Traffic Safety Improvement Program

Applications for
Site Specific
FY 2017

Received August 15, 2015

Site Specific
FY 2017

Page No.	Applicant	Title/Subject	$ $ $	
			Project	Request
5	Iowa DOT - Traffic and Safety	Low-cost safety improvements on county roads	$500,000	$500,000
9	Iowa DOT District 1	Intersection of Oralabor Rd & Delaware Ave in Ankeny	$3,217,300	$500,000
45	City of Des Moines	42nd St Streetscape	$1,696,300	$500,000
89	City of Des Moines	Martin Luther King Jr Parkway & Prospect Road Signal	$290,000	$120,000
116	City of Des Moines	Upgrading the traffic signal operation at 25 existing intersections that currently operate as fixed-time signals	$660,000	$120,000
164	City of Urbandale	142nd St and Douglas Ave	$502,000	$500,000
201	City of Ames	South Duff Avenue Traffic Signal	$450,000	$450,000
213	Webster County	P59 approx. 2 miles north of the City of Fort Dodge	$190,000	$190,000
232	City of Cedar Falls	University Ave and Cedar Heights Drive intersection	$2,100,000	$500,000
260	City of Waterloo	Systemic Traffic Safety Improvements on 5th and 6th Streets	$484,000	$484,000
281	Cherokee County	480th Street extension/paving	$2,190,000	$750,000
290	Clay County & City of Spencer	West 4th St/Co Rd B-24	$620,000	$500,000
313	Crawford Count	Intersection with US 30 on the north end south and east to the intersection with E53	$1,734,740	$500,000
384	Plymouth County	C-60 reconstruction from C-66 west 3.25 miles	$1,740,000.00	$50,000

Site Specific
(Continued)

Page No.	Applicant	Title/Subject	$ $ $	
			Project	Request
418	Montgomery County	H34 East Pavement Widening	$695,644	$400,000
423	City of Ottumwa	S Marion St and 2nd St W	$223,700	$223,700
462	Washington County	W61 from G36 (220th St) to G26 (190th St)	$2,039,026	$500,000
481	Buchanan County	Otterville blacktop shoulders	$1,160,000	$500,000
493	City of DeWitt	Intersection of 11th St., Maynard Way and Casey's General Store business driveway	$445,700	$300,000
618	City of Clinton	13th Ave N corridor from N 4th St to N 2nd St	$200,000	$200,000
671	City of Dubuque	Northwest Arterial and Pennsylvania Ave Intersection	$415,005.13	$364,005.13
691	RPA 8	US 52 from Dubuque/Jackson Co line to the northern city limits of Bellevue	$1,800,000	$500,000
705	Iowa DOT District 6	US 151/IA 13/US 30 Ramp D	$450,000	$450,000
722	City of Cedar Rapids	Kirkwood Blvd SW & CCSD South Access Drive	$636,780	$500,000
746	Iowa DOT District 6	US 61 Turn Lanes at Coonhunter's Road	$170,000	$170,000
771	Iowa DOT District 6	US 61 paved shoulders - Blue Grass to Davenport	$1,500,000	$500,000
	Totals	**26 Projects**	**$ 26,110,196**	**$ 10,271,705**

Statewide

Rev. 5/15

Application for TRAFFIC SAFETY FUNDS

GENERAL INFORMATION **DATE:** 8/13/15

Location / Title of Project Low-Cost Safety Improvements on County Roads

Applicant Iowa DOT Office of Traffic and Safety

Contact Person Chris Poole Title Safety Programs Engineer

Complete Mailing Address 800 Lincoln Way

Ames, IA 50010

Phone (515) 239-1267 E-Mail chris.poole@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 Project Cost $ 500,000

Safety Funds Requested $ 500,000

A. Application Certification: Not applicable

B. Narrative:

Local and national research indicates that a high portion of run-off-the-road crashes occur on two lane roadways, and that many of those crashes can be mitigated through the application of low-cost, systemic-type safety improvements. Such improvements include edgeline rumble strips, centerline rumble strips, enhanced pavement markings, lighting, and signage. These strategies are designed to increase driver awareness of the roadway environment, and decrease the risk of motorists departing the roadway.

These funds will be used by the Iowa DOT's Office of Traffic and Safety to provide matching funds for county projects utilizing the Department's HSIP-Secondary program. The percentage of the match may vary depending on project type, but will not exceed 10 percent. HSIP-Secondary projects must incorporate low-cost, systemic-type safety improvements, with per-mile costs in the range of $2,000 to $10,000. Projects are selected based on potential impact on safety, with a focus on reducing lane departure crashes.

C. Cost: $500,000

D. Schedule: July 1, 2016 through June 30, 2017

E. Map: N/A

F. Pictures of the Site: N/A

G. Plan View: N/A

H. Aerial Photograph: N/A

I. Crash Reports: To be determined.

J. Traffic Volumes: To be determined.

K. Traffic Signal Information: N/A

L. B/C Ratio: Example attached.

Edgeline - Centerline County Program Benefit Cost Sheet Example

Surface:	*Paved*
Routes:	*Federal Aid*
F(x) Class:	*All*

Cost / Mile	$ 6,000.00
Life (years)	10
CMF	0.85
Traffic Growth	1%
Years of Crash Data	10

County Information *Improvement Information* *Volume Information* *Crash Information* *Injury Information* *Crash Cost Information* *Benefit/Cost Information*

County Information						Benefit/Cost Information		
County	Mileage (miles)	Percent of Total County Mileage (%)	Percent of Total Paved Mileage (%)	Percent of Total Federal Aid Mileage (%)	AADT (veh/day)	Present Value of Avoided Crashes ($)	Present Value of Project Costs ($)	Benefit Cost Ratio
Black Hawk	123.410	15.85%	51.19%	97.72%	1201.2	$ 2,344,092	$ 740,460	3.17
Bremer	96.223	13.46%	70.80%	100.00%	944.6	$ 945,968	$ 577,338	1.64
Buchanan	182.076	19.02%	90.47%	99.30%	796.9	$ 3,323,771	$ 1,092,456	3.04
Butler	138.469	14.36%	67.10%	95.12%	526.1	$ 2,641,127	$ 830,814	3.18
Chickasaw	125.514	14.74%	85.15%	95.30%	603.8	$ 1,938,855	$ 753,084	2.57
Grundy	136.703	16.38%	69.45%	97.83%	745.1	$ 3,287,458	$ 820,218	4.01
6 County Average	133.733	15.63%	72.36%	97.55%	802.9	$2,413,545	$802,395	2.94

District 1

Iowa Department of Transportation

Rev. 3/08

Application for TRAFFIC SAFETY FUNDS

GENERAL INFORMATION

Location / Title of Project: Intersection of Oralabor Rd & Delaware Ave in Ankeny

Applicant: Iowa Department of Transportation-District 1

Contact Person: Gary Kretlow Title: Traffic Tech

Complete Mailing Address: 1020 S. 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 Project Cost $ 3,217,300

Safety Funds Requested $ 500,000

FINAL PROJECT CONCEPT STATEMENT

SE Delaware Avenue and IA 160 (SE Oralabor Road)

Polk County
Proj.# NHSN-160-1-1(12)--2R-77

Maint. No. 7702.4S160
FHWA No. 41781

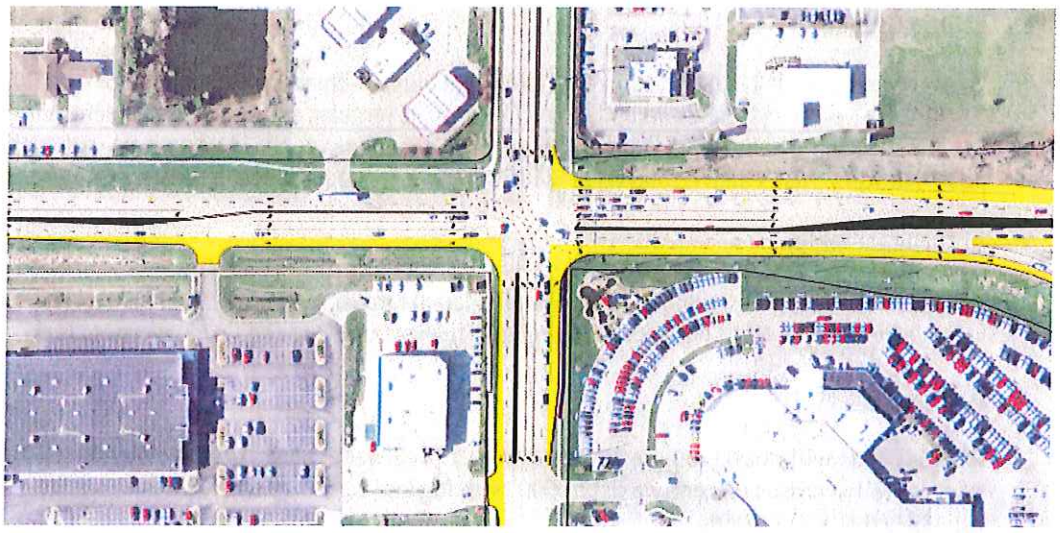
Prepared by Foth Infrastructure & Environment
for the City of Ankeny and the Iowa Department of Transportation
District 1

May 11, 2015

I. STUDY AREA

A. Project Description

The project consists of a traffic study and conceptual development of improvements at the intersection of SE Delaware Avenue and IA 160 (SE Oralabor Road) and along IA 160 (SE Oralabor Road) from SE Peachtree Drive to SE Creekview Drive in the City of Ankeny. The traffic study limits along IA 160 begin at SE Peachtree Drive and extend east to SE Creekview Drive. The study limits along SE Delaware Avenue begin at the signalized entrance to Mills Fleet Farm and extend north to SE Lorenz Drive. The project includes collecting existing traffic data for the study corridor, existing traffic capacity analyses, proposing intersection improvement alternatives, preparing a traffic study report, selecting the preferred alternatives, developing a concept statement, preparing an interchange operations report and recommending funding sources.



B. Need for Project

The City of Ankeny and the Iowa DOT requested a traffic impact study of the intersection of SE Delaware Avenue and SE Oralabor Road to address long traffic queues and lengthy delays at the signalized intersection. The traffic queues and delays occurring for the southbound SE Delaware Ave to eastbound IA 160 and the northbound I-35 exit to westbound IA 160 were identified as the most problematic. The study area for the project extends along SE Delaware Avenue from SE Lorenz Drive south to the Mills Fleet Farm traffic signal and along IA 160 from SE Peachtree Drive east to SE Creekview Drive. The study area includes the I-35 interchange ramp terminals. The traffic study was conducted to account for both the existing traffic volumes and the projected traffic growth along the corridor. The purpose of the study was to identify both near term and future improvements to the existing intersection configuration and traffic signal timing improvements or modifications within the corridor. The near term improvements would be based on the I-35 interchange remaining as currently constructed, while the future improvements would consider future reconstruction of the interchange.

C. Present Facility

IA 160 (SE Oralabor Road) in the project area is a 4/5 lane urban facility with 53'/69' wide PCC pavement with curb and gutter. A 10' wide bike trail exists along the south side of IA 160, from U.S. Highway 69 east to SE Delaware Avenue. A 4' sidewalk is present along the north side of IA 160 from the approximately 300' west of SE Rio Drive to SE Delaware Avenue. IA 160 was re-constructed from a 2-lane rural facility to a 4-lane urban facility in 1986. IA 160 was widened in 1997 from a 4-lane facility to a 5-lane facility from just west of SE Hulsizer Drive to just east of SE Delaware Avenue. Additional widening on IA 160 from a 4-lane to 5-lane facility was completed in 2012 from just east of U.S. Highway 69 to just east of SE Peachtree Drive.

The existing structure carrying IA 160 traffic over Interstate 35 is a 253' x 68' prestressed concrete beam bridge constructed in 1986.

SE Delaware Avenue is a 5-lane urban facility with 79' wide PCC pavement with curb and gutter.

D. Traffic Estimates

The current year (2012) and design year (2025) average daily traffic estimates for IA 160 are 28,200 ADT with 3% trucks and 34,700 ADT with 3% trucks, respectively. The current year (2012) and design year (2025) average daily traffic estimates for SE Delaware Avenue are 24,200 ADT with 2% trucks and 32,800 ADT with 2% trucks, respectively.

E. Sufficiency Rating

IA 160 is classified as a principal arterial and is a maintenance service level "B" road with a sufficiency rating of 53. The federal bridge sufficiency rating for the I-35 overpass is 66.

F. Access Control

Access rights will not be required for this project. In general, along both IA 160 and SE Delaware Avenue full accesses currently exist at 600' spacing and right-in / right-out accesses are established at 300'spacing.

G. Crash History

During the five-year study period from 2007 through 2012, there were 35 crashes reported at this intersection. A total of 316 crashes were reported along IA 160 within the traffic study corridor. No fatalities were reported within the study period.

II. PROJECT CONCEPT

A. Feasible Alternates

Alternative #1

Alternative #1 includes widening of IA 160 to provide the following:

An additional lane from IA 160 to enter the I-35 Southbound Entrance Ramp, creating a dedicated right turn lane and a shared thru-right lane onto the I-35 Southbound Entrance Ramp.

Dual westbound right turn lanes, dual westbound left turn lanes, dual eastbound left turn lanes, dual northbound left turn lanes and a single northbound right turn lane at the intersection of IA 160 and SE Delaware Avenue.

A single left turn lane for both westbound and eastbound IA 160 at both the I-35 Southbound Ramp and I-35 Northbound Entrance Ramp.

Installation of new traffic signals will be necessary at the intersection of IA 160 and SE Delaware Avenue, the intersection of IA 160 and the I-35 southbound ramp terminals, and the intersection of IA 160 and the I-35 northbound ramp terminals.

Refer to attached sheets A1.1-A1.4 for Alternative #1 details.

The existing Right-of-Way widths are generally 140' west of SE Hulsizer Drive and 160' east of SE Hulsizer Drive along IA 160. The Right-of-Way width is 120' along SE Delaware Avenue. Permanent Right-of-Way is anticipated in the SE quadrant of the IA 160 and SE Delaware Avenue intersection for the proposed traffic signal and pedestrian ramp.

Traffic will be maintained via staging. It is anticipated that lane closures will be limited to non-peak hours whenever possible to reduce traffic delays.

Road Item	**Estimated Cost**
Excavation	$102,750
Removal of pavement	$24,000
Modified subbase	$83,250
PCC Pavement, 9 in.	$691,250
PCC median, 6 in.	$85,000
Storm Sewer Structures	$31,500
Storm Sewer	$11,250
Guardrail, Steel Beam	$12,000
Sidewalk, PCC	$6,000
Traffic Signals	$750,000

Erosion Control	$7,500
Traffic Control	$75,000
Mobilization	$150,000
Misc. & Contingency @ 30%	$608,900
Right-of-Way	$21,000
Road Total	**$2,659,400**

Bridge Item	**Estimated Cost**
Bridge Approach Pavement	$218,000
Bridge Approach Barrier	$14,000
Bridge End Drains	$20,000
Misc. & Contingency @ 10%	$25,200
Bridge Total	**$277,200**
Total for Alternative #1 Bridge and Road Items Combined	**$2,936,600**

Alternative #2

This alternative is similar to Alternative #1 with the addition of dual northbound right turn lanes and a single westbound right turn lane at the intersection of IA 160 and the I-35 northbound ramp terminals. The northbound I-35 exit ramp will be widened to accommodate approximately 400' of a two-lane ramp section in advance of the dedicated turn lanes. The widening will require extending the inlet of an existing box culvert. Alternative #2 will include the addition of dual southbound right turn lanes at the I-35 southbound ramp terminal. Refer to attached sheets A2.1-A2.4 for Alternative #2 details.

The existing Right-of-Way widths are generally 140' west of SE Hulsizer Drive and 160' east of SE Hulsizer Drive along IA 160. The Right-of-Way width is 120' along SE Delaware Avenue. Permanent Right-of-Way is anticipated in the SE quadrant of the IA 160 and SE Delaware Avenue intersection for the proposed traffic signal and pedestrian ramp.

Traffic will be maintained via staging. It is anticipated that lane closures will be limited to non-peak hours.

Road Item	**Estimated Cost**
Excavation	$120,000
Removal of Pavement	$24,000
Modified Subbase	$103,500
PCC Pavement, 9 in.	$799,850
PCC Median, 6 in.	$85,000
Paved Shoulder	$27,500
Storm Sewer Structures	$31,500
Storm Sewer	$11,250
Guardrail, Steel Beam	$12,000
Sidewalk, PCC	$6,000
Traffic Signals	$750,000
Erosion Control	$7,500
Traffic Control	$75,000
Mobilization	$150,000
Misc. & Contingency @ 30%	$661,000

Right-of-Way	$21,000
Road Total	**$2,885,100**

Bridge Item	**Estimated Cost**
RCB Culvert Extension	$50,000
Bridge Approach Pavement	$218,000
Bridge Approach Barrier	$14,000
Bridge End Drains	$20,000
Misc. & Contingency @ 10%	$30,200
Bridge Total	**$332,200**
Total for Alternative #2 Bridge and Road Items Combined	**$3,217,300**

B. Recommendations

Based on the similarity of the alternatives, it is recommended that Alternative #2 be implemented to provide the maximum benefit for improving current traffic queues and delays within the study corridor. The additional cost associated with Alternative #2 was considered necessary to add benefit in traffic operations at the interchange ramp intersections.

C. Construction Sequence

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

D. Pedestrian Facilities

Existing and proposed pedestrian facilities are present within the project limits. ADA accommodations will be included in the design and construction of the project.

E. Special Considerations

OLE has not reviewed the proposed alternatives to determine if a 404 permit would be required for either alternative. Wetland and stream mitigation is not anticipated for either proposed alternative.

Permanent Right-of-Way is anticipated for the proposed alternatives. Permanent Right-of-Way is anticipated in the SE and NE quadrants of the IA 160 and SE Delaware Avenue intersection for the proposed traffic signal and pedestrian ramp improvements. Temporary easements may be necessary for grading purposes and to tie existing driveways into the proposed widening. The temporary easements will be similar for each alternative.

Existing utilities in the area include overhead electric and underground communications lines within the existing Right-of-Way. Underground communication lines run along both the north and south sides of IA 160. Communication lines are also present along both the east and west sides of SE Delaware Avenue. The City of Ankeny has traffic signal interconnect fiber line located along the north side of IA 160 from SE Peachtree Drive east to just west of the I-35 northbound ramp terminals, where it crosses to the south side and continues to SE Creekview Drive. A major overhead electric line is present along the east side of SE Delaware Avenue.

The power pole located in the SE quadrant of the intersection of IA 160 and SE Delaware Avenue will be impacted by the widening project. Existing street lighting along the north side of IA 160 from SE Peachtree Drive east to SE Hulsizer Drive will also be impacted by the widening project. Impacts to existing utilities will be similar for each alternative.

F. Program Status

This project is not currently listed in the approved 2015 – 2019 Iowa Transportation Improvement Program. The Iowa DOT will apply for TSIP funding on behalf of the City of Ankeny. The City of Ankeny intends to apply for U-STEP and ICAAP funding. The TSIP, U-STEP, ICAAP, Iowa DOT FY2017 - 3R, and city funding sources will be used for the project's construction. The agreement between the Iowa DOT and the City of Ankeny will include the responsibility for project costs. In addition to the identified potential funding sources, the Iowa DOT will be responsible for Right-of-Way costs and construction phase services.

ENGINEER'S OPINION OF PROBABLE COST - ALTERNATE 2

SE Oralabor Rd (IA 160) and SE Delaware Ave - Intersection Improvements

Iowa DOT No. NHSN-160-1(12)--2R-77

Ankeny, Iowa

Date: May. 11, 2015

ITEM NO.	ITEM CODE	ITEM	UNIT	QUANTITY	UNIT PRICE	Total Cost
ROADWAY CONSTRUCTION ITEMS						
1		EXCAVATION, CLASS 10, ROADWAY AND BORROW	CY	10000	$ 12.00	$ 120,000.00
2		REMOVAL OF PAVEMENT	SY	2400	$ 10.00	$ 24,000.00
3		MODIFIED SUBBASE	CY	2300	$ 45.00	$ 103,500.00
4		PCC PAVEMENT, 9 IN.	SY	12305	$ 65.00	$ 799,825.00
5		PCC MEDIAN, 6 IN.	SY	1700	$ 50.00	$ 85,000.00
6		PAVED SHOULDER	SY	550	$ 50.00	$ 27,500.00
7		STORM SEWER STRUCTURES	EACH	9	$ 3,500.00	$ 31,500.00
8		STORM SEWER GRAVITY MAIN, LESS THAN 36"	LF	150	$ 75.00	$ 11,250.00
9		GUARDRAIL, STEEL BEAM	LF	300	$ 40.00	$ 12,000.00
10		SIDEWALK, PCC	SY	120	$ 50.00	$ 6,000.00
11		TRAFFIC SIGNALIZATION[2]	LS	1	$ 750,000.00	$ 750,000.00
12		EROSION CONTROL	LS	1	$ 7,500.00	$ 7,500.00
13		TRAFFIC CONTROL	LS	1	$ 75,000.00	$ 75,000.00
14		MOBILIZATION	LS	1	$ 150,000.00	$ 150,000.00
SUBTOTAL ROADWAY CONSTRUCTION						$ 2,203,100.00
		CONTINGENCY (30%)				$ 661,000.00
BRIDGE CONSTRUCTION ITEMS						
1		BOX CULVERT EXTENSION	LS	1	$ 50,000.00	$ 50,000.00
2		BRIDGE APPROACH PAVEMENT	SY	1090	$ 200.00	$ 218,000.00
3		BRIDGE APPROACH BARRIER	EACH	4	$ 3,500.00	$ 14,000.00
4		BRIDGE END DRAINS	EACH	4	$ 5,000.00	$ 20,000.00
SUBTOTAL BRIDGE CONSTRUCTION						$ 302,000.00
		CONTINGENCY (10%)				$ 30,200.00
TOTAL ESTIMATED CONSTRUCTION COSTS						**$ 3,196,300.00**

1.) The unit prices are based on awarded contract prices thru April 2015 and DO NOT include an inflation factor.
2.) Traffic signaliztion item inclues new signals at Oralabor/Delaware, I-35 SB ramp terminal and the I-35 NB ramp terminal)
3.) This estimate DOES NOT include costs associated with possible utility and street lighting relocation.
4.) This estimate DOES NOT include costs associated with possible retaining wall construction.

RIGHT OF WAY (ESTIMATE)						
		Parcel -				
		Fee Title	AC	0.5	$ 15,000.00	$ 7,500.00
		Temporary Easement	AC	1.0	$ 10,000.00	$ 10,000.00
		Drainage/PUE/Other	AC	0.0	$ 15,000.00	$ -
SUBTOTAL						$ 17,500.00
		CONTINGENCY (30%)				$ 3,500.00
ESTIMATED RIGHT-OF-WAY COSTS						**$ 21,000.00**
ESTIMATED PROJECT COSTS						**$ 3,217,300.00**

Foth Infrastructure and Environment, LLC
8191 Birchwood Court, Suite L
Johnston, Iowa 50131
Phone: (515) 254-1393
Fax: (515) 254-1642

Date Prepared: 5/10/2015
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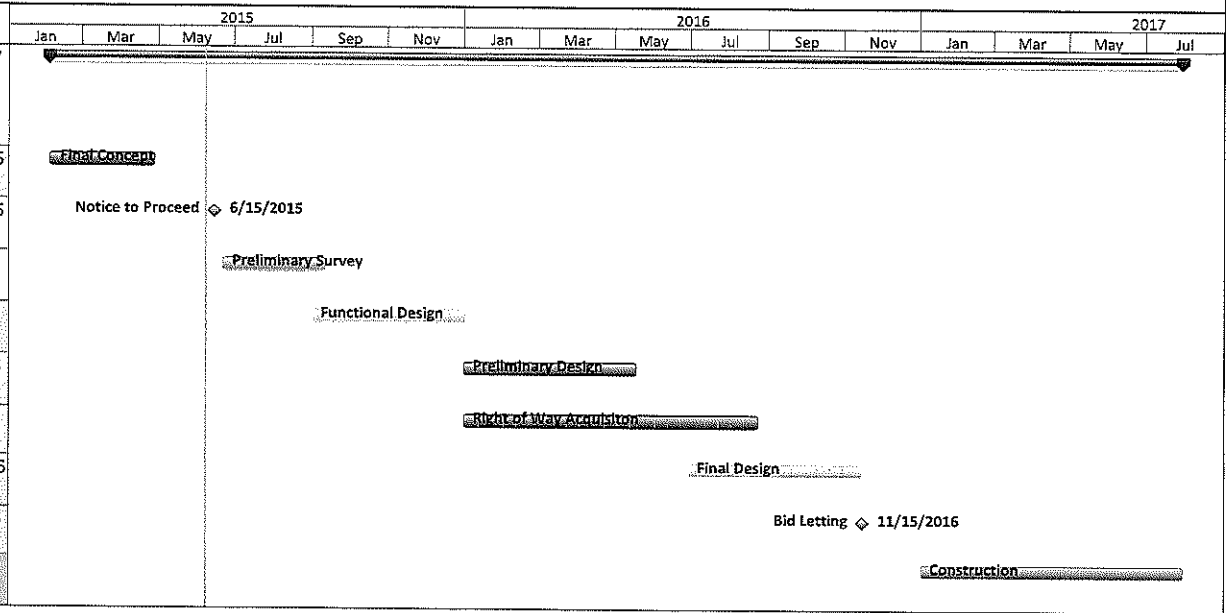
PROJECT SCHEDULE - NHSN-160-1(12)--2R-77

ID	Task Name	Duration	Start	Finish
1	**SE Oralabor Rd (IA 160) / SE Delaware Ave Intersection Improvements**	**650 days**	**Tue 2/3/15**	**Sun 7/30/17**
2	Final Concept	60 days	Tue 2/3/15	Mon 4/27/15
3	Notice to Proceed	0 days	Mon 6/15/15	Mon 6/15/15
4	Preliminary Survey	60 days	Mon 6/22/15	Fri 9/11/15
5	Functional Design	89 days	Tue 9/1/15	Fri 1/1/16
6	Preliminary Design	98 days	Fri 1/1/16	Tue 5/17/16
7	Right of Way Acquisiton	168 days	Fri 1/1/16	Tue 8/23/16
8	Final Design	100 days	Wed 6/29/16	Tue 11/15/16
9	Bid Letting	0 days	Tue 11/15/16	Tue 11/15/16
10	Construction	151 days	Mon 1/2/17	Sun 7/30/17



Looking North along Delaware Avenue south of Oralabor Road (IA 160) from south entrance to Karl

Looking North along Delaware Avenue south of Oralabor Road (IA 160) from north entrance to Karl

Looking west along Oralabor Road (IA 160) toward Delaware Avenue

Looking East along Oralabor Road (IA 160) towards west side of I-35 interchange

Looking East along Oralabor Road (IA 160) towards east side of I-35 interchange

Looking south along the east side of Delaware Avenue towards Oralabor Road (IA 160)

Looking south along the west side of Delaware Avenue towards Oralabor Road (IA 160)

Looking east along Oralabor Road towards Delaware Avenue from south side of Oralabor Road

IOWADOT

Ankeny

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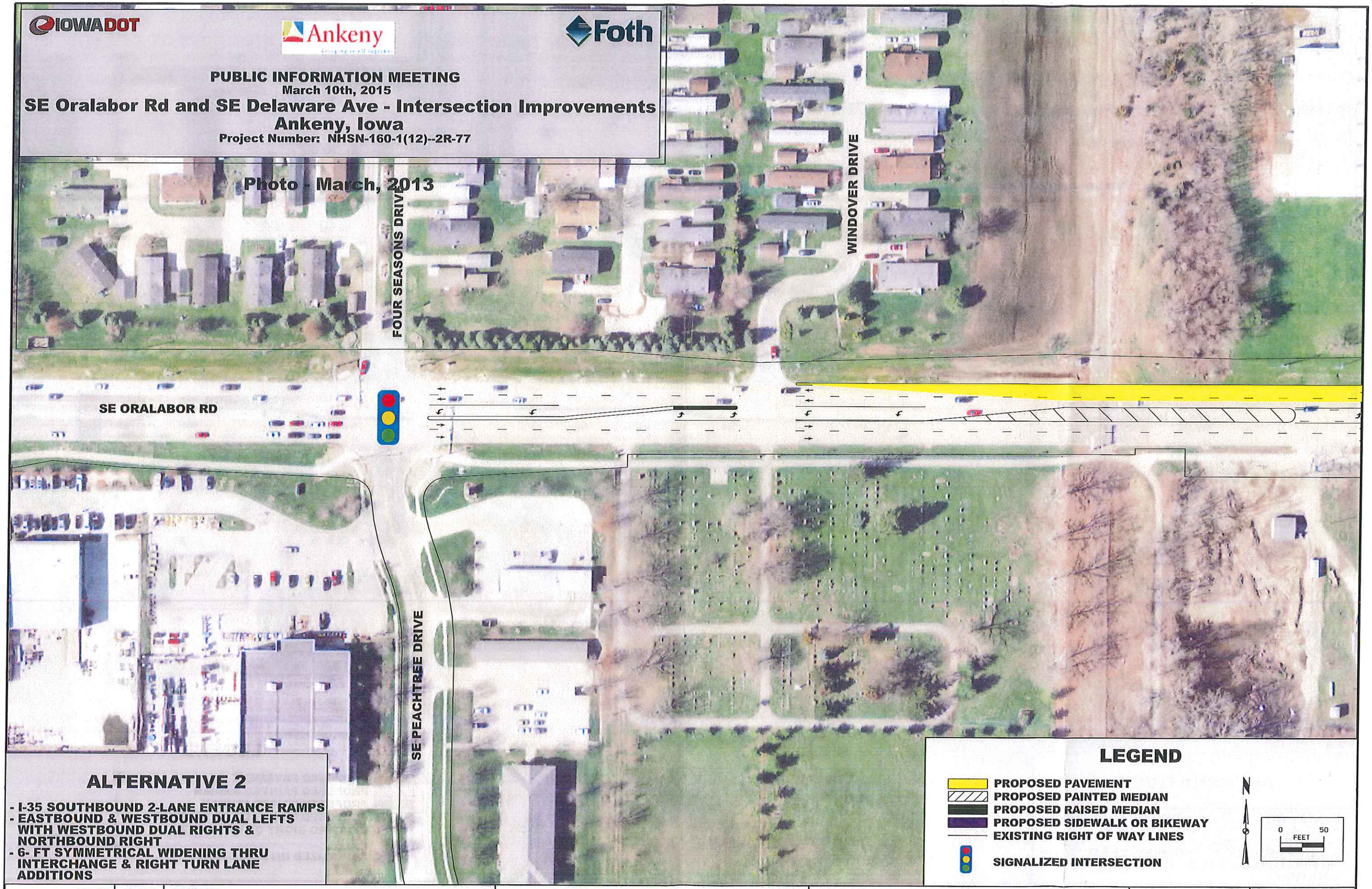
PUBLIC INFORMATION MEETING
March 10th, 2015

SE Oralabor Rd and SE Delaware Ave - Intersection Improvements
Ankeny, Iowa

Project Number: NHSN-160-1(12)--2R-77



ALTERNATIVE 2

- I-35 SOUTHBOUND 2-LANE ENTRANCE RAMPS
- EASTBOUND & WESTBOUND DUAL LEFTS WITH WESTBOUND DUAL RIGHTS & NORTHBOUND RIGHT
- 6- FT SYMMETRICAL WIDENING THRU INTERCHANGE & RIGHT TURN LANE ADDITIONS

LEGEND

- PROPOSED PAVEMENT
- PROPOSED PAINTED MEDIAN
- PROPOSED RAISED MEDIAN
- PROPOSED SIDEWALK OR BIKEWAY
- EXISTING RIGHT OF WAY LINES
- SIGNALIZED INTERSECTION

N

0 FEET 50

ENGLISH	IOWA DOT	DESIGN TEAM	COUNTY	PROJECT NUMBER	SHEET NUMBER A2.1

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IOWADOT

Ankeny

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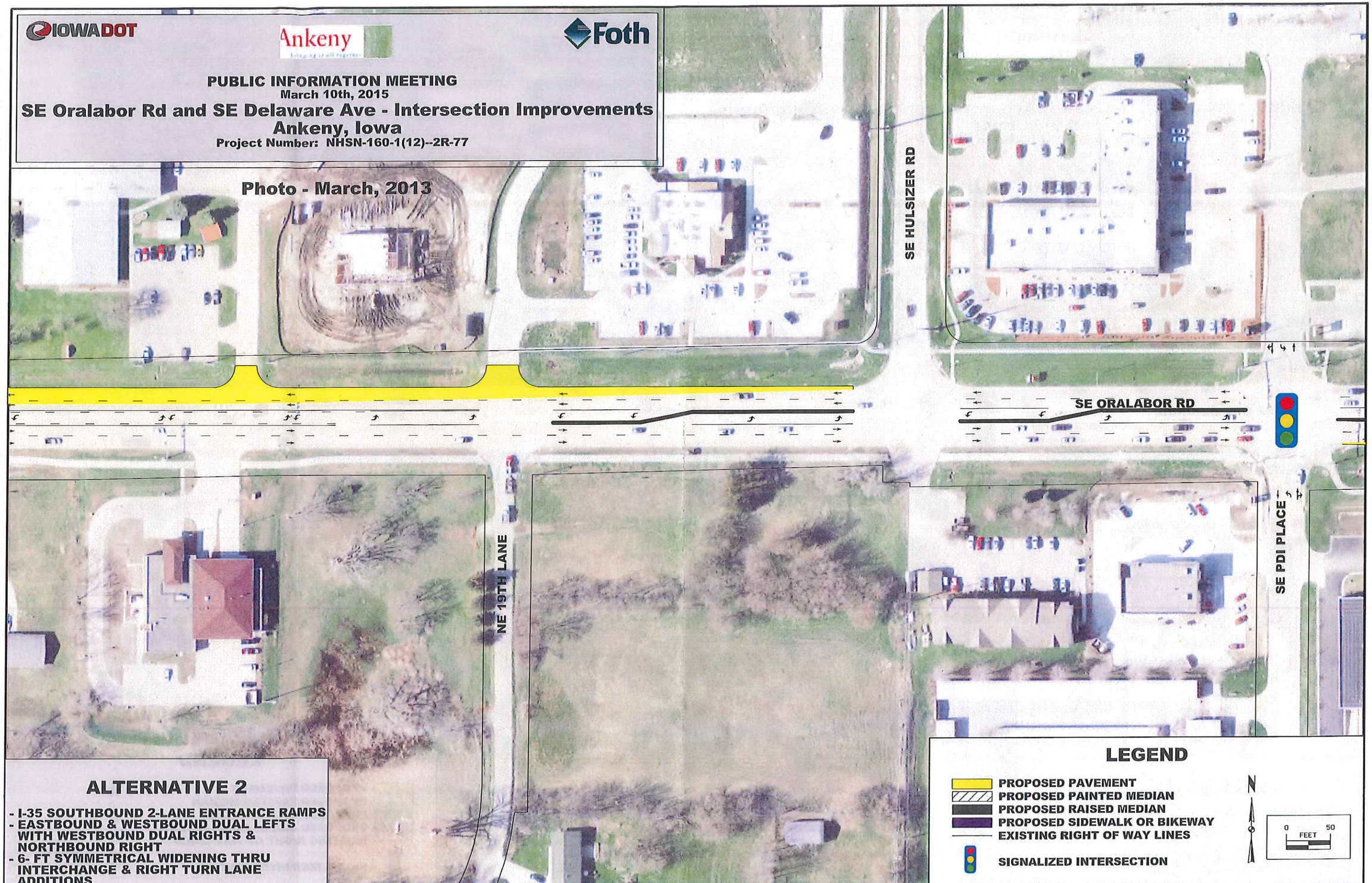
PUBLIC INFORMATION MEETING
March 10th, 2015

SE Oralabor Rd and SE Delaware Ave - Intersection Improvements
Ankeny, Iowa

Project Number: NHSN-160-1(12)--2R-77



ALTERNATIVE 2

- I-35 SOUTHBOUND 2-LANE ENTRANCE RAMPS
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- PROPOSED SIDEWALK OR BIKEWAY
- EXISTING RIGHT OF WAY LINES
- SIGNALIZED INTERSECTION

N

0 FEET 50

ENGLISH	IOWA DOT	DESIGN TEAM	COUNTY	PROJECT NUMBER	SHEET NUMBER A2.2

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IOWADOT

Ankeny

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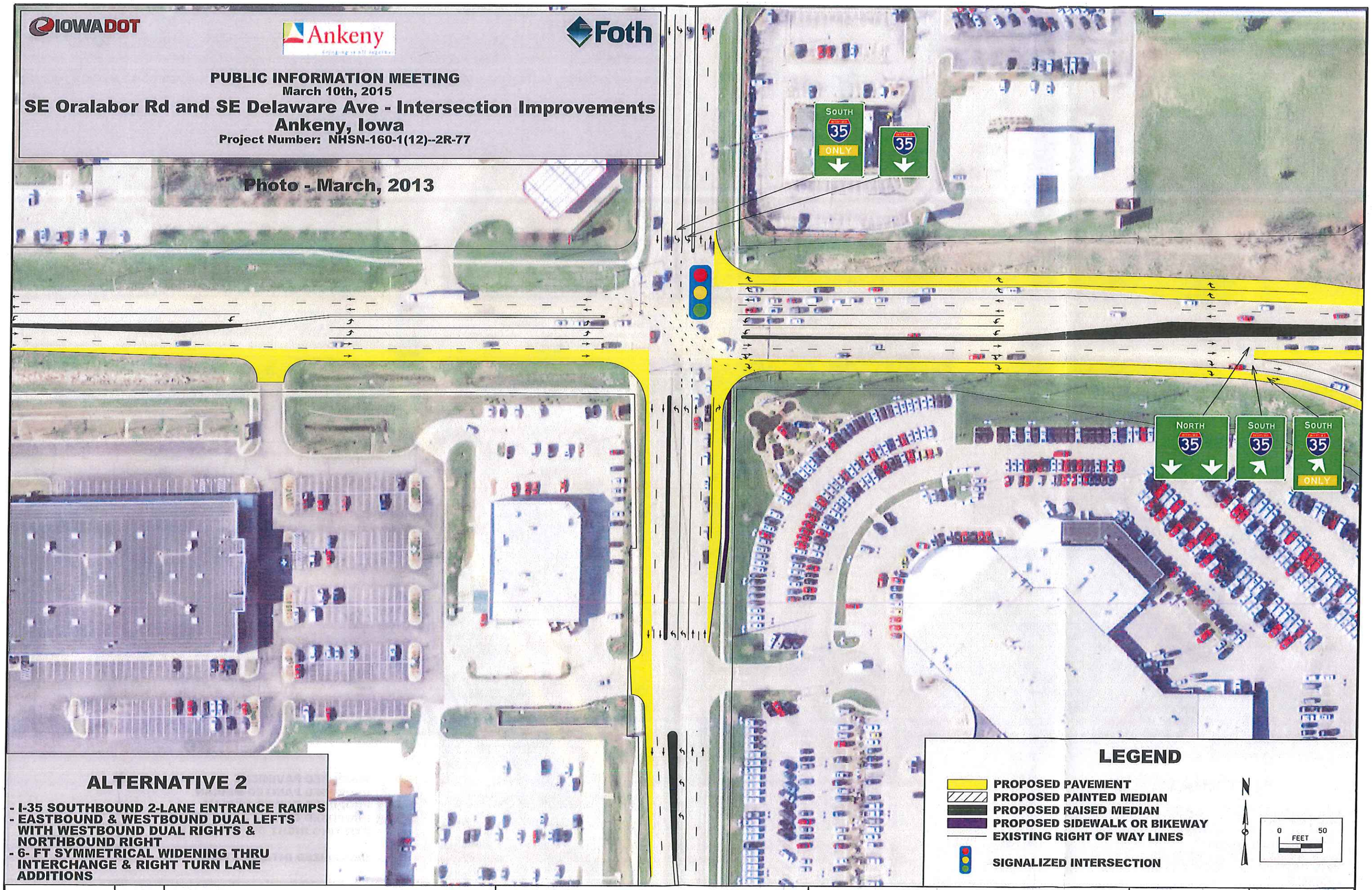
PUBLIC INFORMATION MEETING
March 10th, 2015

SE Oralabor Rd and SE Delaware Ave - Intersection Improvements
Ankeny, Iowa

Project Number: NHSN-160-1(12)--2R-77



ALTERNATIVE 2

- I-35 SOUTHBOUND 2-LANE ENTRANCE RAMPS
- EASTBOUND & WESTBOUND DUAL LEFTS WITH WESTBOUND DUAL RIGHTS & NORTHBOUND RIGHT
- 6- FT SYMMETRICAL WIDENING THRU INTERCHANGE & RIGHT TURN LANE ADDITIONS

ENGLISH	IOWA DOT	DESIGN TEAM	COUNTY	PROJECT NUMBER	SHEET NUMBER A2.3

2/17/2015 SYSTEMDATE mjl1 X:\DM\IE\2013\13I001-06\CAD\Displays\77160012_Alternatives_11x17.dgn

IOWADOT

Ankeny
bringing it all together

Foth

PUBLIC INFORMATION MEETING
March 10th, 2015

SE Oralabor Rd and SE Delaware Ave - Intersection Improvements
Ankeny, Iowa

Project Number: NHSN-160-1(12)--2R-77

ALTERNATIVE 2

- I-35 SOUTHBOUND 2-LANE ENTRANCE RAMPS
- EASTBOUND & WESTBOUND DUAL LEFTS WITH WESTBOUND DUAL RIGHTS & NORTHBOUND RIGHT
- 6- FT SYMMETRICAL WIDENING THRU INTERCHANGE & RIGHT TURN LANE ADDITIONS

LEGEND

- PROPOSED PAVEMENT
- PROPOSED PAINTED MEDIAN
- PROPOSED RAISED MEDIAN
- PROPOSED CULVERT EXTENSION
- EXISTING RIGHT OF WAY LINES
- SIGNALIZED INTERSECTION

N

0 50
FEET

ENGLISH	IOWA DOT	DESIGN TEAM	COUNTY	PROJECT NUMBER	SHEET NUMBER A2.4

5/11/2015 SYSTEMDATE acjl X:\DM\IE\2013\13I001-06\CAD\Displays\77160012_Alternatives_11x17.dgn

Google earth

feet
km

Iowa Department of Transportation

Turning Movement Traffic Count Summary

Annualized Daily Traffic For All Vehicles

Station Number:

77331701099

Count Date:

Tuesday, October 02, 2012

County:

Polk

Location Description:

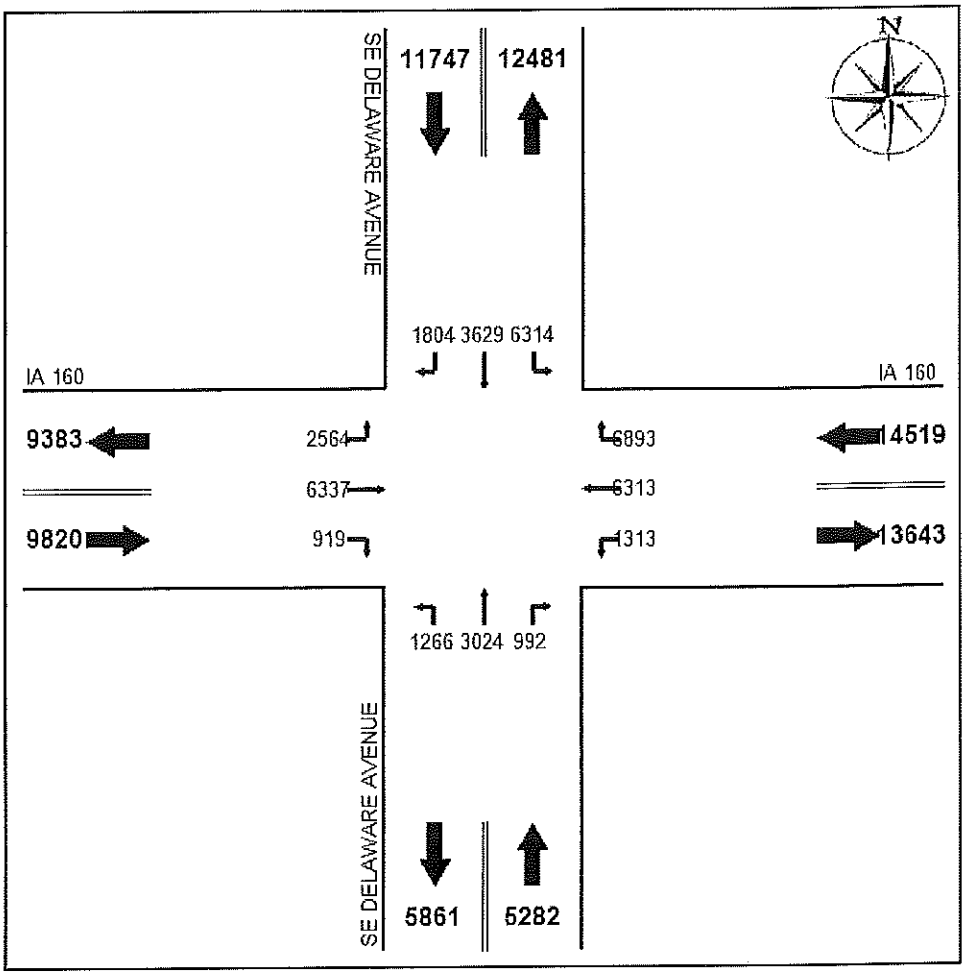
IA 160 & SE Deleware Ave

Volume Factor: 1.851

Pass Class Factor: 1.883

SU Class Factor: 1.472

Combo Class Factor: 1.445



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	560	252	59	101	643	395	57	95	52	71	541	72
08:00	395	194	78	71	473	338	68	128	43	104	417	79
11:00	379	269	154	92	358	499	98	255	95	251	368	74
12:00	519	434	212	90	391	570	120	297	60	276	404	66
15:00	430	243	135	105	415	502	95	227	85	196	451	67
16:00	558	277	163	127	559	636	128	308	104	194	629	71
17:00	541	276	163	124	571	739	118	310	99	277	597	69

Iowa Department of Transportation

Turning Movement Traffic Count Summary

Vehicle Type: Passenger Vehicles

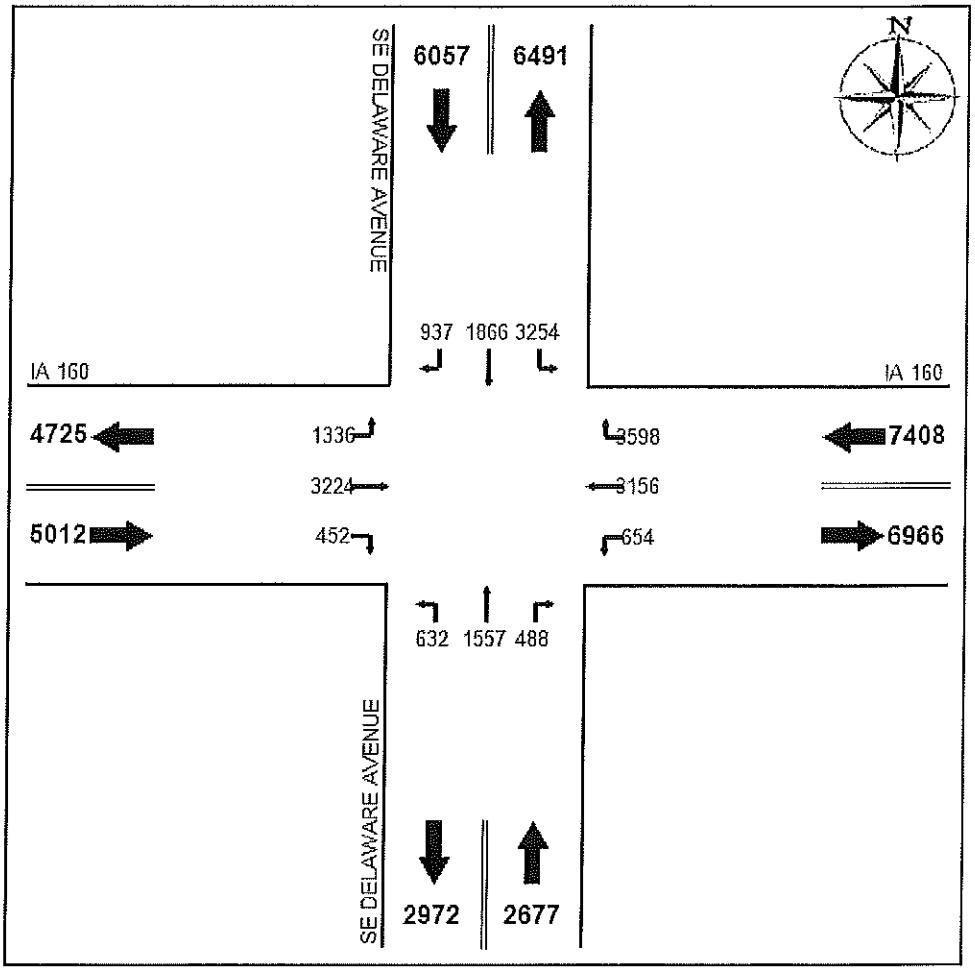
Station Number:
77331701099

Count Date:
Tuesday, October 02, 2012

County:
Polk

Location Description:
IA 160 & SE Deleware Ave

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	544	243	55	93	610	385	46	87	46	65	512	69
08:00	358	177	72	69	424	321	60	113	37	97	393	71
11:00	359	261	149	84	313	489	90	244	84	246	342	65
12:00	500	419	208	83	354	547	111	289	55	265	380	60
15:00	411	231	133	96	383	491	89	217	76	193	428	63
16:00	548	266	160	111	534	633	120	303	94	193	596	59
17:00	534	269	160	118	538	732	116	304	96	277	573	65

Iowa Department of Transportation

Turning Movement Traffic Count Summary

Vehicle Type: Single-Unit Trucks

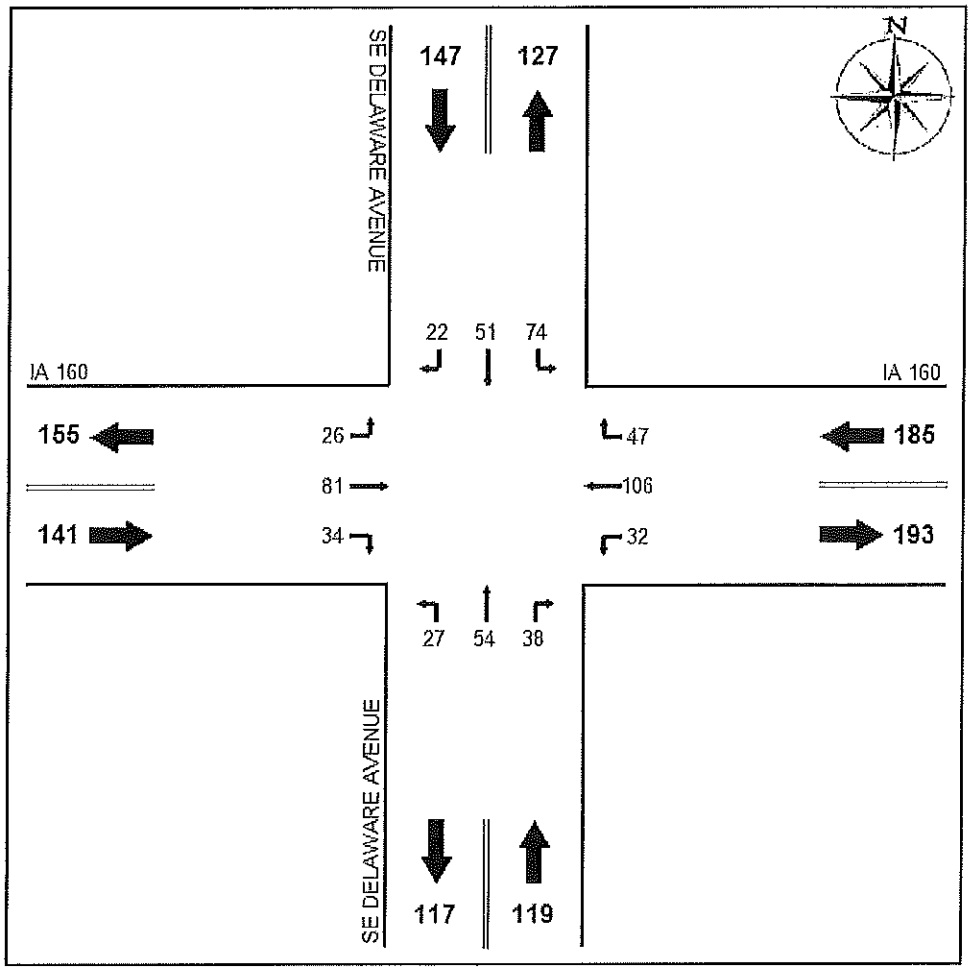
Station Number:
77331701099

Count Date:
Tuesday, October 02, 2012

County:
Polk

Location Description:
IA 160 & SE Deleware Ave

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	7	2	3	5	11	5	5	7	4	4	16	2
08:00	24	10	5	0	28	10	5	13	5	6	11	8
11:00	13	7	4	6	29	6	6	9	7	4	4	6
12:00	9	10	2	7	9	11	4	6	5	9	9	5
15:00	10	9	2	4	12	8	4	8	7	2	10	3
16:00	6	8	3	8	11	3	2	5	8	1	22	7
17:00	5	5	3	2	6	4	1	6	2	0	9	3

Iowa Department of Transportation

Turning Movement Traffic Count Summary

Vehicle Type: Combination Trucks

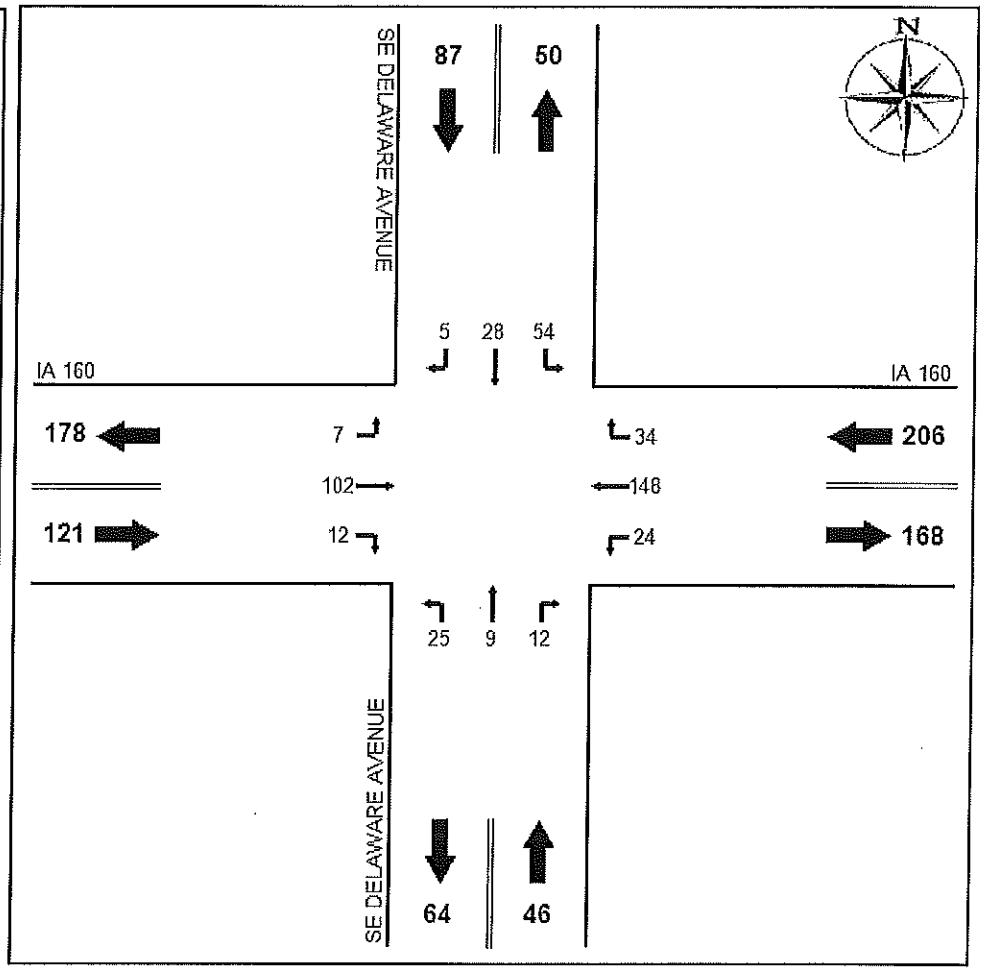
Station Number:
77331701099

Count Date:
Tuesday, October 02, 2012

County:
Polk

Location Description:
IA 160 & SE Deleware Ave

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	9	7	1	3	22	5	6	1	2	2	13	1
08:00	13	7	1	2	21	7	3	2	1	1	13	0
11:00	7	1	1	2	16	4	2	2	4	1	22	3
12:00	10	5	2	0	28	12	5	2	0	2	15	1
15:00	9	3	0	5	20	3	2	2	2	1	13	1
16:00	4	3	0	8	14	0	6	0	2	0	11	5
17:00	2	2	0	4	27	3	1	0	1	0	15	1

Office of Systems Planning

Route	2013 Primary Route Section Description	Rural/Municipal	Section length (miles)	Annual Average Daily Traffic	Vehicle Classification Distribution of Annual Average Daily Traffic											Average Daily Vehicle Miles	
								Single Unit Trucks				Combination Trucks					
					Motorcycles	Cars, Vans and Pickups	Total Trucks and Buses	Buses	2 Axle	3 Axle	4 or more Axles	4 or less Axles	5 Axle	6 or more Axles	Multiple Trailer	All Vehicles	Trucks and Buses
160	77 POLK COUNTY																
160	JUNCTION IA 415 TO																
160	INTERSECTION US 69	M	1.086	22000	96	21252	652	34	328	65	13	27	151	15	20	23892	708
160	JUNCTION SE HULSIZER DRIVE	M	0.751	21300	93	20580	627	31	296	59	11	29	163	16	22	15996	471
160	INTERSECTION DELAWARE AVENUE *	M	0.247	20100	87	19223	790	31	296	59	11	49	279	27	38	4965	195
160	I 35 INTERCHANGE	M	0.362	28000	121	26800	1079	42	408	81	16	66	378	37	51	10136	391
160	END OF IA 160																
	ROUTE SUMMARY - MUNICIPAL		2.446	22481												54989	1765

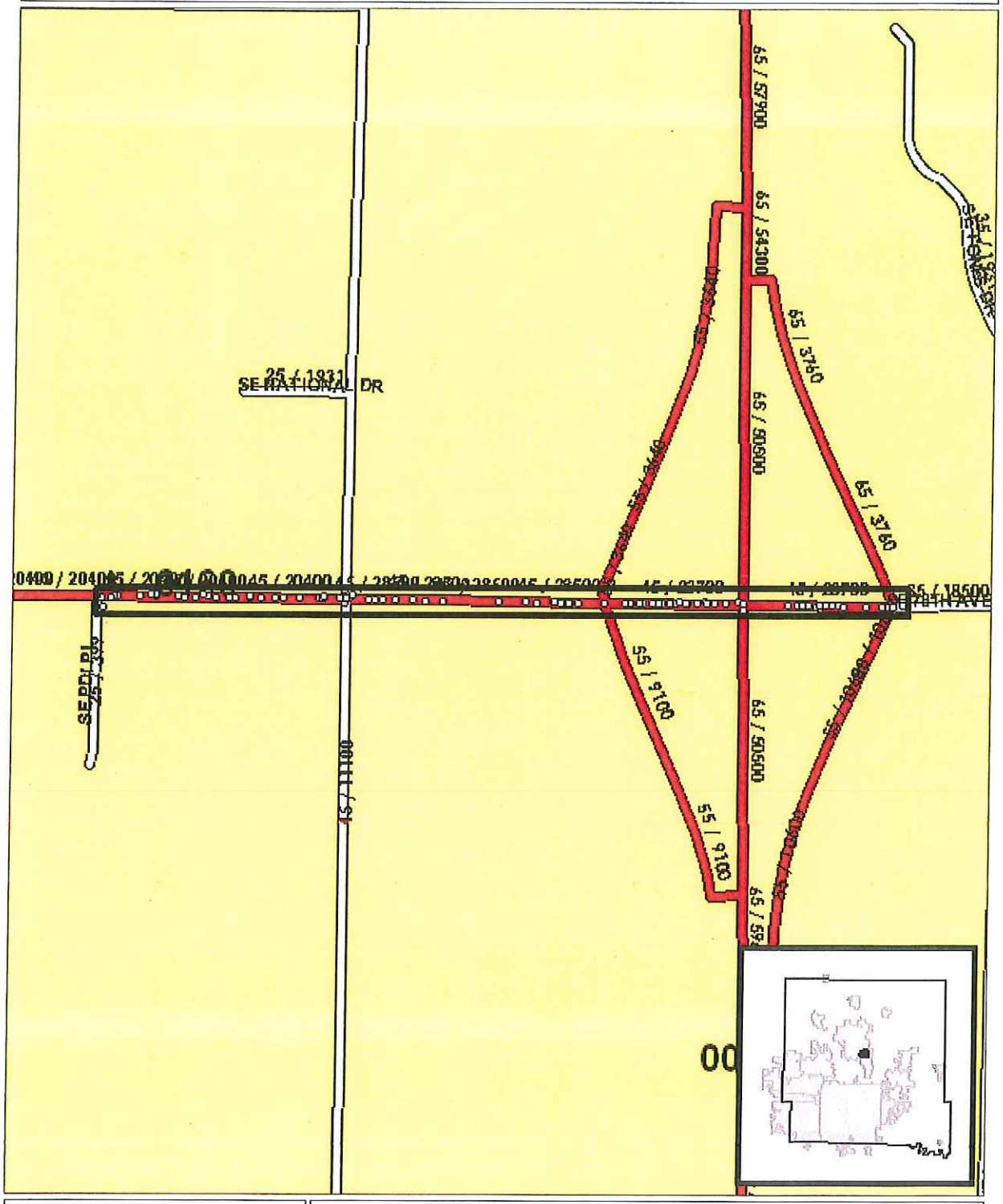
Iowa Department of Transportation

Location Map

Oralabor Rd from SE PDI Place to east side of

Incidents: 220

Report Version 1.1 Mar 2005



Analyst: G. Kretlow

Notes:

Iowa Department of Transportation

Driver and Time Summary

Oralabor Rd from SE PDI Place to east side of

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	2	5	2	1	-	-	-	12	5
MON	-	-	-	-	2	3	7	3	8	-	1	-	-	24	11
TUE	-	-	-	3	2	5	3	8	10	4	4	-	-	39	18
WED	-	-	2	2	3	2	2	3	11	5	3	-	-	33	15
THU	-	-	-	3	5	4	4	3	7	2	2	1	-	31	14
FRI	-	-	-	4	1	5	10	7	12	3	2	-	-	44	20
SAT	-	-	-	-	1	5	12	10	3	2	3	1	-	37	17
Tot.			2	13	14	25	40	39	53	17	15	2		220	
%			1	6	6	11	18	18	24	8	7	1			100

Driver Age/Gender Summary:

Age	Male	Female	NR	Drivers	%
<14	-	-	-		
14	-	-	-		
15	3	-	-	3	1
16	4	4	-	8	2
17	3	4	-	7	1
18	8	14	-	22	5
19	10	7	-	17	4
20	9	6	2	17	4
21 to 24	26	23	-	49	10
25 to 29	21	24	1	46	10
30 to 34	25	26	2	53	11
35 to 39	33	7	-	40	9
40 to 44	17	19	1	37	8
45 to 49	21	14	-	35	7
50 to 54	23	18	-	41	9
55 to 59	20	9	-	29	6
60 to 64	11	14	1	26	6
65 to 69	4	4	-	8	2
70 to 74	6	4	-	10	2
75 to 79	1	3	-	4	1
80 to 84	2	1	-	3	1
85 to 89	1	3	-	4	1
90 to 94	-	1	-	1	0
95 plus	-	-	-		
NR	-	1	6	7	1
Drivers	248	206	13	467	
%	53	44	3		100

Drug/Alcohol Summary:

Drug	Total	%
Alcohol, Less than Statutory		
Alcohol, Statutory	2	1
Drug/Alcohol, Less than Statutory		
Drug/Alcohol, Statutory		
Refused	1	0
Under Influence of Alc/Drugs/Meds	1	0
None Indicated	216	98
Total Crashes	220	100

Fixed Object Struck Summary:

	Vehs.	%
Bridge/Bridge rail/Overpass		
Underpass/Structure Support		
Culvert		
Ditch/Embankment	1	0
Curb/Island/Raised Median	1	0
Guardrail	1	0
Concrete Barrier		
Tree		
Pole - Utility/Light/Etc	1	0
Sign Post		
Mailbox		
Impact Attenuator		
Other Fixed Object		
None	463	99
Total Vehicles	467	100

Selection Filter:

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

Analyst: G. Kretlow

Notes:

Iowa Department of Transportation

Major Cause Summary

Oralabor Rd from SE PDI Place to east side of

Report Version 1.1 Jan 2005

Analysis Years: 2010 [48], 2011 [42], 2012 [51], 2013 [35], 2014 [44]

Crash Summary:

Fatal	-
Major Injury	2
Minor Injury	13
Possible/Unknown	52
PDO	153
Total Crashes	220

Injury Summary:

Fatal	-
Major Injury	2
Minor Injury	15
Possible	70
Unknown	-
Total Injuries	87

TOT Property Damage: $872,874

AVG Property Damage: $3,968

Surface Condition Summary:

Dry	174
Wet	27
Ice	6
Snow	9
Slush	1
Sand/Dirt/Oil/Gravel	1
Water	-
Other	-
Unknown	1
Not Reported	1
Total Crashes	220

Major Cause Summary:

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

Selection Filter:

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

Analyst: G. Kretlow

Notes:

Iowa Department of Transportation

Abbreviated Crash Report

Oralabor Rd from SE PDI Place to east side of

Report Version 1.2 Mar 2005

Date	DOT Case #	Agency Case #	City	Crash Sev.	Literal Description
01/07/2010	2010549343	10-000092	Ankeny	PDO	0 / SE DELAWARE AVE and SE DELAWARE AVE and Iowa 0160 / SE ORALABOR
01/16/2010	2010552508	10-000256	Ankeny	PDO	1100 BLOCK SE ORALABOR
01/28/2010	2010554038	10-000469	Ankeny	PDO	0 / SE DELAWARE AVE and SE DELAWARE AVE and NB/EB Iowa 0160 / SE
02/04/2010	2010556117	10-000579	Ankeny	PDO	900 BLK SE ORALABOR RD (EB)
02/05/2010	2010556107	10-000599	Ankeny	Poss/Unk	0 / SE DELAWARE AVE and SE DELAWARE AVE and Iowa 0160 / SE ORALABOR
02/08/2010	2010557956	10-000646	Ankeny	PDO	SE DELAWARE, SE ORALABOR
02/09/2010	2010557962	10-000698	Ankeny	PDO	I-35 NORTHBOUND OFF RAMP AT ORALABOE EXIT
03/06/2010	2010562656	10-001093	Ankeny	PDO	1200 BLOCK OF SE ORALABOR RD
03/16/2010	2010563760	10-001264	Ankeny	PDO	0 / SE DELAWARE AVE and SE DELAWARE AVE and Iowa 0160 / SE ORALABOR
03/20/2010	2010564678	10-001342	Ankeny	Poss/Unk	0 / SE DELAWARE AVE and SE DELAWARE AVE and NB/EB Iowa 0160 / SE
03/29/2010	2010565693	10-001478	Ankeny	Poss/Unk	1100 BLK SE ORALAOR RD
04/03/2010	2010598600	10-001564	Ankeny	Minor	SB/WB Iowa 0160 / SE ORALABOR RD
04/27/2010	2010570399	10-001974	Ankeny	PDO	1300 BLOCK IOWA 0160 / SE ORALABOR RD
05/18/2010	2010573833	10-002364	Ankeny	PDO	SE PDI PL AND SE ORALABOR RD EAST BOUND
05/21/2010	2010573842	10-002418	Ankeny	PDO	1200 BLOCK SE ORALBOR RD
05/25/2010	2010574760	10-002488	Ankeny	PDO	2600 BLOCK SE DELAWARE AVE
05/27/2010	2010576035	10-002511	Ankeny	PDO	1200 BLOCK SE ORALABOR RD.
06/06/2010	2010577120	10-002697	Ankeny	PDO	1600 BLOCK SE ORALABOR RD
06/09/2010	2010577123	10-002730	Ankeny	Minor	E BOUND ORALABOR / I-35 NB OFF RAMP
06/11/2010	2010577129	10-002772	Ankeny	Poss/Unk	SE DELAWARE AVENUE AND SE ORALABOR RD
07/17/2010	2010586585	10-003452	Ankeny	PDO	Iowa 0160 / SE ORALABOR RD and Interstate 0035
07/23/2010	2010583639	10-003554	Ankeny	PDO	I-35 NORTHBOUND OFF RAMP AND SE ORALABOR
07/23/2010	2010583640	10-003559	Ankeny	PDO	1200-B SE ORALABOR RD
07/25/2010	2010585515	10-003597	Ankeny	Poss/Unk	SE ORALABOR RD AND SE PDI PL
08/06/2010	2010585534	10-003817	Ankeny	PDO	SE ORALABOR, SE PDI PLACE
08/08/2010	2010586590	10-003856	Ankeny	PDO	INTERSTATE 35 AND SE ORALABOR RD
08/18/2010	2010587585	10-004063	Ankeny	PDO	SE ORALABOR RD AND SE DELAWARE AVE
08/30/2010	2010589609	10-004287	Ankeny	Poss/Unk	SE PDI PL and Iowa 0160 / SE ORALABOR RD
09/08/2010	2010590636	10-004445	Ankeny	Minor	SE DELAWARE AVE/SE ORALABOR RD
09/16/2010	2010591680	10-004579	Ankeny	Poss/Unk	INTERSTATE 35 NORTHBOUND OFF RAMP TO SE ORALABOR
09/16/2010	2010591681	10-004585	Ankeny	Minor	1100 BLK SE ORALABOR RD
09/17/2010	2010591684	10-004598	Ankeny	Poss/Unk	Iowa 0160 / SE ORALABOR RD and Interstate 0035

