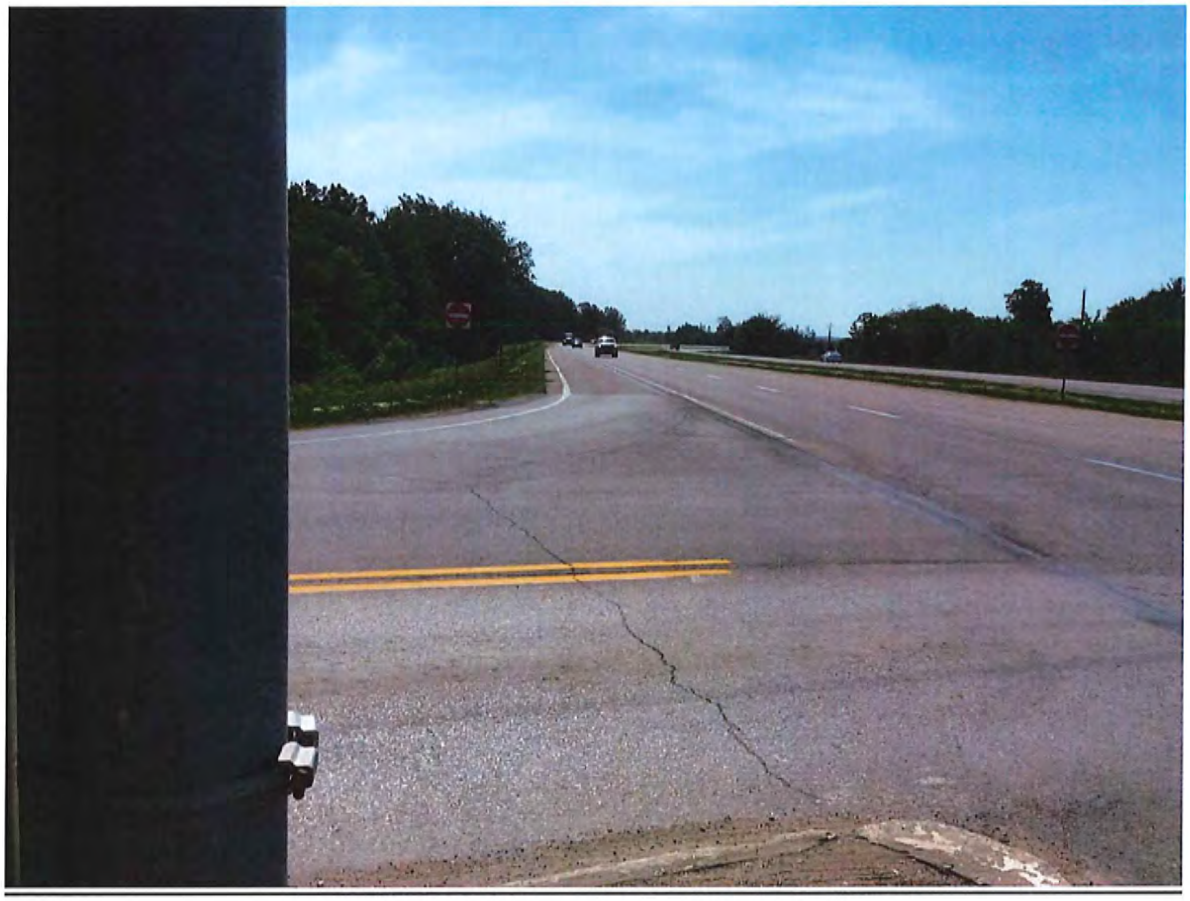
Offset Turn Lane Cost Estimate

Bid Items	Quantities	Unit	Unit Price	Total
Clearing & Grubbing	27	Unit	$110	$2,970.00
12" Special Backfill	332	Ton	$29.70	$9,860.40
Embankment in Place	1930	CY	$26.40	$5,095.20
Class 13 Excavation	440	CY	$5.50	$2,420.00
Topsoil-Strip,Salvage,Spread	860	CY	$8.80	$7,568.00
Type A Granular Shoulder	500	Ton	$38.50	$19,250.00
Earth Shoulder Finishing	10	Sta	$130	$1,300.00
7" HMA Base Widening	275	Ton	$78	$21,450.00
1.5" HMA Intermediate	124	Ton	$100	$12,400.00
1.5" HMA Surface	195	Ton	$100	$19,500.00
Asphalt Binder	35	Ton	$600	$21,000.00
Removal of Pavement	400	SY	$35	$14,000.00
Remove & Reinstall Sign	2	Each	$175	$350.00
Construction Survey	1	LS	$4,000	$4,000.00
Silt Fence	1200	LF	$2.50	$3,000.00
Traffic Control	1	LS		$12,000.00
Mobilization	1	LS		$50,000.00
Total				$206,163.60

Figure 4: <u>Aerial View of Project Location</u>

Figure 5: <u>IA 141 Looking West</u>

NW 121st Looking East



NW 121ST ST

ONE WAY
STOP
CROSS TRAFFIC
DOES NOT STOP
DIVIDED
HIGHWAY

ONE WAY
STOP
CROSS TRAFFIC
DOES NOT STOP
DIVIDED
HIGHWAY
NW 121
DO NOT
ENTER

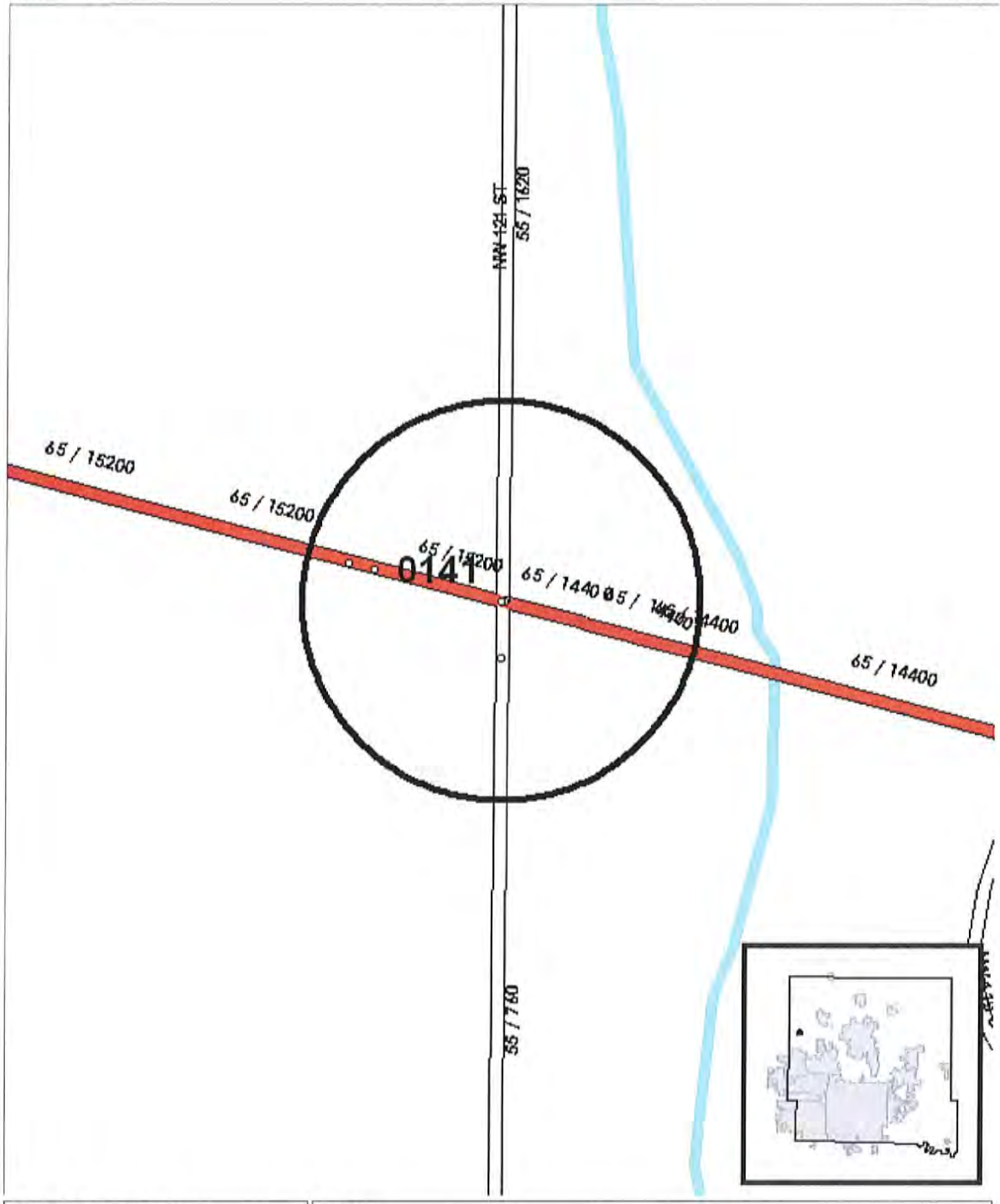
Iowa Department of Transportation

Location Map

IA 141 & NW 121st

Incidents: 23

Report Version 1.1 Mar 2005



Analyst: G. Kretlow

Notes:

Iowa Department of Transportation

Major Cause Summary

IA 141 & NW 121st

Report Version 1.1 Jan 2006

Analysis Years: 2011 [3], 2012 [4], 2013 [7], 2014 [6], 2015 [3]

Crash Summary:

Fatal	-
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Minor Injury	5
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PDO	13
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Ice	1
Snow	-
Slush	-
Sand/Dirt/Oil/Gravel	-
Water	-
Other	-
Unknown	1
Not Reported	2
Total Crashes	23

Major Cause Summary:

5 Animal	Improper Backing
Ran Traffic Signal	Illegally Parked/Unattended
1 Ran Stop Sign	Swerving/Evasive Action
Crossed Centerline	Over-Correcting/Over-Steering
FTYROW: At Uncontrolled Intersection	Downhill Runaway
FTYROW: Making Right Turn on Red Signal	Equipment Failure
14 FTYROW: From Stop Sign	Separation of Units
2 FTYROW: From Yield Sign	Ran Off Road - Right
FTYROW: Making Left Turn	Ran Off Road - Straight
FTYROW: From Driveway	Ran Off Road - Left
FTYROW: From Parked Position	Lost Control
FTYROW: To Pedestrian	Inattentive/Distracted By: Passenger
FTYROW: Other (explain in narrative)	Inattentive/Distracted By: Use of Phone or Other
Traveling Wrong Way or on Wrong Side of Rd	Inattentive/Distracted By: Fallen Object
Driving Too Fast for Conditions	Inattentive/Distracted By: Fatigued/Asleep
Exceeded Authorized Speed	Other: Vision Obstructed
Made Improper Turn	Oversized Load/ Oversized Vehicle
Improper Lane Change	Cargo/Equipment Loss or Shift
1 Followed Too Close	Other: Other Improper Action
Disregarded Railroad Signal	Unknown
Disregarded Warning Sign	Other: No Improper Action
Operating Vehicle in Reckless/Aggressive Manner	None Indicated

Selection Filter:

((YEAR = 2011 or YEAR = 2012 or YEAR = 2013 or YEAR = 2014 or YEAR = 2015))

Analyst: G. Kretlow

Notes:

Iowa Department of Transportation

Abbreviated Crash Report

IA 141 & NW 121st

Date	DOT Case #	Agency Case #	City	Crash Sev.	Literal Description
04/02/2011	2011624538	11-2209	Grimes	PDO	F04R / NW 121 ST and Iowa 0141 / IOWA 141 and NW 121 ST
09/17/2011	2011647649	11-6749		PDO	SB/WB Iowa 0141 / IOWA 141 and NW 121 ST and F04R / NW 121 ST
11/19/2011	2011658135	11-8435		PDO	SB/EB IOWA 0141 / IOWA 141
03/30/2012	2012679604	12-2195		PDO	SB/WB Iowa 0141 / IOWA 141 and NW 121 ST and F04R / NW 121 ST
06/15/2012	2012690338	12-4181		Minor	SB/WB Iowa 0141 / IOWA 141 and NW 121 ST and F04R / NW 121 ST
07/31/2012	2012696319	12-5287		Major	NB/EB Iowa 0141 / IOWA 141 and NW 121 ST and F04R / NW 121 ST
09/28/2012	2012705037	12-6694		Major	12100 BLK HWY 141
03/01/2013	2013728390	13-1510		PDO	SB/WB Iowa 0141 / IOWA 141 and NW 121 ST and F04R / NW 121 ST
05/17/2013	2013739813	13-3373	Grimes	Major	NB/EB Iowa 0141 / IOWA 141 and NW 121 ST and F04R / NW 121 ST
07/14/2013	2013748300	13-4690		PDO	NB/EB Iowa 0141 / IOWA 141
08/03/2013	2013752256	13-5210	Grimes	Minor	SB/WB Iowa 0141 / IOWA 141 and NW 121 ST and F04R / NW 121 ST
09/06/2013	2013756173	13-6021	Grimes	Minor	SB/WB Iowa 0141 / IOWA 141 and NW 121 ST and F04R / NW 121 ST
10/11/2013	2013761563	13-6908		PDO	12100 BLK HWY 141 EB
11/21/2013	2013768390	13-7833	Grimes	Minor	F04R/NW 121 ST AND STATE 141/IOWA 141
05/23/2014	2014800554			Major	F04R / NW 121 ST and Iowa 0141 / IOWA 141 and NW 121 ST
08/02/2014	2014810569	14-5105		PDO	NW 121 ST AND STATE 141/IOWA 141
08/21/2014	2014813383	14-5519		PDO	F04R/NW 121 ST AND STATE 141/IOWA 141
09/25/2014	2014818524	14-6328	Grimes	Poss/Unk	F04R/NW 121 ST AND STATE 141/IOWA 141
09/26/2014	2014818708	14-6347		PDO	HWY 141 & NW 121ST STREET
12/03/2014	2014831629	14-7967		PDO	12500 BLOCK STATE 141/IOWA 141
03/09/2015	2015849349	15-1541		PDO	NW 121ST STREET & HIGHWAY 141
04/24/2015	2015855910	15-2576		Minor	F04R/NW 121 ST AND STATE 141/IOWA 141
07/13/2015	2015868285	15-4360		PDO	F04R/NW 121 ST AND STATE 141/IOWA 141

Selection Filter:

((YEAR = 2011 or YEAR = 2012 or YEAR = 2013 or YEAR = 2014 or YEAR = 2015))

Analyst: G. Kretlow

Notes:

Iowa Department of Transportation

Turning Movement Traffic Count Summary

Annualized Daily Traffic For All Vehicles

Station Number:

77316025099

Count Date:

Monday, June 18, 2012

County:

Polk

Location Description:

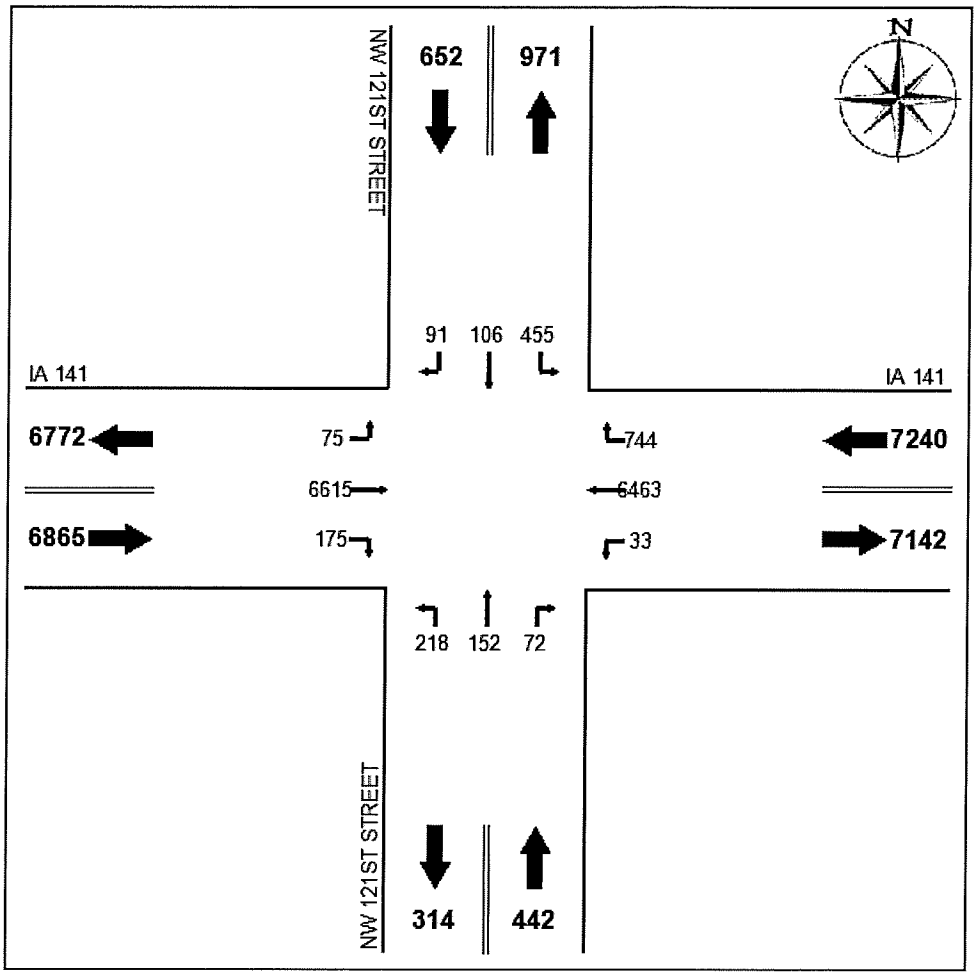
IA 144 and NW 121st St

Volume Factor: 1.963

Pass Class Factor: 2.043

SU Class Factor: 1.705

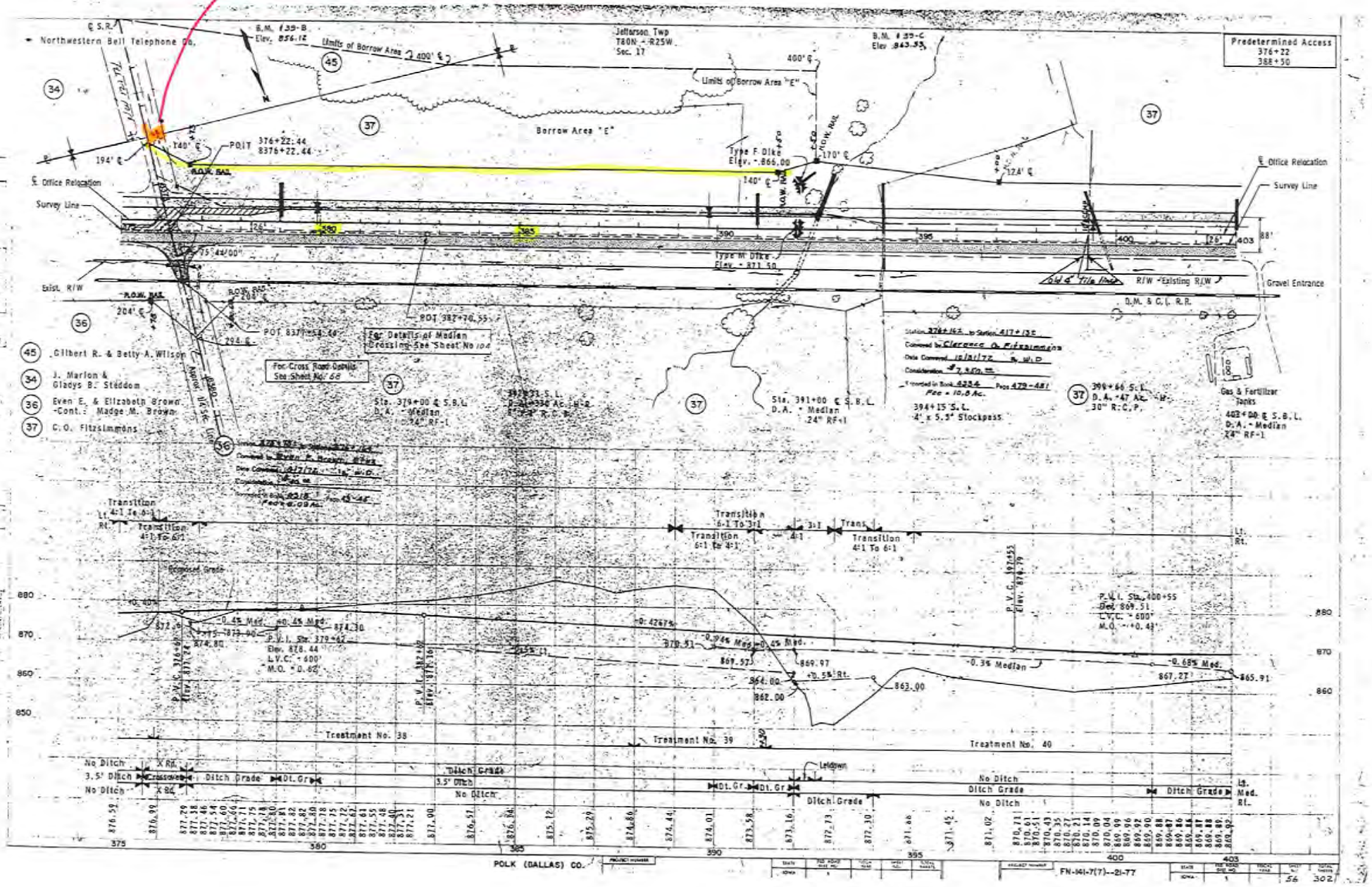
Combo Class Factor: 1.661

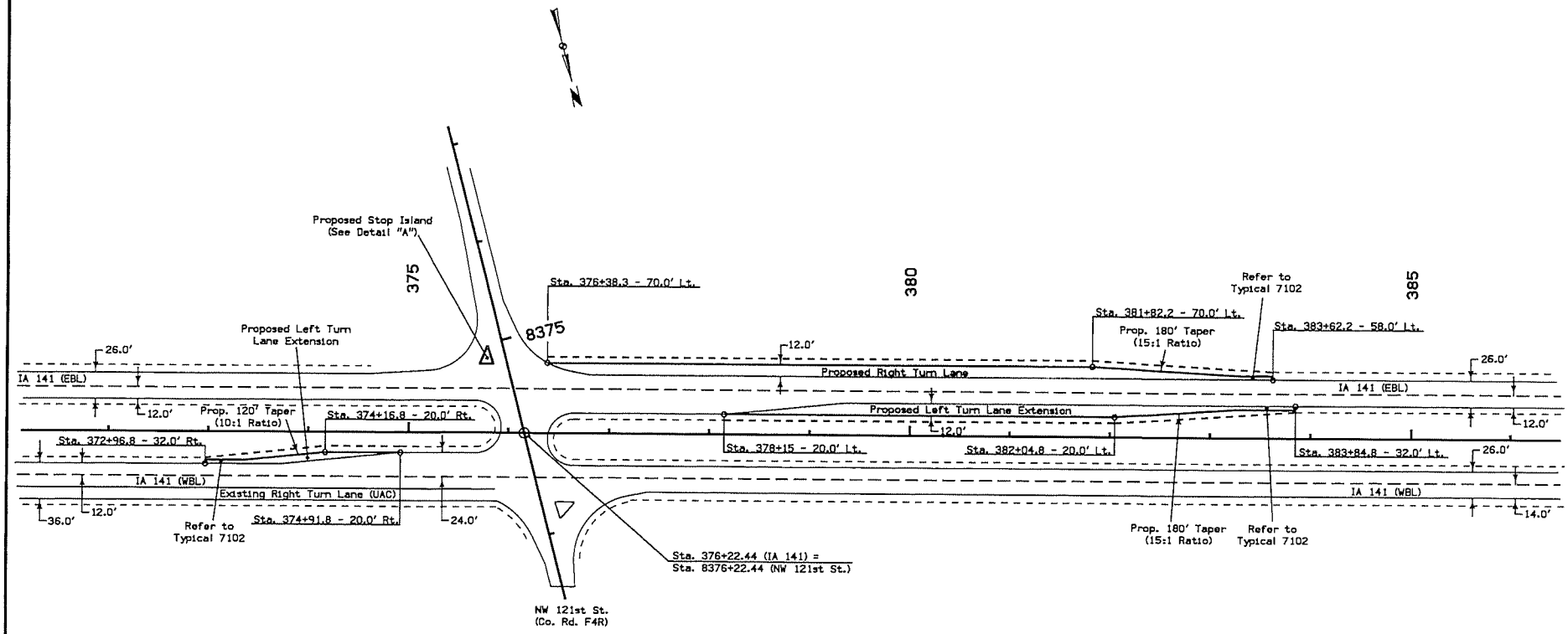


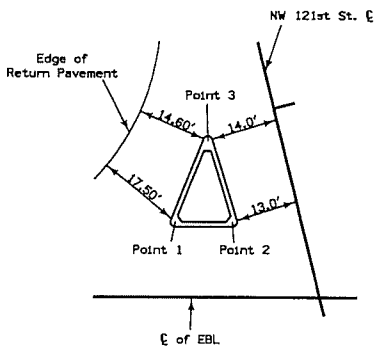
Raw Data-All Vehicles:

	N Leg			E Leg			S Leg			W Leg		
	L	*T*	*R*	*L*	*T*	*R*	*L*	*T*	*R*	*L*	*T*	*R*
07:00	47	7	6	5	380	43	11	6	6	6	868	26
08:00	33	8	5	2	312	45	14	5	7	10	587	7
11:00	34	7	5	1	326	34	15	10	9	4	342	10
12:00	21	5	7	0	331	53	10	6	3	3	337	5
15:00	27	5	6	4	439	47	10	7	0	3	359	8
16:00	37	7	8	2	683	66	23	17	7	3	456	15
17:00	25	13	8	2	729	78	24	24	4	8	334	15

Possible Entrance Relocation







Detail "A"
(Not to Scale)

1.0' Radius Location Point:
Point 1 = Sta. 375+71.84 - 69.0' Lt.
Point 2 = Sta. 375+83.84 - 69.0' Lt.
Sta. 8375+20.86 - 14.0' Rt.
Point 3 = Sta. 8375+03.28 - 15.0' Rt.

0 60 FEET

Geometric Details
Left and Right Turn Lane
IA 141 & NW 121st St. Intersection

DESIGN TEAM Tony Gustafson/Gary Mackey	ENGLISH	IOWA DOT * OFFICE OF DESIGN	POLK COUNTY	PROJECT NUMBER HES-141-7(35)--2H-77	SHEET NUMBER D.01

25-AUG-2005 08:55 gmackey W:\Projects\7714101005\DistrictDesign\77141035.d01

IOWA DOT

Application for TRAFFIC SAFETY FUNDS

GENERAL INFORMATION **DATE:** 8/1/16

Location / Title of Project South Duff (US 69) Widening in Ames

Applicant Iowa Department of Transportation-District 1

Contact Person Gary Kretlow Title Traffic Tech

Complete Mailing Address 1020 South 4th St
Ames, IA 50010

Phone 515-239-1199 (Area Code) E-Mail gary.kretlowjr@dot.iowa.gov

If more than one highway authority is involved in this project, please indicate and fill in the information below (use additional sheets if necessary).

Co-Applicant(s) _____

Contact Person _____ Title _____

Complete Mailing Address _____

Phone _____ (Area Code) E-Mail _____

PLEASE COMPLETE THE FOLLOWING PROJECT INFORMATION:

Application Type

- Site Specific ☒
- Traffic Control Device ☐
- Safety Study ☐

Funding Amount

Total Safety Cost	$ 500,000
Total Project Cost	$ 867,000
Safety Funds Requested	$ 500,000

Does this project appear on a Safety Improvement Candidate List or is there a safety study recommendation for this project?
☐ Yes – Explain _____
☒ No

Rev. 5/14

Road Segment Benefit / Cost Safety Analysis

Iowa DOT Office of Traffic & Safety

County: Story Prepared by: Gary Kretlow Date Prepared: Jul 20, 2016

Location: On U.S. 69 from Jewel Dr to SCL of Ames

Improvement

Proposed Improvement(s): Add a center turn lane from Jewel Drive to south city limits to reduce crashes at Garden Road and Ken Maril Road along with at multiple driveways along U.S. 69 (South Duff)

$ 500,000	Estimated Improvement Cost, **EC**	20	Est. Improvement Life, years, **Y**
$ 500	Other Annual Cost (after initial year), **AC**	30	Crash Reduction Factor (integer), **CRF**
$ 6,795	Present Value Other Annual Costs, **OC**	4.0%	Discount Rate, **INT**
	$OC = \frac{AC}{INT}\left(1 - \frac{1}{(1+INT)^Y}\right)$	$ 506,795	Present Value All Costs, **COST** = EC + OC

Traffic Volume Data

Source: Iowa DOT 2015 Date of traffic count

Length (mi.)	Two-way veh/day	Description
0.52	8,600	From SCL to Jewel Dr
0.52	miles total	

1.0% Projected Traffic Growth (0%-10%), **G**

4,455 Current Vehicle Miles / Day, **VM**

5,436 End of Life Veh. Miles / Day

1,626,002 Current Veh. Miles / Year, **AM**

35,802,945 Total Projected Veh. Miles Over Life of Project, **TVMT**

$$TVMT = \frac{AM}{-G}\left(1 - \left(\frac{1+G}{1}\right)^Y\right)$$

Crash Data

2011 First full year --> 2015 Last full year 5.0 years, Time Period, **T**

Additional months values as of May 2014

0	Fatal Crashes →	0	Fatalities @	$4,500,000	$	-
		2	Major Injuries @	$325,000	$	650,000
10	Injury Crashes →	7	Minor Injuries @	$65,000	$	455,000
		1	Possible Injuries @	$35,000	$	35,000
10	Property Damage Only		(assumed cost per crash)	$7,400	$	148,000
			-OR- enter all Property Costs of all crashes:			
20	Total Crashes, **TA**			Total $ Loss, **LOSS**	$	1,288,000

4.00	Current Crashes / Year, **AA** = TA / T	**246.0**	Crashes / HMVM, Crash Rate, **CR**
$ 64,400	Cost per Crash, **AVCR** = LOSS / TA		CR = TA x 10^8 / (AM x T)
88.1	Total Expected Crashes, **TCR** = CR x TVMT/10^8	$ 1,141,480	Present Value of Avoided Crashes, **BENEFIT**
1.20	Crashes Avoided First Year **AAR** = AA x CRF / 100		
$ 77,280	Crash Costs Avoided in First Year, AAR x AVCR		
26.4	Total Avoided Crashes, TCR x CRF/ 100		

$$BEN. = \frac{AVCR \times AAR}{(INT - G)}\left(1 - \left(\frac{1+G}{1+INT}\right)^Y\right)$$

Benefit / Cost Ratio

Benefit : Cost = $1,141,480 : $506,795 = **2.25** : 1

U.S. 69 from Jewel Drive to Ken Maril Rd. (Widening from 2 to 3 lanes)

1. Existing Conditions

U.S. 69 from just south of Jewel Drive to Ken Maril Road in Ames is currently a 2 lane roadway. It currently has Jewel Drive, Garden Road, and Ken Maril Road that connect to it and run east from U.S. 69.

2. Proposed Concept

Based on future development on the west side of U.S. 69, it is recommended to widen U.S. 69 to a 3 lane roadway to accommodate future turning traffic movements.

3. Justification

A traffic impact study done for the city of Ames shows that when the development on the west side of the road is complete, the site will generate approximately 9,300 trips per day. The last traffic count along U.S. 69 in 2015 shows 8,000 vehicles per day.

4. Cost Estimate and Proposed Funding Sources

The cost of the proposed improvements is estimated at $867,000.00.

Actual costs of the improvements may vary as detailed plans are prepared, and costs shown represent current dollars as of the report date. The most likely funding source for the recommended improvements is TSF funds or Traffic Safety Improvement Program (TSIP). Further information on potential funding sources is available on the Iowa DOT website at http://www.iowadot.gov/fundguid.htm.

5. Proposed Schedule

The project is proposed for letting in year 2017 with construction to be completed by end of 2018.

U.S. 69 from Jewel Drive to Ken Maril Rd. (Widening from 2 to 3 lanes)

Figure 1: <u>Location Map</u>

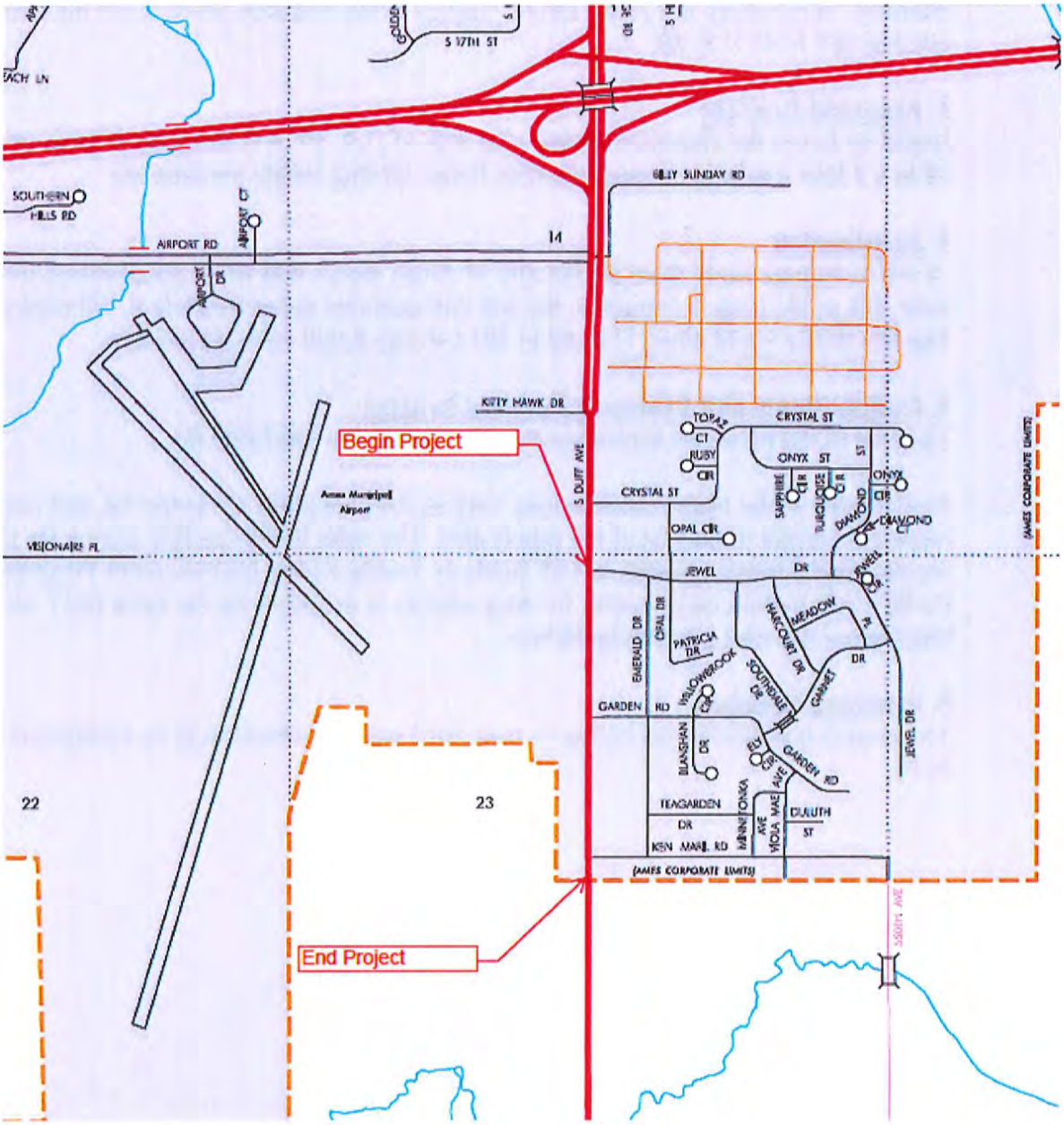


Figure 2: <u>5-Year Crash Summary</u>

Crash reports for a five year period from January 2011 through December 2015 were reviewed. Crash history was gathered from the Iowa DOT's crash database. *CMAT* and *SAVER* crash analysis software were used to analyze crash data. Table 1 below summarizes the crash history along U.S. 69 in the project area and shows the crash diagrams for the intersections. Jewel Drive did not have any crashes fall within the intersection and why there is no diagram. The calculated crash rates are based on the 2015 traffic count data. Summaries of crash history and collision diagrams of the intersections are included in the appendix.

The crash rate is 246 crashes per hundred million vehicle miles (HMVM). The state average of similar facilities is 253 crashes per HMVM. Of the 20 crashes, 8 crashes were caused by following too close.

Iowa Department of Transportation

Major Cause Summary

South Duff In Ames from Jewell to Ken Maril

Analysis Years: 2011 (2), 2012 (3), 2013 (&0), 2014 (3), 2015 (2)

Crash Summary:

Fatal	-
Major Injury	2
Minor Injury	7
Possible/Unknown	1
PDO	10
Total Crashes	20

Injury Summary:

Fatal	-
Major Injury	2
Minor Injury	7
Possible	6
Unknown	-
Total Injuries	15

Surface Condition Summary:

Dry	18
Wet	1
Ice	-
Snow	-
Slush	-
Sand/Dirt/Oil/Gravel	-
Water	-
Other	-
Unknown	-
Not Reported	1
Total Crashes	20

TOT Property Damage: $153,095

AVG Property Damage: $7,655

U.S. 69 from Jewel Drive to Ken Maril Rd. (Widening from 2 to 3 lanes)

Intersection of US 69 & Garden Rd.

2011 - 2016 Reportable Crashes

(0) crashes could not be placed in this schematic

- Straight
- Stopped
- Unknown
- Backing
- Overtaking
- Sideswipe
- Parked
- Erratic
- Out of control
- Right turn
- Left turn
- U-turn
- Pedestrian
- Bicycle
- Injury
- Fatality
- Nighttime
- DUI

Fixed objects:

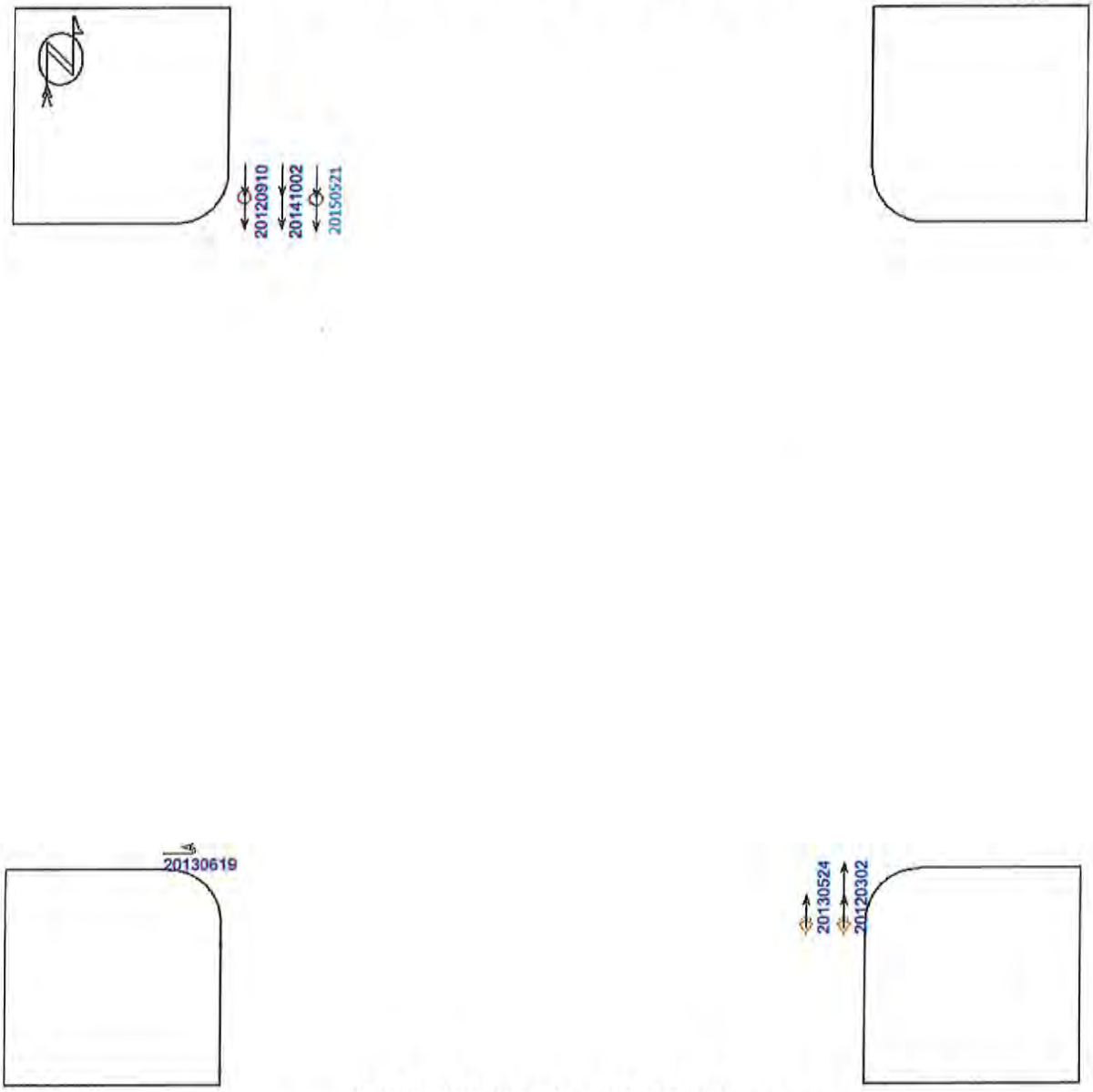
- General
- Signal
- Tree
- Pole
- Curb
- Animal
- 3rd vehicle
- Extra data

Pd' Programming, Inc. 07/06/2016

U.S. 69 from Jewel Drive to Ken Maril Rd. (Widening from 2 to 3 lanes)

Intersection of US 69 & Ken Maril Rd

2011 - 2016 Reportable Crashes



(0) crashes could not be placed in this schematic

Straight	Parked	Pedestrian	Fixed objects:
Stopped	Erratic	Bicycle	General, Pole
Unknown	Out of control	Injury	Signal, Curb
Backing	Right turn	Fatality	Tree, Animal
Overtaking	Left turn	Nighttime	3rd vehicle
Sideswipe	U-turn	DUI	Extra data

Pd' Programming, Inc. 07/06/2016

U.S. 69 from Jewel Drive to Ken Maril Rd. (Widening from 2 to 3 lanes)

Figure 3: Cost Estimate

Item Number	Description	Units	Quantity	Unit Price	Cost
1	9" PCC	SY	4045	$65	$263,000
2	12" Modified Subbase	CY	1350	$37	$50,000
3	Embankment In Place	CY	8666	$20	$175,000
4	Longitudinal Subdrain & Outlets	LF	2600' for drain and 5 outlets	$5 for drain $150 for outlets	$14000
5	Granular Shoulders	Tons	24	$25	$1000
6	Culvert Extensions	Each	3	$30,000	$90,000
7	Right of Way	Lump Sum	1	$100,000	$100,000
8	Traffic Control		5%		$35,000
9	Mobilization		5%		$35,000
10	M&C		15%		$104,000
Total Cost					$867,000

Figure 4: Aerial View of Project Location

U.S. 69 from Jewel Drive to Ken Maril Rd. (Widening from 2 to 3 lanes)

Figure 5: <u>U.S. 69 looking south from Jewel Dr.</u>

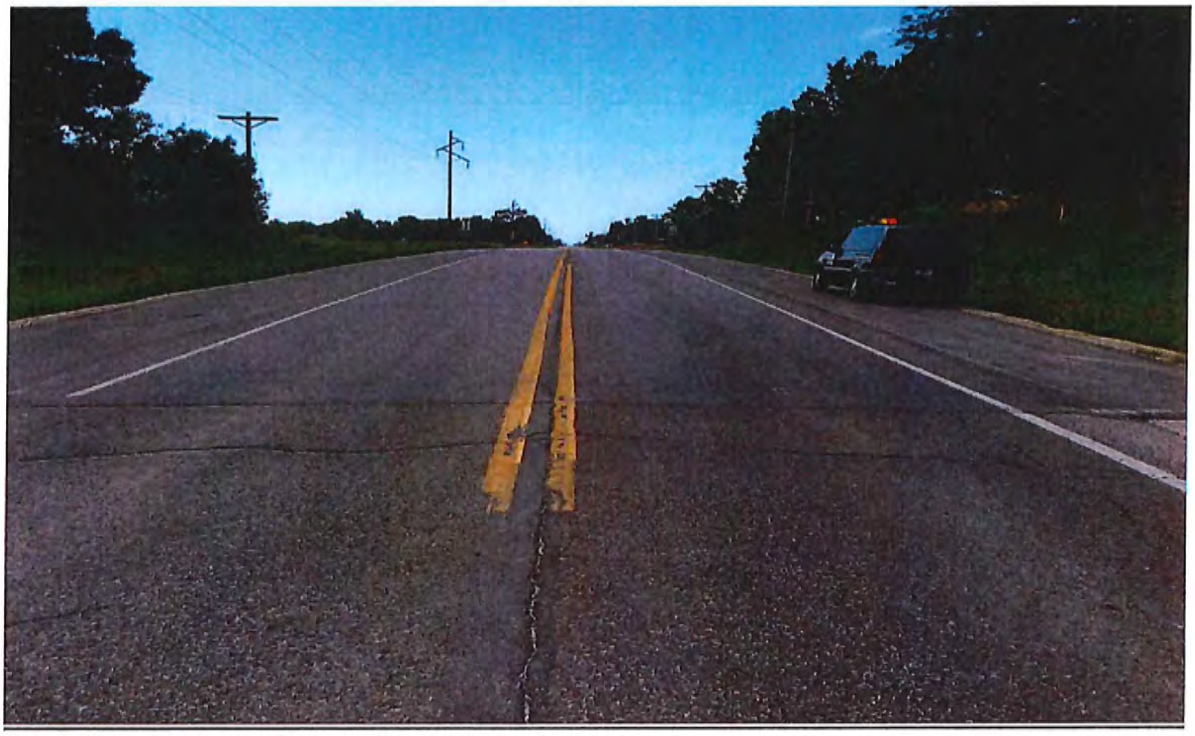
U.S. 69 from Jewel Drive to Ken Maril Rd. (Widening from 2 to 3 lanes)

U.S. 69 looking north from Garden

U.S. 69 looking south from Garden

U.S. 69 from Jewel Drive to Ken Maril Rd. (Widening from 2 to 3 lanes)

U.S. 69 looking south from Ken Maril Rd



U.S. 69 looking north from Ken Maril Rd

U.S. 69 from Jewel Drive to Ken Maril Rd. (Widening from 2 to 3 lanes)

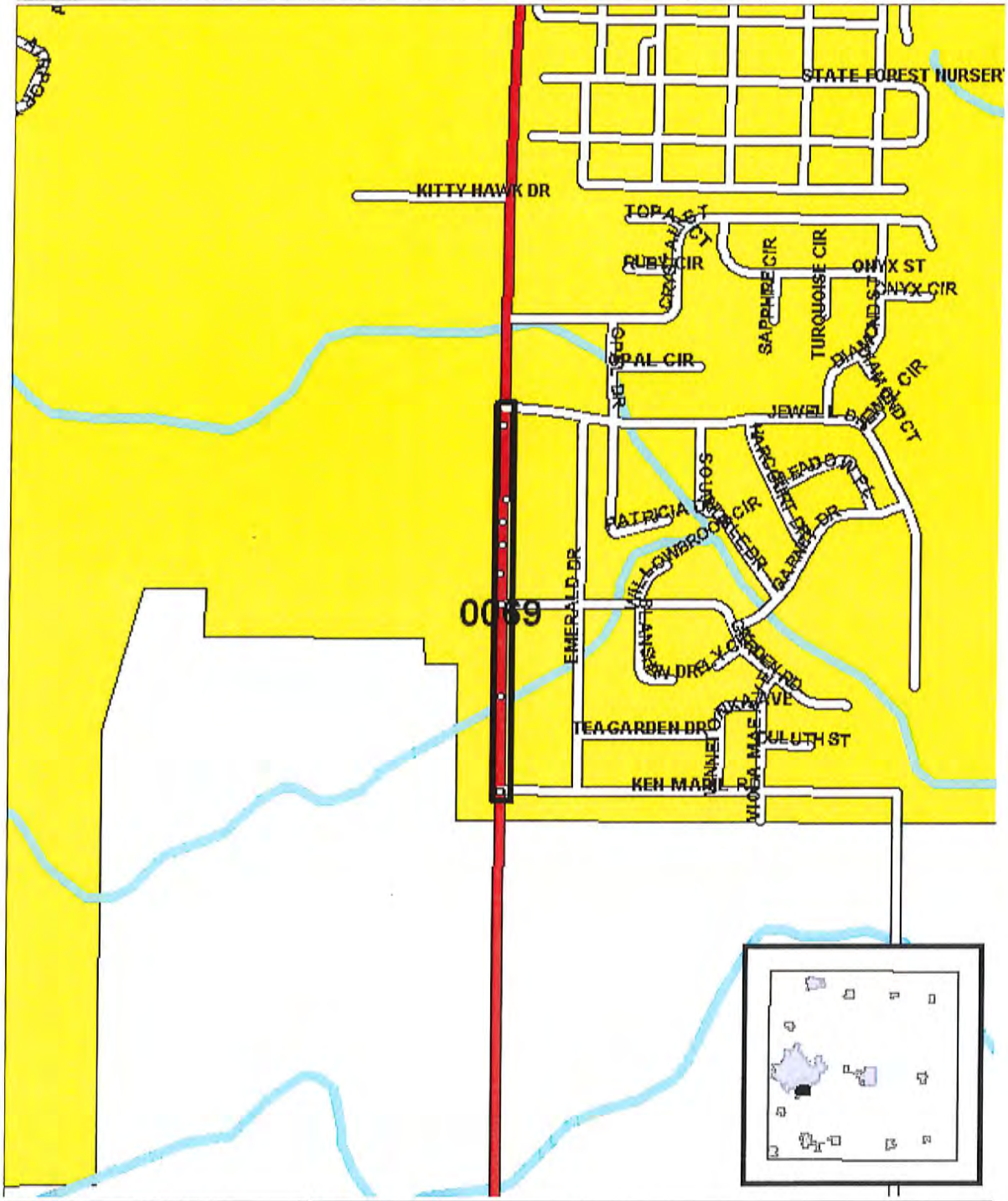
Iowa Department of Transportation

Location Map

South Duff in Ames from Jewell to Ken Maril

Incidents: 20

Report Version 1.1 Mar 2005



Analyst: G. Kretlow

Notes:

Iowa Department of Transportation

Major Cause Summary

South Duff in Ames from Jewell to Ken Maril

Report Version 1.1 Jan 2005

Analysis Years: 2011 [2], 2012 [3], 2013 [10], 2014 [3], 2015 [2]

Crash Summary:

Fatal	-
Major Injury	2
Minor Injury	7
Possible/Unknown	1
PDO	10
Total Crashes	20

Injury Summary:

Fatal	-
Major Injury	2
Minor Injury	7
Possible	6
Unknown	-
Total Injuries	15

Surface Condition Summary:

Dry	18
Wet	1
Ice	-
Snow	-
Slush	-
Sand/Dirt/Oil/Gravel	-
Water	-
Other	-
Unknown	-
Not Reported	1
Total Crashes	20

TOT Property Damage: $153,095

AVG Property Damage: $7,655

Major Cause Summary:

3	Animal
	Ran Traffic Signal
	Ran Stop Sign
	Crossed Centerline
	FTYROW: At Uncontrolled Intersection
	FTYROW: Making Right Turn on Red Signal
	FTYROW: From Stop Sign
	FTYROW: From Yield Sign
	FTYROW: Making Left Turn
1	FTYROW: From Driveway
	FTYROW: From Parked Position
	FTYROW: To Pedestrian
	FTYROW: Other (explain in narrative)
1	Traveling Wrong Way or on Wrong Side of Rd
2	Driving Too Fast for Conditions
	Exceeded Authorized Speed
	Made Improper Turn
	Improper Lane Change
8	Followed Too Close
	Disregarded Railroad Signal
	Disregarded Warning Sign
	Operating Vehicle in Reckless/Aggressive Manner
	Improper Backing
	Illegally Parked/Unattended
1	Swerving/Evasive Action
	Over-Correcting/Over-Steering
	Downhill Runaway
	Equipment Failure
	Separation of Units
	Ran Off Road - Right
	Ran Off Road - Straight
	Ran Off Road - Left
	Lost Control
	Inattentive/Distracted By: Passenger
	Inattentive/Distracted By: Use of Phone or Other
1	Inattentive/Distracted By: Fallen Object
	Inattentive/Distracted By: Fatigued/Asleep
	Other: Vision Obstructed
	Oversized Load/ Oversized Vehicle
	Cargo/Equipment Loss or Shift
3	Other: Other Improper Action
	Unknown
	Other: No Improper Action
	None Indicated

Selection Filter:

((YEAR = 2011 or YEAR = 2012 or YEAR = 2013 or YEAR = 2014 or YEAR = 2015))

Analyst: G. Kretlow

Notes:

Iowa Department of Transportation

Crash Detail Report

South Duff in Ames from Jewell to Ken Maril

Report Version 1.3 Aug 2006

2011635943 06/23/2011 15:11 — 3300 BLK S. DUFF
County: 85 **City:** Ames

Major Cause: Traveling wrong way or on wrong side of road
Roadway Type: Non-intersection: No special feature

Severity:	Minor	**Manner of Crash:**	Head-on
Fatalities:	0	**Surface Conditions:**	Dry
Major Injuries:	0	**Light Conditions:**	Daylight
Minor Injuries:	1	**Weather Conditions:**	Cloudy
Possible Injuries:	0	**Drug/Alc Involved:**	none indicated
Unknown Injuries:	0	**Property Damage:**	$13400

Number of Vehicles: 2

	Unit 1	Unit 2	Unit 3
Init Trav Dir:	North	South	0
Veh Action:	88	Essentially straight	0
Configuration:	Sport utility vehicle	Passenger car	0
Driver Age:	80	58	0
Driver Gender:	M	M	
Driver Cond:	Asleep/fatigued/etc.	Normal	0
Drivr Contr 1:	Wrong way/wrong side	none	0
Drivr Contr 2:	Fatigued/Asleep	not reported	0
Fixed Object:	none	none	0

2011635945 06/24/2011 10:10 — US 69/S DUFF AVE AND GARDEN RD
County: 85 **City:** Ames

Major Cause: Driving too fast for conditions
Roadway Type: Intersection: T - intersection

Severity:	Major	**Manner of Crash:**	Rear-end
Fatalities:	0	**Surface Conditions:**	Dry
Major Injuries:	1	**Light Conditions:**	Daylight
Minor Injuries:	0	**Weather Conditions:**	Clear
Possible Injuries:	0	**Drug/Alc Involved:**	none indicated
Unknown Injuries:	0	**Property Damage:**	$11000

Number of Vehicles: 2

	Unit 1	Unit 2	Unit 3
Init Trav Dir:	South	South	0
Veh Action:	Essentially straight	Slowing/stopping	0
Configuration:	Sport utility vehicle	Motorcycle	0
Driver Age:	17	37	0
Driver Gender:	F	M	
Driver Cond:	Normal	Normal	0
Drivr Contr 1:	Too fast for conditions	none	0
Drivr Contr 2:	not reported	not reported	0
Fixed Object:	none	none	0

Iowa Department of Transportation

Crash Detail Report

South Duff in Ames from Jewell to Ken Maril

Report Version 1.3 Aug 2004

2012675633 03/02/2012 18:56 US 0069/S DUFF AVE AND KEN MARIL RD
County: 85 **City:** Ames

Major Cause: Followed too close
Roadway Type: Non-intersection: No special feature

Severity:	PDO	**Manner of Crash:**	Rear-end
Fatalities:	0	**Surface Conditions:**	Dry
Major Injuries:	0	**Light Conditions:**	Dark - roadway lighted
Minor Injuries:	0	**Weather Conditions:**	Clear
Possible Injuries:	0	**Drug/Alc Involved:**	none indicated
Unknown Injuries:	0	**Property Damage:**	$2000

Number of Vehicles: 2

	Unit 1	Unit 2	Unit 3
Init Trav Dir:	North	North	0
Veh Action:	Essentially straight	Slowing/stopping	0
Configuration:	Passenger car	Passenger car	0
Driver Age:	19	60	0
Driver Gender:	M	M	
Driver Cond:	Normal	Normal	0
Drivr Contr 1:	Followed too close	none	0
Drivr Contr 2:	not reported	not reported	0
Fixed Object:	none	none	0

2012703127 09/10/2012 07:05 KEN MARIL RD AND US 69/S DUFF AVE
County: 85 **City:** Ames

Major Cause: Followed too close
Roadway Type: Intersection: T - intersection

Severity:	Minor	**Manner of Crash:**	Rear-end
Fatalities:	0	**Surface Conditions:**	Dry
Major Injuries:	0	**Light Conditions:**	Daylight
Minor Injuries:	1	**Weather Conditions:**	Clear
Possible Injuries:	0	**Drug/Alc Involved:**	none indicated
Unknown Injuries:	0	**Property Damage:**	$27999

Number of Vehicles: 2

	Unit 1	Unit 2	Unit 3
Init Trav Dir:	South	South	0
Veh Action:	Essentially straight	Slowing/stopping	0
Configuration:	Passenger car	Sport utility vehicle	0
Driver Age:	57	29	0
Driver Gender:	M	F	
Driver Cond:	Normal	Normal	0
Drivr Contr 1:	Followed too close	none	0
Drivr Contr 2:	not reported	not reported	0
Fixed Object:	none	none	0

Iowa Department of Transportation

Crash Detail Report

South Duff in Ames from Jewell to Ken Maril

Report Version 1.3 Aug 2006

2012712074 11/01/2012 15:18 US 69/S DUFF AVE AND GARDEN RD
County: 85 **City:** Ames

Major Cause: Other improper action
Roadway Type: Intersection: T - intersection
Severity: PDO **Manner of Crash:** Rear-end
Fatalities: 0 **Surface Conditions:** Dry
Major Injuries: 0 **Light Conditions:** Daylight
Minor Injuries: 0 **Weather Conditions:** Clear
Possible Injuries: 0 **Drug/Alc Involved:** none indicated
Unknown Injuries: 0 **Property Damage:** $4000 **Number of Vehicles:** 2

	Unit 1	Unit 2	Unit 3
Init Trav Dir:	South	South	0
Veh Action:	Essentially straight	88	0
Configuration:	Sport utility vehicle	4-tire light truck	0
Driver Age:	60	58	0
Driver Gender:	F	M	
Driver Cond:	Normal	Normal	0
Drivr Contr 1:	Other improper action	none	0
Drivr Contr 2:	not reported	not reported	0
Fixed Object:	none	none	0

2013724431 02/01/2013 14:35 US 69/S DUFF AVE AND GARDEN RD
County: 85 **City:** Ames

Major Cause: Followed too close
Roadway Type: Intersection: T - intersection
Severity: Poss/Unk **Manner of Crash:** Rear-end
Fatalities: 0 **Surface Conditions:** Dry
Major Injuries: 0 **Light Conditions:** Daylight
Minor Injuries: 0 **Weather Conditions:** Clear
Possible Injuries: 1 **Drug/Alc Involved:** none indicated
Unknown Injuries: 0 **Property Damage:** $6500 **Number of Vehicles:** 2

	Unit 1	Unit 2	Unit 3
Init Trav Dir:	South	South	0
Veh Action:	Essentially straight	Slowing/stopping	0
Configuration:	Passenger car	4-tire light truck	0
Driver Age:	27	52	0
Driver Gender:	M	M	
Driver Cond:	Normal	Normal	0
Drivr Contr 1:	Followed too close	none	0
Drivr Contr 2:	Other improper action	not reported	0
Fixed Object:	none	none	0

Iowa Department of Transportation

Crash Detail Report

South Duff in Ames from Jewell to Ken Maril

Report Version 1.3 Aug 2006

2013727793 02/20/2013 08:50 US 69/S DUFF AVE AND GARDEN RD
County: 85 **City:** Ames

Major Cause: Other improper action
Roadway Type: Intersection: T - intersection

Severity: PDO
Fatalities: 0
Major Injuries: 0
Minor Injuries: 0
Possible Injuries: 0
Unknown Injuries: 0

Manner of Crash: Angle, oncoming left turn
Surface Conditions: Dry
Light Conditions: Daylight
Weather Conditions: Clear
Drug/Alc Involved: none indicated
Property Damage: $5998

Number of Vehicles: 2

	Unit 1	Unit 2	Unit 3
Init Trav Dir:	East	West	0
Veh Action:	Turning left	Stopped for sign/signal	0
Configuration:	Sport utility vehicle	4-tire light truck	0
Driver Age:	23	49	0
Driver Gender:	F	M	
Driver Cond:	Normal	Normal	0
Drivr Contr 1:	Other improper action	Other improper action	0
Drivr Contr 2:	not reported	not reported	0
Fixed Object:	none	none	0

2013744642 05/24/2013 22:30 KEN MARIL RD AND US 69/S DUFF AVE
County: 85 **City:** Ames

Major Cause: Animal
Roadway Type: Non-intersection: No special feature

Severity: PDO
Fatalities: 0
Major Injuries: 0
Minor Injuries: 0
Possible Injuries: 0
Unknown Injuries: 0

Manner of Crash: Non-collision
Surface Conditions: Dry
Light Conditions: Dark - roadway lighted
Weather Conditions: Partly cloudy
Drug/Alc Involved: none indicated
Property Damage: $1500

Number of Vehicles: 1

	Unit 1	Unit 2	Unit 3
Init Trav Dir:	North	0	0
Veh Action:	Essentially straight	0	0
Configuration:	Sport utility vehicle	0	0
Driver Age:	56	0	0
Driver Gender:	M		
Driver Cond:	Normal	0	0
Drivr Contr 1:	none	0	0
Drivr Contr 2:	not reported	0	0
Fixed Object:	none	0	0

Iowa Department of Transportation

Crash Detail Report

South Duff in Ames from Jewell to Ken Maril

Report Version 13 Aug 2006

2013745841 06/19/2013 06:55 KEN MARIL RD AND US 69/S DUFF AVE
County: 85 **City:** Ames

Major Cause: Inattentive/distracted by: Fallen object
Roadway Type: Intersection: T - intersection

Severity:	PDO	**Manner of Crash:**	Non-collision
Fatalities:	0	**Surface Conditions:**	Dry
Major Injuries:	0	**Light Conditions:**	Daylight
Minor Injuries:	0	**Weather Conditions:**	Clear
Possible Injuries:	0	**Drug/Alc Involved:**	none indicated
Unknown Injuries:	0	**Property Damage:**	$6000

Number of Vehicles: 1

	Unit 1	Unit 2	Unit 3
Init Trav Dir:	East	0	0
Veh Action:	Making U-turn	0	0
Configuration:	Passenger car	0	0
Driver Age:	33	0	0
Driver Gender:	F		
Driver Cond:	Normal	0	0
Drivr Contr 1:	Distracted fallen object	0	0
Drivr Contr 2:	not reported	0	0
Fixed Object:	Tree	0	0

2013748952 07/15/2013 07:35 US 69/S DUFF AVE AND GARDEN RD
County: 85 **City:** Ames

Major Cause: Followed too close
Roadway Type: Non-intersection: No special feature

Severity:	Minor	**Manner of Crash:**	Rear-end
Fatalities:	0	**Surface Conditions:**	Dry
Major Injuries:	0	**Light Conditions:**	Daylight
Minor Injuries:	1	**Weather Conditions:**	Clear
Possible Injuries:	0	**Drug/Alc Involved:**	none indicated
Unknown Injuries:	0	**Property Damage:**	$18998

Number of Vehicles: 2

	Unit 1	Unit 2	Unit 3
Init Trav Dir:	South	South	0
Veh Action:	Essentially straight	Slowing/stopping	0
Configuration:	Passenger car	Sport utility vehicle	0
Driver Age:	55	50	0
Driver Gender:	M	F	
Driver Cond:	Normal	Normal	0
Drivr Contr 1:	Followed too close	none	0
Drivr Contr 2:	not reported	not reported	0
Fixed Object:	none	none	0

Iowa Department of Transportation

Crash Detail Report

South Duff in Ames from Jewell to Ken Maril

Report Version 13 Aug 2008

2013751348 07/23/2013 16:15 US 69/S DUFF AVE AND GARDEN RD
County: 85 **City:** Ames

Major Cause: Followed too close
Roadway Type: Non-intersection: No special feature

Severity:	PDO	**Manner of Crash:**	Rear-end
Fatalities:	0	**Surface Conditions:**	Dry
Major Injuries:	0	**Light Conditions:**	Daylight
Minor Injuries:	0	**Weather Conditions:**	Clear
Possible Injuries:	0	**Drug/Alc Involved:**	none indicated
Unknown Injuries:	0	**Property Damage:**	$5700

Number of Vehicles: 3

	Unit 1	Unit 2	Unit 3
Init Trav Dir:	South	South	South
Veh Action:	Essentially straight	Slowing/stopping	Stopped for sign/signal
Configuration:	Sport utility vehicle	Passenger car	4-tire light truck
Driver Age:	16	20	unknown
Driver Gender:	F	F	NR
Driver Cond:	Normal	Normal	not reported
Drivr Contr 1:	Followed too close	none	none
Drivr Contr 2:	not reported	not reported	not reported
Fixed Object:	none	none	none

2013758153 08/19/2013 09:27 US 69/S DUFF AVE AND GARDEN RD
County: 85 **City:** Ames

Major Cause: Followed too close
Roadway Type: Intersection: T - intersection

Severity:	Minor	**Manner of Crash:**	Rear-end
Fatalities:	0	**Surface Conditions:**	Dry
Major Injuries:	0	**Light Conditions:**	Daylight
Minor Injuries:	1	**Weather Conditions:**	Partly cloudy
Possible Injuries:	1	**Drug/Alc Involved:**	none indicated
Unknown Injuries:	0	**Property Damage:**	$4000

Number of Vehicles: 2

	Unit 1	Unit 2	Unit 3
Init Trav Dir:	South	South	0
Veh Action:	Essentially straight	Slowing/stopping	0
Configuration:	Van or mini-van	Passenger car	0
Driver Age:	54	77	0
Driver Gender:	F	F	
Driver Cond:	Normal	Normal	0
Drivr Contr 1:	Followed too close	none	0
Drivr Contr 2:	not reported	not reported	0
Fixed Object:	none	none	0

Iowa Department of Transportation

Crash Detail Report

South Duff in Ames from Jewell to Ken Maril

Report Version 1.3 Aug 2006

2013755755 08/30/2013 15:27 US 0069/S DUFF AVE
County: 85 **City:** Ames

Major Cause: Followed too close
Roadway Type: Non-intersection: No special feature

Severity:	Major	**Manner of Crash:**	Rear-end
Fatalities:	0	**Surface Conditions:**	Dry
Major Injuries:	1	**Light Conditions:**	Daylight
Minor Injuries:	0	**Weather Conditions:**	Clear
Possible Injuries:	0	**Drug/Alc Involved:**	none indicated
Unknown Injuries:	0	**Property Damage:**	$5000

Number of Vehicles: 2

	Unit 1	Unit 2	Unit 3
Init Trav Dir:	North	North	0
Veh Action:	Essentially straight	Slowing/stopping	0
Configuration:	Motorcycle	Passenger car	0
Driver Age:	43	21	0
Driver Gender:	M	M	
Driver Cond:	Normal	Normal	0
Drivr Contr 1:	Followed too close	none	0
Drivr Contr 2:	not reported	not reported	0
Fixed Object:	none	none	0

2013765244 10/30/2013 13:07 US 69/S DUFF AVE AND GARDEN RD
County: 85 **City:** Ames

Major Cause: Driving too fast for conditions
Roadway Type: Intersection: T - intersection

Severity:	Minor	**Manner of Crash:**	Rear-end
Fatalities:	0	**Surface Conditions:**	Wet
Major Injuries:	0	**Light Conditions:**	Daylight
Minor Injuries:	1	**Weather Conditions:**	Rain
Possible Injuries:	2	**Drug/Alc Involved:**	none indicated
Unknown Injuries:	0	**Property Damage:**	$11000

Number of Vehicles: 3

	Unit 1	Unit 2	Unit 3
Init Trav Dir:	South	South	South
Veh Action:	Essentially straight	Slowing/stopping	Turning left
Configuration:	Passenger car	Sport utility vehicle	Passenger car
Driver Age:	18	64	38
Driver Gender:	F	M	F
Driver Cond:	Normal	Normal	Normal
Drivr Contr 1:	Too fast for conditions	none	none
Drivr Contr 2:	not reported	not reported	not reported
Fixed Object:	none	none	none

Iowa Department of Transportation

Crash Detail Report

South Duff in Ames from Jewell to Ken Maril

Report Version 1.3 Aug 2006

2013768904 11/19/2013 11:18 US 69/S DUFF AVE
County: 85 **City:** Ames

Major Cause: Swerving/evasive action
Roadway Type: Non-intersection: No special feature

Severity:	PDO	**Manner of Crash:**	Non-collision
Fatalities:	0	**Surface Conditions:**	Dry
Major Injuries:	0	**Light Conditions:**	Daylight
Minor Injuries:	0	**Weather Conditions:**	Clear
Possible Injuries:	0	**Drug/Alc Involved:**	none indicated
Unknown Injuries:	0	**Property Damage:**	$2100

Number of Vehicles: 1

	Unit 1	Unit 2	Unit 3
Init Trav Dir:	South	0	0
Veh Action:	88	0	0
Configuration:	4-tire light truck	0	0
Driver Age:	20	0	0
Driver Gender:	M		
Driver Cond:	Normal	0	0
Drivr Contr 1:	Lost control	0	0
Drivr Contr 2:	Swerved to avoid	0	0
Fixed Object:	Tree	0	0

2014802146 06/01/2014 08:43 3200 BLK US 69/S DUFF AVE - ENTRANCE TO STORY MEMORIAL GARDENS
County: 85 **City:** Ames

Major Cause: FTY from driveway
Roadway Type: Non-intersection: Business drive

Severity:	Minor	**Manner of Crash:**	Angle, oncoming left turn
Fatalities:	0	**Surface Conditions:**	Dry
Major Injuries:	0	**Light Conditions:**	Daylight
Minor Injuries:	1	**Weather Conditions:**	Clear
Possible Injuries:	2	**Drug/Alc Involved:**	none indicated
Unknown Injuries:	0	**Property Damage:**	$8000

Number of Vehicles: 2

	Unit 1	Unit 2	Unit 3
Init Trav Dir:	East	South	0
Veh Action:	Turning left	Essentially straight	0
Configuration:	Passenger car	Van or mini-van	0
Driver Age:	76	80	0
Driver Gender:	F	M	
Driver Cond:	Normal	Normal	0
Drivr Contr 1:	FTY from driveway	none	0
Drivr Contr 2:	not reported	not reported	0
Fixed Object:	none	none	0

Iowa Department of Transportation

Crash Detail Report

South Duff in Ames from Jewell to Ken Maril

Report Version 1.3 Aug 2009

2014820484 10/02/2014 15:30 US 69/S DUFF AVE AND KEN MARIL RD
County: 85 **City:** Ames

Major Cause: Other improper action
Roadway Type: Non-intersection: No special feature

Severity:	PDO	**Manner of Crash:**	Rear-end
Fatalities:	0	**Surface Conditions:**	Dry
Major Injuries:	0	**Light Conditions:**	Daylight
Minor Injuries:	0	**Weather Conditions:**	Cloudy
Possible Injuries:	0	**Drug/Alc Involved:**	none indicated
Unknown Injuries:	0	**Property Damage:**	$10500

Number of Vehicles: 2

	Unit 1	Unit 2	Unit 3
Init Trav Dir:	South	South	0
Veh Action:	Essentially straight	Slowing/stopping	0
Configuration:	Passenger car	Sport utility vehicle	0
Driver Age:	17	40	0
Driver Gender:	M	F	
Driver Cond:	Normal	Normal	0
Drivr Contr 1:	Other improper action	none	0
Drivr Contr 2:	not reported	not reported	0
Fixed Object:	none	none	0

2014831831 11/30/2014 12:25 US 69/3714 S DUFF AVE
County: 85 **City:** Ames

Major Cause: Animal
Roadway Type: Non-intersection: No special feature

Severity:	PDO	**Manner of Crash:**	Non-collision
Fatalities:	0	**Surface Conditions:**	Dry
Major Injuries:	0	**Light Conditions:**	Daylight
Minor Injuries:	0	**Weather Conditions:**	Clear
Possible Injuries:	0	**Drug/Alc Involved:**	none indicated
Unknown Injuries:	0	**Property Damage:**	$3900

Number of Vehicles: 1

	Unit 1	Unit 2	Unit 3
Init Trav Dir:	North	0	0
Veh Action:	Essentially straight	0	0
Configuration:	Passenger car	0	0
Driver Age:	87	0	0
Driver Gender:	M		
Driver Cond:	Normal	0	0
Drivr Contr 1:	none	0	0
Drivr Contr 2:	not reported	0	0
Fixed Object:	none	0	0

Iowa Department of Transportation

Crash Detail Report

South Duff in Ames from Jewell to Ken Maril

2015860413 05/21/2015 17:09 US 69/S DUFF AVE AND KEN MARIL RD
County:85 City:Ames

Major Cause: Followed too close
Roadway Type: Intersection: T - intersection

Severity:	Minor	Manner of Crash:	Rear-end
Fatalities:	0	Surface Conditions:	Dry
Major Injuries:	0	Light Conditions:	Daylight
Minor Injuries:	1	Weather Conditions:	Clear
Possible Injuries:	0	Drug/Alc Involved:	none indicated
Unknown Injuries:	0	Property Damage:	$4000

Number of Vehicles: 2

	Unit 1	Unit 2	Unit 3
Init Trav Dir:	South	South	0
Veh Action:	Essentially straight	Slowing/stopping	0
Configuration:	Passenger car	Sport utility vehicle	0
Driver Age:	21	61	0
Driver Gender:	F	F	
Driver Cond:	Normal	Normal	0
Drivr Contr 1:	Followed too close	none	0
Drivr Contr 2:	not reported	not reported	0
Fixed Object:	none	none	0

2015883283 08/14/2015 20:31 US 69/S DUFF AVE
County:85 City:Ames

Major Cause: Animal
Roadway Type: Not reported

Severity:	PDO	Manner of Crash:	Non-collision
Fatalities:	0	Surface Conditions:	not reported
Major Injuries:	0	Light Conditions:	not reported
Minor Injuries:	0	Weather Conditions:	not reported
Possible Injuries:	0	Drug/Alc Involved:	none indicated
Unknown Injuries:	0	Property Damage:	$1500

Number of Vehicles: 1

	Unit 1	Unit 2	Unit 3
Init Trav Dir:	South	0	0
Veh Action:	not reported	0	0
Configuration:	Van or mini-van	0	0
Driver Age:	55	0	0
Driver Gender:	F		
Driver Cond:	not reported	0	0
Drivr Contr 1:	none	0	0
Drivr Contr 2:	not reported	0	0
Fixed Object:	none	0	0

Iowa Department of Transportation

Driver and Time Summary

South Duff in Ames from Jewell to Ken Maril

Report Version 13 Aug 2008

Crash Time of Day Summary:

From To	00:00 01:59	02:00 03:59	04:00 05:59	06:00 07:59	08:00 09:59	10:00 11:59	12:00 13:59	14:00 15:59	16:00 17:59	18:00 19:59	20:00 21:59	22:00 23:59	NR	Total	%
SUN	-	-	-	-	1	-	1	-	-	-	-	-	-	2	10
MON	-	-	-	2	1	-	-	-	-	-	-	-	-	3	15
TUE	-	-	-	-	-	1	-	-	1	-	-	-	-	2	10
WED	-	-	-	1	1	-	1	-	-	-	-	-	-	3	15
THU	-	-	-	-	-	-	-	3	1	-	-	-	-	4	20
FRI	-	-	-	-	-	1	-	2	-	1	1	1	-	6	30
SAT	-	-	-	-	-	-	-	-	-	-	-	-	-		
Tot.				3	3	2	2	5	2	1	1	1		20	
%				15	15	10	10	25	10	5	5	5			100

Driver Age/Gender Summary:

Age	Male	Female	NR	Drivers	%
<14	-	-	-		
14	-	-	-		
15	-	-	-		
16	-	1	-	1	3
17	1	1	-	2	5
18	-	1	-	1	3
19	1	-	-	1	3
20	1	1	-	2	5
21 to 24	1	2	-	3	8
25 to 29	1	1	-	2	5
30 to 34	-	1	-	1	3
35 to 39	1	1	-	2	5
40 to 44	1	1	-	2	5
45 to 49	1	-	-	1	3
50 to 54	1	2	-	3	8
55 to 59	5	1	-	6	16
60 to 64	2	2	-	4	11
65 to 69	-	-	-		
70 to 74	-	-	-		
75 to 79	-	2	-	2	5
80 to 84	2	-	-	2	5
85 to 89	1	-	-	1	3
90 to 94	-	-	-		
95 plus	-	-	-		
NR	-	-	1	1	3
Drivers	19	17	1	37	
%	51	46	3		100

Drug/Alcohol Summary:

	Total	%
Drug		
Alcohol, Less than Statutory		
Alcohol, Statutory		
Drug/Alcohol, Less than Statutory		
Drug/Alcohol, Statutory		
Refused		
Under Influence of Alc/Drugs/Meds		
None Indicated	20	100
Total Crashes	20	100

Fixed Object Struck Summary:

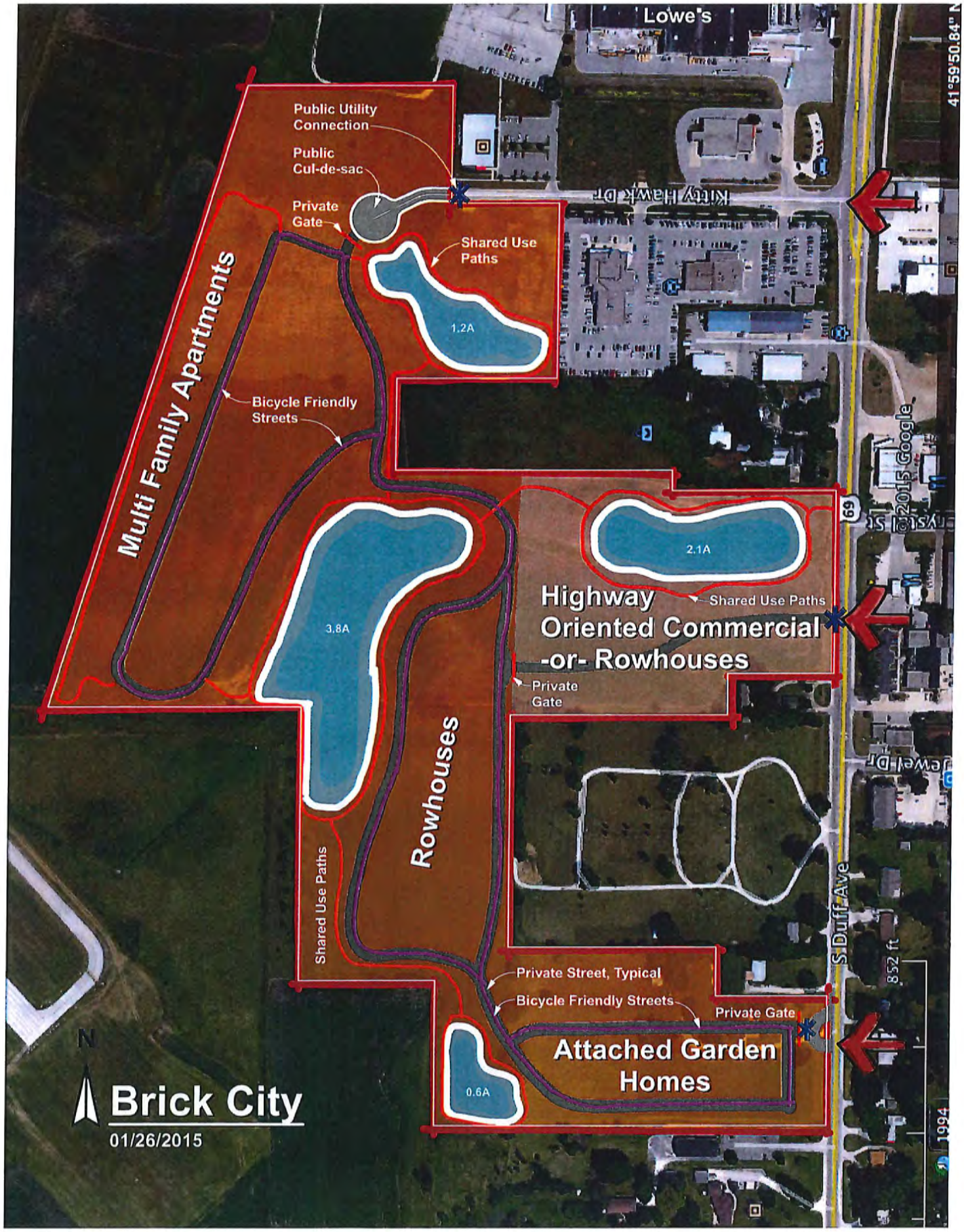
	Vehs.	%
Bridge/Bridge rail/Overpass		
Underpass/Structure Support		
Culvert		
Ditch/Embankment		
Curb/Island/Raised Median		
Guardrail		
Concrete Barrier		
Tree	2	5
Pole - Utility/Light/Etc		
Sign Post		
Mailbox		
Impact Attenuator		
Other Fixed Object		
None	35	95
Total Vehicles	37	100

Selection Filter:

((YEAR = 2011 or YEAR = 2012 or YEAR = 2013 or YEAR = 2014 or YEAR = 2015))

Analyst: G. Kretlow

Notes:


Lowe's
Public Utility Connection
Public Cul-de-sac
Private Gate
Shared Use Paths
1.2A
Kitty Hawk Dr
Multi Family Apartments
Bicycle Friendly Streets
3.8A
Rowhouses
Shared Use Paths
2.1A
Highway Oriented Commercial -or- Rowhouses
Shared Use Paths
Private Gate
Private Street, Typical
Bicycle Friendly Streets
Private Gate
Attached Garden Homes
0.6A
S Duff Ave
852 ft
69
© 2015 Google
N
Brick City
01/26/2015

Brick City
01/26/2015

Quick Facts
- 57+/- Total Acres; all property secured with purchase agreements
- 700+/- Dwelling Units supporting 2,000+/- neighborhood residents
- 13,000+/- lin ft of trails and shared use paths
- 8 acres of natural water features
- CyRide-ready cul-de-sac at the extension of Kitty Hawk Drive
- Wessex-type feel - 2x the size
- traffic pattern and number of residents similar to Fountainview
- developer willing to work with City to solve Teagarden drainage issues per 2010 study
- three vehicular access points supporting all public utility connections
- 5 min drive to hundreds of current jobs; soon to be thousands

Design Strategies
Sustainable environmental principles including:
- natural grasses and berms surrounding rolling terrain
- flood mitigation and storm water management systems
- minimal trees and bushes
- parking areas integrated with natural berming features

Sense of Place:
- Private and secure access for residents and guests
- Recreational trail system encourages community and neighborhood oriented interaction
- Community Commercial Node access readily available
- connection to established recreational paths to the north is in negotiation

Features:
- exterior of brick and natural stone
- contemporary interiors reflecting current market desires and current demographic demands

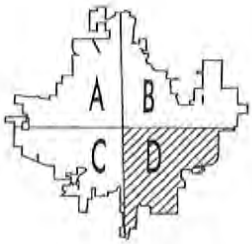
IOWADOT

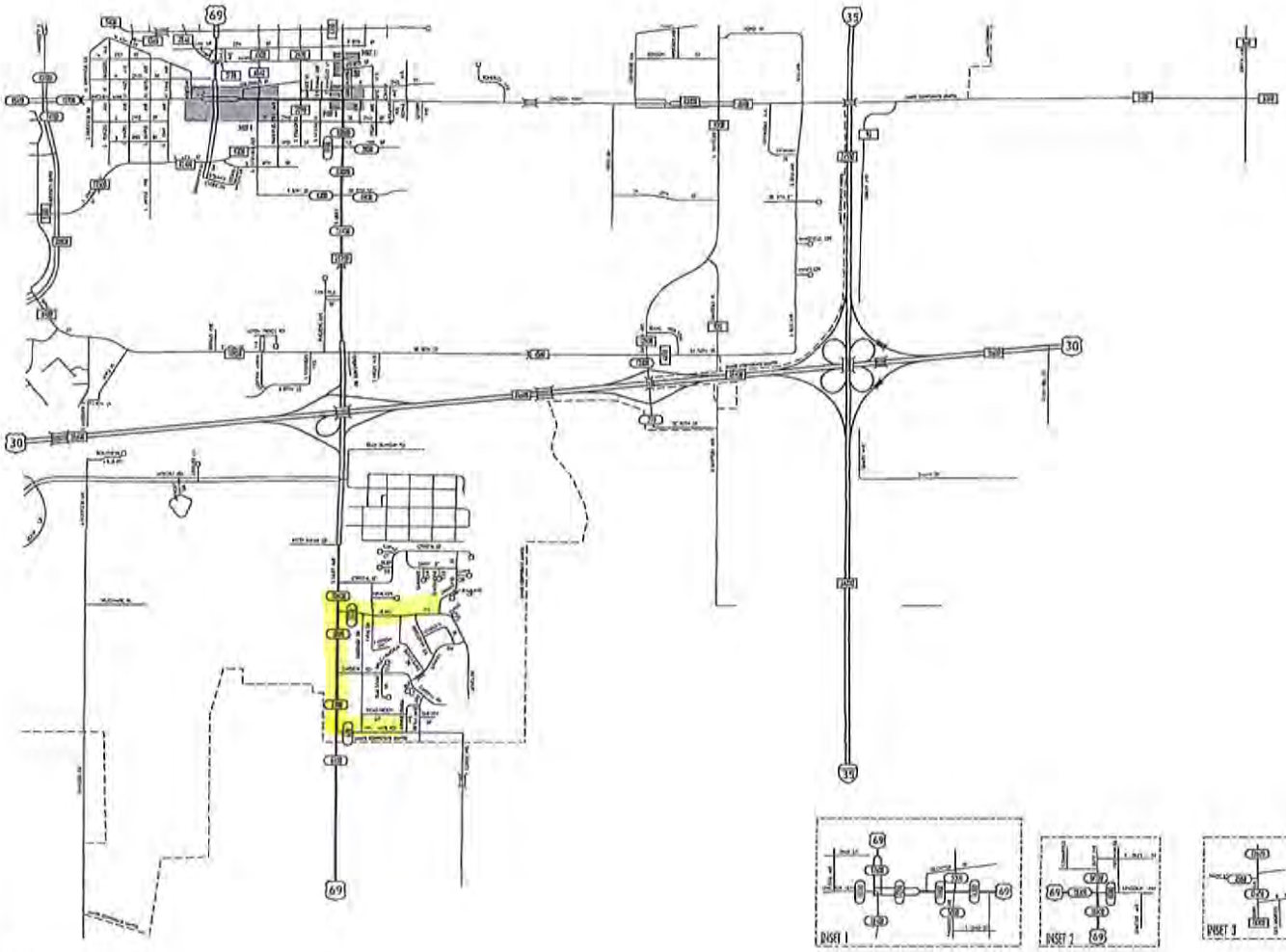
TRAFFIC FLOW MAP OF

AMES D

STORY COUNTY

2015 ANNUAL AVERAGE DAILY TRAFFIC





PREPARED BY
IOWA DEPARTMENT OF TRANSPORTATION
DIVISION OF PLANNING AND PROGRAMMING
OFFICE OF SYSTEM PLANNING
PHONE (515) 239-1531

LEGEND

RECORDER ONLY
MANUAL COUNT

Iowa Department of Transportation

Turning Movement Traffic Count Summary

Annualized Daily Traffic For All Vehicles

Station Number:

85214973099

Count Date:

Tuesday, September 15, 2015

County:

Story

Location Description:

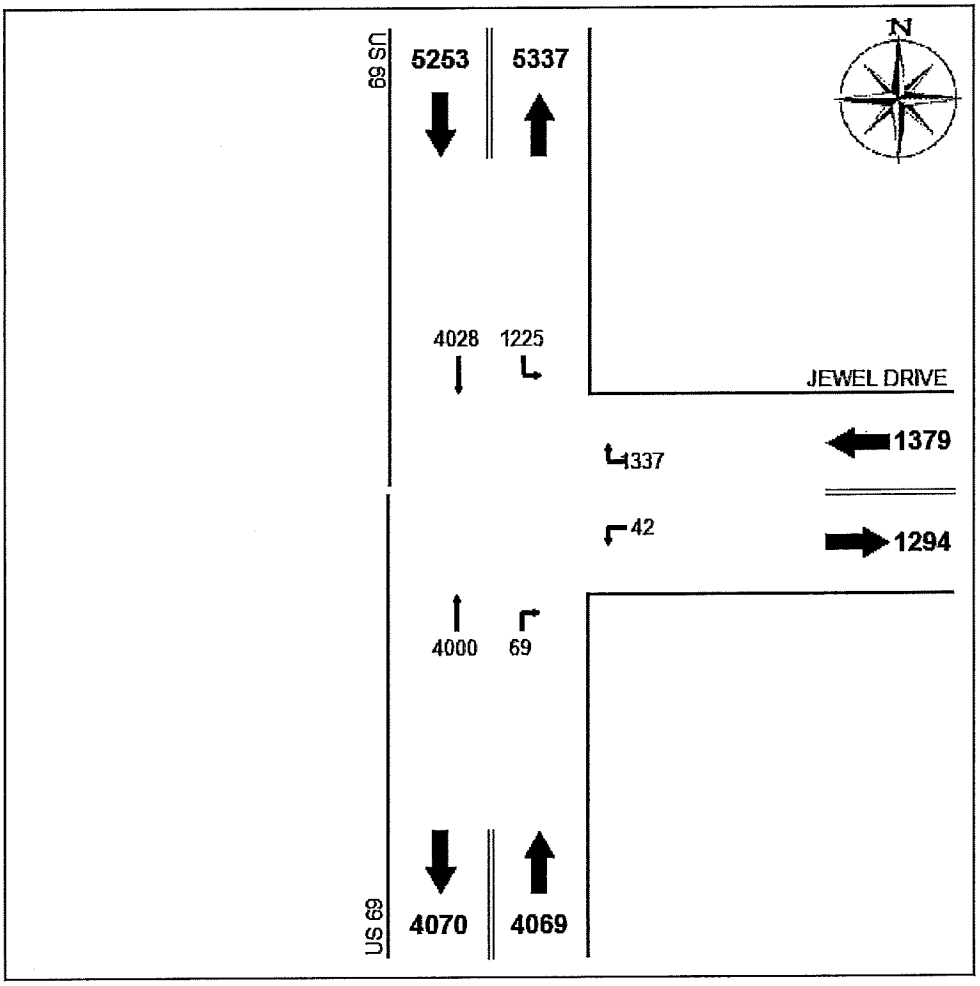
US 69 & JEWEL DR

Volume Factor: 1.810

Pass Class Factor: 1.899

SU Class Factor: 1.520

Combo Class Factor: 1.511



Raw Data-All Vehicles:

	N Leg		E Leg		S Leg	
	L	*T*	*L*	*R*	*T*	*R*
07:00	53	167	5	163	606	1
08:00	77	120	6	150	392	10
11:00	73	228	1	59	180	2
12:00	57	264	1	55	218	3
15:00	133	362	2	88	215	10
16:00	120	491	4	89	256	6
17:00	136	516	3	102	258	5

Iowa Department of Transportation

Turning Movement Traffic Count Summary

Annualized Daily Traffic For All Vehicles

Station Number:

85214173099

Count Date:

Tuesday, September 15, 2015

County:

Story

Location Description:

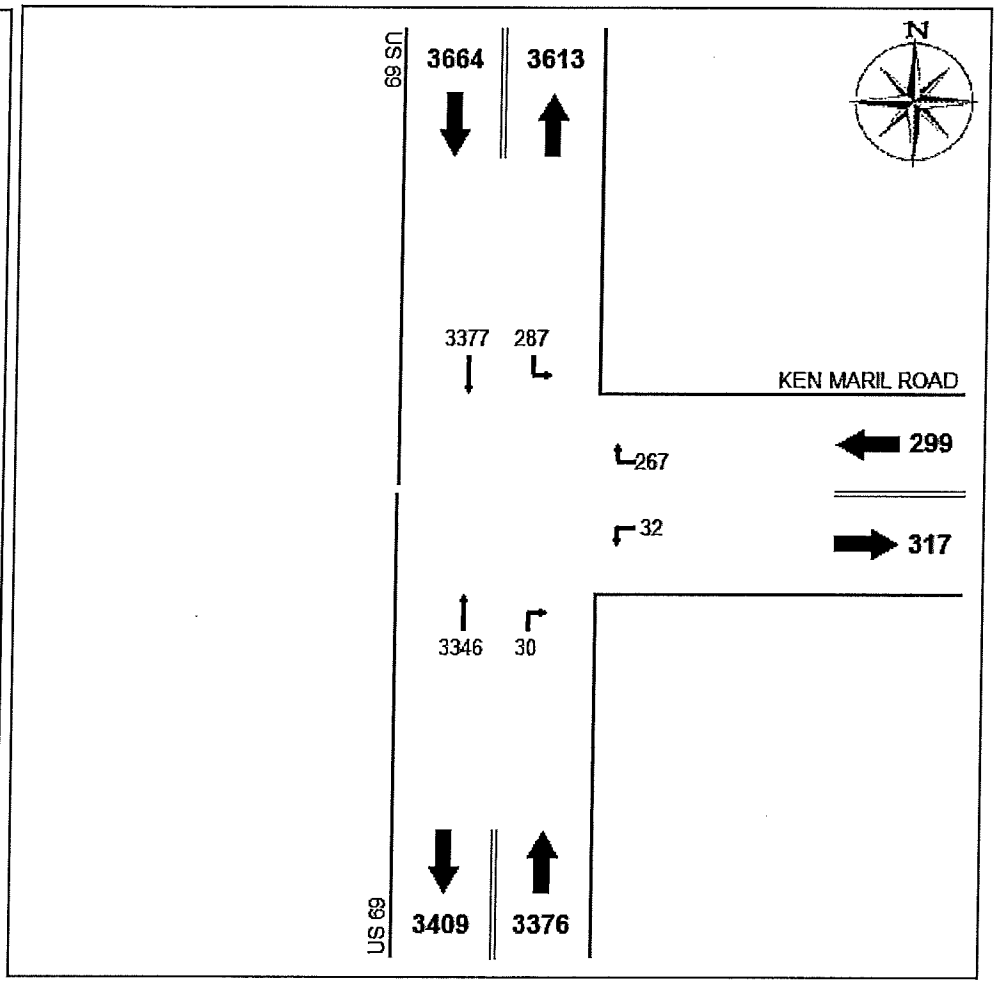
US 69 & KEN MARIL RD

Volume Factor: 1.810

Pass Class Factor: 1.899

SU Class Factor: 1.520

Combo Class Factor: 1.511



Raw Data-All Vehicles:

	N Leg		E Leg		S Leg	
	L	*T*	*L*	*R*	*T*	*R*
07:00	7	162	7	45	504	1
08:00	9	110	3	13	324	0
11:00	19	187	1	11	153	0
12:00	19	213	0	14	167	1
15:00	24	295	3	24	183	4
16:00	34	419	2	20	227	3
17:00	40	419	1	14	219	7

Application for TRAFFIC SAFETY FUNDS

GENERAL INFORMATION **DATE:** 07/18/2016

Location / Title of Project 32nd Ave & Manawa Centre Dr

Applicant City of Council Bluffs

Contact Person Mark Franz Title Traffic Superintendent

Complete Mailing Address 1001 10th Avenue
Council Bluffs, IA 51501

Phone (712) 328-4645 (Area Code) E-Mail mfranz@councilbluffs-ia.gov

If more than one highway authority is involved in this project, please indicate and fill in the information below (use additional sheets if necessary).

Co-Applicant(s) _____

Contact Person _____ Title _____

Complete Mailing Address _____

_____

Phone _____ (Area Code) E-Mail _____

PLEASE COMPLETE THE FOLLOWING PROJECT INFORMATION:

Application Type

- Site Specific ☒
- Traffic Control Device ☐
- Safety Study ☐

Funding Amount

Total Safety Cost	$ 164,200
Total Project Cost	$ 191,100
Safety Funds Requested	$ 164,200

Does this project appear on a Safety Improvement Candidate List or is there a safety study recommendation for this project?
☐ Yes – Explain _____
☒ No

APPLICATION CERTIFICATION FOR LOCAL GOVERNMENT

To the best of my knowledge and belief, all information included in this application is true and accurate, including the commitment of all physical and financial resources. This application has been duly authorized by the participating local government(s). I understand the attached resolution(s) binds the participating local government(s) to assume responsibility if any additional funds are committed, and to ensure maintenance of any new or improved city streets or secondary roads.

I understand that, although this information is sufficient to secure a commitment of funds, a firm contract between the applicant and the Department of Transportation is required prior to the authorization of funds.

Representing the City of Council Bluffs

Signed: Gregory W. Reeder — 7/25/16

Signature — Date Signed

Gregory W. Reeder

Typed Name

Attest: Matthew S. Cox — 7/25/16

Signature — Date Signed

Matthew S. Cox

Typed Name

FELSBURG HOLT & ULLEVIG
connecting and enhancing communities

COUNCIL BLUFFS

Traffic Safety Improvements Program
32nd Avenue & Manawa Centre Drive

Existing Conditions
The City of Council Bluffs has noticed an increasing crash trend at the intersection of 32nd Avenue with Manawa Centre Drive. 32nd Avenue has a posted speed limit of 25 miles per hour (mph) and runs east-west through the middle of Lake Manawa Centre. Between South Expressway and Manawa Centre Drive, 32nd Avenue is a four-lane cross-section with medians and exclusive left-turn lanes provided at intersections. East of Manawa Centre Drive, 32nd Avenue is a two-lane access road collecting traffic from big box retail store parking lots on either side of the road.

Manawa Centre Drive has a posted speed limit of 25 mph and runs north-south through the middle of Lake Manawa Centre. The roadway has a three-lane cross-section with a two-way left-turn lane provided through the development, and provides access to the retailers between 30th Avenue and 35th Avenue. 35th Avenue and Manawa Centre Drive provide a connection to the Metro Crossing development to the south and east.

The intersection has exclusive left-turn lanes on each approach and shared through/right turn lanes on all approaches with the exception of the eastbound approach, which has a through lane, exclusive left turn lane, and an exclusive right turn lane. There are a total of nine entering lanes at this all-way stop controlled intersection. Significant development exists on each corner of the intersection, as shown in the **Table 1** below, resulting in each entering lane being utilized throughout the day.

Table 1. Adjacent Land Use - 32nd Avenue & Manawa Centre Drive

Northeast Quadrant	Southeast Quadrant	Southwest Quadrant	Northwest Quadrant
The Home Depot	Walmart Supercenter	Menards	OfficeMax
Best Buy	Sam's Club	Advance Auto Parts	Strip Mall
Gordmans	Lake Manawa Centre Wash and Gas	Long John Silver's	Restaurant
Toys"R"Us			
ALDI			

All-way stop control intersections with multi-lane approaches provide challenges for drivers to determine right-of-way especially in retail locations with drivers who do not traverse the intersection regularly. This is proving to be the case at the intersection of 32nd Avenue with Manawa Centre Drive as can be seen in the recent crash history.

Crash Analysis
Crash history for this intersection was collected from the Iowa DOT CMAT software to identify trends and safety issues with the current intersection geometry and operations. The evaluation period is from 2011 to 2015. During these five years, 24 crashes have been reported, resulting two minor injuries, three possible injuries, and $97,710 in property damage. Broadside crashes accounted for 75% of the total crashes and resulted in one of the minor injury crashes, two of the possible injury crashes, and $77,900 in property damage. As can be seen in **Figure 1**, broadside crashes have been increasing over the past five years. This trend is expected to continue with further developments planned to the east and south in the area.

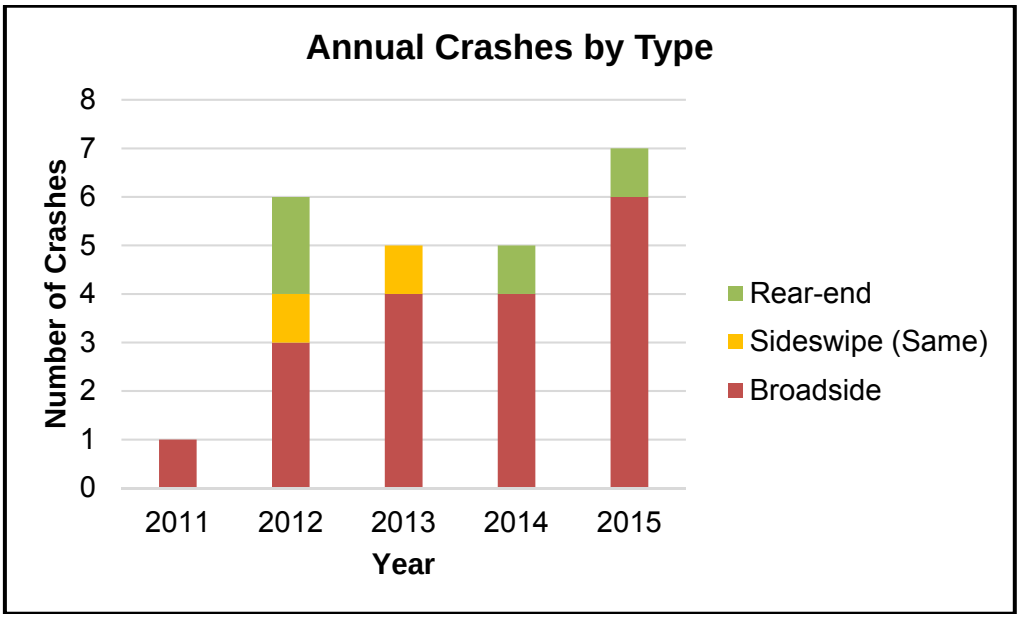


Figure 1. Annual Crashes by Type

Proposed Concept

A traffic signal is proposed to mitigate broadside collisions, the most frequent and severe crash type at this intersection. The traffic signal will include flashing yellow arrows for the northbound and southbound left turns, with the intention of operating in protected/permissive mode. Eastbound and westbound left turns will be permissive only with three-section head indications. Radar detection will be used as it is the City's preferred method for detection as specified in the *City of Council Bluffs Supplemental Specifications for Public Improvements*.

The traffic signal will be connected to the City's interconnect system via a fiber connection with the nearby traffic signal at South Expressway and 32nd Avenue. All signs and traffic control devices will be MUTCD compliant and specified with the final design. Mast arm poles and the cabinet pad will be placed outside of the clear zone. No additional right-of-way will be required for this project.

Safety Justification

According to *Crash Modification Factor (CMF) ID 5525* from the CMF Clearinghouse, a Crash Reduction Factor (CRF) of 34.4 can be anticipated for all crashes resulting in all severities for converting a stop-controlled intersection to traffic signal controlled. In the past five years, there have been two minor injury, three possible injury, and 19 property damage only crashes at the intersection of 32nd Avenue with Manawa Centre Drive. The installed traffic signal would be expected to result in a reduction in crashes for the more severe broadside crash type, however it will likely lead to an increase in crashes for the less severe rear-end crash type.

Benefit/Cost Analysis

The primary purpose of a benefit/cost analysis is to economically justify a project's merit by comparing the anticipated benefits to the cost to complete the project. The total estimated cost of a traffic signal, including interconnect to South Expressway, at 32nd Avenue and Manawa Centre Drive is $191,100. With ineligible expenses such as utility relocation and engineering fees omitted, which are not considered a safety related costs, the total safety related project cost is $164,200. Annual operations and maintenance cost will be approximately $1,500 per year after the initial year. This cost was not included in the cost estimate but is reflected in the benefit/cost analysis. An estimated 15-year improvement life cycle, a 34.4 CRF, and 24 correctible crashes over the previous five-year time period yield an anticipated safety related benefit/cost ratio of 1.98:1.

BIDDER: Engineer's Estimate

PROJECT: 32nd Ave & Manawa Centre Dr TSIP Traffic Signal
DATE: July 2016

ITEM NO.	DESCRIPTION	ESTIMATED QUANTITY	UNIT	UNIT PRICE	AMOUNT
	TRAFFIC SIGNAL - PERMANENT				
1	MOBILIZATION	1	LS	$2,000.00	$2,000.00
2	COMBINATION MAST ARM SIGNAL AND LIGHTING POLE	4	EACH	$11,000.00	$44,000.00
3	TRAFFIC SIGNAL, 3-SECTION W/BACKPLATE	11	EACH	$700.00	$7,700.00
4	TRAFFIC SIGNAL, 4-SECTION W/BACKPLATE	2	EACH	$950.00	$1,900.00
5	TRAFFIC SIGNAL CONTROLLER, TYPE TS2 WITH CONTROLLER CABINET & PAD	1	EACH	$10,000.00	$10,000.00
6	PULL BOX	3	EACH	$700.00	$2,100.00
7	PEDESTRIAN SIGNAL	2	EACH	$500.00	$1,000.00
8	PEDESTRIAN PUSH BUTTON	2	EACH	$150.00	$300.00
9	3-INCH CONDUIT, TRENCHED	60	LF	$10.00	$600.00
10	3-INCH CONDUIT, JACKED	250	LF	$20.00	$5,000.00
11	TRAFFIC SIGNAL WIRING	1	LS	$10,000.00	$10,000.00
12	250W HPS EQUIVALENT LED ROADWAY LUMINAIRE	4	EACH	$1,500.00	$6,000.00
13	REMOVE LIGHTING UNIT	1	EACH	$1,000.00	$1,000.00
14	18" STREET NAME SIGN	4	EACH	$400.00	$1,600.00
15	OVERHEAD SIGN	4	EACH	$400.00	$1,600.00
16	REMOVE EXISTING SIGN AND POST	4	EACH	$50.00	$200.00
17	PROVIDE AND INSTALL RADAR VEHICLE DETECTION SYSTEM	1	LS	$26,000.00	$26,000.00
				PERMANENT SIGNAL TOTAL	**$121,000.00**
	TRAFFIC SIGNAL - INTERCONNECT				
1	REMOVE PULL BOX, TYPE PB-1	1	EACH	$240.00	$240.00
2	PULL BOX - TYPE PB-6	2	EACH	$680.00	$1,360.00
3	PULL BOX - TYPE PB-10	1	EACH	$2,200.00	$2,200.00
4	TERMINAL FUSION SPLICE POINT	1	EACH	$1,300.00	$1,300.00
5	FIBER OPTIC DISTRIBUTION ASSEMBLY CABLE	1	EACH	$1,500.00	$1,500.00
6	3-INCH CONDUIT, TRENCHED	675	LF	$6.50	$4,388.00
7	3-INCH CONDUIT, JACKED	465	LF	$15.00	$6,975.00
8	36 STRAND SINGLE MODE FIBER OPTIC CABLE	1480	LF	$2.25	$3,330.00
9	FIBER OPTIC COMMUNICATION SYSTEM	1	LS	$5,000.00	$5,000.00
10	TESTING AND DOCUMENTATION OF FIBER OPTIC COMMUNICATION SYSTEM	1	LS	$2,000.00	$2,000.00
				INTERCONNECT TOTAL	**$28,300.00**
	RIGHT OF WAY				$0.00
	CONTINGENCIES (10%)				$14,900.00
	SAFETY RELATED PROJECT COSTS				**$164,200.00**
	UTILITY RELOCATIONS (3%)				$4,500.00
	DESIGN ENGINEERING (10%)				$14,900.00
	CONSTRUCTION ENGINEERING (5%)				$7,500.00
	INELIGIBLE EXPENSES PROJECT COSTS				**$26,900.00**
	TOTAL PROJECT COST				**$191,100.00**

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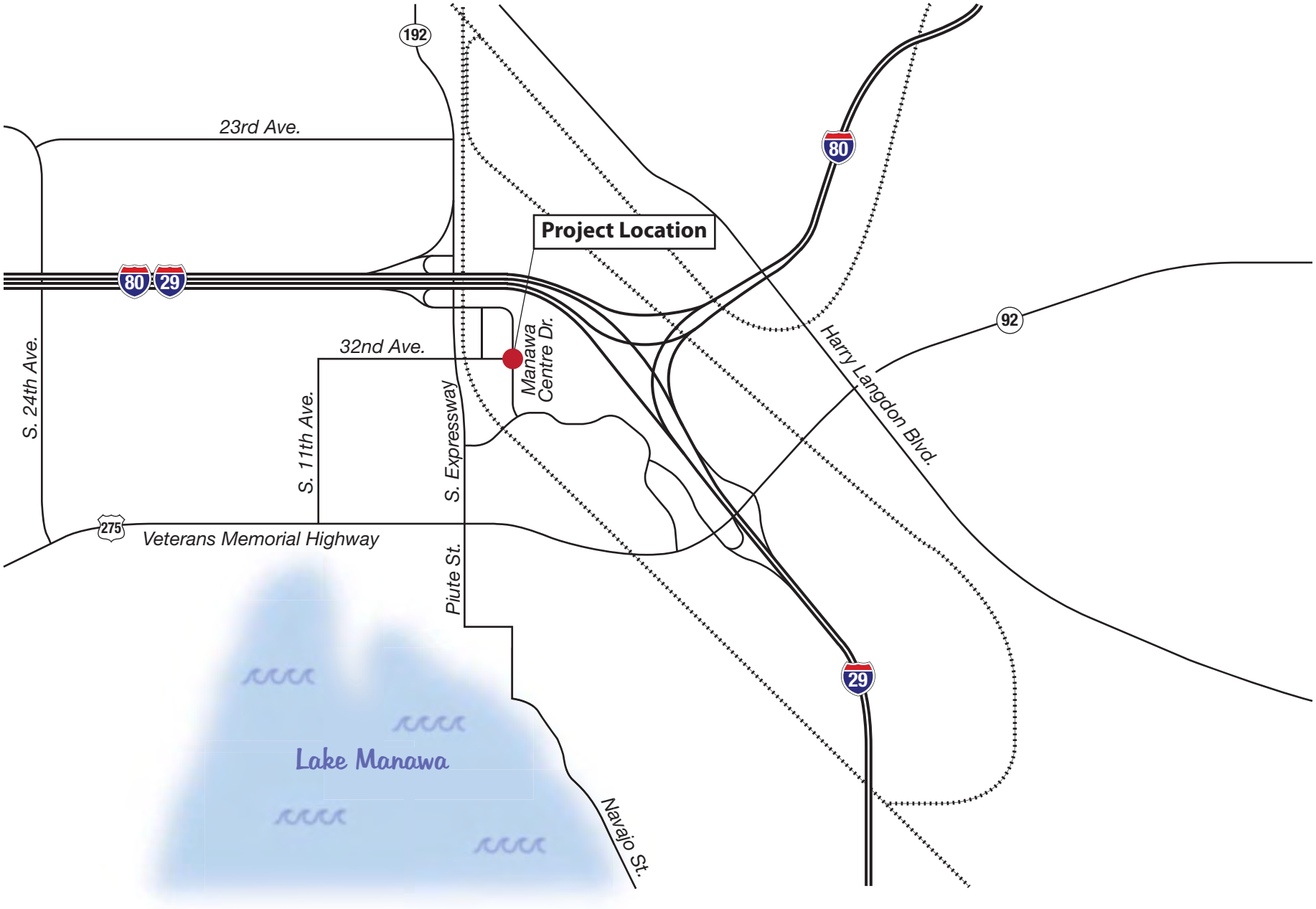
Traffic Safety Improvements Program
Traffic Signal Installation
32nd Avenue & Manawa Centre Drive
Council Bluffs, IA

Project Schedule

Submittal of 2016 TSIP Funds Application	August 15, 2016
TSIP Funds Available	July 1, 2017
Traffic Signal Design	July – August 2017
Project Bidding	February 2018
Begin Construction	April 2018
End Construction	June 2018

11422 Miracle Hills Drive, Suite 115 Omaha, NE 68154 tel 402.445.4405 fax 402.445.4394
www.fhueng.com info@fhueng.com



Vicinity Map

FELSBURG HOLT & ULLEVIG

32nd Avenue & Manawa Centre Drive
Approach Photographs

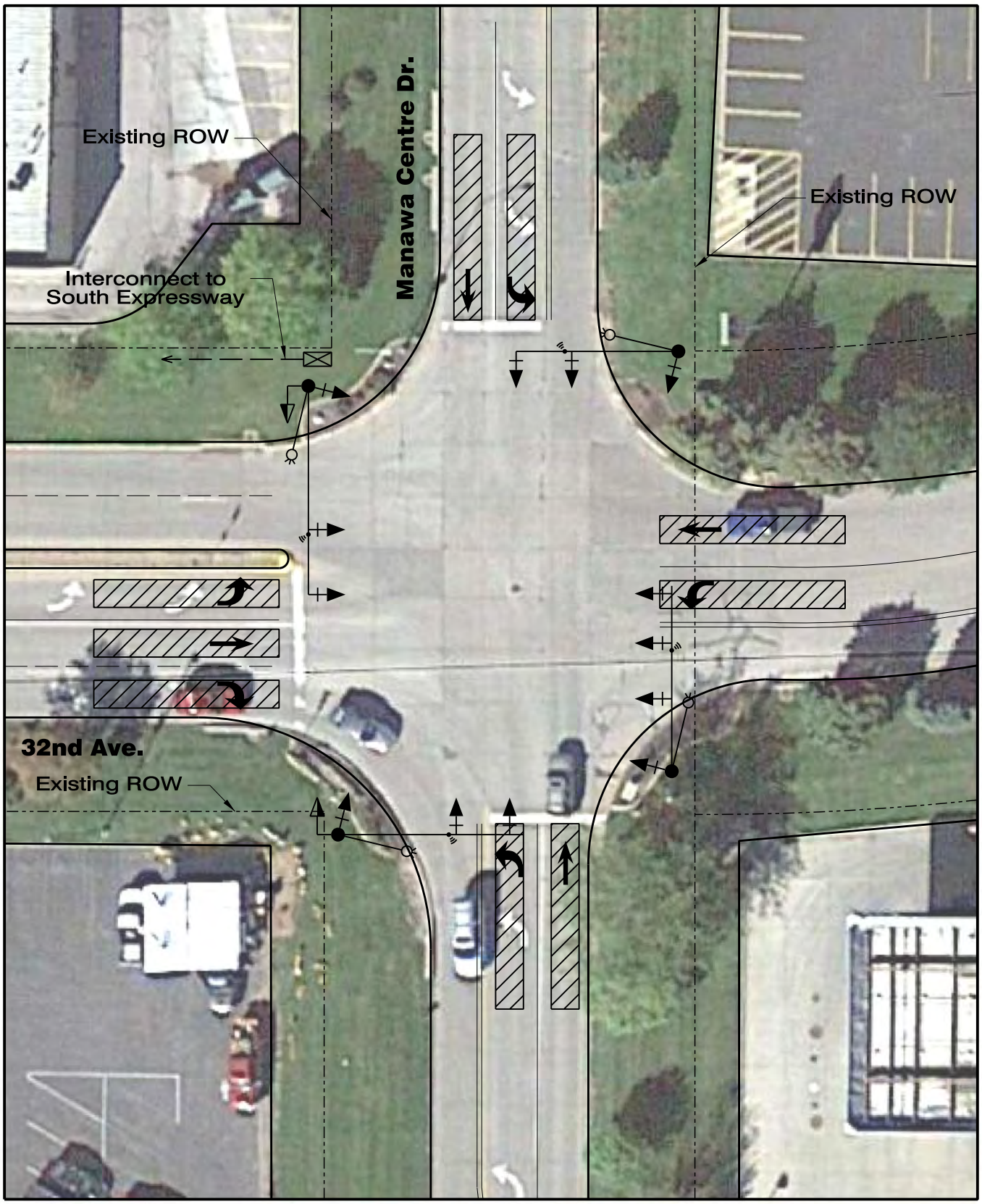
Manawa Centre Drive looking North at 32nd Avenue

Manawa Centre Drive looking South at 32nd Avenue

32nd Avenue & Manawa Centre Drive
Approach Photographs

32nd Avenue looking East at Manawa Centre Drive

32nd Avenue looking West at Manawa Centre Drive



FELSBURG HOLT & ULLEVIG

COUNCIL BLUFFS

North

32ND AVE & MANAWA CENTRE DR
CONCEPTUAL PLAN

North

FELSBURG HOLT & ULLEVIG

COUNCIL BLUFFS

32ND AVE & MANAWA CENTRE DR AERIAL PHOTOGRAPHY

Iowa Department of Transportation

Major Cause Summary

Major Cause Summary 32nd Ave & Manawa Centre Dr

Report Version 1.1 Jan 2005

Analysis Years: 2011 [1], 2012 [6], 2013 [5], 2014 [5], 2015 [7]

Crash Summary:

Fatal	-
Major Injury	-
Minor Injury	2
Possible/Unknown	3
PDO	19
Total Crashes	24

Injury Summary:

Fatal	-
Major Injury	-
Minor Injury	2
Possible	5
Unknown	1
Total Injuries	8

TOT Property Damage: $97,710

AVG Property Damage: $4,071

Surface Condition Summary:

Dry	19
Wet	5
Ice	-
Snow	-
Slush	-
Sand/Dirt/Oil/Gravel	-
Water	-
Other	-
Unknown	-
Not Reported	-
Total Crashes	24

Major Cause Summary:

	Animal		Improper Backing
1	Ran Traffic Signal		Illegally Parked/Unattended
8	Ran Stop Sign		Swerving/Evasive Action
	Crossed Centerline		Over-Correcting/Over-Steering
	FTYROW: At Uncontrolled Intersection		Downhill Runaway
	FTYROW: Making Right Turn on Red Signal		Equipment Failure
6	FTYROW: From Stop Sign		Separation of Units
	FTYROW: From Yield Sign		Ran Off Road - Right
	FTYROW: Making Left Turn		Ran Off Road - Straight
	FTYROW: From Driveway		Ran Off Road - Left
	FTYROW: From Parked Position		Lost Control
	FTYROW: To Pedestrian		Inattentive/Distracted By: Passenger
1	FTYROW: Other (explain in narrative)		Inattentive/Distracted By: Use of Phone or Other
	Traveling Wrong Way or on Wrong Side of Rd		Inattentive/Distracted By: Fallen Object
	Driving Too Fast for Conditions		Inattentive/Distracted By: Fatigued/Asleep
	Exceeded Authorized Speed		Other: Vision Obstructed
	Made Improper Turn		Oversized Load/ Oversized Vehicle
	Improper Lane Change		Cargo/Equipment Loss or Shift
2	Followed Too Close	2	Other: Other Improper Action
	Disregarded Railroad Signal	4	Unknown
	Disregarded Warning Sign		Other: No Improper Action
	Operating Vehicle in Reckless/Aggressive Manner		None Indicated

Selection Filter:

((CITYNAME = 'Council Bluffs')) AND ((YEAR = 2011 or YEAR = 2012 or YEAR = 2013 or YEAR = 2014 or YEAR = 2015))

Analyst: Mark Franz

Notes:

Felsburg Holt & Ullevig : Omaha (NE)
11422 Miracle Hills Drive Suite 115

Omaha, Nebraska, United States 12345
(402) 445-4405 mark.meisinger@fhueng.com

Count Name: 32nd Ave & Manawa Centre Dr
TMC
Site Code: 323
Start Date: 01/30/2014
Page No: 1

Turning Movement Data

Start Time	NB Manawa Centre Dr Northbound						SB Manawa Centre Dr Southbound						EB 32nd Ave Eastbound						WB 32nd Ave Westbound						
	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	Int. Total
5:00 PM	35	34	2	0	0	71	29	33	7	0	0	69	8	20	43	0	0	71	3	31	30	0	0	64	275
5:15 PM	29	36	2	0	0	67	33	33	6	0	0	72	6	17	36	0	0	59	2	45	23	0	0	70	268
5:30 PM	16	24	3	0	0	43	26	31	4	0	0	61	5	18	45	0	0	68	4	30	23	0	0	57	229
5:45 PM	34	20	2	0	0	56	26	23	4	0	0	53	7	18	39	0	0	64	2	38	17	0	0	57	230
Hourly Total	114	114	9	0	0	237	114	120	21	0	0	255	26	73	163	0	0	262	11	144	93	0	0	248	1002
6:00 PM	29	21	2	0	0	52	23	26	10	0	0	59	5	28	29	0	0	62	2	37	22	0	0	61	234
6:15 PM	24	33	1	0	0	58	20	30	2	0	0	52	2	13	37	0	0	52	1	49	18	0	0	68	230
6:30 PM	22	24	1	0	0	47	26	20	6	0	0	52	3	15	32	0	0	50	0	30	18	0	0	48	197
6:45 PM	13	32	1	0	0	46	20	26	2	0	0	48	3	12	37	1	0	53	3	31	19	0	0	53	200
Hourly Total	88	110	5	0	0	203	89	102	20	0	0	211	13	68	135	1	0	217	6	147	77	0	0	230	861
7:00 PM	21	19	4	0	0	44	21	18	2	0	0	41	3	13	31	0	0	47	3	28	14	0	0	45	177
7:15 PM	20	15	2	0	0	37	24	9	4	0	0	37	5	8	23	0	0	36	4	25	20	0	0	49	159
7:30 PM	17	10	0	0	0	27	12	13	1	0	0	26	3	20	27	0	0	50	0	22	14	0	0	36	139
7:45 PM	18	20	0	0	0	38	21	7	4	0	0	32	5	18	27	0	0	50	2	37	15	0	0	54	174
Hourly Total	76	64	6	0	0	146	78	47	11	0	0	136	16	59	108	0	0	183	9	112	63	0	0	184	649
*** BREAK ***	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2:00 PM	31	38	3	0	0	72	29	42	7	0	0	78	14	34	67	0	0	115	9	52	20	0	1	81	346
2:15 PM	27	42	5	0	0	74	41	34	9	0	0	84	6	23	55	0	0	84	3	58	34	0	0	95	337
2:30 PM	37	37	9	0	0	83	36	37	10	0	0	83	14	28	54	0	0	96	3	57	32	0	0	92	354
2:45 PM	33	37	2	0	0	72	36	30	9	0	0	75	10	28	62	0	0	100	5	65	22	0	0	92	339
Hourly Total	128	154	19	0	0	301	142	143	35	0	0	320	44	113	238	0	0	395	20	232	108	0	1	360	1376
3:00 PM	24	31	7	0	0	62	30	38	9	0	0	77	7	24	50	0	0	81	6	53	39	0	0	98	318
3:15 PM	31	30	5	0	0	66	40	34	3	0	1	77	9	31	49	0	0	89	8	51	32	0	0	91	323
3:30 PM	25	41	6	0	0	72	34	30	7	0	0	71	10	26	46	0	0	82	8	55	22	0	0	85	310
3:45 PM	29	40	1	0	0	70	36	37	9	0	0	82	14	25	56	0	0	95	8	60	32	0	0	100	347
Hourly Total	109	142	19	0	0	270	140	139	28	0	1	307	40	106	201	0	0	347	30	219	125	0	0	374	1298
4:00 PM	32	26	1	0	0	59	37	34	8	0	0	79	4	36	51	0	0	91	7	57	27	0	0	91	320
4:15 PM	33	26	4	0	0	63	34	38	3	0	0	75	11	34	37	0	0	82	2	60	34	0	0	96	316
4:30 PM	29	33	2	0	0	64	28	38	2	0	0	68	7	24	41	0	0	72	7	64	25	0	0	96	300
4:45 PM	41	37	0	0	0	78	29	35	7	0	0	71	7	23	36	0	0	66	2	54	29	0	0	85	300
Hourly Total	135	122	7	0	0	264	128	145	20	0	0	293	29	117	165	0	0	311	18	235	115	0	0	368	1236
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5:45 PM	28	31	3	0	0	62	29	24	7	0	0	60	10	19	51	0	0	80	5	44	34	0	0	83	285
Hourly Total	121	120	20	0	0	261	135	130	27	0	0	292	28	94	177	0	1	299	17	199	131	0	0	347	1199
6:00 PM	43	24	5	0	2	72	33	18	6	0	0	57	7	25	45	0	1	77	2	53	25	0	0	80	286
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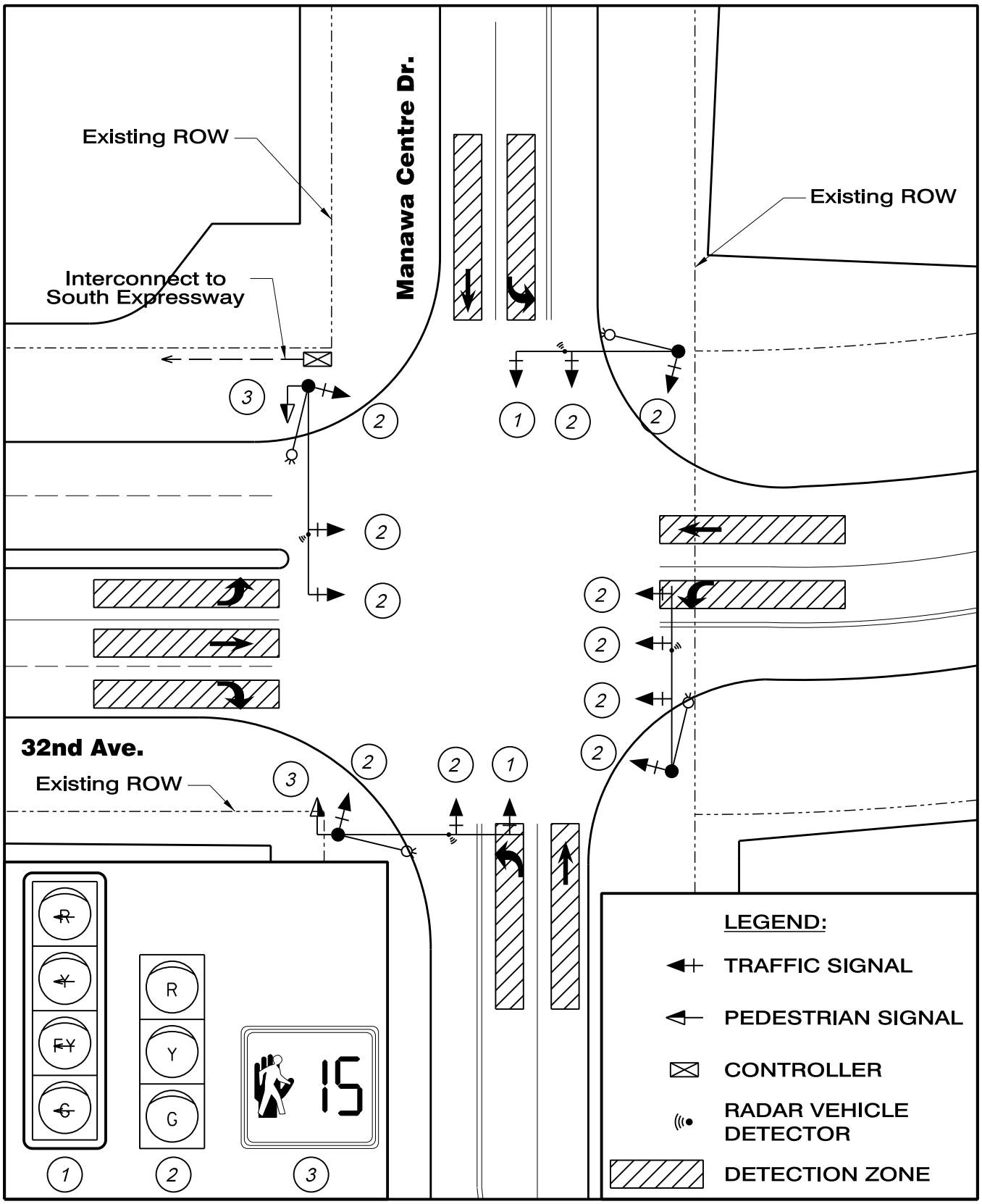
6:30 PM	31	28	5	0	0	64	33	20	6	0	0	59	9	22	43	0	0	74	3	53	22	0	0	78	275
6:45 PM	23	24	1	0	0	48	24	27	3	0	0	54	8	22	43	0	0	73	3	41	30	0	0	74	249

J. Turning Movement Counts

Hourly Total	132	105	15	0	2	252	121	100	20	0	0	241	30	90	170	0	1	290	9	189	111	0	0	309	1092
7:00 PM	28	29	2	0	0	59	20	30	6	0	0	56	6	29	42	0	0	77	0	34	31	0	0	65	257
7:15 PM	27	19	0	0	0	46	26	22	2	0	0	50	6	22	32	0	0	60	1	56	26	0	0	83	239
7:30 PM	31	16	4	0	0	51	18	25	8	0	0	51	4	22	37	0	0	63	2	47	25	0	0	74	239
7:45 PM	27	14	2	0	0	43	29	16	3	0	0	48	4	18	24	0	0	46	0	35	23	0	0	58	195
Hourly Total	113	78	8	0	0	199	93	93	19	0	0	205	20	91	135	0	0	246	3	172	105	0	0	280	930
Grand Total	1016	1009	108	0	2	2133	1040	1019	201	0	1	2260	246	811	1492	1	2	2550	123	1649	928	0	1	2700	9643
Approach %	47.6	47.3	5.1	0.0	-	-	46.0	45.1	8.9	0.0	-	-	9.6	31.8	58.5	0.0	-	-	4.6	61.1	34.4	0.0	-	-	-
Total %	10.5	10.5	1.1	0.0	-	22.1	10.8	10.6	2.1	0.0	-	23.4	2.6	8.4	15.5	0.0	-	26.4	1.3	17.1	9.6	0.0	-	28.0	-
Car	1009	1008	108	0	-	2125	1037	1008	200	0	-	2245	243	799	1486	1	-	2529	121	1630	924	0	-	2675	9574
% Car	99.3	99.9	100.0	-	-	99.6	99.7	98.9	99.5	-	-	99.3	98.8	98.5	99.6	100.0	-	99.2	98.4	98.8	99.6	-	-	99.1	99.3
Truck	7	1	0	0	-	8	3	11	1	0	-	15	3	12	6	0	-	21	2	19	4	0	-	25	69
% Truck	0.7	0.1	0.0	-	-	0.4	0.3	1.1	0.5	-	-	0.7	1.2	1.5	0.4	0.0	-	0.8	1.6	1.2	0.4	-	-	0.9	0.7
Ped	-	-	-	-	2	-	-	-	-	-	1	-	-	-	-	-	2	-	-	-	-	-	1	-	-
% Ped	-	-	-	-	100.0	-	-	-	-	-	100.0	-	-	-	-	-	100.0	-	-	-	-	-	100.0	-	-



FELSBURG HOLT & ULLEVIG

COUNCIL BLUFFS

32ND AVE & MANAWA CENTRE DR
CONCEPTUAL TRAFFIC SIGNAL DESIGN

North

Rev. 5/14

Intersection or Spot Benefit / Cost Safety Analysis

Iowa DOT Office of Traffic & Safety

County: Pottawattamie Prepared by: Fellsburg Holt & Ullevig Date Prepared: Jul 18, 2016

Intersection: 32nd Ave & Manawa Centre Dr

Improvement

Proposed Improvement(s): Install traffic signal.