Iowa Department of Transportation

Abbreviated Crash Report

Oralabor Rd from SE PDI Place to east side of

Report Version 1.2 Mar 2005

Date	DOT Case #	Agency Case #	City	Crash Sev.	Literal Description
09/20/2010	2010592722	10-004650	Ankeny	Poss/Unk	1100 BLOCK SE ORALABOR
09/22/2010	2010592729	10-004702	Ankeny	Minor	1100 BLOCK SE ORALABOR
09/30/2010	2010593871	10-004867	Ankeny	PDO	SE ORLABOR RD/I-35 SB ON-RAMP
10/02/2010	2010595043	10-004895	Ankeny	PDO	SE ORALABOR, WESTBOUND LANE, WITH INTERSECTION OF SB INTERSTATE 35
10/07/2010	2010595050	10-004971	Ankeny	Poss/Unk	1010 SE ORALABOR ROAD
10/18/2010	2010597421	10-005177	Ankeny	PDO	NB OFF RAMP INTERSTATE 35 AT SE ORALABOR RD
10/26/2010	2010598607	10-005317	Ankeny	PDO	SE ORALABOR RD AND SE DELAWARE AVE
11/06/2010	2010601824	10-005520	Ankeny	Minor	IOWA 0160 / SE ORALABOR RD AND INTERSTATE 0035
11/08/2010	2010601830	10-005574	Ankeny	PDO	Iowa 0160 / SE ORALABOR RD
11/11/2010	2010601837	10-005628	Ankeny	PDO	Iowa 0160 / SE ORALABOR RD and SE DELAWARE AVE
11/13/2010	2010603107	10-005671	Ankeny	PDO	Iowa 0160 / SE ORALABOR RD overpass of Interstate 0035
12/01/2010	2010606163	10-005986	Ankeny	PDO	SE ORALABOR RD & SE DELAWARE AVE
12/07/2010	2010606179	10-006081	Ankeny	Poss/Unk	1200 BLK SE ORALABOR RD
12/11/2010	2010610283	10-006154	Ankeny	PDO	1000 BLOCK SE ORALABOR RD
12/19/2010	2010610271	10-006269	Ankeny	PDO	NB/EB Iowa 0160 / SE ORALABOR RD
12/25/2010	2010610239	10-006344	Ankeny	PDO	1400 SE ORALABOR RD
01/12/2011	2011618571	11-000213	Ankeny	PDO	1010 SE ORALABOR RD
01/30/2011	2011617291	11-000461	Ankeny	PDO	SE ORALABOR RD / SE PDI PLACE
02/01/2011	2011617300	11-000497	Ankeny	PDO	Iowa 0160 / SE ORALABOR RD and SE DELAWARE AVE
03/09/2011	2011622627	11-001066	Ankeny	PDO	1300-BLOCK SE ORALABOR RD
03/15/2011	2011623395	11-001154	Ankeny	Poss/Unk	Iowa 0160 / SE ORALABOR RD and SE DELAWARE AVE
03/16/2011	2011624540	11-001175	Ankeny	PDO	SE ORALABOR RD./SE DELAWARE AVE.
03/26/2011	2011625331	11-001332	Ankeny	Poss/Unk	1300 BLOCK SE ORALABOR RD
04/01/2011	2011625338	11-001429	Ankeny	PDO	1200 BLOCK SE ORALABOR
04/15/2011	2011631461	11-001676	Ankeny	PDO	1100 BLK SE ORALABOR RD.
04/21/2011	2011627913	11-001796	Ankeny	Major	SE ORALABOR RD AND SB I-35 ON RAMP
05/13/2011	2011630727	11-002163	Ankeny	PDO	IOWA 0160 / SE ORALABOR RD AND INTERSTATE 0035 NB OFF-RAMP
05/21/2011	2011632476	11-002302	Ankeny	PDO	SE ORALABOR RD AND SE DELAWARE AVE
06/11/2011	2011634528	11-002626	Ankeny	PDO	1300 BLOCK SE ORALABOR RD
06/12/2011	2011635485	11-002653	Ankeny	PDO	SE ORALABOR RD AND SE PDI PL
06/17/2011	2011635496	11-002732	Ankeny	Poss/Unk	1200 SE ORALABOR RD
06/25/2011	2011636251	11-002866	Ankeny	Poss/Unk	SB/WB Iowa 0160 / SE ORALABOR RD and SE PDI PL

Iowa Department of Transportation

Abbreviated Crash Report

Oralabor Rd from SE PDI Place to east side of

Report Version 1.2 Mar 2005

Date	DOT Case #	Agency Case #	City	Crash Sev.	Literal Description
07/09/2011	2011638419	11-003142	Ankeny	PDO	Iowa 0160 / SE ORALABOR RD and Interstate 0035 and SB/WB NE 78TH AVE
07/18/2011	2011639492	11-003469	Ankeny	Minor	PDI PI AND SE ORALABOR
07/20/2011	2011639497	11-003508	Ankeny	PDO	1000 BLOCK SE ORALABOR
07/30/2011	2011641541	11-003706	Ankeny	PDO	Iowa 0160 / SE ORALABOR RD and SE DELAWARE AVE
08/06/2011	2011642361	11-003827	Ankeny	PDO	1200 SE ORALABOR RD
08/10/2011	2011643477	11-003884	Ankeny	Minor	SE ORALABOR RD AND I-35 SB OFF RAMP
08/15/2011	2011644364	11-003960	Ankeny	PDO	1100 SE ORALABOR RD
08/25/2011	2011646453	2011049509	Ankeny	PDO	I35 AND ORALABOR RD WB
08/25/2011	2011646463	2011049505	Ankeny	PDO	NB/EB Iowa 0160 / SE ORALABOR RD
08/25/2011	2011648345	11-004123	Ankeny	PDO	SE ORALABOR RD/SE PDI PL
08/31/2011	2011646318	11-004200	Ankeny	PDO	SB/WB Iowa 0160 / SE ORALABOR RD and SE DELAWARE AVE
09/01/2011	2011646324	11-004215	Ankeny	PDO	Iowa 0160 / SE ORALABOR RD and SE DELAWARE AVE
09/14/2011	2011648357	11-004438	Ankeny	PDO	SE ORALABOR RD AND SE DELAWARE AVE
09/16/2011	2011648365	11-004470	Ankeny	PDO	900 SE ORALABOR RD
09/22/2011	2011649423	11-004573	Ankeny	PDO	Iowa 0160 / SE ORALABOR RD overpass of Interstate 0035
09/29/2011	2011650439	11-004678	Ankeny	PDO	NB/EB Iowa 0160 / SE ORALABOR RD and SE DELAWARE AVE
11/04/2011	2011656602	11-005272	Ankeny	Poss/Unk	SE ORALABOR RD/SE DELAWARE AVE.
11/15/2011	2011658979	11-005476	Ankeny	PDO	900 BLK SE ORALABOR RD.
11/19/2011	2011658972	11-005537	Ankeny	PDO	WB IOWA 0160 / SE ORALABOR RD AND SE DELAWARE AVE
11/20/2011	2011658974	11-005546	Ankeny	PDO	Iowa 0160 / SE ORALABOR RD
12/02/2011	2011661303	11-005748	Ankeny	PDO	900 BLK SE ORALABOR RD
12/10/2011	2011663698	2011068877	Ankeny	PDO	OFF RAMP I 35 TO WB ON ORALABOR
12/13/2011	2011663934	11-005912	Ankeny	Minor	SE ORALABOR RD AND I-35 NORTHBOUND ON RAMP
12/14/2011	2011663943	11-005938	Ankeny	PDO	SE ORALABOR RD/SE DELAWARE AVE.
12/15/2011	2011663944	11-005953	Ankeny	Poss/Unk	1300 BLOCK SE ORALABOR RD
12/19/2011	2011665481	11-006024	Ankeny	PDO	SE ORALABOR RD AND SE DELAWARE AVE
02/01/2012	2012671915	12-000404	Ankeny	Poss/Unk	1500 BLOCK SE ORALABOR RD
02/04/2012	2012672877	12-000452	Ankeny	PDO	1000 BLK SE ORALABOR RD
02/25/2012	2012674893	12-000766	Ankeny	PDO	1200 BLK SE ORALABOR RD.
02/25/2012	2012674895	12-000767	Ankeny	Poss/Unk	SE ORALABOR RD/SE DELAWARE AVE.
02/28/2012	2012676015	12-000817	Ankeny	Poss/Unk	1300 BLK SE ORALABOR RD
03/06/2012	2012677206	12-000903	Ankeny	PDO	1200 BLK SE ORALABOR RD

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03/10/2012	2012677210	12-000957	Ankeny	Poss/Unk	Iowa 0160 / SE ORALABOR RD overpass of Interstate 0035
03/20/2012	2012679374	12-001089	Ankeny	PDO	1000 BLK SE ORALABOR RD.
04/08/2012	2012681313	12-001373	Ankeny	Poss/Unk	NB/EB Iowa 0160 / SE ORALABOR RD and SE PDI PL
04/14/2012	2012687934	12-001456	Ankeny	Minor	NB/EB Iowa 0160 / SE ORALABOR RD and SE DELAWARE AVE
04/17/2012	2012683128	12-001494	Ankeny	PDO	1200 BLK SE ORALABOR
04/23/2012	2012684080	12-001594	Ankeny	PDO	SE ORALABOR RD AND SE DELAWARE AVE
04/25/2012	2012685031	12-001628	Ankeny	PDO	1100 BLK SE ORALABOR RD
05/02/2012	2012685033	12-001758	Ankeny	PDO	1300 BLOCK SE ORALABOR RD
05/06/2012	2012686044	12-001823	Ankeny	PDO	1100 SE ORALABOR RD
05/11/2012	2012686053	12-001915	Ankeny	PDO	1200 BLK SE ORALABOR RD
06/13/2012	2012691029	12-002420	Ankeny	PDO	1500 BLK SE ORALABOR RD
06/18/2012	2012692304	12-002491	Ankeny	PDO	1200 SE ORALABOR
06/20/2012	2012692309	12-002514	Ankeny	PDO	1300 BLOCK SE ORALABOR RD
07/03/2012	2012694532	12-002741	Ankeny	PDO	Iowa 0160 / SE ORALABOR RD and Interstate 0035 and SB/WB NE 78TH AVE
07/13/2012	2012695036	12-002916	Ankeny	Poss/Unk	1300 BLOCK SE ORALABOR RD
07/17/2012	2012695931	12-002968	Ankeny	PDO	1200 BLK SE ORALABOR
07/19/2012	2012695936	12-003014	Ankeny	Poss/Unk	Iowa 0160 / SE ORALABOR RD
07/24/2012	2012698795	12-003105	Ankeny	Major	SE ORALABOR AND SE PDI PL
07/26/2012	2012696900	12-003132	Ankeny	Poss/Unk	I35 OVERPASS / SE ORALABOR RD
08/10/2012	2012698810	12-003367	Ankeny	PDO	1100 BLK WB IOWA 0160 / SE ORALABOR RD
08/10/2012	2012698811	12-003365	Ankeny	PDO	WB IOWA 0160 / SE ORALABOR RD - 200 FEET EAST OF SE DELAWARE AVE
08/13/2012	2012699749	12-003418	Ankeny	PDO	SE DELAWARE AVE/SE ORALABOR RD
08/18/2012	2012699763	12-003493	Ankeny	PDO	300 FEET WEST OF I-35 NORTHBOUND RAMPS - IOWA 0160 / SE ORALABOR RD
08/18/2012	2012699765	12-003501	Ankeny	Poss/Unk	Iowa 0160 / SE ORALABOR RD and SE DELAWARE AVE
08/18/2012	2012699766	12-003502	Ankeny	PDO	Iowa 0160 / SE ORALABOR RD and SE DELAWARE AVE
08/31/2012	2012701635	12-003713	Ankeny	PDO	NB/EB Iowa 0160 / SE ORALABOR RD
08/31/2012	2012701637	12-003718	Ankeny	PDO	1000 BLOCK SE ORALABOR RD
09/10/2012	2012703560	12-003853	Ankeny	PDO	1200 BLK SE ORALABOR RD
09/11/2012	2012703566	12-003888	Ankeny	PDO	1000 BLOCK SE ORALABOR RD
09/28/2012	2012705752	12-004144	Ankeny	Poss/Unk	1200 BLOCK SE ORALABOR
09/28/2012	2012706858	12-004137	Ankeny	PDO	Iowa 0160 / SE ORALABOR RD
10/02/2012	2012706863	12-004202	Ankeny	PDO	1000 BLOCK SE ORALABOR RD

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10/05/2012	2012706859	12-004251	Ankeny	PDO	Iowa 0160 / SE ORALABOR RD
10/05/2012	2012706869	12-004256	Ankeny	PDO	900 BLK SE ORALABOR
10/30/2012	2012711072	12-004651	Ankeny	Poss/Unk	900 BLOCK SE ORALABOR RD
11/09/2012	2012712557	12-004824	Ankeny	PDO	1000 BLOCK SE ORALABOR RD
11/12/2012	2012712563	12-004872	Ankeny	PDO	Iowa 0160 / SE ORALABOR RD and Interstate 0035
11/15/2012	2012714411	12-004913	Ankeny	PDO	INT SE ORALABOR AND SE DELAWARE
11/30/2012	2012715451	12-005152	Ankeny	PDO	1300 BLOCK SE ORALABOR
12/11/2012	2012717794	12-005304	Ankeny	Poss/Unk	1200 BLOCK SE ORALABOR RD
12/12/2012	2012717806	12-005316	Ankeny	PDO	1100 BLK SE ORALABOR RD
12/19/2012	2012720868	12-005422	Ankeny	Poss/Unk	1100 BLOCK SE ORALABOR RD
12/27/2012	2012719693	12-005570	Ankeny	PDO	Iowa 0160 / SE ORALABOR RD
12/28/2012	2012719704	12-005599	Ankeny	PDO	NB/EB Iowa 0160 / SE ORALABOR RD and SE DELAWARE AVE
12/31/2012	2012719708	12-005642	Ankeny	PDO	Iowa 0160 / SE ORALABOR RD and Interstate 0035
01/08/2013	2013721960	13-000097	Ankeny	PDO	Iowa 0160 / SE ORALABOR RD and Interstate 0035 and NE 78TH AVE
02/01/2013	2013724237	13-000453	Ankeny	PDO	INT SE ORALABOR RD AND SE PDI PL
02/08/2013	2013725812	13-000558	Ankeny	PDO	1200 BLOCK SE ORALABOR
02/15/2013	2013726353	13-000676	Ankeny	PDO	SE PDI AND SE ORALABOR RD
03/05/2013	2013729130	13-000940	Ankeny	Poss/Unk	INTERSTATE 35 AND NE 78TH AVE AND INTERSTATE 35 AND STATE 160/SE
03/26/2013	2013732613	13-001218	Ankeny	PDO	1200 BLOCK SE ORALABOR RD
03/29/2013	2013732621	13-001260	Ankeny	PDO	1200 BLOCK SE ORALABOR RD
05/08/2013	2013739587	13-001827	Ankeny	PDO	STATE 160/SE ORALABOR RD AND INTERSTATE 35
05/10/2013	2013739591	13-001857	Ankeny	PDO	1200 SE ORALABOR RD
05/21/2013	2013740589	13-002026	Ankeny	PDO	STATE 160/SE ORALABOR RD
05/23/2013	2013740590	13-002051	Ankeny	PDO	1100 BLK SE ORALABOR RD
06/19/2013	2013745167	13-002472	Ankeny	PDO	2700 BLK SE PDI PL
07/11/2013	2013748096	13-002803	Ankeny	PDO	SE ORALABOR RD AND SE PDI PL
07/29/2013	2013751230	13-003075	Ankeny	PDO	SB/WB Iowa 0160 / SE ORALABOR RD
08/01/2013	2013751237	13-003116	Ankeny	PDO	900 BLOCK SE ORALABOR RD
08/09/2013	2013752496	13-003215	Altoona	PDO	1200 BLK SE ORALABOR RD
08/22/2013	2013757921	13-003403	Ankeny	PDO	1000 BLOCK SE ORALABOR RD
08/24/2013	2013754351	13-003448	Ankeny	PDO	STATE 160/SE ORALABOR RD AND SE DELAWARE AVE
08/25/2013	2013754352	13-003459	Ankeny	PDO	STATE 160/SE ORALABOR RD AND SE DELAWARE AVE

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08/26/2013	2013755385	13-003475	Ankeny	PDO	INTERSTATE 35 AND NE 78TH AVE AND INTERSTATE 35 AND STATE 160/SE
08/30/2013	2013755398	13-003542	Ankeny	PDO	900 BLOCK SE ORALABOR RD
09/11/2013	2013756948	13-003711	Ankeny	Poss/Unk	SB ENTRANCE RAMP AT SE ORALABOR RD
10/03/2013	2013761054	13-004023	Ankeny	PDO	STATE 160/SE ORALABOR RD
10/09/2013	2013761569	13-004121	Ankeny	PDO	NB/EB Iowa 0160 / SE ORALABOR RD
10/11/2013	2013761576	13-004157	Ankeny	Poss/Unk	INTERSTATE 35 AND STATE 160/SE ORALABOR RD AND INTERSTATE 35 AND NE
10/12/2013	2013761578	13-004177	Ankeny	Minor	STATE 160/SE ORALABOR RD AND SE DELAWARE AVE
10/15/2013	2013762363	13-004221	Ankeny	PDO	1000 BLOCK SE ORALABOR RD
10/19/2013	2013763013	13-004283	Ankeny	Minor	1100 BLK SE ORALABOR (WESTBOUND LANE), EAST OF THE INTERSECTION WITH
10/22/2013	2013763017	13-004341	Ankeny	PDO	900 BLK SE ORALABOR RD
10/23/2013	2013763218	13-004357	Ankeny	PDO	900 BLOCK SE ORALABOR RD
11/12/2013	2013767135	13-004708	Ankeny	Poss/Unk	1400 BLK SE ORALABOR RD
12/10/2013	2013772557	13-005106	Ankeny	PDO	1000 BLOCK SE ORALABOR RD
12/13/2013	2013773261	13-005155	Ankeny	PDO	SE ORALABOR RD/SE PDI PL
12/18/2013	2013774202	13-005234	Ankeny	PDO	1200 BLOCK SE ORALABOR RD
12/21/2013	2013774993	13-005298	Ankeny	PDO	SE PDI PLACE AND SE ORALABOR RD
01/02/2014	2014777258	14-000025	Ankeny	PDO	STATE 160/SE ORALABOR RD AND SE DELAWARE AVE
01/03/2014	2014777710	14-000039	Ankeny	PDO	STATE 160/SE ORALABOR RD AND SE DELAWARE AVE
01/08/2014	2014778443	14-000091	Ankeny	PDO	Iowa 0160 / SE ORALABOR RD
01/28/2014	2014782276	14-000426	Ankeny	Poss/Unk	SE ORALABOR RD AND INTERSTATE 35
02/02/2014	2014782780	14-000486	Ankeny	PDO	SE DELAWARE AVE/SE ORALABOR RD
02/04/2014	2014783291	14-000516	Ankeny	PDO	STATE 160/SE ORALABOR RD AND SE DELAWARE AVE
02/09/2014	2014784388	14-000636	Ankeny	PDO	1200 BLOCK SE ORALABOR RD
02/13/2014	2014785881	14-000697	Ankeny	PDO	1200 BLOCK SE ORALABOR RD
02/20/2014	2014787118	14-000829	Ankeny	Poss/Unk	NB/EB Interstate 0035 underpass of Iowa 0160 / SE ORALABOR RD
02/21/2014	2014787419	14-000847	Ankeny	PDO	INTERSTATE 35 AND STATE 160/SE ORALABOR RD AND INTERSTATE 35 AND NE
02/26/2014	2014788541	14-000945	Ankeny	Poss/Unk	SE PDI PL AND SE ORALABOR RD
03/03/2014	2014789222	14-001027	Ankeny	PDO	1000 BLOCK SE ORALABOR RD
03/05/2014	2014789605	14-001051	Ankeny	PDO	900 BLK STATE 160/SE ORALABOR RD
03/14/2014	2014791016	14-001186	Ankeny	Poss/Unk	STATE 160/SE ORALABOR RD AND SE PDI PL
05/05/2014	2014797754	14-001957	Ankeny	Poss/Unk	1300 BLK SE ORALABOR RD
05/07/2014	2014797865	14-001983	Ankeny	Poss/Unk	STATE 160/SE ORALABOR RD AND SE DELAWARE AVE

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05/10/2014	2014798325	14-002034	Ankeny	PDO	Iowa 0160 / SE ORALABOR RD
05/31/2014	2014801247	14-002359	Ankeny	Poss/Unk	1200 BLK SE ORALABOR RD
06/07/2014	2014802578	14-002464	Ankeny	Poss/Unk	STATE 160/SE ORALABOR RD AND SE DELAWARE AVE
06/30/2014	2014805965	14-002809	Ankeny	Poss/Unk	1300 BLOCK SE ORALABOR RD
07/01/2014	2014806162	14-002825	Ankeny	PDO	SE PDI PL AND SE ORALABOR RD
07/01/2014	2014806164	14-002828	Ankeny	PDO	SE PDI PL/SE ORALABOR RD
07/04/2014	2014806591	14-002875	Ankeny	PDO	1400 BLK SE ORALABOR RD
07/07/2014	2014807410	14-002915	Ankeny	Poss/Unk	700 BLK SE ORALABOR RD
07/15/2014	2014807825	14-003038	Ankeny	Poss/Unk	STATE 160/SE ORALABOR RD AND INTERSTATE 35
07/16/2014	2014808150	14-003047	Ankeny	Poss/Unk	STATE 160/SE ORALABOR RD AND SE DELAWARE AVE
07/22/2014	2014808683	14-003143	Ankeny	PDO	1200 BLOCK SE ORALABOR RD
08/16/2014	2014812849	14-003514	Ankeny	PDO	SE PDI PL AND STATE 160/SE ORALABOR RD
08/25/2014	2014813887	14-003633	Ankeny	Poss/Unk	900 BLOCK SE ORALABOR
08/26/2014	2014814159	14-003661	Ankeny	Poss/Unk	STATE 160/SE ORALABOR RD AND SE DELAWARE AVE
09/20/2014	2014817661	14-004065	Ankeny	PDO	1400 BLK SE ORALABOR RD
10/24/2014	2014823333	14-004612	Ankeny	Poss/Unk	900 SE ORALABOR RD
10/29/2014	2014824139	14-004686	Ankeny	Poss/Unk	2600 BLOCK SE DELAWARE AVE
10/30/2014	2014824311	14-004697	Ankeny	PDO	STATE 160/SE ORALABOR RD AND INTERSTATE 35 AND INTERSTATE 35
10/30/2014	2014824538	14-004705	Ankeny	PDO	INTERSTATE 35 AND SE ORALABOR RD
11/21/2014	2014834165	14-005052	Ankeny	PDO	SE PDI/SE ORALABOR
11/28/2014	2014830935	14-005163	Ankeny	PDO	INTERSTATE 35 AND STATE 160/SE ORALABOR RD AND INTERSTATE 35 AND NE
12/01/2014	2014831566	14-005200	Ankeny	PDO	STATE 160/SE ORALABOR RD AND SE DELAWARE AVE
12/02/2014	2014831568	14-005217	Ankeny	Minor	1300 BLK SE ORALABOR RD
12/16/2014	2014834450	14-005431	Ankeny	PDO	STATE 160/SE ORALABOR RD AND SE DELAWARE AVE
12/17/2014	2014834265	14-005439	Ankeny	Poss/Unk	STATE 160/SE ORALABOR RD AND SE DELAWARE AVE
12/20/2014	2014834958	14-005482	Ankeny	Poss/Unk	STATE 160/SE ORALABOR RD AND INTERSTATE 35
12/22/2014	2014835213	14-005503	Ankeny	PDO	I-35/SE ORALABOR RD
12/26/2014	2014835918	14-005561	Ankeny	PDO	STATE 160/SE ORALABOR RD AND SE DELAWARE AVE MEASURING 3545 FEET

Iowa Department of Transportation

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Oralabor Rd from SE PDI Place to east side of

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Selection Filter:

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

Analyst: G. Kretlow

Notes:

Rev. 5/14

Road Segment Benefit / Cost Safety Analysis

Iowa DOT Office of Traffic & Safety

County: Polk | Prepared by: Gary Kretlow | Date Prepared: Jan 22, 2015

Location: On Oralabor Rd from SE PDI Place east to east side of I-35 interchange

Improvement

Proposed Improvement(s): add additional turn lanes at Delaware Ave and over bridge over I-35

$ 500,000	Estimated Improvement Cost, **EC**	20	Est. Improvement Life, years, **Y**
$ 500	Other Annual Cost (after initial year), **AC**	8	Crash Reduction Factor (integer), **CRF**
$ 6,795	Present Value Other Annual Costs, **OC**	4.0%	Discount Rate, **INT**
		$ 506,795	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 | 2013 Date of traffic count

Length (mi.)	Two-way veh/day	Description
0.20	20,100	from SE Hulsizer to Delaware
0.30	28,000	from Delaware to I-35
0.50	miles total	

12,420	Current Vehicle Miles / Day, **VM**
15,155	End of Life Veh. Miles / Day
4,533,300	Current Veh. Miles / Year, **AM**
99,818,751	Total Projected Veh. Miles Over Life of Project, **TVMT**

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

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

Crash Data

2010 First full year --> 2014 Last full year | 5.0 years, Time Period, **T**

Additional months | values as of May 2014

0	Fatal Crashes →	0	Fatalities @	$4,500,000	$ -
		2	Major Injuries @	$325,000	$ 650,000
67	Injury Crashes →	13	Minor Injuries @	$65,000	$ 845,000
		52	Possible Injuries @	$35,000	$ 1,820,000
153	Property Damage Only		(assumed cost per crash)	$7,400	$ 1,628,000
			-OR- enter all Property Costs of all crashes:		
220	Total Crashes, **TA**			Total $ Loss, **LOSS**	$ 4,943,000

44.00	Current Crashes / Year, **AA** = TA / T	970.6	Crashes / HMVM, Crash Rate, **CR** CR = TA x 10^8 / (AM x T)
$ 22,468	Cost per Crash, **AVCR** = LOSS / TA	$ 1,168,186	Present Value of Avoided Crashes, **BENEFIT**
968.8	Total Expected Crashes, **TCR** = CR x TVMT/10^8		
3.52	Crashes Avoided First Year **AAR** = AA x CRF / 100		
$ 79,088	Crash Costs Avoided in First Year, AAR x AVCR		
77.5	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 = $1,168,186 : $506,795 = **2.31** : 1

Application for FY2017 Traffic Safety Funds
Iowa Department of Transportation

(Site Specific)

42nd Street Streetscape

Corridor Safety Improvements

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

August, 2015

Rev. 5/15

Application for TRAFFIC SAFETY FUNDS

GENERAL INFORMATION **DATE:** August 7, 2015

Location / Title of Project 42nd Street Streetscape

Applicant City of Des Moines

Contact Person Calvin Miller Title Civil Engineer 1

Complete Mailing Address 400 Robert D Ray Drive
Des Moines, Iowa 50309

Phone 515-283-4748 (Area Code) E-Mail cbmiller@dmgov.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) N/A

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 $ 1,696,300

Safety Funds Requested $ 500,000

Rev. 5/15

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. Franklin Cownie — AUG 10 2015

Signature — Date Signed

T. M. Franklin Cownie

Typed Name

Attest: Diane Rauh — AUG 10 2015

Signature — Date Signed

Diane Rauh

Typed Name

Exhibit A

★ **Roll Call Number**
15-1230

Agenda Item Number
7

Date July 27, 2015

APPROVING FISCAL YEAR 2017 TRAFFIC SAFETY FUND APPLICATIONS 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 applications to the Iowa Department of Transportation for Traffic Safety Funds to cover a portion of the construction costs for the following projects:

1. 42nd Street Streetscape
2. Martin Luther King Jr. Parkway and Prospect Road Traffic Signal Installation
3. Citywide Fixed-Time Signal Upgrade Project – Phase 2

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

(Council Communication Number 15-428 Attached)

Moved by Gatto to adopt.

APPROVED AS TO FORM:

Kathleen Vanderpool
Deputy City Attorney

COUNCIL ACTION	YEAS	NAYS	PASS	ABSENT
COWNIE	✓			
COLEMAN	✓			
GATTO	✓			
GRAY	✓			
HENSLEY	✓			
MAHAFFEY	✓			
MOORE	✓			
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

Exhibit B

PROJECT DESCRIPTION

42nd Street Streetscape
Corridor Safety Improvements

Project Description:

The project includes the implementation of the safety improvements identified as part of the Roosevelt Cultural District Streetscape Study. See Attachment A for the proposed plan. Identified improvements include traffic signalization at 42nd Street and Crocker Street, removing the westbound traffic movement at the 42nd Street and Chamberlain Drive intersection, replacement/relocation of the pedestrian signals across 42nd Street, additional dedicated turn lanes, and sidewalk improvements to enhance pedestrian mobility and safety along the corridor.

The total project cost is estimated to be approximately $1.7M. The City is responsible for approximately $982,300 and private funding is anticipated to be approximately $714,000. TAP funding in the amount of $480,000 has been programmed for FY 2017. A total of $500,000 is being requested from State Traffic Safety Improvement Program funds.

Existing Conditions:

42nd Street is classified as a Minor Arterial Roadway. In this area it has a four lane undivided cross-section with two-through lanes in each direction at the south end of the corridor transitioning to a two-lane undivided section on the north end. The 2012 Average Daily Traffic for 42nd Street was 16,500 vehicles per day (vpd) at the south end of the corridor and 15,700 vpd at the north end of the corridor. There is a designated right-turn lane for southbound traffic at Center Street / I-235. The posted speed limit on this section of 42nd Street is 30-MPH.

There are substantial volumes of pedestrians that cross 42nd Street along the corridor due to the shopping district and school within the project area. The Des Moines Area Regional Transit (DART) has bus service along this section of 42nd Street. There is a DART stop on the west side of 42nd Street south of Chamberlain Avenue and a stop on the east side of 42nd Street south of Crocker Street adding to the volume of pedestrians in the project area.

Project Justification:

A traffic study was completed in December 2012 as a part of the Streetscape Study and is attached as Attachment A for reference. The study included a traffic capacity, pedestrian, and safety analysis for existing conditions as well as the proposed alternatives.

The study also reported that traffic signals would be warranted at 42nd Street and Crocker Street based on Warrant No. 1B (8-Hour Vehicular Volume) once the proposed traffic pattern changes are made.

Of the thirty-four reported crashes between 2010 and 2014, there were eleven personal injury crashes. The majority of the crashes were rear-end, broadside, and sideswipe-same direction. All of these types of crashes would generally be considered correctible by the improvements planned as part of this project due to the reduction of several conflict points along the corridor.

Crash reduction factors for the proposed corridor improvements were obtained from the Crash Modification Factors Clearinghouse for a 4-lane to 3-lane road diet, the addition of a traffic signal at 42nd Street and Crocker Street, and the elimination of a left turn for northbound 42nd Street traffic at Chamberlain Avenue.

Based on current IDOT value factors, the total estimated loss from crashes during the described five-year period is $666,600 (See Exhibit "L"). Assuming an overall crash reduction factor of 61 percent and an estimated project life of 15 years, the request for $500,000 of Traffic Safety relates to a benefit-cost factor of **1.93:1.**

COST ESTIMATE

COSTS

City of Des Moines	**$ 982,300**
Roosevelt Cultural District	**$ 714,000**
TOTAL PROJECT COST:	**$ 1,696,300**

Federal Funding (FY 2017 TAP)	**$ 480,000**
TSF FUNDS REQUESTED:	**$ 500,000**

See Next Page for detailed Cost Opinion

Exhibit C

Roosevlt Cultural District Master Plan
Preliminary Planning Opinion of Probable Project Costs

Prepared for Roosevelt Cultural District & City of Des Moines

August 2013

KEY:	
=City 100%	= 50/50 split
= Private 100%	

Cost breakout based on the Streetscape Policy

Base + MidAm Total + Private Improvements (TOTAL PROJECT COST)= $1,696,300.00

City 100% (base improvements, storm sewer)	$725,400.00		
RCD 100% (undergrounding, upgraded materials, fixtures)	$456,900.00	includes private imp contingency & design/eng	
50/50 Split (street lights, plant materials, trees)	$72,000.00	EACH:	$36,000.00
Subtotal	**$1,254,300.00**		
Contingency (20%) for Base & Mid-Am	$249,000.00	50/50 Split	
Design & Engineering for Base & Mid-Am	$193,000.00	50/50 Split	
Subtotal	**$442,000.00**	EACH:	$221,000.00
GRAND TOTAL	**$1,696,300.00**		
RCD Total	**$714,000.00**	42%	**$1,696,300.00**
City Total	**$982,300.00**	58%	

Base Project

No.	Item	Quantity	Unit	Unit Price	Extended Amount
1	Traffic Control	1	LS	$67,000.00	$67,000.00
2	Mobilization	1	LS	$61,000.00	$61,000.00
3	Localized Roadway Storm Sewer and Intakes ǂ	1	LS	$60,000.00	$60,000.00
4	Adjustment Of Water and Storm Sewer Fixtures	10	EA	$500.00	$5,000.00
5	Removal of Roadway Pavement and Driveways (includes curb)	1280	SY	$11.00	$14,080.00
6	Removal of Chain Link Fence, as per plan	225	LF	$5.00	$1,125.00
7	Removal of Pedestrian Signals	1	LS	$5,000.00	$5,000.00
8	Removal of Sidewalk	930	SY	$5.00	$4,650.00
9	Pavement Scarification / Milling for Resurfacing	5150	SY	$5.00	$25,750.00
10	HMA Pavement Overlay (2 IN. Surface)	570	TON	$120.00	$68,400.00
11	Concrete Curb and Gutter	1350	LF	$25.00	$33,750.00
12	Sidewalk PCC Concrete, 5 IN. (with decorative joint)	1285	SY	$45.00	$57,825.00
13	Driveway PCC Concrete, 7 IN. (with decorative joint)	225	SY	$50.00	$11,250.00
14	Cast Iron Detectable Warning Panels for Curb Ramps	180	SF	$45.00	$8,100.00
15	Decorative fence (east side of detention)	225	LF	$80.00	$18,000.00
16	Traffic Signalization	1	LS	$200,000.00	$200,000.00
17	Installation of Pedestrian Signalization	1	LS	$100,000.00	$100,000.00
18	Painted Pavement Markings, Epoxy	29	STA	$85.00	$2,465.00
19	2-5/8" (6CM) Concrete Pavers w/ Subbase	405	SY	$95.00	$38,475.00
20	3-1/8" (8CM) Concrete Pavers w/ Subbase [Crosswalks]	195	SY	$120.00	$23,400.00
21	Planter Paving Band	625	LF	$35.00	$21,875.00
22	Light Pole Banners (2 sided)	22	EA	$350.00	$7,700.00
23	Topsoil, Furnish and Spread	100	CY	$40.00	$4,000.00
24	Amended Soil	50	CY	$60.00	$3,000.00
25	Sodding	110	SQ	$55.00	$6,050.00
26	Street Trees	18	EA	$400.00	$7,200.00
27	Shrubs	120	EA	$45.00	$5,400.00
28	Perennials	410	EA	$15.00	$6,150.00
29	Benches	2	EA	$1,500.00	$3,000.00
30	Litter Receptacles	2	EA	$1,200.00	$2,400.00
31	Bike Racks	5	EA	$800.00	$4,000.00
32	Seat Wall	15	LF	$150.00	$2,250.00
33	Retaining Wall and Stairs in front of Hubbell	250	SF	$30.00	$7,500.00
34	Major Gateway Column w/ Footing	5	EA	$12,000.00	$60,000.00
35	Minor Gateway Column w/ Footing	7	EA	$5,000.00	$35,000.00
36	Miscellaneous Wayfinding	1	LS	$10,000.00	$10,000.00
37	Miscellaneous Column and Tree Lighting and Electrical	1	LS	$15,000.00	$15,000.00
	Subtotal =				$1,006,000.00
	Contingency (20%) =				$201,000.00
	Design, Engineering, and Administration (thru const) =				$181,000.00
	Base Total =				**$1,388,000.00**

* This does not include any right-of-way acquisition
ǂ There may be minor cost savings from the City's storm sewer separation project
‡ This does not include costs for stand alone public art not integrated with site amenities
ⱡ This does not include street reconfiguration on California and Crocker west of the Master Plan limits

Exhibit C

MidAmerican Energy Costs					
No.	Item	Quantity	Unit	Unit Price	Extended Amount
1	Undergrounding power lines [J]	1	LS	$350,000.00	$350,000.00
2	Potential savings if poles need to be relocated as a result of conflict with storm sewer construciton; because of franchise agreement	1	LS	-$150,000.00	-$150,000.00
3	Buy-down cost of street lighting	16	EA	$2,500.00	$40,000.00
				Subtotal =	$240,000.00
				Contingency (20%) =	$48,000.00
				Design Oversight (5%) =	$12,000.00
				Mid-Am Total =	**$300,000.00**

[J] Cost includes pole on the NW Corner of Crocker Street and a pole at the DM Playhouse. (There is a potential savings if poles need to be relocated as a result of conflict with storm sewer construciton.)

Base (pg 1) + MidAm Total =	**$1,688,000.00**

Private Improvements					
No.	Item	Quantity	Unit	Unit Price	Extended Amount
1	Painted Pavement Markings (Shops at Roosevelt)	4	STA	$85.00	$340.00
2	Removal of Painted Pavement Markings (Shops at Roosevelt)	4	STA	$100.00	$400.00
3	Painted Pavement Markings (DM Playhouse)	5	STA	$85.00	$425.00
4	Removal of Painted Pavement Markings (DM Playhouse)	2.9	STA	$100.00	$290.00
5	Sidewalk PCC Concrete, 5 IN., (Hubbell School)	100	SY	$45.00	$4,500.00
6	Removals, PCC Sidewalk (Hubbell School)	50	SY	$10.00	$500.00
				Subtotal =	$6,000.00
				Contingency (20%) =	$1,200.00
				Design & Engineering (thru const) =	$1,100.00
				Private Imp Total =	**$8,300.00**

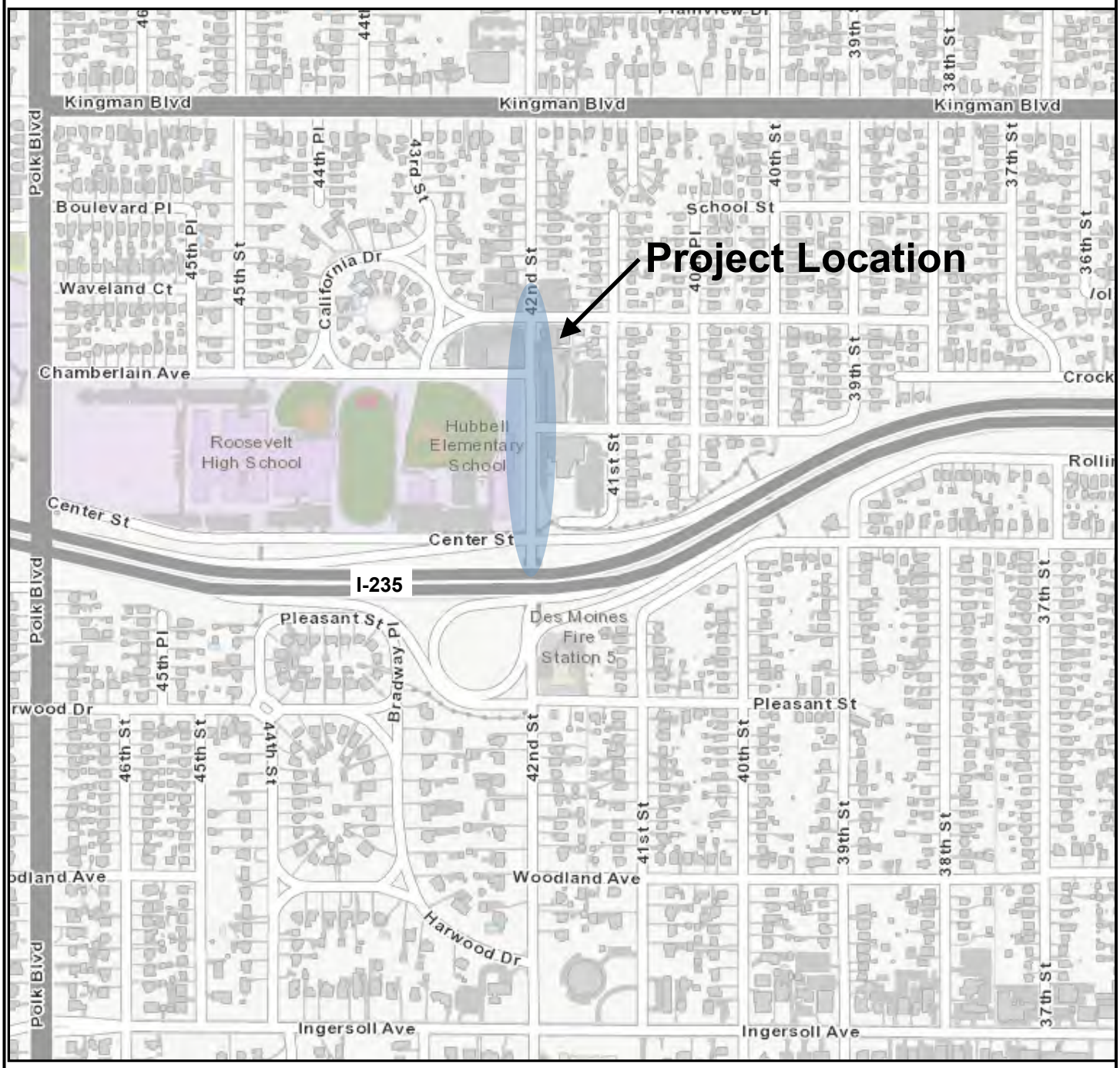
Exhibit D

TIME SCHEDULE

42nd Street Streetscape Corridor Improvements

Project Approval:	**December, 2015**
Agreement Signed:	**April, 2016**
Project bid:	**Fall, 2016**
Construction completed:	**October, 2017**
Project Closeout:	**June, 2018**

Exhibit E



42nd Street Streetscape
Corridor Improvements
Location Map

CITY OF DES MOINES
ENGINEERING DEPARTMENT

Exhibit F

CORRIDOR PHOTOGRAPHS

Looking North from Center Street

Looking North from Rollins Avenue

Exhibit F

Looking West down Chamberlain Avenue

Looking South from Crocker Street

Looking West down Crocker Street

Looking East down Crocker Street

Exhibit G

EXISTING AND PROPOSED CONDITIONS

Existing Conditions

Proposed Plan

Exhibit H

AERIAL PHOTOGRAPH

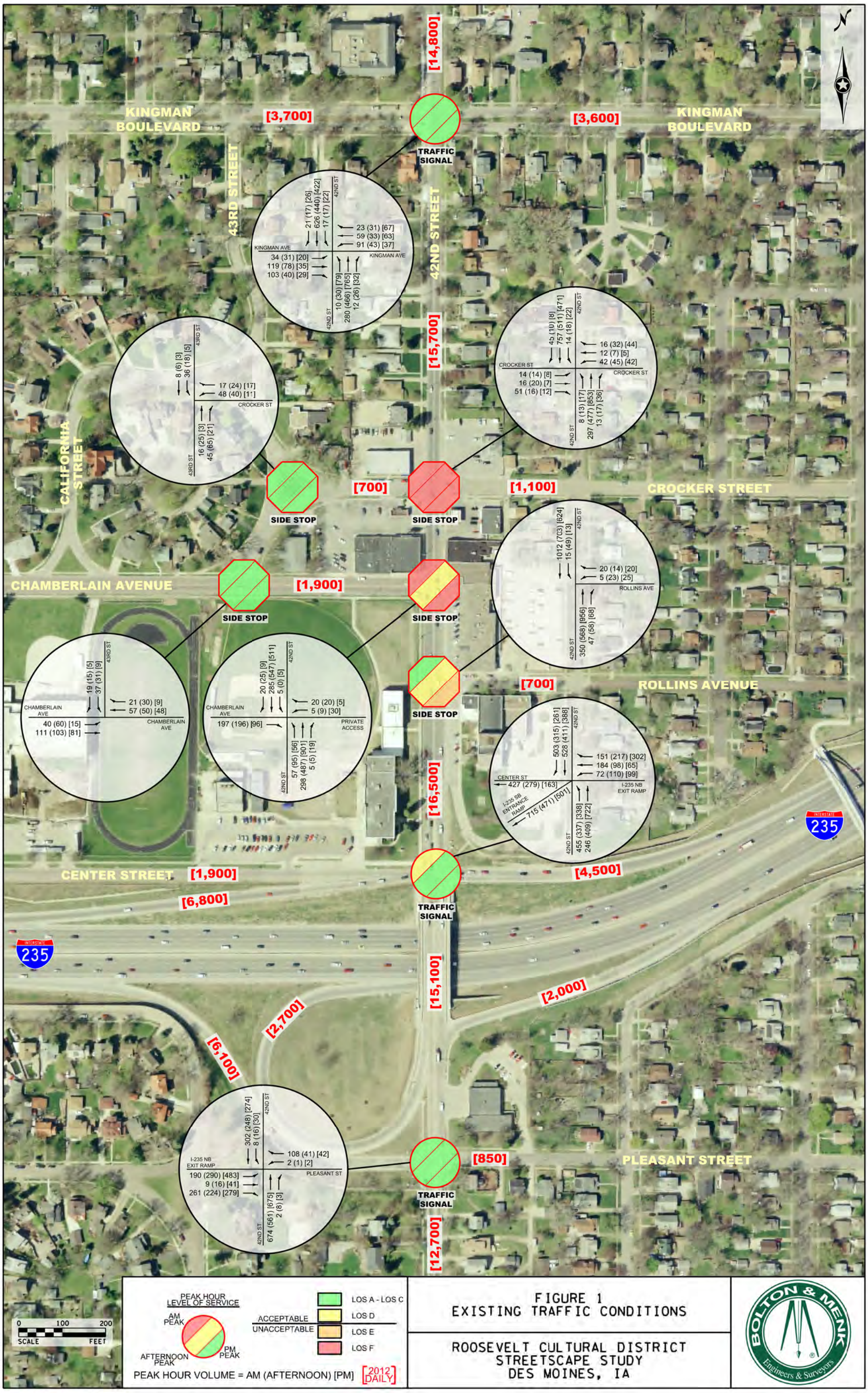
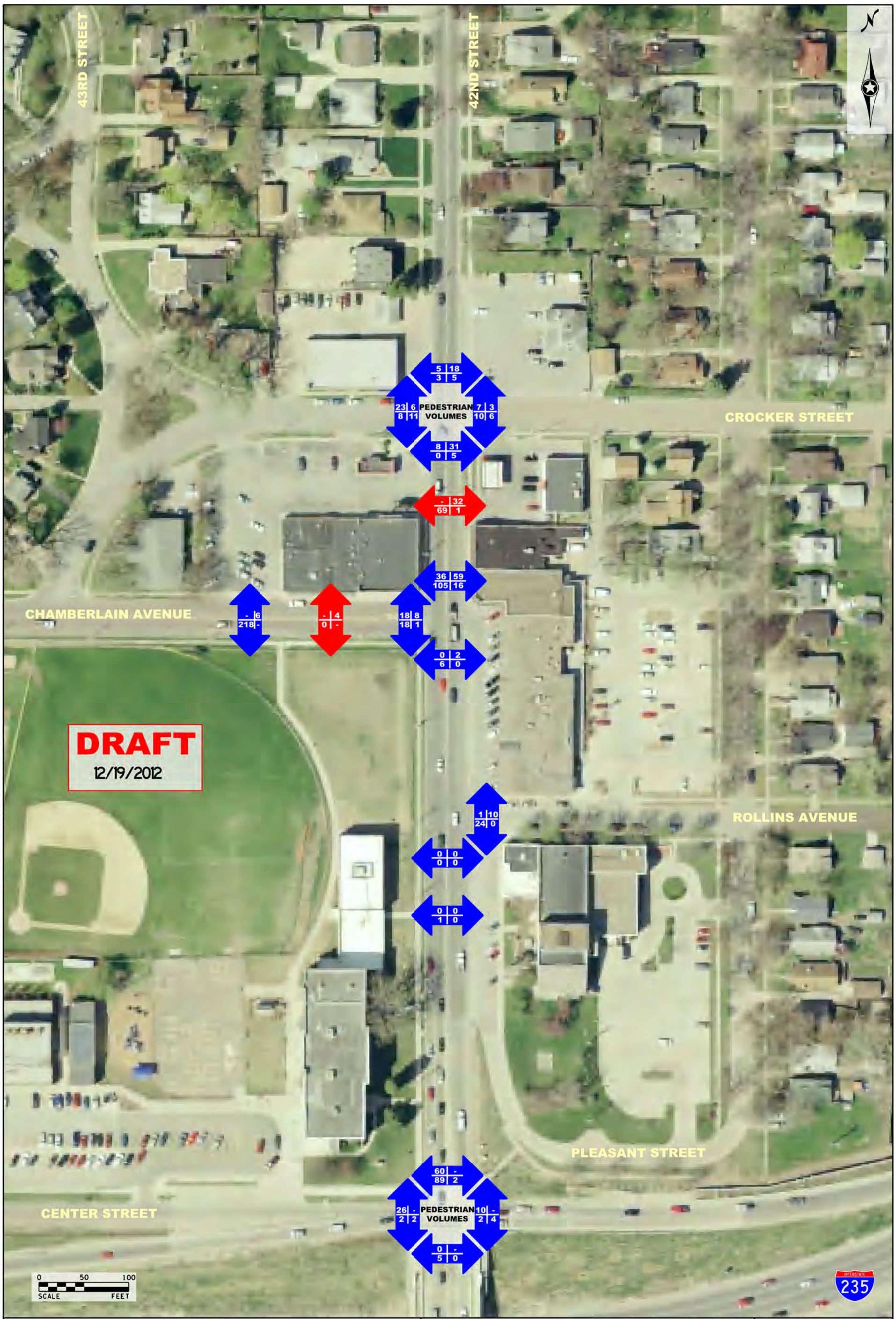


FIGURE 1
EXISTING TRAFFIC CONDITIONS

ROOSEVELT CULTURAL DISTRICT
STREETSCAPE STUDY
DES MOINES, IA



LEGEND

AM PEAK	NOON PEAK
AFTERNOON PEAK	PM PEAK

INTERSECTION/ DESIGNATED CROSSING LOCATON

MID-BLOCK CROSSING LOCATON

FIGURE 4
PEDESTRAIN VOLUMES AND CROSSING LOCATIONS

ROOSEVELT CULTURAL DISTRICT STREETSCAPE STUDY
DES MOINES, IA

BOLTON & MENK
Engineers & Surveyors

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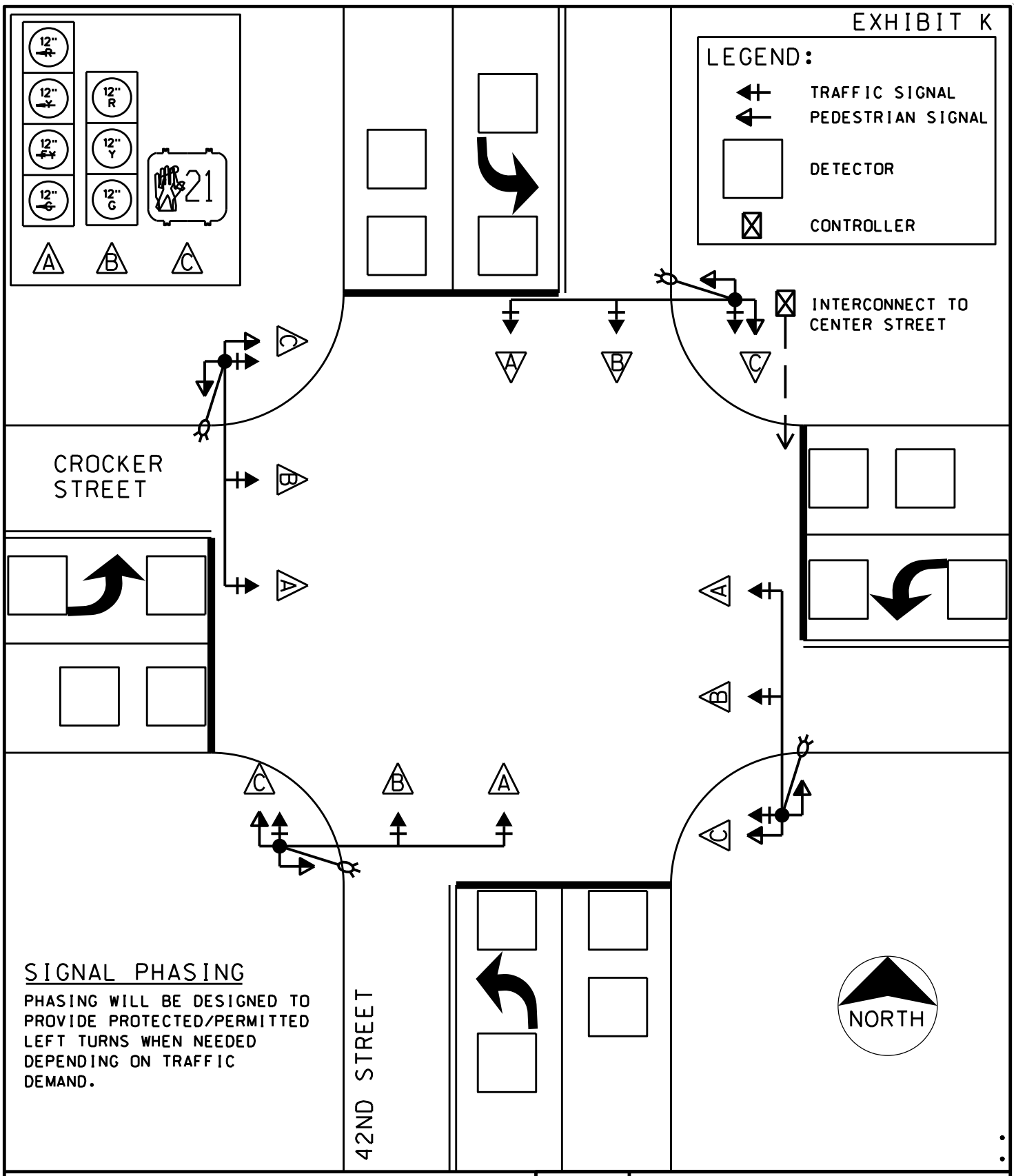
EXHIBIT K



SIGNAL PHASING

PHASING WILL BE DESIGNED TO PROVIDE PROTECTED/PERMITTED LEFT TURNS WHEN NEEDED DEPENDING ON TRAFFIC DEMAND.

$file-date$

Rev/By	DEPARTMENT OF ENGINEERING CITY OF DES MOINES, IOWA (515) 283-4931
	EXHIBIT K
	SHEET 1 OF 1

Exhibit L

Rev. 5/14

Road Segment Benefit / Cost Safety Analysis

Iowa DOT Office of Traffic & Safety

County: Polk | Prepared by: BJW | Date Prepared: Aug 10, 2015

Location: 42nd Street between Center Street and Crocker Street

Improvement

Proposed Improvement(s): Corridor Improvements as Identified on attached Improvements Plan

$ 500,000	Estimated Improvement Cost, **EC**	15	Est. Improvement Life, years, **Y**
$ -	Other Annual Cost (after initial year), **AC**	61	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: Traffic Impact Study (attached) | 2012 Date of traffic count

Length (mi.)	Two-way veh/day	Description
0.20	16,500	Center to Crocker
0.20	miles total	

3,300	Current Vehicle Miles / Day, **VM**
3,831	End of Life Veh. Miles / Day
1,204,500	Current Veh. Miles / Year, **AM**
19,388,711	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

2010 First full year --> 2014 Last full year | 5.0 years, Time Period, **T**

Additional months | values as of May 2014

0	Fatal Crashes →	0	Fatalities @	$4,500,000	$ -
		0	Major Injuries @	$325,000	$ -
11	Injury Crashes →	1	Minor Injuries @	$65,000	$ 65,000
		10	Possible Injuries @	$35,000	$ 350,000
23	Property Damage Only		(assumed cost per crash)	$7,400	$ 251,600
			-OR- enter all Property Costs of all crashes:		
34	Total Crashes, **TA**			Total $ Loss, **LOSS**	$ 666,600

6.80	Current Crashes / Year, **AA** = TA / T	**564.5**	Crashes / HMVM, Crash Rate, **CR** CR = TA x 10^8 / (AM x T)
$ 19,606	Cost per Crash, **AVCR** = LOSS / TA		
109.5	Total Expected Crashes, **TCR** = CR x TVMT/10^8	**$ 963,311**	Present Value of Avoided Crashes, **BENEFIT**
4.15	Crashes Avoided First Year **AAR** = AA x CRF / 100		
$ 81,325	Crash Costs Avoided in First Year, AAR x AVCR		
66.8	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 = $963,311 : $500,000 = **1.93** : 1

BOLTON & MENK, INC.
Consulting Engineers & Surveyors
P.O. Box 668 • 2730 Ford Street • Ames, IA 50010-0668
Phone (515) 233-6100 • Fax (515) 233-4430
www.bolton-menk.com

M E M O R A N D U M

Date: **December 18, 2012**

To: **City of Des Moines, IA**

From: **Bryan Nemeth, PE, PTOE**

Jacob Bongard, EIT

Subject: Traffic Analysis and Recommendations
Roosevelt Cultural District Streetscape Study
City of Des Moines, Iowa
BMI Project No.: A11.105669

I. Introduction

The objective of this technical memorandum is to document and summarize the traffic operations for the Roosevelt Cultural District Streetscape Study area located in Des Moines, IA. This technical memorandum studies the impact of trip redistribution from possible access changes and roadway/traffic control improvements on the traffic operations of key study area intersections. This information will be used to identify problems and needs within the study area and develop recommendations on traffic control options and needs associated with roadway network alternatives.

II. Existing Conditions

Data Collection

In order to determine how traffic is currently operating in the study area, a traffic operations analysis was completed for existing conditions at eight key intersections within the study area. Turning movement volumes, Annual Daily Traffic volumes (ADT), and Annual Average Daily Traffic volumes (AADT) were collected from field studies and information from the Iowa Department of Transportation (IADOT) for these key intersections/segments.

Traffic data collection efforts were performed November 12 – 14, 2012 for AM (6:30- 8:30 a.m.), Afternoon (2:30 – 3:30 p.m.), and PM (4:45 – 5:45 p.m.) peak periods. Peak hour traffic volumes were collected at the following intersections:

1. 42nd Street at Kingman Boulevard
2. 42nd Street at Crocker Street
3. 42nd Street at Chamberlain Avenue/ Private Access
4. 42nd Street at Rollins Avenue
5. 42nd Street at I-235 Entrance/Exit Ramp / Center Street

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6. 42nd Street at I-235 NB Exit Ramp / Pleasant Street
7. 43rd Street at Crocker Street

Additional daily volume counts were collected the roadway segments listed below:

1. I-235 Northbound Entrance Ramp (From Northbound 42nd Street)
2. I-235 Northbound Entrance Ramp (From Southbound 42nd Street)
3. I-235 Southbound Entrance Ramp
4. Center Street (West of I-235 Southbound Entrance Ramp)
5. Rollins Avenue (East of 42nd Street)
6. Chamberlain Avenue (West of 42nd Street)
7. 41st Street (Between Rollins Avenue and I-235 Southbound Ramp)
8. 42nd Street (Between Rollins Avenue and 41st Street)
9. 42nd Street (North of Crocker Street)

Figure 1 illustrates the peak hour traffic and ADT volumes of these key intersections and segments.

Traffic Operation Analysis

Operations analysis of the AM and PM peak hours was conducted at the above listed key intersections to determine how traffic currently operates throughout the study area. A level of service (LOS) analysis was completed for key intersections to determine how well these intersections operate with study area traffic volumes. The LOS results are based on average delay per vehicle as calculated by the 2010 Highway Capacity Manual (HCM). Control delay is the delay experienced by vehicles slowing down as they are approaching the intersection, the wait time at the intersection, and the time for the vehicle to speed up through the intersection and enter into the traffic stream. The average intersection control delay is a volume weighted average of delay experienced by all motorists entering the intersection on all intersection approaches. Intersections and each intersection approach are given a ranking from LOS A through LOS F. LOS A indicates the best traffic operation, with vehicles experiencing minimal delays. LOS A through D is generally perceived to be acceptable to drivers. LOS E indicates that an intersection is operating at, or very near, its capacity and that drivers experience considerable delays. LOS F indicates an intersection where demand exceeds capacity and drivers experience substantial delays.

The LOS and its associated intersection delay for signalized and unsignalized intersections are presented in Table 1. The delay threshold for unsignalized intersections is lower for each LOS compared to signalized intersections, which accounts for the fact that people expect a higher level of service when at a stop-controlled intersection. A higher LOS (i.e. LOS D, E, and F) is indicative of elevated delay times compared to lower levels of service (i.e. LOS A, B, and C).

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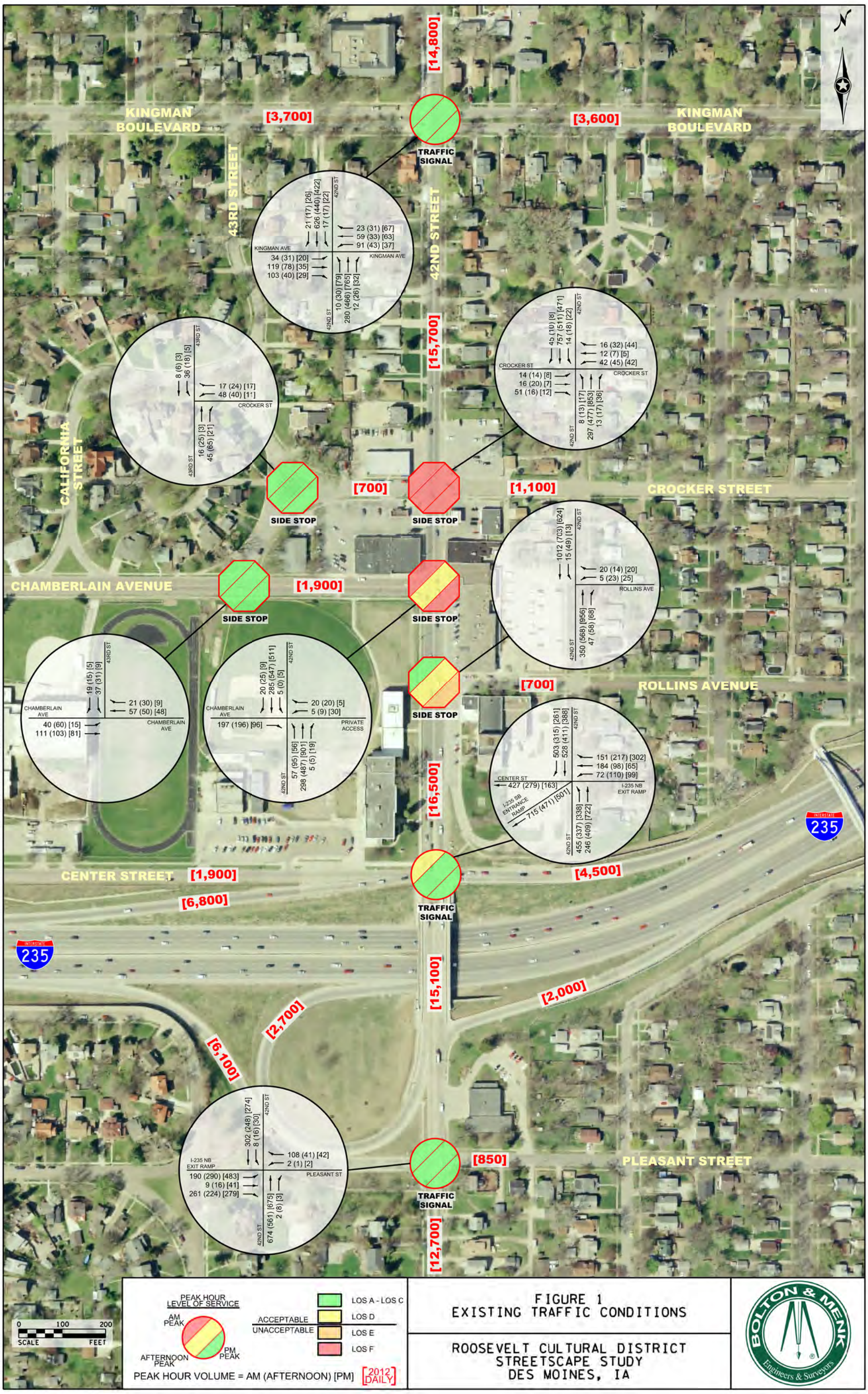

FIGURE 1
EXISTING TRAFFIC CONDITIONS

ROOSEVELT CULTURAL DISTRICT
STREETSCAPE STUDY
DES MOINES, IA

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Table 1: Level of Service Criteria

	Signalized Intersection	Unsignalized Intersection
LOS	**Control Delay per Vehicle (sec.)**	**Control Delay per Vehicle (sec.)**
A	≤ 10	≤ 10
B	>10 and ≤ 20	>10 and ≤ 15
C	>20 and ≤ 35	>15 and ≤ 25
D	>35 and ≤ 55	>25 and ≤ 35
E	>55 and ≤ 80	>35 and ≤ 50
F	>80	>50

Figure 1 illustrates LOS for signalized and side street stop controlled movements during AM, Afternoon, and PM peak hours. Currently, the only movements displaying unacceptable levels of service are the westbound left-turn movements at Rollins Avenue, the Shops at Roosevelt, and Crocker Street. This is primarily due to the limited gaps available to motorists attempting to enter onto 42nd Street against unopposed northbound and southbound thru traffic. It should be noted that Rollins Avenue is actually a one-way street eastbound away from 42nd Street. Vehicles are illegally going westbound to access 42nd Street. The results are shown in Table 2, below.

Table 2: Existing Traffic Operations

Intersection	Intersection Control	Peak Hour	Intersection LOS	Side Street LOS	Unacceptable Movements
42nd Street at Kingman Boulevard	Traffic Signal	AM	14 - B	-	
		AFTERNOON	11 - A	-	
		PM	10 - B	-	
42nd Street at Crocker Street	Side Street Stop Signs	AM	-	324 - F	EB , WB
		AFTERNOON	-	108 - F	EB, WB
		PM	-	233 - F	EB, WB
42nd Street at Chamberlain Avenue	Side Street Stop Signs	AM	-	50 - F	EB, WB
		AFTERNOON	-	32 - D	
		PM	-	277 -F	WB
42nd Street at Rollins Avenue	Side Street Stop Signs	AM	-	18 - C	
		AFTERNOON	-	26 - D	
		PM	-	42 - E	WB
42nd Street at I-235 Ramps/Center Street	Traffic Signal	AM	37 - D	-	WBT
		AFTERNOON	13 - B	-	
		PM	12 - B	-	
42nd Street at I-235 Ramp/Pleasant Street	Traffic Signal	AM	10 - A	-	
		AFTERNOON	15 - B	-	
		PM	24 - C	-	
43rd Street at Crocker Street	Side Street Stop Signs	AM	-	8 - A	
		AFTERNOON	-	8 - A	
		PM	-	7 - A	
43rd Street at Chamberlain Avenue	Side Street Stop Signs	AM	-	10 - B	
		AFTERNOON	-	10 - B	
		PM	-	10 - A	

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While all intersections operate at an acceptable level, numerous side street stop controlled movements experience unacceptable delay during the existing AM, Afternoon, and PM peak hours. An unacceptable movement is classified as any that displays a LOS E or F. Intersection failure analysis is typically based upon the overall operations of an intersection as a whole, but in analyzing the individual movements, excessive delay for vehicles attempting to enter a high volume roadway are noted and accounted for. An unacceptable LOS for a side-street movement at an unsignalized intersection is considered to be unacceptable whereas a minor movement with unacceptable LOS at a signal or all-way stop may be considered acceptable.

The majority of failure occurring on individual movements can be attributed to the amount of delay experienced by the traffic on the minor approach attempting to complete a movement against the major street movements. As an example, the delay experienced for the eastbound and westbound movements at Crocker Street and Chamberlain Avenue under existing conditions exceed acceptable levels due to the large number of thru movements on 42nd Street during the AM and PM peak hours. The elevated traffic volumes on 42nd Street reduce the number of available gaps between vehicles on the mainline roadway, causing difficulties for side street traffic to enter into the flow of traffic.

III. Build Conditions

Traffic Forecasts

Concepts are proposed to better utilize the existing roadway footprint currently accommodating study area traffic. The goal is to not only better manage vehicular traffic, but to also better accommodate high pedestrian volumes. This becomes increasingly crucial due to the number of school-age pedestrians traveling to and from Hubbell Elementary School and Roosevelt High School that are required to cross 42nd Street and other study area roadways on a daily basis. Existing measures have been taken to aid in the performance of these movements (i.e. pedestrian signal and a raised crosswalk with bump-outs) but further improvements can be made. Two primary concepts were developed to better manage traffic throughout the study corridor. The individual attributes of each concept are as follows:

<u>Design Concept 1 (Figure 2)</u>

- The westbound approach from I-235 westbound widened to three lanes of approach from the existing two lanes.
- 42nd Street alignment shifted west to create additional green space and sidewalk near the Shops At Roosevelt.
- Chamberlain Avenue becomes one-way eastbound, east of the private parking lot.
- Two-Way-Left-Turn Lane (TWLTL) on 42nd Street from Rollins Avenue to Crocker Street.
- Southbound, eastbound, and westbound Left-Turn Lanes provided at Crocker/42nd.
- Traffic Signal at the intersection of 42nd Street at Crocker Street.

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FIGURE 2
PRELIMINARY DESIGN CONCEPT 1

ROOSEVELT CULTURAL DISTRICT
STREETSCAPE STUDY
DES MOINES, IA

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Design Concept 2 (Figure 3)

- The westbound approach from I-235 westbound widened to three lanes of approach from the existing two lanes.
- 42nd Street alignment shifted west to create additional green space and sidewalk near the Shops At Roosevelt.
- Additional right of way required west of 42nd Street to accommodate full length right turn lane extending to Chamberlain Avenue with additional thru lane added at southbound 42nd Street at Center Street/ I-235 SB Entrance Ramp.
- Chamberlain Avenue becomes one-way eastbound roadway, east of private parking lot.
- Two-Way-Left-Turn Lane (TWLTL) on 42nd Street from Rollins Avenue to Crocker Street.
- Southbound, eastbound, and westbound Left-Turn Lanes at Crocker/42nd.
- Traffic Signal at the intersection of 42nd Street at Crocker Street.

Table 3, below, provides an overview of the operation of signalized and side street stop controlled movements during the AM and PM peak hours. AM and PM Peak hours were determined to be the controlling peak periods and were therefore the only peaks analyzed going forward from the existing conditions. A more detailed analysis of the proposed design concepts can be found in appendix A of this document. The analysis performed indicates that little to no intersection failures are anticipated for study area intersections following the implementation of the proposed improvements, and actually show improvements at multiple intersections. Figures 2 and 3 show the preliminary roadway design concepts for which the traffic forecasts were developed.

Table 3: Concept Traffic Operations

#	Intersection	Level of Service		
		2012 Existing	2012 Concept 1	2012 Concept 2
1	42nd Street at Kingman Boulevard	B / B	B / B	B / B
2	42nd Street at Crocker Street	F / F	B / B	B / B
3	42nd Street at Chamberlain Avenue	F / F	D / B	D / B
4	42nd Street at Rollins Avenue	C / E	A / A	A / A
5	42nd Street at I-235 Ramps/Center Street	D / B	C / B	C / B
6	42nd Street at I-235 Ramp/Pleasant Street	A / C	B / C	B / C
7	43rd Street at Crocker Street	A / A	A / A	A / A
8	43rd Street at Chamberlain Avenue	B / A	A / A	A / A

*AM/PM Peak Hour Intersection Level of Service

The significant improvements observed at many of the study area intersection can be attributed to the mitigation in traffic control at the intersection of 42nd Street at Crocker Street as well as the limitations placed on existing 42nd Street accesses. The most difficult movements to complete in

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FIGURE 3
PRELIMINARY DESIGN CONCEPT 2

ROOSEVELT CULTURAL DISTRICT
STREETSCAPE STUDY
DES MOINES, IA

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the existing roadway network are the left turns onto 42nd Street from the side street movements. This issue was aided by reversing the direction of traffic in the Shops at Roosevelt parking lot and better channelizing the motorists to enter back onto 42nd Street via the proposed traffic signal at Crocker Street. The proposed signal at Crocker Street also provides a dedicated movement to vehicles entering onto 42nd Street from either side of 42nd Street, which is not available on the existing roadway network.

The variations between Concept 1 and Concept 2 can be seen in the additional capacity available at the intersection of 42nd Street at Center Street/ I-235 Southbound Ramp. The dedicated southbound right turn lane paired with the two thru-lanes in Concept 2 allows for additional vehicles to pass through the intersection with identical phase lengths compared to the design in Concept 1. The queuing associated with the thru movements during the AM peak hour from Concept 1 to Concept 2 is anticipated to experience a reduction in average queue length from approximately 375' to 100' and a reduction in the maximum queue length from 540' to 150'. The average left turn queue length is projected to decrease from 280' to 160' and the maximum queue from 430' to 340' from Concept 1 to Concept 2. With intersection spacing of approximately 425' to Rollins Avenue, a safer environment could be created by eliminating the backed up vehicles from the Rollins Avenue intersection when maximum queues are present.

A traffic signal warrant analysis was also performed for the intersection of 42nd Street at Crocker Street under existing conditions and with traffic redistributed based upon the redistribution of the Shops at Roosevelt exiting traffic. The results of this analysis can be seen in Appendix B of this document. The analysis shows that a traffic signal is warranted when vehicles are redistributed to Crocker Street from the Shops at Roosevelt.

IV. Pedestrian Analysis

Pedestrian counts were performed at select study intersections and mid-block crossing locations on December 7, 2012. Additional counts performed at study intersections were completed to ensure accuracy of previous pedestrian counts and to collect data at mid-block pedestrian crossing locations. It was determined that the majority of pedestrians are crossing study area roadways at intersections and designated locations. It is apparent that the corridor has taken measures to promote pedestrian safety within the corridor and the lack of any pedestrian crashes in the past three years fortifies this concept. Figure 4 illustrates the peak pedestrian volumes at both designated and mid-block crossing locations.

The design concepts also incorporate two design features that will allow the corridor to continue to efficiently accommodate pedestrians and improve safety. The expansion of green space and sidewalk on the east side of the roadway creates a safer and better established link between the traffic signal at Center Street and Chamberlain Avenue. It will also be necessary to ensure that the existing pedestrian signal and proposed signal at Crocker Street are coordinated to efficiently accommodate both motorists and pedestrians. Coordination between the signals would promote fluid northbound and southbound vehicle movements and ensure high compliance rates by ensuring that the signal at Crocker Street is at a stop condition when the pedestrian flasher is activated.

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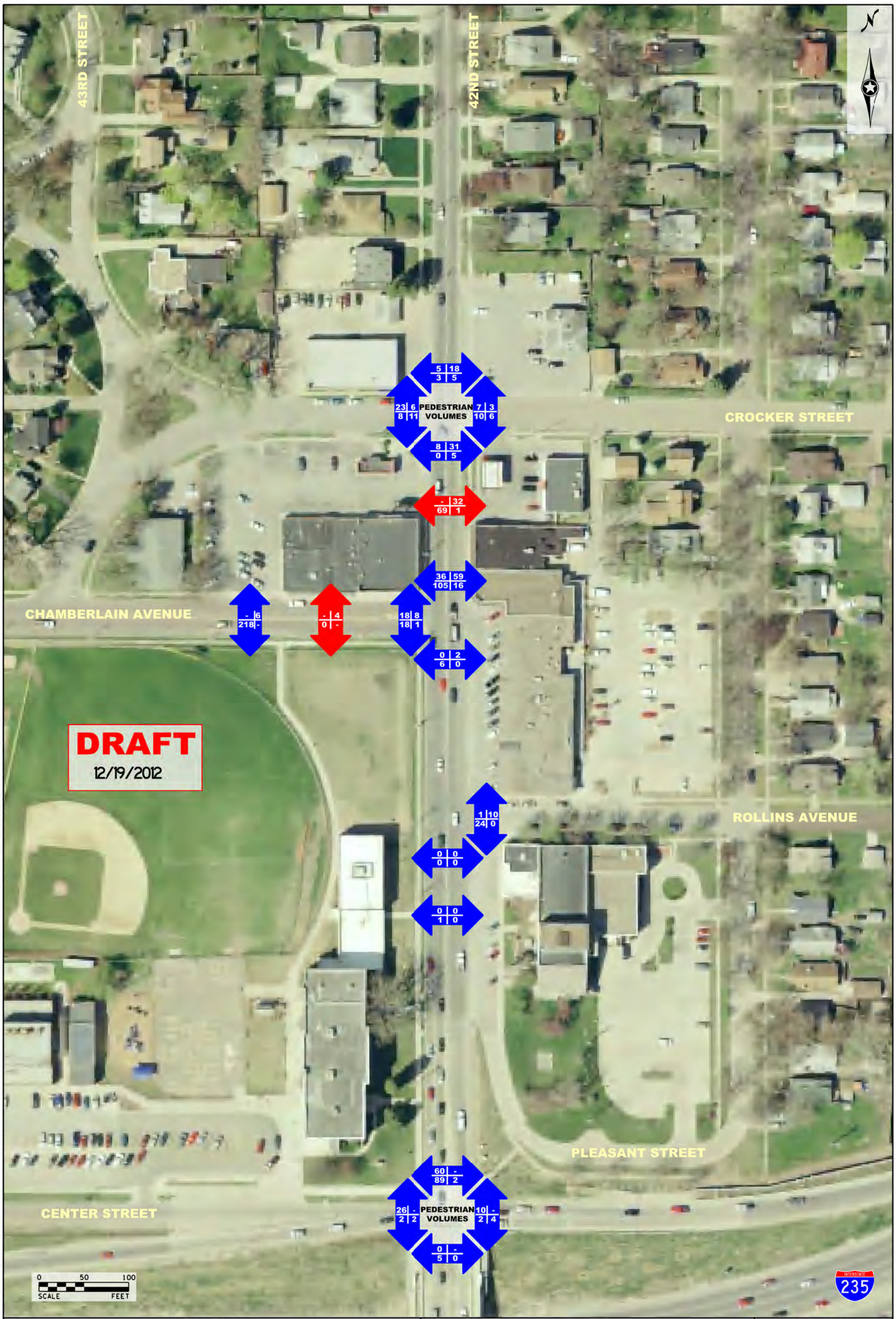

LEGEND

AM PEAK	NOON PEAK
AFTERNOON PEAK	PM PEAK

INTERSECTION/ DESIGNATED CROSSING LOCATON

MID-BLOCK CROSSING LOCATON

FIGURE 4
PEDESTRAIN VOLUMES AND CROSSING LOCATIONS

ROOSEVELT CULTURAL DISTRICT STREETSCAPE STUDY
DES MOINES, IA

BOLTON & MENK
Engineers & Surveyors

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V. Safety Analysis

As an accompaniment to the traffic analysis, a safety analysis was performed for the study area. Six intersections were evaluated to determine whether the reported crash events from 2009 – 2011 reported as above the statewide average for a comparable intersection. Intersection crash rates are evaluated based upon the number of crashes occurring at an intersection as a function of daily traffic volumes and study period.

Crash data was attained using a program available through the Iowa Department of Transportation (IADOT) known as the Crash Mapping Analysis Tool (CMAT). This program provides an interactive format that allows users to isolate and identify intersection and segment crashes on all documented roadways throughout the state. Relevant data was attained through this program and analyzed for the years of 2009-2011. Intersection crash rates were then compared against averages attained from the 2007-2009 MnDOT average crash rates because current intersections crash rates could not be attained through IADOT. Table 4, below, provides a summary of the crashes recorded.

Table 4: Existing Crash Analysis (2009-2011)

Intersection	Total Crashes	Crash Rate	MnDOT Average
42nd Street at Pleasant Street	8	0.36	0.7
42nd Street at Center Street	22	**0.99**	0.7
42nd Street at Rollins Avenue	7	**0.39**	0.2
42nd Street at Chamberlain Drive	10	**0.52**	0.2
42nd Street at Crocker Street	8	**0.43**	0.2
42nd Street between Crocker & Kingman	3	-	-
42nd Street at Kingman Avenue	13	0.63	0.7

*Crash rates based upon number of crashes per million entering vehicles (MEV)

The intersections in Table 3 displaying above average crash rates are further analyzed to determine the mitigation required to improve the overall operation and safety throughout the study area:

<u>42nd Street at Center Street</u>

The crashes documented at the intersection of 42nd Street at Center Street are a factor of the high volumes of traffic utilizing the intersection as well as the irregularity of the existing intersection geometry. The most prevalent crash type occurring at the intersection over the study period is rear end crashes. This is common to nearly all signalized intersections due to varying traffic control messages paired with differing driver aggressiveness/behavior. Right angle crashes are the second most prevalent, which is irregular due to the ability of a signalized intersection to separate conflicting movements with different phases. These crashes appear to occur due to drivers intentionally running the red light and hitting a vehicle completing a legal movement.

<u>42nd Street at Rollins Avenue</u>

Proposed improvements could better safety by reassigning vehicles entering the Shops At Roosevelt to the Chamberlain Avenue intersection and vehicles exiting the Shops At Roosevelt to the proposed Crocker Street traffic signal via eastbound Rollins Avenue and northbound 41st

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Street. The redesign of Shops At Roosevelt parking lot will reverse parking and the flow of traffic making the entrance at Chamberlain Avenue and the exit onto Rollins Avenue. The reconfiguration should reduce the number of vehicles attempting to enter 42nd Street by way of the eastbound one-way roadway of Rollins Avenue. The signal at 42nd Street at Crocker Street would also provide vehicles with a dedicated movement onto 42nd Street, creating a much safer environment then attempting to enter from the side street stop control at Rollins Avenue.

42nd Street at Chamberlain Drive

The intersection of 42nd Street at Chamberlain Drive currently operates as a near full access intersection. The improvements proposed in Concept 1 and Concept 2 limit the west leg of the intersection to one-way eastbound-right traffic. The mitigation reduces the overall access points at the existing intersection by seven and therefore could potentially have a positive impact on the overall safety of the intersection. With the removal of exiting westbound traffic on the west leg of the intersection, a combination of crossing, turning, and merging conflict points are eliminated.

42nd Street at Crocker Street

The proposed left-turn lanes remove vehicles from the through movement and could potentially reduce the number of rear end crashes occurring at the intersection. The proposed signal at 42nd Street at Crocker Street would also provide vehicles with a dedicated movement onto 42nd Street, creating a much safer environment then attempting to enter from the side street stop control from the minor approaches.

A comprehensive table of crashes occurring at study area intersection can be found in appendix C of this document.

VI. Conclusions and Recommendations

Based on the analysis, the following conclusions and recommendations have been developed for your consideration.

- The proposed improvements provide a positive impact to the overall study area traffic operations due to improved access management and the proposed traffic signal at the intersection of 42nd Street at Crocker Street. The traffic signal provides a dedicated movement to local traffic that currently have difficulties entering onto 42nd Street due to the constant stream of traffic during peak hours.
- The parking lot for the Shops At Roosevelt will no longer be able to accommodate northbound delivery vehicles due to reconfiguration, but will still be able to handle 30' single unit trucks in the southbound direction. Delivery trucks will then be expected to drop off items at the parking lot behind the Shops or a possible dedicated parking stall could be considered on Rollins Avenue to ensure a convenient drop off area is available.
- A traffic signal is justified at the intersection of 42nd Street at Crocker Street due to the changes proposed at Chamberlain Avenue and reconfiguration of the Shops At Roosevelt parking lot. These improvements along with increased signage and enforcement are anticipated to better route traffic from the parking lot to eastbound Rollins Avenue and north to the Crocker Street signal.

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- The proposed design concepts are anticipated to better accommodate pedestrian movements by coordinating the proposed Crocker Street traffic signal with the pedestrian signal and adding a sidewalk link from Center Street to Chamberlain Avenue east of 42nd Street.
- The addition of an independent left-turn lane to the east leg improves the overall operations at 42nd Street at I-235 SB Ramp/Center Street because less time is required to clear the westbound queue and a larger portion of the cycle length can be allocated to the primary northbound and southbound movements. The improvements on the southbound approach under Concept 2 are also projected to reduce vehicle queuing experienced by motorists and improve safety at Rollins by keeping stopped vehicles from backing up into the intersection.
- A reduction in study area crashes is anticipated with the proposed improvements due to:
    - Improved traffic operation stemming from more defined travel paths on 42nd Street traffic due to more defined lane designations.
    - Additional turn lanes to remove slowing traffic from mainline 42nd Street
    - A dedicated movement available to eastbound and westbound traffic at the intersection of 42nd Street at Crocker Street that provides the minor approaches with a dedicated movement to enter into the mainline flow of traffic.
    - A reduction in conflict points at the intersection of 42nd Street at Chamberlain Drive stemming from the elimination of westbound traffic onto the west leg of the intersection.

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Appendix A

Level of Service Tables

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Intersection Dealy and Level of Service
2012 Build Conditions

Table 5: Preliminary Design Concept 1 Build					
Intersection	**Intersection Control**	**Peak Hour**	**Intersection LOS**	**Side Street LOS**	**Unacceptable Movements**
42nd Street at Kingman Boulevard	Traffic Signal	AM	16 - B	-	
		PM	11 - B	-	
42nd Street at Crocker Street	Traffic Signal	AM	11 - B	-	
		PM	13 - B	-	
42nd Street at Chamberlain Avenue	Side Street Stop Signs	AM	-	35 - D	
		PM	-	15 - B	
42nd Street at Rollins Avenue	Side Street Stop Signs	AM	-	1 - A	
		PM	-	1 - A	
42nd Street at I-235 Ramps/Center Street	Traffic Signal	AM	32 - C	-	
		PM	14 - B	-	
42nd Street at I-235 Ramp/Pleasant Street	Traffic Signal	AM	11 - B	-	
		PM	26 - C	-	
43rd Street at Crocker Street	Side Street Stop Signs	AM	-	9 - A	
		PM	-	8 - A	
43rd Street at Chamberlain Avenue	Side Street Stop Signs	AM	-	9 - A	
		PM	-	9 - A	

Table 6: Preliminary Design Concept 2 Build					
Intersection	**Intersection**	**Peak Hour**	**Intersection**	**Side Street**	**Unacceptable**
42nd Street at Kingman Boulevard	Traffic Signal	AM	16 - B	-	
		PM	11 - B	-	
42nd Street at Crocker Street	Traffic Signal	AM	11 - B	-	
		PM	11 - B	-	
42nd Street at Chamberlain Avenue	Side Street Stop Signs	AM	-	35 - D	
		PM	-	15 - B	
42nd Street at Rollins Avenue	Side Street Stop Signs	AM	-	1 - A	
		PM	-	1 - A	
42nd Street at I-235 Ramps/Center Street	Traffic Signal	AM	23 - C	-	
		PM	13 - B	-	
42nd Street at I-235 Ramp/Pleasant Street	Traffic Signal	AM	11 - B	-	
		PM	26 - C	-	
43rd Street at Crocker Street	Side Street Stop Signs	AM	-	9 - A	
		PM	-	9 - A	
43rd Street at Chamberlain Avenue	Side Street Stop Signs	AM	-	9 - A	
		PM	-	9 - A	

Appendix B

Traffic Signal Warrants

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SIGNAL WARRANTS ANALYSIS

2012 Existing Conditions

LOCATION: Des Moines
COUNTY: Polk
REF. POINT:
DATE: 12/8/2012

OPERATOR: JJB

Speed	Approach Description		Lanes
30	Major App1:	42nd Street Northbound	1
30	Major App3:	42nd Street Southbound	1
30	Minor App2:	Crocker Street Eastbound	1
30	Minor App4:	Crocker Street Westbound	1

0.70 FACTOR USED? No
POPULATION < 10,000? No
EXISTING SIGNAL ? No

HOUR	MAJOR APP. 1	MAJOR APP. 3	TOTAL 1+3	MAJOR 1A/1B	MINOR APP. 2	MINOR 2 1A/1B	MINOR APP. 4	MINOR 4 1A/1B	**MET SAME 1A/1B**
THRESHOLDS 1A/1B:				500/750			150/75	150/75	
0:00 - 1:00	68	30	98	/	5	/	5	/	/
1:00 - 2:00	46	12	58	/	5	/	5	/	/
2:00 - 3:00	26	7	33	/	5	/	5	/	/
3:00 - 4:00	27	12	40	/	9	/	9	/	/
4:00 - 5:00	22	47	69	/	18	/	18	/	/
5:00 - 6:00	88	106	194	/	32	/	32	/	/
6:00 - 7:00	161	427	588	X/	41	/	41	/	/
7:00 - 8:00	223	755	978	X/X	18	/	46	/	/
8:00 - 9:00	454	608	1061	X/X	14	/	37	/	/
9:00 - 10:00	395	369	765	X/X	12	/	30	/	/
10:00 - 11:00	523	371	894	X/X	11	/	28	/	/
11:00 - 12:00	558	389	947	X/X	16	/	62	/	/
12:00 - 13:00	441	397	838	X/X	20	/	78	/X	/**X**
13:00 - 14:00	483	424	907	X/X	26	/	70	/	/
14:00 - 15:00	525	450	975	X/X	33	/	62	/	/
15:00 - 16:00	567	477	1044	X/X	39	/	54	/	/
16:00 - 17:00	647	437	1085	X/X	16	/	49	/	/
17:00 - 18:00	884	453	1337	X/X	20	/	57	/	/
18:00 - 19:00	649	484	1132	X/X	16	/	46	/	/
19:00 - 20:00	423	406	829	X/X	12	/	34	/	/
20:00 - 21:00	376	334	710	X/	6	/	17	/	/
21:00 - 22:00	323	244	567	X/	4	/	11	/	/
22:00 - 23:00	204	147	351	/	4	/	11	/	/
23:00 - 24:00	116	83	199	/	4	/	6	/	/

	Met (Hr)	Required (Hr)	
Warrant 1A	0	8	Not satisfied
Warrant 1B	1	8	Not satisfied
Warrant 2	0	4	Not satisfied
Warrant 3	0	1	Not satisfied
Warrant 7	4	8	Not satisfied

LOCATION: Des Moines
COUNTY: Polk
REF. POINT:
DATE: 12/8/2012

OPERATOR: JJB

Speed	Approach Description		Lanes
30	Major App1:	42nd Street Northbound	1
30	Major App3:	42nd Street Southbound	1
30	Minor App2:	Crocker Street Eastbound	1
30	Minor App4:	Crocker Street Westbound	1

0.70 FACTOR USED? No
POPULATION < 10,000? No
EXISTING SIGNAL ? No

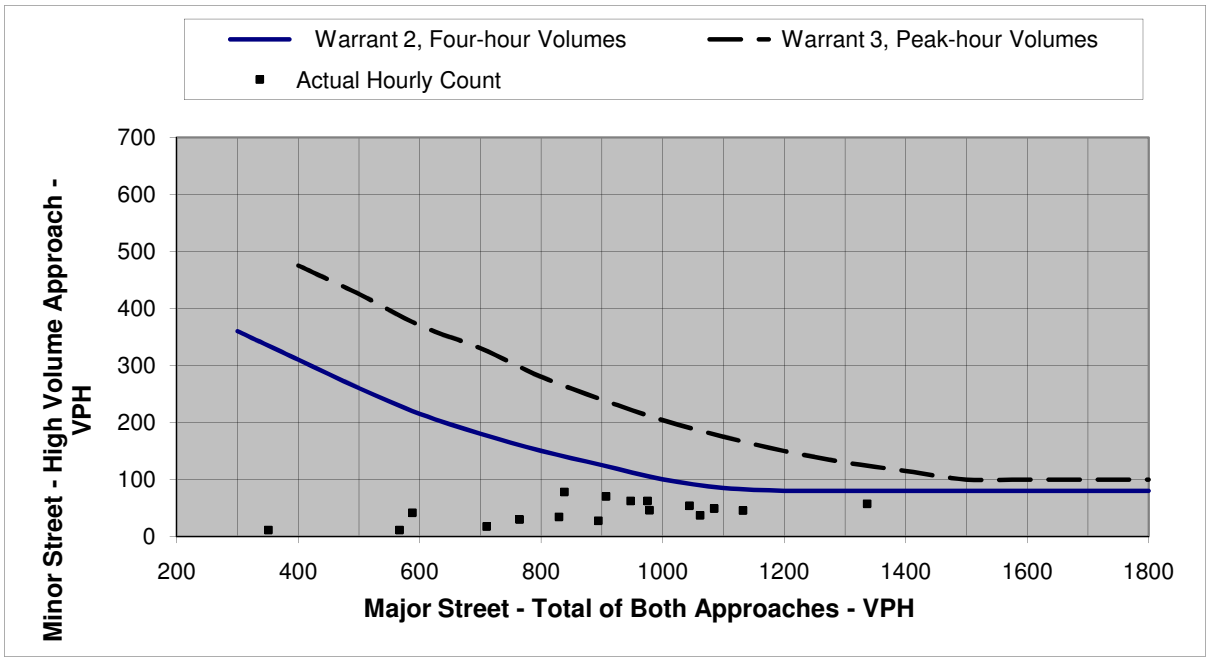

Figure 1. Four Hour and Peak Hour Warrant Analysis

Note: For data points outside the graph range, check the minor street volume against the lower thresholds

Warrant Criteria			Actual Hourly Count	
Major	Warrant 2, F	Warrant 3, Peal	Major	Actual Hourly Count
200			98	5
300	360		58	5
400	310	475	33	5
500	260	425	40	9
600	215	370	69	18
700	180	330	194	32
800	150	280	588	41
900	125	240	978	46
1000	100	204	1061	37
1100	85	175	765	30
1200	80	150	894	28
1300	80	130	947	62
1400	80	115	838	78
1500	80	100	907	70
1600	80	100	975	62
1700	80	100	1044	54
1800	80	100	1085	49
			1337	57
			1132	46
			829	34
			710	17
			567	11
			351	11
			199	6

SIGNAL WARRANTS ANALYSIS

2012 Build Conditions

LOCATION: Des Moines
COUNTY: Polk
REF. POINT:
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Speed	Approach Description		Lanes
30	Major App1:	42nd Street Northbound	1
30	Major App3:	42nd Street Southbound	1
30	Minor App2:	Crocker Street Eastbound	1
30	Minor App4:	Crocker Street Westbound	1

0.70 FACTOR USED? No
POPULATION < 10,000? No
EXISTING SIGNAL ? No

THRESHOLDS 1A/1B:				500/750			150/75	150/75	
HOUR	MAJOR APP. 1	MAJOR APP. 3	TOTAL 1+3	MAJOR 1A/1B	MINOR APP. 2	MINOR 2 1A/1B	MINOR APP. 4	MINOR 4 1A/1B	**MET SAME 1A/1B**
0:00 - 1:00	68	30	98	/	5	/	5	/	/
1:00 - 2:00	46	12	58	/	5	/	5	/	/
2:00 - 3:00	26	7	33	/	5	/	5	/	/
3:00 - 4:00	27	12	40	/	9	/	9	/	/
4:00 - 5:00	22	47	69	/	18	/	18	/	/
5:00 - 6:00	88	106	194	/	32	/	42	/	/
6:00 - 7:00	161	427	588	X/	41	/	66	/	/
7:00 - 8:00	223	755	978	X/X	18	/	67	/	/
8:00 - 9:00	454	608	1061	X/X	14	/	52	/	/
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10:00 - 11:00	523	371	894	X/X	11	/	62	/	/
11:00 - 12:00	558	389	947	X/X	16	/	102	/X	/**X**
12:00 - 13:00	441	397	838	X/X	20	/	112	/X	/**X**
13:00 - 14:00	483	424	907	X/X	26	/	98	/X	/**X**
14:00 - 15:00	525	450	975	X/X	33	/	101	/X	/**X**
15:00 - 16:00	567	477	1044	X/X	39	/	101	/X	/**X**
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20:00 - 21:00	376	334	710	X/	6	/	28	/	/
21:00 - 22:00	323	244	567	X/	4	/	11	/	/
22:00 - 23:00	204	147	351	/	4	/	11	/	/
23:00 - 24:00	116	83	199	/	4	/	6	/	/

	Met (Hr)	Required (Hr)	
Warrant 1A	0	8	Not satisfied
Warrant 1B	**8**	8	**Satisfied**
Warrant 2	3	4	Not satisfied
Warrant 3	0	1	Not satisfied
Warrant 7	**11**	8	**Satisfied, check accident record**

LOCATION: Des Moines
COUNTY: Polk
REF. POINT:
DATE: 12/8/2012

OPERATOR: JJB

Speed	Approach Description		Lanes
30	Major App1:	42nd Street Northbound	1
30	Major App3:	42nd Street Southbound	1
30	Minor App2:	Crocker Street Eastbound	1
30	Minor App4:	Crocker Street Westbound	1

0.70 FACTOR USED? No
POPULATION < 10,000? No
EXISTING SIGNAL ? No

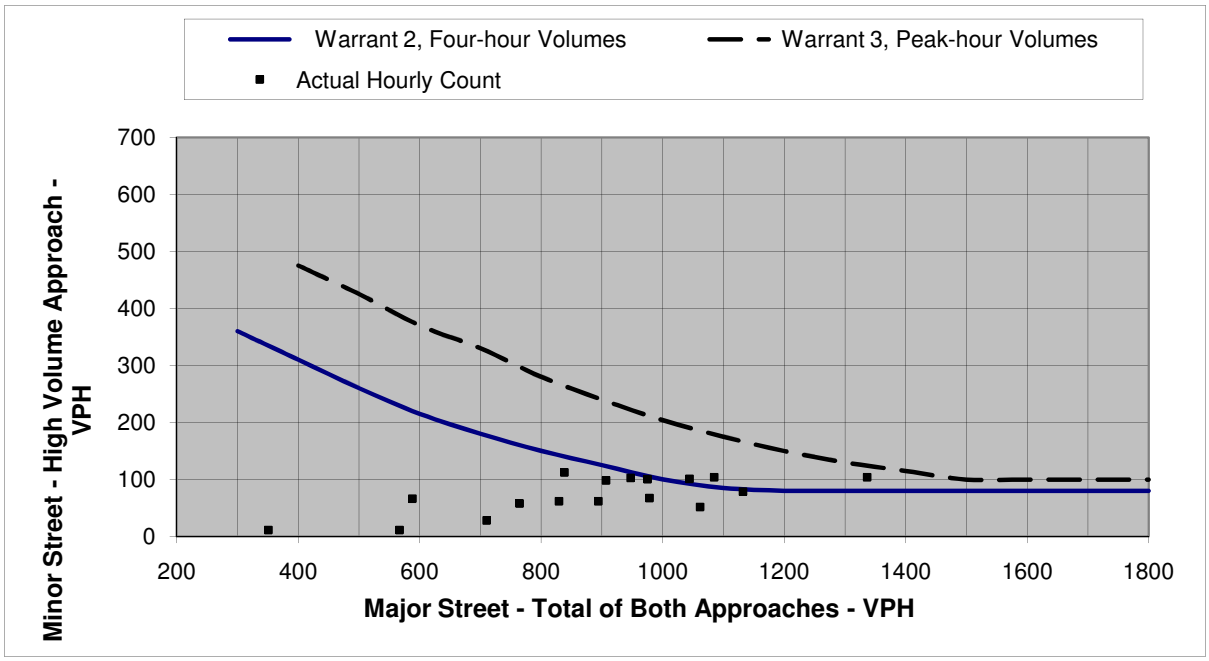

Figure 1. Four Hour and Peak Hour Warrant Analysis

Note: For data points outside the graph range, check the minor street volume against the lower thresholds

Warrant Criteria			Actual Hourly Count	
Major	Warrant 2, F	Warrant 3, Peal	Major	Actual Hourly Count
200			98	5
300	360		58	5
400	310	475	33	5
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600	215	370	69	18
700	180	330	194	42
800	150	280	588	66
900	125	240	978	67
1000	100	204	1061	52
1100	85	175	765	58
1200	80	150	894	62
1300	80	130	947	102
1400	80	115	838	112
1500	80	100	907	98
1600	80	100	975	101
1700	80	100	1044	101
1800	80	100	1085	104
			1337	104
			1132	79
			829	62
			710	28
			567	11
			351	11
			199	6

Appendix C

Crash Analysis

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Intersection Crash Analysis (2009 - 2011)

Crash Summary

Intersection	Total Crashes	Year			Severity				
		2009	2010	2011	PDO	C	B	A	Fatal
42nd Street at Pleasant Street	8	3	1	4	5	3			
42nd Street at Center Street	22	9	6	7	19	3			
42nd Street at Rollins Avenue	7	3	0	4	5	2			
42nd Street at Chamberlain Drive	10	4	5	1	5	4	1		
42nd Street at Crocker Street	8	4	2	2	2	6	1		
42nd Street between Crocker & Kingman	3	1	2	0	3				
42nd Street at Kingman Avenue	13	5	6	2	9	2	2		

Intersection	Crash Type						
	Rear End	Right Angle	Left-Turn	Sideswipe (Same)	Sideswipe (Passing)	Ran Off Road	Head On
42nd Street at Pleasant Street	6					2	
42nd Street at Center Street	8	6	2	1	1	4	
42nd Street at Rollins Avenue	6						1
42nd Street at Chamberlain Drive	4	2		2		2	
42nd Street at Crocker Street	3	3				1	2
42nd Street between Crocker & Kingman	3						
42nd Street at Kingman Avenue	8	3				2	

Application for FY2017 Traffic Safety Funds
Iowa Department of Transportation

(Site Specific)

Martin Luther King Jr. Pkwy and Prospect Rd

Traffic Signal Installation

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

August, 2015

Rev. 5/15

Application for TRAFFIC SAFETY FUNDS

GENERAL INFORMATION **DATE:** August 7, 2015

Location / Title of Project: Martin Luther King Jr Parkway & Prospect Road Signal

Applicant: City of Des Moines

Contact Person: Calvin Miller Title: Civil Engineer 1

Complete Mailing Address: 400 Robert D Ray Drive
Des Moines, Iowa 50309

Phone: 515-283-4748 (Area Code) E-Mail: cbmiller@dmgov.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): N/A

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 $ 290,000

Safety Funds Requested $ 120,000

Rev. 5/15

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 — AUG 10 2015

Signature — Date Signed

T. M. Franklin Cownie

Typed Name

Attest: Diane Rauh — AUG 10 2015

Signature — Date Signed

Diane Rauh

Typed Name

★ Roll Call Number
15-1230

Agenda Item Number
7

Date July 27, 2015

APPROVING FISCAL YEAR 2017 TRAFFIC SAFETY FUND APPLICATIONS 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 applications to the Iowa Department of Transportation for Traffic Safety Funds to cover a portion of the construction costs for the following projects:

1. 42nd Street Streetscape
2. Martin Luther King Jr. Parkway and Prospect Road Traffic Signal Installation
3. Citywide Fixed-Time Signal Upgrade Project – Phase 2

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

(Council Communication Number 15-428 Attached)

Moved by Gatto to adopt.

APPROVED AS TO FORM:

Kathleen Vanderpool
Kathleen Vanderpool
Deputy City Attorney

COUNCIL ACTION	YEAS	NAYS	PASS	ABSENT
COWNIE	✓			
COLEMAN	✓			
GATTO	✓			
GRAY	✓			
HENSLEY	✓			
MAHAFFEY	✓			
MOORE	✓			
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

Exhibit B

PROJECT DESCRIPTION

Martin Luther King Jr. Parkway and Prospect Road Intersection Signalization

Project Description:

The proposed improvement includes the installation of a traffic signal at the intersection of Martin Luther King Jr. Parkway (MLK Parkway) and Prospect Road. Pedestrian crossings would be provided at the intersection. A 10' clear zone will be established within the limits of the project.

New traffic signals with backplates and detection for fully-actuated operation would be installed. This signal will include pedestrian countdown heads and phasing, along with left turn phasing on MLK Parkway. The signals would be interconnected to the existing traffic signals along Martin Luther King Jr Parkway.

The total project cost is estimated to be $290,000. A total of $120,000 is being requested from State Traffic Safety Improvement Program funds.

Existing Conditions:

MLK Parkway is classified as a Principal Arterial Roadway. In this area it has a four lane cross-section with two-through lanes in each direction. Designated left-turn lanes are provided northbound and southbound at Prospect Road. The posted speed limit on this section of MLK Parkway is 35-MPH. Travel speeds show the 85th percentile speed on MLK Parkway as 38 MPH with a 10-mph pace speed of 32-41 MPH.

Prospect Road is a two-lane neighborhood street providing access to the Prospect Park Neighborhood. Prospect Road provides a direct connection from Hickman Road to MLK Parkway with access through Prospect Park which provides boating, playground, picnicking, and other amenities. The speed limit on this section of Prospect Road is 25 MPH.

The Des Moines Area Regional Transit (DART) has bus service along this section of MLK Parkway. There is a DART stop at this intersection creating pedestrian crossing traffic at this intersection.

A 48 hour weekday traffic count was collected by the City of Des Moines in May 2014 at this intersection. The approach traffic volume recorded on MLK Parkway was 21,890 vehicles per day in the area by Prospect Road. The approach traffic volume recorded on Prospect Road at MLK Parkway was 1,450 vehicles per day.

Project Justification:

A traffic study dated July 12, 2014, prepared by the City of Des Moines, is included in the application.

Traffic signals are warranted at this location based on Warrant No. 3B (Peak Hour Volume) and No. 6 (Coordinated Signal System).

Traffic signal warrants have been added in Exhibit J.

Of the nine reported crashes, there were four personal injury crashes. The majority of the crashes were right angle, left turn, and rear-end. Left-turning and right angle types would generally be considered correctible by the improvements planned as part of this project.

Based on current IDOT value factors, the total estimated loss from crashes during the described six-year period is $531,600 (See Exhibit “L”). Assuming an overall crash reduction factor of 20 percent and an estimated project life of 15 years, the request for $120,000 of Traffic Safety relates to a benefit-cost factor of **1.87:1.**

TRAFFIC AND TRANSPORTATION DIVISION MEMORANDUM

DATE: July 9, 2014

FROM: Jennifer McCoy, City Traffic Engineer

SUBJECT: Signal Warrant Study – Prospect Rd and Martin Luther King Parkway

RECOMMENDATION:
The installation of a traffic signal at the intersection of Martin Luther King Parkway and Prospect Road is recommended.

STUDY:

Introduction
Traffic signals are valuable devices for the control of vehicle and pedestrian traffic. After extensive study and analysis, the Federal Highway Administration developed the eight traffic signal warrants contained within the MUTCD that define the minimum conditions under which the installation of a traffic control signal might be justified. The MUTCD states that traffic signals should not be installed unless one or more of the signal warrants are satisfied

Purpose
A petition was submitted by the residents in the Prospect Park Neighborhood Association on the west side of Martin Luther King Parkway (MLK Parkway) and Prospect Road intersection along with staff from the Des Moines Public Schools Bus Garage located to the east of the intersection stating that they wish to have this location examined for the installation of a signal. Letters of support for this signal and for the city to conduct a study were received from Des Moines Public Schools, Prospect Park Neighborhood Association, Chautauqua Park Neighborhood Association, former Des Moines Mayor Preston Daniels, and current Councilman Bill Gray.

Roadway Elements
Martin Luther King Parkway (MLK Parkway) is a Principal Arterial Roadway. In this area it has a four lane cross-section with two-through lanes in each direction. Designated left-turn lanes are provided northbound and southbound at Prospect Road. The posted speed limit on this section of MLK Parkway is 35-MPH. Travel speeds show an 85th percentile speed on MLK Parkway as 38 MPH with a 10-mph pace speed of 32-41 MPH.

Prospect Road is a two-lane neighborhood street providing access to the Prospect Park Neighborhood. Figure 1 shows the current intersection layout and surrounding land uses. Prospect Road provides a direct connection from Hickman Road to MLK Parkway with access through Prospect Park which includes boating, playground, picnicking, and other amenities. The posted speed limit on this section of Prospect Road by MLK Parkway is 25 MPH.

The nearest adjacent traffic signals are approximately 1/3 mile to the south at Hickman Road and 1/3 mile to the north at Urbandale Avenue.

Traffic Counts
A 48 hour weekday traffic count collected in May 2014 at this intersection was used for this study. The approach traffic volume measured on MLK Parkway was 21,890 vehicles per day in the area by Prospect Road. The approach traffic volume measured on Prospect Road at MLK Parkway was 1,450 vehicles per day.

The existing peak hour volumes for the MLK and Prospect intersection are shown below in **table 1**:

Table 1 –Existing Peak Hour Approach Volumes

Roadway	Movement	A.M. Peak Hour (vph)	P.M. Peak Hour (vph)
MLK	NB	513	1009
	SB	1211	931
Prospect	EB	21	18
	WB	104	155

Bus Routing

The Des Moines Public School Bus Transportation Facility is located in the northeast quadrant of this intersection, with access drives onto both MLK Parkway and Prospect Road. Currently, their bus drivers are not allowed to make a westbound left turn from Prospect Road onto MLK Parkway. Those drivers wishing to go south or west from the facility must make a right hand turn at the intersection of MLK and Prospect or travel south east on Prospect to Hickman Road and make a right turn. The alternative route detours were provided by drivers of the district's buses. These three different detours require that buses travel up to 16 blocks out of their way through a park or through a narrow residential street, Payne Road. Figures 2-4 show the location of these current detours. The school district has approximately 104 buses daily that leave the bus garage. If a signal were installed at MLK and Prospect Road, it could be assumed that at least 40 buses per day would turn left at the new

signal instead of using the detour routes they are currently taking. The school district estimates that these detours cost them approximately $10,000 per year in extra fuel costs.

FIGURE 2 – Detour 1

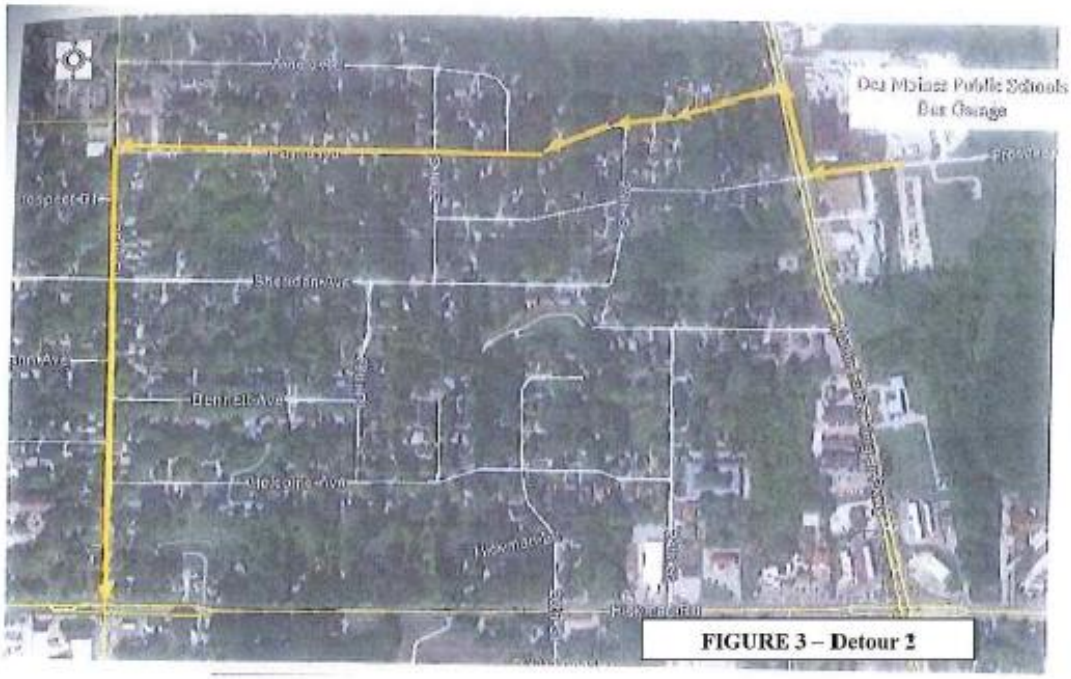


FIGURE 3 – Detour 2

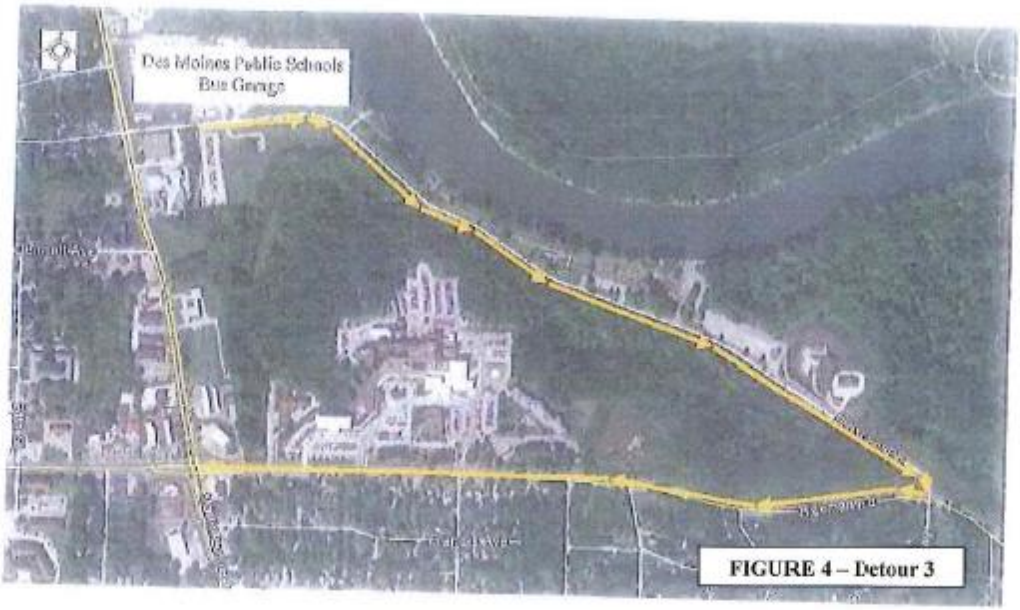


FIGURE 4 – Detour 3

Warrant Analysis

The warrant study analysis was based on the signal warrants given in the 2009 *Manual on Uniform Traffic Control Devices* (MUTCD). Typically, a percentage of the vehicles turning right from the minor street (Prospect Road) are not considered in the signal warrant analysis because these vehicles experience very little delay and marginally benefit from the traffic signal. The analysis of the intersection conditions of MLK & Prospect measured against the signal warrants indicates that the four-hour and peak hour warrant were met with no reduction for right turns.

However, based upon field observations and the understanding that buses now taking a right turn will likely take a left turn if a traffic signal were present, a 40% reduction for right turns was applied. This resulted in this location meeting one warrant, the peak hour warrant, as shown below in **table 2**:

Table 2 – Signal Warrant Analysis Results

Warrant #	Description	Satisfied?
1A	Eight-Hour Vehicular Volume – Condition A	No
1B	Eight-Hour Vehicular Volume – Condition B	No
2	Four-Hour Vehicular Volume	No
3	Peak Hour	Yes
4	Pedestrian Volume	N/A
5	School Crossing	N/A
6	Coordinated Signal System	Yes
7	Crash Experience	No
8	Roadway Network	Not Needed

Note: Warrant Study worksheets are contained in Appendix A.

There are three scenarios for which Warrant 1 could be satisfied: the traffic volumes at the intersection could satisfy the Minimum Vehicular Volume criteria for a minimum of 8 hours – or – the traffic volumes at the intersection could satisfy the Interruption of Continuous Traffic criteria for a minimum of 8 hours – or – the Minimum Vehicular Volume criteria and the Interruption of Continuous Traffic criteria could

be satisfied to 80% of the requirements for a minimum of 8 hours each. In this study, the Minimum Vehicular Volume criterion, Condition A and the Interruption of Continuous Traffic criterion, Condition B, were not satisfied for any hours.

Warrant 2 requires that for a minimum of four hours the plotted points representing the total volume on the major street and the corresponding volume on the higher volume minor street approach fall above the curve specified in Figure 4C-1 in the 2009 MUTCD. In this study, the Four Hour Vehicular Volume Warrant was not satisfied for any hour, therefore not satisfying Warrant 2.

There are two scenarios for satisfying Warrant 3: the measured delay, side street volume, and total intersection volume exceed the values specified in the MUTCD during the peak hour at the intersection – or – for a minimum of one hour the plotted point representing the total volume on the major street and the corresponding volume on the higher volume minor street approach falls above the curve specified in the MUTCD corresponding to the appropriate lane configuration and speed. The actual delay was not measured. Scenario B - the peak hour volume plotted point was met. Therefore, Warrant 3 was satisfied.

Warrant 4, the Pedestrian Volume warrant, was not evaluated at this intersection. There are pedestrian crosswalks at the intersection however observations of the intersection did not identify any significant amount of pedestrian activity. Warrant 5, the School Crossing warrant, was not evaluated at this intersection because this intersection is not a school crossing location. Warrant 6, the Coordinated Signal System warrant, and Warrant 8, the Roadway Network warrant, are not applicable to this intersection because the traffic signal is not needed to provide proper platooning of vehicles.

Warrant 6, Coordinated Signal System, allows for a traffic signal to be installed where the existing traffic control signals do not provide the necessary degree of vehicular platooning, and the proposed signals would provide good traffic signal progression. Because the existing signals are approximately 3,700 feet apart, there is poor platooning of vehicles. New traffic signals at Prospect Road, which is midway between the two existing signals, would allow for good platooning of traffic flow through this corridor.

Warrant 7, the Crash Experience warrant, requires that there have been five collisions of the type potentially preventable by signal installation in a recent 12 month-period at the intersection. Collision reports were reviewed for the intersection for the years 2004 - 2012. During this eight-year time period, there were 19 total collisions at the intersection. These crashes resulted in 21 injuries. There were not five or more crashes in a one-year period that could be prevented by installation of a traffic signal at this location therefore; the Crash Experience warrant is not satisfied.

SUMMARY:
The 2009 Manual on Uniform Traffic Control Devices (MUTCD) outlines eight traffic signal warrants contained within the MUTCD that define the minimum conditions under which the installation of a traffic control signal might be justified.

The installation of the traffic signal at Martin Luther King Parkway and Prospect Road is recommended for the following reasons:

- The Peak Hour warrant and the Coordinated Signal System warrant are met
- Crashes are not excessive, but over half of the crashes that occurred have resulted in major or minor injuries
- A signal at this location would allow for more direct routing of large school buses instead of alternative routing through narrow residential streets and a city park

Exhibit C

Opinion of Probable Cost
MLK Parkway & Prospect Road Traffic Signalization
07/06/15

NO.	ITEM	UNIT	UNIT COST	Quant.	TOTAL
1	TRAFFIC SIGNALIZATION	LS	$175,000.00	1	$175,000.00
2	FIBER OPTIC CABLE - 12 SM	LIN FT	$2.50	2000	$5,000.00
3	HANDHOLE - TYPE III	EACH	$1,250.00	2	$2,500.00
4	FIBER OPTIC CONNECTION (HICKMAN/MLK)	LS	$7,500.00	1	$7,500.00
5	PAINTED PAVEMENT MARKINGS	STA	$150.00	6.5	$975.00
6	CURB RAMP MODIFICATIONS	EACH	$2,500.00	4	$10,000.00
7	POLE/MAST ARM REMOVAL (ADVANCED)	EACH	$1,500.00	2	$3,000.00
8	TRAFFIC CONTROL	LS	$2,500.00	1	$2,500.00
9	MOBILIZATION	LS	$7,500.00	1	$7,500.00
10	CONSTRUCTION SURVEY	LS	$4,500.00	1	$4,500.00

SUBTOTAL	$218,475.00
15% Contingency	$32,772.00
CONSTRUCTION TOTAL	$251,247.00
Design / Bid / CA (15% of Construction Costs)	$37,688.00
TOTAL PROJECT COST	**$288,935**

Project Description
New traffic signalization, fiber optic interconnection to the traffic signals at MLK & Hickman Road, curb ramp improvements to provide E/W crosswalks

Exhibit D

TIME SCHEDULE

MARTIN LUTHER KING JR PKWY AND PROSPECT RD TRAFFIC SIGNAL INSTALLATION

Project Approval:	**December, 2015**
Agreement Signed:	**April, 2016**
Project bid:	**March, 2017**
Construction completed:	**October, 2017**
Project Closeout:	**June, 2018**

Exhibit E

VICINITY MAP

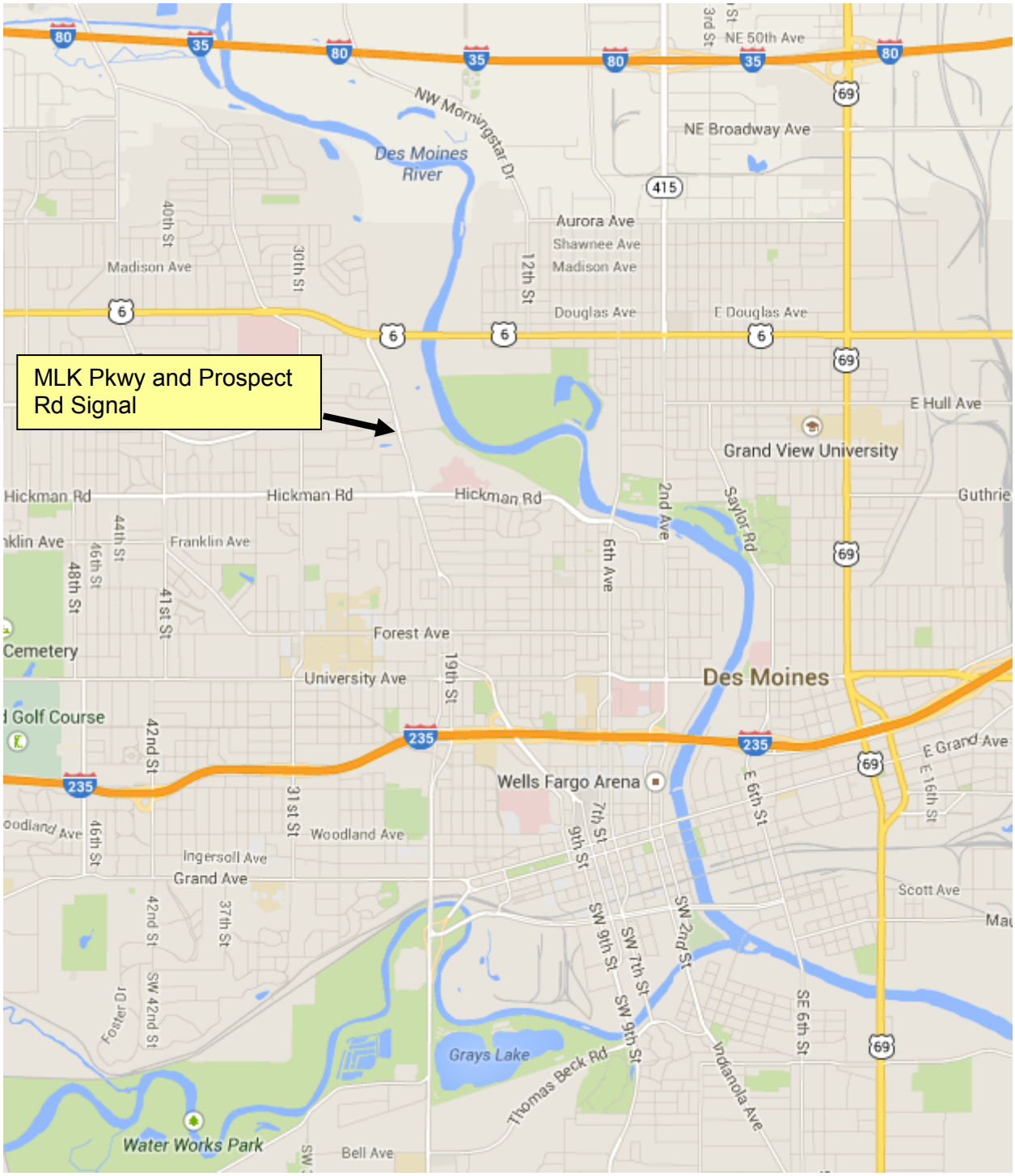


Exhibit F

APPROACH PHOTOGRAPHS

MLK Parkway looking South at Prospect Road

Prospect Rd looking West at MLK Parkway

MLK Parkway looking North at Prospect Road

Prospect Road looking East at MLK Parkway

Exhibit G

EXISTING AND PROPOSED CONDITIONS

Exhibit H

AERIAL PHOTOGRAPH

City Of Des Moines

400 Robert D. Ray Dr.
Des Moines, IA. 50309
(515) 283-4973

Site Code: #23
Station ID:
M.L. King Jr. Pkwy.-North of Prospect Rd
Southbound Traffic
Latitude: 0' 0.0000 Undefined

Start Time	Mon 12-May-14	Tue 13-May-14	Wed 14-May-14	Thu 15-May-14	Fri 16-May-14		Average Day		Sat 17-May-14	Sun 18-May-14		Week Average		
12:00 AM	*	82	98	99	100		95		*	*		95		
01:00	*	67	46	66	64		61		*	*		61		
02:00	*	24	36	36	35		33		*	*		33		
03:00	*	29	39	37	27		33		*	*		33		
04:00	*	90	81	78	94		86		*	*		86		
05:00	*	204	231	229	221		221		*	*		221		
06:00	*	625	683	707	667		670		*	*		670		
07:00	*	**1119**	**1250**	**1211**	**1198**		**1194**		*	*		**1194**		
08:00	*	815	852	882	837		846		*	*		846		
09:00	*	583	558	562	625		582		*	*		582		
10:00	*	583	618	601	*		601		*	*		601		
11:00	*	653	606	634	*		631		*	*		631		
12:00 PM	707	632	645	734	*		680		*	*		680		
01:00	660	640	725	674	*		675		*	*		675		
02:00	714	733	713	762	*		730		*	*		730		
03:00	760	764	730	929	*		796		*	*		796		
04:00	**824**	**821**	**803**	**931**	*		**845**		*	*		**845**		
05:00	648	748	711	825	*		733		*	*		733		
06:00	569	584	664	626	*		611		*	*		611		
07:00	462	473	496	474	*		476		*	*		476		
08:00	351	415	471	507	*		436		*	*		436		
09:00	315	347	346	338	*		336		*	*		336		
10:00	214	234	258	249	*		239		*	*		239		
11:00	100	142	147	168	*		139		*	*		139		
Day Total	6324	11407	11807	12359	3868		11749		0	0		11749		
% Avg. WkDay	53.8%	97.1%	100.5%	105.2%	32.9%									
% Avg. Week	53.8%	97.1%	100.5%	105.2%	32.9%		100.0%		0.0%	0.0%				
AM Peak	-	07:00	07:00	07:00	07:00	-	07:00	-	-	-	-	07:00	-	-
Vol.	-	1119	1250	1211	1198	-	1194	-	-	-	-	1194	-	-
PM Peak	16:00	16:00	16:00	16:00	-	-	16:00	-	-	-	-	16:00	-	-
Vol.	824	821	803	931	-	-	845	-	-	-	-	845	-	-
Grand Total	6324	11407	11807	12359	3868		11749		0	0		11749		

ADT ADT 11,749 AADT 11,749

City Of Des Moines

400 Robert D. Ray Dr.
Des Moines, IA. 50309
(515) 283-4973

Site Code: #22
Station ID:
M.L. King Jr. Pkwy.-South of Prospect Rd
Northbound Traffic
Latitude: 0° 0.0000 Undefined

Start Time	Mon 12-May-14	Tue 13-May-14	Wed 14-May-14	Thu 15-May-14	Fri 16-May-14		Average Day		Sat 17-May-14	Sun 18-May-14		Week Average		
12:00 AM	*	77	75	92	101		86		*	*		86		
01:00	*	47	60	54	59		55		*	*		55		
02:00	*	26	35	28	34		31		*	*		31		
03:00	*	28	25	21	12		22		*	*		22		
04:00	*	60	44	51	54		52		*	*		52		
05:00	*	169	192	193	169		181		*	*		181		
06:00	*	335	345	373	373		356		*	*		356		
07:00	*	503	490	497	496		496		*	*		496		
08:00	*	489	498	513	**559**		515		*	*		515		
09:00	*	448	510	515	532		501		*	*		501		
10:00	*	465	508	533	*		502		*	*		502		
11:00	**584**	**598**	**575**	**578**	*		**584**		*	*		**584**		
12:00 PM	627	593	674	616	*		628		*	*		628		
01:00	576	611	610	616	*		603		*	*		603		
02:00	660	675	686	663	*		671		*	*		671		
03:00	760	804	757	836	*		789		*	*		789		
04:00	**1017**	**1056**	**989**	**1009**	*		**1018**		*	*		**1018**		
05:00	945	971	933	866	*		929		*	*		929		
06:00	553	593	612	576	*		584		*	*		584		
07:00	438	500	510	489	*		484		*	*		484		
08:00	333	430	432	371	*		392		*	*		392		
09:00	286	274	292	357	*		302		*	*		302		
10:00	214	213	221	228	*		219		*	*		219		
11:00	148	140	148	131	*		142		*	*		142		
Day Total	7141	10105	10221	10206	2389		10142		0	0		10142		
% Avg. WkDay	70.4%	99.6%	100.8%	100.6%	23.6%									
% Avg. Week	70.4%	99.6%	100.8%	100.6%	23.6%		100.0%		0.0%	0.0%				
AM Peak	11:00	11:00	11:00	11:00	08:00	-	11:00	-	-	-	-	11:00	-	-
Vol.	584	598	575	578	559	-	584	-	-	-	-	584	-	-
PM Peak	16:00	16:00	16:00	16:00	-	-	16:00	-	-	-	-	16:00	-	-
Vol.	1017	1056	989	1009	-	-	1018	-	-	-	-	1018	-	-
Grand Total	7141	10105	10221	10206	2389		10142		0	0		10142		

ADT ADT 10,141 AADT 10,141

City Of Des Moines

400 Robert D. Ray Dr.
Des Moines, IA. 50309
(515) 283-4973

Site Code: #24
Station ID:
Prospect Rd.-West of M.L. King Jr. Pkwy.

Latitude: 0° 0.0000 Undefined

Start	12-May-14		13-May-14		14-May-14		15-May-14		16-May-14		17-May-14		18-May-14		Week Average	
Time	EB	WB	EB	WB	EB	WB	EB	WB	EB	WB	EB	WB	EB	WB	EB	WB
12:00 AM	*	*	3	2	6	2	4	3	2	2	*	*	*	*	4	2
01:00	*	*	1	0	5	2	1	0	1	0	*	*	*	*	2	0
02:00	*	*	1	1	1	2	2	3	0	0	*	*	*	*	1	2
03:00	*	*	0	1	4	4	2	1	0	3	*	*	*	*	2	2
04:00	*	*	3	4	0	1	1	2	2	0	*	*	*	*	2	2
05:00	*	*	2	6	6	8	4	7	**6**	7	*	*	*	*	4	7
06:00	*	*	4	**23**	3	**21**	4	**19**	5	**22**	*	*	*	*	4	**21**
07:00	*	*	6	22	4	20	3	18	5	14	*	*	*	*	4	18
08:00	*	*	5	12	8	12	8	10	6	10	*	*	*	*	7	11
09:00	*	*	5	7	**9**	10	11	17	3	11	*	*	*	*	7	11
10:00	*	*	7	15	6	13	10	14	*	*	*	*	*	*	8	14
11:00	*	*	**14**	9	9	10	**12**	8	*	*	*	*	*	*	**12**	9
12:00 PM	16	13	12	5	10	17	15	12	*	*	*	*	*	*	13	12
01:00	13	**21**	9	17	8	11	12	17	*	*	*	*	*	*	10	16
02:00	17	**22**	20	**19**	12	15	14	**23**	*	*	*	*	*	*	16	**20**
03:00	13	8	23	16	17	12	10	11	*	*	*	*	*	*	16	12
04:00	17	8	**27**	14	20	**18**	**23**	10	*	*	*	*	*	*	**22**	12
05:00	**24**	9	26	15	13	13	14	10	*	*	*	*	*	*	19	12
06:00	23	11	22	16	**22**	15	13	10	*	*	*	*	*	*	20	13
07:00	11	12	11	15	17	18	13	10	*	*	*	*	*	*	13	14
08:00	10	4	12	4	19	6	16	5	*	*	*	*	*	*	14	5
09:00	8	10	6	13	7	9	13	10	*	*	*	*	*	*	8	10
10:00	11	3	6	2	6	5	9	5	*	*	*	*	*	*	8	4
11:00	6	7	3	3	7	8	5	0	*	*	*	*	*	*	5	4
Total	169	128	228	241	219	252	219	225	30	69	0	0	0	0	221	233
Day	297		469		471		444		99		0		0		454	
AM Peak	-	-	11:00	06:00	09:00	06:00	11:00	06:00	05:00	06:00	-	-	-	-	11:00	06:00
Vol.	-	-	14	23	9	21	12	19	6	22	-	-	-	-	12	21
PM Peak	17:00	14:00	16:00	14:00	18:00	16:00	16:00	14:00	-	-	-	-	-	-	16:00	14:00
Vol.	24	22	27	19	22	18	23	23	-	-	-	-	-	-	22	20

Comb. Total	297	469	471	444	99	0	0	454

ADT ADT 456 AADT 456

Exhibit J

City Of Des Moines

400 Robert D. Ray Dr.
Des Moines, IA. 50309
(515) 283-4973

Site Code: #21
Station ID:
Prospect Rd.-East of M.L. King Jr. Pkwy.