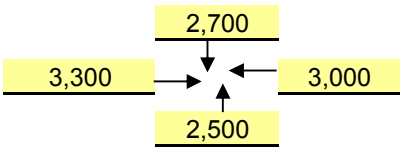
$ 164,200	Estimated Improvement Cost, **EC**	15	Est. Improvement Life, years, **Y**
$ 1,500	Other Annual Cost (after initial year), **AC**	34	Crash Reduction Factor (integer), **CRF**
$ 16,678	Present Value Other Annual Costs, **OC**	4.0%	Discount Rate (time value of $), **INT**
		$ 180,878	Present Value Cost, **COST** = EC + OC

$$OC = \frac{AC}{INT}\left(1 - \frac{1}{(1+INT)^Y}\right)$$

Traffic Volume Data

Source: City of Council Bluffs 1/30/2014 Date of traffic count

Daily Entering Vehicles by Approach (or AADT / 2)



4,197,500 Current Annual Entering Veh., **AEV** = DEV * 365

15,477 veh / day, Final Year DEV, **FDEV**

72.59 MEV, Total Million Entering Veh. Over life of Project, **TMEV**

2.0% Projected Traffic Growth (0%-10%), **G**

11,500 Current Daily Entering Vehicles, **DEV**

$$TMEV = \frac{AEV}{-G}\left(1 - \left(\frac{1+G}{1}\right)^Y\right) \Big/ 10^6$$

Crash Data

2011	First full year -->	2015	Last full year		5.0 years, Time Period, **T**		
0	Additional months				values as of May 2014		
0	Fatal Crashes →	0	Fatalities @		$4,500,000	$	-
		0	Major Injuries @		$325,000	$	-
5	Injury Crashes →	2	Minor Injuries @		$65,000	$	130,000
		3	Possible Injuries @		$35,000	$	105,000
19	Property Damage Only		(assumed cost per crash)		$7,400	$	177,600
		-OR-	enter all Property Costs of all crashes:				
24	Total Crashes, **TA**				Total $ Loss, **LOSS**	$	412,600

4.80	Current Crashes / Year, **AA** = TA / T	1.14	Crashes / MEV, Crash Rate, **CR**
$ 17,192	Cost per Crash, **AVC** = LOSS / TA		CR = TA x 10^6 / (DEV x 365 x T)
83.0	Total Expected Crashes, **TECR** = CR x TMEV	$ 358,650	Present Value of Avoided
1.65	Crashes Avoided First Year **AAR** = AA x CRF / 100		Crashes, **BENEFIT**
$ 28,387	Crash Costs Avoided in First Year, AAR x AVC		
28.6	Total Avoided Crashes, TECR x CRF/ 100		

$$BEN. = \frac{AVC \times AAR}{(INT - G)}\left(1 - \left(\frac{1+G}{1+INT}\right)^Y\right)$$

Benefit / Cost Ratio

Benefit : Cost = $358,650 : $180,878 = **1.98** : 1

Rev. 6/16 A

IOWADOT

Application for TRAFFIC SAFETY FUNDS

GENERAL INFORMATION **DATE:** 8/2/2016

Location / Title of Project: Starline Shoulder Expansion

Applicant: Clarke County

Contact Person: Thomas B Andersen Title: County Engineer

Complete Mailing Address: Courthouse
Osceola, Iowa 50213

Phone: 641-342-2716 (Area Code) E-Mail: ccsrd@clarkecountyiowa.org

If more than one highway authority is involved in this project, please indicate and fill in the information below (use additional sheets if necessary).

Co-Applicant(s) _____

Contact Person _____ Title _____

Complete Mailing Address _____

Phone _____ (Area Code) E-Mail _____

PLEASE COMPLETE THE FOLLOWING PROJECT INFORMATION:

Application Type

- Site Specific ☒
- Traffic Control Device ☐
- Safety Study ☐

Funding Amount

Total Safety Cost	$ 1,400,000
Total Project Cost	$
Safety Funds Requested	$ 500,000

Does this project appear on a Safety Improvement Candidate List or is there a safety study recommendation for this project?
☐ Yes – Explain _____
☒ No

Rev. 6/16

APPLICATION CERTIFICATION FOR LOCAL GOVERNMENT

To the best of my knowledge and belief, all information included in this application is true and accurate, including the commitment of all physical and financial resources. This application has been duly authorized by the participating local government(s). I understand the attached resolution(s) binds the participating local government(s) to assume responsibility if any additional funds are committed, and to ensure maintenance of any new or improved city streets or secondary roads.

I understand that, although this information is sufficient to secure a commitment of funds, a firm contract between the applicant and the Department of Transportation is required prior to the authorization of funds.

Representing the Clarke County

Signed: _____ 08/08/16
Signature Date Signed

Thomas B Andersen
Typed Name

Attest: _____ 8-8-16
Signature Date Signed

Elizabeth M Simpson
Typed Name

NARRATIVE

CLARKE COUNTY HIGHWAY NO. R45/STARLINE AVENUE BICYCLE TRAIL

TRANSPORTATION SAFETY IMPROVEMENT PROGRAM GRANT APPLICATION

Clarke County, in conjunction with other groups interested in developing bicycle trails within and adjacent to Clarke County and interested in making existing bicycle trails more accessible, safe, and ridable, has determined that development of the Clarke County Highway No R45/Starline Avenue corridor into an improved, designated bicycle trail would be an excellent project to move forward with. The existing roadway presents a spacious eighty(80) foot wide right-of-way(ROW) with two(2) each eleven foot(11.0 ft.) wide Portland Cement Concrete(PCC) pavement driving lanes and six foot plus(6.0 ft.+) roadstone shoulders. The existing roadstone shoulders do not lend themselves very adequately to bicycle traffic because of the rough, hard to maintain surface characteristic of roadstone shoulders.

The proposed improvements will transform the substandard roadstone shoulders into a smooth, all-weather surface suitable for safe, enjoyable bicycling by constructing two(2) each six(6) foot wide, five(5) inch thick Hot-Mix Asphalt(HMA) bicycle trails on the shoulder on each side of Clarke County Highway No. R45/Starline Avenue. The proposed improvements will remove bicycle traffic off the Starline pavement onto the new shoulders; thereby improving the safety of bicyclists by moving the bikers further away from motorists. Construction of rumble strips will improve and enhance the safety of both motorists and bicyclists alike by putting a physical barrier between motorists and bicyclists. Rumble strips will also warn motorists that they are leaving the paved driving surface when they are doing so - - - a significant benefit.

The posted speed limit on Clarke County Highway No. R45/Starline Avenue is fifty-five(55) miles per hour(mph). The Clarke County Highway No. R45/Starline Avenue "clear zone" meets current design criteria; and Clarke County works hard and conscientiously to keep the "clear zone" free of obstructions, e.g., trees, boulders, non-complying mailboxes, etc. The current and future Clarke County Highway No. R45/Starline Avenue clear zone is and should be completely "clear" of obstacles, obstructions, and injury causing vegetation.

Clarke County has designed the proposed Clarke County Highway No. R45/Starline Avenue Bicycle Trail to comply with all applicable "Manual on Uniform Traffic Control Devices(MUTCD)" and "Statewide Urban Design and Specifications Program(SUDAS)" requirements. To enhance safety and comply with MUTCD and SUDAS standards and specifications the bicycle lane width is six feet(6.0 ft.) on EACH side of Clarke County Highway No. R45/Starline Avenue; the thickness of the proposed bicycle trail is five inches(5.0 in.); and motor vehicle traffic is separated from the bicycle traffic by rumble strips constructed into/in the proposed, new paved shoulders.

Clarke County Highway No. R45/Starline Avenue has experienced relatively numerous severe accidents in the past, including two(2) fatal accidents, causing the benefit-cost ratio to be so high for such an expensive project. The proposed bicycle trail minimizes the risk/potential for future accidents by providing a safer surface for bicyclists to utilize; provides a real, tangible barrier to separate motor vehicle traffic from bicycle traffic by the construction of rumble strips into the proposed bicycle trail; minimizes the chance of loose rock being thrown on travelled surfaces; and maximizes the separation distance between motor vehicle traffic and bicycle traffic by taking the

bicycle traffic of the pavement utilized for a road by motorized vehicle traffic. Finally, Clarke County Highway No. R45/Starline Avenue will be signed and marked in accordance with Part Nine(9), "Traffic Controls for Bicycle Facilities – Manual on Uniform Traffic Control Devices(MUTCD)", if the proposed improvements are constructed.

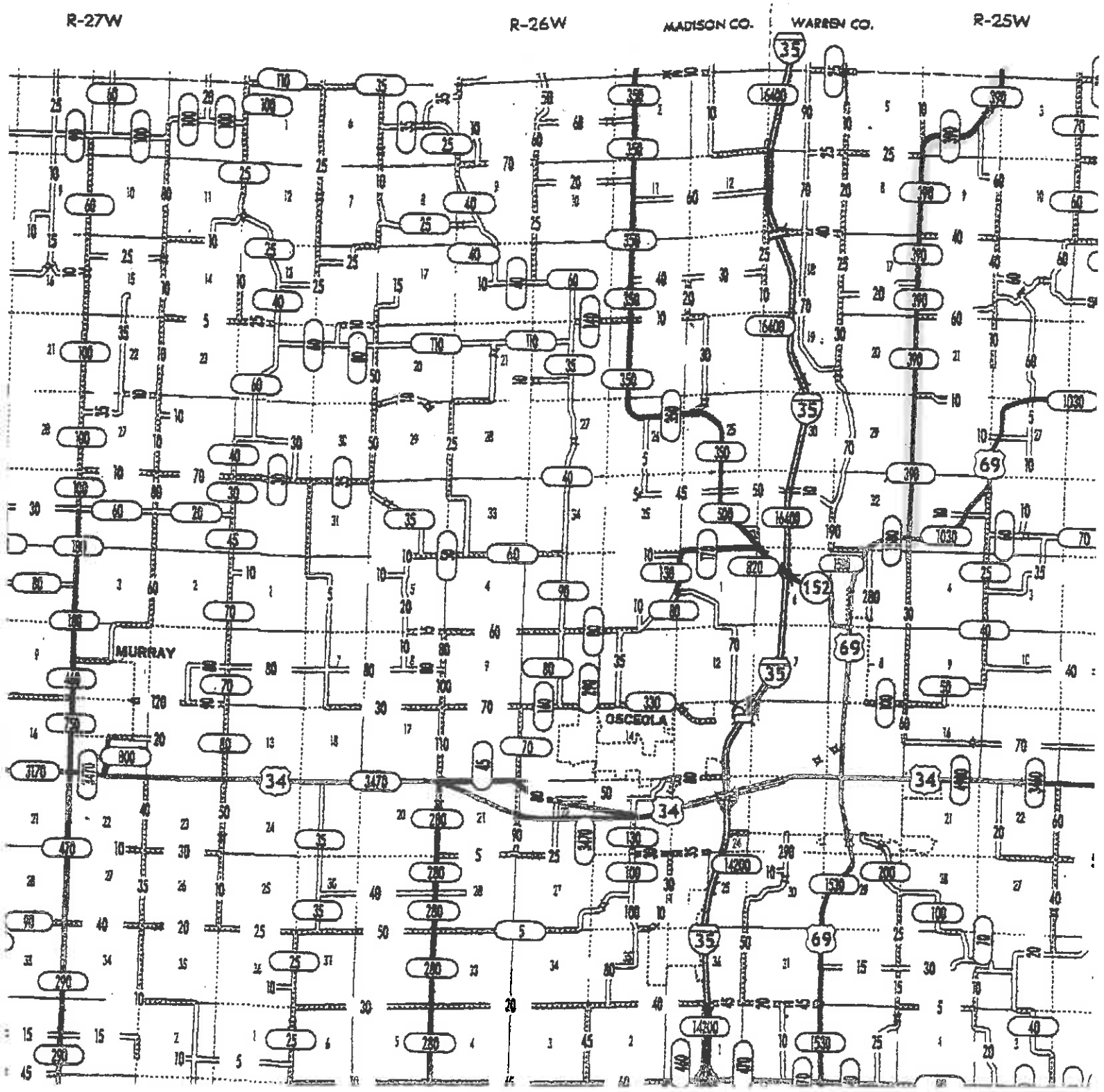
Cost Estimate - Clarke County Starline Paved Shoulder Project

HMA ST Base Course, 1/2" with a PG 58-28S. AC - 14 miles, 6' wide, 5' deep

Item	Units	Quantity	Price per Unit	Total
Materials				
	Tons	13,400	$50.00	$670,000
	tons AC	804	$400.00	$321,600
	cy Exc	6844	$15.00	$102,667
Mobilization				$100,000
Flaggers				$100,000
Rumble Strips				$100,000
Core Samples				$5,733
TOTAL				$1,400,000
SCHEDULE				
LET PROJECT BIDS IN March 2017				
COMPLETE CONSTRUCTION IN September 2017				
ANTICIPATED FUNDING				
TRANSPORTATION ALTERNATIVES PROGRAM GRANT				$100,000
TRANSPORTATION SAFETY IMPROVEMENTS GRANT				$500,000
OTHER GRANTS				$800,000
TOTAL				$1,400,000

E/J

2012 ANNUAL AVERAGE DAIL
2008 ANNUAL AVERAGE DAIL



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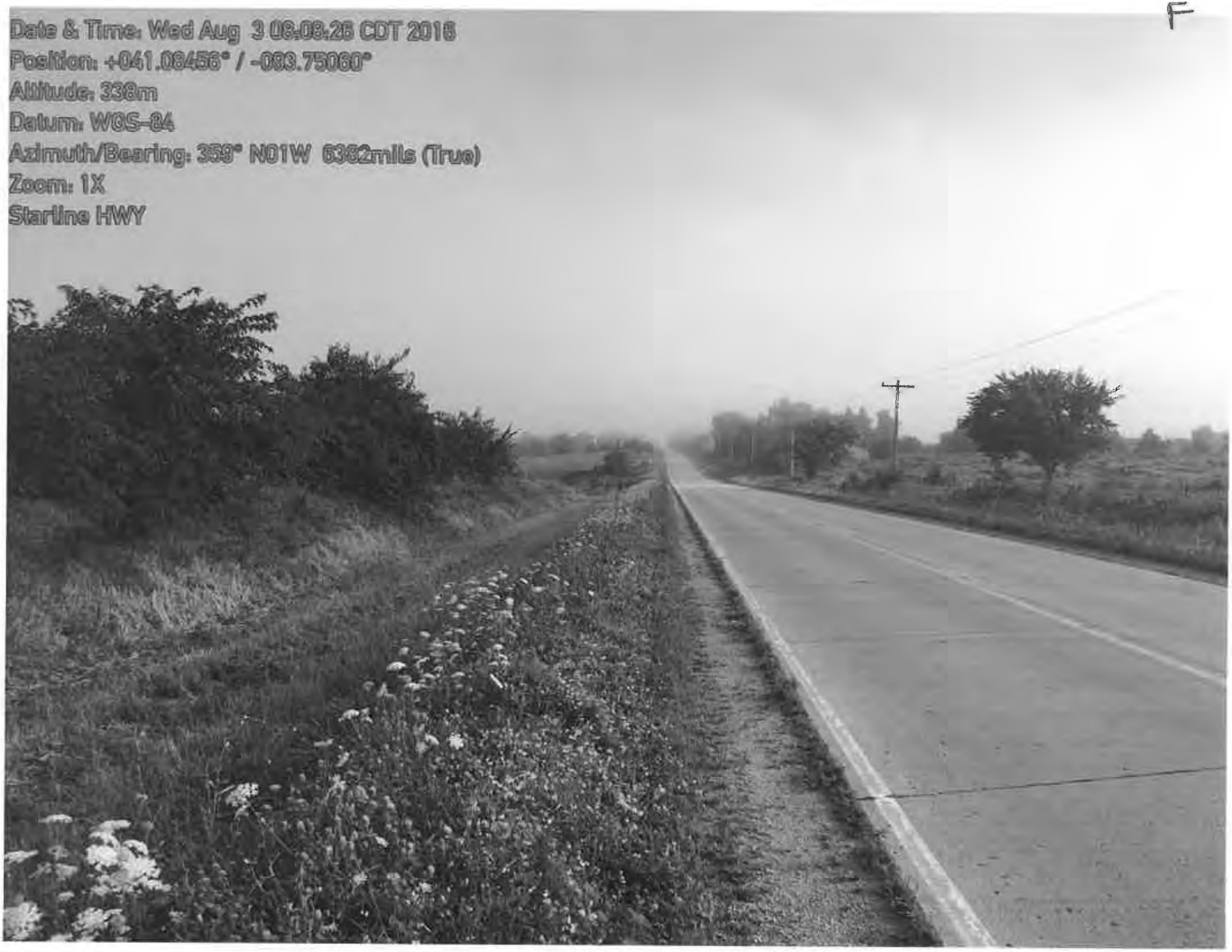
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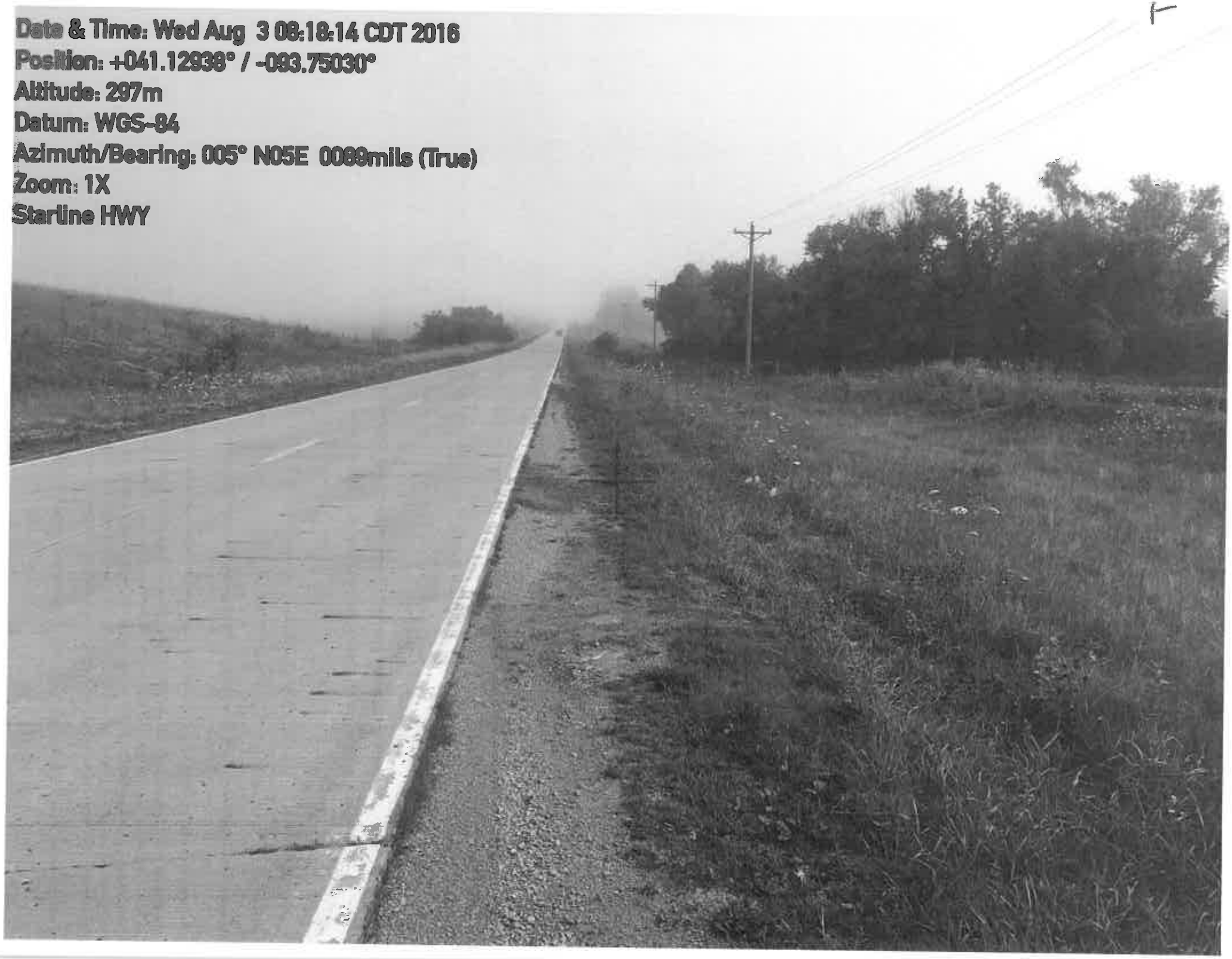
Azimuth/Bearing: 359° N01W 6362mils (True)
Zoom: 1X
Starline HWY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Zoom: 1X
Starline HWY

Date & Time: Wed Aug 3 08:23:19 CDT 2016
Position: +041.14891° / -093.74999°
Altitude: 321m
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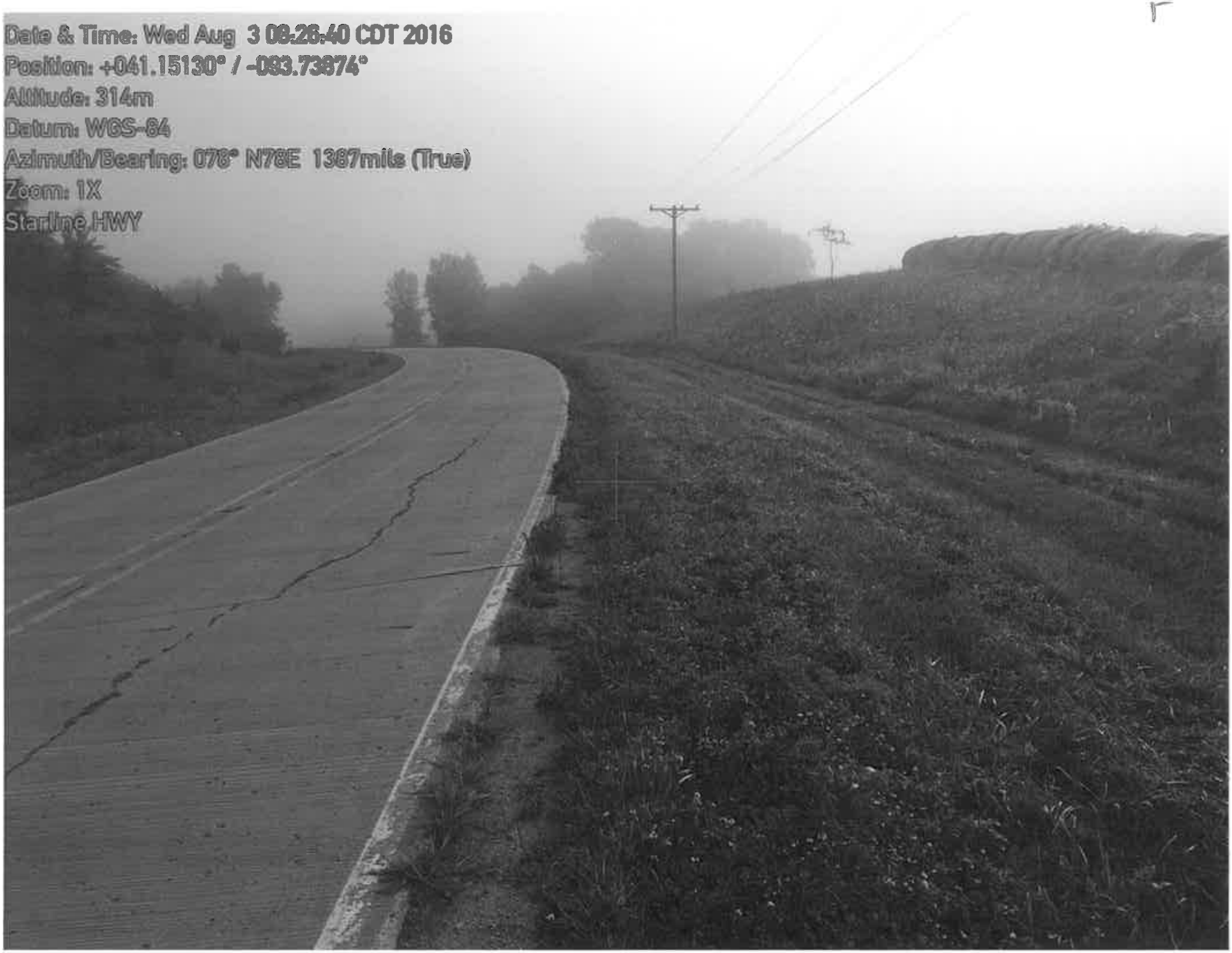
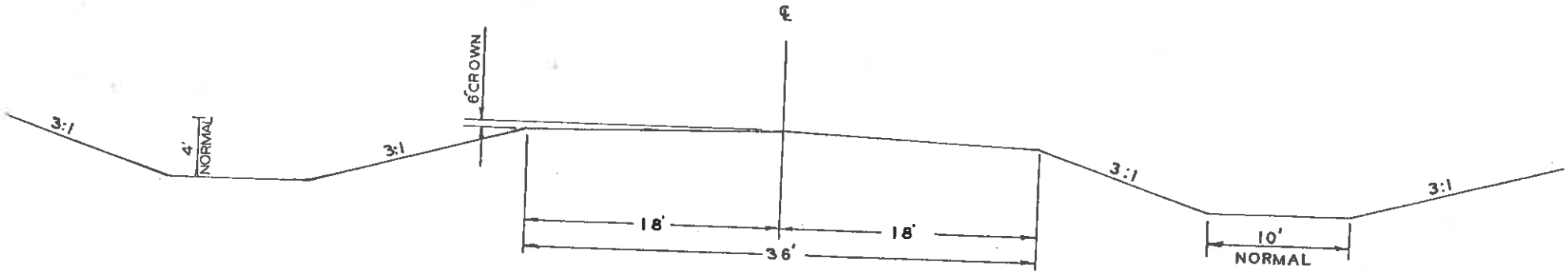
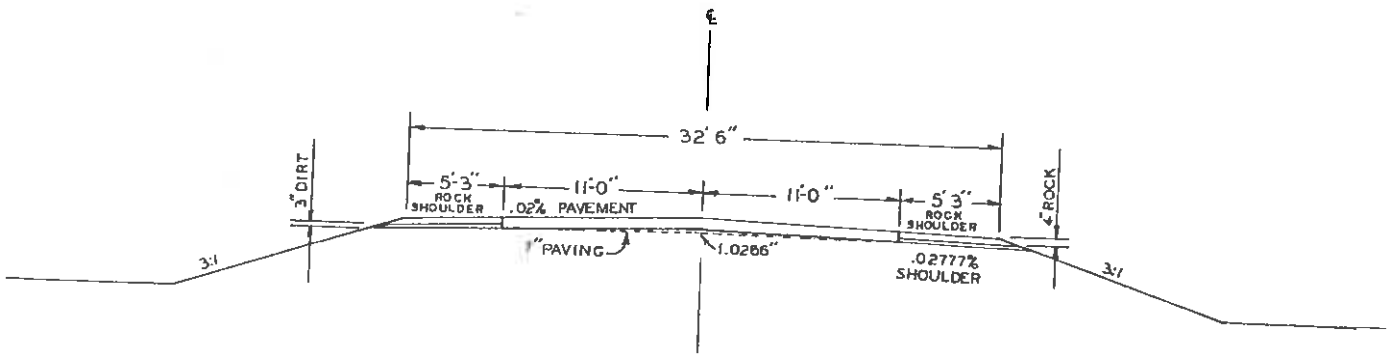
Azimuth/Bearing: 021° N21E 0373mils (True)
Zoom: 1X
Starline HWY


Date & Time: Wed Aug 3 08:26:40 CDT 2016
Position: +041.15130° / -093.73874°
Altitude: 314m
Datum: WGS-84
Azimuth/Bearing: 078° N78E 1387mils (True)
Zoom: 1X
Starline HWY

G



TYPICAL CROSS SECTION
FOR GRADING



TYPICAL CROSS SECTION
FOR FUTURE 22' PAVING

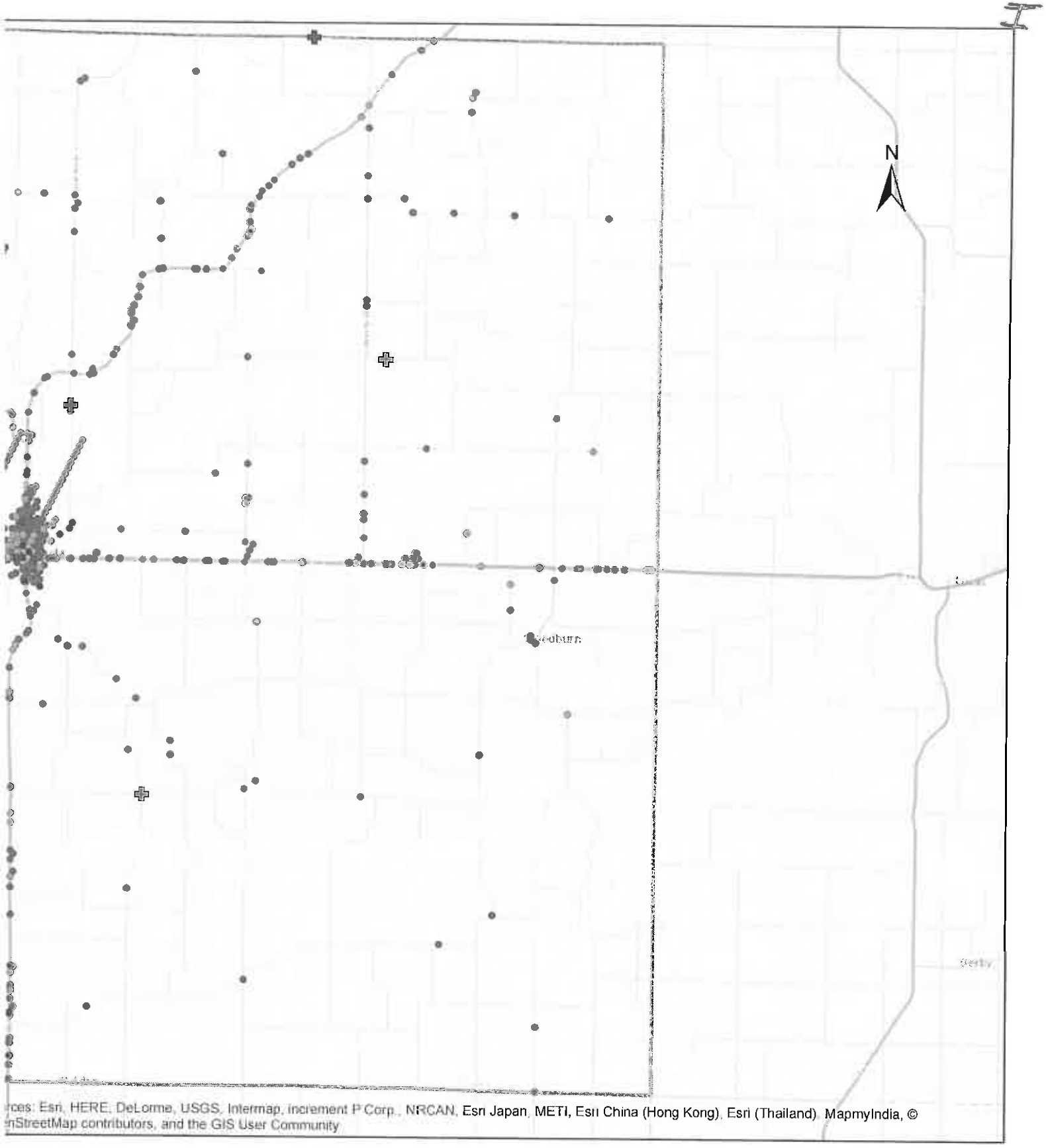
REMOVAL OF EXIST

1. STA. 238+48 ℄ :
CONC. BOX CULVE

2. STA. 196+36 ℄ 7
CONC. BOX CUL

~NOTE~
3" OF DIRT FOR SHOULDER FILL
TO BE [illegible]

P



ty, Iowa

RECEIVED
08/04/16

Disclaimer:
The information contained in this report was derived from the June 15, 2016 Iowa Department of Transportation crash database. If errors or odd cases are found, please communicate the case number or send a printed crash report to Michael Pawlovich, Iowa DOT, Office of Traffic and Safety, (Michael.Pawlovich@dot.iowa.gov, 515.239.1428). Since the database is actively being updated, edited, and reviewed, some of the fatality totals may differ from the Fatality Analysis Reporting System (FARS).

L

Rev. 5/14

Road Segment Benefit / Cost Safety Analysis

Iowa DOT Office of Traffic & Safety

County: CLARKE Prepared by: THOMAS B. ANDERSEN Date Prepared: Aug 8, 2016

Location: Clarke County highway No. R45/Starline Ave from Warren County Line South to US Highwat 69 (Approx 7

Improvement

Proposed Improvement(s): 6' paved shoulders on both sides of road and add edgeline rumble strips

$1,400,000 Estimated Improvement Cost, **EC**

$ - Other Annual Cost (after initial year), **AC**

$ - Present Value Other Annual Costs, **OC**

$$OC = \frac{AC}{INT}\left(1 - \frac{1}{(1+INT)^Y}\right)$$

20 Est. Improvement Life, years, **Y**

71 Crash Reduction Factor (integer), **CRF**

4.0% Discount Rate, **INT**

$ 1,400,000 Present Value All Costs, **COST** = EC + OC

Traffic Volume Data

Source: Iowa DOT 2012 Date of traffic count

Length (mi.)	Two-way veh/day	Description
7.00	390	
7.00	miles total	

2,730 Current Vehicle Miles / Day, **VM**

4,057 End of Life Veh. Miles / Day

996,450 Current Veh. Miles / Year, **AM**

24,211,114 Total Projected Veh. Miles Over Life of Project, **TVMT**

$$TVMT = \frac{AM}{-G}\left(1 - \left(\frac{1+G}{1}\right)^Y\right)$$

2.0% Projected Traffic Growth (0%-10%), **G**

Crash Data

2003 First full year --> 2007 Last full year 5.0 years, Time Period, **T**

Additional months values as of May 2014

2	Fatal Crashes →	1	Fatalities @	$4,500,000	$ 4,500,000
		2	Major Injuries @	$325,000	$ 650,000
8	Injury Crashes →	2	Minor Injuries @	$65,000	$ 130,000
		4	Possible Injuries @	$35,000	$ 140,000
6	Property Damage Only		(assumed cost per crash)	$7,400	$ 118,400
			-OR- enter all Property Costs of all crashes:		
16	Total Crashes, **TA**			Total $ Loss, **LOSS**	$ 5,538,400

3.20 Current Crashes / Year, **AA** = TA / T

$ 346,150 Cost per Crash, **AVCR** = LOSS / TA

77.8 Total Expected Crashes, **TCR** = CR x TVMT/10^8

2.27 Crashes Avoided First Year **AAR** = AA x CRF / 100

$ 786,453 Crash Costs Avoided in First Year, AAR x AVCR

55.2 Total Avoided Crashes, TCR x CRF/ 100

321.1 Crashes / HMVM, Crash Rate, **CR**

CR = TA x 10^8 / (AM x T)

$ 12,655,323 Present Value of Avoided Crashes, **BENEFIT**

$$BEN. = \frac{AVCR \times AAR}{(INT - G)}\left(1 - \left(\frac{1+G}{1+INT}\right)^Y\right)$$

Benefit / Cost Ratio

Benefit : Cost = $12,655,323 : $1,400,000 = **9.04** : 1

Application for TRAFFIC SAFETY FUNDS

GENERAL INFORMATION **DATE:** August 14, 2016

Location / Title of Project S Marion Street and 2nd Street W, Ottumwa, Iowa

Applicant City of Ottumwa

Contact Person Larry Seals Title Public Works Director

Complete Mailing Address 105 East Third Street
Ottumwa, Iowa 52501

Phone (641) 683-0680 (Area Code) E-Mail lseals@ci.ottumwa.ia.us

If more than one highway authority is involved in this project, please indicate and fill in the information below (use additional sheets if necessary).

Co-Applicant(s) _____

Contact Person _____ Title _____

Complete Mailing Address _____

_____

Phone _____ (Area Code) E-Mail _____

PLEASE COMPLETE THE FOLLOWING PROJECT INFORMATION:

Application Type

- Site Specific ☒
- Traffic Control Device ☐
- Safety Study ☐

Funding Amount

Total Safety Cost	$ 209,259
Total Project Cost	$ 209,259
Safety Funds Requested	$ 209,259

Does this project appear on a Safety Improvement Candidate List or is there a safety study recommendation for this project?
☐ Yes – Explain _____
☒ No

Rev. 6/16

APPLICATION CERTIFICATION FOR LOCAL GOVERNMENT

To the best of my knowledge and belief, all information included in this application is true and accurate, including the commitment of all physical and financial resources. This application has been duly authorized by the participating local government(s). I understand the attached resolution(s) binds the participating local government(s) to assume responsibility if any additional funds are committed, and to ensure maintenance of any new or improved city streets or secondary roads.

I understand that, although this information is sufficient to secure a commitment of funds, a firm contract between the applicant and the Department of Transportation is required prior to the authorization of funds.

Representing the City of Ottumwa

Signed: Tom X. Lazio — 7.19.16

Signature — Date Signed

Tom X. Lazio, Mayor

Typed Name

Attest: Amanda Valent — 7.19.16

Signature — Date Signed

Amanda Valent, City Clerk

Typed Name

RESOLUTION #189-2016

A RESOLUTION APPROVING THE TRANSPORTATION SAFETY IMPROVEMENT PROGRAM (TSIP) APPLICATION FOR INSTALLATION OF A MINI-ROUNDABOUT AT THE INTERSECTION OF SOUTH MARION STREET AND WEST SECOND STREET IN THE CITY OF OTTUMWA

WHEREAS, The City of Ottumwa entered a Professional Services Agreement with Shive Hattery Architecture and Engineering out of Cedar Rapids, Iowa, on May 31, 2016, to provide assistance and public education for the adoption of roundabouts within the City of Ottumwa; and,

WHEREAS, Shive Hattery presented Roundabout Education in correlation to how these will affect the City of Ottumwa on June 14, 2016; and,

WHEREAS, They have prepared the necessary TSIP Applications for the three roundabout locations within the City of Ottumwa for approval; and,

WHERAS, this resolution specifies the installation of a mini-roundabout at the intersection of South Marion Street and West Second Street; and,

WHEREAS, the improvements proposed to be installed will help reduce crashes and improve traffic operations within the City of Ottumwa.

NOW, THEREFORE, BE IT RESOLVED, BY THE CITY COUNCIL OF THE CITY OF OTTUMWA, IOWA THAT:

1. The Transportation Safety Improvement Program (TSIP) Application for the intersection of South Marion Street and West Second Street is hereby approved.
2. The City Council hereby commits the additional City funds necessary for construction of the project beyond any TSIP funding, and;
3. The City Council hereby commits to accepting and maintaining these improvements.

APPROVED, PASSED, AND ADOPTED, this 19th day of July 2016.

CITY OF OTTUMWA, IOWA

Tom X. Lazio

Tom X. Lazio, Mayor

ATTEST:

Amanda Valent

Amanda Valent, City Clerk

Resolution

S. Marion & W. Second Round-About Grant Application

Roll Call Number: 24

Resolution Number: 189-2016

Agenda Item Number: H-9

Date: 7/19/16

Council Member Streeby moved, seconded by Council Member Steves. The roll was called and the vote was as follows:

COUNCIL ACTION	AYES	NAYS	ABSTAIN	ABSENT
Dalbey	☑	☐	☐	☐
Meyers	☑	☐	☐	☐
Roe	☑	☐	☐	☐
Stevens	☑	☐	☐	☐
Streeby	☑	☐	☐	☐
Total	5	0	0	0

CERTIFICATE

I, AMANDA VALENT, City Clerk of said City, hereby certify that at a meeting of the City Council of said City of Ottumwa, Iowa held on the above date, among other proceedings, the above was adopted.

I, further certify this is a true and correct copy of Resolution No. 189 -20 16 adopted by the Ottumwa City Council and said original is on file in my office.

IN WITNESS WHEREOF, I have hereunto set my hand and affixed my seal this 21st day of July, 20 16.

Amanda Valent City Clerk

Background

The City of Ottumwa is planning to make enhancements to the intersection of S Marion Street and 2nd Street W to address running stop signs on S Marion. Last year, 2nd Street was converted from a one-way street to two-way. This change to the corridor had little to no effect on the safety of this intersection and crashes continue to occur as will be discussed in the crash history section.

S Marion Street is a two-lane urban roadway with parking on both sides of the street and a posted speed of 25 MPH. S Marion is the minor street and is currently stop controlled. 2nd Street W is the major street and operates under free-flow conditions. The posted speed limit is 25 MPH and also has parking along both side of the street. The most frequent crash type is a failure of the S Marion Street motorists to yield to the vehicles on 2nd Street.

The majority of the traffic is passenger vehicles and truck-turning traffic is minimal. Trucks (WB-50 and above) have alternative routes which makes the design vehicle for this intersection single unit trucks and school buses. The corridor was looked at to determine the best solution for slowing down vehicles while not having a negative impact on traffic operations.Traffic signals were evaluated for this intersection and none of the eight warrants were met as required by MUTCD.

Proposed Improvements

The proposed intersection improvements include constructing a mini roundabout which will serve as a traffic calming measure. Splitter islands will be installed to reduce the intersection speeds and notify motorist of the intersection. The splitter islands will be raised to allow for pedestrian refuges and additional raised medians will be added to reduce crosswalk lengths and additional deflection where possible. The central island will be fully traversable and constructed with HMA or other materials to provide a contrast in color. The central island will be raised 3-4” to deter motorists from traveling through the island and will allow for any large trucks or buses to navigate the intersection. Pavement markings will be modified in the vicinity of the intersection reduce the on-street parking closest to the intersection. Included in the improvements is intersection lighting to illuminate the approaches and pedestrian crossings. The lighting will be cut-off to reduce the impact to adjacent property owners. Refer to **Section G** for proposed improvements. Prior to the final recommendation a presentation was made to City Council

to discuss the proposed solution which was well received. The need to slow motorists down along this corridor is important and a roundabout will provide this result.

Crash history for this intersection was collected from Iowa DOT CMAT software and has been evaluated from 2005 to 2015 to identify trends and safety issues with the current geometry. In the past 10 years 32 crashes have been reported at this location resulting in 7 minor and 10 possible injuries. 29 of the 32 (90%) were broadside crashes. Refer to **Section I** for crash history and summary. Photos of recent accidents are also included in this application to show the severity of the crashes at this location.

The proposed improvements will provide users with an intersection that will reduce speeds, provide accommodations for pedestrians and bicyclists, and will aid in providing acceptable gaps. The proposed improvements are expected to result in a safer intersection and reduce the number of injury crashes per year.

SHIVEHATTERY
ARCHITECTURE + ENGINEERING

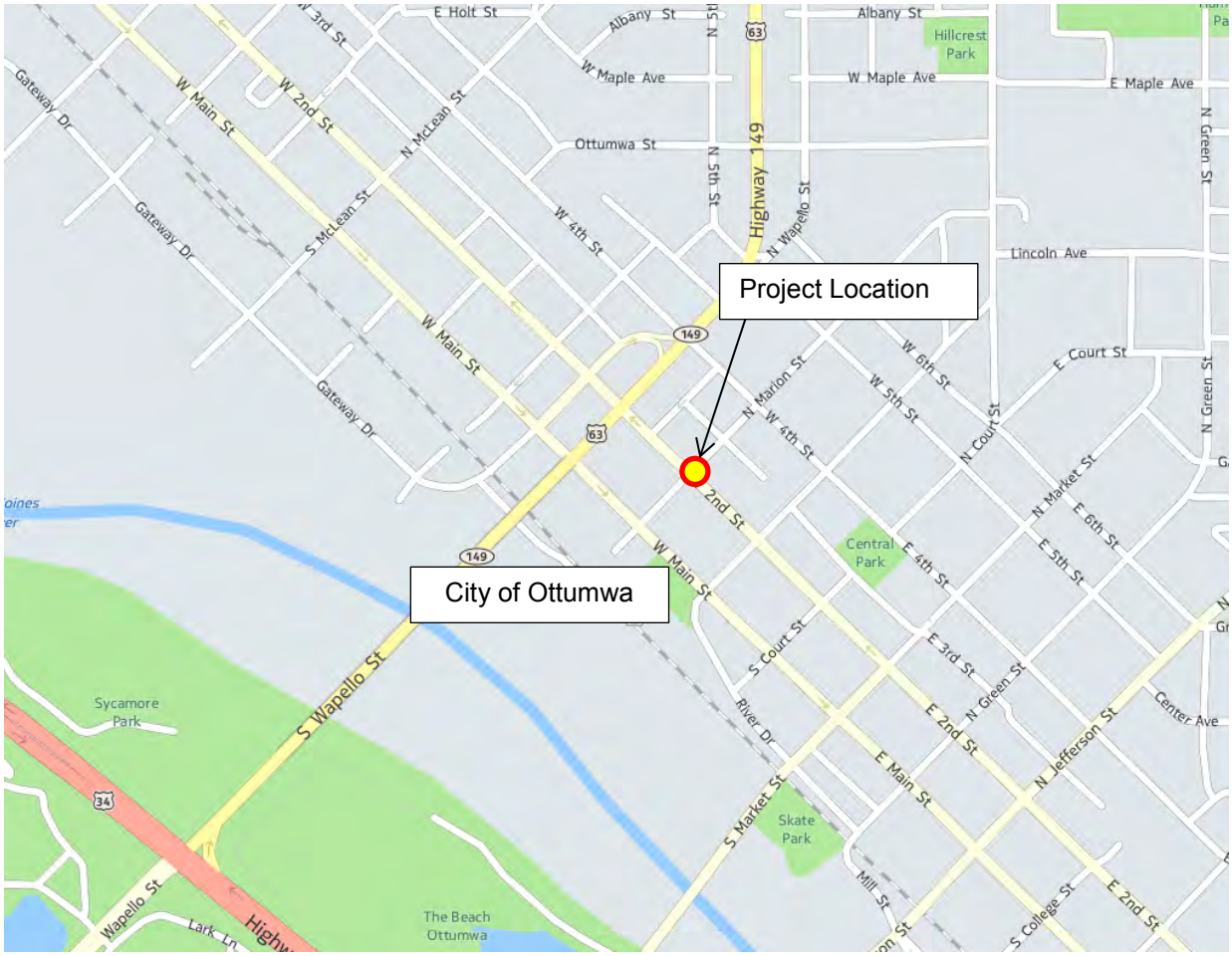
Proposed Public Improvements - Mini-Roundabout
S Marion Street & 2nd Street W

Ottumwa, Iowa
Engineer's Rough Order Magnitude of Cost
Estimate of Quantities - August 14, 2016

Item No	Description	Unit	Unit Price	Quantity	Cost
1	Removal of Pavement	SY	$ 10	977	$ 9,770
2	Removal of Sidewalk	SY	$ 8	450	$ 3,600
3	Removal of Light Pole	EA	$ 200	1	$ 200
4	Hydrant Relocation	EA	$ 500	2	$ 1,000
5	PCC Patch, 10"	SY	$ 80	100	$ 8,000
6	PCC Colored - Median & Crosswalk	SY	$ 90	525	$ 47,250
7	PCC Sidewalk, 4"	SY	$ 35	300	$ 10,500
8	PCC Sidewalk Ramp	SY	$ 50	52	$ 2,600
9	Granular Subbase, 6"	SY	$ 7	977	$ 6,839
10	Storm Improvements	LS	$ 20,000	1	$ 20,000
11	Pavement Markings and Signage	LS	$ 5,000	1	$ 5,000
12	Street Lighting	EA	$ 8,000	8	$ 64,000
13	Erosion Control & Administration	LS	$ 500	1	$ 500
14	Construction Survey	LS	$ 8,000	1	$ 8,000
15	Traffic Control	LS	$ 12,000	1	$ 12,000
16	Mobilization	LS	$ 10,000	1	$ 10,000
	Rough Order of Magnitude Construction Cost				$ 209,259

Improvements to the 2nd Street and Marion Street Intersection which are to be funded through Traffic Safety Improvement Fund. The schedule proposed for the safety improvements is as follows:

- **August 2016** – Submit for 2016 TSIP Funds
- **September 2016 – January 2017** – Proceed with design of improvements
- **December 2016** – TSIP Funds are awarded
- **February 2017** –Let intersection project
- **Summer 2017** – Construction begins
- **July 2017** –TSIP funds are available for the 2nd Street and Marion Street Intersection Improvements
- **August 2017** – Construction complete for mini roundabout.


Project Location
City of Ottumwa
E Holt St
Albany St
Albany St
Hillcrest Park
W Maple Ave
W Maple Ave
E Maple Ave
Ottumwa St
Highway 149
N Wapello St
N Green St
Lincoln Ave
Gateway Dr
W Main St
W 2nd St
N McLean St
S McLean St
W 4th St
N 5th St
W 6th St
E Court St
N Marion St
W 5th St
N Court St
N Market St
E 6th St
E 5th St
E 4th St
Central Park
2nd St
W Main St
S Court St
E 3rd St
N Green St
E 2nd St
N Jefferson St
Center Ave
River Dr
E Main St
S Market St
Skate Park
Mill St
S College St
E 2nd St
S Wapello St
Sycamore Park
Wapello St
Lark Ln
The Beach Ottumwa

Looking Northeast from Marion Street NE Bound Approach

Looking Southeast from 2nd Street SE Bound Approach

Looking Northwest from 2nd Street NW Bound Approach*

Looking Southwest from Marion Street SW Bound Approach

*Source: Google®

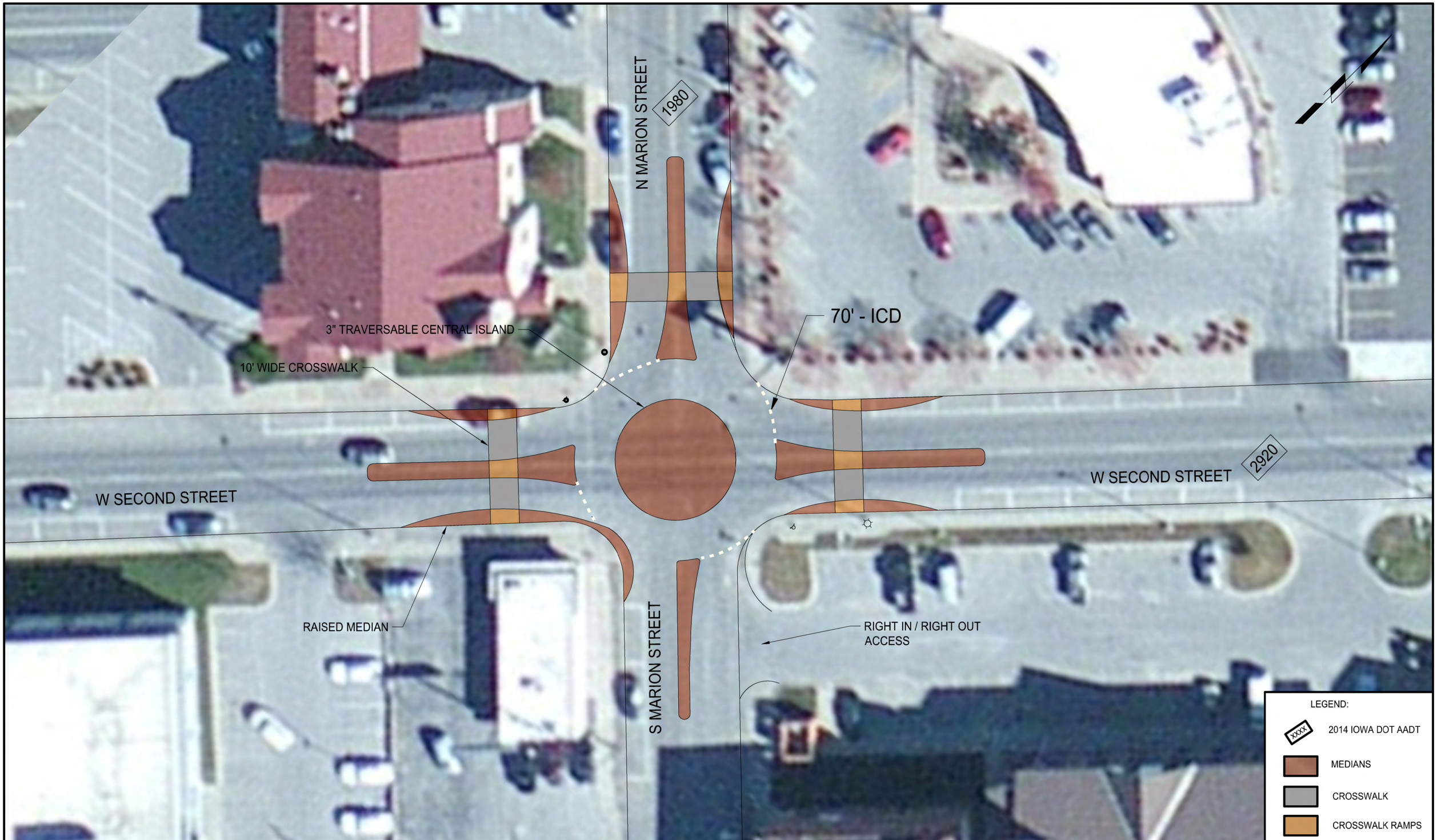
Broadside Collision: 6/18/2015 (1)

Broadside Collision: 6/18/2015 (2)

Broadside Collision: 6/18/2015 (3)

Broadside Collision: Date Unknown (1)

Broadside Collision: Date Unknown (2)



SHIVEHATTERY
ARCHITECTURE + ENGINEERING

OTTUMWA
CITY OF BRIDGES...RIVER OF OPPORTUNITY

S MARION STREET AND W SECOND STREET
OTTUMWA, IOWA

08-14-2016

2162430

ROUNDABOUT IMPROVEMENTS CONCEPT

SCALE
0 30 60
SCALE IN FEET

EXHIBIT: G

Project Location
Ottumwa
Google earth

Iowa Department of Transportation

Major Cause Summary

0

Report Version 1.1 Jan 2005

Analysis Years: 2006 [4], 2007 [3], 2008 [3], 2009 [1], 2010 [3], 2011 [3], 2012 [3], 2013 [2], 2014 [2], 2015 [8]

Crash Summary:

Fatal	-
Major Injury	-
Minor Injury	7
Possible/Unknown	10
PDO	15
Total Crashes	32

Injury Summary:

Fatal	-
Major Injury	-
Minor Injury	11
Possible	13
Unknown	-
Total Injuries	24

TOT Property Damage: $161,379

AVG Property Damage: $5,043

Surface Condition Summary:

Dry	28
Wet	2
Ice	-
Snow	2
Slush	-
Sand/Dirt/Oil/Gravel	-
Water	-
Other	-
Unknown	-
Not Reported	-
Total Crashes	32

Major Cause Summary:

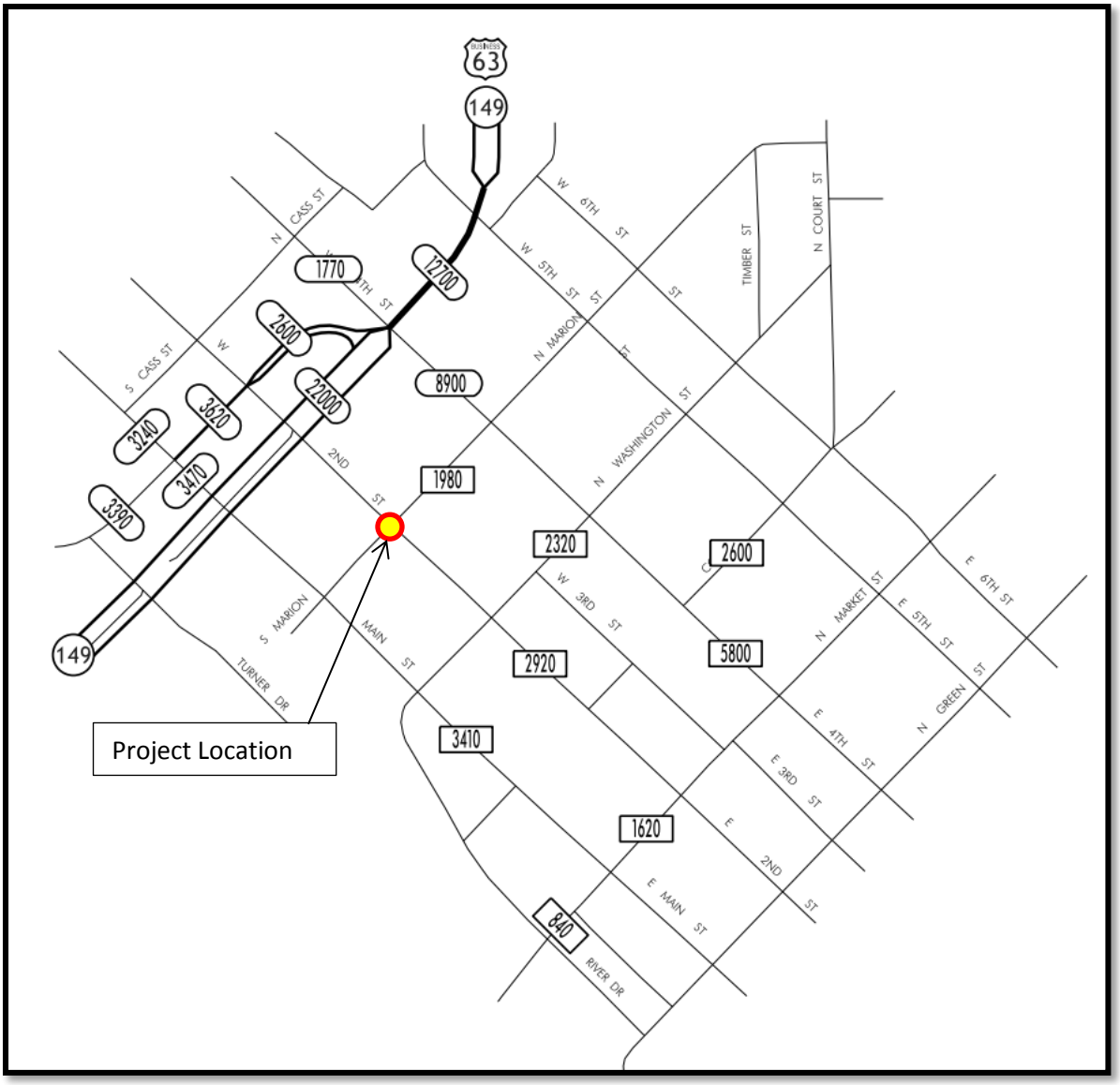
	Animal		Improper Backing
	Ran Traffic Signal		Illegally Parked/Unattended
12	Ran Stop Sign		Swerving/Evasive Action
	Crossed Centerline		Over-Correcting/Over-Steering
	FTYROW: At Uncontrolled Intersection		Downhill Runaway
	FTYROW: Making Right Turn on Red Signal		Equipment Failure
15	FTYROW: From Stop Sign		Separation of Units
	FTYROW: From Yield Sign		Ran Off Road - Right
	FTYROW: Making Left Turn		Ran Off Road - Straight
	FTYROW: From Driveway		Ran Off Road - Left
	FTYROW: From Parked Position		Lost Control
	FTYROW: To Pedestrian		Inattentive/Distracted By: Passenger
	FTYROW: Other (explain in narrative)	1	Inattentive/Distracted By: Use of Phone or Other
	Traveling Wrong Way or on Wrong Side of Rd		Inattentive/Distracted By: Fallen Object
	Driving Too Fast for Conditions		Inattentive/Distracted By: Fatigued/Asleep
	Exceeded Authorized Speed		Other: Vision Obstructed
1	Made Improper Turn		Oversized Load/ Oversized Vehicle
	Improper Lane Change		Cargo/Equipment Loss or Shift
	Followed Too Close		Other: Other Improper Action
	Disregarded Railroad Signal	2	Unknown
	Disregarded Warning Sign	1	Other: No Improper Action
	Operating Vehicle in Reckless/Aggressive Manner		None Indicated

Selection Filter:

((YEAR <> 2016))

Analyst:

Notes:



2014 Iowa DOT Traffic Map

Road Name	2014 Iowa DOT AADT
Marion Street	1980
2nd Street	2920

Intersection or Spot Benefit / Cost Safety Analysis

Rev. 5/14

Iowa DOT Office of Traffic & Safety

County: Wapello | Prepared by: Shive-Hattery | Date Prepared: Aug 14, 2016

Intersection: S Marion & 2nd Street W - Ottumwa, Iowa

Improvement

Proposed Improvement(s): Conversion to Mini Roundabout

Existing 2-way Stop at 4-way intersection

$ 209,259	Estimated Improvement Cost, **EC**	20	Est. Improvement Life, years, **Y**
	Other Annual Cost (after initial year), **AC**	65	Crash Reduction Factor (integer), **CRF**
$ -	Present Value Other Annual Costs, **OC**	4.0%	Discount Rate (time value of $), **INT**
		$ 209,259	Present Value Cost, **COST** = EC + OC

$$OC = \frac{AC}{INT}\left(1 - \frac{1}{(1+INT)^Y}\right)$$

Traffic Volume Data

Source: Iowa DOT | 2014 Date of traffic count

Daily Entering Vehicles by Approach (or AADT / 2)

990

1,460 → ← 1,460

990

1,788,500 Current Annual Entering Veh., **AEV** = DEV * 365

5,979 veh / day, Final Year DEV, **FDEV**

39.38 MEV, Total Million Entering Veh. Over life of Project, **TMEV**

1.0% Projected Traffic Growth (0%-10%), **G**

4,900 Current Daily Entering Vehicles, **DEV**

$$TMEV = \frac{AEV}{-G}\left(1 - \left(\frac{1+G}{1}\right)^Y\right) \Big/ 10^6$$

Crash Data

2006 First full year --> 2015 Last full year 10.0 years, Time Period, **T**

Additional months

values as of May 2014

0	Fatal Crashes →	0	Fatalities @	$4,500,000	$ -
		0	Major Injuries @	$325,000	$ -
17	Injury Crashes →	11	Minor Injuries @	$65,000	$ 715,000
		13	Possible Injuries @	$35,000	$ 455,000
15	Property Damage Only		(assumed cost per crash)	$7,400	$ 236,800
		-OR-	enter all Property Costs of all crashes:		
32	Total Crashes, **TA**			Total $ Loss, **LOSS**	$ 1,406,800

3.20	Current Crashes / Year, **AA** = TA / T	1.79	Crashes / MEV, Crash Rate, **CR**
$ 43,963	Cost per Crash, **AVC** = LOSS / TA		CR = TA x 10^6 / (DEV x 365 x T)
70.5	Total Expected Crashes, **TECR** = CR x TMEV	$ 1,350,663	Present Value of Avoided
2.08	Crashes Avoided First Year **AAR** = AA x CRF / 100		Crashes, **BENEFIT**
$ 91,442	Crash Costs Avoided in First Year, AAR x AVC		
45.8	Total Avoided Crashes, TECR x CRF/ 100		

$$BEN. = \frac{AVC \times AAR}{(INT - G)}\left(1 - \left(\frac{1+G}{1+INT}\right)^Y\right)$$

Benefit / Cost Ratio

Benefit : Cost = $1,350,663 : $209,259 = **6.45** : 1

Application for TRAFFIC SAFETY FUNDS

GENERAL INFORMATION **DATE:** August 14, 2016

Location / Title of Project: North Ferry Street & Albia Road - Ottumwa, Iowa

Applicant: City of Ottumwa

Contact Person: Larry Seals Title: Public Works Director

Complete Mailing Address: 105 East Third Street
Ottumwa, Iowa 52501

Phone: (641) 683-0680 (Area Code) E-Mail: lseals@ci.ottumwa.ia.us

If more than one highway authority is involved in this project, please indicate and fill in the information below (use additional sheets if necessary).

Co-Applicant(s) _____

Contact Person _____ Title _____

Complete Mailing Address _____

Phone _____ (Area Code) E-Mail _____

PLEASE COMPLETE THE FOLLOWING PROJECT INFORMATION:

Application Type

- Site Specific ☒
- Traffic Control Device ☐
- Safety Study ☐

Funding Amount

Total Safety Cost	$ 719,075
Total Project Cost	$ 719,075
Safety Funds Requested	$ 500,000

Does this project appear on a Safety Improvement Candidate List or is there a safety study recommendation for this project?
☐ Yes – Explain _____
☒ No

Rev. 6/16

APPLICATION CERTIFICATION FOR LOCAL GOVERNMENT

To the best of my knowledge and belief, all information included in this application is true and accurate, including the commitment of all physical and financial resources. This application has been duly authorized by the participating local government(s). I understand the attached resolution(s) binds the participating local government(s) to assume responsibility if any additional funds are committed, and to ensure maintenance of any new or improved city streets or secondary roads.

I understand that, although this information is sufficient to secure a commitment of funds, a firm contract between the applicant and the Department of Transportation is required prior to the authorization of funds.

Representing the City of Ottumwa

Signed: Tom X. Lazio 7.19.16

Signature Date Signed

Tom X. Lazio, Mayor

Typed Name

Attest: Amanda Valent 7.19.16

Signature Date Signed

Amanda Valent, City Clerk

Typed Name

RESOLUTION #190-2016

A RESOLUTION APPROVING THE TRANSPORTATION SAFETY IMPROVEMENT PROGRAM (TSIP) APPLICATION FOR INSTALLATION OF A ROUNDABOUT AT THE INTERSECTION OF NORTH FERRY STREET AND ALBIA ROAD IN THE CITY OF OTTUMWA

WHEREAS, The City of Ottumwa entered a Professional Services Agreement with Shive Hattery Architecture and Engineering out of Cedar Rapids, Iowa, on May 31, 2016, to provide assistance and public education for the adoption of roundabouts within the City of Ottumwa; and,

WHEREAS, Shive Hattery presented Roundabout Education in correlation to how these will affect the City of Ottumwa on June 14, 2016; and,

WHEREAS, They have prepared the necessary TSIP Applications for the three roundabout locations within the City of Ottumwa for approval; and,

WHERAS, this resolution specifies the installation of a roundabout at the intersection of North Ferry Street and Albia Road; and,

WHEREAS, the improvements proposed to be installed will help reduce crashes and improve traffic operations within the City of Ottumwa.

NOW, THEREFORE, BE IT RESOLVED, BY THE CITY COUNCIL OF THE CITY OF OTTUMWA, IOWA THAT:

1. The Transportation Safety Improvement Program (TSIP) Application for the intersection of North Ferry Street and Albia Road is hereby approved.
2. The City Council hereby commits the additional City funds necessary for construction of the project beyond any TSIP funding, and;
3. The City Council hereby commits to accepting and maintaining these improvements.

APPROVED, PASSED, AND ADOPTED, this 19th day of July 2016.

CITY OF OTTUMWA, IOWA

Tom X. Lazio, Mayor

ATTEST:

Amanda Valent, City Clerk

Resolution

N Ferry & Albia Rd. Round-About Grant Application

Roll Call Number: 24

Resolution Number: 190-2016

Agenda Item Number: H-10

Date: 7/19/16

Council Member Meyers moved, seconded by Council Member Roe. The roll was called and the vote was as follows:

COUNCIL ACTION	AYES	NAYS	ABSTAIN	ABSENT
Dalbey	☑	☐	☐	☐
Meyers	☑	☐	☐	☐
Roe	☑	☐	☐	☐
Stevens	☑	☐	☐	☐
Streeby	☑	☐	☐	☐
Total	5	0	0	0

CERTIFICATE

I, AMANDA VALENT, City Clerk of said City, hereby certify that at a meeting of the City Council of said City of Ottumwa, Iowa held on the above date, among other proceedings, the above was adopted.

I, further certify this is a true and correct copy of Resolution No. 190 -20 16 adopted by the Ottumwa City Council and said original is on file in my office.

IN WITNESS WHEREOF, I have hereunto set my hand and affixed my seal this 21st day of July, 20 16.

Amanda Valent City Clerk

Background

The City of Ottumwa is planning to make improvements to the intersection of North Ferry Street and Albia Road. It is a three-way intersection that is traffic signal controlled. North Ferry Street is a four-lane collector road with a right-lane bypass in the southbound direction and northbound left-turn lane. Albia Road is a three-lane cross section, (two-lane road with a left-turn lane). North of the intersection, North Ferry Street converts to Wapello Road, which is a four-lane divided corridor. The speed limits of both roadways is 30 mph. See **Exhibit H** for existing conditions. This intersection was identified by City Staff as a top 10 intersection to address safety concerns. Observations of speeds and failing to yield at driveways has also lead to a number of near miss accidents. This area is continuing to development and as new development occurs, sidewalks and trails will be installed which will lead to increased number of pedestrians.

Crash History

Crash history for this intersection was collected from Iowa DOT CMAT software and was evaluated from 2007 to 2015 to identify trends and safety issues with the current geometry. In the past 8.3 years 18 crashes have been reported, resulting in 3 minor injuries, and 2 possible injuries. The causes of the majority of crashes are failure to yield from a driveway, failure to stop at traffic signal/stop sign and driving too fast. The driveway that collisions have been reported at is the Family Video driveway where the right-turn bypass, driveway, and Albia Road all converge in the same location. Refer to **Section I** for crash history summary provided by CMAT, a crash analysis tool provided and updated by the Iowa DOT.

Proposed Improvements

Due to the amount and types of crashes at the intersection, it is proposed to construct a roundabout to increase safety. The roundabout will slow down traffic, which will reduce the amount of crashes due to excessive speeding. The amount of broadside and sideswipe collisions occurring at the bypass lane is also expected to be reduced due to the proposed geometry. Collisions caused by failure to

yield at driveways are expected to decrease as the roundabout provides one exit from North Ferry Street to Albia Road where it conflicts with the Family Video driveway.

Conclusion

The proposed improvements will provide users with an intersection that will reduce speeds, aid in acceptable gaps and reduce the number of conflict points at the intersection. The proposed improvements are expected to result in a safer intersection and reduce the number of injury crashes per year. With the addition of sidewalk improvements, this is another benefit to installing a roundabout to allow for a safe crossing of the intersection.

SHIVEHATTERY
ARCHITECTURE + ENGINEERING

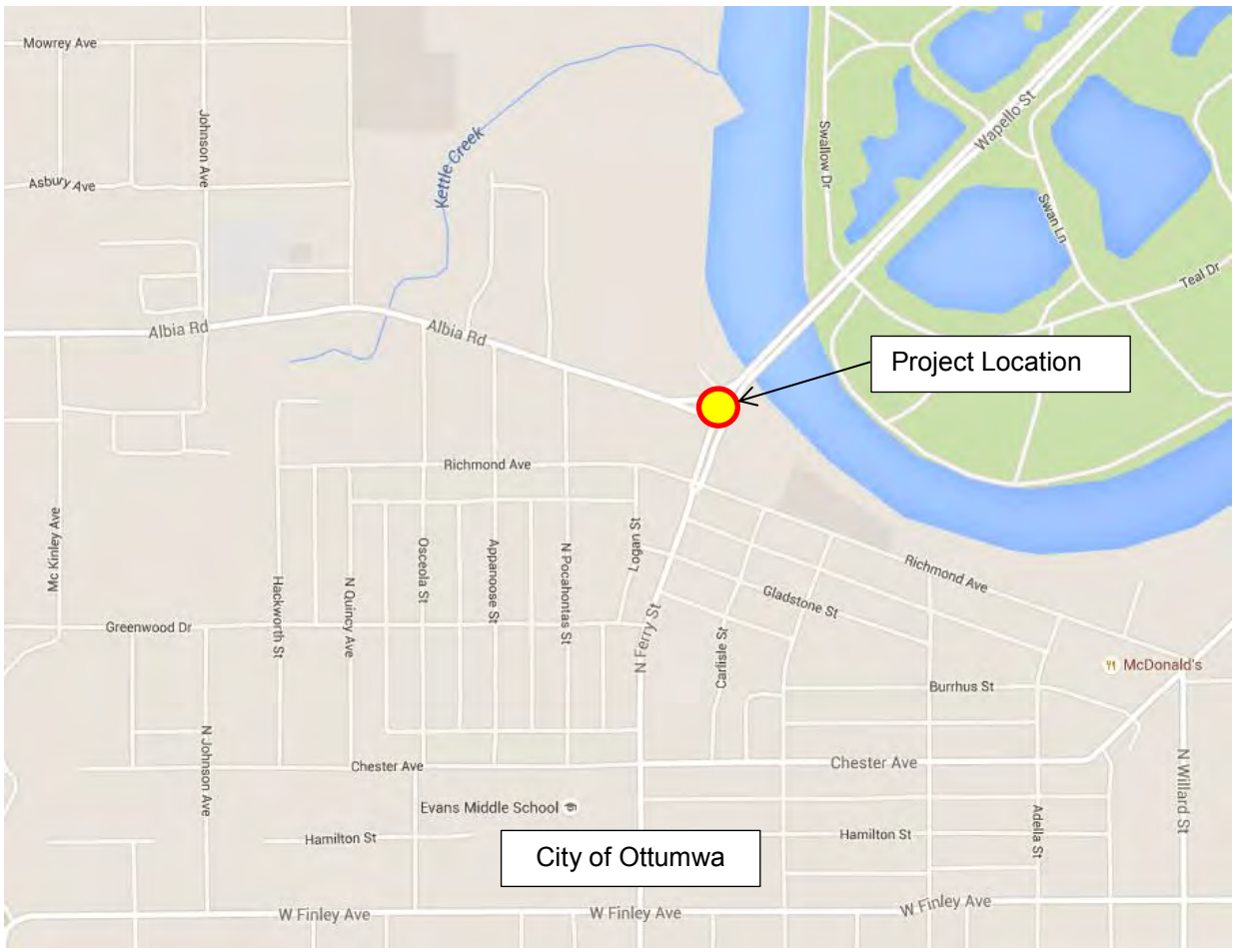
Proposed Public Improvements - Modern Roundabout
North Ferry Street and Albia Road

Ottumwa, Iowa
Engineer's Rough Order Magnitude of Cost
Estimate of Quantities - August 14, 2016

Item No	Description	Unit	Unit Price	Quantity	Cost
1	Removal of Pavement	SY	$ 8	5,380	$ 43,040
2	Removal of Tree	EA	$ 200	10	$ 2,000
3	Removal of Traffic Signal	LS	$ 30,000	1	$ 30,000
4	Unclassified Excavation & Embankment	CY	$ 8	900	$ 7,200
5	PCC, 10"	SY	$ 55	5,025	$ 276,375
6	PCC, Truck Apron	SY	$ 90	275	$ 24,750
7	PCC Driveway, 6"	SY	$ 35	80	$ 2,800
8	Granular Subbase, 6"	SY	$ 7	5,380	$ 37,660
9	Storm Sewer	LF	$ 85	750	$ 63,750
10	Subdrain, 6"	LF	$ 15	1,000	$ 15,000
11	Storm Sewer Intake, RA-3	EA	$ 2,500	4	$ 10,000
12	Storm Sewer Intake, RA-5	EA	$ 3,500	4	$ 14,000
13	Imported Top Soil	CY	$ 30	1,350	$ 40,500
14	Hydroseeding with Liquid Mulch Binder	ACRE	$ 4,000	1	$ 4,000
15	Pavement Markings and Signage	LS	$ 15,000	1	$ 15,000
16	Street Lighting	EA	$ 4,000	8	$ 32,000
17	Erosion Control & Administration	LS	$ 1,000	1	$ 1,000
18	Construction Survey	LS	$ 10,000	1	$ 10,000
19	Traffic Control	LS	$ 50,000	1	$ 50,000
20	Mobilization	LS	$ 40,000	1	$ 40,000
	Rough Order of Magnitude Construction Cost				$ 719,075

Improvements to the North Ferry and Albia Road Intersection, which are to be funded through Traffic Safety Improvement Fund. The schedule proposed for the safety improvements is as follows:

- **August 2016** – Submit for 2016 TSIP Funds
- **October 2016 – October 2017** – Proceed with design of improvements
- **December 2016** – TSIP Funds are awarded
- **July 2017** –TSIP funds are available for the intersection improvements
- **January 2018** –Let intersection project
- **Spring 2018** – Construction begins
- **November 2018** – Construction complete for intersection improvements.


Mowrey Ave
Asbury Ave
Johnson Ave
Kettle Creek
Swallow Dr
Wapello St
Swan Ln
Teal Dr
Albia Rd
Albia Rd
Project Location
Richmond Ave
Mc Kinley Ave
Hackworth St
N Quincy Ave
Osceola St
Appanoose St
N Pocahontas St
Logan St
N Ferry St
Carlisle St
Gladstone St
Richmond Ave
Greenwood Dr
McDonald's
Burrhus St
N Johnson Ave
Chester Ave
Chester Ave
N Willard St
Evans Middle School
Hamilton St
Hamilton St
Adella St
City of Ottumwa
W Finley Ave
W Finley Ave
W Finley Ave

Looking North on North Ferry Street (NB Approach)*

Looking South on Wapello Street (SB Approach), Right-Turn Bypass*

*Source: Google®

Looking North on North Ferry Street (SB Approach)*

Looking East on Albia Road (EB Approach)*

*Source: Google®

SHIVEHATTERY
ARCHITECTURE + ENGINEERING

OTTUMWA
CITY OF BRIDGES...RIVER OF OPPORTUNITY

NORTH FERRY STREET & ALBIA ROAD
OTTUMWA, IOWA

08-14-2016

2162430

ROUNDABOUT IMPROVEMENTS CONCEPT

SCALE
0 25 50
SCALE IN FEET

EXHIBIT: G

Project Location
Google earth

Iowa Department of Transportation

Major Cause Summary

Report Version 1.1 Jan 2005

Analysis Years: 2007 [4], 2009 [3], 2011 [2], 2012 [2], 2013 [3], 2014 [3], 2015 [1]

Crash Summary:

Fatal	-
Major Injury	-
Minor Injury	3
Possible/Unknown	1
PDO	14
Total Crashes	18

Injury Summary:

Fatal	-
Major Injury	-
Minor Injury	3
Possible	2
Unknown	-
Total Injuries	5

TOT Property Damage: $59,850

AVG Property Damage: $3,325

Surface Condition Summary:

Dry	12
Wet	4
Ice	1
Snow	1
Slush	-
Sand/Dirt/Oil/Gravel	-
Water	-
Other	-
Unknown	-
Not Reported	-
Total Crashes	18

Major Cause Summary:

	Animal		Improper Backing
2	Ran Traffic Signal		Illegally Parked/Unattended
	Ran Stop Sign		Swerving/Evasive Action
	Crossed Centerline		Over-Correcting/Over-Steering
	FTYROW: At Uncontrolled Intersection		Downhill Runaway
	FTYROW: Making Right Turn on Red Signal		Equipment Failure
2	FTYROW: From Stop Sign		Separation of Units
	FTYROW: From Yield Sign		Ran Off Road - Right
1	FTYROW: Making Left Turn		Ran Off Road - Straight
1	FTYROW: From Driveway		Ran Off Road - Left
	FTYROW: From Parked Position	3	Lost Control
	FTYROW: To Pedestrian		Inattentive/Distracted By: Passenger
1	FTYROW: Other (explain in narrative)		Inattentive/Distracted By: Use of Phone or Other
	Traveling Wrong Way or on Wrong Side of Rd		Inattentive/Distracted By: Fallen Object
3	Driving Too Fast for Conditions		Inattentive/Distracted By: Fatigued/Asleep
	Exceeded Authorized Speed		Other: Vision Obstructed
	Made Improper Turn		Oversized Load/ Oversized Vehicle
	Improper Lane Change		Cargo/Equipment Loss or Shift
1	Followed Too Close	3	Other: Other Improper Action
	Disregarded Railroad Signal		Unknown
	Disregarded Warning Sign		Other: No Improper Action
1	Operating Vehicle in Reckless/Aggressive Manner		None Indicated

Selection Filter:

((YEAR <> 2005))

Analyst:

Notes:

2014 Iowa DOT Traffic Map

Road Name	2014 Iowa DOT AADT
Albia Road	9800
N Ferry Street	7300
Wapello Street	10200

Intersection or Spot Benefit / Cost Safety Analysis

Rev. 5/14

Iowa DOT Office of Traffic & Safety

County: Wapello | Prepared by: Shive-Hattery | Date Prepared: Aug 14, 2016

Intersection: North Ferry Street & Albia Road - Ottumwa, Iowa

Improvement

Proposed Improvement(s): Conversion to Single-Lane Roundabout

Existing 3-Way Traffic Signal with Southbound Right-Turn Bypass Lane

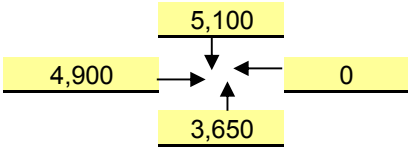
$ 719,075	Estimated Improvement Cost, **EC**	20	Est. Improvement Life, years, **Y**
	Other Annual Cost (after initial year), **AC**	60	Crash Reduction Factor (integer), **CRF**
$ -	Present Value Other Annual Costs, **OC**	4.0%	Discount Rate (time value of $), **INT**
		$ 719,075	Present Value Cost, **COST** = EC + OC

$$OC = \frac{AC}{INT}\left(1 - \frac{1}{(1+INT)^Y}\right)$$

Traffic Volume Data

Source: Iowa Department of Transportation | 2014 Date of traffic count

Daily Entering Vehicles by Approach (or AADT / 2)



4,982,250	Current Annual Entering Veh., **AEV** = DEV * 365
16,656	veh / day, Final Year DEV, **FDEV**
109.70	MEV, Total Million Entering Veh. Over life of Project, **TMEV**
1.0%	Projected Traffic Growth (0%-10%), **G**
13,650	Current Daily Entering Vehicles, **DEV**

$$TMEV = \frac{AEV}{-G}\left(1 - \left(\frac{1+G}{1}\right)^Y\right) \Big/ 10^6$$

Crash Data

2007 First full year --> 2015 Last full year — 9.0 years, Time Period, **T**

Additional months — values as of May 2014

0	Fatal Crashes	0	Fatalities @	$4,500,000	$	-
		0	Major Injuries @	$325,000	$	-
4	Injury Crashes	3	Minor Injuries @	$65,000	$	195,000
		2	Possible Injuries @	$35,000	$	70,000
14	Property Damage Only		(assumed cost per crash)	$7,400	$	133,200
		-OR-	enter all Property Costs of all crashes:			
18	Total Crashes, **TA**			Total $ Loss, **LOSS**	$	398,200

2.00	Current Crashes / Year, **AA** = TA / T	0.40	Crashes / MEV, Crash Rate, **CR**
$ 22,122	Cost per Crash, **AVC** = LOSS / TA		CR = TA x 10^6 / (DEV x 365 x T)
44.0	Total Expected Crashes, **TECR** = CR x TMEV	$ 392,113	Present Value of Avoided Crashes, **BENEFIT**
1.20	Crashes Avoided First Year **AAR** = AA x CRF / 100		
$ 26,547	Crash Costs Avoided in First Year, AAR x AVC		
26.4	Total Avoided Crashes, TECR x CRF/ 100		

$$BEN. = \frac{AVC \times AAR}{(INT - G)}\left(1 - \left(\frac{1+G}{1+INT}\right)^Y\right)$$

Benefit / Cost Ratio

Benefit : Cost = $392,113 : $719,075 = **0.55** : 1

Application for TRAFFIC SAFETY FUNDS

GENERAL INFORMATION **DATE:** August 14, 2016

Location / Title of Project North Ferry Street & Richmond Ave - Ottumwa, Iowa

Applicant City of Ottumwa

Contact Person Larry Seals Title Public Works Director

Complete Mailing Address 105 East Third Street
Ottumwa, Iowa 52501

Phone (641) 683-0680 (Area Code) E-Mail lseals@ci.ottumwa.ia.us

If more than one highway authority is involved in this project, please indicate and fill in the information below (use additional sheets if necessary).

Co-Applicant(s) _____

Contact Person _____ Title _____

Complete Mailing Address _____

_____

Phone _____ (Area Code) E-Mail _____

PLEASE COMPLETE THE FOLLOWING PROJECT INFORMATION:

Application Type

- Site Specific ☒
- Traffic Control Device ☐
- Safety Study ☐

Funding Amount

Total Safety Cost	$ 288,150
Total Project Cost	$ 288,150
Safety Funds Requested	$ 288,150

Does this project appear on a Safety Improvement Candidate List or is there a safety study recommendation for this project?
☐ Yes – Explain _____
☒ No

Rev. 6/16

APPLICATION CERTIFICATION FOR LOCAL GOVERNMENT

To the best of my knowledge and belief, all information included in this application is true and accurate, including the commitment of all physical and financial resources. This application has been duly authorized by the participating local government(s). I understand the attached resolution(s) binds the participating local government(s) to assume responsibility if any additional funds are committed, and to ensure maintenance of any new or improved city streets or secondary roads.

I understand that, although this information is sufficient to secure a commitment of funds, a firm contract between the applicant and the Department of Transportation is required prior to the authorization of funds.

Representing the City of Ottumwa

Signed: Tom X. Lazio 7.19.16

Signature Date Signed

Tom X. Lazio, Mayor

Typed Name

Attest: Amanda Valent 7.19.16

Signature Date Signed

Amanda Valent, City Clerk

Typed Name

RESOLUTION #179-2016

A RESOLUTION APPROVING THE TRANSPORTATION SAFETY IMPROVEMENT PROGRAM (TSIP) APPLICATION FOR INSTALLATION OF A MINI-ROUNDABOUT AT THE INTERSECTION OF NORTH FERRY STREET AND RICHMOND AVENUE IN THE CITY OF OTTUMWA

WHEREAS, The City of Ottumwa entered a Professional Services Agreement with Shive Hattery Architecture and Engineering out of Cedar Rapids, Iowa, on May 31, 2016, to provide assistance and public education for the adoption of roundabouts within the City of Ottumwa; and,

WHEREAS, Shive Hattery presented Roundabout Education in correlation to how these will affect the City of Ottumwa on June 14, 2016; and,

WHEREAS, They have prepared the necessary TSIP Applications for the three roundabout locations within the City of Ottumwa for approval; and,

WHERAS, this resolution specifies the installation of a mini-roundabout at the intersection of North Ferry Street and Richmond Avenue; and,

WHEREAS, the improvements proposed to be installed will help reduce crashes and improve traffic operations within the City of Ottumwa.

NOW, THEREFORE, BE IT RESOLVED, BY THE CITY COUNCIL OF THE CITY OF OTTUMWA, IOWA THAT:

1. The Transportation Safety Improvement Program (TSIP) Application for the intersection of North Ferry Street and Richmond Avenue is hereby approved.
2. The City Council hereby commits the additional City funds necessary for construction of the project beyond any TSIP funding, and;
3. The City Council hereby commits to accepting and maintaining these improvements.

APPROVED, PASSED, AND ADOPTED, this 19th day of July 2016.

CITY OF OTTUMWA, IOWA

Tom X. Lazio

Tom X. Lazio, Mayor

ATTEST:

Amanda Valent

Amanda Valent, City Clerk

Resolution

N. Ferry & Richmond Ave. Round-About Grant Application

Roll Call Number: 24

Resolution Number: 179-2016

Agenda Item Number: H-5

Date: 7/19/16

Council Member Streeby moved, seconded by Council Member Dalbey. The roll was called and the vote was as follows:

COUNCIL ACTION	AYES	NAYS	ABSTAIN	ABSENT
Dalbey	☑	☐	☐	☐
Meyers	☑	☐	☐	☐
Roe	☑	☐	☐	☐
Stevens	☑	☐	☐	☐
Streeby	☑	☐	☐	☐
Total	5	0	0	0

CERTIFICATE

I, AMANDA VALENT, City Clerk of said City, hereby certify that at a meeting of the City Council of said City of Ottumwa, Iowa held on the above date, among other proceedings, the above was adopted.

I, further certify this is a true and correct copy of Resolution No. 179 -20 16 adopted by the Ottumwa City Council and said original is on file in my office.

IN WITNESS WHEREOF, I have hereunto set my hand and affixed my seal this 21st day of July, 20 16.

Amanda Valent City Clerk

Background

The City of Ottumwa is planning to make improvements to the intersection of North Ferry Street and Richmond Avenue. It is a four-way intersection that is stop controlled in three directions. North Ferry Street is four lanes north of Richmond Avenue and three lanes south of Richmond Avenue. Richmond Avenue is a two-lane collector road and has a right-turn auxiliary lane in the westbound direction. The speed limit of both roadways is 30 mph. There are eight business driveways within 170' of the intersection that cause conflict points and have resulted in crashes. See **Exhibit H** for existing conditions.

Crash History

Crash history for this intersection was collected from Iowa DOT CMAT software and was evaluated from 2007 to 2016 to identify trends and safety issues with the current geometry and operations. In the past 9 years 30 crashes have been reported resulting in 3 major injuries, 2 minor injuries, and 9 possible injuries. The majority of crashes have been due to a failure to yield from a stop sign (40%). One of the major injuries was due to failing to yield to a pedestrian. Other crash causes include excessive speeding, running stop signs, and failing to yield to traffic from driveways. Refer to **Section I** for a crash history summary.

Proposed Improvements

Due to the amount and types of crashes at the intersection, it is proposed to construct a mini roundabout to increase safety. The mini roundabout will serve as a traffic calming device, which will slow down traffic to reduce the amount of crashes due to excessive speeding. Splitter islands will be installed to reduce the intersection speeds and notify motorists of the intersection. Due to the wide streets, the splitter islands will provide adequate deflection which will result in lower intersection speeds. Sidewalks are also proposed in addition to crosswalks and curb ramps to safely accommodate pedestrians at the intersection and connect to existing sidewalks according to ADA compliance. The splitter islands will serve as a pedestrian refuge as they will be raised. The central island will be a 3" traversable raised curb to deter motorists from traveling through the intersection, however will accommodate large trucks and buses. Additionally, the outer edges will be removed and the mini roundabout will be reconstructed in a way that will control access points to properties near the intersection. This is anticipated to reduce

crashes at driveways. New businesses will be relocating to this area which will result in an increase in traffic. The proposed improvements will accommodate this increase in traffic. Refer to **Exhibit G** for the proposed improvements.

Conclusion

The proposed improvements will provide users with an intersection that will reduce speeds, provide accommodations for pedestrians and will aid in providing acceptable gaps. The proposed improvements are expected to result in a safer intersection and reduce the number of injury crashes per year.

SHIVEHATTERY
ARCHITECTURE + ENGINEERING

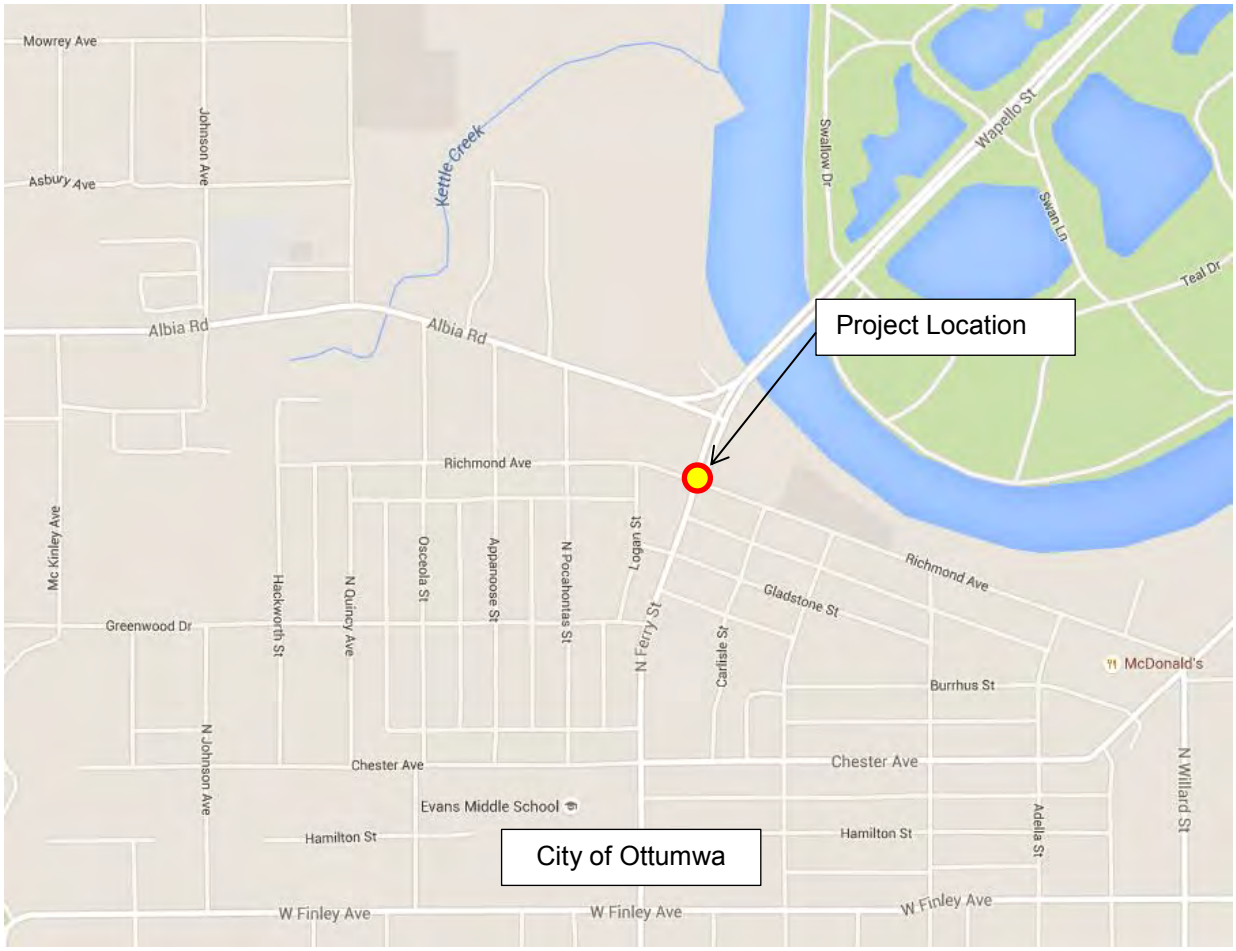
Proposed Public Improvements - Mini-Roundabout
North Ferry Street & Richmond Avenue

Ottumwa, Iowa
Engineer's Rough Order Magnitude of Cost
Estimate of Quantities -August 14, 2016

Item No	Description	Unit	Unit Price	Quantity	Cost
1	Removal of Pavement	SY	$ 10	1,650	$ 16,500
2	Removal of Sidewalk	SY	$ 8	500	$ 4,000
3	Removal of Light Pole	EA	$ 250	4	$ 1,000
4	PCC Driveway, 6"	SY	$ 35	500	$ 17,500
5	PCC Colored - Median & Crosswalk	SY	$ 110	550	$ 60,500
6	PCC Sidewalk, 4"	SY	$ 35	500	$ 17,500
7	PCC Sidewalk Ramp	SY	$ 50	100	$ 5,000
8	Curb & Gutter, 2'	LF	$ 35	650	$ 22,750
9	Granular Subbase, 6"	SY	$ 8	1,650	$ 13,200
10	Storm Improvements	LS	$ 15,000	1	$ 15,000
11	Pavement Markings and Signage	LS	$ 5,000	1	$ 5,000
12	Street Lighting	EA	$ 8,000	8	$ 64,000
13	Imported Top Soil	CY	$ 30	200	$ 6,000
14	Seeding	SY	$ 2	600	$ 1,200
15	Erosion Control & Administration	LS	$ 1,000	1	$ 1,000
16	Construction Survey	LS	$ 8,000	1	$ 8,000
17	Traffic Control	LS	$ 15,000	1	$ 15,000
18	Mobilization	LS	$ 15,000	1	$ 15,000
	Rough Order of Magnitude Construction Cost				$ 288,150

Improvements to the North Ferry & Richmond Avenue Intersection, which are to be funded through Traffic Safety Improvement Fund. The schedule proposed for the safety improvements is as follows:

- **August 2016** – Submit for 2016 TSIP Funds
- **August – December** – Proceed with design of improvements in accordance with the Federal Aid Process for an Iowa DOT Letting
- **December 2016** – TSIP Funds are awarded
- **January 2017** –Let intersection project in accordance with the Iowa DOT, Federal Aid, Minor Project Schedule
- **Summer 2017** – Construction begins
- **July 2017** –TSIP funds are awarded
- **August 2017** – Construction complete for mini roundabout.


Project Location
City of Ottumwa
Mowrey Ave
Asbury Ave
Johnson Ave
Kettle Creek
Albia Rd
Albia Rd
Swallow Dr
Wapello St
Swan Ln
Teal Dr
Richmond Ave
Richmond Ave
Mc Kinley Ave
Greenwood Dr
Hackworth St
N Quincy Ave
Osceola St
Apparoose St
N Pocahontas St
Logan St
N Ferry St
Carlisle St
Gladstone St
McDonald's
Burrhus St
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Chester Ave
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N Willard St
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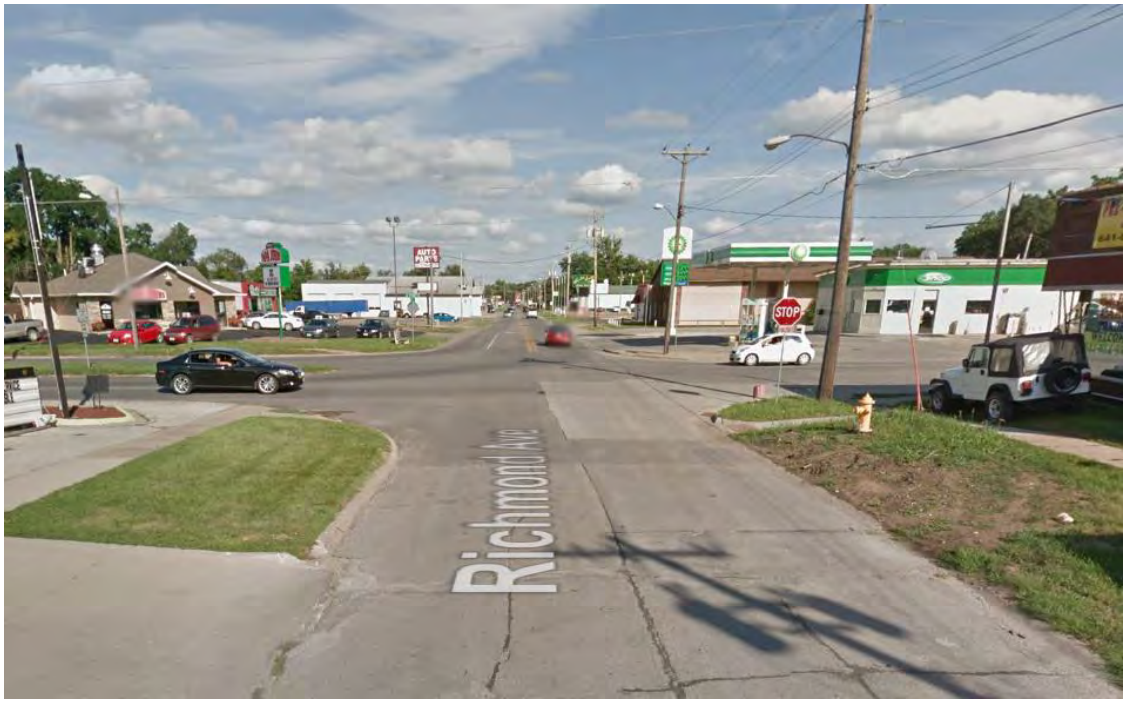
W Finley Ave
W Finley Ave



Looking East from Richmond Avenue, EB Approach*

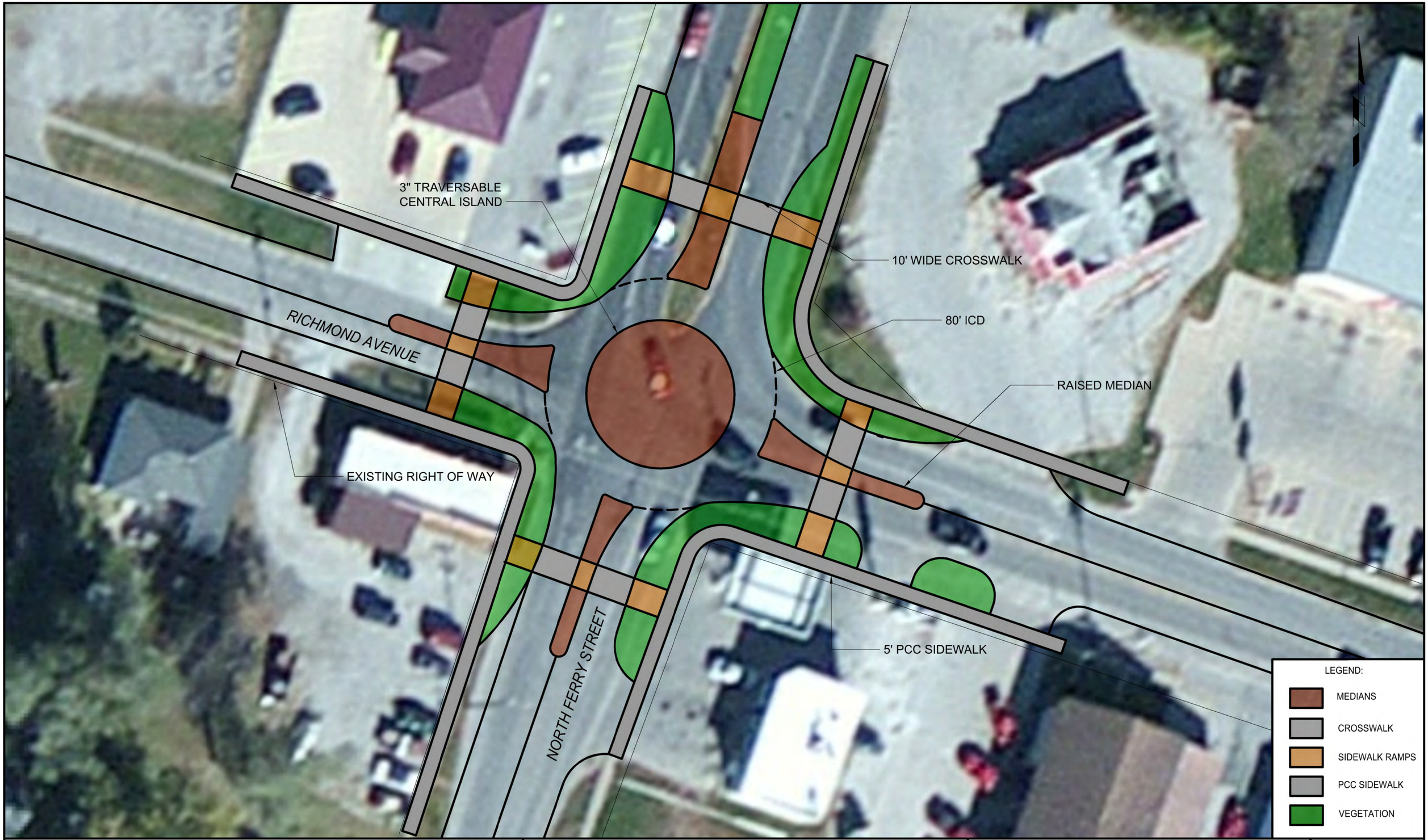
Looking North from North Ferry Street, NB Approach*

*Source: Google®

Looking South from North Ferry Street, SB Approach*

Looking West from Richmond Avenue, WB Approach*

*Source: Google®



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OTTUMWA
CITY OF BRIDGES...RIVER OF OPPORTUNITY

NORTH FERRY STREET & RICHMOND AVENUE
OTTUMWA, IOWA

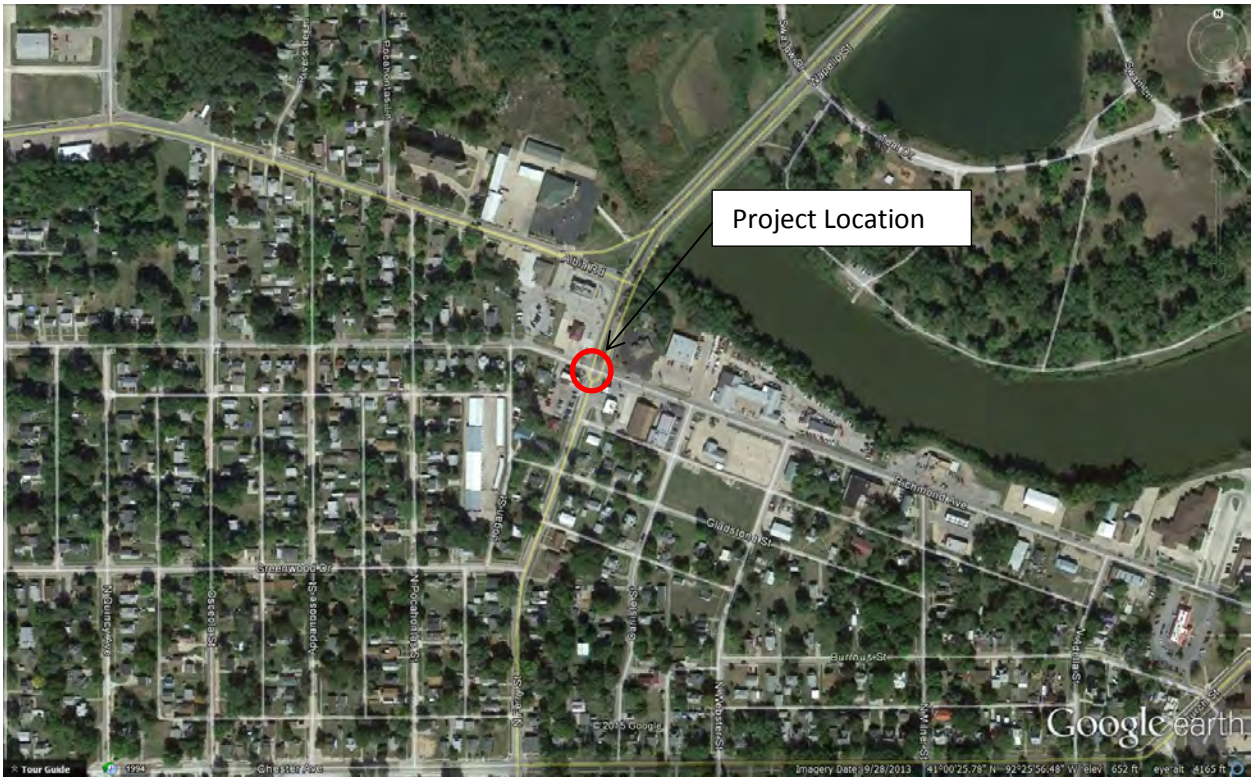
08-14-2016

2162430

ROUNDABOUT IMPROVEMENTS CONCEPT

SCALE
0 15 30
SCALE IN FEET

EXHIBIT: G


Project Location
Google earth

Iowa Department of Transportation

Major Cause Summary

0

Report Version 1.1 Jan 2005

Analysis Years: 2007 [3], 2008 [2], 2010 [3], 2011 [3], 2012 [3], 2013 [4], 2014 [5], 2015 [3], 2016 [4]

Crash Summary:

Fatal	-
Major Injury	3
Minor Injury	2
Possible/Unknown	6
PDO	19
Total Crashes	30

Injury Summary:

Fatal	-
Major Injury	3
Minor Injury	2
Possible	9
Unknown	-
Total Injuries	14

TOT Property Damage: $162,751

AVG Property Damage: $5,425

Surface Condition Summary:

Dry	26
Wet	2
Ice	-
Snow	2
Slush	-
Sand/Dirt/Oil/Gravel	-
Water	-
Other	-
Unknown	-
Not Reported	-
Total Crashes	30

Major Cause Summary:

	Animal		Improper Backing
	Ran Traffic Signal		Illegally Parked/Unattended
4	Ran Stop Sign		Swerving/Evasive Action
1	Crossed Centerline		Over-Correcting/Over-Steering
	FTYROW: At Uncontrolled Intersection		Downhill Runaway
	FTYROW: Making Right Turn on Red Signal		Equipment Failure
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	FTYROW: From Yield Sign		Ran Off Road - Right
	FTYROW: Making Left Turn		Ran Off Road - Straight
1	FTYROW: From Driveway		Ran Off Road - Left
	FTYROW: From Parked Position		Lost Control
1	FTYROW: To Pedestrian		Inattentive/Distracted By: Passenger
	FTYROW: Other (explain in narrative)		Inattentive/Distracted By: Use of Phone or Other
	Traveling Wrong Way or on Wrong Side of Rd		Inattentive/Distracted By: Fallen Object
	Driving Too Fast for Conditions		Inattentive/Distracted By: Fatigued/Asleep
1	Exceeded Authorized Speed		Other: Vision Obstructed
	Made Improper Turn		Oversized Load/ Oversized Vehicle
	Improper Lane Change		Cargo/Equipment Loss or Shift
3	Followed Too Close	4	Other: Other Improper Action
	Disregarded Railroad Signal	1	Unknown
	Disregarded Warning Sign		Other: No Improper Action
2	Operating Vehicle in Reckless/Aggressive Manner		None Indicated

Selection Filter:

((YEAR <> 2006))

Analyst:

Notes:

2014 Iowa DOT Traffic Map

Road Name	2014 Iowa DOT AADT
N Ferry Street	7300
Richmond Avenue	9300

Intersection or Spot Benefit / Cost Safety Analysis

Rev. 5/14

Iowa DOT Office of Traffic & Safety

County: Wapello | Prepared by: Shive-Hattery | Date Prepared: Aug 14, 2016

Intersection: North Ferry Street & Richmond Avenue - Ottumwa, Iowa

Improvement

Proposed Improvement(s): Conversion to Mini Roundabout

Existing 3-Way stop at 4 way intersection with 2 approaches with left turn lanes

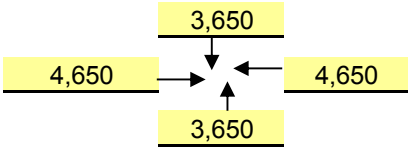
$ 288,150	Estimated Improvement Cost, **EC**	20	Est. Improvement Life, years, **Y**
	Other Annual Cost (after initial year), **AC**	60	Crash Reduction Factor (integer), **CRF**
$ -	Present Value Other Annual Costs, **OC**	4.0%	Discount Rate (time value of $), **INT**
		$ 288,150	Present Value Cost, **COST** = EC + OC

$$OC = \frac{AC}{INT}\left(1 - \frac{1}{(1+INT)^Y}\right)$$

Traffic Volume Data

Source: Iowa Department of Transportation | 2014 Date of traffic count

Daily Entering Vehicles by Approach (or AADT / 2)



6,059,000 Current Annual Entering Veh., **AEV** = DEV * 365

24,667 veh / day, Final Year DEV, **FDEV**

147.22 MEV, Total Million Entering Veh. Over life of Project, **TMEV**

2.0% Projected Traffic Growth (0%-10%), **G**

16,600 Current Daily Entering Vehicles, **DEV**

$$TMEV = \frac{AEV}{-G}\left(1 - \left(\frac{1+G}{1}\right)^Y\right) \Big/ 10^6$$

Crash Data

2007 First full year --> 2015 Last full year 9.3 years, Time Period, **T**

4 Additional months

values as of May 2014

0	Fatal Crashes	0	Fatalities @	$4,500,000	$	-
		3	Major Injuries @	$325,000	$	975,000
11	Injury Crashes	2	Minor Injuries @	$65,000	$	130,000
		9	Possible Injuries @	$35,000	$	315,000
19	Property Damage Only		(assumed cost per crash)	$7,400	$	222,000
		-OR-	enter all Property Costs of all crashes:			
30	Total Crashes, **TA**			Total $ Loss, **LOSS**	$	1,642,000

3.21	Current Crashes / Year, **AA** = TA / T	0.53	Crashes / MEV, Crash Rate, **CR**
$ 54,733	Cost per Crash, **AVC** = LOSS / TA		CR = TA x 10^6 / (DEV x 365 x T)
78.1	Total Expected Crashes, **TECR** = CR x TMEV	$ 1,698,589	Present Value of Avoided Crashes, **BENEFIT**
1.93	Crashes Avoided First Year **AAR** = AA x CRF / 100		
$ 105,557	Crash Costs Avoided in First Year, AAR x AVC		
46.9	Total Avoided Crashes, TECR x CRF/ 100		

$$BEN. = \frac{AVC \times AAR}{(INT - G)}\left(1 - \left(\frac{1+G}{1+INT}\right)^Y\right)$$

Benefit / Cost Ratio

Benefit : Cost = $1,698,589 : $288,150 = **5.89** : 1

IOWA DOT

Application for TRAFFIC SAFETY FUNDS

GENERAL INFORMATION **DATE:** June 23, 2016

Location / Title of Project D-16 Otterville Boulevard Shoulder Construction

Applicant Buchanan County Secondary Roads

Contact Person Brian Keierleber Title Buchanan County Engineer

Complete Mailing Address 1511 1st St. East
Independence, Iowa 50644

Phone (319)334-6031 (Area Code) E-Mail engineer@co.buchanan.ia.us

If more than one highway authority is involved in this project, please indicate and fill in the information below (use additional sheets if necessary).

Co-Applicant(s) _____

Contact Person _____ Title _____

Complete Mailing Address _____

_____

Phone _____ (Area Code) E-Mail _____

PLEASE COMPLETE THE FOLLOWING PROJECT INFORMATION:

Application Type

- Site Specific ☒
- Traffic Control Device ☐
- Safety Study ☐

Funding Amount

Total Safety Cost	$ $871,430
Total Project Cost	$ $1,117,030
Safety Funds Requested	$ $500,000

Does this project appear on a Safety Improvement Candidate List or is there a safety study recommendation for this project? ☒Yes – Explain It is the number 1 Road segment candidate for improvement in our Local Road Safety Plan.

APPLICATION CERTIFICATION FOR LOCAL GOVERNMENT

To the best of my knowledge and belief, all information included in this application is true and accurate, including the commitment of all physical and financial resources. This application has been duly authorized by the participating local government(s). I understand the attached resolution(s) binds the participating local government(s) to assume responsibility if any additional funds are committed, and to ensure maintenance of any new or improved city streets or secondary roads.

I understand that, although this information is sufficient to secure a commitment of funds, a firm contract between the applicant and the Department of Transportation is required prior to the authorization of funds.

Representing the BUCHANAN COUNTY BOARD OF SUPERVISORS

Signed: Donald B. Shonka 8/1/16

Signature CHAIR — Date Signed

Donald B. Shonka

Typed Name

Attest: Cindy Gosse 8/1/16

Signature — Date Signed

Cindy Gosse

Typed Name

NARRATIVE

According to the Buchanan County Local Road Safety Plan published in March of 2016 the Otterville Boulevard (D-16) is the highest Risk Road Segment on the Buchanan County Road System. It ranks number 1 with 10 points. Only two other road segments in the County have 10 points. Buchanan County plans to construct shoulders and flatten the foreslopes in 2019 provided we can develop sufficient funding for this project while completing numerous other projects in the county. It is our current policy to pave 4' of shoulder as we rehabilitate the pavement surface of the paving projects. We currently have 34 miles of widened shoulders and 15 miles of paved shoulders. We have 6 miles of paved shoulders ready for letting this year. In addition as we pave the shoulders we also place safety edge on the shoulder. We have also placed centerline rumbles and shoulder rumbles. In order to pave the shoulder we must have a shoulder. The Otterville Boulevard does not have sufficient shoulder for us to pave the shoulder. Because of this we must first acquire Right of Way then we can construct the wider shoulder and flatten the slopes. The accident history is not dramatic with accidents but Based on our Local Road Safety plan it is appropriate and a priority to address the shoulders as we rehabilitate this segment of road. We are to a point that to reduce accidents we must be done on a systemic manner. Otterville Boulevard is a 55 mile per hour roadway with numerous curves. The speed limit is reduced to 35 mph through the unincorporated village of Otterville. The road is listed as having 4 ft. shoulders but that was prior to asphalt overlays. The current AADT is listed as 870 VPD on the 3.47 miles miles and 600 VPD on .75 miles. Currently all curves with radius less than 1500 ft. are marked and have chevrons. We use center and edge pavement markings.

Under IM 3.214 a planned concrete overlay places us in the restoration category. The 3R table requires us to have 3:1 slopes. Widening the shoulders and flattening the slopes are appropriate. We would plan to construct a 10 ft. shoulder. After an overlay an 8 ft. shoulder would exist of which 4 ft. would be paved and 4 ft. would be rock. This is the primary route to Independence for the Amish and the wider shoulders would greatly increase safety for everyone. This design would accommodate them and provide a separation from the vehicular traffic. We must take cultural aspects into consideration as we address this route. Constructing wider shoulders and flatter slopes are the appropriate answer. The Amish Community was not a consideration by the Local Road Safety Plan but it does confirm the need. The LRSP confirms this as a priority.

Local Road Safety Plan
Project Description for Segment Improvements

Risk Factor Points: 10

Project Name: OTTERVILLE BLVD between FAIRBANK-AMISH BLVD and JAMESTOWN AVE
Agency Name: Buchanan County
Contact Name: Keierleber, Brian
E-mail: engineer@co.buchanan.ia.us

Date: 8/17/15

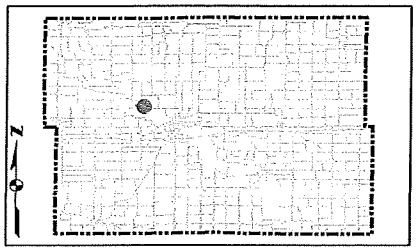
Prepared By: DJG/DVM
Checked By: MMO

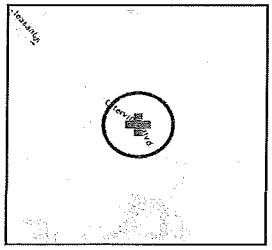
Location Description

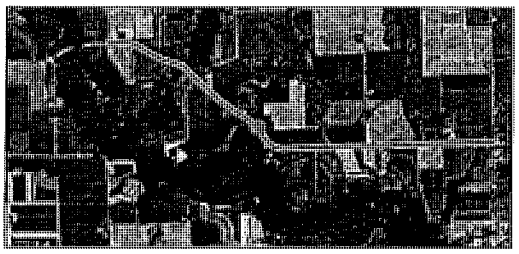
Paved Road: OTTERVILLE BLVD
Length (mi): 4.22

GPS ID: 664

Project Location







Segment Information and Systemic Ranking Summary

Systemic Ranking Summary	Value	Points
Average Daily Traffic (ADT)	822	6
Pavement and Shoulder Width (ft)	30.0	0
Number of Driveways/Intersections per Mile	15.18	2
Lane Departure Crash Rate per VMT	0.00009	2
Total Risk Factor Points (18 max)		10

Other Information	
Paved Shoulder	No
Shoulder Width (ft)	4
Speed Limit (mph)	55
Lane Width (ft)	11.0
Number of Lanes	2
Rumble Strips	No

	Key Emphasis Areas
	Younger Drivers
	Older Drivers
	Speed-Related
	Impaired Driving
	Inattentive/Distracted Driving
	Unprotected Persons
X	Lane Departures
X	Roadside Collisions
	Intersections
X	Local Roads

Crash Data, 2004-2013	
Total Crashes	28
K and A Crashes	0

Opinion of Probable Cost

Item No.	Item Description	Quantity	Unit	Unit Price	Item Cost
	Install 4" Retroreflective Edgeline (Both Sides of Road)	4.22	MILE	$ 1,200	$ 5,058
	Install 6" Retroreflective Edgeline (Both Sides of Road)	0.00	MILE	$ 1,800	$ -
	Install 4" Retroreflective Centerline	4.22	MILE	$ 800	$ 3,372
	Pave 2' Shoulder with Safety Edge (Both Sides of Road)	0.00	MILE	$ 65,000	$ -
	Install Edgeline Rumble Strips (Both Sides of Road)	4.22	MILE	$ 2,000	$ 8,431
	Install Centerline Rumble Strips	0.00	MILE	$ 1,000	$ -
	Clear and Grub (15 ft Both Sides of Road)	4.22	MILE	$ 20,000	$ 84,306
				Subtotal:	$ 101,167
				Engineering: (% +/-) 15%	$ 15,267
				Mobilization: (% +/-)* 10%	$ 10,120
				Traffic Control: (% +/-) 5%	$ 5,089
				Contingency:(% +/-) 20%	$ 20,356
				Estimated Project Cost:	$ 152,000

Basis for Cost Projection

- ☑ No Design Completed
- ☐ Preliminary Design
- ☐ Final Design

* Mobilization is 10% +/- of the subtotal with a minimum of $2,500 and a maximum of $75,000.

Opinion of Probable Construction Cost Disclaimer:
Kimley-Horn has no control over the cost of labor, materials, equipment, or over the Contractor's methods of determining prices or over competitive bidding or market conditions. Opinions of probable costs provided herein are based on the information known to Kimley-Horn at this time and represent only the Kimley-Horn's judgment as a design professional familiar with the construction industry. The Kimley-Horn cannot and does not guarantee that proposals, bids, or actual construction costs will not vary from its opinions of probable costs.

Project Description Form Disclaimer:
The recommended improvements contained in this project description form were developed through a Geographic Information System (GIS) database risk assessment and project decision tree selection process, as specifically stated in our scope of services. Kimley-Horn has no control over the accuracy of the GIS databases nor the suitability of the specific improvements for the location, and has provided recommended improvements for consideration by the County Engineer. The County Engineer may use this project description form to aid in the selection and development of projects, but this project description form should not be used as the sole basis for the County Engineer's decision making process. We endeavored to research issues and constraints to the extent practical given the scope, budget, and schedule agreed to with the Client. Our assessment is based in large part on information provided to us by others (DOT, county staff, etc.) and therefore is only as accurate and complete as the information provided to us. This project description form is based on our knowledge as of August 2015.