Latitude: 0' 0.0000 Undefined

Start	27-May-14		28-May-14		29-May-14		30-May-14		31-May-14		01-Jun-14		02-Jun-14		Week Average	
Time	EB	WB	EB	WB	EB	WB	EB	WB	EB	WB	EB	WB	EB	WB	EB	WB
12:00 AM	*	*	7	9	4	4	9	5	*	*	*	*	*	*	7	6
01:00	*	*	8	2	8	3	8	4	*	*	*	*	*	*	8	3
02:00	*	*	3	2	4	4	5	7	*	*	*	*	*	*	4	4
03:00	*	*	2	2	3	1	6	4	*	*	*	*	*	*	4	2
04:00	*	*	9	4	13	2	6	1	*	*	*	*	*	*	9	2
05:00	*	*	63	13	58	12	60	13	*	*	*	*	*	*	60	13
06:00	*	*	81	59	88	56	73	56	*	*	*	*	*	*	81	57
07:00	*	*	**133**	36	**114**	47	**121**	54	*	*	*	*	*	*	**123**	46
08:00	*	*	84	55	97	72	77	59	*	*	*	*	*	*	86	62
09:00	*	*	61	86	60	79	75	98	*	*	*	*	*	*	65	88
10:00	*	*	62	**92**	64	88	73	**104**	*	*	*	*	*	*	66	**95**
11:00	*	*	95	82	67	**90**	*	*	*	*	*	*	*	*	81	86
12:00 PM	*	*	**100**	111	86	100	*	*	*	*	*	*	*	*	93	106
01:00	*	*	79	102	**117**	92	*	*	*	*	*	*	*	*	**98**	97
02:00	**87**	110	87	109	78	99	*	*	*	*	*	*	*	*	84	106
03:00	87	125	77	**164**	92	131	*	*	*	*	*	*	*	*	85	140
04:00	85	**151**	93	131	82	**155**	*	*	*	*	*	*	*	*	87	**146**
05:00	86	125	93	111	77	125	*	*	*	*	*	*	*	*	85	120
06:00	69	77	81	91	76	69	*	*	*	*	*	*	*	*	75	79
07:00	57	65	67	71	70	78	*	*	*	*	*	*	*	*	65	71
08:00	46	64	57	67	61	69	*	*	*	*	*	*	*	*	55	67
09:00	42	32	42	37	27	34	*	*	*	*	*	*	*	*	37	34
10:00	13	17	17	21	20	23	*	*	*	*	*	*	*	*	17	20
11:00	10	14	10	14	13	18	*	*	*	*	*	*	*	*	11	15
Total	582	780	1411	1471	1379	1451	513	405	0	0	0	0	0	0	1386	1465
Day	1362		2882		2830		918		0		0		0		2851	
AM Peak	-	-	07:00	10:00	07:00	11:00	07:00	10:00	-	-	-	-	-	-	07:00	10:00
Vol.	-	-	133	92	114	90	121	104	-	-	-	-	-	-	123	95
PM Peak	14:00	16:00	12:00	15:00	13:00	16:00	-	-	-	-	-	-	-	-	13:00	16:00
Vol.	87	151	100	164	117	155	-	-	-	-	-	-	-	-	98	146

Comb. Total	1362	2882	2830	918	0	0	0	2851

ADT ADT 2,850 AADT 2,850

SIGNAL WARRANT STUDY
WARRANT SUMMARY

LOCATION:	N/S STREET	E/W STREET	DATE OF COUNT
	MLK Pkwy	Prospect	5/12/2014

APPROACH	# OF LANES	MAJOR or MINOR?
NB THRU LANES	2	MAJOR
SB THRU LANES	2	MAJOR
EB THRU LANES	1	MINOR
WB THRU LANES	1	MINOR

PEAK HOUR:	16:00
85TH %TILE SPEED:	35
PEDESTRIAN SPEED:	4
DISTANCE TO NEXT SIGNAL:	1760
MEDIAN WIDTH:	0

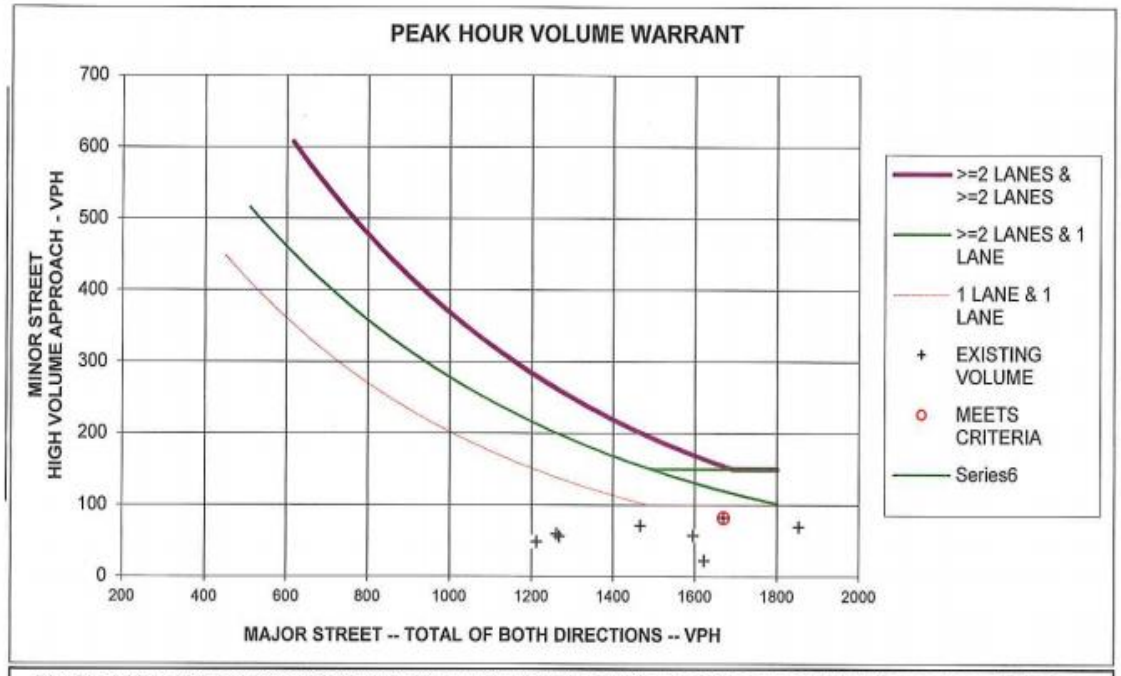
WARRANT	# MET	# REQUIRED	WARRANT MET ?
#1 EIGHT HOUR VEHICULAR VOLUME			**NO**
CONDITION A: MINIMUM VEHICULAR VOLUME			
HOURS	*0*	*8*	*NO*
CONDITION B: INTERRUPTION OF CONTINUOUS TRAFFIC			
HOURS	*1*	*8*	*NO*
CONDITION A + CONDITION B			
CONDITION A HOURS	*0*	*8*	*NO*
CONDITION B HOURS	*3*	*8*	
#2 FOUR HOUR VEHICULAR VOLUME			**NO**
HOURS	1	>4	
#3 PEAK HOUR			**YES**
CONDITION A: DELAY AND VOLUME			*NO*
PART 1. VEHICLE-HOURS DELAY			
VEHICLE-HOURS		*4*	*NO*
PART 2. MINOR STREET VOLUME			
VEHICLES PER HOUR	*89*	*100*	*NO*
PART 3. INTERSECTION VOLUME			
VEHICLES PER HOUR	*1957*	*800*	*YES*
CONDITION B: PLOTTED POINT			
HOURS	*1*	*1*	*YES*
#4 PEDESTRIAN VOLUME			**Not Applicable**
HOURS	0	4 OR 1	
#5 SCHOOL CROSSING			**Not Applicable**
GAPS			
PEDESTRIANS		>10	
#6 COORDINATED SIGNAL SYSTEM			**YES**
#7 CRASH EXPERIENCE			**NO**
CRASHES	1	5	
#8 ROADWAY NETWORK			**NO**

WARRANT #3

Peak Hour Volume: Condition B - Plotted Point

		MLK Pkwy & Prospect	
WARRANT MET?	YES	NUMBER OF HOURS MEETING REQUIRED VOLUMES	1
		REQUIRED NUMBER OF HOURS	1

TIME	MAJOR STREET VOLUME	MINOR APPROACH VOLUME	HIGHER VOLUME MINOR APPROACH	NUMBER OF LANES	TOTAL INTERSECTION VOLUME
10:00	678	11	W	1	689
12:00	812	14	W	1	826
13:00	782	18	W	1	800
16:00	1080	18	W	1	1098
7:00	789	11	W	1	800
14:00	862	16	W	1	878
15:00	1001	13	W	1	1014
16:00	1058	22	W	1	1080



The Peak Hour Volume warrant is intended for application when traffic conditions are such that for one hour of the day minor street traffic suffers undue traffic delay in entering or crossing the major street.

The Peak Hour Volume warrant is satisfied when the plotted point representing the vehicles per hour on the major street (total of both approaches) and the corresponding vehicles per hour of the higher volume minor street approach (one direction only) for one hour (any four consecutive 15-minute periods) of an average day falls above the curve *described in the MUTCD corresponding to the appropriate lane configuration and speed.*

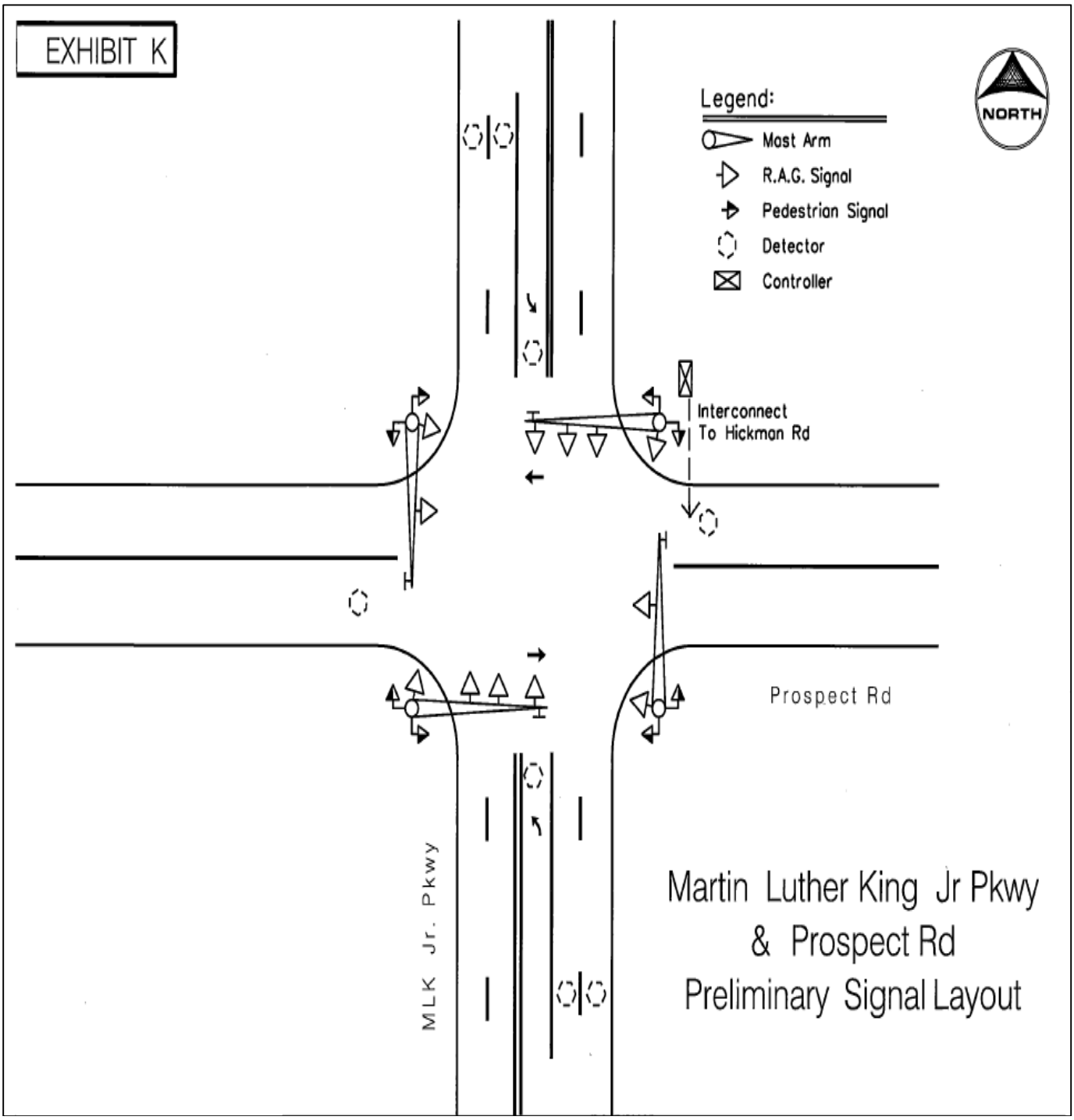


EXHIBIT K
Legend:
Mast Arm
R.A.G. Signal
Pedestrian Signal
Detector
Controller
NORTH
Interconnect
To Hickman Rd
Prospect Rd
MLK Jr. Pkwy
Martin Luther King Jr Pkwy
& Prospect Rd
Preliminary Signal Layout

Exhibit L

Rev. 5/14

Intersection or Spot Benefit / Cost Safety Analysis

Iowa DOT Office of Traffic & Safety

County: Polk | Prepared by: BJW | Date Prepared: Aug 11, 2015

Intersection: ML King Parkway and Prospect Road

Improvement

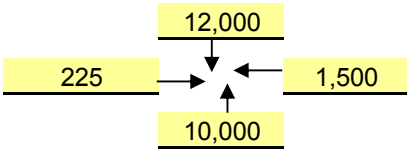
Proposed Improvement(s): Install Traffic Signals

$ 120,000	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**
	$$OC = \frac{AC}{INT}\left(1 - \frac{1}{(1+INT)^Y}\right)$$	$ 120,000	Present Value Cost, **COST** = EC + OC

Traffic Volume Data

Source: City of Des Moines | 2014 Date of traffic count

Daily Entering Vehicles by Approach (or AADT / 2)



8,659,625	Current Annual Entering Veh., **AEV** = DEV * 365
31,931	veh / day, Final Year DEV, **FDEV**
149.75	MEV, Total Million Entering Veh. Over life of Project, **TMEV**
2.0%	Projected Traffic Growth (0%-10%), **G**
23,725	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 — 6.0 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
4	Injury Crashes	0	Minor Injuries @	$65,000	$ -
		4	Possible Injuries @	$35,000	$ 140,000
5	Property Damage Only		(assumed cost per crash)	$7,400	$ 66,600
		-OR-	enter all Property Costs of all crashes:		
9	Total Crashes, **TA**			Total $ Loss, **LOSS**	$ 531,600

1.50	Current Crashes / Year, **AA** = TA / T	0.17	Crashes / MEV, Crash Rate, **CR**
$ 59,067	Cost per Crash, **AVC** = LOSS / TA		CR = TA x 10^6 / (DEV x 365 x T)
25.9	Total Expected Crashes, **TECR** = CR x TMEV	$ 223,881	Present Value of Avoided Crashes, **BENEFIT**
0.30	Crashes Avoided First Year **AAR** = AA x CRF / 100		
$ 17,720	Crash Costs Avoided in First Year, AAR x AVC		
5.2	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 = $223,881 : $120,000 = **1.87** : 1

Application for FY2017 Traffic Safety Funds
Iowa Department of Transportation

(Site Specific)

Citywide Fixed-Time Traffic Signal Upgrade Project – Phase 2

(Install semi-actuated operation at 25 signalized locations)

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

August 2015

Rev. 5/15

Application for TRAFFIC SAFETY FUNDS

GENERAL INFORMATION **DATE:** August 7, 2015

Location / Title of Project: Citywide Fixed-Time Signal Upgrade Project - Phase 2

Applicant: City of Des Moines

Contact Person: Calvin Miller Title: Civil Engineer 1

Complete Mailing Address: 400 Robert D Ray Drive
Des Moines, Iowa 50309

Phone: 515-283-4748 (Area Code) E-Mail: cbmiller@dmgov.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): N/A

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 $ 660,000

Safety Funds Requested $ 120,000

Rev. 5/15

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 — AUG 10 2015

Signature — Date Signed

T. M. Franklin Cownie

Typed Name

Attest: Diane Rauh — AUG 10 2015

Signature — Date Signed

Diane Rauh

Typed Name

Exhibit A

★ **Roll Call Number**
15-1230

Agenda Item Number
7

Date July 27, 2015

APPROVING FISCAL YEAR 2017 TRAFFIC SAFETY FUND APPLICATIONS 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 applications to the Iowa Department of Transportation for Traffic Safety Funds to cover a portion of the construction costs for the following projects:

1. 42nd Street Streetscape
2. Martin Luther King Jr. Parkway and Prospect Road Traffic Signal Installation
3. Citywide Fixed-Time Signal Upgrade Project – Phase 2

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

(Council Communication Number 15-428 Attached)

Moved by Gatto to adopt.

APPROVED AS TO FORM:

Kathleen Vanderpool
Deputy City Attorney

COUNCIL ACTION	YEAS	NAYS	PASS	ABSENT
COWNIE	✓			
COLEMAN	✓			
GATTO	✓			
GRAY	✓			
HENSLEY	✓			
MAHAFFEY	✓			
MOORE	✓			
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

Exhibit B

PROJECT DESCRIPTION

CITYWIDE FIXED TIME SIGNAL UPGRADE PROJECT – PHASE 2

Proposed Project:

This project consists of upgrading the traffic signal operation at 25 existing intersections in Des Moines that currently operate as fixed- time signals. The proposed project would provide "semi-actuated" operation by installing vehicle detectors on the side-street and left-turning phases, along with adding pedestrian push-buttons and pedestrian signal indications.

The locations are along several of the city's heavy volume transportation corridors – E. 14th/ E. 15th Street (U.S. 69), ML King Jr. Pkwy / 19th Street, 6th Avenue, and Ingersoll Avenue. The specific locations are listed below and also shown on Exhibit E:

1. E 14th Street and Walker Street
2. E 14th Street and Grand Avenue
3. E 14th Street and Walnut Street
4. E 14th Street at Court Avenue
5. E 15th Street and Walker Street
6. E 15th Street and Grand Avenue
7. E 15th Street and Walnut Street
8. E 15th Street and Court Avenue
9. 6th Avenue and Holcomb Avenue
10. 6th Avenue and Hickman Road
11. 6th Avenue and College Avenue
12. 6th Avenue and Forest Avenue
13. 6th Avenue and University Ave.
14. 19th Street and Carpenter Ave
15. 19th Street and Forest Avenue
16. 19th Street and Clark Street
17. ML King and Carpenter Ave
18. ML King and Forest Avenue
19. ML King and Clark Street
20. 25th Street and Forest Avenue
21. 27th Street and Forest Avenue
22. 17th Street and Ingersoll Avenue
23. 18th Street and Ingersoll Avenue
24. 8th Street and Cherry Street
25. 9th Street and Cherry Street

The total project cost is estimated to be $660,000. FY2015 Iowa Clean Air Attainment (ICAAP) funds have been approved in the amount of $480,000. State Traffic Safety funds in the amount of $120,000 are being requested in order to complete the funding package for the construction portion of this project.

Existing Conditions:

The twenty-five traffic signal locations proposed to be upgraded on this project are all "fixed-time" signals. Since there is no side-street vehicle or pedestrian detection, the traffic signals must cycle through all of their phases on a pre-timed basis, regardless of the presence of vehicles or pedestrians. This operation results in the main-street vehicles stopping or waiting unnecessarily when no vehicles are present on the side street.

Traffic volumes vary on these streets. From Iowa DOT 2012 traffic count data, the E 14th/E 15th Street (U.S. 69) corridor carries up to 40,000 vehicles per day (veh/day). The 19th/ML King Jr. Pkwy corridor volumes are 22,500 veh/day. The 6th Avenue corridor handles about 10,000 veh/day. Ingersoll Avenue volumes are approximately 10,500 veh/day, with Forest Avenue carrying 7,000 veh/day and Cherry Street carrying about 5,000 veh/day.

Speed limits also vary, but are generally in the 25-35 mph range.

Project Justification:

Because of the fixed-time signal operation, drivers on the main street are exposed to more rear-end and sideswipe-same direction crashes than if the signals remained green for their approaches. When this new project is implemented, motorists on the main street will not be required to stop as often, thereby reducing the number of these rear-end and sideswipe conflicts.

Research numbers for the Crash Mitigation Factors (CMF) vary from 10-80 percent reduction. For our analysis, a very conservative approach was taken, in that ONLY rear-end and sideswipe crashes were considered to be correctable, and then a 10% CMF was applied. (All other types of crashes, including right-angle, were not considered to be "correctable" in this analysis.)

A review of the crash history for the 4-year period between 2011-2014 indicated a total of 406 crashes at the 25 subject intersections. The analysis of this crash information indicates the following:

Accident Type	Number
Broadside	111
Rear End	**136**
Sideswipe – same direction	**90**
Left-Turning	28
Head-on	10
Non-Collision	31
Total	**406**
Average per year per intersection:	**4.1**

There were a total of 226 reported crashes that are considered correctable (Rear-end and Sideswipe-same direction- highlighted above). Of these, there were 66 personal injury crashes involving 73 injuries.

Based on current IDOT value factors, the total estimated loss from crashes during the described four-year period is $ 5,007,400 (See Exhibit "L"). Assuming a crash reduction of 10 percent of the correctible crashes and an estimated project life of 15 years, the request for $120,000 of Traffic Safety Funds relates to a benefit-cost factor of **12.36:1.**

Exhibit C

COST ESTIMATE	
Citywide Fixed-Time Signal Upgrade Project - Phase 2	
1. 6th Avenue at College Ave.	$20,000
2. 6th Avenue at Forest Ave.	$20,000
3. 6th Avenue at Hickman Rd.	$30,000
4. 6th Avenue at Holcomb Ave.	$20,000
5. 6th Avenue at University Ave.	$30,000
6. Cherry St. at 8th Street	$15,000
7. Cherry St. at 9th Street	$15,000
8. East 14th St. at Court Ave.	$25,000
9. East 14th St. at Walnut St.	$20,000
10. East 14th St. at Grand Ave.	$25,000
11. East 14th St. at Walker St.	$20,000
12. East 15th St. at Court Ave.	$25,000
13. East 15th St. at Walnut St.	$20,000
14. East 15th St. at Grand Ave.	$25,000
15. East 15th St. at Walker St.	$20,000
16. Ingersoll Ave. at 17th St.	$20,000
17. Ingersoll Ave. at 18th St.	$20,000
18. 19th St. at Carpenter Ave.	$25,000
19. 19th St. at Forest Ave.	$25,000
20. 19th St. at Clark St.	$20,000
21. ML King at Clark St.	$20,000
22. ML King at Forest Ave.	$25,000
23. ML King at Carpenter Ave.	$20,000
24. Forest Ave. at 25th St.	$20,000
25. Forest Ave. at 27th St.	$20,000
TRAFFIC SIGNAL MODIFICATIONS:	$545,000
CONTINGENCY (10%):	$55,000
TOTAL CONSTRUCTION COST:	**$600,000**
DESIGN/INCIDENTALS:	$60,000
TOTAL PROJECT COST:	$660,000

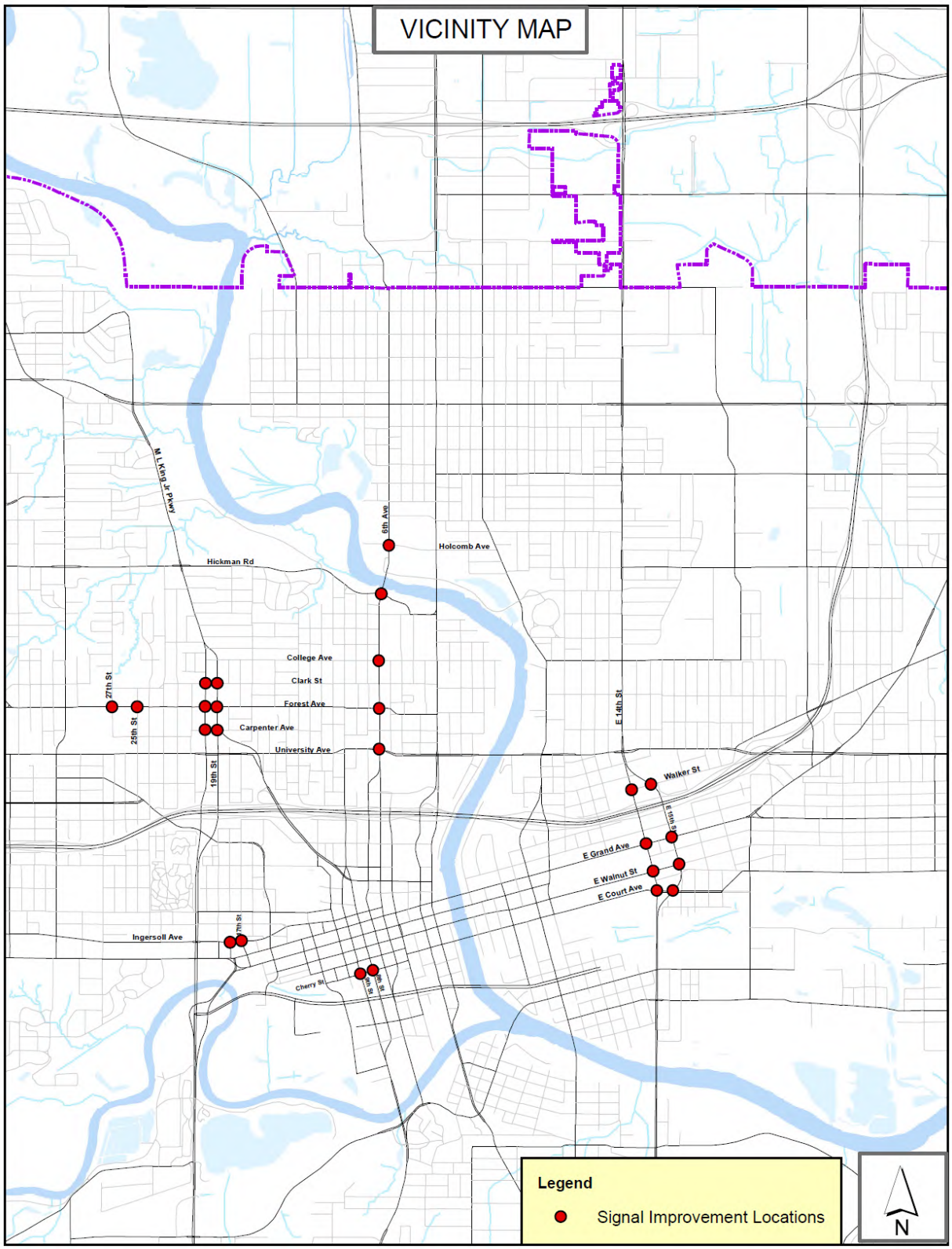
Exhibit D

TIME SCHEDULE

CITYWIDE FIXED-TIME SIGNAL UPGRADE PROJECT – PHASE 2

Project Approval:	**December 2015**
Agreement Signed:	**February 2016**
Project bid:	**April 2016**
Construction completed:	**October 2016**
Project Closeout:	**January 2017**

Exhibit E


VICINITY MAP
M L King Jr Pkwy
6th Ave
Holcomb Ave
Hickman Rd
College Ave
Clark St
Forest Ave
Carpenter Ave
University Ave
27th St
25th St
19th St
E 14th St
Walker St
E Elm St
E Grand Ave
E Walnut St
E Court Ave
Ingersoll Ave
7th St
Cherry St
Legend
Signal Improvement Locations
N

Photos of 3 typical intersections that are part of project Exhibit F

On Walnut Street, looking east toward E 14th Street

On E

On Walnut Street, looking west toward E 14th Street

Exhibit F

On East 14th Street, looking south toward Walnut Street.

On Ingersoll Avenue, looking west toward 17th Street.

Exhibit F

On Ingersoll Avenue, looking east toward 17th Street.

On 17th Street, looking north toward Ingersoll Avenue

Exhibit F

On 17th Street, looking south toward Ingersoll Avenue

On 19th Street, looking north toward Forest Avenue.

Exhibit F

On Forest Avenue, looking west toward 19th Street

On Forest Avenue, looking east toward 19th Street

Exhibit I

OFFICER CRASH REPORTS

6th and Holcomb

CASENUMBER	DATE	CSEVERITY	PROPDMG	CRCOMANNER	SURF_COND	INITDIR	VACTION	REPAIRCOST	INJSTATUS
2011626368	20110416	Property Damage Only	4000	Rear-end	Wet	South	Movement essentially straight	0	
2011626368			0			South	Slowing/stopping	4000	
2011637259	20110705	Property Damage Only	4500	Rear-end	Dry	North	Slowing/stopping	2000	
2011637259			0			North	Slowing/stopping	2500	
2012678645	20120323	Possible/Unknown	6000	Rear-end	Dry	South	Movement essentially straight	4500	Possible
2012678645			0			South	Movement essentially straight	1500	
2012686913	20120523	Property Damage Only	13000	Rear-end	Dry	South	Movement essentially straight	8000	
2012686913			0			South	Stopped for stop sign/signal	2000	
2012686913			0			South	Stopped for stop sign/signal	1000	
2012686913			0			South	Stopped for stop sign/signal	2000	
2012705455	20121002	Property Damage Only	4000	Rear-end	Dry	North	Movement essentially straight	0	
2012705455			0			North	Stopped for stop sign/signal	4000	
2012709830	20121030	Property Damage Only	6000	Rear-end	Dry	South	Movement essentially straight	1500	
2012709830			0			South	Movement essentially straight	3000	
2012709830			0			South	Movement essentially straight	1500	
2012714780	20121128	Property Damage Only	3500	Sideswipe - same direction	Dry	South	Changing lanes	2000	
2012714780			0			South	Movement essentially straight	1500	
2013743120	20130608	Property Damage Only	4000	Rear-end	Wet	North	Movement essentially straight	2500	
2013743120			0			North	Stopped for stop sign/signal	1500	

6th and Hickman/Arlington

CASENUMBER	DATE	CSEVERITY	PROPDMG	CRCOMANNER	SURF_COND	INITDIR	VACTION	REPAIRCOST	INJSTATUS
2011654642	20111102	Property Damage Only	1500	Rear-end	Wet	North	Movement essentially straight	300	
2011654642			0			North	Stopped for stop sign/signal	1200	
2012701216	20120904	Property Damage Only	8000	Rear-end	Dry	South	Movement essentially straight	4000	
2012701216			0			South	Stopped for stop sign/signal	4000	
2012706692	20121010	Property Damage Only	2000	Sideswipe - same direction	Dry	West	Turning right	0	
2012706692			0			West	Turning right	2000	
2012715530	20121204	Property Damage Only	2489	Rear-end	Dry	Not Reported	Unknown	0	
2012715530			0			Not Reported	Stopped for stop sign/signal	2489	
2013749189	20130721	Property Damage Only	2200	Rear-end	Wet	North	Slowing/stopping	200	
2013749189			0			North	Movement essentially straight	2000	
2013750077	20130724	Property Damage Only	6000	Rear-end	Dry	South	Movement essentially straight	2000	
2013750077			0			South	Stopped for stop sign/signal	2000	
2013750077			0			South	Stopped for stop sign/signal	1000	
2013750077			0			South	Stopped for stop sign/signal	1000	
2013757498	20130917	Property Damage Only	10000	Rear-end	Wet	East	Slowing/stopping	8000	
2013757498			0			East	Stopped for stop sign/signal	2000	

6th and College

CASENUMBER	DATE	CSEVERITY	PROPDMG	CRCOMANNER	SURF_COND	INITDIR	VACTION	REPAIRCOST	INJSTATUS

Exhibit I

2011631478	20110525	Property Damage Only	2500	Rear-end	Dry	South	Movement essentially straight	1000	
2011631478			0			South	Slowing/stopping	1500	
2012676882	20120313	Property Damage Only	2600	Rear-end	Dry	South	Stopped for stop sign/signal	2500	
2012676882			0			South	Slowing/stopping	100	
2012690786	20120619	Property Damage Only	4000	Rear-end	Dry	North	Movement essentially straight	0	
2012690786			0			North	Stopped for stop sign/signal	4000	
2012710665	20121101	Property Damage Only	7000	Rear-end	Dry	South	Movement essentially straight	4000	
2012710665			0			South	Legally Parked	3000	
2013755155	20130901	Property Damage Only	5000	Sideswipe - same direction	Dry	North	Movement essentially straight	1500	
2013755155			0			North	Changing lanes	3500	
2013758517	20130919	Minor Injury	4500	Rear-end	Wet	East	Stopped for stop sign/signal	4500	Non-incapacitating
2013758517			0			North	Movement essentially straight	0	
2013763387	20131024	Property Damage Only	3500	Rear-end	Dry	South	Movement essentially straight	500	
2013763387			0			South	Movement essentially straight	3000	

6th and Forest

CASENUMBER	DATE	CSEVERITY	PROPDMG	CRCOMANNER	SURF_COND	INITDIR	VACTION	REPAIRCOST	INJSTATUS
2011625162	20110407	Property Damage Only	5500	Rear-end	Wet	South	Movement essentially straight	1500	
2011625162			0			South	Slowing/stopping	2500	
2011625162			0			South	Stopped for stop sign/signal	1500	

6th and University

CASENUMBER	DATE	CSEVERITY	PROPDMG	CRCOMANNER	SURF_COND	INITDIR	VACTION	REPAIRCOST	INJSTATUS
2011629468	20110430	Property Damage Only	6500	Rear-end	Dry	West	Movement essentially straight	1500	
2011629468			0			West	Slowing/stopping	3000	
2011629468			0			West	Slowing/stopping	1000	
2011629468			0			West	Slowing/stopping	1000	
2011632344	20110601	Property Damage Only	1500	Rear-end	Dry	West	Changing lanes	0	
2011632344			0			West	Stopped for stop sign/signal	1500	
2011635910	20110627	Property Damage Only	2000	Sideswipe - same direction	Dry	North	Movement essentially straight	0	
2011635910			0			North	Turning right	2000	
2011654270	20111031	Property Damage Only	1500	Sideswipe - same direction	Dry	West	Changing lanes	500	
2011654270			0			West	Movement essentially straight	1000	
2012668707	20120110	Possible/Unknown	1000	Rear-end	Dry	West	Stopped for stop sign/signal	1000	Possible
2012668707			0			West	Movement essentially straight	0	
2012669799	20120126	Property Damage Only	1500	Rear-end	Dry	East	Movement essentially straight	1500	
2012669799			0			East	Unknown	0	
2012698996	20120817	Property Damage Only	3500	Sideswipe - same direction	Dry	South	Changing lanes	1500	
2012698996			0			South	Stopped for stop sign/signal	2000	
2012701640	20120906	Minor Injury	1000	Rear-end	Dry	North	Movement essentially straight	250	Non-incapacitating
2012701640			0			North	Turning right	750	
2012703060	20120917	Property Damage Only	1600	Rear-end	Wet	South	Movement essentially straight	650	
2012703060			0			South	Slowing/stopping	950	
2013719895	20130103	Property Damage Only	1500	Sideswipe - same direction	Dry	South	Turning left	0	
2013719895			0			South	Movement essentially straight	1500	

Exhibit I

2013734166	20130409	Property Damage Only	6500	Rear-end	Wet	West	Movement essentially straight	2000	
2013734166			0			West	Slowing/stopping	4500	
2013738863	20130510	Property Damage Only	1500	Sideswipe - same direction	Dry	West	Movement essentially straight	0	
2013738863			0			West	Movement essentially straight	1500	
2013763238	20131022	Property Damage Only	2000	Rear-end	Dry	North	Movement essentially straight	1000	
2013763238			0			North	Turning right	1000	
2013771373	20131129	Property Damage Only	2500	Sideswipe - same direction	Dry	South	Entering traffic lane (merging)	500	
2013771373			0			South	Changing lanes	2000	

19th and Keo/Carpenter

CASENUMBER	DATE	CSEVERITY	PROPDMG	CRCOMANNER	SURF_COND	INITDIR	VACTION	REPAIRCOST	INJSTATUS
2011642036	20110807	Property Damage Only	6500	Sideswipe - same direction	Dry	North	Turning left	3000	
2011642036			0			North	Movement essentially straight	3500	
2011642467	20110802	Property Damage Only	4307	Sideswipe - same direction	Dry	North	Changing lanes	1500	
2011642467			0			North	Movement essentially straight	2807	
2012691462	20120622	Property Damage Only	2000	Rear-end	Dry	North	Changing lanes	1000	
2012691462			0			North	Movement essentially straight	1000	
2012702633	20120913	Property Damage Only	6000	Sideswipe - same direction	Wet	North	Turning left	3000	
2012702633			0			North	Movement essentially straight	3000	
2013726574	20130219	Property Damage Only	2500	Sideswipe - same direction	Dry	North	Turning left	500	
2013726574			0			North	Movement essentially straight	2000	
2013737914	20130503	Property Damage Only	2500	Rear-end	Snow	North	Movement essentially straight	2000	
2013737914			0			North	Stopped for stop sign/signal	500	
2013764174	20131029	Possible/Unknown	1500	Rear-end	Dry	West	Movement essentially straight	500	Unknown
2013764174			0			West	Stopped for stop sign/signal	1000	

19th and Forest

CASENUMBER	DATE	CSEVERITY	PROPDMG	CRCOMANNER	SURF_COND	INITDIR	VACTION	REPAIRCOST	INJSTATUS
2011625603	20110408	Minor Injury	500	Rear-end	Dry	East	Movement essentially straight	500	Non-incapacitating
2011625603			0			East	Movement essentially straight	0	
2011645556	20110902	Property Damage Only	1500	Sideswipe - same direction	Dry	North	Movement essentially straight	750	
2011645556			0			North	Movement essentially straight	750	
2012676889	20120313	Property Damage Only	1650	Sideswipe - same direction	Dry	East	Turning left	800	
2012676889			0			East	Movement essentially straight	850	
2012687640	20120529	Property Damage Only	2000	Rear-end	Dry	North	Turning right	1000	
2012687640			0			East	Slowing/stopping	1000	
2012701219	20120902	Minor Injury	50	Rear-end	Dry	East	Stopped for stop sign/signal	50	Non-incapacitating
2012701219			0			East	Slowing/stopping	0	
2012702260	20120903	Property Damage Only	3000	Rear-end	Dry	North	Stopped for stop sign/signal	3000	
2012702260			0			North	Movement essentially straight	0	
2012705594	20121003	Possible/Unknown	4500	Rear-end	Dry	North	Slowing/stopping	2500	Possible
2012705594			0			North	Slowing/stopping	1000	
2012705594			0			North	Slowing/stopping	1000	
2012710678	20121106	Property Damage Only	6000	Sideswipe - same direction	Dry	South	Leaving traffic lane	3000	

Exhibit I

2012710678			0			South	Turning left	3000	
2012715467	20121206	Property Damage Only	2500	Rear-end	Wet	North	Movement essentially straight	500	
2012715467			0			North	Movement essentially straight	2000	

19th and Clark

CASENUMBER	DATE	CSEVERITY	PROPDMG	CRCOMANNER	SURF_COND	INITDIR	VACTION	REPAIRCOST	INJSTATUS
2011627979	20110401	Possible/Unknown	500	Rear-end	Dry	West	Movement essentially straight	0	Unknown
2011627979			0			West	Stopped for stop sign/signal	500	
2011647678	20110912	Property Damage Only	3000	Sideswipe - same direction	Dry	North	Turning left	2000	
2011647678			0			North	Movement essentially straight	1000	
2011659792	20111129	Minor Injury	4000	Sideswipe - same direction	Dry	North	Changing lanes	2000	Non-incapacitating
2011659792			0			North	Movement essentially straight	2000	
2011663623	20111220	Minor Injury	7000	Angle - oncoming left turn	Dry	East	Turning left	4000	Non-incapacitating
2011663623			0			West	Movement essentially straight	3000	
2012706680	20121011	Property Damage Only	1500	Rear-end	Dry	North	Slowing/stopping	1000	
2012706680			0			North	Slowing/stopping	500	
2013724301	20130204	Property Damage Only	2500	Sideswipe - same direction	Wet	North	Movement essentially straight	1500	
2013724301			0			North	Changing lanes	1000	
2013735748	20130417	Minor Injury	7500	Sideswipe - same direction	Wet	North	Turning left	4500	Non-incapacitating
2013735748			0			North	Movement essentially straight	2000	
2013761586	20131008	Possible/Unknown	2000	Sideswipe - same direction	Dry	North	Movement essentially straight	0	Possible
2013761586			0			North	Turning left	2000	

MLK and Clark

CASENUMBER	DATE	CSEVERITY	PROPDMG	CRCOMANNER	SURF_COND	INITDIR	VACTION	REPAIRCOST	INJSTATUS
2011637916	20110711	Property Damage Only	4500	Rear-end	Dry	South	Stopped for stop sign/signal	1000	
2011637916			0			South	Slowing/stopping	3500	
2011639992	20110727	Minor Injury	8500	Sideswipe - same direction	Dry	South	Movement essentially straight	5000	Non-incapacitating
2011639992			0			South	Slowing/stopping	2500	
2011639992			0			South	Stopped for stop sign/signal	1000	
2013721978	20130113	Property Damage Only	25000	Rear-end	Dry	South	Movement essentially straight	10000	
2013721978			0			South	Stopped for stop sign/signal	10000	
2013721978			0			South	Stopped for stop sign/signal	5000	
2013756194	20130906	Property Damage Only	2000	Rear-end	Dry	South	Movement essentially straight	1500	
2013756194			0			South	Stopped for stop sign/signal	500	

MLK and Forest

CASENUMBER	DATE	CSEVERITY	PROPDMG	CRCOMANNER	SURF_COND	INITDIR	VACTION	REPAIRCOST	INJSTATUS
2011622213	20110314	Possible/Unknown	7300	Rear-end	Dry	South	Movement essentially straight	2500	Possible
2011622213			0			South	Slowing/stopping	4000	
2011622213			0			South	Slowing/stopping	500	
2011622213			0			South	Slowing/stopping	300	
2011646648	20110906	Property Damage Only	7500	Sideswipe - same direction	Dry	South	Turning left	3500	

Exhibit I

2011646648			0			South	Movement essentially straight	4000	
2012668666	20120120	Property Damage Only	4300	Sideswipe - same direction	Dry	South	Changing lanes	1800	
2012668666			0			South	Movement essentially straight	2500	
2012693670	20120710	Property Damage Only	2000	Rear-end	Dry	East	Movement essentially straight	500	
2012693670			0			East	Stopped for stop sign/signal	1500	
2013746446	20130630	Property Damage Only	5500	Sideswipe - same direction	Dry	South	Turning left	2000	
2013746446			0			South	Movement essentially straight	3500	
2013757210	20130913	Property Damage Only	5000	Sideswipe - same direction	Dry	South	Movement essentially straight	3000	
2013757210			0			South	Turning left	2000	

MLK and Carpenter

CASENUMBER	DATE	CSEVERITY	PROPDMG	CRCOMANNER	SURF_COND	INITDIR	VACTION	REPAIRCOST	INJSTATUS
2011644396	20110825	Minor Injury	10500	Rear-end	Dry	South	Movement essentially straight	4500	Non-incapacitating
2011644396			0			South	Turning left	6000	
2012674091	20120223	Property Damage Only	2800	Sideswipe - same direction	Wet	South	Changing lanes	800	
2012674091			0			South	Movement essentially straight	2000	
2012679295	20120324	Property Damage Only	3000	Sideswipe - same direction	Dry	South	Changing lanes	1500	
2012679295			0			South	Turning left	1500	
2012707892	20121018	Property Damage Only	2400	Rear-end	Wet	South	Movement essentially straight	2000	
2012707892			0			South	Movement essentially straight	400	
2013772803	20131212	Property Damage Only	4000	Sideswipe - same direction	Dry	South	Turning left	4000	
2013772803			0			South	Movement essentially straight	0	

25th and Forest

CASENUMBER	DATE	CSEVERITY	PROPDMG	CRCOMANNER	SURF_COND	INITDIR	VACTION	REPAIRCOST	INJSTATUS
2012702867	20120914	Property Damage Only	2000	Rear-end	Dry	North	Movement essentially straight	1000	
2012702867			0			North	Stopped for stop sign/signal	1000	

27th and Forest

CASENUMBER	DATE	CSEVERITY	PROPDMG	CRCOMANNER	SURF_COND	INITDIR	VACTION	REPAIRCOST	INJSTATUS
2011639350	20110715	Property Damage Only	1700	Sideswipe - same direction	Dry	West	Turning left	0	
2011639350			0			West	Movement essentially straight	1700	

17th and Ingersoll

none

18th and Ingersoll

CASENUMBER	DATE	CSEVERITY	PROPDMG	CRCOMANNER	SURF_COND	INITDIR	VACTION	REPAIRCOST	INJSTATUS
2013729002	20130226	Minor Injury	200	Rear-end	Snow	West	Movement essentially straight	100	Non-incapacitating
2013729002			0			West	Stopped for stop sign/signal	100	

Exhibit I

SW 8th and Cherry

CASENUMBER	DATE	CSEVERITY	PROPDMG	CRCOMANNER	SURF_COND	INITDIR	VACTION	REPAIRCOST	INJSTATUS
2012043158	2001 Officer TraCS	Property Damage Only	5000	Sideswipe - same direction	Dry	West	Movement essentially straight	2500	
2012043158			0			West	Turning right	2500	

SW 9th and Cherry

none

E 14th and Walker

CASENUMBER	DATE	CSEVERITY	PROPDMG	CRCOMANNER	SURF_COND	INITDIR	VACTION	REPAIRCOST	INJSTATUS
2011617317	20110210	Possible/Unknown	3500	Rear-end	Dry	South	Movement essentially straight	2500	Possible
2011617317			0			South	Movement essentially straight	1000	
2011626618	20110417	Possible/Unknown	8000	Rear-end	Wet	South	Movement essentially straight	5000	Possible
2011626618			0			South	Movement essentially straight	3000	
2011630945	20110521	Possible/Unknown	1568	Rear-end	Dry	South	Movement essentially straight	0	Possible
2011630945			0			South	Movement essentially straight	1568	
2011639972	20110723	Property Damage Only	3000	Rear-end	Wet	South	Slowing/stopping	500	
2011639972			0			South	Stopped for stop sign/signal	2500	
2011653571	20110926	Possible/Unknown	0	Rear-end	Unknown	West	Movement essentially straight	0	Unknown
2011653571			0			West	Movement essentially straight	0	
2012701404	20120905	Possible/Unknown	2500	Rear-end	Dry	South	Movement essentially straight	1000	Possible
2012701404			0			South	Stopped for stop sign/signal	1500	
2012702262	20120904	Property Damage Only	3500	Rear-end	Dry	South	Movement essentially straight	2500	
2012702262			0			South	Slowing/stopping	1000	

E 14th and Grand

CASENUMBER	DATE	CSEVERITY	PROPDMG	CRCOMANNER	SURF_COND	INITDIR	VACTION	REPAIRCOST	INJSTATUS
2011610596	20110105	Possible/Unknown	1500	Rear-end	Dry	South	Movement essentially straight	1000	Possible
2011610596			0			South	Other (explain in narrative)	500	Possible
2011611098	20110111	Property Damage Only	2500	Rear-end	Snow	South	Turning right	2500	
2011611098			0			South	Movement essentially straight	0	
2011619184	20110221	Property Damage Only	3000	Rear-end	Dry	West	Movement essentially straight	2000	
2011619184			0			West	Movement essentially straight	1000	
2011621308	20110307	Property Damage Only	4200	Rear-end	Wet	South	Movement essentially straight	3000	
2011621308			0			South	Slowing/stopping	1200	
2011631663	20110525	Property Damage Only	4128	Rear-end	Wet	South	Slowing/stopping	2500	
2011631663			0			South	Slowing/stopping	1628	
2011643209	20110810	Minor Injury	1000	Rear-end	Dry	South	Movement essentially straight	0	Non-incapacitating
2011643209			0			South	Movement essentially straight	1000	
2011645218	20110830	Possible/Unknown	9000	Sideswipe - same direction	Wet	North	Turning left	5000	Possible
2011645218			0			North	Movement essentially straight	4000	
2011665583	20111128	Possible/Unknown	4500	Sideswipe - same direction	Dry	South	Turning left	2500	Possible
2011665583			0			South	Movement essentially straight	2000	

Exhibit I

2012668849	20120110	Property Damage Only	2300	Sideswipe - same direction	Dry	South	Movement essentially straight	800	
2012668849			0			South	Turning left	1500	
2012670365	20120130	Property Damage Only	2500	Sideswipe - same direction	Dry	South	Turning left	2000	
2012670365			0			South	Movement essentially straight	500	
2012680537	20120405	Property Damage Only	5000	Rear-end	Dry	South	Slowing/stopping	3000	
2012680537			0			South	Stopped for stop sign/signal	2000	
2012685296	20120514	Property Damage Only	4000	Rear-end	Dry	South	Movement essentially straight	2500	
2012685296			0			South	Turning right	1500	
2012694327	20120702	Possible/Unknown	6000	Sideswipe - same direction	Dry	South	Movement essentially straight	4000	Possible
2012694327			0			South	Movement essentially straight	2000	
2012695541	20120621	Minor Injury	600	Rear-end	Dry	South	Stopped for stop sign/signal	300	Non-incapacitating
2012695541			0			South	Slowing/stopping	300	Non-incapacitating
2012700378	20120824	Minor Injury	6500	Rear-end	Dry	South	Movement essentially straight	3500	Non-incapacitating
2012700378			0			South	Movement essentially straight	3000	
2012706697	20121010	Property Damage Only	7000	Rear-end	Dry	South	Movement essentially straight	3000	
2012706697			0			South	Other (explain in narrative)	4000	
2012707870	20121018	Property Damage Only	4000	Rear-end	Wet	South	Movement essentially straight	2000	
2012707870			0			South	Slowing/stopping	2000	
2013720218	20130107	Property Damage Only	4000	Rear-end	Dry	South	Stopped for stop sign/signal	3000	
2013720218			0			South	Slowing/stopping	1000	
2013744585	20130613	Property Damage Only	2300	Sideswipe - same direction	Dry	South	Turning left	1000	
2013744585			0			South	Movement essentially straight	1300	
2013760526	20130930	Property Damage Only	1700	Sideswipe - same direction	Dry	South	Turning left	1500	
2013760526			0			South	Movement essentially straight	200	
2013765957	20131022	Property Damage Only	1500	Rear-end	Wet	South	Turning right	1000	
2013765957			0			South	Turning right	500	

E 14th and Walnut

CASENUMBER	DATE	CSEVERITY	PROPDMG	CRCOMANNER	SURF_COND	INITDIR	VACTION	REPAIRCOST	INJSTATUS
2011634307	20110607	Property Damage Only	1500	Rear-end	Dry	South	Movement essentially straight	1000	
2011634307			0			South	Slowing/stopping	500	
2011635175	20110620	Property Damage Only	4000	Rear-end	Wet	South	Movement essentially straight	3000	
2011635175			0			South	Stopped for stop sign/signal	1000	
2011637345	20110701	Property Damage Only	2700	Rear-end	Dry	South	Slowing/stopping	1500	
2011637345			0			South	Slowing/stopping	1200	
2011644382	20110823	Possible/Unknown	4000	Sideswipe - same direction	Dry	West	Movement essentially straight	1000	Possible
2011644382			0			West	Legally Parked	1000	
2011644382			0			West	Legally Parked	1000	
2011644382			0			West	Legally Parked	1000	
2011665193	20111229	Possible/Unknown	10000	Rear-end	Dry	South	Movement essentially straight	5000	Unknown
2011665193			0			South	Movement essentially straight	5000	
2012679624	20120401	Property Damage Only	4000	Sideswipe - same direction	Dry	North	Turning left	2000	
2012679624			0			North	Turning left	2000	
2012695542	20120531	Property Damage Only	4500	Rear-end	Wet	South	Slowing/stopping	200	
2012695542			0			South	Other (explain in narrative)	4000	
2012695542			0			South	Other (explain in narrative)	300	

Exhibit I

2012698502	20120814	Minor Injury	6300	Sideswipe - same direction	Dry	South	Movement essentially straight	3000	Non-incapacitating
2012698502			0			South	Movement essentially straight	3000	
2012707149	20121012	Property Damage Only	2600	Rear-end	Dry	South	Movement essentially straight	2500	
2012707149			0			South	Movement essentially straight	100	
2013726684	20130208	Property Damage Only	3000	Rear-end	Dry	South	Movement essentially straight	1500	
2013726684			0			South	Slowing/stopping	1500	
2013759519	20130928	Property Damage Only	2000	Rear-end	Wet	South	Movement essentially straight	1000	
2013759519			0			South	Stopped for stop sign/signal	1000	
2013776646	20131231	Minor Injury	7000	Rear-end	Wet	South	Movement essentially straight	5000	Non-incapacitating
2013776646			0			South	Movement essentially straight	2000	

E 14th and Court

CASENUMBER	DATE	CSEVERITY	PROPDMG	CRCOMANNER	SURF_COND	INITDIR	VACTION	REPAIRCOST	INJSTATUS
2011653779	20111022	Property Damage Only	5000	Rear-end	Dry	South	Slowing/stopping	4000	
2011653779			0			South	Slowing/stopping	1000	
2011655156	20111104	Possible/Unknown	2500	Rear-end	Dry	South	Movement essentially straight	2000	Possible
2011655156			0			South	Movement essentially straight	500	
2012682276	20120419	Property Damage Only	3000	Rear-end	Dry	South	Movement essentially straight	2000	
2012682276			0			South	Stopped for stop sign/signal	1000	
2012692357	20120702	Property Damage Only	5000	Rear-end	Dry	South	Movement essentially straight	3500	
2012692357			0			South	Stopped for stop sign/signal	1500	
2012704249	20120924	Possible/Unknown	0	Rear-end	Dry	South	Movement essentially straight	0	Possible
2012704249			0			South	Movement essentially straight	0	
2012710897	20121103	Property Damage Only	1500	Sideswipe - same direction	Dry	South	Changing lanes	0	
2012710897			0			South	Movement essentially straight	1500	
2012711915	20121111	Property Damage Only	2000	Sideswipe - same direction	Wet	South	Changing lanes	0	
2012711915			0			South	Movement essentially straight	2000	
2013721639	20130113	Property Damage Only	3700	Rear-end	Dry	East	Movement essentially straight	200	
2013721639			0			East	Stopped for stop sign/signal	3500	
2013740598	20130523	Property Damage Only	3000	Sideswipe - same direction	Dry	West	Turning left	1500	
2013740598			0			West	Movement essentially straight	1500	
2013749156	20130719	Minor Injury	4000	Sideswipe - same direction	Dry	South	Movement essentially straight	2000	Non-incapacitating
2013749156			0			South	Movement essentially straight	2000	
2013773304	20131213	Minor Injury	8000	Rear-end	Wet	South	Slowing/stopping	5000	Non-incapacitating
2013773304			0			South	Stopped for stop sign/signal	3000	
2013775671	20131225	Property Damage Only	9000	Rear-end	Wet	South	Movement essentially straight	5000	
2013775671			0			South	Slowing/stopping	4000	

E 15th and Court

CASENUMBER	DATE	CSEVERITY	PROPDMG	CRCOMANNER	SURF_COND	INITDIR	VACTION	REPAIRCOST	INJSTATUS
2011647657	20110915	Property Damage Only	1800	Sideswipe - same direction	Dry	North	Turning left	900	
2011647657			0			North	Movement essentially straight	900	
2012668906	20120118	Property Damage Only	1800	Rear-end	Dry	North	Movement essentially straight	900	
2012668906			0			North	Movement essentially straight	900	
2012703059	20120917	Property Damage Only	1700	Rear-end	Wet	North	Movement essentially straight	1200	

Exhibit I

2012703059			0			North	Movement essentially straight	500	
2012709632	20121022	Property Damage Only	4000	Rear-end	Dry	North	Movement essentially straight	1000	
2012709632			0			North	Stopped for stop sign/signal	3000	
2013726114	20130131	Property Damage Only	2500	Rear-end	Snow	North	Stopped for stop sign/signal	1500	
2013726114			0			North	Slowing/stopping	1000	
2013733963	20130327	Minor Injury	1800	Rear-end	Dry	North	Movement essentially straight	800	Non-incapacitating
2013733963			0			North	Stopped for stop sign/signal	1000	

E 15th and Walnut

CASENUMBER	DATE	CSEVERITY	PROPDMG	CRCOMANNER	SURF_COND	INITDIR	VACTION	REPAIRCOST	INJSTATUS
2011659590	20111129	Property Damage Only	6000	Sideswipe - same direction	Dry	North	Turning left	3000	
2011659590			0			North	Movement essentially straight	3000	
2012676740	20120303	Minor Injury	10000	Sideswipe - same direction	Dry	North	Turning left	5000	Possible
2012676740			0			North	Movement essentially straight	5000	Non-incapacitating
2012698997	20120817	Property Damage Only	3500	Sideswipe - same direction	Dry	North	Changing lanes	1500	
2012698997			0			North	Movement essentially straight	2000	
2012706343	20121007	Possible/Unknown	5000	Sideswipe - same direction	Dry	North	Changing lanes	1900	Possible
2012706343			0			North	Movement essentially straight	3000	
2013726379	20130214	Property Damage Only	2500	Sideswipe - same direction	Dry	North	Changing lanes	1500	
2013726379			0			North	Movement essentially straight	1000	
2013735346	20130417	Property Damage Only	2000	Sideswipe - same direction	Wet	North	Movement essentially straight	1000	
2013735346			0			North	Turning left	1000	
2013741328	20130524	Possible/Unknown	12000	Sideswipe - same direction	Dry	North	Turning left	6000	Possible
2013741328			0			North	Movement essentially straight	6000	
2013751076	20130731	Property Damage Only	6700	Sideswipe - same direction	Dry	North	Movement essentially straight	3500	
2013751076			0			North	Changing lanes	200	
2013751076			0			North	Movement essentially straight	3000	

E 15th and Grand

CASENUMBER	DATE	CSEVERITY	PROPDMG	CRCOMANNER	SURF_COND	INITDIR	VACTION	REPAIRCOST	INJSTATUS
2011613462	20110104	Property Damage Only	2000	Rear-end	Dry	North	Stopped for stop sign/signal	2000	
2011613462			0			North	Movement essentially straight	0	
2011613729	20110123	Property Damage Only	9821	Sideswipe - same direction	Dry	North	Turning right	2500	
2011613729			0			North	Movement essentially straight	7321	
2011628980	20110508	Possible/Unknown	1501	Rear-end	Dry	North	Movement essentially straight	0	Possible
2011628980			0			North	Stopped for stop sign/signal	1501	
2011634545	20110613	Property Damage Only	1600	Rear-end	Dry	East	Movement essentially straight	1500	
2011634545			0			East	Other (explain in narrative)	100	
2011635902	20110626	Possible/Unknown	4500	Sideswipe - same direction	Dry	North	Turning left	2500	Possible
2011635902			0			North	Movement essentially straight	2000	Possible
2011639440	20110722	Property Damage Only	4500	Sideswipe - same direction	Dry	North	Turning left	2000	
2011639440			0			West	Movement essentially straight	2500	
2011656633	20111109	Minor Injury	1000	Rear-end	Wet	North	Slowing/stopping	500	Non-incapacitating
2011656633			0			North	Stopped for stop sign/signal	200	
2011656633			0			North	Stopped for stop sign/signal	300	

Exhibit I

2011657374	20111115	Property Damage Only	4000	Rear-end	Dry	North	Movement essentially straight	2000	
2011657374			0			North	Turning right	2000	
2012668945	20120115	Property Damage Only	5000	Sideswipe - same direction	Dry	North	Turning left	3000	
2012668945			0			North	Movement essentially straight	2000	
2012681525	20120414	Property Damage Only	6000	Sideswipe - same direction	Wet	North	Turning left	3500	
2012681525			0			North	Movement essentially straight	2500	
2012698126	20120811	Property Damage Only	4000	Sideswipe - same direction	Dry	North	Movement essentially straight	2000	
2012698126			0			North	Changing lanes	2000	
2012703460	20120912	Property Damage Only	3620	Sideswipe - same direction	Dry	West	Movement essentially straight	3620	
2012703460			0			North	Turning right	0	
2012705426	20121001	Property Damage Only	2500	Rear-end	Dry	North	Movement essentially straight	0	
2012705426			0			North	Movement essentially straight	2500	
2012707155	20121011	Possible/Unknown	6500	Rear-end	Dry	West	Turning right	1500	Possible
2012707155			0			West	Turning right	1500	
2012707155			0			West	Movement essentially straight	3500	
2012715900	20121209	Property Damage Only	1501	Sideswipe - same direction	Dry	North	Movement essentially straight	0	
2012715900			0			North	Turning left	1501	
2012718952	20121228	Property Damage Only	2100	Rear-end	Wet	North	Movement essentially straight	100	
2012718952			0			North	Changing lanes	1000	
2012718952			0			North	Slowing/stopping	1000	
2013734857	20130410	Property Damage Only	2000	Rear-end	Wet	West	Movement essentially straight	500	
2013734857			0			West	Stopped for stop sign/signal	1500	
2013736871	20130423	Property Damage Only	8000	Sideswipe - same direction	Dry	North	Changing lanes	5000	
2013736871			0			North	Movement essentially straight	3000	
2013741532	20130530	Property Damage Only	3000	Rear-end	Wet	North	Movement essentially straight	1500	
2013741532			0			North	Slowing/stopping	1500	
2013743118	20130607	Property Damage Only	1500	Sideswipe - same direction	Dry	North	Movement essentially straight	0	
2013743118			0			North	Movement essentially straight	1500	
2013750899	20130731	Property Damage Only	3000	Sideswipe - same direction	Dry	North	Turning left	1500	
2013750899			0			North	Movement essentially straight	1500	
2013752270	20130807	Property Damage Only	2000	Rear-end	Dry	North	Movement essentially straight	1000	
2013752270			0			North	Stopped for stop sign/signal	1000	
2013752295	20130812	Property Damage Only	4000	Sideswipe - same direction	Dry	North	Changing lanes	2500	
2013752295			0			North	Movement essentially straight	1500	
2013753867	20130818	Property Damage Only	4000	Rear-end	Dry	North	Movement essentially straight	2000	
2013753867			0			North	Stopped for stop sign/signal	2000	
2013755217	20130830	Possible/Unknown	6000	Rear-end	Dry	North	Movement essentially straight	2500	Possible
2013755217			0			North	Stopped for stop sign/signal	3500	
2013755726	20130824	Property Damage Only	4000	Sideswipe - same direction	Dry	North	Movement essentially straight	2000	
2013755726			0			North	Turning left	2000	
2013756954	20130909	Property Damage Only	4000	Sideswipe - same direction	Dry	West	Changing lanes	2500	
2013756954			0			West	Movement essentially straight	1500	
2013760093	20131002	Property Damage Only	5000	Sideswipe - same direction	Dry	North	Turning left	2000	
2013760093			0			North	Movement essentially straight	3000	
2013761390	20131005	Property Damage Only	2000	Rear-end	Dry	North	Movement essentially straight	1000	
2013761390			0			North	Slowing/stopping	1000	
2013764832	20131101	Property Damage Only	1500	Sideswipe - same direction	Dry	North	Movement essentially straight	0	
2013764832			0			North	Movement essentially straight	1500	

Exhibit I

2013764835	20131101	Property Damage Only	1500	Rear-end	Dry	North	Turning right	1500
2013764835			0			North	Movement essentially straight	0

E 15th and Walker

CASENUMBER	DATE	CSEVERITY	PROPDMG	CRCOMANNER	SURF_COND	INITDIR	VACTION	REPAIRCOST	INJSTATUS
2012700443	20120828	Property Damage Only	7000	Sideswipe - same direction	Dry	North	Movement essentially straight	4000	
2012700443			0			North	Turning left	3000	

106 Rear End Crashes
71 Sideswipe - Same Direction

46 injury crashes

FATALITIES	INJURIES	MAJINJURY	MININJURY	POSSINJURY	UNKINJURY	PROPDMG
0	52	0	22	26	4	$ 711,635

Exhibit I

6th and Holcomb

CASENUMBER	DATE	CSEVERITY	PROPDMG	CRCOMANNER	SURF_COND	INITDIR	VACTION	REPAIRCOST	INJSTATUS
201162368	20110416	Property Damage Only	4000	Rear-end	Wet	South	Movement essentially straight	0	
201162368			0			South	Slowing/stopping	4000	
201167259	20110705	Property Damage Only	4500	Rear-end	Dry	North	Slowing/stopping	2000	
201167259			0			North	Slowing/stopping	2500	
201267645	20120523	Possible/Unknown	6000	Rear-end	Dry	South	Movement essentially straight	4500	Possible
201267645			0			South	Movement essentially straight	1500	
201268913	20120523	Property Damage Only	13000	Rear-end	Dry	South	Movement essentially straight	8000	
201268913			0			South	Stopped for stop sign/signal	2000	
201268913			0			South	Stopped for stop sign/signal	1000	
201268913			0			South	Stopped for stop sign/signal	2000	
201270455	20121002	Property Damage Only	4000	Rear-end	Dry	North	Movement essentially straight	0	
201270455			0			North	Stopped for stop sign/signal	4000	
201270830	20121030	Property Damage Only	6000	Rear-end	Dry	South	Movement essentially straight	1500	
201270830			0			South	Movement essentially straight	3000	
201270830			0			South	Movement essentially straight	1500	
201274780	20121128	Property Damage Only	3500	Sideswipe - same direction	Dry	South	Changing lanes	2000	
201274780			0			South	Movement essentially straight	1500	
201374120	20130608	Property Damage Only	4000	Rear-end	Wet	North	Movement essentially straight	2500	
201374120			0			North	Stopped for stop sign/signal	1500	

6th and Hickman/Arlington

CASENUMBER	DATE	CSEVERITY	PROPDMG	CRCOMANNER	SURF_COND	INITDIR	VACTION	REPAIRCOST	INJSTATUS
201163642	20111102	Property Damage Only	1500	Rear-end	Wet	North	Movement essentially straight	300	
201163642			0			North	Stopped for stop sign/signal	1200	
201270216	20120906	Property Damage Only	8000	Rear-end	Dry	South	Movement essentially straight	4000	
201270216			0			South	Stopped for stop sign/signal	4000	
201270692	20121010	Property Damage Only	2000	Sideswipe - same direction	Dry	West	Turning right	0	
201270692			0			West	Turning right	2000	
201271530	20121204	Property Damage Only	2489	Rear-end	Dry	Not Reported	Unknown	0	
201271530			0			Not Reported	Stopped for stop sign/signal	2489	
201374189	20130721	Property Damage Only	2200	Rear-end	Wet	North	Slowing/stopping	200	
201374189			0			North	Movement essentially straight	2000	
201373677	20130724	Property Damage Only	6000	Rear-end	Dry	South	Movement essentially straight	2000	
201373677			0			South	Stopped for stop sign/signal	2000	
201373677			0			South	Stopped for stop sign/signal	1000	
201373677			0			South	Stopped for stop sign/signal	1000	
201375498	20130917	Property Damage Only	10000	Rear-end	Wet	East	Slowing/stopping	8000	
201375498			0			East	Stopped for stop sign/signal	2000	

6th and College

CASENUMBER	DATE	CSEVERITY	PROPDMG	CRCOMANNER	SURF_COND	INITDIR	VACTION	REPAIRCOST	INJSTATUS

Exhibit I

6th and Holcomb

CASENUMBER	DATE	CSEVERITY	PROPDMG	CRCOMANNER	SURF_COND	INITDIR	VACTION	REPAIRCOST	INJSTATUS
2011626368	20110416	Property Damage Only	4000	Rear-end	Wet	South	Movement essentially straight	0	
2011626368			0			South	Slowing/stopping	4000	
2011637259	20110705	Property Damage Only	4500	Rear-end	Dry	North	Slowing/stopping	2000	
2011637259			0			North	Slowing/stopping	2500	
2012678645	20120323	Possible/Unknown	6000	Rear-end	Dry	South	Movement essentially straight	4500	Possible
2012678645			0			South	Movement essentially straight	1500	
2012686913	20120523	Property Damage Only	13000	Rear-end	Dry	South	Movement essentially straight	8000	
2012686913			0			South	Stopped for stop sign/signal	2000	
2012686913			0			South	Stopped for stop sign/signal	1000	
2012686913			0			South	Stopped for stop sign/signal	2000	
2012705455	20121002	Property Damage Only	4000	Rear-end	Dry	North	Movement essentially straight	0	
2012705455			0			North	Stopped for stop sign/signal	4000	
2012709830	20121030	Property Damage Only	6000	Rear-end	Dry	South	Movement essentially straight	1500	
2012709830			0			South	Movement essentially straight	3000	
2012709830			0			South	Movement essentially straight	1500	
2012714780	20121128	Property Damage Only	3500	Sideswipe - same direction	Dry	South	Changing lanes	2000	
2012714780			0			South	Movement essentially straight	1500	
2013743120	20130608	Property Damage Only	4000	Rear-end	Wet	North	Movement essentially straight	2500	
2013743120			0			North	Stopped for stop sign/signal	1500	

6th and Hickman/Arlington

CASENUMBER	DATE	CSEVERITY	PROPDMG	CRCOMANNER	SURF_COND	INITDIR	VACTION	REPAIRCOST	INJSTATUS
2011654642	20111102	Property Damage Only	1500	Rear-end	Wet	North	Movement essentially straight	300	
2011654642			0			North	Stopped for stop sign/signal	1200	
2012701216	20120904	Property Damage Only	8000	Rear-end	Dry	South	Movement essentially straight	4000	
2012701216			0			South	Stopped for stop sign/signal	4000	
2012706692	20121010	Property Damage Only	2000	Sideswipe - same direction	Dry	West	Turning right	0	
2012706692			0			West	Turning right	2000	
2012715530	20121204	Property Damage Only	2489	Rear-end	Dry	Not Reported	Unknown	0	
2012715530			0			Not Reported	Stopped for stop sign/signal	2489	
2013749189	20130721	Property Damage Only	2200	Rear-end	Wet	North	Slowing/stopping	200	
2013749189			0			North	Movement essentially straight	2000	
2013750077	20130724	Property Damage Only	6000	Rear-end	Dry	South	Movement essentially straight	2000	
2013750077			0			South	Stopped for stop sign/signal	2000	
2013750077			0			South	Stopped for stop sign/signal	1000	
2013750077			0			South	Stopped for stop sign/signal	1000	
2013757498	20130917	Property Damage Only	10000	Rear-end	Wet	East	Slowing/stopping	8000	
2013757498			0			East	Stopped for stop sign/signal	2000	

6th and College

CASENUMBER	DATE	CSEVERITY	PROPDMG	CRCOMANNER	SURF_COND	INITDIR	VACTION	REPAIRCOST	INJSTATUS

Exhibit I

2011631478	20110525	Property Damage Only	2500	Rear-end	Dry	South	Movement essentially straight	1000	
2011631478			0			South	Slowing/stopping	1500	
2012676882	20120313	Property Damage Only	2600	Rear-end	Dry	South	Stopped for stop sign/signal	2500	
2012676882			0			South	Slowing/stopping	100	
2012690786	20120619	Property Damage Only	4000	Rear-end	Dry	North	Movement essentially straight	0	
2012690786			0			North	Stopped for stop sign/signal	4000	
2012710665	20121101	Property Damage Only	7000	Rear-end	Dry	South	Movement essentially straight	4000	
2012710665			0			South	Legally Parked	3000	
2013755155	20130901	Property Damage Only	5000	Sideswipe - same direction	Dry	North	Movement essentially straight	1500	
2013755155			0			North	Changing lanes	3500	
2013758517	20130919	Minor Injury	4500	Rear-end	Wet	East	Stopped for stop sign/signal	4500	Non-incapacitating
2013758517			0			North	Movement essentially straight	0	
2013763387	20131024	Property Damage Only	3500	Rear-end	Dry	South	Movement essentially straight	500	
2013763387			0			South	Movement essentially straight	3000	

6th and Forest

CASENUMBER	DATE	CSEVERITY	PROPDMG	CRCOMANNER	SURF_COND	INITDIR	VACTION	REPAIRCOST	INJSTATUS
2011625162	20110407	Property Damage Only	5500	Rear-end	Wet	South	Movement essentially straight	1500	
2011625162			0			South	Slowing/stopping	2500	
2011625162			0			South	Stopped for stop sign/signal	1500	

6th and University

CASENUMBER	DATE	CSEVERITY	PROPDMG	CRCOMANNER	SURF_COND	INITDIR	VACTION	REPAIRCOST	INJSTATUS
2011629468	20110430	Property Damage Only	6500	Rear-end	Dry	West	Movement essentially straight	1500	
2011629468			0			West	Slowing/stopping	3000	
2011629468			0			West	Slowing/stopping	1000	
2011629468			0			West	Slowing/stopping	1000	
2011632344	20110601	Property Damage Only	1500	Rear-end	Dry	West	Changing lanes	0	
2011632344			0			West	Stopped for stop sign/signal	1500	
2011635910	20110627	Property Damage Only	2000	Sideswipe - same direction	Dry	North	Movement essentially straight	0	
2011635910			0			North	Turning right	2000	
2011654270	20111031	Property Damage Only	1500	Sideswipe - same direction	Dry	West	Changing lanes	500	
2011654270			0			West	Movement essentially straight	1000	
2012668707	20120110	Possible/Unknown	1000	Rear-end	Dry	West	Stopped for stop sign/signal	1000	Possible
2012668707			0			West	Movement essentially straight	0	
2012669799	20120126	Property Damage Only	1500	Rear-end	Dry	East	Movement essentially straight	1500	
2012669799			0			East	Unknown	0	
2012698996	20120817	Property Damage Only	3500	Sideswipe - same direction	Dry	South	Changing lanes	1500	
2012698996			0			South	Stopped for stop sign/signal	2000	
2012701640	20120906	Minor Injury	1000	Rear-end	Dry	North	Movement essentially straight	250	Non-incapacitating
2012701640			0			North	Turning right	750	
2012703060	20120917	Property Damage Only	1600	Rear-end	Wet	South	Movement essentially straight	650	
2012703060			0			South	Slowing/stopping	950	
2013719895	20130103	Property Damage Only	1500	Sideswipe - same direction	Dry	South	Turning left	0	
2013719895			0			South	Movement essentially straight	1500	

Exhibit I

2nd and Euclid

CRASH_KEY	CASENUMBER	DATE	CSEVERITY	PROPDMG	CRCOMANNER	VEHICLE	INITDIR	VACTION	REPAIRCOST	INJSTATUS
2007002115	2007202169	20070114	Possible/Unknown	21000	Broadside	1	North	Movement essentially straight	9000	Possible
2007002115	2007202169			0		2	West	Movement essentially straight	12000	
2007005835	2007206054	20070208	Property Damage Only	2100	Angle - oncoming left turn	1	South	Turning right	1100	
2007005835	2007206054			0		2	North	Turning left	1000	
2007007186	2007207481	20070208	Possible/Unknown	2000	Broadside	1	East	Movement essentially straight	1000	Unknown
2007007186	2007207481			0		2	South	Movement essentially straight	500	
2007007186	2007207481			0		3	South	Movement essentially straight	500	
2007010136	2007210541	20070221	Property Damage Only	4000	Sideswipe - same direction	1	East	Movement essentially straight	1000	
2007010136	2007210541			0		2	East	Movement essentially straight	2000	
2007010136	2007210541			0		3	East	Movement essentially straight	1000	
2007010170	2007210580	20070224	Possible/Unknown	2000	Rear-end	1	West	Movement essentially straight	1000	Unknown
2007010170	2007210580			0		2	West	Stopped for stop sign/signal	1000	
2007015634	2007216353	20070331	Property Damage Only	2200	Sideswipe - opposite direction	1	Not Reported	Movement essentially straight	1200	
2007015634	2007216353			0		2	West	Turning right	1000	
2007018364	2007368632	20070425	Property Damage Only	4800	Sideswipe - same direction	1	West	Movement essentially straight	2800	
2007018364	2007368632			0		2	West	Changing lanes	2000	
2007022917	2007373797	20070525	Property Damage Only	2500	Angle - oncoming left turn	1	West	Turning left	2000	
2007022917	2007373797			0		2	East	Movement essentially straight	500	
2007025090	2007376250	20070607	Possible/Unknown	7000	Angle - oncoming left turn	1	South	Movement essentially straight	3000	Possible
2007025090	2007376250			0		2	North	Turning left	4000	Possible
2007025540	2007376760	20070613	Possible/Unknown		Non-collision	1	North	Turning right		Possible
2007028168	2007379730	20070703	Property Damage Only	1100	Rear-end	1	East	Movement essentially straight	1000	
2007028168	2007379730			0		2	East	Movement essentially straight	100	
2007028755	2007380393	20070628	Property Damage Only	6000	Rear-end	1	West	Movement essentially straight	3000	
2007028755	2007380393			0		2	West	Turning right	3000	
2007029971	2007381764	20070711	Minor Injury	6000	Angle - oncoming left turn	1	East	Turning left	3000	Non-incapacitating
2007029971	2007381764			0		2	West	Movement essentially straight	3000	
2007031384	2007383361	20070725	Property Damage Only	8000	Rear-end	1	East	Movement essentially straight	6000	
2007031384	2007383361			0		2	East		2000	
2007039261	2007392284	20070917	Possible/Unknown	3000	Rear-end	1	East	Stopped for stop sign/signal	2000	Possible
2007039261	2007392284			0		2	East	Stopped for stop sign/signal	1000	Possible
2007047035	2007400928	20071029	Property Damage Only	3000	Unknown	1	West	Movement essentially straight	1500	
2007047035	2007400928			0		2	North	Movement essentially straight	1500	
2007048803	2007402893	20071112	Possible/Unknown	5500	Broadside	1	South	Movement essentially straight	2000	Possible
2007048803	2007402893			0		2	East	Movement essentially straight	3500	
2007056317	2007411124	20071211	Property Damage Only	4500	Broadside	1	West	Movement essentially straight	2500	
2007056317	2007411124			0		2	South	Turning right	2000	
2008007897	2008424992	20080201	Possible/Unknown	2900	Angle - oncoming left turn	1	East	Movement essentially straight	1900	Possible
2008007897	2008424992			0		2	West	Turning left	1000	Possible
2008011039	2008428498	20080218	Possible/Unknown		Rear-end	1	East	Movement essentially straight		Possible
2008011039	2008428498			0		2	East	Movement essentially straight		
2008027991	2008447733	20080620	Property Damage Only	4000	Rear-end	1	West	Movement essentially straight	3500	
2008027991	2008447733			0		2	West	Stopped for stop sign/signal	500	
2008034181	2008454865	20080809	Property Damage Only	11000	Angle - oncoming left turn	1	East	Turning left	6000	
2008034181	2008454865			0		2	West	Movement essentially straight	5000	
2008055426	2008478582	20081216	Property Damage Only	5500	Broadside	1	South	Movement essentially straight	4000	
2008055426	2008478582			0		2	West	Movement essentially straight	1500	
2008059396	2008483280	20081220	Property Damage Only	8000	Broadside	1	West	Turning left	4000	
2008059396	2008483280			0		2	South	Movement essentially straight	4000	
2009003976	2009489088	20090114	Property Damage Only	1700	Rear-end	1	East	Stopped for stop sign/signal	1600	
2009003976	2009489088			0		2	East	Movement essentially straight	100	
2009006209	2009491933	20090130	Property Damage Only	5000	Broadside	1	East	Movement essentially straight	2000	
2009006209	2009491933			0		2	North	Movement essentially straight	3000	
2009011045	2009497570	20090310	Property Damage Only	6000	Rear-end	1	West	Movement essentially straight	3500	

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2009011045	2009497570			0		2	West	Slowing/stopping	2500	
2009020694	2009508692	20090521	Property Damage Only	4300	Rear-end	1	West	Stopped for stop sign/signal	2800	
2009020694	2009508692			0		2	West	Movement essentially straight	1500	
2009020698	2009508697	20090519	Property Damage Only	3000	Sideswipe - same direction	1	East	Changing lanes	1500	
2009020698	2009508697			0		2	East	Movement essentially straight	1500	
2009022221	2009510380	20090606	Property Damage Only	3000	Broadside	1	West	Movement essentially straight	2000	
2009022221	2009510380			0		2	North	Movement essentially straight	1000	
2009028251	2009517134	20090716	Property Damage Only	1000	Rear-end	1	West	Slowing/stopping	0	
2009028251	2009517134			0		2	West	Slowing/stopping	1000	
2009030340	2009519518	20090808	Property Damage Only	4500	Broadside	1	East	Movement essentially straight	1500	
2009030340	2009519518			0		2	South	Movement essentially straight	3000	
2009031348	2009520673	20090811	Property Damage Only	2000	Rear-end	1	West	Slowing/stopping	1000	
2009031348	2009520673			0		2	West	Slowing/stopping	1000	
2009034961	2009524762	20090913	Property Damage Only	2000	Rear-end	1	East	Stopped for stop sign/signal	1000	
2009034961	2009524762			0		2	East	Movement essentially straight	1000	
2009036437	2009526420	20090914	Possible/Unknown	50	Non-collision	1	East	Turning right	50	Possible
2009037003	2009527054	20090925	Property Damage Only		Broadside	1	East	Turning left	3000	
2009037003	2009527054			0		2	West	Movement essentially straight		
2009037005	2009527056	20090926	Minor Injury	4000	Broadside	1	South	Movement essentially straight	2500	Non-incapacitating
2009037005	2009527056			0		2	East	Movement essentially straight	1500	
2009047106	2009538265	20091122	Minor Injury	2000	Non-collision	1	North	Turning right	2000	Non-incapacitating
2009047172	2009538341	20091127	Property Damage Only	2000	Sideswipe - same direction	1	East	Changing lanes	1500	
2009047172	2009538341			0		2	East	Turning left	500	
2009050275	2009541701	20091210	Property Damage Only	7000	Rear-end	1	South	Turning right	3000	
2009050275	2009541701			0		2	South	Movement essentially straight	4000	
2009051974	2009543539	20091219	Property Damage Only	7000	Sideswipe - same direction	1	South	Changing lanes	2000	
2009051974	2009543539			0		2	South	Movement essentially straight	5000	
2009054509	2009546615	20091224	Possible/Unknown	7500	Broadside	1	South	Movement essentially straight	2500	Possible
2009054509	2009546615			0		2	West	Slowing/stopping	5000	

2nd and New York

CRASH_KEY	CASENUMBER	DATE	CSEVERITY	PROPDMG	CRCOMANNER	VEHICLE	INITDIR	VACTION	REPAIRCOST	INJSTATUS
2007017296	2007367421	20070413	Property Damage Only	2500	Angle - oncoming left turn	1	South	Turning left	1500	
2007017296	2007367421			0		2	North	Movement essentially straight	1000	
2007025081	2007376241	20070531	Property Damage Only	3500	Angle - oncoming left turn	1	North	Turning left	1500	
2007025081	2007376241			0		2	South	Movement essentially straight	2000	
2007038567	2007391509	20070912	Minor Injury	0	Non-collision	1	East	Turning right	0	Non-incapacitating
2008000198	2008414989	20080103	Property Damage Only		Rear-end	1	South	Slowing/stopping		
2008000198	2008414989			0		2	South	Stopped for stop sign/signal	1000	
2008009263	2008426508	20080215	Property Damage Only	3500	Broadside	1	East	Turning left	1600	
2008009263	2008426508			0		2	South	Movement essentially straight	1900	
2008022760	2008441841	20080511	Property Damage Only		Broadside	1	North	Movement essentially straight	3000	
2008022760	2008441841			0		2	East	Movement essentially straight		
2008033267	2008453816	20080730	Possible/Unknown	0	Non-collision	1	South	Movement essentially straight	0	Possible
2008043197	2008465165	20081008	Property Damage Only		Angle - oncoming left turn	1	South	Movement essentially straight	2500	
2008043197	2008465165			0		2	West	Turning left		
2009006201	2009491922	20090130	Property Damage Only	3500	Rear-end	1	South	Slowing/stopping	3000	
2009006201	2009491922			0		2	South	Stopped for stop sign/signal	500	
2009006464	2009492247	20090127	Possible/Unknown	29000	Rear-end	1	South	Movement essentially straight	15000	Possible
2009006464	2009492247			0		2	South	Stopped for stop sign/signal	14000	Possible
2009024736	2009513160	20090617	Minor Injury	1000	Rear-end	1	South	Movement essentially straight	200	Non-incapacitating
2009024736	2009513160			0		2	South	Stopped for stop sign/signal	800	
2009026375	2009515015	20090706	Property Damage Only	6500	Rear-end	1	North	Movement essentially straight	5000	
2009026375	2009515015			0		2	North	Stopped for stop sign/signal	1500	
2009034810	2009524596	20090903	Property Damage Only	7000	Broadside	1	North	Movement essentially straight	5000	

Exhibit I

2009034810	2009524596			0		2	East	Movement essentially straight	2000	
2009034810	2009524596			0		2	East	Movement essentially straight	2000	
2009034810	2009524596			0		2	East	Movement essentially straight	2000	
2009034810	2009524596			0		2	East	Movement essentially straight	2000	

2nd and holcomb

CRASH_KEY	CASENUMBER	DATE	CSEVERITY	PROPDMG	CRCOMANNER	VEHICLI	INITDIR	VACTION	REPAIRCOST	INJSTATUS
2007015604	2007216320	20070405	Property Damage Only	6500	Rear-end	1	South	Movement essentially straight	1500	
2007015604	2007216320			0		2	South	Changing lanes	5000	
2007044879	2007398566	20071017	Possible/Unknown	10000	Rear-end	1	North	Movement essentially straight	5000	Possible
2007044879	2007398566			0		2	North	Slowing/stopping	5000	
2007057951	2007412958	20071216	Property Damage Only	5800	Broadside	1	West	Movement essentially straight	2900	
2007057951	2007412958			0		2	South	Movement essentially straight	2900	
2008013487	2008431191	20080308	Minor Injury	2000	Broadside	1	East	Movement essentially straight	1000	Non-incapacitating
2008013487	2008431191			0		2	North	Movement essentially straight	1000	Non-incapacitating
2008015427	2008433398	20080320	Property Damage Only	4500	Broadside	1	North	Movement essentially straight	1500	
2008015427	2008433398			0		2	East	Movement essentially straight	3000	
2008017901	2008436260	20080408	Property Damage Only	2000	Head-on	1	South	Turning left	500	
2008017901	2008436260			0		2	North	Movement essentially straight	1500	
2008022058	2008441025	20080508	Minor Injury	30000	Broadside	1	South	Turning left	12000	Non-incapacitating
2008022058	2008441025			0		2	North	Movement essentially straight	8000	
2008022058	2008441025			0		3	West	Stopped for stop sign/signal	6000	
2008022058	2008441025			0		4	West	Stopped for stop sign/signal	4000	
2008028935	2008448841	20080627	Possible/Unknown	13000	Angle - oncoming left turn	1	South	Turning left	9000	Possible
2008028935	2008448841			0		2	North	Movement essentially straight	4000	Possible
2008032507	2008452935	20080730	Major Injury	3000	Angle - oncoming left turn	1	North	Movement essentially straight	1000	Non-incapacitating
2008032507	2008452935			0		2	South	Turning left	2000	Incapacitating
2008034115	2008454788	20080808	Property Damage Only		Sideswipe - same direction	1	North	Stopped for stop sign/signal	1000	
2008034115	2008454788			0		2	North			
2008056893	2008480153	20081223	Possible/Unknown		Rear-end	1	South	Unknown		Possible
2008056893	2008480153			0		2	South	Stopped for stop sign/signal	1000	Possible
2009000594	2009483952	20090108	Property Damage Only	3300	Angle - oncoming left turn	1	North	Turning left	2500	
2009000594	2009483952			0		2	South	Movement essentially straight	800	
2009001268	2009485323	20090113	Property Damage Only	5175	Broadside	1	West	Movement essentially straight	1000	

2nd and College

CRASH_KEY	CASENUMBER	DATE	CSEVERITY	PROPDMG	CRCOMANNER	VEHICLI	INITDIR	VACTION	REPAIRCOST	INJSTATUS
2007000725	2007200750	20070107	Property Damage Only	1050	Broadside	1	East	Movement essentially straight	50	
2007000725	2007200750			0		2	South	Movement essentially straight	1000	
2007014391	2007215018	20070317	Property Damage Only	4500	Sideswipe - same direction	1	North	Changing lanes	2500	
2007014391	2007215018			0		2	North	Movement essentially straight	2000	
2007019380	2007369793	20070504	Property Damage Only	10000	Broadside	1	East	Movement essentially straight	4000	
2007019380	2007369793			0		2	North	Movement essentially straight	4000	
2007019380	2007369793			0		3	West	Stopped for stop sign/signal	2000	
2007020245	2007370742	20070510	Property Damage Only	2500	Broadside	1	North	Movement essentially straight	1500	
2007020245	2007370742			0		2	East	Turning left	1000	
2007040413	2007393581	20070921	Minor Injury	2000	Non-collision	1	South	Movement essentially straight	2000	Non-incapacitating
2007045938	2007399733	20071026	Property Damage Only	4000	Rear-end	1	West	Backing	1000	
2007045938	2007399733			0		2	West	Stopped for stop sign/signal	3000	
2007057789	2007412781	20071226	Property Damage Only	2200	Broadside	1	West	Backing	1200	
2007057789	2007412781			0		2	North	Movement essentially straight	1000	
2008027040	2008446666	20080617	Possible/Unknown	1000	Non-collision	1	North	Movement essentially straight	1000	Possible
2008049993	2008472648	20081120	Property Damage Only	5000	Sideswipe - opposite direction	1	South	Movement essentially straight	1500	
2008049993	2008472648			0		2	North	Turning left	3500	

Exhibit I

[illegible]	[illegible]			0		2 West	Movement essentially straight			
2008054964	2008478084	20081215	Property Damage Only	4500	Rear-end	1 North	Movement essentially straight	2000		
2008054964	2008478084			0		2 North	Movement essentially straight	2500		
2008055945	2008479119	20081210	Property Damage Only	2000	Rear-end	1 East	Movement essentially straight	500		
2008055945	2008479119			0		2 East	Movement essentially straight	1500		
2008056420	2008479634	20081210	Property Damage Only	2500	Rear-end	1 West	Movement essentially straight	1000		
2008056420	2008479634			0		2 West	Turning right	1500		
2009005224	2009490768	20090123	Property Damage Only	3000	Broadside	1 South	Stopped for stop sign/signal	1000		
2009005224	2009490768			0		2 East	Turning left	2000		
2009005245	2009490799	20090119	Major Injury	5000	Broadside	1 South	Turning left	2000	Incapacitating	
2009005245	2009490799			0		2 East	Movement essentially straight	3000		
2009007026	2009492894	20090213	Property Damage Only	1000	Rear-end	1 North	Movement essentially straight	0		
2009007026	2009492894			0		2 North	Stopped for stop sign/signal	1000		
2009007527	2009493466	20090210	Property Damage Only	4000	Rear-end	1 South	Backing	1000		
2009007527	2009493466			0		2 South	Stopped for stop sign/signal	3000		
2009009349	2009495595	20090226	Property Damage Only	2000	Rear-end	1 East	Movement essentially straight	1000		
2009009349	2009495595			0		2 East	Stopped for stop sign/signal	1000		
2009011053	2009497581	20090311	Possible/Unknown	0	Non-collision	1 South	Turning right	0	Possible	
2009020963	2009508992	20090527	Possible/Unknown	6500	Rear-end	1 West	Movement essentially straight	4000	Possible	
2009020963	2009508992			0		2 West	Stopped for stop sign/signal	2000		
2009020963	2009508992			0		3 West	Stopped for stop sign/signal	500		
2009021718	2009509838	20090526	Property Damage Only	3000	Rear-end	1 East	Movement essentially straight	2000		
2009021718	2009509838			0		2 East	Movement essentially straight	1000		
2009021922	2009510054	20090607	Property Damage Only		Rear-end	1 West	Movement essentially straight			
2009021922	2009510054			0		2 West	Stopped for stop sign/signal	1500		
2009031810	2009521187	20090815	Property Damage Only	1000	Rear-end	1 West	Turning right	500		
2009031810	2009521187			0		2 North	Turning right	500		
2009033735	2009523380	20090831	Property Damage Only	2000	Rear-end	1 West	Movement essentially straight	1000		
2009033735	2009523380			0		2 West	Movement essentially straight	1000		
2009036568	2009526568	20090922	Possible/Unknown	2000	Non-collision	1 North	Movement essentially straight	2000	Possible	
2009040664	2009531106	20091015	Minor Injury		Broadside	1 East	Movement essentially straight	2000	Possible	
2009040664	2009531106			0		2 West	Turning left		Non-incapacitating	
2009041739	2009532265	20091026	Possible/Unknown	2000	Angle - oncoming left turn	1 South	Turning left	1500	Possible	
2009041739	2009532265			0		2 North	Movement essentially straight	500		
2009048220	2009539474	20091031	Property Damage Only		Rear-end	1 Not Reported	Stopped for stop sign/signal	1000		
2009048220	2009539474			0		2 Not Reported	Not Reported			
2009048220	2009539474			0		2 Not Reported	Not Reported			
2009048220	2009539474			0		2 Not Reported	Not Reported			
2009048220	2009539474			0		2 Not Reported	Not Reported			
2009048220	2009539474			0		2 Not Reported	Not Reported			
2009048220	2009539474			0		2 Not Reported	Not Reported			
2009048220	2009539474			0		2 Not Reported	Not Reported			

E12th and Grand

CRASH_KEY	CASENUMBER	DATE	CSEVERITY	PROPDMG	CRCOMANNER	VEHICLE	INITDIR	VACTION	REPAIRCOST	INJSTATUS
2007017847	2007368046	20070424	Property Damage Only	1500	Broadside	1	South	Movement essentially straight	1000	
2007017847	2007368046			0		2	West	Movement essentially straight	500	
2007031376	2007383352	20070724	Property Damage Only	6000	Broadside	1	East	Movement essentially straight	3000	

E9th and Grand

CRASH_KEY	CASENUMBER	DATE	CSEVERITY	PROPDMG	CRCOMANNER	VEHICLE	INITDIR	VACTION	REPAIRCOST	INJSTATUS
2007022875	2007373745	20070524	Property Damage Only	2400	Broadside	1	West	Movement essentially straight	1200	
2007022875	2007373745			0		2	South	Movement essentially straight	1200	

Exhibit I

2008007334	2008424329	20080117	Property Damage Only	2300	Broadside	1	East	Movement essentially straight	800	
2008007334	2008424329			0		2	North	Movement essentially straight	1500	
2008034967	2008455780	20080806	Minor Injury	4000	Broadside	1	East	Movement essentially straight	2000	Possible
2008034967	2008455780			0		2	North	Movement essentially straight	2000	Non-incapacitating
2008034979	2008455792	20080730	Property Damage Only	3500	Broadside	1	South	Movement essentially straight	1500	
2008034979	2008455792			0		2	East	Movement essentially straight	2000	
2009012984	2009499852	20090326	Property Damage Only	7000	Broadside	1	East	Turning right	2000	
2009012984	2009499852			0		2	South	Movement essentially straight	5000	
2009028842	2009517803	20090708	Property Damage Only	7000	Broadside	1	North	Movement essentially straight	3500	
2009028842	2009517803			0		2	East	Movement essentially straight	3500	

9th and University

CRASH_KEY	CASENUMBER	DATE	CSEVERITY	PROPDMG	CRCOMANNER	VEHICLE	INITDIR	VACTION	REPAIRCOST	INJSTATUS
2007001371	2007201404	20070109	Property Damage Only	2000	Rear-end	1	East	Movement essentially straight	1000	
2007001371	2007201404			0		2	East	Stopped for stop sign/signal	1000	
2007016686	2007366714	20070416	Possible/Unknown	5000	Rear-end	1	West	Movement essentially straight	1500	Possible
2007016686	2007366714			0		2	West	Movement essentially straight	1500	Possible
2007016686	2007366714			0		3	West	Movement essentially straight	1000	Possible
2007016686	2007366714			0		4	West	Movement essentially straight	1000	Possible
2008012790	2008430409	20080304	Property Damage Only	5000	Angle - oncoming left turn	1	East	Turning left	2500	
2008012790	2008430409			0		2	West	Movement essentially straight	2500	
2008022484	2008441524	20080516	Major Injury	4000	Non-collision	1	West	Turning left	4000	Incapacitating
2008030558	2008450699	20080715	Property Damage Only	2000	Broadside	1	North	Movement essentially straight	500	
2008030558	2008450699			0		2	East	Movement essentially straight	1500	
2008032930	2008453422	20080731	Property Damage Only	4000	Rear-end	1	North	Movement essentially straight	1500	
2008032930	2008453422			0		2	North	Stopped for stop sign/signal	2500	
2008043076	2008465021	20081014	Property Damage Only	4500	Angle - oncoming left turn	1	West	Turning left	2000	
2008043076	2008465021			0		2	East	Movement essentially straight	2500	
2008047480	2008469894	20081107	Property Damage Only	4500	Angle - oncoming left turn	1	West	Turning left	2500	
2008047480	2008469894			0		2	East	Movement essentially straight	2000	
2009026994	2009515733	20090710	Property Damage Only		Broadside	1	West	Movement essentially straight	2500	
2009026994	2009515733			0		2	Not Reported	Not Reported		
2009028088	2009516954	20090721	Property Damage Only	10000	Head-on	1	East	Turning left	5000	
2009028088	2009516954			0		2	West	Movement essentially straight	5000	
2009030357	2009519539	20090806	Property Damage Only		Rear-end	1	West			
2009030357	2009519539			0		2	West	Movement essentially straight	2500	
2009034741	2009524518	20090909	Property Damage Only	6000	Head-on	1	East	Turning left	2000	
2009034741	2009524518			0		2	West	Movement essentially straight	4000	
2009035918	2009525839	20090917	Minor Injury	1000	Non-collision	1	South	Turning right	1000	Non-incapacitating
2009039208	2009529496	20091009	Property Damage Only	2500	Sideswipe - same direction	1	South	Movement essentially straight	1000	
2009039208	2009529496			0		2	South	Changing lanes	1500	
2009043815	2009534667	20091105	Minor Injury	5000	Non-collision	1	West	Movement essentially straight	5000	Non-incapacitating
2009043815	2009534667			0		0			0	Non-incapacitating
2009045013	2009535975	20091112	Major Injury	7500	Angle - oncoming left turn	1	West	Turning left	2500	Incapacitating
2009045013	2009535975			0		2	East	Movement essentially straight	5000	

13th and University

CRASH_KEY	CASENUMBER	DATE	CSEVERITY	PROPDMG	CRCOMANNER	VEHICLE	INITDIR	VACTION	REPAIRCOST	INJSTATUS
2007002225	2007202286	20070116	Property Damage Only	2000	Rear-end	1	West	Movement essentially straight	1000	
2007002225	2007202286			0		2	West	Not Reported	1000	
2007002230	2007202292	20070116	Property Damage Only	1500	Rear-end	1	West	Stopped for stop sign/signal	500	
2007002230	2007202292			0		2	West	Slowing/stopping	1000	
2007003100	2007203204	20070119	Possible/Unknown	2000	Angle - oncoming left turn	1	South	Turning left	1000	Possible

Exhibit I

2007003100	2007203204			0		2	South	Movement essentially straight	1000	Unknown
2007013238	2007213789	20070316	Property Damage Only	3000	Angle - oncoming left turn	1	East	Turning left	1000	
2007013238	2007213789			0		2	West	Movement essentially straight	2000	
2007018369	2007368637	20070424	Property Damage Only	1100	Broadside	1	West	Movement essentially straight	1000	
2007018369	2007368637			0		2	North	Movement essentially straight	100	
2007029094	2007380766	20070702	Property Damage Only	6000	Sideswipe - same direction	1	East	Changing lanes	3000	
2007029094	2007380766			0		2	East	Movement essentially straight	3000	
2007029095	2007380767	20070702	Possible/Unknown		Rear-end	1	East	Movement essentially straight		Possible
2007029095	2007380767			0		2	East	Stopped for stop sign/signal	500	Possible
2007029095	2007380767			0		0			0	Possible
2007041172	2007394433	20071001	Property Damage Only		Rear-end	1	East	Movement essentially straight	1000	
2007041172	2007394433			0		2	East	Movement essentially straight		
2007044011	2007397604	20071016	Major Injury	18000	Broadside	1	South	Movement essentially straight	9000	Non-incapacitating
2007044011	2007397604			0		2	East	Movement essentially straight	9000	Incapacitating
2007044011	2007397604			0		0			0	Possible
2007044035	2007397631	20071013	Property Damage Only	3500	Rear-end	1	East	Movement essentially straight	2000	
2007044035	2007397631			0		2	East	Movement essentially straight	1500	
2007053254	2007407745	20071202	Property Damage Only	1400	Rear-end	1	East	Movement essentially straight	400	
2007053254	2007407745			0		2	East	Movement essentially straight	1000	
2008033448	2008454021	20080804	Property Damage Only	3500	Rear-end	1	East	Turning left	2500	
2008033448	2008454021			0		2	East	Movement essentially straight	1000	
2008042646	2008464545	20081010	Property Damage Only	9000	Broadside	1	West	Movement essentially straight	4000	
2008042646	2008464545			0		2	South	Movement essentially straight	1500	
2008042646	2008464545			0		3	North	Movement essentially straight	3500	
2009026144	2009514767	20090706	Possible/Unknown		Broadside	1	East	Movement essentially straight		Possible
2009026144	2009514767			0		2	South	Movement essentially straight	3000	
2009027645	2009516471	20090716	Major Injury	7000	Angle - oncoming left turn	1	North	Turning left	2000	Incapacitating
2009027645	2009516471			0		2	South	Movement essentially straight	5000	
2009034935	2009524733	20090911	Minor Injury	3500	Broadside	1	West	Turning left	1000	Non-incapacitating
2009034935	2009524733			0		2	East	Movement essentially straight	2500	Non-incapacitating
2009038253	2009528445	20091002	Property Damage Only		Broadside	1	West	Turning left	3000	
2009038253	2009528445			0		2	East	Movement essentially straight	2500	
2009038253	2009528445			0		3	North	Stopped for stop sign/signal	2500	

19th and University

CRASH_KEY	CASENUMBER	DATE	CSEVERITY	PROPDMG	CRCOMANNER	VEHICLI	INITDIR	VACTION	REPAIRCOST	INJSTATUS
2007001540	2007201576	20070115	Property Damage Only	4000	Broadside	1	North	Movement essentially straight	1000	
2007001540	2007201576			0		2	East	Movement essentially straight	3000	
2007003005	2007203097	20070122	Major Injury	10000	Broadside	1	East	Movement essentially straight	5000	Incapacitating
2007003005	2007203097			0		2	North	Movement essentially straight	3000	
2007003005	2007203097			0		3	West	Stopped for stop sign/signal	2000	
2007004207	2007204361	20070130	Property Damage Only	1500	Rear-end	1	North	Movement essentially straight	0	
2007004207	2007204361			0		2	North	Slowing/stopping	1500	
2007017264	2007367382	20070415	Property Damage Only		Broadside	1	Not Reported	Movement essentially straight	3500	
2007017264	2007367382			0		2	Not Reported	Not Reported		
2007018028	2007368251	20070425	Property Damage Only	2500	Rear-end	1	North	Movement essentially straight	1500	
2007018028	2007368251			0		2	Unknown	Legally Parked	1000	
2007018481	2007368770	20070428	Property Damage Only	2100	Rear-end	1	North	Slowing/stopping	100	
2007018481	2007368770			0		2	North	Slowing/stopping	2000	
2007018481	2007368770			0		3	North	Unknown	0	
2007035427	2007387940	20070822	Property Damage Only		Broadside	1	Not Reported	Not Reported		
2007035427	2007387940			0		2	North	Movement essentially straight	2000	

Exhibit I

2008052916	2008475861	20081205	Property Damage Only	2200	Rear-end	1	North	Slowing/stopping	2000	
2008052916	2008475861			0		2	North	Movement essentially straight	200	
2009003645	2009488653	20090123	Property Damage Only	5000	Angle - oncoming left turn	1	North	Turning left	2500	
2009003645	2009488653			0		2	South	Movement essentially straight	2500	
2009010041	2009496390	20090206	Property Damage Only	5000	Angle - oncoming left turn	1	North	Turning left	2000	
2009010041	2009496390			0		2	South	Movement essentially straight	3000	
2009010126	2009496489	20090228	Minor Injury	7500	Sideswipe - same direction	1	South	Movement essentially straight	3000	Non-incapacitating
2009010126	2009496489			0		2	West	Turning left	4500	
2009034143	2009523836	20090903	Property Damage Only	8000	Broadside	1	North	Movement essentially straight	4000	
2009034143	2009523836			0		2	East	Movement essentially straight	4000	

2nd and University

CRASH_KEY	CASENUMBER	DATE	CSEVERITY	PROPDMG	CRCOMANNER	VEHICLE	INITDIR	VACTION	REPAIRCOST	INJSTATUS
2007013606	2007214180	20070313	Property Damage Only	2000	Rear-end	1	East	Movement essentially straight	1000	
2007013606	2007214180			0		2	East	Stopped for stop sign/signal	1000	
2007025957	2007377249	20070617	Property Damage Only	2500	Broadside	1	South	Turning right	1000	
2007025957	2007377249			0		2	Unknown	Unknown	1500	
2007026596	2007377973	20070621	Possible/Unknown	1000	Non-collision	1	South	Turning right	1000	Possible
2007029853	2007381630	20070715	Property Damage Only	1500	Sideswipe - same direction	1	East	Turning left	1000	
2007029853	2007381630			0		2	East	Turning left	500	
2007035494	2007388021	20070816	Property Damage Only		Rear-end	1	Not Reported	Not Reported		
2007035494	2007388021			0		2	Not Reported	Stopped for stop sign/signal	1000	
2007035770	2007388335	20070823	Property Damage Only	2500	Rear-end	1	East	Slowing/stopping	1200	
2007035770	2007388335			0		2	East	Stopped for stop sign/signal	1300	
2007036852	2007389567	20070901	Property Damage Only	1500	Rear-end	1	East	Slowing/stopping	500	
2007036852	2007389567			0		2	East	Movement essentially straight	1000	
2007037705	2007390533	20070908	Property Damage Only	3050	Broadside	1	West	Turning right	50	
2007037705	2007390533			0		2	South	Stopped for stop sign/signal	3000	
2007038058	2007390936	20070907	Property Damage Only	7900	Rear-end	1	North	Slowing/stopping	1400	
2007038058	2007390936			0		2	North	Stopped for stop sign/signal	3700	
2007038058	2007390936			0		3	South	Turning left	2800	
2007052500	2007406929	20071120	Property Damage Only	3000	Rear-end	1	West	Stopped for stop sign/signal	2500	
2007052500	2007406929			0		2	West	Stopped for stop sign/signal	500	
2007054126	2007408697	20071210	Property Damage Only	4000	Broadside	1	West	Movement essentially straight	1500	
2007054126	2007408697			0		2	North	Turning left	2500	
2007057970	2007412982	20071215	Property Damage Only	18000	Broadside	1	South	Movement essentially straight	15000	
2007057970	2007412982			0		2	East	Movement essentially straight	3000	
2007060461	2007417275	20071226	Property Damage Only	4500	Head-on	1	East	Movement essentially straight	1500	
2007060461	2007417275			0		2	West	Turning left	3000	
2008003518	2008419812	20080117	Property Damage Only		Rear-end	1	East	Slowing/stopping	3500	
2008003518	2008419812			0		2	East	Stopped for stop sign/signal		
2008006532	2008423424	20080206	Property Damage Only	2000	Angle - oncoming left turn	1	West	Turning left	1000	
2008006532	2008423424			0		2	East	Movement essentially straight	1000	
2008006813	2008423747	20080206	Property Damage Only	2500	Angle - oncoming left turn	1	East	Movement essentially straight	1000	
2008006813	2008423747			0		2	West	Turning left	1000	
2008006813	2008423747			0		3	East	Turning left	500	
2008012169	2008429727	20080228	Possible/Unknown	1000	Rear-end	1	East	Movement essentially straight	500	Possible
2008012169	2008429727			0		2	East	Stopped for stop sign/signal	500	
2008014606	2008432446	20080315	Property Damage Only		Broadside	1	East	Movement essentially straight		
2008014606	2008432446			0		2	South	Movement essentially straight	5000	
2008029100	2008449026	20080704	Minor Injury	100	Unknown	1	South	Turning right	100	Non-incapacitating
2008037203	2008458341	20080827	Minor Injury	1500	Rear-end	1	East	Stopped for stop sign/signal	1000	Non-incapacitating
2008037203	2008458341			0		2	East	Movement essentially straight	500	
2008054962	2008478082	20081216	Possible/Unknown		Rear-end	1	West	Slowing/stopping	500	Possible

Exhibit I

2007040489	2007393673	20070925	Property Damage Only		Broadside	1	East	Movement essentially straight		
2007040489	2007393673			0		2	North	Movement essentially straight	4000	
2007041181	2007394442	20071001	Property Damage Only	1500	Rear-end	1	North	Movement essentially straight	1000	
2007041181	2007394442			0		2	North	Stopped for stop sign/signal	500	
2007044297	2007397930	20071017	Possible/Unknown	2000	Sideswipe - same direction	1	North	Movement essentially straight	1500	Possible
2007044297	2007397930			0		2	North	Turning left	500	
2007053763	2007408300	20071207	Minor Injury		Broadside	1	East	Unknown		Non-incapacitating
2007053763	2007408300			0		2	North	Movement essentially straight	5000	
2007058151	2007413180	20071225	Major Injury	2000	Broadside	1	East	Movement essentially straight	1000	Incapacitating
2007058151	2007413180			0		2	North	Movement essentially straight	1000	
2008001051	2008416732	20080103	Property Damage Only	2000	Rear-end	1	North	Movement essentially straight	1500	
2008001051	2008416732			0		2	North	Movement essentially straight	500	
2008001747	2008417715	20080117	Property Damage Only	1700	Rear-end	1	North	Slowing/stopping	500	
2008001747	2008417715			0		2	North	Stopped for stop sign/signal	1200	
2008008666	2008425858	20080216	Possible/Unknown	2000	Broadside	1	East	Movement essentially straight	1000	Possible
2008008666	2008425858			0		2	North	Movement essentially straight	1000	
2008010652	2008427958	20080223	Possible/Unknown	2700	Broadside	1	East	Movement essentially straight	700	Possible
2008010652	2008427958			0		2	North	Movement essentially straight	2000	
2008012481	2008430063	20080229	Minor Injury		Broadside	1	North	Movement essentially straight		Non-incapacitating
2008012481	2008430063			0		2	East	Movement essentially straight	2500	
2008018765	2008437242	20080417	Property Damage Only	3500	Broadside	1	North	Movement essentially straight	2000	
2008018765	2008437242			0		2	East	Movement essentially straight	1500	
2008027508	2008447202	20080612	Property Damage Only	2500	Non-collision	1	West	Turning right	2500	
2008035807	2008456734	20080822	Possible/Unknown	1000	Rear-end	1	West	Movement essentially straight	500	Possible
2008035807	2008456734			0		2	West	Stopped for stop sign/signal	500	
2008046924	2008469291	20081104	Property Damage Only	9000	Broadside	1	East	Movement essentially straight	5000	
2008046924	2008469291			0		2	North	Movement essentially straight	4000	
2008051067	2008473830	20081127	Property Damage Only	4500	Broadside	1	West	Movement essentially straight	2000	
2008051067	2008473830			0		2	North	Movement essentially straight	2500	
2009003782	2009488848	20090118	Property Damage Only	4000	Broadside	1	North	Movement essentially straight	2000	
2009003782	2009488848			0		2	East	Movement essentially straight	2000	
2009007490	2009493423	20090111	Property Damage Only	5500	Broadside	1	West	Movement essentially straight	500	
2009007490	2009493423			0		2	North	Movement essentially straight	5000	
2009008323	2009494371	20090220	Property Damage Only		Broadside	1	Not Reported	Unknown		
2009008323	2009494371			0		2	North	Movement essentially straight	1000	
2009012068	2009498770	20090320	Possible/Unknown	5500	Broadside	1	East	Movement essentially straight	3000	Possible
2009012068	2009498770			0		2	North	Movement essentially straight	2500	
2009014502	2009501606	20090410	Property Damage Only	2200	Rear-end	1	West	Movement essentially straight	200	
2009014502	2009501606			0		2	West	Stopped for stop sign/signal	2000	
2009015965	2009503379	20090419	Property Damage Only	10000	Broadside	1	North	Movement essentially straight	5000	
2009015965	2009503379			0		2	East	Movement essentially straight	5000	
2009020838	2009508859	20090527	Property Damage Only	1750	Broadside	1	East	Movement essentially straight	1500	
2009020838	2009508859			0		2	North	Movement essentially straight	250	
2009034957	2009524758	20090912	Property Damage Only	2000	Rear-end	1	West	Movement essentially straight	1000	
2009034957	2009524758			0		2	West	Stopped for stop sign/signal	1000	
2009052385	2009543980	20091221	Property Damage Only	6500	Rear-end	1	North	Movement essentially straight	2000	
2009052385	2009543980			0		2	North	Stopped for stop sign/signal	4000	
2009052385	2009543980			0		3	North	Stopped for stop sign/signal	500	
2009053120	2009544785	20091227	Property Damage Only	13000	Broadside	1	East	Movement essentially straight	3500	
2009053120	2009544785			0		2	North	Movement essentially straight	6000	
2009053120	2009544785			0		3	North	Movement essentially straight	3500	

MLK and University

CRASH_KEY	CASENUMBER	DATE	CSEVERITY	PROPDMG	CRCOMANNER	VEHICLE	INITDIR	VACTION	REPAIRCOST	INJSTATUS
2007001842	2007201894	20070115	Possible/Unknown	4000	Broadside	1	West	Movement essentially straight	1000	Possible

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2007001842	2007201894			0		2	South	Movement essentially straight	3000		
2007003070	2007203168	20070121	Minor Injury	2000	Broadside	1	South	Movement essentially straight	1000	Non-incapacitating	
2007003070	2007203168			0		2	West	Movement essentially straight	1000		
2007004203	2007204357	20070129	Property Damage Only	5000	Broadside	1	East	Movement essentially straight	2500		
2007004203	2007204357			0		2	South	Movement essentially straight	2500		
2007012638	2007213179	20070314	Property Damage Only	2000	Rear-end	1	East	Slowing/stopping	500		
2007012638	2007213179			0		2	East	Slowing/stopping	1500		
2007019845	2007370287	20070507	Property Damage Only	3000	Broadside	1	West	Movement essentially straight	2000		
2007019845	2007370287			0		2	South	Movement essentially straight	1000		
2007022898	2007373773	20070524	Property Damage Only	3500	Rear-end	1	East	Movement essentially straight	500		
2007022898	2007373773			0		2	East	Stopped for stop sign/signal	3000		
2007030726	2007382632	20070719	Property Damage Only	5000	Sideswipe - same direction	1	South	Changing lanes	2000		
2007030726	2007382632			0		2	South	Movement essentially straight	3000		
2007033314	2007385565	20070805	Major Injury	2000	Rear-end	1	East	Slowing/stopping	1000	Incapacitating	
2007033314	2007385565			0		2	East	Stopped for stop sign/signal	1000	Possible	
2007040328	2007393486	20070915	Possible/Unknown		Broadside	1	South	Movement essentially straight	3000	Possible	
2007040328	2007393486			0		2	West	Movement essentially straight		Possible	
2007049964	2007404164	20071115	Property Damage Only	2250	Sideswipe - same direction	1	South	Changing lanes	750		
2007049964	2007404164			0		2	South	Not Reported	1500		
2007052174	2007406568	20071201	Property Damage Only	2000	Sideswipe - same direction	1	South	Turning left	1000		
2007052174	2007406568			0		2	South	Turning left	1000		
2007052181	2007406575	20071130	Possible/Unknown		Rear-end	1	East	Stopped for stop sign/signal	2000	Possible	
2007052181	2007406575			0		2	East	Movement essentially straight			
2008013494	2008431199	20080307	Property Damage Only	2000	Rear-end	1	South	Slowing/stopping	1000		
2008013494	2008431199			0		2	South	Slowing/stopping	1000		
2008013767	2008431512	20080309	Possible/Unknown	2000	Broadside	1	East	Movement essentially straight	1000	Possible	
2008013767	2008431512			0		2	South	Movement essentially straight	1000	Possible	
2008013767	2008431512			0		0			0	Possible	
2008015429	2008433400	20080323	Property Damage Only	4000	Broadside	1	West	Movement essentially straight	2000		
2008015429	2008433400			0		2	South	Movement essentially straight	2000		
2008030867	2008451067	20080719	Property Damage Only	3000	Broadside	1	East	Movement essentially straight	1500		
2008030867	2008451067			0		2	South	Movement essentially straight	1500		
2008032061	2008452434	20080719	Property Damage Only	8000	Broadside	1	West	Movement essentially straight	3000		
2008032061	2008452434			0		2	South	Movement essentially straight	5000		
2008034109	2008454780	20080806	Fatal	7500	Broadside	1	South	Movement essentially straight	2500	Fatal	
2008034109	2008454780			0		2	West	Movement essentially straight	5000		
2008039958	2008461474	20080921	Possible/Unknown	3000	Broadside	1	West	Movement essentially straight	1500	Possible	
2008039958	2008461474			0		2	South	Movement essentially straight	1500		
2008043778	2008465794	20081017	Minor Injury	10500	Broadside	1	West	Movement essentially straight	3000	Non-incapacitating	
2008043778	2008465794			0		2	South	Movement essentially straight	7500	Possible	
2008048250	2008470742	20081112	Minor Injury	7800	Broadside	1	East	Movement essentially straight	4000	Possible	
2008048250	2008470742			0		2	South	Movement essentially straight	3800	Non-incapacitating	
2008048250	2008470742			0		0			0	Possible	
2009005344	2009490906	20090131	Possible/Unknown	5000	Broadside	1	West	Movement essentially straight	1500	Possible	
2009005344	2009490906			0		2	South	Movement essentially straight	3500		
2009006451	2009492231	20090207	Minor Injury	11000	Broadside	1	West	Movement essentially straight	6000	Possible	
2009006451	2009492231			0		2	South	Movement essentially straight	5000	Possible	
2009006451	2009492231			0		0			0	Non-incapacitating	
2009009803	2009496117	20090303	Possible/Unknown	2000	Rear-end	1	South	Movement essentially straight	1000	Possible	
2009009803	2009496117			0		2	South	Stopped for stop sign/signal	1000	Possible	
2009010496	2009496922	20090308	Possible/Unknown	10000	Broadside	1	West	Movement essentially straight	5000	Possible	
2009010496	2009496922			0		2	South	Movement essentially straight	5000	Possible	
2009012089	2009498792	20090315	Property Damage Only	6000	Broadside	1	West	Movement essentially straight	4000		
2009012089	2009498792			0		2	South	Movement essentially straight	2000		
2009014775	2009501922	20090406	Possible/Unknown	7500	Broadside	1	South	Movement essentially straight	2500	Possible	
2009014775	2009501922			0		2	East	Movement essentially straight	5000		

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2009020836	2009508857	20090529	Property Damage Only	5000	Sideswipe - same direction	1	East	Turning left	3000	
2009020836	2009508857			0		2	East	Movement essentially straight	2000	
2009021541	2009509642	20090509	Possible/Unknown	15000	Broadside	1	South	Movement essentially straight	7500	Possible
2009021541	2009509642			0		2	West	Movement essentially straight	7500	Possible
2009024116	2009512480	20090621	Property Damage Only	8500	Broadside	1	West	Movement essentially straight	5000	
2009024116	2009512480			0		2	South	Movement essentially straight	3500	
2009027101	2009515856	20090629	Possible/Unknown		Non-collision	1	East	Turning right		Possible
2009027463	2009516253	20090715	Possible/Unknown	150	Rear-end	1	South	Movement essentially straight	50	Possible
2009027463	2009516253			0		2	South	Movement essentially straight	100	
2009028254	2009517137	20090720	Property Damage Only	3000	Sideswipe - same direction	1	South	Movement essentially straight	1500	
2009028254	2009517137			0		2	South	Movement essentially straight	1500	
2009033015	2009522558	20090825	Property Damage Only	2000	Broadside	1	South	Turning right	1000	
2009033015	2009522558			0		2	West	Movement essentially straight	1000	
2009034936	2009524734	20090905	Property Damage Only	1500	Non-collision	1	East	Movement essentially straight	1500	
2009036132	2009526075	20090920	Property Damage Only	5000	Broadside	1	East	Movement essentially straight	3000	
2009036132	2009526075			0		2	South	Movement essentially straight	2000	
2009042471	2009533200	20091031	Possible/Unknown	6000	Broadside	1	South	Movement essentially straight	3000	Possible
2009042471	2009533200			0		2	West	Movement essentially straight	3000	
2009047137	2009538302	20091127	Minor Injury	7000	Broadside	1	East	Movement essentially straight	3000	Non-incapacitating
2009047137	2009538302			0		2	East	Turning left	4000	

12th and Keo Way

CRASH_KEY	CASENUMBER	DATE	CSEVERITY	PROPDMG	CRCOMANNER	VEHICLE	INITDIR	VACTION	REPAIRCOST	INJSTATUS
2007001666	2007201707	20070112	Property Damage Only	5000	Broadside	1	West	Movement essentially straight	2500	
2007001666	2007201707			0		2	North	Turning right	2500	
2007035212	2007387702	20070821	Possible/Unknown	3500	Head-on	1	South	Movement essentially straight	500	Possible
2007035212	2007387702			0		2	North	Turning left	3000	
2008015431	2008433402	20080322	Property Damage Only	1500	Angle - oncoming left turn	1	East	Movement essentially straight	500	
2008015431	2008433402			0		2	West	Turning left	1000	
2008018564	2008437021	20080408	Property Damage Only	3000	Sideswipe - opposite direction	1	North	Movement essentially straight	1500	
2008018564	2008437021			0		2	South	Movement essentially straight	1500	
2008051045	2008473801	20081128	Major Injury	1000	Non-collision	1	South	Turning right	1000	Incapacitating
2009001276	2009485311	20090112	Property Damage Only	2000	Broadside	1	East	Movement essentially straight	1000	
2009001276	2009485311			0		2	North	Movement essentially straight	1000	
2009025192	2009513692	20090627	Possible/Unknown	10000	Broadside	1	East	Movement essentially straight	6000	Possible
2009025192	2009513692			0		2	North	Movement essentially straight	4000	Possible
2009025192	2009513692			0		0			0	Possible
2009040377	2009530789	20091019	Property Damage Only	3500	Broadside	1	North	Turning left	2000	
2009040377	2009530789			0		2	South	Movement essentially straight	1500	

24th and University

CRASH_KEY	CASENUMBER	DATE	CSEVERITY	PROPDMG	CRCOMANNER	VEHICLE	INITDIR	VACTION	REPAIRCOST	INJSTATUS
2007022675	2007373530	20070529	Property Damage Only	7000	Broadside	1	West	Movement essentially straight	4000	
2007022675	2007373530			0		2	North	Movement essentially straight	3000	
2007035755	2007388319	20070823	Property Damage Only	2500	Broadside	1	South	Movement essentially straight	1500	
2007035755	2007388319			0		2	East	Movement essentially straight	1000	
2007039324	2007392353	20070913	Property Damage Only	3500	Broadside	1	West	Movement essentially straight	1500	
2007039324	2007392353			0		2	South	Movement essentially straight	2000	
2007040569	2007393765	20070922	Property Damage Only	1750	Angle - oncoming left turn	1	East	Turning left	750	
2007040569	2007393765			0		2	West	Movement essentially straight	1000	
2008007386	2008424384	20080105	Property Damage Only	3000	Broadside	1	East	Legally Parked	2500	
2008007386	2008424384			0		2	East	Movement essentially straight	500	
2009010243	2009496626	20090905	Property Damage Only	3300	Broadside	1	South	Turning left	1500	
2009010243	2009496626			0		2	East	Movement essentially straight	1800	

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2007016951	2007367012			0		2	West	Movement essentially straight	500	
2007049318	2007403455	20071112	Property Damage Only	1300	Rear-end	1	East	Movement essentially straight	1000	
2007049318	2007403455			0		2	East	Stopped for stop sign/signal	300	
2007052861	2007407330	20071130	Property Damage Only	10000	Non-collision	1	West	Movement essentially straight	10000	
2008025766	2008445241	20080609	Property Damage Only	1500	Sideswipe - same direction	1	South	Turning left	300	
2008025766	2008445241			0		2	South	Turning left	1200	

28th and Grand

CRASH_KEY	CASENUMBER	DATE	CSEVERITY	PROPDMG	CRCOMANNER	VEHICLE	INITDIR	VACTION	REPAIRCOST	INISTATUS
2007002235	2007202297	20070114	Property Damage Only	3100	Non-collision	1	South	Movement essentially straight	2500	
2007046321	2007400148	20071018	Minor Injury	3500	Broadside	1	South	Movement essentially straight	1500	Non-incapacitating
2007046321	2007400148			0		2	West	Movement essentially straight	2000	
2008014159	2008431954	20080311	Property Damage Only	8000	Broadside	1	North	Turning left	4000	
2008014159	2008431954			0		2	West	Movement essentially straight	4000	
2008015956	2008434022	20080326	Property Damage Only	8000	Rear-end	1	West	Movement essentially straight	4000	
2008015956	2008434022			0		2	West	Slowing/stopping	4000	
2009044632	2009535560	20091105	Minor Injury	15000	Angle - oncoming left turn	1	South	Turning left	5000	Non-incapacitating
2009044632	2009535560			0		2	West	Movement essentially straight	10000	

35th and Grand

CRASH_KEY	CASENUMBER	DATE	CSEVERITY	PROPDMG	CRCOMANNER	VEHICLE	INITDIR	VACTION	REPAIRCOST	INISTATUS
2007008270	2007208610	20070214	Possible/Unknown	1400	Rear-end	1	East	Movement essentially straight	800	Possible
2007008270	2007208610			0		2	East	Movement essentially straight	600	
2007016987	2007367058	20070409	Property Damage Only	1998	Rear-end	1	East	Stopped for stop sign/signal	999	
2007016987	2007367058			0		2	East	Slowing/stopping	999	
2008028922	2008448828	20080628	Property Damage Only	1700	Rear-end	1	South	Stopped for stop sign/signal	200	
2008028922	2008448828			0		2	South	Movement essentially straight	1500	
2008037816	2008459031	20080828	Property Damage Only	7700	Rear-end	1	East	Slowing/stopping	1200	
2008037816	2008459031			0		2	East	Slowing/stopping	3500	
2008037816	2008459031			0		3	East	Movement essentially straight	3000	
2008038080	2008459336	20080911	Property Damage Only	3500	Sideswipe - same direction	1	East	Movement essentially straight	2000	
2008038080	2008459336			0		2	East	Turning left	1500	
2009033368	2009522975	20090828	Property Damage Only	7000	Broadside	1	South	Turning right	4500	
2009033368	2009522975			0		2	West	Movement essentially straight	2500	

42nd and Grand

CRASH_KEY	CASENUMBER	DATE	CSEVERITY	PROPDMG	CRCOMANNER	VEHICLE	INITDIR	VACTION	REPAIRCOST	INISTATUS
2007019945	2007370395	20070430	Property Damage Only	6000	Broadside	1	North	Movement essentially straight	3000	
2007019945	2007370395			0		2	East	Movement essentially straight	3000	
2007039491	2007392534	20070918	Property Damage Only	5500	Rear-end	1	East	Movement essentially straight	4000	
2007039491	2007392534			0		2	East	Slowing/stopping	1500	
2007054548	2007409183	20071202	Property Damage Only	4700	Rear-end	1	North	Slowing/stopping	3500	
2007054548	2007409183			0		2	North	Stopped for stop sign/signal	1200	
2008005370	2008422100	20080202	Minor Injury	4500	Head-on	1	South	Turning left	2500	Non-incapacitating
2008005370	2008422100			0		2	North	Movement essentially straight	2000	
2008011041	2008428500	20080218	Property Damage Only	3000	Angle - oncoming left turn	1	East	Turning left	1500	
2008011041	2008428500			0		2	West	Movement essentially straight	1500	
2008059753	2008483961	20081212	Property Damage Only	10000	Non-collision	1	South	Movement essentially straight	10000	
2009010136	2009496505	20090227	Property Damage Only		Broadside	1	East	Movement essentially straight		
2009010136	2009496505			0		2	South	Movement essentially straight	1500	
2009011054	2009497582	20090311	Property Damage Only	4000	Angle - oncoming left turn	1	West	Turning left	2500	
2009011054	2009497582			0		2	East	Movement essentially straight	1500	

Exhibit I

2009023118	2009511374	20090606	Property Damage Only	8000	Broadside	1	West	Movement essentially straight	5000	
2009023118	2009511374			0		2	South	Movement essentially straight	3000	
2009023522	2009511815	20090617	Property Damage Only	1700	Angle - oncoming left turn	1	South	Turning left	1500	
2009023522	2009511815			0		2	North	Movement essentially straight	200	
2009053112	2009544773	20091226	Property Damage Only	2700	Rear-end	1	East	Movement essentially straight	2000	
2009053112	2009544773			0		2	East	Stopped for stop sign/signal	700	

25th and University

CRASH_KEY	CASENUMBER	DATE	CSEVERITY	PROPDMG	CRCOMANNER	VEHICLE	INITDIR	VACTION	REPAIRCOST	INJSTATUS
2007016214	2007366181	20070403	Major Injury	7500	Broadside	1	West	Movement essentially straight	5000	Possible
2007016214	2007366181			0		2	South	Movement essentially straight	2500	Incapacitating
2008002159	2008418237	20080118	Property Damage Only	2000	Broadside	1	West	Movement essentially straight	1000	
2008002159	2008418237			0		2	North	Movement essentially straight	1000	
2008057265	2008480568	20081223	Property Damage Only	5700	Rear-end	1	Not Reported	Legally Parked	3000	
2008057265	2008480568			0		2	Not Reported	Legally Parked	200	
2008057265	2008480568			0		3	North	Turning left	2500	
2009017375	2009504967	20090502	Possible/Unknown	6000	Rear-end	1	West	Movement essentially straight	5000	Possible
2009017375	2009504967			0		2	West	Stopped for stop sign/signal	1000	
2009021710	2009509829	20090603	Property Damage Only	10000	Rear-end	1	East	Movement essentially straight	3000	
2009021710	2009509829			0		2	East	Slowing/stopping	4000	
2009021710	2009509829			0		3	East	Slowing/stopping	2000	
2009021710	2009509829			0		4	East	Slowing/stopping	1000	
2009024117	2009512481	20090621	Property Damage Only	2500	Broadside	1	South	Movement essentially straight	1000	
2009024117	2009512481			0		2	West	Movement essentially straight	1500	

28th and University

CRASH_KEY	CASENUMBER	DATE	CSEVERITY	PROPDMG	CRCOMANNER	VEHICLE	INITDIR	VACTION	REPAIRCOST	INJSTATUS
2007006351	2007206593	20070201	Possible/Unknown	0	Non-collision	1	North	Turning left	0	Possible
2007006353	2007206595	20070131	Property Damage Only	2800	Sideswipe - same direction	1	North	Turning right	300	
2007006353	2007206595			0		2	East	Legally Parked	2500	
2007021480	2007372161	20070518	Possible/Unknown	3000	Rear-end	1	West	Movement essentially straight	2000	Possible
2007021480	2007372161			0		2	West	Stopped for stop sign/signal	1000	
2007040593	2007393793	20070920	Property Damage Only	11500	Rear-end	1	West	Movement essentially straight	2500	
2007040593	2007393793			0		2	West	Stopped for stop sign/signal	7000	
2007040593	2007393793			0		3	West	Stopped for stop sign/signal	2000	
2008037201	2008458339	20080825	Property Damage Only	4000	Rear-end	1	East	Movement essentially straight	3500	
2008037201	2008458339			0		2	East	Stopped for stop sign/signal	500	
2009046281	2009537356	20091119	Property Damage Only	7500	Rear-end	1	East	Movement essentially straight	7500	
2009046281	2009537356			0		2	East	Stopped for stop sign/signal	0	

Polk and University

CRASH_KEY	CASENUMBER	DATE	CSEVERITY	PROPDMG	CRCOMANNER	VEHICLE	INITDIR	VACTION	REPAIRCOST	INJSTATUS
2007027259	2007378709	20070626	Possible/Unknown	0	Non-collision	1	North	Turning right	0	Possible
2008027750	2008447466	20080624	Property Damage Only	1000	Sideswipe - same direction	1	West	Changing lanes	500	
2008027750	2008447466			0		2	West	Movement essentially straight	500	
2009053118	2009544779	20091227	Property Damage Only	4000	Rear-end	1	North	Movement essentially straight	500	
2009053118	2009544779			0		2	North	Movement essentially straight	3500	

19th and Grand

CRASH_KEY	CASENUMBER	DATE	CSEVERITY	PROPDMG	CRCOMANNER	VEHICLE	INITDIR	VACTION	REPAIRCOST	INJSTATUS
2007016951	2007367012	20070417	Property Damage Only	1000	Rear-end	1	West	Stopped for stop sign/signal	500	

Exhibit I

2009012560	2009499347	20090324	Property Damage Only	10000	Broadside	1	West	Turning right	5000
2009012560	2009499347			0		2	North	Movement essentially straight	5000
2009015358	2009502674	20090413	Property Damage Only	2000	Angle - oncoming left turn	1	East	Turning left	1000
2009015358	2009502674			0		2	West	Movement essentially straight	1000
2009018256	2009505963	20090511	Property Damage Only		Non-collision	1	North	Turning right	
2009028092	2009516958	20090720	Property Damage Only	6000	Angle - oncoming left turn	1	East	Turning left	3500
2009028092	2009516958			0		2	West	Movement essentially straight	2500

200	Property Damage Only
53	Possible/Unknown Injury
26	Minor Injury
11	Major Injury
1	Fatal
291	Total Crashes

$1,242,748

79	possible
31	non-incapacitating
11	incapacitating
1	fatal

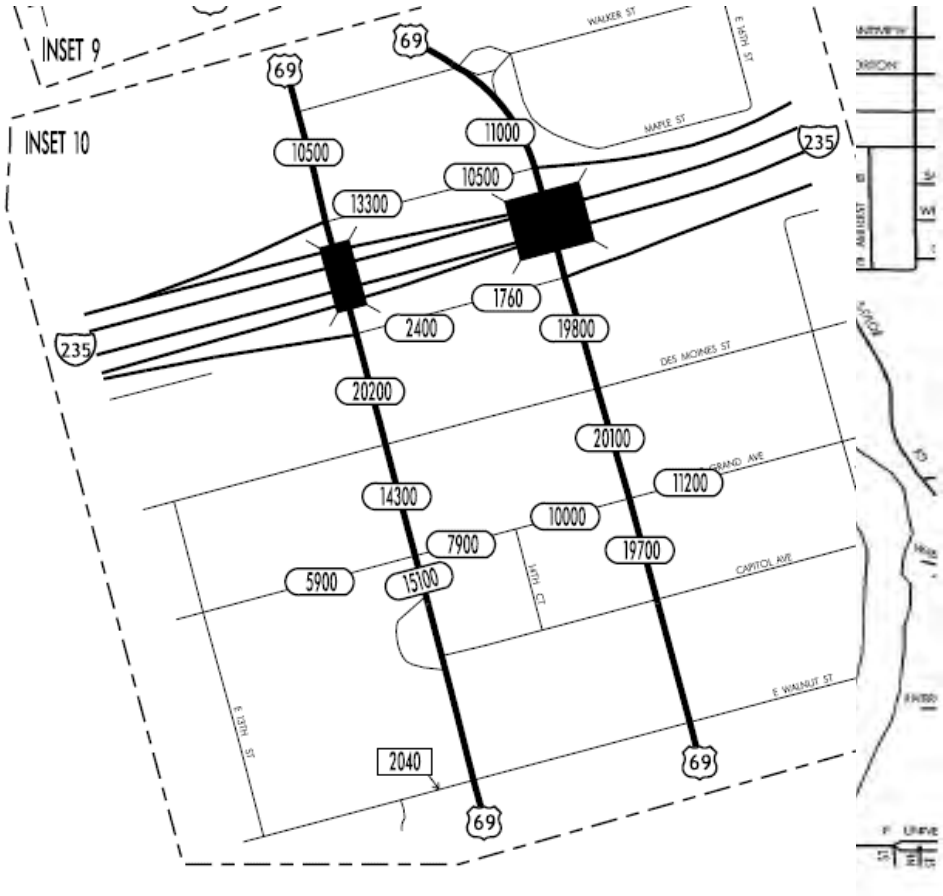
112	Broadside
32	Angle - oncoming left turn
23	Non-Collision
92	Rear End
21	Sideswipe- same direction
3	Sideswipe - opposite direction
6	Head-on
2	Unknown

291

Exhibit I

Exhibit J

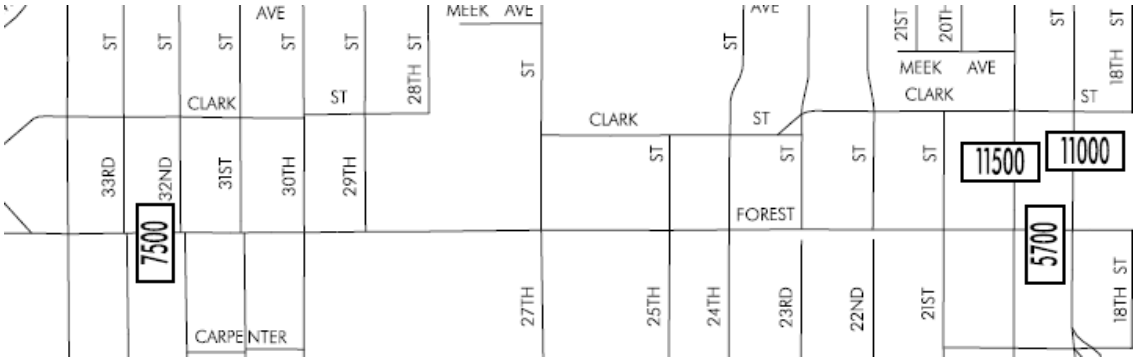
E 14th / E 15th Street Corridor - 2012 IDOT Counts



ML King / 19th Street Corridor - 2012 IDOT Counts

Exhibit J

Forest Avenue Corridor - 2012 IDOT Counts

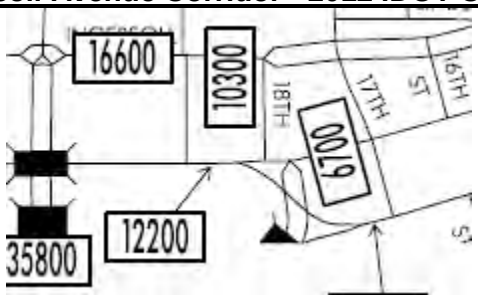


Cherry Street Corridor - 2008 IDOT Counts

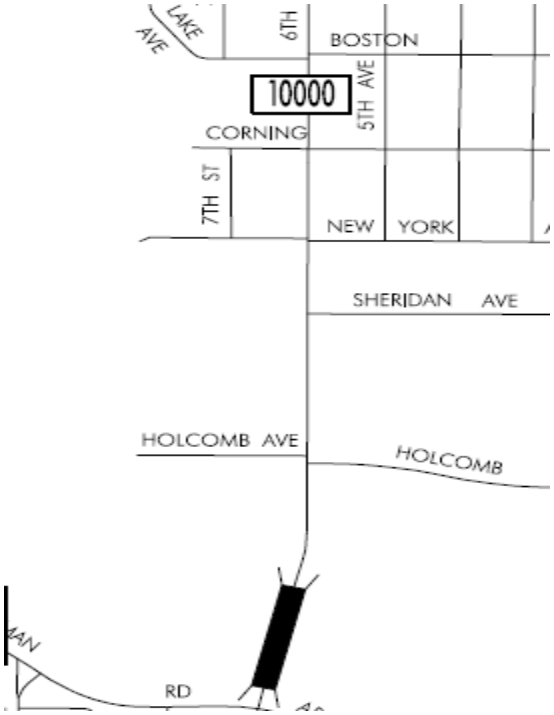
[There were no recent counts available for the Cherry Street corridor, although it is estimated to be approximately 5,000 vehicles/day.