Project Location Map Sources:
Esri, DeLorme, NAVTEQ, USGS, Intermap, iPC, NRCAN, Esri Japan, METI, Esri China (Hong Kong), Esri (Thailand), TomTom, 2013, DigitalGlobe, GeoEye, i-cubed, USDA, AEX, Getmapping, Aerogrip, IGN, IGP, swisstopo, and the GIS User Community

End of Project Description

B_3 supplement

Kimley»Horn

Otterville Boulevard Cost Estimate

All the grading costs are a result of shoulder widening and flattening of slopes. All listed costs are safety related but additional ROW costs are to be excluded.

Row acquisition

4.22 miles x 20 ft. x 2 sides x 5280 ft. per mile x 1 acre /43560 sqft. X $10,000/acre = $204,606

Acquisition costs approximately 20 percent

$204,606 x 1.2 = $245,600

Total ROW costs = $ 245,600

Actual Grading

Assume $175,000 per mile based on the D-22 shoulder grading of 2012 and adjust with 18% increase. $175,000 x 1.18 x 4.22 miles = $871430.

Total Grading Costs = $ 871,430.

Total Project Costs = $1,117,030

Otterville Boulevard Timeline

July 2016 Notify Landowners of survey

August 2016 Begin survey

September Begin Environmental Clearances by Historic Reviews and Wetland Reviews

Begin Preliminary plan development

May 2017 Complete Environmental reviews

Summer 2017 Public Information Meeting and Utility Coordination Meeting

Fall 2017 Begin ROW Acquisition

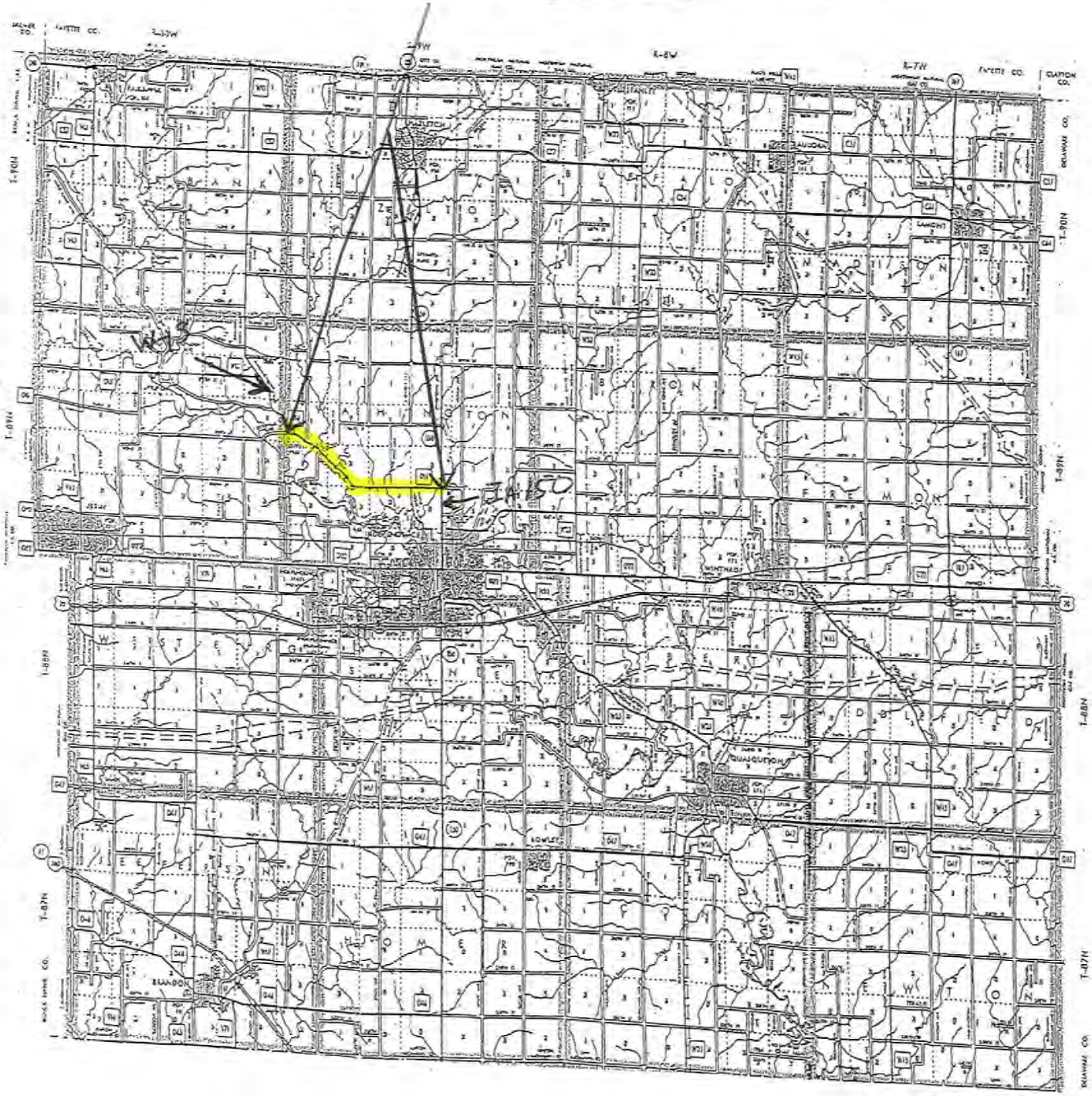
Spring 2018 Complete ROW Acquisition

Summer 2018 Final Plan development

Fall 2018 Letting

E

D-16 OTTERVILLE BOULEVARD



HIGHWAY AND TRANSPORTATION MAP

BUCHANAN COUNTY IOWA

Prepared by

Iowa Department of Transportation

Phone (515) 239-1267

In Cooperation With

United States Department of Transportation

JANUARY 1, 2009

LEGEND

E

E1

F2

F 3

F4

F 5

F6

F7

F 8

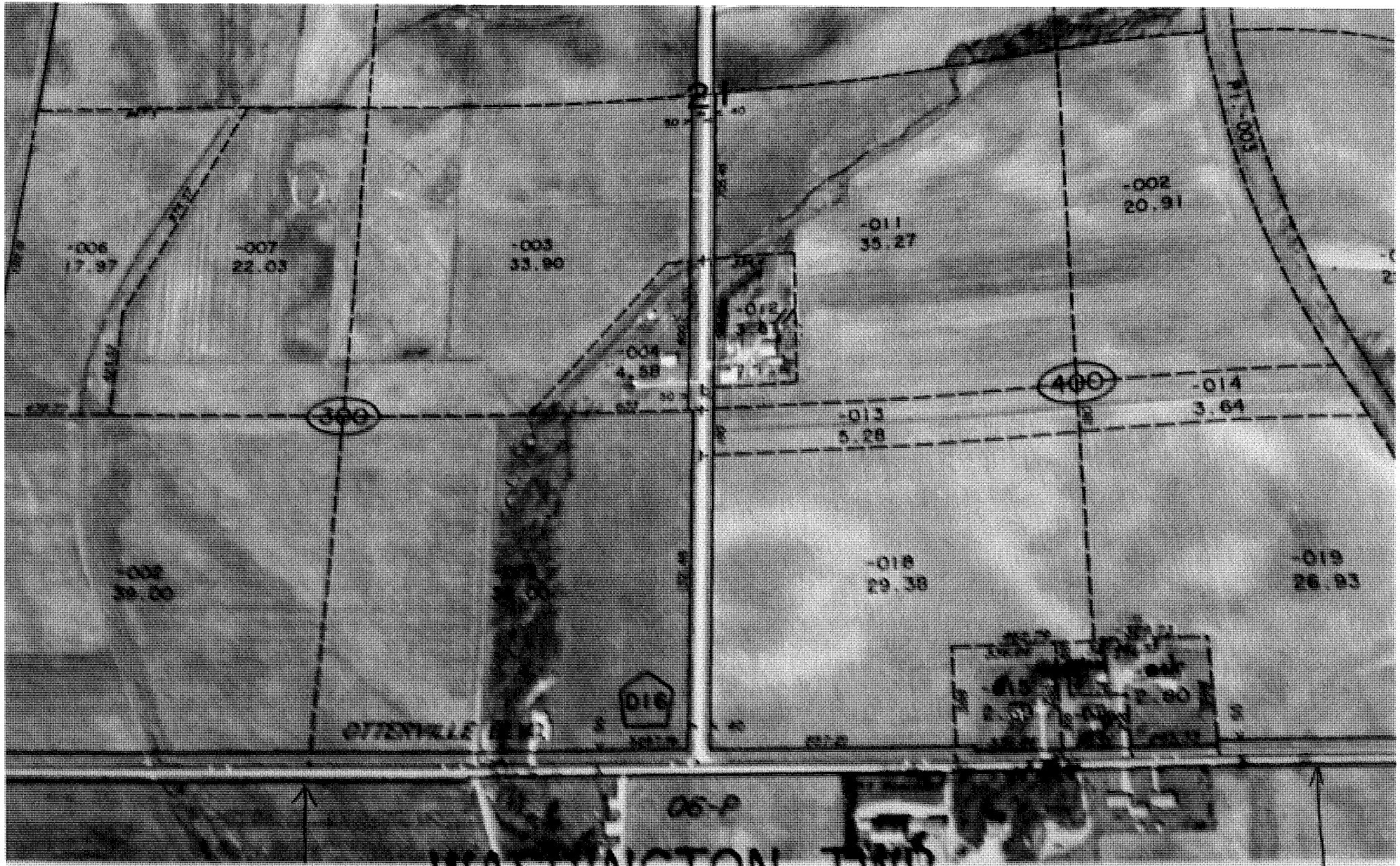
F9

F/8

F 91

F 12

OTTERVILLE BLVD.
ADDITIONAL
ROW PROPER
20
TON TWP.
39N. R.9W.



WASHINGTON TWP.

SECS. 16 & 21 T.89N. R.9W.

G2

-001
40.00
-002
40.00
-001
39.00
400
-003
34.84
-005
38.69
-004
21.85
Homer Creek
-006
13.97
DI6
ATTERVILLE BLVD.
400
ADDITIONAL ROW PROPOSED
06-Q
WASHINGTON TWP.
SECS. 15 & 22 T.89N. R.9W

G3

-006
39.00
-002
38.25
-006
16.00
PROPOSED ROW
-011
4.82
-012
1.58
PI 06-19-220-001
300
OTTERVILLE BLVD.
PI6
PROPOSED -008
2.00
ROW
-010
10.17
-005
2.80
-009
1.00
-003
4.00
-004
33.39
-002
23.48
PI.06-19-205-005
Otterville Creek
100
-008

2004 - 2013 Reportable Crash History
D-16 (Otterville Boulevard) from IA 150 to W-13
Buchanan County, IA

		Crashes						Injuries					
Year	**County**	**Crashes**	**Fatal**	**Major**	**Minor**	**Poss/Unk**	**PDO**	**Injuries**	**Fatalities**	**Major**	**Minor**	**Possible**	**Unknown**
2004	Buchanan	4	0	1	0	0	3	1	0	1	0	0	0
2005	Buchanan	3	0	0	0	2	1	3	0	0	0	3	0
2006	Buchanan	8	0	0	0	1	7	1	0	0	0	1	0
2007	Buchanan	1	0	0	0	1	0	1	0	0	0	1	0
2008	Buchanan	2	0	0	0	1	1	1	0	0	0	1	0
2009	Buchanan	3	0	0	0	1	2	1	0	0	0	1	0
2010	Buchanan	6	0	0	0	1	5	1	0	0	0	1	0
2011	Buchanan	4	0	0	0	2	2	2	0	0	0	2	0
2012	Buchanan	3	0	0	0	0	3	0	0	0	0	0	0
2013	Buchanan	2	0	0	1	0	1	1	0	0	1	0	0
	Totals:	36	0	1	1	9	25	12	0	1	1		10

meeting the following criteria:
(This feature currently not operational.)

Feature Count Report (Tuesday, June 28, 2016 2:47:50 PM Central Daylight Time)
produced using: Iowa's Safety Analysis, Visualization, and Exploration Resource (SAVER)
by:
Jon Frederiksen
Engineering Intern

print version

D-16 (Otterville Boulevard) from IA
Buchanan County, IA
2004 - 2013 Reportable Crash I

(

	Major Cause	Total	Fatal	Major
2004	Animal	16		
thru	Ran Traffic Signal			
2013	Ran Stop Sign	1		
	Crossed centerline	1		
	FTYROW: At uncontrolled intersection			
	FTYROW: Making right turn on red signal			
	FTYROW: From stop sign			
	FTYROW: From yield sign			
	FTYROW: Making left turn	1		
	FTYROW: From driveway			
	FTYROW: From parked position			
	FTYROW: To pedestrian			
	FTYROW: Other (explain in narrative)	1		
	Traveling wrong way or on wrong side of road			
	Driving too fast for conditions	6		
	Exceeded authorized speed			
	Made improper turn	2		
	Improper Lane Change			
	Followed too close			
	Disregarded RR Signal			
	Disregarded Warning Sign			
	Operating vehicle in an erratic/reckless/careless/negligent/aggressive manner			
	Improper Backing			
	Illegally Parked/Unattended			
	Swerving/Evasive Action	2		
	Over correcting/over steering			
	Downhill runaway			
	Equipment failure			
	Separation of units			
	Ran off road - right	3		1
	Ran off road - straight			
	Ran off road - left			
	Lost Control			
	Inattentive/distracted by: Passenger			
	Inattentive/distracted by: Use of phone or other device			
	Inattentive/distracted by: Fallen object			
	Inattentive/distracted by: Fatigued/asleep			
	Other (explain in narrative): Vision obstructed	1		
	Oversized Load/Vehicle			
	Cargo/equipment loss or shift			
	Other (explain in narrative): Other improper action	1		
	Unknown			
	Other (explain in narrative): No improper action	1		
	None indicated			

150 to W-13

History

Crashes					Injuries			
Minor	Possible/Unknown	PDO	Total	Fatalities	Major	Minor	Possible	Unknown
		16						
	1		1				1	
	1		2				2	
		1						
		1						
	3	3	3				3	
	1	1	1				1	
		2						
	2		3		1		2	
		1						
	1		1				1	
1			1			1		

The combined CMF for the sideslope and shoulder widening treatments based on the above discussion can be 0.94 x 0.71 = 0.667, which brings us a CRF of 0.333.

You might have a valid argument that widening shoulder for the purpose of the problem you have may have higher reduction on the specific crashes you are experiencing on this location.
Please let me know if you have any questions or concern on this.

Thanks,
Hossein

Hossein Naraghi
Research Engineer
Instituite for Transportation
Iowa state University
2711 S. Loop Drive, Suite 4700
Ames, Iowa 50010-8664
Office: 515-294-4069
hnaraghi@iastate.edu

From: Brian Keierleber [mailto:bkeierleber@co.buchanan.ia.us]
Sent: Thursday, July 28, 2016 2:49 PM
To: Naraghi, Hossein [ITRNS] <hnaraghi@iastate.edu>
Subject: RE: Otterville

Thanks, I am attempting to get the application in. Also the appropriate lifespan

---

From: Naraghi, Hossein [ITRNS] [mailto:hnaraghi@iastate.edu]
Sent: Wednesday, July 27, 2016 2:59 PM
To: Brian Keierleber
Subject: RE: Otterville

Hi Brian,

CMF for slope can be obtained from HSM, but the issue was finding something that matches our situation widening unpaved road from 4ft to 10ft. I have found some similarity in some studies and trying to come up with a CMF that can best represents our situation here. I will give my final thoughts by the end of the week.

Thanks,
Hossein

Hossein Naraghi
Research Engineer
Instituite for Transportation
Iowa state University
2711 S. Loop Drive, Suite 4700
Ames, Iowa 50010-8664
Office: 515-294-4069
hnaraghi@iastate.edu

I-Supplement

Brian Keierleber

From: Naraghi, Hossein [ITRNS] <hnaraghi@iastate.edu>
Sent: Monday, August 01, 2016 10:52 AM
To: Brian Keierleber
Cc: Hans, Zachary N [ITRNS]
Subject: RE: Otterville

Brian,

This is from TSIP general instructions:

"CMAT/SAVER CRASH SUMMARY OF MOTOR VEHICLE ACCIDENTS 1) 3 most recent years (or more) for locations averaging 10 or more crashes per year. 2) 5 most recent years (or more) for locations averaging less than 10 crashes per year."

Thanks,
Hossein

From: Brian Keierleber [mailto:bkeierleber@co.buchanan.ia.us]
Sent: Friday, July 29, 2016 5:17 PM
To: Naraghi, Hossein [ITRNS] <hnaraghi@iastate.edu>
Subject: RE: Otterville

Thanks. I will get my aplication in. How many years should I use?

Sent from my U.S. Cellular® Smartphone

-------- Original message --------
From: "Naraghi, Hossein [ITRNS]" <hnaraghi@iastate.edu>
Date:07/29/2016 4:57 PM (GMT-06:00)
To: Brian Keierleber <bkeierleber@co.buchanan.ia.us>
Cc: "Hans, Zachary N [ITRNS]" <zhans@iastate.edu>
Subject: RE: Otterville

Brian,

For the sideslope improvement from 1V:2H to 1V:4H the CMF from HSM for roadside element treatments of rural 2-lane road is 0.94.

For improving unpaved shoulder width from 4ft to 10ft, there is no specific CMF in HSM. However there have been some studies from CMF clearinghouse on rural 2-lane roads in Kansas. One of the countermeasure they used was upgrading narrow unpaved shoulder (<5 ft) to wide unpaved shoulder (> 5 ft). This study was somehow similar to the situation we have, but every situation is unique and countermeasure is appropriate with the existing problem.

Base on the above study, the CMF for all crashes is 0.71. This study does not specify the exact width of the shoulder for prior and after treatment like what you suggested (4ft to 10 ft). They just say < 5 ft prior to treatment and > 5 ft after the treatment.

Rev. 5/14

Road Segment Benefit / Cost Safety Analysis

Iowa DOT Office of Traffic & Safety

County: Buchanan County Prepared by: Brian Keierleber Date Prepared: Aug 9, 2016

Location: Otterville Boulevard (D-16)

Improvement

Proposed Improvement(s): Construct 10 ft. shoulders and flatten foreslopes for future paved shoulders and rumbles

$ 871,430	Estimated Improvement Cost, **EC**	20	Est. Improvement Life, years, **Y**
$ -	Other Annual Cost (after initial year), **AC**	33	Crash Reduction Factor (integer), **CRF**
$ -	Present Value Other Annual Costs, **OC**	4.0%	Discount Rate, **INT**
	$$OC = \frac{AC}{INT}\left(1 - \frac{1}{(1+INT)^Y}\right)$$	$ 871,430	Present Value All Costs, **COST** = EC + OC

Traffic Volume Data

Source: Service Bureau Listing 2013 Date of traffic count

Length (mi.)	Two-way veh/day	Description
3.47	870	west of Wapsi Access
0.75	600	east of Wapsi Access
4.22	miles total	

3,469	Current Vehicle Miles / Day, **VM**
4,233	End of Life Veh. Miles / Day
1,266,149	Current Veh. Miles / Year, **AM**
27,879,329	Total Projected Veh. Miles Over Life of Project, **TVMT**

$$TVMT = \frac{AM}{-G}\left(1 - \left(\frac{1+G}{1}\right)^Y\right)$$

1.0% Projected Traffic Growth (0%-10%), **G**

Crash Data

2004 First full year --> 2013 Last full year 10.0 years, Time Period, **T**

Additional months values as of May 2014

0	Fatal Crashes	0	Fatalities @	$4,500,000	$ -
		1	Major Injuries @	$325,000	$ 325,000
12	Injury Crashes	1	Minor Injuries @	$65,000	$ 65,000
		9	Possible Injuries @	$35,000	$ 315,000
25	Property Damage Only		(assumed cost per crash)	$7,400	$ 273,800
			-OR- enter all Property Costs of all crashes:		
37	Total Crashes, **TA**			Total $ Loss, **LOSS**	$ 978,800

3.70	Current Crashes / Year, **AA** = TA / T	**292.2**	Crashes / HMVM, Crash Rate, **CR** CR = TA x 10^8 / (AM x T)
$ 26,454	Cost per Crash, **AVCR** = LOSS / TA	$ 477,100	Present Value of Avoided Crashes, **BENEFIT**
81.5	Total Expected Crashes, **TCR** = CR x TVMT/10^8		
1.22	Crashes Avoided First Year **AAR** = AA x CRF / 100		
$ 32,300	Crash Costs Avoided in First Year, AAR x AVCR		
26.9	Total Avoided Crashes, TCR x CRF/ 100		

$$BEN. = \frac{AVCR \times AAR}{(INT - G)}\left(1 - \left(\frac{1+G}{1+INT}\right)^Y\right)$$

Benefit / Cost Ratio

Benefit : Cost = $477,100 : $871,430 = **0.55** : 1

L1

Application for TRAFFIC SAFETY FUNDS

GENERAL INFORMATION **DATE:** August 9, 2016

Location / Title of Project Highway 6 & Jones Blvd Intersection / Traffic Signals

Applicant City of Coralville

Contact Person Dan Holderness Title City Engineer

Complete Mailing Address P.O. Box 5127
Coralville, Iowa 52241

Phone (319)-248-1720 (Area Code) E-Mail dholderness@coralville.org

If more than one highway authority is involved in this project, please indicate and fill in the information below (use additional sheets if necessary).

Co-Applicant(s) _____

Contact Person _____ Title _____

Complete Mailing Address _____

_____

Phone _____ (Area Code) E-Mail _____

PLEASE COMPLETE THE FOLLOWING PROJECT INFORMATION:

Application Type

- Site Specific ☒
- Traffic Control Device ☐
- Safety Study ☐

Funding Amount

Total Safety Cost	$ 328,000.00
Total Project Cost	$ 353,000.00
Safety Funds Requested	$ 328,000.00

Does this project appear on a Safety Improvement Candidate List or is there a safety study recommendation for this project?

☐ Yes – Explain _____
☒ No

Rev. 6/16

APPLICATION CERTIFICATION FOR LOCAL GOVERNMENT

To the best of my knowledge and belief, all information included in this application is true and accurate, including the commitment of all physical and financial resources. This application has been duly authorized by the participating local government(s). I understand the attached resolution(s) binds the participating local government(s) to assume responsibility if any additional funds are committed, and to ensure maintenance of any new or improved city streets or secondary roads.

I understand that, although this information is sufficient to secure a commitment of funds, a firm contract between the applicant and the Department of Transportation is required prior to the authorization of funds.

Representing the City of Coralville, IA

Signed: _____ 8/9/16
Signature Date Signed

Dan Holderness, P.E.
Typed Name

Attest: _____ 8/9/16
Signature Date Signed

Thor Johnson, City Clerk
Typed Name

A. RESOLUTION

RESOLUTION NO. 2016-170

RESOLUTION OF SUPPORT FOR TRAFFIC SAFETY IMPROVEMENTS PROGRAM APPLICATION TO THE IOWA DEPARTMENT OF TRANSPORTATION FOR THE HIGHWAY 6/JONES BOULEVARD INTERSECTION SIGNALIZATION PROJECT.

WHEREAS, the City Council of the City of Coralville have heretofore deemed it necessary and desirable to install traffic signals at the Highway 6/Jones Boulevard intersection (the "Project"); and

WHEREAS, to that end the City is applying for $353,000.00 through the Traffic Safety Improvements Program through the Iowa Department of Transportation; and

WHEREAS, these funds if approved will pay for the entire cost of the project.

NOW, THEREFORE, BE IT RESOLVED, by the City Council of the City of Coralville, Johnson County, Iowa, that the City Council does hereby support the application of the City for funding via the Traffic Safety Improvements Program for the Project.

BE IT FURTHER RESOLVED, that the Application is hereby approved, and the Mayor is hereby directed to execute said Application on behalf of the City of Coralville.

Passed and approved this 26th day of July, 2016.

John A. Lundell, Mayor

ATTEST:

Thorsten J. Johnson, City Clerk

B. NARRATIVE

The City of Coralville is submitting this application for Traffic Safety Improvement Program (TSIP) funding under the Site Specific category. This funding request is to provide for the purchase of all material and equipment necessary for traffic control signals at the Highway 6 (2nd Street), Jones Boulevard, and Westcor Drive intersection. The City of Coralville will be responsible for the operation and maintenance of the signalized intersection.

Existing Conditions

This intersection is located in west Coralville. Highway 6 is an east-west state highway that provides regional access to the metropolitan area and local arterial access between Iowa City, Coralville, and Tiffin. Jones Boulevard, to the north of the intersection, will eventually be extended further north and function as a north-south arterial corridor parallel to Highway 965. As built today, this segment of Jones Boulevard functions as a two lane collector road that serves several businesses and provides access to Heartland Drive. Westcor Drive is a two-lane local road that currently terminates approximately 800' south of Highway 6. There is an at-grade rail crossing on Westcor Drive just south of the intersection.

This intersection is currently stop controlled for north-south traffic only. Both Jones Boulevard and Westcor Drive are posted at 25 mph. Each approach has a dedicated left-turn lane and shared through/right-turn lanes with channelized, stop-controlled right-turn lanes. Highway 6 has dedicated right and left-turn lanes and a single through lane in both directions. Highway 6 is posted at 55 mph.

Proposed Concept

The proposed concept is to install traffic control signals at this intersection in an effort to reduce the potential for, and the severity of future collisions. This includes all materials and equipment for the traffic control signals' underground components, detection, communications, cabinet and controller, poles, heads, and signs; as well as other costs identified in the cost estimate.

The clear zone does not present a safety hazard at this intersection. The Statewide Urban Design and Specifications (SUDAS) clear zone requirement of 32 feet will be met and maintained with the proposed intersection improvements.

Safety Justification

A traffic signal warrant analysis was performed in April 2015 by the Metropolitan Planning Organization of Johnson County (MPOJC) to determine the need for a traffic signal at this intersection. At least one of the eight warrants listed in **Table 1** must be met for the consideration of a traffic signal. Based on the analysis of the MUTCD traffic signal warrants; Warrant 2, 3, 7, and 8 are met at the Highway 6, Jones Boulevard and Westcor Drive intersection, while warrants 1A and 1B (8-hour vehicle warrants) are not met. This indicates that

the minor approaches are experiencing excessive delay or conflict in entering or crossing the major street during a few hours each day and that side-street drivers may be taking inadequate gaps in traffic due to these delays, which is correctable by a traffic control signal.

Table 1: Summary of Examined Warrants

Warrant	Description	Warrant Met?
1A	Minimum Vehicular Volume	No
1B	Interruption of Continuous Traffic	No
2	Four Hour Vehicular Volumes	Yes
3	Peak Hour Volumes	Yes
4	Pedestrian Volume	n/a
5	School Crossing	n/a
6	Coordinated Signal System	n/a
7	Crash Experience	Yes
8	Roadway Network	Yes

The intersection capacity analysis completed in April 2015 shows that while overall intersection delay and level of service is very good at LOS A (because Highway 6 "runs free" and carries 74% of the daily traffic), Jones Boulevard / Westcor Drive traffic experiences significant delay. Today, the northbound movement performs as LOS E during the PM peak hour with the northbound left-turn movement performing at LOS F. The southbound movement performs at LOS C during the PM peak hour with the southbound left-turn movement performing at LOS E.

As the area continues to develop and traffic volumes increase, lengthening delays on the side street may contribute to drivers continuing to take inadequate gaps in traffic when turning onto Highway 6, which could lead to an increase in collisions.

Between 2011 and 2014 there were thirteen total collisions, seven of which would be corrected by a traffic signal. The first five collisions reported in **Table 2** fell within the same twelve month period. The installation of a traffic control signal at this location will reduce the frequency and severity of major collisions including broadside and angle-oncoming left turn.

Table 2: Collision Experience

Highway 6 / Jones Blvd / Westcor Drive (2011-2014)			
Date of Collision	**Major Cause**	**Manner of Crash**	**Same 12 Month Period?**
08/07/2011	FTY from Stop Sign	Broadside	YES
10/20/2011	Ran Stop Sign	Broadside	YES
12/27/2011	Ran Stop Sign	Broadside	YES
07/10/2012	FTY from Stop Sign	Broadside	YES
08/24/2012	FTY from Stop Sign	Angle, oncoming left-turn	YES*
12/18/2012	FTY from Stop Sign	Broadside	No
01/02/2013	FTY from Stop Sign	Broadside	No

* Collision within 17 days of falling in the same 12 month period. Because it falls in the same calendar month, it was counted towards the collision warrant.

C. ITEMIZED BREAKDOWN OF ALL COSTS

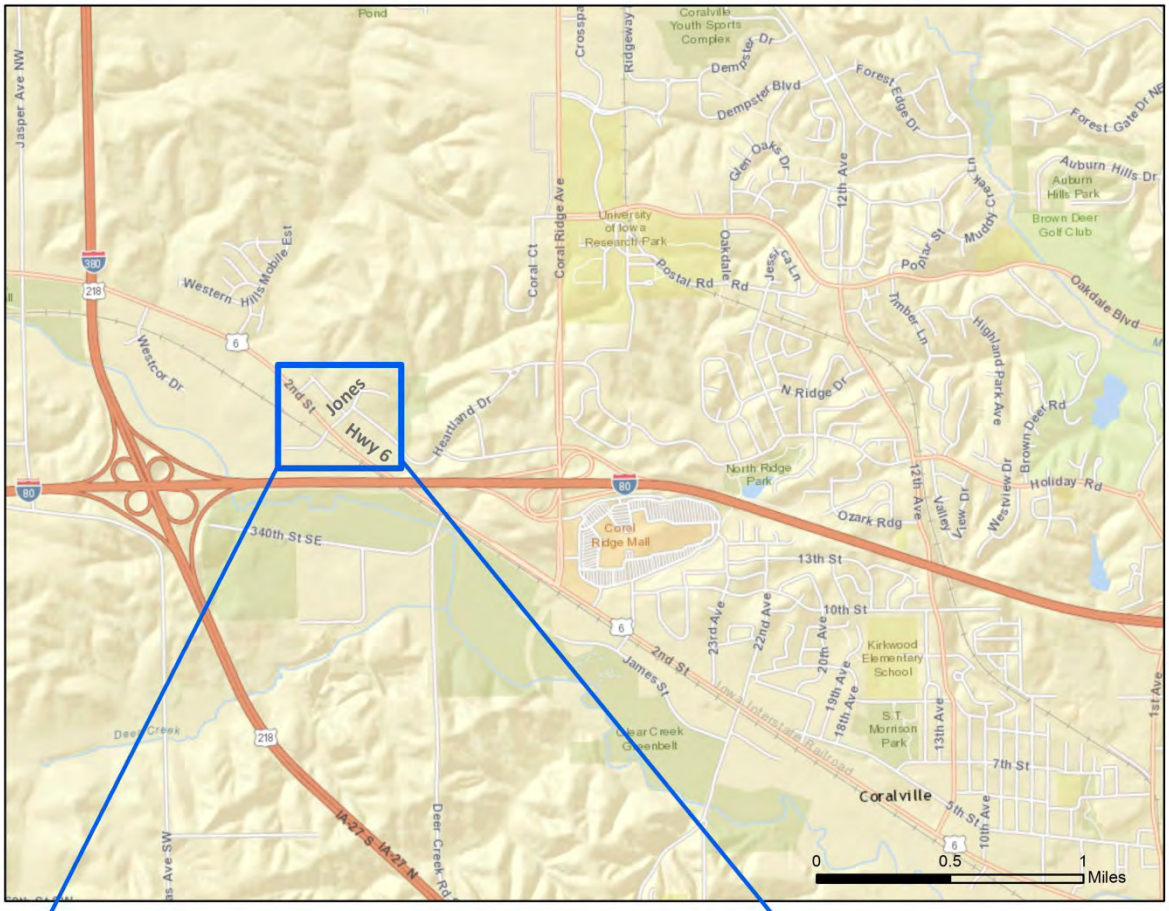
Item No	Description	Cost
1	Mobilization	$17,000.00
2	Construction Survey	$3,500.00
3	Traffic Control	$17,000.00
4	Traffic Signal	$283,00.00
5	Site Restoration	$3,500.00
6	Pavement Markings and Signage	$4,000.00
	Construction Subtotal	**$328,000.00**

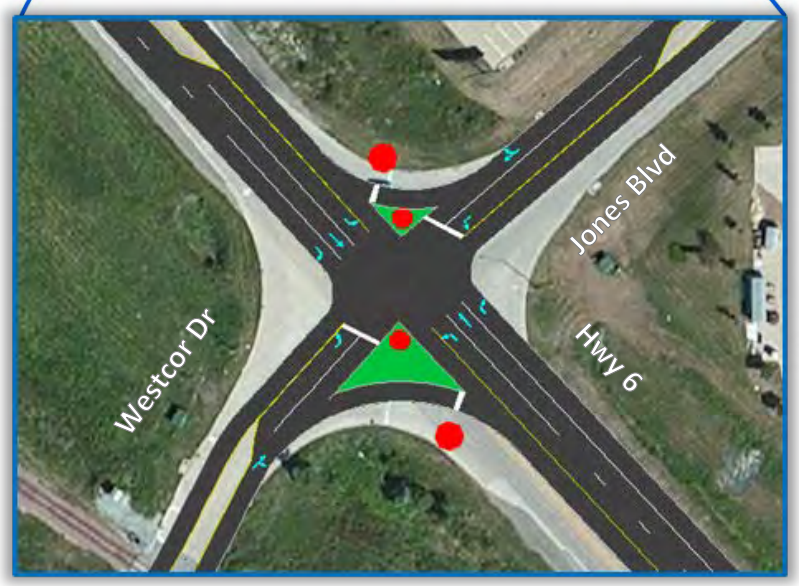
*Total project costs and construction costs provided herein are made on the basis of Engineer's experience and qualifications and represent the Engineer's best judgment.

D. TIME SCHEDULE

Activity	Date
July 26, 2016	**City Council approved submission**
August 15, 2016	**TSIP Funding Application Deadline**
Mid-December 2016	**TSIP Notification of Award**
July 1, 2017	**TSIP Funding Available**
July 2017	**Project Letting**
January 1, 2018	**Project Completion**

E. PROJECT LOCATION MAP





Highway 6, Jones Blvd, & Westcor Dr Intersection

N

Coralville, Iowa

F. COLOR PICTURES

IMAGES 1 / 2: HWY 6, JONES BLVD, AND WESTCOR DRIVE INTERSECTION

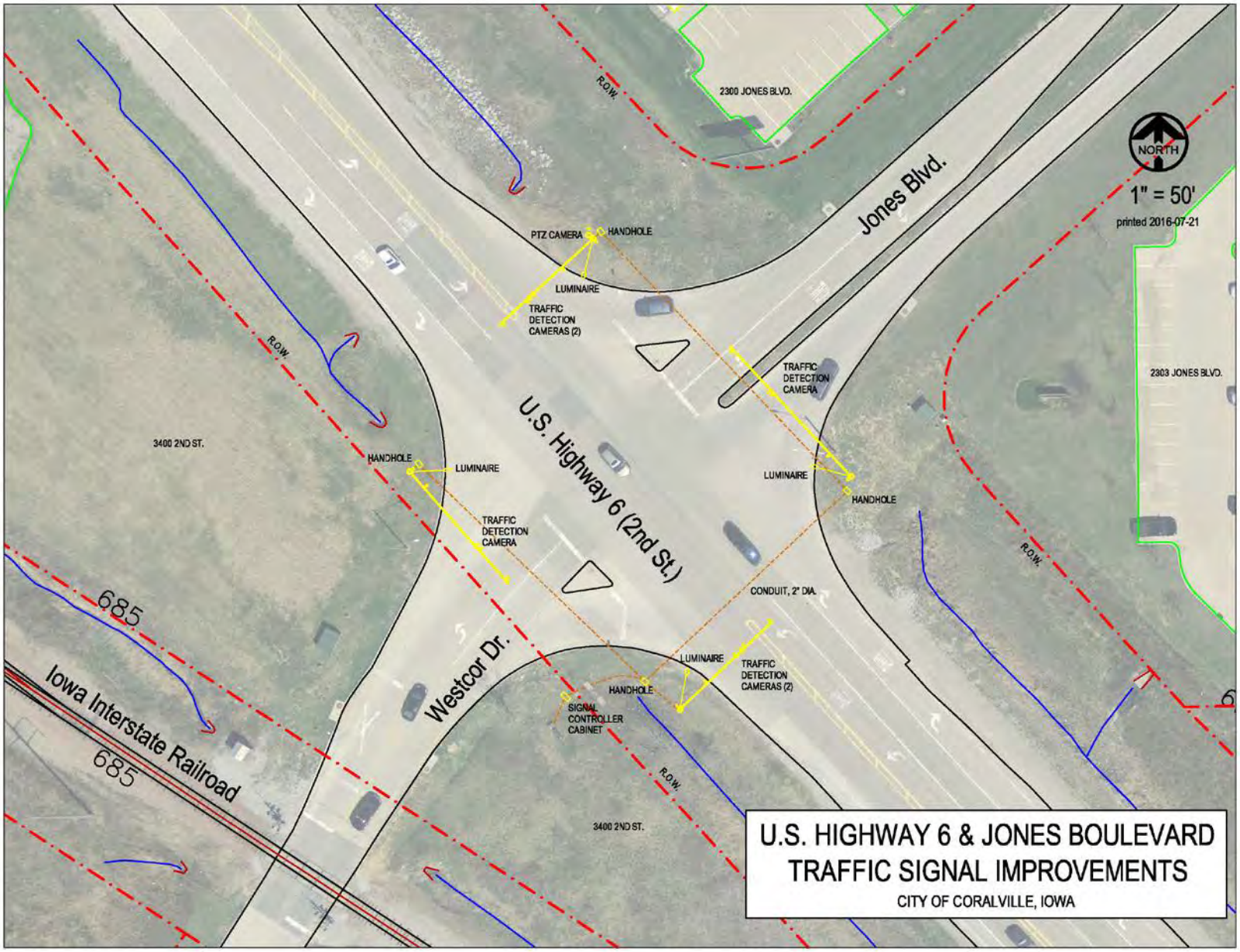
IMAGES 3 / 4: WESTCOR DRIVE – NB APPROACH

IMAGES 5 / 6: JONES BLVD – SB APPROACH

IMAGE 7: HWY 6 – EB APPROACH

IMAGE 8: HWY 6 – WB APPROACH

G. PLAN VIEW


NORTH
1" = 50'
printed 2016-07-21
Jones Blvd.
U.S. Highway 6 (2nd St.)
Westcor Dr.
Iowa Interstate Railroad
2300 JONES BLVD.
2303 JONES BLVD.
3400 2ND ST.
3400 2ND ST.
R.O.W.
PTZ CAMERA
HANDHOLE
LUMINAIRE
TRAFFIC DETECTION CAMERAS (2)
TRAFFIC DETECTION CAMERA
CONDUIT, 2" DIA.
SIGNAL CONTROLLER CABINET
685
685
U.S. HIGHWAY 6 & JONES BOULEVARD
TRAFFIC SIGNAL IMPROVEMENTS
CITY OF CORALVILLE, IOWA

H. AERIAL PHOTOGRAPH

Retrieved from Johnson County Pictometry Viewer (2012)

I. CMAT CRASH SUMMARY OF MOTOR VEHICLE ACCIDENTS

Iowa Department of Transportation

Major Cause Summary

Linn Mark Jeff

Analysis Years: 2010 [2], 2011 [3], 2012 [4], 2013 [2], 2014 [2]

Crash Summary:

Fatal	-
Major Injury	-
Minor Injury	1
Possible/Unknown	2
PDO	10
Total Crashes	13

Injury Summary:

Fatal	-
Major Injury	-
Minor Injury	1
Possible	2
Unknown	-
Total Injuries	3

Surface Condition Summary:

Dry	12
Wet	1
Ice	-
Snow	-
Slush	-
Sand/Dirt/Oil/Gravel	-
Water	-
Other	-
Unknown	-
Not Reported	-
Total Crashes	13

TOT Property Damage: $79,900

AVG Property Damage: $6,146

Major Cause Summary:

Animal	Improper Backing
Ran Traffic Signal	Illegally Parked/Unattended
2 Ran Stop Sign	Swerving/Evasive Action
Crossed Centerline	Over-Correcting/Over-Steering
FTYROW: At Uncontrolled Intersection	Downhill Runaway
FTYROW: Making Right Turn on Red Signal	Equipment Failure
4 FTYROW: From Stop Sign	Separation of Units
FTYROW: From Yield Sign	Ran Off Road - Right
1 FTYROW: Making Left Turn	Ran Off Road - Straight
FTYROW: From Driveway	Ran Off Road - Left
FTYROW: From Parked Position	Lost Control
FTYROW: To Pedestrian	Inattentive/Distracted By: Passenger
FTYROW: Other (explain in narrative)	Inattentive/Distracted By: Use of Phone or Other
Traveling Wrong Way or on Wrong Side of Rd	Inattentive/Distracted By: Fallen Object
1 Driving Too Fast for Conditions	Inattentive/Distracted By: Fatigued/Asleep
Exceeded Authorized Speed	Other: Vision Obstructed
Made Improper Turn	Oversized Load/ Oversized Vehicle
Improper Lane Change	Cargo/Equipment Loss or Shift
5 Followed Too Close	Other: Other Improper Action
Disregarded Railroad Signal	Unknown
Disregarded Warning Sign	Other: No Improper Action
Operating Vehicle In Reckless/Aggressive Manner	None Indicated

Selection Filter:

((YEAR = 2010 or YEAR = 2011 or YEAR = 2012 or YEAR = 2013 or YEAR = 2014))

Analyst: sarah

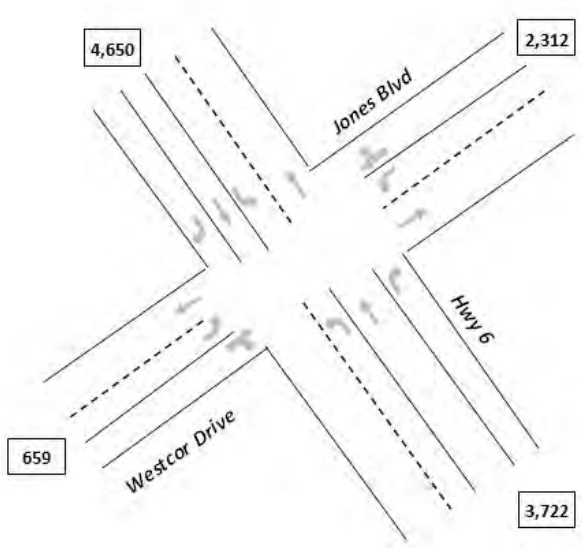
Notes:

8/2/2016 Crash Mapping Analysis Tool Page: 1 of 1

J. TRAFFIC VOLUMES

Average Daily Traffic (ADT) volumes for entering vehicles at the intersection were taken on April 8th – 11th, 2014 for a total of 72 hours using the MH Corbin Traffic Analyzer. Highway 6 carries approximately 8,300 vehicles per day, which is 74% of the total entering traffic at the intersection. 85th percentile speeds on Highway 6 range from 58.8 – 59.9 mph.

Location: Highway 6, Jones Blvd, & Westcor Dr
Date Recorded: April 8th—11th, 2014
Requested by: City of Coralville



See **Attachment A** for 15-minute traffic intervals.

K. TRAFFIC SIGNAL LAYOUT, TYPE, PROPOSED PHASING, AND DETECTOR LOCATIONS

To follow is a summary of the type, proposed phasing and detector information for the proposed traffic signals at this intersection. Refer to the plan view (Item G) for traffic signal layout and detector locations.

- Initial placement of traffic control signals.
- The traffic control signals will be fully-actuated and mast arm mounted utilizing a universally adjustable mast arm mount traffic signal bracket.
- The signal will consist of 8 phases.
- A Pan/Tilt/Zoom camera will be installed on the NW signal pole to assist the City of Coralville and Iowa DOT with incident management and to monitor the corridor's traffic continuity.
- Traffic detection cameras will be mounted on all (4) mast arms as shown in the plan view (Item G). The cameras will increase the efficiency of the intersection and provide for advance detection.
    - 2 cameras – Hwy 6 EB
    - 2 cameras – Hwy 6 WB
    - 1 camera – Westcor Drive
    - 1 camera – Jones Boulevard
- Applicable traffic signage will be installed according to the Manual on Uniform Traffic Control Devices (MUTCD).

L. BENEFIT / COST ASSUMPTIONS

The following assumptions were made to complete the benefit / cost ratio worksheet.

1. Estimated Improvement Life (Y) = 15 Years
2. Crash Reduction Factor (CRF) = 44
   - Intersection Traffic Control: Install a traffic signal
3. Growth = 7% based on the proposed construction of the Forevergreen Road / I-380 Interchange and reconstruction of the I-380 / I-80 Interchange.

L. BENEFIT / COST

Rev. 5/14

Intersection or Spot Benefit / Cost Safety Analysis

Iowa DOT Office of Traffic & Safety

County: Johnson | Prepared by: MPOJC | Date Prepared: Jul 11, 2016

Intersection: Hwy 6, Jones Blvd, and Westcor Drive Intersection

Improvement

Proposed Improvement(s): Traffic signal installation at the Hwy 6, Jones Blvd, and Westcor Drive intersection.

$ 328,000	Estimated Improvement Cost, **EC**	15	Est. Improvement Life, years, **Y**
$ 1,000	Other Annual Cost (after initial year), **AC**	44	Crash Reduction Factor (integer), **CRF**
$ 11,118	Present Value Other Annual Costs, **OC**	4.0%	Discount Rate (time value of $), **INT**
		$ 339,118	Present Value Cost, **COST** = EC + OC

$$OC = \frac{AC}{INT}\left(1 - \frac{1}{(1+INT)^Y}\right)$$

Traffic Volume Data

Source: MPOJC | April 8-11, 2014 Date of traffic count

Daily Entering Vehicles by Approach (or AADT / 2)

2,312

4,650 → ✱ ← 3,722

659

4,140,195 Current Annual Entering Veh., **AEV** = DEV * 365

31,296 veh / day, Final Year DEV, **FDEV**

104.04 MEV, Total Million Entering Veh. Over life of Project, **TMEV**

7.0% Projected Traffic Growth (0%-10%), **G**

11,343 Current Daily Entering Vehicles, **DEV**

$$TMEV = \frac{AEV}{-G}\left(1 - \left(\frac{1+G}{1}\right)^Y\right) \Big/ 10^6$$

Crash Data

2009 First full year --> 2014 Last full year 7.3 years, Time Period, **T**

15 Additional months

values as of May 2014

0	Fatal Crashes →	0	Fatalities @	$4,500,000	$	-
		0	Major Injuries @	$325,000	$	-
6	Injury Crashes →	1	Minor Injuries @	$65,000	$	65,000
		7	Possible Injuries @	$35,000	$	245,000
15	Property Damage Only		(assumed cost per crash)	$7,400	$	155,400
		-OR-	enter all Property Costs of all crashes:			
21	Total Crashes, **TA**			Total $ Loss, **LOSS**	$	465,400

2.90	Current Crashes / Year, **AA** = TA / T	0.70	Crashes / MEV, Crash Rate, **CR** CR = TA x 10^6 / (DEV x 365 x T)
$ 22,162	Cost per Crash, **AVC** = LOSS / TA	$ 500,870	Present Value of Avoided Crashes, **BENEFIT**
72.8	Total Expected Crashes, **TECR** = CR x TMEV		
1.27	Crashes Avoided First Year **AAR** = AA x CRF / 100		
$ 28,245	Crash Costs Avoided in First Year, AAR x AVC		
32.0	Total Avoided Crashes, TECR x CRF/ 100		

$$BEN. = \frac{AVC \times AAR}{(INT - G)}\left(1 - \left(\frac{1+G}{1+INT}\right)^Y\right)$$

Benefit / Cost Ratio

Benefit : Cost = $500,870 : $339,118 = **1.48** : 1

Application for FY2018 Traffic Safety Funds
Iowa Department of Transportation

(Site Specific)

Hubbell Avenue

Corridor Safety Improvements

Division of Traffic and Transportation
Jennifer L. McCoy, P.E., P.T.O.E.
City Traffic Engineer

August 15, 2016

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Application for TRAFFIC SAFETY FUNDS

GENERAL INFORMATION **DATE:** August 15, 2016

Location / Title of Project Hubbell Avenue Corridor

Applicant City of Des Moines

Contact Person Jennifer Dakovich Title Principal Traffic Engineer

Complete Mailing Address 400 E. Court Ave, 2nd Floor

Des Moines, Iowa 50309

Phone (515) 283-4973 E-Mail jldakovich@dmgov.org
(Area Code)

If more than one highway authority is involved in this project, please indicate and fill in the information below (use additional sheets if necessary).

Co-Applicant(s) _____

Contact Person _____ Title _____

Complete Mailing Address _____

_____

Phone _____ E-Mail _____
(Area Code)

PLEASE COMPLETE THE FOLLOWING PROJECT INFORMATION:

Application Type

- Site Specific ☒
- Traffic Control Device ☐
- Safety Study ☐

Funding Amount

Total Safety Cost	$ 12,600,000
Total Project Cost	$ 12,600,000
Safety Funds Requested	$ 500,000

Does this project appear on a Safety Improvement Candidate List or is there a safety study recommendation for this project?

☒ Yes – Explain Hubbell Ave Corridor Study April 2016 "Memo Regarding the Safety Assessments of Hubbell Ave in Des Moines" by Iowa DOT LTAP -Jan 2015

☐ No

Rev. 6/16

APPLICATION CERTIFICATION FOR LOCAL GOVERNMENT

To the best of my knowledge and belief, all information included in this application is true and accurate, including the commitment of all physical and financial resources. This application has been duly authorized by the participating local government(s). I understand the attached resolution(s) binds the participating local government(s) to assume responsibility if any additional funds are committed, and to ensure maintenance of any new or improved city streets or secondary roads.

I understand that, although this information is sufficient to secure a commitment of funds, a firm contract between the applicant and the Department of Transportation is required prior to the authorization of funds.

Representing the City of Des Moines

Signed: T.M. Franklin Cownie 8/8/16

Signature Date Signed

T.M. Franklin Cownie, Mayor

Typed Name

Attest: 8/8/16

Signature Date Signed

DIANE RAUH

Typed Name

★ **Roll Call Number**
16-1313

Agenda Item Number
26

Date August 8, 2016

APPROVING FISCAL YEAR 2018 TRAFFIC SAFETY FUND APPLICATION TO THE IOWA DEPARTMENT OF TRANSPORTATION

BE IT RESOLVED, BY THE CITY COUNCIL OF THE CITY OF DES MOINES, IOWA:

That the City Manager is hereby directed to submit an application to the Iowa Department of Transportation for Traffic Safety Funds to cover a portion of the construction costs for the Hubbell Avenue Corridor Safety Improvements project.

The City further agrees that if this project is funded and constructed, the City of Des Moines will provide adequate resources to maintain the improvements for their useful life.

(Council Letter Number 16-447 attached)

Moved by Hensley to adopt.

APPROVED AS TO FORM:

Kathleen Vanderpool
Deputy City Attorney

COUNCIL ACTION	YEAS	NAYS	PASS	ABSENT
COWNIE	✓			
COLEMAN	✓			
GATTO	✓			
GRAY	✓			
HENSLEY	✓			
MOORE	✓			
WESTERGAARD	✓			
TOTAL	7			

MOTION CARRIED APPROVED

T. M. Franklin Cownie Mayor

CERTIFICATE

I, DIANE RAUH, City Clerk of said City hereby certify that at a meeting of the City Council of said City of Des Moines, held on the above date, among other proceedings the above was adopted.

IN WITNESS WHEREOF, I have hereunto set my hand and affixed my seal the day and year first above written.

Diane Rauh
City Clerk

Narrative

Existing Conditions

Deteriorated pavement; significant volume of crashes; safety deficiencies; minimal pedestrian or bicycle accommodations; skewed intersections; blind spots; inefficient traffic operations. These statements summarize the Hubbell Avenue corridor in Des Moines today. The Hubbell Avenue Corridor Reconstruction Project will transform the 0.5 mile stretch of Hubbell Avenue between East 33rd Street and East 38th Street, East Douglas Avenue from East 33rd Street to Hubbell Avenue, and East Euclid Avenue from East 33rd Street to Hubbell Avenue in Des Moines from a vehicle-centric, four-lane, roadway into a revitalized, multimodal, divided urban roadway. The objective of this project is to design and construct a corridor that is safe and accommodating and moves all forms of traffic as safely and efficiently as possible. Hubbell Avenue is a four-lane, semi-divided road with a posted speed of 40 mph. The corridor includes four at-grade intersections, 13 commercial and residential driveway access points, residential housing to the south and a frontage road paralleling Hubbell Avenue. Hubbell Avenue runs diagonally southeast and northwest which forms several odd intersection angles. These skews are the cause of many crashes due to line of sight distance and blind spots. This stretch of Hubbell Avenue had 151 car crashes from 2013 through early 2016, including two fatalities. The corridor currently carries up to 23,000 vehicles per day and is projected to increase by an additional 4,000 vehicles per day within the next 30 years.

Crash History

151 crashes have occurred within the 0.5 mile corridor of Hubbell Avenue during the 3.5 year period between January 2013 and April 2016. During that period 18 personal injury crashes resulted in 25 injuries, including 1 fatal crash resulting in 2 deaths. The total property damage loss was $892,090, with an average of $5,908 loss per crash. This corridor has a crash rate of 1,270 crashes per hundred million vehicle miles (HMVM) traveled. This crash rate is approximately 4.8 times the statewide average crash rate of 264 crashes per HMVM for the same class of roadway. The majority of crashes in this corridor are due to failure to yield at stop signs, failure to yield making a left turn, following too close, and failure to yield at traffic signals.

Proposed Concept

The goals of the Hubbell Avenue Corridor Reconstruction Project are to:

- Enhance safety
- Improve traffic flow
- Create better sight distance
- Create better turning angles
- Provide for bicycle and pedestrian access and mobility
- Improve pavement conditions

A median will be added to Hubbell Avenue to separate opposing lanes of traffic and provide access control. Left turn lanes will be added at key intersections. The all-way stop at East Euclid Avenue will be replaced with a traffic signal. The western portion of East Douglas Avenue will be rerouted to create two T-intersections on both sides of the QuikTrip, thus eliminating the existing skewed intersection. Along with eliminating the two Hubbell Avenue access points to QuikTrip, a pedestrian crossing will also be added by East 37th Street. A traffic signal and crosswalks will be added at the East Douglas Avenue and Hubbell Avenue intersection with the Hilltop Apartments entrance. The signal for the intersection of Hubbell Avenue and East 38th Street will be removed along with the section of East 38th Street between Hubbell Avenue and

East Douglas Avenue; thus eliminating another diagonal intersection and rerouting traffic to the new signalized intersection of Hubbell Avenue and East Douglas Avenue.

Safety Justification

The proposed traffic signal pole locations will increase the clear zone at the intersections of Hubbell Avenue and East Euclid Avenue and Hubbell Avenue and East 38th Street/East Douglas Avenue. Protected-permissive left turn indications will be added along Hubbell Avenue. Consolidating and reducing the number of driveway accesses is expected to reduce the potential for crashes by reducing the number of conflict points along Hubbell Avenue. Realignment of the major intersections should also reduce difficulty of gap selection by drivers entering or exiting the roadways. Construction of the left turn lanes at major intersections is expected to reduce the potential for a rear-end collisions at the intersection as the left turning traffic will be removed from the through lane while slowing to make a left turn. A pedestrian signal will be added at East 37th Street to provide a connection from the neighborhood to bus stops, businesses, parks and a trailhead. A five-foot wide sidewalk will be constructed on the north and south side. These new facilities will benefit transit riders, pedestrians and bicyclists. ADA compliant ramps will be constructed at all intersections.

Manual on Uniform Traffic Control Devices (MUTCD) Requirements

All proposed intersection and traffic safety improvements will be consistent with the 2009 MUTCD.

Clear Zones

All proposed intersection and traffic safety improvements will be consistent with accepted engineering design practice and will include adequate clear zones adjacent to the roadway.

Itemized Breakdown of Costs

Foth

Foth Infrastructure & Environment, LLC
#191 Birchwood Court, Suite L • Johnston, Iowa 50131-2931
Phone: (515) 254-1393 • Fax: (515) 254-1642

March 2, 2016
Hubbell Avenue Corridor Safety Improvements
E. Euclid Avenue to E38th Street
Preliminary Opinion of Probable Construction Costs
(Order of Magnitude Estimate)
Des Moines, Iowa

PREFERRED ALTERNATIVE

ITEM NO.		ITEM DESCRIPTION	UNIT	QUANTITY	UNIT PRICE	TOTAL
DIVISION 1 - GENERAL						
1.1		MOBILIZATION	LS	1	$365,000	$ 365,000.00
1.2		CONSTRUCTION SURVEY	LS	1	$190,000	$ 190,000.00
DIVISION 2 - EARTHWORK						$ 1,348,650.00
DIVISION 3 - TRENCH AND TRENCHLESS CONSTRUCTION						$ 25,000.00
DIVISION 4 - SEWERS AND DRAINS						$ 814,500.00
DIVISION 5 - WATER MAINS AND APPURTENANCES						$ 524,500.00
DIVISION 6 - STRUCTURES FOR SANITARY AND STORM SEWERS						$ 496,500.00
DIVISION 7 - STREETS AND RELATED WORK						$ 2,844,000.00
DIVISION 8 - TRAFFIC CONTROL						$ 820,300.00
DIVISION 9 - SITE WORK AND LANDSCAPING						$ 50,000.00
DIVISION 10 - DEMOLITION						
DIVISION 11 - MISCELLANEOUS						
DIVISION 12 - GENERAL						
DIVISION 13 - CULVERT						
SUBTOTAL COSTS						**$ 7,479,000**
		CONTINGENCY (20%)				$ 1,496,000.00
TOTAL ROAD CONSTRUCTION COSTS						**$ 8,975,000**
DESIGN, ADMINSTRATIVE & RIGHT OF WAY						**$ 3,011,000**
		CONTINGENCY (20%)				$ 603,000.00
TOTAL DESIGN, ADMIN, & RIGHT OF WAY COSTS						**$ 3,614,000**
TOTAL ESTIMATED PROJECT COST (Order of Magnitude)						**$ 12,600,000**

ESTIMATE ASSUMPTIONS:
(a) Project estimated as a complete street reconstruction of Hubbell Avenue and sidestreets.
(b) Estimate **does not** include major sanitary sewer system replacement (only minor repairs and manhole adjustments).
(c.) Estimate includes mainline/sidestreet replacement/upgrading of water main including valves/hydrants within the project area.
(d) Estimate ***does not*** include street lighting installation costs.
(e.) Estimate ***does not*** include major environmental clean costs.
(f.) Estimate ***does not*** include overhead or underground electric relocation.
(g.) Posted speed limit for this section of the corridor is lowered to 35 MPH. If not vertical curve adjustment recommended to achieve preferred sight distance criteria (additional 500-ft of 4-lane reconst $750,000)
RIGHT-OF-WAY NOTES:
(1) Complete parcel acquisition estimate includes $8/SF FOR 6,279 SF OF LAND + BUILDING 1.5 x $55,500 + $50,000 DEMO/HAZARD CLEANUP x 10%
(2) Parcel acquisition estimate includes $8/SF x 1.50 increase for major impacts. Also antipated that the City would vacate old street alignment to property owner while retaining easements.
(3) Parcel acquisition estimate includes $3/SF for existing frontage road area plus other land for sidewalk connection to trail.
(4) Assume property at 3703 Hubbell Avenue impacts do not require complete parcel acquisition and proposed conceptual improvements can be implemented without significant impacts to property use.

Anticipated Funding Sources

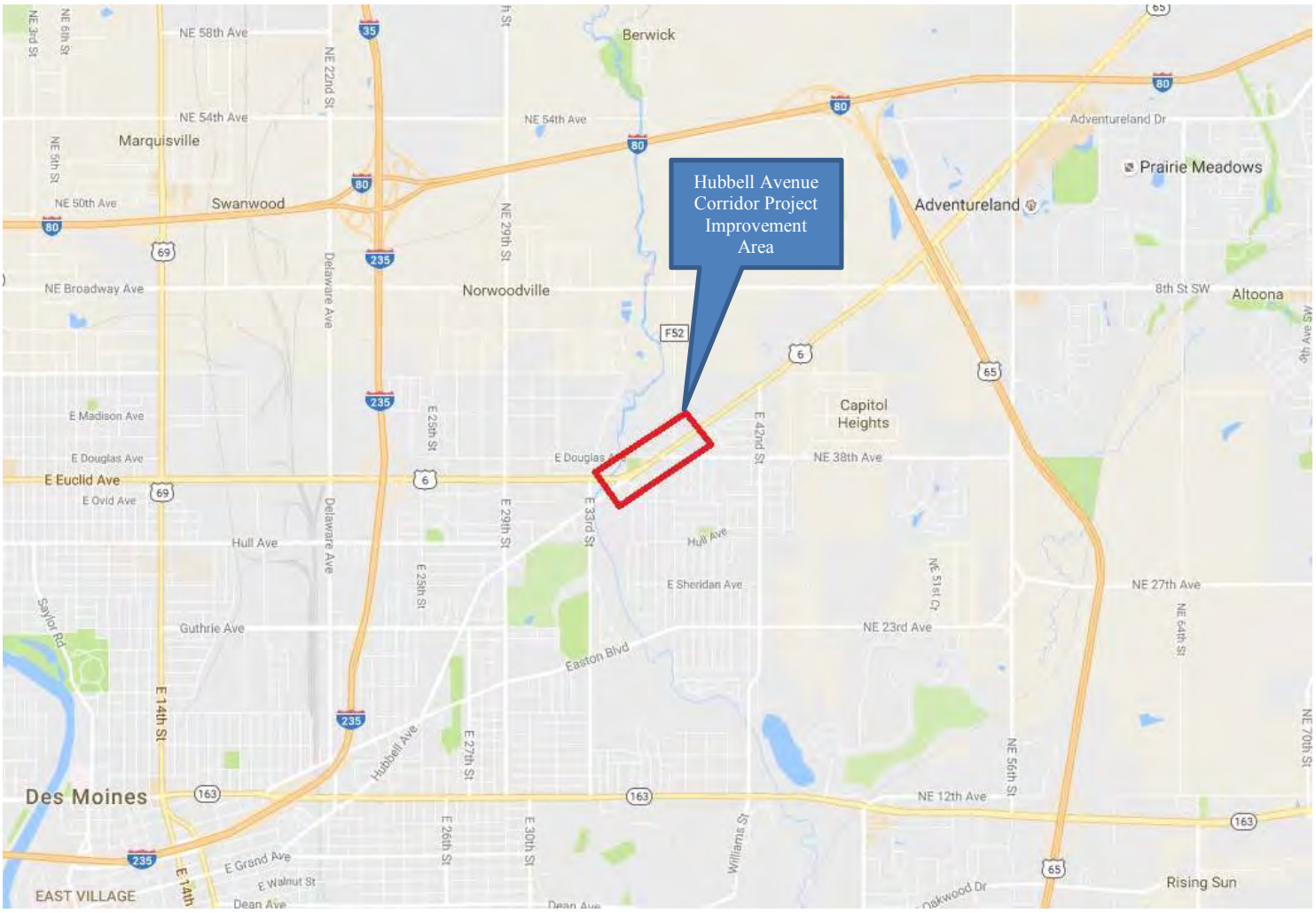
Funding	**Total**	**Percent**
Local	$8,200,000	65%
Iowa DOT Transportation Program Funds	$4,000,000	32%
USTEP	$400,000	3%
Total	**$12,600,000**	

*Entire project cost is safety related in this specific situation

Project Schedule **Section E**

Design Survey	July - October 2016
Preliminary Plan Design	November 2016 - May 2017
Acquisition Plat Preparation	May - June 2017
Property Acquisitions	July – December 2017 (6 mos)
Utility Relocations	January – August 2018
Final Plan Preparation	April – June 2018
Plan Approval & Project Letting	July – August 2018
Construction	September 2018 – December 2019

Project Map **Section F**

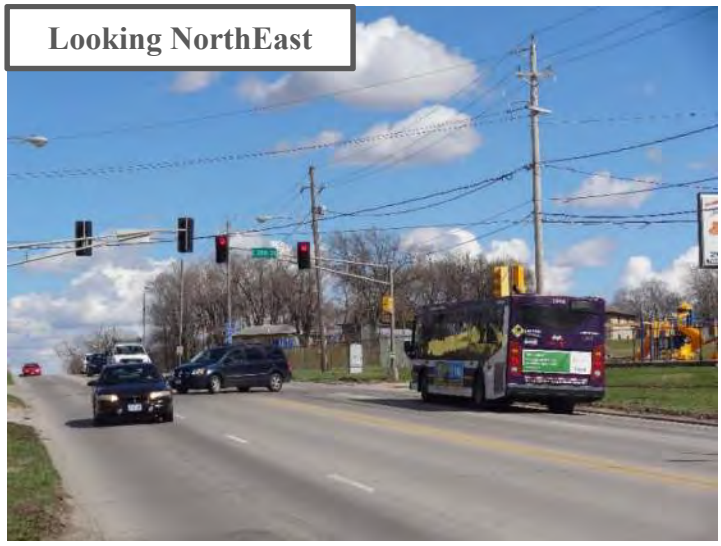


Color Pictures

Euclid Ave & Hubbell Ave Intersection

Douglas Ave & Hubbell Ave Intersection

Hubbell Ave and 38th St Intersection



Existing with ROW and Intersection Numbers

Proposed Plan with Proposed ROW

CMAT/SAVER Crash Summary

Iowa Department of Transportation

Major Cause Summary

Hubbell Avenue Corridor

Analysis Years: 2013 [32], 2014 [46], 2015 [50], 2016 [21]

Crash Summary:

Fatal	1
Major Injury	7
Minor Injury	11
Possible/Unknown	43
PDO	89
Total Crashes	151

Injury Summary:

Fatal	2
Major Injury	8
Minor Injury	17
Possible	55
Unknown	5
Total Injuries	87

TOT Property Damage: $892,090

AVG Property Damage: $5,908

Surface Condition Summary:

Dry	113
Wet	26
Ice	1
Snow	9
Slush	2
Sand/Dirt/Oil/Gravel	–
Water	–
Other	–
Unknown	–
Not Reported	–
Total Crashes	151

Major Cause Summary:

	Animal
9	Ran Traffic Signal
4	Ran Stop Sign
8	Crossed Centerline
	FTYROW: At Uncontrolled Intersection
	FTYROW: Making Right Turn on Red Signal
33	FTYROW: From Stop Sign
	FTYROW: From Yield Sign
23	FTYROW: Making Left Turn
7	FTYROW: From Driveway
	FTYROW: From Parked Position
	FTYROW: To Pedestrian
4	FTYROW: Other (explain in narrative)
2	Traveling Wrong Way or on Wrong Side of Rd
1	Driving Too Fast for Conditions
2	Exceeded Authorized Speed
6	Made Improper Turn
1	Improper Lane Change
14	Followed Too Close
	Disregarded Railroad Signal
	Disregarded Warning Sign
1	Operating Vehicle in Reckless/Aggressive Manner
1	Improper Backing
	Illegally Parked/Unattended
1	Swerving/Evasive Action
	Over-Correcting/Over-Steering
	Downhill Runaway
	Equipment Failure
	Separation of Units
1	Ran Off Road - Right
	Ran Off Road - Straight
	Ran Off Road - Left
8	Lost Control
1	Inattentive/Distracted By: Passenger
2	Inattentive/Distracted By: Use of Phone or Other
	Inattentive/Distracted By: Fallen Object
1	Inattentive/Distracted By: Fatigued/Asleep
3	Other: Vision Obstructed
	Oversized Load/ Oversized Vehicle
	Cargo/Equipment Loss or Shift
4	Other: Other Improper Action
12	Unknown
1	Other: No Improper Action
1	None Indicated

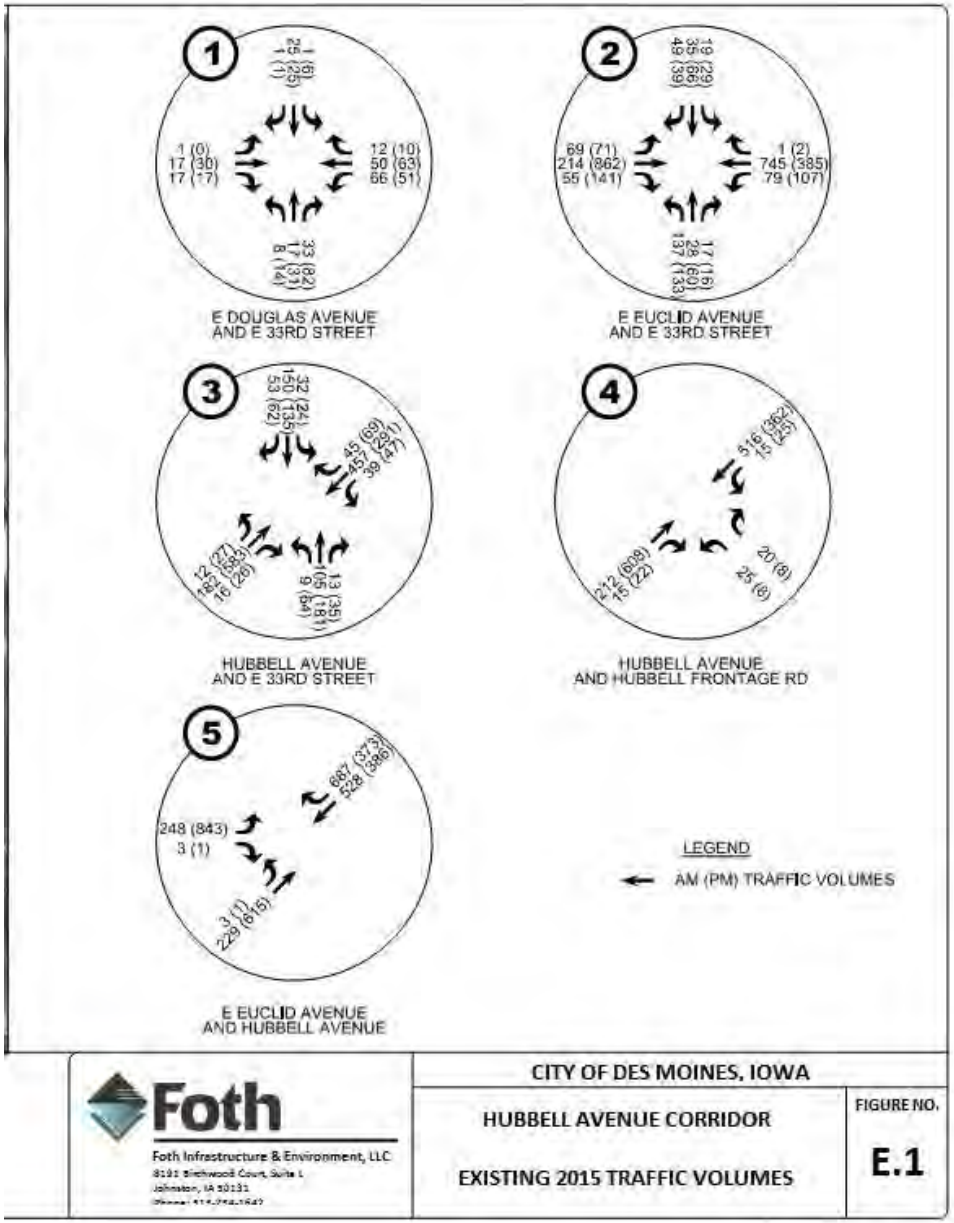
Selection Filter:

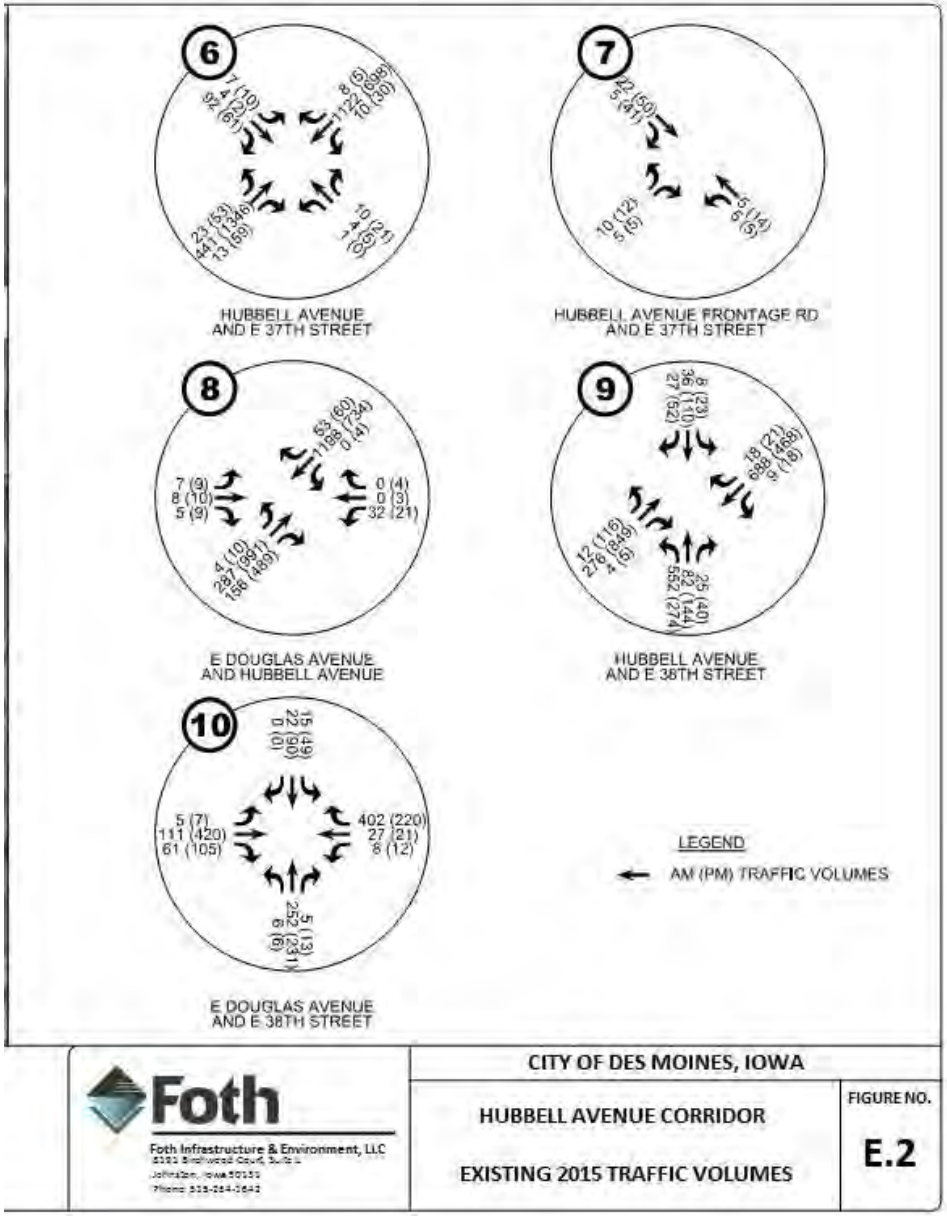
((YEAR = 2013 or YEAR = 2014 or YEAR = 2015 or YEAR = 2016))

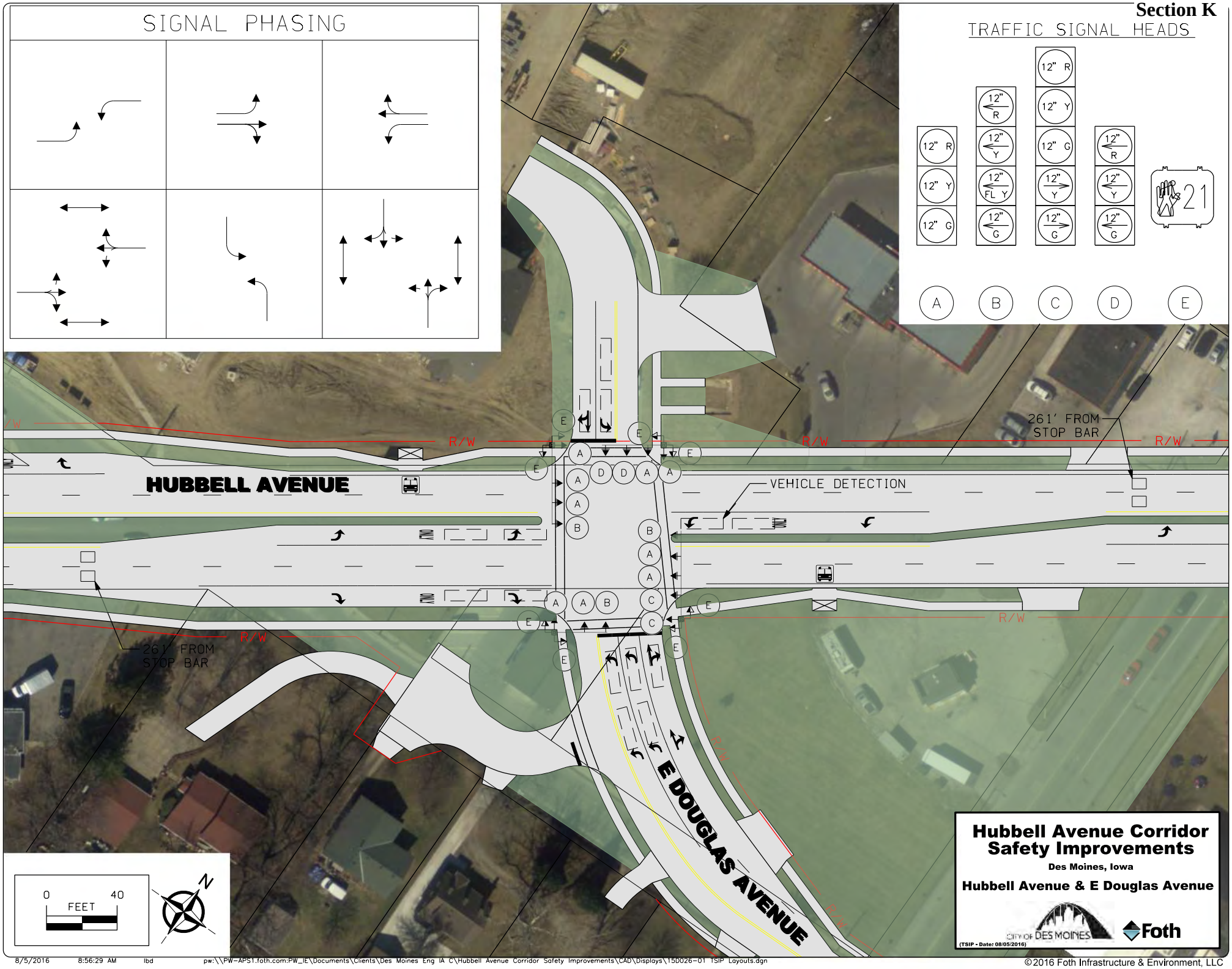
Analyst: Grant Martin

Notes:

Intersection numbers correspond to numbers on Existing Plan figure in Section G.







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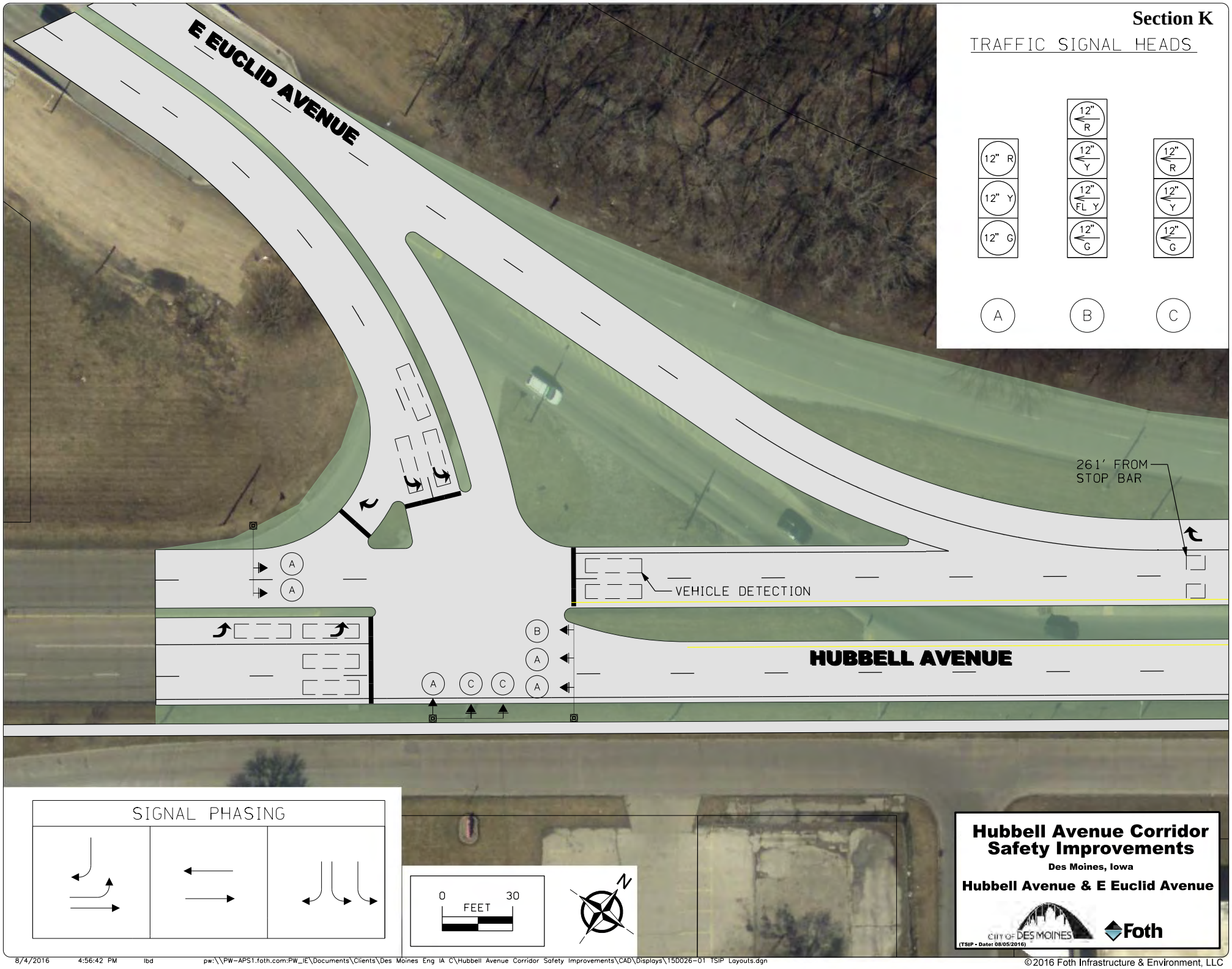

Hubbell Avenue Corridor Safety Improvements

Des Moines, Iowa

Hubbell Avenue & E Euclid Avenue

CITY OF DES MOINES

Foth

(TSIP - Date: 08/05/2016)

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Rev. 5/14

Road Segment Benefit / Cost Safety Analysis

Iowa DOT Office of Traffic & Safety

County: Polk | Prepared by: Foth | Date Prepared: Jul 29, 2016

Location: Hubbell Avenue from Euclid Avenue to 38th Street

Improvement

Proposed Improvement(s): Adding/removing traffic signals, rotating road crossings into T-intersections, adding turn lanes, adding pedestrian crossings, median to separate traffic, eliminating unecessary road segments.

$ 12,600,000	Estimated Improvement Cost, **EC**	20	Est. Improvement Life, years, **Y**
$ -	Other Annual Cost (after initial year), **AC**	64	Crash Reduction Factor (integer), **CRF**
$ -	Present Value Other Annual Costs, **OC**	4.0%	Discount Rate, **INT**
		$ 12,600,000	Present Value All Costs, **COST** = EC + OC

$$OC = \frac{AC}{INT}\left(1 - \frac{1}{(1+INT)^Y}\right)$$

Traffic Volume Data

Source: Iowa DOT | 2015 Date of traffic count

Length (mi.)	Two-way veh/day	Description
0.50	23,000	Urban Arterial
0.50	miles total	

0.5% Projected Traffic Growth (0%-10%), **G**

11,500	Current Vehicle Miles / Day, **VM**
12,706	End of Life Veh. Miles / Day
4,197,500	Current Veh. Miles / Year, **AM**
88,059,837	Total Projected Veh. Miles Over Life of Project, **TVMT**

$$TVMT = \frac{AM}{-G}\left(1 - \left(\frac{1+G}{1}\right)^Y\right)$$

Crash Data

2013 First full year | 2015 Last full year | 3.3 years, Time Period, **T**

4 Additional months | values as of May 2014

1	Fatal Crashes →	1	Fatalities @	$4,500,000	$ 4,500,000
		9	Major Injuries @	$325,000	$ 2,925,000
61	Injury Crashes →	17	Minor Injuries @	$65,000	$ 1,105,000
		60	Possible Injuries @	$35,000	$ 2,100,000
89	Property Damage Only		(assumed cost per crash)	$7,400	$ 1,117,400
			-OR- enter all Property Costs of all crashes:		
151	Total Crashes, **TA**			Total $ Loss, **LOSS**	$ 11,747,400

45.30	Current Crashes / Year, **AA** = TA / T	**1,079.2**	Crashes / HMVM, Crash Rate, **CR** CR = TA x 10^8 / (AM x T)
$ 77,797	Cost per Crash, **AVCR** = LOSS / TA		
950.4	Total Expected Crashes, **TCR** = CR x TVMT/10^8	$ 31,747,250	Present Value of Avoided Crashes, **BENEFIT**
28.81	Crashes Avoided First Year **AAR** = AA x CRF / 100		
$ 2,241,404	Crash Costs Avoided in First Year, AAR x AVCR		
604.4	Total Avoided Crashes, TCR x CRF/ 100		

$$BEN. = \frac{AVCR \times AAR}{(INT - G)}\left(1 - \left(\frac{1+G}{1+INT}\right)^Y\right)$$

Benefit / Cost Ratio

Benefit : Cost = $31,747,250 : $12,600,000 = **2.52** : 1

*CRF was calculated for the addition of both signalized intersections (35), both left turn lanes (20) and a high visibility crosswalk (30). Using below average values and not including all safety reduction factors to keep the estimate conservative.

**First fatality counted as a major injury.

Application for TRAFFIC SAFETY FUNDS

GENERAL INFORMATION **DATE:** 8/12/16

Location / Title of Project US18/IA122 from N 20th St to Willow Creek Ct, Clear Lake

Applicant District 2 Office

Contact Person David Little Title Engineer

Complete Mailing Address 428 43rd Street SW
Mason City, IA 50401

Phone 641-423-7584 (Area Code) E-Mail David.Little@dot.iowa.gov

If more than one highway authority is involved in this project, please indicate and fill in the information below (use additional sheets if necessary).

Co-Applicant(s) _____

Contact Person _____ Title _____

Complete Mailing Address _____

_____

Phone _____ (Area Code) E-Mail _____

PLEASE COMPLETE THE FOLLOWING PROJECT INFORMATION:

Application Type

- Site Specific ☒
- Traffic Control Device ☐
- Safety Study ☐

Funding Amount

Total Safety Cost	$ 713,000
Total Project Cost	$ 713,000
Safety Funds Requested	$ 500,000

Does this project appear on a Safety Improvement Candidate List or is there a safety study recommendation for this project? ☒Yes – Explain Traffic Operations Study By Snyder and Associates

Rev. 6/16

APPLICATION CERTIFICATION FOR LOCAL GOVERNMENT

To the best of my knowledge and belief, all information included in this application is true and accurate, including the commitment of all physical and financial resources. This application has been duly authorized by the participating local government(s). I understand the attached resolution(s) binds the participating local government(s) to assume responsibility if any additional funds are committed, and to ensure maintenance of any new or improved city streets or secondary roads.

I understand that, although this information is sufficient to secure a commitment of funds, a firm contract between the applicant and the Department of Transportation is required prior to the authorization of funds.

Representing the Iowa Department of Transportation, District 2 Office

Signed: David L Little — Aug 11, 2016

Signature — Date Signed

David L. Little, P.E. Assistant District Engineer

Typed Name

Attest: David Roeber — 8/11/16

Signature — Date Signed

David Roeber, P.E. District Construction Engineer

Typed Name

Document A

"Sailing Ahead" With the City of CLEAR LAKE "Where People Make the Difference"

CITY OF CLEAR LAKE

15 North 6th Street • P.O. Box 185 • Clear Lake, IA 50428
Phone: 641-357-5267 • Fax: 641-357-8711
www.cityofclearlake.com

Mayor
NELSON P. CRABB

City Administrator
SCOTT FLORY

COUNCIL MEMBERS

MARK EBELING
Ward 1

TONY J. NELSON
Ward 2

JIM BOEHNKE
Ward 3

MIKE CALLANAN
At Large

GARY HUGI
At Large

August 9, 2016

Steven Schroder
Iowa Department of Transportation
Office of Traffic and Safety
800 Lincoln Way
Ames, IA 50010

Dear Steven,

The City of Clear Lake, Iowa, and the Iowa DOT have identified a number of operational and safety issues in the US18/IA 122 corridor between North 20th Street and Willow Creek Court, including the I-35 Exit 194 ramp terminal intersections. Preliminary engineering by Snyder and Associates have determined that a new traffic signal system and turn lane improvements will reduce congestion and driver confusion in the area.

The City of Clear Lake supports the Iowa DOT's efforts to make improve traffic operations in this corridor. We feel the improvements will provide a safety benefit to the traveling public.

The City lends its support to this Traffic Safety Improvement Program application.

Sincerely,

Scott Flory
City Administrator
City of Clear Lake

CLEAR LAKE

Document B

US 18/IA 122 from N 20th Street to Hickory Avenue/Willow Creek Court
Clear Lake, IA

Existing Conditions

The US 18/IA 122 corridor from N 20th Street to Hickory Avenue/Willow Creek Court is located at Exit 194 of I-35 within the corporate limits of Clear Lake in Cerro Gordo County. The corridor is comprised of five intersections, two of which are the ramp terminals to I-35 in just 4,000 feet, all with heavy turning volumes, heavy trucks, and limited turn-lane storage.

The intersections will be described going eastbound through the corridor. The intersection of US 18/N 20th Street is in close proximity to the others and will require signal coordination with the other intersection improvements.

US 18/N 24th Street is located approximately 650 feet west of the southbound ramp terminal intersection. This intersection serves a truck stop, convenience store, and large hotel/restaurant facility on the south side, and numerous restaurants, convenience stores, smaller hotels, and a residential area on the north side. This intersection has on-going operational concerns due to large volumes of turning trucks with limited turn lane storage, and a limited distance of frontage road/property access points. Also, the city is having on-going problems with off-tracking trucks hitting signal poles.

Southbound I-35 ramp terminal intersection is currently unsignalized. A recent traffic impact study concerning a proposed truck stop facility in the area indicated this intersection warrants traffic signals. There is additional concern the wide median may create signal display problems with the installation of traffic signals, confusing motorists.

Northbound I-35 ramp terminal intersection is currently signalized, but there have been long standing operational concerns due to the placement of the signal pole on the NE quadrant on which the displays for the NB off-ramp are mounted. The display is well away from the NB off-ramp traffic and unfortunately becomes visible to EB-NB left turning traffic when maneuvering through the median crossover. Seeing this signal displaying red confuses the left-turning traffic. It's been somewhat effective to address this concern by using optically-limited signal displays.

The IA 122/Hickory Avenue/Willow Creek Court intersection serves two car dealerships, a truck repair business, and a truck stop facility constructed in 2015 on the south leg. There is potential for large scale commercial industrial redevelopment on the north leg. A traffic impact study for the new truck stop justified the installation of signals at this intersection. Signals

including off-set left turn lanes were installed with the truck stop development. The study also justified signals at the southbound ramp terminal.

Concept

The District would like to install traffic signals at the southbound ramp terminal intersection, improve signal coordination of the five signalized intersections, from N 20th Street to Willow Creek Court and provide turn-lane storage length improvements throughout. The proposed project can be constructed within existing ROW.

Justification

The 2011-2015 crash history for the corridor includes 92 reportable crashes, resulting in 40 injuries. Of the five intersections US 18 and N 24th Street had 34 crashes with 14 injuries; US 18 and SB ramp intersection had 16 crashes with 2 injuries, and the NB ramp intersection had 20 crashes with 14 injuries.

The predominant crash types include *Rear End, Angle Oncoming Left Turn, Broadside, and Sideswipe Same Direction*. The predominant cause is running of the traffic signals. It's believed the operations and signal timing of the intersections cause drivers to become impatient and run the red light to make the desired turn.

Operationally, the existing short turn lanes in conjunction with the high volume of turning trucks quickly fill the turn lane storage length and cause backups in the mainline thru traffic lanes. Congestion is observed on a routine basis especially during peak hours at each of the intersections. Additionally turning trucks continue to impact nearby signal poles in the returns of the intersection.

Given the existing conditions and high turning volumes with the current crash experience and operational issues, District feels strongly that turn lane improvements and installation of additional signals should be constructed in addition to coordinating the signal timing of all five intersections. The City of Clear Lake supports the project.

Document C

Project Cost Estimate
Installation of Traffic Signals and Turn Lane Improvements

Intersection Improvements:

US 18 & N 24th St.	$251,000
US 18 & SB I-35 Ramps	$331,000
US 18 & NB I-35 Ramps	$131,000
Project Total=	$713,000

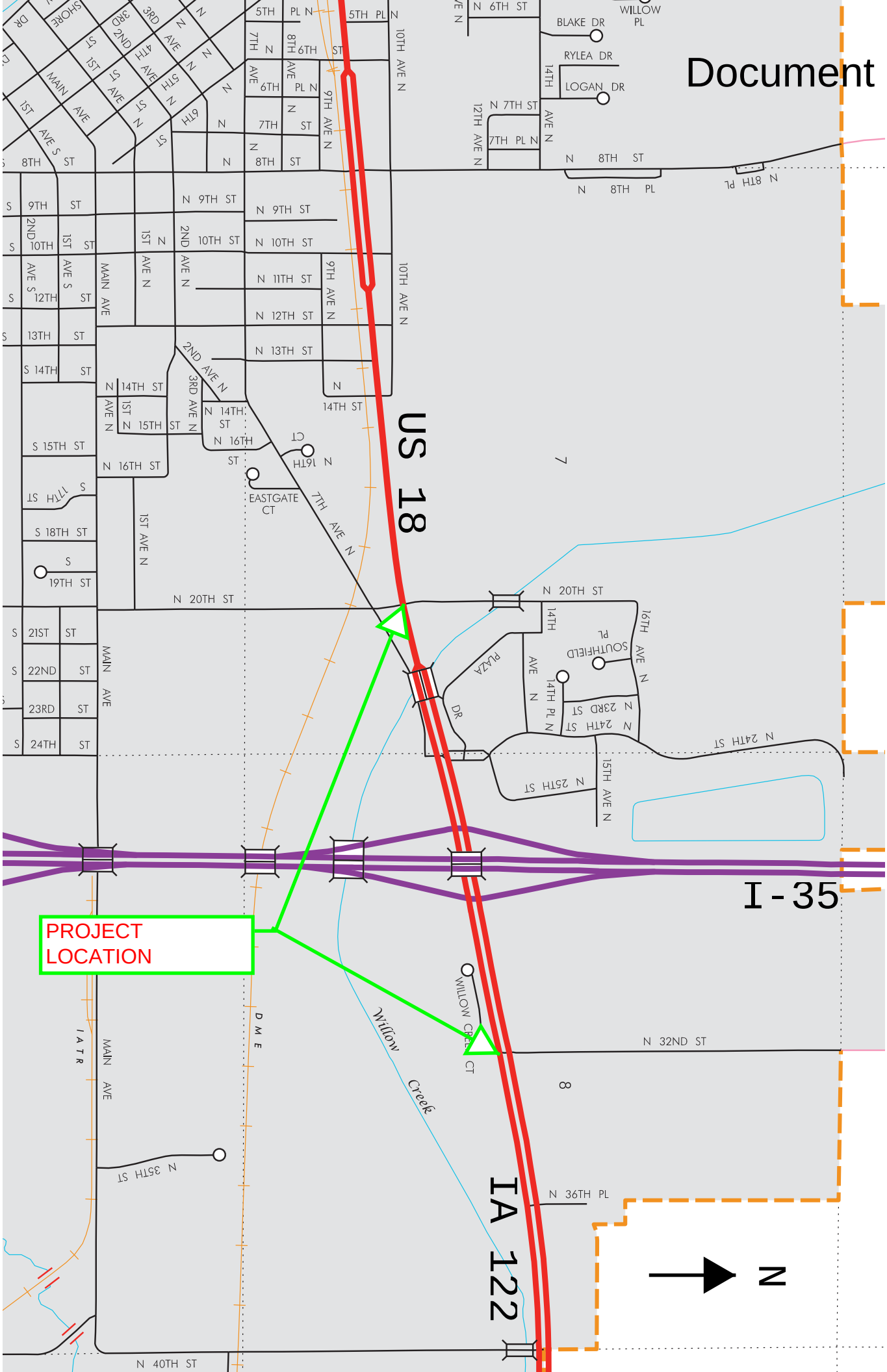
*Additional funding required as project costs exceed application amount.

Document D

Proposed Schedule:

Grant Approval	December 2016
Project Development	May 2017-July 2018
Project Letting	July 2018
Project Completion	July 2019

Document E


US 18
IA 122
I-35
PROJECT LOCATION
Willow Creek
N 20TH ST
N 32ND ST
N 36TH PL
N 40TH ST
N 35TH ST
N 24TH ST
N 25TH ST
N 8TH ST
N 8TH PL
N 8TH PL
N 7TH ST
N 6TH ST
N 9TH ST
N 10TH ST
N 11TH ST
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S 15TH ST
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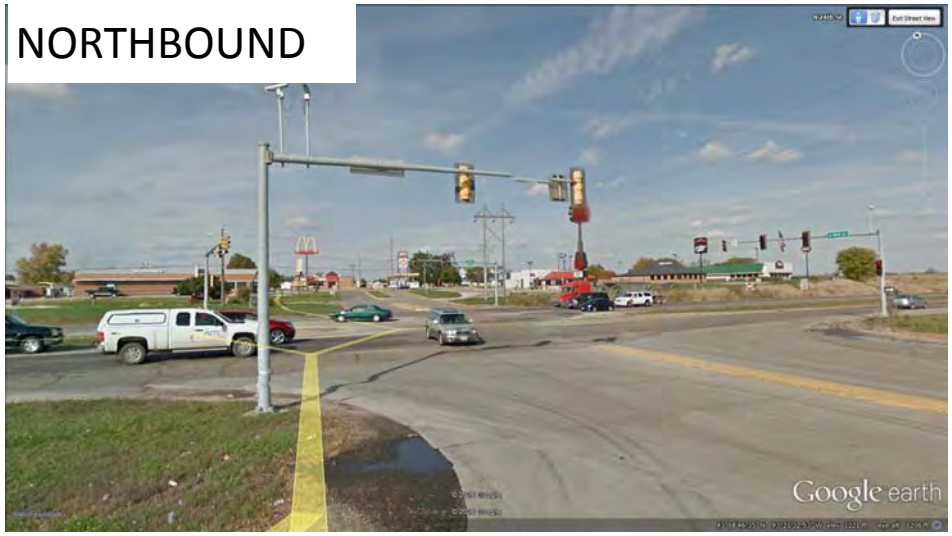
S 19TH ST
S 21ST ST
S 22ND ST
S 23RD ST
S 24TH ST
MAIN AVE
10TH AVE N
9TH AVE N
7TH AVE N
2ND AVE N
3RD AVE N
1ST AVE N
15TH AVE N
16TH AVE N
BLAKE DR
RYLEA DR
LOGAN DR
WILLOW PL
SOUTHFIELD PL
PLAZA DR
EASTGATE CT
WILLOW CREEK CT
N 16TH CT
N 14TH PL
N 23RD ST
N 24TH ST
N
7
8

US 18 & N 24th Street

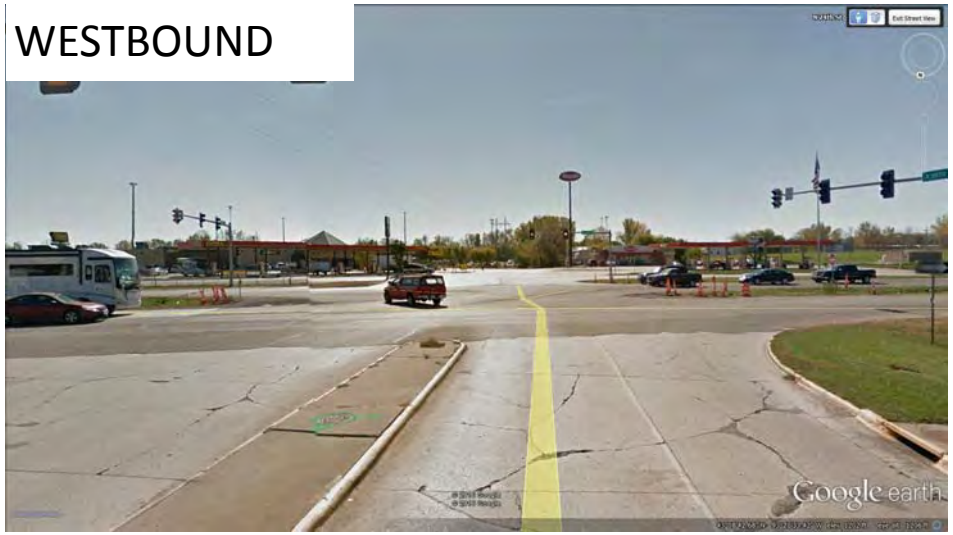
DOCUMENT F

EASTBOUND

NORTHBOUND



WESTBOUND



SOUTHBOUND

US 18 & SB I-35 RAMPS

DOCUMENT F

EASTBOUND

WESTBOUND

LOOKING NORTH

US 18 & NB I-35 RAMPS

DOCUMENT F

EASTBOUND

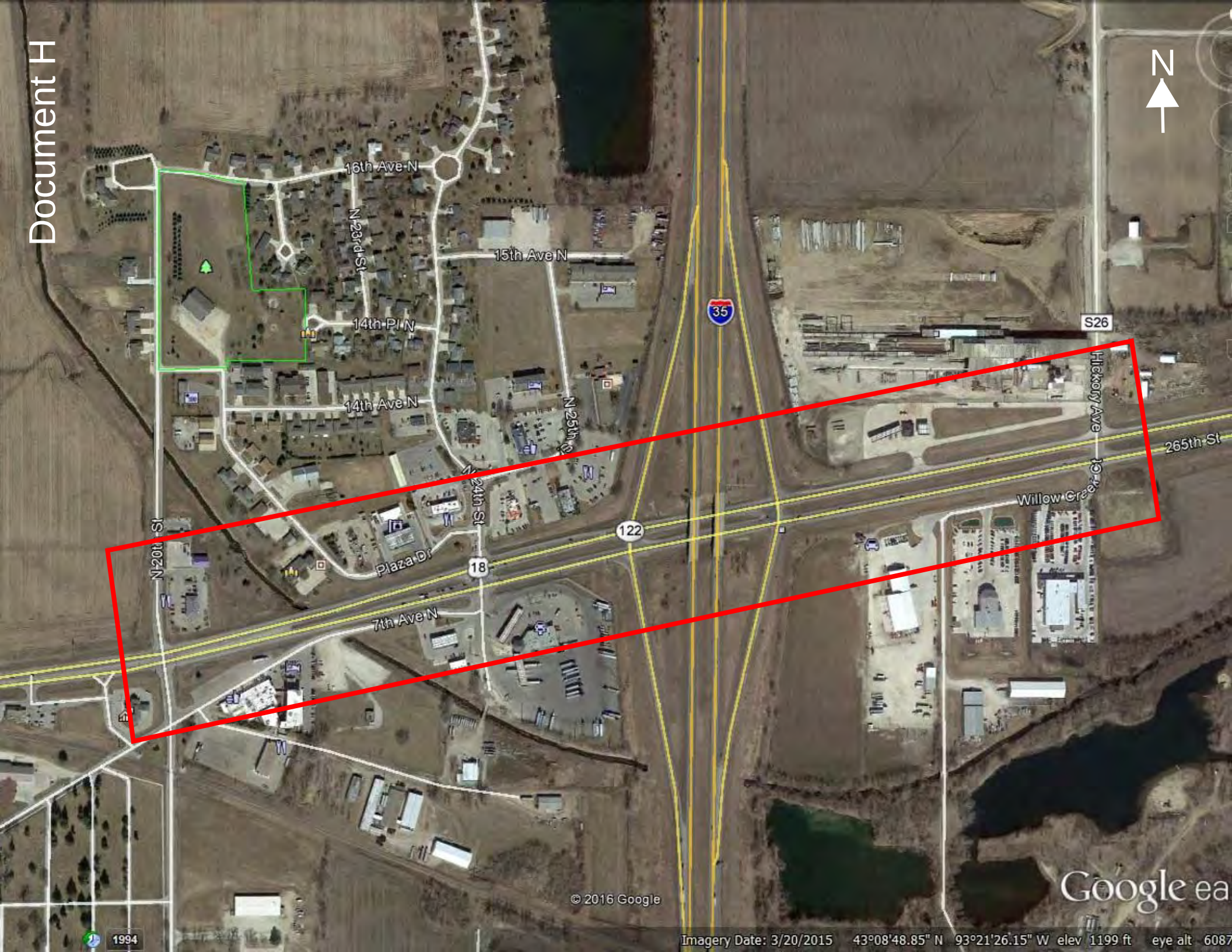
WESTBOUND

LOOKING NORTH

Document G

N 20th St.:
Traffic Signal
Modification &
Coordination
N 24th St.:
Traffic Signal
Modification &
Coordination w/
Turn Lane
Improvements
SB Ramps:
Install Traffic
Signals & Turn
Lane Improvements
NB Ramps:
Traffic Signal
Modification &
Coordination w/
Turn Lane
Improvements
Willow Creek Court:
Traffic Signal
Coordination
N 20th St
7th Ave N
Plaza Dr
N 24th St
14th Ave N
14th Pl N
N 23rd St
16th Ave N
N 25th St
Willow Creek Ct
Hickory Ave
265th St
18
42
35
S26
© 2016 Google
Imagery Date: 3/20/2015 43°08'48.85" N 93°21'26.15" W elev 1199 ft eye alt 6087
Google ea

Document H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16th Ave N
N 23rd St
15th Ave N
14th Pl N
14th Ave N
N 25th St
N 24th St
N 20th St
Plaza Dr
7th Ave N
35
122
18
S26
Hickory Ave
265th St
Willow Creek
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1994
Imagery Date: 3/20/2015 43°08'48.85" N 93°21'26.15" W elev 1199 ft eye alt 6087

Document I

2011-2015 Crash History
US 18/ IA 122, N 20th St to N 32nd St
Clear Lake, Iowa

Location	Number of Crashes (Injuries)	Injury Severity	Crash Rate	Predominant Crash Types (Number of Crashes)	Predominant Major Causes (Number of Crashes)
Corridor*	92 (40)	5 major 10 minor 25 possible	467/HMVM	• Rear-end (40) • Angle Oncoming Left Turn (16) • Broadside (15) • Sideswipe, Same Direction (14)	• Ran Traffic Signal (19) • Other Improper Action (19) • Followed Too Close (16)
US 18 & N 20th St Intersection	9 (7)	1 minor 6 possible	0.34/MEV	• Rear-end (5) • Angle Oncoming Left Turn (2)	• Followed Too Close (3) • FTYROW: Making a Left Turn (2)
US 18 & N 24th St Intersection	34 (14)	1 major 5 minor 8 possible	1.01/MEV	• Rear-end (11) • Angle Oncoming Left Turn (10) • Sideswipe, Same Direction (7)	• Ran Traffic Signal (11) • Other Improper Action (8)
N 24th St & Plaza Dr Intersection	4 (3)	3 possible	0.40/MEV	• None	• FTYROW: From Stop Sign (2)
US 18 & I-35 SB Ramps Intersection	16 (2)	2 possible	0.51/ MEV	• Rear-end (8) • Broadside (3) • Angle Oncoming Left Turn (2) • Sideswipe, Same Direction (2)	• Followed Too Close (4) • FTYROW: Making Left Turn (2) • Lost Control (2) • Other Improper Action (2)
US 18 & I-35 NB Ramps Intersection	20 (14)	4 major 3 minor 7 possible	0.72/ MEV	• Rear-end (11) • Broadside (6) • Non-collision (2)	• Ran Traffic Signal (7) • Followed too close (6)
IA 122 & N 32nd St Intersection	4 (1)	1 minor	0.13/ MEV	• Broadside (2)	• FTYROW From Yield Sign (2)

* Corridor totals include intersection crashes
HMVM = Hundred million vehicle miles traveled
MEV = Million entering vehicles

DOCUMENT J

Iowa Department of Transportation

Turning Movement Traffic Count Summary

Annualized Daily Traffic For All Vehicles

Station Number:

17326917099

Count Date:

Tuesday, June 04, 2013

County:

Cerro Gordo

Location Description:

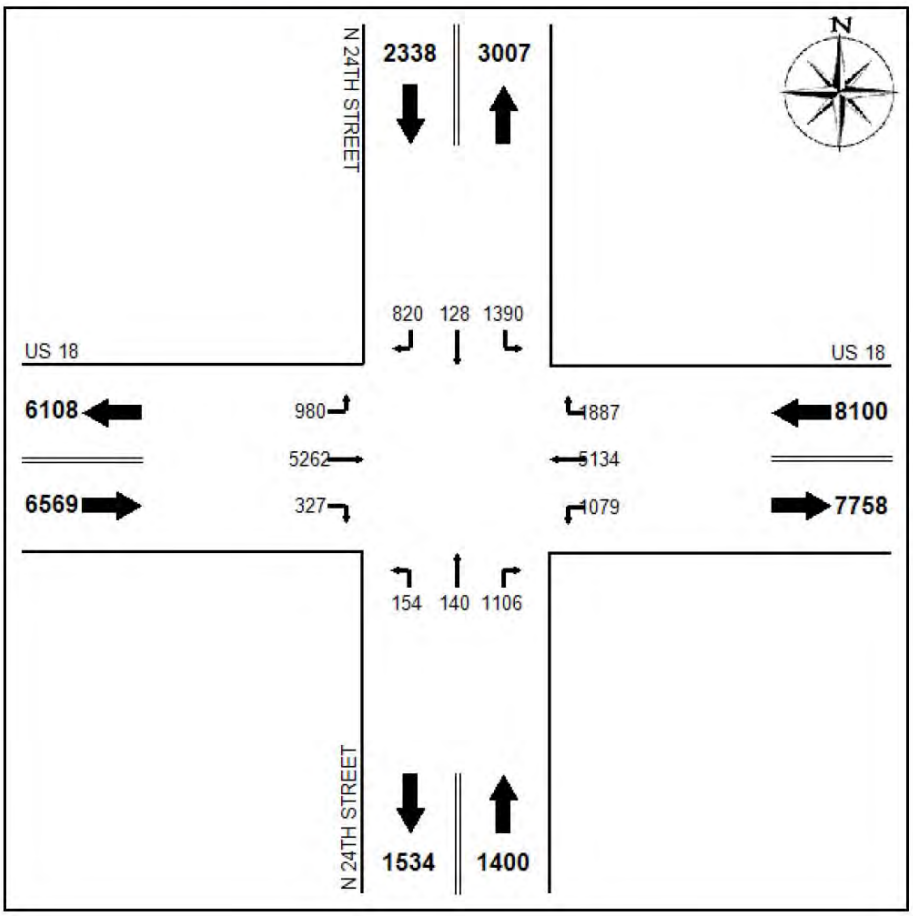
US 18, 7th Ave N & N 24th St

Volume Factor: 1.853

Pass Class Factor: 1.897

SU Class Factor: 1.588

Combo Class Factor: 1.538



Raw Data-All Vehicles:

	N Leg			E Leg			S Leg			W Leg		
	L	*T*	*R*	*L*	*T*	*R*	*L*	*T*	*R*	*L*	*T*	*R*
07:00	64	6	16	43	208	63	10	9	107	37	532	26
08:00	77	7	34	83	224	93	9	7	106	49	403	26
11:00	115	12	71	95	334	176	14	11	82	69	356	27
12:00	195	24	110	117	348	228	23	24	115	159	374	26
15:00	96	9	57	77	510	122	12	8	72	53	403	21
16:00	92	6	49	98	567	132	10	5	72	68	390	19
17:00	98	4	97	106	555	186	7	11	76	83	365	32

DOCUMENT J

Iowa Department of Transportation

Turning Movement Traffic Count Summary

Annualized Daily Traffic For All Vehicles

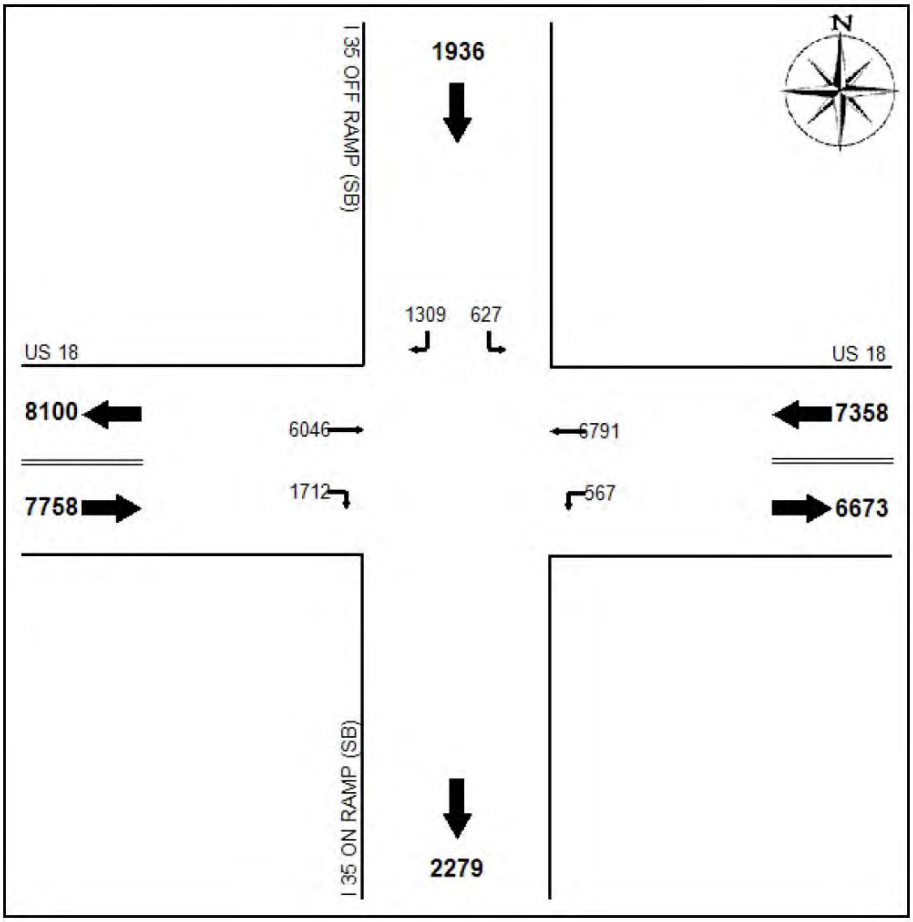
Station Number:
17327120799

Count Date:
Tuesday, June 04, 2013

County:
Cerro Gordo

Location Description:
I 35, US 18 & IA 122

Volume Factor: 1.853
Pass Class Factor: 1.897
SU Class Factor: 1.588
Combo Class Factor: 1.538



Raw Data-All Vehicles:

	N Leg		E Leg		W Leg	
	L	*R*	*L*	*T*	*T*	*R*
07:00	31	65	26	249	585	118
08:00	47	96	30	304	459	127
11:00	49	115	40	490	418	135
12:00	49	124	47	569	505	179
15:00	45	93	56	616	446	125
16:00	61	98	46	699	412	142
17:00	57	137	61	710	415	124

DOCUMENT J

Iowa Department of Transportation

Turning Movement Traffic Count Summary

Annualized Daily Traffic For All Vehicles

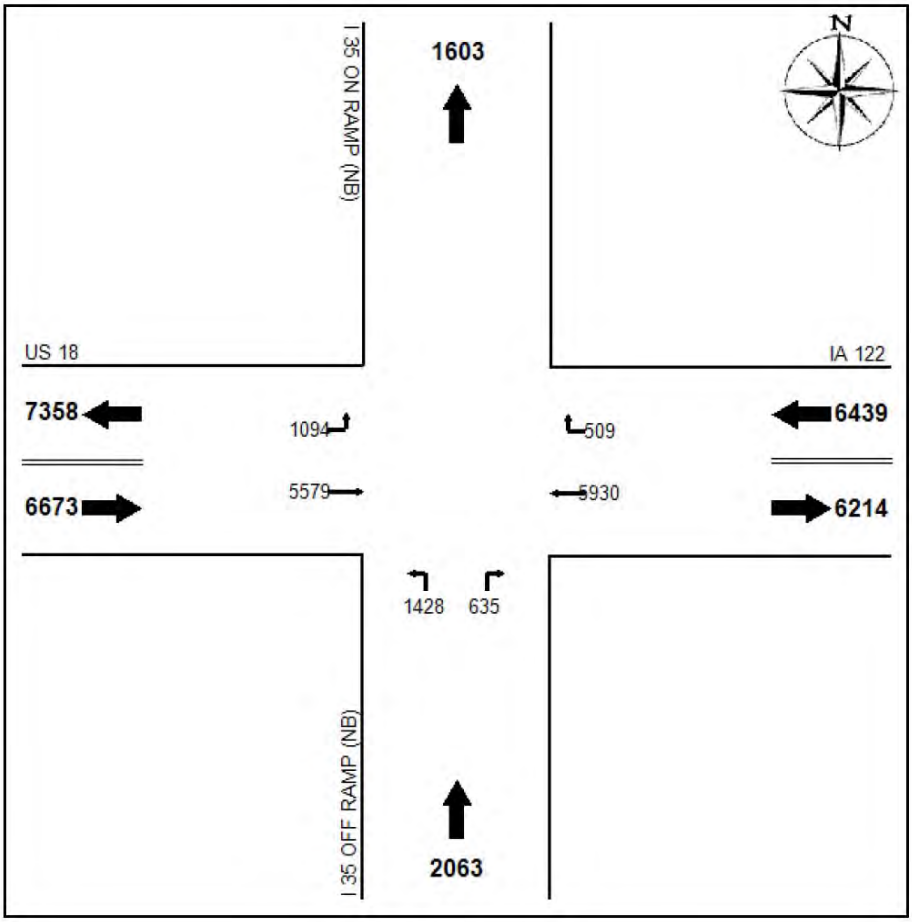
Station Number:
17327120399

Count Date:
Tuesday, June 04, 2013

County:
Cerro Gordo

Location Description:
I-35/IA 27, US 18 & IA 122

Volume Factor: 1.853
Pass Class Factor: 1.897
SU Class Factor: 1.588
Combo Class Factor: 1.538



Raw Data-All Vehicles:

	E Leg		S Leg		W Leg	
	T	*R*	*L*	*R*	*L*	*T*
07:00	201	14	74	55	62	554
08:00	243	25	91	52	59	447
11:00	394	37	136	52	86	381
12:00	462	43	154	47	130	424
15:00	584	42	88	48	99	392
16:00	634	46	111	47	81	392
17:00	638	68	133	41	83	389

Combined Benefit/ Cost Analysis Summary

Intersection	Benefit	Cost	B/C
US 18 & 24th St	$825,239	$251,000	3.29
US 18 & SB I-35 Ramps	$218,170	$331,000	0.66
US 18 & NB I-35 Ramps	$1,437,658	$131,000	10.97
Total	$2,481,066	$713,000	3.48

Intersection or Spot Benefit / Cost Safety Analysis

Rev. 5/14

Iowa DOT Office of Traffic & Safety

County: Cerro Gordo Prepared by: AJB Date Prepared: Jun 30, 2016

Intersection: US 18 & 24th St

Improvement

Proposed Improvement(s): Add signal heads. Construct positive offset left turn lanes and signal modfications.

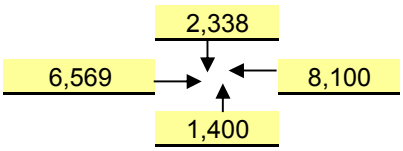
$ 251,000	Estimated Improvement Cost, **EC**	15	Est. Improvement Life, years, **Y**
	Other Annual Cost (after initial year), **AC**	30	Crash Reduction Factor (integer), **CRF**
$ -	Present Value Other Annual Costs, **OC**	4.0%	Discount Rate (time value of $), **INT**
		$ 251,000	Present Value Cost, **COST** = EC + OC

$$OC = \frac{AC}{INT}\left(1 - \frac{1}{(1+INT)^Y}\right)$$

Traffic Volume Data

Source: Iowa DOT 2013 Date of traffic count

Daily Entering Vehicles by Approach (or AADT / 2)



6,718,555	Current Annual Entering Veh., **AEV** = DEV * 365
22,342	veh / day, Final Year DEV, **FDEV**
110.49	MEV, Total Million Entering Veh. Over life of Project, **TMEV**
1.3%	Projected Traffic Growth (0%-10%), **G**
18,407	Current Daily Entering Vehicles, **DEV**

$$TMEV = \frac{AEV}{-G}\left(1 - \left(\frac{1+G}{1}\right)^Y\right) \Big/ 10^6$$

Crash Data

2011 First full year --> 2015 Last full year 5.0 years, Time Period, **T**

Additional months values as of May 2014

0	Fatal Crashes		Fatalities @	$4,500,000	$ -
		1	Major Injuries @	$325,000	$ 325,000
10	Injury Crashes	5	Minor Injuries @	$65,000	$ 325,000
		8	Possible Injuries @	$35,000	$ 280,000
24	Property Damage Only		(assumed cost per crash)	$7,400	$ -
		-OR-	enter all Property Costs of all crashes:		$ 209,034
34	Total Crashes, **TA**		Total $ Loss, **LOSS**		$ 1,139,034

6.80	Current Crashes / Year, **AA** = TA / T	1.01	Crashes / MEV, Crash Rate, **CR** CR = TA x 10^6 / (DEV x 365 x T)
$ 33,501	Cost per Crash, **AVC** = LOSS / TA		
111.8	Total Expected Crashes, **TECR** = CR x TMEV	$ 825,239	Present Value of Avoided Crashes, **BENEFIT**
2.04	Crashes Avoided First Year **AAR** = AA x CRF / 100		
$ 68,342	Crash Costs Avoided in First Year, AAR x AVC		
33.5	Total Avoided Crashes, TECR x CRF/ 100		

$$BEN. = \frac{AVC \times AAR}{(INT - G)}\left(1 - \left(\frac{1+G}{1+INT}\right)^Y\right)$$

Benefit / Cost Ratio

Benefit : Cost = $825,239 : $251,000 = **3.29** : 1

Intersection or Spot Benefit / Cost Safety Analysis

Rev. 5/14

Iowa DOT Office of Traffic & Safety

County: Cerro Gordo Prepared by: AJB Date Prepared: Jun 30, 2016

Intersection: US 18 & SB I-35 Ramps

Improvement

Proposed Improvement(s): Install traffic signal. Provide separate southbound left and right turn lanes.

Construct positive offset westbound left turn lane, and lengthen turn lane.

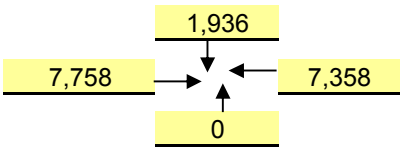
$ 331,000	Estimated Improvement Cost, **EC**	15	Est. Improvement Life, years, **Y**
	Other Annual Cost (after initial year), **AC**	30	Crash Reduction Factor (integer), **CRF**
$ -	Present Value Other Annual Costs, **OC**	4.0%	Discount Rate (time value of $), **INT**
		$ 331,000	Present Value Cost, **COST** = EC + OC

$$OC = \frac{AC}{INT}\left(1 - \frac{1}{(1+INT)^Y}\right)$$

Traffic Volume Data

Source: Iowa DOT 2013 Date of traffic count

Daily Entering Vehicles by Approach (or AADT / 2)



6,223,980	Current Annual Entering Veh., **AEV** = DEV * 365
22,950	veh / day, Final Year DEV, **FDEV**
107.63	MEV, Total Million Entering Veh. Over life of Project, **TMEV**
2.0%	Projected Traffic Growth (0%-10%), **G**
17,052	Current Daily Entering Vehicles, **DEV**

$$TMEV = \frac{AEV}{-G}\left(1 - \left(\frac{1+G}{1}\right)^Y\right) \Big/ 10^6$$

Crash Data

2011	First full year -->	2015	Last full year	5.0	years, Time Period, **T**	
	Additional months				values as of May 2014	
0	Fatal Crashes		Fatalities @	$4,500,000	$	-
		0	Major Injuries @	$325,000	$	-
2	Injury Crashes	0	Minor Injuries @	$65,000	$	-
		2	Possible Injuries @	$35,000	$	70,000
14	Property Damage Only		(assumed cost per crash)	$7,400	$	-
			-OR- enter all Property Costs of all crashes:		$	217,800
16	Total Crashes, **TA**			Total $ Loss, **LOSS**	$	287,800

3.20	Current Crashes / Year, **AA** = TA / T	0.51	Crashes / MEV, Crash Rate, **CR**
$ 17,988	Cost per Crash, **AVC** = LOSS / TA		CR = TA x 10^6 / (DEV x 365 x T)
55.3	Total Expected Crashes, **TECR** = CR x TMEV	$ 218,170	Present Value of Avoided
0.96	Crashes Avoided First Year **AAR** = AA x CRF / 100		Crashes, **BENEFIT**
$ 17,268	Crash Costs Avoided in First Year, AAR x AVC		
16.6	Total Avoided Crashes, TECR x CRF/ 100		

$$BEN. = \frac{AVC \times AAR}{(INT - G)}\left(1 - \left(\frac{1+G}{1+INT}\right)^Y\right)$$

Benefit / Cost Ratio

Benefit : Cost = $218,170 : $331,000 = **0.66** : 1

Intersection or Spot Benefit / Cost Safety Analysis

Rev. 5/14

Iowa DOT Office of Traffic & Safety

County: Cerro Gordo Prepared by: AJB Date Prepared: Jun 30, 2016

Intersection: US 18 & NB I-35 Ramps

Improvement

Proposed Improvement(s): Add signal heads. Construct EB positive offset left turn lane and signal modifications.

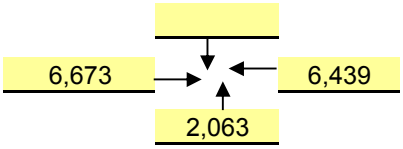
$ 131,000	Estimated Improvement Cost, **EC**	15	Est. Improvement Life, years, **Y**
	Other Annual Cost (after initial year), **AC**	30	Crash Reduction Factor (integer), **CRF**
$ -	Present Value Other Annual Costs, **OC**	4.0%	Discount Rate (time value of $), **INT**
		$ 131,000	Present Value Cost, **COST** = EC + OC

$$OC = \frac{AC}{INT}\left(1 - \frac{1}{(1+INT)^Y}\right)$$

Traffic Volume Data

Source: Iowa DOT 2013 Date of traffic count

Daily Entering Vehicles by Approach (or AADT / 2)



5,538,875	Current Annual Entering Veh., **AEV** = DEV * 365
21,818	veh / day, Final Year DEV, **FDEV**
98.96	MEV, Total Million Entering Veh. Over life of Project, **TMEV**
2.5%	Projected Traffic Growth (0%-10%), **G**
15,175	Current Daily Entering Vehicles, **DEV**

$$TMEV = \frac{AEV}{-G}\left(1 - \left(\frac{1+G}{1}\right)^Y\right) \Big/ 10^6$$

Crash Data

2011 First full year --> 2015 Last full year 5.0 years, Time Period, **T**

Additional months values as of May 2014

0	Fatal Crashes		Fatalities @	$4,500,000	$ -
		4	Major Injuries @	$325,000	$ 1,300,000
10	Injury Crashes	3	Minor Injuries @	$65,000	$ 195,000
		7	Possible Injuries @	$35,000	$ 245,000
10	Property Damage Only		(assumed cost per crash)	$7,400	$ -
		-OR-	enter all Property Costs of all crashes:		$ 101,545
20	Total Crashes, **TA**		Total $ Loss, **LOSS**		$ 1,841,545

4.00	Current Crashes / Year, **AA** = TA / T	0.72	Crashes / MEV, Crash Rate, **CR**
$ 92,077	Cost per Crash, **AVC** = LOSS / TA		CR = TA x 10^6 / (DEV x 365 x T)
71.5	Total Expected Crashes, **TECR** = CR x TMEV	$ 1,437,658	Present Value of Avoided Crashes, **BENEFIT**
1.20	Crashes Avoided First Year **AAR** = AA x CRF / 100		
$ 110,493	Crash Costs Avoided in First Year, AAR x AVC		
21.4	Total Avoided Crashes, TECR x CRF/ 100		

$$BEN. = \frac{AVC \times AAR}{(INT - G)}\left(1 - \left(\frac{1+G}{1+INT}\right)^Y\right)$$

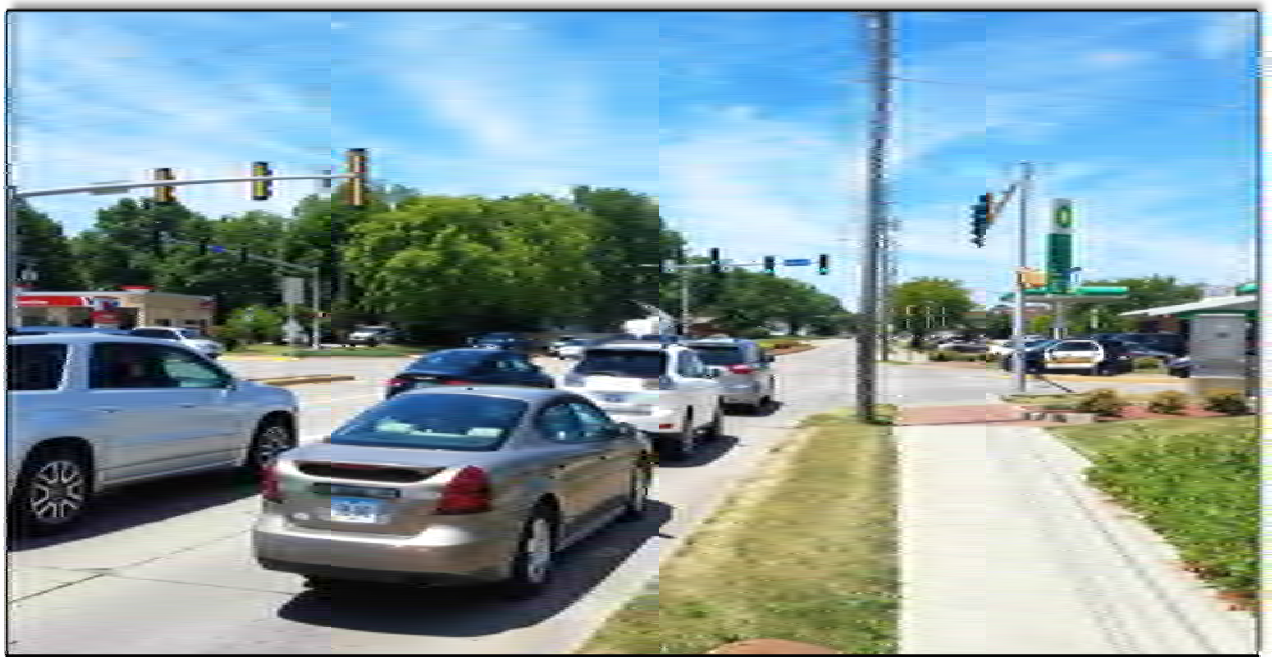
Benefit / Cost Ratio

Benefit : Cost = $1,437,658 : $131,000 = **10.97** : 1

Application for

Traffic Safety Improvement Program

Iowa Department of Transportation



Ankeny Boulevard (US 69) and First Street Intersection Improvements

Ankeny, Iowa

August 15, 2016

Ankeny

bringing it all together.

city of
Ankeny
bringing it all together

August 12, 2016

Mr. Steven Schroder, P.E.
Iowa DOT – Office of Traffic and Safety
800 Lincoln Way
Ames, Iowa 50010

RE: Application for Iowa DOT Traffic Safety Improvement Program Funding
Ankeny Boulevard (U.S. Hwy. 69) and First Street Intersection Improvements – Ankeny, Iowa

Dear Mr. Schroder:

Please accept this application for funding assistance through the Iowa DOT's Traffic Safety Improvement Program (TSIP). The project being proposed by the City of Ankeny is the Ankeny Boulevard (U.S. Hwy. 69) and First Street Intersection Improvements. The scope of the project includes the following:

- Reconfigure the intersection to provide a single westbound left turn lane and a separate westbound right turn lane on First Street.
- Replace or modify the existing traffic signal installation at the intersection to provide four-section flashing yellow signal heads for the left turn lanes; combination signal / light poles with adequate clear zone from the back of curb; and accessible pedestrian signals.
- Improve the pedestrian ramps and adjacent streetscaping to meet current ADA standards.
- Modify or replace the median at the intersection's north approach to lengthen the southbound left turn lane on Ankeny Boulevard (U.S. Hwy. 69).

The City of Ankeny wants to improve traffic safety and mobility at the Ankeny Boulevard (U.S. Hwy. 69) and First Street intersection. During the past several years, there have been numerous crashes at the intersection. The negative offset of the outside westbound dual left turn lane on First Street and associated sight distance obstructions caused by the opposing left turning vehicles were likely factors in many of the crashes. The intersection also experiences high traffic volumes throughout most of the day, which causes vehicle delays and impedes traffic mobility. These factors can increase the likelihood of crashes occurring at the intersection. Given the crash history and traffic mobility issues at the intersection, we believe the proposed project is a good candidate for receiving funding assistance through the Iowa DOT's TSIP. If the project receives TSIP funding, the City of Ankeny will provide the necessary additional funds and proceed with the project as outlined in the proposed schedule included in the funding application.

Please contact me if you have any questions or need additional information regarding the funding application. We appreciate the Iowa DOT considering the TSIP funding application for this project.

Sincerely,
City of Ankeny
Mark Mueller

Mark Mueller, P.E.
Director of Public Works and City Engineer

Application for TRAFFIC SAFETY FUNDS

GENERAL INFORMATION **DATE:** August 15, 2016

Location / Title of Project Ankeny Blvd (US 69) & First St Intersection Improvements

Applicant City of Ankeny

Contact Person Mark Mueller, P.E. Title Director of Public Works

Complete Mailing Address 220 W. First St.
Ankeny, Iowa 50023

Phone (515) 963-3522 (Area Code) E-Mail MMueller@AnkenyIowa.gov

If more than one highway authority is involved in this project, please indicate and fill in the information below (use additional sheets if necessary).

Co-Applicant(s) Iowa DOT District 1

Contact Person Tony Gustafson, P.E. Title Assistant District Engineer

Complete Mailing Address 1020 S. Fourth St.
Ames, Iowa 50010

Phone 515-239-1430 (Area Code) E-Mail Tony.Gustafson@dot.iowa.gov

PLEASE COMPLETE THE FOLLOWING PROJECT INFORMATION:

Application Type

- Site Specific ☒
- Traffic Control Device ☐
- Safety Study ☐

Funding Amount

Total Safety Cost	$ 559,800
Total Project Cost	$ 628,800
Safety Funds Requested	$ 500,000

Does this project appear on a Safety Improvement Candidate List or is there a safety study recommendation for this project?
☒ Yes – Explain See Section B
☐ No

A

Rev. 6/16

APPLICATION CERTIFICATION FOR LOCAL GOVERNMENT

To the best of my knowledge and belief, all information included in this application is true and accurate, including the commitment of all physical and financial resources. This application has been duly authorized by the participating local government(s). I understand the attached resolution(s) binds the participating local government(s) to assume responsibility if any additional funds are committed, and to ensure maintenance of any new or improved city streets or secondary roads.

I understand that, although this information is sufficient to secure a commitment of funds, a firm contract between the applicant and the Department of Transportation is required prior to the authorization of funds.

Representing the City of Ankeny

Signed: Mark Mueller 8/03/16

Signature Date Signed

Mark Mueller, P.E.

Typed Name

Attest: Adam L. Lust 08/03/16

Signature Date Signed

Adam Lust, P.E.

Typed Name

A

RESOLUTION 2016-264

A RESOLUTION AUTHORIZING THE CITY OF ANKENY, IOWA TO MAKE AN APPLICATION TO THE IOWA DEPARTMENT OF TRANSPORTATION'S (IOWA DOT) TRAFFIC SAFETY IMPROVEMENT PROGRAM (TSIP) FOR THE PARTIAL FUNDING OF A PROJECT FOR SITE SPECIFIC IMPROVEMENTS AT THE INTERSECTION OF ANKENY BOULEVARD (U.S. HIGHWAY 69) AND FIRST STREET WITHIN THE CITY LIMITS OF ANKENY.

WHEREAS, the Traffic Safety Improvement Program is established by the Iowa Department of Transportation; and

WHEREAS, said program allows for funding to be provided to states, counties, or cities for eligible projects or programs that will contribute to improving traffic safety and operations; and

WHEREAS, the City of Ankeny has determined that improvements at the intersection of Ankeny Boulevard (U.S. Highway 69) and First Street will likely improve traffic safety and operations. The proposed improvements include the the reconfiguration of the west and east legs of the intersection to provide one westbound to northbound right turn lane and one westbound to southbound left turn lane, along with the lengthening of the southbound to eastbound left turn lane, traffic signal modifications, and pedestrian ramp improvements.

NOW, THEREFORE, BE IT RESOLVED by the City Council of the City of Ankeny, Iowa, that:

1. The City Council supports and approves the application for Traffic Safety Improvement Program (TSIP) funding.

2. The City Council hereby commits the additional City fund necessary for construction of the project beyond any Traffic Safety Improvement Program (TSIP) funding.

3. The City Council hereby commits to accepting and maintaining these improvements in accordance with the Iowa DOT's Traffic Safety Improvement Program (TSIP).

4. The Mayor, or Mayor's designee, is hereby authorized to sign and execute the application on behalf of the City.

DATED at Ankeny, Iowa this 18th day of July, 2016.

Gary Lorenz, Mayor

ATTEST:

Pamela DeMouth, City Clerk

NARRATIVE

Existing Conditions

The Ankeny Boulevard (US Highway 69) and First Street intersection is a major signalized intersection of a principal arterial and a minor arterial in the center of the City of Ankeny. Both streets are urban divided four-lane facilities with left turn lanes and raised medians at the intersection. Dual westbound left turn lanes are provided on the east leg. To the south, east, and west of the intersection, Ankeny Boulevard and First Street transition to four-lane undivided street. Existing speed limits are 35 mph for each approach to the intersection.

The existing traffic signal installation at the intersection is interconnected and coordinated with adjacent traffic signals. Protected-permissive left turn phasing with five-section traffic signal heads is provided for each approach, including the westbound dual left turn lanes. The traffic signal pole for westbound signal heads is a twin mast arm pole, located in the west leg median. This pole and mast arm poles in the northeast and southeast quadrants of the intersection are located within five feet of the curb.

Due to intersection safety and traffic operational concerns, the *Ankeny Boulevard and First Street Intersection Traffic Study* was recently completed to evaluate intersection and traffic control improvement needs. Field observations and analyses performed as part of this study confirmed that the existing westbound dual left turn lanes are not needed, and a westbound right turn lane would be beneficial in reducing excessive westbound outside through lane queues currently experienced. The study identified recommended improvements included in this TSIP application.

Traffic Data

Iowa DOT 2012 average annual daily traffic (AADT) at the intersection is shown below. As part of the *Ankeny Boulevard and First Street Intersection Traffic Study*, additional traffic counts were conducted in 2015. Based on these traffic counts, 2015 AADT was calculated, using Iowa DOT expansion factors, and is also shown below. Detailed count data is provided in Section J of this application.

Year	Intersection Leg AADT			
	N	S	E	W
2012	23,700	21,900	18,100	14,900
2015	22,600	20,900	18,800	14,200

Crash History

Due to intersection crash history, the Ankeny Boulevard and First Street intersection has been identified by the Iowa DOT as #22 on the statewide Safety Improvement Candidate Location (SICL) list, and is the highest ranked intersection in the City of Ankeny. The 2013-2015 crash data was analyzed using Iowa DOT CMAT software. During this three-year period, 76 crashes occurred, resulting in one major injury, seven minor injuries and 14 possible injuries. The

intersection crash rate for this period was 1.77 crashes per million entering vehicles. Detailed crash data is provided in Section I of this application.

The predominant crash type at the intersection was angle / oncoming left turn crashes (31 crashes), followed closely by rear-end crashes (27 crashes). Approximately 28% of the total crashes (21 crashes) involved a westbound left turning vehicle. The negative offset of the outside westbound dual left turn lane and associated sight distance obstructions caused by opposing left turn vehicles were likely factors in many of these crashes.

Proposed Concept

Proposed intersection safety improvements include modifying the intersection to provide a single westbound left turn lane and a separate westbound right turn lane. As shown in section G of this application, this will be accomplished by modifying existing medians to the east and west of the intersection to transition the westbound through lanes. The existing outside westbound left turn lane will become the inside westbound through lane. The existing outside westbound through lane will become the westbound right turn lane. No right-of-way acquisition is anticipated. Additional proposed improvements include the following:

- Modify or replace the existing traffic signal installation to provide:
    - Four-section flashing yellow arrow signal heads over each left turn lane
    - Combination signal / light poles with 10’ minimum clear zone from back of curb
    - Accessible Pedestrian Signals (APS)

- Modify pedestrian ramps and adjacent streetscaping as needed to meet current ADA standards.

- Modify or replace the Ankeny Boulevard median to the north of First Street to lengthen the southbound left turn lane from approximately 120 feet to 175 feet.

Safety Justification

Expected safety benefits of the proposed improvements include the following:

- Fewer westbound and eastbound left turn crashes due to the elimination of the outside westbound left turn lane and an improvement in sight distance.

- Fewer westbound rear-end crashes due to the addition of the dedicated right turn lane and a reduction in vehicle queue lengths.

- Fewer left turn and other crashes with the installation of four-section flashing yellow arrow left turn signal heads.

The *Ankeny Boulevard and First Street Intersection Traffic Study* report was provided to Iowa DOT District 1, and the District is in support of the recommended intersection improvements.

ITEMIZED PROJECT COST BREAKDOWN
ANKENY BOULEVARD (US 69) AND FIRST STREET
INTERSECTION IMPROVEMENTS
ANKENY, IOWA

NO.	DESCRIPTION	QTY	UNIT COST	UNIT	COST
1	Mobilization	1	$20,000	LS	$20,000
2	Traffic Control	1	$20,000	LS	$20,000
3	Clearing and Grubbing	1	$2,000	LS	$2,000
4	Topsoil, Furnish and Spread	120	$30	CY	$3,600
5	Storm Sewer Intake	1	$4,000	EA	$4,000
6	PCC Pavement	550	$100	SY	$55,000
7	PCC Median Pavement	360	$70	SY	$25,200
8	PCC Driveway Pavement	150	$70	SY	$10,500
9	PCC Curb and Gutter	1060	$50	LF	$53,000
10	Pavement Markings	1	$5,000	LS	$5,000
11	Removal of Pavement Markings	1	$2,000	LS	$2,000
12	Removal of Pavement	910	$15	SY	$13,650
13	Removal of Curb and Gutter	620	$40	LF	$24,800
14	Removal of Intakes	1	$1,000	EA	$1,000
15	Pedestrian Ramps	1	$15,000	LS	$15,000
16	Traffic Signal Improvements	1	$230,000	LS	$230,000
17	Seeding and Mulching	1	$2,000	LS	$2,000

Subtotal =	$486,800
Construction Contingency (15%) =	$73,000
Total Estimated Safety-Related Cost =	**$559,800**
Landscaping and Streetscaping =	$69,000
Total Estimated Cost =	**$628,800**

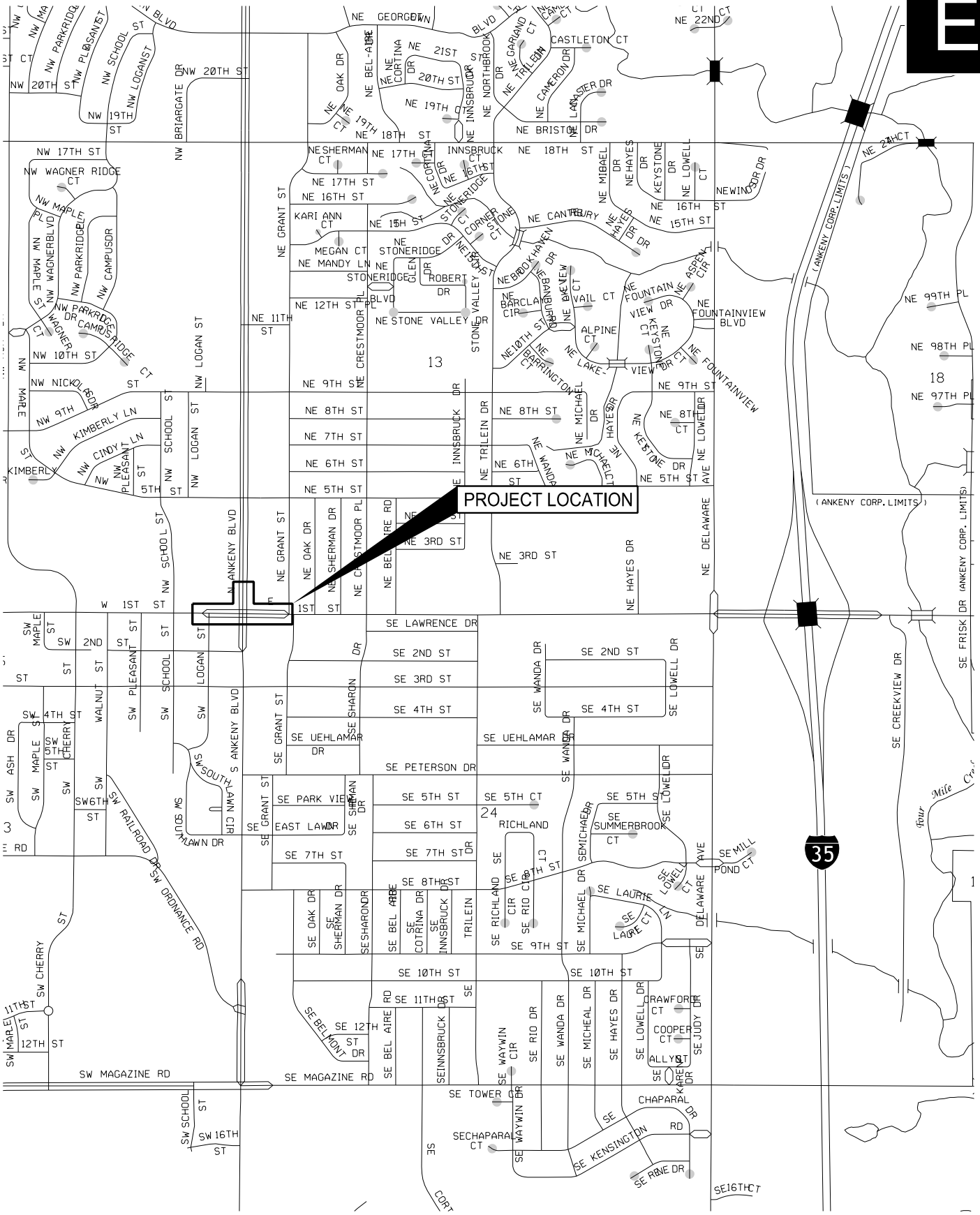
PROPOSED FUNDING SOURCES

SOURCE	AMOUNT
Traffic Safety Improvement Program Funding	$500,000
Local Funds	$128,800
Total	$628,800

PROPOSED PROJECT SCHEDULE
ANKENY BOULEVARD AND FIRST STREET INTERSECTION IMPROVEMENTS
ANKENY, IOWA

August 2016	TSIP Application
December 2016	Iowa DOT Approval
January 2017	TSIP Agreement
February 2017 – December 2017	Project Engineering
January 2018	Project Letting
April 2018 – September 2018	Project Construction

E



LOCATION MAP
ANKENY BOULEVARD (US 69) AND FIRST STREET INTERSECTION
ANKENY, IOWA

Snyder & Associates
Engineers and Planners

NO SCALE

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Photo 1: Ankeny Blvd Looking North

Photo 2: Ankeny Blvd Looking North

Photo 3: Ankeny Blvd Looking South

Photo 4: Ankeny Blvd Looking South

Photo 5: First St Looking East

Photo 6: First St Looking East

Photo 7: First St Looking West

Photo 8: First St Looking West

G

PROPOSED IMPROVEMENTS
ANKENY BOULEVARD (US 69) AND FIRST STREET INTERSECTION
ANKENY, IOWA

SNYDER & ASSOCIATES
Engineers and Planners

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PROPOSED IMPROVEMENT AREA
ANKENY BOULEVARD (US 69) AND FIRST STREET INTERSECTION
ANKENY, IOWA

SNYDER & ASSOCIATES
Engineers and Planners

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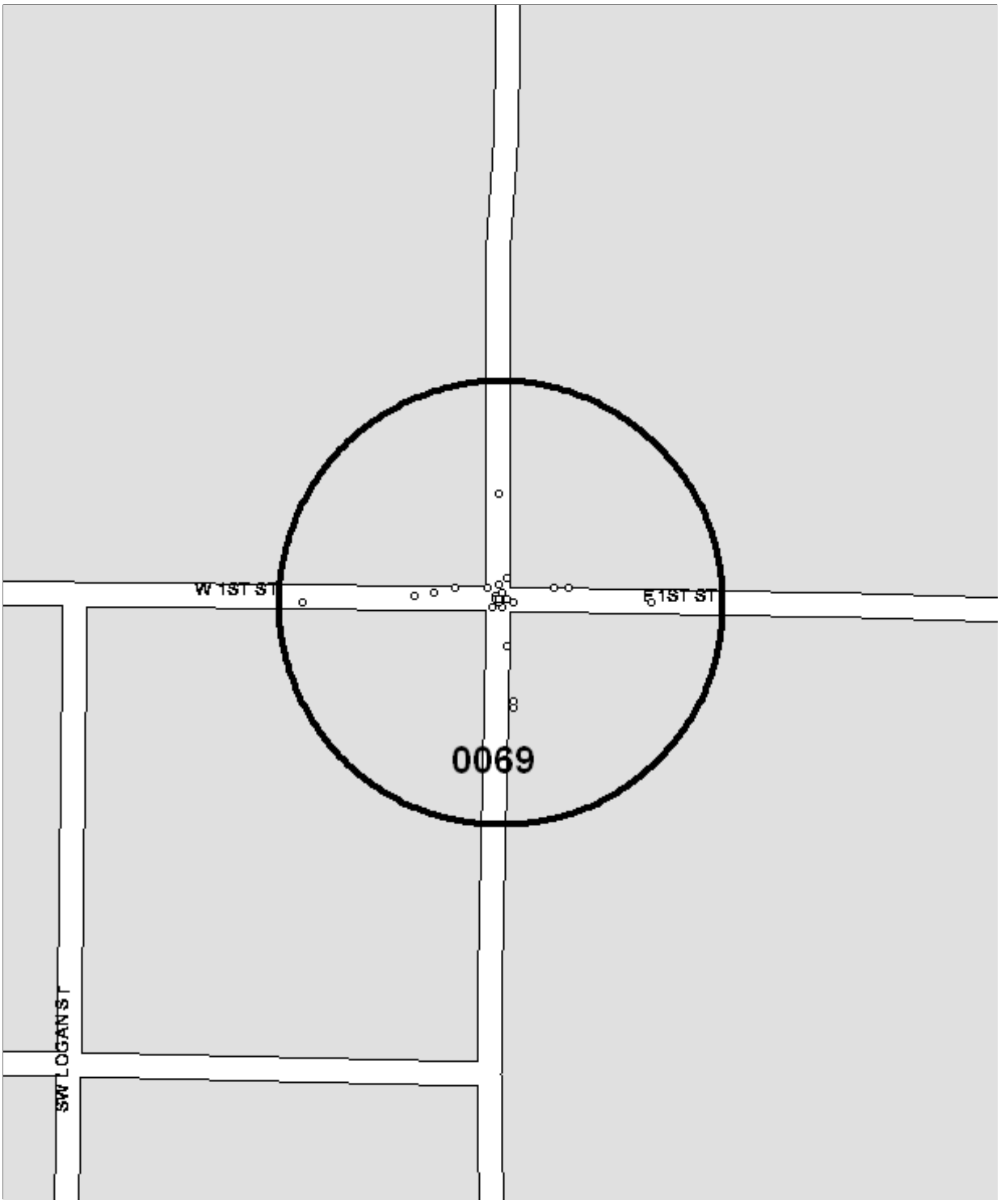
Iowa Department of Transportation

Location Map

Ankeny Blvd & First St

Incidents: 76

Report Version 1.1 Mar 2005



Analyst:	Notes:

Iowa Department of Transportation

Major Cause Summary

Ankeny Blvd & First St

Report Version 1.1 Jan 2005

Analysis Years: 2013 [25], 2014 [25], 2015 [26]

Crash Summary:

Fatal	-
Major Injury	1
Minor Injury	6
Possible/Unknown	9
PDO	60
Total Crashes	76

Injury Summary:

Fatal	-
Major Injury	1
Minor Injury	7
Possible	14
Unknown	1
Total Injuries	23

TOT Property Damage: $450,381

AVG Property Damage: $5,926

Surface Condition Summary:

Dry	58
Wet	8
Ice	3
Snow	6
Slush	-
Sand/Dirt/Oil/Gravel	-
Water	-
Other	-
Unknown	1
Not Reported	-
Total Crashes	76

Major Cause Summary:

	Animal
5	Ran Traffic Signal
	Ran Stop Sign
	Crossed Centerline
	FTYROW: At Uncontrolled Intersection
	FTYROW: Making Right Turn on Red Signal
	FTYROW: From Stop Sign
	FTYROW: From Yield Sign
29	FTYROW: Making Left Turn
	FTYROW: From Driveway
	FTYROW: From Parked Position
	FTYROW: To Pedestrian
2	FTYROW: Other (explain in narrative)
1	Traveling Wrong Way or on Wrong Side of Rd
5	Driving Too Fast for Conditions
	Exceeded Authorized Speed
3	Made Improper Turn
	Improper Lane Change
8	Followed Too Close
	Disregarded Railroad Signal
	Disregarded Warning Sign
	Operating Vehicle in Reckless/Aggressive Manner
	Improper Backing
	Illegally Parked/Unattended
	Swerving/Evasive Action
	Over-Correcting/Over-Steering
	Downhill Runaway
	Equipment Failure
	Separation of Units
	Ran Off Road - Right
	Ran Off Road - Straight
	Ran Off Road - Left
1	Lost Control
1	Inattentive/Distracted By: Passenger
	Inattentive/Distracted By: Use of Phone or Other
1	Inattentive/Distracted By: Fallen Object
	Inattentive/Distracted By: Fatigued/Asleep
	Other: Vision Obstructed
	Oversized Load/ Oversized Vehicle
	Cargo/Equipment Loss or Shift
11	Other: Other Improper Action
7	Unknown
2	Other: No Improper Action
	None Indicated

Selection Filter:

((YEAR = 2013 or YEAR = 2014 or YEAR = 2015))

Analyst:

Notes:

Iowa Department of Transportation

Driver and Time Summary

Ankeny Blvd & First St

Report Version 1.0 Aug 2006

Crash Time of Day Summary:

From / To	00:00 01:59	02:00 03:59	04:00 05:59	06:00 07:59	08:00 09:59	10:00 11:59	12:00 13:59	14:00 15:59	16:00 17:59	18:00 19:59	20:00 21:59	22:00 23:59	NR	Total	%
SUN	-	-	-	-	1	1	-	-	3	-	1	-	-	6	8
MON	-	-	-	-	-	2	1	1	4	1	-	-	-	9	12
TUE	-	-	-	-	1	1	1	-	-	1	-	-	-	4	5
WED	-	-	-	1	1	-	-	5	4	4	-	-	-	15	20
THU	-	-	-	-	-	2	2	-	7	1	2	-	-	14	18
FRI	-	-	-	1	-	4	3	3	5	2	3	1	-	22	29
SAT	-	-	1	-	1	2	-	1	-	1	-	-	-	6	8
Tot.			1	2	4	12	7	10	23	10	6	1		76	
%			1	3	5	16	9	13	30	13	8	1			100

Driver Age/Gender Summary:

Age	Male	Female	NR	Drivers	%
<14	-	-	-		
14	-	-	-		
15	-	-	-		
16	4	3	-	7	4
17	3	2	-	5	3
18	1	1	-	2	1
19	4	3	-	7	4
20	2	2	1	5	3
21 to 24	9	9	-	18	12
25 to 29	12	6	1	19	12
30 to 34	11	15	-	26	17
35 to 39	4	4	-	8	5
40 to 44	6	8	-	14	9
45 to 49	3	2	-	5	3
50 to 54	3	-	1	4	3
55 to 59	3	9	-	12	8
60 to 64	1	5	-	6	4
65 to 69	4	3	-	7	4
70 to 74	2	1	-	3	2
75 to 79	-	2	-	2	1
80 to 84	2	-	-	2	1
85 to 89	1	1	1	3	2
90 to 94	-	-	-		
95 plus	-	-	-		
NR	-	-	1	1	1
Drivers	75	76	5	156	
%	48	49	3		100

Drug/Alcohol Summary:

Drug	Total	%
Alcohol, Less than Statutory		
Alcohol, Statutory		
Drug/Alcohol, Less than Statutory		
Drug/Alcohol, Statutory		
Refused		
Under Influence of Alc/Drugs/Meds		
None Indicated	76	100
Total Crashes	76	100

Fixed Object Struck Summary:

	Vehs.	%
Bridge/Bridge rail/Overpass		
Underpass/Structure Support		
Culvert		
Ditch/Embankment		
Curb/Island/Raised Median		
Guardrail		
Concrete Barrier		
Tree		
Pole - Utility/Light/Etc	2	1
Sign Post	1	1
Mailbox		
Impact Attenuator		
Other Fixed Object		
None	153	98
Total Vehicles	156	100

Selection Filter:

((YEAR = 2013 or YEAR = 2014 or YEAR = 2015))

Analyst:

Notes:

Snyder & Associates

2727 Snyder Blvd.
Ankeny, Iowa, 50023

J

Ankeny Blvd and 1st St
Ankeny, IA
Ankeny Blvd and 1st St Traffic Study

File Name : Ankeny Blvd and 1st St
Site Code :
Start Date : 9/17/2015
Page No : 1

Groups Printed- Cars+ - Heavy Vehicles

	Ankeny Blvd SB					1st St WB					Ankeny Blvd NB					1st St EB					
Start Time	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Int. Total
06:00 AM	17	40	2	0	59	13	18	5	0	36	7	14	5	0	26	3	37	5	0	45	166
06:15 AM	27	50	1	0	78	10	21	14	0	45	2	22	10	1	35	5	39	5	1	50	208
06:30 AM	30	69	11	0	110	19	41	17	0	77	9	35	16	0	60	3	70	8	0	81	328
06:45 AM	44	86	10	0	140	23	47	29	0	99	10	49	10	0	69	17	88	20	0	125	433
Total	118	245	24	0	387	65	127	65	0	257	28	120	41	1	190	28	234	38	1	301	1135
07:00 AM	61	90	18	0	169	28	40	19	0	87	15	65	15	0	95	14	97	20	0	131	482
07:15 AM	64	120	12	0	196	30	64	25	0	119	37	73	31	0	141	14	108	20	0	142	598
07:30 AM	70	175	15	1	261	54	91	35	0	180	40	68	28	0	136	22	134	28	1	185	762
07:45 AM	66	163	17	0	246	55	90	42	0	187	33	93	25	0	151	30	128	32	0	190	774
Total	261	548	62	1	872	167	285	121	0	573	125	299	99	0	523	80	467	100	1	648	2616
08:00 AM	54	104	16	0	174	48	52	32	0	132	56	74	23	0	153	26	123	42	0	191	650
08:15 AM	66	117	20	0	203	28	45	25	0	98	35	79	29	0	143	24	96	47	0	167	611
08:30 AM	46	95	13	0	154	34	51	28	0	113	11	69	23	1	104	18	56	15	0	89	460
08:45 AM	48	83	12	0	143	32	60	35	0	127	15	80	32	0	127	7	60	20	0	87	484
Total	214	399	61	0	674	142	208	120	0	470	117	302	107	1	527	75	335	124	0	534	2205
09:00 AM	25	80	10	0	115	21	39	32	0	92	14	68	28	0	110	19	41	15	0	75	392
09:15 AM	32	91	17	0	140	33	29	32	0	94	8	60	24	0	92	14	50	10	0	74	400
09:30 AM	39	97	10	0	146	22	41	42	0	105	20	91	23	0	134	16	39	12	0	67	452
09:45 AM	46	99	16	0	161	39	58	38	0	135	21	103	27	0	151	19	44	20	0	83	530
Total	142	367	53	0	562	115	167	144	0	426	63	322	102	0	487	68	174	57	0	299	1774
10:00 AM	39	82	13	0	134	29	44	53	0	126	14	78	24	0	116	11	53	11	3	78	454
10:15 AM	56	97	20	0	173	33	38	44	0	115	13	69	30	0	112	21	61	16	1	99	499
10:30 AM	44	98	21	0	163	35	36	45	0	116	24	93	27	0	144	25	58	16	1	100	523
10:45 AM	39	115	9	0	163	39	47	45	0	131	17	95	32	0	144	18	51	15	0	84	522
Total	178	392	63	0	633	136	165	187	0	488	68	335	113	0	516	75	223	58	5	361	1998
11:00 AM	46	99	11	0	156	30	64	50	0	144	27	84	42	0	153	18	53	23	1	95	548
11:15 AM	59	112	19	0	190	34	50	51	0	135	25	100	36	0	161	17	39	20	0	76	562
11:30 AM	53	104	11	1	169	32	41	66	0	139	19	130	34	0	183	20	72	24	0	116	607
11:45 AM	56	138	21	1	216	38	65	38	0	141	18	121	41	0	180	12	72	25	0	109	646
Total	214	453	62	2	731	134	220	205	0	559	89	435	153	0	677	67	236	92	1	396	2363
12:00 PM	49	118	15	0	182	46	55	62	0	163	37	135	38	0	210	22	59	25	0	106	661
12:15 PM	42	118	17	0	177	39	53	53	0	145	27	132	30	0	189	17	54	16	0	87	598
12:30 PM	38	128	23	0	189	49	49	46	0	144	21	102	36	0	159	18	53	26	0	97	589
12:45 PM	59	129	23	4	215	46	51	49	0	146	30	138	30	0	198	25	65	23	1	114	673
Total	188	493	78	4	763	180	208	210	0	598	115	507	134	0	756	82	231	90	1	404	2521
01:00 PM	54	104	17	0	175	29	63	57	0	149	36	104	39	0	179	33	56	15	0	104	607
01:15 PM	38	98	20	1	157	31	58	59	0	148	17	110	31	0	158	24	49	15	1	89	552
01:30 PM	51	96	18	5	170	17	52	48	6	123	24	121	31	0	176	21	60	24	1	106	575
01:45 PM	28	99	18	0	145	27	63	45	0	135	23	125	29	1	178	20	52	17	1	90	548
Total	171	397	73	6	647	104	236	209	6	555	100	460	130	1	691	98	217	71	3	389	2282
02:00 PM	49	102	13	0	164	34	35	52	2	123	32	126	37	1	196	27	66	26	1	120	603
02:15 PM	41	113	20	1	175	33	46	49	1	129	18	123	35	0	176	19	52	19	2	92	572
02:30 PM	49	113	18	0	180	39	80	57	1	177	17	149	31	1	198	23	54	17	2	96	651
02:45 PM	52	101	21	0	174	28	83	51	0	162	36	149	27	0	212	26	53	14	0	93	641
Total	191	429	72	1	693	134	244	209	4	591	103	547	130	2	782	95	225	76	5	401	2467
03:00 PM	41	110	22	1	174	39	80	56	0	175	29	141	32	0	202	33	73	19	0	125	676
03:15 PM	42	108	24	0	174	36	71	56	0	163	27	137	27	0	191	32	63	27	0	122	650
03:30 PM	55	112	17	0	184	33	91	63	0	187	39	131	30	0	200	33	75	23	0	131	702
03:45 PM	53	128	25	1	207	34	106	61	0	201	29	165	48	0	242	39	94	48	2	183	833
Total	191	458	88	2	739	142	348	236	0	726	124	574	137	0	835	137	305	117	2	561	2861

Snyder & Associates

2727 Snyder Blvd.
Ankeny, Iowa, 50023

J

Ankeny Blvd and 1st St
Ankeny, IA
Ankeny Blvd and 1st St Traffic Study

File Name : Ankeny Blvd and 1st St
Site Code :
Start Date : 9/17/2015
Page No : 2

Groups Printed- Cars+ - Heavy Vehicles

	Ankeny Blvd SB					1st St WB					Ankeny Blvd NB					1st St EB					
Start Time	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Int. Total
04:00 PM	66	132	20	6	224	32	107	77	0	216	37	171	45	2	255	37	92	38	3	170	865
04:15 PM	51	119	27	0	197	46	108	69	2	225	32	180	35	0	247	45	72	22	1	140	809
04:30 PM	60	140	26	1	227	37	109	73	1	220	32	178	34	0	244	33	95	23	0	151	842
04:45 PM	56	151	24	0	231	58	119	68	0	245	27	188	30	0	245	33	64	21	0	118	839
Total	233	542	97	7	879	173	443	287	3	906	128	717	144	2	991	148	323	104	4	579	3355
05:00 PM	60	151	26	0	237	43	128	81	0	252	39	190	20	0	249	38	78	20	1	137	875
05:15 PM	68	134	24	0	226	37	128	78	0	243	48	184	30	0	262	47	82	35	0	164	895
05:30 PM	43	146	23	2	214	61	129	77	0	267	38	205	26	0	269	46	80	28	0	154	904
05:45 PM	63	167	26	2	258	39	119	81	0	239	43	218	29	0	290	34	88	24	0	146	933
Total	234	598	99	4	935	180	504	317	0	1001	168	797	105	0	1070	165	328	107	1	601	3607
06:00 PM	58	128	17	1	204	49	96	79	1	225	42	144	32	0	218	39	82	25	3	149	796
06:15 PM	58	131	15	2	206	36	95	55	1	187	46	157	20	0	223	29	63	29	0	121	737
06:30 PM	60	153	23	2	238	32	95	50	0	177	24	155	23	0	202	25	76	25	0	126	743
06:45 PM	51	102	15	0	168	34	80	42	0	156	37	115	19	0	171	15	91	25	0	131	626
Total	227	514	70	5	816	151	366	226	2	745	149	571	94	0	814	108	312	104	3	527	2902
Grand Total	2562	5835	902	32	9331	1823	3521	2536	15	7895	1377	5986	1489	7	8859	1226	3610	1138	27	6001	32086
Apprch %	27.5	62.5	9.7	0.3		23.1	44.6	32.1	0.2		15.5	67.6	16.8	0.1		20.4	60.2	19	0.4		
Total %	8	18.2	2.8	0.1	29.1	5.7	11	7.9	0	24.6	4.3	18.7	4.6	0	27.6	3.8	11.3	3.5	0.1	18.7	
Cars+	2530	5680	886	19	9115	1792	3435	2490	6	7723	1335	5839	1445	5	8624	1212	3537	1080	18	5847	31309
% Cars+	98.8	97.3	98.2	59.4	97.7	98.3	97.6	98.2	40	97.8	96.9	97.5	97	71.4	97.3	98.9	98	94.9	66.7	97.4	97.6
Heavy Vehicles	32	155	16	13	216	31	86	46	9	172	42	147	44	2	235	14	73	58	9	154	777
% Heavy Vehicles	1.2	2.7	1.8	40.6	2.3	1.7	2.4	1.8	60	2.2	3.1	2.5	3	28.6	2.7	1.1	2	5.1	33.3	2.6	2.4

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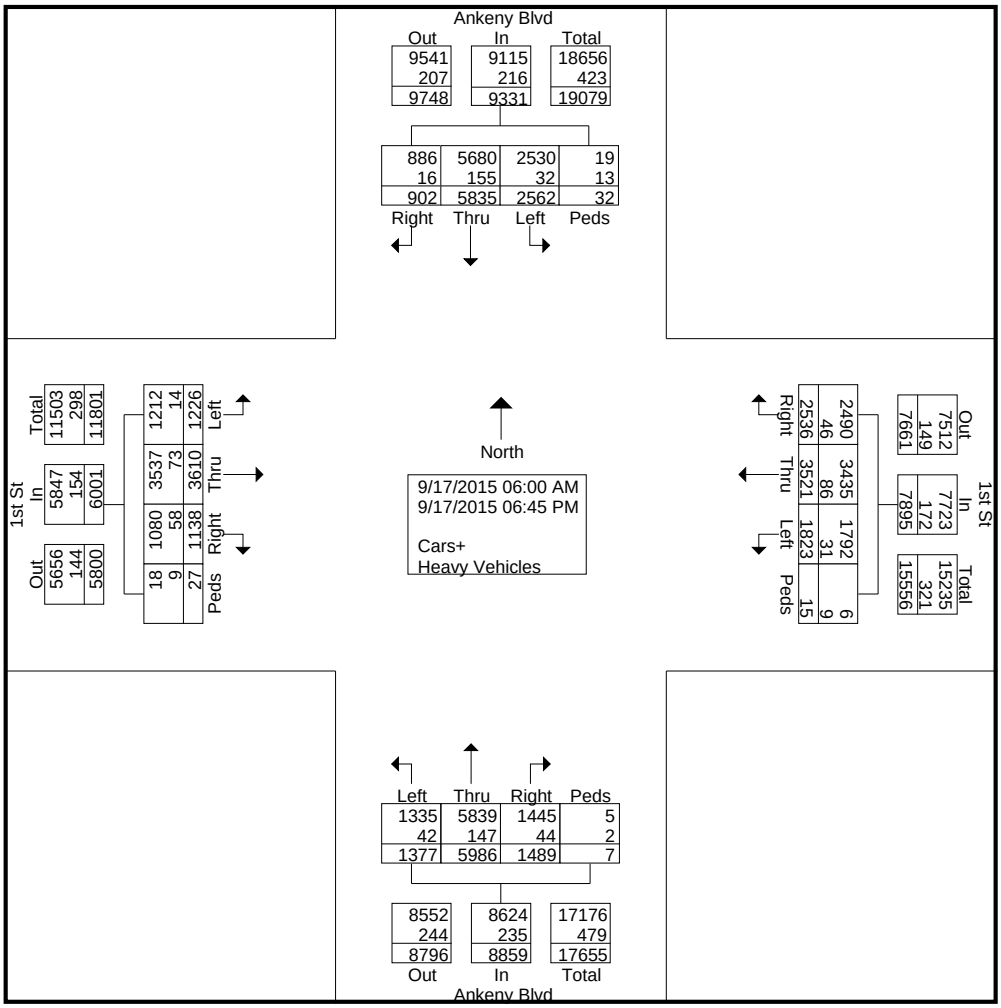
2727 Snyder Blvd.
Ankeny, Iowa, 50023

J

Ankeny Blvd and 1st St
Ankeny, IA
Ankeny Blvd and 1st St Traffic Study

File Name : Ankeny Blvd and 1st St
Site Code :
Start Date : 9/17/2015
Page No : 3



Snyder & Associates

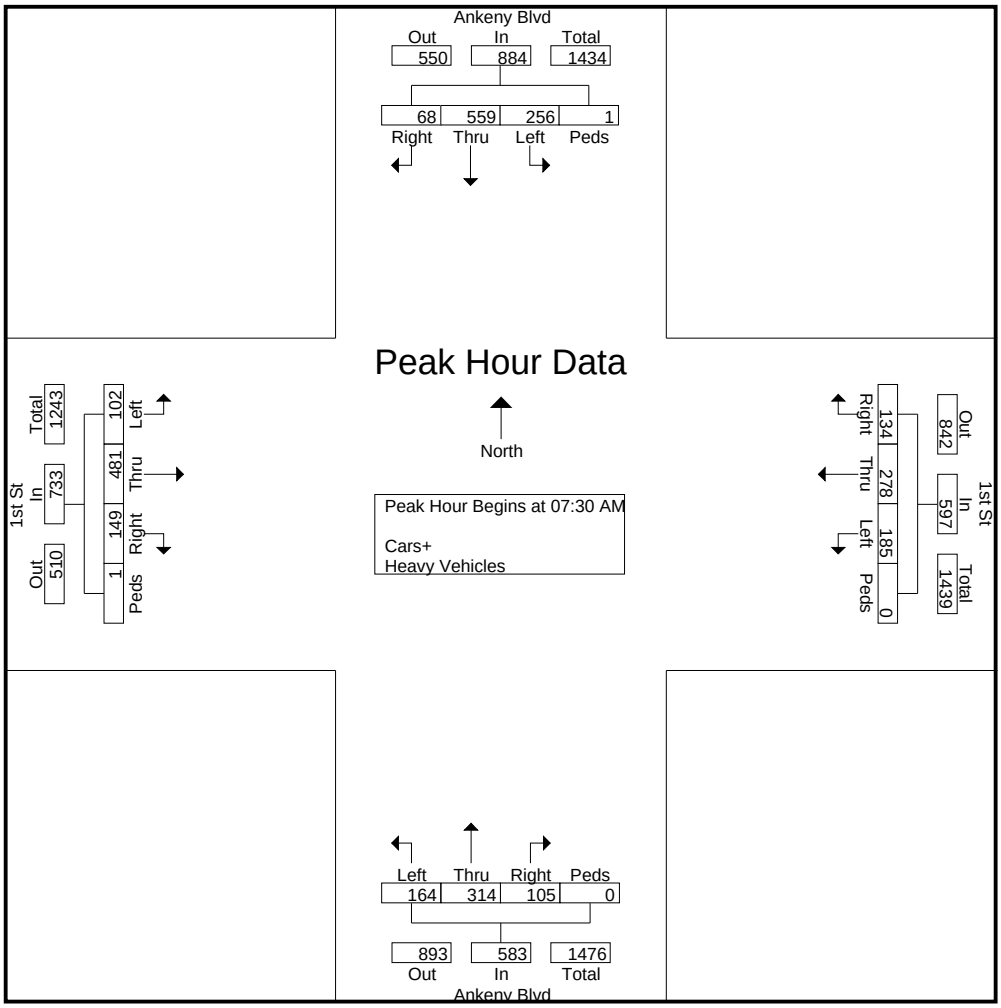
2727 Snyder Blvd.
Ankeny, Iowa, 50023

J

Ankeny Blvd and 1st St
Ankeny, IA
Ankeny Blvd and 1st St Traffic Study

File Name : Ankeny Blvd and 1st St
Site Code :
Start Date : 9/17/2015
Page No : 4

	Ankeny Blvd SB					1st St WB					Ankeny Blvd NB					1st St EB					
Start Time	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Int. Total
Peak Hour Analysis From 06:00 AM to 08:45 AM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 07:30 AM																					
07:30 AM	**70**	**175**	15	**1**	**261**	54	**91**	35	0	180	40	68	28	0	136	22	**134**	28	**1**	185	762
07:45 AM	66	163	17	0	246	**55**	90	**42**	0	**187**	33	**93**	25	0	151	**30**	128	32	0	190	**774**
08:00 AM	54	104	16	0	174	48	52	32	0	132	**56**	74	23	0	**153**	26	123	42	0	**191**	650
08:15 AM	66	117	**20**	0	203	28	45	25	0	98	35	79	**29**	0	143	24	96	**47**	0	167	611
Total Volume	256	559	68	1	884	185	278	134	0	597	164	314	105	0	583	102	481	149	1	733	2797
% App. Total	29	63.2	7.7	0.1		31	46.6	22.4	0		28.1	53.9	18	0		13.9	65.6	20.3	0.1		
PHF	.914	.799	.850	.250	.847	.841	.764	.798	.000	.798	.732	.844	.905	.000	.953	.850	.897	.793	.250	.959	.903



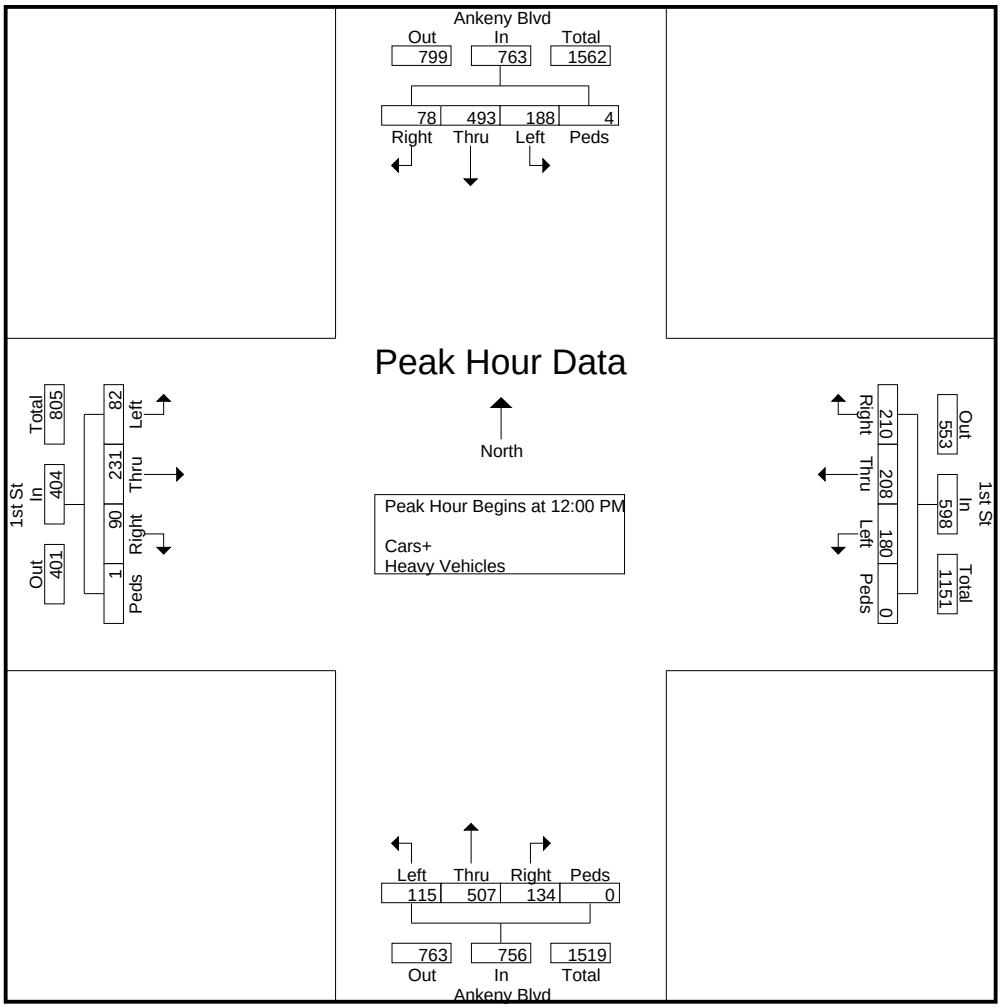
Snyder & Associates

2727 Snyder Blvd.
Ankeny, Iowa, 50023

Ankeny Blvd and 1st St
Ankeny, IA
Ankeny Blvd and 1st St Traffic Study

File Name : Ankeny Blvd and 1st St
Site Code :
Start Date : 9/17/2015
Page No : 5

	Ankeny Blvd SB					1st St WB					Ankeny Blvd NB					1st St EB					
Start Time	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Int. Total
Peak Hour Analysis From 09:00 AM to 12:45 PM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 12:00 PM																					
12:00 PM	49	118	15	0	182	46	**55**	**62**	0	**163**	**37**	135	**38**	0	**210**	22	59	25	0	106	661
12:15 PM	42	118	17	0	177	39	53	53	0	145	27	132	30	0	189	17	54	16	0	87	598
12:30 PM	38	128	**23**	0	189	**49**	49	46	0	144	21	102	36	0	159	18	53	**26**	0	97	589
12:45 PM	**59**	**129**	23	**4**	**215**	46	51	49	0	146	30	**138**	30	0	198	**25**	**65**	23	**1**	**114**	**673**
Total Volume	188	493	78	4	763	180	208	210	0	598	115	507	134	0	756	82	231	90	1	404	2521
% App. Total	24.6	64.6	10.2	0.5		30.1	34.8	35.1	0		15.2	67.1	17.7	0		20.3	57.2	22.3	0.2		
PHF	.797	.955	.848	.250	.887	.918	.945	.847	.000	.917	.777	.918	.882	.000	.900	.820	.888	.865	.250	.886	.936



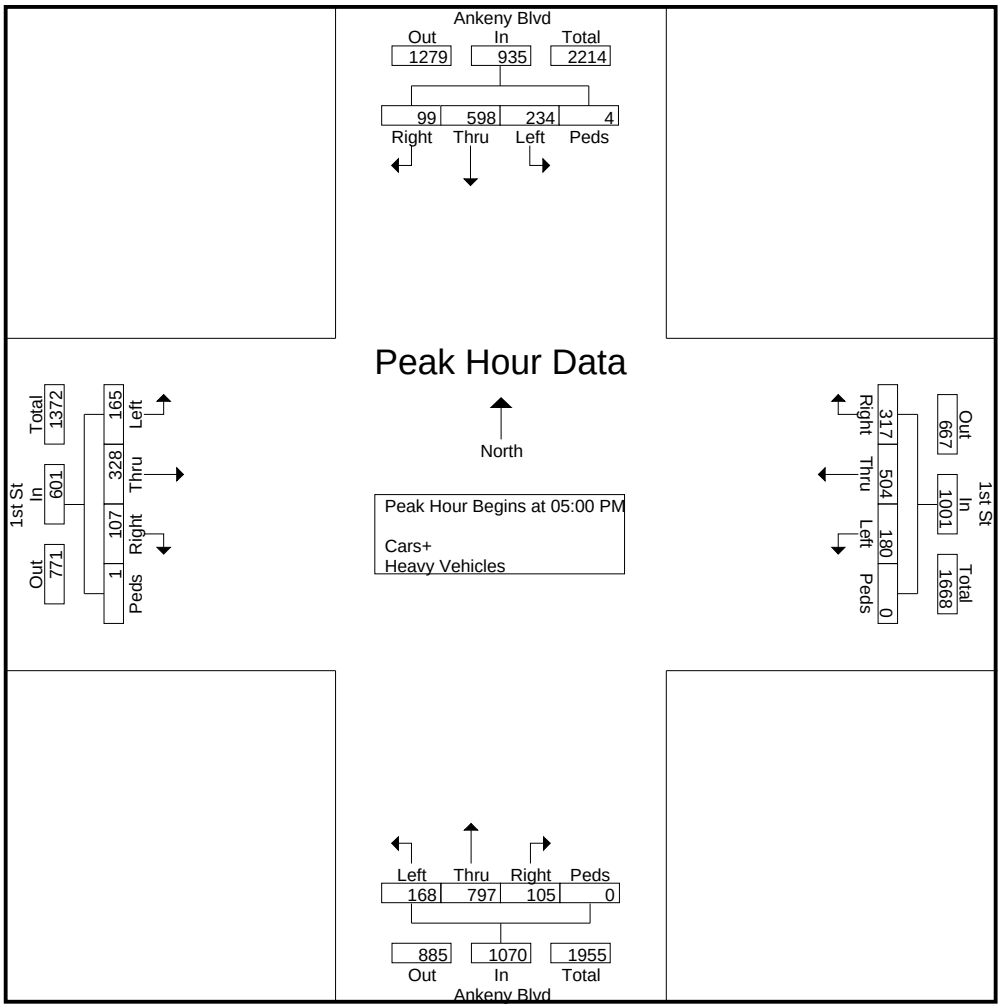
Snyder & Associates

2727 Snyder Blvd.
Ankeny, Iowa, 50023

Ankeny Blvd and 1st St
Ankeny, IA
Ankeny Blvd and 1st St Traffic Study

File Name : Ankeny Blvd and 1st St
Site Code :
Start Date : 9/17/2015
Page No : 6

	Ankeny Blvd SB					1st St WB					Ankeny Blvd NB					1st St EB					
Start Time	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Int. Total
Peak Hour Analysis From 01:00 PM to 06:45 PM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 05:00 PM																					
05:00 PM	60	151	**26**	0	237	43	128	**81**	0	252	39	190	20	0	249	38	78	20	**1**	137	875
05:15 PM	**68**	134	24	0	226	37	128	78	0	243	**48**	184	**30**	0	262	**47**	82	**35**	0	**164**	895
05:30 PM	43	146	23	**2**	214	**61**	**129**	77	0	**267**	38	205	26	0	269	46	80	28	0	154	904
05:45 PM	63	**167**	26	2	**258**	39	119	81	0	239	43	**218**	29	0	**290**	34	**88**	24	0	146	**933**
Total Volume	234	598	99	4	935	180	504	317	0	1001	168	797	105	0	1070	165	328	107	1	601	3607
% App. Total	25	64	10.6	0.4		18	50.3	31.7	0		15.7	74.5	9.8	0		27.5	54.6	17.8	0.2		
PHF	.860	.895	.952	.500	.906	.738	.977	.978	.000	.937	.875	.914	.875	.000	.922	.878	.932	.764	.250	.916	.967



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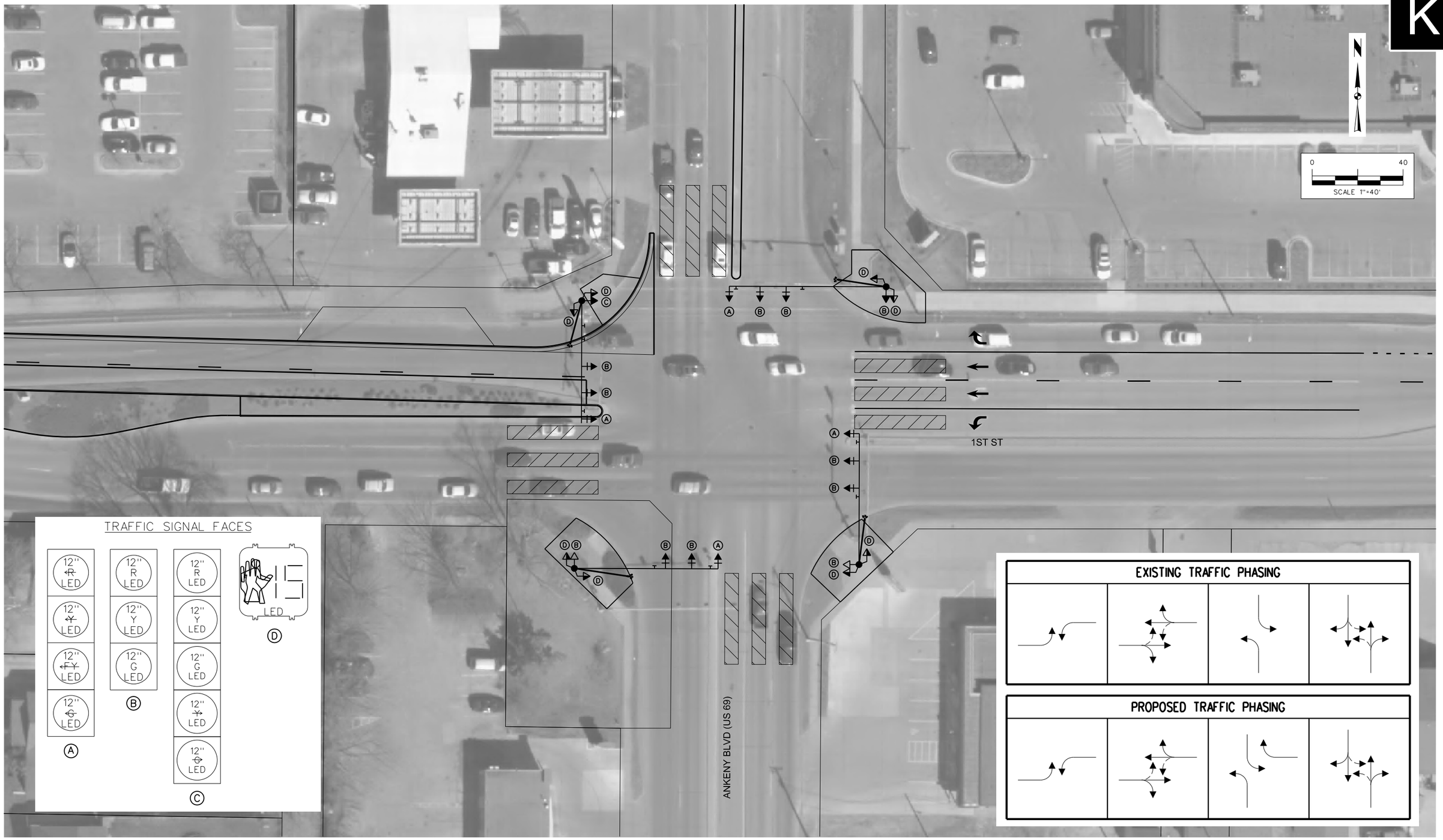

SNYDER & ASSOCIATES
Engineers and Planners

PROPOSED TRAFFIC SIGNAL LAYOUT
ANKENY BOULEVARD (US 69) AND FIRST STREET INTERSECTION
ANKENY, IOWA

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BENEFIT / COST ANALYSIS
ANKENY BOULEVARD (US 69) AND FIRST STREET
INTERSECTION IMPROVEMENTS
ANKENY, IOWA

For purposes of the benefit / cost analysis, an estimated improvement life of 15 years was selected. This is consistent with Iowa DOT recommended TSIP service lives for turn lane and traffic signal improvements.

Based on review of available data on the *Crash Modifications Factors Clearinghouse* website, a cumulative crash reduction factor (CRF) was applied for the proposed improvements. Applicable crash reduction factors include the following:

Countermeasure	CRF	Crash Type	Applicable Crashes	Adjusted CRF	Reference
Introducing zero or positive offset left turn lane on crossing roadway.	26	Angle	41%	9.4	Wang & Adel-Aty, 2007
	20	Angle			
Add right turn lane on one major-road approach.	4	All	100%	4.0	Harwood et al., 2002
Install left turn flashing yellow arrow signals and supplemental traffic signs.	14.3	Left Turn	41%	5.9	Schattler et al., 2015
	9.87	Other	59%	5.8	
Cumulative CRF				22.9	

Eliminating the outside dual westbound left turn lane, by converting it to a through lane, will eliminate the existing negative offset associated with this turn lane. With four foot wide medians, the resultant offset will be close to zero, significantly improving available sight distance for westbound and eastbound left turning drivers. Converting the outside westbound through lane to a right turn lane will better accommodate traffic demands, reduce vehicle queue lengths, and reduce the potential for westbound rear-end crashes. Replacing existing five-section protected-permissive left turn signal heads with four-section flashing yellow arrow heads and lengthening the southbound left turn lane are also expected to improve intersection safety.

Crash history shows that 24 of the 76 intersection crashes (32%) involved a westbound or eastbound left turning vehicle, and were potentially correctable by eliminating the outside westbound left turn lane. Based on this, the calculated cumulative CRF of 22.9 appears to be reasonable. To be somewhat conservative, a CRF of 20 was used for the benefit / cost analysis. With an estimated safety improvement construction cost of $559,800 the resultant benefit / cost ratio is 2.43:1.

Intersection or Spot Benefit / Cost Safety Analysis

Rev. 5/14

Iowa DOT Office of Traffic & Safety

County: Polk Prepared by: Snyder & Associates Date Prepared: Aug 3, 2016

Intersection: US 69 (Ankeny Boulevard) and First Street in Ankeny

Improvement

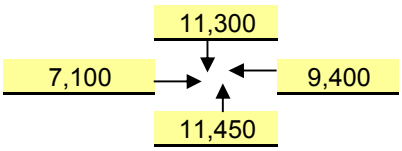
Proposed Improvement(s): Reduce WB dual left turn lanes to single left turn lane. Add WB right turn lane. Provide flashing yellow arrow left turn signal heads. Lengthen SB left turn lane.

$ 559,800	Estimated Improvement Cost, **EC**	15	Est. Improvement Life, years, **Y**
	Other Annual Cost (after initial year), **AC**	20	Crash Reduction Factor (integer), **CRF**
$ -	Present Value Other Annual Costs, **OC**	4.0%	Discount Rate (time value of $), **INT**
	$$OC = \frac{AC}{INT}\left(1 - \frac{1}{(1+INT)^Y}\right)$$	$ 559,800	Present Value Cost, **COST** = EC + OC

Traffic Volume Data

Source: Snyder & Associates 2015 Date of traffic count

Daily Entering Vehicles by Approach (or AADT / 2)



14,326,250	Current Annual Entering Veh., **AEV** = DEV * 365
45,568	veh / day, Final Year DEV, **FDEV**
230.61	MEV, Total Million Entering Veh. Over life of Project, **TMEV**
1.0%	Projected Traffic Growth (0%-10%), **G**
39,250	Current Daily Entering Vehicles, **DEV**

$$TMEV = \frac{AEV}{-G}\left(1 - \left(\frac{1+G}{1}\right)^Y\right) \Big/ 10^6$$

Crash Data

2013 First full year --> 2015 Last full year 3.0 years, Time Period, **T**

Additional months values as of May 2014

	Fatal Crashes →		Fatalities @	$4,500,000	$	-
		1	Major Injuries @	$325,000	$	325,000
16	Injury Crashes →	7	Minor Injuries @	$65,000	$	455,000
		14	Possible Injuries @	$35,000	$	490,000
60	Property Damage Only		(assumed cost per crash)	$7,400	$	-
		-OR-	enter all Property Costs of all crashes:		$	450,381
76	Total Crashes, **TA**			Total $ Loss, **LOSS**	$	1,720,381

25.33	Current Crashes / Year, **AA** = TA / T	1.77	Crashes / MEV, Crash Rate, **CR** CR = TA x 10^6 / (DEV x 365 x T)
$ 22,637	Cost per Crash, **AVC** = LOSS / TA		
407.8	Total Expected Crashes, **TECR** = CR x TMEV	$ 1,358,547	Present Value of Avoided Crashes, **BENEFIT**
5.07	Crashes Avoided First Year **AAR** = AA x CRF / 100		
$ 114,692	Crash Costs Avoided in First Year, AAR x AVC		
81.6	Total Avoided Crashes, TECR x CRF/ 100		

$$BEN. = \frac{AVC \times AAR}{(INT - G)}\left(1 - \left(\frac{1+G}{1+INT}\right)^Y\right)$$

Benefit / Cost Ratio

Benefit : Cost = $1,358,547 : $559,800 = **2.43** : 1

Application for TRAFFIC SAFETY FUNDS

GENERAL INFORMATION **DATE:** August 9, 2016

Location / Title of Project Riverside Rd, pcc overlay, pvd shoulders, rumble strips

Applicant Washington County

Contact Person Jacob Thorius Title County Engineer

Complete Mailing Address 210 W Main Street, Suite 2
Washington, IA 52353

Phone (319) 653-7731 (Area Code) E-Mail thorius@co.washington.ia.us

If more than one highway authority is involved in this project, please indicate and fill in the information below (use additional sheets if necessary).

Co-Applicant(s) City of Riverside

Contact Person Lory Young Title City Clerk

Complete Mailing Address PO Box 188
Riverside, IA 52327

Phone 319-648-3501 (Area Code) E-Mail lory@cityofriversideiowa.com

PLEASE COMPLETE THE FOLLOWING PROJECT INFORMATION:

Application Type

- Site Specific ☒
- Traffic Control Device ☐
- Safety Study ☐

Funding Amount

Total Safety Cost	$ 500,000
Total Project Cost	$ 2,395,518
Safety Funds Requested	$ 500,000

Does this project appear on a Safety Improvement Candidate List or is there a safety study recommendation for this project?
☐ Yes – Explain _____
☒ No

Rev. 6/16

APPLICATION CERTIFICATION FOR LOCAL GOVERNMENT

To the best of my knowledge and belief, all information included in this application is true and accurate, including the commitment of all physical and financial resources. This application has been duly authorized by the participating local government(s). I understand the attached resolution(s) binds the participating local government(s) to assume responsibility if any additional funds are committed, and to ensure maintenance of any new or improved city streets or secondary roads.

I understand that, although this information is sufficient to secure a commitment of funds, a firm contract between the applicant and the Department of Transportation is required prior to the authorization of funds.

Representing the County of Washington

Signed: _____ 8-9-16
Signature Date Signed

Richard Young
Typed Name

Attest: _____ 8/9/16
Signature Date Signed

Jacob Thorius
Typed Name

Rev. 6/16

APPLICATION CERTIFICATION FOR LOCAL GOVERNMENT

To the best of my knowledge and belief, all information included in this application is true and accurate, including the commitment of all physical and financial resources. This application has been duly authorized by the participating local government(s). I understand the attached resolution(s) binds the participating local government(s) to assume responsibility if any additional funds are committed, and to ensure maintenance of any new or improved city streets or secondary roads.

I understand that, although this information is sufficient to secure a commitment of funds, a firm contract between the applicant and the Department of Transportation is required prior to the authorization of funds.

Representing the City of Riverside

Signed: Allen Schneider 8/11/16
Signature Date Signed

Allen Schneider - Mayor
Typed Name

Attest: Lory Young City Clerk 8/11/16
Signature Date Signed

LORY YOUNG CITY CLERK
Typed Name

Narrative of Proposed Project:

Washington County and the City of Riverside are applying for Traffic Safety Improvement Program (TSIP) funds to be used for improving the safety on W61 (Riverside Road) from Spruce Avenue to River Street in Riverside, approximately 3.51 miles. TSIP funds are being sought to aid in the placement of a 24 foot PCC overlay with 2 foot paved shoulders and 8 inch rumble strips from Spruce Avenue to Riverside, the County portion of this project. For the portion of the project within the city limits of Riverside, TSIP funds will be used to add a 2 foot paved shoulder. This overlay project will increase the width of the travel lanes and add a paved shoulder with rumbles that will help to improve the safety for the traveling public by giving them a notification they are drifting off the road. This notification and wider pavement will give the driver more time to react and correct the problem before they encounter an edge rut and/or loose granular material on the rocked shoulder. Due to lower vehicle speeds within the City of Riverside, rumble strips will not be utilized within the city limits, however, the paved shoulders will minimize development of an edge rut and improve safety for the traveling public.

Currently, the Riverside Road, originally constructed in 1963, is a 20 foot wide PCC pavement with 8 foot granular shoulders, 2:1 foreslopes, variable backslopes and numerous patches that have been placed to address the aging pavement. This is the main road from Washington to Riverside with an annual average traffic count of 837 vpd on this stretch of road between Spruce Avenue and River Street. This stretch of road has three curves, one of which is a ninety degree change in direction while the other two are either at the bottom or top of a hill and end up getting taken on the short side of the curve. All three curves are signed with appropriate curve signs and delineated with chevrons. The road is posted at 55 mph with advisory speeds of 35 mph for all three curves.

A safety issues exists with the continual development of edge ruts all along the Riverside Road. Specifically edge ruts develop from vehicles dropping their tires off the edge of the pavement as a result of the narrowness of the lanes and in the curves as vehicles cut the inside of the curve to maintain their speed or even drift to the high side of the curve when they travel to fast around the curve. In addition, wind whip created by the vehicles traversing along the road and meeting/passing each other also contributes to a loss of material and development of an edge rut. The combination of the edge rut, which tends to cause a driver to over correct if they drop off the pavement into the rut, and the narrowness of the lanes and the existing slopes create a safety hazard for the public. As stated earlier, the paving of the shoulders will help provide a safer road for the traveling public by providing a wider driving surface and some advanced warning.

The majority of reported accidents over the last ten years have been minor in nature and have involved the driver over correcting and swerving to avoid the ditch. One fatality did occur in 2010 as a result of the driver crossing the centerline, losing control and entering the ditch. A wider road and paved shoulders will greatly reduce the amount of wind whipping away the granular shoulder and vehicles dropping off of the pavement, both of which are causing an edge rut to develop alongside the pavement. Reducing the likelihood of an edge rut will help minimize the over correcting action that happens when a tire drops off the pavement into a rut. In addition rumble strips will be placed within the paved shoulder and will alert drivers sooner

that they are veering off the paved driving surface. These rumble strips are intended to give them more time to react and correct the travel of their vehicle. The increased hard surfaced driving area and reduced rutting will help in being proactive to reduce the number of future accidents and unreported near miss accidents.

C

Itemized Breakdown of All Costs:

Please see the attached sheet for the cost breakdown, showing improvements made with and without the safety funds.

Below is a breakdown of the anticipated funding for the project, with and without the safety improvement. For the safety improvement of two foot paved shoulders with rumble strips, Washington County is requesting $500,000 in TSIP funds.

Funding Source Breakdown				
With Safety Improvement			Without Safety Improvement	
Funding Source	Amount		Funding Source	Amount
Federal Aid (STP)	$1,516,414		Federal Aid (STP)	$1,514,070
Farm to Market (FM)	$379,104		Farm to Market (FM)	$378,517
TSIP	$500,000		TSIP	$0
Total	$2,395,518		Total	$1,892,587

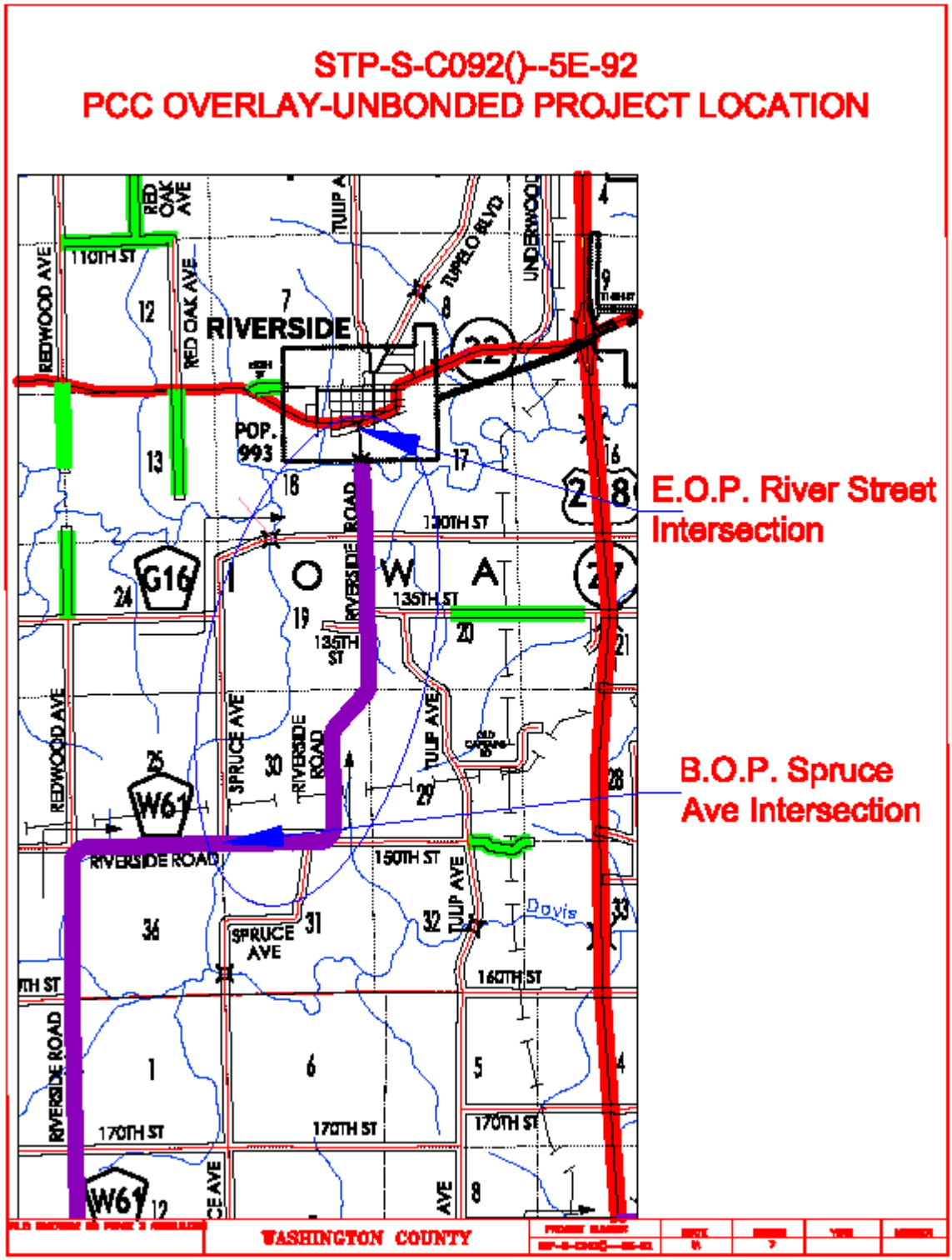
D

Time Schedule:

TSIP Application	August 15, 2016
Preliminary Project Design	November 2016
TSIP Funding Award	December 2016
Final Project Design	April 2017
TSIP Funds Available	July 2017
Project Letting	December 2017
Project Construction	April 2018-October 2018

E

Map:

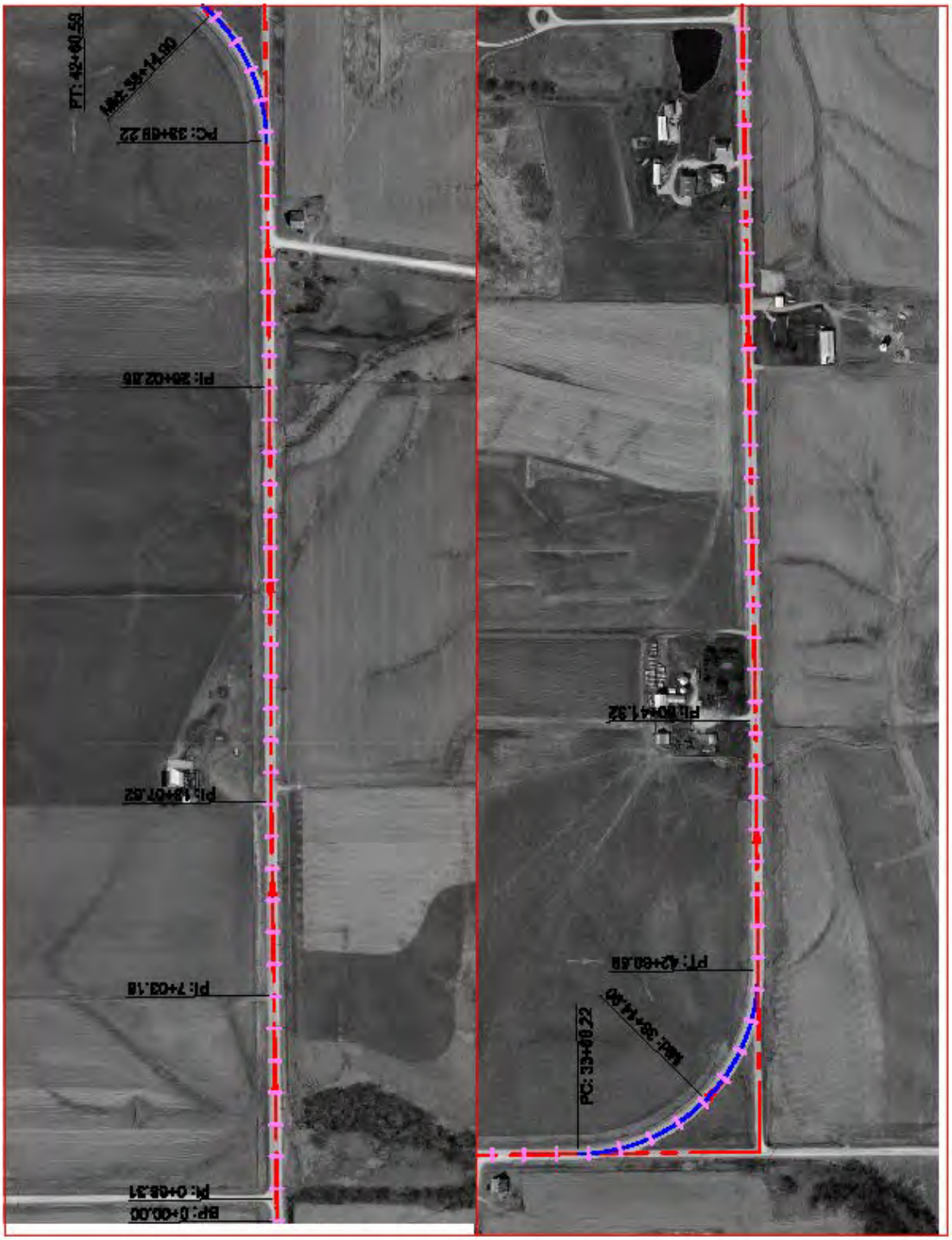

STP-S-C092()--5E-92
PCC OVERLAY-UNBONDED PROJECT LOCATION
RIVERSIDE
POP. 993
E.O.P. River Street Intersection
B.O.P. Spruce Ave Intersection
RIVERSIDE ROAD
SPRUCE AVE
TULIP AVE
REDWOOD AVE
RED OAK AVE
110TH ST
130TH ST
135TH ST
150TH ST
160TH ST
170TH ST
G16
W61
Davis
WASHINGTON COUNTY

Color Pictures:

Typical sections of existing pavement with edge rut developing along pavement edge. In the bottom two pictures, notice edge rutting developing on inside of curve because of vehicles dropping off the pavement. The top right picture shows edge rutting also develops along the outside of the curve because of the narrowness of the pavement.

G & H

Plan View & Aerial:



PI: 121+67.31
PI: 138+14.52
PC: 73+67.30
MC: 75+82.32
PT: 77+76.86
PC: 82+73.69
MC: 84+89.76
PT: 86+06.18

PI: 171+42.55
EP: 185+45.16

PI: 145+10.73
PI: 171+42.53

Iowa Department of Transportation

Major Cause Summary

Riverside Rd from Spruce Ave to River Street Major

Report Version 1.1 Jan 2005

Analysis Years: 2006 [2], 2007 [1], 2008 [2], 2009 [2], 2010 [4], 2011 [1], 2012 [1], 2013 [1], 2014 [2]

Crash Summary:

Fatal	1
Major Injury	1
Minor Injury	2
Possible/Unknown	1
PDO	11
Total Crashes	16

Injury Summary:

Fatal	1
Major Injury	2
Minor Injury	2
Possible	2
Unknown	-
Total Injuries	7

TOT Property Damage: $102,495

AVG Property Damage: $6,406

Surface Condition Summary:

Dry	7
Wet	4
Ice	2
Snow	2
Slush	-
Sand/Dirt/Oil/Gravel	-
Water	-
Other	-
Unknown	-
Not Reported	1
Total Crashes	16

Major Cause Summary:

3	Animal
	Ran Traffic Signal
1	Ran Stop Sign
2	Crossed Centerline
	FTYROW: At Uncontrolled Intersection
	FTYROW: Making Right Turn on Red Signal
	FTYROW: From Stop Sign
	FTYROW: From Yield Sign
2	FTYROW: Making Left Turn
1	FTYROW: From Driveway
	FTYROW: From Parked Position
	FTYROW: To Pedestrian
	FTYROW: Other (explain in narrative)
	Traveling Wrong Way or on Wrong Side of Rd
	Driving Too Fast for Conditions
	Exceeded Authorized Speed
	Made Improper Turn
	Improper Lane Change
	Followed Too Close
	Disregarded Railroad Signal
	Disregarded Warning Sign
	Operating Vehicle in Reckless/Aggressive Manner
	Improper Backing
	Illegally Parked/Unattended
1	Swerving/Evasive Action
	Over-Correcting/Over-Steering
1	Downhill Runaway
	Equipment Failure
	Separation of Units
4	Ran Off Road - Right
	Ran Off Road - Straight
	Ran Off Road - Left
	Lost Control
	Inattentive/Distracted By: Passenger
	Inattentive/Distracted By: Use of Phone or Other
	Inattentive/Distracted By: Fallen Object
	Inattentive/Distracted By: Fatigued/Asleep
	Other: Vision Obstructed
	Oversized Load/ Oversized Vehicle
	Cargo/Equipment Loss or Shift
	Other: Other Improper Action
1	Unknown
	Other: No Improper Action
	None Indicated

Selection Filter:

((YEAR <> 2016))

Analyst:

Notes:

J

Traffic Volume:

The 2014 AADT for this stretch of the Riverside Road (W61) is 837

Turning movement and intersection counts are not available for this stretch of road.

K

Traffic Signals – N/A

L

Benefit/Cost Ratio:

See attached worksheet

The following Crash Modification Factors (CMF) were used in the calculation of the Benefit/Cost Ratio:

CMF ID: 6690 – Pave Shoulder, with a CRF of 18
CMF ID: 3478 – Install Shoulder Rumble Strips, with a CRF of 28

These factors were combined in the Excel spreadsheet to create a cumulative CRF of 40.96 and a service life of 35 years was used for the 8 inch PCC Unbonded Overlay; the widening unit and paved shoulder will be approximately 12 inch thick. The B/C Ratio was calculated to be 2.24.

A CMF for widening the existing pavement from 20 feet to 24 feet was not included as that is not part of the safety grant, but was considered as it will add a positive benefit to the roadway and reducing potential crashes. If that were to be included in the analysis, then CMF ID: 4811 – Change Lane Width from X to Y (in feet), with a CRF of 32 would have been used. Combining all three CRFs results in a cumulative CRF of 60 and a B/C Ratio of 3.28.

Rev. 5/14

Road Segment Benefit / Cost Safety Analysis

Iowa DOT Office of Traffic & Safety

County: Washington | Prepared by: Jacob Thorius | Date Prepared: Aug 12, 2016

Location: W61 (Riverside Road) From Spurce Avenue north to Hwy 22 in Riverside

Improvement

Proposed Improvement(s): 28' PCC Overlay with lanes widened from 10' to 12', paved shoulders 2' wide, and edgline rumble strips

$ 500,000	Estimated Improvement Cost, **EC**	35	Est. Improvement Life, years, **Y**
$ -	Other Annual Cost (after initial year), **AC**	41	Crash Reduction Factor (integer), **CRF**
$ -	Present Value Other Annual Costs, **OC**	4.0%	Discount Rate, **INT**
	$$OC = \frac{AC}{INT}\left(1 - \frac{1}{(1+INT)^Y}\right)$$	$ 500,000	Present Value All Costs, **COST** = EC + OC

Traffic Volume Data

Source: DOT Traffic Count Data | 2014 Date of traffic count

Length (mi.)	Two-way veh/day	Description
2.34	670	Spruce to 135th Street
0.53	980	135th St to 130th Street
0.64	1,330	130th Street to River Street
3.51	miles total	

1.0% Projected Traffic Growth (0%-10%), **G**

2,938 Current Vehicle Miles / Day, **VM**

4,163 End of Life Veh. Miles / Day

1,072,516 Current Veh. Miles / Year, **AM**

44,681,312 Total Projected Veh. Miles Over Life of Project, **TVMT**

$$TVMT = \frac{AM}{-G}\left(1 - \left(\frac{1+G}{1}\right)^Y\right)$$

Crash Data

2006 First full year --> 2015 Last full year | 10.0 years, Time Period, **T**

Additional months | values as of May 2014

1	Fatal Crashes	0	Fatalities @	$4,500,000	$	-
		3	Major Injuries @	$325,000	$	975,000
4	Injury Crashes	2	Minor Injuries @	$65,000	$	130,000
		2	Possible Injuries @	$35,000	$	70,000
11	Property Damage Only		(assumed cost per crash)	$7,400	$	-
			-OR- enter all Property Costs of all crashes:		$	102,495
16	Total Crashes, **TA**			Total $ Loss, **LOSS**	$	1,277,495

1.60	Current Crashes / Year, **AA** = TA / T	149.2	Crashes / HMVM, Crash Rate, **CR** CR = TA x 10^8 / (AM x T)
$ 79,843	Cost per Crash, **AVCR** = LOSS / TA	$ 1,119,147	Present Value of Avoided Crashes, **BENEFIT**
66.7	Total Expected Crashes, **TCR** = CR x TVMT/10^8		
0.66	Crashes Avoided First Year **AAR** = AA x CRF / 100		
$ 52,377	Crash Costs Avoided in First Year, AAR x AVCR		
27.3	Total Avoided Crashes, TCR x CRF/ 100		

$$BEN. = \frac{AVCR \times AAR}{(INT - G)}\left(1 - \left(\frac{1+G}{1+INT}\right)^Y\right)$$

Benefit / Cost Ratio

Benefit : Cost = $1,119,147 : $500,000 = **2.24** : 1

Project Number: STP-S-C092()--5E-92

				Original Plan			Safety Improvement		
				24' PCC w/ 7' Granular Shoulders			24' PCC Pavement w/ 2' PCC & 5' Granular Shoulders		
Item No.	**Item Code**	**Item**	Unit	Quantity	Unit Price	Estimated Price	Quantity	Unit Price	Estimated Price
1	2102-0425070	SPECIAL BACKFILL	TON	550.00	$ 21.25	$ 11,687.50	550.00	$ 21.25	$ 11,687.50
2	2121-7425020	GRANULAR SHOULDERS, TYPE B	TON	10,825.00	$ 20.00	$ 216,500.00	10,825.00	$ 20.00	$ 216,500.00
3	2122-5190008	PAVED SHOULDER, P.C. CONCRETE, 8 IN.	SY	0	$ 43.26	$ -	284.76	$ 43.26	$ 12,318.72
4	2213-2713300	EXCAVATION, CLASS 13, FOR WIDENING	CY	2,214.00	$ 15.00	$ 33,210.00	2,214.00	$ 15.00	$ 33,210.00
5	2213-7100400	RELOCATION OF MAIL BOXES	EACH	29.00	$ 150.00	$ 4,350.00	29.00	$ 150.00	$ 4,350.00
6	2123-7450000	SHOULDER CONSTRUCTION, EARTH	STA	370.92	$ 84.00	$ 31,157.28	370.92	$ 84.00	$ 31,157.28
7	2301-1034080	STANDARD OR SLIP FORM P.C.C. PAVEMEN, CLASS C, CLASS 3I, 8 IN.	SY	6,218.13	$ 95.74	$ 595,323.77	7,254.49	$ 95.74	$ 694,544.87
8	2303-0245828	ASPHALT BINDER, PG 58-28	TON	3.00	$ 605.00	$ 1,815.00	125.00	$ 605.00	$ 75,625.00
9	2310-5151040	PORTLAND CEMENT CONCRETE OVERLAY, FURNISH ONLY	CY	9,508.12	$ 73.04	$ 694,473.08	11,702.31	$ 73.04	$ 854,736.72
10	2310-5151251	PORTLAND CEMENT CONCRETE OVERLAY, PLACEMENT ONLY (UNBONDED)	SY	39,495.28	$ 4.09	$ 161,535.70	46,077.83	$ 4.09	$ 188,458.32
11	2310-8300540	HOT MIX ASPHALT STRESS RELIEF COURSE	TON	43.00	$ 60.00	$ 2,580.00	1,965.00	$ 60.00	$ 117,900.00
12	2315-8275025	SURFACING, DRIVEWAY, CLASS A CRUSHED STONE	TON	206.00	$ 22.31	$ 4,595.86	206.00	$ 22.31	$ 4,595.86
13	2510-6745850	REMOVAL OF PAVEMENT	SY	6,737.34	$ 6.50	$ 43,792.71	6,737.34	$ 6.50	$ 43,792.71
14	2518-6910000	SAFETY CLOSURE	EACH	10.00	$ 125.00	$ 1,250.00	10.00	$ 125.00	$ 1,250.00
15	2527-9263109	PAINTED PAVEMENT MARKING, WATERBORNE OR SOLVENT-BASED	STA	542.33	$ 15.25	$ 8,270.53	542.33	$ 15.25	$ 8,270.53
16	2528-8445110	TRAFFIC CONTROL	LS	1.00	$ 7,500.00	$ 7,500.00	1.00	$ 7,500.00	$ 7,500.00
17	2528-8445113	FLAGGERS	EACH	1.00	$ 440.61	$ 440.61	1.00	$ 440.61	$ 440.61
18	2533-4980005	MOBILIZATION	LS	1.00	$ 65,000.00	$ 65,000.00	1.00	$ 65,000.00	$ 65,000.00
19	2548-0000200	MILLED SHOULDER RUMBLE STRIPS, PCC SURFACE	STA	-	$ 28.51	$ -	342.86	$ 28.51	$ 9,774.94
20	2601-2634100	MULCHING	ACRE	2.70	$ 700.00	$ 1,890.00	4.70	$ 700.00	$ 3,290.00
21	2601-2636041	SEEDING AND FERTILIZING	ACRE	2.70	$ 1,450.00	$ 3,915.00	4.70	$ 1,450.00	$ 6,815.00
22	2601-2642100	STABILIZING CROP - SEEDING AND FERTILIZING	ACRE	2.70	$ 500.00	$ 1,350.00	4.70	$ 500.00	$ 2,350.00
23	2602-0000020	SILT FENCE	LF	100.00	$ 2.00	$ 200.00	100.00	$ 2.00	$ 200.00
24	2602-0000030	SILT FENCE FOR DITCH CHECKS	LF	100.00	$ 2.00	$ 200.00	100.00	$ 2.00	$ 200.00
25	2602-0000101	MAINTENANCE OF SILT FENCE OR SILT FENCE FOR DITCH CHECK	LF	100.00	$ 0.50	$ 50.00	100.00	$ 0.50	$ 50.00
26	2602-0010010	MOBILIZATIONS, EROSION CONTROL	EACH	1.00	$ 500.00	$ 500.00	1.00	$ 500.00	$ 500.00
27	2602-0010020	MOBILIZATIONS, EMERGENCY EROSION CONTROL	EACH	1.00	$ 1,000.00	$ 1,000.00	1.00	$ 1,000.00	$ 1,000.00
						$ 1,892,587.04			$ 2,395,518.07

ITEMIZED BREAKDOWN OF ALL COSTS

C.

Application for TRAFFIC SAFETY FUNDS

GENERAL INFORMATION **DATE:** August 11, 2016

Location / Title of Project Highway 6 & Park Road / Single-Lane Roundabout

Applicant City of Tiffin

Contact Person Doug Boldt Title City Administrator

Complete Mailing Address P.O. Box 259
Tiffin, Iowa 52340

Phone (319)-545-2572 (Area Code) E-Mail dboldt@tiffin-iowa.org

If more than one highway authority is involved in this project, please indicate and fill in the information below (use additional sheets if necessary).

Co-Applicant(s) _____

Contact Person _____ Title _____

Complete Mailing Address _____

_____

Phone _____ (Area Code) E-Mail _____

PLEASE COMPLETE THE FOLLOWING PROJECT INFORMATION:

Application Type

- Site Specific ☒
- Traffic Control Device ☐
- Safety Study ☐

Funding Amount

Total Safety Cost	$ 1,466,439.70
Total Project Cost	$ 1,979,693.60
Safety Funds Requested	$ 500,000.00

Does this project appear on a Safety Improvement Candidate List or is there a safety study recommendation for this project?

☐ Yes – Explain _____
☒ No

APPLICATION CERTIFICATION FOR LOCAL GOVERNMENT

To the best of my knowledge and belief, all of the information included in this application is true and accurate, including the commitment of all physical and financial resources. This application has been duly authorized by the participating local government(s). I understand the attached resolution(s) binds the participating local government(s) to assume responsibility if any additional funds are committed and to ensure maintenance of any new or improved city streets or secondary roads.

I understand that, although this information is sufficient to secure a commitment of funds, a firm contract between the applicant and the Department of Transportation is required prior to the authorization of funds.

Representing the City of Tiffin

Signed: _____ 7/22/16

Signature — Date Signed

Steven L Berner, Mayor

Typed/Printed Name

Attest: _____ 7-22-16

Signature — Date Signed

Doug Boldt - City Administrator

Typed/Printed Name

A. RESOLUTION

RESOLUTION NO. 2016-049

A RESOLUTION AUTHORIZING THE CITY OF TIFFIN, IOWA, TO MAKE AN APPLICATION TO THE IOWA DEPARTMENT OF TRANSPORTATION TRAFFIC SAFETY IMPROVEMENT PROGRAM FOR THE FUNDING OF A ROUNDABOUT AT THE INTERSECTION OF HIGHWAY 6 AND PARK ROAD

Whereas, the Iowa Department of Transportation Traffic Safety Improvement operates under the rules of the Iowa Administrative Code 761 – Chapter 164, and;

Whereas, said program allow for the distribution of traffic safety funds to cities, counties and the Iowa DOT for roadway improvements, research, studies, or public information initiatives, and;

Whereas, the City of Tiffin, Iowa, has determined that by constructing a Roundabout at the intersection Highway 6 and Park Road will improve the safety at the intersection.

Now, therefore be it resolved by the City Council of the City of Tiffin, Iowa, that the City Council supports an application for Iowa Department of Transportation Traffic Safety Improvement Program funding and hereby authorizes the Mayor to execute a completed application on behalf of the City.

On the 19th day of July, 2016, at a regular meeting of the Tiffin City Council, Tiffin, Iowa, Councilperson Ryan introduced **RESOLUTION NO. 2016-049, A RESOLUTION AUTHORIZING THE CITY OF TIFFIN, IOWA, TO MAKE AN APPLICATION TO THE IOWA DEPARTMENT OF TRANSPORTATION TRAFFIC SAFETY IMPROVEMENT PROGRAM FOR THE FUNDING OF A ROUNDABOUT AT THE INTERSECTION OF HIGHWAY 6 AND PARK ROAD** and made a motion for approval. Motion seconded by Councilperson Kahler.

Ayes: Bartels, Havens, Kahler, Upton, Ryan
Nays: None.
Absent: None.

Whereupon Five Council members were present and voted approval and Mayor Berner declared that **RESOLUTION NO. 2016-049, A RESOLUTION AUTHORIZING THE CITY OF TIFFIN, IOWA, TO MAKE AN APPLICATION TO THE IOWA DEPARTMENT OF TRANSPORTATION TRAFFIC SAFETY IMPROVEMENT PROGRAM FOR THE FUNDING OF A ROUNDABOUT AT THE INTERSECTION OF HIGHWAY 6 AND PARK ROAD** to be adopted and signified his approval of the same by affixing his signature thereto.

Passed by the City Council on the 19th day of July, 2016.

City of Tiffin

Steven L. Berner, Mayor

ATTEST: _____
Doug Boldt, City Administrator/Clerk

B. NARRATIVE

Introduction and Background

The City of Tiffin is submitting this application for Traffic Safety Improvement Program funds under the Site Specific category. This funding request is for the construction of a single-lane roundabout at the Highway 6 and Park Road intersection located in east Tiffin. As shown in **Image 1** there is an elementary school at the north-east corner of the intersection. A well-used pedestrian / bicycle trail is located south-west of the intersection.

Existing Conditions

Image 1: Highway 6 and Park Road Intersection

Highway 6 is functionally classified as a "Minor Arterial" street that provides east-west regional access to the metropolitan area and local access between Iowa City, Coralville, and Tiffin. The posted speed limit on Highway 6 is 55 mph while 85th percentile speeds range from 54.8 – 63 mph.

As built today, Park Road is a north-south road running parallel to Interstate 380 between Highway 6 and Forevergreen Road. The posted speed limit is 25 mph. At the intersection with Highway 6, traffic is currently stop controlled for north-south traffic only.

Proposed Concept

The Iowa DOT Traffic Safety Improvement Program funds are critical in supporting the City of Tiffin's effort to improve the safety and traffic flow at the Highway 6 and Park Road intersection through the construction of a single-lane roundabout.

In addition to improved traffic circulation and accessibility, the following goals can be achieved through the completion of this project:

1. Reduce overall collisions, particularly those resulting in fatal or major injuries.
2. Create an efficient and safe connection between North Liberty and Coralville, as well as Interstate 380 upon completion of the planned I-380 / Forevergreen Road interchange to be completed in the next several years.

The clear zone does not present a safety hazard at this intersection. The Statewide Urban Design and Specifications (SUDAS) clear zone requirement will be met and maintained with the proposed intersection improvements. All proposed intersection and traffic safety improvements will be consistent with the 2009 Manual on Uniform Traffic Control Devices (MUTCD). The City of Tiffin will be responsible for the operation and maintenance of the intersection.

Safety Justification

The construction of a roundabout, by design, will improve the safety of this intersection and allow for efficient traffic flow as the corridor will be experiencing an increase in traffic as a result of the newly constructed Tiffin Elementary School, the proposed construction of the Forevergreen Road interchange, expansion of I-380 to a six-lane cross-section, and reconstruction of the I-80 / I-380 interchange.

The expected increase in safety that results from a single-lane roundabout stems from the reduction in conflict points, a reduction in speed differentials at the intersection, and a decrease in speed as motorists proceed through the intersection. Roundabouts constructed at intersections along high-speed, two-lane highways have been shown to reduce the number and severity of crashes.

An evaluation of the crash history for the Highway 6 and Park Road intersection was performed using the most current crash data from the CMAT Iowa statewide database (2007-2015). There were found to be 14 crashes in almost 8 years, of which resulted in 2 fatalities, 2 major injuries, 2 minor injuries, 6 possible injuries, and 1 unknown injury. The majority of crashes (50%) are rear end collisions. Other recorded causes of crashes include broadside, sideswipe same-direction, and non-collision.

One collision resulting in 2 fatalities and 2 major injuries stands out. These fatalities / injuries were a result of a broadside collision. Per the AASHTO Highway Safety Manual, roundabouts are shown to reduce these types of crashes where people are seriously hurt or killed by 78-82% when compared to conventional stop-controlled intersections.

Project Justification

This grant application utilized the benefit / cost worksheet as provided by the Iowa DOT and resulted in a remarkably high benefit / cost ratio of **5.98** for the 20 year life span of this project. A 10% traffic growth rate / year is believed to be a conservative value based upon the anticipated growth in development for the area. A future interchange is currently planned at Forevergreen Road and I-380. This new facility will substantially increase traffic within the Park Road corridor.

C. ITEMIZED BREAKDOWN OF ALL COSTS

Curbed Roundabout, U.S. Hwy 6 at Park Road (Jasper Ave)
The City of Tiffin
15218.2

Date: December 1, 2015

Budgeting COST ESTIMATE
Roundabout @ Marengo Rd/Park Rd

No.	Description	Unit	Quantity	ENGINEER'S ESTIMATE	
				Unit Price	Extended Price
	Division or Phase				
1	Excavation, Class 10	CY	2024	$ 5.00	$ 10,120.00
2	Embankment in Place, Contractor Furnished	CY	2472	$ 7.25	$ 17,922.00
3	Topsoil, Strip, Salvage, Spread	CY	4496	$ 8.00	$ 35,968.00
4	PCC Base Course 10-inch*	SY	8445	$ 55.00	$ 464,475.00
5	PCC Pavement Samples	LS	1	$ 3,000.00	$ 3,000.00
6	HMA Pavement 1M ESAL Intermediate Course	TON	529	$ 35.00	$ 18,515.00
7	HMA Pavement 1M ESAL Surface Course L-3	TON	529	$ 36.00	$ 19,044.00
8	HMA Binder PG 64-22	TON	63	$ 540.00	$ 34,020.00
9	HMA Pavement Samples	LS	1	$ 3,500.00	$ 3,500.00
10	Pipe Culvert, 2000D RCP, 36" Dia.	LF	150	$ 100.00	$ 15,000.00
11	Pipe Culvert, 2000D RCP, 24" Dia. **	LF	711	$ 70.00	$ 49,770.00
12	Pipe Culvert, 2000D RCP, 18" Dia.	LF	160	$ 75.00	$ 12,000.00
13	Pipe Apron, Concrete, 36" Dia.	EACH	2	$ 1,800.00	$ 3,600.00
14	Pipe Apron, Concrete, 24" Dia.**	EACH	2	$ 1,280.00	$ 2,560.00
15	Pipe Apron, Concrete, 18" Dia.	EACH	2	$ 965.00	$ 1,930.00
16	Subdrain, Longitudinal, Shoulder, 4" Dia.	LF	4318	$ 5.00	$ 21,590.00
17	Subdrain, Outlet, RF-19-E	EACH	14	$ 200.00	$ 2,800.00
18	30" PCC Curb & Gutter **	LF	7139	$ 25.00	$ 178,475.00
19	Shoulder Shaping	STA	46	$ 20.00	$ 920.00
20	Pavement Scarification	SY	3973	$ 2.00	$ 7,946.00
21	Pavement Removal	SY	3973	$ 10.00	$ 39,730.00
22	Removal of Pavement Markings	STA	23	$ 22.00	$ 506.00
23	Painted Pavement Symbols	Each	12	$ 10.00	$ 120.00
24	Painted Pavement Markings	STA	184	$ 100.00	$ 18,400.00
25	Type A Signs	SF	50	$ 18.00	$ 900.00
26	Posts for Type A Signs	LF	160	$ 12.00	$ 1,920.00
27	Mobilization	LS	1	$ 60,000.00	$ 60,000.00
28	Traffic Control	LS	1	$ 30,000.00	$ 30,000.00
29	Flaggers	EACH	90	$ 350.00	$ 31,500.00
30	Silt Fence & Ditch Checks	LF	2400	$ 2.00	$ 4,800.00
31	Silt Fence, Maintenance	LF	2400	$ 1.00	$ 2,400.00
32	Silt fence, Removal	LF	2400	$ 0.50	$ 1,200.00
33	Truck Apron	SY	482	$ 35.00	$ 16,870.00
34	Erosion Control Mobilization	EACH	6	$ 500.00	$ 3,000.00
35	Modified Subbase	CY	2111	$ 30.00	$ 63,330.00
36	Seeding and Fertilizing Urban	ACRE	4	$ 1,600.00	$ 6,400.00
37	PCC 8" (Park Road)	SY	2828	$ 32.00	$ 90,496.00
38	Modified Subbase (Park Road)	CY	628	$ 30.00	$ 18,840.00
39	Painted Pavement Markings (Park Road)	STA	6	$ 10.00	$ 60.00
40	Painted Pavement Symbols (Park Road)	Each	7	$ 100.00	$ 700.00
41	SW-509 Intake**	EACH	8	$ 4,850.00	$ 38,800.00
42	PCC Base Course 10-inch***	SY	0	$ 55.00	$ -
43					$ -
	Engineer's Construction Estimate				$ 1,333,127.00
	Contingency 10%				$ 133,312.70

C. ITEMIZED BREAKDOWN OF ALL COSTS

Curbed Roundabout, U.S. Hwy 6 at Park Road (Jasper Ave)
The City of Tiffin
15218.2

Date: December 1, 2015

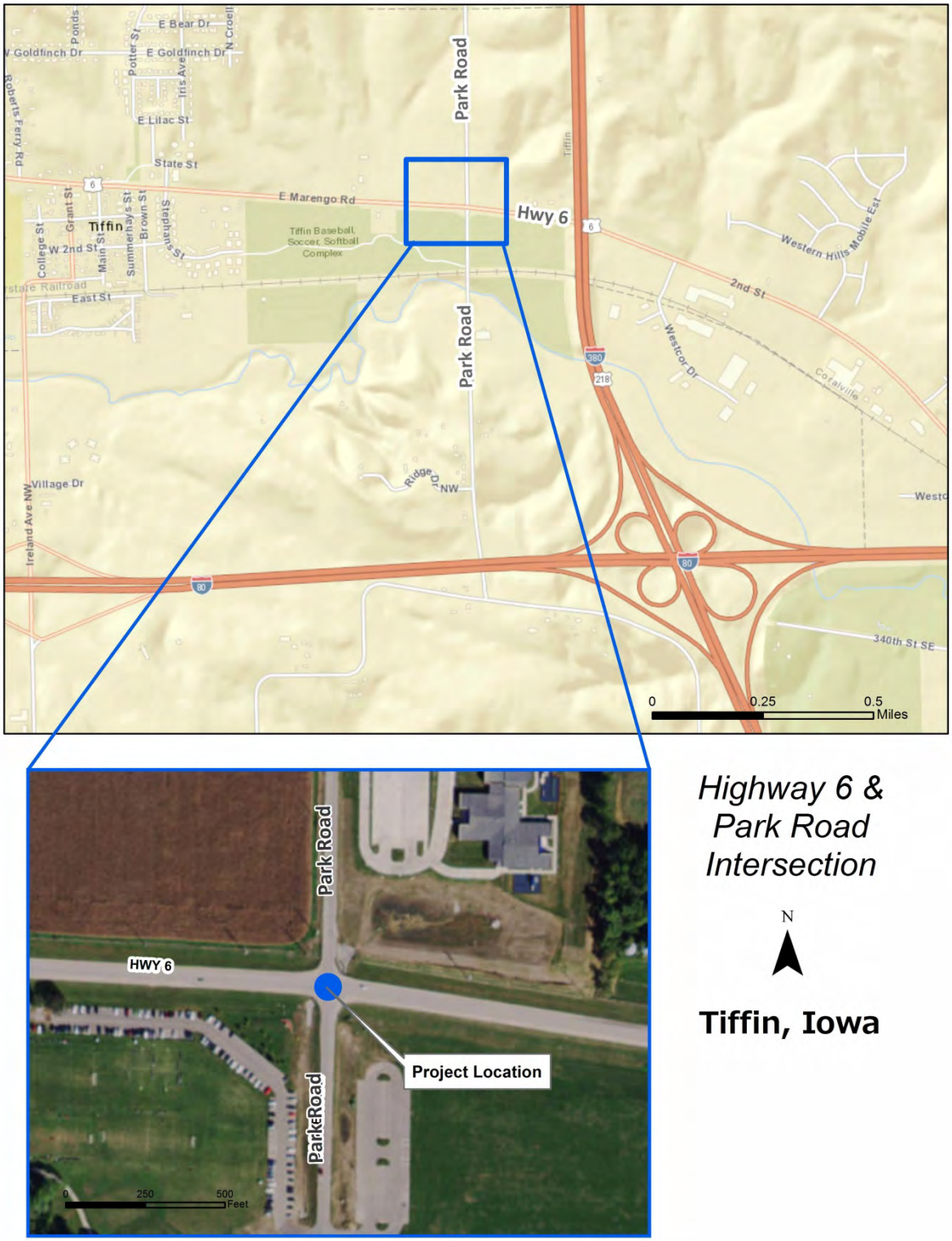
Budgeting COST ESTIMATE
Roundabout @ Marengo Rd/Park Rd

No.	Description	Unit	Quantity	ENGINEER'S ESTIMATE	
				Unit Price	Extended Price
	Estimated Construction Cost to be shown on Notice to Bidders			$	1,466,439.70
	Engineering (% or $ amount)			$	513,253.90
	Onsite Observation (if not included in above Engineering %)			inc	
	Estimated HFC fees (not including Reimbursables)			$	513,253.90
	Estimated Bonding Counsel Fees			$	-
	ESTIMATED TOTAL PROJECT COST			$	1,979,693.60

D. TIME SCHEDULE

Activity	Date
July 19, 2016	**City Council approved submission**
August 15, 2016	**TSIP Funding Application Deadline**
Mid-December 2016	**TSIP Notification of Award**
July 2017	**TSIP Funding Available**
November 21, 2017	**Project Letting**
Spring 2018	**Begin project construction**
Fall 2018	**Project completion**

E. PROJECT LOCATION MAP



Highway 6 & Park Road Intersection

N

Tiffin, Iowa

F. COLOR PICTURES

Image 2: Park Road – Looking North

Image 3: Park Road - Looking South

Image 4: Highway 6 - Looking East

Image 5: Highway 6 - Looking West

G. PLAN VIEW EXISTING

HART-FREDERICK CONSULTANTS, P.C.
510 East State Street, P.O. Box 560, Tiffin, IA 52340-0560
Phone: (319) 545-7215 Fax: (319) 545-7220

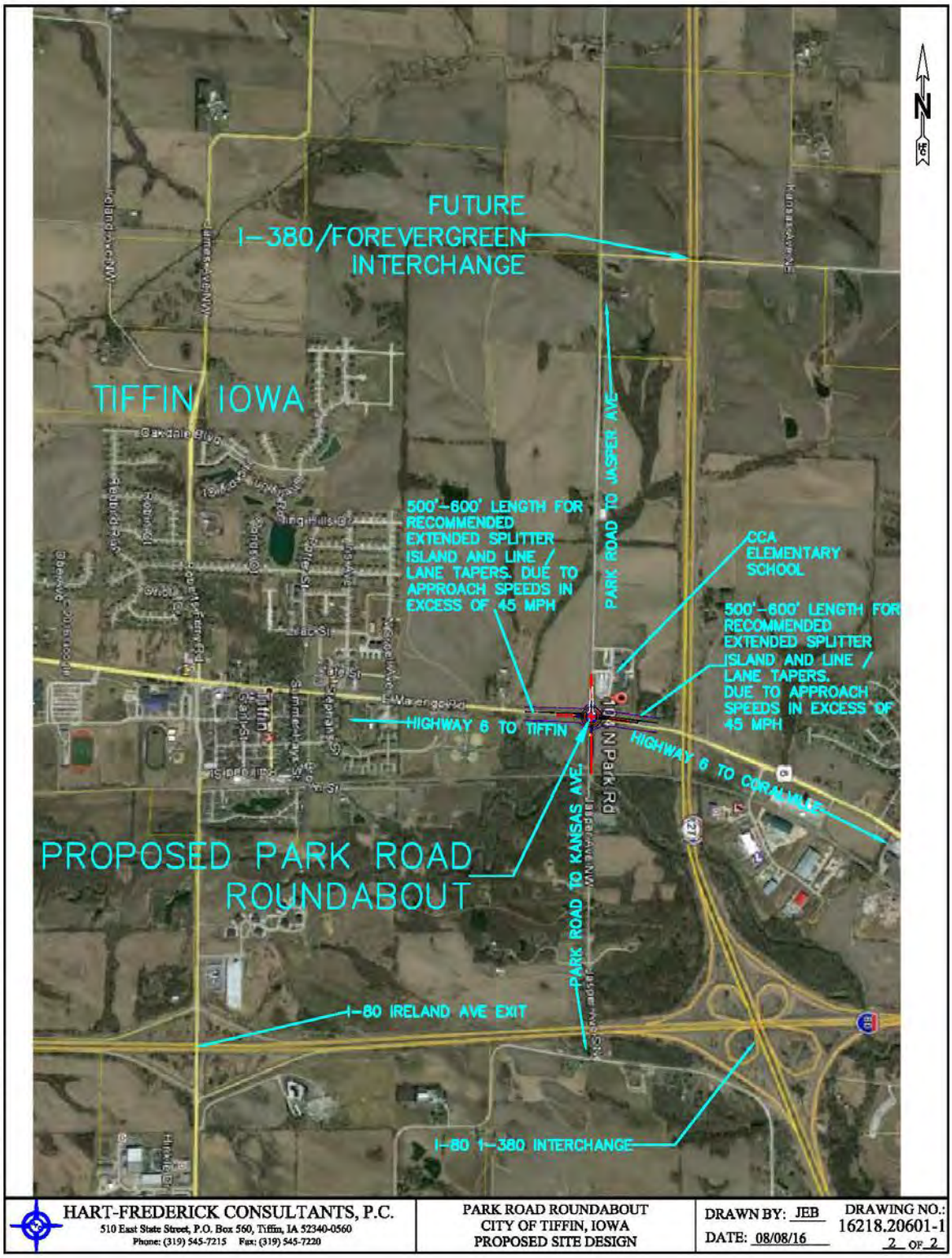
PARK ROAD ROUNDABOUT
CITY OF TIFFIN, IOWA
EXISTING SITE CONDITIONS MAP

DRAWN BY: JEB
DATE: 08/08/16

DRAWING NO.: 16218.20601-1
1 OF 2

T:\Tiffin\16218.206 Park Road Roundabout\TSP SUBMIT.dwg, 8/8/2016 12:05:31 PM, Adobe PDF

G. PLAN VIEW PROPOSED



HART-FREDERICK CONSULTANTS, P.C.
510 East State Street, P.O. Box 560, Tiffin, IA 52340-0560
Phone: (319) 545-7215 Fax: (319) 545-7220

PARK ROAD ROUNDABOUT
CITY OF TIFFIN, IOWA
PROPOSED SITE DESIGN

DRAWN BY: JEB
DATE: 08/08/16

DRAWING NO.: 16218.20601-1
2 OF 2

T:\Tiffin\16218.206 Park Road Roundabout\TSP SUBMIT.dwg, 8/8/2016 12:04:57 PM, Adobe PDF

H. AERIAL PHOTOGRAPH

Image 6: Aerial Photograph of the Intersection

Retrieved from Johnson County Pictometry Viewer (2012)

I. CMAT CRASH SUMMARY OF MOTOR VEHICLE ACCIDENTS

Iowa Department of Transportation

Major Cause Summary

Linn Mark Jeff

Analysis Years: 2007 [2], 2009 [1], 2011 [2], 2012 [3], 2013 [1], 2014 [2], 2015 [1]

Crash Summary:

Fatal	1
Major Injury	-
Minor Injury	2
Possible/Unknown	4
PDO	7
Total Crashes	14

Injury Summary:

Fatal	2
Major Injury	2
Minor Injury	2
Possible	6
Unknown	1
Total Injuries	13

Surface Condition Summary:

Dry	9
Wet	2
Ice	2
Snow	-
Slush	-
Sand/Dirt/Oil/Gravel	-
Water	-
Other	-
Unknown	-
Not Reported	1
Total Crashes	14

TOT Property Damage: $128,200

AVG Property Damage: $9,157

Major Cause Summary:

1 Animal	Improper Backing
Ran Traffic Signal	Illegally Parked/Unattended
2 Ran Stop Sign	2 Swerving/Evasive Action
Crossed Centerline	Over-Correcting/Over-Steering
FTYROW: At Uncontrolled Intersection	Downhill Runaway
FTYROW: Making Right Turn on Red Signal	Equipment Failure
FTYROW: From Stop Sign	Separation of Units
FTYROW: From Yield Sign	Ran Off Road - Right
FTYROW: Making Left Turn	Ran Off Road - Straight
FTYROW: From Driveway	Ran Off Road - Left
FTYROW: From Parked Position	Lost Control
FTYROW: To Pedestrian	Inattentive/Distracted By: Passenger
FTYROW: Other (explain in narrative)	Inattentive/Distracted By: Use of Phone or Other
Traveling Wrong Way or on Wrong Side of Rd	Inattentive/Distracted By: Fallen Object
2 Driving Too Fast for Conditions	Inattentive/Distracted By: Fatigued/Asleep
Exceeded Authorized Speed	Other: Vision Obstructed
2 Made Improper Turn	Oversized Load/ Oversized Vehicle
Improper Lane Change	Cargo/Equipment Loss or Shift
3 Followed Too Close	2 Other: Other Improper Action
Disregarded Railroad Signal	Unknown
Disregarded Warning Sign	Other: No Improper Action
Operating Vehicle in Reckless/Aggressive Manner	None Indicated

Selection Filter:

None

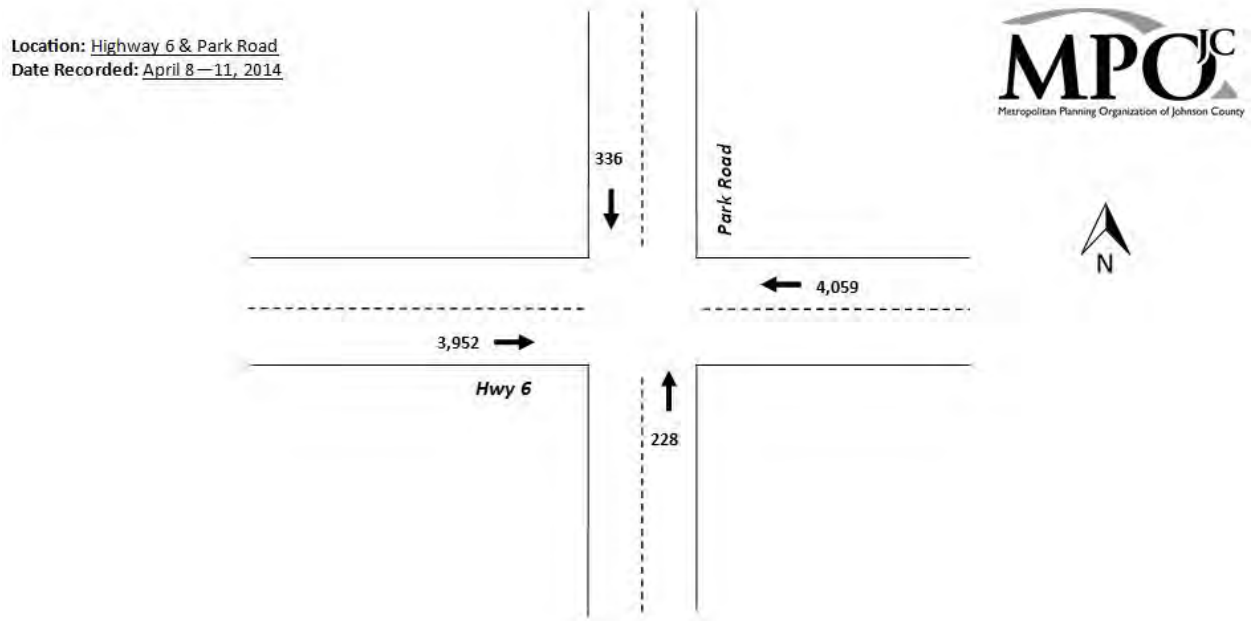
Analyst: sarah

Notes:

7/11/2016 Crash Mapping Analysis Tool Page: 1 of 1

J. TRAFFIC VOLUMES

Average Daily Traffic (ADT) volumes for entering vehicles at the intersection were taken on April 8 – 11th, 2014 for a total of 72 hours using the MH Corbin Traffic Analyzer. Highway 6 carries approximately 8,000 vehicles per day, which is 93% of the total entering traffic at the intersection. 85th percentile speeds on Highway 6 range from 54.8 – 63 mph.



The 15-minute intervals are shown in **Attachment A.**

L. BENEFIT / COST ASSUMPTIONS

The following assumptions were made to complete the benefit / cost ratio worksheet.

1. Estimated Improvement Life (Y) = 20 Years
2. Crash Reduction Factor (CRF) = 35.98
    - Conversion of intersection into single-lane roundabout (Qin et al., 2013)
3. Growth = 10% based on the future Forevergreen Road / I-380 Interchange, reconstruction of the I-380 / 80 Interchange, expansion of I-380 to a six-lane cross-section, and the recently constructed Tiffin Elementary School at 104 N Park Road Tiffin, Iowa.
4. Crash Data
    - There was 1 crash involving 2 fatalities. This was counted as 1 fatality and 1 major injury as directed by Iowa DOT staff.