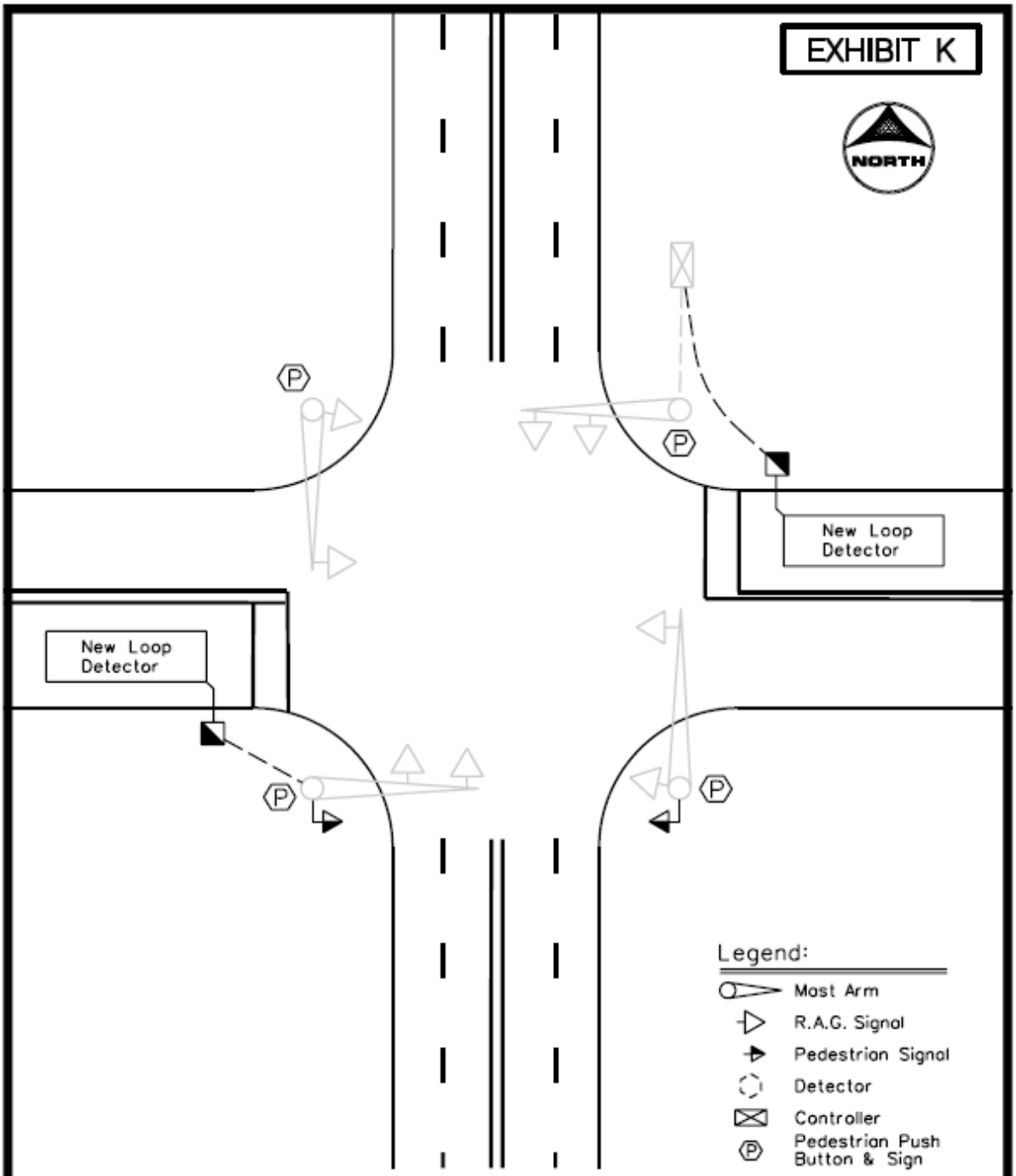
Exhibit J

Ingersoll Avenue Corridor - 2012 IDOT Counts



6th Avenue Corridor - 2012 IDOT Counts





Typical Intersection
Preliminary Signal Layout

Exhibit L

Rev. 5/14

Intersection or Spot Benefit / Cost Safety Analysis

Iowa DOT Office of Traffic & Safety

County: Polk | Prepared by: BJW | Date Prepared: Aug 11, 2015

Intersection: Citywide Fixed-Time Traffic Signal Upgrade - Phase 2 (25 intersections)

Improvement

Proposed Improvement(s): Upgrade existing fixed-time signals to semi-actuated

Note: Only "correctable" crashes are included in the analysis (sideswipe-same direction, rear-end on main st)

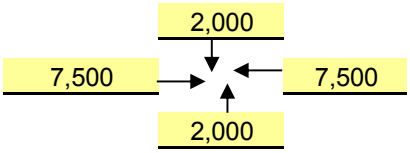
$ 120,000	Estimated Improvement Cost, **EC**	15	Est. Improvement Life, years, **Y**
	Other Annual Cost (after initial year), **AC**	10	Crash Reduction Factor (integer), **CRF**
$ -	Present Value Other Annual Costs, **OC**	4.0%	Discount Rate (time value of $), **INT**
		$ 120,000	Present Value Cost, **COST** = EC + OC

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

Traffic Volume Data

Source: Iowa DOT | 2012 Date of traffic count

Daily Entering Vehicles by Approach (or AADT / 2)



6,935,000	Current Annual Entering Veh., **AEV** = DEV * 365
22,058	veh / day, Final Year DEV, **FDEV**
111.63	MEV, Total Million Entering Veh. Over life of Project, **TMEV**
1.0%	Projected Traffic Growth (0%-10%), **G**
19,000	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 --> 2014 Last full year — 4.0 years, Time Period, **T**

Additional months — values as of May 2014

0	Fatal Crashes	0	Fatalities @	$4,500,000	$	-
		0	Major Injuries @	$325,000	$	-
66	Injury Crashes	26	Minor Injuries @	$65,000	$	1,690,000
		47	Possible Injuries @	$35,000	$	1,645,000
160	Property Damage Only		(assumed cost per crash)	$7,400	$	1,672,400
		-OR-	enter all Property Costs of all crashes:			
226	Total Crashes, **TA**			Total $ Loss, **LOSS**	$	5,007,400

56.50	Current Crashes / Year, **AA** = TA / T	8.15	Crashes / MEV, Crash Rate, **CR**
$ 22,157	Cost per Crash, **AVC** = LOSS / TA		CR = TA x 10^6 / (DEV x 365 x T)
909.5	Total Expected Crashes, **TECR** = CR x TMEV	$ 1,482,838	Present Value of Avoided Crashes, **BENEFIT**
5.65	Crashes Avoided First Year **AAR** = AA x CRF / 100		
$ 125,185	Crash Costs Avoided in First Year, AAR x AVC		
90.9	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 = $1,482,838 : $120,000 = **12.36** : 1

SHIVEHATTERY
ARCHITECTURE + ENGINEERING

August 14, 2015

Donna Matulac, P.E.
Office of Traffic and Safety
Iowa Department of Transportation
800 Lincoln Way
Ames, Iowa 50010

Dear Donna,

Included is the Traffic Safety Improvement Application for a Site Specific improvement in the City of Urbandale, Iowa. The intersection identified for the improvements is 142nd Street & Douglas Parkway. 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.

Michael Anthony, PE
Civil Engineer
(515) 422-5523
manthony@shive-hattery.com

Project # 4153830

Traffic Safety Improvement Program Application

142nd Street and Douglas Parkway
Urbandale, Iowa
August 14, 2015

Prepared by:

SHIVEHATTERY
ARCHITECTURE + ENGINEERING

4125 Westown Parkway, Suite 100
West Des Moines, Iowa 50131
800.798.8104

Rev. 5/15

Application for TRAFFIC SAFETY FUNDS

GENERAL INFORMATION **DATE:** 08/14/2015

Location / Title of Project 142nd St and Douglas Ave Roudabout Improvements

Applicant City of Urbandale

Contact Person David J. McKay, P.E. Title Public Works Director

Complete Mailing Address 3600 86th Street
Urbandale, IA 50322

Phone (515) 331-6713 (Area Code) E-Mail dmckay@urbandale.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 Project Cost $ 502,000

Safety Funds Requested $ 500,000

Rev. 5/15

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 Urbandale

Signed: David McKay 8-14-15

Signature Date Signed

David J. McKay, P.E.

Typed Name

Attest: 8/14/15

Signature Date Signed

John B. Larson, P.E.

Typed Name

RESOLUTION 145-2015

A RESOLUTION AUTHORIZING THE CITY OF URBANDALE, IOWA, TO MAKE AN APPLICATION TO THE IOWA DEPARTMENT OF TRANSPORTATION TRAFFIC SAFETY IMPROVEMENT PROGRAM FOR THE FUNDING OF GEOMTERTIC MODIFICATIONS AT THE 142ND STREET AND DOUGLAS PARKWAY ROUNDABOUT AND FURTHER APPROVING THE APPLICATION WHICH OBLIGATES THE CITY TO MAINTAIN THE FUNDED IMPROVEMENTS.

WHEREAS, the Iowa Department of Transportation Traffic Safety Improvement operates under the rules of the Iowa Administrative Code 761 – Ch.164; and

WHEREAS, said program allows for the distribution of traffic safety funds to cities, counties and the Iowa DOT for roadway safety improvements, research, studies, or public information initiatives.; and

WHEREAS, the City of Urbandale has determined that by constructing geometric improvements at the 142nd Street and Douglas Parkway roundabout there will be improved safety at the intersection;

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

1. The City Council supports and approves the attached application for Iowa Department of Transportation Traffic Safety Improvement Program funding.
2. The City Council hereby commits to accepting and maintaining these improvements.
3. The Mayor is hereby authorized to execute the application on behalf of the City.

PASSED AND APPROVED this 4th day of August, 2015.

Robert D. Andeweg, Mayor

Attest:

Debra Mains

Debra Mains, City Clerk

Background / Existing Conditions

The City of Urbandale is proposing to make improvements to the intersection of 142nd Street and Douglas Parkway. The existing intersection is a four (4) leg roundabout that was originally constructed in 2004 prior to more modern roundabout design criteria being established. Each approach of the roundabout is perpendicular to the inscribed circle and passes through the center of the roundabout. This type of geometry creates large speed differentials between entering and circulating traffic. The design does not meet current roundabout design guidelines due to the lack of entrance and departure angles which naturally limit the speed of vehicles entering the roundabout. With minimal side friction to limit speed along Douglas Parkway, traffic entering the roundabout is forced to abruptly reduce their speed in order to navigate the roundabout. The increased speed of entering traffic also results in a decreased reaction time to evaluate gaps and ability to merge into circulating traffic.

The of Douglas Parkway corridor from 142nd Street to 128th Street was a completely new east-west connection from Interstate 35/80 to existing gravel roads serving the development to the west. As development in these western suburbs exploded, traffic volumes along the east-west arterials of University Avenue, Hickman Road and Douglas Parkway skyrocketed. The subject corridor along Douglas Parkway which saw no traffic in 2004, was first measured for traffic in 2008, more than doubled in traffic by 2012 and has continued to see an increase as more and more development is added to the west. In 2008, the Douglas Parkway corridor was expanded west to 156th Street. By 2010, it was expanded and extended all of the way to Waukee creating a parallel route to Hickman Road for commuting traffic from the west. With the continued development to the north and west of the Douglas Parkway corridor, traffic numbers will continue to rise on this important east-west arterial to Interstate 35/80.

Douglas Parkway is a divided, four lane arterial. Recent improvements to 142nd Street south have expanded the roadway to four lanes from Douglas Parkway to Hickman Road. 142nd Street north is built out to four lanes for 300' at which point it is reduced to two lanes up to Aurora Avenue. 142nd Street is currently classified as a minor arterial to the south and collector to the north. The posted speed limit of both roadways is 35 mph. See **Exhibit H** for existing conditions.

Crash Analysis

Crash history for this intersection was collected from both Iowa DOT CMAT software and actual officer reports from the Urbandale Police Department. The evaluation period is from 2005 to 2014 to identify trends and safety issues with the current intersection geometry and operations. In the past 7 years 31 crashes have been reported resulting in 1 major injury, 2 minor injuries, and 4 possible injuries. The majority of crashes (65%) are sideswipe collisions due to failure to yield or improperly merging upon entry/exiting of the roundabout. Approximately 65% of these collisions occurred with one or both vehicles traveling westbound. Other recorded causes of crashes include striking a pole or median, running off the road, and rear end collisions.

In the past four years, the frequency of crashes has more than doubled from the previous four years. This is directly attributed to the increased traffic from development and the build-out of the Douglas Parkway corridor to support the surrounding area. Roundabouts, by their design, result in crashes that are often less severe due to speed and manner of the collision. This is reinforced by the increased number of sideswipe and “Property Damage Only” collisions. However, although these crashes are less severe in nature still pose a major safety concern and significant financial loss. Refer to **Section I** for crash history, officer accident reports, and crash details.

Proposed Improvements

Due to the amount and manner of crashes at the intersection, it is proposed to reconstruct the roundabout using modern design guidelines for increased safety. The majority of crashes are sideswipe upon entering or exiting the roundabout. It is proposed to reconstruct all four legs of the roundabout in order to increase the deflection angle for the traffic entering the roundabout. This revised geometry will naturally slow motorists down, providing them with more time to judge gaps of circulating traffic and greater control of their vehicle when entering the roundabout. The outside circulating radii of the roundabout will also be widened allowing for a better defined path to navigate the roundabout. The existing fishhook pavement marking will also be removed and replaced with standard lane designation arrows. Lastly, the pedestrian crossings will be reconstructed and additional lighting will be installed to eliminate backlighting

of the roundabout and pedestrians. Refer to **Exhibit G** for the proposed improvements.

Safety Justification

Currently there no crash modification factor(s) (CMF) in place that are directly related to converting an existing roundabout with geometric and operational issues and modernizing it to the current guidelines. Of the 31 crashes in 7 years, at least 16 were related to failing to yield or making improper turns. A crash reduction factor (CRF) of 25 was used for the justification as follows:

- Path overlap - Each approach and exit has the condition where the motorists upon entry and exit are not directed into the proper lane. This creates unnecessary and additional conflict points. By removing these conflict points, sideswipe and improper turn crashes will be reduced.
- Deflection - Each approach has no deflection which causes motorists to approach and enter the roundabout at higher speeds. Reconstructing the approaches to create deflection will help reduce entering motorist's speed to those of the circulating traffic. Additionally, this allows motorists to enter and navigate the roundabout at a more reasonable speed to maintain control and maintain proper lane assignments. By adding deflection, failure to yield and high speed entry crashes will be reduced.

Roundabout design is focused on achieving consistent speed through an intersection; something the existing design does not allow. Vehicles are forced to greatly reduce their speed just prior to entering the roundabout; similar to navigating a traditional intersection when making a right turn. There are four major safety issues to this design:

- Requires greater gap between circulating traffic when entering due to abruptly reduced approach speeds
- Increased queuing of traffic at approach legs
- Decreases reaction time when analyzing surrounding traffic and proper lane assignment
- Promotes path overlap for vehicles navigating straight through the roundabout due to lack of deflection angle

The proposed improvements focus on addressing these safety issues by reducing the confusion of

navigating the roundabout. Natural path of a vehicle is determined by the speed and orientation of the vehicle at the yield line. By decreasing the entry angle through the approach legs, motorists are allowed time to analyze gaps of circulating traffic prior to entering the roundabout. This creates a more clearly defined path and allows motorists to focus more on surrounding traffic and proper lane assignment and less on navigating the roundabout. Most importantly these improvements will result in a safer roundabout and a reduced frequency of crashes.

SHIVEHATTERY
ARCHITECTURE + ENGINEERING

Proposed Roundabout Modernization
Douglas Parkway & 142nd Street

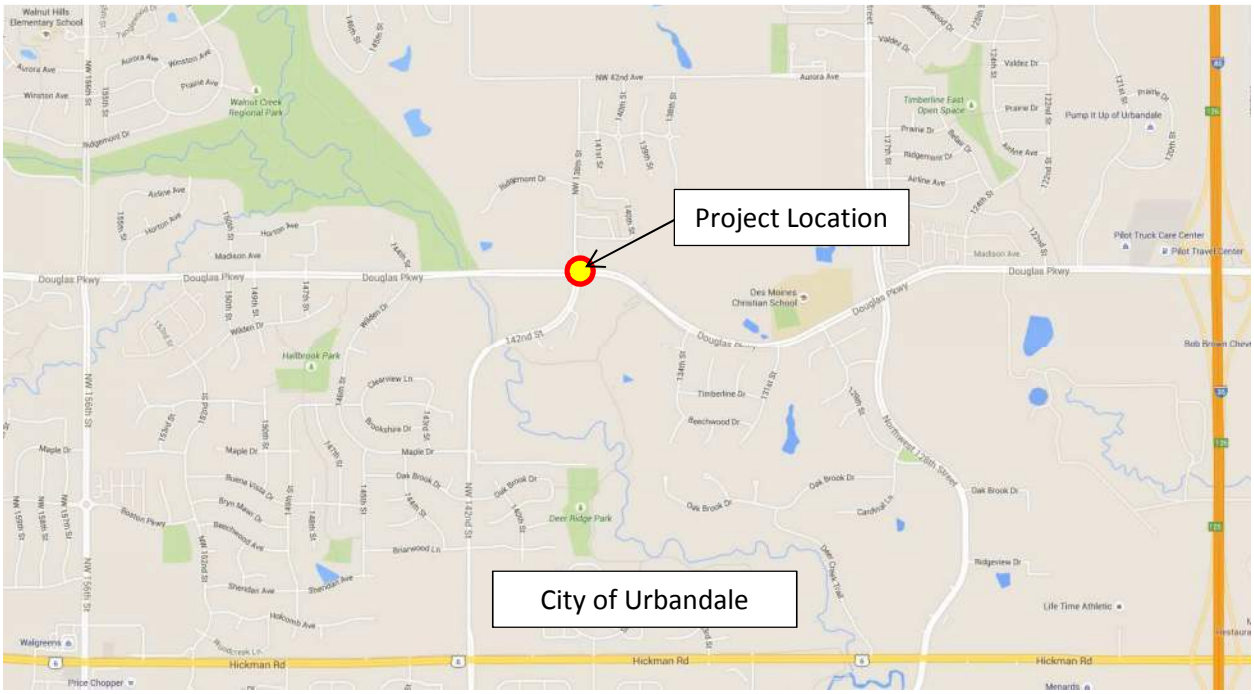
Urbandale, Iowa
Opinion of Probable Construction Costs
August 14, 2015

Item No	Description	Unit	Unit Price	Quantity	Cost
1	MOBILIZATION	LS	$22,000	1	$22,000
2	CONSTRUCTION SURVEY	LS	$3,500	1	$3,500
3	TRAFFIC CONTROL	LS	$15,000	1	$15,000
4	REMOVAL OF EXISTING PAVEMENT	SY	$12	3600	$43,200
5	PAVEMENT MARKING REMOVAL	STA	$100	8	$800
6	PAVEMENT SYMBOL REMOVAL	EA	$100	10	$1,000
7	STORM STRUCTURE REMOVAL	EA	$1,500	8	$12,000
8	STORM SEWER	LF	$85	80	$6,800
9	STORM SEWER STRUCTURES	EA	$3,500	8	$28,000
10	EARTHWORK, FINE GRADING	LS	$10,000	1	$10,000
11	SUBGRADE PREP, 12"	SY	$6	3600	$21,600
12	PCC PAVEMENT, CL C, 9"	SY	$67	3600	$241,200
13	PCC SIDEWALK, 4"	SY	$50	100	$5,000
14	TOP SOIL, STRIP, STOCKPILE, AND SPREAD	SY	$20	1400	$28,000
15	PAVEMENT MARKINGS	STA	$200	20	$4,000
16	PAVEMENT SYMBOLS	EA	$150	20	$3,000
17	PERMANENT SIGNAGE	EA	$300	20	$6,000
18	SITE RESTORATION	AC	$4,500	1	$4,500
			SUBTOTAL	$	456,000
			10% CONTINGENCY	$	46,000
			TOTAL	**$**	**502,000**

**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. HOWEVER, THE ENGINEER CANNOT AND DOES NOT GUARANTEE THAT BIDS OR ACTUAL TOTAL PROJECT OR CONSTRUCTION COSTS WILL NOT VARY FROM THE ESTIMATE OF PROBABLE CONSTRUCTION COST. THIS ESTIMATE IS INTENDED TO ASSIST IN BUDGETARY ASSESSMENT AND DOES NOT GUARANTEE THAT ACTUAL PROJECT COSTS WILL NOT EXCEED OR BE LOWER THAN THE AMOUNTS STATED IN THIS ESTIMATE.

Improvements to the 142nd Street and Douglas Parkway Roundabout are to be funded through Traffic Safety Improvement Fund. The schedule proposed for the safety improvements is as follows:

- **August 15, 2015** – Submit for 2015 TSIP Funds
- **Mid-December 2015** – TSIP Funds are awarded
- **July 1, 2016** –TSIP funds are available for the intersection improvements
- **August 2016** – Proceed with design of improvements
- **February 2017** – Let intersection project
- **2017 Construction Season** – Construction begins / Completed


Project Location
City of Urbandale
Douglas Pkwy
Hickman Rd
142nd St
NW 142nd St
NW 42nd Ave
Aurora Ave
Madison Ave
Des Moines Christian School
Walnut Creek Regional Park
Hallbrook Park
Deer Ridge Park
Timberline East Open Space
Pump It Up of Urbandale
Pilot Truck Care Center
Pilot Travel Center
Life Time Athletic
Walgreens
Price Chopper
Menards

Looking South/West along Douglas Parkway (East Approach)

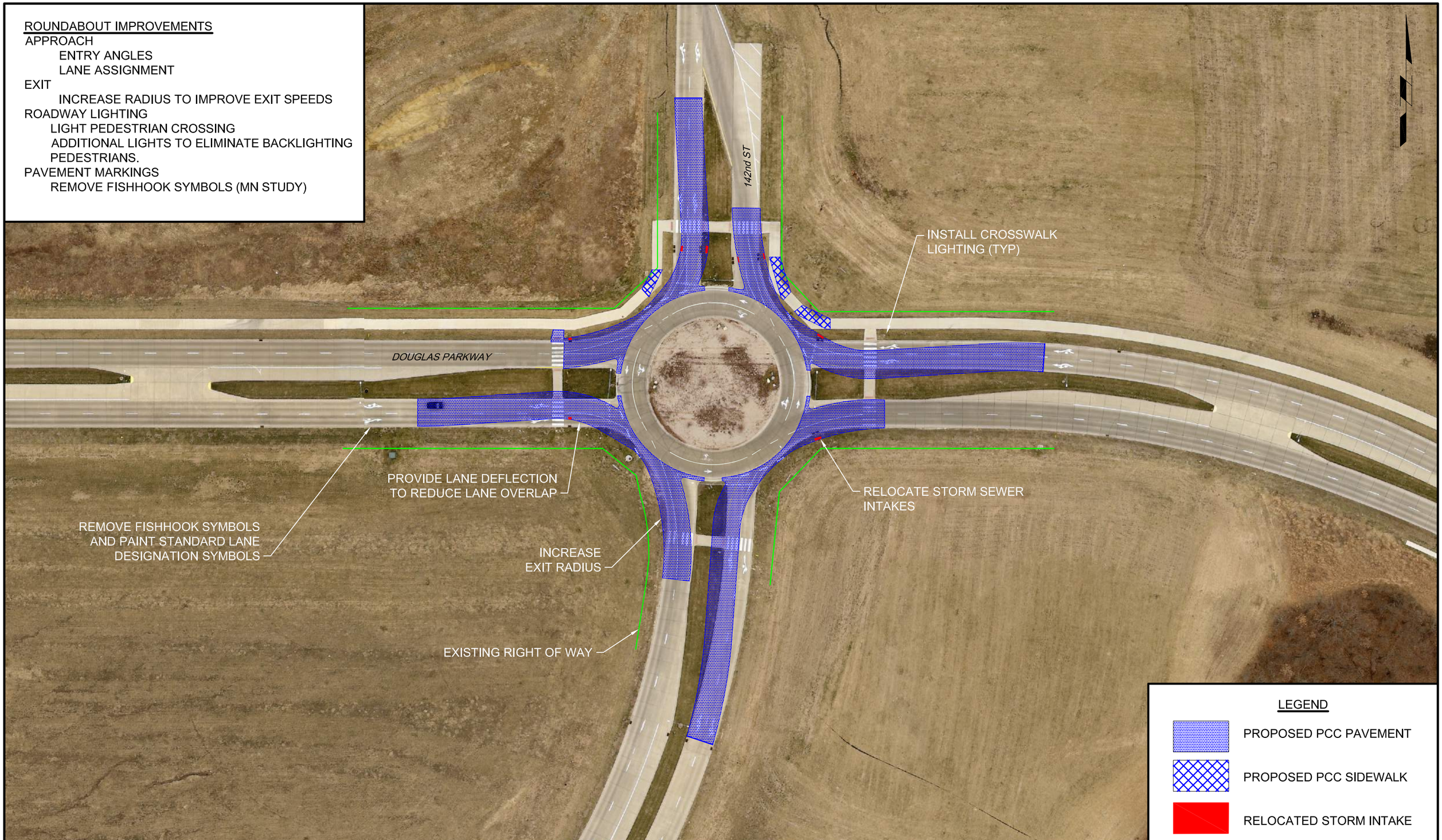
Looking West along Douglas Parkway (East Approach)

Looking South/East on Douglas Parkway

Looking South on 142nd Street (North Approach, WB Exit)

Looking North on 142nd Street (South Approach)

Looking North on 142nd Street (South Approach)



SHIVEHATTERY
ARCHITECTURE + ENGINEERING

8.15.2015

DOUGLAS PARKWAY & 142ND STREET
URBANDALE, IOWA

ROUNDABOUT IMPROVEMENTS CONCEPT

SCALE
0 40 80
SCALE IN FEET

EXHIBIT: G

Ridgemont Dr
138th Street
Douglas Prky
Douglas Prky
142nd Street

Note: Police reports available upon request. Police reports have been verified against CMAT Data.

Iowa Department of Transportation

Major Cause Summary

Report Version 1.1 Jan 2005

Analysis Years: 2008 [5], 2009 [1], 2010 [7], 2012 [3], 2013 [6], 2014 [6], 2015 [3]

Crash Summary:

Fatal	-
Major Injury	1
Minor Injury	1
Possible/Unknown	4
PDO	25
Total Crashes	31

Injury Summary:

Fatal	-
Major Injury	1
Minor Injury	1
Possible	4
Unknown	-
Total Injuries	6

TOT Property Damage: $124,900

AVG Property Damage: $4,029

Surface Condition Summary:

Dry	24
Wet	4
Ice	-
Snow	2
Slush	-
Sand/Dirt/Oil/Gravel	-
Water	-
Other	-
Unknown	-
Not Reported	1
Total Crashes	31

Major Cause Summary:

3	Animal
	Ran Traffic Signal
	Ran Stop Sign
	Crossed Centerline
1	FTYROW: At Uncontrolled Intersection
	FTYROW: Making Right Turn on Red Signal
	FTYROW: From Stop Sign
5	FTYROW: From Yield Sign
1	FTYROW: Making Left Turn
	FTYROW: From Driveway
	FTYROW: From Parked Position
	FTYROW: To Pedestrian
4	FTYROW: Other (explain in narrative)
	Traveling Wrong Way or on Wrong Side of Rd
4	Driving Too Fast for Conditions
	Exceeded Authorized Speed
2	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
	Swerving/Evasive Action
	Over-Correcting/Over-Steering
	Downhill Runaway
1	Equipment Failure
	Separation of Units
	Ran Off Road - Right
1	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
4	Other: Other Improper Action
2	Unknown
3	Other: No Improper Action
	None Indicated

Selection Filter:

((YEAR <> 2005 and YEAR <> 2006 and YEAR <> 2007))

Analyst:

Notes:

Iowa Department of Transportation

Crash Detail Report

Report Version 1.3 Aug 2006

2008432221 03/13/2008 23:25 DOUGLAS PKWY and 142ND ST
County: 77 **City:** Urbandale

Major Cause: Equipment failure
Roadway Type: Intersection: Four-way intersection

Severity:	PDO	**Manner of Crash:**	Non-collision
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:**	$3500

Number of Vehicles: 1

	Unit 1	Unit 2	Unit 3
Init Trav Dir:	East	0	0
Veh Action:	Essentially straight	0	0
Configuration:	Passenger car	0	0
Driver Age:	18	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:	Curb/island/raised median	0	0

2008435723 04/05/2008 06:30 DOUGLAS AT 142ND
County: 77 **City:** Urbandale

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

Severity:	Minor	**Manner of Crash:**	Non-collision
Fatalities:	0	**Surface Conditions:**	Dry
Major Injuries:	0	**Light Conditions:**	Dawn
Minor Injuries:	1	**Weather Conditions:**	Clear
Possible Injuries:	0	**Drug/Alc Involved:**	none indicated
Unknown Injuries:	0	**Property Damage:**	$7000

Number of Vehicles: 1

	Unit 1	Unit 2	Unit 3
Init Trav Dir:	West	0	0
Veh Action:	Essentially straight	0	0
Configuration:	Sport utility vehicle	0	0
Driver Age:	61	0	0
Driver Gender:	M		
Driver Cond:	Normal	0	0
Drivr Contr 1:	Too fast for conditions	0	0
Drivr Contr 2:	not reported	0	0
Fixed Object:	Other fixed object	0	0

Iowa Department of Transportation

Crash Detail Report

Report Version 1.3 Aug 2006

2008458223 09/03/2008 15:25 DOUGLAS PKWY AND 142ND ST
County: 77 **City:** Urbandale

Major Cause: FTY at uncontrolled intersection
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:**	$3000

Number of Vehicles: 2

	Unit 1	Unit 2	Unit 3
Init Trav Dir:	North	North	0
Veh Action:	Turning right	Turning right	0
Configuration:	Passenger car	4-tire light truck	0
Driver Age:	29	37	0
Driver Gender:	F	M	
Driver Cond:	Normal	Normal	0
Drivr Contr 1:	FTY uncontrolled inters	none	0
Drivr Contr 2:	not reported	not reported	0
Fixed Object:	none	none	0

2008460617 09/18/2008 07:02 DOUGLAS PKWY and 142ND ST
County: 77 **City:** Urbandale

Major Cause: FTY from yield sign
Roadway Type: Intersection: Other intersection

Severity:	PDO	**Manner of Crash:**	Sideswipe, same direction
Fatalities:	0	**Surface Conditions:**	Dry
Major Injuries:	0	**Light Conditions:**	Dawn
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:	South	West	0
Veh Action:	Turning left	Entering (merging)	0
Configuration:	Sport utility vehicle	Passenger car	0
Driver Age:	16	41	0
Driver Gender:	M	F	
Driver Cond:	Normal	Normal	0
Drivr Contr 1:	none	FTY from yield sign	0
Drivr Contr 2:	not reported	not reported	0
Fixed Object:	none	none	0

Iowa Department of Transportation

Crash Detail Report

Report Version 1.3 Aug 2006

2008478590 12/15/2008 06:43 14200 BLK OF DOUGLAS EB
County: 77 **City:** Urbandale

Major Cause: Other: No improper action
Roadway Type: Intersection: Other intersection

Severity:	PDO	**Manner of Crash:**	Sideswipe, same direction
Fatalities:	0	**Surface Conditions:**	Dry
Major Injuries:	0	**Light Conditions:**	Dawn
Minor Injuries:	0	**Weather Conditions:**	Cloudy
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:	East	East	0
Veh Action:	Changing lanes	Essentially straight	0
Configuration:	Sport utility vehicle	Passenger car	0
Driver Age:	38	25	0
Driver Gender:	F	F	
Driver Cond:	Normal	Normal	0
Drivr Contr 1:	not reported	none	0
Drivr Contr 2:	not reported	not reported	0
Fixed Object:	none	none	0

2009510600 06/06/2009 18:23 DOUGLAS PKWY and 142ND ST
County: 77 **City:** Urbandale

Major Cause: Other: No improper action
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:**	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:	West	West	0
Veh Action:	88	88	0
Configuration:	Sport utility vehicle	Passenger car	0
Driver Age:	38	37	0
Driver Gender:	M	M	
Driver Cond:	Normal	Normal	0
Drivr Contr 1:	none	none	0
Drivr Contr 2:	not reported	not reported	0
Fixed Object:	none	none	0

Iowa Department of Transportation

Crash Detail Report

Report Version 1.3 Aug 2006

2010551672 01/25/2010 16:59 14200 BLK OF DOUGLAS WB
County: 77 **City:** Urbandale

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

Severity:	PDO	**Manner of Crash:**	Rear-end
Fatalities:	0	**Surface Conditions:**	Snow
Major Injuries:	0	**Light Conditions:**	Daylight
Minor Injuries:	0	**Weather Conditions:**	Snow
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:	West	West	0
Veh Action:	Essentially straight	Slowing/stopping	0
Configuration:	Sport utility vehicle	Passenger car	0
Driver Age:	54	54	0
Driver Gender:	M	F	
Driver Cond:	Normal	Normal	0
Drivr Contr 1:	Too fast for conditions	none	0
Drivr Contr 2:	Followed too close	not reported	0
Fixed Object:	none	none	0

2010571088 05/06/2010 15:12 DOUGLAS PKWY and 142ND ST
County: 77 **City:** Urbandale

Major Cause: FTY from yield sign
Roadway Type: Intersection: Four-way intersection

Severity:	Poss/Unk	**Manner of Crash:**	Non-collision
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:**	$1000

Number of Vehicles: 2

	Unit 1	Unit 2	Unit 3
Init Trav Dir:	North	West	0
Veh Action:	Essentially straight	Essentially straight	0
Configuration:	Motorcycle	Passenger car	0
Driver Age:	23	17	0
Driver Gender:	M	F	
Driver Cond:	Normal	Normal	0
Drivr Contr 1:	Swerved to avoid	FTY from yield sign	0
Drivr Contr 2:	not reported	not reported	0
Fixed Object:	none	none	0

Iowa Department of Transportation

Crash Detail Report

Report Version 1.3 Aug 2006

2010574927 05/31/2010 08:58 3700 BLK 142ND STREET
County: 77 **City:** Urbandale

Major Cause: Driving too fast for conditions
Roadway Type: Non-intersection: No special feature

Severity:	Poss/Unk	**Manner of Crash:**	Non-collision
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:**	$5000

Number of Vehicles: 1

	Unit 1	Unit 2	Unit 3
Init Trav Dir:	North	0	0
Veh Action:	Essentially straight	0	0
Configuration:	Motorcycle	0	0
Driver Age:	20	0	0
Driver Gender:	M		
Driver Cond:	Normal	0	0
Drivr Contr 1:	Too fast for conditions	0	0
Drivr Contr 2:	Lost control	0	0
Fixed Object:	Curb/island/raised median	0	0

2010583155 07/11/2010 05:43 142ND & DOUGLAS PARKWAY
County: 77 **City:** Urbandale

Major Cause: Driving too fast for conditions
Roadway Type: Non-intersection: No special feature

Severity:	Poss/Unk	**Manner of Crash:**	Non-collision
Fatalities:	0	**Surface Conditions:**	Dry
Major Injuries:	0	**Light Conditions:**	Daylight
Minor Injuries:	0	**Weather Conditions:**	Clear
Possible Injuries:	1	**Drug/Alc Involved:**	Alcohol: Statutory
Unknown Injuries:	0	**Property Damage:**	$5000

Number of Vehicles: 1

	Unit 1	Unit 2	Unit 3
Init Trav Dir:	West	0	0
Veh Action:	Essentially straight	0	0
Configuration:	Passenger car	0	0
Driver Age:	35	0	0
Driver Gender:	M		
Driver Cond:	Other	0	0
Drivr Contr 1:	Too fast for conditions	0	0
Drivr Contr 2:	Lost control	0	0
Fixed Object:	none	0	0

Iowa Department of Transportation

Crash Detail Report

Report Version 1.3 Aug 2006

2010581904 07/16/2010 16:47 3800 BLOCK 142ND STREET
County: 77 **City:** Urbandale

Major Cause: Animal
Roadway Type: unknown

Severity:	Major	**Manner of Crash:**	Non-collision
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:**	$1500

Number of Vehicles: 1

	Unit 1	Unit 2	Unit 3
Init Trav Dir:	North	0	0
Veh Action:	Essentially straight	0	0
Configuration:	Motorcycle	0	0
Driver Age:	26	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

2010587072 08/23/2010 14:15 142ND ST
County: 77 **City:** Urbandale

Major Cause: unknown
Roadway Type: Intersection: Other 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:**	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:	South	South	0
Veh Action:	Essentially straight	Essentially straight	0
Configuration:	Van or mini-van	Sport utility vehicle	0
Driver Age:	28	32	0
Driver Gender:	M	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

Iowa Department of Transportation

Crash Detail Report

Report Version 1.3 Aug 2006

2010598475 11/02/2010 20:45 142ND ST and DOUGLAS PKWY
County: 77 **City:** Urbandale

Major Cause: FTY other
Roadway Type: Non-intersection: No special feature

Severity:	PDO	**Manner of Crash:**	Sideswipe, same direction
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:	West	West	0
Veh Action:	Turning left	Essentially straight	0
Configuration:	Passenger car	Passenger car	0
Driver Age:	31	41	0
Driver Gender:	F	M	
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

2012680553 04/05/2012 17:04 142ND ST and DOUGLAS PKWY
County: 77 **City:** Urbandale

Major Cause: FTY from yield sign
Roadway Type: Intersection: Other 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:**	Clear
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:	South	East	0
Veh Action:	Essentially straight	Entering (merging)	0
Configuration:	Passenger car	4-tire light truck	0
Driver Age:	50	50	0
Driver Gender:	F	M	
Driver Cond:	Normal	Normal	0
Drivr Contr 1:	none	FTY from yield sign	0
Drivr Contr 2:	not reported	not reported	0
Fixed Object:	none	none	0

Iowa Department of Transportation

Crash Detail Report

Report Version 1.3 Aug 2006

2012695055 07/19/2012 17:52 DOUGLAS PARKWAY AND 142ND STREET
County: 77 **City:** Urbandale

Major Cause: FTY other
Roadway Type: Intersection: Other 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:**	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	West	0
Veh Action:	88	88	0
Configuration:	Passenger car	Sport utility vehicle	0
Driver Age:	25	34	0
Driver Gender:	M	M	
Driver Cond:	Normal	Normal	0
Drivr Contr 1:	Made improper turn	none	0
Drivr Contr 2:	FTY other	not reported	0
Fixed Object:	none	none	0

2012715482 12/06/2012 17:13 142ND ST and DOUGLAS PKWY
County: 77 **City:** Urbandale

Major Cause: Made improper turn
Roadway Type: Non-intersection: No special feature

Severity:	PDO	**Manner of Crash:**	Sideswipe, same direction
Fatalities:	0	**Surface Conditions:**	Wet
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:**	$2500

Number of Vehicles: 2

	Unit 1	Unit 2	Unit 3
Init Trav Dir:	North	North	0
Veh Action:	Turning right	Essentially straight	0
Configuration:	Sport utility vehicle	Passenger car	0
Driver Age:	40	31	0
Driver Gender:	F	F	
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

Iowa Department of Transportation

Crash Detail Report

Report Version 1.3 Aug 2006

2013743130 06/10/2013 07:55 142ND ST and DOUGLAS PKWY
County: 77 **City:** Urbandale

Major Cause: unknown
Roadway Type: Intersection: Other intersection
Severity: Poss/Unk **Manner of Crash:** Broadside
Fatalities: 0 **Surface Conditions:** Dry
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:** $5000 **Number of Vehicles:** 2

	Unit 1	Unit 2	Unit 3
Init Trav Dir:	North	East	0
Veh Action:	Turning left	Turning left	0
Configuration:	Passenger car	Sport utility vehicle	0
Driver Age:	55	unknown	0
Driver Gender:	F	NR	
Driver Cond:	Normal	unknown	0
Drivr Contr 1:	none	unknown	0
Drivr Contr 2:	not reported	not reported	0
Fixed Object:	none	none	0

2013743231 06/10/2013 18:48 DOUGLAS PKWY
County: 77 **City:** Urbandale

Major Cause: Other improper action
Roadway Type: Intersection: Other 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:** 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:	West	West	0
Veh Action:	Essentially straight	Essentially straight	0
Configuration:	Passenger car	4-tire light truck	0
Driver Age:	27	37	0
Driver Gender:	F	NR	
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

Iowa Department of Transportation

Crash Detail Report

Report Version 1.3 Aug 2006

2013748551 07/14/2013 02:00 14200 DOUGLAS PKWY
County: 77 **City:** Urbandale

Major Cause: Ran off road - straight
Roadway Type: Intersection: Four-way intersection

Severity:	PDO	**Manner of Crash:**	Non-collision
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:**	Alcohol: Statutory
Unknown Injuries:	0	**Property Damage:**	$3300

Number of Vehicles: 1

	Unit 1	Unit 2	Unit 3
Init Trav Dir:	West	0	0
Veh Action:	Turning right	0	0
Configuration:	Passenger car	0	0
Driver Age:	49	0	0
Driver Gender:	M		
Driver Cond:	Infl by alc/drugs/meds	0	0
Drivr Contr 1:	Lost control	0	0
Drivr Contr 2:	not reported	0	0
Fixed Object:	Curb/island/raised median	0	0

2013772586 09/17/2013 16:14 142ND ST
County: 77 **City:** Urbandale

Major Cause: FTY other
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:**	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:	West	West	0
Veh Action:	Essentially straight	Essentially straight	0
Configuration:	Passenger car	Passenger car	0
Driver Age:	57	52	0
Driver Gender:	M	M	
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

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Crash Detail Report

Report Version 1.3 Aug 2006

2013757940 09/18/2013 17:12 142ND ST AND DOUGLAS PKWY
County: 77 **City:** Urbandale

Major Cause: Other improper action
Roadway Type: Intersection: Other 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:**	Clear
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:	West	West	0
Veh Action:	88	88	0
Configuration:	Van or mini-van	Sport utility vehicle	0
Driver Age:	35	65	0
Driver Gender:	F	F	
Driver Cond:	Normal	Normal	0
Drivr Contr 1:	none	Other improper action	0
Drivr Contr 2:	not reported	not reported	0
Fixed Object:	none	none	0

2013778726 12/30/2013 12:45 DOUGLAS PKWY AND 142ND ST
County: 77 **City:** Urbandale

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

Severity:	PDO	**Manner of Crash:**	Sideswipe, same direction
Fatalities:	0	**Surface Conditions:**	Snow
Major Injuries:	0	**Light Conditions:**	Daylight
Minor Injuries:	0	**Weather Conditions:**	Snow
Possible Injuries:	0	**Drug/Alc Involved:**	none indicated
Unknown Injuries:	0	**Property Damage:**	$8000

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:	71	42	0
Driver Gender:	F	F	
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

Iowa Department of Transportation

Crash Detail Report

Report Version 1.3 Aug 2006

2014779285 01/13/2014 18:11 14300BLK DOUGLAS PKWY
County: 77 **City:** Urbandale

Major Cause: Animal
Roadway Type: Not reported

Severity:	PDO	**Manner of Crash:**	not reported
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:**	$3000

Number of Vehicles: 1

	Unit 1	Unit 2	Unit 3
Init Trav Dir:	West	0	0
Veh Action:	not reported	0	0
Configuration:	Passenger car	0	0
Driver Age:	46	0	0
Driver Gender:	M		
Driver Cond:	not reported	0	0
Drivr Contr 1:	none	0	0
Drivr Contr 2:	not reported	0	0
Fixed Object:	none	0	0

2014803156 06/09/2014 20:13 142ND ST and DOUGLAS PKWY
County: 77 **City:** Urbandale

Major Cause: FTY from yield 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	North	0
Veh Action:	Essentially straight	Essentially straight	0
Configuration:	Sport utility vehicle	Passenger car	0
Driver Age:	17	unknown	0
Driver Gender:	M	NR	
Driver Cond:	Normal	unknown	0
Drivr Contr 1:	none	FTY from yield sign	0
Drivr Contr 2:	not reported	not reported	0
Fixed Object:	none	none	0

Iowa Department of Transportation

Crash Detail Report

Report Version 1.3 Aug 2006

2014806416 07/02/2014 17:55 142ND ST & DOUGLAS PKWY INTERSECTION
County: 77 **City:** Urbandale

Major Cause: Made improper turn
Roadway Type: Intersection: Other intersection

Severity:	PDO	**Manner of Crash:**	Non-collision
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:**	$4000

Number of Vehicles: 1

	Unit 1	Unit 2	Unit 3
Init Trav Dir:	not reported	0	0
Veh Action:	not reported	0	0
Configuration:	Tractor/semi-trailer	0	0
Driver Age:	unknown	0	0
Driver Gender:	NR		
Driver Cond:	unknown	0	0
Drivr Contr 1:	Made improper turn	0	0
Drivr Contr 2:	Other improper action	0	0
Fixed Object:	Pole: utility/light/etc	0	0

2014814960 08/28/2014 07:59 142ND ST AND DOUGLAS AVE ROUNDABOUT
County: 77 **City:** Urbandale

Major Cause: FTY other
Roadway Type: Intersection: Other intersection

Severity:	PDO	**Manner of Crash:**	Sideswipe, same direction
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:	West	West	0
Veh Action:	88	88	0
Configuration:	Passenger car	Sport utility vehicle	0
Driver Age:	36	34	0
Driver Gender:	M	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

Iowa Department of Transportation

Crash Detail Report

Report Version 1.3 Aug 2006

2014815620 09/05/2014 07:48 DOUGLAS PKWY AND 142ND ST
County: 77 **City:** Urbandale

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

Severity:	PDO	**Manner of Crash:**	Sideswipe, same direction
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:**	$4000

Number of Vehicles: 2

	Unit 1	Unit 2	Unit 3
Init Trav Dir:	South	West	0
Veh Action:	Essentially straight	Turning right	0
Configuration:	Passenger car	Passenger car	0
Driver Age:	33	33	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

2014832322 12/04/2014 18:09 14200BLK DOUGLAS PKWY
County: 77 **City:** Urbandale

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:**	Dark - roadway lighted
Minor Injuries:	0	**Weather Conditions:**	Clear
Possible Injuries:	0	**Drug/Alc Involved:**	none indicated
Unknown Injuries:	0	**Property Damage:**	$5000

Number of Vehicles: 1

	Unit 1	Unit 2	Unit 3
Init Trav Dir:	West	0	0
Veh Action:	Essentially straight	0	0
Configuration:	Sport utility vehicle	0	0
Driver Age:	26	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

Iowa Department of Transportation

Crash Detail Report

Report Version 1.3 Aug 2006

2015854319 04/09/2015 14:25 142ND ST AND DOUGLAS PKWY
County: 77 **City:** Urbandale

Major Cause: Other: No improper action
Roadway Type: Intersection: Other intersection

Severity:	PDO	**Manner of Crash:**	Sideswipe, same direction
Fatalities:	0	**Surface Conditions:**	Wet
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:**	$2100

Number of Vehicles: 2

	Unit 1	Unit 2	Unit 3
Init Trav Dir:	West	West	0
Veh Action:	Essentially straight	Essentially straight	0
Configuration:	4-tire light truck	Passenger car	0
Driver Age:	69	60	0
Driver Gender:	M	M	
Driver Cond:	Normal	Normal	0
Drivr Contr 1:	none	none	0
Drivr Contr 2:	not reported	not reported	0
Fixed Object:	none	none	0

2015861193 05/26/2015 15:54 142ND ST AND DOUGLAS PKWY
County: 77 **City:** Urbandale

Major Cause: FTY making left turn
Roadway Type: Intersection: Other 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:**	$2000

Number of Vehicles: 2

	Unit 1	Unit 2	Unit 3
Init Trav Dir:	West	West	0
Veh Action:	Turning left	Essentially straight	0
Configuration:	Passenger car	Van or mini-van	0
Driver Age:	22	40	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

Iowa Department of Transportation

Crash Detail Report

Report Version 1.3 Aug 2006

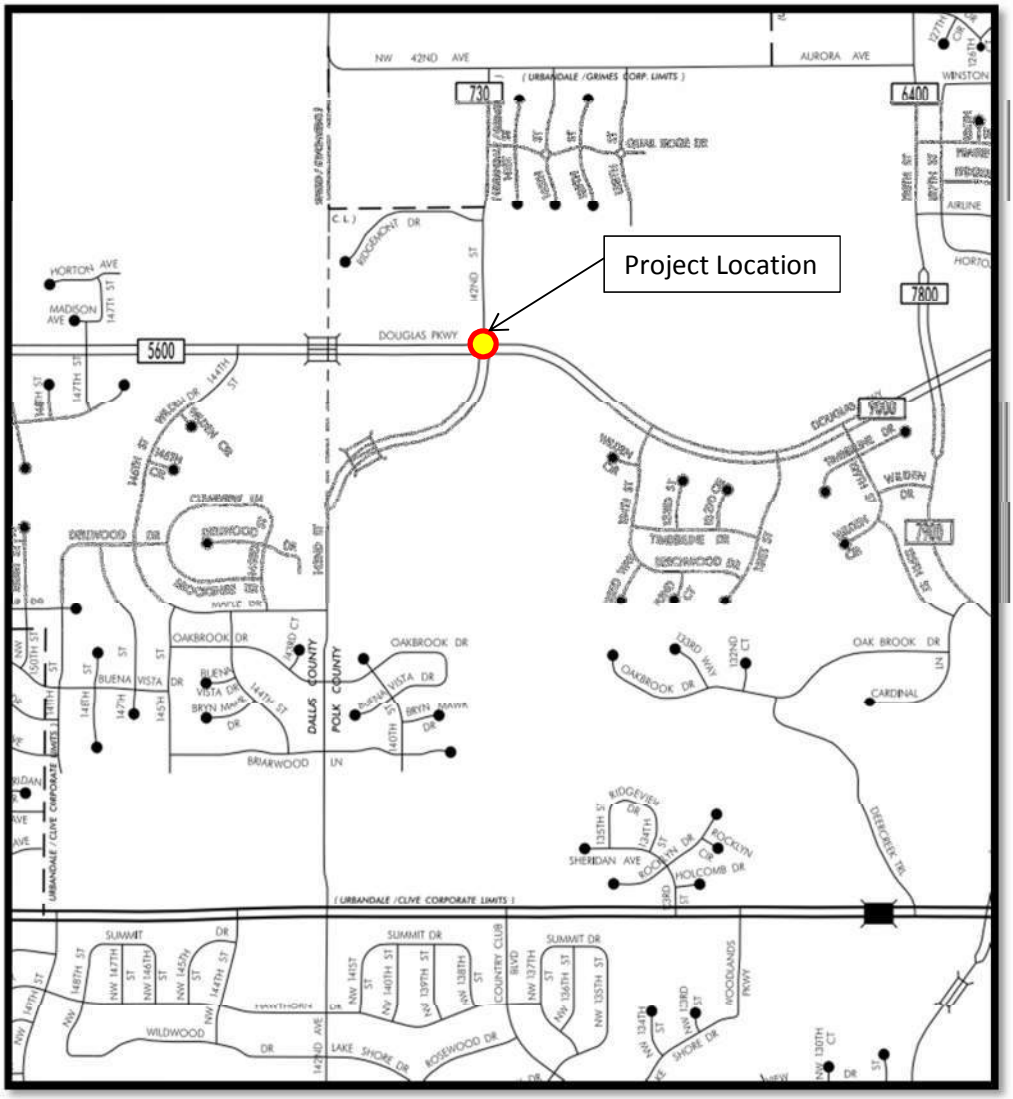
2015863018 06/08/2015 17:55 DOUGLAS PKWY AND 142ND ST
County: 77 **City:** Urbandale

Major Cause: FTY from yield sign
Roadway Type: Intersection: Other 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:**	$6500

Number of Vehicles: 2

	Unit 1	Unit 2	Unit 3
Init Trav Dir:	North	West	0
Veh Action:	88	Entering (merging)	0
Configuration:	Sport utility vehicle	4-tire light truck	0
Driver Age:	64	16	0
Driver Gender:	F	F	
Driver Cond:	Normal	Normal	0
Drivr Contr 1:	none	Erratic/reckless/aggrssv	0
Drivr Contr 2:	not reported	FTY from yield sign	0
Fixed Object:	none	none	0



2012 Iowa DOT Traffic Map

Road Name	2012 Iowa DOT AADT
Douglas Parkway	5600 (West), 9000 (East)
142nd Street	8000* (South), 4000* (North)

*Estimated Traffic volumes based off of surrounding area growth factor applied to 2008 DOT Traffic Volumes.

Intersection or Spot Benefit / Cost Safety Analysis

Iowa DOT Office of Traffic & Safety

County: Polk | Prepared by: David Fliehler | Date Prepared: Aug 14, 2015

Intersection: 142nd Street and Douglas Parkway: Urbandale, Iowa

Improvement

Proposed Improvement(s): Increase roundabout entry angles, increase radius to improve exit speeds, Roadway lighting, updated pavement symbols.

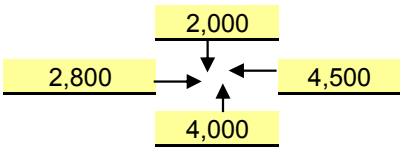
$ 502,000	Estimated Improvement Cost, **EC**	20	Est. Improvement Life, years, **Y**
$ -	Other Annual Cost (after initial year), **AC**	25	Crash Reduction Factor (integer), **CRF**
$ -	Present Value Other Annual Costs, **OC**	4.0%	Discount Rate (time value of $), **INT**
		$ 502,000	Present Value Cost, **COST** = EC + OC

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

Traffic Volume Data

Source: Iowa Dot Traffic Maps | 2012, 2008 Date of traffic count

Daily Entering Vehicles by Approach (or AADT / 2)



4,854,500	Current Annual Entering Veh., **AEV** = DEV * 365
89,476	veh / day, Final Year DEV, **FDEV**
278.04	MEV, Total Million Entering Veh. Over life of Project, **TMEV**
10.0%	Projected Traffic Growth (0%-10%), **G**
13,300	Current Daily Entering Vehicles, **DEV**

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

Crash Data

2008 First full year --> 2014 Last full year — 7.0 years, Time Period, **T**

Additional months — values as of May 2014

	Fatal Crashes →		Fatalities @	$4,500,000	$ -
		1	Major Injuries @	$325,000	$ 325,000
6	Injury Crashes →	1	Minor Injuries @	$65,000	$ 65,000
		4	Possible Injuries @	$35,000	$ 140,000
25	Property Damage Only		(assumed cost per crash)	$7,400	$ 229,400
		-OR-	enter all Property Costs of all crashes:		
31	Total Crashes, **TA**		Total $ Loss, **LOSS**		$ 759,400

4.43	Current Crashes / Year, **AA** = TA / T	0.91	Crashes / MEV, Crash Rate, **CR** CR = TA x 10^6 / (DEV x 365 x T)
$ 24,497	Cost per Crash, **AVC** = LOSS / TA		
253.6	Total Expected Crashes, **TECR** = CR x TMEV	$ 935,844	Present Value of Avoided Crashes, **BENEFIT**
1.11	Crashes Avoided First Year **AAR** = AA x CRF / 100		
$ 27,121	Crash Costs Avoided in First Year, AAR x AVC		
63.4	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 = $935,844 : $502,000 = **1.86** : 1

Rev. 5/15

Application for TRAFFIC SAFETY FUNDS

GENERAL INFORMATION **DATE:** August 12, 2015

Location / Title of Project South Duff Avenue Traffic Signal

Applicant City of Ames

Contact Person Damion Pregitzer, P.E. Title Traffic Engineer

Complete Mailing Address 515 Clark Avenue

Ames, Iowa 50010

Phone 515-239-5160 (Area Code) E-Mail dpregitzer@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 Project Cost $ $450,000

Safety Funds Requested $ $450,000

Rev. 5/15

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: _____ 8/13/2015
Signature Date Signed

Damion Pregitzer, PE
Typed Name

Attest: _____ 8-13-15
Signature Date Signed

John Joiner, PE
Typed Name

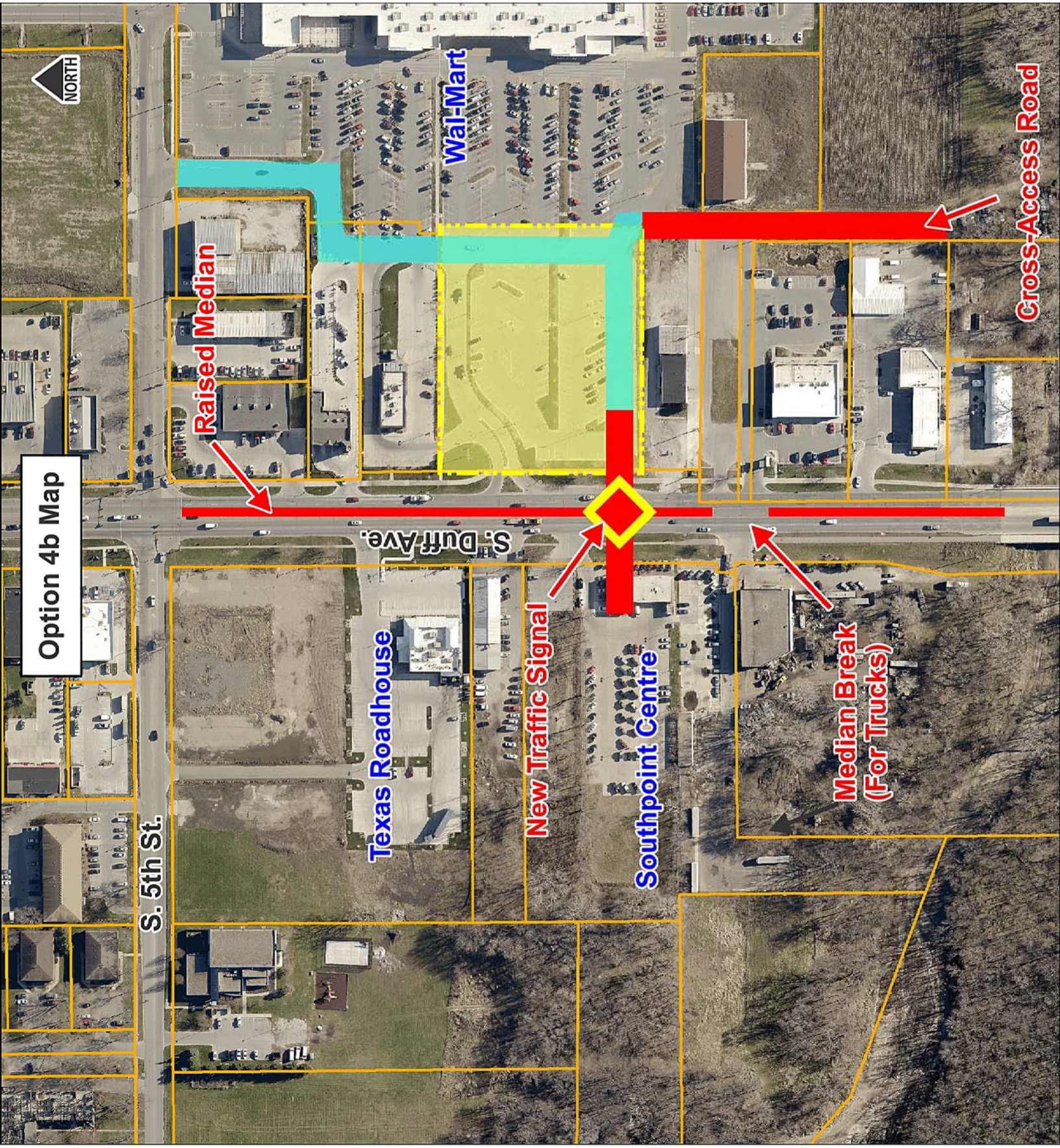
Item B

TRAFFIC SAFETY IMPROVEMENTS PROGRAM
TRAFFIC SIGNAL INSTALLATION
SOUTH DUFF AVENUE
AMES, IOWA

The City of Ames, Iowa is applying for Traffic Safety Improvement Program (TSIP) funding for safety improvements at a proposed intersection along South Duff Avenue, and a raised, concrete median along South Duff Avenue from South 5th Street to the new signal location (see Exhibit A). The proposed signal will be located approximately 725 feet south of the intersection of South 5th Street and South Duff Avenue. This new signal and raised median would allow access to frontage roads which will connect the commercial properties, and alleviate the existing congestion along South Duff Avenue. This project is an opportunity to make a significant traffic safety improvement in the South Duff Avenue corridor that will have mutual benefit for both the adjacent businesses and the Ames community

The current posted speed limit between the Squaw Creek bridge and South 5th Street is 35 mph. The 2011 traffic volumes obtained from the Iowa DOT's website indicate that almost 27,000 vehicles per day (vpd) use this segment of South Duff Avenue. Crash data from 2004 to 2013 show 103 crashes within the proposed project area. It is estimated the proposed improvements would decrease that number by approximately 40%. The existing signal at South 5th Street and South Duff Avenue operates at a Level of Service (LOS) 'D' with approximately 46 seconds of delay. The approaches at this existing intersection are rated as follows: eastbound is LOS 'D' (45 seconds), westbound is LOS 'F' (85 seconds), northbound is LOS 'D' (45 seconds), and southbound is LOS 'D' (45 seconds). The peak hours of traffic through this area are documented as between 7:40 AM and 8:20 AM, and 5:15 PM and 6:00 PM. The proposed traffic signal and raised median would improve the level of service of the signal at South 5th Street and South Duff Avenue to a LOS 'C' with approximately 21 seconds of delay.

Exhibit 'A'


Option 4b Map
NORTH
Raised Median
Wal-Mart
Cross-Access Road
S. Duff Ave.
S. 5th St.
Texas Roadhouse
New Traffic Signal
Southpoint Centre
Median Break
(For Trucks)

Item C

City of Ames, Iowa
South Duff Avenue
Traffic Signal and Raised Median
TSIP Application

		Engineer's Estimate			
		Unit	Qty.	Unit Price	Total
1	New Traffic Signal	1	LS	$290,000	$290,000
2	Raised Concrete Median	1	LS	$160,000	$160,000
	Total				**$450,000**
	TSIP Grant Request				**$450,000**

Item D

City of Ames, Iowa
South Duff Avenue
Traffic Signal and Raised Median
TSIP Application

Project Schedule

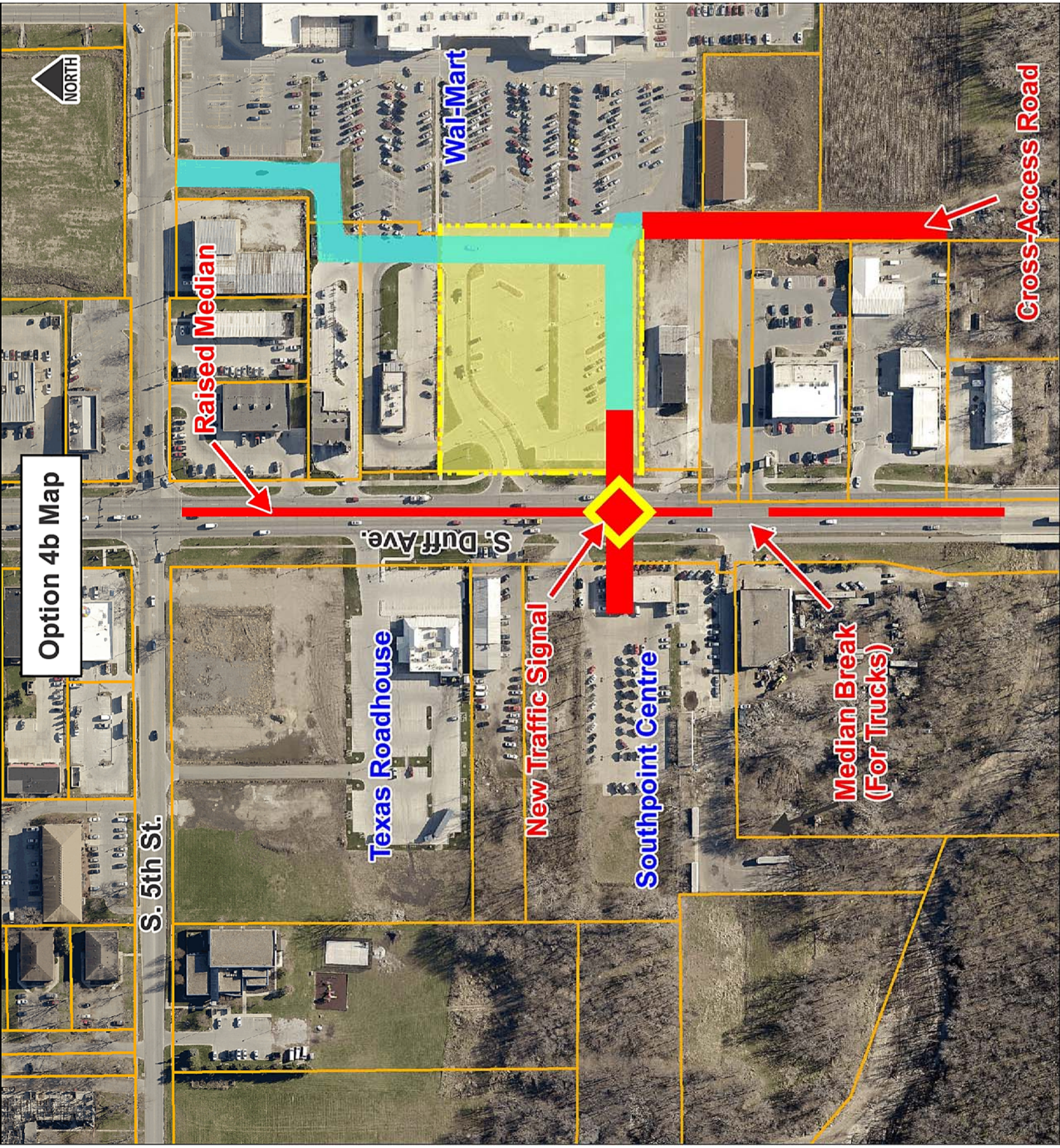
Notification of Funding Award	December ‘15/January ‘16
Traffic Signal Design	February - March ‘16
Project Bidding	May ‘16
Begin Construction	July ‘16
End Construction	August ‘16

Item E

PROJECT LOCATION - Ames, Iowa

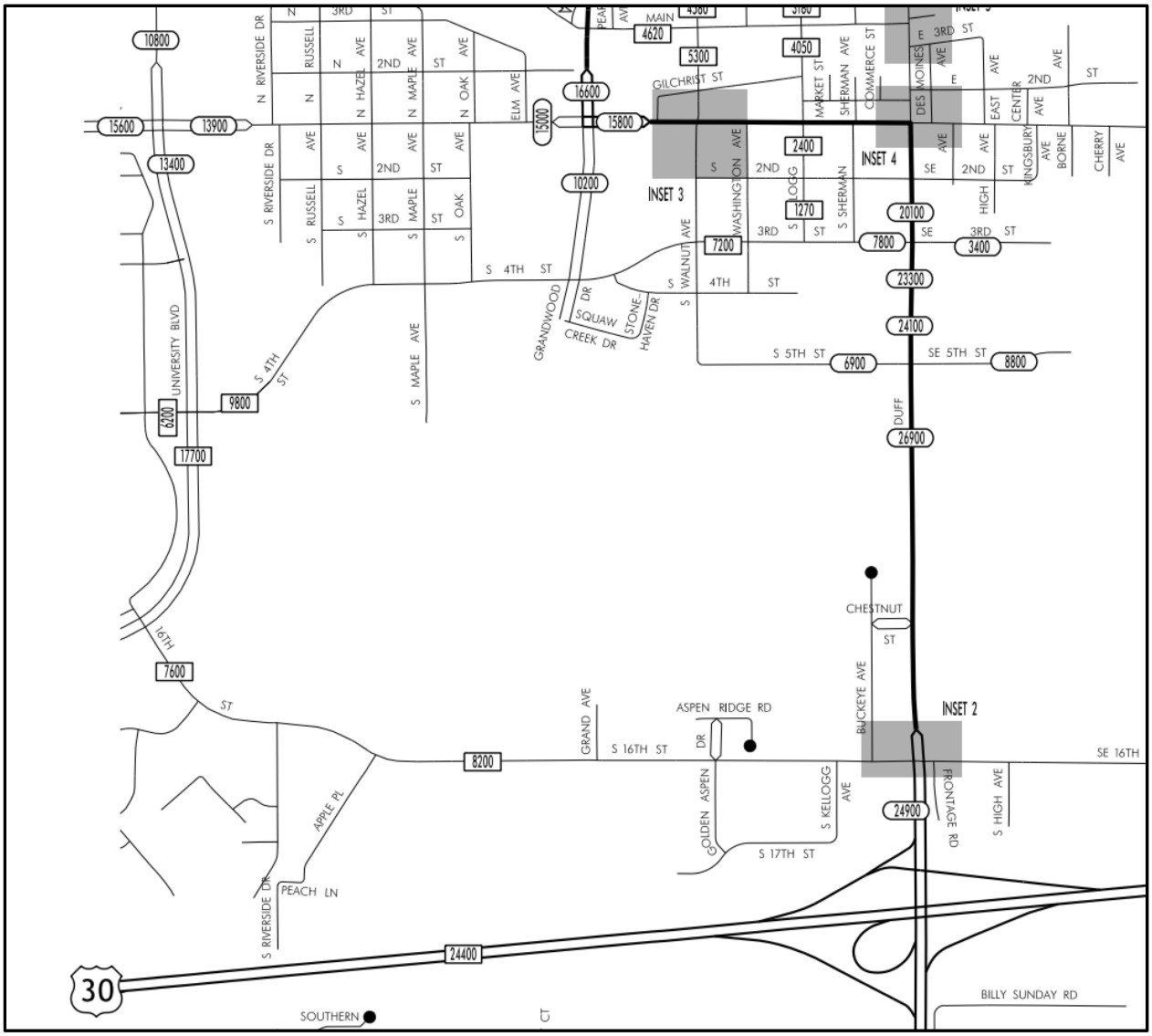
New traffic signal and raised median along South Duff Avenue

Item H


Option 4b Map
NORTH
Raised Median
Wal-Mart
Cross-Access Road
S. Duff Ave.
S. 5th St.
Texas Roadhouse
New Traffic Signal
Southpoint Centre
Median Break
(For Trucks)

Item J

TRAFFIC SAFETY IMPROVEMENTS PROGRAM
TRAFFIC SIGNAL INSTALLATION
SOUTH DUFF AVENUE
AMES, IOWA



2011 ADT Data - South Duff Avenue between Hwy 30 & Lincoln Way (Iowa DOT)

Iowa Department of Transportation

Turning Movement Traffic Count Summary

Annualized Daily Traffic For All Vehicles

Station Number:

85217573099

Count Date:

Wednesday, March 23, 2011

County:

Story

Location Description:

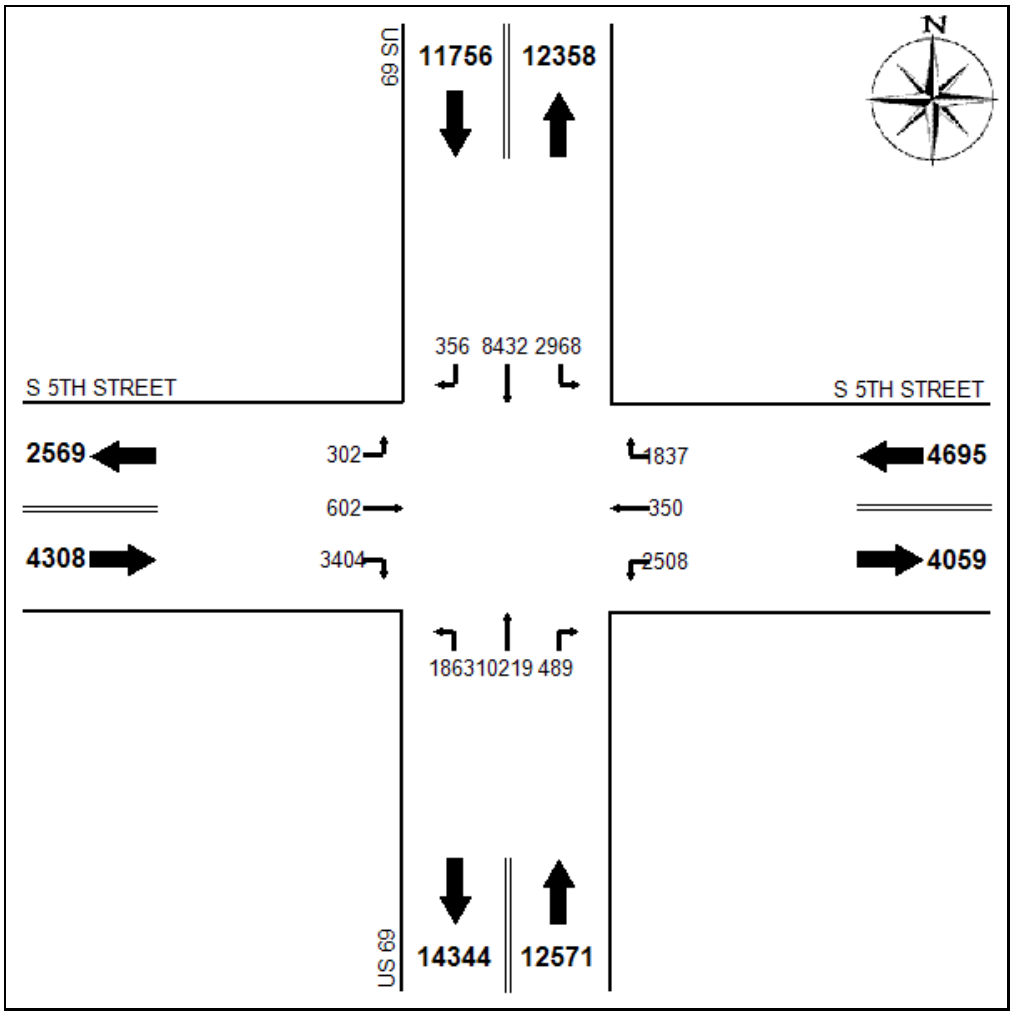
US 69 & 5TH ST

Volume Factor: 1.948

Pass Class Factor: 1.956

SU Class Factor: 1.914

Combo Class Factor: 1.710



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	33	331	18	33	8	40	46	595	14	14	9	124
08:00	79	449	16	40	4	36	65	619	17	23	15	117
11:00	200	667	28	141	13	138	111	792	47	22	41	194
12:00	304	730	37	240	42	172	191	878	48	27	54	291
15:00	264	696	29	198	28	176	107	796	31	21	56	270
16:00	326	663	25	305	54	193	208	678	43	19	74	384
17:00	312	783	30	326	30	185	225	876	51	29	59	361

Item L

Rev. 5/14

Intersection or Spot Benefit / Cost Safety Analysis

Iowa DOT Office of Traffic & Safety

County: Story Prepared by: Mark A. Crawford, P.E. Date Prepared: Aug 11, 2014

Intersection: South Duff Avenue between South 5th Street and Squaw Creek Bridge

Improvement

Proposed Improvement(s): Installation of new traffic signal approximately 725 feet south of South 5th St. along South Duff Avenue, and construction of a raised concrete median from South 5th St. to new signal

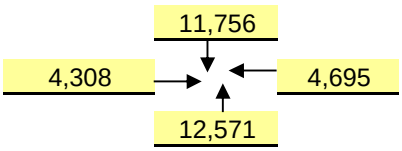
$ 450,000	Estimated Improvement Cost, **EC**	25	Est. Improvement Life, years, **Y**
	Other Annual Cost (after initial year), **AC**	50	Crash Reduction Factor (integer), **CRF**
$ -	Present Value Other Annual Costs, **OC**	4.0%	Discount Rate (time value of $), **INT**
		$ 450,000	Present Value Cost, **COST** = EC + OC

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

Traffic Volume Data

Source: Iowa DOT - South Duff AADT 2011 Date of traffic count

Daily Entering Vehicles by Approach (or AADT / 2)



12,165,450 Current Annual Entering Veh., **AEV** = DEV * 365

42,743 veh / day, Final Year DEV, **FDEV**

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

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

33,330 Current Daily Entering Vehicles, **DEV**

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

Crash Data

2010 First full year --> 2012 Last full year 3.0 years, Time Period, **T**

0 Additional months values as of May 2014

0	Fatal Crashes		Fatalities @	$4,500,000	$	-
			Major Injuries @	$325,000	$	-
4	Injury Crashes	4	Minor Injuries @	$65,000	$	260,000
		0	Possible Injuries @	$35,000	$	-
37	Property Damage Only		(assumed cost per crash)	$7,400	$	303,400
		-OR-	enter all Property Costs of all crashes:			
41	Total Crashes, **TA**			Total $ Loss, **LOSS**	$	563,400

13.67	Current Crashes / Year, **AA** = TA / T	**1.12**	Crashes / MEV, Crash Rate, **CR**
$ 13,741	Cost per Crash, **AVC** = LOSS / TA		CR = TA x 10^6 / (DEV x 365 x T)
386.0	Total Expected Crashes, **TECR** = CR x TMEV	**$ 1,624,277**	Present Value of Avoided Crashes, **BENEFIT**
6.83	Crashes Avoided First Year **AAR** = AA x CRF / 100		
$ 93,900	Crash Costs Avoided in First Year, AAR x AVC		
193.0	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 = $1,624,277 : $450,000 = **3.61** : 1

Iowa Department of Transportation

Rev. 3/08

Application for TRAFFIC SAFETY FUNDS

GENERAL INFORMATION

Location / Title of Project: P59 S. of 340th Street / Pave Shoulders and Improve Curve Superelevation

Applicant: Webster County

Contact Person: Ryan Weidemann Title: Asst. to Engineer

Complete Mailing Address: 703 Central Avenue, Suite 3, Fort Dodge, IA 50501

Phone: 515-576-3281 (Area Code) E-Mail: rweidemann@webstercountyia.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 Project Cost $ 190,000

Safety Funds Requested $ 190,000

RESOLUTION

RESOLUTION AUTHORIZING APPLICATION FOR TRAFFIC SAFETY IMPROVEMENT PROGRAM (TSIP) FUNDING ON P59 (PARAGON AVENUE) APPROXIMATELY TWO MILES NORTH OF FORT DODGE, IOWA

WHEREAS, the Iowa Department of Transportation administers the Traffic Safety Improvement Program (TSIP), which provides funding for locations where vehicular safety is a concern and documented, and

WHEREAS, Webster County desires to submit a Site Specific Traffic Safety Improvement Fund Application on Route P59 (Paragon Avenue) to improve a horizontal curve on a 1150 foot long corridor commencing 300 feet south of 150th Street, and

WHEREAS, the total estimated cost of proposed project is $190,000 and the amount of safety funds requested for the proposed project is $190,000.