L. BENEFIT / COST

Rev. 5/14

Intersection or Spot Benefit / Cost Safety Analysis

Iowa DOT Office of Traffic & Safety

County: Johnson | Prepared by: MPOJC | Date Prepared: Jul 18, 2016

Intersection: Highway 6 and Park Road Intersection

Improvement

Proposed Improvement(s): Single-Lane Roundabout

$ 1,466,440	Estimated Improvement Cost, **EC**	20	Est. Improvement Life, years, **Y**
$ 7,500	Other Annual Cost (after initial year), **AC**	36	Crash Reduction Factor (integer), **CRF**
$ 101,927	Present Value Other Annual Costs, **OC**	4.0%	Discount Rate (time value of $), **INT**
		$ 1,568,367	Present Value Cost, **COST** = EC + OC

$$OC = \frac{AC}{INT}\left(1 - \frac{1}{(1+INT)^Y}\right)$$

Traffic Volume Data

Source: MPOJC | April 9-11, 2014 Date of traffic count

Daily Entering Vehicles by Approach (or AADT / 2)

336
3,952 → ✱ ← 4,059
228

3,129,875 Current Annual Entering Veh., **AEV** = DEV * 365

57,688 veh / day, Final Year DEV, **FDEV**

179.26 MEV, Total Million Entering Veh. Over life of Project, **TMEV**

$$TMEV = \frac{AEV}{-G}\left(1 - \left(\frac{1+G}{1}\right)^Y\right) \Big/ 10^6$$

10.0% Projected Traffic Growth (0%-10%), **G**

8,575 Current Daily Entering Vehicles, **DEV**

Crash Data

2008 First full year --> 2014 Last full year — 7.8 years, Time Period, **T**

10 Additional months — values as of May 2014

1	Fatal Crashes →	1	Fatalities @	$4,500,000	$ 4,500,000
		3	Major Injuries @	$325,000	$ 975,000
6	Injury Crashes →	2	Minor Injuries @	$65,000	$ 130,000
		6	Possible Injuries @	$35,000	$ 210,000
7	Property Damage Only		(assumed cost per crash)	$7,400	$ 103,600
		-OR-	enter all Property Costs of all crashes:		
14	Total Crashes, **TA**			Total $ Loss, **LOSS**	$ 5,918,600

1.79 Current Crashes / Year, **AA** = TA / T

$ 422,757 Cost per Crash, **AVC** = LOSS / TA

102.4 Total Expected Crashes, **TECR** = CR x TMEV

0.64 Crashes Avoided First Year **AAR** = AA x CRF / 100

$ 271,853 Crash Costs Avoided in First Year, AAR x AVC

36.8 Total Avoided Crashes, TECR x CRF/ 100

0.57 Crashes / MEV, Crash Rate, **CR**
CR = TA x 10^6 / (DEV x 365 x T)

$ 9,380,470 Present Value of Avoided Crashes, **BENEFIT**

$$BEN. = \frac{AVC \times AAR}{(INT - G)}\left(1 - \left(\frac{1+G}{1+INT}\right)^Y\right)$$

Benefit / Cost Ratio

Benefit : Cost = $9,380,470 : $1,568,367 = **5.98** : 1

Rev. 6/16

IOWA DOT

Application for TRAFFIC SAFETY FUNDS

GENERAL INFORMATION **DATE:** 8/9/16

Location / Title of Project: Addition of Paved Shoulders & Edgeline Rumbles on J40

Applicant: Lee County Secondary Roads

Contact Person: Ernest L. Steffensmeier Title: County Engineer

Complete Mailing Address: PO Box 158, 933 Avenue H
Fort Madison, IA 52627

Phone: 319 372-2541 (Area Code) E-Mail: ernies@leecounty.org

If more than one highway authority is involved in this project, please indicate and fill in the information below (use additional sheets if necessary).

Co-Applicant(s) _____

Contact Person _____ Title _____

Complete Mailing Address _____

Phone _____ (Area Code) E-Mail _____

PLEASE COMPLETE THE FOLLOWING PROJECT INFORMATION:

Application Type

- Site Specific ☒
- Traffic Control Device ☐
- Safety Study ☐

Funding Amount

Total Safety Cost	$ 503,184
Total Project Cost	$ 503,184
Safety Funds Requested	$ 500,000

Does this project appear on a Safety Improvement Candidate List or is there a safety study recommendation for this project?
☐ Yes – Explain _____
☒ No

Rev. 6/16

APPLICATION CERTIFICATION FOR LOCAL GOVERNMENT

To the best of my knowledge and belief, all information included in this application is true and accurate, including the commitment of all physical and financial resources. This application has been duly authorized by the participating local government(s). I understand the attached resolution(s) binds the participating local government(s) to assume responsibility if any additional funds are committed, and to ensure maintenance of any new or improved city streets or secondary roads.

I understand that, although this information is sufficient to secure a commitment of funds, a firm contract between the applicant and the Department of Transportation is required prior to the authorization of funds.

Representing the Lee County Board of Supervisors

Signed: Ron Fedler — 8.9.16
Signature — Date Signed

Ron Fedler
Typed Name

Attest: Denise Fraise — 8.9.16
Signature — Date Signed

Denise Fraise
Typed Name

[A3]

RESOLUTION
NO. 2016-093

WHEREAS The TRAFFIC SAFETY IMPROVEMENT PROGRAM (TSIP) operates under the rules of the Iowa Administrative Code 761-- Ch. 164 and TSIP allocates Traffic Safety Funds (TSF), and

WHEREAS only city and county governments and the Iowa Department of Transportation may apply for Traffic Safety Funds, and

WHEREAS J40 (County Road 103) in Lee County, from Highway 27 to the city of West Point is an eligible route, and

WHEREAS TSF awards cannot exceed $500,000 per project and project costs beyond the maximum award shall be paid by the local agency, and

WHEREAS, the Sponsoring Agent shall maintain, or cause to be maintained, the completed improvements in a manner acceptable to the IDOT.

NOW, THEREFORE, BE IT RESOLVED that the Lee County Board of Supervisors shall provide the local share for safety improvements to J40 (County Road 103) and maintain the completed improvements in a manner acceptable the IDOT.

Passed and approved this 9th day of August , 2016.

Lee County Board of Supervisors

Ron Fedler

Ron Fedler, Chairman

Matt Pflug

Matt Pflug, Vice-Chair

Gary Folluo

Gary Folluo, Member

Rick Larkin, Member

Don Hunold

Don Hunold, Member

Attest:

Denise Fraise

Denise Fraise, Auditor

NARRATIVE [B]

Lee County is submitting an application herewith for TSIP site specific funding on J40 (County Road 103) from Highway 27 east to the city of West Point.

J40 is a typical 2 lane rural road consisting of a 22' wide HMA surface. The road was developed as State Highway 103 in 1931. Initial grading consisted of 1.5:1 foreslopes and 2' ditch bottoms. In 1949, additional grading was completed to flatten the slopes to 3:1, except in areas of high fill (>6') where slopes were flattened to just 2:1. Shoulders at this time were 6 ft and overall clearzone was made 11' minimum. Over time, with additional HMA overlays, the current shoulder widths have narrowed to approximately 5 ft. In 2003, jurisdiction of the state highway was transferred to Lee County.

The roadway is signed for 55 mph and contains several horizontal curves requiring warning signs. All signs are currently installed according to MUTCD requirements.

Motorists are involved in a relatively high number of accidents on this route. If a vehicle travels off course, relatively narrow shoulders provide limited chance for errant vehicles to correct their steering once leaving the pavement. As with most similar roads, edge rutting commonly develops at the edge of paving. While frequently addressed by maintenance crews, this is a persistent issue that may reduce errant vehicles' ability to recover, or result in over correction after travelling onto the shoulder.

Crash Data for this section of J40 show a high number of primarily single-vehicle accidents where vehicles are leaving the roadway. 27 accidents, dating from 2007 to present, have resulted in a range of property damage and injuries ranging in severity from minor to major. More recently, 17 accidents have been recorded from 2010 to present. Estimated loss of property and productivity resulting from these accidents is nearly $1.2 million.

To reduce the number of crashes and resulting losses, multiple safety features are being proposed:

-A 2 ft paved shoulder *(CRF of 18% [reference: Crash Modification Factors Clearinghouse ID #6690])* will provide drivers a wider surface, without dropoff, to redirect their vehicles before leaving the road.

-Milled edgeline rumble strips *(CRF of 47% [CMF ID #3561])* will provide drivers with tactile and auditory warnings as they are about to leave their lane of travel, providing a quicker reaction time in which to correct their errant direction.

-A wider (5") edgeline (CRF of 37.7% [CMF ID # 4751]) will heighten driver awareness of the edge of the travelled way, thereby reducing roadway departures.

A crash analysis and Benefit/Cost calculation has been performed for the proposed safety improvements. Over a period of 7 years, calculations show a B/C ratio of **3.42 : 1**. The situation as presented and the predicted savings indicate that this would be a worthwhile appropriation of funding. Consideration for funding for these improvements is greatly appreciated.

ITEMIZED COSTS [C]

Preliminary Estimate of Costs for Shoulder Widening/Edgeline Rumbles on J40 from Highway 27 to West Point Corp. Limits

Item No	Item	Unit	Quantity	Unit Price	Extended Amount
2122-5500060	PAVED SHOULDER, HOT MIX ASPHALT MIXTURE, 6 IN.	SY	12428.89	$32.00	$397,724.44
2213-2713300	EXCAVATION, CLASS 13, FOR WIDENING	CY	2071.48	$22.00	$45,572.59
2527-9263109	PAINTED PAVEMENT MARKING, WATERBORNE OR SOLVENT-BASED (White)	STA	559.30	$10.00	$5,593.00
2528-8445110	TRAFFIC CONTROL	LS	1.00	$5,000.00	$5,000.00
2528-8445113	FLAGGERS	EACH	15.00	$450.00	$6,750.00
2528-8445115	PILOT CARS	EACH	5.00	$700.00	$3,500.00
2533-4980005	MOBILIZATION	LS	1.00	$25,000.00	$25,000.00
2548-0000100	MILLED SHOULDER RUMBLE STRIPS, HMA SURFACE	STA	559.30	$15.00	$8,389.50
2548-0000110	ASPHALT EMULSION FOR FOG SEAL (SHOULDER RUMBLE STRIPS	GAL	807.88	$7.00	$5,655.14

Total Feet of Shoulder & Rumble Strip Improvements **55,930.00**

Total **$503,184.68**

Requested Traffic Safety Improvement Program Funds $500,000.00

Lee County Funds (Farm-to-Market or Local) $3,184.68

TIME SCHEDULE [D]

January 1, 2017 — Anticipated Approval Funds

Spring - Summer 2017 — Project Development

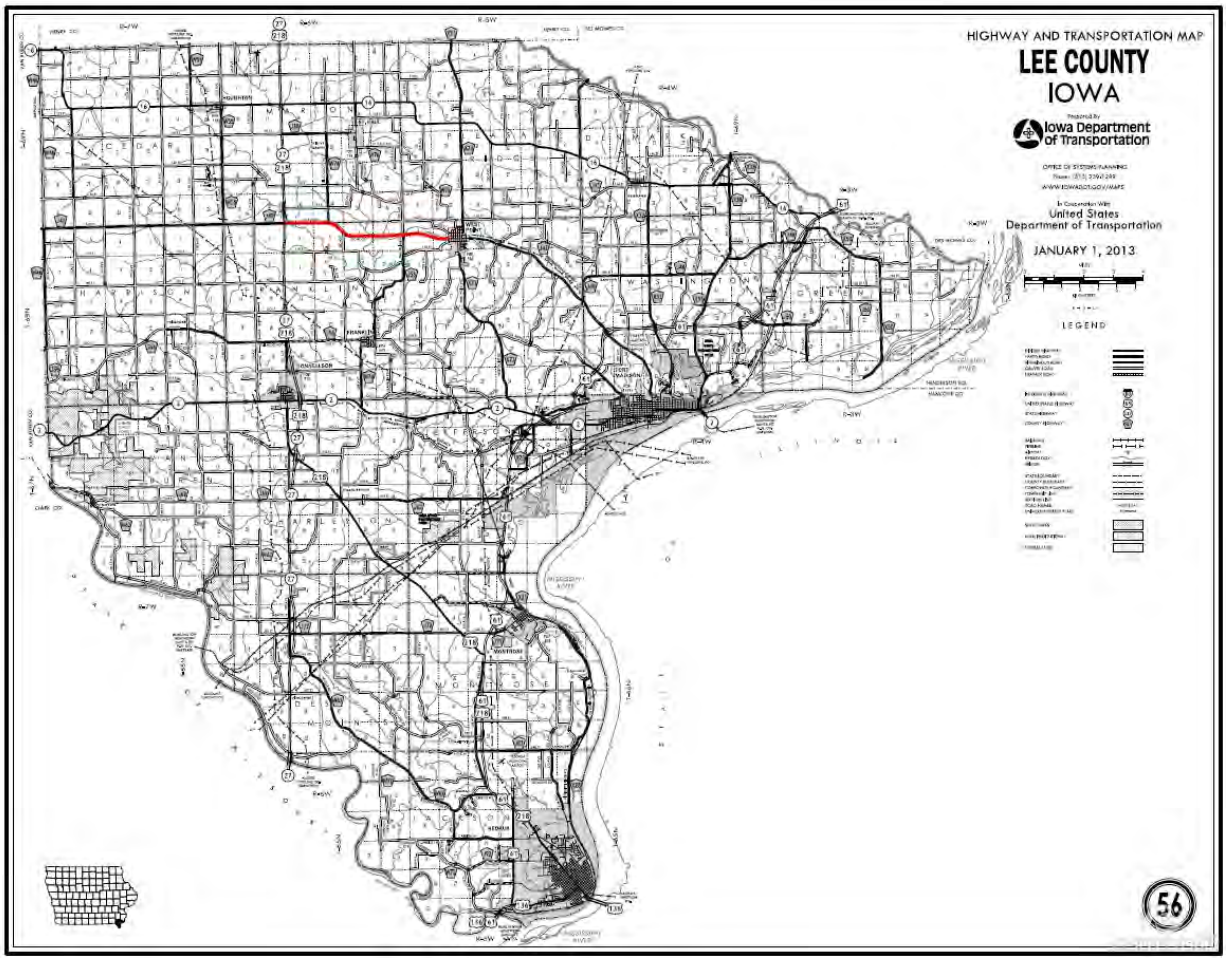
(per IDOT IM 3.005 Critical Path Memorandum to local agencies)

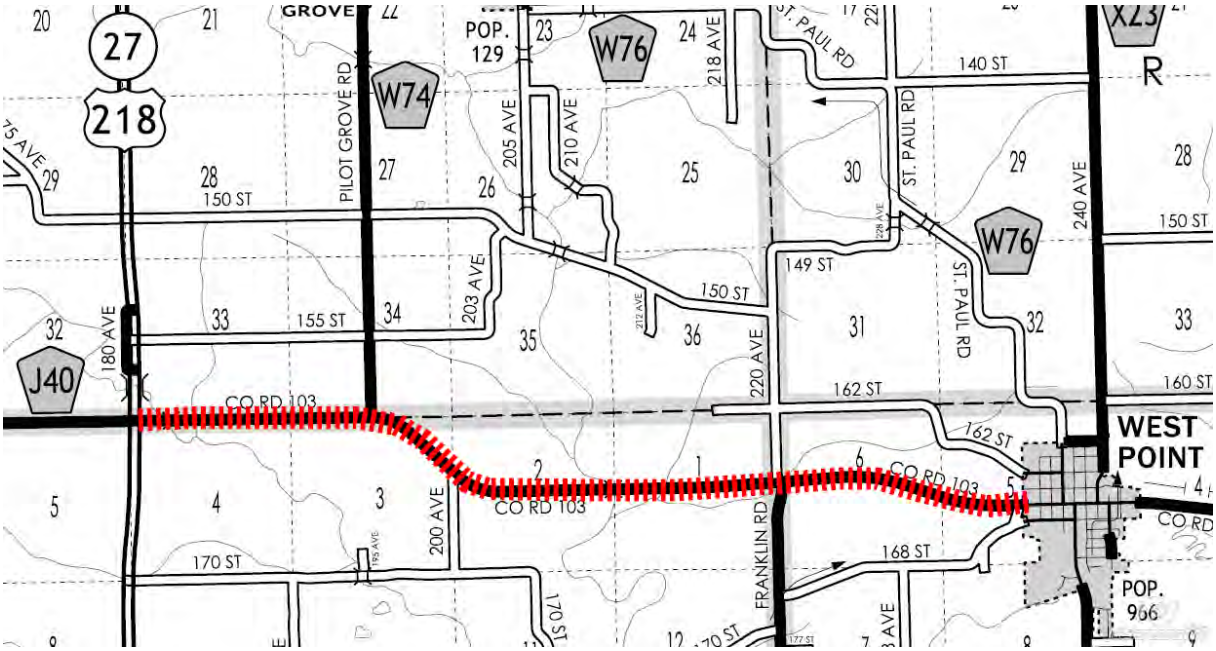
Fall - Winter 2017 — Project Letting

2018 Construction Season (FY '18 - '19) — Project Completion

(*No later than October '18, subject to contract late start date and specified working days.)*

MAP [E]

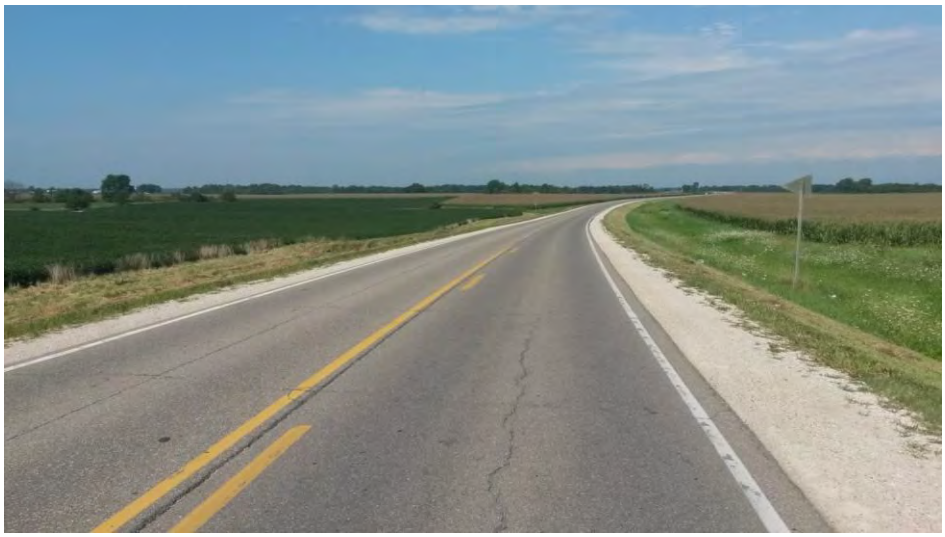

HIGHWAY AND TRANSPORTATION MAP
LEE COUNTY
IOWA
Iowa Department of Transportation
United States Department of Transportation
JANUARY 1, 2013
LEGEND
56

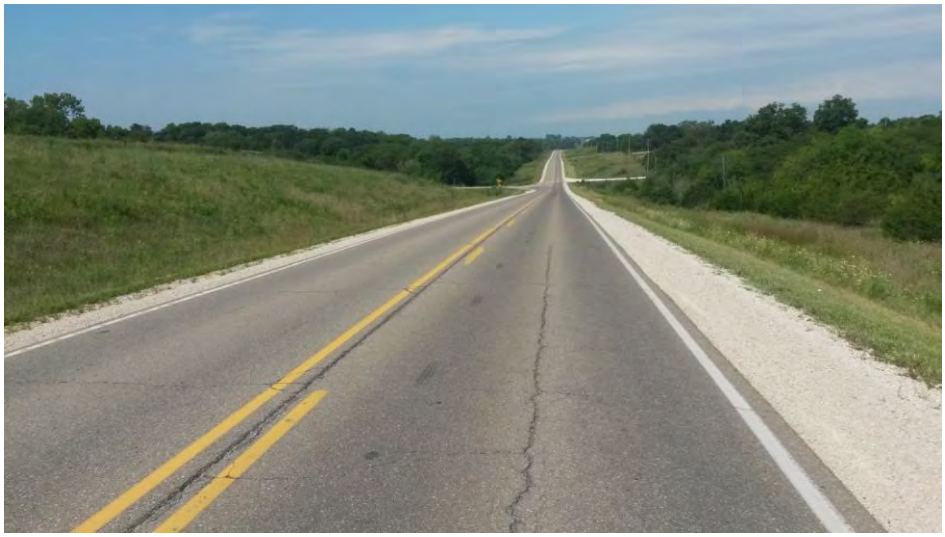

27
218
W74
W76
J40
X23
POP. 129
PILOT GROVE RD
205 AVE
210 AVE
218 AVE
ST. PAUL RD
140 ST
150 ST
149 ST
155 ST
162 ST
160 ST
168 ST
170 ST
180 AVE
203 AVE
200 AVE
220 AVE
240 AVE
FRANKLIN RD
CO RD 103
WEST POINT
POP. 966

PHOTOS OF PROJECT SITE [F]

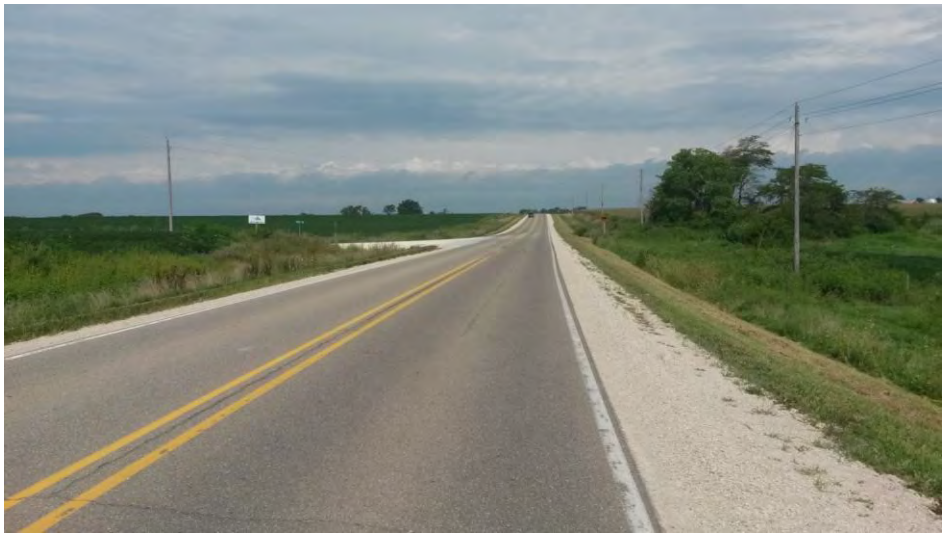
Photos depicting typical conditions of J40:

Two lane HMA road with 5 ft granular shoulders. Multiple vertical & horizontal curves, and multiple points of access.

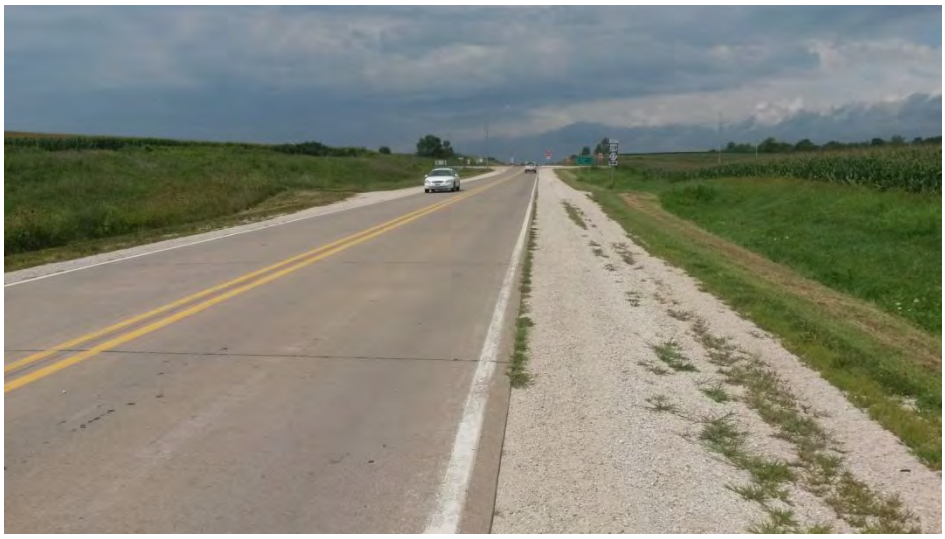




[F2]



Intermittent edge rutting is a recurring problem along J40.

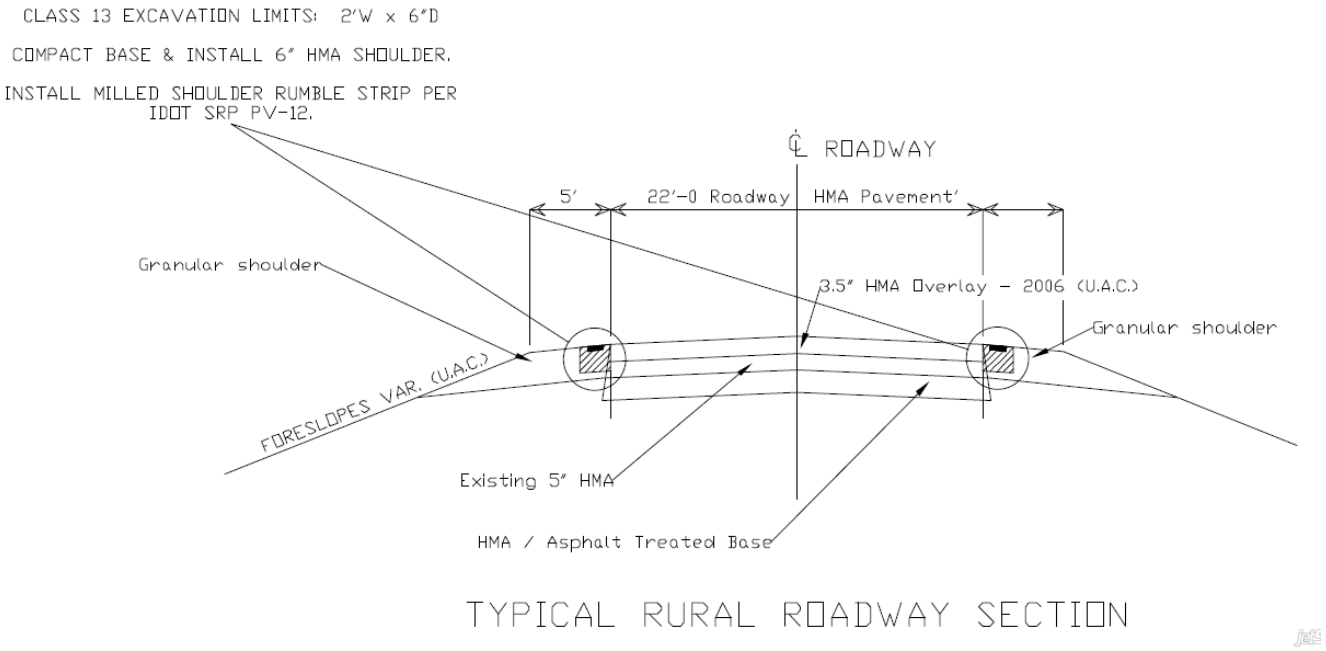


PLAN VIEW [G]

(Views of the existing ROW as visible in the Lee County GIS.)

J40 contains multiple horizontal/vertical curves and moderate grades. It is signed at 55 mph with several advisory/warning signs. Right of way is typically 90-130 ft, though it varies considerably in areas of extensive cut/fill, drainage structures, etc.

Current pavement consists of 11' lanes and 5 ft granular shoulders. Proposed safety improvements include adding 2 ft paved shoulders, installation of edgeline rumble strips (PV-12) and widening of existing edgelines from 4 to 5".



H. Aerial Photograph

Aerial view of proposed project shows a typical rural Lee County Road. This view shows the multiple horizontal curves of J40.

NORTH

Iowa Department of Transportation

Major Cause Summary

Lee County J40 (Highway 27 to West Point)

Report version 1.1 (Jan 2006)

Analysis Years: 2010 [1], 2011 [4], 2012 [1], 2013 [4], 2014 [1], 2015 [4], 2016 [2]

Crash Summary:

Fatal	-
Major Injury	2
Minor Injury	3
Possible/Unknown	4
PDO	8
Total Crashes	17

Injury Summary:

Fatal	-
Major Injury	2
Minor Injury	4
Possible	5
Unknown	-
Total Injuries	11

Surface Condition Summary:

Dry	12
Wet	1
Ice	1
Snow	1
Slush	1
Sand/Dirt/Oil/Gravel	-
Water	-
Other	-
Unknown	1
Not Reported	-
Total Crashes	17

TOT Property Damage: $106,250

AVG Property Damage: $6,250

Major Cause Summary:

	Animal		Improper Backing
	Ran Traffic Signal		Illegally Parked/Unattended
	Ran Stop Sign	3	Swerving/Evasive Action
	Crossed Centerline		Over-Correcting/Over-Steering
	FTYROW: At Uncontrolled Intersection		Downhill Runaway
	FTYROW: Making Right Turn on Red Signal		Equipment Failure
	FTYROW: From Stop Sign		Separation of Units
	FTYROW: From Yield Sign	6	Ran Off Road - Right
	FTYROW: Making Left Turn		Ran Off Road - Straight
	FTYROW: From Driveway	2	Ran Off Road - Left
	FTYROW: From Parked Position	6	Lost Control
	FTYROW: To Pedestrian		Inattentive/Distracted By: Passenger
	FTYROW: Other (explain in narrative)		Inattentive/Distracted By: Use of Phone or Other
	Traveling Wrong Way or on Wrong Side of Rd		Inattentive/Distracted By: Fallen Object
	Driving Too Fast for Conditions		Inattentive/Distracted By: Fatigued/Asleep
	Exceeded Authorized Speed		Other: Vision Obstructed
	Made Improper Turn		Oversized Load/ Oversized Vehicle
	Improper Lane Change		Cargo/Equipment Loss or Shift
	Followed Too Close		Other: Other Improper Action
	Disregarded Railroad Signal		Unknown
	Disregarded Warning Sign		Other: No Improper Action
	Operating Vehicle in Reckless/Aggressive Manner		None Indicated

Selection Filter:

((MAJORCAUSE = 15 or MAJORCAUSE = 25 or MAJORCAUSE = 30 or MAJORCAUSE = 31 or MAJORCAUSE = 32 or MAJORCAUSE = 33)) AND ((YEAR <> 2006 and YEAR <> 2007 and YEAR <> 2008 and YEAR <> 2009))

Analyst: BJH

Notes: 2010 - June 15, 2016

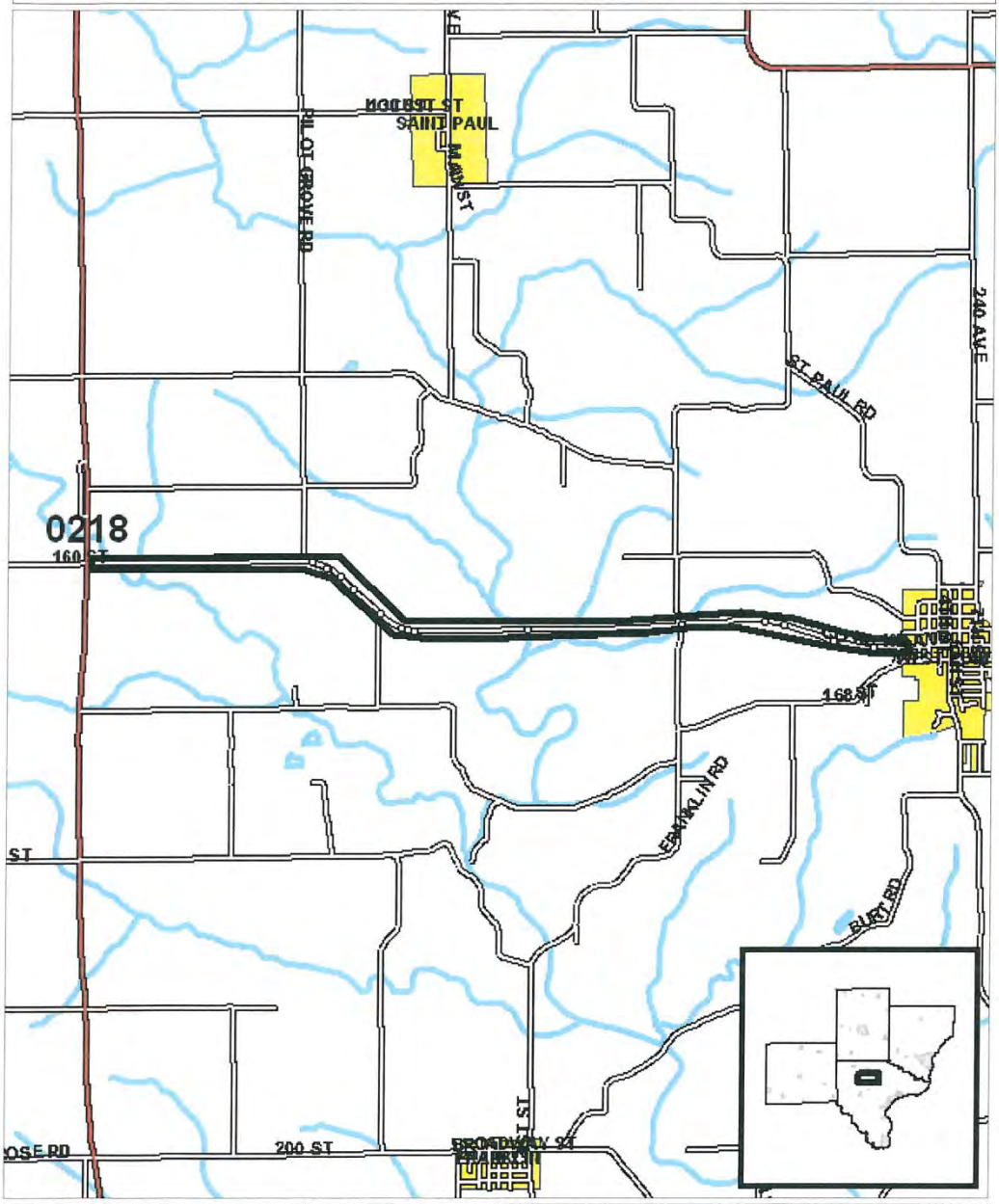
Iowa Department of Transportation

Location Map

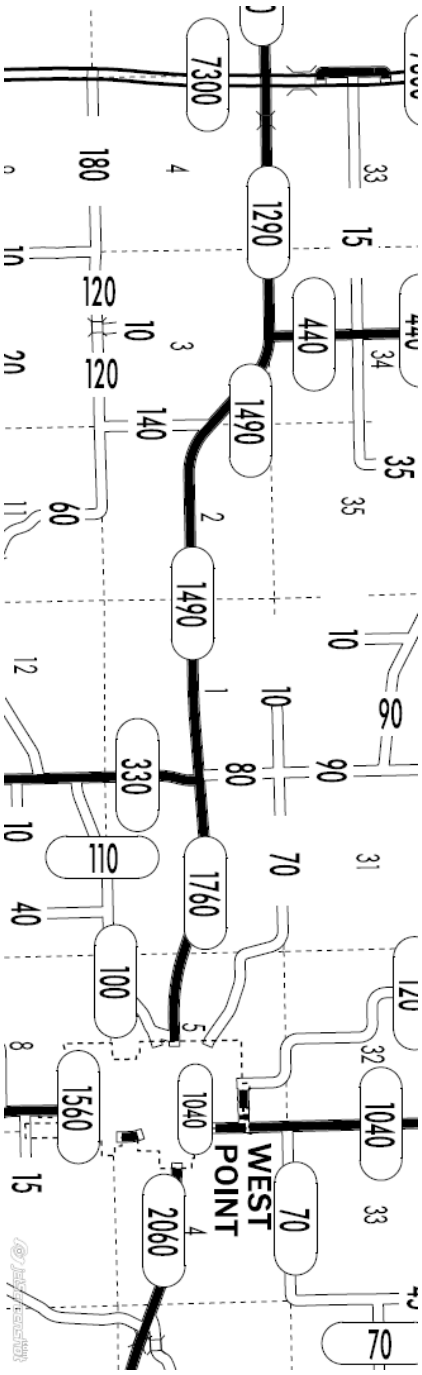
Lee County J40 (Highway 27 to West Point)

Incidents: 17

Report Version 1 1 Mar 2005



Analyst: BJH	Notes: 2010 - June 15, 2016



NORTH

Source: 2014 AADT Traffic Flow Map of Lee County, prepared by Iowa DOT.

TRAFFIC SIGNALS [K]

Not Applicable

The cumulative Crash Reduction Factor was determined as follows:

If more than one safety improvement will be made, the cummulative crash reduction factor must be calculated using the following formula:

CRF = 100*(1-(1-CRF1/100)*(1-CRF2/100)*(1-CRF3/100)*(1-CRF4/100)*(1-CRF5/100))

or enter the individual values into this calculator:

Enter up to 5 CRFs:	18	47	37.7		
Cummulative CRF =	72.92442				

[L2]

Rev. 5/14

Road Segment Benefit / Cost Safety Analysis
Iowa DOT Office of Traffic & Safety

County: Lee | Prepared by: Benjamin Hull, P.E. | Date Prepared: Aug 11, 2016

Location: J40 (County Road 103) from Highway 27 to West Point Corporate Limits

Improvement

Proposed Improvement(s): Install 2' Paved Shoulder, Install 12" Edgeline Rumble Strips (PV-12), Increase White Edgeline from 4" to 5".

$ 503,184	Estimated Improvement Cost, EC	20	Est. Improvement Life, years, Y
$ -	Other Annual Cost (after initial year), AC	73	Crash Reduction Factor (integer), CRF
$ -	Present Value Other Annual Costs, OC	4.0%	Discount Rate, INT
	$OC = \frac{AC}{INT}\left(1-\frac{1}{(1+INT)^Y}\right)$	$ 503,184	Present Value All Costs, COST = EC + OC

Traffic Volume Data

Source: 2014 Iowa DOT AADT Map of Lee County | 6/1/2014 Date of traffic count

Length (mi.)	Two-way veh/day	Description
1.55	1,760	
2.65	1,490	
1.5	1,290	
5.70	miles total	

1.0% Projected Traffic Growth (0%-10%), G

8,612	Current Vehicle Miles / Day, VM
10,508	End of Life Veh. Miles / Day
3,143,198	Current Veh. Miles / Year, AM
69,210,078	Total Projected Veh. Miles Over Life of Project, TVMT

$$TVMT = \frac{AM}{-G}\left(1-\left(\frac{1+G}{1}\right)^Y\right)$$

Crash Data

2010 First full year --> 2016 Last full year | 7.5 years, Time Period, T

5.5 Additional months | values as of May 2014

0	Fatal Crashes →	0	Fatalities @	$4,500,000	$ -
		2	Major Injuries @	$325,000	$ 650,000
9	Injury Crashes →	4	Minor Injuries @	$65,000	$ 260,000
		5	Possible Injuries @	$35,000	$ 175,000
8	Property Damage Only		(assumed cost per crash)	$7,400	$ -
			-OR- enter all Property Costs of all crashes:		$ 106,250
17	Total Crashes, TA			Total $ Loss, LOSS	$ 1,191,250

2.28	Current Crashes / Year, AA = TA / T	72.5	Crashes / HMVM, Crash Rate, CR CR = TA x 10^8 / (AM x T)
$ 70,074	Cost per Crash, AVCR = LOSS / TA	$ 1,722,207	Present Value of Avoided Crashes, BENEFIT
50.2	Total Expected Crashes, TCR = CR x TVMT/10^8		
1.66	Crashes Avoided First Year AAR = AA x CRF / 100		
$ 116,596	Crash Costs Avoided in First Year, AAR x AVCR		
36.6	Total Avoided Crashes, TCR x CRF/ 100		

$$BEN. = \frac{AVCR \times AAR}{(INT-G)}\left(1-\left(\frac{1+G}{1+INT}\right)^Y\right)$$

Benefit / Cost Ratio

Benefit : Cost = $1,722,207 : $503,184 = 3.42 : 1

Rev. 6/16

IOWA DOT

Application for TRAFFIC SAFETY FUNDS

GENERAL INFORMATION **DATE:** 8/9/16

Location / Title of Project: Addition of Paved Shoulders & Edgeline Rumbles on X23

Applicant: Lee County Secondary Roads

Contact Person: Ernest L. Steffensmeier Title: County Engineer

Complete Mailing Address: PO Box 158, 933 Avenue H
Fort Madison, IA 52627

Phone: 319 372-2541 (Area Code) E-Mail: ernies@leecounty.org

If more than one highway authority is involved in this project, please indicate and fill in the information below (use additional sheets if necessary).

Co-Applicant(s) _____

Contact Person _____ Title _____

Complete Mailing Address _____

Phone _____ (Area Code) E-Mail _____

PLEASE COMPLETE THE FOLLOWING PROJECT INFORMATION:

Application Type

- Site Specific ☒
- Traffic Control Device ☐
- Safety Study ☐

Funding Amount

Total Safety Cost	$ 539,769
Total Project Cost	$ 539,769
Safety Funds Requested	$ 500,000

Does this project appear on a Safety Improvement Candidate List or is there a safety study recommendation for this project?
☐ Yes – Explain _____
☒ No

Rev. 6/16

APPLICATION CERTIFICATION FOR LOCAL GOVERNMENT

To the best of my knowledge and belief, all information included in this application is true and accurate, including the commitment of all physical and financial resources. This application has been duly authorized by the participating local government(s). I understand the attached resolution(s) binds the participating local government(s) to assume responsibility if any additional funds are committed, and to ensure maintenance of any new or improved city streets or secondary roads.

I understand that, although this information is sufficient to secure a commitment of funds, a firm contract between the applicant and the Department of Transportation is required prior to the authorization of funds.

Representing the Lee County Board of Supervisors

Signed: Ron Fedler — 8.9.16
Signature — Date Signed

Ron Fedler
Typed Name

Attest: Denise Frouse — 8.9.16
Signature — Date Signed

Denise Frouse
Typed Name

RESOLUTION
NO. 2016-094

WHEREAS The TRAFFIC SAFETY IMPROVEMENT PROGRAM (TSIP) operates under the rules of the Iowa Administrative Code 761-- Ch. 164 and TSIP allocates Traffic Safety Funds (TSF), and

WHEREAS only city and county governments and the Iowa Department of Transportation may apply for Traffic Safety Funds, and

WHEREAS X23 (West Point Road) in Lee County, from Highway 2 to the city of West Point is an eligible route, and

WHEREAS TSF awards cannot exceed $500,000 per project and project costs beyond the maximum award shall be paid by the local agency, and

WHEREAS, the Sponsoring Agent shall maintain, or cause to be maintained, the completed improvements in a manner acceptable to the IDOT.

NOW, THEREFORE, BE IT RESOLVED that the Lee County Board of Supervisors shall provide the local share for safety improvements to X23 (West Point Road) and maintain the completed improvements in a manner acceptable the IDOT.

Passed and approved this 9th day of August , 2016.

Lee County Board of Supervisors

Ron Fedler

Ron Fedler, Chairman

Matt Pflug

Matt Pflug, Vice-Chair

Gary Folluo

Gary Folluo, Member

Rick Larkin, Member

Don Hunold

Don Hunold, Member

Attest:

Denise Fraise

Denise Fraise, Auditor

NARRATIVE [B]

Lee County is submitting an application herewith for TSIP site specific funding on County Road X23 (West Point Road) from a point just west of the city of Fort Madison; beginning at Highway 2 and extending north to the city of West Point.

X23 is a typical 2 lane rural road consisting of a 24' wide HMA surface. Grading for the roadway was completed between 1966 - 1971, consisting of 6' shoulders, 3:1 foreslopes, and 6/16 ft of clearzone for fill/cut sections, respectively. Over time, with additional HMA overlays, the current shoulder widths have narrowed to approximately 5 ft.

The roadway is signed for 55 mph, but contains several vertical curves and horizontal curves requiring warning signs and some advisory speed plaques. All signs are currently installed according to MUTCD requirements.

The curvilinear alignment is a key factor in a high number of accidents with vehicles leaving the roadway, while the relatively narrow shoulders provide limited chance for errant vehicles to correct their steering once leaving the pavement. As with most similar roads, edge rutting commonly develops at the edge of paving. While frequently addressed by maintenance crews, this is a persistent issue that may reduce errant vehicles' ability to recover, or result in over correction after travelling onto the shoulder.

Crash Data for this section of X23 show a high number of primarily single-vehicle accidents where vehicles are leaving the roadway. 40 accidents, dating from 2007 to present, have resulted in a range of property damage and injuries ranging in severity from minor to fatal. Estimated loss of property and productivity resulting from these accidents is estimated at $1.9 million.

To reduce the number of crashes and resulting losses, multiple safety features are being proposed:

-A 2 ft paved shoulder *(CRF of 18% [reference: Crash Modification Factors Clearinghouse ID #6690])* will provide drivers a wider surface, without dropoff, to redirect their vehicles before leaving the road.

-Milled edgeline rumble strips *(CRF of 47% [CMF ID #3561])* will provide drivers with tactile and auditory warnings as they are about to leave their lane of travel, providing a quicker reaction time in which to correct their errant direction.

-A wider (5") edgeline (CRF of 37.7% [CMF ID # 4751]) will heighten driver awareness of the edge of the travelled way, thereby reducing roadway departures.

A crash analysis and Benefit/Cost calculation has been performed for the proposed safety improvements. Over a period of 9.5 years, calculations show a B/C ratio of **3.99 : 1**. Over a shorter period, 6.5 years, calculations shows a slightly smaller B/C ratio of 3.82 : 1.

The situation as presented and the predicted savings indicate that this would be a worthwhile appropriation of funding. Consideration for funding for these improvements is greatly appreciated.

Itemized Costs [C]

Preliminary Estimate of Costs for Shoulder Widening, Edgeline Rumbles, & 5" Edgelines on X23 from Highway 2 to West Point Corp. Limits

Item No	Item	Unit	Quantity	Unit Price	Extended Amount
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2213-2713300	EXCAVATION, CLASS 13, FOR WIDENING	CY	2235.19	$22.00	$49,174.07
2527-9263109	PAINTED PAVEMENT MARKING, WATERBORNE OR SOLVENT-BASED (White)	STA	603.50	$10.00	$6,035.00
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2528-8445113	FLAGGERS	EACH	15.00	$450.00	$6,750.00
2528-8445115	PILOT CARS	EACH	5.00	$700.00	$3,500.00
2533-4980005	MOBILIZATION	LS	1.00	$25,000.00	$25,000.00
2548-0000100	MILLED SHOULDER RUMBLE STRIPS, HMA SURFACE	STA	603.50	$15.00	$9,052.50
2548-0000110	ASPHALT EMULSION FOR FOG SEAL (SHOULDER RUMBLE STRIPS	GAL	871.72	$7.00	$6,102.06

Total Feet of Shoulder & Rumble Strip Improvements **60,350.00**

Total **$539,769.19**

Requested Traffic Safety Improvement Program Funds $500,000.00
Lee County Funds (Farm-to-Market or Local) $39,769.19

TIME SCHEDULE [D]

January 1, 2017 — Anticipated Approval Funds

Spring - Summer 2017 — Project Development

(per IDOT IM 3.005 Critical Path Memorandum to local agencies)

Fall - Winter 2017 — Project Letting

2018 Construction Season (FY '18 - '19) — Project Completion

(*No later than October '18, subject to contract late start date and specified working days.)*

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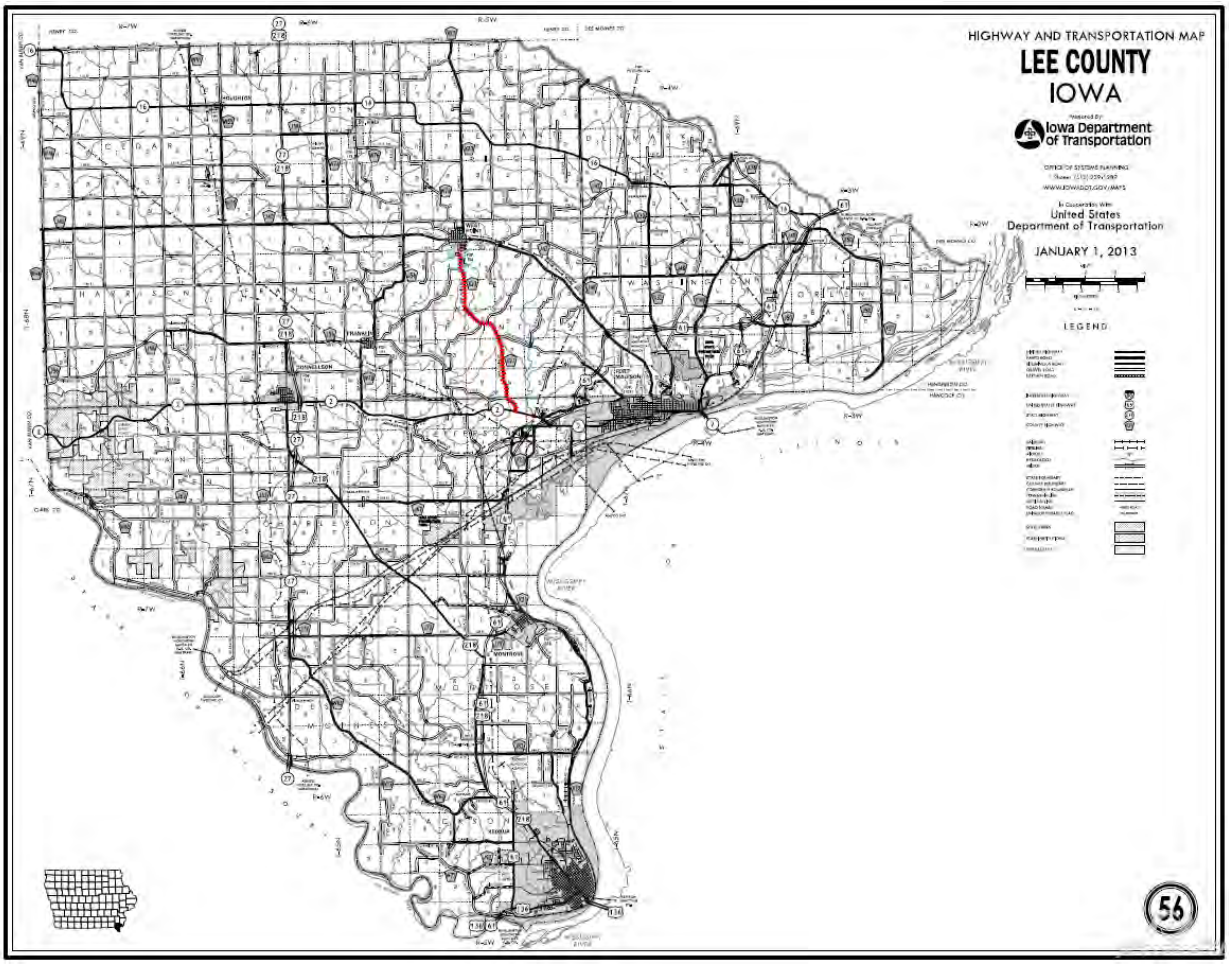
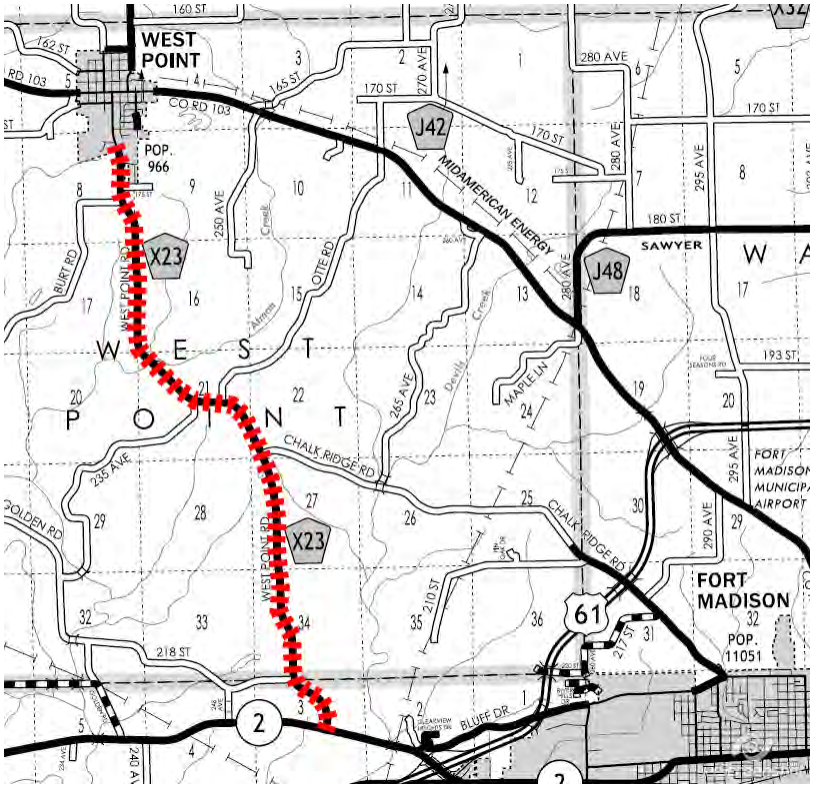
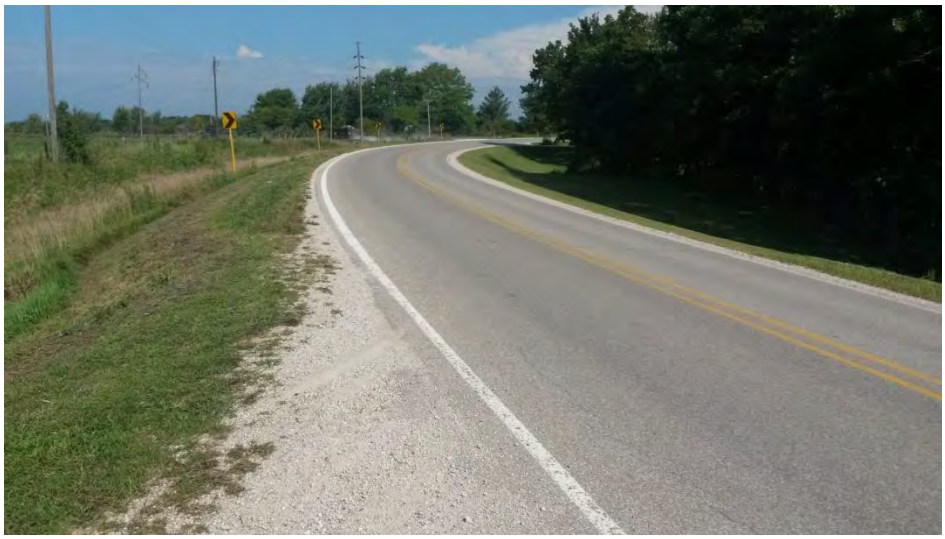

HIGHWAY AND TRANSPORTATION MAP
LEE COUNTY
IOWA
Iowa Department of Transportation
United States Department of Transportation
JANUARY 1, 2013
LEGEND
56


WEST POINT
POP. 966
CO RD 103
J42
MIDAMERICAN ENERGY
SAWYER
J48
X23
WEST POINT RD
BURT RD
OTTE RD
CHALK RIDGE RD
MAPLE LN
FORT MADISON MUNICIPAL AIRPORT
FORT MADISON
POP. 11051
61
2
BLUFF DR
280 AVE
295 AVE
290 AVE
265 AVE
250 AVE
235 AVE
270 AVE
170 ST
180 ST
193 ST
210 ST
218 ST
240 AVE

PHOTOS OF PROJECT SITE [F]

Photos depicting typical conditions of X23: a two lane HMA road with 5 ft granular shoulders. Multiple vertical & horizontal curves, and multiple points of access.



[F2]

[F3]

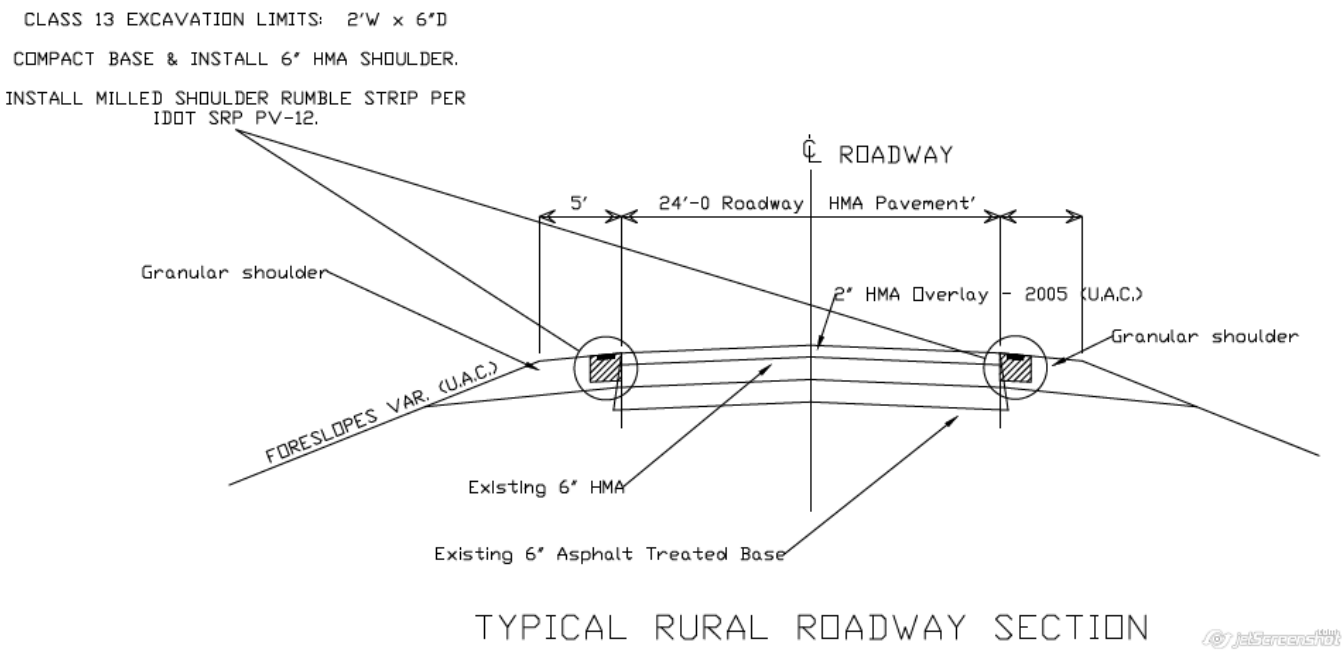
Intermittent edge rutting persists despite frequent shoulder maintenance.

PLAN VIEW [G]

(Views of the existing ROW as visible in the Lee County GIS.)

X23 contains multiple horizontal/vertical curves and moderate grades. It is signed at 55 mph with several advisory/warning signs and advisory speed plaques. Right of way is typically 100 ft, though it varies considerably in areas of extensive cut/fill, drainage structures, etc.

Current pavement consists of 12' lanes and 5 ft granular shoulders. Proposed safety improvements include adding 2 ft paved shoulders, installation of edgeline rumble strips (PV-12) and widening of existing edgelines from 4 to 5".



Aerial Photograph [H]

Aerial view of proposed project shows a typical rural Lee County Road. This view shows the winding and curvy nature of X23 with multiple curves and grade changes.

Iowa Department of Transportation

Major Cause Summary

Lee Count X23 (Highway 2 to West Point)

Analysis Years: 2007 [11], 2008 [4], 2009 [5], 2010 [5], 2011 [3], 2012 [1], 2013 [4], 2014 [2], 2015 [2], 2016 [3]

Crash Summary:

Fatal	1
Major Injury	2
Minor Injury	4
Possible/Unknown	11
PDO	22
Total Crashes	40

Injury Summary:

Fatal	1
Major Injury	2
Minor Injury	4
Possible	13
Unknown	-
Total Injuries	20

Surface Condition Summary:

Dry	12
Wet	3
Ice	13
Snow	10
Slush	1
Sand/Dirt/Oil/Gravel	-
Water	-
Other	-
Unknown	1
Not Reported	-
Total Crashes	40

TOT Property Damage: $201,450

AVG Property Damage: $5,036

Major Cause Summary:

	Animal		Improper Backing
	Ran Traffic Signal		Illegally Parked/Unattended
	Ran Stop Sign	16	Swerving/Evasive Action
	Crossed Centerline		Over-Correcting/Over-Steering
	FTYROW: At Uncontrolled Intersection		Downhill Runaway
	FTYROW: Making Right Turn on Red Signal		Equipment Failure
	FTYROW: From Stop Sign		Separation of Units
	FTYROW: From Yield Sign	11	Ran Off Road - Right
	FTYROW: Making Left Turn		Ran Off Road - Straight
	FTYROW: From Driveway	2	Ran Off Road - Left
	FTYROW: From Parked Position	4	Lost Control
	FTYROW: To Pedestrian		Inattentive/Distracted By: Passenger
	FTYROW: Other (explain in narrative)		Inattentive/Distracted By: Use of Phone or Other
	Traveling Wrong Way or on Wrong Side of Rd		Inattentive/Distracted By: Fallen Object
7	Driving Too Fast for Conditions		Inattentive/Distracted By: Fatigued/Asleep
	Exceeded Authorized Speed		Other: Vision Obstructed
	Made Improper Turn		Oversized Load/ Oversized Vehicle
	Improper Lane Change		Cargo/Equipment Loss or Shift
	Followed Too Close		Other: Other Improper Action
	Disregarded Railroad Signal		Unknown
	Disregarded Warning Sign		Other: No Improper Action
	Operating Vehicle in Reckless/Aggressive Manner		None Indicated

Selection Filter:

((MAJORCAUSE = 15 or MAJORCAUSE = 25 or MAJORCAUSE = 30 or MAJORCAUSE = 31 or MAJORCAUSE = 32 or MAJORCAUSE = 33)) AND ((YEAR <> 2006))

Analyst: BJH

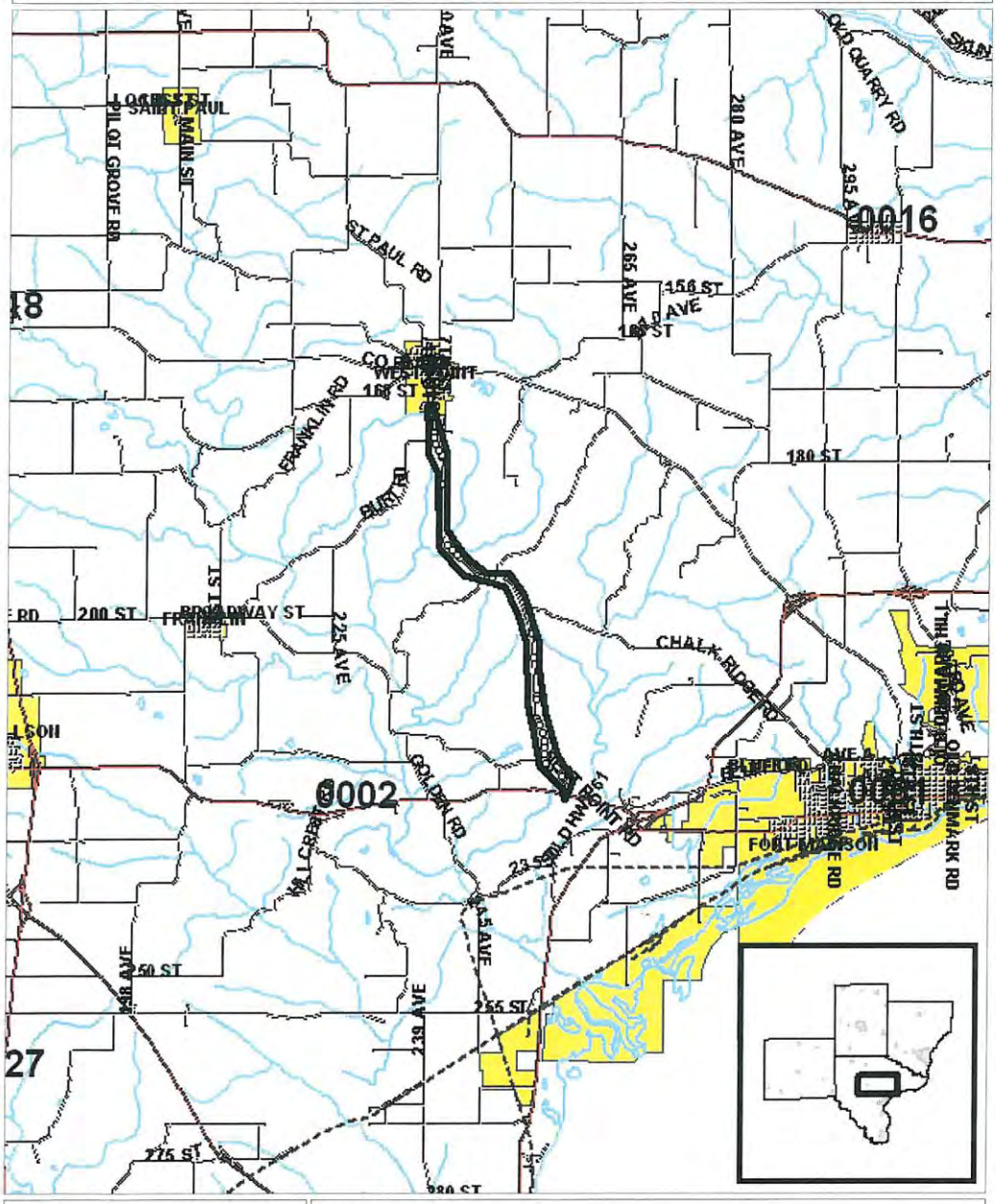
Notes: 2007 - June 15, 2016

Iowa Department of Transportation

Location Map

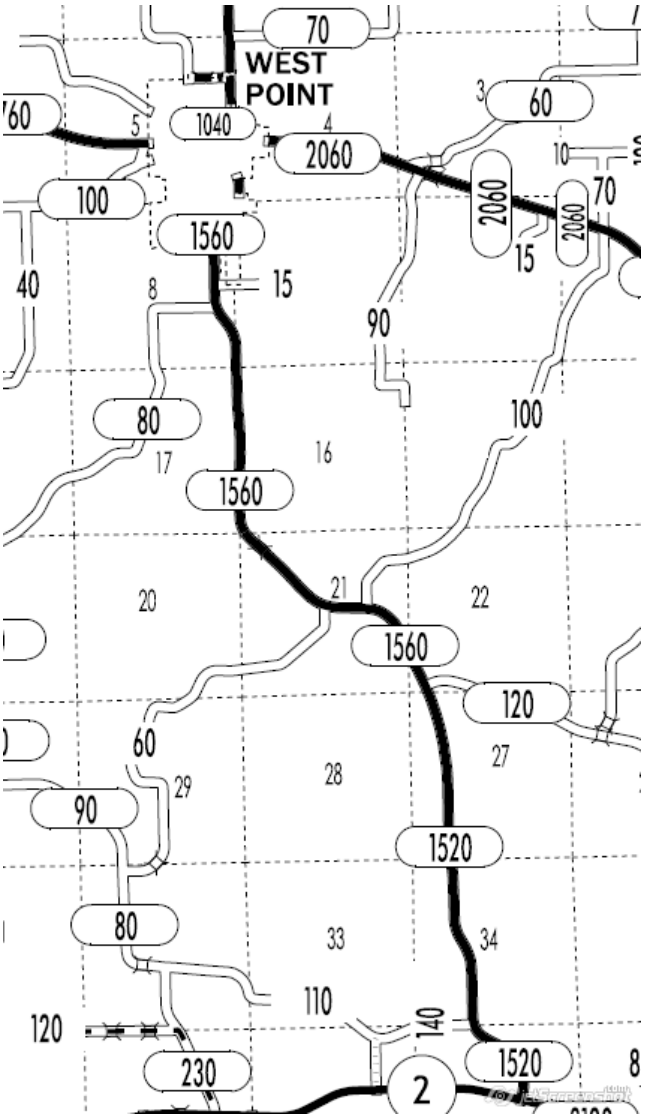
Lee Count X23 (Highway 2 to West Point)

Incidents: 40



Analyst: BJH

Notes:



Source: 2014 AADT Traffic Flow Map of Lee County, prepared by Iowa DOT.

TRAFFIC SIGNALS [K]

Not Applicable

BENEFIT / COST RATIO [L]

The cumulative Crash Reduction Factor was determined as follows:

If more than one safety improvement will be made, the cummulative crash reduction factor must be calculated using the following formula:

CRF = 100*(1-(1-CRF1/100)*(1-CRF2/100)*(1-CRF3/100)*(1-CRF4/100)*(1-CRF5/100))

or enter the individual values into this calculator:

Enter up to 5 CRFs:	18	47	37.7		
Cummulative CRF =	72.92442				

[L2]

Rev. 5/14

Road Segment Benefit / Cost Safety Analysis

Iowa DOT Office of Traffic & Safety

County: Lee | Prepared by: Benjamin Hull, P.E. | Date Prepared: Aug 10, 2016

Location: X23 (West Point Road) from Highway 2 to West Point Corporate Limits

Improvement

Proposed Improvement(s):

$ 539,769	Estimated Improvement Cost, EC	20	Est. Improvement Life, years, Y
$ -	Other Annual Cost (after initial year), AC	73	Crash Reduction Factor (integer), CRF
$ -	Present Value Other Annual Costs, OC	4.0%	Discount Rate, INT
	$OC = \frac{AC}{INT}\left(1-\frac{1}{(1+INT)^Y}\right)$	$ 539,769	Present Value All Costs, COST = EC + OC

Traffic Volume Data

Source: 2014 Iowa DOT Map of Lee County | 6/1/2014 Date of traffic count

Length (mi.)	Two-way veh/day	Description
2.50	1,560	
3.80	1,520	
6.30	miles total	

9,676	Current Vehicle Miles / Day, VM
11,807	End of Life Veh. Miles / Day
3,531,740	Current Veh. Miles / Year, AM
77,765,397	Total Projected Veh. Miles Over Life of Project, TVMT

$$TVMT = \frac{AM}{-G}\left(1-\left(\frac{1+G}{1}\right)^Y\right)$$

1.0% Projected Traffic Growth (0%-10%), G

Crash Data

2007 First full year --> 2015 Last full year | 9.5 years, Time Period, T

5.5 Additional months | values as of May 2014

1	Fatal Crashes	0	Fatalities @	$4,500,000	$ -
		3	Major Injuries @	$325,000	$ 975,000
17	Injury Crashes	4	Minor Injuries @	$65,000	$ 260,000
		13	Possible Injuries @	$35,000	$ 455,000
22	Property Damage Only		(assumed cost per crash)	$7,400	$ -
			-OR- enter all Property Costs of all crashes:		$ 201,450
40	Total Crashes, TA			Total $ Loss, LOSS	$ 1,891,450

4.23	Current Crashes / Year, AA = TA / T	119.7	Crashes / HMVM, Crash Rate, CR CR = TA x 10^8 / (AM x T)
$ 47,286	Cost per Crash, AVCR = LOSS / TA	$ 2,153,322	Present Value of Avoided Crashes, BENEFIT
93.1	Total Expected Crashes, TCR = CR x TVMT/10^8		
3.08	Crashes Avoided First Year AAR = AA x CRF / 100		
$ 145,783	Crash Costs Avoided in First Year, AAR x AVCR		
67.9	Total Avoided Crashes, TCR x CRF/ 100		

$$BEN. = \frac{AVCR \times AAR}{(INT-G)}\left(1-\left(\frac{1+G}{1+INT}\right)^Y\right)$$

Benefit / Cost Ratio

Benefit : Cost = $2,153,322 : $539,769 = 3.99 : 1

Rev. 6/16

Application for TRAFFIC SAFETY FUNDS

GENERAL INFORMATION **DATE:** 8/11/2016

Location / Title of Project X54 Shoulder Safety Project From I-80 to county line

Applicant Cedar County Secondary Roads

Contact Person Rob Fangmann Title Cedar County Engineer

Complete Mailing Address 400 Cedar Street
Tipton, IA 52772

Phone (319) 665-3457 (Area Code) E-Mail engineer@cedarcounty.org

If more than one highway authority is involved in this project, please indicate and fill in the information below (use additional sheets if necessary).

Co-Applicant(s) _____

Contact Person _____ Title _____

Complete Mailing Address _____

Phone _____ (Area Code) E-Mail _____

PLEASE COMPLETE THE FOLLOWING PROJECT INFORMATION:

Application Type

- Site Specific ☒
- Traffic Control Device ☐
- Safety Study ☐

Funding Amount

Total Safety Cost	$ 385,000
Total Project Cost	$ 385,000
Safety Funds Requested	$ 385,000

Does this project appear on a Safety Improvement Candidate List or is there a safety study recommendation for this project? ☐Yes – Explain _____
☒No

Rev. 6/16

APPLICATION CERTIFICATION FOR LOCAL GOVERNMENT

To the best of my knowledge and belief, all information included in this application is true and accurate, including the commitment of all physical and financial resources. This application has been duly authorized by the participating local government(s). I understand the attached resolution(s) binds the participating local government(s) to assume responsibility if any additional funds are committed, and to ensure maintenance of any new or improved city streets or secondary roads.

I understand that, although this information is sufficient to secure a commitment of funds, a firm contract between the applicant and the Department of Transportation is required prior to the authorization of funds.

Representing the Cedar County Board of Supervisors

Signed: _____

Signature Date Signed

Dawn Smith

Typed Name

Attest: _____

Signature Date Signed

Cari Gritton

Typed Name

OFFICE OF THE CEDAR COUNTY ENGINEER

COURTHOUSE; 400 CEDAR ST.
TIPTON, IOWA 52772-1752
www.cedarcounty.org

PHONE: (563) 886-6102 FAX: (563) 886-2110 EMAIL: engineer@cedarcounty.org

August 11, 2016

Cedar County respectfully submits this application for TSIP funds for a curve safety project located on X54 (Moscow Road) from Interstate 80 south to the Cedar/Muscatine County Line. The speed limit at this location is 55 miles per hour.

This stretch of roadway has experienced 15 reported accidents between 2010 and 2014. 3 of these have been run off the road accidents caused by the driver's failure to navigate the roadway. Two of which were fatalities.

The project would include the paving of the shoulders along the entire route to provide the motorist a larger area of recovery. Cedar County in the past has installed fluorescent yellow chevrons along the curves, flattened the foreslope in areas and removed an entrance obstruction in the event a motorist leaves the travelled portion of the roadway, but we are exploring additional options to reduce the number of crashes.

We believe this project would improve the recoverable area for the driver which would help them navigate it properly and reduce the number of run off the road crashes.

Cedar County, Iowa
X-54 Shoulder Widening

NO.	ITEM CODE	ITEM DESCRIPTION	UNITS	UNIT PRICE			
1	2121-7425020	GRANULAR SHOULDER, TYPE B	TON	$19.89	620.000	$	12,331.80
2	2122-5500060	PAVED SHOULDERS, HMA 6 IN.	SY	$21.46	8033.300	$	172,394.62
3	2303-1258284	ASPHALT BINDER, PG 58-28H, HIGH TRAFFIC	TON	$389.89	303.700	$	118,409.59
4	2213-2713300	EXCAVATION, CLASS 13, FOR WIDENING	CY	$14.03	2677.800	$	37,569.53
5	2303-6911000	HOT MIX ASPHALT PAVEMENT SAMPLES	LS	$2,382.36	1.000	$	2,382.36
6	2527-9263109	POINTED PAVEMENT MARKING, WATERBORNE OR SOLVENT BASED	STA	$8.89	363.000	$	3,227.07
7	2528-8445110	TRAFFIC CONTROL	LS	$8,737.56	1.000	$	8,737.56
8	2528-8445112	FLAGGERS	EA	$440.67	12.000	$	5,288.04
9	2528-8445115	PILOT CAR	EA	$651.84	6.000	$	3,911.04
10	2533-4980005	MOBILIZATION	LS	$20,000.00	1.000	$	20,000.00
				TOTAL		$	384,251.62

OFFICE OF THE CEDAR COUNTY ENGINEER
COURTHOUSE; 400 CEDAR ST.
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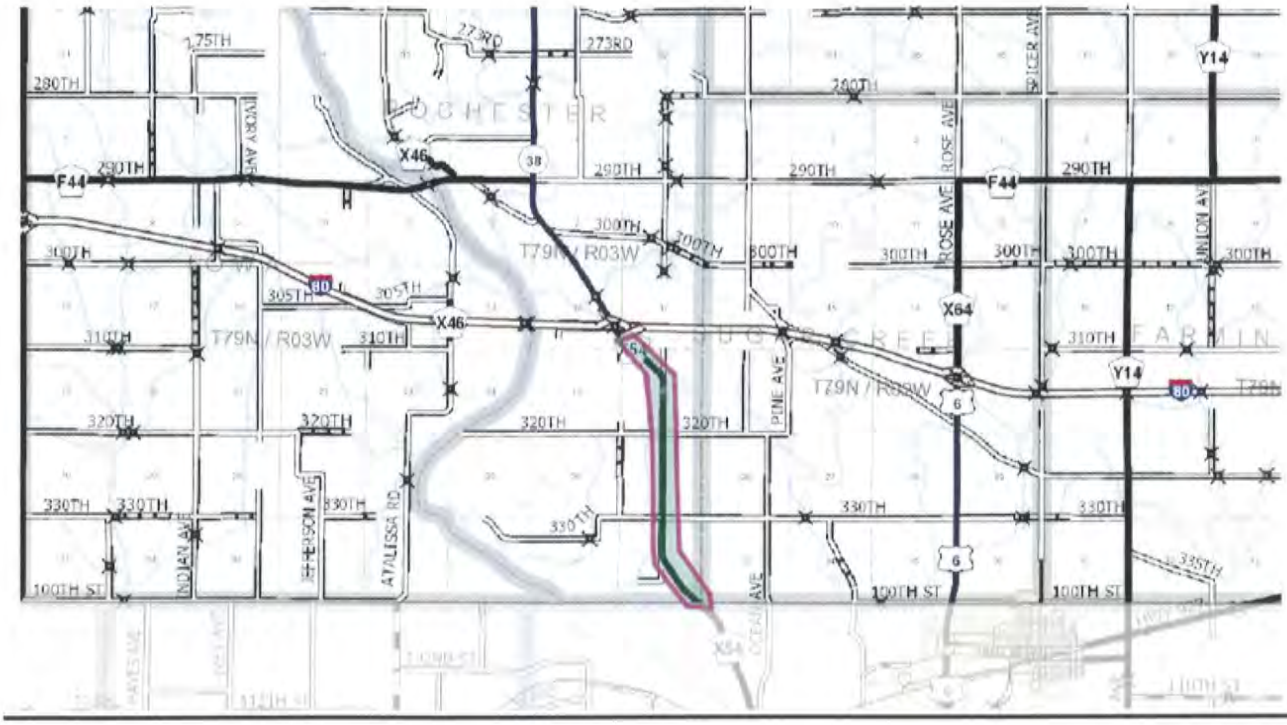
PHONE: (563) 886-6102 FAX: (563) 886-2110 EMAIL: engineer@cedarcounty.org

D. Time Schedule

This project will take approximately 30 working days to complete. If the grant is approved, Cedar County will program the project as early as possible in our construction program. We anticipate the project to be completed by the end of the 2018 fiscal year.

E. Location Map



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F. Color Pictures

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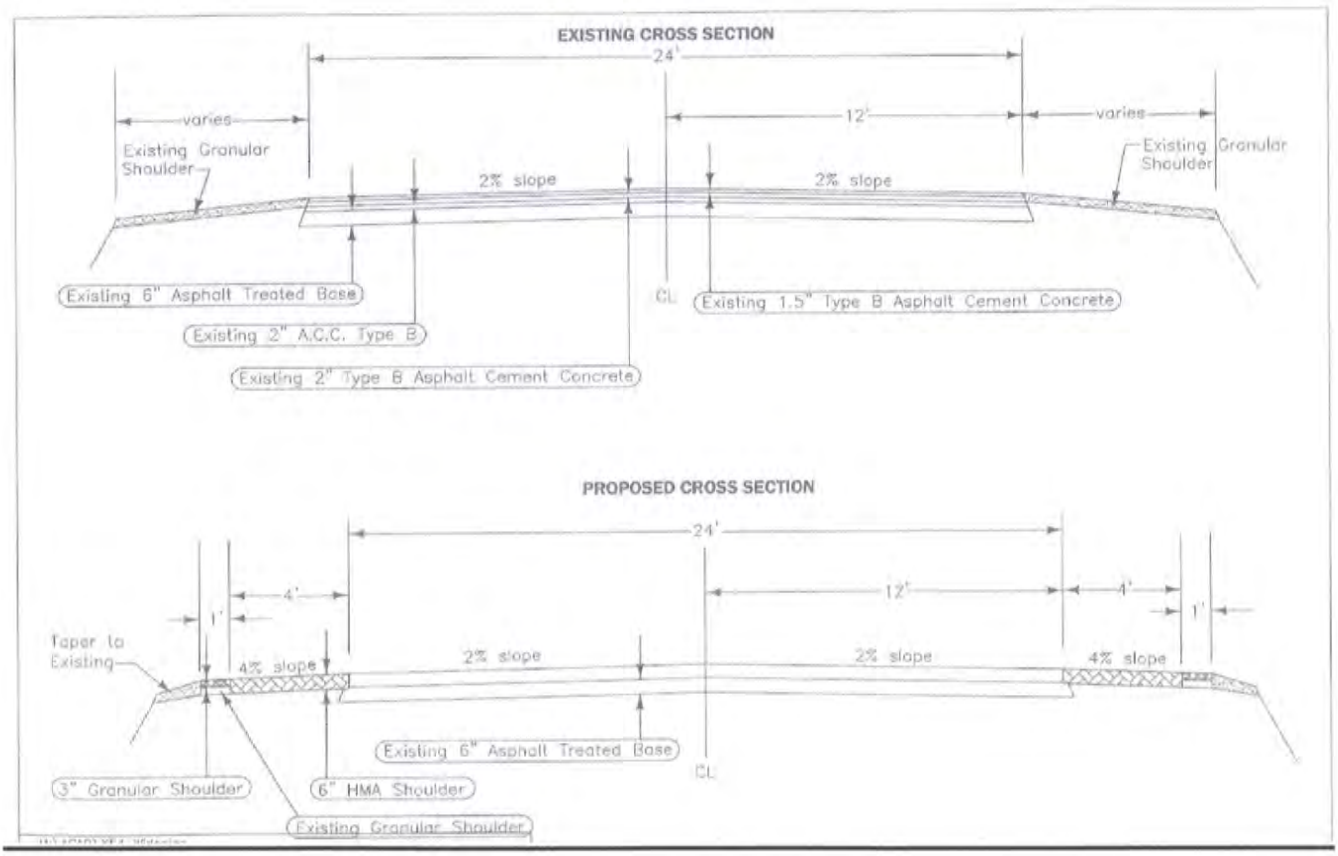
G. Plan View



Iowa Department of Transportation

Major Cause Summary

X54 Shoulder Safety Project

Analysis Years: 2010 [3], 2011 [8], 2012 [4], 2013 [3]

Crash Summary:

Fatal	2
Major Injury	-
Minor Injury	1
Possible/Unknown	2
PDO	10
Total Crashes	15

Injury Summary:

Fatal	2
Major Injury	-
Minor Injury	1
Possible	2
Unknown	-
Total Injuries	5

TOT Property Damage: $98,982

AVG Property Damage: $6,599

Surface Condition Summary:

Dry	7
Wet	5
Ice	1
Snow	1
Slush	-
Sand/Dirt/Oil/Gravel	-
Water	-
Other	-
Unknown	-
Not Reported	1
Total Crashes	15

Major Cause Summary:

7	Animal
	Ran Traffic Signal
	Ran Stop Sign
1	Crossed Centerline
	FTYROW: At Uncontrolled Intersection
	FTYROW: Making Right Turn on Red Signal
	FTYROW: From Stop Sign
	FTYROW: From Yield Sign
1	FTYROW: Making Left Turn
	FTYROW: From Driveway
	FTYROW: From Parked Position
	FTYROW: To Pedestrian
1	FTYROW: Other (explain in narrative)
	Traveling Wrong Way or on Wrong Side of Rd
	Driving Too Fast for Conditions
	Exceeded Authorized Speed
	Made Improper Turn
	Improper Lane Change
	Followed Too Close
	Disregarded Railroad Signal
	Disregarded Warning Sign
	Operating Vehicle in Reckless/Aggressive Manner
	Improper Backing
	Illegally Parked/Unattended
2	Swerving/Evasive Action
	Over-Correcting/Over-Steering
	Downhill Runaway
	Equipment Failure
	Separation of Units
3	Ran Off Road - Right
	Ran Off Road - Straight
	Ran Off Road - Left
	Lost Control
	Inattentive/Distracted By: Passenger
	Inattentive/Distracted By: Use of Phone or Other
	Inattentive/Distracted By: Fallen Object
	Inattentive/Distracted By: Fatigued/Asleep
	Other: Vision Obstructed
	Oversized Load/ Oversized Vehicle
	Cargo/Equipment Loss or Shift
	Other: Other Improper Action
	Unknown
	Other: No Improper Action
	None Indicated

Selection Filter:

((YEAR = 2010 or YEAR = 2011 or YEAR = 2012 or YEAR = 2013 or YEAR = 2014))

Analyst: Rob Fangmann

Notes:

Iowa Department of Transportation

Abbreviated Crash Report

X54 Shoulder Safety Project

Report Version 1.2 Mar 2005

Date	DOT Case #	Agency Case #	City	Crash Sev.	Literal Description
02/10/2010	2010559242			PDO	X054 / MOSCOW RD measuring 0.5 Miles North from X054 / MOSCOW RD and
07/19/2010	2010583537	2010042588		PDO	X54/307TH STREET
10/26/2010	2010598151			PDO	X054 / MOSCOW RD measuring 0.5 Miles Southeast from Interstate 0080
02/08/2011	2011617729			PDO	X054 / MOSCOW RD measuring 1 Miles Southeast from Interstate 0080 and
05/17/2011	2011630633	2011028770		Poss/Unk	MOSCOW ROAD .5 MILES S OF I-80
05/18/2011	2011632002	2011029030		PDO	X054 / MOSCOW RD
05/21/2011	2011632237			Poss/Unk	X054 / MOSCOW RD
08/02/2011	2011641930			PDO	X054 / MOSCOW RD measuring 300 Feet South from X054 / MOSCOW RD and
01/26/2012	2012670255			PDO	Interstate 0080 and Iowa 0038 / IOWA 38 and X054 / MOSCOW RD
01/26/2012	2012672312			PDO	Interstate 0080 and Iowa 0038 / IOWA 38 and X054 / MOSCOW RD
06/08/2012	2012690227			PDO	X054 / MOSCOW RD measuring 2 Miles South from Iowa 0038 / IOWA 38 and
06/16/2012	2012690664	2012033713		Fatal	X54 NORTH OF 320TH ST
02/06/2013	2013726446			PDO	X054 / MOSCOW RD and NATIONAL AVE
08/25/2013	2013756350	2013047441		Minor	HIGHWAY 38 @ I80 E/B ON/OFF RAMP (EXIT 267)
10/03/2013	2013768075			Fatal	X054 / MOSCOW RD

Selection Filter:

((YEAR = 2010 or YEAR = 2011 or YEAR = 2012 or YEAR = 2013 or YEAR = 2014))

Analyst: Rob Fangmann

Notes:

Rev. 5/14

Road Segment Benefit / Cost Safety Analysis

Iowa DOT Office of Traffic & Safety

County: **Cedar** Prepared by: **Rob Fangmann** Date Prepared: **Aug 11, 2016**

Location: **X54 From Interstate 80 south to the Cedar/Muscatine County Line**

Improvement

Proposed Improvement(s): **Pave 4' Shoulders along X54**

$ 385,000	Estimated Improvement Cost, **EC**	20	Est. Improvement Life, years, **Y**
$ -	Other Annual Cost (after initial year), **AC**	24	Crash Reduction Factor (integer), **CRF**
$ -	Present Value Other Annual Costs, **OC**	4.0%	Discount Rate, **INT**
	$OC = \frac{AC}{INT}\left(1 - \frac{1}{(1+INT)^Y}\right)$	$ 385,000	Present Value All Costs, **COST** = EC + OC

Traffic Volume Data

Source: **Iowa DOT Traffic Counts** **2014** Date of traffic count

Length (mi.)	Two-way veh/day	Description
3.50	1,580	X54 from I-80 to county line
3.50	miles total	

1.0% Projected Traffic Growth (0%-10%), **G**

5,530 Current Vehicle Miles / Day, **VM**
6,748 End of Life Veh. Miles / Day
2,018,450 Current Veh. Miles / Year, **AM**
44,444,259 Total Projected Veh. Miles Over Life of Project, **TVMT**

$$TVMT = \frac{AM}{-G}\left(1 - \left(\frac{1+G}{1}\right)^Y\right)$$

Crash Data

2010 First full year --> 2014 Last full year 5.0 years, Time Period, **T**

Additional months values as of May 2014

2	Fatal Crashes	1	**Fatalities @**	**$4,500,000**	$ 4,500,000
		1	Major Injuries @	$325,000	$ 325,000
3	Injury Crashes	1	**Minor Injuries @**	**$65,000**	$ 65,000
		2	Possible Injuries @	$35,000	$ 70,000
10	Property Damage Only		(assumed cost per crash)	$7,400	$ 111,000
			-OR- enter all Property Costs of all crashes:		
15	Total Crashes, **TA**			Total $ Loss, **LOSS**	$ 5,071,000

3.00	Current Crashes / Year, **AA** = TA / T	148.6	Crashes / HMVM, Crash Rate, **CR** CR = TA x 10^8 / (AM x T)
$ 338,067	Cost per Crash, **AVCR** = LOSS / TA	$ 3,595,308	Present Value of Avoided Crashes, **BENEFIT**
66.1	Total Expected Crashes, **TCR** = CR x TVMT/10^8		
0.72	Crashes Avoided First Year **AAR** = AA x CRF / 100		
$ 243,408	Crash Costs Avoided in First Year, AAR x AVCR		
15.9	**Total Avoided Crashes, TCR x CRF/ 100**		

$$BEN. = \frac{AVCR \times AAR}{(INT - G)}\left(1 - \left(\frac{1+G}{1+INT}\right)^Y\right)$$

Benefit / Cost Ratio

Benefit : Cost = $3,595,308 : $385,000 = **9.34** : 1

Application for

Traffic Safety Improvement Program

Iowa Department of Transportation

First Avenue South & South Fifteenth Street Corridor Improvements

Fort Dodge, Iowa

August 12, 2015

CITY OF FORT DODGE
Engineering
www.fortdodgeiowa.org

August 12, 2016

Mr. Steven Schroder, P.E.
Office of Traffic & Safety
Iowa Department of Transportation
800 Lincoln Way
Ames, IA 50010

Dear Mr. Schroder:

The City of Fort Dodge is pleased to submit, for your consideration, an application for funding assistance through the Traffic Safety Improvement Program (TSIP). The proposed project eligible for funding assistance and consideration is the First Avenue South and South Fifteen Street Corridor Improvements Project.

The proposed project includes converting both corridors to include a two-way left turn lane as well as construction of right turn lanes at the intersection of both corridors. Implementation of a two-way left turn lane will reduce rear end crashes on the two lane with parking 1st Avenue South corridor and the four lane, no parking, South 15th St corridor.

Both corridors have experienced a higher than the statewide average crash rate and inclusion of these improvements is expected to reduce crashes and thus the crash rate.

The City is confident the analysis presented herein supports the applicability of the safety goals of the Traffic Safety Improvement Program and demonstrates the worthiness of the project for TSIP funding assistance.

Please feel free to contact me with any questions.

Sincerely,

Chad W. Schaeffer, P.E.
Director of Business Affairs, Community Growth, & Engineering

Enclosure(s)

Application for TRAFFIC SAFETY FUNDS

GENERAL INFORMATION **DATE:** August 12, 2016

Location / Title of Project Corridor Improvements Project

Applicant City of Fort Dodge

Contact Person Chad Schaeffer Title City Engineer

Complete Mailing Address 819 1st Ave S

Fort Dodge, IA 50501

Phone (515) 576-3601 E-Mail cschaeffer@fortdodgeiowa.org
(Area Code)

If more than one highway authority is involved in this project, please indicate and fill in the information below (use additional sheets if necessary).

Co-Applicant(s) _____

Contact Person _____ Title _____

Complete Mailing Address _____

_____

Phone _____ E-Mail _____
(Area Code)

PLEASE COMPLETE THE FOLLOWING PROJECT INFORMATION:

Application Type

- Site Specific ☒
- Traffic Control Device ☐
- Safety Study ☐

Funding Amount

Total Safety Cost	$ 512,500
Total Project Cost	$ 1,309,000
Safety Funds Requested	$ 500,000

Does this project appear on a Safety Improvement Candidate List or is there a safety study recommendation for this project?

☒ Yes – Explain Study
☐ No

APPLICATION CERTIFICATION FOR LOCAL GOVERNMENT

To the best of my knowledge and belief, all information included in this application is true and accurate, including the commitment of all physical and financial resources. This application has been duly authorized by the participating local government(s). I understand the attached resolution(s) binds the participating local government(s) to assume responsibility if any additional funds are committed, and to ensure maintenance of any new or improved city streets or secondary roads.

I understand that, although this information is sufficient to secure a commitment of funds, a firm contract between the applicant and the Department of Transportation is required prior to the authorization of funds.

Representing the City of Fort Dodge

Signed: _____ 8/8/2016
Signature — Date Signed

MATT BEMRICH (MAYOR)
Typed Name

Attest: _____ 8/8/2016
Signature — Date Signed

Jeff Nemmers (City Clerk)
Typed Name

RESOLUTION NO. 16-08-127

A RESOLUTION AUTHORIZING THE SUBMITTAL OF AN APPLICATION FOR TRAFFIC SAFETY IMPROVEMENT PROGRAM (TSIP) FUNDING FOR 1ST AVE. S. AND S. 15TH ST. CORRIDORS WHICH INCLUDES ADDING RIGHT TURN LANES AT ALL APPROACHES AND REPLACEMENT OF TRAFFIC SIGNALS TO THE INTERSECTION OF 1ST AVE. S. AND S. 15TH ST., AND CONVERSION OF THE CORRIDORS TO A THREE-LANE CONFIGURATION.

WHEREAS, the Iowa Department of Transportation has established the TSIP and provides funding for locations where vehicular safety is a concern and documented.

WHEREAS, the First Avenue South and South 15th Street Corridors have been identified as locations where vehicular safety and traffic flow could be improved and funded by TSIP.

WHEREAS, the improvements, including the addition of right turn lanes, the installation of a new traffic signals, and the conversion of the Corridors to a three-lane configuration will help reduce crashes in this area and improve traffic operations.

NOW, THEREFORE, BE IT RESOLVED by the City Council of Fort Dodge, Iowa, as follows:

1. The City Council supports and approves the application for TSIP funding.
2. The City Council hereby commits the additional City funds necessary for construction of the project beyond any TSIP funding.
3. The City Council hereby commits to accepting and maintaining these improvements.
4. The Mayor is hereby authorized to execute the application on behalf of the City.

PASSED AND APPROVED this 8th day of August, 2016 by the City Council of the City of Fort Dodge, Iowa.

Ayes: Flattery, Halter, Conrad, Alstott, Moehnke and Hill

Nays: None

Other: ABSENT: FRITZ

Matt Bemrich, Mayor

ATTEST:

Jeff Nemmers, City Clerk

NARRATIVE

Existing Conditions

First Ave S is a two-lane urban street with parking allowed on both sides of the street with a 47' back-to-back of curb distance. The corridor, from west of S 13th St to S 20th St or Veterans Memorial Bridge (0.5 miles), has a posted speed limit of 25 miles per hour (mph). The corridor has a mix of land uses including commercial and residential throughout. The S 15th St corridor extends from 5th Ave S to 1st Ave S (0.3 miles for this application). The entire length of the corridor is a four-lane undivided facility with no parking allowed (44' wide). The posted speed limit is 30 mph. Pavement condition for both corridors is in relatively good condition with areas of cracking.

The intersections along 1st Ave S and S 15th St are mostly stop-controlled with the side street being controlled. The exception is the intersection of 1st Ave S & S 15th St, which is signalized. Parking has been removed approaching this S 15th St intersection along 1st Ave S to add eastbound and westbound left turn lanes. Eastbound, parking has been removed from 100 ft west of S 14th St through the S 16th St intersection. Westbound, parking has been removed from the S 17th St intersection to 100' west of the S 15th St intersection. The eastbound and westbound left turn lanes have the double yellow center pavement marking aligned across the intersection creating a visibility concern for vehicles turning left from the permissive only left turn movement. The signal phasing for the northbound and southbound movement has been split (separate) as a part of a Traffic Engineering Assistance Program (TEAP) study to improve safety and operations of the intersection.

Due to safety and operational concerns at the 1st Ave S & S 15th St intersection, a traffic study was recently performed for the corridors. Safety and operational analyses indicated that converting to three lanes for both corridors would improve safety without significant impacts to operations. The study recommended improvements were included in the TSIP application.

Traffic Data

The Iowa DOT collected traffic count data in Fort Dodge in 2007, 2011, and 2015. Only the 2011 count included turning movements at the 1st Ave S & S 15th St intersection. An additional turning movement count was collected in 2016 at the intersection, however, construction projects in the area impacted volumes along 1st Ave S and S 15th St as S 15th St was a designated detour route.

Year	Intersection Approach AADT			
	North	South	East	West
2007 *	12,100			
2010 #	10,610	7,700	9,750	7,440
2011 *	8,600	6,700	8,700	7,100
2016 # ^	10,730	11,480	3,820	5,240

* -DOT Traffic Count
\# - Consultant Traffic Count - adjusted to AADT
^ - Construction in vicinity impacted all traffic

Year	Segment AADT		
	1st Ave S - S 16th St to S 17th St	1st Ave S - S 18th St to S 19th St	S 15th St - 2nd Ave S to 3rd Ave S
2007 *	7,000		
2011 *	9,500	10,300	7,400
2015 * ^	8,000	7,700	
2016 # ^			9,990

* -DOT Traffic Count
\# - Consultant Traffic Count - adjusted to AADT
^ - Construction in vicinity impacted all traffic

Crash History

For the five years of crash analysis (2011-2015), the combined area has experienced 79 crashes, resulting in each corridor experiencing a crash rate of over 500 crashes per hundred million vehicle miles (HMVM) traveled. The crashes along 1st Ave S consisted of mostly rear-end, right angle, and left turn angle crashes. The crashes along S 15th St consisted of mostly right angle crashes. Both corridors did have occurrences of sideswipe crashes in the same direction, common with narrow travel lanes.

Due to the split phasing of traffic at the signalized 1st Ave S and S 15th St intersection, there has been no reported crashes between northbound and southbound vehicles. However, 20% (6) of the crashes (30) that occurred at the intersection involved eastbound or westbound left turning traffic colliding with the opposing traffic. Over 35% (11) of the crashes were rear-end collisions, occurring on all approaching directions. Approximately 30% (9) of the crashes were the result of a collision between conflicting directions of travel (east/west vehicles colliding with north/south vehicle). A pole was struck near the intersection as both the signal and utility poles at the intersection are located within one foot of the back of curb.

Proposed Improvements

The proposed safety improvements include converting both corridors to three lanes with a center two-way left turn lane (TWLTL). This will be accomplished by removing parking along 1st Ave S (except for the north side west of S 15th St). The remaining pavement along both 1st Ave S, east of S 15th St, and S 15th St will be utilized for bike lanes. At the intersection of 1st Ave S and S 15th St, the traffic signal will be replaced, a protected/permissive left turn phasing implemented for 1st Ave S, and right turn lanes will be constructed on all approaches. Pavement patching and replacement will occur to improve the potential safety for bicyclists. These improvements are shown in Sections G and K.

The expected safety benefits for the proposed improvements include the following:

- Reduction in eastbound and westbound left turn related crashes due to aligning the left turn lanes to improve sight distance and implementation of protected/permissive left turn phasing.
- Reduction in rear-end crashes on all approaches to the intersection and along each corridor due to the creation of left turn lanes for northbound and southbound traffic and construction of right turn lanes on all four approaches to the intersection and creation of the center TWLTL.
- Reduction in sideswipe related crashes due to the creation of a center TWLTL and reduction to a single travel lane.
- Reduction of the potential for vehicles colliding with the signal poles and other fixed objects due to the signal poles being relocated further from the traveled way and the travel lanes being moved further from the existing curb along S 15th St.
- The split phasing for northbound and southbound traffic will be removed, increasing the potential for collisions, however, protected/permissive left turn phasing will be implemented to offset some of the potential.

This project would be the first of potentially four TSIP funding application submittals for these corridors. The remaining three TSIP applications will be for segments of 15th St between 1st Ave S and 20th Ave N.

ITEMIZED PROJECT COST BREAKDOWN
1ST AVENUE SOUTH AND SOUTH 15TH STREET CORRIDOR IMPROVEMENTS
FORT DODGE, IOWA

Item Number	Item Description	Estimated Quantity	Safety Portion	Unit	Unit Price	Estimated Safety Cost	Extended Amount
1	Pavement Removal	1595	20%	SY	$10	$3,190	$15,950
2	Pavement Milling	3,822	20%	SY	$6	$4,586	$22,932
3	Removal and Replace Structure	21		EA	$3,500	$-	$73,500
4	Structure Adjustment	34	20%	EA	$500	$3,400	$17,000
5	Remove and Replace Pipe	10		LF	$80	$-	$800
6	Full Depth Patching, HMA	423	20%	SY	$110	$9,306	$46,530
7	HMA Overlay Pavement	416	20%	TON	$95	$7,904	$39,520
8	Partial Depth Patching, PCC	133	20%	SF	$50	$1,330	$6,650
9	Full Depth Patching, PCC (Includes Curb and Gutter)	3,545	20%	SY	$110	$77,990	$389,950
10	Bridge Approach Pavement (Remove and Replace)	143	20%	SY	$230	$6,578	$32,890
11	PCC Pavement, Class C, 10.5 Inch	1,499	75%	SY	$75	$84,319	$112,425
12	PCC Sidewalk (Including Detectable Warnings)	1,077	100%	SY	$45	$48,465	$48,465
13	Joint Cleaning and Sealing	23,700		LF	$1	$-	$23,700
14	Traffic Signals	1	75%	LS	$200,000	$150,000	$200,000
15	Pavement Marking	126	100%	STA	$150	$18,900	$18,900
16	Erosion Control	1		LS	$4,000	$-	$4,000
17	Traffic Control	1	20%	LS	$13,000	$2,600	$13,000
18	Restoration	1		LS	$5,000	$-	$5,000
19	Mobilization	1	40%	LS	$67,000	$26,800	$67,000
					Subtotal	**$445,368**	**$1,138,212**
					Misc. & Contingency (15% +/-)	**$67,132**	**$170,788**
					Total Construction Costs	**$512,500**	**$1,309,000**
					Design and Construction Engineering (15%+/-)		**$197,000**
					Total Project Cost		**$1,506,000**

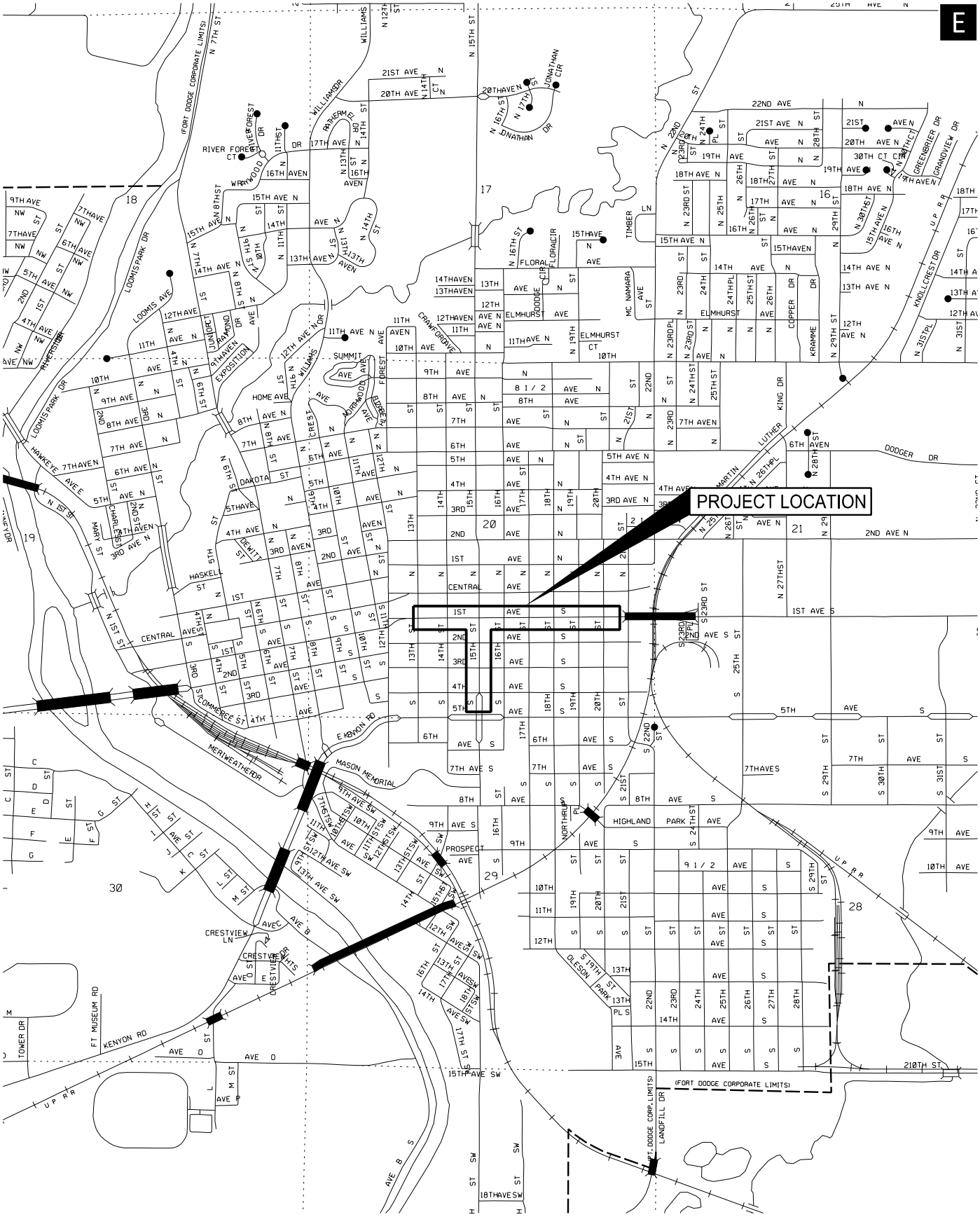
Right-of-Way Acquisition is not included in this Estimate

PROPOSED FUNDING SOURCES

Source	Amount
Traffic Safety Improvement Program Funding	$500,000
Local Funds	$809,000
Total	$1,309,000

PROPOSED PROJECT SCHEDULE
1ST AVENUE SOUTH AND SOUTH 15TH STREET CORRIDOR IMPROVEMENTS
FORT DODGE, IOWA

August 2016	TSIP Application
December 2016	Iowa DOT Approval
January 2017	TSIP Agreement
January - December 2017	Project Design and ROW acquisition
February 2018	Project Letting
April - November 2018	Project Construction



LOCATION MAP
1ST AVENUE SOUTH AND SOUTH 15TH STREET CORRIDORS
FORT DODGE, IOWA

Snyder & Associates
Engineers and Planners

NO SCALE

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Photo 1: 1st Ave S @ S 15th St - Looking East from Turn Lane

Photo 2: 1st Ave S @ S 15th St - Looking West

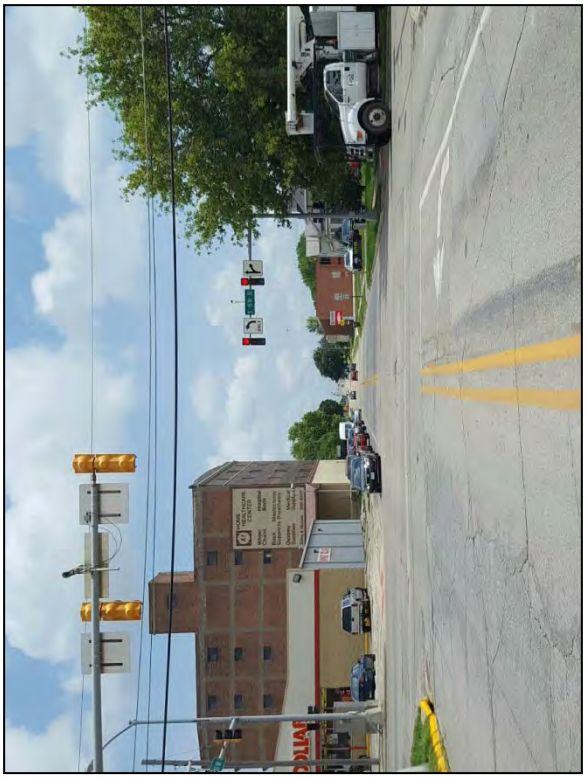


Photo 3: 1st Ave S @ S 15th St - Looking East from Center Line

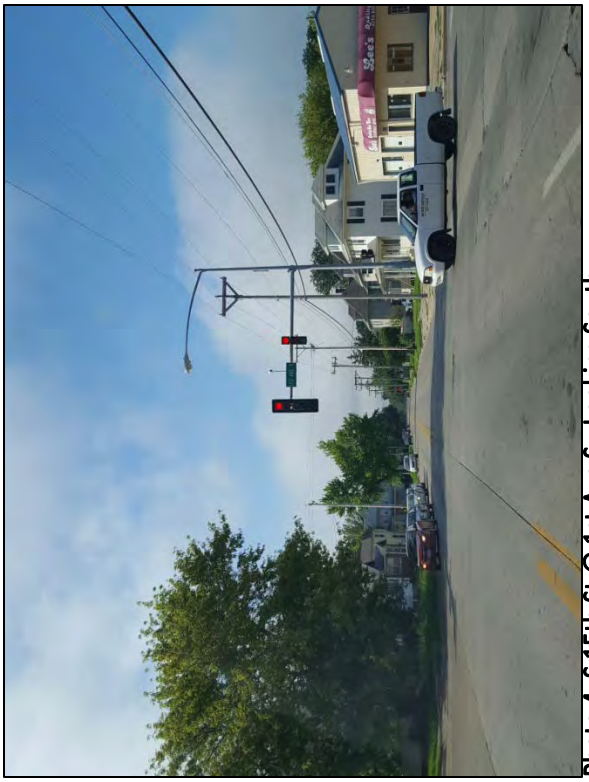


Photo 4: S 15th St @ 1st Ave S - Looking South

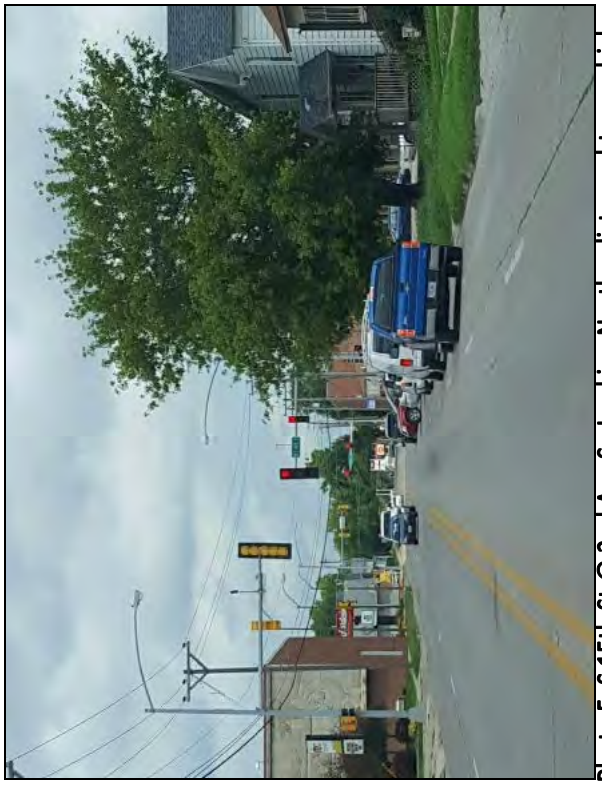


Photo 5: S 15th St @ 2nd Ave S - Looking North - distance btwn vehicles

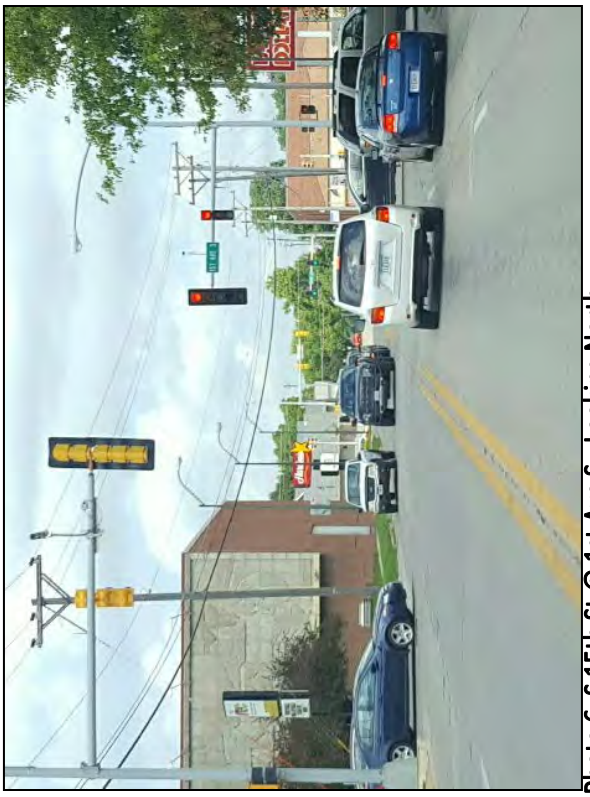
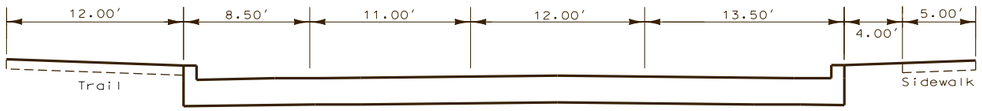


Photo 6: S 15th St @ 1st Ave S - Looking North

Photo 7: S 15th St @ 1st Ave S - Looking Northeast

Photo 8: S 15th St @ 3rd Ave S - Looking North

PARKING CROSS SECTION
FROM S 13TH ST
TO S 15TH ST



PROPOSED IMPROVEMENTS
1ST AVENUE SOUTH CORRIDOR (1 OF 2)
1ST AVENUE SOUTH AND
SOUTH 15TH STREET CORRIDORS
FORT DODGE, IOWA

0 30
SCALE (FEET)

FIGURE 1

SNYDER & ASSOCIATES
Engineers and Planners

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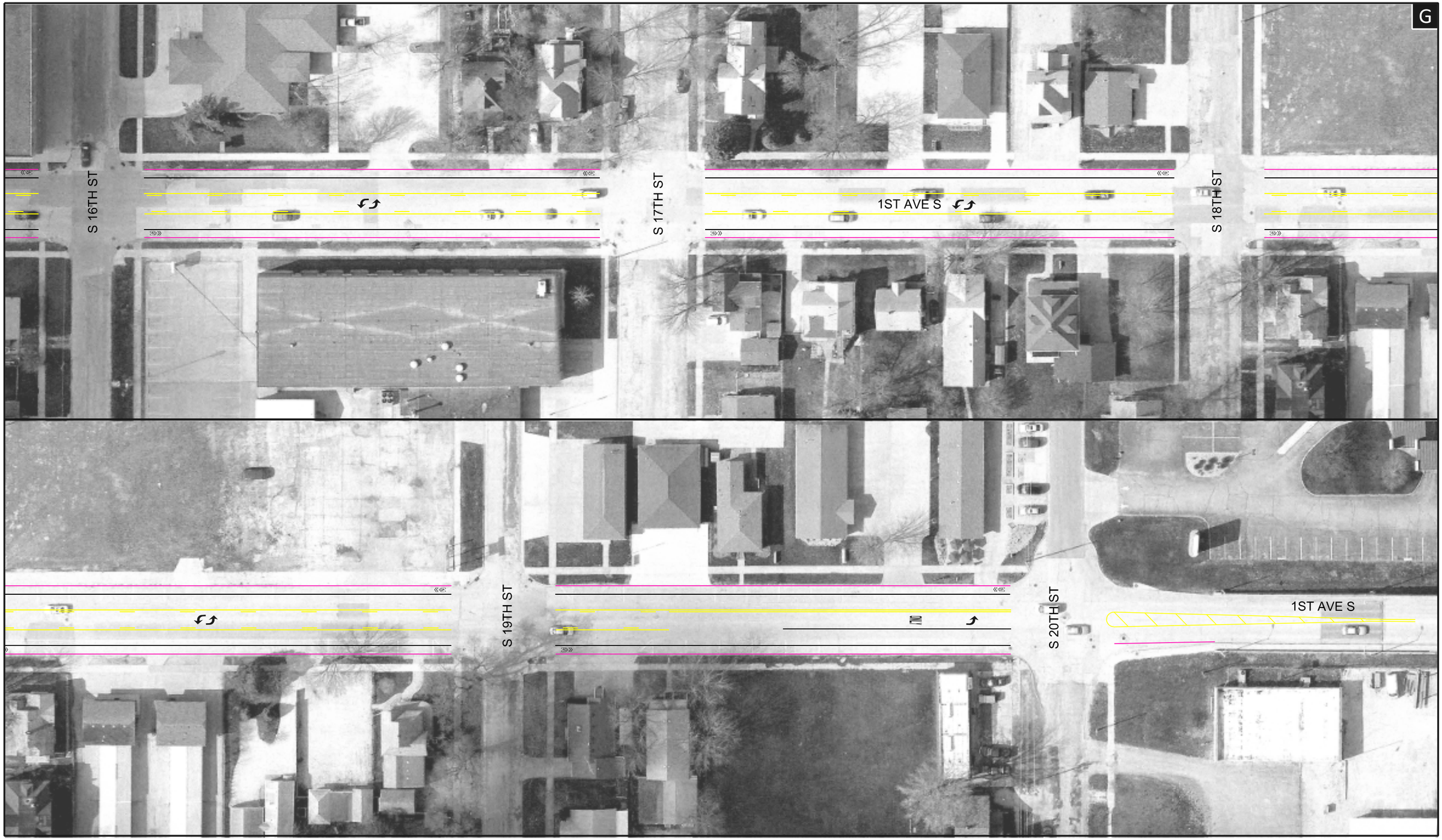
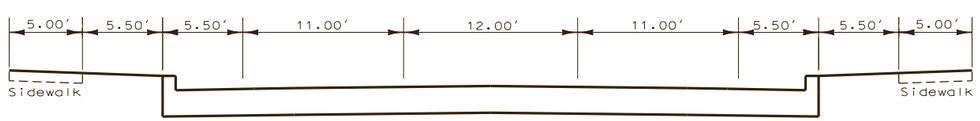


BIKE LANE CROSS SECTION
FROM S 15TH ST
TO S 20TH ST



PROPOSED IMPROVEMENTS
1ST AVENUE SOUTH CORRIDOR (2 OF 2)
1ST AVENUE SOUTH AND
SOUTH 15TH STREET CORRIDORS
FORT DODGE, IOWA

0 30
SCALE (FEET)

FIGURE 2

SNYDER & ASSOCIATES
Engineers and Planners

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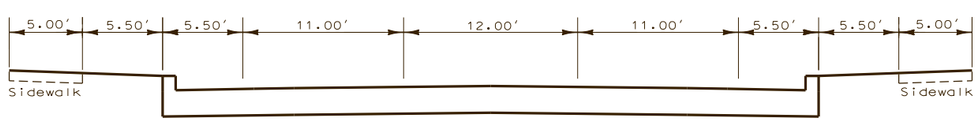
Snyder & Associates
Engineers and Planners

BIKE LANE
CROSS SECTION
FROM 4TH AVE S
TO 20TH AVE N



PROPOSED IMPROVEMENTS
SOUTH 15TH STREET CORRIDOR
1ST AVENUE SOUTH AND
SOUTH 15TH STREET CORRIDORS
FORT DODGE, IOWA

0 30
SCALE (FEET)

FIGURE 3

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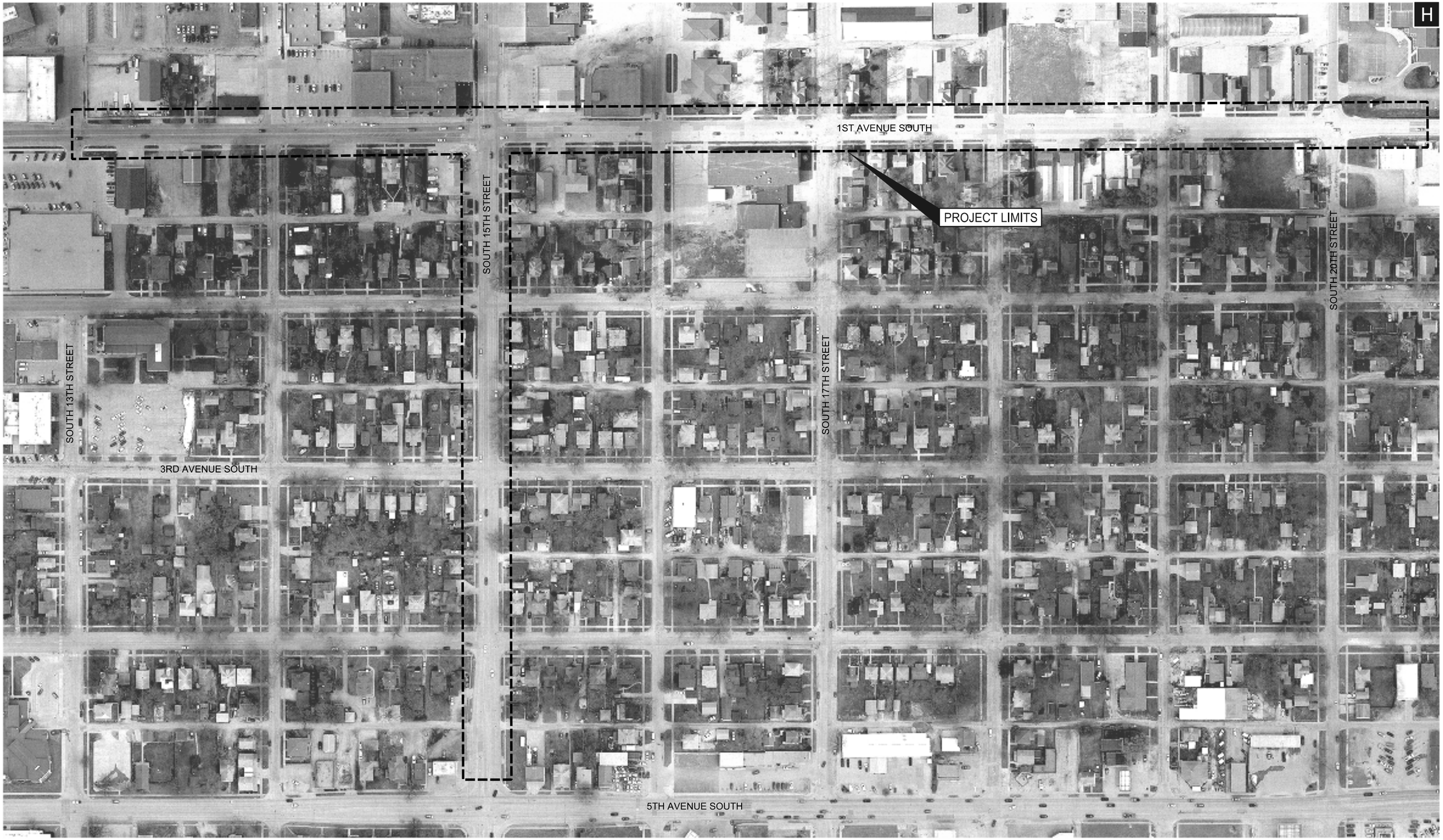

PROPOSED IMPROVEMENT AREA
1ST AVENUE SOUTH AND
SOUTH 15TH STREET CORRIDORS
FORT DODGE, IOWA

0 100
SCALE (FEET)

N

SNYDER & ASSOCIATES
Engineers and Planners

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Iowa Department of Transportation

Major Cause Summary

Fort Dodge - 1st Ave S - S 13th St-S 20th St

Report Version 1.1 Jan 2005

Analysis Years: 2011 [12], 2012 [7], 2013 [16], 2014 [15], 2015 [9]

Crash Summary:

Fatal	-
Major Injury	-
Minor Injury	4
Possible/Unknown	16
PDO	39
Total Crashes	59

Injury Summary:

Fatal	-
Major Injury	-
Minor Injury	5
Possible	16
Unknown	1
Total Injuries	22

TOT Property Damage: $259,805

AVG Property Damage: $4,403

Surface Condition Summary:

Dry	46
Wet	6
Ice	2
Snow	1
Slush	2
Sand/Dirt/Oil/Gravel	1
Water	-
Other	-
Unknown	1
Not Reported	-
Total Crashes	59

Major Cause Summary:

	Animal
1	Ran Traffic Signal
3	Ran Stop Sign
1	Crossed Centerline
	FTYROW: At Uncontrolled Intersection
	FTYROW: Making Right Turn on Red Signal
7	FTYROW: From Stop Sign
	FTYROW: From Yield Sign
6	FTYROW: Making Left Turn
	FTYROW: From Driveway
	FTYROW: From Parked Position
	FTYROW: To Pedestrian
3	FTYROW: Other (explain in narrative)
1	Traveling Wrong Way or on Wrong Side of Rd
2	Driving Too Fast for Conditions
	Exceeded Authorized Speed
1	Made Improper Turn
	Improper Lane Change
8	Followed Too Close
	Disregarded Railroad Signal
	Disregarded Warning Sign
2	Operating Vehicle in Reckless/Aggressive Manner
1	Improper Backing
	Illegally Parked/Unattended
	Swerving/Evasive Action
	Over-Correcting/Over-Steering
	Downhill Runaway
	Equipment Failure
	Separation of Units
	Ran Off Road - Right
	Ran Off Road - Straight
	Ran Off Road - Left
2	Lost Control
1	Inattentive/Distracted By: Passenger
3	Inattentive/Distracted By: Use of Phone or Other
	Inattentive/Distracted By: Fallen Object
	Inattentive/Distracted By: Fatigued/Asleep
2	Other: Vision Obstructed
	Oversized Load/ Oversized Vehicle
	Cargo/Equipment Loss or Shift
14	Other: Other Improper Action
1	Unknown
	Other: No Improper Action
	None Indicated

Selection Filter:

((YEAR = 2011 or YEAR = 2012 or YEAR = 2013 or YEAR = 2014 or YEAR = 2015))

Analyst: S&A

Notes: 2011-2015

Iowa Department of Transportation

Driver and Time Summary

Fort Dodge - 1st Ave S - S 13th St-S 20th St

Report Version 1.0 Aug 2006

Crash Time of Day Summary:

From To	00:00 01:59	02:00 03:59	04:00 05:59	06:00 07:59	08:00 09:59	10:00 11:59	12:00 13:59	14:00 15:59	16:00 17:59	18:00 19:59	20:00 21:59	22:00 23:59	NR	Total	%
SUN	-	-	-	-	-	1	-	-	2	2	1	-	-	6	10
MON	-	-	-	-	1	1	1	1	2	-	-	-	-	6	10
TUE	-	-	-	-	1	1	2	2	2	2	-	-	-	10	17
WED	-	-	-	1	2	2	2	1	2	-	-	1	-	11	19
THU	-	-	-	1	-	1	2	2	2	1	1	-	-	10	17
FRI	-	-	-	1	1	-	1	3	-	2	-	-	-	8	14
SAT	-	1	-	2	-	-	-	1	1	1	2	-	-	8	14
Tot.		1		5	5	6	8	10	11	8	4	1		59	
%		2		8	8	10	14	17	19	14	7	2			100

Driver Age/Gender Summary:

Age	Male	Female	NR	Drivers	%
<14	-	-	-		
14	-	-	-		
15	-	-	-		
16	2	1	-	3	3
17	2	1	-	3	3
18	1	2	-	3	3
19	-	2	-	2	2
20	2	2	-	4	3
21 to 24	3	4	-	7	6
25 to 29	6	8	-	14	12
30 to 34	2	8	-	10	9
35 to 39	7	5	-	12	10
40 to 44	2	6	-	8	7
45 to 49	3	3	-	6	5
50 to 54	4	5	-	9	8
55 to 59	2	1	-	3	3
60 to 64	3	7	-	10	9
65 to 69	2	3	-	5	4
70 to 74	2	1	-	3	3
75 to 79	-	1	-	1	1
80 to 84	1	2	-	3	3
85 to 89	-	-	-		
90 to 94	1	1	-	2	2
95 plus	-	-	-		
NR	1	-	8	9	8
Drivers	46	63	8	117	
%	39	54	7		100

Drug/Alcohol Summary:

	Total	%
Drug		
Alcohol, Less than Statutory		
Alcohol, Statutory	1	2
Drug/Alcohol, Less than Statutory		
Drug/Alcohol, Statutory		
Refused	1	2
Under Influence of Alc/Drugs/Meds	1	2
None Indicated	56	95
Total Crashes	59	100

Fixed Object Struck Summary:

	Vehs.	%
Bridge/Bridge rail/Overpass		
Underpass/Structure Support		
Culvert		
Ditch/Embankment		
Curb/Island/Raised Median		
Guardrail		
Concrete Barrier		
Tree		
Pole - Utility/Light/Etc	1	1
Sign Post		
Mailbox		
Impact Attenuator		
Other Fixed Object		
None	116	99
Total Vehicles	117	100

Selection Filter:

((YEAR = 2011 or YEAR = 2012 or YEAR = 2013 or YEAR = 2014 or YEAR = 2015))

Analyst: S&A

Notes: 2011-2015

Iowa Department of Transportation

Major Cause Summary

Fort Dodge - S 15th St - 5th Ave S - 1st Ave S

Report Version 1.1 Jan 2005

Analysis Years: 2011 [6], 2012 [4], 2013 [5], 2014 [3], 2015 [2]

Crash Summary:

Fatal	-
Major Injury	-
Minor Injury	1
Possible/Unknown	3
PDO	16
Total Crashes	20

Injury Summary:

Fatal	-
Major Injury	-
Minor Injury	1
Possible	4
Unknown	-
Total Injuries	5

TOT Property Damage: $85,212

AVG Property Damage: $4,261

Surface Condition Summary:

Dry	15
Wet	5
Ice	-
Snow	-
Slush	-
Sand/Dirt/Oil/Gravel	-
Water	-
Other	-
Unknown	-
Not Reported	-
Total Crashes	20

Major Cause Summary:

	Animal		Improper Backing
	Ran Traffic Signal		Illegally Parked/Unattended
1	Ran Stop Sign		Swerving/Evasive Action
1	Crossed Centerline		Over-Correcting/Over-Steering
	FTYROW: At Uncontrolled Intersection		Downhill Runaway
	FTYROW: Making Right Turn on Red Signal		Equipment Failure
3	FTYROW: From Stop Sign		Separation of Units
	FTYROW: From Yield Sign		Ran Off Road - Right
1	FTYROW: Making Left Turn		Ran Off Road - Straight
4	FTYROW: From Driveway		Ran Off Road - Left
	FTYROW: From Parked Position		Lost Control
	FTYROW: To Pedestrian		Inattentive/Distracted By: Passenger
1	FTYROW: Other (explain in narrative)		Inattentive/Distracted By: Use of Phone or Other
	Traveling Wrong Way or on Wrong Side of Rd		Inattentive/Distracted By: Fallen Object
	Driving Too Fast for Conditions		Inattentive/Distracted By: Fatigued/Asleep
	Exceeded Authorized Speed		Other: Vision Obstructed
	Made Improper Turn		Oversized Load/ Oversized Vehicle
	Improper Lane Change		Cargo/Equipment Loss or Shift
	Followed Too Close	6	Other: Other Improper Action
	Disregarded Railroad Signal	2	Unknown
	Disregarded Warning Sign	1	Other: No Improper Action
	Operating Vehicle in Reckless/Aggressive Manner		None Indicated

Selection Filter:

((YEAR = 2011 or YEAR = 2012 or YEAR = 2013 or YEAR = 2014 or YEAR = 2015))

Analyst: S&A

Notes: 2011-2015

Iowa Department of Transportation

Driver and Time Summary

Fort Dodge - S 15th St - 5th Ave S - 1st Ave S

Report Version 1.0 Aug 2006

Crash Time of Day Summary:

From To	00:00 01:59	02:00 03:59	04:00 05:59	06:00 07:59	08:00 09:59	10:00 11:59	12:00 13:59	14:00 15:59	16:00 17:59	18:00 19:59	20:00 21:59	22:00 23:59	NR	Total	%
SUN	-	-	-	-	1	-	-	-	-	-	-	-	-	1	5
MON	-	-	-	-	-	1	1	1	-	1	-	-	-	4	20
TUE	-	-	-	-	-	1	1	-	-	-	-	-	-	2	10
WED	-	-	-	-	1	-	-	1	1	-	-	1	-	4	20
THU	-	-	-	-	1	-	2	-	-	-	-	-	-	3	15
FRI	-	-	-	-	1	-	1	2	1	-	-	-	-	5	25
SAT	-	-	-	-	-	-	-	-	1	-	-	-	-	1	5
Tot.					4	2	5	4	3	1		1		20	
%					20	10	25	20	15	5		5			100

Driver Age/Gender Summary:

Age	Male	Female	NR	Drivers	%
<14	-	-	-		
14	-	-	-		
15	-	-	-		
16	-	-	-		
17	-	-	-		
18	1	1	-	2	5
19	1	-	-	1	3
20	-	-	-		
21 to 24	1	2	-	3	8
25 to 29	4	4	-	8	21
30 to 34	3	3	-	6	16
35 to 39	1	2	-	3	8
40 to 44	1	-	-	1	3
45 to 49	1	3	-	4	11
50 to 54	1	-	-	1	3
55 to 59	2	1	-	3	8
60 to 64	-	1	-	1	3
65 to 69	1	1	-	2	5
70 to 74	-	-	-		
75 to 79	-	-	-		
80 to 84	-	-	-		
85 to 89	-	-	-		
90 to 94	1	-	-	1	3
95 plus	-	-	-		
NR	1	-	1	2	5
Drivers	19	18	1	38	
%	50	47	3		100

Drug/Alcohol Summary:

	Total	%
Drug		
Alcohol, Less than Statutory		
Alcohol, Statutory		
Drug/Alcohol, Less than Statutory		
Drug/Alcohol, Statutory		
Refused		
Under Influence of Alc/Drugs/Meds		
None Indicated	20	100
Total Crashes	20	100

Fixed Object Struck Summary:

	Vehs.	%
Bridge/Bridge rail/Overpass		
Underpass/Structure Support		
Culvert		
Ditch/Embankment		
Curb/Island/Raised Median		
Guardrail		
Concrete Barrier		
Tree		
Pole - Utility/Light/Etc	1	3
Sign Post		
Mailbox		
Impact Attenuator		
Other Fixed Object		
None	37	97
Total Vehicles	38	100

Selection Filter:

((YEAR = 2011 or YEAR = 2012 or YEAR = 2013 or YEAR = 2014 or YEAR = 2015))

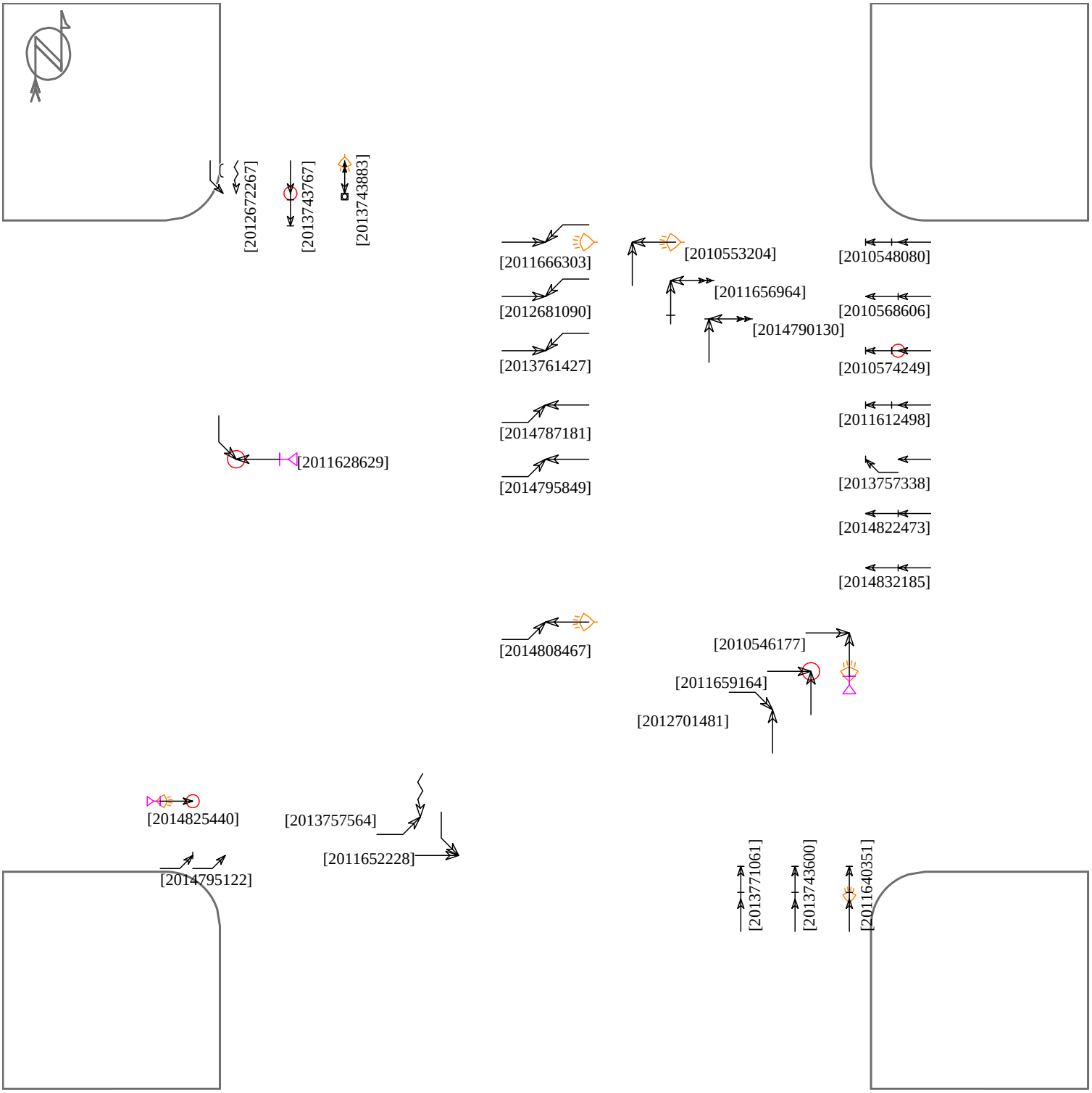
Analyst: S&A

Notes: 2011-2015

1st Ave S and S 15th St
2010-2014

30 Crashes

Clear



(0) crashes could not be placed in this schematic

Straight	Parked	Pedestrian	Fixed objects:
Stopped	Erratic	Bicycle	General / Pole
Unknown	Out of control	Injury	Signal / Curb
Backing	Right turn	Fatality	Tree / Animal
Overtaking	Left turn	Nighttime	3rd vehicle
Sideswipe	U-turn	DUI	Extra data

Pd' Programming, Inc. 7/28/2016

Iowa Department of Transportation

J

Turning Movement Traffic Count Summary

Annualized Daily Traffic For All Vehicles

Station Number:

94433826099

Count Date:

Thursday, April 07, 2011

County:

Webster

Location Description:

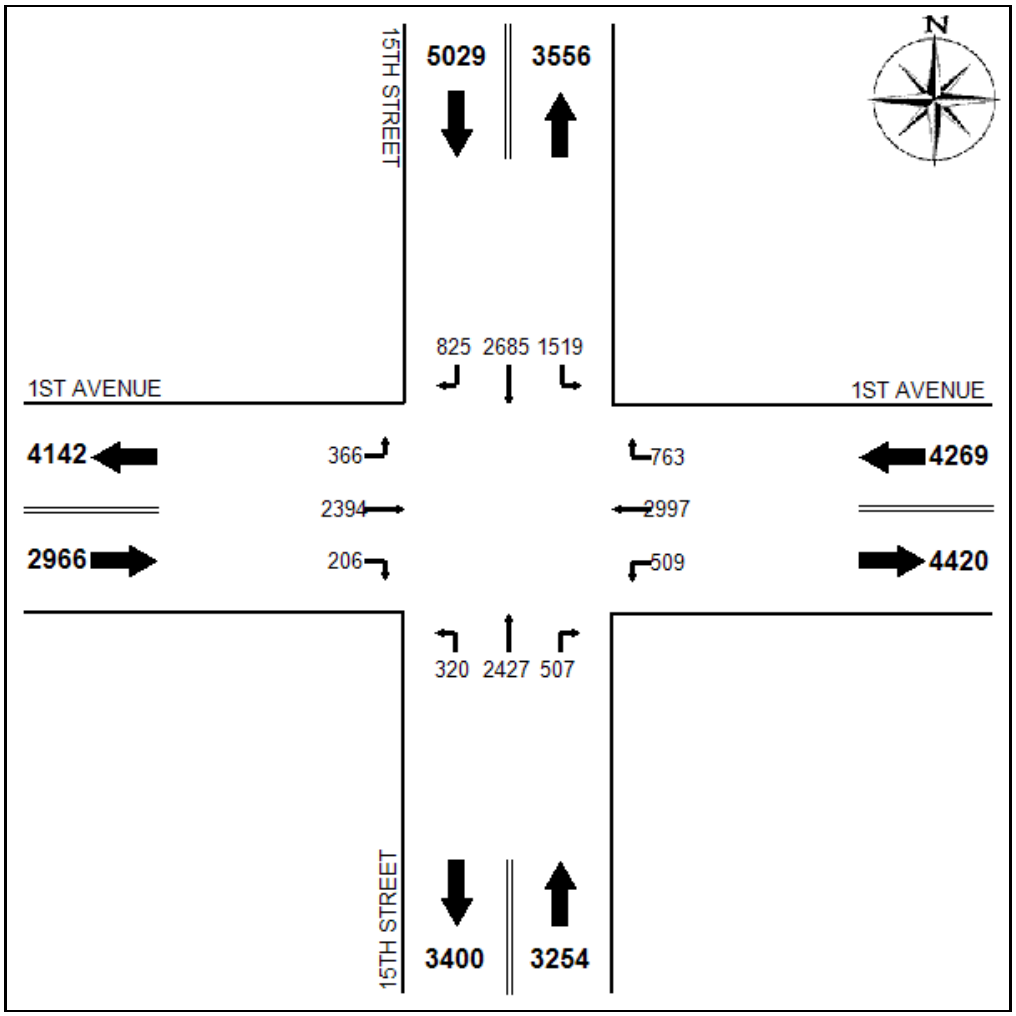
1ST AVENUE & 15TH STREET

Volume Factor: 1.730

Pass Class Factor: 1.733

SU Class Factor: 1.546

Combo Class Factor: 1.621



Raw Data-All Vehicles:

	N Leg			E Leg			S Leg			W Leg		
	L	*T*	*R*	*L*	*T*	*R*	*L*	*T*	*R*	*L*	*T*	*R*
07:00	86	268	62	20	127	18	22	151	37	18	124	4
08:00	99	228	80	27	176	45	33	148	40	23	157	11
11:00	116	180	54	38	222	62	20	171	45	30	204	19
12:00	138	214	64	47	322	63	29	224	38	37	249	15
15:00	147	203	84	57	288	85	23	223	50	33	195	27
16:00	162	220	66	67	324	66	29	233	49	35	257	25
17:00	131	243	67	38	274	102	29	256	34	36	198	18

Iowa Department of Transportation

J

Turning Movement Traffic Count Summary

Vehicle Type: Passenger Vehicles

Station Number:

94433826099

Count Date:

Thursday, April 07, 2011

County:

Webster

Location Description:

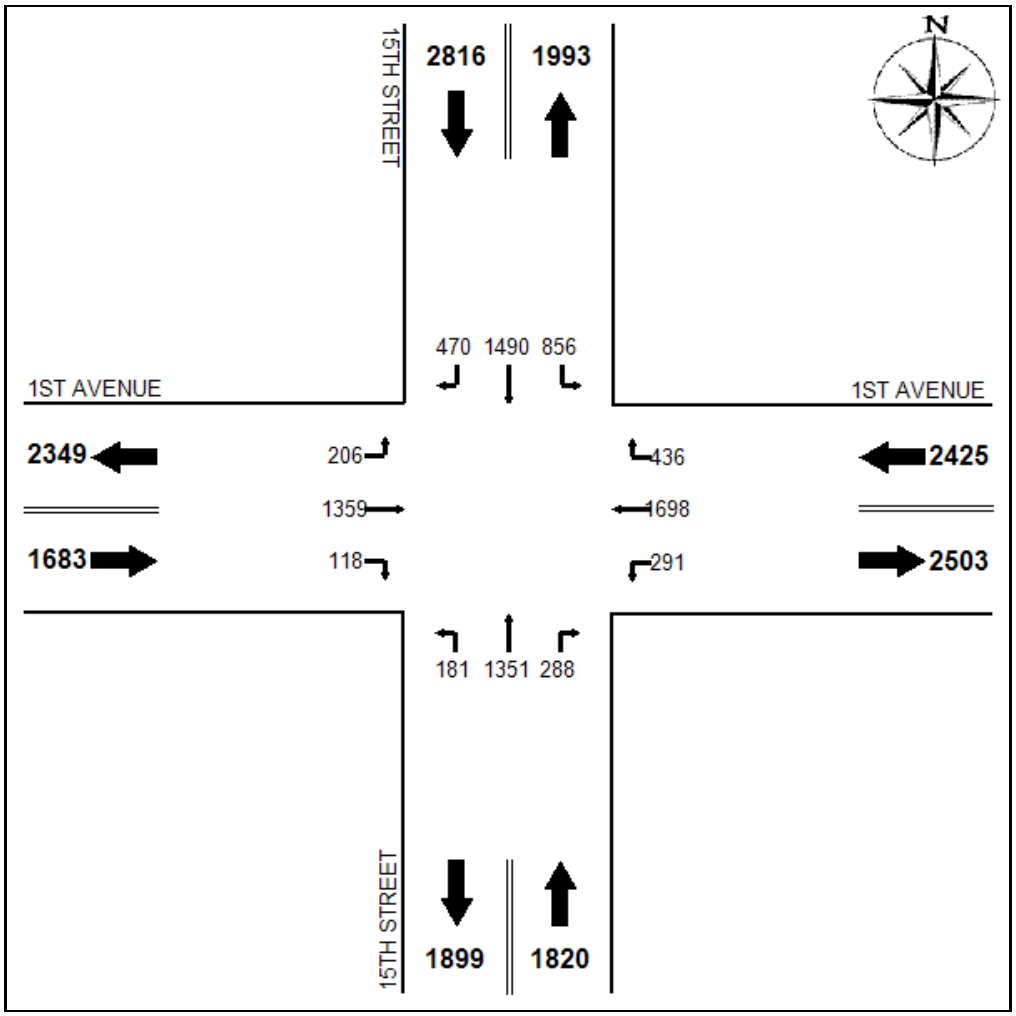
1ST AVENUE & 15TH STREET

Volume Factor: N/A

Pass Class Factor: N/A

SU Class Factor: N/A

Combo Class Factor: N/A



Raw Data-Passenger Vehicles:

	N Leg			E Leg			S Leg			W Leg		
	L	*T*	*R*	*L*	*T*	*R*	*L*	*T*	*R*	*L*	*T*	*R*
07:00	81	249	62	20	122	17	21	141	36	16	119	4
08:00	94	218	79	26	168	44	33	131	40	21	148	11
11:00	113	170	52	37	216	62	19	158	42	29	200	19
12:00	135	204	62	47	313	62	29	222	37	37	246	14
15:00	142	197	83	57	285	84	23	216	50	33	194	27
16:00	161	213	66	66	321	66	27	229	49	34	255	25
17:00	130	239	66	38	273	101	29	254	34	36	197	18

Iowa Department of Transportation

J

Turning Movement Traffic Count Summary

Vehicle Type: Single-Unit Trucks

Station Number:

94433826099

Count Date:

Thursday, April 07, 2011

County:

Webster

Location Description:

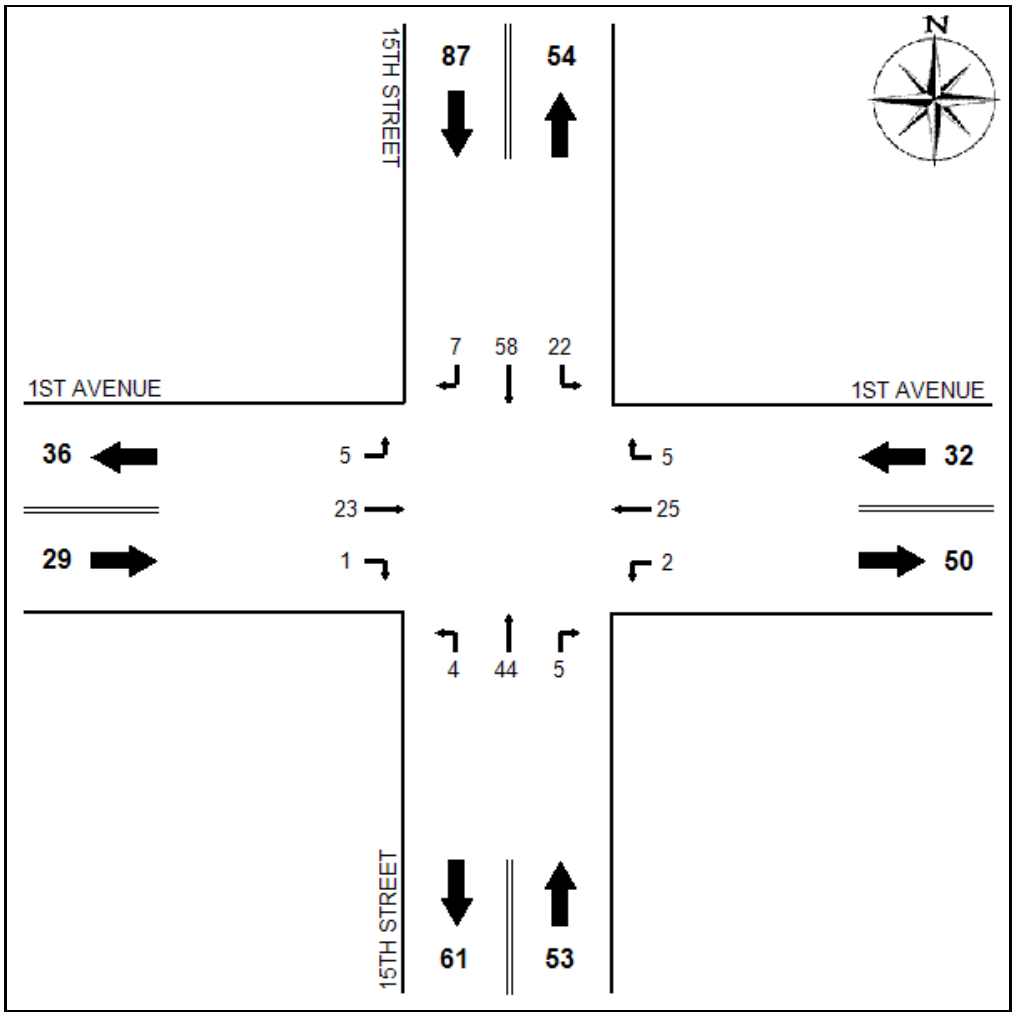
1ST AVENUE & 15TH STREET

Volume Factor: N/A

Pass Class Factor: N/A

SU Class Factor: N/A

Combo Class Factor: N/A



Raw Data-Single-Unit Trucks:

	N Leg			E Leg			S Leg			W Leg		
	L	*T*	*R*	*L*	*T*	*R*	*L*	*T*	*R*	*L*	*T*	*R*
07:00	4	18	0	0	4	1	1	9	1	1	4	0
08:00	5	9	1	1	3	1	0	15	0	2	8	0
11:00	3	7	2	0	4	0	1	9	3	1	4	0
12:00	3	9	2	0	7	1	0	1	1	0	3	1
15:00	5	6	1	0	3	1	0	5	0	0	1	0
16:00	1	5	0	1	3	0	2	4	0	1	2	0
17:00	1	4	1	0	1	1	0	1	0	0	1	0

Iowa Department of Transportation

J

Turning Movement Traffic Count Summary

Vehicle Type: Combination Trucks

Station Number:

94433826099

Count Date:

Thursday, April 07, 2011

County:

Webster

Location Description:

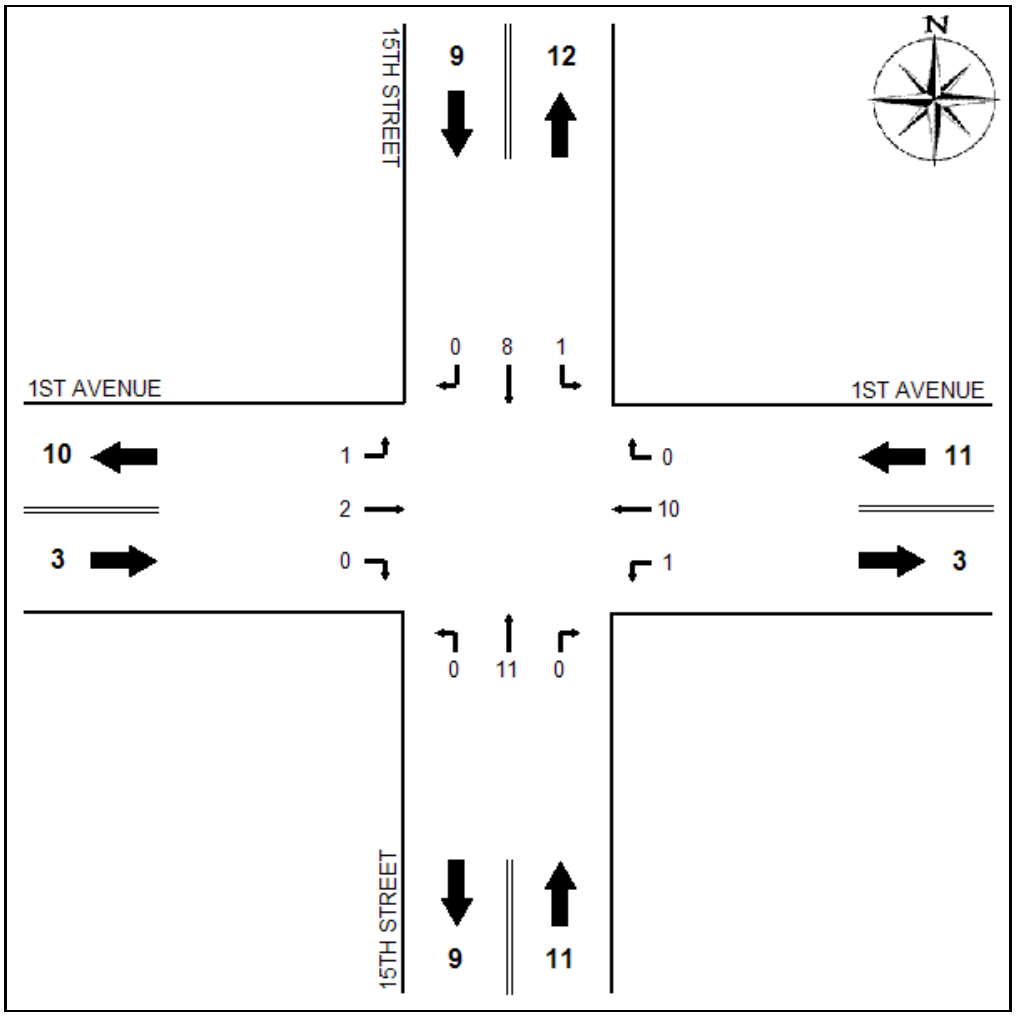
1ST AVENUE & 15TH STREET

Volume Factor: N/A

Pass Class Factor: N/A

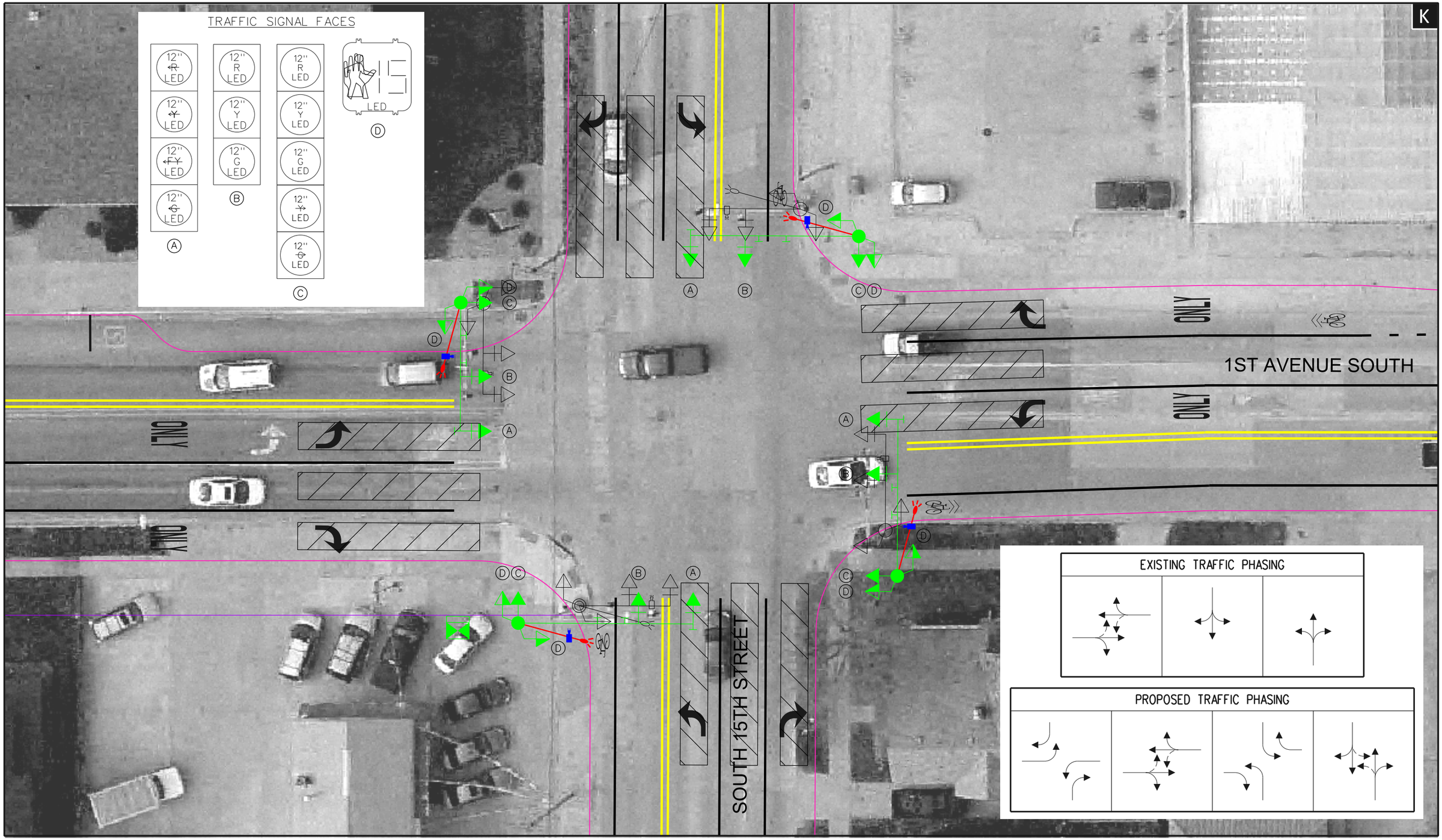
SU Class Factor: N/A

Combo Class Factor: N/A



Raw Data-Combination Trucks:

	N Leg			E Leg			S Leg			W Leg		
	L	*T*	*R*	*L*	*T*	*R*	*L*	*T*	*R*	*L*	*T*	*R*
07:00	1	1	0	0	1	0	0	1	0	1	1	0
08:00	0	1	0	0	5	0	0	2	0	0	1	0
11:00	0	3	0	1	2	0	0	4	0	0	0	0
12:00	0	1	0	0	2	0	0	1	0	0	0	0
15:00	0	0	0	0	0	0	0	2	0	0	0	0
16:00	0	2	0	0	0	0	0	0	0	0	0	0
17:00	0	0	0	0	0	0	0	1	0	0	0	0



SNYDER & ASSOCIATES
Engineers and Planners

PROPOSED IMPROVEMENTS
1ST AVENUE SOUTH CORRIDOR (1 OF 2)
1ST AVENUE SOUTH AND
SOUTH 15TH STREET CORRIDORS
FORT DODGE, IOWA

0 10
SCALE (FEET)

N

pw:\\SAPNWS01.snyder-associates.com:ProjectWise\Documents\2016_Projects\16.0343\Cadd\TSP_Figures.pft V8iColorHalfWeightPDF.pltcfg 8/1/2016 1:20 kmox

BENEFIT/COST ANALYSIS
1ST AVENUE SOUTH AND SOUTH 15TH STREET CORRIDOR IMPROVEMENTS
FORT DODGE, IOWA

For the purposes of the benefit/cost analysis, an estimated improvement life of 15 years was selected. This is consistent with the Iowa DOT recommended TSIP service lives for turn lane and traffic signal improvements.

Based on the review of available data on the *Crash Modifications Factors Clearinghouse* website, a cumulative crash reduction factor (CRF) was applied for the proposed improvements. Applicable crash reduction factors include the following:

Countermeasure	CRF	Crash Type	Applicable Crashes	Adjusted CRF	Reference
Introducing zero or positive offset left-turn lane	26	Angle	9%	2.1	Wang & Adel-Aty, 2007
	20	Angle			
Install TWLTL on two lane road	12.6	All	79%	10.0	Lyon et al., 2008
Narrow cross section (4 to 3 lanes with two way left-turn lane)	37	All	21%	7.8	Gates et al., 2007
Change from permissive only to FYA - protected/ permissive left turn	6.5	All	37%	3.0	Simpson & Troy, 2015
	40.2	Left Turn	9%		
Change from protected only to FYA - protected/ permissive left turn	-12.4	All	37%	-4.6	Simpson & Troy, 2015
Install right-turn lane	30	Rear end	15%	4.5	Ale et al., 2014
Provide a right-turn lane on both major-road approaches	8	All	37%	3.0	Harwood et al., 2002
Cumulative CRF				**25.8**	

Countermeasures not included:

Increased clear zone (addition of bike lane)
Replacement/Installation of Sidewalk Ramps (ADA Compliant)

Installing a two-way left turn lane along 1st Ave S will eliminate the negative offset associated with the opposing left turn lanes at intersections, as well as reduce the potential for rear-end crashes along the remaining corridor. Converting S 15th St to a three-lane cross-section with a two-way left turn lane continues to reduce the potential for rear-end crashes, as well as creates aligned left turn lanes at the 1st Ave S & S 15th St intersection (north/south). With narrowing the roadway along S 15th St, bike lanes will be added and improve the clearance to existing fixed objects located behind the curb and improve speed consistency. The construction of right turn lanes at the 1st Ave S & S 15th intersection will further reduce the potential for rear-end crashes at the intersection. Implementing protected/permissive left turn phasing at the traffic signal will reduce the potential for crashes east/west, yet increase the potential north/south.

Based on this review, the calculated cumulative CRF of 25.8 appears to be reasonable. To be conservative, a CRF of 25 was used in the benefit/cost analysis. With an estimated safety improvement construction cost of $512,500, the resultant benefit/cost ratio is 1.94:1.

Rev. 5/14

Road Segment Benefit / Cost Safety Analysis

Iowa DOT Office of Traffic & Safety

County: Webster | Prepared by: S&A | Date Prepared: Aug 1, 2016

Location: 1st Ave S (S 13th St to S 20th St) & S 15th St (1st Ave S to 5th Ave S) in Fort Dodge

Improvement

Proposed Improvement(s): Convert 1st Ave S from 2 lanes to 3 lanes with TWLTL and remove most parking.

Convert S 15th St from 4 lanes to 3 lanes with TWLTL and bike lanes

$ 512,500	Estimated Improvement Cost, **EC**	15	Est. Improvement Life, years, **Y**
$ -	Other Annual Cost (after initial year), **AC**	25	Crash Reduction Factor (integer), **CRF**
$ -	Present Value Other Annual Costs, **OC**	4.0%	Discount Rate, **INT**
		$ 512,500	Present Value All Costs, **COST** = EC + OC

$$OC = \frac{AC}{INT}\left(1 - \frac{1}{(1+INT)^Y}\right)$$

Traffic Volume Data

Source: Iowa DOT | 2011/2015 Date of traffic count

Length (mi.)	Two-way veh/day	Description
0.54	8,000	1st Ave S
0.24	10,300	S 15th St
0.78	miles total	

1.0% Projected Traffic Growth (0%-10%), **G**

6,792	Current Vehicle Miles / Day, **VM**
7,885	End of Life Veh. Miles / Day
2,479,080	Current Veh. Miles / Year, **AM**
39,905,492	Total Projected Veh. Miles Over Life of Project, **TVMT**

$$TVMT = \frac{AM}{-G}\left(1 - \left(\frac{1+G}{1}\right)^Y\right)$$

Crash Data

2011 First full year --> 2015 Last full year | 5.0 years, Time Period, **T**

0 Additional months | values as of May 2014

0	Fatal Crashes	0	Fatalities @	$4,500,000	$	-
		0	Major Injuries @	$325,000	$	-
24	Injury Crashes	6	Minor Injuries @	$65,000	$	390,000
		21	Possible Injuries @	$35,000	$	735,000
51	Property Damage Only		(assumed cost per crash)	$7,400	$	555,000
			-OR- enter all Property Costs of all crashes:			
75	Total Crashes, **TA**			Total $ Loss, **LOSS**	$	1,680,000

15.00	Current Crashes / Year, **AA** = TA / T	**605.1**	Crashes / HMVM, Crash Rate, **CR** CR = TA x 10^8 / (AM x T)
$ 22,400	Cost per Crash, **AVCR** = LOSS / TA		
241.5	Total Expected Crashes, **TCR** = CR x TVMT/10^8	**$ 994,994**	Present Value of Avoided Crashes, **BENEFIT**
3.75	Crashes Avoided First Year **AAR** = AA x CRF / 100		
$ 84,000	Crash Costs Avoided in First Year, AAR x AVCR		
60.4	Total Avoided Crashes, TCR x CRF/ 100		

$$BEN. = \frac{AVCR \times AAR}{(INT - G)}\left(1 - \left(\frac{1+G}{1+INT}\right)^Y\right)$$

Benefit / Cost Ratio

Benefit : Cost = $994,994 : $512,500 = **1.94** : 1

SHIVEHATTERY
ARCHITECTURE + ENGINEERING

August 14, 2016

Steven Schroder, P.E.
Office of Traffic and Safety
Iowa Department of Transportation
800 Lincoln Way
Ames, Iowa 50010

Dear Mr. Schroder,

Included is the Traffic Safety Improvement Application for traffic control devices improvement in the City of Eldridge, Iowa. The location identified includes improvements at S 1st St & E Iowa Ave and the midblock of S 5th St between Prairie Vista Dr & Valley Dr. The Benefit/ Cost spreadsheet is submitted in PDF and excel format. If you have any questions regarding the material submitted in the application please feel free to contact me by phone or e-mail.

Sincerely,

SHIVE-HATTERY, INC.

Gregory J. Schaapveld, PE, LEED AP
Civil Engineer
(309) 277-1973
gschaapveld@shive-hattery.com

Traffic Safety Improvement Program Application

S 1st St & E Iowa Ave and Midblock of S 5th St between Prairie Vista Dr & Valley Dr

Eldridge, Iowa

August 14, 2016

Prepared by:

SHIVEHATTERY
ARCHITECTURE + ENGINEERING

1701 River Dr, Suite 200
Moline, IL 200
(309) 764-7650

Application for TRAFFIC SAFETY FUNDS

GENERAL INFORMATION **DATE:** August 15, 2016

Location / Title of Project S 1st Street & E Iowa Avenue, Midblock of 5th Avenue

Applicant City of Eldridge

Contact Person John Dowd Title City Administrator

Complete Mailing Address 305 N 3rd Street, P.O. Box 375
Eldridge, IA 52748

Phone 563-285-4841 (Area Code) E-Mail jdowd@cityofeldridgeia.org

If more than one highway authority is involved in this project, please indicate and fill in the information below (use additional sheets if necessary).

Co-Applicant(s) _____

Contact Person _____ Title _____

Complete Mailing Address _____

_____

Phone _____ (Area Code) E-Mail _____

PLEASE COMPLETE THE FOLLOWING PROJECT INFORMATION:

Application Type

- Site Specific ☒
- Traffic Control Device ☐
- Safety Study ☐

Funding Amount

Total Safety Cost	$ 120,525
Total Project Cost	$ 120,525
Safety Funds Requested	$ 120,525

Does this project appear on a Safety Improvement Candidate List or is there a safety study recommendation for this project?

☐ Yes – Explain _____
☒ No

Rev. 6/16

APPLICATION CERTIFICATION FOR LOCAL GOVERNMENT

To the best of my knowledge and belief, all information included in this application is true and accurate, including the commitment of all physical and financial resources. This application has been duly authorized by the participating local government(s). I understand the attached resolution(s) binds the participating local government(s) to assume responsibility if any additional funds are committed, and to ensure maintenance of any new or improved city streets or secondary roads.

I understand that, although this information is sufficient to secure a commitment of funds, a firm contract between the applicant and the Department of Transportation is required prior to the authorization of funds.

Representing the City of Eldridge

Signed: John R Dowd — August 5, 2016

Signature — Date Signed

John Dowd

Typed Name

Attest: Denise M Benson — August 5, 2016

Signature — Date Signed

Denise M. Benson

Typed Name

Resolution 2016-16

A RESOLUTION APPROVING AN APPLICATION FOR TRAFFIC SAFETY IMPROVEMENT PROGRAM FUNDS FROM THE IOWA DEPARTMENT OF TRANSPORTATION

WHEREAS, the mayor and city council have determined that placing pedestrian crossings on S. First and S. 5th Street are necessary to improve traffic safety in the areas near the North Scott High School and Edward White Elementary.

NOW, THEREFORE, BE IT RESOLVED, BY THE CITY COUNCIL OF THE CITY OF ELDRIDGE, IOWA THAT:

1. The Transportation Safety Improvement Program (TSIP) Application for a pedestrian crossing on S. First Street and S. 5th Street within the City of Eldridge are hereby approved.

2. The City Council hereby commits the additional City funds necessary for construction of the project beyond any TSIP funding, and;

3. The City Council hereby commits to accepting and maintaining these improvements.

PASSED AND APPROVED THIS 1st DAY OF AUGUST, 2016

Mayor

Attest:

City Clerk

Campus Look at Student Safety

Background

The City of Eldridge is planning to make enhancements on streets adjacent to the North Scott Community School District campus. The streets identified for improvements are South 1st Street and South 5th Street. These streets run north-south and between them are Ed White Elementary School and North Scott High School. One block south and to the west of South 5th Street is North Scott Junior High School. There are 350 students, 62 staff (including part-time staff) at the elementary school and 940 students and 130 staff at the high school. Also in this area is the athletic complex which includes the track and football field which further adds to the pedestrian traffic.

South 5th Street is an urban two-lane road with a posted speed limit of 25 MPH and sidewalks on both side of the street. The proposed location of the crossing on South 5th Street is located at the midblock between West Valley Drive and West Prairie Vista Drive. Currently, permanent stop signs are in place at the intersection of South 5th Street and West Valley Drive and temporary stops signs are placed at the intersection of South 5th Street and West Prairie Vista Drive during the school peak hours. This crossing has adequate sight distance and there would be little to no turning vehicles.

South 1st Street is a rural two-lane road with a posted speed limit of 25 MPH. There is nearly 4,000 vehicles a day traveling along South 1st Street and nearly 2,000 on East Iowa Avenue based on the Iowa DOT 2014 Traffic Flow Map. The intersection at South 1st Street is stop controlled on the side streets. The City has looked at this intersection and an all-way stop is warranted, however since this is a major north-south route through the City, this alternative would disrupt traffic along the corridor. The corridor was analyzed to determine the best solution for slowing down vehicles to increase safety, while not having a negative impact on traffic operations.

Crash history for these two intersections were collected from Iowa DOT CMAT software and has been evaluated for the intersections of South 1st Street and East Iowa Avenue and the midblock location on South 5th Street from 2005 to 2015 to identify trends and safety issues.

At South 1st Street and East Iowa Avenue, 20 crashes have been reported at this location resulting in two major and seven possible injuries. 11 of the 20 (55%) were due to failing to yield at the stop sign. Three others were due to making a left-turn.

On South 5th Street between West Valley Drive and West Prairie Vista Drive, a total of four crashes have been reported with no injuries. At the midblock location no crashes have been reported. Refer to **Section I** for crash history and summary for both of these locations.

Proposed Improvements

Through studies along South 1st Street it was determined that installing permanent stop signs was not an option due to the disruption of traffic along that corridor. Though permanent stop signs were recently installed at South 5th Street and West Valley Drive, with the location of the intersection being south of the school it is not the sole pedestrian crossing point. Further, during peak demand cars and busses line up along the east side of South 5th Street, hampering clear sight lines for both motorists and pedestrians. Both the studies and discussions at council meetings indicated that the installation of pedestrian signals would be the most beneficial for all stakeholders. From these discussions, the proposed improvements include (Refer to **Section G)**:

- Installing a pedestrian signal along South 5th Street at the mid-block between West Prairie Vista Drive and West Valley Drive. The signal would be push button activated when students are present.
- Similar to South 5th Street, a pedestrian signal is proposed at the intersection of South 1st Street and East Iowa Avenue to create a dedicated crossing.

There are a number of benefits of the push button activated signals for the travelling public and the school district:

- Dedicated pedestrian corridor will be identified through the school campus.
- The dedicated crossings will draw attention to the motorists by making them stop when students are present. When students are not present the signal will remain green, which will reduce the impact to the traffic operations for a majority of the time.
- With the signal extending overhead across the traveled lanes it will be easily identified by motorists regardless of adjacent parked traffic on South 5th Street.

SHIVEHATTERY
ARCHITECTURE + ENGINEERING

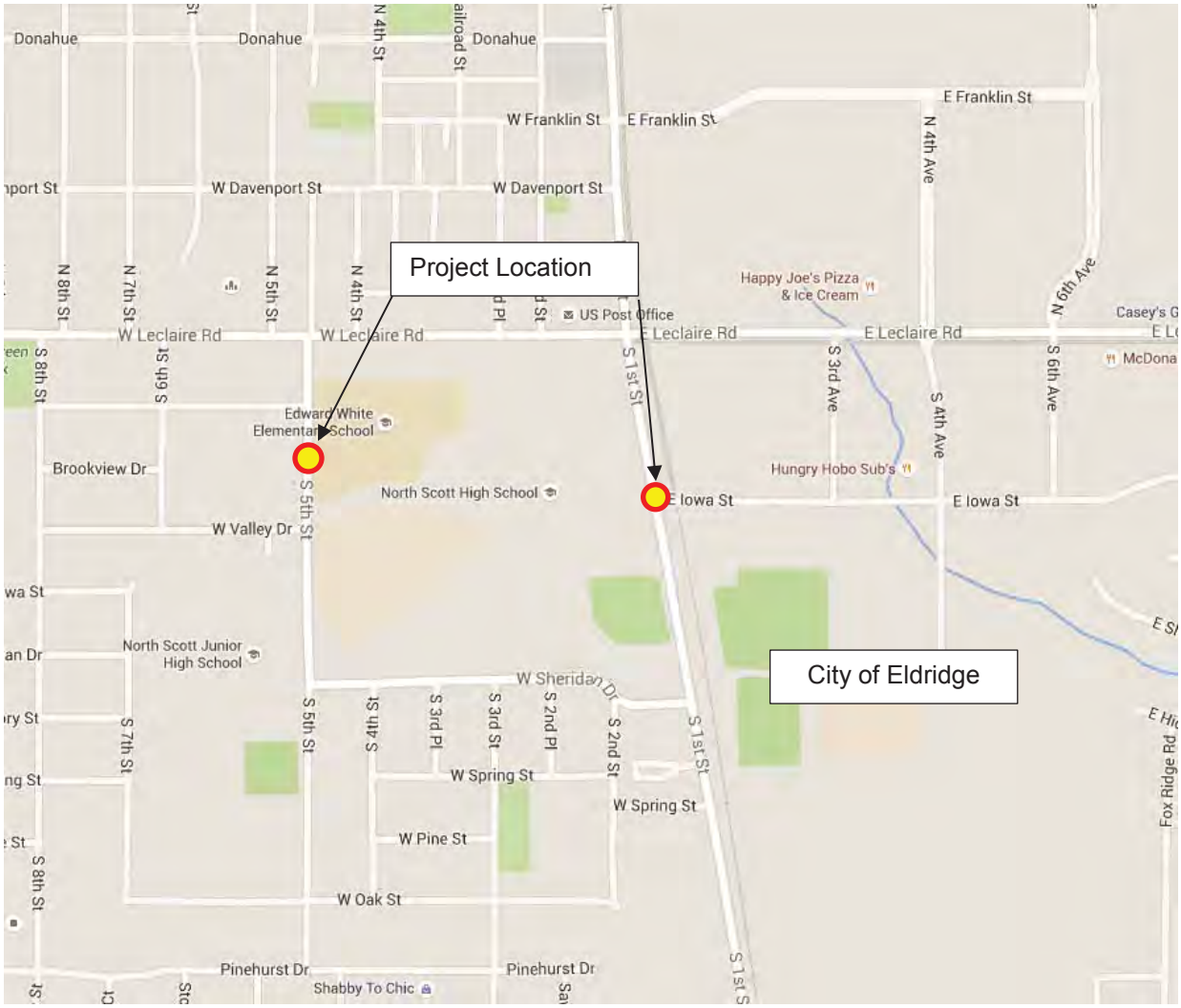
Proposed Public Improvements - Site Specific
S 1st St & E Iowa Ave and Midblock of S 5th St between Prairie Vista Dr & Valley Dr

Eldridge, Iowa
Engineer's Rough Order Magnitude of Cost
Estimate of Quantities - August 14, 2016

Item No	Description	Unit	Unit Price	Quantity	Cost
1	PCC Sidewalk, 4"	SY	$ 35	45	$ 1,575
2	PCC Sidewalk Ramp	SY	$ 50	5	$ 250
3	Detectable Warning Panel	SF	$ 35	20	$ 700
4	Signal Pole	LS	$ 25,000	4	$ 100,000
5	Pavement Markings and Signage	LS	$ 5,000	1	$ 5,000
6	Erosion Control & Administration	LS	$ 500	1	$ 500
7	Construction Survey	LS	$ 8,000	1	$ 8,000
8	Traffic Control	LS	$ 1,500	1	$ 1,500
9	Mobilization	LS	$ 3,000	1	$ 3,000
	Rough Order of Magnitude Construction Cost				$ 120,525

Improvements to the location are to be funded through Traffic Safety Improvement Fund. The schedule proposed for the safety improvements is as follows:

- **August 2016** – Submit for 2016 TSIP Funds
- **September 2016 – January 2017** – Proceed with design of improvements
- **December 2016** – TSIP Funds are awarded
- **February 2017** –Let intersection project
- **Summer 2017** – Construction begins
- **July 2017** –TSIP funds are available
- **August 2017** – Construction complete for proposed improvements


Project Location
City of Eldridge
Donahue
Donahue
Donahue
N 4th St
W Franklin St
E Franklin St
E Franklin St
N 4th Ave
W Davenport St
W Davenport St
N 8th St
N 7th St
N 5th St
N 4th St
N 6th Ave
Happy Joe's Pizza & Ice Cream
US Post Office
W Leclaire Rd
W Leclaire Rd
E Leclaire Rd
E Leclaire Rd
S 8th St
S 6th St
S 1st St
S 3rd Ave
S 4th Ave
S 6th Ave
Edward White Elementary School
Brookview Dr
North Scott High School
Hungry Hobo Sub's
E Iowa St
E Iowa St
S 5th St
W Valley Dr
North Scott Junior High School
W Sheridan Dr
S 7th St
S 5th St
S 4th St
S 3rd Pl
S 3rd St
S 2nd Pl
S 2nd St
S 1st St
W Spring St
W Spring St
W Pine St
S 8th St
W Oak St
Pinehurst Dr
Pinehurst Dr
Shabby To Chic
Fox Ridge Rd

Looking North from S 1st Street, S Approach

Looking West from S 5th Street, Midblock

Looking South from E Iowa Street, E Approach

Looking North from S 5th Street, Midblock

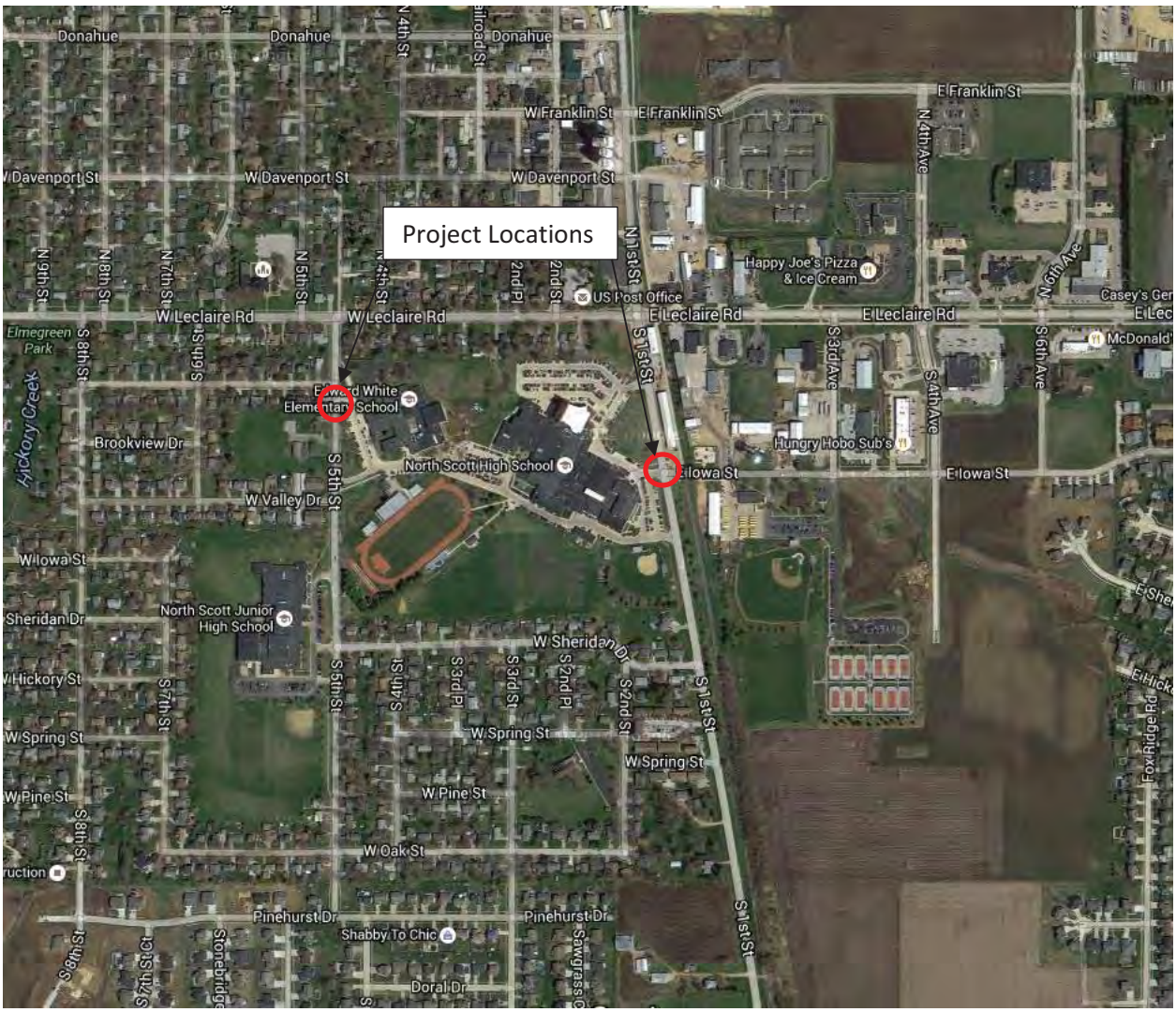
Looking West from E Iowa Street, E Approach

Looking North From S 5th St, S Approach at Prairie Vista Dr

Looking South from S 5th Street, Midblock

Looking South from S 5th St, North Approach at Prairie Vista Dr

5th Avenue
S 1st Street
Edward White
Elementary School
North Scott
High School
Mast Arm
Pedestrian Push Button
Landscaping Adjustments
Proposed Sidewalk
Stop Bar
Stop Bar
Pedestrian Push Button
Mast Arm
LEGEND
1
Pedestrian Hybrid
Beacon
2
CROSSWALK
STOP
ON RED
R10-23
3
W11-2
4
W16-7P


Project Locations
Donahue
W Franklin St
E Franklin St
W Davenport St
W Leclaire Rd
E Leclaire Rd
Happy Joe's Pizza & Ice Cream
US Post Office
Elmegreen Park
Hickory Creek
Brookview Dr
North Scott High School
E Iowa St
Hungry Hobo Sub's
W Valley Dr
W Iowa St
North Scott Junior High School
Sheridan Dr
W Sheridan Dr
W Hickory St
W Spring St
W Pine St
W Oak St
Pinehurst Dr
Shabby To Chic
Doral Dr
N 1st St
S 1st St
N 4th Ave
N 6th Ave
S 3rd Ave
S 4th Ave
S 6th Ave
S 5th St
S 2nd St
S 2nd Pl
S 3rd Pl
S 4th St
S 7th St
S 8th St
N 5th St
N 7th St
N 8th St
N 9th St
Foxridge Rd
Casey's Gen
McDonald'

Iowa Department of Transportation

Major Cause Summary

Report Version 1.1 Jan 2005

Analysis Years: 2005 [4], 2007 [3], 2008 [4], 2009 [1], 2010 [5], 2011 [1], 2013 [2]

Crash Summary:

Fatal	-
Major Injury	2
Minor Injury	-
Possible/Unknown	6
PDO	12
Total Crashes	20

Injury Summary:

Fatal	-
Major Injury	2
Minor Injury	-
Possible	7
Unknown	-
Total Injuries	9

TOT Property Damage: $103,450

AVG Property Damage: $5,173

Surface Condition Summary:

Dry	17
Wet	3
Ice	-
Snow	-
Slush	-
Sand/Dirt/Oil/Gravel	-
Water	-
Other	-
Unknown	-
Not Reported	-
Total Crashes	20

Major Cause Summary:

	Animal
	Ran Traffic Signal
	Ran Stop Sign
	Crossed Centerline
	FTYROW: At Uncontrolled Intersection
	FTYROW: Making Right Turn on Red Signal
11	FTYROW: From Stop Sign
	FTYROW: From Yield Sign
3	FTYROW: Making Left Turn
1	FTYROW: From Driveway
	FTYROW: From Parked Position
	FTYROW: To Pedestrian
	FTYROW: Other (explain in narrative)
	Traveling Wrong Way or on Wrong Side of Rd
	Driving Too Fast for Conditions
	Exceeded Authorized Speed
	Made Improper Turn
	Improper Lane Change
1	Followed Too Close
	Disregarded Railroad Signal
	Disregarded Warning Sign
	Operating Vehicle in Reckless/Aggressive Manner
	Improper Backing
	Illegally Parked/Unattended
	Swerving/Evasive Action
	Over-Correcting/Over-Steering
	Downhill Runaway
	Equipment Failure
	Separation of Units
1	Ran Off Road - Right
	Ran Off Road - Straight
	Ran Off Road - Left
	Lost Control
1	Inattentive/Distracted By: Passenger
	Inattentive/Distracted By: Use of Phone or Other
	Inattentive/Distracted By: Fallen Object
	Inattentive/Distracted By: Fatigued/Asleep
	Other: Vision Obstructed
	Oversized Load/ Oversized Vehicle
	Cargo/Equipment Loss or Shift
	Other: Other Improper Action
	Unknown
2	Other: No Improper Action
	None Indicated

Selection Filter:

None

Analyst:

Notes:

Iowa Department of Transportation

Major Cause Summary

Report Version 1.1 Jan 2005

Analysis Years: 2006 [1], 2008 [1], 2009 [1], 2014 [1]

Crash Summary:

Fatal	-
Major Injury	-
Minor Injury	-
Possible/Unknown	-
PDO	4
Total Crashes	4

Injury Summary:

Fatal	-
Major Injury	-
Minor Injury	-
Possible	-
Unknown	-
Total Injuries	0

TOT Property Damage: $10,831

AVG Property Damage: $2,708

Surface Condition Summary:

Dry	4
Wet	-
Ice	-
Snow	-
Slush	-
Sand/Dirt/Oil/Gravel	-
Water	-
Other	-
Unknown	-
Not Reported	-
Total Crashes	4

Major Cause Summary:

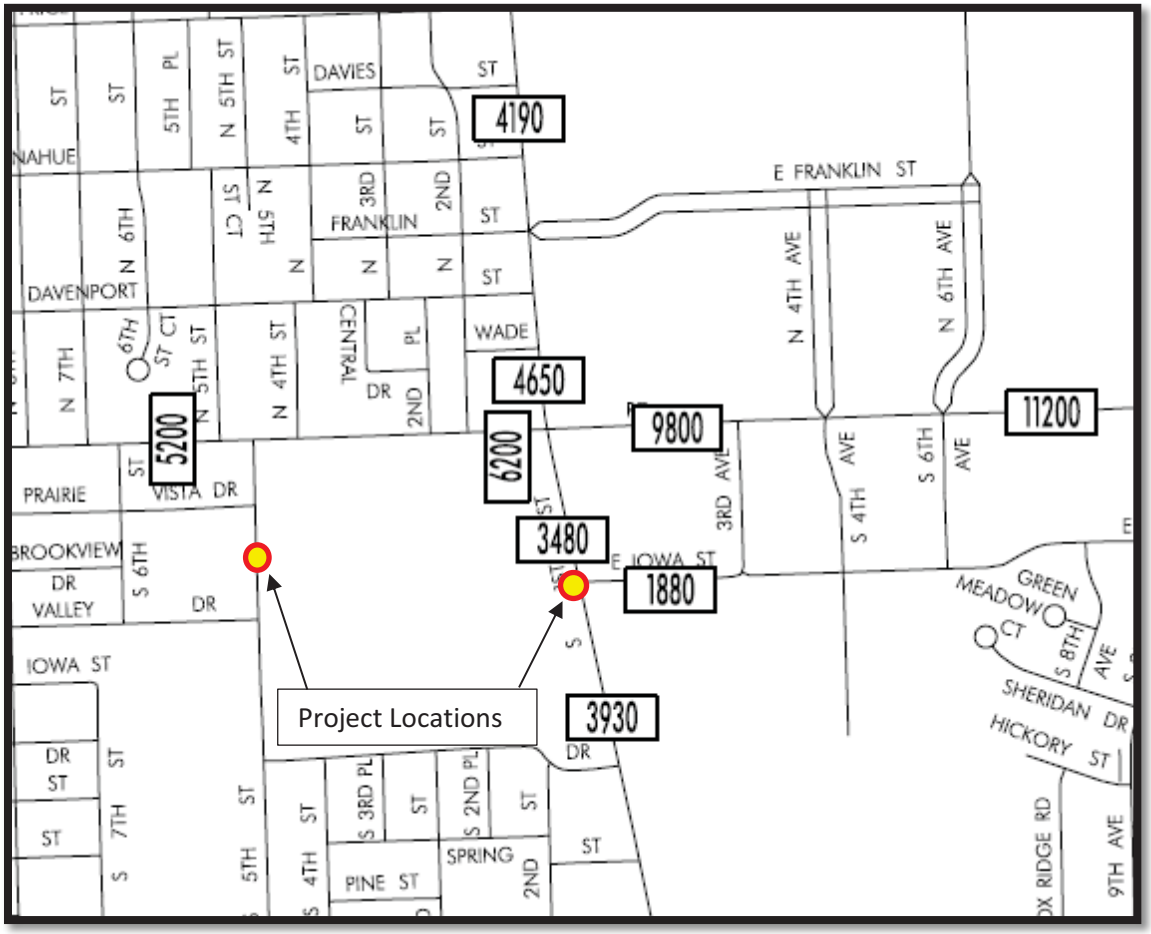
	Animal		Improper Backing
	Ran Traffic Signal		Illegally Parked/Unattended
	Ran Stop Sign		Swerving/Evasive Action
	Crossed Centerline		Over-Correcting/Over-Steering
	FTYROW: At Uncontrolled Intersection		Downhill Runaway
	FTYROW: Making Right Turn on Red Signal		Equipment Failure
	FTYROW: From Stop Sign		Separation of Units
	FTYROW: From Yield Sign		Ran Off Road - Right
1	FTYROW: Making Left Turn		Ran Off Road - Straight
	FTYROW: From Driveway		Ran Off Road - Left
	FTYROW: From Parked Position		Lost Control
	FTYROW: To Pedestrian		Inattentive/Distracted By: Passenger
	FTYROW: Other (explain in narrative)		Inattentive/Distracted By: Use of Phone or Other
	Traveling Wrong Way or on Wrong Side of Rd		Inattentive/Distracted By: Fallen Object
	Driving Too Fast for Conditions		Inattentive/Distracted By: Fatigued/Asleep
	Exceeded Authorized Speed	1	Other: Vision Obstructed
	Made Improper Turn		Oversized Load/ Oversized Vehicle
	Improper Lane Change		Cargo/Equipment Loss or Shift
	Followed Too Close	1	Other: Other Improper Action
	Disregarded Railroad Signal		Unknown
	Disregarded Warning Sign		Other: No Improper Action
1	Operating Vehicle in Reckless/Aggressive Manner		None Indicated

Selection Filter:

((YEAR <> 2005))

Analyst:

Notes:



2014 Iowa DOT Traffic Map

Road Name	2014 Iowa DOT AADT
S 1St Street	3480
E Iowa Street	1880

Intersection or Spot Benefit / Cost Safety Analysis

Rev. 5/14

Iowa DOT Office of Traffic & Safety

County: Scott | Prepared by: Shive-Hattery | Date Prepared: Aug 14, 2016

Intersection: S 1st St & E Iowa Ave, Midblock of S 5th St between Prairie Vista Dr & Valley Dr

Improvement

Proposed Improvement(s): Installation of advanced signing and overhead pedestrian crossing signal

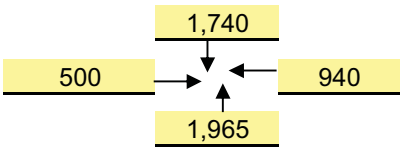
$ 120,525	Estimated Improvement Cost, **EC**	15	Est. Improvement Life, years, **Y**
$ 1,500	Other Annual Cost (after initial year), **AC**	70	Crash Reduction Factor (integer), **CRF**
$ 16,678	Present Value Other Annual Costs, **OC**	4.0%	Discount Rate (time value of $), **INT**
		$ 137,203	Present Value Cost, **COST** = EC + OC

$$OC = \frac{AC}{INT}\left(1 - \frac{1}{(1+INT)^Y}\right)$$

Traffic Volume Data

Source: Iowa DOT (South 1st Avenue East & Iowa Avenue) | 2014 Date of traffic count

Daily Entering Vehicles by Approach (or AADT / 2)



1,877,925 Current Annual Entering Veh., **AEV** = DEV * 365

5,545 veh / day, Final Year DEV, **FDEV**

29.18 MEV, Total Million Entering Veh. Over life of Project, **TMEV**

0.5% Projected Traffic Growth (0%-10%), **G**

5,145 Current Daily Entering Vehicles, **DEV**

$$TMEV = \frac{AEV}{-G}\left(1 - \left(\frac{1+G}{1}\right)^Y\right) \Big/ 10^6$$

Crash Data

2005 First full year --> 2015 Last full year — 11.0 years, Time Period, **T**

0 Additional months — values as of May 2014

0	Fatal Crashes	0	Fatalities @	$4,500,000	$ -
		2	Major Injuries @	$325,000	$ 650,000
8	Injury Crashes		Minor Injuries @	$65,000	$ -
		7	Possible Injuries @	$35,000	$ 245,000
16	Property Damage Only		(assumed cost per crash)	$7,400	$ 177,600
			-OR- enter all Property Costs of all crashes:		
24	Total Crashes, **TA**			Total $ Loss, **LOSS**	$ 1,072,600

2.18	Current Crashes / Year, **AA** = TA / T	1.16	Crashes / MEV, Crash Rate, **CR**
$ 44,692	Cost per Crash, **AVC** = LOSS / TA		CR = TA x 10^6 / (DEV x 365 x T)
33.9	Total Expected Crashes, **TECR** = CR x TMEV	$ 783,195	Present Value of Avoided
1.53	Crashes Avoided First Year **AAR** = AA x CRF / 100		Crashes, **BENEFIT**
$ 68,256	Crash Costs Avoided in First Year, AAR x AVC		
23.7	Total Avoided Crashes, TECR x CRF/ 100		

$$BEN. = \frac{AVC \times AAR}{(INT - G)}\left(1 - \left(\frac{1+G}{1+INT}\right)^Y\right)$$

Benefit / Cost Ratio

Benefit : Cost = $783,195 : $137,203 = **5.71** : 1

Rev. 6/16

Application for TRAFFIC SAFETY FUNDS

GENERAL INFORMATION **DATE:** August 15, 2016

Location / Title of Project South 16th St./Duff Ave. Traffic Safety Improvement

Applicant City of Ames

Contact Person Rudy Koester Title Civil Engineer II

Complete Mailing Address 515 Clark Avenue
Ames, IA 50010

Phone 515.239.5245 (Area Code) E-Mail rkoester@city.ames.ia.us

If more than one highway authority is involved in this project, please indicate and fill in the information below (use additional sheets if necessary).

Co-Applicant(s) _____

Contact Person _____ Title _____

Complete Mailing Address _____

_____

Phone _____ (Area Code) E-Mail _____

PLEASE COMPLETE THE FOLLOWING PROJECT INFORMATION:

Application Type

- Site Specific ☒
- Traffic Control Device ☐
- Safety Study ☐

Funding Amount

Total Safety Cost	$ 495,000
Total Project Cost	$ 722,000
Safety Funds Requested	$ 495,000

Does this project appear on a Safety Improvement Candidate List or is there a safety study recommendation for this project? ☒Yes –This project is cited in a location study report (associated with a NEPA requirement) and is recommended for implementation. ☐No

APPLICATION CERTIFICATION FOR LOCAL GOVERNMENT

To the best of my knowledge and belief, all information included in this application is true and accurate, including the commitment of all physical and financial resources. This application has been duly authorized by the participating local government(s). I understand the attached resolution(s) binds the participating local government(s) to assume responsibility if any additional funds are committed, and to ensure maintenance of any new or improved city streets or secondary roads.

I understand that, although this information is sufficient to secure a commitment of funds, a firm contract between the applicant and the Department of Transportation is required prior to the authorization of funds.

Representing the City of Ames

Signed: _____ 08/15/2016
Signature Date Signed

Rudy Koester, P.E. Civil Engineer II
Typed Name

Attest: _____ 08/15/2016
Signature Date Signed

Tracy Warner P.E., Municipal Engineer
Typed Name

B: Narrative:

Introduction and Background

The City of Ames has initiated a major capital improvement to extend South Grand Avenue from Squaw Creek Drive south to South 16th Street and extend South 5th Street from South Walnut Avenue to South Grand Avenue. The work will improve connections between South Grand Avenue and South 16th Street, and improve South 5th Street from 1,000 feet east of South Walnut Avenue to South Grand Avenue. A shift in future traffic patterns generated as part of the project will dramatically impact several proximate intersections already experiencing heightened crash rates and related safety concerns. This situation prompted an outpouring of feedback during the formulation of recent planning documents.

The Ames Area Metropolitan Planning Organization (MPO) conducted extensive community outreach activities while drafting the *Ames Mobility, Ames Area MPO 2015-2040 Long Range Transportation Plan*. A significant amount of input received focused on taking steps to enhance roadway safety for all users. Citizens overwhelmingly identified South Duff Avenue/South 16th Street as needing upgrades during the initiative. In fact, the participants selected this intersection as being one of the top two in the community. The percentage of citizens citing this intersection as a priority for improvement over the next five years grew from 18% in 2010 to 27% in 2014. This represented the most significant jump experienced by the eight available options while the next closest increase was a mere two percentage points.

Public concerns related to the South Duff Avenue/South 16th Street intersection ranged from bicycle safety to the need to add a turning lane and alter existing traffic signals to ease congestion during rush hour or Iowa State University football games. This reaction prompted city officials to explore opportunities designed to help the local transportation system operate more safely and efficiently. Refer to Section E for an aerial photograph depicting the relationship between the project area and South Grand Avenue.

Existing Conditions

The signalized intersection of South Duff Avenue/South 16th Street is located in southeast Ames just north of U.S. Highway 30 (U.S. 30) interchange 148. South Duff Avenue within the proposed project area is a signalized corridor with a non-divided four lane road with a two-way left turn lane. South 16th Street is a non-divided four lane road lacking designated turn lanes. The referenced roadways in the immediate vicinity of the intersection are classified as a principal arterial and minor arterial, respectively.

The area surrounding the South Duff Avenue/South 16th Street intersection serves as a primary commercial node within the community. Existing uses include big box stores, popular national and local restaurants, auto dealerships, a movie theater, a grocery store, and professional service providers. High-density housing developments, including both multi-family and mobile park homes, are also located approximately three-quarters of a mile to the west. Capacity issues prompted by these significant trip generators, in combination with Iowa State University commuter traffic, often cause the intersection to become heavily-congested leading to potential user conflicts. A 2011 Existing Conditions Traffic Analysis conducted by the Ames Area MPO indicated it had a current Level of Service (LOS) of D/E during PM peak hour conditions. A Future Conditions Intersection Capacity Utilization Analysis from the cited *Long Range Transportation Plan* forecasts a drop to an LOS of F during PM peak hours without improvements.

Annual Average Daily Traffic (AADT) figures obtained from the Iowa Department of Transportation (Iowa DOT) indicates the number of cars traveling along South Duff Avenue just north of the project area is incrementally increasing. 25,200 cars traveled the referenced area per day in 2015 compared to 24,100 in

2011 (+4.4%) and 23,000 in 2003 (+8.7%). The real growth has occurred along South 16th Street to the west of the intersection with South Duff Avenue. The roadway experienced 10,800 AADT in 2015 which represents a 6.5% increase from 2011 (10,100 AADT) and a 27.8% increase from 2003 (7,800 AADT). Some of this growth is a result of recent construction within the corridor including commercial and multi-family housing developments. The number of trips being generated, including from pedestrian commuters walking between the districts, will likely increase as the area continues to develop. This ultimately creates more potential conflicts between vehicular and non-vehicular travelers.

The City's Future Land Use map identifies a portion of the remaining undeveloped lands adjoining the project area to the east as future "Highway-Oriented Commercial" development. These uses are typically more regionally-focused based on their locations along major thoroughfares and thus can attract a substantial amount of additional roadway users. Further, the pending extension of South Grand Avenue to South 16th Street will likely shift additional traffic into the local transportation system as commuters seek alternative routes while navigating the community. This will collectively place additional strain on the existing infrastructure causing negative impacts such as poor operations and significant congestion during peak traffic periods. Most importantly, it increases opportunities for conflicts in an area already overly-prone to accidents.

Proposed Project

Requested Iowa DOT Traffic Safety Improvement Program funds will advance the construction of eastbound to northbound and westbound to southbound dedicated left turn lanes along South 16th Street at the signalized intersection. The City will also restrict the frontage road along South Duff Avenue to a right-in/right-out operation as part of the improvements. These efforts will significantly improve safety by better segregating traffic at the intersection and enhancing driver expectancies. Additionally, this emphasizes the use of design principles that are proven to be safe and reliable. This focus is consistent with the Iowa DOT Strategic Highway Safety Plan – particularly implementing innovative intersection design that reduces crashes as well as intersection related fatalities and injuries. Planned improvements are consistent with Iowa DOT's goals to *improve two signalized, urban intersections on the local system.*

Safety Justification

The proposed project area sustained the second highest crash incidence rate of any intersection within the City of Ames from 2009 to 2013[1]. More recent IDOT data from 2011-2015 indicates seventy-four accidents occurred at South Duff Avenue/South 16th Street during the 5-year period including 0 Fatal, 0 Major Injury, 9 Minor Injury, 9 Possible Injury, and 56 Property Damage Only crashes. These resulted in 0 Fatal, 0 Major Injuries, 11 Minor Injuries, and 15 Possible Injuries to parties involved. The most commonly cited crash reasons included "followed too close" and "failure to yield right of way- making left turn." In fact, the former cause accounts for 1 in every 5 crashes in the project area. The current lack of dedicated turning lanes on South 16th Street can lead to dangerous situations where drivers may take a high risk north-or-south bound turn to avoid being stuck in congestion or having to wait through multiple light cycles. Although no fatalities or major injuries occurred, the elevated frequency of occurrences raises the potential for future incidents to have serious consequences. It also highlights a dramatic need for infrastructure improvements to enhance motorist safety.

This analysis took the applicable Crash Reduction Factors (CRF) from the Crash Modification Factors Clearinghouse website based upon the planned improvements to the roadway. As seen on the

[1] *Ames Mobility, Ames Area MPO 2015-2040 Long Range Transportation Plan*, October 12, 2015.

Benefit/Cost worksheet (using the provided Iowa DOT Excel template) there was a cumulative CRF = 27.57391 was calculated. Rounding to the nearest integer value of 28 was used. This CRF resulted in a B/C ratio of 1.69 :1 for the life of this project. This is believed to be a conservative value based upon past and anticipated future growth. This area of Ames has and continues to exceed expected rates as it is a highly desirable area for development.

C: Itemized Breakdown of All Costs:

PLANNING LEVEL
OPINION OF PROBABLE PROJECT COST
SOUTH 16TH STREET AND SOUTH DUFF AVENUE WIDENING
FEBRUARY 2016

ITEM NO.	ITEM	UNIT	TOTAL QUANTITY	UNIT PRICE	TOTAL
1.1 Demolition					
1.1.1	Pavement Removal	SY	1,550	$10	$7,750
1.1.2	Clearing and Grubbing	AC	0.00	$5,000.00	$0
1.1.3	Structure Removal (Bridge)	SF	0	$5.00	$0
1.2 Excavation and Grading					
1.2.1	Excavation and Grading Class 10	CY	0	$3.00	$0
1.2.2	Excavation and Grading Class 12	CY	0	$6.00	$0
1.2.3	Excavation and Grading, Unk.	% of 1.1.1 & 1.3.1,2	15%		$16,920
1.3 Pavement					
1.3.1	Concrete Pavement	SY	1,910	$65	$105,050
1.3.2	Asphalt Pavement	TONS	0	$55.00	$0
1.3.3	Granular Base	CY	2,192	$27.00	$59,184
1.4 Drainage					
1.4.1	Box Culvert- Extension	SF	10	$85.00	$850
1.4.2	Box Culvert- New	SF	0	$85.00	$0
1.4.3	Drainage, Unknown	% of 1.1.1 & 1.3.1,2	10%		$11,280
1.5 Structures					
1.5.1	Bridge, Concrete slab	SF	0	$70.00	$0
1.5.2	Bridge, Prestressed Beam	SF	0	$72.00	$0
1.5.3	Bridge, Steel Girder	SF	0	$90.00	$0
1.5.4	Retaining Wall	SF	0	$35.00	$0
1.6 Special Construction					
1.6.1	Granular Surfacing	TONS	0	$18.00	$0
1.6.2	Traffic Signals	EA	1	$175,000	$175,000
1.6.3	Railroad	Track LF	0	$135	$0
1.6.4	Erosion Control	% of 1.1.1 & 1.3.1,2	2%		$2,256
1.6.5	Lighting	% of 1.1.1 & 1.3.1,2	2%		$2,256
1.6.6	Typical Utilities	% of 1.1.1 & 1.3.1,2	5%		$5,640
1.7 Traffic Control					
1.7.1	Traffic Control	% of 1.1.1 & 1.3.1,2	6%		$6,768
1.8 Miscellaneous					
1.8.1	Pavement Marking and Signing	% of 1.1.1 & 1.3.1,2	2%		$2,256
1.8.2	Incidentals	% of 1.1.1 & 1.3.1,2	20%		$22,560
1.8.3	Mobilization	% of above	8-10%		$16,711
1.8.4	Contingency	% of above	20%		$86,896
Subtotal Construction (Current Year)					$521,377

Years Until Construction (4)

Subtotal Construction (Construction Year)		Assuming 3.5% Inflation		$598,292
Engineering, legal, administration	% of above	20%		$119,658
Opinion of Probable Costs				$717,950
Permanent ROW/Easements	AC	0.4	$10,000	$4,000
Temporary Construction Easements	AC	0.1	$2,000	$200
Structures to Purchase	EA	0	$150,000	$0
TOTAL				$722,000

HRGreen

PLANNING LEVEL
OPINION OF PROBABLE PROJECT COST
SOUTH 16TH STREET AND SOUTH DUFF AVENUE WIDENING
FEBRUARY 2016[2]

ITEM NO.	ITEM	UNIT	TOTAL QUANTITY	UNIT PRICE	TOTAL
1.1 Demolition					
1.1.1	Pavement Removal	SY	0	$5.00	$0
1.1.2	Clearing and Grubbing	AC	0.00	$5,000.00	$0
1.1.3	Structure Removal (Bridge)	SF	0	$5.00	$0
1.2 Excavation and Grading					
1.2.1	Excavation and Grading Class 10	CY	0	$3.00	$0
1.2.2	Excavation and Grading Class 12	CY	0	$6.00	$0
1.2.3	Excavation and Grading, Unk.	% of 1.1.1 & 1.3.1,2	15%		$15,758
1.3 Pavement					
1.3.1	Concrete Pavement	SY	1,910	$55.00	$105,050
1.3.2	Asphalt Pavement	TONS	0	$55.00	$0
1.3.3	Granular Base	CY	2,192	$27.00	$59,184
1.4 Drainage					
1.4.1	Box Culvert- Extension	SF	0	$85.00	$0
1.4.2	Box Culvert- New	SF	0	$85.00	$0
1.4.3	Drainage, Unknown	% of 1.1.1 & 1.3.1,2			$0
1.5 Structures					
1.5.1	Bridge, Concrete slab	SF	0	$70.00	$0
1.5.2	Bridge, Prestressed Beam	SF	0	$72.00	$0
1.5.3	Bridge, Steel Girder	SF	0	$90.00	$0
1.5.4	Retaining Wall	SF	0	$35.00	$0
1.6 Special Construction					
1.6.1	Granular Surfacing	TONS	0	$18.00	$0
1.6.2	Traffic Signals	EA	1	$175,000	$175,000
1.6.3	Railroad	Track LF	0	$135	$0
1.6.4	Erosion Control	% of 1.1.1 & 1.3.1,2			$0
1.6.5	Lighting	% of 1.1.1 & 1.3.1,2	2%		$2,101
1.6.6	Typical Utilities	% of 1.1.1 & 1.3.1,2			$0
1.7 Traffic Control					
1.7.1	Traffic Control	% of 1.1.1 & 1.3.1,2	0%		$0
1.8 Miscellaneous					
1.8.1	Pavement Marking and Signing	% of 1.1.1 & 1.3.1,2	2%		$2,101
1.8.2	Incidentals	% of 1.1.1 & 1.3.1,2	0%		$0
1.8.3	Mobilization	% of above	0%		$0
1.8.4	Contingency	% of above	20%		$71,839
Subtotal Construction (Current Year)					$431,032

[2] The OPC summarized in this table includes those costs that are associated with "safety" improvements.

Years Until Construction (4)

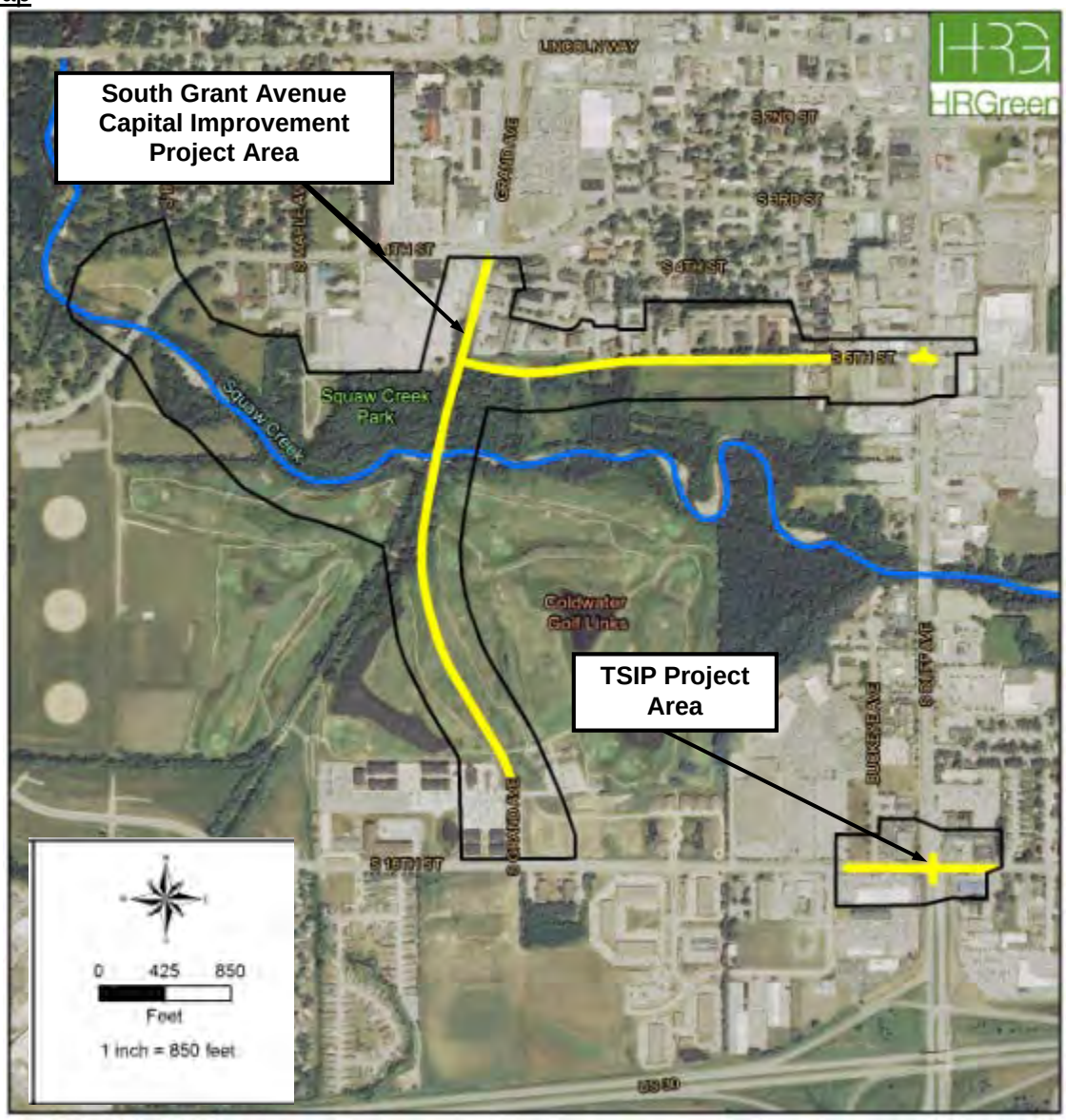
Subtotal Construction (Construction Year)		Assuming 3.5% Inflation		$494,619
Engineering, legal, administration	% of above	0%		$0
Opinion of Probable Costs				$494,619
Permanent ROW/Easements	AC	0.0	$10,000	$0
Temporary Construction Easements	AC	0.0	$2,000	$0
Structures to Purchase	EA	0	$150,000	$0
TOTAL				$495,000

HRGreen

D: Time Schedule

Date	Activity
August 2016	Submit TSIP Grant Application
September 2016	Prepare Plans and Specifications
October 2016	Iowa DOT Plan Review
November 2016	Final Plan Revisions
December 2016	Grant Approval from Commission
February 2017	Bid Letting
March 2017	Award Project
May-June 2017	Begin Construction
October-November 2017	Project Completion

E: Map


South Grant Avenue Capital Improvement Project Area
TSIP Project Area
LINCOLN WAY
S 2ND ST
S 3RD ST
S 6TH ST
S 7TH ST
S 16TH ST
S GRANT AVE
S KELLEY AVE
Squaw Creek
Squaw Creek Park
Coldwater Golf Links
BUCKEYE AVE
S DUFF AVE
HRGreen
0 425 850
Feet
1 inch = 850 feet

F: Color Pictures

Photograph depicting the South Duff Avenue and South 16th Street project area.

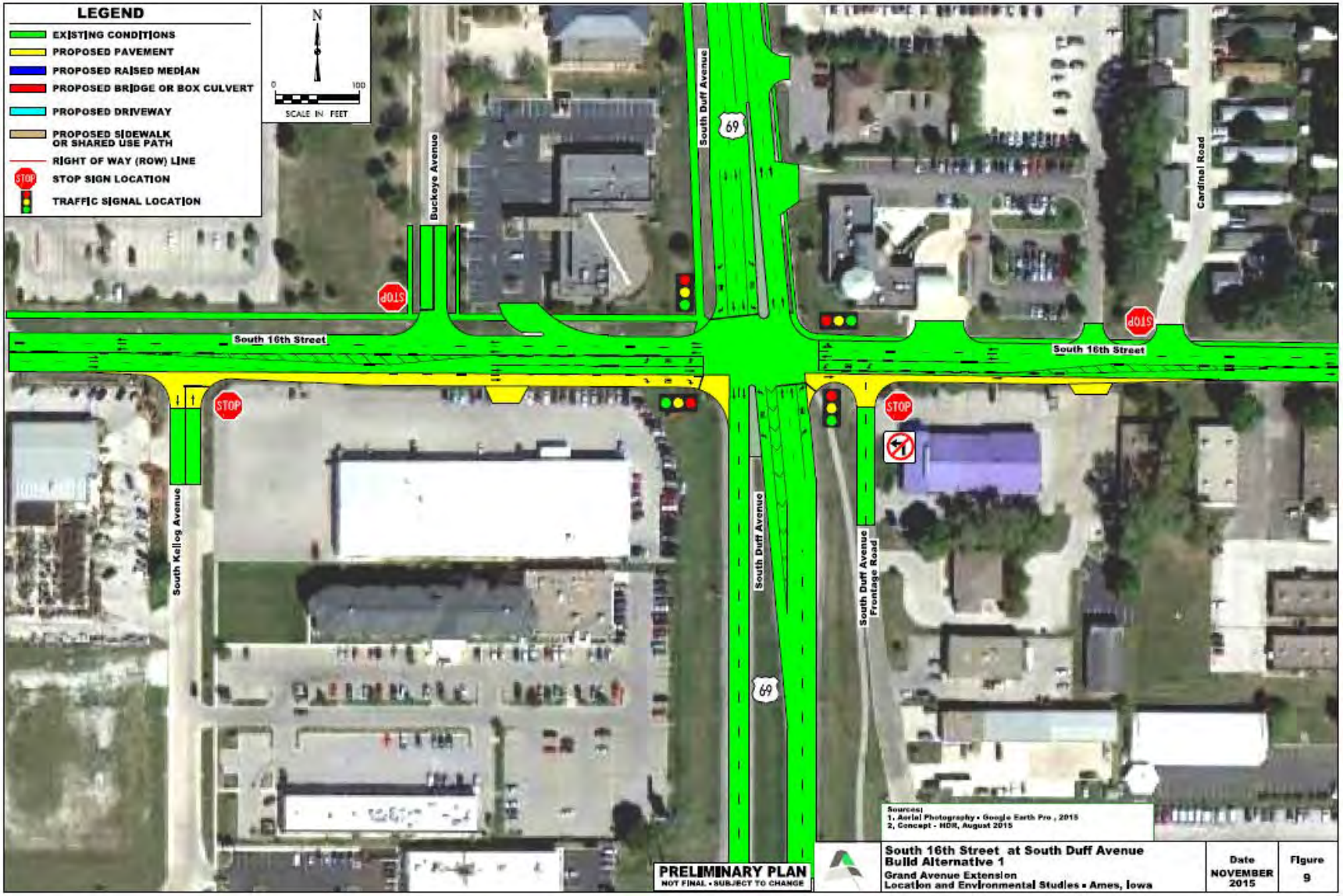
View of South 16th Street heading east. Note the lack of a dedicated left turn lane.

View of South 16th Street heading west. Example of current congestion issues facing the intersection.

View of South Duff Avenue heading north. Note the trip generators surrounding the intersection.

View of South Duff Avenue heading south. Picture highlights different users of the project area.

G: Plan View


LEGEND
EXISTING CONDITIONS
PROPOSED PAVEMENT
PROPOSED RAISED MEDIAN
PROPOSED BRIDGE OR BOX CULVERT
PROPOSED DRIVEWAY
PROPOSED SIDEWALK OR SHARED USE PATH
RIGHT OF WAY (ROW) LINE
STOP SIGN LOCATION
TRAFFIC SIGNAL LOCATION
N
0
100
SCALE IN FEET
South 16th Street
South Duff Avenue
Buckeye Avenue
Cardinal Road
South Kellog Avenue
South Duff Avenue Frontage Road
69
STOP
Sources:
1. Aerial Photography - Google Earth Pro , 2015
2. Concept - HDR, August 2015
PRELIMINARY PLAN
NOT FINAL • SUBJECT TO CHANGE
South 16th Street at South Duff Avenue
Build Alternative 1
Grand Avenue Extension
Location and Environmental Studies • Ames, Iowa
Date
NOVEMBER 2015
Figure
9

H: Aerial Photograph

View looking north at the approximate eastern and western extents of the project area.

I: Narrative: CMAT/SAVER Crash Summary of Motor Vehicle Accidents

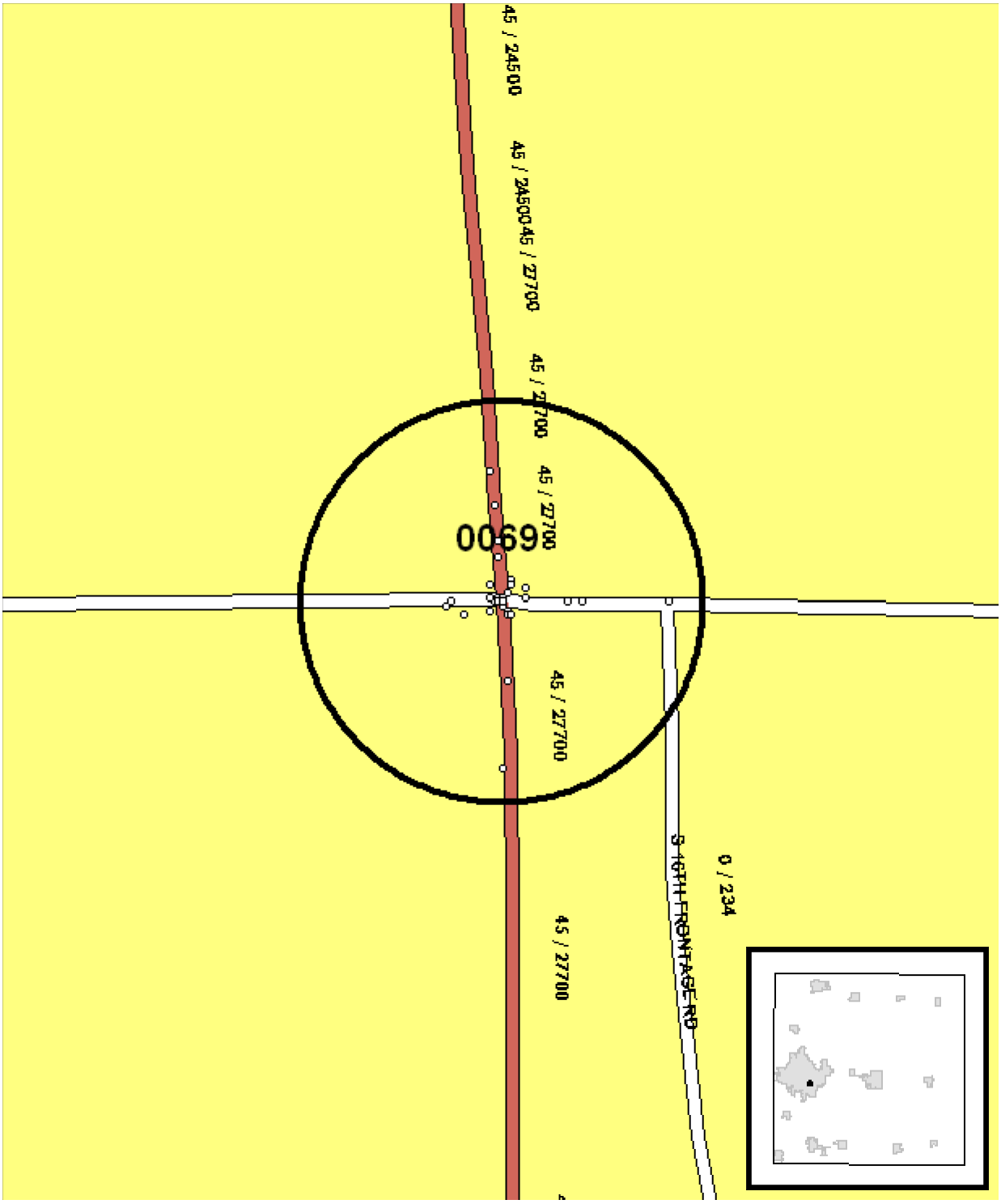
Iowa Department of Transportation

Location Map

SE 16th St & Duff

Incidents: 74

Report Version 1.1 Mar 2005



7/26/2016 Crash Mapping Analysis Tool 3.4.2

Iowa Department of Transportation

Major Cause Summary

SE 16th St & Duff Ave

Report Version 1.1 Jan 2005

Analysis Years: 2011 [15], 2012 [15], 2013 [14], 2014 [9], 2015 [21]

Crash Summary:

Fatal	-
Major Injury	-
Minor Injury	9
Possible/Unknown	9
PDO	56
Total Crashes	74

Injury Summary:

Fatal	-
Major Injury	-
Minor Injury	11
Possible	15
Unknown	-
Total Injuries	26

Surface Condition Summary:

Dry	57
Wet	10
Ice	1
Snow	6
Slush	-
Sand/Dirt/Oil/Gravel	-
Water	-
Other	-
Unknown	-
Not Reported	-
Total Crashes	74

TOT Property Damage: $398,854

AVG Property Damage: $5,390

Major Cause Summary:

	Animal
7	Ran Traffic Signal
	Ran Stop Sign
2	Crossed Centerline
	FTYROW: At Uncontrolled Intersection
1	FTYROW: Making Right Turn on Red Signal
1	FTYROW: From Stop Sign
	FTYROW: From Yield Sign
15	FTYROW: Making Left Turn
	FTYROW: From Driveway
	FTYROW: From Parked Position
	FTYROW: To Pedestrian
2	FTYROW: Other (explain in narrative)
1	Traveling Wrong Way or on Wrong Side of Rd
4	Driving Too Fast for Conditions
	Exceeded Authorized Speed
2	Made Improper Turn
1	Improper Lane Change
25	Followed Too Close
	Disregarded Railroad Signal
	Disregarded Warning Sign
	Operating Vehicle in Reckless/Aggressive Manner
1	Improper Backing
	Illegally Parked/Unattended
	Swerving/Evasive Action
	Over-Correcting/Over-Steering
	Downhill Runaway
	Equipment Failure
	Separation of Units
	Ran Off Road - Right
	Ran Off Road - Straight
	Ran Off Road - Left
1	Lost Control
1	Inattentive/Distracted By: Passenger
	Inattentive/Distracted By: Use of Phone or Other
	Inattentive/Distracted By: Fallen Object
	Inattentive/Distracted By: Fatigued/Asleep
	Other: Vision Obstructed
	Oversized Load/ Oversized Vehicle
	Cargo/Equipment Loss or Shift
7	Other: Other Improper Action
2	Unknown
1	Other: No Improper Action
	None Indicated

Selection Filter:

((YEAR = 2011 or YEAR = 2012 or YEAR = 2013 or YEAR = 2014 or YEAR = 2015))

7/26/2016 Crash Mapping Analysis Tool

Iowa Department of Transportation

Driver and Time Summary

SE 16th St & Duff Ave

Report Version 1.0 Aug 2006

Crash Time of Day Summary:

From / To	00:00 01:59	02:00 03:59	04:00 05:59	06:00 07:59	08:00 09:59	10:00 11:59	12:00 13:59	14:00 15:59	16:00 17:59	18:00 19:59	20:00 21:59	22:00 23:59	NR	Total	%
SUN	-	-	-	-	1	2	1	-	1	1	1	-	-	7	9
MON	-	-	-	-	2	-	3	-	3	-	-	1	-	9	12
TUE	-	-	-	-	1	2	-	3	2	1	-	-	-	9	12
WED	-	-	-	-	-	3	6	-	2	-	1	-	-	12	16
THU	-	-	-	-	2	2	5	2	5	-	-	-	-	16	22
FRI	-	-	-	1	1	2	4	-	2	3	-	-	-	13	18
SAT	2	-	-	-	-	-	2	2	1	-	1	-	-	8	11
Tot.	2			1	7	11	21	7	16	5	3	1		74	
%	3			1	9	15	28	9	22	7	4	1			100

Driver Age/Gender Summary:

Age	Male	Female	NR	Drivers	%
<14	-	-	-		
14	-	-	-		
15	-	-	-		
16	1	-	-	1	1
17	1	3	-	4	3
18	3	3	-	6	4
19	5	1	-	6	4
20	1	2	-	3	2
21 to 24	20	16	-	36	24
25 to 29	6	10	-	16	10
30 to 34	6	4	-	10	7
35 to 39	10	4	-	14	9
40 to 44	-	2	-	2	1
45 to 49	4	6	-	10	7
50 to 54	8	5	-	13	8
55 to 59	9	1	-	10	7
60 to 64	3	2	-	5	3
65 to 69	2	5	-	7	5
70 to 74	2	1	-	3	2
75 to 79	-	3	-	3	2
80 to 84	-	1	-	1	1
85 to 89	-	2	-	2	1
90 to 94	-	-	-		
95 plus	-	-	-		
NR	-	-	1	1	1
Drivers	81	71	1	153	
%	53	46	1		100

Drug/Alcohol Summary:

	Total	%
Drug		
Alcohol, Less than Statutory	1	1
Alcohol, Statutory	2	3
Drug/Alcohol, Less than Statutory		
Drug/Alcohol, Statutory		
Refused		
Under Influence of Alc/Drugs/Meds	1	1
None Indicated	70	95
Total Crashes	74	100

Fixed Object Struck Summary:

	Vehs.	%
Bridge/Bridge rail/Overpass		
Underpass/Structure Support		
Culvert		
Ditch/Embankment	1	1
Curb/Island/Raised Median		
Guardrail		
Concrete Barrier		
Tree		
Pole - Utility/Light/Etc		
Sign Post		
Mailbox		
Impact Attenuator		
Other Fixed Object		
None	152	99
Total Vehicles	153	100

Selection Filter:

((YEAR = 2011 or YEAR = 2012 or YEAR = 2013 or YEAR = 2014 or YEAR = 2015))

7/26/2016 Crash Mapping Analysis Tool

Iowa Department of Transportation

Crash Detail Report

SE 16th St & Duff Ave

Report Version 1.3 Aug 2006

2011623912 03/19/2011 13:55 S 16TH FRONTAGE RD AND SE 16TH ST
County:85 **City:**Ames

Major Cause:FTY from stop sign
Roadway Type: Intersection: T - intersection

Severity:	Minor	**Manner of Crash:**	Broadside
Fatalities:	0	**Surface Conditions:**	Dry
Major Injuries:	0	**Light Conditions:**	Daylight
Minor Injuries:	1	**Weather Conditions:**	Clear
Possible Injuries:	0	**Drug/Alc Involved:**	none indicated
Unknown Injuries:	0	**Property Damage:**	$1900

Number of Vehicles:2

	Unit 1	Unit 2	Unit 3
Init Trav Dir:	North	East	0
Veh Action:	Turning left	Essentially straight	0
Configuration:	Passenger car	Motorcycle	0
Driver Age:	34	45	0
Driver Gender:	M	M	
Driver Cond:	Normal	Normal	0
Drivr Contr 1:	FTY from stop sign	none	0
Drivr Contr 2:	not reported	not reported	0
Fixed Object:	none	none	0

2011624080 03/29/2011 08:46 US 69/S DUFF AVE AND SE 16TH ST AND S 16TH ST
County:85 **City:**Ames

Major Cause: Driving too fast for conditions
Roadway Type: Intersection: Four-way intersection

Severity:	Poss/Unk	**Manner of Crash:**	Rear-end
Fatalities:	0	**Surface Conditions:**	Wet
Major Injuries:	0	**Light Conditions:**	Daylight
Minor Injuries:	0	**Weather Conditions:**	Cloudy
Possible Injuries:	1	**Drug/Alc Involved:**	none indicated
Unknown Injuries:	0	**Property Damage:**	$1000

Number of Vehicles:2

	Unit 1	Unit 2	Unit 3
Init Trav Dir:	North	North	0
Veh Action:	Slowing/stopping	Stopped for sign/signal	0
Configuration:	Passenger car	Passenger car	0
Driver Age:	59	53	0
Driver Gender:	M	F	
Driver Cond:	Normal	Normal	0
Drivr Contr 1:	Too fast for conditions	none	0
Drivr Contr 2:	not reported	not reported	0
Fixed Object:	none	none	0

7/26/2016 Crash Mapping Analysis Tool

Iowa Department of Transportation

Crash Detail Report

SE 16th St & Duff Ave

Report Version 1.3 Aug 2006

2011633558 05/19/2011 16:34 US 69/S DUFF AVE AND SE 16TH ST AND S 16TH ST
County:85 **City:**Ames

Major Cause: Lost control
Roadway Type: Intersection: Four-way intersection
Severity: Minor **Manner of Crash:**Non-collision
Fatalities:0 **Surface Conditions:**Dry
Major Injuries:0 **Light Conditions:**Daylight
Minor Injuries:1 **Weather Conditions:**Cloudy
Possible Injuries:0 **Drug/Alc Involved:**none indicated
Unknown Injuries:0 **Property Damage:**$400 **Number of Vehicles:**1

	Unit 1	Unit 2	Unit 3
Init Trav Dir:	East	0	0
Veh Action:	Turning left	0	0
Configuration:	Motorcycle	0	0
Driver Age:	59	0	0
Driver Gender:	M		
Driver Cond:	Normal	0	0
Drivr Contr 1:	Lost control	0	0
Drivr Contr 2:	not reported	0	0
Fixed Object:	none	0	0

2011633560 06/07/2011 15:15 US 69/S DUFF AVE AND SE 16TH ST AND S 16TH ST
County:85 **City:**Ames

Major Cause: Followed too close
Roadway Type: Intersection: Four-way intersection
Severity: Poss/Unk **Manner of Crash:**Rear-end
Fatalities:0 **Surface Conditions:**Dry
Major Injuries:0 **Light Conditions:**Daylight
Minor Injuries:0 **Weather Conditions:**Clear
Possible Injuries:1 **Drug/Alc Involved:**none indicated
Unknown Injuries:0 **Property Damage:**$500 **Number of Vehicles:**2

	Unit 1	Unit 2	Unit 3
Init Trav Dir:	South	South	0
Veh Action:	Essentially straight	Essentially straight	0
Configuration:	Van or mini-van	Passenger car	0
Driver Age:	26	43	0
Driver Gender:	F	F	
Driver Cond:	Normal	Normal	0
Drivr Contr 1:	Followed too close	none	0
Drivr Contr 2:	not reported	not reported	0
Fixed Object:	none	none	0

7/26/2016 Crash Mapping Analysis Tool

Iowa Department of Transportation

Crash Detail Report

SE 16th St & Duff Ave

Report Version 1.3 Aug 2006

2011639145 07/10/2011 10:35 US 69/S DUFF AVE AND SE 16TH ST AND S 16TH ST
County:85 **City:**Ames

Major Cause: Other improper action
Roadway Type: Intersection: Four-way intersection
Severity: Poss/Unk **Manner of Crash:**Broadside
Fatalities:0 **Surface Conditions:**Wet
Major Injuries:0 **Light Conditions:**Daylight
Minor Injuries:0 **Weather Conditions:**Rain
Possible Injuries:1 **Drug/Alc Involved:**none indicated
Unknown Injuries:0 **Property Damage:**$25000 **Number of Vehicles:**3

	Unit 1	Unit 2	Unit 3
Init Trav Dir:	West	South	East
Veh Action:	Essentially straight	Essentially straight	Stopped for sign/signal
Configuration:	Passenger car	Passenger car	Van or mini-van
Driver Age:	64	21	24
Driver Gender:	M	M	M
Driver Cond:	Normal	Normal	Normal
Drivr Contr 1:	Other improper action	Other improper action	none
Drivr Contr 2:	not reported	not reported	not reported
Fixed Object:	none	none	none

2011642816 08/10/2011 16:38 US 69/S DUFF AVE AND SE 16TH ST AND S 16TH ST
County:85 **City:**Ames

Major Cause: Ran traffic signal
Roadway Type: Intersection: Four-way intersection
Severity: Minor **Manner of Crash:**Angle, oncoming left turn
Fatalities:0 **Surface Conditions:**Dry **Major**
Injuries:0 **Light Conditions:**Daylight
Minor Injuries:2 **Weather Conditions:**Clear
Possible Injuries:0 **Drug/Alc Involved:**none indicated
Unknown Injuries:0 **Property Damage:**$6000 **Number of Vehicles:**2

	Unit 1	Unit 2	Unit 3
Init Trav Dir:	North	South	0
Veh Action:	Turning left	Essentially straight	0
Configuration:	Sport utility vehicle	Passenger car	0
Driver Age:	37	30	0
Driver Gender:	M	M	
Driver Cond:	Normal	Normal	0
Drivr Contr 1:	Ran traffic signal	Ran traffic signal	0
Drivr Contr 2:	FTY making left turn	not reported	0
Fixed Object:	none	none	0

7/26/2016 Crash Mapping Analysis Tool

Iowa Department of Transportation

Crash Detail Report

SE 16th St & Duff Ave

Report Version 1.3 Aug 2006

2011650801 10/03/2011 22:16 US 69/S DUFF AVE AND SE 16TH ST AND S 16TH ST
County:85 **City:**Ames

Major Cause: Ran traffic signal
Roadway Type: Intersection: Four-way intersection
Severity: Minor **Manner of Crash:**Broadside
Fatalities:0 **Surface Conditions:**Dry
Major Injuries:0 **Light Conditions:**Dark - roadway lighted
Minor Injuries:1 **Weather Conditions:**Clear
Possible Injuries:0 **Drug/Alc Involved:**none indicated
Unknown Injuries:0 **Property Damage:**$9000 **Number of Vehicles:**2

	Unit 1	Unit 2	Unit 3
Init Trav Dir:	South	West	0
Veh Action:	Essentially straight	Essentially straight	0
Configuration:	Passenger car	Passenger car	0
Driver Age:	18	22	0
Driver Gender:	F	M	
Driver Cond:	Normal	Normal	0
Drivr Contr 1:	Ran traffic signal	none	0
Drivr Contr 2:	not reported	not reported	0
Fixed Object:	none	none	0

2012697241 08/02/2012 16:30 US 69/S DUFF AVE AND SE 16TH ST AND S 16TH ST
County:85 **City:**Ames

Major Cause: Ran traffic signal
Roadway Type: Intersection: Four-way intersection
Severity: Poss/Unk **Manner of Crash:**Angle, oncoming left turn
Fatalities:0 **Surface Conditions:**Dry **Major**
Injuries:0 **Light Conditions:**Daylight
Minor Injuries:0 **Weather Conditions:**Clear
Possible Injuries:1 **Drug/Alc Involved:**none indicated
Unknown Injuries:0 **Property Damage:**$19000 **Number of Vehicles:**2

	Unit 1	Unit 2	Unit 3
Init Trav Dir:	North	South	0
Veh Action:	Turning left	Essentially straight	0
Configuration:	Passenger car	Sport utility vehicle	0
Driver Age:	75	52	0
Driver Gender:	F	F	
Driver Cond:	Normal	Normal	0
Drivr Contr 1:	FTY making left turn	Ran traffic signal	0
Drivr Contr 2:	not reported	not reported	0
Fixed Object:	none	none	0

7/26/2016 Crash Mapping Analysis Tool

Iowa Department of Transportation

Crash Detail Report

SE 16th St & Duff Ave

Report Version 1.3 Aug 2006

2013724927 01/28/2013 17:43 US 69/S DUFF AVE
County:85 **City:**Ames

Major Cause: Traveling wrong way or on wrong side of road
Roadway Type: Non-intersection: No special feature
Severity: Poss/Unk **Manner of Crash:**Head-on
Fatalities:0 **Surface Conditions:**Wet
Major Injuries:0 **Light Conditions:**Dusk
Minor Injuries:0 **Weather Conditions:**Mist
Possible Injuries:3 **Drug/Alc Involved:**Under influence of Alc/Drugs/Meds
Unknown Injuries:0 **Property Damage:**$6750 **Number of Vehicles:**4

	Unit 1	Unit 2	Unit 3
Init Trav Dir:	North	South	South
Veh Action:	Essentially straight	Essentially straight	Essentially straight
Configuration:	Passenger car	Passenger car	Passenger car
Driver Age:	18	36	27
Driver Gender:	M	M	F
Driver Cond:	Infl by alc/drugs/meds	Normal	Normal
Drivr Contr 1:	Wrong way/wrong side	none	none
Drivr Contr 2:	not reported	not reported	not reported
Fixed Object:	none	none	none

2013732960 03/29/2013 19:15 SE 16TH ST
County:85 **City:**Ames

Major Cause: Followed too close
Roadway Type: Non-intersection: No special feature
Severity: Poss/Unk **Manner of Crash:**Rear-end
Fatalities:0 **Surface Conditions:**Dry
Major Injuries:0 **Light Conditions:**Daylight
Minor Injuries:0 **Weather Conditions:**Clear
Possible Injuries:1 **Drug/Alc Involved:**none indicated
Unknown Injuries:0 **Property Damage:**$850 **Number of Vehicles:**2

	Unit 1	Unit 2	Unit 3
Init Trav Dir:	West	West	0
Veh Action:	Essentially straight	Stopped for sign/signal	0
Configuration:	Passenger car	Passenger car	0
Driver Age:	16	47	0
Driver Gender:	M	F	
Driver Cond:	Normal	Normal	0
Drivr Contr 1:	Followed too close	none	0
Drivr Contr 2:	not reported	not reported	0
Fixed Object:	none	none	0

7/26/2016 Crash Mapping Analysis Tool

Iowa Department of Transportation

Crash Detail Report

SE 16th St & Duff Ave

Report Version 1.3 Aug 2006

2013760927 10/01/2013 16:10 SE 16TH ST AND US 69/S DUFF AVE AND S 16TH ST
County:85 **City:**Ames

Major Cause:FTY making left turn
Roadway Type: Intersection: Four-way intersection
Severity: Minor **Manner of Crash:**Angle, oncoming left turn
Fatalities:0 **Surface Conditions:**Dry **Major**
Injuries:0 **Light Conditions:**Daylight
Minor Injuries:1 **Weather Conditions:**Clear
Possible Injuries:1 **Drug/Alc Involved:**none indicated
Unknown Injuries:0 **Property Damage:**$7500 **Number of Vehicles:**3

	Unit 1	Unit 2	Unit 3
Init Trav Dir:	South	North	West
Veh Action:	Turning left	Essentially straight	Stopped for sign/signal
Configuration:	Passenger car	Passenger car	Sport utility vehicle
Driver Age:	60	28	21
Driver Gender:	F	F	F
Driver Cond:	Normal	Normal	Normal
Drivr Contr 1:	FTY making left turn	none	none
Drivr Contr 2:	not reported	not reported	not reported
Fixed Object:	none	none	none

2014780487 01/12/2014 12:35 US 69/1500 BLK S DUFF AVE
County:85 **City:**Ames

Major Cause: Followed too close
Roadway Type: Non-intersection: No special feature
Severity: Minor **Manner of Crash:**Rear-end
Fatalities:0 **Surface Conditions:**Wet
Major Injuries:0 **Light Conditions:**Daylight
Minor Injuries:2 **Weather Conditions:**Cloudy
Possible Injuries:0 **Drug/Alc Involved:**none indicated
Unknown Injuries:0 **Property Damage:**$11000 **Number of Vehicles:**2

	Unit 1	Unit 2	Unit 3
Init Trav Dir:	North	North	0
Veh Action:	Essentially straight	Slowing/stopping	0
Configuration:	Passenger car	Passenger car	0
Driver Age:	21	49	0
Driver Gender:	M	M	
Driver Cond:	Normal	Normal	0
Drivr Contr 1:	Followed too close	none	0
Drivr Contr 2:	not reported	not reported	0
Fixed Object:	none	none	0

7/26/2016 Crash Mapping Analysis Tool

Iowa Department of Transportation

Crash Detail Report

SE 16th St & Duff Ave

Report Version 1.3 Aug 2006

2014788140 02/25/2014 11:21 SE 16TH ST AND US 69/S DUFF AVE AND S 16TH ST
County:85 **City:**Ames

Major Cause: Ran traffic signal
Roadway Type: Intersection: Four-way intersection
Severity: Poss/Unk **Manner of Crash:**Broadside
Fatalities:0 **Surface Conditions:**Snow
Major Injuries:0 **Light Conditions:**Daylight
Minor Injuries:0 **Weather Conditions:**Cloudy
Possible Injuries:1 **Drug/Alc Involved:**none indicated
Unknown Injuries:0 **Property Damage:**$6500 **Number of Vehicles:**2

	Unit 1	Unit 2	Unit 3
Init Trav Dir:	West	South	0
Veh Action:	Essentially straight	Essentially straight	0
Configuration:	Passenger car	Passenger car	0
Driver Age:	19	22	0
Driver Gender:	M	F	
Driver Cond:	Normal	Normal	0
Drivr Contr 1:	Ran traffic signal	none	0
Drivr Contr 2:	not reported	not reported	0
Fixed Object:	none	none	0

2014810711 07/28/2014 16:32 SE 16TH ST AND US 69/S DUFF AVE AND S 16TH ST
County:85 **City:**Ames

Major Cause:FTY making left turn
Roadway Type: Non-intersection: Business drive
Severity: Poss/Unk **Manner of Crash:**Broadside
Fatalities:0 **Surface Conditions:**Dry
Major Injuries:0 **Light Conditions:**Daylight
Minor Injuries:0 **Weather Conditions:**Partly cloudy
Possible Injuries:1 **Drug/Alc Involved:**none indicated
Unknown Injuries:0 **Property Damage:**$5000 **Number of Vehicles:**2

	Unit 1	Unit 2	Unit 3
Init Trav Dir:	North	East	0
Veh Action:	Turning left	Essentially straight	0
Configuration:	Passenger car	Passenger car	0
Driver Age:	21	22	0
Driver Gender:	M	M	
Driver Cond:	Normal	Normal	0
Drivr Contr 1:	FTY making left turn	none	0
Drivr Contr 2:	not reported	not reported	0
Fixed Object:	none	none	0

7/26/2016 Crash Mapping Analysis Tool

Iowa Department of Transportation

Crash Detail Report

SE 16th St & Duff Ave

Report Version 1.3 Aug 2006

2014826992 11/10/2014 17:37 SE 16TH ST AND US 69/S DUFF AVE AND S 16TH ST
County:85 **City:**Ames

Major Cause:FTY making left turn
Roadway Type: Intersection: Four-way intersection
Severity: Minor **Manner of Crash:**Angle, oncoming left turn
Fatalities:0 **Surface Conditions:**Dry
Major Injuries:0 **Light Conditions:**Dark - roadway lighted
Minor Injuries:1 **Weather Conditions:**Severe winds
Possible Injuries:3 **Drug/Alc Involved:**none indicated
Unknown Injuries:0 **Property Damage:**$13000 **Number of Vehicles:**2

	Unit 1	Unit 2	Unit 3
Init Trav Dir:	North	South	0
Veh Action:	Turning left	Essentially straight	0
Configuration:	Sport utility vehicle	Passenger car	0
Driver Age:	21	67	0
Driver Gender:	M	F	
Driver Cond:	Normal	Normal	0
Drivr Contr 1:	FTY making left turn	none	0
Drivr Contr 2:	not reported	not reported	0
Fixed Object:	none	none	0

2015870658 07/24/2015 12:50 SE 16TH ST AND US 69/S DUFF AVE AND S 16TH ST
County:85 **City:**Ames

Major Cause: Followed too close
Roadway Type: Non-intersection: No special feature
Severity: Poss/Unk **Manner of Crash:**Rear-end
Fatalities:0 **Surface Conditions:**Dry
Major Injuries:0 **Light Conditions:**Daylight
Minor Injuries:0 **Weather Conditions:**Clear
Possible Injuries:1 **Drug/Alc Involved:**none indicated
Unknown Injuries:0 **Property Damage:**$4199 **Number of Vehicles:**2

	Unit 1	Unit 2	Unit 3
Init Trav Dir:	South	South	0
Veh Action:	Essentially straight	Slowing/stopping	0
Configuration:	Passenger car	Sport utility vehicle	0
Driver Age:	49	50	0
Driver Gender:	F	M	
Driver Cond:	Normal	Normal	0
Drivr Contr 1:	Followed too close	none	0
Drivr Contr 2:	not reported	not reported	0
Fixed Object:	none	none	0

7/26/2016 Crash Mapping Analysis Tool

Iowa Department of Transportation

Crash Detail Report

SE 16th St & Duff Ave

Report Version 1.3 Aug 2006

2015871507 07/30/2015 17:35 SE 16TH ST AND US 69/S DUFF AVE AND S 16TH ST
County:85 **City:**Ames

Major Cause: Followed too close
Roadway Type: Intersection: Four-way intersection

Severity: Minor **Manner of Crash:**Rear-end
Fatalities:0 **Surface Conditions:**Dry
Major Injuries:0 **Light Conditions:**Daylight
Minor Injuries:1 **Weather Conditions:**Clear
Possible Injuries:0 **Drug/Alc Involved:**none indicated
Unknown Injuries:0 **Property Damage:**$5000 **Number of Vehicles:**3

	Unit 1	Unit 2	Unit 3
Init Trav Dir:	South	South	South
Veh Action:	Essentially straight	Essentially straight	Slowing/stopping
Configuration:	4-tire light truck	4-tire light truck	Passenger car
Driver Age:	57	54	48
Driver Gender:	M	F	M
Driver Cond:	Normal	Normal	Normal
Drivr Contr 1:	Followed too close	Followed too close	none
Drivr Contr 2:	not reported	not reported	not reported
Fixed Object:	none	none	none

2015881794 10/03/2015 15:33 SE 16TH ST AND US 69/S DUFF AVE AND S 16TH ST
County:85 **City:**Ames

Major Cause: Followed too close
Roadway Type: Intersection: Four-way intersection

Severity: Minor **Manner of Crash:**Rear-end
Fatalities:0 **Surface Conditions:**Dry
Major Injuries:0 **Light Conditions:**Daylight
Minor Injuries:1 **Weather Conditions:**Clear
Possible Injuries:0 **Drug/Alc Involved:**Alcohol: Statutory
Unknown Injuries:0 **Property Damage:**$2800 **Number of Vehicles:**2

	Unit 1	Unit 2	Unit 3
Init Trav Dir:	East	East	0
Veh Action:	Turning right	Stopped for sign/signal	0
Configuration:	Passenger car	Passenger car	0
Driver Age:	34	21	0
Driver Gender:	M	F	
Driver Cond:	Infl by alc/drugs/meds	Normal	0
Drivr Contr 1:	Followed too close	none	0
Drivr Contr 2:	not reported	not reported	0
Fixed Object:	none	none	0

7/26/2016 Crash Mapping Analysis Tool

J: Traffic Volumes and/or Turning Movements

Annualized Daily Traffic For All Vehicles

Station Number:

85216573099

Count Date:
Tuesday, March 22, 2011

County:
Story

Location Description:

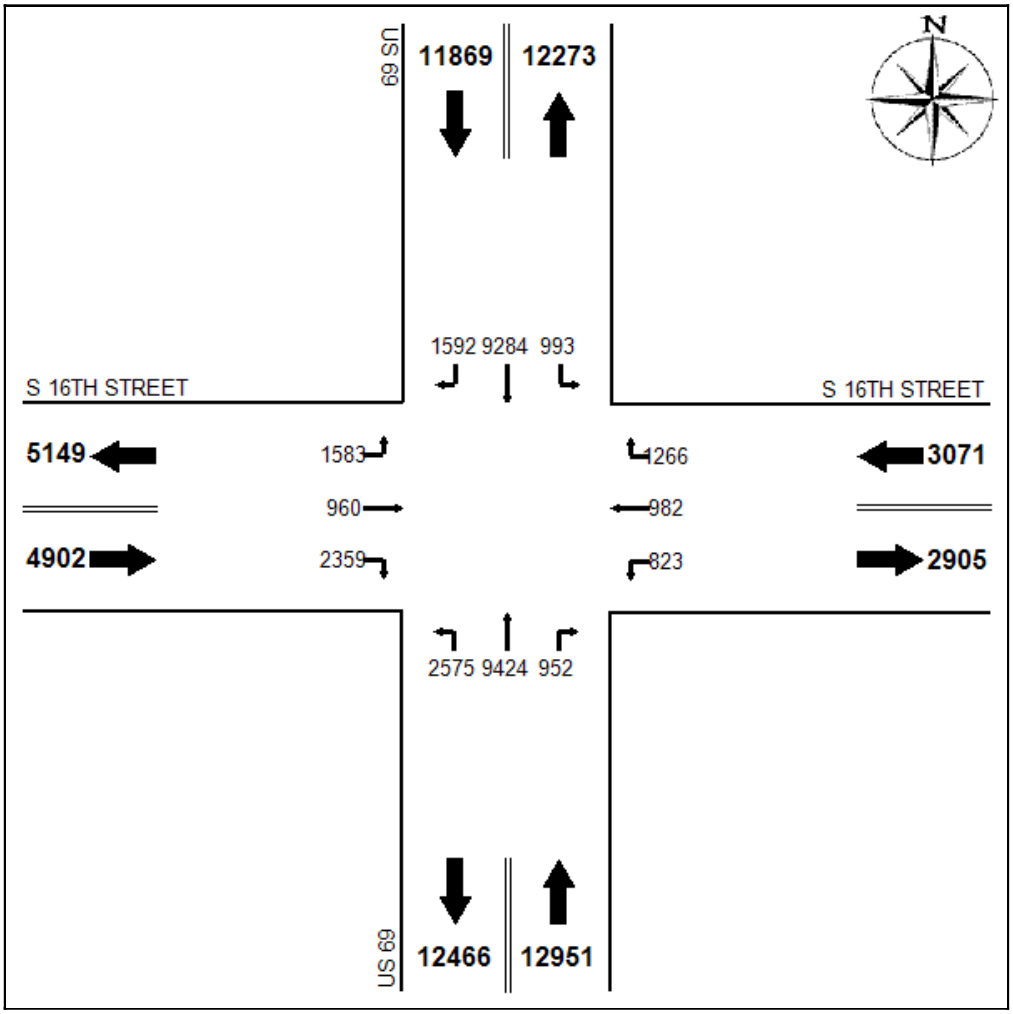
US 69 & S 16TH ST

Volume Factor : 1.944

Pass Class Factor: 1.968

SU Class Factor: 1.868

Combo Class Factor: 1.672



Raw Data-All Vehicles:

	N Leg			E Leg			S Leg			W Leg		
	L	*T*	*R*	*L*	*T*	*R*	*L*	*T*	*R*	*L*	*T*	*R*
07:00	27	334	79	33	71	44	266	666	84	38	37	87
08:00	79	383	80	33	56	45	243	582	96	59	59	86
11:00	64	599	108	49	64	124	150	704	59	137	78	127
12:00	121	756	163	77	88	122	167	723	69	172	75	189
15:00	74	853	100	79	59	99	122	659	75	85	67	225
16:00	57	896	126	71	77	112	157	677	55	148	82	223
17:00	84	906	154	78	85	98	205	787	47	167	92	264

Vehicle Type: Passenger Vehicles

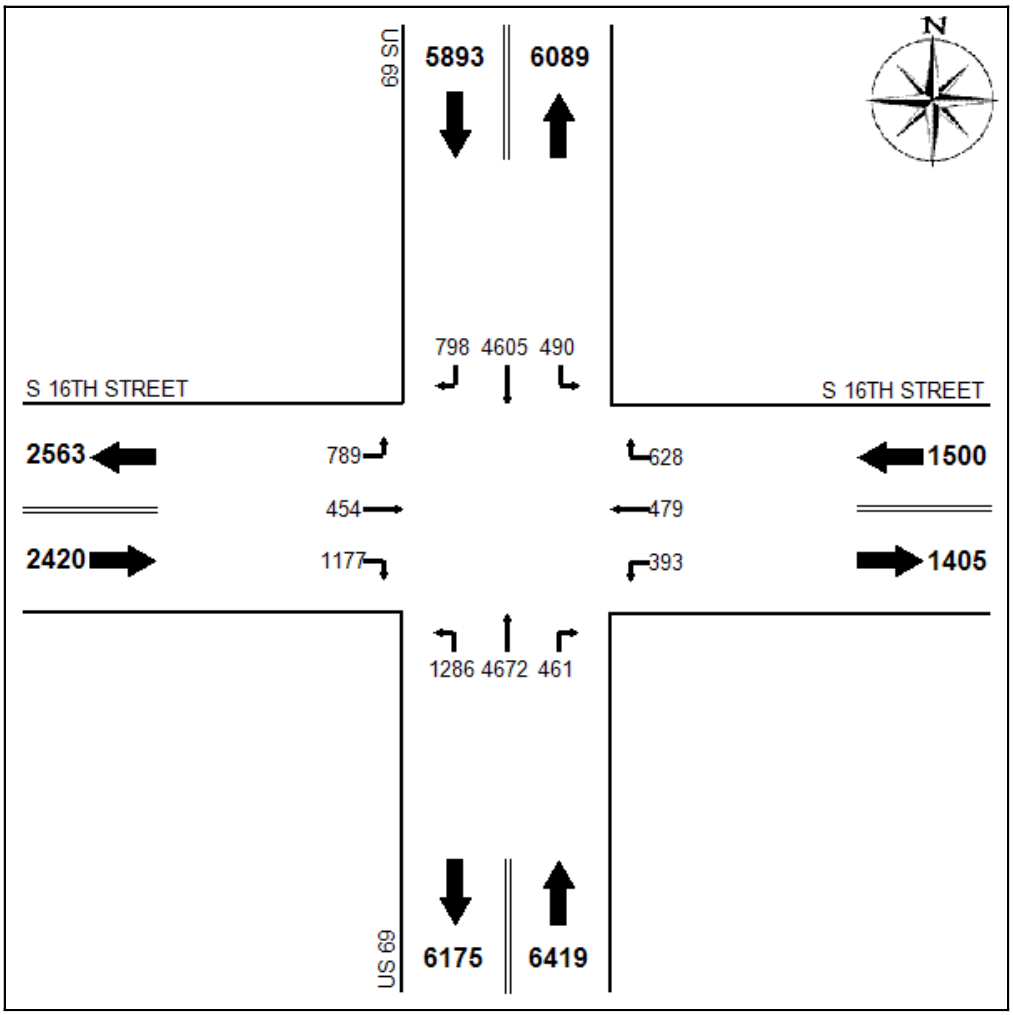
Station Number:
85216573099

Count Date:
Tuesday, March 22, 2011

County:
Story

Location Description:
US 69 & S 16TH ST

Volume Factor : N/A
Pass Class Factor: N/A
SU Class Factor: N/A
Combo Class Factor: N/A



Raw Data-Passenger Vehicles:

	N Leg			E Leg			S Leg			W Leg		
	L	*T*	*R*	*L*	*T*	*R*	*L*	*T*	*R*	*L*	*T*	*R*
07:00	26	318	78	30	61	42	263	644	79	37	37	86
08:00	75	358	78	26	53	41	237	557	92	57	54	81
11:00	62	575	105	42	63	121	145	687	55	133	69	122
12:00	118	734	159	76	83	119	161	702	66	164	70	184
15:00	72	839	100	76	58	96	121	644	71	84	58	220
16:00	55	881	125	67	76	111	155	660	52	147	75	221
17:00	82	900	153	76	85	98	204	778	46	167	91	263

Turning Movement Traffic Count Summary
Vehicle Type: Single-Unit Trucks

Station Number :85216573099

Count Date:

Tuesday, March 22, 2011

County:

Story

Location Description:

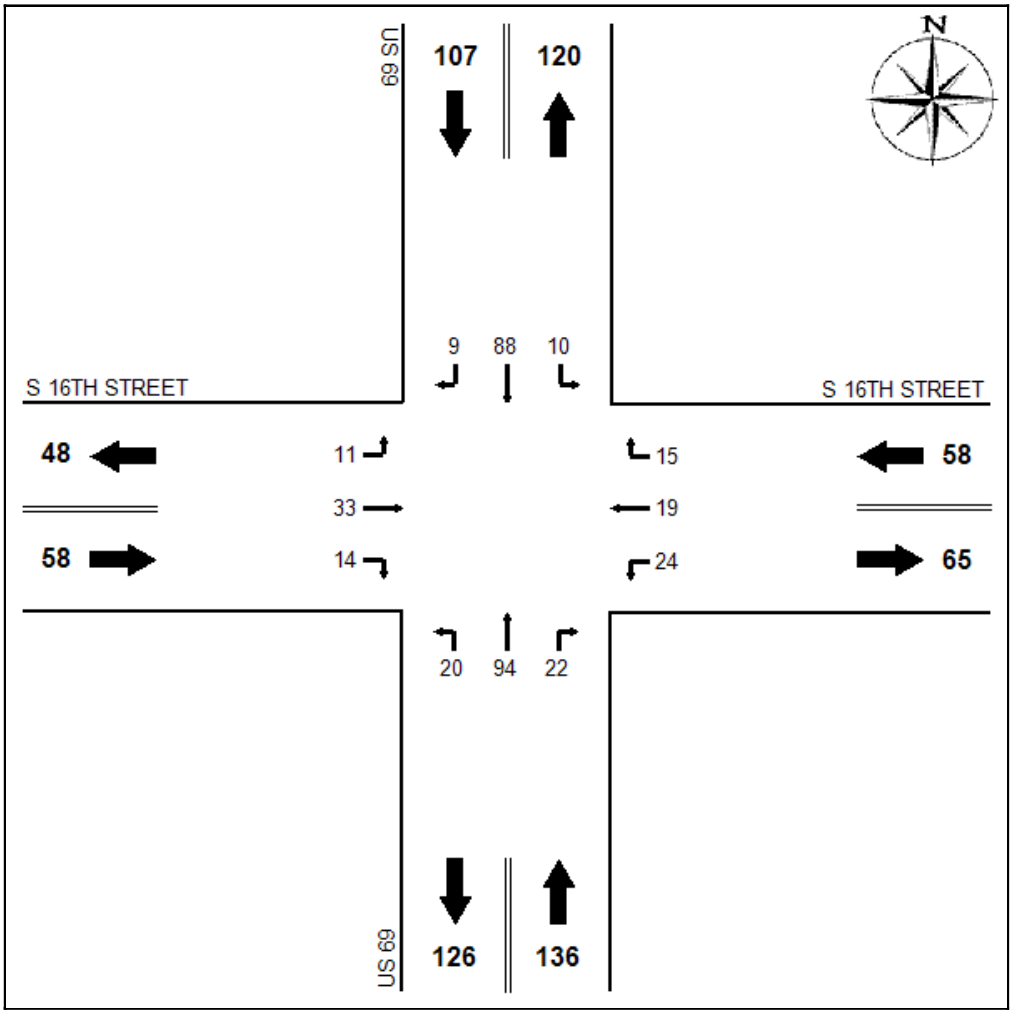
US 69 & S 16TH ST

Volume Factor : N/A

Pass Class Factor: N/A

SU Class Factor: N/A

Combo Class Factor: N/A



Raw Data-Single-Unit Trucks:

	N Leg			E Leg			S Leg			W Leg		
	L	*T*	*R*	*L*	*T*	*R*	*L*	*T*	*R*	*L*	*T*	*R*
07:00	1	14	1	3	9	2	2	18	5	0	0	0
08:00	3	16	2	5	2	4	5	17	3	1	5	4
11:00	1	19	2	7	1	3	4	1	4	3	8	2
12:00	2	14	3	0	5	3	6	1	2	5	4	3
15:00	1	9	0	3	1	2	1	14	4	1	8	3
16:00	1	12	1	4	1	1	2	15	3	1	7	2
17:00	1	4	0	2	0	0	0	8	1	0	1	0

Iowa Department of Transportation

Turning Movement Traffic Count Summary

Vehicle Type: Combination Trucks

Station Number:

85216573099

Count Date:

Tuesday, March 22, 2011

County:

Story

Location Description:

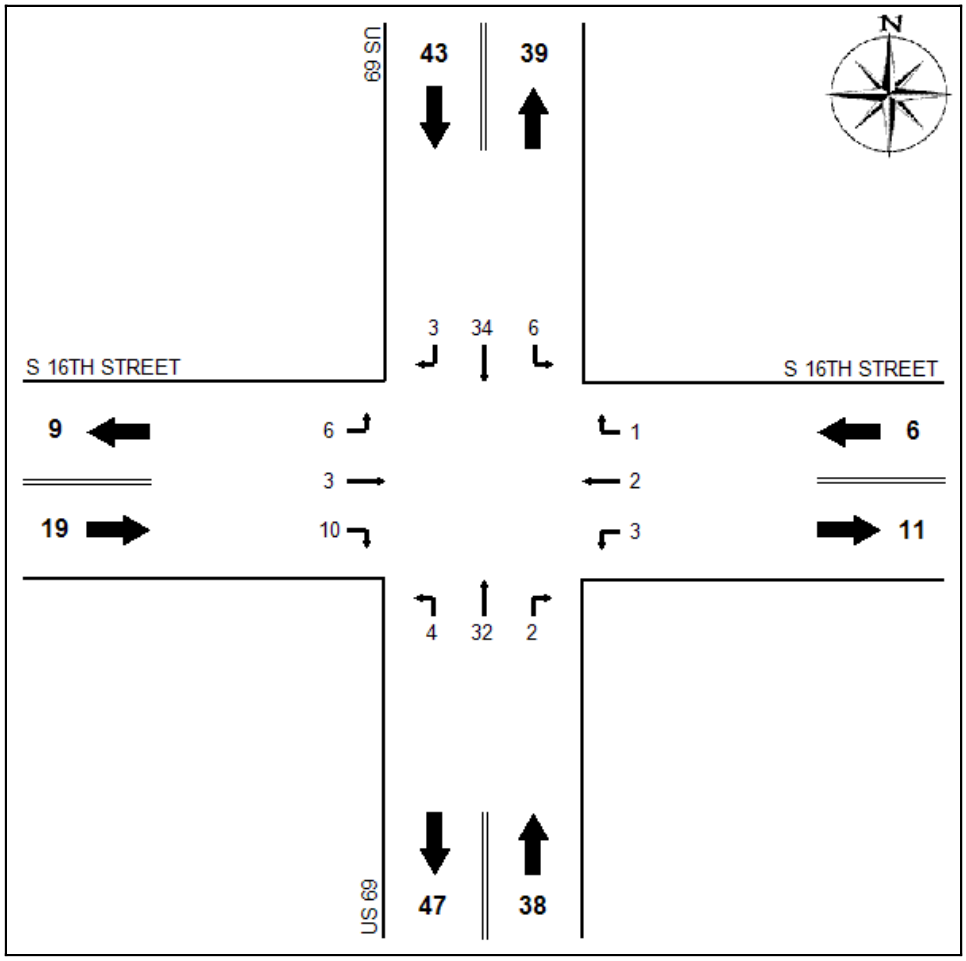
US 69 & S 16TH ST

Volume Factor : N/A

Pass Class Factor: N/A

SU Class Factor: N/A

Combo Class Factor: N/A



Raw Data-Combination Trucks:

	N Leg			E Leg			S Leg			W Leg		
	L	*T*	*R*	*L*	*T*	*R*	*L*	*T*	*R*	*L*	*T*	*R*
07:00	0	2	0	0	1	0	1	4	0	1	0	1
08:00	1	9	0	2	1	0	1	8	1	1	0	1
11:00	1	5	1	0	0	0	1	6	0	1	1	3
12:00	1	8	1	1	0	0	0	10	1	3	1	2
15:00	1	5	0	0	0	1	0	1	0	0	1	2
16:00	1	3	0	0	0	0	0	2	0	0	0	0
17:00	1	2	1	0	0	0	1	1	0	0	0	1

K: Traffic Signals

See **Section G** for illustration of proposed traffic signal installation – Traffic signal poles would be replaced in each of the four quadrants. It is anticipated that the proposed traffic signal poles would be located within existing right-of-way, greater than ten feet offset from the face of the curb/edge of travel way and stand alone pedestrian push button poles would be constructed adjacent to the sidewalk facilities. It is anticipated that the existing traffic signal controller cabinet would be replaced with a new cabinet located in the same southeast quadrant.