NOW, THEREFORE, BE IT RESOLVED that the Webster County Board of Supervisors fully endorses this proposed project and authorizes the County Engineer to sign and submit all necessary application documents to the Iowa Department of Transportation.

BE IT FURTHER RESOLVED that the Webster County Board of Supervisors hereby commits to accept and maintain these improvements, if the application is approved by the Iowa Department of Transportation.

PASSED AND APPROVED this 31st day of March, 2015.

Keith Dencklau, Chairperson
Webster County Board of Supervisors

ATTEST: _____
Carol Messerly, Webster County Auditor

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 Webster County Secondary Road Department

Signed: Randall J. Will — March 31, 2015

Signature — Date Signed

Randall J. Will

Typed Name

Attest: Carol Messerly — 3/31/2015

Signature — Date Signed

Carol Messerly

Typed Name

WEBSTER COUNTY ENGINEER'S OFFICE

Randall J. Will, P.E. & P.L.S.
County Engineer

Jamie Johll, P.E.
Assistant County Engineer

Angela Roderick
Office Manager

703 Central Avenue, Suite 3
4th Floor Courthouse
Fort Dodge, Iowa 50501-3895

515-576-3281 Fax 515-576-0415

Email: engineer@webstercountyia.org
Web site: www.webstercountyia.org

Brian Henderson, P.E.
Assistant to Engineer

Ryan Weidemann, P.E., L.S.I.
Assistant to Engineer

March 23, 2015

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

Dear Steven:

The Webster County Engineer's Office is applying for Traffic Safety Improvement Program (TSIP) Funds to improve a horizontal curve on route P59, approximately 2 miles north of the City of Fort Dodge. This road connects the City of Fort Dodge with the City of Badger and the surrounding rural area. The current 2011 Traffic Count is 2100 VPD. The posted advisory speed for this curve is 45 MPH, while the rest of P59 in this area is 55 MPH.

The project area is a corridor 1,150' long, commencing 300' south of 150th Street. The current roadway is a 24' wide paved asphalt surface with 8' granular shoulders, a 2% traditional crown with no superelevation, and 4:1 foreslopes. There currently is 120' of Right of Way, and clear zone is adequate. The horizontal curve radius meets current design standards for 55 MPH, however the 2% crown does not.

This segment of P59 was resurfaced in 2007. The horizontal alignment of the road immediately north of this curve was realigned and widened with the 2007 resurfacing project. There have been 9 reported accidents on the curve since 2004, 5 of which came after the realignment to the north. According to the resident of the acreage adjacent to the curve, many more accidents go unreported. The crash history, field evidence, and resident's testimony shows southbound drivers are loosing control of their vehicle to the right, overcorrecting, and crossing the centerline left, ending up in the east ditch. The lack of superelevation and paved shoulder contrasts to the curves immediately north of the project area.

The project would include adjusting the cross section by adding superelevation to the curve and adding 2' wide paved shoulders through the curve and the tangents coming in and out of the curve. Some minor grading will be required to maintain adequate foreslope and clear zone. Additional right of way will not be necessary. We believe making these improvements to the curve will provide motorists with a consistent roadway, thus greatly reducing the number of accidents on this curve.

Attached you will find all of the required submittals outlined in the TSIP Site Specific Application Requirements. Please contact us if any additional information is required. Thank you for considering this application.

Sincerely,

Ryan Weidemann, P.E, L.S.I.
Asst. to Webster County Engineer

Enclosures

WEBSTER COUNTY ENGINEER'S OFFICE

PROJECT # FM-TSF-CO94(P59)- -5B-94

Updated 3/23/15

PART C

ESTIMATED PROJECT QUANTITIES						
ITEM NO.	ITEM CODE	ITEM	UNIT	TOTAL	UNIT COST	TOTAL COST
1	2102-2710070	EXCAVATION, CLASS 10, ROADWAY AND BORROW	CY	882	$15.00	$13,230.00
2	2121-7425020	GRANULAR SHOULDERS, TYPE B	TON	671	$50.00	$33,550.00
3	2213-8200000	BASE WIDENING, HOT MIX ASPHALT MIXTURE	TON	200	$90.00	$18,000.00
4	2303-0031500	HOT MIX ASPHALT MIXTURE (1M ESAL), BASE COURSE, 1/2 IN. MIX	TON	370	$90.00	$33,300.00
5	2303-0033500	HOT MIX ASPHALT MIXTURE (1M ESAL), SURF. COURSE, 1/2 IN. MIX, NO SPC. FRIC	TON	220	$90.00	$19,800.00
6	2303-0246422	ASPHALT BINDER, PG 64-22	TON	47.4	$600.00	$28,440.00
7	2303-6911000	HOT MIX ASPHALT PAVEMENT SAMPLES	LS	1	$1,000.00	$1,000.00
8	2527-9263109	PAINTED PAVEMENT MARKING, WATERBORNE OR SOLVENT-BASED	STA	75	$25.00	$1,875.00
9	2528-8445110	TRAFFIC CONTROL	LS	1	$5,000.00	$5,000.00
10	2528-8445113	FLAGGERS	EACH	16	$345.00	$5,520.00
11	2528-8445115	PILOT CARS	EACH	8	$515.00	$4,120.00
12	2533-4980005	MOBILIZATION	LS	1	$23,865.00	$23,865.00
13	2602-0000030	SILT FENCE FOR DITCH CHECKS	LF	180	$10.00	$1,800.00
14	2602-0010010	MOBILIZATION, EROSION CONTROL	EACH	1	$500.00	$500.00
					TOTAL*	**$190,000.00**

UPDATED FOR SAFETY FUND APPLICATION

DATE 03/23/2015

*REQUESTED TRAFFIC SAFETY IMPROVEMENT FUNDS

TRAFFIC SAFETY IMPROVEMENT PROGRAM APPLICATION

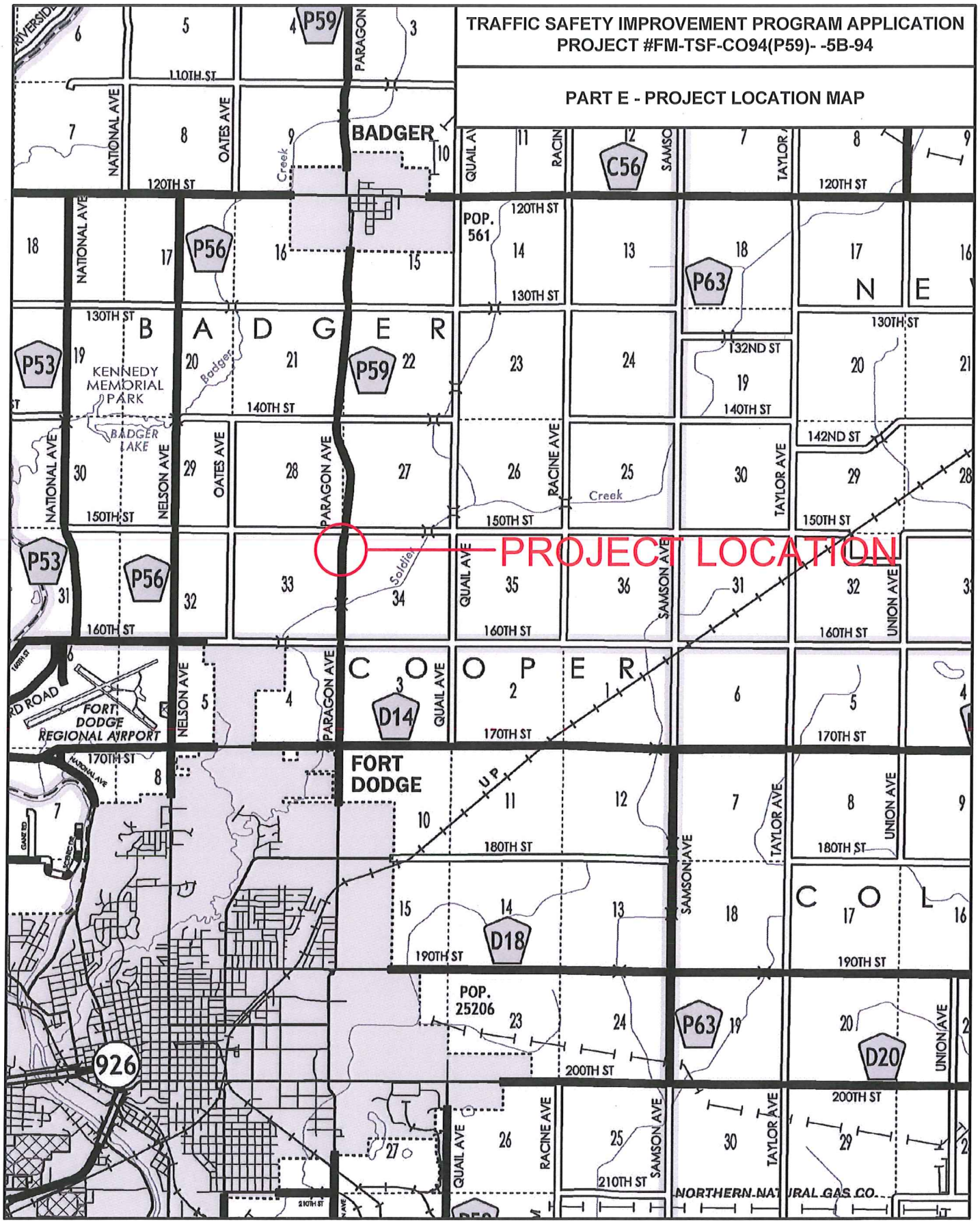
PROJECT #FM-TSF-CO94(P59)- -5B-94

Time Schedule

• TSIP Application	August 15, 2015
• TSIP Funding Award	January 2016
• Preliminary Project Design	August 2015 - December 2015
• Final Design	January 2016
• Contract Turn In to Iowa DOT	February 2016
• Project Letting	April 2016
• Project Construction	July-December 2016

TRAFFIC SAFETY IMPROVEMENT PROGRAM APPLICATION
PROJECT #FM-TSF-CO94(P59)- -5B-94

PART E - PROJECT LOCATION MAP



TRAFFIC SAFETY IMPROVEMENT PROGRAM APPLICATION
PROJECT #FM-TSF-CO94(P59)- -5B-94

P59 CURVE LOOKING SOUTHBOUND

P59 CURVE LOOKING NORTHBOUND

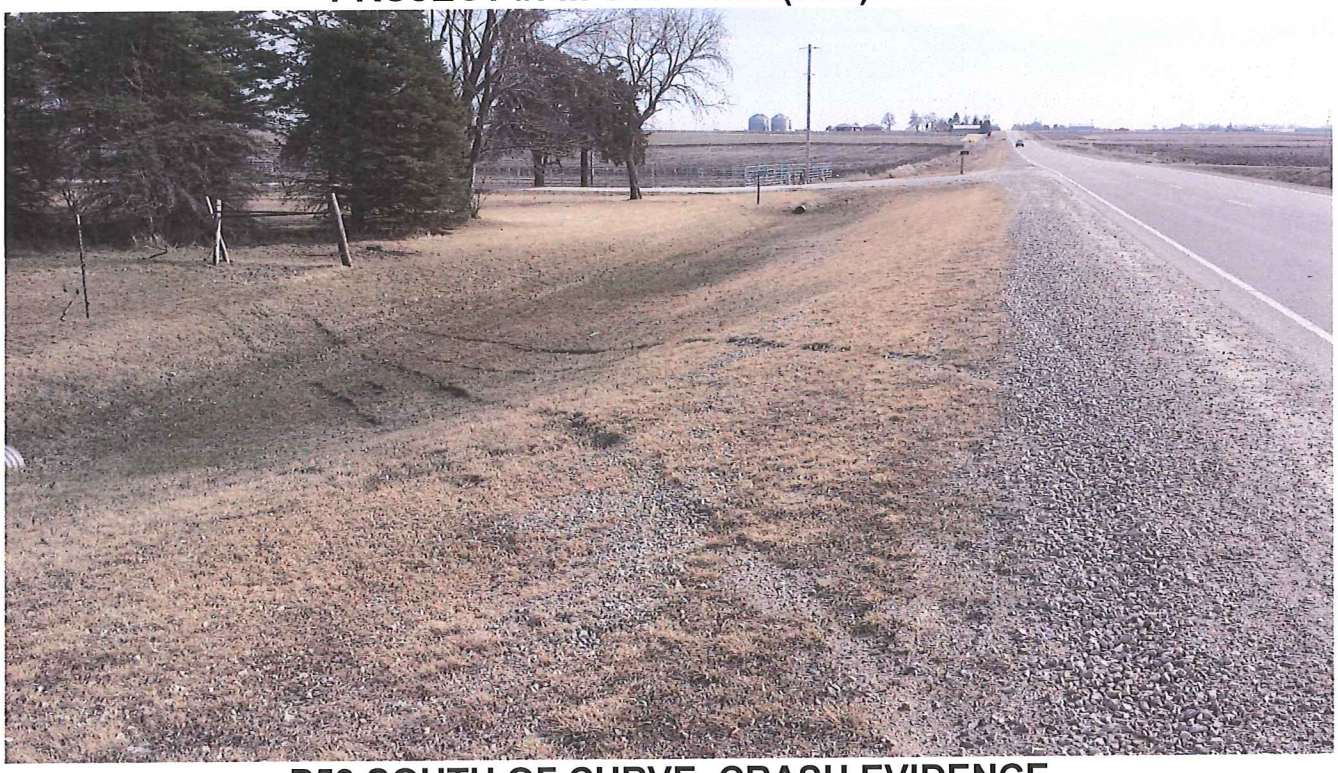
WEBSTER COUNTY ENGINEER'S OFFICE

TRAFFIC SAFETY IMPROVEMENT PROGRAM APPLICATION
PROJECT #FM-TSF-CO94(P59)- -5B-94

P59 SOUTH OF CURVE, LOOKING AT AREA OF LANE DEPARTURE

P59 SOUTH OF CURVE, AREA OF LANE DEPARTURE

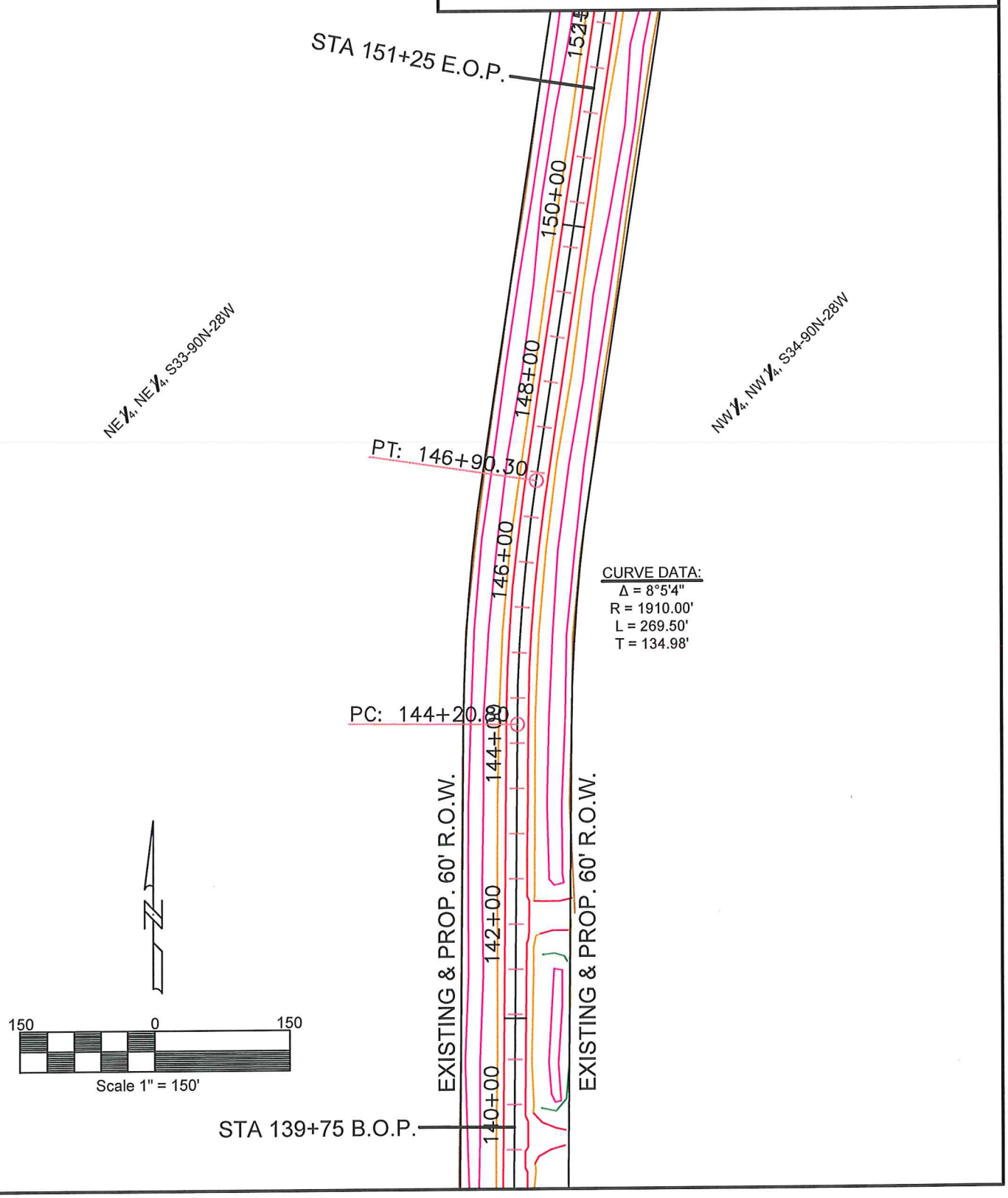
TRAFFIC SAFETY IMPROVEMENT PROGRAM APPLICATION
PROJECT #FM-TSF-CO94(P59)- -5B-94



P59 SOUTH OF CURVE, CRASH EVIDENCE

TRAFFIC SAFETY IMPROVEMENT PROGRAM APPLICATION
PROJECT #FM-TSF-CO94(P59)- -5B-94

PART G - PLAN VIEW



PROJECT # FM-TSF-CO94(P59)--5B-94

PART H - AERIAL PHOTO

Iowa Department of Transportation

Major Cause Summary

PART I. P59 Curve S. of 150th Street

Report Version 1.1 Jan 2005

Analysis Years: 2004 [1], 2005 [1], 2006 [2], 2010 [1], 2011 [2], 2014 [2]

Crash Summary:

Fatal	1
Major Injury	2
Minor Injury	1
Possible/Unknown	1
PDO	4
Total Crashes	9

Injury Summary:

Fatal	1
Major Injury	2
Minor Injury	1
Possible	2
Unknown	-
Total Injuries	6

Surface Condition Summary:

Dry	9
Wet	-
Ice	-
Snow	-
Slush	-
Sand/Dirt/Oil/Gravel	-
Water	-
Other	-
Unknown	-
Not Reported	-
Total Crashes	9

TOT Property Damage: $67,270

AVG Property Damage: $7,474

Major Cause Summary:

	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
	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
1	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
1	Over-Correcting/Over-Steering
	Downhill Runaway
	Equipment Failure
	Separation of Units
2	Ran Off Road - Right
	Ran Off Road - Straight
3	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:

None

Analyst: Ryan Weidemann

Notes:

Iowa Department of Transportation

Abbreviated Crash Report

PART I. P59 Curve S. of 150th Street

Report Version 1.2 Mar 2005

Date	DOT Case #	Agency Case #	City	Crash Sev.	Literal Description
12/19/2004	2004261996	04-1177		Major	P059 / PARAGON AVE
01/12/2005	2005201419	05-023		PDO	P059 / PARAGON AVE
09/17/2006	2006242170	06-0752		Major	P059 / PARAGON AVE
12/04/2006	2006254990	06-1001		PDO	P059 / PARAGON AVE
11/12/2010	2010599805	10-0821		Fatal	P059 / PARAGON AVE
04/09/2011	2011640946	11-0230		Poss/Unk	P059 / PARAGON AVE
11/04/2011	2011656870	2011062072		PDO	P059 / PARAGON AVE measuring 0.2 Miles South from P059 / PARAGON AVE
03/18/2014	2014791441	14-0148		Minor	P059/PARAGON AVE
09/29/2014	2014819225	2014056006		PDO	S OF BADGER ON P-59

Selection Filter:

None

Analyst: Ryan Weidemann

Notes:

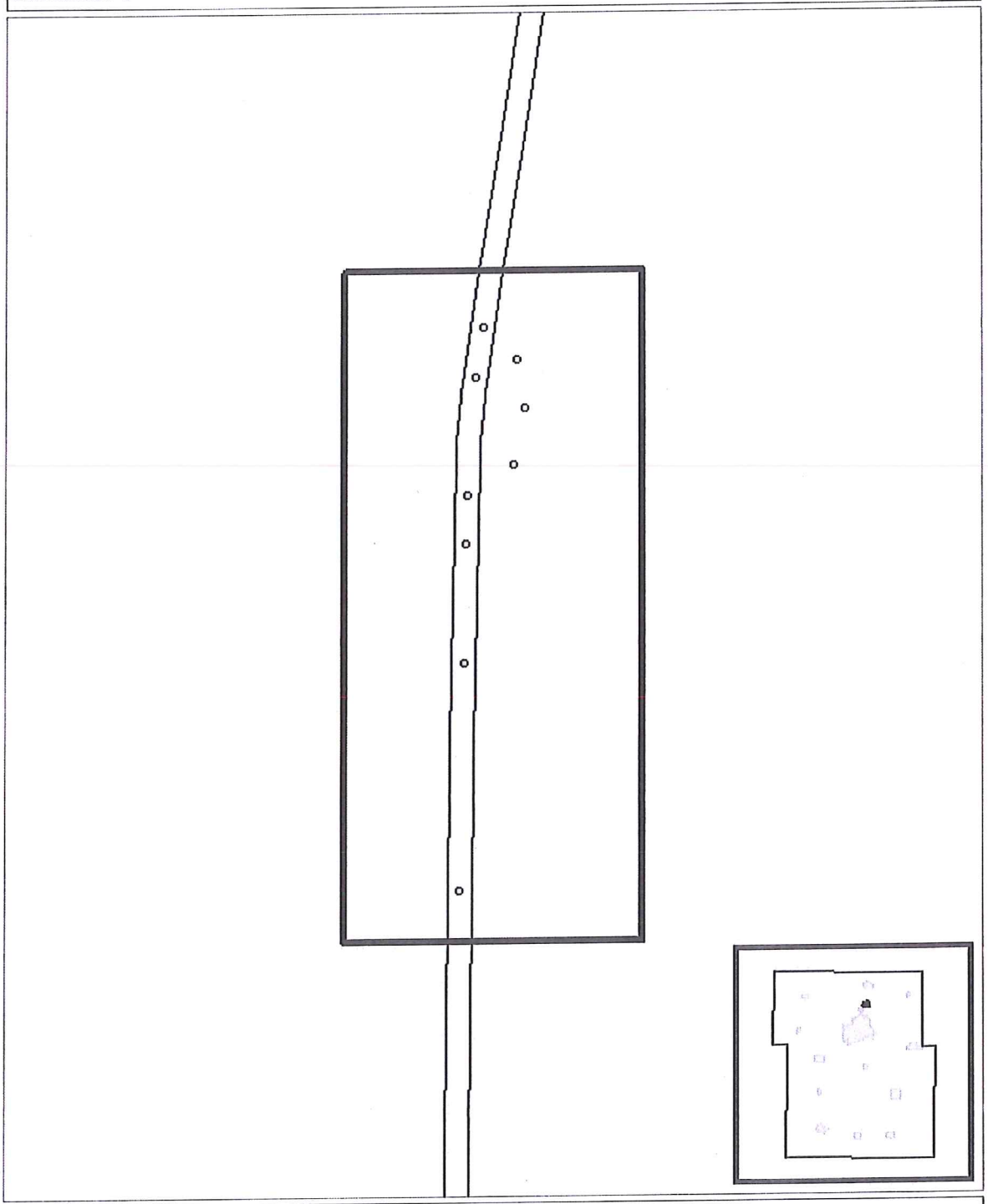
Iowa Department of Transportation

Location Map

PART I. P59 Curve S. of 150th Street

Incidents: 9

Report Version 1.1 Mar 2005

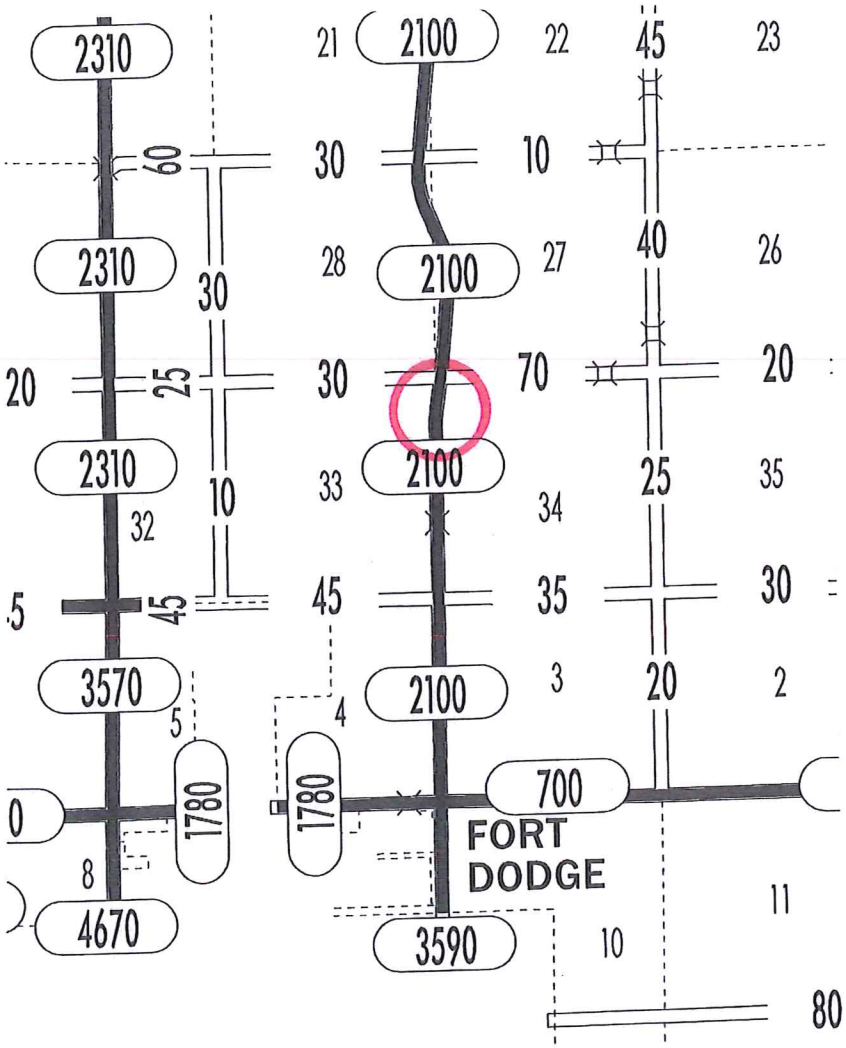


Analyst: Ryan Weidemann

Notes:

TRAFFIC SAFETY IMPROVEMENT PROGRAM APPLICATION
PROJECT #FM-TSF-CO94(P59)- -5B-94

PART J - TRAFFIC VOLUMES



TRAFFIC SAFETY IMPROVEMENT PROGRAM APPLICATION
PROJECT #FM-TSF-CO94(P59)- -5B-94

BENEFIT/COST ANALYSIS

Per the Iowa DOT TSIP Road Segment Benefit / Cost Safety Analysis instructions, the following assumptions were used to calculate a Benefit / Cost Ratio:

1. Estimated improvement life (Y) = 20 Years
   - TSIP B/C Approximate Improvement Service Life

2. Crash Reduction Factor (CRF) = 37,

   - **30**, for widening paved shoulder from 0 to 2 feet (Li, et al., Safety Effects of Shoulder Paving for Rural and Urban Interstate, Multilane, Two-Lane Highways)
   - **10**, for upgrading superelevation on existing horizontal curves with superelevation rates less than recommended design values (Hughes, Warren & Daily, K, Effect of Highway Standards on Safety, Issue 374)

   The cumulative factor of simultaneous improvements of CRF values of 30 and 10 equals **37**. Note that the factor for upgrading superelevation did not come from the CMF Clearinghouse because no studies of improvement to superelevation could be found on that site. We believe the factor of 10 is extremely conservative, based on the fact the study assumed correcting some existing superelevation to a more appropriate grade. In this case, there is no superelevation, the curve has a standard crown, and that correcting the superelevation to the required standard will greatly improve curve navigability.

The county is requesting $190,000 in TSIP funding assistance for this project, and the resulting Benefit / Cost Ratio is 1.61:1.

Rev. 5/14

Road Segment Benefit / Cost Safety Analysis

Iowa DOT Office of Traffic & Safety

County: Webster | Prepared by: Ryan Weidemann | Date Prepared: Mar 11, 2015

Location: P59 Curve

Improvement

Proposed Improvement(s): Pave Shoulders and add superelevation

$ 190,000	Estimated Improvement Cost, **EC**	20	Est. Improvement Life, years, **Y**
$ -	Other Annual Cost (after initial year), **AC**	37	Crash Reduction Factor (integer), **CRF**
$ -	Present Value Other Annual Costs, **OC**	4.0%	Discount Rate, **INT**
	$$OC = \frac{AC}{INT}\left(1 - \frac{1}{(1+INT)^Y}\right)$$	$ 190,000	Present Value All Costs, **COST** = EC + OC

Traffic Volume Data

Source: Iowa DOT 2011 Count | 2011 Date of traffic count

Length (mi.)	Two-way veh/day	Description
0.22	2,100	
0.22	miles total	

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

462 Current Vehicle Miles / Day, **VM**

564 End of Life Veh. Miles / Day

168,630 Current Veh. Miles / Year, **AM**

3,713,065 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

2004 First full year --> 2014 Last full year — 11.0 years, Time Period, **T**

Additional months — values as of May 2014

1	Fatal Crashes →		Fatalities @	$4,500,000	$ -
		1	Major Injuries @	$325,000	$ 325,000
3	Injury Crashes →	3	Minor Injuries @	$65,000	$ 195,000
		1	Possible Injuries @	$35,000	$ 35,000
4	Property Damage Only		(assumed cost per crash)	$7,400	$ 59,200
			-OR- enter all Property Costs of all crashes:		
8	Total Crashes, **TA**			Total $ Loss, **LOSS**	$ 614,200

0.73	Current Crashes / Year, **AA** = TA / T	**431.3**	Crashes / HMVM, Crash Rate, **CR** CR = TA x 10^8 / (AM x T)
$ 76,775	Cost per Crash, **AVCR** = LOSS / TA	$ 305,155	Present Value of Avoided Crashes, **BENEFIT**
16.0	Total Expected Crashes, **TCR** = CR x TVMT/10^8		
0.27	Crashes Avoided First Year **AAR** = AA x CRF / 100		
$ 20,659	Crash Costs Avoided in First Year, AAR x AVCR		
5.9	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 = $305,155 : $190,000 = **1.61** : 1

District 2

Application for TRAFFIC SAFETY FUNDS

GENERAL INFORMATION **DATE:** August 11, 2015

Location / Title of Project University Avenue and Cedar Heights Drive intersection

Applicant City of Cedar Falls

Contact Person Randy Lorenzen Title City Engineer

Complete Mailing Address 220 Clay Street
Cedar Falls, Iowa 50613

Phone 319-268-5176 (Area Code) E-Mail Randy.Lorenzen@cedarfalls.com

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 $ $2,100,000

Safety Funds Requested $ $500,000

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 Cedar Falls, Iowa

Signed: _____ 8/11/15
Signature Date Signed

Ron Gaines
Typed Name

Attest: _____ 8/11/15
Signature Date Signed

Michelle Sweeney
Typed Name

Existing Conditions

Deteriorated pavement over sixty years old; high speeds; safety deficiencies; no pedestrian or bicycle accommodations; overbuilt; no connectivity to limited transit options; inefficient traffic operations. These statements summarize the University Avenue corridor in Cedar Falls today. The University Avenue Corridor Reconstruction Project is an ambitious effort to transform University Avenue between Iowa Highway 58 and Midway Drive in Cedar Falls from a vehicle-centric, six-lane, highway into a revitalized, four-lane, multimodal, urban roadway guided by one of the nation's best complete street policies. 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.

University Avenue is a six-lane, divided highway with a posted speed of 45 mph. The corridor includes 17 at-grade intersections, 60 commercial and residential driveway access points, and intermittent frontage roads paralleling University Avenue. The corridor currently carries up to 20,000 vehicles per day. Corridor improvements have been under consideration and study since 2008.

University Avenue & Cedar Heights Road Drive Intersection

Cedar Heights Drive is one of the major intersections along the corridor and is the highest crash location on University Avenue. The current Average Daily Traffic through this intersection is 15,515 vehicles. The most frequent type of crash at the Cedar Heights Drive intersection is eastbound or westbound left-turning traffic colliding with oncoming vehicles. Rear-end collisions are also prevalent at this intersection. Several factors contribute to the crashes at this intersection, including:

- Limited sight distance for westbound left-turning traffic due to the horizontal curve in University Avenue at this location
- High traffic volumes due to the proximity of commercial properties at this intersection, including a car dealership, banks and a motel.
- Skewed intersection results in a sharper left-turn angle
- Proximity of frontage road access points
- High speeds along corridor
- Split phase traffic signal operation increases delay and causes driver impatience.

In addition, this location lacks adequate pedestrian facilities to safely cross this busy intersection.

Crash History

This intersection has the highest crash rate along the 2 mile long project corridor. An overbuilt roadway, high speeds, and intersection geometrics are factors contributing to the safety issues at this intersection. Between 2004 and 2014, there were 97 crashes at this intersection, a rate of 1.55 crashes per million entering vehicles (above the statewide average during this time).

Iowa Department of Transportation

Major Cause Summary

Univeristy Ave & Cedar Heights Dr - Major Cause

Analysis Years: 2010 (10), 2011 (6), 2012 (5), 2013 (7), 2014 (5)

Crash Summary:

Fatal	-
Major Injury	1
Minor Injury	5
Possible/Unknown	12
PDO	15
Total Crashes	33

Injury Summary:

Fatal	-
Major Injury	1
Minor Injury	6
Possible	13
Unknown	2
Total Injuries	22

Surface Condition Summary:

Dry	26
Wet	3
Ice	-
Snow	3
Slush	1
Sand/Dirt/Oil/Gravel	-
Water	-
Other	-
Unknown	-
Not Reported	-
Total Crashes	33

TOT Property Damage: $179,850

AVG Property Damage: $5,450

Major Cause Summary:

	Animal
9	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
10	FTYROW: Making Left Turn
	FTYROW: From Driveway
	FTYROW: From Parked Position
	FTYROW: To Pedestrian
	FTYROW: Other (explain in narrative)
	Traveling Wrong Way or on Wrong Side of Rd
1	Driving Too Fast for Conditions
	Exceeded Authorized Speed
	Made Improper Turn
	Improper Lane Change
2	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
	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
	Other: No Improper Action
	None Indicated

Selection Filter:

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

Analyst:

Notes:

8/11/2015 Crash Mapping Analysis Tool Page: 1 of 1

Iowa Department of Transportation

Major Cause Summary

Univeristy Ave & Cedar Heights Dr - Major Cause

Analysis Years: 2010 (10), 2011 (6), 2012 (5), 2013 (7), 2014 (5)

Crash Summary:

Fatal	-
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Minor Injury	5
Possible/Unknown	12
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Injury Summary:

Fatal	-
Major Injury	1
Minor Injury	6
Possible	13
Unknown	2
Total Injuries	22

Surface Condition Summary:

Dry	26
Wet	3
Ice	-
Snow	3
Slush	1
Sand/Dirt/Oil/Gravel	-
Water	-
Other	-
Unknown	-
Not Reported	-
Total Crashes	33

TOT Property Damage: $179,850

AVG Property Damage: $5,450

Major Cause Summary:

	Animal
9	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
10	FTYROW: Making Left Turn
	FTYROW: From Driveway
	FTYROW: From Parked Position
	FTYROW: To Pedestrian
	FTYROW: Other (explain in narrative)
	Traveling Wrong Way or on Wrong Side of Rd
1	Driving Too Fast for Conditions
	Exceeded Authorized Speed
	Made Improper Turn
	Improper Lane Change
2	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
	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
	Other: No Improper Action
	None Indicated

Selection Filter:

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

Analyst:

Notes:

8/11/2015 Crash Mapping Analysis Tool Page: 1 of 1

Proposed Concept
The goals of the Cedar Heights Drive intersection improvements and the University Avenue Reconstruction Project are to:

- Enhance safety
- Improve pavement conditions
- Support and revitalize economic growth throughout the corridor
- Provide for bicycle and pedestrian access and mobility
- Improve traffic flow

The City of Cedar Falls recognized the transportation challenges of the University Avenue corridor years ago and, through various efforts over the last decade, has developed a multimodal transportation project that will completely transform the operations and functionality of the corridor. The complete streets design includes a road diet, reduced lane widths, reduced speed, roundabouts, sidewalks, trails, bus stops/shelters, street lighting, and streetscaping. This project will increase mobility and connectivity for residents, visitors, and students.

The intersection of University Avenue and Cedar Heights Drive will be improved by:

- Installation of a roundabout
- Reducing the corridor from six lanes to four lanes
- Reducing the lane widths from 12 feet to 11 feet
- Reduction of speed through intersection
- Addition of pedestrian facilities

Safety Justification
The reductions in the number and width of travel lanes – often called a “road diet” – will have multiple benefits. The road diet will reduce lane capacity and slow the speed of traffic. In addition, the posted speed of the corridor will be reduced from 45 miles per hour to 35 miles per hour. Road diets improve speed limit compliance, which improves safety – for all users. Lower speeds decrease the severity when crashes do occur. The slower traffic speeds require less time for a vehicle to stop, reducing the chance of striking a pedestrian. If a pedestrian crash does occur, the severity is drastically reduced with the lower speeds. A pedestrian struck at 40 mph has an 85% chance of being killed. At 30 mph, that chance is nearly cut in half to 45%.

These lower speeds benefit bicyclists sharing the road with vehicles in the same way. Road diets also benefit pedestrians in that the decreased number of vehicle travel lanes for pedestrians to cross reduces the exposure time for pedestrians, reducing their crash risk.

A roundabout will be constructed at this intersection. Lower speeds and reduced number of vehicle and pedestrian conflicts points at roundabouts minimize the severity and number of overall crashes. These factors also reduce the number of injury crashes at roundabout intersections versus other types of intersections. According to the Federal Highway Administration (FHWA) Proven Safety Countermeasures, converting a signalized intersection to a roundabout a location can experience:

- 78% reduction in severe (injury/fatal) crashes
- 48% reduction in overall crashes

A five-foot wide sidewalk will be constructed on the north side of the intersection and a ten-foot wide multi-use trail will be constructed on the south side. These new facilities will benefit transit riders, pedestrians and bicyclists. ADA compliant ramps will be constructed at the intersection.

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
8191 Birchwood Court, Suite L • Johnston, Iowa 50131-2931
Phone: (515) 254-1393 • Fax: (515) 254-1642

University Avenue Improvements
Cedar Heights Drive Intersection
ary Opinion of Probable Construction Costs
Cedar Falls, Iowa - 2014

ITEM NO.	ITEM DESCRIPTION	UNIT	UNIT PRICE	CEDAR HEIGHTS DR 4 LANES - ROUNDABOUTS QUANTITY	TOTAL
Part A. General Roadway Reconstruction					
Construction Costs:					
A1. MAINLINE/SIDEROAD IMPROVEMENTS					
A1.1	CLEARING & GRUBBING	LS	$5,000	1	$ 5,000.00
A1.2	PAVEMENT REMOVAL	CY	$4	8,500	$ 34,000.00
A1.3	EXCAVATION, CLASS 10	CY	$10	1,000.00	$ 10,000.00
A1.4	SUBGRADE PREPARATION	SY	$3	9,500.00	$ 28,500.00
A1.5	12" MODIFIED SUBBASE	CY	$30	3,200.00	$ 96,000.00
A1.6	SPECIAL SUBGRADE TREATMENT	SY	$10	1,000.00	$ 10,000.00
A1.7	10" PCC PAVEMENT, CLASS C-4, w/ 6" CURB (MAINLINE)	SY	$55	4,500.00	$ 247,500.00
A1.8	8" PCC PAVEMENT, CLASS C-4, w/ 6" CURB (SIDEROAD)	SY	$50	3,500.00	$ 175,000.00
A1.9	7" PCC PAVEMENT, DRIVEWAY	SY	$45	250.00	$ 11,250.00
A1.10	PAVEMENT MARKINGS & SIGNING (PERMANENT/TEMPORARY)	LS	$10,000	1	$ 10,000.00
			SUBTOTAL COST		**$628,000**
Miscellaneous Costs:					
A2. GENERAL					
A2.1	MOBILIZATION (3%)	LS	$75,000	1	$ 75,000.00
A2.2	PAVEMENT MARKINGS & SIGNING (PERMANENT/TEMPORARY)	LS	$10,000	1	$ 10,000.00
A2.3	TRAFFIC CONTROL	LS	$20,000	1	$ 20,000.00
A2.4	TEMPORARY TRAFFIC SIGNALS	EA	$25,000	1	$ 25,000.00
A2.5	TEMPORARY PAVEMENT	SY	$35	1,000	$ 35,000.00
A2.6	SURFACE RESTORATION (PERMANENT/TEMPORARY)	LS	$10,000	1	$ 10,000.00
A2.7	EROSION CONTROL	LS	$5,000	1	$ 5,000.00
			SUBTOTAL COST		**$180,000**
A3. STORM SEWER IMPROVEMENTS					
A3.1	SEWER, STORM, RCP, MINOR - CROSS RUNS (15-18")	LF	$60	850	$ 51,000.00
A3.2	SEWER, STORM, RCP, MAJOR - TRUNK LINE (24-36")	LF	$90	150	$ 13,500.00
A3.3	REMOVE STORM SEWER PIPE LESS THAN OR EQUAL TO 36 IN.	LF	$20	650	$ 13,000.00
A3.4	MANHOLE, STORM SEWER, SW-403	EA	$5,000	2	$ 10,000.00
A3.5	INTAKE, STORM SEWER, SW-508 OR SW-510	EA	$4,500	6	$ 27,000.00
			SUBTOTAL COST		**$115,000**
Other Costs:					
A4. CONTINGENCY (10%)					**$ 92,300.00**
A5. RIGHT-OF-WAY					
	RESIDENTIAL RIGHT-OF-WAY	SF	$5.00	-	$ -
	COMMERCIAL RIGHT-OF-WAY	SF	$12.00	2,075	$ 24,900
	COMPLETE PARCEL ACQUISITIONS (including demolition)	LS		***1 Parcel (Extened Stay)***	$ 400,000
	MISCELLANEIOUS CONSTRUCTION EASEMENTS				$ 10,000
					$435,000
	SUBTOTAL COST PART A				**$1,450,300**
Part D. Pedestrian Improvements					
D1. PEDESTRIAN IMPROVEMENTS					
D1.1	5" PCC SIDEWALK, 5-FT	SY	$30	300	$ 9,000.00
D1.2	6" PCC PEDESTRIAN TRAIL, 10-FT	SY	$35	1300	$ 45,500.00
	CONTINGENCY (10%)				$ 5,450.00
			SUBTOTAL COST		**$60,000**
	SUBTOTAL COST PART D				**$60,000**
Part E. Other Infrastructure Improvements					
E1. ROADWAY LIGHTING					
E1.1	STREET LIGHT POLES (STANDARD GALVANIZED)	EA	$3,500	8	$ 28,000.00
E1.2	STREET LIGHT WIRING (INCLUDING HANDHOLES)	LF	$20	300	$ 6,000.00
E1.3	EXISTING POLE REMOVAL	EA	$500	4	$ 2,000.00
	CONTINGENCY (10%)				$ 3,600.00
			SUBTOTAL COST		**$40,000**
E2. SANITARY SEWER					
E2.1	SANITARY SEWER GRAVITY MAIN, TRENCHED, PVC 8 IN	LF	$120	200	$ 24,000.00
E2.2	REMOVE SANITARY SEWER PIPE LESS THAN OR EQUAL TO 36 IN.	LF	$50	200	$ 10,000.00
E2.3	MANHOLE, SANITARY SEWER, SW-301, 48 IN. NEW	EA	$3,500	2	$ 7,000.00
	CONTINGENCY (10%)				$ 4,100.00
			SUBTOTAL COST		**$50,000**
	SUBTOTAL COST PART E				**$90,000**
SUBTOTAL ESTIMATED PROJECT COSTS					**$ 1,700,000**

Part F. Other Miscellaneous Costs	
PROJECT DESIGN AND CONTRACT ADMINISTRATION COSTS (22%)	**$374,000**
OTHER MISCELLANEOUS COSTS	**$0**
Subtotal Cost for Other Miscellaneous Costs =	
TOTAL ESTIMATED PROJECT COSTS	**$ 2,100,000**

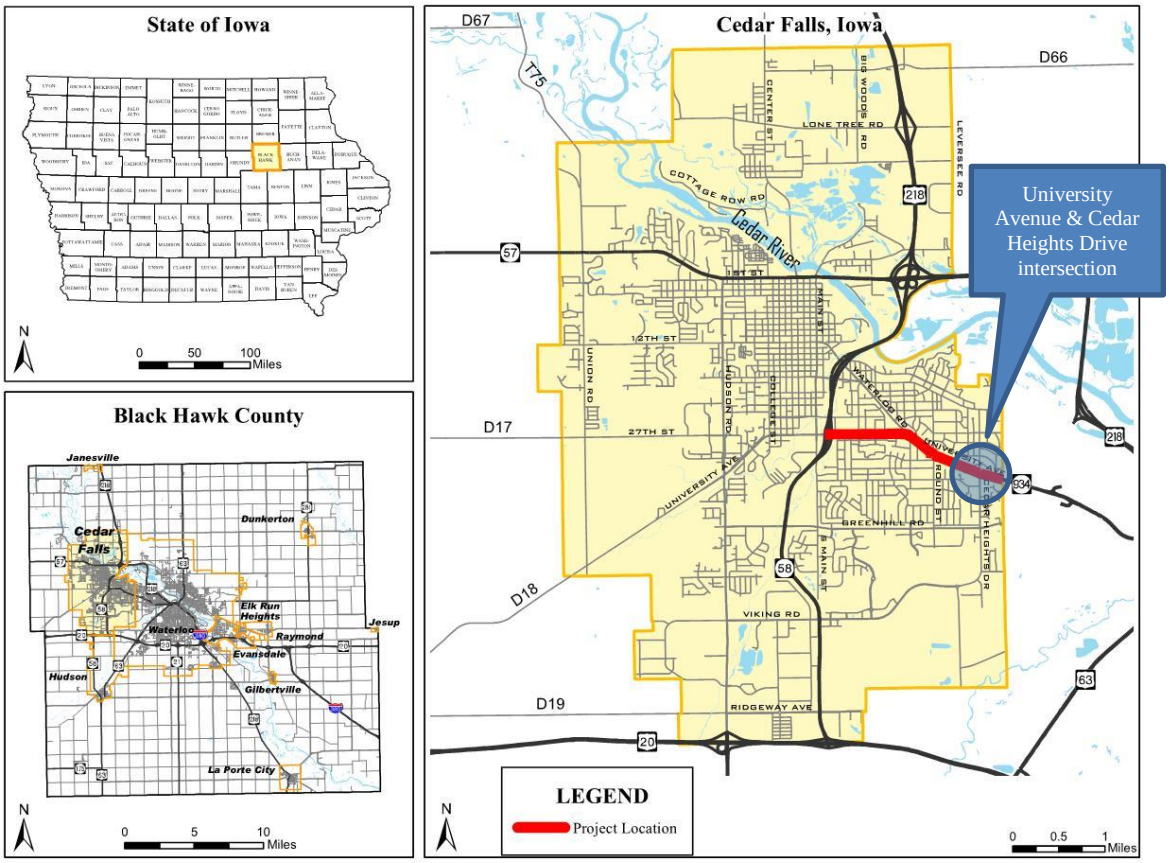
Anticipated Funding Sources

Funding	**Total**	**Percent**
Local	$1,600,000	76%
TSIP	$500,000	24%
Total	**$2,100,000**	

Project Schedule

University Avenue Corridor Study	Completed in August 2010
Environmental Assessment	Completed in October 2013
FONSI	February 2014
Traffic Analysis and Conceptual Design	Completed February 2015
Public Involvement and Right-of-Way Acquisition	February 2015 to May 2016
Final Design	December 2015 to May 2016
Construction	July 2016 to December 2017

Project Map


State of Iowa
N
0 50 100 Miles
Black Hawk County
Janesville
Cedar Falls
Dunkerton
Elk Run Heights
Waterloo
Raymond
Evansdale
Jesup
Hudson
Gilbertville
La Porte City
N
0 5 10 Miles
Cedar Falls, Iowa
D67
D66
T75
CENTER ST
BIG WOODS RD
LONE TREE RD
LEVERSEE RD
COTTAGE ROW RD
Cedar River
218
57
1ST ST
12TH ST
UNION RD
HUDSON RD
COLLEGE ST
MAIN ST
WAYNE ST
D17
27TH ST
UNIVERSITY AVE
ROUND ST
934
GREENHILL RD
CEDAR HEIGHTS DR
58
D18
VIKING RD
63
D19
RIDGEWAY AVE
20
University Avenue & Cedar Heights Drive intersection
LEGEND
Project Location
N
0 0.5 1 Miles

Color Pictures

Looking East

Looking West

Looking South

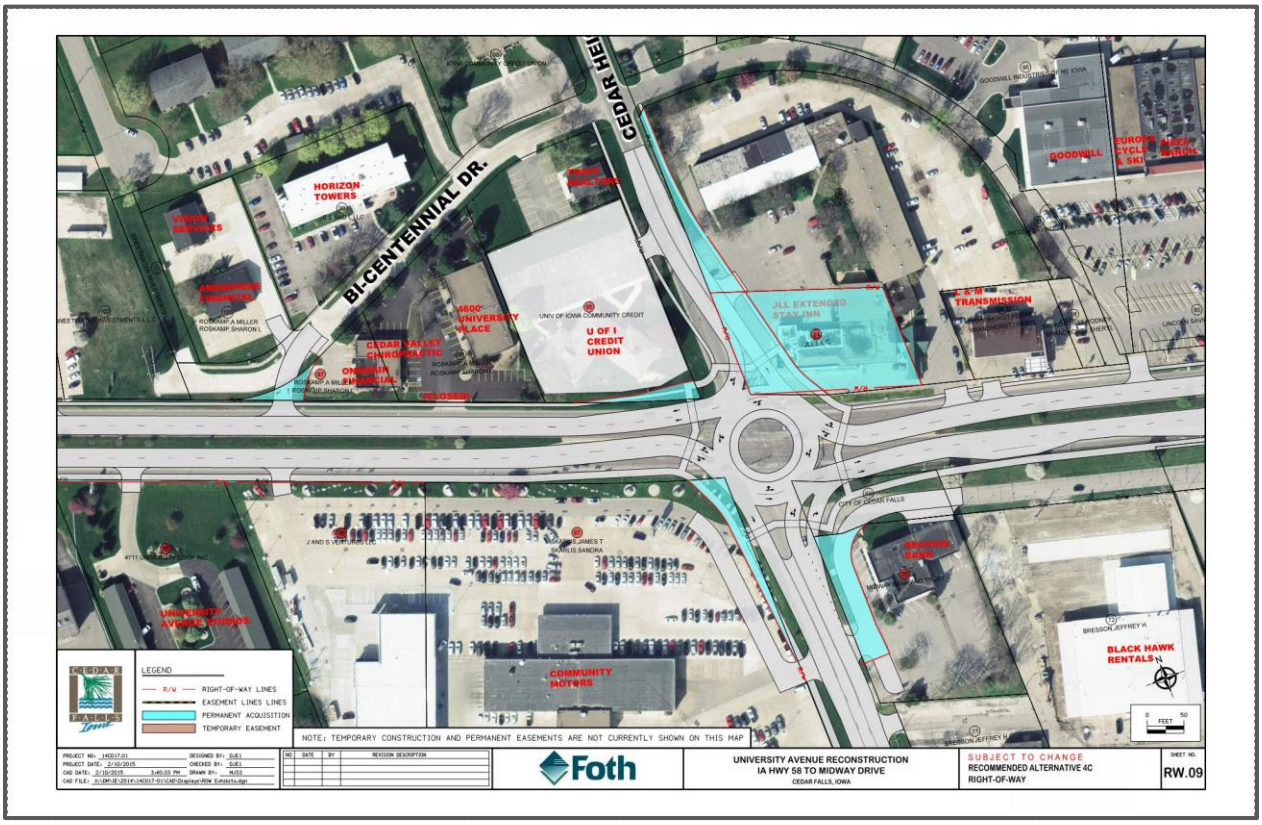
Looking Southeast

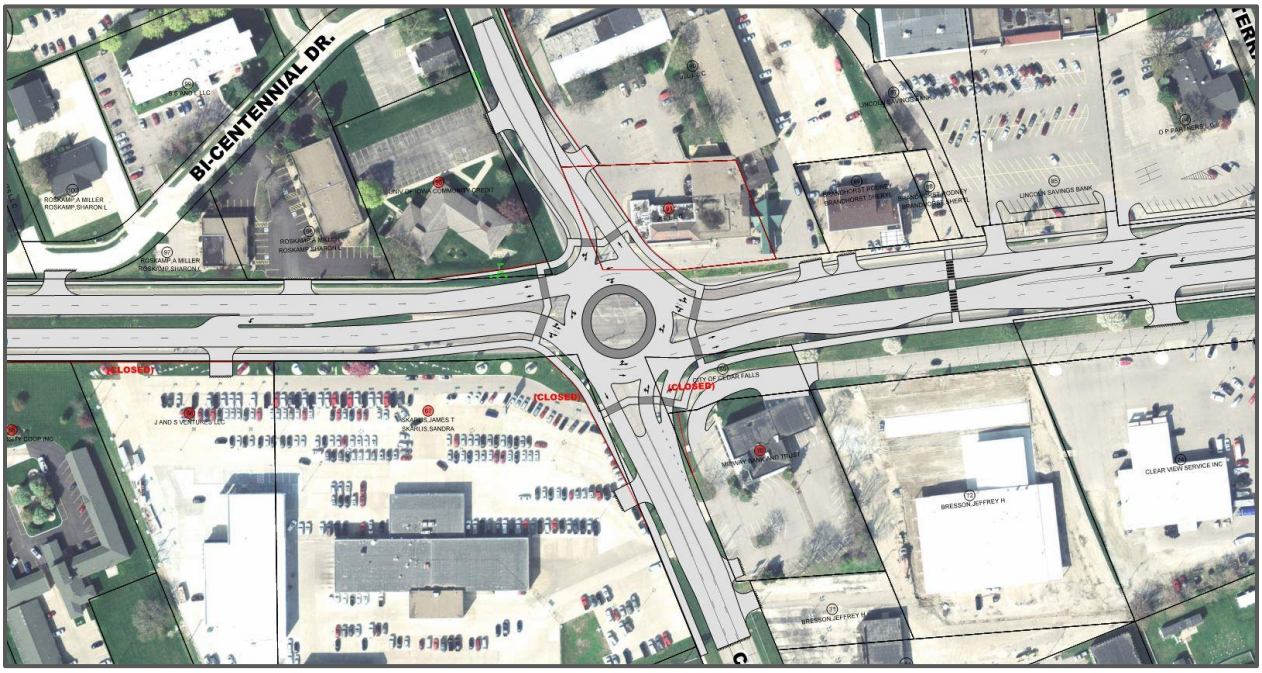
Looking North

Looking South

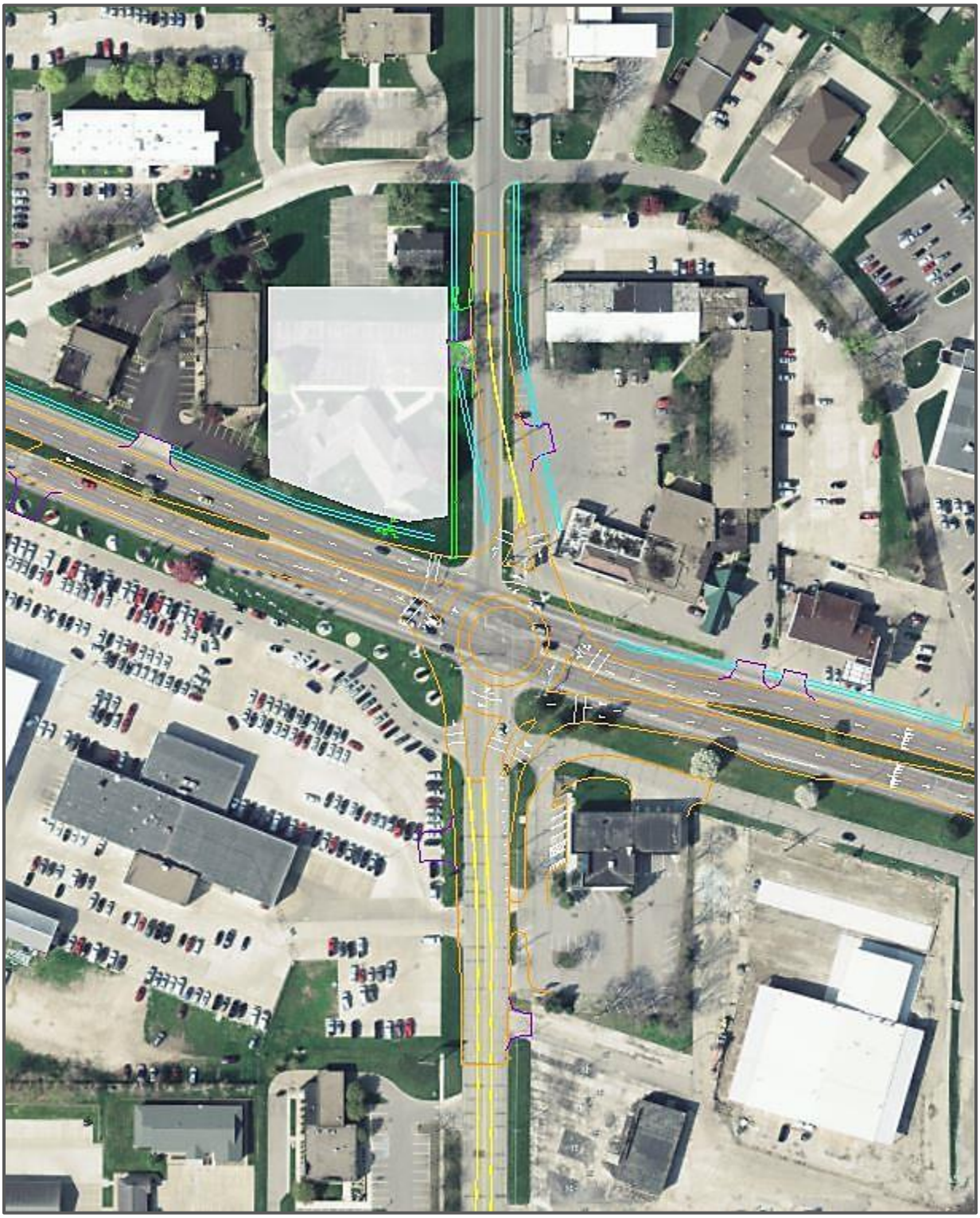
Looking Northwest
Google earth

Plan View


BI-CENTENNIAL DR.
CEDAR HEI
HORIZON TOWERS
4600 UNIVERSITY PLACE
U OF I CREDIT UNION
JLL EXTENDED STAY INN
GOODWILL
COMMUNITY MOTORS
BLACK HAWK RENTALS
LEGEND
R/W RIGHT-OF-WAY LINES
EASEMENT LINES LINES
PERMANENT ACQUISITION
TEMPORARY EASEMENT
NOTE: TEMPORARY CONSTRUCTION AND PERMANENT EASEMENTS ARE NOT CURRENTLY SHOWN ON THIS MAP
Foth
UNIVERSITY AVENUE RECONSTRUCTION
IA HWY 58 TO MIDWAY DRIVE
CEDAR FALLS, IOWA
SUBJECT TO CHANGE
RECOMMENDED ALTERNATIVE 4C
RIGHT-OF-WAY
RW.09


BI-CENTENNIAL DR.
(CLOSED)
(CLOSED)
(CLOSED)
CITY OF CEDAR FALLS
BRESSON JEFFREY H
CLEAR VIEW SERVICE INC
LINCOLN SAVINGS BANK

Aerial Photograph

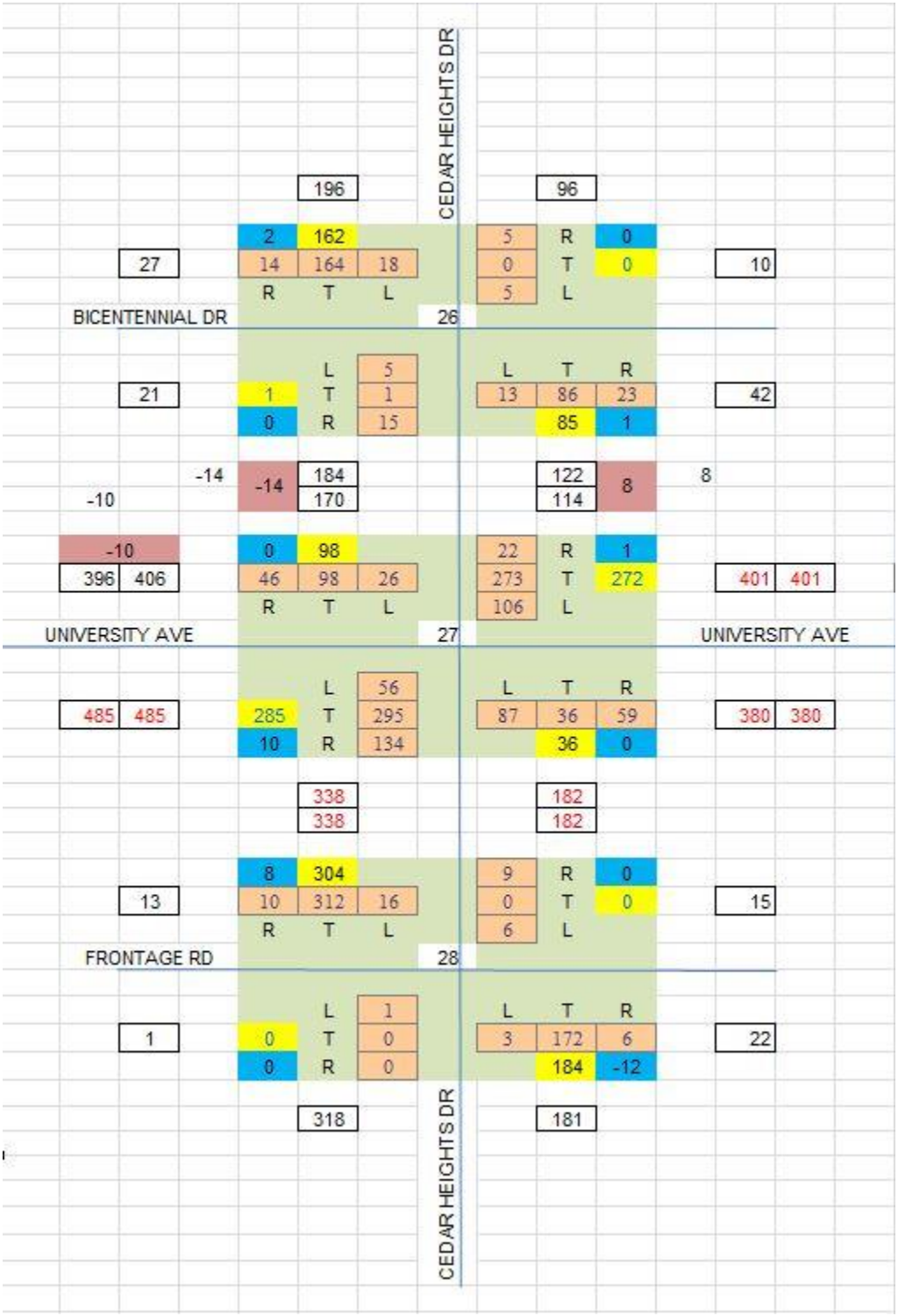


Officer Reports

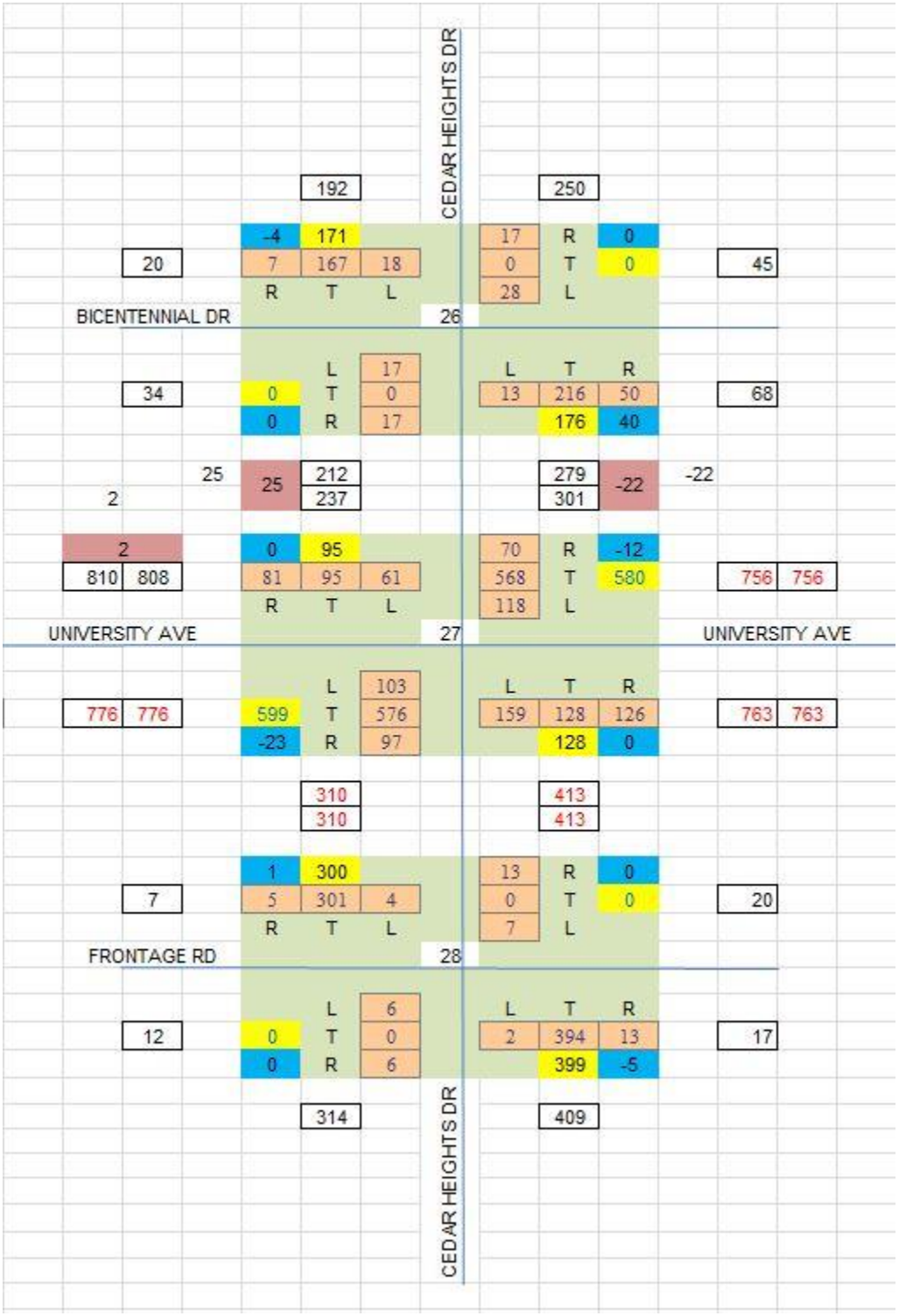
See Appendix for Officer Reports from 2010 to 2015.