L: Benefit/Cost Ratio Worksheet

Rev. 5/14

Intersection or Spot Benefit / Cost Safety Analysis

Iowa DOT Office of Traffic & Safety

County: Story Prepared by: HR Green, Inc. Date Prepared: Jul 26, 2016

Intersection: U.S. Hwy 69 (S. Duff Ave) and S 16th Street, Ames, Iowa

Improvement

Proposed Improvement(s): Installation of dedicated left turn lanes along South 16th Street. Restriction of frontage road along South Duff Avenue to right-in and right-out only.

$ 495,000	Estimated Improvement Cost, **EC**	15	Est. Improvement Life, years, **Y**
	Other Annual Cost (after initial year), **AC**	28	Crash Reduction Factor (integer), **CRF**
$ -	Present Value Other Annual Costs, **OC**	4.0%	Discount Rate (time value of $), **INT**
	$ 495,000		Present Value Cost, **COST** = EC + OC

$$OC = \frac{AC}{INT}\left(1 - \frac{1}{(1+INT)^{Y}}\right)$$

Traffic Volume Data

Source: Iowa DOT 2011 Traffic Count 2011 Date of traffic count

Daily Entering Vehicles by Approach (or AADT / 2)

11,869

4,902 3,071

12,951

11,969,445 Current Annual Entering Veh., **AEV** = DEV * 365

35,605 veh / day, Final Year DEV, **FDEV**

186.62 MEV, Total Million Entering Veh. Over life of Project, **TMEV**

0.6% Projected Traffic Growth (0 %-10 %), **G**

32,793 Current Daily Entering Vehicles, **DEV**

$$TMEV = \frac{AEV}{-G}\left(\left(\frac{1+G}{1}\right)^{Y} - 1\right) / 10^{6}$$

Crash Data

2011	First full year -->	2015	Last full year		5.0 years, Time Period, **T**		
0	Additional months				values as of May 2014		
0	Fatal Crashes	0	Fatalities @		$4,500,000	$	-
		0	Major Injuries @		$325,000	$	-
18	Injury Crashes	9	Minor Injuries @		$65,000	$	585,000
		9	Possible Injuries @		$35,000	$	315,000
56	Property Damage Only		(assumed cost per crash)		$7,400	$	-
		-OR-	enter all Property Costs of all crashes:			$	398,854
74	Total Crashes, **TA**				Total $ Loss, **LOSS**	$	1,298,854

	14.80 Current Crashes / Year, **AA** = TA / T	1.24	Crashes / MEV, Crash Rate, **CR**
$	17,552 Cost per Crash, **AVC** = LOSS / TA		CR = TA x 10^6 / (DEV x 365 x T)
	230.8 Total Expected Crashes, **TECR** = CR x TMEV	$ 837,242	Present Value of Avoided
	4.14 Crashes Avoided First Year **AAR** = AA x CRF / 100		Crashes, **BENEFIT**
$	72,736 Crash Costs Avoided in First Year, AAR x AVC		
	64.6 Total Avoided Crashes, TECR x CRF/ 100		

$$BEN = \frac{AVC \times AAR}{(INT - G)}\left(\frac{1+G}{1+INT}\right)^{Y}$$

Benefit / Cost Ratio

Benefit : Cost = $837,242 : $495,000 = **1.69** : 1

SHIVEHATTERY
ARCHITECTURE + ENGINEERING

August 12, 2016

Steven Schroder, P.E.
Office of Traffic and Safety
Iowa Department of Transportation
800 Lincoln Way
Ames, Iowa 50010

Dear Mr. Schroder,

Included is the Traffic Safety Improvement Program Application for a site specific improvement in the City of Waukee, Iowa. The intersection identified for the improvements is SE Boone Drive & SE Olson Drive. The Benefit/ Cost spreadsheet is submitted in PDF and excel format. If you have any questions regarding the material submitted in the application please feel free to contact me by phone or e-mail.

Sincerely,

SHIVE-HATTERY, INC.

Nathan Hardisty, PE
Civil Engineer
(515) 223-8104
nhardisty@shive-hattery.com

Project #4164180

Traffic Safety Improvement Program Application

SE Boone Dr. & SE Olson Dr.
Waukee, Iowa
August 12, 2016

Prepared by:
SHIVEHATTERY
ARCHITECTURE + ENGINEERING
4125 Westown Pkwy, Ste. 100
West Des Moines, IA 50266
(515) 223-8104

Application for TRAFFIC SAFETY FUNDS

GENERAL INFORMATION **DATE:** 8/12/2016

Location / Title of Project S Boone Drive & S Olson Drive

Applicant City of Waukee

Contact Person John R. Gibson Title Director of Public Works

Complete Mailing Address 805 University Avenue
Waukee, IA 50263

Phone 515-978-7920 (Area Code) E-Mail jgibson@waukee.org

If more than one highway authority is involved in this project, please indicate and fill in the information below (use additional sheets if necessary).

Co-Applicant(s) _____

Contact Person _____ Title _____

Complete Mailing Address _____

_____

Phone _____ (Area Code) E-Mail _____

PLEASE COMPLETE THE FOLLOWING PROJECT INFORMATION:

Application Type

- Site Specific ☒
- Traffic Control Device ☐
- Safety Study ☐

Funding Amount

Total Safety Cost	$ 185,450
Total Project Cost	$ 185,450
Safety Funds Requested	$ 185,450

Does this project appear on a Safety Improvement Candidate List or is there a safety study recommendation for this project?
☐ Yes – Explain _____
☒ No

Rev. 6/16

APPLICATION CERTIFICATION FOR LOCAL GOVERNMENT

To the best of my knowledge and belief, all information included in this application is true and accurate, including the commitment of all physical and financial resources. This application has been duly authorized by the participating local government(s). I understand the attached resolution(s) binds the participating local government(s) to assume responsibility if any additional funds are committed, and to ensure maintenance of any new or improved city streets or secondary roads.

I understand that, although this information is sufficient to secure a commitment of funds, a firm contract between the applicant and the Department of Transportation is required prior to the authorization of funds.

Representing the City of Waukee

Signed: _____ 8/12/16
Signature Date Signed

John R. Gibson
Typed Name

Attest: Beth Richardson 8/12/16
Signature Date Signed

Beth Richardson
Typed Name

THE CITY OF WAUKEE, IOWA

RESOLUTION 16-344

AUTHORIZING THE CITY OF WAUKEE, IOWA, TO SUBMIT AN APPLICATION TO THE IOWA DEPARTMENT OF TRANSPORTATION TRAFFIC SAFETY IMPROVEMENT PROGRAM FOR FUNDING FOR THE SE BOONE DRIVE AND SE OLSON DRIVE INTERSECTION IMPROVEMENTS PROJECT

IN THE NAME AND BY THE AUTHORITY OF THE CITY OF WAUKEE, IOWA

WHEREAS, the City of Waukee, Iowa is a duly organized municipality within Dallas County; **AND,**

WHEREAS, the Iowa Department of Transportation has established the Traffic Safety Improvement Program and provides funding for locations where vehicular safety is a concern and documented; **AND,**

WHEREAS, the intersection of SE Boone Drive and SE Olson Drive has been identified as a location where vehicular safety and traffic flow could be improved and funded by Traffic Safety Improvement Program; **AND,**

WHEREAS, the City of Waukee has determined the conversion of the existing SE Boone Drive and SE Olson Drive intersection to a mini roundabout from the existing four way stop will decrease accidents and improve traffic operations.

NOW THEREFORE BE IT RESOLVED by the City of Waukee City Council in session this 8th day of August, 2016, that:

1. City Council supports and approves the application for Traffic Safety Improvement Program funding.
2. The City Council hereby commits the additional City funds necessary for construction of the project beyond and Traffic Safety Improvement Program funding.
3. The City Council hereby commits to accepting and maintaining these improvements.
4. The Mayor hereby authorized to execute the application on behalf of the City.

William F. Peard, Mayor

Attest:

Rebecca D. Schuett, City Clerk

ROLL CALL VOTE	AYE	NAY	ABSENT	ABSTAIN
Anna Bergman	X			
Brian Harrison			X	
Shelly Hughes	X			
Larry R. Lyon	X			
Rick Peterson	X			

Background

The City of Waukee is planning to make improvements to the intersection of SE Boone Drive and SE Olson Drive. The improvements are targeted at improving safety and reducing delay at the intersection.

SE Boone Drive is a two lane minor arterial with a posted speed of 35 MPH. SE Olson Drive is a major collector to the west of SE Boone Drive and a minor collector to the east with a posted speed limit of 25 MPH. The intersection is currently a 4-way stop including flashing beacons mounted above the stops signs on SE Boone Drive. See section F for existing conditions.

Eight of 18 crashes (44%) at this location were attributed to running the stop signs on SE Boone Drive. Another eight of 18 crashes (44%) were rear-end collisions attributed to following to close or speed along SE Boone Dr. There is a known compliance issue with the stop sign on SE Boone Drive which prompted the installation of the flashing beacons. At peak times, vehicles along SE Boone Drive back up several hundred feet north and south of the intersection making drivers impatient causing them to not follow the all-way stop controlled protocol. This contributes to the congestion and ultimately causes safety concerns which is evident with the rear-end collisions and injuries.

Proposed Improvements

The proposed improvements are to construct a mini roundabout to address the failure to yield to the SE Boone Drive stop sign and reduce the conditions for rear-end collisions by reducing speeds with properly designed raised splitter islands. The central island will be raised to deter motorist from traveling through the island while remaining fully traversable for trucks, buses, and larger vehicles. The central island will be constructed with colored or stained concrete to contrast in color. Raised splitter islands will be added on all legs to direct vehicles into and out of the roundabout, these will be colored similar to the central island. Included in the improvements is lighting to illuminate the pedestrian cross walks and approaches to the mini roundabout. Refer to Section G for proposed improvements.

The proposed improvements will provide the City of Waukee and users with a safer intersection for all modes of travel including the following benefits:

- allows pedestrians to cross one lane of traffic at a time
- vehicles are moving at slower speeds
- less vehicle and pedestrian conflicts
- motorists only have to monitor vehicles from the left
- reduced queues to reduce the noncompliance issue

The National Cooperative Highway Research Program (NCHRP) report 672 states that injury crash reductions of approximately 76% are achieved when intersections are converted from a signal or stop control to a roundabout. The mini roundabout at this location is expected to result in similar reductions in the number of injury crashes per year.

SHIVEHATTERY
ARCHITECTURE + ENGINEERING

Proposed Public Improvements - Mini-Roundabout
SE Boone Dr & SE Olson Dr

Waukee, Iowa
Engineer's Rough Order Magnitude of Cost
Estimate of Quantities - August 12, 2016

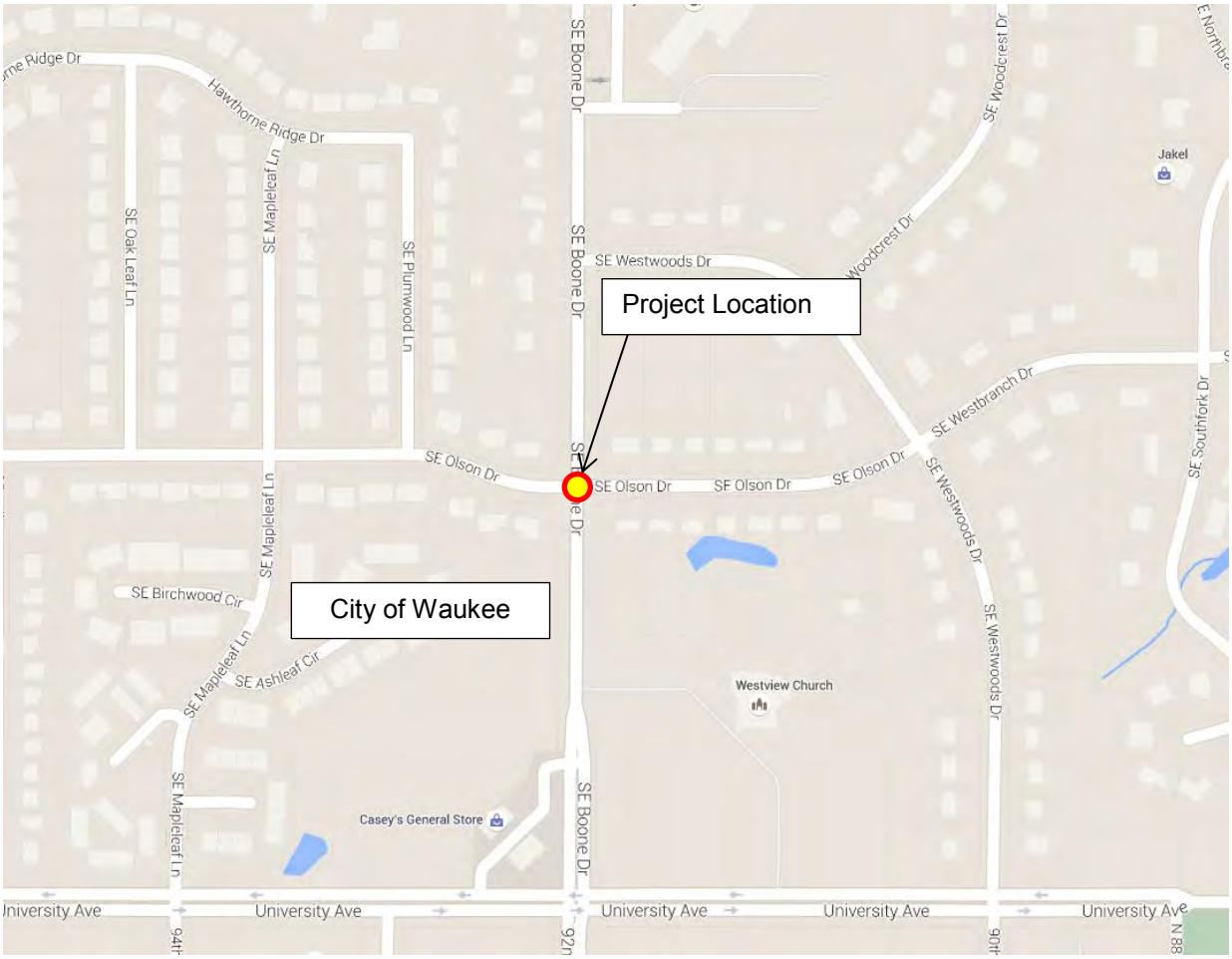
Item No	Description	Unit	Unit Price	Quantity	Cost
1	Traffic Control	LS	$ 15,000	1	$ 15,000
2	Mobilization	LS	$ 15,000	1	$ 15,000
3	Removal of Pavement	SY	$ 8	350	$ 2,800
4	Removal of Sidewalk	SY	$ 12	275	$ 3,300
5	PCC Pavement, Colored, 8"	SY	$ 120	225	$ 27,000
6	PCC Pavement, 8"	SY	$ 85	150	$ 12,750
7	PCC Sidewalk, 5"	SY	$ 65	260	$ 16,900
8	Detectable Warning Panel	SF	$ 45	160	$ 7,200
9	Modified Subbase, 6"	TON	$ 60	300	$ 18,000
10	Durable Pavement Markings and Signage	LS	$ 5,000	1	$ 5,000
11	Street Lighting	EA	$ 10,000	4	$ 40,000
12	Imported Top Soil	CY	$ 50	50	$ 2,500
13	Sodding	SQ	$ 60	150	$ 9,000
14	Erosion Control & Administration	LS	$ 1,000	1	$ 1,000
15	Construction Survey	LS	$ 5,000	1	$ 5,000
16	Storm Sewer Improvements	LS	$ 5,000	1	$ 5,000
	TOTAL COST OPINION				$ 185,450

Assumptions
*Full Depth Pavement vs. Dowled-On Medians
*Colored Concrete vs. PCC Pavers

*The Architect/Engineer, as a design professional familiar with the construction industry, has prepared this opinion of the Probable Cost of Construction. It is recognized, however, that neither the Architect/Engineer nor the Owner has control over the cost of labor, materials, or equipment, over the Contractor's method of determining bid prices, or over competitive bidding, market, or negotiating conditions. Accordingly, the Architect/Engineer cannot and does not warrant or represent which bids or negotiated prices will not vary from the Probable Cost of Construction.

Improvements to the SE Boone Drive & SE Olson Drive Intersection which are to be funded through Traffic Safety Improvement Fund. The schedule proposed for the safety improvements is as follows:

- **August 2016** – Submit for 2016 TSIP Funds
- **December 2016** – TSIP Funds are awarded
- **January 2017** – Proceed with design of improvements
- **May 2017** –Let intersection project
- **Summer 2017** – Construction begins
- **July 2017** –TSIP funds are available for the SE Boone Dr. & SE Olson Dr. Intersection Improvements
- **August 2017** – Construction complete


Project Location
City of Waukee
Hawthorne Ridge Dr
SE Boone Dr
SE Woodcrest Dr
Jakel
SE Oak Leaf Ln
SE Mapleleaf Ln
SE Plumwood Ln
SE Westwoods Dr
Woodcrest Dr
SE Westbranch Dr
SE Olson Dr
SE Southfork Dr
SE Birchwood Cir
SE Ashleaf Cir
Westview Church
Casey's General Store
University Ave

Looking West from SE Olson Dr., East Approach*

Looking East from SE Olson Dr., West Approach*

Looking South from SE Boone Dr., North Approach*

Looking North from SE Boone Dr., North Approach*

*Source: Google®

24' B-B

TRAVERSABLE CENTRAL ISLAND

TRAVERSABLE TURNING APRON

64' ICD

10' CROSSWALK (TYP.)

SPLITTER ISLAND

SE Olson Dr

38' B-B

28' B-B

SE Westbranch Dr

14' (TYP.)

LUMINAIRE (TYP.)

5' SIDEWALK (TYP.)

20' (TYP.)

SE Boone Dr

ROUNDABOUT SIGN (TYP.)

Legend

- Full Depth PCC
- Colored PCC
- Sidewalk
- Sidewalk Removal

CRASH HISTORY (2006-2016)

Fatal:	0
Major Injury:	1
Minor Injury:	1
Possible/Unknown:	3
Property Damage Only:	13
TOTAL:	18

SHIVEHATTERY
ARCHITECTURE + ENGINEERING

Waukee
THE KEY TO GOOD LIVING

SE BOONE DR & SE OLSON DR
WAUKEE, IOWA
07.19.16

INTERSECTION IMPROVMENTS

SCALE
0 10 20
SCALE IN FEET

EXHIBIT: 1

Project Location
SE Olson Dr
SE Boone Dr
SE Olson Dr

Iowa Department of Transportation

Major Cause Summary

0

Report Version 1.1 Jan 2005

Analysis Years: 2006 [3], 2007 [4], 2008 [1], 2009 [1], 2010 [2], 2011 [1], 2012 [1], 2014 [2], 2015 [1], 2016 [2]

Crash Summary:

Fatal	-
Major Injury	1
Minor Injury	1
Possible/Unknown	3
PDO	13
Total Crashes	18

Injury Summary:

Fatal	-
Major Injury	1
Minor Injury	4
Possible	4
Unknown	-
Total Injuries	9

TOT Property Damage: $145,484

AVG Property Damage: $8,082

Surface Condition Summary:

Dry	16
Wet	1
Ice	-
Snow	1
Slush	-
Sand/Dirt/Oil/Gravel	-
Water	-
Other	-
Unknown	-
Not Reported	-
Total Crashes	18

Major Cause Summary:

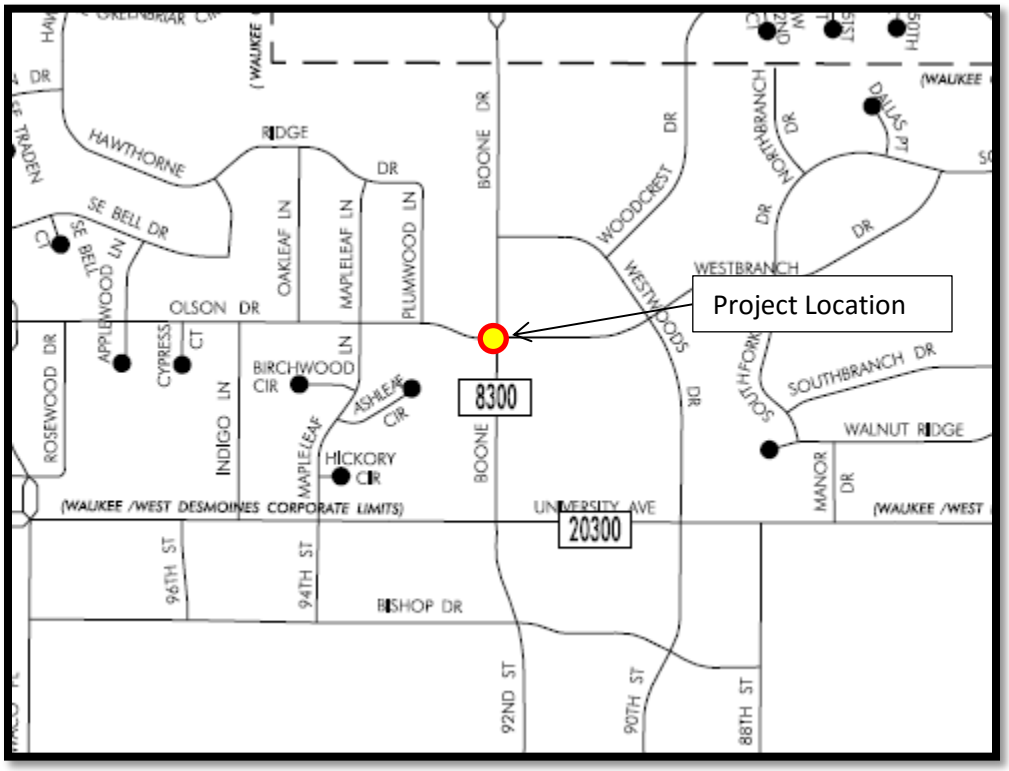
	Animal		Improper Backing
1	Ran Traffic Signal		Illegally Parked/Unattended
6	Ran Stop Sign	1	Swerving/Evasive Action
	Crossed Centerline		Over-Correcting/Over-Steering
	FTYROW: At Uncontrolled Intersection		Downhill Runaway
	FTYROW: Making Right Turn on Red Signal		Equipment Failure
1	FTYROW: From Stop Sign		Separation of Units
	FTYROW: From Yield Sign		Ran Off Road - Right
	FTYROW: Making Left Turn		Ran Off Road - Straight
	FTYROW: From Driveway		Ran Off Road - Left
	FTYROW: From Parked Position		Lost Control
	FTYROW: To Pedestrian		Inattentive/Distracted By: Passenger
	FTYROW: Other (explain in narrative)		Inattentive/Distracted By: Use of Phone or Other
	Traveling Wrong Way or on Wrong Side of Rd		Inattentive/Distracted By: Fallen Object
1	Driving Too Fast for Conditions		Inattentive/Distracted By: Fatigued/Asleep
1	Exceeded Authorized Speed		Other: Vision Obstructed
	Made Improper Turn		Oversized Load/ Oversized Vehicle
	Improper Lane Change		Cargo/Equipment Loss or Shift
5	Followed Too Close	2	Other: Other Improper Action
	Disregarded Railroad Signal		Unknown
	Disregarded Warning Sign		Other: No Improper Action
	Operating Vehicle in Reckless/Aggressive Manner		None Indicated

Selection Filter:

None

Analyst:

Notes:



2014 Iowa DOT Traffic Map

Road Name	2014 Iowa DOT AADT
SE Boone Dr	8300
SE Olson Dr	N/A

Intersection or Spot Benefit / Cost Safety Analysis

Rev. 5/14

Iowa DOT Office of Traffic & Safety

County: Dallas | Prepared by: Shive-Hattery | Date Prepared: Aug 12, 2016

Intersection: SE Boone Dr & SE Olson Dr

Improvement

Proposed Improvement(s): Conversion to Mini Roundabout

Existing All-Way Stop

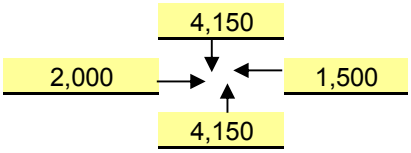
$ 205,380	Estimated Improvement Cost, **EC**	20	Est. Improvement Life, years, **Y**
	Other Annual Cost (after initial year), **AC**	65	Crash Reduction Factor (integer), **CRF**
$ -	Present Value Other Annual Costs, **OC**	4.0%	Discount Rate (time value of $), **INT**
		$ 185,450	Present Value Cost, **COST** = EC + OC

$$OC = \frac{AC}{INT}\left(1 - \frac{1}{(1+INT)^Y}\right)$$

Traffic Volume Data

Source: Iowa DOT | 2014 Date of traffic count

Daily Entering Vehicles by Approach (or AADT / 2)



4,307,000	Current Annual Entering Veh., **AEV** = DEV * 365
14,398	veh / day, Final Year DEV, **FDEV**
94.84	MEV, Total Million Entering Veh. Over life of Project, **TMEV**
1.0%	Projected Traffic Growth (0%-10%), **G**
11,800	Current Daily Entering Vehicles, **DEV**

$$TMEV = \frac{AEV}{-G}\left(1 - \left(\frac{1+G}{1}\right)^Y\right) \Big/ 10^6$$

Crash Data

2006	First full year -->	2015	Last full year	10.3 years, Time Period, **T**		
3	Additional months			values as of May 2014		
	Fatal Crashes		Fatalities @	$4,500,000	$	-
		1	Major Injuries @	$325,000	$	325,000
5	Injury Crashes	4	Minor Injuries @	$65,000	$	260,000
		4	Possible Injuries @	$35,000	$	140,000
13	Property Damage Only		(assumed cost per crash)	$7,400	$	133,200
		-OR-	enter all Property Costs of all crashes:			
18	Total Crashes, **TA**			Total $ Loss, **LOSS**	$	858,200

1.76	Current Crashes / Year, **AA** = TA / T	0.41	Crashes / MEV, Crash Rate, **CR**
$ 47,678	Cost per Crash, **AVC** = LOSS / TA		CR = TA x 10^6 / (DEV x 365 x T)
38.7	Total Expected Crashes, **TECR** = CR x TMEV	$ 803,858	Present Value of Avoided Crashes, **BENEFIT**
1.14	Crashes Avoided First Year **AAR** = AA x CRF / 100		
$ 54,422	Crash Costs Avoided in First Year, AAR x AVC		
25.1	Total Avoided Crashes, TECR x CRF/ 100		

$$BEN. = \frac{AVC \times AAR}{(INT - G)}\left(1 - \left(\frac{1+G}{1+INT}\right)^Y\right)$$

Benefit / Cost Ratio

Benefit : Cost = $803,858 : $185,450 = **4.33** : 1

Application for
Traffic Safety Improvement Program
Iowa Department of Transportation

US 6 (Hickman Rd) and Alice's Road
Intersection Improvements
Waukee, Iowa
August 15, 2016

Waukee
PUBLIC WORKS

August 11, 2016

Mr. Steven Schroder, P.E.
Office of Traffic & Safety
Iowa Department of Transportation
800 Lincoln Way
Ames, IA 50010

Dear Mr. Schroder:

The City of Waukee is pleased to submit, for your consideration, an application for funding assistance through the Traffic Safety Improvement Program (TSIP). The proposed project eligible for funding assistance and consideration is the US Highway 6 (Hickman Road) and Alice's Road Intersection Improvements Project.

The proposed project includes the addition of vehicle capacity to the intersection of US 6 with Alice's Road through roadway widening. Increased capacity will be obtained with an additional left turn lane, one through lane, and dedicated right turn lane on each approach of the intersection.

The added capacity is needed due to recent and anticipated traffic growth on US 6 and added traffic volume on Alice's Road from the recent extension and connection to Grand Prairie Parkway and Interstate 80. This project is consistent with the City of Waukee's capital improvement plan and included in the approved Des Moines Area Metropolitan Planning Organization's Transportation Improvement Program, and included in concepts included in recent draft recommendations with the Iowa DOT led US 6 Corridor Study.

The City is confident the analysis presented herein supports the applicability of the safety goals of the Traffic Safety Improvement Program and demonstrates the worthiness of the project for TSIP funding assistance.

Please feel free to contact me with any questions.

Sincerely,

John Gibson
Director Public Works
City of Waukee

John R. Gibson
Public Works Director
Cell: 515-707-5002
jgibson@Waukee.org

805 University Ave., Waukee, IA 50263
515-978-7920 • Waukee.org

Application for TRAFFIC SAFETY FUNDS

GENERAL INFORMATION **DATE:** August 15, 2016

Location / Title of Project US 6 & Alice's Rd Intersection Improvements

Applicant City of Waukee

Contact Person John Gibson Title Director of Public Works

Complete Mailing Address 805 University Avenue
Waukee, IA 50263

Phone (515)978-7920 E-Mail jgibson@waukee.org
(Area Code)

If more than one highway authority is involved in this project, please indicate and fill in the information below (use additional sheets if necessary).

Co-Applicant(s) _____

Contact Person _____ Title _____

Complete Mailing Address _____

_____

Phone _____ E-Mail _____
(Area Code)

PLEASE COMPLETE THE FOLLOWING PROJECT INFORMATION:

Application Type

- Site Specific ☒
- Traffic Control Device ☐
- Safety Study ☐

Funding Amount

Total Safety Cost	$ 695,000
Total Project Cost	$ 3,350,000
Safety Funds Requested	$ 500,000

Does this project appear on a Safety Improvement Candidate List or is there a safety study recommendation for this project?
☐ Yes – Explain _____
☒ No

Rev. 6/16

APPLICATION CERTIFICATION FOR LOCAL GOVERNMENT

To the best of my knowledge and belief, all information included in this application is true and accurate, including the commitment of all physical and financial resources. This application has been duly authorized by the participating local government(s). I understand the attached resolution(s) binds the participating local government(s) to assume responsibility if any additional funds are committed, and to ensure maintenance of any new or improved city streets or secondary roads.

I understand that, although this information is sufficient to secure a commitment of funds, a firm contract between the applicant and the Department of Transportation is required prior to the authorization of funds.

Representing the City of Waukee

Signed: _____ 8-11-16
Signature Date Signed

John R. Gibson
Typed Name

Attest: _____ 8-11-16
Signature Date Signed

Beth Richardson
Typed Name

THE CITY OF WAUKEE, IOWA

RESOLUTION 16-342

AUTHORIZING THE CITY OF WAUKEE, IOWA TO SUBMIT AN APPLICATION TO THE IOWA DEPARTMENT OF TRANSPORTATION TRAFFIC SAFETY IMPROVEMENT PROGRAM FUNDING FOR THE HICKMAN ROAD AND ALICE'S ROAD INTERSECTION IMPROVEMENTS PROJECT

IN THE NAME AND BY THE AUTHORITY OF THE CITY OF WAUKEE, IOWA

WHEREAS, the City of Waukee, Iowa is a duly organized municipality within Dallas County; **AND,**

WHEREAS, the Iowa Department of Transportation has established the Traffic Safety Improvement Program and provides funding for locations where vehicular safety is a concern and documented; **AND,**

WHEREAS, the intersection of Hickman Road and Alice's Road has been identified as a location where vehicular safety and traffic flow could be improved and funded by Traffic Safety Improvement Program; **AND,**

WHEREAS, the City of Waukee has determined that by providing addition of vehicle capacity to the intersection of Alice's Road with Hickman Road through roadway widening will help reduce crashes and improve traffic operations. Increased capacity will be obtained with an additional left turn lane, one through lane, and dedicated right turn lane on each approach of the intersection.

NOW THEREFORE BE IT RESOLVED by the City of Waukee City Council in session this 1st day of August, 2016, that:

1. City Council supports and approves the application for Traffic Safety Improvement Program funding.
2. The City Council hereby commits the additional City funds necessary for construction of the project beyond and Traffic Safety Improvement Program funding.
3. The City Council hereby commits to accepting and maintaining these improvements.
4. The Mayor hereby authorized to execute the application on behalf of the City.

William F. Peard, Mayor

Attest:

Rebecca D. Schuett, City Clerk

The City has completed the interchange project and Grand Prairie Parkway project to University Avenue (extension of Alice's Road). Included in the current City capital improvements program are continued improvements to Alice's Road and US 6 (Hickman Rd) to accommodate the growing traffic volumes on these two roads from the population growth within the City and also from the attractiveness of the connection to I80 as a regional route. Phase 4 of the plan is programmed for the 2017 construction season and includes widening of Alice's Road from University Avenue to 400 feet north of Olson Drive. Phase 5 of the plan is widening of Alice's Road from 400 feet north of Olson Drive to 1,000 feet north of US 6 including improvements to the intersection of US 6 as shown to the right. Phase 5 will include two parts; A - Alice's Road widening and B - US 6 intersection improvements. The Alice's Road widening portion is programmed with an estimated cost of $7.75 million and secured funding from the Des Moines MPO Surface Transportation Funds of $1.4 million. A table showing both portions of Phase 5 costs and funding sources is included in Section C. Section G/H shows the limits of the intersection improvement portion.

Figure 1: Phase 5 – Alice's Improvements

Existing Conditions

The City of Waukee is applying for Traffic Safety Improvement Program (TSIP) funding for safety improvements to the intersection of Alice's Road and US 6. The intersection is a four leg intersection with the west and east approaches providing two through lanes with designated left-turn and right-turn lanes. The north and south approaches each have one entering lane, a designated left-turn and right-turn lanes, and one through lane. Sidewalk is provided along the west side of the north approach and the Raccoon River Valley Trail (RRVT) runs along the north side of US 6 and crosses the north approach. The intersection is controlled by traffic signal with protected only left turn phasing for westbound/eastbound approaches and protected/permissive left turn phasing northbound/southbound on Alice's Road. The posted speed limits are 55 mph on US 6 and 45 mph on Alice's Road.

Recent development in the northwest quadrant of the intersection of Alice's Road and US 6 has increased traffic volumes on Alice's Road. Additionally more retail and residential development is

proposed north and west of the intersection. Recently Alice's Road was extended and connected to Grand Prairie Parkway and Interstate 80. A US 6 corridor Study form the west limits of Waukee to the I35/80 interchange is near completion by the Iowa DOT. The study addresses safety, operation, and future roadway needs based on the continuing traffic growth in the area, and is a cooperative effort with Waukee, Clive, and Urbandale.

Traffic Counts

Manual turning movement traffic counts were conducted during the peak periods in April of 2014. The peak hour counts were conducted from 6:45 to 8:45 AM, 11:00 AM to 1:00 PM, and 4:00 to 6:00 PM. The Iowa DOT conducted turning movement counts at the intersections in September of 2012 and obtained AADT on each leg of the intersection by applying expansion factors to the counts. The 2014 traffic Counts are included in Section J of this application. Figure 2 shows the 2012 AADT for each intersection leg. Waukee has been identified as one of the fastest growing cities in Iowa, and traffic volumes will continue to grow on Alice's Road and US 6. A conservative growth rate of 2% per year for traffic volumes was used for analysis.

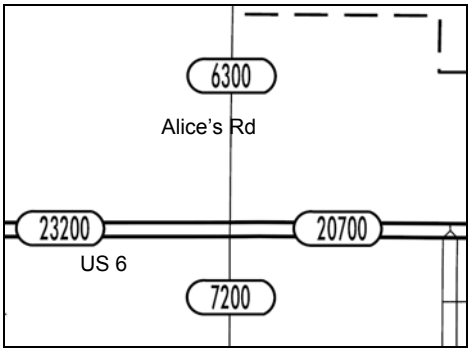


Figure 2: 2012 AADT

Crash History

A three year period from January 1, 2013 through December 31, 2015 of crash data was evaluated. The three year period was evaluated due to north/south improvements completed during the 2012 construction season for interim needs at the intersection. The intersection had 32 reported crashes per the Iowa DOT crash database, based on the assumed influence area of the intersection. The influence area was selected based on a distance of 300' from the center of the intersection on all approaches per typical vehicle queues and high posted speed limits. Of the 32 crashes, 5 crashes were caused by running traffic signal and 10 crashes were caused by following too close with 21 crashes rear end type of collisions. Twelve percent of the crashes occurred from 6:00 to 10:00 AM and 47% of the crashes occurred between 4:00 and 8:00 PM. Seventy-three percent of the crashes occurred during a weekday. Table 1 below summarizes the reported crashes at the intersection including injuries by severity.

Table 1: Crash (Injury) Severity Alice's Road and US 6, (2013-2015)

Year	Fatal	Major Injury	Minor Injury	Possible/ Unknown	PDO	Total	Amount of Property Damage
2013	-	-	1 (1)	3 (3)	6	10 (4)	$71,950
2014	-	-	-	3 (3)	6	9 (3)	$36,950
2015	-	1 (3)	1 (4)	3 (6)	8	13 (13)	$61,200
Total	**-**	**1 (3)**	**2 (5)**	**9 (12)**	**20**	**32 (20)**	**$170,100**

Existing Operational Analysis

The existing traffic volumes were utilized to analyze the current intersection operations. The data was analyzed using the Synchro 8 software, utilizing the Highway Capacity Manual (HCM) 2010 methods. The Iowa DOT policy is to design to Level of Service (LOS) C and the Des Moines Area MPO has adopted LOS D for intersection and corridor operation during typical weekday peak hour traffic

conditions. The AM and PM peak hours intersection LOS with existing traffic is E while the midday peak hour intersection LOS is C. During the AM peak hour, eastbound traffic is observed to queue approximately 1,000 feet and the westbound traffic during the PM peak hour is observed to queue the same distances. On Alice's Road during the AM and PM peak hours, traffic is observed to queue to SE Laurel Street(approx. 1,200 feet) for northbound traffic and the middle access to Hy-Vee (approx. 600 feet) for southbound traffic.

Proposed Improvements

Based on the above intersection safety performance, identified concerns, and projected traffic volume growth on US 6 and Alice's Road, the City of Waukee intends to complete improvements as outlined by the Iowa DOT's US 6 Corridor Study draft recommendation. Intersection improvements will include the following as shown in the proposed layout in Sections G/H:

US 6 - Both approaches

- Dual left turn lanes 300' storage length
- Right turn lane 300' storage
- Develop 3 through lanes (timing is pending overall corridor change)

Alice's Road – Both approaches

- Dual left turn lanes – 250' storage length
  - Convert northbound/southbound left turn signal phasing to protected only
- Right turn lane 200' storage length
  - Northbound third through lane will terminate as right turn only lane

Alice's Road – South approach

- Three through lanes in each direction south of US 6

Due to the widening, the traffic signal poles will be relocated to provide the preferred clear zone as outlined in the Iowa DOT Design Manual. The Raccoon River Valley Trail will be relocated along with the sidewalk on the west side of the north approach. New ADA compliant curb ramps will be constructed as part of the sidewalk/trail relocations. A 10 feet wide trail will be installed on the west side of the road and 5 feet wide sidewalk on the east side as part of the overall corridor improvement project.

The proposed improvements will improve capacity of the intersection, resulting in shorter vehicle delay and queues, decreased congestion, and improved travel time. With the positive effects of additional capacity, the safety of the intersection will be increased because of the uniform flow of traffic, reduction in number of stopped vehicles, lengthy vehicle queues well in advance of typical stopping locations, and reduced driver frustration due to delay. The projected reduction in vehicle delay during the peak hours is 40 seconds per vehicle. Protected only left turns in all direction will reduce left turn collisions as well. Given the higher speed nature of both corridors it is critical that variations in speed be minimized for through movements. The capacity improvements will improve safety by eliminating spillback from turn lanes, and improving ability to maximize green on the major through movements.

PROPOSED FUNDING SOURCES
US 6 & ALICE'S RD INTERSECTION IMPROVEMENTS

Phase 5 - Alice's Road Improvements	Cost	Funding		Local Funds
Phase 5A - Alice's Widening				
	$4.4M	$1.4M	STP	$3.0M
Phase 5B - US 6 & Alice's Rd Intersection Improvements				
	$3.35M	$500k	TSIP	
		$700k	ICAAP*	
		$400K	USTEP**	
5B Project Total	$3.35M	$1.6M		$1.75M
Phase 5 Total	**$7.75M**	**$3.0M**		**$4.75M**

*Note *ICAAP preliminary requested amount*
***Estimated request pending TSIP & ICAAP Funding Awarded*

INTERSECTION IMPROVEMENTS PROJECT COST
US 6 & ALICE'S RD INTERSECTION IMPROVEMENTS

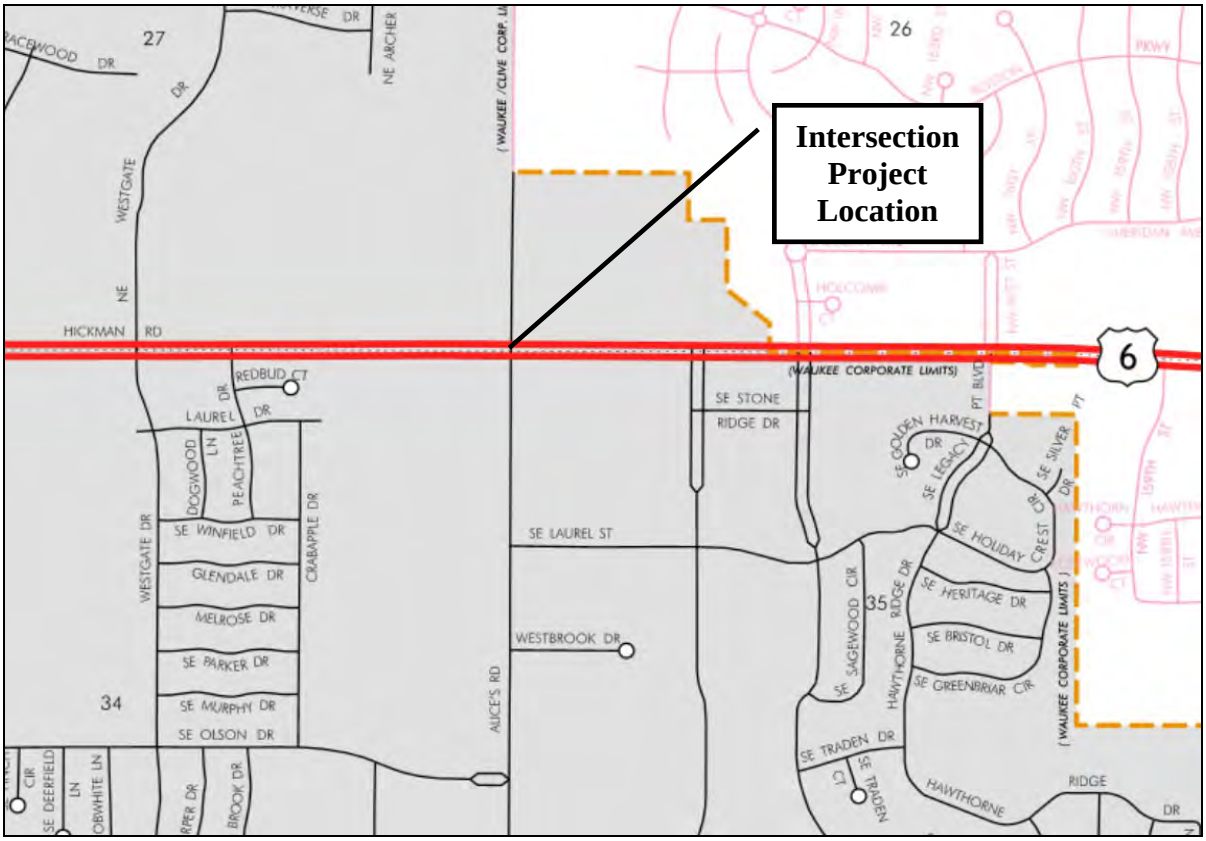
Item Number	Item Description	Estimated Quantity	Safety Portion	Unit	Unit Price	Estimated Safety Cost	Extended Amount
1	Pavement Removal	4,400	20%	SY	$ 10	$ 8,800	$ 44,000
2	Excavation, Class 10	8,500	20%	CY	$ 15	$ 25,500	$ 127,500
3	Storm Sewer Intakes	20	20%	EA	$ 6,000	$ 24,000	$ 120,000
4	Storm Sewer Pipe	400	20%	LF	$ 100	$ 8,000	$ 40,000
5	Subdrain	5,100	20%	LF	$ 15	$ 15,300	$ 76,500
6	Modified Subbase	4,900	20%	CY	$ 45	$ 44,100	$ 220,500
7	PC Concrete Pavment	12,700	20%	SY	$ 70	$ 177,800	$ 889,000
8	PC Concrete Sidewalk	3,500		SY	$ 40	$ -	$ 140,000
9	PC Concrete Median	800	50%	SY	$ 90	$ 36,000	$ 72,000
10	Pavment Markings	150	80%	STA	$ 75	$ 9,000	$ 11,250
11	Light Pole Replacement	16	50%	EA	$ 5,000	$ 40,000	$ 80,000
12	Restoration	1		LS	$ 20,000	$ -	$ 20,000
13	Erosion Control	1		LS	$ 10,000	$ -	$ 10,000
14	Traffic Signalization	1	50%	LS	$ 300,000	$ 150,000	$ 300,000
15	Traffic Control	1	20%	LS	$ 50,000	$ 10,000	$ 50,000
16	Mobilization	1	20%	LS	$ 120,000	$ 24,000	$ 120,000
					Subtotal	**$ 575,000**	**$2,320,000**
					Contingency (+/- 20%)	**$ 120,000**	**$ 460,000**
					Construction Costs	**$ 695,000**	**$2,780,000**
					Engineering (15%)		**$ 420,000**
					Right-of-Way		**$ 150,000**
					Total Project Cost		**$3,350,000**

Note: Improvements Cost Opinion per Iowa DOT US 6 Corridor Study

PROPOSED PROJECT SCHEDULE
US 6 & ALICE'S RD INTERSECTION IMPROVEMENTS
WAUKEE, IA

August 2016	TSIP Application
December 2016	ICAAP Application
December 2016 - February 2017	Iowa DOT Approval TSIP/ICAAP
February - March 2017	U-STEP Funding Request Funding Agreements
February – November 2017	Project Engineering & Plan Development
January 2018	Project Letting
February – December 2018	Project Construction to Substantial Completion

LOCATON MAP



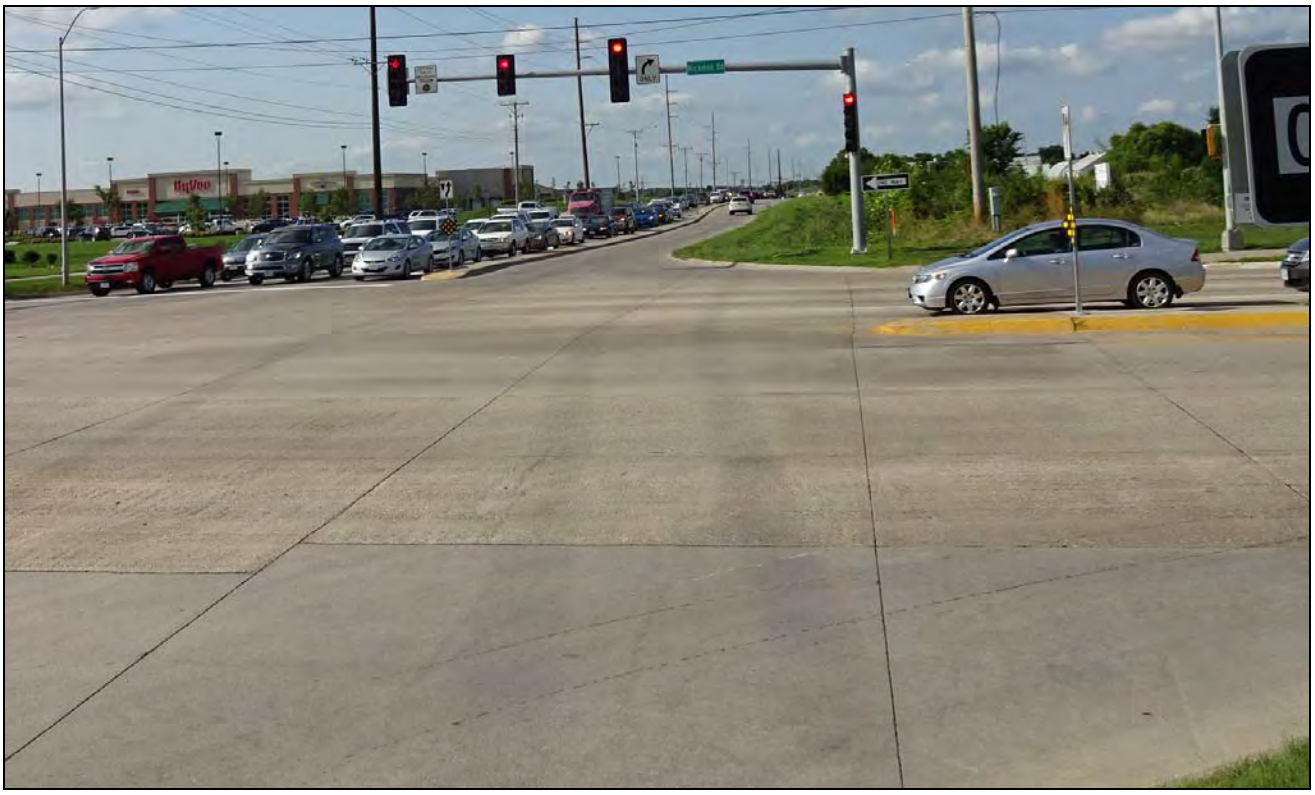
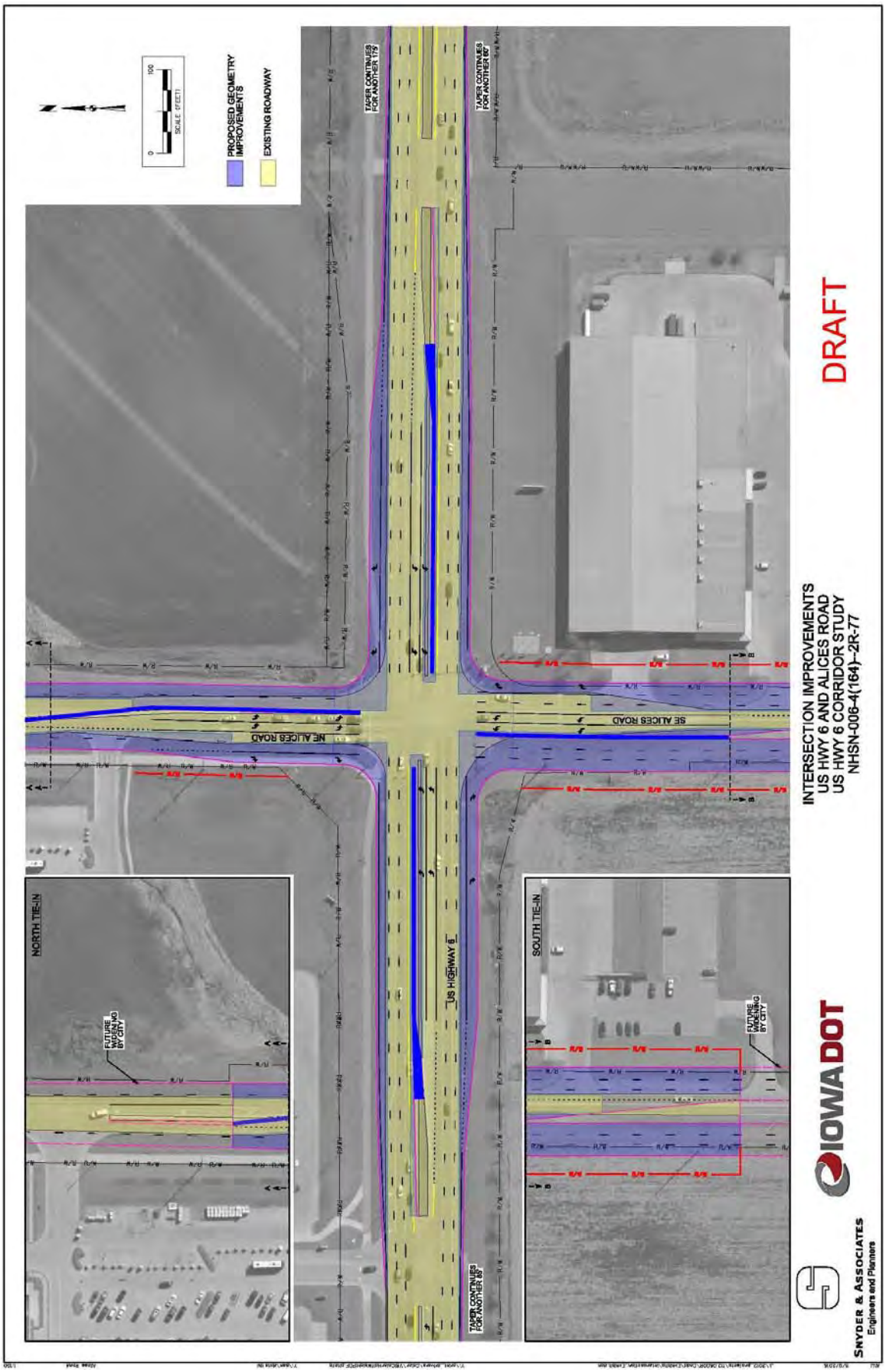


Photo 1: Alice's Rd at US 6 Looking North during PM Peak Hour

Photo 2: Alice's Rd South of US 6 Looking North during PM Peak Hour

Photo 3: US 6 at Alice's Rd Looking East during PM Peak Hour

Photo 4: US 6 at Alice's Rd Looking West during PM Peak Hour


PROPOSED GEOMETRY IMPROVEMENTS
EXISTING ROADWAY
SCALE (FEET)
0
100
TAPER CONTINUES FOR ANOTHER 175
TAPER CONTINUES FOR ANOTHER 167
TAPER CONTINUES FOR ANOTHER 165
NE ALICES ROAD
SE ALICES ROAD
US HIGHWAY 6
NORTH TIE-IN
SOUTH TIE-IN
FUTURE WIDENING BY CITY
FUTURE WIDENING BY CITY
DRAFT
INTERSECTION IMPROVEMENTS
US HWY 6 AND ALICES ROAD
US HWY 6 CORRIDOR STUDY
NHSN-006-4(164)--2R-77
IOWA DOT
SNYDER & ASSOCIATES
Engineers and Planners

Iowa Department of Transportation

Major Cause Summary

Alice's Rd & Hickman Rd

Analysis Years: 2013 [10], 2014 [9], 2015 [13]

Crash Summary:

Fatal	-
Major Injury	1
Minor Injury	2
Possible/Unknown	9
PDO	20
Total Crashes	32

Injury Summary:

Fatal	-
Major Injury	3
Minor Injury	5
Possible	12
Unknown	-
Total Injuries	20

Surface Condition Summary:

Dry	23
Wet	6
Ice	-
Snow	1
Slush	1
Sand/Dirt/Oil/Gravel	-
Water	-
Other	-
Unknown	-
Not Reported	1
Total Crashes	32

TOT Property Damage: $170,100

AVG Property Damage: $5,316

Major Cause Summary:

1	Animal
5	Ran Traffic Signal
	Ran Stop Sign
	Crossed Centerline
	FTYROW: At Uncontrolled Intersection
1	FTYROW: Making Right Turn on Red Signal
	FTYROW: From Stop Sign
	FTYROW: From Yield Sign
	FTYROW: Making Left Turn
	FTYROW: From Driveway
	FTYROW: From Parked Position
	FTYROW: To Pedestrian
	FTYROW: Other (explain in narrative)
1	Traveling Wrong Way or on Wrong Side of Rd
1	Driving Too Fast for Conditions
	Exceeded Authorized Speed
	Made Improper Turn
	Improper Lane Change
10	Followed Too Close
	Disregarded Railroad Signal
	Disregarded Warning Sign
	Operating Vehicle in Reckless/Aggressive Manner
	Improper Backing
	Illegally Parked/Unattended
	Swerving/Evasive Action
	Over-Correcting/Over-Steering
	Downhill Runaway
1	Equipment Failure
	Separation of Units
	Ran Off Road - Right
	Ran Off Road - Straight
	Ran Off Road - Left
1	Lost Control
	Inattentive/Distracted By: Passenger
	Inattentive/Distracted By: Use of Phone or Other
	Inattentive/Distracted By: Fallen Object
	Inattentive/Distracted By: Fatigued/Asleep
	Other: Vision Obstructed
	Oversized Load/ Oversized Vehicle
	Cargo/Equipment Loss or Shift
7	Other: Other Improper Action
2	Unknown
2	Other: No Improper Action
	None Indicated

Selection Filter:

((YEAR = 2013 or YEAR = 2014 or YEAR = 2015))

Analyst: S&A

Notes: 2013-2015 - 300' radius

8/15/2016 **Crash Mapping Analysis Tool** **Page:** 1 of 1

Iowa Department of Transportation

Driver and Time Summary

Alice's Rd & Hickman Rd

Crash Time of Day Summary:

From / To	00:00 01:59	02:00 03:59	04:00 05:59	06:00 07:59	08:00 09:59	10:00 11:59	12:00 13:59	14:00 15:59	16:00 17:59	18:00 19:59	20:00 21:59	22:00 23:59	NR	Total	%
SUN	-	1	-	-	-	-	1	-	-	3	-	-	-	5	16
MON	-	-	-	-	-	1	-	1	-	-	-	-	-	2	6
TUE	-	-	-	-	-	-	1	1	1	1	-	-	-	4	12
WED	-	-	-	-	1	-	-	-	2	1	-	-	-	4	12
THU	-	-	-	2	1	-	2	1	3	2	-	-	-	11	34
FRI	-	-	-	-	-	1	-	-	-	-	1	1	-	3	9
SAT	-	-	-	-	-	-	1	-	2	-	-	-	-	3	9
Tot.		1		2	2	2	5	3	8	7	1	1		32	
%		3		6	6	6	16	9	25	22	3	3			100

Driver Age/Gender Summary:

Age	Male	Female	NR	Drivers	%
<14	-	-	-		
14	-	-	-		
15	-	-	-		
16	2	3	-	5	7
17	-	3	-	3	4
18	-	1	-	1	1
19	-	-	-		
20	-	-	-		
21 to 24	4	1	-	5	7
25 to 29	8	1	-	9	13
30 to 34	2	5	-	7	10
35 to 39	1	2	-	3	4
40 to 44	3	5	-	8	12
45 to 49	4	2	-	6	9
50 to 54	3	2	-	5	7
55 to 59	3	3	-	6	9
60 to 64	1	-	-	1	1
65 to 69	1	-	-	1	1
70 to 74	1	-	-	1	1
75 to 79	-	-	-		
80 to 84	-	1	-	1	1
85 to 89	-	-	-		
90 to 94	2	-	-	2	3
95 plus	-	-	-		
NR	-	-	3	3	4
Drivers	35	29	3	67	
%	52	43	4		100

Drug/Alcohol Summary:

	Total	%
Drug	1	3
Alcohol, Less than Statutory		
Alcohol, Statutory	2	6
Drug/Alcohol, Less than Statutory		
Drug/Alcohol, Statutory		
Refused	2	6
Under Influence of Alc/Drugs/Meds		
None Indicated	27	84
Total Crashes	32	100

Fixed Object Struck Summary:

	Vehs.	%
Bridge/Bridge rail/Overpass		
Underpass/Structure Support		
Culvert		
Ditch/Embankment		
Curb/Island/Raised Median	1	1
Guardrail		
Concrete Barrier		
Tree		
Pole - Utility/Light/Etc		
Sign Post		
Mailbox		
Impact Attenuator		
Other Fixed Object		
None	66	99
Total Vehicles	67	100

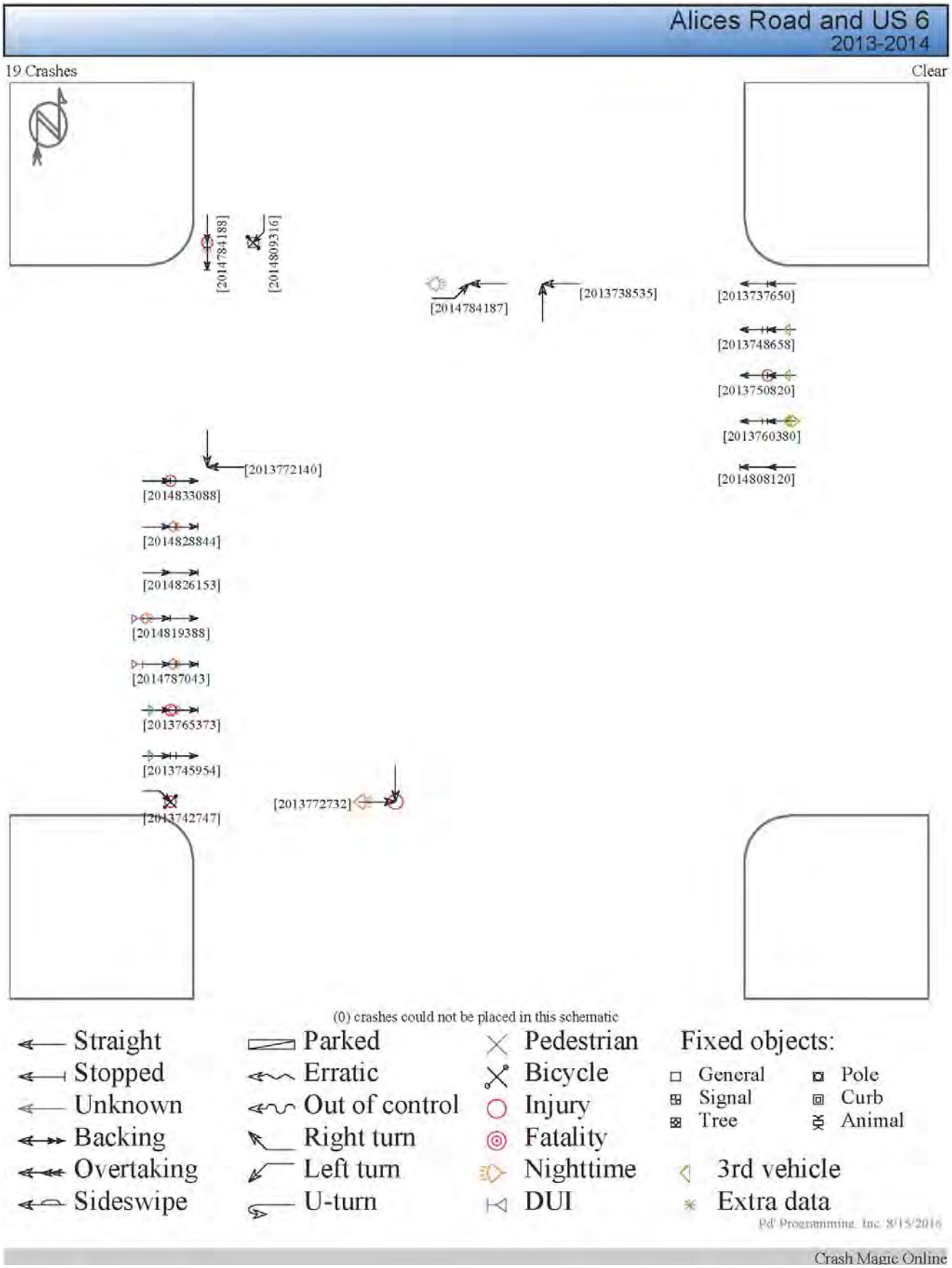
Selection Filter:

((YEAR = 2013 or YEAR = 2014 or YEAR = 2015))

Analyst: S&A

Notes: 2013-2015 - 300' radius

8/15/2016 **Crash Mapping Analysis Tool** Page: 1 of 1


Alices Road and US 6
2013-2014
19 Crashes
Clear
[2014784188]
[2014809316]
[2014784187]
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(0) crashes could not be placed in this schematic
Straight
Stopped
Unknown
Backing
Overtaking
Sideswipe
Parked
Erratic
Out of control
Right turn
Left turn
U-turn
Pedestrian
Bicycle
Injury
Fatality
Nighttime
DUI
Fixed objects:
General
Signal
Tree
Pole
Curb
Animal
3rd vehicle
Extra data
Pd' Programming, Inc. 8/15/2016
Crash Magic Online

Snyder & Associates, Inc.

2727 SW Snyder Blvd
Ankeny, IA 50023

US 6 Corridor Study
Alice's Rd & Hickman Rd
Waukee, IA

File Name : alices & hickman
Site Code : Alices and Hickman
Start Date : 4/9/2014
Page No : 1

Groups Printed- Passenger Cars - Other Vehicles - Bicycles on Crosswalk - Pedestrians

	Alice's Rd Southbound					Hickman Rd Westbound					Alice's Rd Northbound					Hickman Rd Eastbound					
Start Time	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Int. Total
06:45 AM	22	25	19	1	67	27	97	0	0	124	17	19	40	0	76	20	211	30	0	261	528
Total	22	25	19	1	67	27	97	0	0	124	17	19	40	0	76	20	211	30	0	261	528
07:00 AM	40	53	16	3	112	28	86	0	0	114	25	24	25	0	74	38	208	23	0	269	569
07:15 AM	42	79	47	1	169	47	115	0	0	162	24	23	42	0	89	54	251	23	0	328	748
07:30 AM	36	88	27	2	153	48	140	0	0	188	32	33	43	0	108	70	261	40	0	371	820
07:45 AM	41	80	42	0	163	65	147	16	0	228	32	40	46	0	118	50	263	41	0	354	863
Total	159	300	132	6	597	188	488	16	0	692	113	120	156	0	389	212	983	127	0	1322	3000
08:00 AM	36	32	34	0	102	19	106	13	0	138	32	21	32	0	85	40	183	31	0	254	579
08:15 AM	28	28	26	0	82	23	111	17	0	151	26	18	25	0	69	21	173	29	0	223	525
08:30 AM	25	28	32	0	85	12	124	18	0	154	34	22	20	0	76	18	186	17	0	221	536
Total	89	88	92	0	269	54	341	48	0	443	92	61	77	0	230	79	542	77	0	698	1640
11:00 AM	24	27	30	2	83	14	108	18	0	140	27	15	31	0	73	16	134	21	0	171	467
11:15 AM	17	19	14	0	50	20	109	21	0	150	26	11	21	0	58	16	140	18	0	174	432
11:30 AM	22	28	27	1	78	23	135	21	0	179	25	22	19	0	66	19	158	27	0	204	527
11:45 AM	24	21	20	1	66	21	139	21	0	181	37	15	20	0	72	28	172	24	0	224	543
Total	87	95	91	4	277	78	491	81	0	650	115	63	91	0	269	79	604	90	0	773	1969
12:00 PM	28	32	25	0	85	17	151	23	0	191	36	25	27	0	88	13	134	30	0	177	541
12:15 PM	21	22	18	0	61	20	155	30	0	205	26	18	24	0	68	23	149	28	0	200	534
12:30 PM	25	14	21	0	60	25	108	19	0	152	37	15	31	0	83	11	145	26	0	182	477
12:45 PM	21	13	25	0	59	26	164	22	0	211	45	16	22	0	83	22	166	19	0	207	560
Total	95	81	89	0	265	87	578	94	0	759	144	74	104	0	322	69	594	103	0	766	2112
04:00 PM	28	26	42	3	99	22	251	20	0	293	42	29	24	0	95	41	164	23	0	228	715
04:15 PM	24	63	63	2	152	49	298	31	0	378	47	37	36	0	120	38	171	24	0	233	883
04:30 PM	40	36	62	2	140	28	270	33	0	331	48	52	31	0	131	46	189	25	0	260	862
04:45 PM	34	31	71	6	142	33	272	33	0	338	62	48	52	0	162	42	200	33	0	275	917
Total	126	156	238	13	533	132	1091	117	0	1340	199	166	143	0	508	167	724	105	0	996	3377
05:00 PM	28	49	59	6	142	35	263	44	0	342	51	56	46	0	153	44	198	37	0	279	916
05:15 PM	30	59	96	5	190	52	272	37	0	361	57	56	24	0	137	35	156	35	0	226	914
05:30 PM	28	65	67	9	169	53	275	40	0	368	51	54	41	0	146	64	223	26	0	313	996
05:45 PM	32	40	72	20	164	47	275	37	0	359	42	44	30	0	116	28	191	23	0	242	881
Total	118	213	294	40	665	187	1085	158	0	1430	201	210	141	0	552	171	768	121	0	1060	3707
Grand Total	696	958	955	64	2673	753	4171	514	0	5438	881	713	752	0	2346	797	4426	653	0	5876	16333
Apprch %	26	35.8	35.7	2.4		13.8	76.7	9.5	0		37.6	30.4	32.1	0		13.6	75.3	11.1	0		
Total %	4.3	5.9	5.8	0.4	16.4	4.6	25.5	3.1	0	33.3	5.4	4.4	4.6	0	14.4	4.9	27.1	4	0	36	
Passenger Cars							4067										4277				15744
% Passenger Cars	98.1	95.7	97.8	0	94.8	94.7	97.5	96.7	0	97	97.3	94.8	95.5	0	96	96.9	96.6	96.9	0	96.7	96.4
Other Vehicles																					
% Other Vehicles	1.9	4.3	2.2	0	2.8	5.3	2.5	3.3	0	3	2.7	5.2	4.5	0	4	3.1	3.4	3.1	0	3.3	3.2
Bicycles Crossing	0	0	0	40	40	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	40
% Bicycles in Crosswalk	0	0	0	62.5	1.5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2
Pedestrians % Pedestrians	0	0	0	37.5	0.9	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1

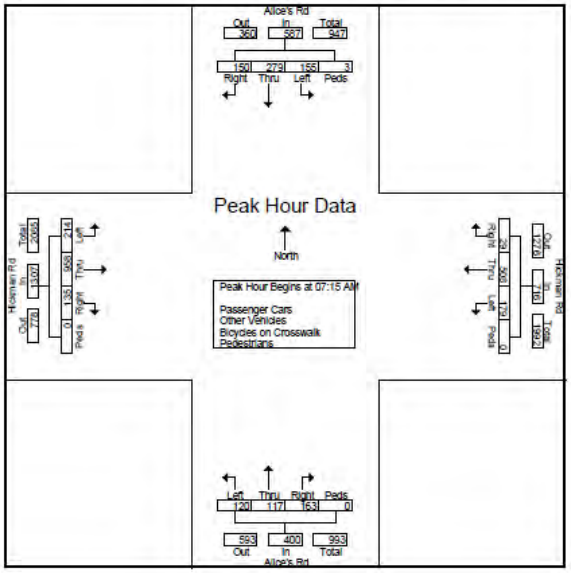
Snyder & Associates, Inc.

2727 SW Snyder Blvd
Ankeny, IA 50023

US 6 Corridor Study
Alice's Rd & Hickman Rd
Waukee, IA

File Name : alices & hickman
Site Code : Alices and Hickman
Start Date : 4/9/2014
Page No : 2

	Alice's Rd Southbound					Hickman Rd Westbound					Alice's Rd Northbound					Hickman Rd Eastbound					
Start Time	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Int. Total
Peak Hour Analysis From 06:45 AM to 09:45 AM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 07:15 AM																					
07:15 AM	**42**	79	**47**	1	**169**	47	115	0	0	162	24	23	42	0	89	54	251	23	0	328	748
07:30 AM	36	**88**	27	**2**	153	48	140	0	0	188	**32**	33	43	0	108	**70**	261	40	0	**371**	820
07:45 AM	41	80	42	0	163	**65**	**147**	**16**	0	**228**	32	**40**	**46**	0	**118**	50	**263**	**41**	0	354	**863**
08:00 AM	36	32	34	0	102	19	106	13	0	138	32	21	32	0	85	40	183	31	0	254	579
Total Volume	155	279	150	3	587	179	508	29	0	716	120	117	163	0	400	214	958	135	0	1307	3010
% App. Total	26.4	47.5	25.6	0.5		25	70.9	4.1	0		30	29.2	40.8	0		16.4	73.3	10.3	0		
PHF	.923	.793	.798	.375	.868	.686	.864	.453	.000	.785	.938	.731	.886	.000	.847	.764	.911	.823	.000	.881	.872



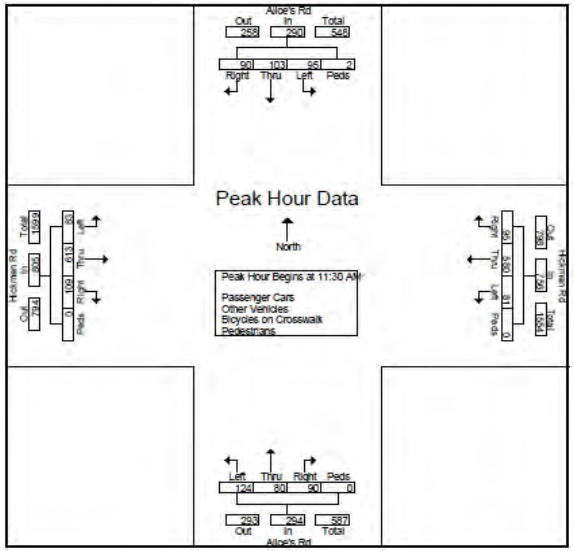
Snyder & Associates, Inc.

2727 SW Snyder Blvd
Ankeny, IA 50023

US 6 Corridor Study
Alice's Rd & Hickman Rd
Waukee, IA

File Name : alices & hickman
Site Code : Alices and Hickman
Start Date : 4/9/2014
Page No : 3

	Alice's Rd Southbound					Hickman Rd Westbound					Alice's Rd Northbound					Hickman Rd Eastbound					
Start Time	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Int. Total
Peak Hour Analysis From 10:00 AM to 01:45 PM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 11:30 AM																					
11:30 AM	22	28	27	1	78	23	135	21	0	179	25	22	19	0	66	19	158	27	0	204	527
11:45 AM	24	21	20	1	66	21	139	21	0	181	37	15	20	0	72	28	172	24	0	224	543
12:00 PM	28	32	25	0	85	17	151	23	0	191	36	25	27	0	88	13	134	30	0	177	541
12:15 PM	21	22	18	0	61	20	155	30	0	205	26	18	24	0	68	23	149	28	0	200	534
Total Volume	95	103	90	2	290	81	580	95	0	756	124	80	90	0	294	83	613	109	0	805	2145
% App. Total	32.8	35.5	31	0.7		10.7	76.7	12.6	0		42.2	27.2	30.6	0		10.3	76.1	13.5	0		
PHF	.848	.805	.833	.500	.853	.880	.935	.792	.000	.922	.838	.800	.833	.000	.835	.741	.891	.908	.000	.898	.988



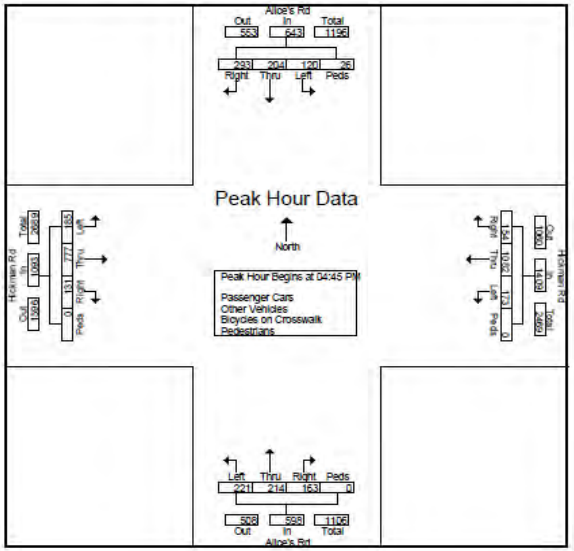
Snyder & Associates, Inc.

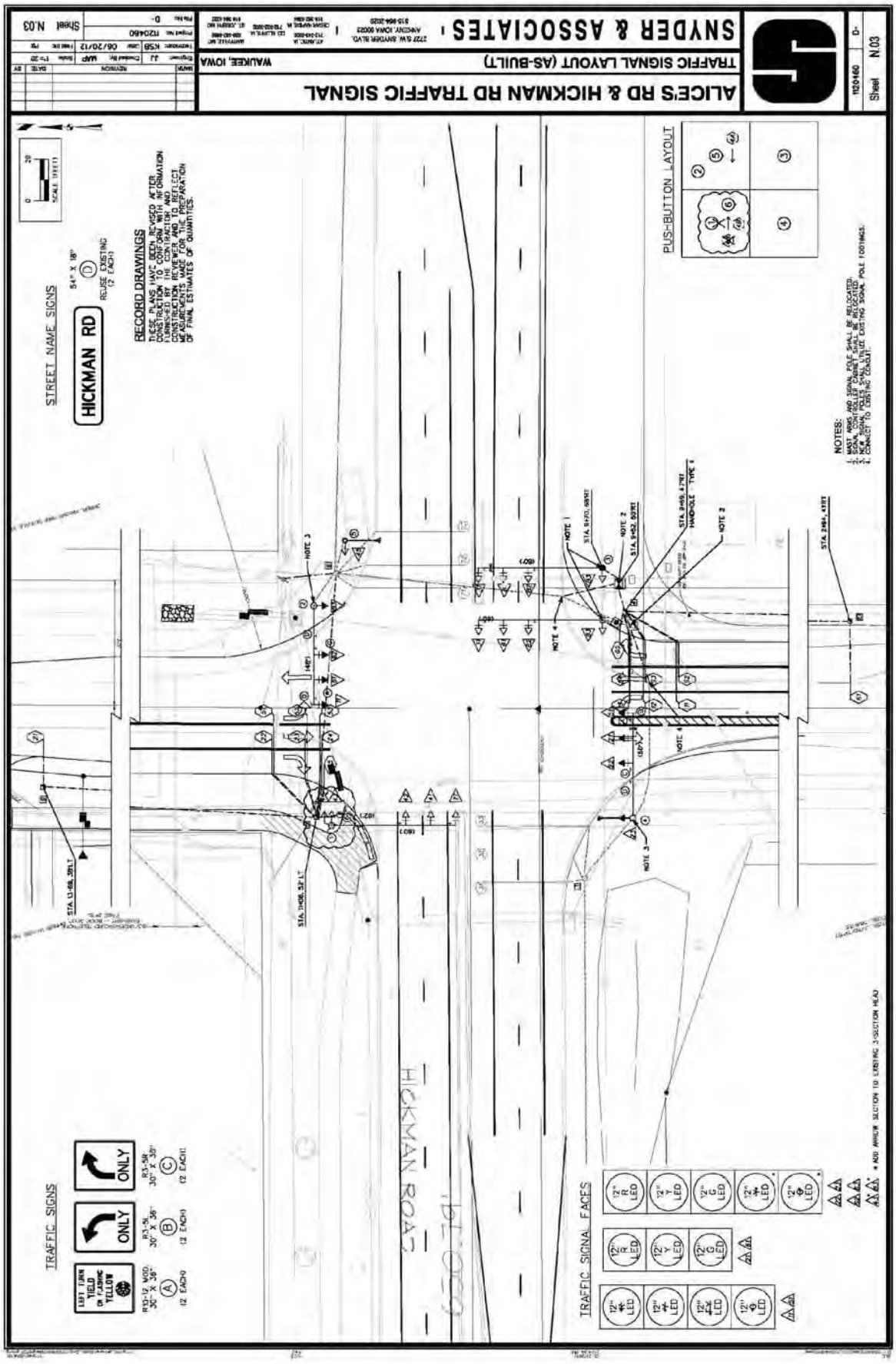
2727 SW Snyder Blvd
Ankeny, IA 50023

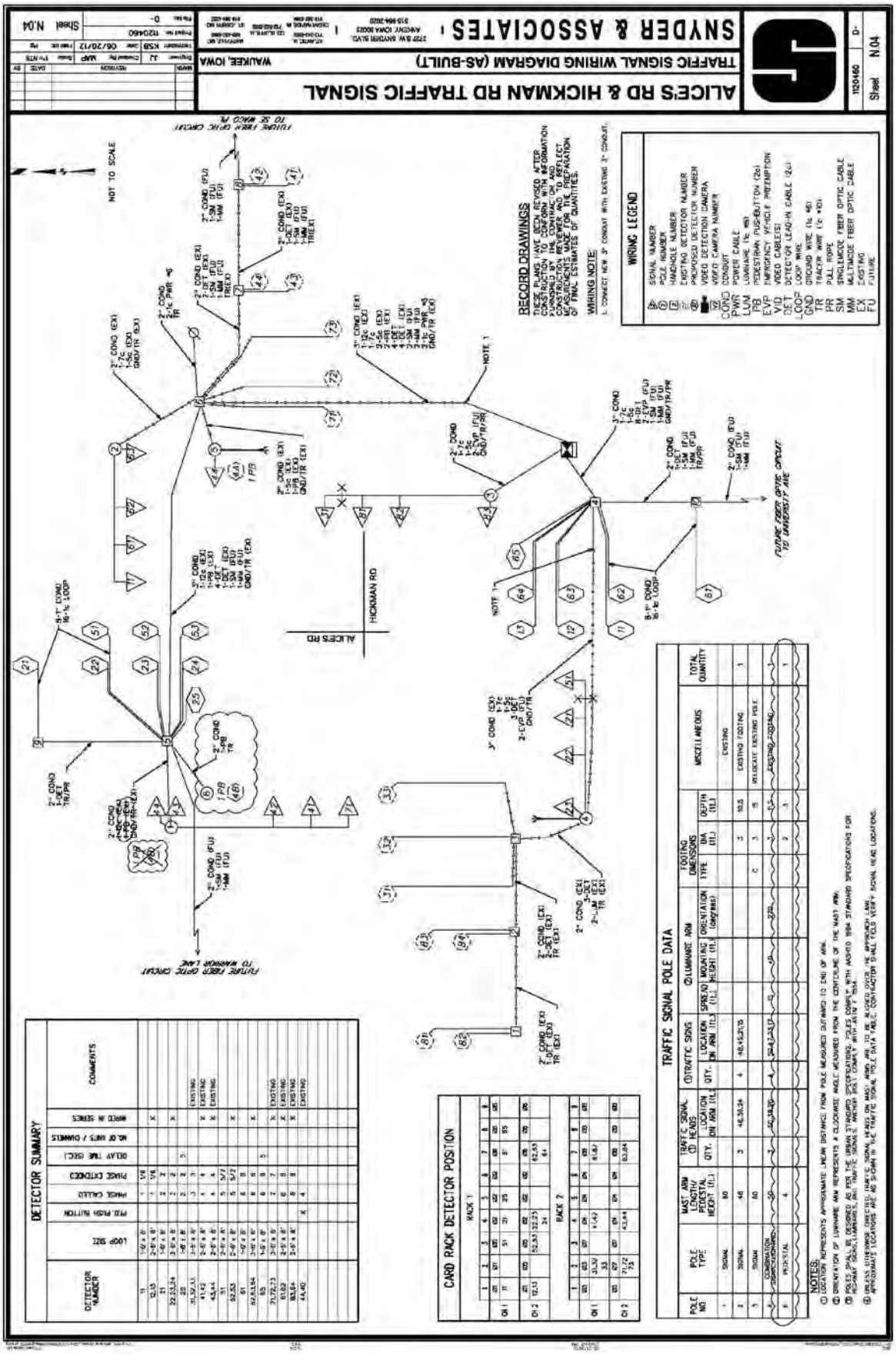
US 6 Corridor Study
Alice's Rd & Hickman Rd
Waukee, IA

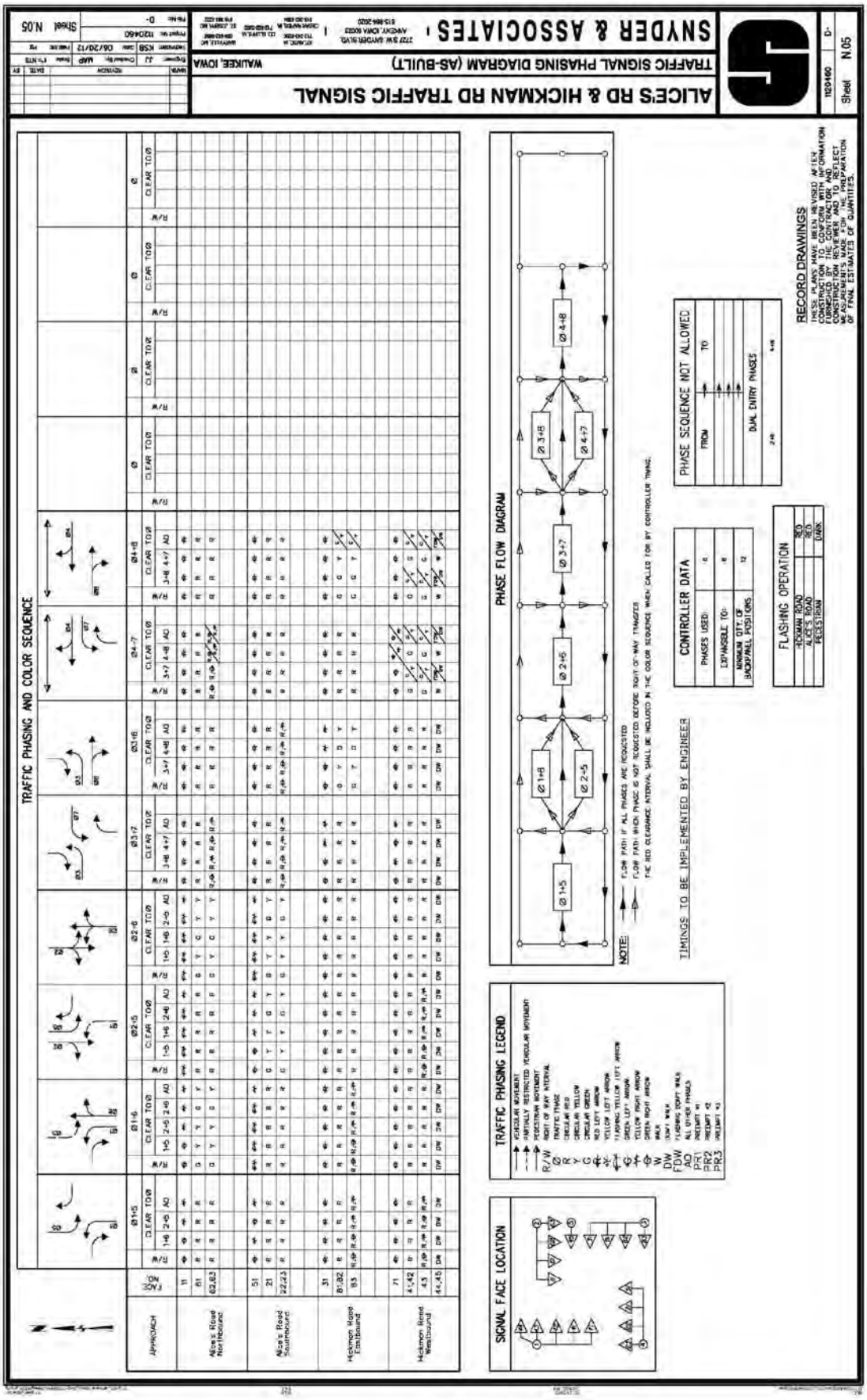
File Name : alices & hickman
Site Code : Alices and Hickman
Start Date : 4/9/2014
Page No : 4

	Alice's Rd Southbound					Hickman Rd Westbound					Alice's Rd Northbound					Hickman Rd Eastbound					
Start Time	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Int. Total
Peak Hour Analysis From 02:00 PM to 05:45 PM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 04:45 PM																					
04:45 PM	34	31	71	6	142	33	272	33	0	338	62	48	52	0	162	42	200	33	0	275	917
05:00 PM	28	49	59	6	142	35	263	44	0	342	51	56	46	0	153	44	198	37	0	279	916
05:15 PM	30	59	96	5	190	52	272	37	0	361	57	56	24	0	137	35	156	35	0	226	914
05:30 PM	28	65	67	9	169	53	275	40	0	368	51	54	41	0	146	64	223	26	0	313	996
Total Volume	120	204	293	26	643	173	1082	154	0	1409	221	214	163	0	598	185	777	131	0	1093	3743
% App. Total	18.7	31.7	45.6	4		12.3	76.8	10.9	0		37	35.8	27.3	0		16.9	71.1	12	0		
PHF	.882	.785	.763	.722	.846	.816	.984	.875	.000	.957	.891	.955	.784	.000	.923	.723	.871	.885	.000	.873	.940




ALICE'S RD & HICKMAN RD TRAFFIC SIGNAL
TRAFFIC SIGNAL LAYOUT (AS-BUILT)
WAUKEE, IOWA
SNYDER & ASSOCIATES
Sheet N.03
RECORD DRAWINGS
STREET NAME SIGNS
HICKMAN RD
REUSE EXISTING (2 EACH)
PUSH-BUTTON LAYOUT
NOTES:
TRAFFIC SIGNS
ONLY
TRAFFIC SIGNAL FACES
HICKMAN ROAD


ALICE'S RD & HICKMAN RD TRAFFIC SIGNAL
TRAFFIC SIGNAL WIRING DIAGRAM (AS-BUILT)
WAUKEE, IOWA
SNYDER & ASSOCIATES
2727 SW SNYDER BLVD.
ANKENY, IOWA 50023
515-964-2020
1120460
Sheet N.04
RECORD DRAWINGS
THESE PLANS HAVE BEEN REVISED AFTER CONSTRUCTION TO CONFORM WITH INFORMATION PROVIDED BY THE CONTRACTOR AND/OR CONSTRUCTION REVIEWER AND TO REFLECT MEASUREMENTS MADE FOR THE PREPARATION OF FINAL ESTIMATES OF QUANTITIES.
WIRING NOTE:
1. CONNECT NEW 3" CONDUIT WITH EXISTING 3" CONDUIT.
WIRING LEGEND
SIGNAL NUMBER
POLE NUMBER
HANDHOLE NUMBER
EXISTING DETECTOR NUMBER
PROPOSED DETECTOR NUMBER
VIDEO DETECTION CAMERA
VIDEO CAMERA NUMBER
CONDUIT
POWER CABLE
LUMINAIRE (1 HS)
LUMINAIRE (1 HS) DISCRIBUTION (2a)
PEDESTRIAN VEHICLE PREEMPTION
VIDEO CABLE(S)
DETECTOR LEAD-IN CABLE (2u)
LOOP WIRE
GROUND WIRE (1c #6)
TRACER WIRE (1c #10)
PULL ROPE
SINGLEMODE FIBER OPTIC CABLE
MULTIMODE FIBER OPTIC CABLE
EXISTING
FUTURE
NOT TO SCALE
HICKMAN RD
ALICE'S RD
FUTURE FIBER OPTIC CIRCUIT TO WARRIOR LANE
FUTURE FIBER OPTIC CIRCUIT TO SE MACO PL
FUTURE FIBER OPTIC CIRCUIT TO UNIVERSITY AVE
NOTE 1
DETECTOR SUMMARY
CARD RACK DETECTOR POSITION
TRAFFIC SIGNAL POLE DATA
NOTES:
① LOCATION REPRESENTS APPROXIMATE LINEAR DISTANCE FROM POLE MEASURED OUTWARD TO END OF ARM.
② ORIENTATION OF LUMINAIRE ARM REPRESENTS A CLOCKWISE ANGLE MEASURED FROM THE CENTERLINE OF THE MAST ARM.
③ POLES SHALL BE DESIGNED AS PER THE URBAN STANDARD SPECIFICATIONS, POLES COMPLY WITH AASHTO 1994 STANDARD SPECIFICATIONS FOR HIGHWAY SIGNS, LUMINAIRES, AND TRAFFIC SIGNALS, AND WITH DALLAS COUNTY WITH ANY 1 1994.
④ UNLESS OTHERWISE DIRECTED, TRAFFIC SIGNAL HEADS ON MAST ARMS TO BE ALIGNED OVER THE APPROACH LANE APPROXIMATE LOCATIONS ARE AS SHOWN IN THE TRAFFIC SIGNAL POLE DATA TABLE. CONTRACTOR SHALL FIELD VERIFY SIGNAL HEAD LOCATIONS.


ALICE'S RD & HICKMAN RD TRAFFIC SIGNAL
TRAFFIC SIGNAL PHASING DIAGRAM (AS-BUILT)
WAUKEE, IOWA
SNYDER & ASSOCIATES
TRAFFIC PHASING AND COLOR SEQUENCE
PHASE FLOW DIAGRAM
SIGNAL FACE LOCATION
TRAFFIC PHASING LEGEND
CONTROLLER DATA
FLASHING OPERATION
PHASE SEQUENCE NOT ALLOWED
RECORD DRAWINGS
TIMINGS TO BE IMPLEMENTED BY ENGINEER
NOTE:
Sheet N.05

Snyder & Associates, Inc.

PROJECT:	Waukee Traffic Signal Timing	NO.:	111.0556.01
		DATE:	10/23/12
SUBJECT:	Coordination Timings	BY: _____	CK: _____
	Hickman Rd & Alice's Rd		
ALIAS ID:	14	Revision: 8/28/13	

Basic Timing Data

	Ph1 - NBL	Ph2 - SB	Ph3 - EBL	Ph4 - WB	Ph5 - SB L	Ph6 - NB	Ph7 - WBL	Ph8 - EB
Min Grn	7	7	7	10	7	7	7	10
Passage	3.0	3.0	2.6	2.6	3.0	3.0	2.6	2.6
Max 1	20	40	20	60	20	40	30	60
Yellow	4.3	4.3	5.1	5.1	4.3	4.3	5.1	5.1
Red Clr	2.0	2.0	1.2	1.2	2.0	2.0	1.2	1.2
Walk				7				
Ped Clear				32				
Ph Min Veh	*14*	*14*	*14*	*17*	*14*	*14*	*14*	*17*
Ph Min Ped		*7*		*46*		*7*		*7*

Coordination Plan Data

Dial 1/Split 1		Cycle:	100		Offset:	65		
Phase	1	2	3	4	5	6	7	8
Time	18	29	27	26	18	29	23	30
Mode			***LAG***	Coord				Coord
Ring Sum Check				100				100

Dial 2/Split 1		Cycle:	80		Offset:	75		
Phase	1	2	3	4	5	6	7	8
Time	16	23	17	24	16	23	17	24
Mode				Coord				Coord
Ring Sum Check				80				80

Dial 3/Split 1		Cycle:	100		Offset:	95		
Phase	1	2	3	4	5	6	7	8
Time	20	25	20	35	20	25	35	20
Mode				Coord				Coord
Ring Sum Check				100				100

Add'l Settings

P:\Traffic\Waukee\Synchro Files\151103 - Waukee Coordination Timings.xlsx

page 11 of 11

BENEFIT/COST ANALYSIS
US 6 & ALICE'S RD INTERSECTION IMPROVEMENTS
WAUKEE, IA

The Benefit/Cost Calculations were based on Iowa DOT Office of Traffic and Safety recommendations. The crash reduction factor (CRF) was based on review of the *Crash Modification Factors Clearinghouse* website published by the Federal Highway Administration. The following lists the assumptions made in the benefit/cost analysis.

- Service Life – 15 years for added lanes & upgrading signal
- Crash Reduction Factor: 24% represents combination of addition of lanes and change of traffic signal phasing from protected/permissive to protected only on Alice's Road
    - Addition of lanes from 4 to 6 had CRF ranging from 15 to 34% including CMFs of 7924, 7929, 7934, 7935, 7937, 7938
    - Change left turn phasing to protected only CMF 4577
- Traffic Growth - Due to continued development in the area, overall population increase in Waukee, and adopted traffic projection models from the Des Moines MPO, a growth rate of 2% per year was assumed over the service life of the improvements.

Project safety cost was determined by correlating the item's cost as a direct relationship that the item would have on crash reductions. So as following the CRF's, the addition of lanes on US 6 would have a safety cost portion of 20% of the total cost of the item. Items directly related to roadway widening would be associated with a safety cost of 20%. Items that have a direct safety benefit have a higher safety cost portion of the total item cost than that of roadway widening. However, the entire cost is not directly associated with safety due to those items are already in place but will need to be reconstructed due to the widening. The breakdown of safety cost portion of items included in the "Safety Portion" and "estimated Safety Cost" columns of the project cost table in Section C.

The estimated total project cost is $3,350,000 with $695,000 cost of safety benefits. The resulting benefit/cost ratio of safety improvements costs is 2.75:1. Thus the City is requesting $500,000 in TSIP funding assistance for this project.

Rev. 5/14

Intersection or Spot Benefit / Cost Safety Analysis

Iowa DOT Office of Traffic & Safety

County: Dallas Prepared by: J. Jackson Date Prepared: Aug 11, 2016

Intersection: US 6 (Hickman Rd) & Alice's Rd

Improvement

Proposed Improvement(s): Dual Left turn lanes on each approach, ritgh turn lanes on each approach, three through lanes on US 6, three through lanes on Alice's Rd south of US 6

$ 695,000	Estimated Improvement Cost, **EC**	15	Est. Improvement Life, years, **Y**
$ -	Other Annual Cost (after initial year), **AC**	24	Crash Reduction Factor (integer), **CRF**
$ -	Present Value Other Annual Costs, **OC**	4.0%	Discount Rate (time value of $), **INT**
		$ 695,000	Present Value Cost, **COST** = EC + OC

$$OC = \frac{AC}{INT}\left(1 - \frac{1}{(1+INT)^Y}\right)$$

Traffic Volume Data

Source: Iowa DOT 9/27/2012 Date of traffic count

Daily Entering Vehicles by Approach (or AADT / 2)

3,496

11,589 → ✱ ← 10,351

3,273

10,478,785 Current Annual Entering Veh., **AEV** = DEV * 365

38,639 veh / day, Final Year DEV, **FDEV**

181.21 MEV, Total Million Entering Veh. Over life of Project, **TMEV**

2.0% Projected Traffic Growth (0%-10%), **G**

28,709 Current Daily Entering Vehicles, **DEV**

$$TMEV = \frac{AEV}{-G}\left(1 - \left(\frac{1+G}{1}\right)^Y\right) \Big/ 10^6$$

Crash Data

2013	First full year -->	2015	Last full year	3.0 years, Time Period, **T**		
	Additional months			values as of May 2014		
0	Fatal Crashes →		Fatalities @	$4,500,000	$	-
		3	Major Injuries @	$325,000	$	975,000
12	Injury Crashes →	5	Minor Injuries @	$65,000	$	325,000
		12	Possible Injuries @	$35,000	$	420,000
20	Property Damage Only		(assumed cost per crash)	$7,400	$	-
		-OR-	enter all Property Costs of all crashes:		$	170,100
32	Total Crashes, **TA**			Total $ Loss, **LOSS**	$	1,890,100

10.67	Current Crashes / Year, **AA** = TA / T	1.02	Crashes / MEV, Crash Rate, **CR**
$ 59,066	Cost per Crash, **AVC** = LOSS / TA		CR = TA x 10^6 / (DEV x 365 x T)
184.5	Total Expected Crashes, **TECR** = CR x TMEV	$ 1,910,415	Present Value of Avoided Crashes, **BENEFIT**
2.56	Crashes Avoided First Year **AAR** = AA x CRF / 100		
$ 151,208	Crash Costs Avoided in First Year, AAR x AVC		
44.3	Total Avoided Crashes, TECR x CRF/ 100		

$$BEN. = \frac{AVC \times AAR}{(INT - G)}\left(1 - \left(\frac{1+G}{1+INT}\right)^Y\right)$$

Benefit / Cost Ratio

Benefit : Cost = $1,910,415 : $695,000 = **2.75** : 1

Rev. 6/16

Application for TRAFFIC SAFETY FUNDS

GENERAL INFORMATION **DATE:** 08-12-2016

Location / Title of Project Grandview/University Intersection Roundabout

Applicant City of Dubuque

Contact Person Bob Schiesl Title Assistant City Engineer

Complete Mailing Address 50 West 13th St

Dubuque, IA 52001

Phone 563-589-4270 (Area Code) E-Mail bschiesl@cityofdubuque.org

If more than one highway authority is involved in this project, please indicate and fill in the information below (use additional sheets if necessary).

Co-Applicant(s) _____

Contact Person _____ Title _____

Complete Mailing Address _____

_____

Phone _____ (Area Code) E-Mail _____

PLEASE COMPLETE THE FOLLOWING PROJECT INFORMATION:

Application Type

- Site Specific ☒
- Traffic Control Device ☐
- Safety Study ☐

Funding Amount

Total Safety Cost	$ 964,842
Total Project Cost	$ 964,842
Safety Funds Requested	$ 500,000

Does this project appear on a Safety Improvement Candidate List or is there a safety study recommendation for this project? ☒Yes – Explain East-West corridor Study

APPLICATION CERTIFICATION FOR LOCAL GOVERNMENT

To the best of my knowledge and belief, all information included in this application is true and accurate, including the commitment of all physical and financial resources. This application has been duly authorized by the participating local government(s). I understand the attached resolution(s) binds the participating local government(s) to assume responsibility if any additional funds are committed, and to ensure maintenance of any new or improved city streets or secondary roads.

I understand that, although this information is sufficient to secure a commitment of funds, a firm contract between the applicant and the Department of Transportation is required prior to the authorization of funds.

Representing the City of Dubuque, Iowa

Signed: _____ 8-15-16
Signature Date Signed

Gus Psihoyos, City Engineer
Typed Name

Attest: _____ 08-15-2016
Signature Date Signed

RUSSELL N. KIEFFER
Typed Name

A. Resolution

Resolution from Dubuque City Council

B. Narrative

Purpose

The City of Dubuque seeks to provide safe and efficient transportation within the City. With this project, the City is proposing to address one of its primary safety concerns by constructing a roundabout at the intersection of North Grandview Avenue, and University Ave.

Existing Conditions

The project location is a four-legged all-way stop-controlled intersection near the center of the City of Dubuque. Area surrounding the intersection is primarily commercial with some residential nearby. Allison-Henderson Park is located on the north east corner of the intersection. Currently this intersection is a four-way stop and has operational delays during peak travel times. Grandview Avenue is a minor arterial that runs north-south and has an AADT of 5,800 - 6,600 near the project site. University Avenue is a minor arterial that runs east-west and has an AADT of 6,000 - 7,200 near the project site. The intersection has high pedestrian traffic due to the nearby park.

Improvements for the Grandview/University intersection were identified in the 2009 East-West Corridor Connectivity Study. The purpose of this study was to analyze east-west traffic flow in the City and identify corridor improvements or modifications needed to support growing traffic demands. The U.S. Highway 20 corridor in Dubuque is the primary east-west route in the City. Future traffic projections indicate that U.S. 20 alone will not provide sufficient capacity for east-west travel in the City. Capacity along alternate east-west corridors will need to be improved to provide connectivity between the western growth areas and the downtown. Corridors evaluated in the study include:

- Asbury Road
- Pennsylvania Avenue
- University Avenue
- Loras Boulevard
- Fremont Avenue
- Kaufmann Avenue
- 32nd Street
- North Cascade Road

For more information on the East-West Corridor Connectivity Study please visit: http://www.cityofdubuque.org/DocumentCenter/Home/View/1879

Project Concept

The East Corridor Connectivity Study recommended removing all on-street parking within 200 feet of the intersection, adding left-turn lanes on all four intersection approaches, and installing traffic signals at the Grandview/University intersection. However, the City has elected to install a roundabout at the intersection instead of signalization. The City feels that the roundabout design will be safer and have less delay than a signalized intersection.

The City's consulting engineer produced a conceptual roundabout design to minimize the impact to adjacent property owners (Attachment G). The roundabout concept was designed to accom-

B. Narrative

modate traffic, provide adequate sight distance, and provide natural vehicle paths.

The roundabout will improve vehicular safety by reducing conflict points and encouraging vehicles to pass through the intersection and speeds slower than in a traditional intersection. The slower speeds and directional circulation offer safety benefits including less severe crashes. Right-angle crashes are eliminated and the crashes that do occur are sideswipes that result in fewer fatalities and serious injuries. Additionally, the slower speeds and single direction circulation make it easier for younger and elderly drivers to enter the traffic stream and appropriately judge adequate gapes in the circulating traffic.

Not only will the roundabout improve safety for drivers, but it will also improve safety for pedestrian and bicycle traffic. The current configuration of the intersection requires pedestrians to cross several lanes to get across the street creating a dangerous situation. The roundabout design will use divider islands to reduce the crossing distance and improve safety for pedestrians. Bicyclists can dismount and cross as pedestrians or enter the roundabout as non-motorized vehicles.

The City of Dubuque is seeking $500,000 from Traffic Safety Improvement Funds. With secured funding, the City anticipates that the projected could begin in April 2017, with completion in November 2018.

Project Justification

The safety challenges presented by the Grandview Ave/University Ave intersection have proved to be very costly for the community. Accident reports provided by the Iowa DOT shows there have been 30 crashes at the intersection between 2011 and 2015. The accidents resulted in three minor injuries, five possible injuries, and $222,000 in property damage. The Benefit/Cost Safety Analysis (Section K) estimates the total loss resulting from the crashes at $592,000. With a projected annual traffic increase of 2%, the cost of future crashes at this intersection is expected to increase.

C. Itemized Breakdown of All Costs

THE CITY OF DUBUQUE
Masterpiece on the Mississippi

City of Dubuque, Iowa

Construction Cost Estimate

Date: 12-Aug-16

Project Name: Intersection of University Avenue and North Grandview Avenue

CIP Funding Amount:

Project Completion Date:

LINE NO.	REFERENCE NUMBER	DESCRIPTION	PLAN QUANTITY	UNIT	UNIT PRICE	TOTAL PRICE
		Division 21 - Earthwork, Subgrade, and Subbases				
1	2102-0425070	Special Backfill (T)	700.00	TON	$ 21.16	$ 14,812.00
2	2102-2710070	Excavation Cl 10, Rdwy & Borrow	1715.00	CY	$ 18.35	$ 31,470.25
3	2105-8425005	Topsoil Furnish & Spread	135.00	CY	$ 40.00	$ 5,400.00
4	2111-8174100	Granular Subbase	550.00	TON	$ 19.00	$ 10,450.00
5	2115-0100000	Modified Subbase	330.00	TON	$ 22.75	$ 7,507.50
					Sub Total	$ 69,639.75
		Division 22 - Base Courses				
6	2210-0475290	Base Macadam Stone	2705.00	TON	$ 17.00	$ 45,985.00
7	2213-6745500	Rmvl Of Curb	0.40	STA	$ 1,500.00	$ 600.00
					Sub Total	$ 46,585.00
		Division 23 - Surface Courses				
8	2301-1033090	Std. / Slip PCC Cl. C Cl. 3 - 9 In. (Doweled)	3060.00	SY	$ 60.00	$ 183,600.00
9	2303-0000100	HMA, Comm Mix (Includes Asphalt Binder), As Per Plan	70.00	TON	$ 120.00	$ 8,400.00
					Sub Total	$ 192,000.00
		Division 24 - Structures				
10	2401-6745765	Rmvl Of Light Poles	2.00	EACH	$ 800.00	$ 1,600.00
11	2401-6745910	Rmvl Of Sign	8.00	EACH	$ 100.00	$ 800.00
12	2435-0600010	Manhole Adjustment, Minor	2.00	EACH	$ 870.00	$ 1,740.00
					Sub Total	$ 4,140.00
		Division 25 - Miscellaneous Construction				
13	2502-8212306	Subdrain Std Perforated 6 In, As Per Plan	450.00	LF	$ 13.00	$ 5,850.00
14	2502-8212406	Subdrain Std Non-Perforated 6 In As Per Plan	170.00	LF	$ 40.00	$ 6,800.00
15	2510-6745850	Removal Of Pavement	3625.00	SY	$ 10.00	$ 36,250.00
16	2511-6745900	Rmvl Of Sidewalk	340.00	SY	$ 10.00	$ 3,400.00
17	2511-7526004	Sidewalk PCC 4 In	240.00	SY	$ 42.00	$ 10,080.00
18	2511-7526006	Sidewalk PCC 6 In	80.00	SY	$ 55.00	$ 4,400.00
19	2511-7528101	Detectable Warnings	152.00	SF	$ 45.00	$ 6,840.00
20	2512-1725256	Curb+Gutter PCC 2.5'	40.00	LF	$ 32.00	$ 1,280.00
21	2515-2475006	Drives PCC 6 In	125.00	SY	$ 56.25	$ 7,031.25
22	2515-6745600	Removal Of Paved Driveway	170.00	SY	$ 13.00	$ 2,210.00
23	2524-9265010	Posts, Steel, As Per Plan	40.00	EACH	$ 308.00	$ 12,320.00
24	2524-9325001	Type A Signs Alum	265.00	SF	$ 27.00	$ 7,155.00
25	2527-9263109	Painted Pavement Marking Waterborne Or Solvent	16.00	STA	$ 60.00	$ 960.00
26	2527-9263117	Painted Pavement Markings, Durable	30.56	STA	$ 275.00	$ 8,404.00
27	2527-9263131	Wet Retroreflective Removable Tape Markings	34.00	STA	$ 160.00	$ 5,440.00
28	2527-9263143	Painted Symbols And Legends, Durable	5.00	EACH	$ 450.00	$ 2,250.00
29	2528-8445110	Traffic Control	1.00	LS	$ 25,000.00	$ 25,000.00
30	2528-8445113	Flaggers	46.00	EACH	$ 500.00	$ 23,000.00
31	2533-4980005	Mobilization	1.00	LS	$ 40,000.00	$ 40,000.00
32	2599-9999018	Std/S-F PCC Pav't, CL C CL 3, 9" (Color Brick Red)	255.00	SY	$ 110.00	$ 28,050.00
33	2599-9999018	Median, PCC, 9" (Color Brick Red)	45.00	SY	$ 110.00	$ 4,950.00
34	2599-9999018	Sidewalk, PCC, 6" (Color Brick Red)	25.00	SY	$ 90.00	$ 2,250.00
35	2599-9999014	Purington Paver With Concrete Base	865.00	SF	$ 15.00	$ 12,975.00
36	2599-9999014	Purington Paver With Plastic Edge Restraints	305.00	SF	$ 10.00	$ 3,050.00
37	2599-999902	Incentive Payment	1.00	CDAY	$ 1,000.00	$ 1,000.00
					Sub Total	$ 260,945.25

C. Itemized Breakdown of All Costs

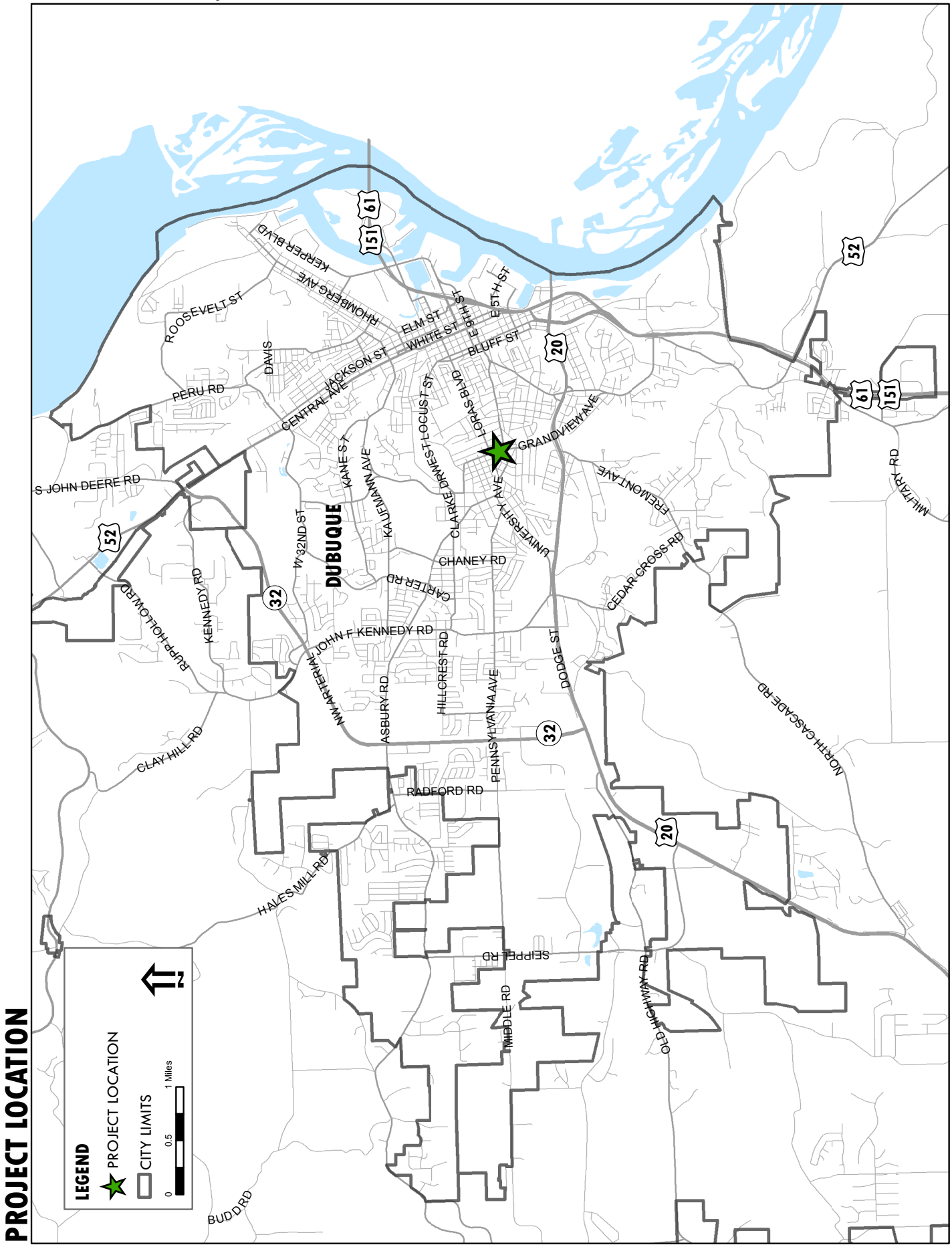
		Division 26 - Roadside Development						
38	2601-2639010	Sodding	76.90	SQ	$	65.00	$	4,998.50
39	2601-2643110	Watering For Sod, Special Ditch Control Or Slope Protection	46.14	MGAL	$	60.00	$	2,768.40
40	2602-0000312	Perimeter And Slope Sediment Control Device, 12 In. Dia.	620.00	LF	$	5.00	$	3,100.00
41	2602-0000350	Removal Of Perimeter And Slope Sediment Control Device	620.00	LF	$	2.50	$	1,550.00
						Sub Total	$	12,416.90
		Division 5010 - Pipe and Fittings						
42	5010-108-A-1	Water Main, Trenched, DIP, 6"	440.00	LF	$	70.00	$	30,800.00
43	5010-108-C-2	Fittings by Weight, DI	728.90	LBS	$	10.00	$	7,289.00
44	5010-108-D-0	Water Service Stub, Copper, 3/4"	36.00	LF	$	70.00	$	2,520.00
45	5010-108-G-0	Water Service Reconnection, Copper, 3/4", Inc New Tap	2.00	EA	$	800.00	$	1,600.00
						Sub Total	$	42,209.00
		Division 5020 - Valves, Fire Hydrants, and Appurtenances						
46	5020-108-A-0	Valve, Gate,6"	4.00	EA	$	1,400.00	$	5,600.00
47	5020-108-C-0	Fire Hydrant	1.00	EA	$	3,800.00	$	3,800.00
48	5020-108-I-0	Drinking Fountain	1.00	EA	$	12,000.00	$	12,000.00
49	5020-108-J-0	Remove and Salvage Fire Hydrant	1.00	EA	$	800.00	$	800.00
						Sub Total	$	22,200.00
		Division 8010 - Traffic Signals & Lighting						
50	8010-108-B-1	Conduit, Seven Way Trenched	503.00	LF	$	12.00	$	6,036.00
51	8010-108-B-1	Conduit, Seven Way Trenchless	628.00	LF	$	18.00	$	11,304.00
52	8010-108-B-1	Conduit, Trenched, PVC, 2"	75.00	LF	$	8.00	$	600.00
53	8010-108-B-1	Conduit, Trenched or Trenchless, HDPE, 2 - 2"	600.00	LF	$	18.00	$	10,800.00
54	8010-108-A.1	Handhole, PC, Round	1.00	EA	$	1,050.00	$	1,050.00
55	8010-108-F.1	Fiber Optic Vault Precast Concrete	1.00	EA	$	3,000.00	$	3,000.00
56	8010-108-A.1	Handhole, PC, Rectangular	1.00	EA	$	1,500.00	$	1,500.00
57	8010-108-A.2	12" x 18" Quazite Hand Hole	8.00	EA	$	500.00	$	4,000.00
58	8010-108-D.1	Street Light Precast Concrete Base, 2' Dia. x 7'	8.00	EA	$	5,000.00	$	40,000.00
59	8010-108-C-0	3C #8 AWG Luminaire Wire	600.00	LF	$	2.95	$	1,770.00
60	8010-108-C-0	#8 AWG XHHW Ground Green	600.00	LF	$	1.50	$	900.00
61	8010-108-C-0	Wiring and Cable - Tracer	600.00	LF	$	2.20	$	1,320.00
62	8010-108-M-0	Street Light, Galvanized, 30'	8.00	EA	$	2,000.00	$	16,000.00
63	8010-108-M-0	Traffic LED Luminaire	8.00	EA	$	800.00	$	6,400.00
						Sub Total	$	104,680.00

	TOTAL	$	754,815.90
CONTINGENCY	**10.00%**	$	75,481.59
ENGINEERING	**15.00%**	$	124,544.62
ROW Easements		$	10,000.00
TOTAL CONSTRUCTION ESTIMATE		$	964,842.11

D. Time Schedule

DESCRIPTION	DATE
Grant Application	August 2016
Notice of Funding	December 2016
Approval of Agreement	July 2017
Construction Plan Preparation	September 2016 - April 2017
Plans Approval	May 2017
Advertise for Bids	October 2017
Open Bid and Award Contract	November 2017
Notice to Proceed	December 2017
Construction	April 2018 - November 2018
Project Closeout	December 2018

E. Location Map



F. Pictures

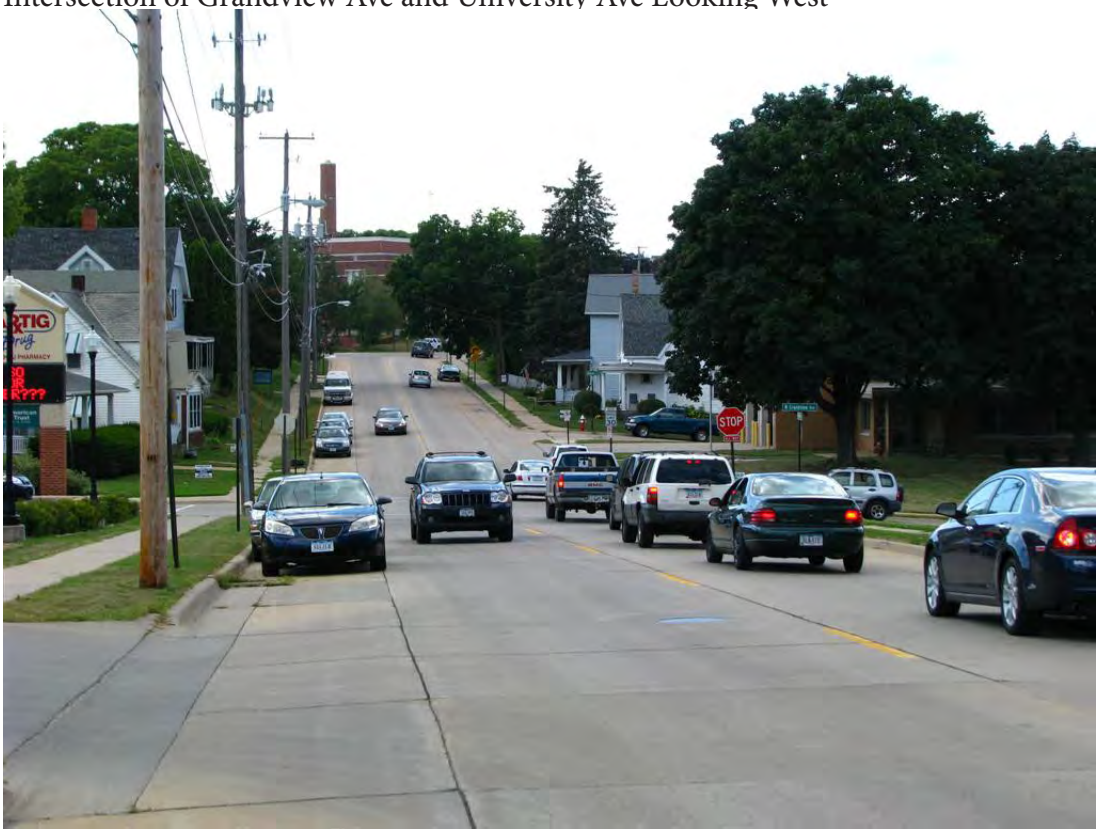
Intersection of Grandview Ave and University Ave Looking North

Intersection of Grandview Ave and University Ave Looking West

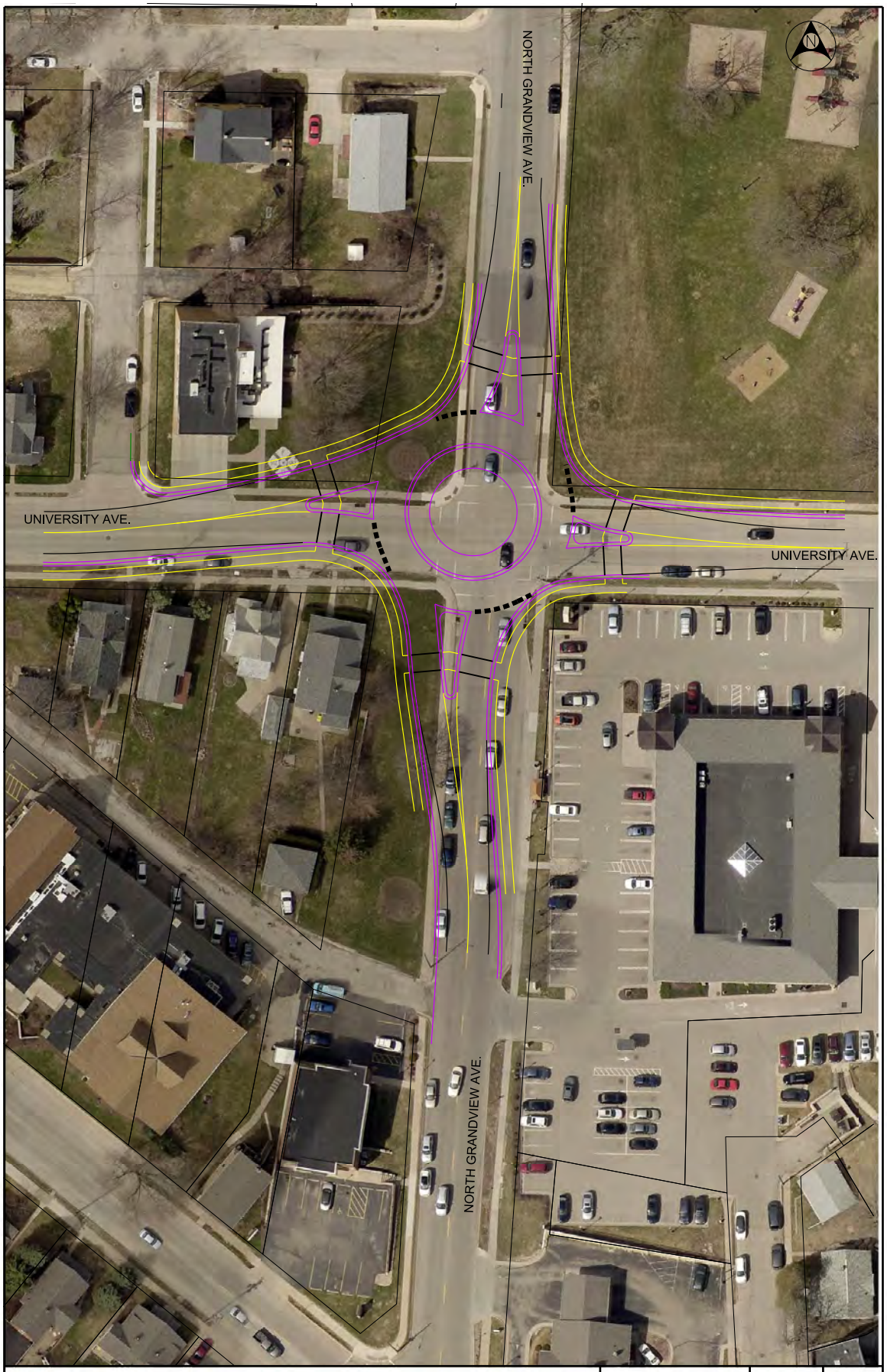
F. Pictures

Intersection of Grandview and University Looking North

Intersection of Grandview Ave and University Ave Looking West



G. Plan View



NORTH GRANDVIEW AVENUE/UNIVERSITY AVENUE
CITY OF DUBUQUE, IA

GHD, Inc.
5325 Wall Street, Suite 2305
T 608 249 4545 F 608 249 4402
E madison@ghd.com W www.ghd.com

DATE	PROJECT No.
AUGUST 2016	-
SCALE	FIGURE No.
1"= 50'	2.0

FILE NAME: G:\111\11109268 University Ave & Grandview Ave - Dubuque IA\CADD\ORE_pw_single lane 118' Ben2.dgn PLOT DATE: 8/12/2016 PLOT SCALE: 50.0000 sf / in.

H. Aerial Photograph

I. CMAT Summary of Crashes

Iowa Department of Transportation

Crash Detail Report

University Ave/ Grandview Ave N

Report Version 1.3 Aug 2006

2011625281 04/06/2011 13:00 UNIVERSITY AVE
County: 31 **City:** Dubuque

Major Cause: Lost control
Roadway Type: Non-intersection: No special feature
Severity: PDO **Manner of Crash:** Rear-end
Fatalities: 0 **Surface Conditions:** Dry
Major Injuries: 0 **Light Conditions:** Daylight
Minor Injuries: 0 **Weather Conditions:** Partly cloudy
Possible Injuries: 0 **Drug/Alc Involved:** none indicated
Unknown Injuries: 0 **Property Damage:** $3500 **Number of Vehicles:** 2

	Unit 1	Unit 2	Unit 3
Init Trav Dir:	West	West	0
Veh Action:	Essentially straight	Turning left	0
Configuration:	Passenger car	Passenger car	0
Driver Age:	25	24	0
Driver Gender:	F	F	
Driver Cond:	Normal	Normal	0
Drivr Contr 1:	Lost control	none	0
Drivr Contr 2:	not reported	not reported	0
Fixed Object:	none	none	0

2011630121 05/13/2011 12:43 GRANDVIEW AVE N and UNIVERSITY AVE
County: 31 **City:** Dubuque

Major Cause: FTY making left turn
Roadway Type: Intersection: Four-way intersection
Severity: PDO **Manner of Crash:** Angle, oncoming left turn
Fatalities: 0 **Surface Conditions:** Wet
Major Injuries: 0 **Light Conditions:** Daylight
Minor Injuries: 0 **Weather Conditions:** Rain
Possible Injuries: 0 **Drug/Alc Involved:** none indicated
Unknown Injuries: 0 **Property Damage:** $3000 **Number of Vehicles:** 2

	Unit 1	Unit 2	Unit 3
Init Trav Dir:	North	South	0
Veh Action:	Turning left	Essentially straight	0
Configuration:	Sport utility vehicle	Sport utility vehicle	0
Driver Age:	43	30	0
Driver Gender:	F	F	
Driver Cond:	Normal	Normal	0
Drivr Contr 1:	FTY making left turn	none	0
Drivr Contr 2:	not reported	not reported	0
Fixed Object:	none	none	0

I. CMAT Summary of Crashes

Iowa Department of Transportation

Crash Detail Report

University Ave/ Grandview Ave N

Report Version 1.3 Aug 2006

2011630127 05/13/2011 22:36 GRANDVIEW AVE N and UNIVERSITY AVE
County: 31 **City:** Dubuque

Major Cause: FTY other
Roadway Type: Intersection: Four-way intersection

Severity:	PDO	**Manner of Crash:**	Broadside
Fatalities:	0	**Surface Conditions:**	Dry
Major Injuries:	0	**Light Conditions:**	Dark - roadway lighted
Minor Injuries:	0	**Weather Conditions:**	Cloudy
Possible Injuries:	0	**Drug/Alc Involved:**	none indicated
Unknown Injuries:	0	**Property Damage:**	$5500

Number of Vehicles: 2

	Unit 1	Unit 2	Unit 3
Init Trav Dir:	South	East	0
Veh Action:	Essentially straight	Essentially straight	0
Configuration:	Sport utility vehicle	Passenger car	0
Driver Age:	65	20	0
Driver Gender:	F	F	
Driver Cond:	Normal	Normal	0
Drivr Contr 1:	FTY other	none	0
Drivr Contr 2:	not reported	not reported	0
Fixed Object:	none	none	0

2011633081 06/03/2011 13:09 GRANDVIEW AVE N and UNIVERSITY AVE
County: 31 **City:** Dubuque

Major Cause: unknown
Roadway Type: Non-intersection: No special feature

Severity:	PDO	**Manner of Crash:**	Broadside
Fatalities:	0	**Surface Conditions:**	Dry
Major Injuries:	0	**Light Conditions:**	Daylight
Minor Injuries:	0	**Weather Conditions:**	Clear
Possible Injuries:	0	**Drug/Alc Involved:**	none indicated
Unknown Injuries:	0	**Property Damage:**	$6500

Number of Vehicles: 2

	Unit 1	Unit 2	Unit 3
Init Trav Dir:	West	South	0
Veh Action:	Essentially straight	Essentially straight	0
Configuration:	Passenger car	Passenger car	0
Driver Age:	21	27	0
Driver Gender:	F	F	
Driver Cond:	Normal	Normal	0
Drivr Contr 1:	unknown	unknown	0
Drivr Contr 2:	not reported	not reported	0
Fixed Object:	none	none	0

I. CMAT Summary of Crashes

Iowa Department of Transportation

Crash Detail Report

University Ave/ Grandview Ave N

Report Version 1.3 Aug 2006

2011644327 08/24/2011 15:01 GRANDVIEW AVE N and UNIVERSITY AVE
County: 31 **City:** Dubuque

Major Cause: FTY from stop sign
Roadway Type: Intersection: Four-way intersection
Severity: Poss/Unk **Manner of Crash:** Broadside
Fatalities: 0 **Surface Conditions:** Dry
Major Injuries: 0 **Light Conditions:** Daylight
Minor Injuries: 0 **Weather Conditions:** Clear
Possible Injuries: 1 **Drug/Alc Involved:** none indicated
Unknown Injuries: 0 **Property Damage:** $2200 **Number of Vehicles:** 2

	Unit 1	Unit 2	Unit 3
Init Trav Dir:	East	South	0
Veh Action:	Essentially straight	Essentially straight	0
Configuration:	Sport utility vehicle	Sport utility vehicle	0
Driver Age:	40	36	0
Driver Gender:	F	F	
Driver Cond:	Normal	Normal	0
Drivr Contr 1:	FTY from stop sign	none	0
Drivr Contr 2:	not reported	not reported	0
Fixed Object:	none	none	0

2011661941 12/02/2011 17:31 GRANDVIEW AVE N and UNIVERSITY AVE
County: 31 **City:** Dubuque

Major Cause: Ran stop sign
Roadway Type: Intersection: Four-way intersection
Severity: Poss/Unk **Manner of Crash:** Broadside
Fatalities: 0 **Surface Conditions:** Dry
Major Injuries: 0 **Light Conditions:** Dark - roadway lighted
Minor Injuries: 0 **Weather Conditions:** Cloudy
Possible Injuries: 1 **Drug/Alc Involved:** none indicated
Unknown Injuries: 0 **Property Damage:** $4500 **Number of Vehicles:** 2

	Unit 1	Unit 2	Unit 3
Init Trav Dir:	East	North	0
Veh Action:	Essentially straight	Essentially straight	0
Configuration:	Sport utility vehicle	Sport utility vehicle	0
Driver Age:	33	54	0
Driver Gender:	F	M	
Driver Cond:	Normal	Normal	0
Drivr Contr 1:	Ran stop sign	none	0
Drivr Contr 2:	not reported	not reported	0
Fixed Object:	none	none	0

I. CMAT Summary of Crashes

Iowa Department of Transportation

Crash Detail Report

University Ave/ Grandview Ave N

Report Version 1.3 Aug 2006

2012671875 02/09/2012 14:30 GRANDVIEW AVE N and UNIVERSITY AVE
County: 31 **City:** Dubuque

Major Cause: Lost control
Roadway Type: Intersection: Four-way intersection
Severity: PDO **Manner of Crash:** Rear-end
Fatalities: 0 **Surface Conditions:** Dry
Major Injuries: 0 **Light Conditions:** Daylight
Minor Injuries: 0 **Weather Conditions:** Cloudy
Possible Injuries: 0 **Drug/Alc Involved:** none indicated
Unknown Injuries: 0 **Property Damage:** $1600 **Number of Vehicles:** 2

	Unit 1	Unit 2	Unit 3
Init Trav Dir:	South	South	0
Veh Action:	Essentially straight	Slowing/stopping	0
Configuration:	Passenger car	4-tire light truck	0
Driver Age:	16	16	0
Driver Gender:	F	M	
Driver Cond:	Normal	Normal	0
Drivr Contr 1:	Lost control	none	0
Drivr Contr 2:	not reported	not reported	0
Fixed Object:	none	none	0

2012674244 02/23/2012 17:41 GRANDVIEW AVE N and UNIVERSITY AVE
County: 31 **City:** Dubuque

Major Cause: FTY from stop sign
Roadway Type: Intersection: Four-way intersection
Severity: Minor **Manner of Crash:** Broadside
Fatalities: 0 **Surface Conditions:** Wet
Major Injuries: 0 **Light Conditions:** Dark - roadway not lighted
Minor Injuries: 1 **Weather Conditions:** Snow
Possible Injuries: 0 **Drug/Alc Involved:** none indicated
Unknown Injuries: 0 **Property Damage:** $11000 **Number of Vehicles:** 2

	Unit 1	Unit 2	Unit 3
Init Trav Dir:	East	South	0
Veh Action:	Essentially straight	Essentially straight	0
Configuration:	Passenger car	Sport utility vehicle	0
Driver Age:	21	41	0
Driver Gender:	M	F	
Driver Cond:	Normal	Normal	0
Drivr Contr 1:	FTY from stop sign	none	0
Drivr Contr 2:	not reported	not reported	0
Fixed Object:	none	none	0

I. CMAT Summary of Crashes

Iowa Department of Transportation

Crash Detail Report

University Ave/ Grandview Ave N

Report Version 1.3 Aug 2006

2012691934 06/26/2012 16:31 GRANDVIEW AVE N and UNIVERSITY AVE
County: 31 **City:** Dubuque

Major Cause: Ran stop sign
Roadway Type: Intersection: Four-way intersection

Severity:	PDO	**Manner of Crash:**	Broadside
Fatalities:	0	**Surface Conditions:**	Dry
Major Injuries:	0	**Light Conditions:**	Daylight
Minor Injuries:	0	**Weather Conditions:**	Clear
Possible Injuries:	0	**Drug/Alc Involved:**	none indicated
Unknown Injuries:	0	**Property Damage:**	$2000

Number of Vehicles: 2

	Unit 1	Unit 2	Unit 3
Init Trav Dir:	East	North	0
Veh Action:	Essentially straight	Essentially straight	0
Configuration:	Sport utility vehicle	Sport utility vehicle	0
Driver Age:	28	41	0
Driver Gender:	F	M	
Driver Cond:	Normal	Normal	0
Drivr Contr 1:	Ran stop sign	none	0
Drivr Contr 2:	not reported	not reported	0
Fixed Object:	none	none	0

2012694999 07/16/2012 19:02 GRANDVIEW AVE N and UNIVERSITY AVE
County: 31 **City:** Dubuque

Major Cause: Ran stop sign
Roadway Type: Intersection: Four-way intersection

Severity:	PDO	**Manner of Crash:**	Broadside
Fatalities:	0	**Surface Conditions:**	Dry
Major Injuries:	0	**Light Conditions:**	Daylight
Minor Injuries:	0	**Weather Conditions:**	Clear
Possible Injuries:	0	**Drug/Alc Involved:**	none indicated
Unknown Injuries:	0	**Property Damage:**	$4000

Number of Vehicles: 2

	Unit 1	Unit 2	Unit 3
Init Trav Dir:	East	South	0
Veh Action:	Essentially straight	Essentially straight	0
Configuration:	Passenger car	4-tire light truck	0
Driver Age:	20	43	0
Driver Gender:	M	F	
Driver Cond:	Normal	Normal	0
Drivr Contr 1:	Ran stop sign	none	0
Drivr Contr 2:	not reported	not reported	0
Fixed Object:	none	none	0

I. CMAT Summary of Crashes

Iowa Department of Transportation

Crash Detail Report

University Ave/ Grandview Ave N

Report Version 1.3 Aug 2006

2013721544 01/09/2013 14:57 GRANDVIEW AVE N and UNIVERSITY AVE
County: 31 **City:** Dubuque

Major Cause: Ran stop sign
Roadway Type: Intersection: Four-way intersection
Severity: PDO
Manner of Crash: Broadside
Fatalities: 0
Surface Conditions: Wet
Major Injuries: 0
Light Conditions: Daylight
Minor Injuries: 0
Weather Conditions: Clear
Possible Injuries: 0
Drug/Alc Involved: none indicated
Unknown Injuries: 0
Property Damage: $7000
Number of Vehicles: 2

	Unit 1	Unit 2	Unit 3
Init Trav Dir:	West	North	0
Veh Action:	Essentially straight	Essentially straight	0
Configuration:	Van or mini-van	Sport utility vehicle	0
Driver Age:	50	70	0
Driver Gender:	F	F	
Driver Cond:	Normal	Normal	0
Drivr Contr 1:	Ran stop sign	none	0
Drivr Contr 2:	not reported	not reported	0
Fixed Object:	none	none	0

2013730488 03/15/2013 07:30 GRANDVIEW AVE N and UNIVERSITY AVE
County: 31 **City:** Dubuque

Major Cause: FTY from stop sign
Roadway Type: Intersection: Four-way intersection
Severity: PDO
Manner of Crash: Angle, oncoming left turn
Fatalities: 0
Surface Conditions: Dry
Major Injuries: 0
Light Conditions: Daylight
Minor Injuries: 0
Weather Conditions: Partly cloudy
Possible Injuries: 0
Drug/Alc Involved: none indicated
Unknown Injuries: 0
Property Damage: $2000
Number of Vehicles: 2

	Unit 1	Unit 2	Unit 3
Init Trav Dir:	North	South	0
Veh Action:	Turning left	Essentially straight	0
Configuration:	Passenger car	Passenger car	0
Driver Age:	71	35	0
Driver Gender:	F	F	
Driver Cond:	Normal	Normal	0
Drivr Contr 1:	FTY from stop sign	none	0
Drivr Contr 2:	FTY making left turn	not reported	0
Fixed Object:	none	none	0

I. CMAT Summary of Crashes

Iowa Department of Transportation

Crash Detail Report

University Ave/ Grandview Ave N

Report Version 1.3 Aug 2006

2013734745 04/13/2013 10:31 GRANDVIEW AVE N and UNIVERSITY AVE
County: 31 **City:** Dubuque

Major Cause: Ran stop sign
Roadway Type: Intersection: Four-way intersection
Severity: PDO **Manner of Crash:** Broadside
Fatalities: 0 **Surface Conditions:** Dry
Major Injuries: 0 **Light Conditions:** Daylight
Minor Injuries: 0 **Weather Conditions:** Partly cloudy
Possible Injuries: 0 **Drug/Alc Involved:** none indicated
Unknown Injuries: 0 **Property Damage:** $7000 **Number of Vehicles:** 2

	Unit 1	Unit 2	Unit 3
Init Trav Dir:	East	South	0
Veh Action:	Essentially straight	Essentially straight	0
Configuration:	Passenger car	Passenger car	0
Driver Age:	72	71	0
Driver Gender:	F	F	
Driver Cond:	Normal	Normal	0
Drivr Contr 1:	Ran stop sign	none	0
Drivr Contr 2:	not reported	not reported	0
Fixed Object:	none	none	0

2013737354 05/02/2013 17:35 GRANDVIEW AVE N and UNIVERSITY AVE
County: 31 **City:** Dubuque

Major Cause: Ran stop sign
Roadway Type: Intersection: Four-way intersection
Severity: Poss/Unk **Manner of Crash:** Broadside
Fatalities: 0 **Surface Conditions:** Wet
Major Injuries: 0 **Light Conditions:** Daylight
Minor Injuries: 0 **Weather Conditions:** Mist
Possible Injuries: 1 **Drug/Alc Involved:** none indicated
Unknown Injuries: 0 **Property Damage:** $5000 **Number of Vehicles:** 2

	Unit 1	Unit 2	Unit 3
Init Trav Dir:	East	South	0
Veh Action:	Essentially straight	Essentially straight	0
Configuration:	Passenger car	Van or mini-van	0
Driver Age:	23	19	0
Driver Gender:	F	M	
Driver Cond:	Normal	Normal	0
Drivr Contr 1:	Ran stop sign	none	0
Drivr Contr 2:	not reported	not reported	0
Fixed Object:	none	none	0

I. CMAT Summary of Crashes

Iowa Department of Transportation

Crash Detail Report

University Ave/ Grandview Ave N

Report Version 1.3 Aug 2006

2013750698 07/29/2013 10:48 GRANDVIEW AVE N and UNIVERSITY AVE
County: 31 **City:** Dubuque

Major Cause: Made improper turn
Roadway Type: Non-intersection: No special feature

Severity:	PDO	**Manner of Crash:**	Angle, oncoming left turn
Fatalities:	0	**Surface Conditions:**	Dry
Major Injuries:	0	**Light Conditions:**	Daylight
Minor Injuries:	0	**Weather Conditions:**	Clear
Possible Injuries:	0	**Drug/Alc Involved:**	none indicated
Unknown Injuries:	0	**Property Damage:**	$4500

Number of Vehicles: 2

	Unit 1	Unit 2	Unit 3
Init Trav Dir:	North	East	0
Veh Action:	Turning left	Essentially straight	0
Configuration:	Passenger car	Passenger car	0
Driver Age:	80	38	0
Driver Gender:	F	M	
Driver Cond:	Normal	Normal	0
Drivr Contr 1:	Made improper turn	none	0
Drivr Contr 2:	not reported	not reported	0
Fixed Object:	none	none	0

2013754224 08/09/2013 14:30 GRANDVIEW AVE N and UNIVERSITY AVE
County: 31 **City:** Dubuque

Major Cause: Ran stop sign
Roadway Type: Intersection: Four-way intersection

Severity:	PDO	**Manner of Crash:**	Broadside
Fatalities:	0	**Surface Conditions:**	Dry
Major Injuries:	0	**Light Conditions:**	Daylight
Minor Injuries:	0	**Weather Conditions:**	Partly cloudy
Possible Injuries:	0	**Drug/Alc Involved:**	none indicated
Unknown Injuries:	0	**Property Damage:**	$1600

Number of Vehicles: 2

	Unit 1	Unit 2	Unit 3
Init Trav Dir:	East	North	0
Veh Action:	Essentially straight	Turning left	0
Configuration:	Passenger car	Other bus: >15 seats	0
Driver Age:	86	71	0
Driver Gender:	M	M	
Driver Cond:	Normal	Normal	0
Drivr Contr 1:	Ran stop sign	none	0
Drivr Contr 2:	not reported	not reported	0
Fixed Object:	none	none	0

I. CMAT Summary of Crashes

Iowa Department of Transportation

Crash Detail Report

University Ave/ Grandview Ave N

Report Version 1.3 Aug 2006

2013776198 12/28/2013 06:33 GRANDVIEW AVE N and UNIVERSITY AVE
County: 31 **City:** Dubuque

Major Cause: Ran stop sign
Roadway Type: Intersection: Four-way intersection
Severity: PDO **Manner of Crash:** Broadside
Fatalities: 0 **Surface Conditions:** Wet
Major Injuries: 0 **Light Conditions:** Dark - roadway lighted
Minor Injuries: 0 **Weather Conditions:** Clear
Possible Injuries: 0 **Drug/Alc Involved:** none indicated
Unknown Injuries: 0 **Property Damage:** $7000 **Number of Vehicles:** 2

	Unit 1	Unit 2	Unit 3
Init Trav Dir:	East	South	0
Veh Action:	Essentially straight	Essentially straight	0
Configuration:	Passenger car	Sport utility vehicle	0
Driver Age:	26	52	0
Driver Gender:	NR	M	
Driver Cond:	Normal	Normal	0
Drivr Contr 1:	Ran stop sign	none	0
Drivr Contr 2:	not reported	not reported	0
Fixed Object:	none	none	0

2014787063 02/19/2014 13:12 GRANDVIEW AVE N and UNIVERSITY AVE
County: 31 **City:** Dubuque

Major Cause: Ran stop sign
Roadway Type: Intersection: Four-way intersection
Severity: Poss/Unk **Manner of Crash:** Broadside
Fatalities: 0 **Surface Conditions:** Dry
Major Injuries: 0 **Light Conditions:** Daylight
Minor Injuries: 0 **Weather Conditions:** Clear
Possible Injuries: 1 **Drug/Alc Involved:** none indicated
Unknown Injuries: 0 **Property Damage:** $6500 **Number of Vehicles:** 2

	Unit 1	Unit 2	Unit 3
Init Trav Dir:	East	South	0
Veh Action:	Essentially straight	Essentially straight	0
Configuration:	4-tire light truck	Passenger car	0
Driver Age:	70	76	0
Driver Gender:	NR	F	
Driver Cond:	Normal	Normal	0
Drivr Contr 1:	Ran stop sign	none	0
Drivr Contr 2:	not reported	not reported	0
Fixed Object:	none	none	0

I. CMAT Summary of Crashes

Iowa Department of Transportation

Crash Detail Report

University Ave/ Grandview Ave N

Report Version 1.3 Aug 2006

2014787320 02/21/2014 15:35 GRANDVIEW AVE N and UNIVERSITY AVE
County: 31 **City:** Dubuque

Major Cause: Lost control
Roadway Type: Intersection: Four-way intersection

Severity:	PDO	**Manner of Crash:**	Rear-end
Fatalities:	0	**Surface Conditions:**	Dry
Major Injuries:	0	**Light Conditions:**	Daylight
Minor Injuries:	0	**Weather Conditions:**	Clear
Possible Injuries:	0	**Drug/Alc Involved:**	none indicated
Unknown Injuries:	0	**Property Damage:**	$6350

Number of Vehicles: 2

	Unit 1	Unit 2	Unit 3
Init Trav Dir:	North	North	0
Veh Action:	Essentially straight	Stopped for sign/signal	0
Configuration:	Passenger car	School bus: >15 seats	0
Driver Age:	73	59	0
Driver Gender:	M	M	
Driver Cond:	Normal	Normal	0
Drivr Contr 1:	Lost control	none	0
Drivr Contr 2:	not reported	not reported	0
Fixed Object:	none	none	0

2014788705 02/28/2014 13:21 GRANDVIEW AVE N and UNIVERSITY AVE
County: 31 **City:** Dubuque

Major Cause: Lost control
Roadway Type: Non-intersection: No special feature

Severity:	PDO	**Manner of Crash:**	Rear-end
Fatalities:	0	**Surface Conditions:**	Dry
Major Injuries:	0	**Light Conditions:**	Daylight
Minor Injuries:	0	**Weather Conditions:**	Cloudy
Possible Injuries:	0	**Drug/Alc Involved:**	none indicated
Unknown Injuries:	0	**Property Damage:**	$5000

Number of Vehicles: 2

	Unit 1	Unit 2	Unit 3
Init Trav Dir:	West	West	0
Veh Action:	Essentially straight	Essentially straight	0
Configuration:	Passenger car	Passenger car	0
Driver Age:	19	56	0
Driver Gender:	F	M	
Driver Cond:	Normal	Normal	0
Drivr Contr 1:	Lost control	none	0
Drivr Contr 2:	not reported	not reported	0
Fixed Object:	none	none	0

I. CMAT Summary of Crashes

Iowa Department of Transportation

Crash Detail Report

University Ave/ Grandview Ave N

Report Version 1.3 Aug 2006

2014806112 06/24/2014 12:52
County: 31 **City:** Dubuque

GRANDVIEW AVE N AND UNIVERSITY AVE MEASURING 1843 FEET NORTHWEST FROM PARKWAY ST

Major Cause: Lost control
Roadway Type: Intersection: Four-way intersection
Severity: Poss/Unk
Manner of Crash: Rear-end
Fatalities: 0
Surface Conditions: Dry
Major Injuries: 0
Light Conditions: Daylight
Minor Injuries: 0
Weather Conditions: Clear
Possible Injuries: 1
Drug/Alc Involved: none indicated
Unknown Injuries: 0
Property Damage: $50
Number of Vehicles: 2

	Unit 1	Unit 2	Unit 3
Init Trav Dir:	East	East	0
Veh Action:	Essentially straight	Stopped for sign/signal	0
Configuration:	Passenger car	Passenger car	0
Driver Age:	57	35	0
Driver Gender:	F	F	
Driver Cond:	Normal	Normal	0
Drivr Contr 1:	Lost control	none	0
Drivr Contr 2:	not reported	not reported	0
Fixed Object:	none	none	0

2014816763 08/18/2014 10:55
County: 31 **City:** Dubuque

GRANDVIEW AVE N AND UNIVERSITY AVE

Major Cause: FTY from stop sign
Roadway Type: Intersection: Four-way intersection
Severity: PDO
Manner of Crash: Broadside
Fatalities: 0
Surface Conditions: Dry
Major Injuries: 0
Light Conditions: Daylight
Minor Injuries: 0
Weather Conditions: Cloudy
Possible Injuries: 0
Drug/Alc Involved: none indicated
Unknown Injuries: 0
Property Damage: $3700
Number of Vehicles: 2

	Unit 1	Unit 2	Unit 3
Init Trav Dir:	East	South	0
Veh Action:	Essentially straight	Essentially straight	0
Configuration:	Van or mini-van	Passenger car	0
Driver Age:	47	64	0
Driver Gender:	F	F	
Driver Cond:	Normal	Normal	0
Drivr Contr 1:	FTY from stop sign	none	0
Drivr Contr 2:	not reported	not reported	0
Fixed Object:	none	none	0

I. CMAT Summary of Crashes

Iowa Department of Transportation

Crash Detail Report

University Ave/ Grandview Ave N

Report Version 1.3 Aug 2006

2014823627 10/24/2014 19:21 GRANDVIEW AVE N AND UNIVERSITY AVE
County: 31 **City:** Dubuque

Major Cause: Ran stop sign
Roadway Type: Intersection: Four-way intersection

Severity:	PDO	**Manner of Crash:**	Broadside
Fatalities:	0	**Surface Conditions:**	Dry
Major Injuries:	0	**Light Conditions:**	Dark - roadway lighted
Minor Injuries:	0	**Weather Conditions:**	Clear
Possible Injuries:	0	**Drug/Alc Involved:**	none indicated
Unknown Injuries:	0	**Property Damage:**	$4000

Number of Vehicles: 2

	Unit 1	Unit 2	Unit 3
Init Trav Dir:	East	South	0
Veh Action:	Essentially straight	Essentially straight	0
Configuration:	Passenger car	Sport utility vehicle	0
Driver Age:	31	62	0
Driver Gender:	F	F	
Driver Cond:	Normal	Normal	0
Drivr Contr 1:	Ran stop sign	none	0
Drivr Contr 2:	not reported	not reported	0
Fixed Object:	none	none	0

2014826559 11/08/2014 12:14 GRANDVIEW AVE N AND UNIVERSITY AVE
County: 31 **City:** Dubuque

Major Cause: Ran stop sign
Roadway Type: Intersection: Four-way intersection

Severity:	PDO	**Manner of Crash:**	Sideswipe, same direction
Fatalities:	0	**Surface Conditions:**	Dry
Major Injuries:	0	**Light Conditions:**	Daylight
Minor Injuries:	0	**Weather Conditions:**	Partly cloudy
Possible Injuries:	0	**Drug/Alc Involved:**	none indicated
Unknown Injuries:	0	**Property Damage:**	$13000

Number of Vehicles: 2

	Unit 1	Unit 2	Unit 3
Init Trav Dir:	East	East	0
Veh Action:	Essentially straight	Turning right	0
Configuration:	Sport utility vehicle	Passenger car	0
Driver Age:	66	27	0
Driver Gender:	NR	M	
Driver Cond:	Normal	Normal	0
Drivr Contr 1:	Ran stop sign	none	0
Drivr Contr 2:	not reported	not reported	0
Fixed Object:	none	none	0

I. CMAT Summary of Crashes

Iowa Department of Transportation

Crash Detail Report

University Ave/ Grandview Ave N

Report Version 1.3 Aug 2006

2014827067 11/12/2014 17:41 GRANDVIEW AVE N AND UNIVERSITY AVE
County: 31 **City:** Dubuque

Major Cause: FTY from stop sign
Roadway Type: Intersection: Four-way intersection

Severity:	PDO	**Manner of Crash:**	Broadside
Fatalities:	0	**Surface Conditions:**	Dry
Major Injuries:	0	**Light Conditions:**	Dark - roadway lighted
Minor Injuries:	0	**Weather Conditions:**	Clear
Possible Injuries:	0	**Drug/Alc Involved:**	none indicated
Unknown Injuries:	0	**Property Damage:**	$2500

Number of Vehicles: 2

	Unit 1	Unit 2	Unit 3
Init Trav Dir:	North	East	0
Veh Action:	Essentially straight	Essentially straight	0
Configuration:	4-tire light truck	Passenger car	0
Driver Age:	18	19	0
Driver Gender:	M	F	
Driver Cond:	Normal	Normal	0
Drivr Contr 1:	FTY from stop sign	none	0
Drivr Contr 2:	not reported	not reported	0
Fixed Object:	none	none	0

2014836395 12/30/2014 17:35 GRANDVIEW AVE N
County: 31 **City:** Dubuque

Major Cause: Lost control
Roadway Type: Non-intersection: No special feature

Severity:	PDO	**Manner of Crash:**	Rear-end
Fatalities:	0	**Surface Conditions:**	Dry
Major Injuries:	0	**Light Conditions:**	Dark - roadway lighted
Minor Injuries:	0	**Weather Conditions:**	Partly cloudy
Possible Injuries:	0	**Drug/Alc Involved:**	none indicated
Unknown Injuries:	0	**Property Damage:**	$3500

Number of Vehicles: 2

	Unit 1	Unit 2	Unit 3
Init Trav Dir:	West	West	0
Veh Action:	Essentially straight	Slowing/stopping	0
Configuration:	Passenger car	Passenger car	0
Driver Age:	20	25	0
Driver Gender:	M	F	
Driver Cond:	Normal	Normal	0
Drivr Contr 1:	Lost control	none	0
Drivr Contr 2:	not reported	not reported	0
Fixed Object:	none	none	0

I. CMAT Summary of Crashes

Iowa Department of Transportation

Crash Detail Report

University Ave/ Grandview Ave N

Report Version 1.3 Aug 2006

2015849401 03/09/2015 09:56 GRANDVIEW AVE N AND UNIVERSITY AVE
County: 31 **City:** Dubuque

Major Cause: Ran stop sign
Roadway Type: Intersection: Four-way intersection

Severity:	PDO	**Manner of Crash:**	Broadside
Fatalities:	0	**Surface Conditions:**	Wet
Major Injuries:	0	**Light Conditions:**	Daylight
Minor Injuries:	0	**Weather Conditions:**	Clear
Possible Injuries:	0	**Drug/Alc Involved:**	none indicated
Unknown Injuries:	0	**Property Damage:**	$1500
			Number of Vehicles: 2

	Unit 1	Unit 2	Unit 3
Init Trav Dir:	West	North	0
Veh Action:	Essentially straight	Essentially straight	0
Configuration:	Sport utility vehicle	Passenger car	0
Driver Age:	27	22	0
Driver Gender:	F	F	
Driver Cond:	Normal	Normal	0
Drivr Contr 1:	Ran stop sign	none	0
Drivr Contr 2:	not reported	not reported	0
Fixed Object:	none	none	0

2015855774 04/23/2015 15:59 GRANDVIEW AVE N AND UNIVERSITY AVE
County: 31 **City:** Dubuque

Major Cause: FTY from stop sign
Roadway Type: Intersection: Four-way intersection

Severity:	Minor	**Manner of Crash:**	Broadside
Fatalities:	0	**Surface Conditions:**	Dry
Major Injuries:	0	**Light Conditions:**	Daylight
Minor Injuries:	1	**Weather Conditions:**	Clear
Possible Injuries:	0	**Drug/Alc Involved:**	none indicated
Unknown Injuries:	0	**Property Damage:**	$8500
			Number of Vehicles: 2

	Unit 1	Unit 2	Unit 3
Init Trav Dir:	East	South	0
Veh Action:	Essentially straight	Essentially straight	0
Configuration:	4-tire light truck	4-tire light truck	0
Driver Age:	67	26	0
Driver Gender:	M	NR	
Driver Cond:	Normal	Normal	0
Drivr Contr 1:	FTY from stop sign	none	0
Drivr Contr 2:	not reported	not reported	0
Fixed Object:	none	none	0

I. CMAT Summary of Crashes

Iowa Department of Transportation

Crash Detail Report

University Ave/ Grandview Ave N

Report Version 1.3 Aug 2006

2015859684 05/19/2015 15:31 GRANDVIEW AVE N AND UNIVERSITY AVE
County: 31 **City:** Dubuque

Major Cause: Ran stop sign
Roadway Type: Intersection: Four-way intersection

Severity:	PDO	**Manner of Crash:**	Broadside
Fatalities:	0	**Surface Conditions:**	Dry
Major Injuries:	0	**Light Conditions:**	Daylight
Minor Injuries:	0	**Weather Conditions:**	Clear
Possible Injuries:	0	**Drug/Alc Involved:**	none indicated
Unknown Injuries:	0	**Property Damage:**	$5500

Number of Vehicles: 2

	Unit 1	Unit 2	Unit 3
Init Trav Dir:	West	South	0
Veh Action:	Essentially straight	Essentially straight	0
Configuration:	Passenger car	Passenger car	0
Driver Age:	61	40	0
Driver Gender:	F	F	
Driver Cond:	Normal	Normal	0
Drivr Contr 1:	Ran stop sign	none	0
Drivr Contr 2:	not reported	not reported	0
Fixed Object:	none	none	0

2015867755 07/09/2015 15:00 GRANDVIEW AVE N AND UNIVERSITY AVE
County: 31 **City:** Dubuque

Major Cause: Other: No improper action
Roadway Type: Non-intersection: No special feature

Severity:	Minor	**Manner of Crash:**	Non-collision
Fatalities:	0	**Surface Conditions:**	Dry
Major Injuries:	0	**Light Conditions:**	Daylight
Minor Injuries:	1	**Weather Conditions:**	Clear
Possible Injuries:	0	**Drug/Alc Involved:**	none indicated
Unknown Injuries:	0	**Property Damage:**	$750

Number of Vehicles: 1

	Unit 1	Unit 2	Unit 3
Init Trav Dir:	North	0	0
Veh Action:	Essentially straight	0	0
Configuration:	Passenger car	0	0
Driver Age:	76	0	0
Driver Gender:	F		
Driver Cond:	Normal	0	0
Drivr Contr 1:	none	0	0
Drivr Contr 2:	not reported	0	0
Fixed Object:	none	0	0

8/12/2016 **Crash Mapping Analysis Tool** **Page:** 15 of 15

J. Traffic olume

TRAFFIC VOLUME

ANNUAL AVERAGE DAILY TRAFFIC

Feet
0 50 100

DATA SOURCE: IOWA DOT

Count Year
N Grandview Ave North, 2013
N Grandview Ave South, 2013
University Ave East, 2009
University Ave West, 2013

Service Layer Credits: Source: Esri, DigitalGlobe, GeoEye, i-cubed, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS User Community

K. Benefit/Cos

Intersection or Spot Benefit / Cost Safety Analysis

Rev. 5/14

Iowa DOT Office of Traffic & Safety

County: Dubuque Prepared by: Chandra Ravada Date Prepared: Aug 12, 2016

Intersection: Grandview and University Ave

Improvement

Proposed Improvement(s): Construct Roundabout

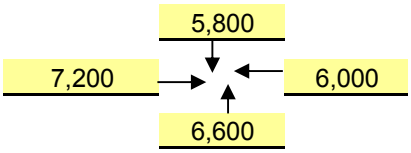
$ 500,000	Estimated Improvement Cost, **EC**	30	Est. Improvement Life, years, **Y**
	Other Annual Cost (after initial year), **AC**	72	Crash Reduction Factor (integer), **CRF**
$ -	Present Value Other Annual Costs, **OC**	4.0%	Discount Rate (time value of $), **INT**
		$ 500,000	Present Value Cost, **COST** = EC + OC

$$OC = \frac{AC}{INT}\left(1 - \frac{1}{(1+INT)^Y}\right)$$

Traffic Volume Data

Source: Iowa Department of Transportation 2013 Date of traffic count

Daily Entering Vehicles by Approach (or AADT / 2)



9,344,000	Current Annual Entering Veh., **AEV** = DEV * 365
46,371	veh / day, Final Year DEV, **FDEV**
379.07	MEV, Total Million Entering Veh. Over life of Project, **TMEV**
2.0%	Projected Traffic Growth (0%-10%), **G**
25,600	Current Daily Entering Vehicles, **DEV**

$$TMEV = \frac{AEV}{-G}\left(1 - \left(\frac{1+G}{1}\right)^Y\right) \Big/ 10^6$$

Crash Data

2011	First full year -->	2015	Last full year	5.0 years, Time Period, **T**		
	Additional months			values as of May 2014		
	Fatal Crashes		Fatalities @	$4,500,000	$	-
			Major Injuries @	$325,000	$	-
8	Injury Crashes	3	Minor Injuries @	$65,000	$	195,000
		5	Possible Injuries @	$35,000	$	175,000
22	Property Damage Only		(assumed cost per crash)	$7,400	$	222,000
		-OR-	enter all Property Costs of all crashes:			
30	Total Crashes, **TA**			Total $ Loss, **LOSS**	$	592,000

6.00	Current Crashes / Year, **AA** = TA / T	0.64	Crashes / MEV, Crash Rate, **CR**
$ 19,733	Cost per Crash, **AVC** = LOSS / TA		CR = TA x 10^6 / (DEV x 365 x T)
243.4	Total Expected Crashes, **TECR** = CR x TMEV	$ 1,881,949	Present Value of Avoided Crashes, **BENEFIT**
4.32	Crashes Avoided First Year **AAR** = AA x CRF / 100		
$ 85,248	Crash Costs Avoided in First Year, AAR x AVC		
175.3	Total Avoided Crashes, TECR x CRF/ 100		

$$BEN. = \frac{AVC \times AAR}{(INT - G)}\left(1 - \left(\frac{1+G}{1+INT}\right)^Y\right)$$

Benefit / Cost Ratio

Benefit : Cost = $1,881,949 : $500,000 = **3.76** : 1

Iowa Department of Transportation

Rev. 3/08

Application for TRAFFIC SAFETY FUNDS

GENERAL INFORMATION

Location / Title of Project H34 East Pavement Widening Phase II

Applicant Montgomery County

Contact Person Bradley Skinner, PE & PLS Title County Engineer

Complete Mailing Address PO Box 95

Red Oak, IA 51566

Phone 712-623-5197 (Area Code) E-Mail bskinner@montgomerycoia.us

If more than one highway authority is involved in this project, please indicate and fill in the information below (use additional sheets if necessary).

Co-Applicant(s) _____

Contact Person _____ Title _____

Complete Mailing Address _____

_____

Phone _____ (Area Code) E-Mail _____

PLEASE COMPLETE THE FOLLOWING PROJECT INFORMATION:

Application Type

- Site Specific ☒
- Traffic Control Device ☐
- Safety Study ☐

Funding Amount

Total Project Cost $ 789,000

Safety Funds Requested $ 500,000

Rev. 3/08

APPLICATION CERTIFICATION FOR LOCAL GOVERNMENT

To the best of my knowledge and belief, all information included in this application is true and accurate, including the commitment of all physical and financial resources. This application has been duly authorized by the participating local government(s). I understand the attached resolution(s) binds the participating local government(s) to assume responsibility if any additional funds are committed, and to ensure maintenance of any new or improved city streets or secondary roads.

I understand that, although this information is sufficient to secure a commitment of funds, a firm contract between the applicant and the Department of Transportation is required prior to the authorization of funds.

Representing the County of Montgomery

Signed: _____ 8/15/16
Signature Date Signed

Bradley Skinner, County Engineer
Typed Name

Attest: _____ 8/15/16
Signature Date Signed

Jeff Skalberg, Assistant County Engineer
Typed Name

Montgomery County
Secondary Roads

Office of the County Engineer
P.O. Box 95 | 406 W 4th Street
Red Oak, Iowa 51566
712.623.5197 (o) | 712.623.9477 (f)
engineer@montgomerycoia.us

August 9, 2016

2018 TSIP Application Narrative
H34 Lane Widening East of Red Oak, Phase II
Montgomery County, Iowa

The proposed project entails widening of 200th Street (Montgomery County Highway H34), from the Q Avenue (County Highway M65 intersection) to the intersection with US Highway 71, for a total of 3.6 miles. The existing highway is an 18-foot wide pavement that functions as an area major collector, an integral Farm-to-Market link between Red Oak and US Highway 71, carrying in excess of 300 vehicles per day - including significant truck traffic.

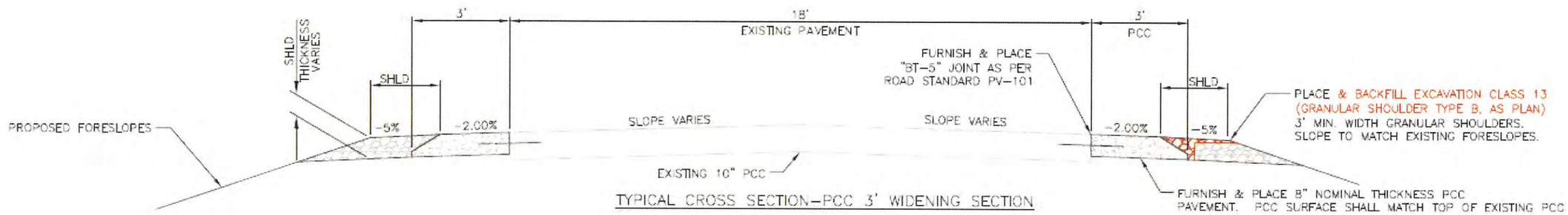
The existing roadway is comprised of an Iowa Highway Commission built ten-inch thick PCC slab, originally constructed with 18-feet wide with curbs in the 1930's. The pavement was in-filled with asphalt and slurry mixtures over the last fifty years to create a positive cross-slope for drainage, but numerous traffic issues remain.

Countless pavement departures (tires off roadway) occur on the narrow roadway every day, with many documented roadway departure incidents resulting in serious accidents and *fatalities on other sections of H34* within the County in recent years. It is nearly impossible for a vehicle to meet an on-coming semi-truck traveling the speed limit without a vehicle departing the pavement. Approximately nine miles of the H34 corridor have previously been funded by TSIP for widening, and this application represents a majority of the remaining 6½ miles.

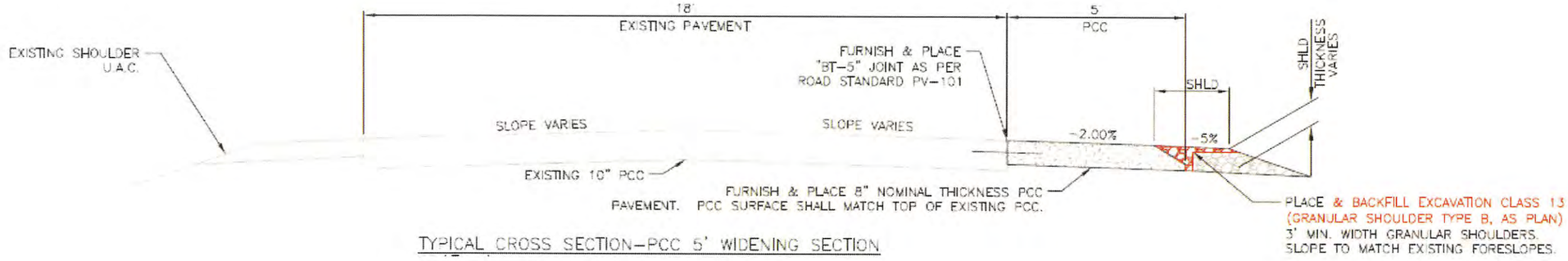
This highway has been a major priority for shoulder maintenance over the years, however, edge ruts develop quickly and hazards frequently materialize after rainstorms or just from routine traffic. The current shoulder configuration is not sustainable without weekly efforts to eliminate shoulder drop off. In short, the roadway cross-section is insufficient for current traffic demands, with numerous safety issues.

Montgomery County proposes to improve the referenced corridor with TSIP funding, to include the above described roadway for widening of five to six foot to accomplish a 22-foot wide paved driving surface plus safety edge for this heavily traveled Farm-to-Market and Federal Aid route. There is generally adequate existing shoulder width to accomplish said widening and allow for a three foot or greater aggregate shoulder going forward. Where clear zone issues exist regarding culverts, guardrail is proposed if extensions are impractical.

Once the widening has been accomplished, Montgomery County will continue work on the corridor with an HMA overlay, as appropriate, with Farm-to-Market funds. The ultimate goal is to eliminate all of the 18-foot pavement on H34, incorporating as many modern safety features as possible (increased width, safety edge, guard rail, rumble stripes, etc.) on the final surface.



TYPICAL CROSS SECTION–PCC 3' WIDENING SECTION



TYPICAL CROSS SECTION–PCC 5' WIDENING SECTION

APPLICATION INFORMATION & DOCUMENTATION

Crash Modification Factors Utilized:

Widen Narrow Pavement, CMF ID 6863, Value = 35.7
Installation of Safety Edge, CMF ID 4311, Value = 6.5
New Guardrail along Embankment, CMF ID 38, Value = 47

C. Cost Estimate (See following page for detail):

Safety Related Improvements:	$789,000
Total Improvements:	$1,205,000
TSIP Application:	$500,000
Local and/or FM Funding:	$705,000

D. Time Schedule:

Award & Contract:	February 2017
Survey & Design:	July 2017 – August 2018
Letting:	November 2019
Construction:	March thru November 2020

E. Project Map: See following pages

F. Color Pictures: See following pages

G: Plan View: See following pages. Note: project planned within existing ROW. Cut-slopes creating snow traps, "Backslope" on plan view drawing, are planned to be removed prior to project.

H: Aerial Photograph: See following pages. Note: Combined with Item G.

I: CMAT/SAVER Summary of Motor Vehicle Accidents: See following pages

J: Traffic Volumes: 2012 Annual Average Daily Traffic PER Iowa DOT Counts, 310 VPD

K: Traffic Signals N/A

L: Benefit/Cost Ratio: 1.53 (See following pages for detail)

ENGINEERS ESTIMATE - TSIP - Highway Q AVE TO HWY 71

8/9/2016

3 Miles w/ 40% 3' each side and 60% 5' one side

ITEM NUMBER	ITEM DESCRIPTION	UNIT	QTY	UNIT PRICE	TOTAL
2102-2713070	EXCAVATION CL 13, RDWY & BORROW	CY	2000.00	$ 7.30	$ 14,600.00
2111-8174200	GRANULAR SUBBASE, PLACE ONLY	SY	250.00	$ 2.00	$ 500.00
2121-7245021	GRANULAR SHOULDER TYPE B, PER PLAN	STA	259.00	$ 150.00	$ 38,850.00
2123-7450000	SHOULDER CONSTRUCTION, EARTH	STA	20.00	$ 600.00	$ 12,000.00
2212-5070310	PATCHES, FULL-DEPTH REPAIR	SY	1000.00	$ 68.50	$ 68,500.00
2212-5070330	PATCHES BY COUNT (REPAIR)	EA	200.00	$ 86.00	$ 17,200.00
2214-5145150	PAVT SCARIFICATION	SY	36960.00	$ 7.00	$ 258,720.00
2302-1200080	PCC PAVEMENT WIDENING 8 IN	SY	11088.00	$ 38.17	$ 423,228.96
2505-4008300	STEEL BEAM GUARDRAIL	LF	250.00	$ 17.00	$ 4,250.00
2505-4021020	STEEL BEAM GUARDRAIL END ANCHOR, W-BEAM	EA	10.00	$ 1,700.00	$ 17,000.00
2505-4021700	STEEL BEAM GUARDRAIL END TERMINAL	EA	10.00	$ 1,700.00	$ 17,000.00
2512-1725306	CURB+GUTTER PCC 3.0'	LF	2000.00	$ 17.98	$ 35,960.00
2518-6910000	SAFETY CLOSURE	EA	7.00	$ 100.00	$ 700.00
2526-8285000	CONSTRUCTION SURVEY	LS	1.00	$ 750.00	$ 750.00
2527-9263117	PAINTED PAVEMENT MARKINGS, DURABLE	STA	369.60	$ 8.00	$ 2,956.80
2527-9263180	PAVT MARKINGS RMVD	STA	369.60	$ 20.00	$ 7,392.00
2528-8445110	TRAFFIC CONTROL	LS	1.00	$ 3,250.00	$ 3,250.00
2528-8445113	FLAGGERS	EA		$ 435.00	$ -
2531-5200020	PAV'T SURF REPAIR (MILL GRAVEL)	SY	8448.00	$ 7.00	$ 59,136.00
2533-4980005	MOBILIZATION	LS	1.00	$ 15,545.32	$ 15,545.32
				Total	**$ 997,539.08**
				Safety Related	**$ 653,119.08**
				Other	**$ 380,380.00**

Admin/Design/Inspection	10%	$99,753.91
Inflation (2 Yrs to Construction)	5%	$49,876.95
Contingency	5%	$57,358.50
TOTAL PROJECT ESTIMATE		***$1,204,528.44***

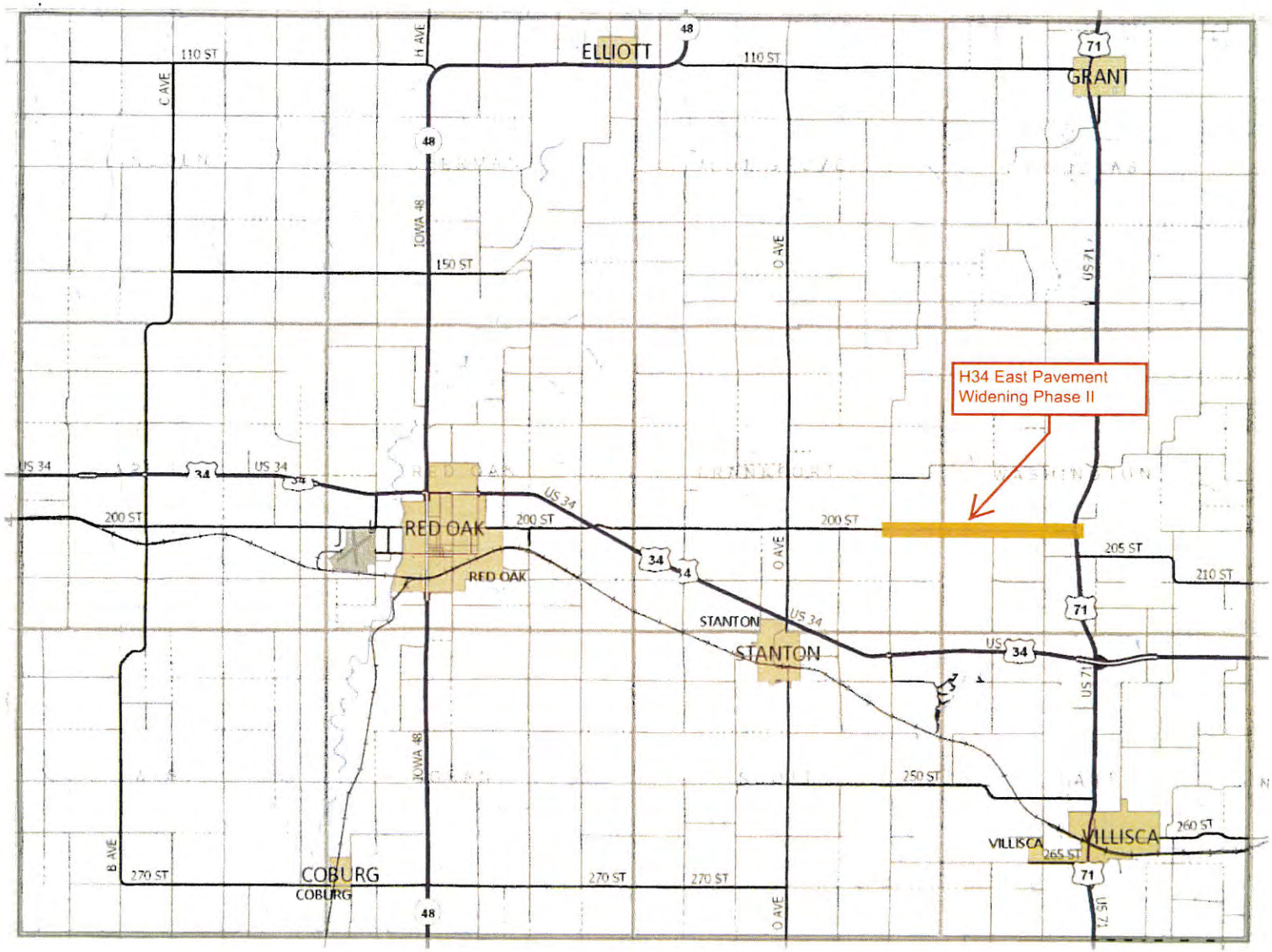
ENGINEERS ESTIMATE - TSIP - Highway Q AVE TO HWY 71

8/9/2016

3.5 Miles w/ 40% 3' each side and 60% 5' one side

ITEM NUMBER	ITEM DESCRIPTION	UNIT	QTY	UNIT PRICE	TOTAL
2102-2713070	EXCAVATION CL 13, RDWY & BORROW	CY	2000.00	$ 7.30	$ 14,600.00
2111-8174200	GRANULAR SUBBASE, PLACE ONLY	SY	250.00	$ 2.00	$ 500.00
2121-7245021	GRANULAR SHOULDER TYPE B, PER PLAN	STA	259.00	$ 150.00	$ 38,850.00
2123-7450000	SHOULDER CONSTRUCTION, EARTH	STA	20.00	$ 600.00	$ 12,000.00
2302-1200080	PCC PAVEMENT WIDENING 8 IN	SY	11088.00	$ 38.17	$ 423,228.96
2505-4008300	STEEL BEAM GUARDRAIL	LF	250.00	$ 17.00	$ 4,250.00
2505-4021020	STEEL BEAM GUARDRAIL END ANCHOR, W-BEAM	EA	10.00	$ 1,700.00	$ 17,000.00
2505-4021700	STEEL BEAM GUARDRAIL END TERMINAL	EA	10.00	$ 1,700.00	$ 17,000.00
2512-1725306	CURB+GUTTER PCC 3.0'	LF	2000.00	$ 17.98	$ 35,960.00
2518-6910000	SAFETY CLOSURE	EA	7.00	$ 100.00	$ 700.00
2526-8285000	CONSTRUCTION SURVEY	LS	1.00	$ 750.00	$ 750.00
2527-9263117	PAINTED PAVEMENT MARKINGS, DURABLE	STA	369.60	$ 8.00	$ 2,956.80
2527-9263180	PAVT MARKINGS RMVD	STA	369.60	$ 20.00	$ 7,392.00
2528-8445110	TRAFFIC CONTROL	LS	1.00	$ 3,250.00	$ 3,250.00
2528-8445113	FLAGGERS	EA		$ 435.00	$ -
2531-5200020	PAV'T SURF REPAIR (MILL GRAVEL)	SY	8448.00	$ 7.00	$ 59,136.00
2533-4980005	MOBILIZATION	LS	1.00	$ 15,545.32	$ 15,545.32
				Total	**$ 653,119.08**

Admin/Design/Inspection	10%	$65,311.91
Inflation (2 Yrs to Construction)	5%	$32,655.95
Contingency	5%	$37,554.35
TOTAL SAFETY PROJECT ESTIMATE		***$788,641.29***



Location Map

F

1. Confined space on left side forcing one side widening to leave clear zone
2. Ample space on right side for 5' additional pavement
3. Pavement edge drop off on right indicative of frequent lane departures due to hilltop meeting of opposing traffic
4. County tandem dump truck positioned on typical width H34. Note tire overhanging pavement edge and mirror overhanging center line

3

1

F

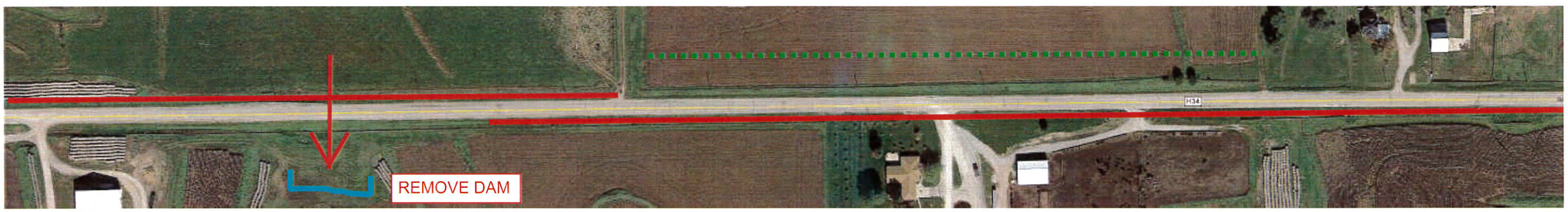
2

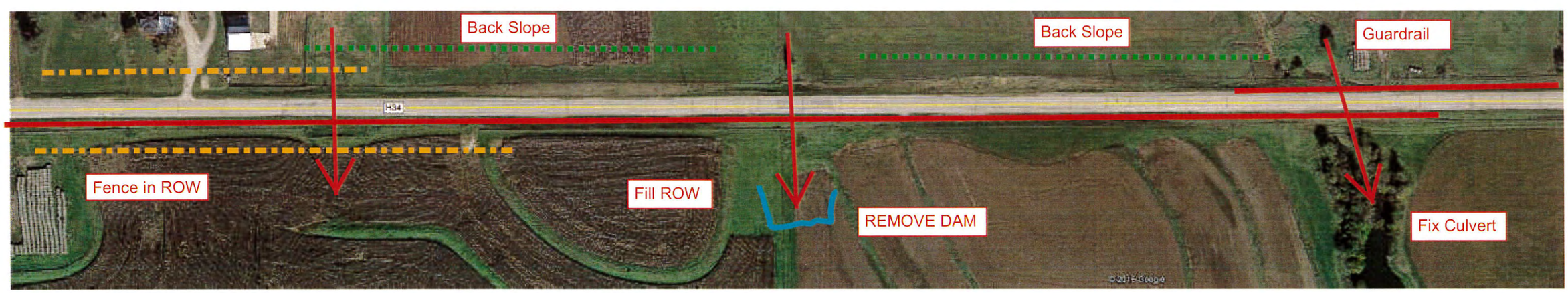
4

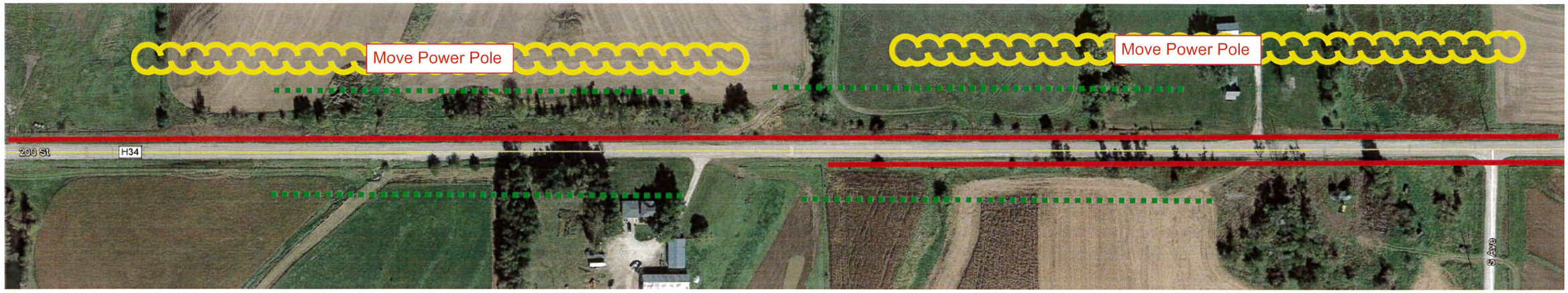
H34 East Pavement Widening Phase II

G & H

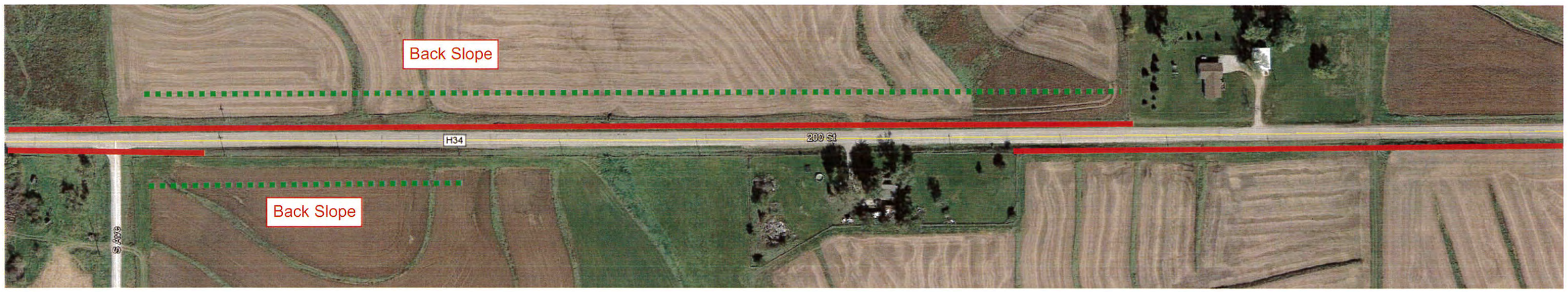
Q Ave.





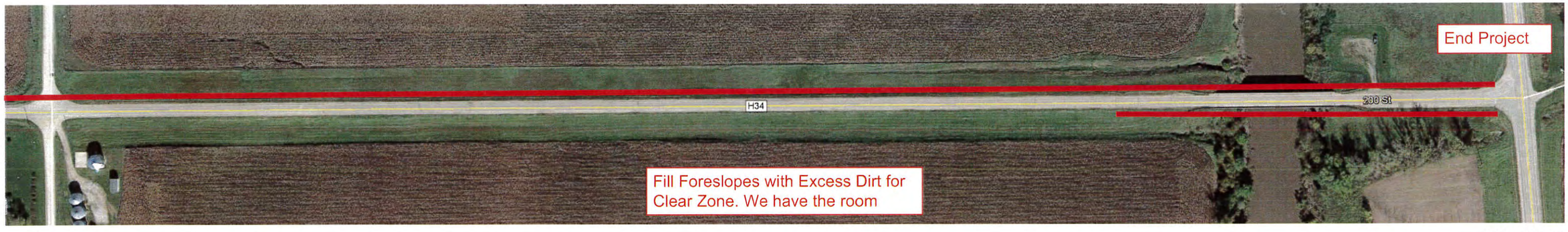


S Ave.



S Ave.

T Ave.


End Project
H34
200 St
Fill Foreslopes with Excess Dirt for
Clear Zone. We have the room

T Ave.

HWY 71

Rev. 5/14

Road Segment Benefit / Cost Safety Analysis

Iowa DOT Office of Traffic & Safety

County: Montgomery Prepared by: Brad Skinner Date Prepared: Aug 11, 2016

Location: H34 from Q Avenue to US Hwy 71

Improvement

Proposed Improvement(s): Pavement Widening, 3 ft Symmetrical with Safety Edge & Gaurdrail

$ 500,000	Estimated Improvement Cost, **EC**	20	Est. Improvement Life, years, **Y**
$ -	Other Annual Cost (after initial year), **AC**	68	Crash Reduction Factor (integer), **CRF**
$ -	Present Value Other Annual Costs, **OC**	4.0%	Discount Rate, **INT**
	$$OC = \frac{AC}{INT}\left(1 - \frac{1}{(1+INT)^Y}\right)$$	$ 500,000	Present Value All Costs, **COST** = EC + OC

Traffic Volume Data

Source: IDOT 2012 Traffic Counts 2012 Date of traffic count

Length (mi.)	Two-way veh/day	Description
3.50	310	Secondary FM/FA Paved Rout
3.50	miles total	

1.0% Projected Traffic Growth (0%-10%), **G**

1,085 Current Vehicle Miles / Day, **VM**

1,324 End of Life Veh. Miles / Day

396,025 Current Veh. Miles / Year, **AM**

8,720,076 Total Projected Veh. Miles Over Life of Project, **TVMT**

$$TVMT = \frac{AM}{-G}\left(1 - \left(\frac{1+G}{1}\right)^Y\right)$$

Crash Data

2006 First full year --> 2015 Last full year 10.0 years, Time Period, **T**

Additional months values as of May 2014

0	Fatal Crashes →	0	Fatalities @	$4,500,000	$	-
		2	Major Injuries @	$325,000	$	650,000
3	Injury Crashes →	1	Minor Injuries @	$65,000	$	65,000
		0	Possible Injuries @	$35,000	$	-
3	Property Damage Only		(assumed cost per crash)	$7,400	$	44,400
			-OR- enter all Property Costs of all crashes:			
6	Total Crashes, **TA**			Total $ Loss, **LOSS**	$	759,400

0.60	Current Crashes / Year, **AA** = TA / T	151.5	Crashes / HMVM, Crash Rate, **CR** CR = TA x 10^8 / (AM x T)
$ 126,567	Cost per Crash, **AVCR** = LOSS / TA	$ 762,747	Present Value of Avoided Crashes, **BENEFIT**
13.2	Total Expected Crashes, **TCR** = CR x TVMT/10^8		
0.41	Crashes Avoided First Year **AAR** = AA x CRF / 100		
$ 51,639	Crash Costs Avoided in First Year, AAR x AVCR		
9.0	Total Avoided Crashes, TCR x CRF/ 100		

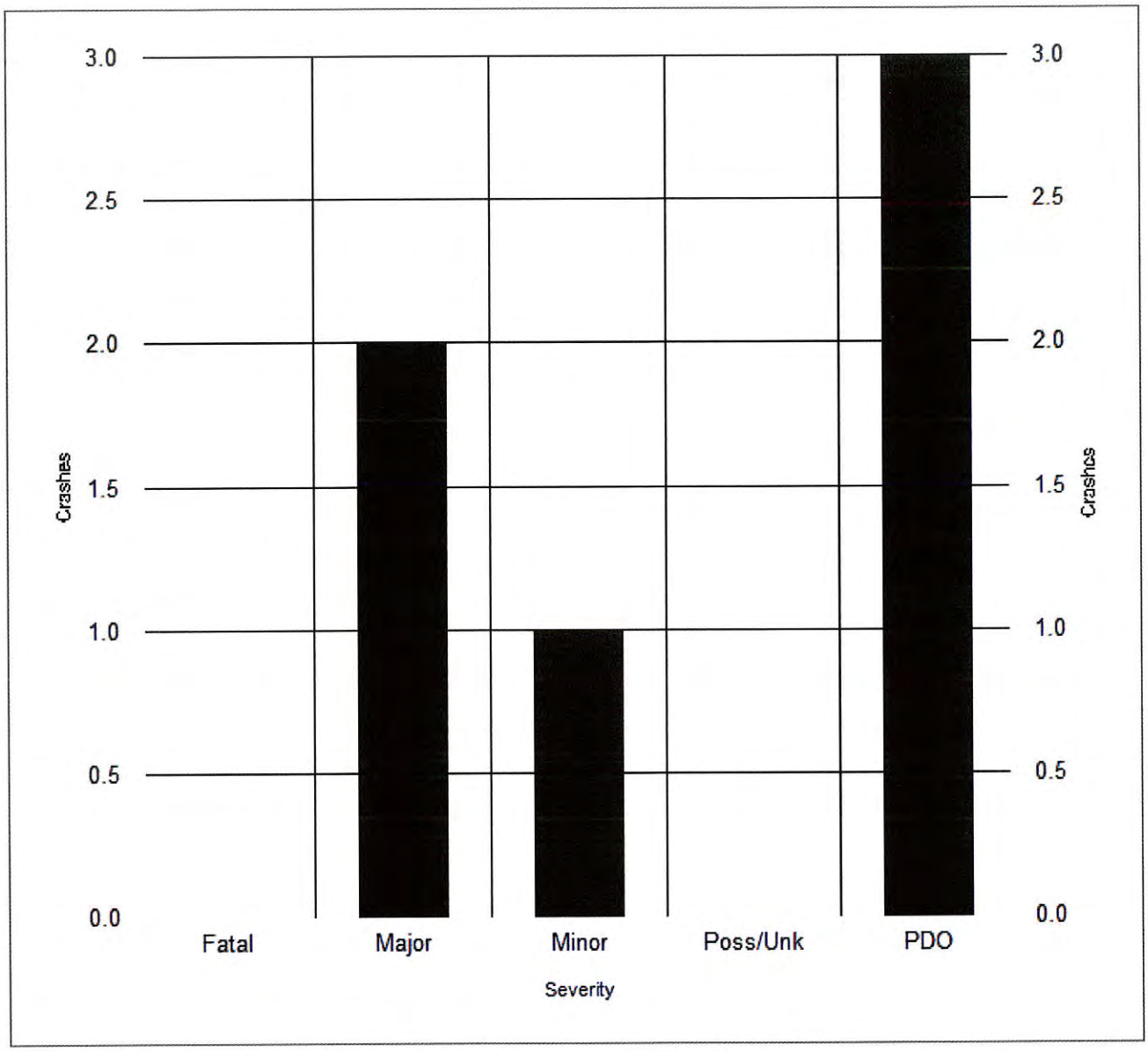
$$BEN. = \frac{AVCR \times AAR}{(INT - G)}\left(1 - \left(\frac{1+G}{1+INT}\right)^Y\right)$$

Benefit / Cost Ratio

Benefit : Cost = $762,747 : $500,000 = **1.53** : 1

H34 FROM Q AVE TO US71

I



8/4/2016 Incidents: 6

PERIOD: 2006 - JULY 2016

Section A.

Rev. 6/16

Application for TRAFFIC SAFETY FUNDS

GENERAL INFORMATION **DATE:** August 15, 2016

Location / Title of Project D46/R27 Intersection Reconstruction

Applicant Hamilton County

Contact Person Nicole Stinn Title Assistant Engineer

Complete Mailing Address 2300 Superior Street, Suite 4
Webster City, IA 50595

Phone (515) 832-9520 (Area Code) E-Mail nstinn@hamiltoncounty.org

If more than one highway authority is involved in this project, please indicate and fill in the information below (use additional sheets if necessary).

Co-Applicant(s) _____

Contact Person _____ Title _____

Complete Mailing Address _____

_____

Phone _____ (Area Code) E-Mail _____

PLEASE COMPLETE THE FOLLOWING PROJECT INFORMATION:

Application Type

- Site Specific ☒
- Traffic Control Device ☐
- Safety Study ☐

Funding Amount

Total Safety Cost	$ 175,000
Total Project Cost	$ 1,425,000
Safety Funds Requested	$ 175,000

Does this project appear on a Safety Improvement Candidate List or is there a safety study recommendation for this project? ☐Yes – Explain _____ ☒No

However, this intersection does rank in approximately the top 15% by risk factor points in our recently completed Local Road Safety Plan.

Rev. 6/16

APPLICATION CERTIFICATION FOR LOCAL GOVERNMENT

To the best of my knowledge and belief, all information included in this application is true and accurate, including the commitment of all physical and financial resources. This application has been duly authorized by the participating local government(s). I understand the attached resolution(s) binds the participating local government(s) to assume responsibility if any additional funds are committed, and to ensure maintenance of any new or improved city streets or secondary roads.

I understand that, although this information is sufficient to secure a commitment of funds, a firm contract between the applicant and the Department of Transportation is required prior to the authorization of funds.

Representing the Hamilton County Secondary Road Department

Signed: Nicole M. Stinn — 08/15/16

Signature — Date Signed

Nicole M. Stinn

Typed Name

Attest: Danny R. Waid — 8-15-2016

Signature — Date Signed

Danny R. Waid

Typed Name

Hamilton County Engineer

2300 Superior Street, Suite 4
Webster City, Iowa 50595-3197
Phone: 515-832-9520 Fax: 515-832-9525

Danny R. Waid, P.E.

dwaid@hamiltoncounty.org

Nicole Stinn, P.E., Assistant Engineer- nstinn@hamiltoncounty.org
Colleen Hansen, Office Manager - chansen@hamiltoncounty.org
Kurt Maxon, Technician - kmaxon@hamiltoncounty.org
Arnold Smith, Technician - asmith@hamiltoncounty.org

B. Narrative of Project

We are applying for the Traffic Safety Improvement Program funding for the reconstruction of the intersection of county roads D46 (280th Street) and R27 (Tunnel Mill Road). This reconstruction will be performed in conjunction with the resurfacing of R27.

Currently, R27 and D46/280th Street meet at 90 degree angles to form a basic intersection. Stop signs are located on 280th Street, so traffic on R27 does not stop. The north and west legs of this intersection are the tangents of a 636.6ft radius curve on D46. There is a stop sign placed on each leg where the tangent intersects with the curve. At the north leg, D46 acts as the thru route. Please see the diagrams on the following page of the intersection complex. The speed limits for R27 and D46 at this location are 55mph and 40mph (recommended curve speed).

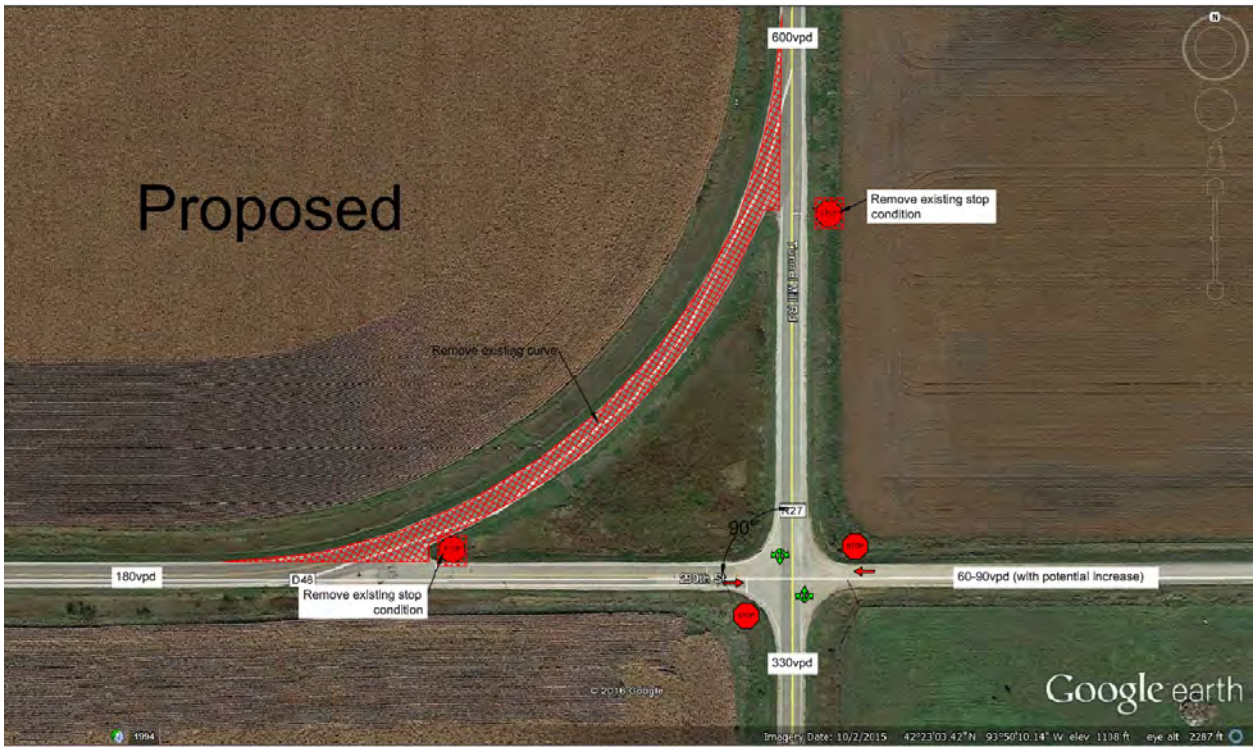
Current traffic counts and patterns indicate R27 should be the obvious thru route at all points within the intersection complex. R27 is paved and currently carries 600vpd north of the intersection and 330vpd south of the intersection. D46 to the west of the intersection is paved carries 180vpd. 280th Street to the east of the intersection has granular surfacing and carries 60-90vpd. (However, the traffic volume on 280th Street has a strong potential to increase due to an impending new crossing the county hopes to construct over the Boone River just to the east. This new crossing replace a weight-limited bridge that currently prohibits the connection of D46 with IA17.)

The safety funds will be used to remove the existing curve on D46 and to convert this intersection into a basic 90 degree two-way stop-controlled intersection. R27 will be treated as the major route and will function as a thru route. D46/280th Street will be treated as the inferior route and will be required to stop.

We feel that the following safety concerns justify this reconstruction.

1) Number of stop situations – There are currently three stop intersections within 350-400ft of each other in this intersection complex. Each stop situation inherently creates more opportunities for crashes. The reconstruction of this intersection would reduce the number of intersections and greatly simplify the situation. This intersection is ranked in the top 15% by risk factor points in the county's Local Road Safety Plan.
2) Sight distance – Currently, if corn is planted in the field in the northwest corner of the intersection, it is difficult for southbound traffic on R27 to see northbound traffic traveling on the D46 curve. The southbound traffic must cross over the northbound lane if they wish to continue travelling south on R27. If southbound traffic were to collide with a vehicle travelling north along the curve, the resulting crash would likely be a broadside/t-bone type crash with very high potential for an injury or fatality. Improving the sight distance within the sight triangle is a countermeasure considered to have been proven effective by the FHWA.
3) Driver confusion – For the above situation, it is difficult for drivers to realize who has the right-of-way. Is it the person continuing straight south on R27 or the person heading north around the curve?
4) Geometry (Skew) – Currently, the tangent legs intersect the curve at approximately 25° angles. Many studies have shown that deviations in skew from 90° results in a higher crash rate. Improving the horizontal intersection alignment/skew is a countermeasure which is considered to have been proven effective by the FHWA.
5) Geometry (Curve radius) – The current curve has a 636.6ft radius and has a posted recommended speed limit of 40mph. In the county's Local Road Safety Plan, the highest risk points for curves are assigned to those curves with a radius less than 1,000ft because analysis showed more crashes associated with curves comprised of smaller radii. Modifying the horizontal geometry is a countermeasure which is considered to have been proven effective by the FHWA.
6) Clear zone – Currently, the shoulders on the curve are only about 3ft wide, and the foreslope on the east side of the curve carries about a 2.5:1 slope. This critical slope falls within the recommended clear zone. The hazard is compounded by cross-slope shoulder break difference created by the top edge of the superelevated curve. The maximum current break is 9.5%. The IDOT Design Manual recommends <8%.

Although there is a lack of severe crash history for this location, we do not believe that is an accurate reflection of the fact that this situation has significant potential to develop a crash history. We believe there are a great number of risk factors that combine to create a situation with a high potential for severe crashes.



C. Itemized Breakdown of Costs

Safety Project Cost Estimate

Item Code	Item	Quantity	Units	Estimated Unit Cost	Total Cost
2102-2710070	Excavation, Class 10, Rdwy & Brrw	12650	cy	$6.50	$82,225.00
2121-7425020	Granular Shoulders, Type B	375	tons	$32.00	$12,000.00
2123-7450000	Shoulder Construction, Earth	25	sta	$190.00	$4,750.00
2210-0475105	Choke Stone Base	60	tons	$25.00	$1,500.00
2210-0475290	Macadam Stone Base	165	tons	$20.00	$3,300.00
2303-1031500	HMA, Standard Traffic, Base Coarse, 1/2" Mix	80	tons	$42.00	$3,360.00
2303-1033500	HMA, Standard Traffic, Surface Coarse, 1/2" Mix	40	tons	$40.00	$1,600.00
2303-1258283	Asphalt Binder, PG 58-28S, Standard Traffic	4.8	tons	$425.00	$2,040.00
2503-0111012	Storm Sewer Gravity Main, Trenched, HDPE, 12"	215	lf	$45.00	$9,675.00
2510-6745850	Removal of Pavement	5650	sy	$6.50	$36,725.00
2533-4980005	Mobilization	1	lump	$15,000.00	$15,000.00
					$172,175.00

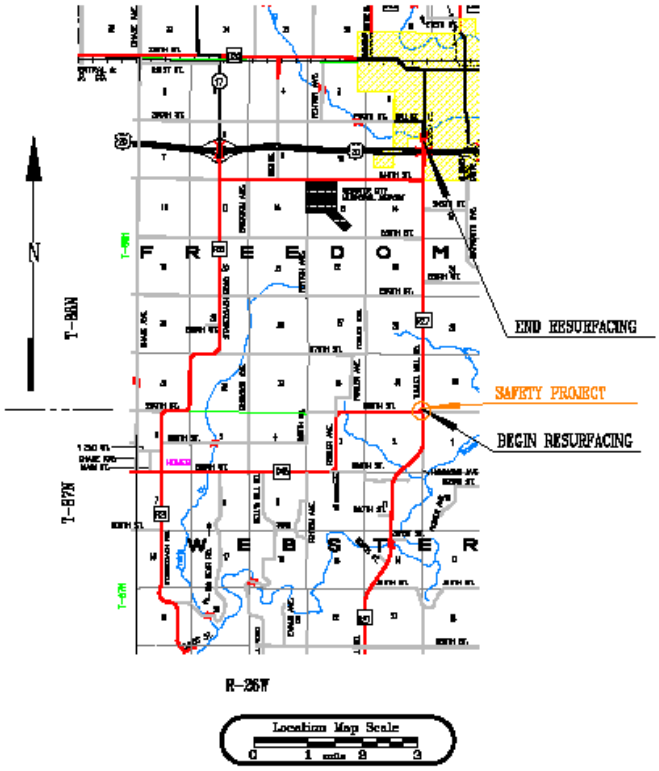
Total Project Cost Estimate

Safety Cost	$175,000
Remaining Project Cost (Federal Aid - STP)	$1,000,000
Remaining Project Cost (Farm-to-Market)	$250,000
Total Project Cost	$1,425,000

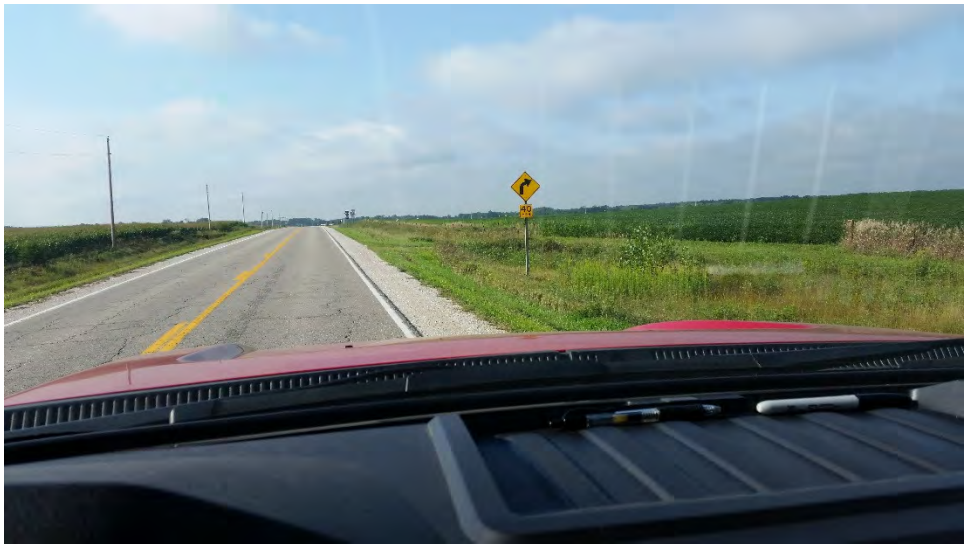
D. Time Schedule

- TSIP Application = August 2016
- Anticipated Letting Date = December 2017
- Construction = May-September 2018 (Approximate)
- Anticipated Completion = September 2018

E. Map


F R E E D O M
W E B S T E R
END RESURFACING
SAFETY PROJECT
BEGIN RESURFACING
T-8N
T-8N
R-26W
Location Map Scale
0 1 miles 2 3

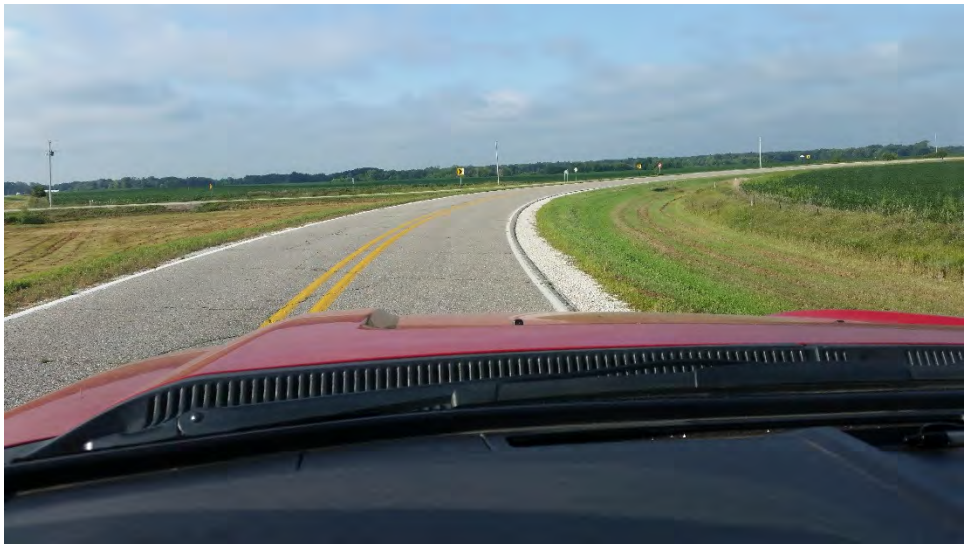
F. Site Pictures



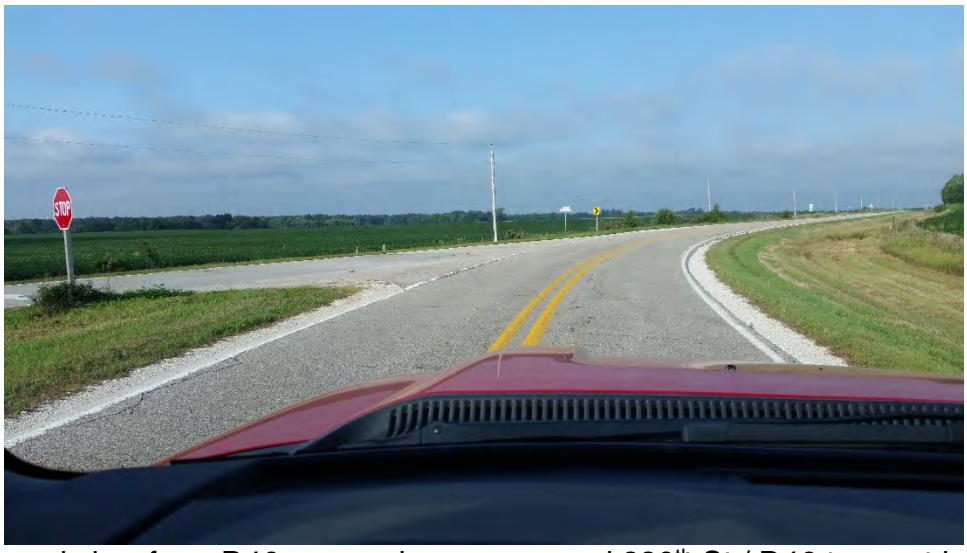
Southbound view from R27 heading into curve (1)

Southbound view from R27 heading into curve (2)

Southbound view on R27 where D46 curve and R27 tangent intersect

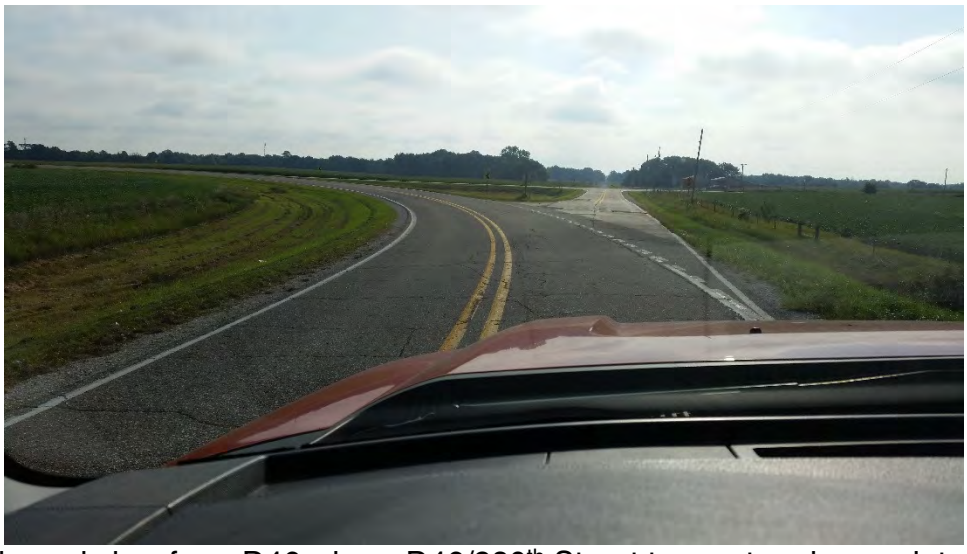


Southbound/westbound view on D46 curve



Westbound view from D46 curve where curve and 280th St./ D46 tangent intersect

Eastbound view from D46 heading into curve



Eastbound view from D46 where D46/280th Street tangent and curve intersect

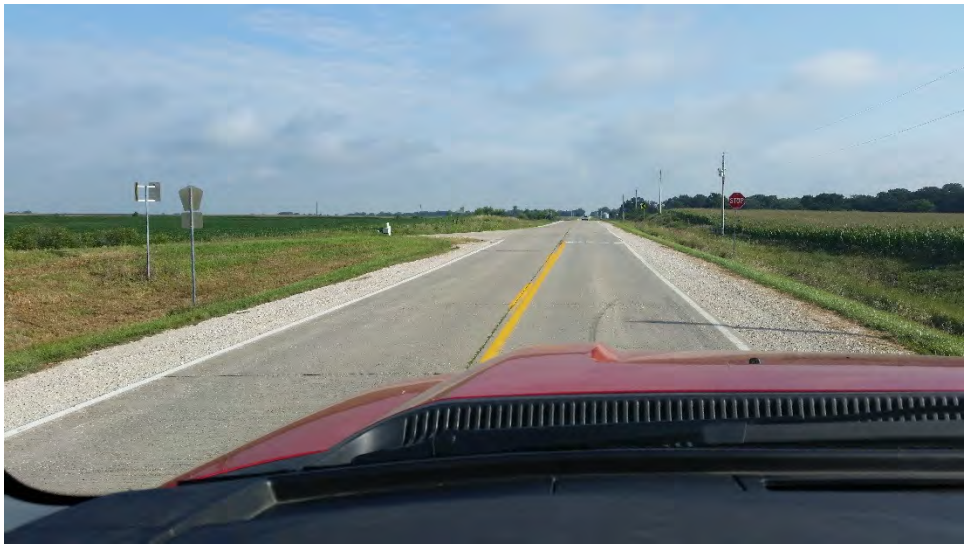
View from D46/280th Street after exiting curve

View from D46/280th Street tangent looking at curve (1)

View from D46/280th Street tangent looking at curve (2)

Eastbound view from D46/280th Street tangent at four-way intersection with R27

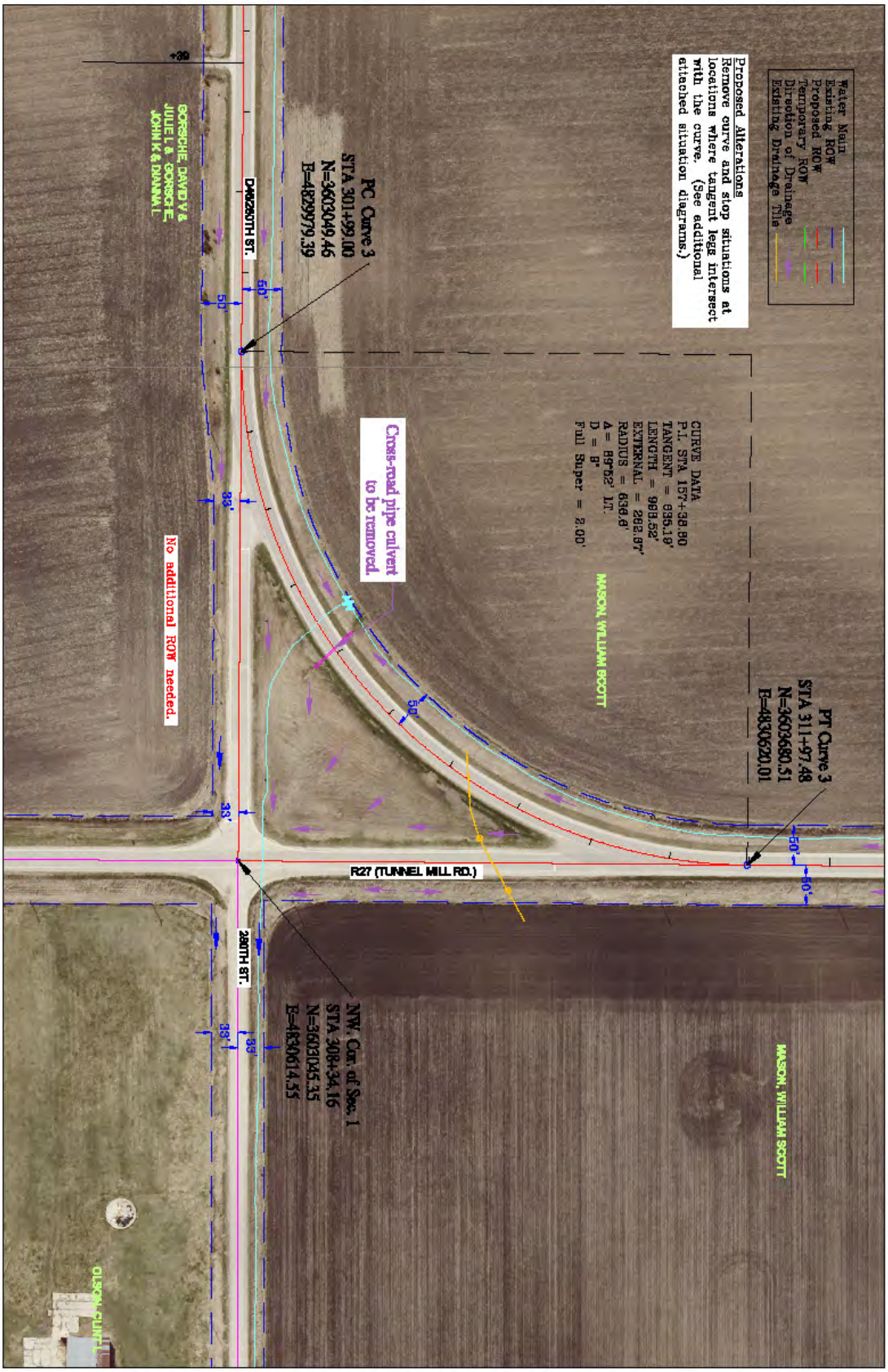
View from 280th Street looking west/northwest at D46/280th Street tangent and curve



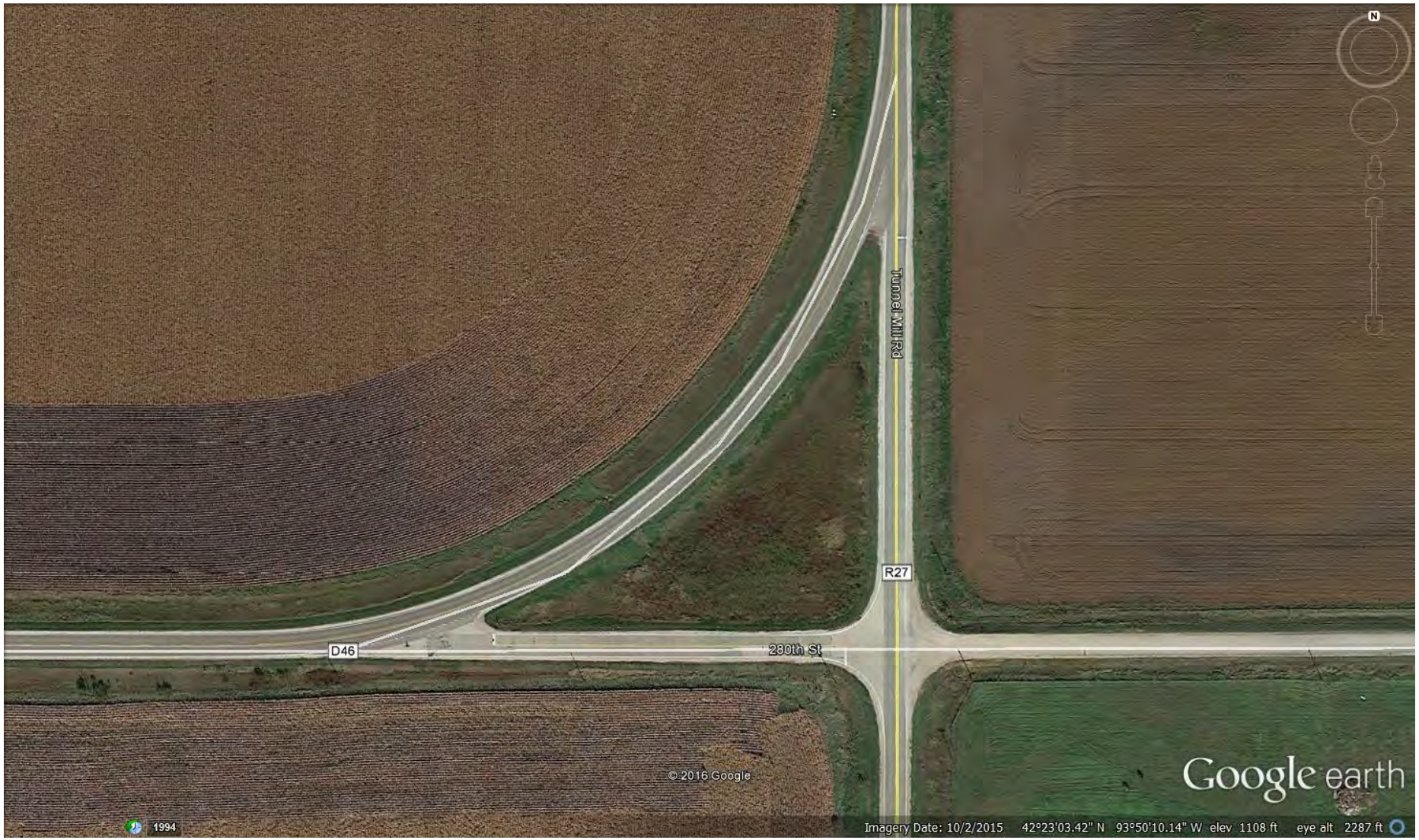
Northbound view from R27 looking at intersection with curve

Northbound view from R27 at intersection with curve

G. Plan View


Water Main
Existing ROW
Proposed ROW
Temporary ROW
Direction of Drainage
Existing Drainage Tile
Proposed Alterations
Remove curve and stop situations at locations where tangent legs intersect with the curve. (See additional attached situation diagrams.)
CURVE DATA
P.I. STA 157+38.80
TANGENT = 635.19'
LENGTH = 988.52'
EXTERNAL = 262.87'
RADIUS = 636.6'
Δ = 89°52' LT.
D = 9°
Full Super = 2.00'
MASON, WILLIAM SCOTT
PT Curve 3
STA 311+97.48
N=3603680.51
E=4830620.01
PC Curve 3
STA 301+99.00
N=3603049.46
E=4829979.39
Cross-road pipe culvert to be removed.
50'
50'
50'
50'
R27 (TUNNEL MILL RD.)
280TH ST.
280TH ST.
33'
33'
33'
33'
NW. Cor. of Sec. 1
STA 308+34.16
N=3603045.35
E=4830614.55
MASON, WILLIAM SCOTT
No additional ROW needed.
GORSCHE, DAVID V &
JULIE L & GORSCHE,
JOHN K & DIANNA L
+00
OLSON, CURTIS

H. Aerial Photograph



I. SAVER CRASH SUMMARY (Last 10 years)

Intersection of D56 and R27 2006-*Preliminary 2016														
	Crash Severity						Total Injuries						Property Damage	Location
	Fatal	Major Injury	Minor Injury	Possible/ Unknown Injury	Property Damage	Total Crashes	Fatalities	Major Injuries	Minor Injury	Possible Injury	Unknown Injury	Total Injuries		
2013	0	0	1	0	0	**1**			**1**			**1**	$8,000	Intersection of D46/280TH ST
2014	0	0	0	1	1	**2**					**1**	**1**	$9,500	Intersection of Co Rd D46/280TH ST & Co Rd R27/TUNNEL MILL RD, Intersection of Co Rd R27/TUNNEL MILL RD & 280TH ST
2015	0	0	1	0	0	**1**			**1**			**1**	$13,000	Intersection of Co Rd D46/280TH ST & Co Rd R27/TUNNEL MILL RD
Total	**0**	**0**	**2**	**1**	**1**	**4**			**2**		**1**	**4**	**$30,500**	

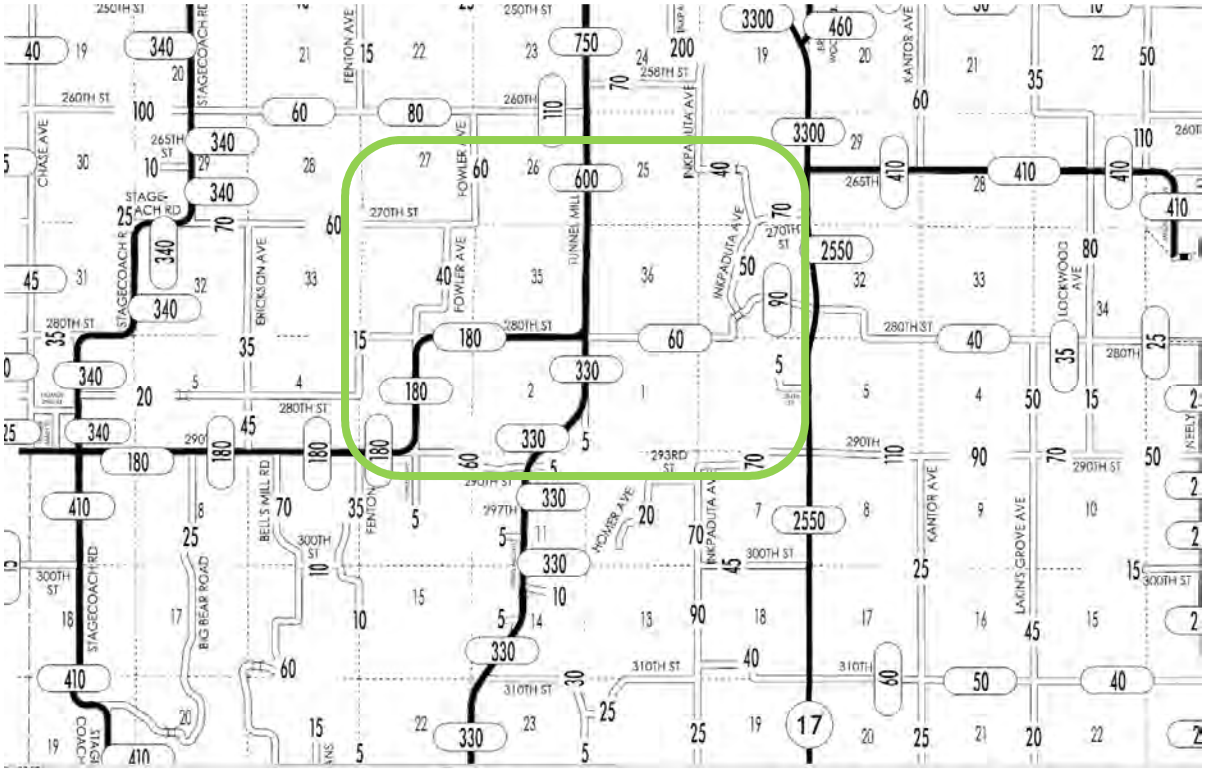
* This information is derived from the July 25, 2016 Iowa DOT crash database snapshot. It is considered preliminary and is subject to change.

All Crashes, Intersection of County Road R27 & County Road D46, Hamilton County, Iowa
2006- Preliminary 2016 (July 25, 2016)

Crash Severity
- Minor Injury (2)
- Possible/Unknown Injury (1)
- Property Damage Only (1)

Disclaimer:
The information contained in this report was derived from the July 25, 2016 Iowa Department of Transportation crash database. If errors or odd cases are found, please communicate the case number or send a printed crash report to Michael Pawlovich, Iowa DOT, Office of Traffic and Safety, (Michael.Pawlovich@dot.iowa.gov, 515.239.1428). Since the database is actively being updated, edited, and reviewed, some of the fatality totals may differ from the Fatality Analysis Reporting System (FARS).

J. Recent Traffic Volumes



K. Traffic Signal Information (Not Applicable)

L. Benefit/Cost Ratio

Segment (Curve Only)

Road Segment Benefit / Cost Safety Analysis
Iowa DOT Office of Traffic & Safety

Rev. 5/14

County: Hamilton Prepared by: Niki Stinn Date Prepared: Aug 15, 2016
Location: Intersection of D46/280th Street and R27

Improvement

Proposed Improvement(s): Remove curve and associated intersections on D46

$ 175,000	Estimated Improvement Cost, **EC**	20	Est. Improvement Life, years, **Y**
$ 2,000	Other Annual Cost (after initial year), **AC**	92	Crash Reduction Factor (integer), **CRF**
$ 27,181	Present Value Other Annual Costs, **OC**	4.0%	Discount Rate, **INT**
		$ 202,181	Present Value All Costs, **COST** = EC + OC

$$OC = \frac{AC}{INT}\left(1 - \frac{1}{(1+INT)^Y}\right)$$

Traffic Volume Data

Source: Iowa DOT 2015 Date of traffic count

Length (mi.)	Two-way veh/day	Description
0.19	180	
0.19	miles total	

34 Current Vehicle Miles / Day, **VM**
42 End of Life Veh. Miles / Day
12,443 Current Veh. Miles / Year, **AM**
273,986 Total Projected Veh. Miles Over Life of Project, **TVMT**

$$TVMT = \frac{AM}{-G}\left(1 - \left(\frac{1+G}{1}\right)^Y\right)$$

1.0% Projected Traffic Growth (0%-10%), **G**

Crash Data

2006 First full year --> 2015 Last full year 10.0 years, Time Period, **T**

0 Additional months values as of May 2014

0	Fatal Crashes	0	Fatalities @	$4,500,000	$	-
		0	Major Injuries @	$325,000	$	-
3	Injury Crashes	2	Minor Injuries @	$65,000	$	130,000
		1	Possible Injuries @	$35,000	$	35,000
1	Property Damage Only		(assumed cost per crash)	$7,400	$	-
			-OR- enter all Property Costs of all crashes:		$	30,500
4	Total Crashes, **TA**			Total $ Loss, **LOSS**	$	195,500

0.40 Current Crashes / Year, **AA** = TA / T
$ 48,875 Cost per Crash, **AVCR** = LOSS / TA
8.8 Total Expected Crashes, **TCR** = CR x TVMT/10^8
0.37 Crashes Avoided First Year **AAR** = AA x CRF / 100
$ 17,986 Crash Costs Avoided in First Year, AAR x AVCR
8.1 Total Avoided Crashes, TCR x CRF/ 100

3,214.6 Crashes / HMVM, Crash Rate, **CR**
CR = TA x 10^8 / (AM x T)
$ 265,666 Present Value of Avoided Crashes, **BENEFIT**

$$BEN. = \frac{AVCR \times AAR}{(INT - G)}\left(1 - \left(\frac{1+G}{1+INT}\right)^Y\right)$$

Benefit / Cost Ratio

Benefit : Cost = $265,666 : $202,181 = 1.31 : 1

The crash reduction factor is a cumulative factor based on individual factors of 67 (for flattening a horizontal curve) and 76 (for changing horizontal alignment). Both factors originated from the CMF Clearinghouse. This worksheet uses the entire estimated safety improvement cost but only analyzes the improvement as a change in a roadway segment (neglects improvement factors for the intersection).

Intersection

Intersection or Spot Benefit / Cost Safety Analysis

Rev. 5/14

Iowa DOT Office of Traffic & Safety

County: Hamilton Prepared by: Niki Stinn Date Prepared: Aug 15, 2016

Intersection: D46/280th Street & R27

Improvement

Proposed Improvement(s): Remove curve and associated intersections on D46

$ 175,000	Estimated Improvement Cost, **EC**	20	Est. Improvement Life, years, **Y**
$ 2,000	Other Annual Cost (after initial year), **AC**	62	Crash Reduction Factor (integer), **CRF**
$ 27,181	Present Value Other Annual Costs, **OC**	4.0%	Discount Rate (time value of $), **INT**
		$ 202,181	Present Value Cost, **COST** = EC + OC

$$OC = \frac{AC}{INT}\left(1 - \frac{1}{(1+INT)^Y}\right)$$

Traffic Volume Data

Source: Iowa DOT 2015 Date of traffic count

Daily Entering Vehicles by Approach (or AADT / 2)

600

180 → ← 90

330

438,000 Current Annual Entering Veh., **AEV** = DEV * 365

1,464 veh / day, Final Year DEV, **FDEV**

9.64 MEV, Total Million Entering Veh. Over life of Project, **TMEV**

1.0% Projected Traffic Growth (0%-10%), **G**

1,200 Current Daily Entering Vehicles, **DEV**

$$TMEV = \frac{AEV}{-G}\left(1 - \left(\frac{1+G}{1}\right)^Y\right) \Big/ 10^6$$

Crash Data

2006 First full year --> 2015 Last full year 10.0 years, Time Period, **T**

0 Additional months values as of May 2014

0	Fatal Crashes →	0	Fatalities @	$4,500,000	$ -
		0	Major Injuries @	$325,000	$ -
3	Injury Crashes →	2	Minor Injuries @	$65,000	$ 130,000
		1	Possible Injuries @	$35,000	$ 35,000
1	Property Damage Only		(assumed cost per crash)	$7,400	$ -
		-OR-	enter all Property Costs of all crashes:		$ 30,500
4	Total Crashes, **TA**		Total $ Loss, **LOSS**		$ 195,500

0.40	Current Crashes / Year, **AA** = TA / T	0.91	Crashes / MEV, Crash Rate, **CR**
$ 48,875	Cost per Crash, **AVC** = LOSS / TA		CR = TA x 10^6 / (DEV x 365 x T)
8.8	Total Expected Crashes, **TECR** = CR x TMEV	$ 179,036	Present Value of Avoided Crashes, **BENEFIT**
0.25	Crashes Avoided First Year **AAR** = AA x CRF / 100		
$ 12,121	Crash Costs Avoided in First Year, AAR x AVC		
5.5	Total Avoided Crashes, TECR x CRF/ 100		

$$BEN. = \frac{AVC \times AAR}{(INT - G)}\left(1 - \left(\frac{1+G}{1+INT}\right)^Y\right)$$

Benefit / Cost Ratio

Benefit : Cost = $179,036 : $202,181 = **0.89** : 1

The crash reduction factor is a cumulative factor based on individual factors of 23 (for changing the skew angle of the intersection) and 50 (for improving sight distance). The skew factor originated from the CMF Clearinghouse while the sight distance factor originated from the FHWA's "Manual for Selecting Safety Improvements in High Risk Rural Roads". This worksheet uses the entire estimated safety improvement cost but only analyzes the improvement as a change in the intersection (neglects improvement factors for improving the alignment).

This project is somewhat unique in that it has merits that cause the need for it to be considered both as a segment and as an intersection. While these individual B/C ratios give an indication of the performance of each component of the situation, we believe the cumulative effect of the improvements should be considered in evaluating the B/C ratio for the project as a whole.