Traffic Volumes and Turning Movements

2015 AM Traffic



2015 PM Traffic



Project No. 13C017.01
University Avenue and Cedar Heights Drive Traffic Count
09/03/2014

Groups Printed - Lights																
Street Name	Cedar Heights Dr--Southbound				University Ave--Westbound				Cedar Heights Dr--Northbound				University Ave--Eastbound			
Start Time	Left	Thru	Right	Peds[1]	Left	Thru	Right	Peds[2]	Left	Thru	Right	Peds[3]	Left	Thru	Right	Peds[4]
6:00 AM	2	9	5		6	22	0		5	2	3		3	21	5	
6:15 AM	6	8	4		9	31	2		2	2	1		4	27	5	
6:30 AM	7	12	4		7	28	0		8	4	9		6	56	8	
6:45 AM	12	9	12		15	43	6		12	2	11		4	46	16	
7:00 AM	4	9	12		14	41	1		19	10	8		8	42	18	
7:15 AM	6	23	15		27	74	5		21	4	11		13	48	30	
7:30 AM	7	20	17		28	68	7		21	14	10		11	70	35	
7:45 AM	6	27	5		30	78	7		28	9	14		14	103	37	
8:00 AM	6	27	9		18	47	3		17	9	24		15	59	31	
8:15 AM	3	18	6		26	84	6		16	17	12		10	40	25	
8:30 AM	9	16	21		20	74	8		18	4	22		13	69	31	
8:45 AM	11	28	17		13	87	9		19	12	13		19	90	24	
9:00 AM																
9:15 AM																
9:30 AM																
9:45 AM																
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10:15 AM																
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10:45 AM																
11:00 AM																
11:15 AM																
11:30 AM	9	13	15		37	101	13		32	25	35		22	89	19	
11:45 AM	13	19	17		31	99	12		31	32	27		21	110	15	
12:00 PM	18	20	13		31	105	19		37	23	27		31	135	22	
12:15 PM	21	24	16		36	115	18		35	19	22		19	100	37	
12:30 PM	16	22	14		21	80	8		29	37	17		21	111	21	
12:45 PM	13	18	13		39	122	16		25	18	20		28	118	29	
1:00 PM	19	20	14		30	99	11		21	29	17		32	118	24	
1:15 PM	13	13	13		32	87	13		18	17	14		22	98	22	
1:30 PM																
1:45 PM																
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3:00 PM																
3:15 PM																
3:30 PM																
3:45 PM																
4:00 PM	17	23	21		31	109	22		34	30	18		29	135	26	
4:15 PM	18	20	27		27	118	15		38	35	25		17	109	22	
4:30 PM	17	26	17		33	130	17		43	30	36		21	132	20	
4:45 PM	10	20	30		34	162	21		33	22	23		28	140	17	
5:00 PM	18	18	15		21	135	13		30	34	35		34	162	32	
5:15 PM	15	29	19		30	147	17		49	41	32		20	159	28	
5:30 PM	8	19	16		31	127	19		26	29	19		26	134	23	
5:45 PM	8	19	15		32	134	15		25	27	11		18	111	19	
6:00 PM	6	12	13		35	132	21		15	18	15		26	116	14	
6:15 PM	11	16	9		32	131	12		17	14	18		24	95	14	
6:30 PM	5	9	11		25	104	13		13	21	15		17	109	11	
6:45 PM	7	14	10		20	96	11		18	28	9		14	108	15	
AM Subtotals:	79	206	127	0	213	677	54	0	186	89	138	0	120	671	265	0
Noon Subtotals:	122	149	115	0	257	808	110	0	228	200	179	0	196	879	189	0
PM Subtotals:	140	225	203	0	351	1525	196	0	341	329	256	0	274	1510	241	0

Project No. 13C017.01
University Avenue and Cedar Heights Drive Traffic Count
09/03/2014

Groups Printed - Buses																
Street Name	Cedar Heights Dr--Southbound				University Ave--Westbound				Cedar Heights Dr--Northbound				University Ave--Eastbound			
Start Time	Left	Thru	Right	-	Left	Thru	Right	-	Left	Thru	Right	-	Left	Thru	Right	-
6:00 AM	0	0	0		0	1	0		0	0	0		0	0	0	
6:15 AM	0	0	0		0	0	0		0	0	0		0	1	0	
6:30 AM	0	0	0		0	1	0		0	0	0		0	0	0	
6:45 AM	0	0	0		0	0	0		0	0	0		0	1	1	
7:00 AM	0	0	0		0	0	0		0	1	0		0	0	0	
7:15 AM	0	0	0		0	2	0		0	0	0		0	2	0	
7:30 AM	0	0	0		0	0	0		0	0	0		0	0	0	
7:45 AM	0	0	0		0	0	0		0	0	0		0	1	0	
8:00 AM	1	0	0		2	0	0		0	0	0		0	2	0	
8:15 AM	0	0	0		0	2	0		0	0	0		0	0	0	
8:30 AM	0	0	0		0	0	1		0	3	0		1	2	0	
8:45 AM	2	1	0		0	0	0		0	0	0		0	0	0	
9:00 AM																
9:15 AM																
9:30 AM																
9:45 AM																
10:00 AM																
10:15 AM																
10:30 AM																
10:45 AM																
11:00 AM																
11:15 AM																
11:30 AM	0	0	0		0	1	0		0	0	0		0	0	0	
11:45 AM	1	0	0		0	0	0		0	0	0		0	0	0	
12:00 PM	0	0	0		1	0	0		0	0	0		0	0	0	
12:15 PM	0	0	0		0	0	0		0	0	0		0	0	0	
12:30 PM	0	0	0		0	1	0		0	0	0		0	1	0	
12:45 PM	0	0	0		0	0	0		0	0	0		0	0	0	
1:00 PM	0	0	0		0	1	0		0	0	0		0	0	0	
1:15 PM	0	0	0		0	1	0		0	0	0		0	0	0	
1:30 PM																
1:45 PM																
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4:00 PM	0	0	0		0	0	0		0	0	0		0	0	0	
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4:30 PM	0	0	0		0	1	1		0	0	0		0	2	0	
4:45 PM	1	0	0		0	1	0		0	0	0		0	0	0	
5:00 PM	0	0	0		0	0	0		0	0	0		0	0	0	
5:15 PM	0	0	0		0	0	0		0	0	0		0	0	0	
5:30 PM	0	0	0		0	1	0		0	1	0		0	1	0	
5:45 PM	0	0	0		0	0	0		0	0	0		0	0	0	
6:00 PM	1	0	0		0	0	0		0	0	0		0	0	0	
6:15 PM	0	0	0		0	1	0		0	0	0		0	0	0	
6:30 PM	0	0	0		0	0	0		0	0	0		0	1	0	
6:45 PM	0	0	0		0	0	0		0	0	0		0	0	0	
AM Subtotals:	3	1	0	0	2	6	1	0	0	4	0	0	1	9	1	0
Noon Subtotals:	1	0	0	0	1	4	0	0	0	0	0	0	0	1	0	0
PM Subtotals:	2	0	0	0	0	4	1	0	0	1	0	0	0	4	0	0

Project No. 13C017.01
University Avenue and Cedar Heights Drive Traffic Count
09/03/2014

Groups Printed - Trucks																
Street Name	Cedar Heights Dr--Southbound				University Ave--Westbound				Cedar Heights Dr--Northbound				University Ave--Eastbound			
Start Time	Left	Thru	Right	-	Left	Thru	Right	-	Left	Thru	Right	-	Left	Thru	Right	-
6:00 AM	0	0	0		0	0	0		0	0	0		0	1	0	
6:15 AM	0	0	0		0	0	0		0	0	1		0	0	0	
6:30 AM	0	0	0		0	1	0		0	0	0		0	1	0	
6:45 AM	0	0	0		1	1	0		0	0	0		0	0	1	
7:00 AM	0	0	0		0	0	0		0	0	0		0	0	0	
7:15 AM	0	0	0		0	0	0		0	0	0		3	0	0	
7:30 AM	0	0	0		0	1	0		0	0	0		0	0	0	
7:45 AM	0	0	0		1	1	0		0	0	0		0	0	1	
8:00 AM	0	1	0		0	1	0		0	0	0		0	0	0	
8:15 AM	0	0	0		1	0	0		1	0	2		1	2	0	
8:30 AM	0	0	0		0	2	0		0	0	0		0	0	1	
8:45 AM	0	3	0		1	1	1		1	1	1		0	0	1	
9:00 AM																
9:15 AM																
9:30 AM																
9:45 AM																
10:00 AM																
10:15 AM																
10:30 AM																
10:45 AM																
11:00 AM																
11:15 AM																
11:30 AM	0	0	0		0	2	0		0	0	0		0	2	0	
11:45 AM	0	0	0		0	3	0		0	0	0		0	0	1	
12:00 PM	0	0	0		0	2	0		1	1	1		0	2	0	
12:15 PM	0	0	0		1	0	0		0	1	0		0	1	1	
12:30 PM	0	0	0		0	0	0		2	1	0		0	3	1	
12:45 PM	0	0	0		1	1	0		0	0	2		0	1	2	
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4:30 PM	0	0	0		0	1	1		0	1	0		0	2	0	
4:45 PM	0	0	0		0	2	0		0	0	0		0	0	0	
5:00 PM	0	0	0		0	1	0		0	0	0		0	1	0	
5:15 PM	0	2	0		0	0	0		4	0	0		0	1	0	
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6:15 PM	1	0	0		0	1	0		0	0	0		0	0	0	
6:30 PM	0	0	0		0	0	0		0	0	0		0	0	0	
6:45 PM	0	0	0		0	0	0		0	0	0		0	1	0	
AM Subtotals:	0	4	0	0	4	8	1	0	2	1	4	0	4	4	4	0
Noon Subtotals:	0	0	0	0	2	11	1	0	5	3	4	0	1	11	6	0
PM Subtotals:	2	2	0	0	1	6	2	0	6	3	1	0	1	7	1	0

Project No. 13C017.01
University Avenue and Cedar Heights Drive Traffic Count
09/03/2014

Groups Printed - Total Vehicles																	
Street Name	Cedar Heights Dr--Southbound				University Ave--Westbound				Cedar Heights Dr--Northbound				University Ave--Eastbound				
Start Time	Left	Thru	Right	Peds[1]	Left	Thru	Right	Peds[2]	Left	Thru	Right	Peds[3]	Left	Thru	Right	Peds[4]	TOTAL
6:00 AM	2	9	5	0	6	23	0	0	5	2	3	0	3	22	5	0	85
6:15 AM	6	8	4	0	9	31	2	0	2	2	2	0	4	28	5	0	103
6:30 AM	7	12	4	0	7	30	0	0	8	4	9	0	6	57	8	0	152
6:45 AM	12	9	12	0	16	44	6	0	12	2	11	0	4	47	18	0	193
7:00 AM	4	9	12	0	14	41	1	0	19	11	8	0	8	42	18	0	187
7:15 AM	6	23	15	0	27	76	5	0	21	4	11	0	16	50	30	0	284
7:30 AM	7	20	17	0	28	69	7	0	21	14	10	0	11	70	35	0	309
7:45 AM	6	27	5	0	31	79	7	0	28	9	14	0	14	104	38	0	362
8:00 AM	7	28	9	0	20	48	3	0	17	9	24	0	15	61	31	0	272
8:15 AM	3	18	6	0	27	86	6	0	17	17	14	0	11	42	25	0	272
8:30 AM	9	16	21	0	20	76	9	0	18	7	22	0	14	71	32	0	315
8:45 AM	13	32	17	0	14	88	10	0	20	13	14	0	19	90	25	0	355
11:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11:30 AM	9	13	15	0	37	104	13	0	32	25	35	0	22	91	19	0	415
11:45 AM	14	19	17	0	31	102	12	0	31	32	27	0	21	110	16	0	432
12:00 PM	18	20	13	0	32	107	19	0	38	24	28	0	31	137	22	0	489
12:15 PM	21	24	16	0	37	115	18	0	35	20	22	0	19	101	38	0	466
12:30 PM	16	22	14	0	21	81	8	0	31	38	17	0	21	115	22	0	406
12:45 PM	13	18	13	0	40	123	16	0	25	18	22	0	28	119	31	0	466
1:00 PM	19	20	14	0	30	101	12	0	22	29	18	0	33	119	24	0	441
1:15 PM	13	13	13	0	32	90	13	0	19	17	14	0	22	99	23	0	368
4:00 PM	17	23	21	0	32	109	22	0	36	32	19	0	29	137	26	0	503
4:15 PM	19	20	27	0	27	118	16	0	38	35	25	0	18	109	22	0	474
4:30 PM	17	26	17	0	33	132	19	0	43	31	36	0	21	136	20	0	531
4:45 PM	11	20	30	0	34	165	21	0	33	22	23	0	28	140	17	0	544
5:00 PM	18	18	15	0	21	136	13	0	30	34	35	0	34	163	32	0	549
5:15 PM	15	31	19	0	30	147	17	0	53	41	32	0	20	160	28	0	593
5:30 PM	8	19	16	0	31	129	19	0	26	30	19	0	26	135	24	0	482
5:45 PM	8	19	15	0	32	134	15	0	25	27	11	0	18	111	19	0	434
6:00 PM	7	12	13	0	35	132	21	0	15	18	15	0	26	116	14	0	424
6:15 PM	12	16	9	0	32	133	12	0	17	14	18	0	24	95	14	0	396
6:30 PM	5	9	11	0	25	104	13	0	13	21	15	0	17	110	11	0	354
6:45 PM	7	14	10	0	20	96	11	0	18	28	9	0	14	109	15	0	351
AM Subtotals:	82	211	127	0	219	691	56	0	188	94	142	0	125	684	270	0	
Noon Subtotals:	123	149	115	0	260	823	111	0	233	203	183	0	197	891	195	0	
PM Subtotals:	144	227	203	0	352	1535	199	0	347	333	257	0	275	1521	242	0	

TRAFFIC DATA																
Street Name	Cedar Heights Dr--Southbound				University Ave--Westbound				Cedar Heights Dr--Northbound				University Ave--Eastbound			
Start Time	Left	Thru	Right	Peds[1]	Left	Thru	Right	Peds[2]	Left	Thru	Right	Peds[3]	Left	Thru	Right	Peds[4]
AM DHV (2014)	26	98	46	0	106	272	22	0	87	36	59	0	56	285	134	0
Noon DHV (2014)	68	84	56	0	130	426	61	0	129	100	89	0	99	472	113	0
PM DHV (2014)	61	95	81	0	118	580	70	0	159	128	126	0	103	599	97	0
AM DHV (2015)	26	98	46	0	106	272	22	0	87	36	59	0	56	285	134	0
Noon DHV (2015)	68	84	56	0	130	426	61	0	129	100	89	0	99	472	113	0
PM DHV (2015)	61	95	81	0	118	580	70	0	159	128	126	0	103	599	97	0

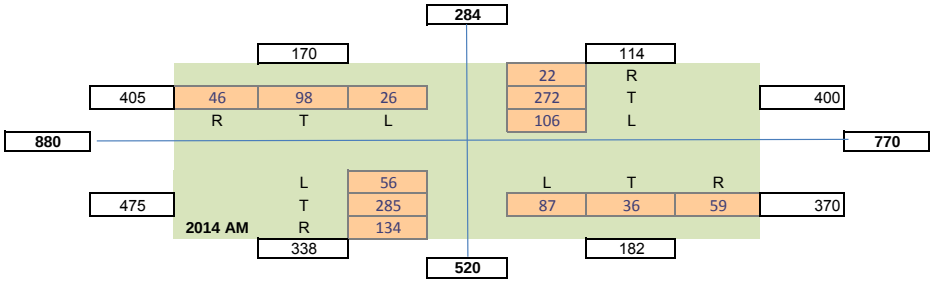
TRUCK TRAFFIC DATA																
Street Name	Cedar Heights Dr--Southbound				University Ave--Westbound				Cedar Heights Dr--Northbound				University Ave--Eastbound			
Start Time	Left	Thru	Right	Peds[1]	Left	Thru	Right	Peds[2]	Left	Thru	Right	Peds[3]	Left	Thru	Right	Peds[4]
Total Trucks	8	7	0		10	39	6		13	12	9		7	36	12	
Total Vehicles	349	587	445		831	3049	366		768	630	582		597	3096	707	
% TRUCKS	2%	1%	0%		1%	1%	2%		2%	2%	2%		1%	1%	2%	

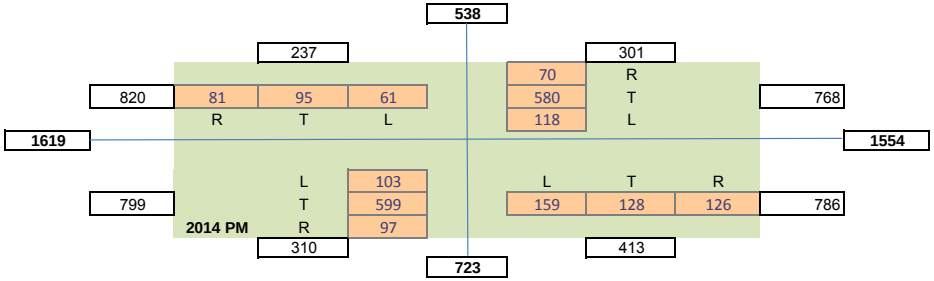
NOTE:
1. Pedestrians traveling North/South across the West leg of University Ave--Eastbound
2. Pedestrians traveling East/West across the North leg of Cedar Heights Dr--Southbound
3. Pedestrians traveling North/South across the East leg of University Ave--Westbound
4. Pedestrians traveling East/West across the South leg of Cedar Heights Dr--Northbound

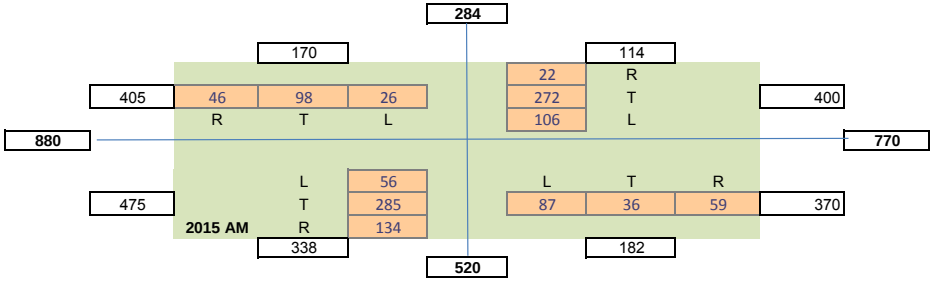
Project No. 13C017.01
University Avenue and Cedar Heights Drive Traffic Count
09/03/2014

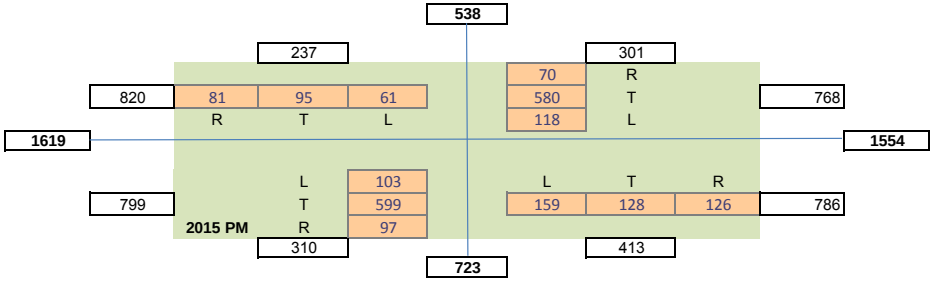
Street Name	Cedar Heights Dr--Southbound				University Ave--Westbound				Cedar Heights Dr--Northbound				University Ave--Eastbound						
Start Time	Left	Thru	Right	Peds[1]	Left	Thru	Right	Peds[2]	Left	Thru	Right	Peds[3]	Left	Thru	Right	Peds[4]			
Total Traffic																	TOTAL	V_{15}	PHF
6:00 AM	27	38	25	0	38	128	8	0	27	10	25	0	17	154	36	0	533	772	0.69
6:15 AM	29	38	32	0	46	146	9	0	41	19	30	0	22	174	49	0	635	772	0.82
6:30 AM	29	53	43	0	64	191	12	0	60	21	39	0	34	196	74	0	816	1136	0.72
6:45 AM	29	61	56	0	85	230	19	0	73	31	40	0	39	209	101	0	973	1236	0.79
7:00 AM	23	79	49	0	100	265	20	0	89	38	43	0	49	266	121	0	1142	1448	0.79
7:15 AM	26	98	46	0	106	272	22	0	87	36	59	0	56	285	134	0	1227	1448	0.85
7:30 AM	23	93	37	0	106	282	23	0	83	49	62	0	51	277	129	0	1215	1448	0.84
7:45 AM	25	89	41	0	98	289	25	0	80	42	74	0	54	278	126	0	1221	1448	0.84
8:00 AM	32	94	53	0	81	298	28	0	72	46	74	0	59	264	113	0	1214	1420	0.85
11:00 AM	23	32	32	0	68	206	25	0	63	57	62	0	43	201	35	0	847	1728	0.49
11:15 AM	41	52	45	0	100	313	44	0	101	81	90	0	74	338	57	0	1336	1956	0.68
11:30 AM	62	76	61	0	137	428	62	0	136	101	112	0	93	439	95	0	1802	1956	0.92
11:45 AM	69	85	60	0	121	405	57	0	135	114	94	0	92	463	98	0	1793	1956	0.92
12:00 PM	68	84	56	0	130	426	61	0	129	100	89	0	99	472	113	0	1827	1956	0.93
12:15 PM	69	84	57	0	128	420	54	0	113	105	79	0	101	454	115	0	1779	1864	0.95
12:30 PM	61	73	54	0	123	395	49	0	97	102	71	0	104	452	100	0	1681	1864	0.90
4:00 PM	64	89	95	0	126	524	78	0	150	120	103	0	96	522	85	0	2052	2176	0.94
4:15 PM	65	84	89	0	115	551	69	0	144	122	119	0	101	548	91	0	2098	2196	0.96
4:30 PM	61	95	81	0	118	580	70	0	159	128	126	0	103	599	97	0	2217	2372	0.93
4:45 PM	52	88	80	0	116	577	70	0	142	127	109	0	108	598	101	0	2168	2372	0.91
5:00 PM	49	87	65	0	114	546	64	0	134	132	97	0	98	569	103	0	2058	2372	0.87
5:15 PM	38	81	63	0	128	542	72	0	119	116	77	0	90	522	85	0	1933	2372	0.81
5:30 PM	35	66	53	0	130	528	67	0	83	89	63	0	94	457	71	0	1736	1928	0.90
5:45 PM	32	56	48	0	124	503	61	0	70	80	59	0	85	432	58	0	1608	1736	0.93
6:00 PM	31	51	43	0	112	465	57	0	63	81	57	0	81	430	54	0	1525	1696	0.90
AM MAX	32	98	56	0	106	298	28	0	89	49	74	0	59	285	134	0	1227		
NOON MAX	69	85	61	0	137	428	62	0	136	114	112	0	104	472	115	0	1827		
PM MAX	65	95	95	0	130	580	78	0	159	132	126	0	108	599	103	0	2217		
AM DHV	26	98	46	0	106	272	22	0	87	36	59	0	56	285	134	0			
NOON DHV	68	84	56	0	130	426	61	0	129	100	89	0	99	472	113	0			
PM DHV	61	95	81	0	118	580	70	0	159	128	126	0	103	599	97	0			

Project No. 13C017.01
University Avenue and Cedar Heights Drive Traffic Count
09/03/2014









Benefit/Cost Ratio

Intersection or Spot Benefit / Cost Safety Analysis

Rev. 5/14

Iowa DOT Office of Traffic & Safety

County: Black Hawk Prepared by: Foth Date Prepared: Aug 1, 2015

Intersection: University Avenue and Cedar Heights Drive

Improvement

Proposed Improvement(s): Conversion of signalized intersection to multi-lane roundabout at intersection of University Avenue and Cedar Heights Drive

$ 500,000	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 (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 DOT/MPO/City Counts 2013-2014 Date of traffic count

Daily Entering Vehicles by Approach (or AADT / 2)

2,700

7,757 → ✦ ← 7,757

1,200

7,086,110	Current Annual Entering Veh., **AEV** = DEV * 365
23,689	veh / day, Final Year DEV, **FDEV**
156.03	MEV, Total Million Entering Veh. Over life of Project, **TMEV**
1.0%	Projected Traffic Growth (0%-10%), **G**
19,414	Current Daily Entering Vehicles, **DEV**

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

Crash Data

2010 First full year --> 2014 Last full year 5.0 years, Time Period, **T**

Additional months values as of May 2014

	Fatal Crashes →		Fatalities @	$4,500,000	$ -
		1	Major Injuries @	$325,000	$ 325,000
18	Injury Crashes →	6	Minor Injuries @	$65,000	$ 390,000
		15	Possible Injuries @	$35,000	$ 525,000
15	Property Damage Only		(assumed cost per crash)	$7,400	$ 244,200
		-OR-	enter all Property Costs of all crashes:		
33	Total Crashes, **TA**			Total $ Loss, **LOSS**	$ 1,484,200

6.60	Current Crashes / Year, **AA** = TA / T	0.93	Crashes / MEV, Crash Rate, **CR** CR = TA x 10^6 / (DEV x 365 x T)
$ 44,976	Cost per Crash, **AVC** = LOSS / TA	$ 3,221,757	Present Value of Avoided Crashes, **BENEFIT**
145.3	Total Expected Crashes, **TECR** = CR x TMEV		
4.85	Crashes Avoided First Year **AAR** = AA x CRF / 100		
$ 218,118	Crash Costs Avoided in First Year, AAR x AVC		
106.8	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 = $3,221,757 : $500,000 = **6.44** : 1

Application for TRAFFIC SAFETY FUNDS

GENERAL INFORMATION **DATE:** Aug 14, 2015

Location / Title of Project: Systemic Traffic Safety Improvements on 5th and 6th Streets

Applicant: City of Waterloo

Contact Person: Mohammad Elahi Title: Traffic Engineer

Complete Mailing Address: 625 Glenwood Street
Waterloo, Iowa 50703

Phone: (319) 291-4440 (Area Code) E-Mail: mohammad.elahi@waterloo-ia.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 Project Cost $ 484,000

Safety Funds Requested $ 484,000

Rev. 5/15

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 Waterloo

Signed: Mohammad Elahi — Aug 17-2015

Signature — Date Signed

Mohammad Elahi

Typed Name

Attest: Susan C. Holmes — 08/17/15

Signature — Date Signed

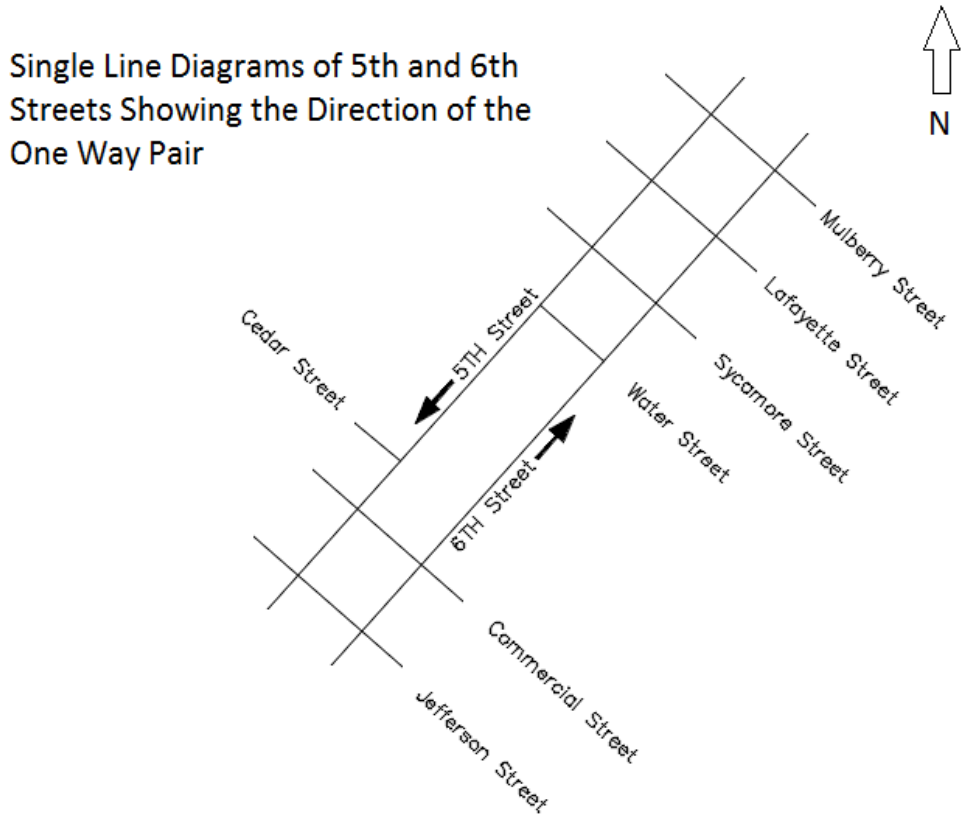
Susan C. Holmes

Typed Name

Systemic Traffic Safety Improvements on 5th and 6th Streets

B. Narrative

Existing Situation: 5th and 6th Streets between Mulberry Street and Jefferson Street are a one-way pair and are about 2600' in length in downtown Waterloo. The speed limit is 30 MPH. There are 4 lanes (3 on the bridge) and 10 signalized intersections. These pretimed signals are well coordinated. This stretch experiences a high number of left turn from wrong-lane crashes. The errant drivers turn left and collide with the same direction vehicle on their left. Several factors contribute to this situation. The traffic signal design and layout is deficient. Signal layout is similar to a two-way design. Signal mast arms poles are installed on far right corners and cover only 2 lanes. There is only 1 signal head over the entire width of the street. There is little signage or clue for 5th Street and 6th Street approach traffic to clearly establish these are one way streets. This situation is confusing. It is particularly troublesome to out of town drivers who are not familiar with downtown Waterloo. There are no lane assignment signs enforcing the one-way nature of streets. There are no vertical signs and very little horizontal signs (pavement markings) to show the driver which lane is for making the turn movement.



A large percentage of all crashes on 5th and 6th Streets are caused by left turns from 2nd lane. There have been a total of 109 “cased” crashes. 47% of the crashes, including a fatality, were caused by someone turning left from the middle lane. Almost all of the crashes involved vehicles on 6th Street or 5th Street. Table 1 shows the number and percentage of wrong lane left turn crashes by severity. There were 204 more crashes for which the police officers did not initiate a report.

Table 1: Total and Wrong Lane Left Turn crashes 1/1/2012 - 7/22/2015

Crash Severity	Total Number of Crashes	Wrong Lane Left Turn on 5th St or 6th St	% Wrong Lane Left Turn
Property Damage Only	90	44	49%
Injury	17	6	33%
Fatal	1	1	100%
Total	109	51	47%

Table 2: Fatal Crash on 5th and 6th Streets 1/1/2012 - 7/22/2015

Location	Date Time Reported	Crash Type or Cause
W 6TH ST/ COMMERCIAL ST	3/9/2014	Left Turn From Wrong Lane

Table 3: SoInjury Crashes on 5th and 6th Streets 1/1/2012 - 7/22/2015

	Location	Date Time Reported	Crash Type or Cause
1	180 W 5TH ST	9/24/2013 5:07:03 PM	bicycle on sidewalk
2	300-BLK E 5TH ST	8/24/2012 9:24:58 AM	chocked on food
3	500-BLK W 5TH ST	5/21/2015 8:05:37 PM	bicycle on sidewalk
4	E 5TH ST/ SYCAMORE ST	9/9/2013 9:03:08 PM	bicycle on sidewalk
5	E 5TH ST/ SYCAMORE ST	9/6/2012 6:50:23 AM	side street RRL
6	E 5TH ST/ SYCAMORE ST	5/19/2012 9:34:45 AM	RRL
7	E 5TH ST/ SYCAMORE ST	9/25/2012 3:44:57 PM	Left Turn From Wrong Lane
8	E 5TH ST/ SYCAMORE ST	2/26/2014 2:12:21 PM	Left Turn From Wrong Lane
9	E 6TH ST/ MULBERRY ST	5/2/2013 1:00:19 AM	RRL
10	E 6TH ST/ SYCAMORE ST	11/9/2012 4:09:08 PM	improper lane change
11	E 6TH ST/ SYCAMORE ST	2/21/2013 3:00:01 PM	right angle
12	E 6TH ST/ SYCAMORE ST	12/21/2014 7:26:11 PM	rearend
13	W 5TH ST/ COMMERCIAL ST	5/19/2014 1:10:04 PM	Commercial left turn
14	W 5TH ST/ COMMERCIAL ST	2/27/201 12:24 PM	Left Turn From Wrong Lane
15	W 6TH ST/ COMMERCIAL ST	6/12/2015 6:34:45 PM	Left Turn From Wrong Lane
16	W 6TH ST/ COMMERCIAL ST	2/18/2012 21:44 PM	Left Turn From Wrong Lane
17	W 6TH ST/ JEFFERSON ST	3/24/2013 2:50:55 PM	Left Turn From Wrong Lane

Table 4: Property Damage Only Crashes on 5th and 6th Streets 1/1/2012 - 7/22/2015

	Location	Date Time Reported	Crash Type or Cause
1	0-BLK W 5TH ST	5/3/2013 2:15:39 AM	fixed object
2	0-BLK W 5TH ST	12/1/2014 6:09:28 PM	improper lane change
3	200-BLK W 6TH ST	9/26/2014 12:18:53 PM	Left Turn From Wrong Lane
4	209 W 5TH ST	12/15/2013 11:10:17 AM	broadside
5	224 W 6TH ST	5/22/2012 11:18:26 AM	improper lane change
6	225 E 6TH ST	7/19/2013 7:26:08 PM	back-out of parking
7	226 W 5TH ST	12/19/2014 5:28:53 PM	back-out of parking
8	300-BLK W 5TH ST	1/17/2015 7:45:29 PM	Left Turn From Wrong Lane
9	313 W 5TH ST	6/2/2013 2:59:48 AM	parked car
10	316 W 5TH ST	6/2/2013 3:02:45 AM	parked car
11	329 W 6TH ST	5/16/2014 12:39:04 PM	parked car
12	400-BLK E 6TH ST	2/24/2012 12:30:59 PM	Left Turn From Wrong Lane

13	400-BLK E 6TH ST	11/12/2014 2:44:09 PM	rearend
14	425 LAFAYETTE ST ' 1715 W 6TH	6/28/2013 5:34:21 PM	parked car
15	500-BLK W 5TH ST	1/19/2012 4:16:11 PM	improper lane change
16	620 W 5TH ST	7/31/2013 5:17:46 PM	Left Turn From Wrong Lane
17	820 W 5TH ST	5/10/2012 11:11:03 AM	Left Turn From Wrong Lane
18	E 5TH ST/ LAFAYETTE ST	1/13/2012 3:36:33 PM	Left Turn From Wrong Lane
19	E 5TH ST/ LAFAYETTE ST	8/27/2013 8:07:31 AM	improper lane change
20	E 5TH ST/ LAFAYETTE ST	3/7/2014 12:35:48 PM	Left Turn From Wrong Lane
21	E 5TH ST/ LAFAYETTE ST	7/21/2014 4:27:35 PM	Left Turn From Wrong Lane
22	E 5TH ST/ MULBERRY ST	9/12/2012 3:32:56 PM	Left Turn From Wrong Lane
23	E 5TH ST/ MULBERRY ST	9/21/2012 2:37:25 PM	Left Turn From Wrong Lane
24	E 5TH ST/ MULBERRY ST	1/30/2014 12:12:54 PM	Left Turn From Wrong Lane
25	E 5TH ST/ MULBERRY ST	6/27/2014 2:25:13 PM	rearend
26	E 5TH ST/ MULBERRY ST	8/18/2014 11:46:07 AM	Left Turn From Wrong Lane
27	E 5TH ST/ MULBERRY ST	1/23/2015 2:51:34 PM	rearend
28	E 5TH ST/ MULBERRY ST	2/11/2015 11:22:29 AM	Left Turn From Wrong Lane
29	E 5TH ST/ SYCAMORE ST	9/4/2012 6:54:30 PM	RRL
30	E 5TH ST/ SYCAMORE ST	11/20/2012 12:14:21 PM	rearend
31	E 5TH ST/ SYCAMORE ST	2/24/2013 3:36:03 PM	out of parking
32	E 5TH ST/ SYCAMORE ST	12/21/2013 7:12:59 PM	rearend
33	E 5TH ST/ SYCAMORE ST	3/1/2014 1:30:52 PM	Left Turn From Wrong Lane
34	E 5TH ST/ SYCAMORE ST	4/15/2014 12:29:03 PM	back-out of parking
35	E 5TH ST/ SYCAMORE ST	7/3/2014 3:03:39 PM	back-out of parking
36	E 5TH ST/ WATER ST	7/20/2013 2:27:01 PM	Left Turn From Wrong Lane
37	E 6TH ST/ LAFAYETTE ST	4/16/2012 12:38:28 PM	Left Turn From Wrong Lane
38	E 6TH ST/ LAFAYETTE ST	8/8/2012 12:00:55 AM	parked car
39	E 6TH ST/ LAFAYETTE ST	4/2/2013 11:04:58 AM	Left Turn From Wrong Lane
40	E 6TH ST/ LAFAYETTE ST	6/22/2015 8:58:28 AM	Left Turn From Wrong Lane
41	E 6TH ST/ MULBERRY ST	10/10/2012 2:16:41 PM	rearend
42	E 6TH ST/ MULBERRY ST	12/27/2012 3:28:28 PM	improper lane change
43	E 6TH ST/ MULBERRY ST	6/25/2013 1:04:24 PM	Left Turn From Wrong Lane
44	E 6TH ST/ MULBERRY ST	2/5/2014 1:09:55 PM	Left Turn From Wrong Lane
45	E 6TH ST/ SYCAMORE ST	5/3/2012 7:54:09 AM	rearend
46	E 6TH ST/ SYCAMORE ST	9/10/2012 5:01:48 PM	rearend
47	E 6TH ST/ SYCAMORE ST	11/1/2012 9:54:33 AM	Left Turn From Wrong Lane
48	E 6TH ST/ SYCAMORE ST	3/12/2013 2:03:33 PM	rearend
49	E 6TH ST/ SYCAMORE ST	7/1/2013 9:38:59 AM	rearend
50	E 6TH ST/ SYCAMORE ST	5/12/2014 12:05:21 PM	Left Turn From Wrong Lane
51	E 6TH ST/ SYCAMORE ST	1/9/2015 8:29:56 AM	sycamore left turn
52	E 6TH ST/ SYCAMORE ST	1/9/2015 1:51:10 PM	Left Turn From Wrong Lane
53	W 5TH ST/ COMMERCIAL ST	11/8/2012 10:54:37 AM	RRL
54	W 5TH ST/ COMMERCIAL ST	12/8/2012 9:33:52 PM	Commercial left turn
55	W 5TH ST/ COMMERCIAL ST	11/21/2013 8:00:41 AM	improper lane change
56	W 5TH ST/ COMMERCIAL ST	4/13/2014 8:51:30 PM	Left Turn From Wrong Lane
57	W 5TH ST/ COMMERCIAL ST	2/17/2015 4:16:36 PM	Commercial left turn
58	W 5TH ST/ COMMERCIAL ST	10/20/2013 12:47:56 PM	Left Turn From Wrong Lane
59	W 5TH ST/ JEFFERSON ST	7/15/2012 3:39:05 AM	hit &run backup
60	W 5TH ST/ JEFFERSON ST	1/22/2012 1:57:59 AM	Jefferson RRL
61	W 5TH ST/ JEFFERSON ST	6/3/2012 12:21:52 PM	wrong direction on one-way
62	W 5TH ST/ JEFFERSON ST	12/22/2013 2:17:04 PM	Left Turn From Wrong Lane

63	W 5TH ST/ JEFFERSON ST	5/28/2014 5:09:12 PM	rearend
64	W 5TH ST/ JEFFERSON ST	2/3/2015 6:06:49 PM	Jefferson backup
65	W 6TH ST/ COMMERCIAL ST	1/30/2012 9:50:54 AM	RRL-undetermined
66	W 6TH ST/ COMMERCIAL ST	2/9/2012 3:42:04 PM	Left Turn From Wrong Lane
67	W 6TH ST/ COMMERCIAL ST	3/9/2012 8:21:23 AM	Left Turn From Wrong Lane
68	W 6TH ST/ COMMERCIAL ST	3/21/2012 10:59:44 AM	on Commercial
69	W 6TH ST/ COMMERCIAL ST	6/21/2012 9:03:00 AM	Left Turn From Wrong Lane
70	W 6TH ST/ COMMERCIAL ST	12/30/2012 4:36:53 PM	Left Turn From Wrong Lane
71	W 6TH ST/ COMMERCIAL ST	4/3/2013 5:53:23 PM	Left Turn From Wrong Lane
72	W 6TH ST/ COMMERCIAL ST	4/8/2013 5:36:56 PM	Left Turn From Wrong Lane
73	W 6TH ST/ COMMERCIAL ST	5/9/2013 9:13:50 AM	Commercial RRL
74	W 6TH ST/ COMMERCIAL ST	12/25/2013 3:27:54 PM	Left Turn From Wrong Lane
75	W 6TH ST/ COMMERCIAL ST	1/20/2014 3:16:56 PM	rearend
76	W 6TH ST/ COMMERCIAL ST	3/7/2014 7:47:41 AM	Left Turn From Wrong Lane
77	W 6TH ST/ COMMERCIAL ST	6/16/2014 8:16:16 PM	Left Turn From Wrong Lane
78	W 6TH ST/ COMMERCIAL ST	7/6/2014 8:42:39 PM	Left Turn From Wrong Lane
79	W 6TH ST/ COMMERCIAL ST	12/17/2014 6:44:54 PM	Left Turn From Wrong Lane
80	W 6TH ST/ COMMERCIAL ST	1/2/2015 2:53:05 PM	Left Turn From Wrong Lane
81	W 6TH ST/ COMMERCIAL ST	2/23/2015 1:33:56 PM	Left Turn From Wrong Lane
82	W 6TH ST/ JEFFERSON ST	6/12/2012 2:27:18 PM	improper lane change
83	W 6TH ST/ JEFFERSON ST	8/18/2012 4:08:12 PM	Jefferson RRL
84	W 6TH ST/ JEFFERSON ST	8/20/2012 8:58:11 PM	Left Turn From Wrong Lane
85	W 6TH ST/ JEFFERSON ST	11/19/2012 11:57:37 AM	Left Turn From Wrong Lane
86	W 6TH ST/ JEFFERSON ST	8/22/2013 10:29:18 AM	wrong direction on one-way
87	W 6TH ST/ JEFFERSON ST	9/28/2013 12:55:37 PM	Left Turn From Wrong Lane
88	W 6TH ST/ JEFFERSON ST	3/21/2015 6:58:11 PM	Left Turn From Wrong Lane
89	W 6TH ST/ JEFFERSON ST	3/24/2015 3:33:24 PM	Left Turn From Wrong Lane
90	W 6TH ST/ JEFFERSON ST	4/15/2015 1:54:59 PM	RRL

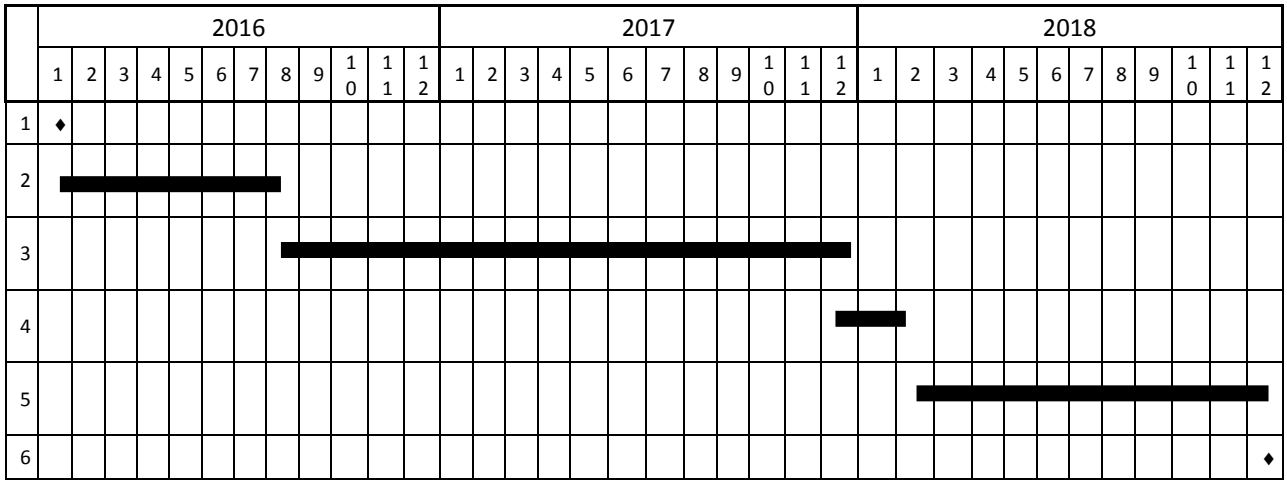
Proposed Solution: The proposed solution consists of typical improvements at all of the signalized intersections and possibly adding signs at 1 non-signalized intersection. The aim is to reduce the wrong lane left turn crashes. Establishing and enforcing the driver's cognition of the one-way operation and lane movement assignment will help. The proposed systemic improvements include installing 1 signal head over each lane. According to the 2009 MUTCD (4D.11.06) "On approaches with two or more lanes for the through movement, one signal face per through lane, centered over each through lane, has also been shown to provide safer operation." Another related proposed improvement is installing vertical signs and horizontal (arrow symbol) signs enforcing lane assignment and confirming one-way movement. The left turn movements are always permissive because of the pedestrian WALK indication for side streets. A flashing left yellow arrow (FYA) over the lane where left is allowed will identify the appropriate lane to make a turn from. FYA will also help improve pedestrian safety. In Waterloo, it is frequently observed that turning drivers do not yield to pedestrians with WALK indication. Other proposed improvements are addition of do not enter/wrong way signs and countdown pedestrian signal heads.

C. ITEMIZED BREAKDOWN OF ALL COSTS

	Item Description	QNTY	UNIT	COST	TOTAL ITEM COST
1	Mast Arm Pole	11	Each	14,000	154,000
2	Controller	10	Each	12,500	125,000
3	Traffic Signal Heads	20	Each	800	16,000
4	Countdown Pedestrian Heads	80	Each	700	56,000
5	Pedestal Pole	5	Each	1,000	5,000
6	Concrete Bases	16	Each	2,000	32,000
7	High Durability Pavement Marking Symbols	24	Each	625	15,000
8	Signs, Mast Arm Mounted	40	Each	150	6,000
9	Signs, Post Mounted with Sign Post	30	Each	100	3,000
10	Remove Existing Mast-arm Pole and Base	10	Each	500	5,000
11	Traffic Control	1	LS	10,000	10,000
12	Incidentals, Wiring, etc.	10	Each	1,000	10,000
13	Mobilization	1	Each	3,000	3,000
14	Contingency/Possible Underground Work	1	Each	44,000	44,000
TOTAL					$484,000

D. TIME SCHEDULE

		START	END
1	START	Jan-2016	
2	DOT Agreement Exchange	Jan-2016	Aug-2016
3	Plans & Contract Documents	Aug-2016	Dec-2017
4	Letting	Dec-2017	Feb-2018
5	Construction	Feb-2018	Dec-2018
6	END		Dec-2018

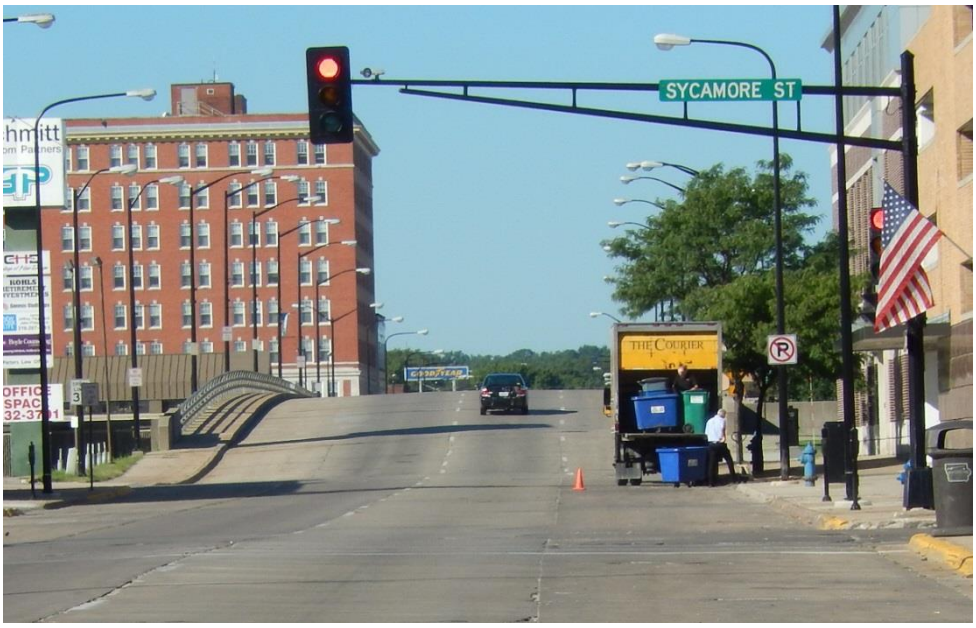


E. MAP identifying the location of the project.

F. COLOR PICTURES: Only 1 Overhead Signal

E. 5th Street and Mulberry Street

E. 5th Street and Lafayette Street



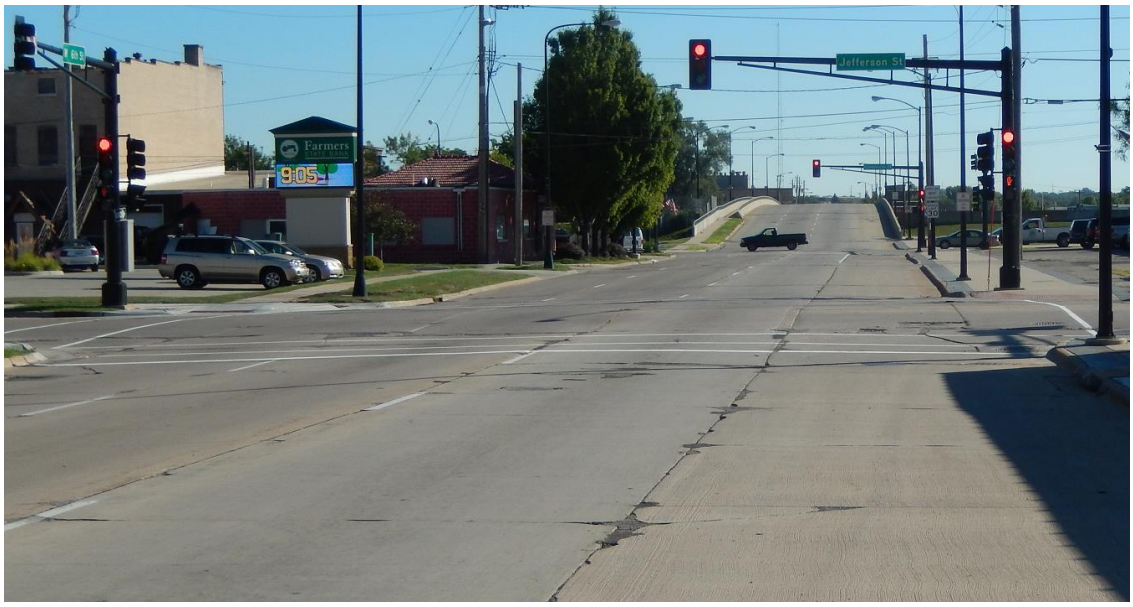
E. 5th Street and Sycamore Street

F

E. 5th Street and Water Street

W. 5th Street and Commercial Street

W. 5th Street and Jefferson Street



W. 6th Street and Jefferson Street (W. 6th Street and Commercial Street Downstream)

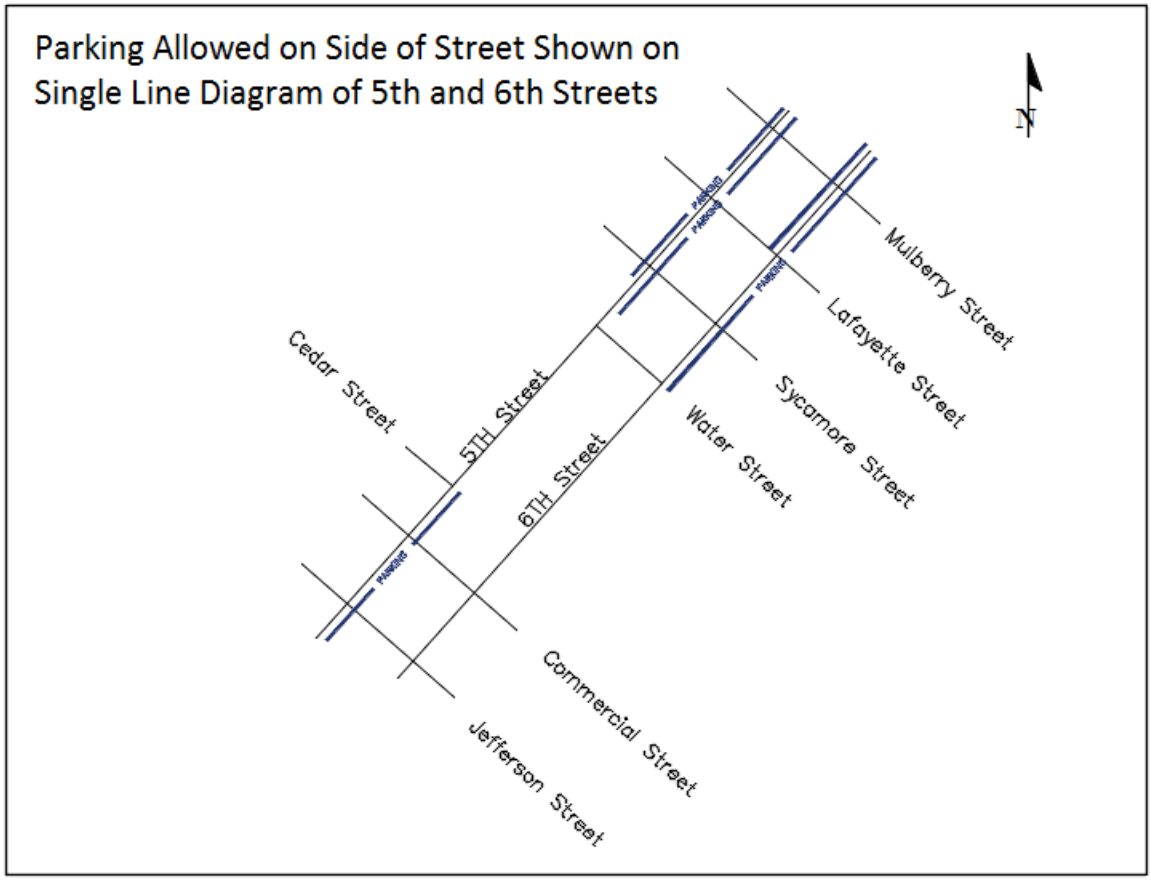
E. 6th Street and Sycamore Street (Also Showing Lafayette and Mulberry Streets Downstream)

E. 6th Street and Lafayette Street

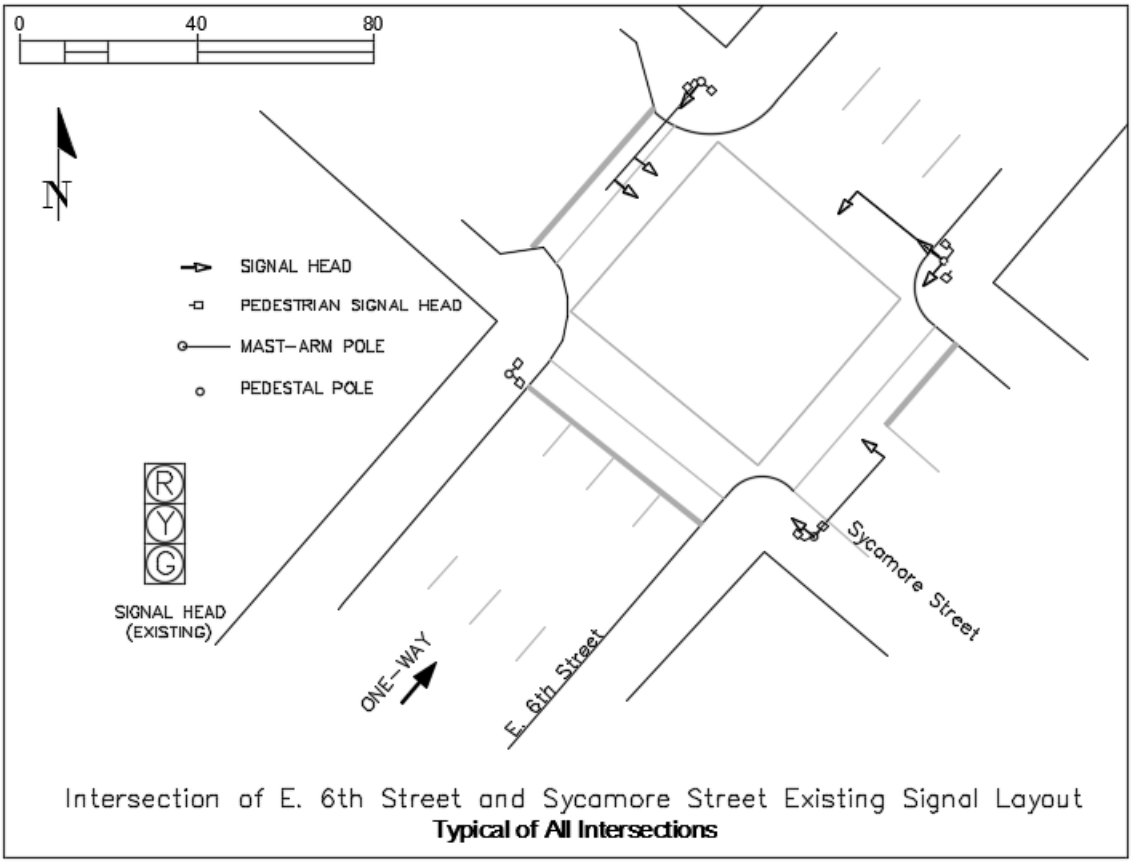
E. 6th Street and Mulberry Street

G. PLAN VIEW OF THE EXISTING CONDITIONS AND PROPOSED PROJECT

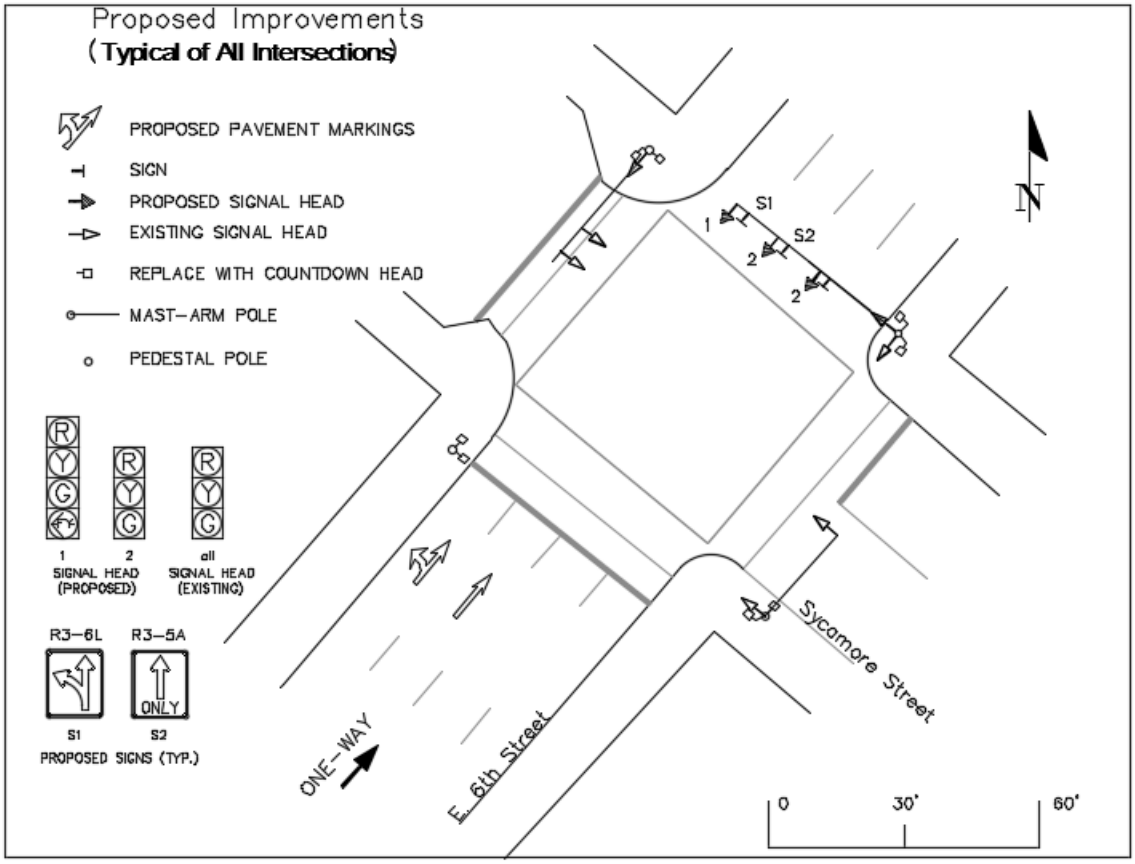
All the intersections have the same signal layout design on 5th Street and 6th Street. The layout consists of 1 signal head overhead only. The mast arm extends only over two lanes. The proposed design will install one signal head over each lane. The typical existing plan of the signals and the typical proposed improvements is shown on the next 2 pages. The only variable is the number of approach lanes. The number of approach lanes change based on the parking situation on some blocks. The proposed improvement layout will remain the same, i.e. 1 signal head over each approach lane.



G



Intersection of E. 6th Street and Sycamore Street Existing Signal Layout
Typical of All Intersections

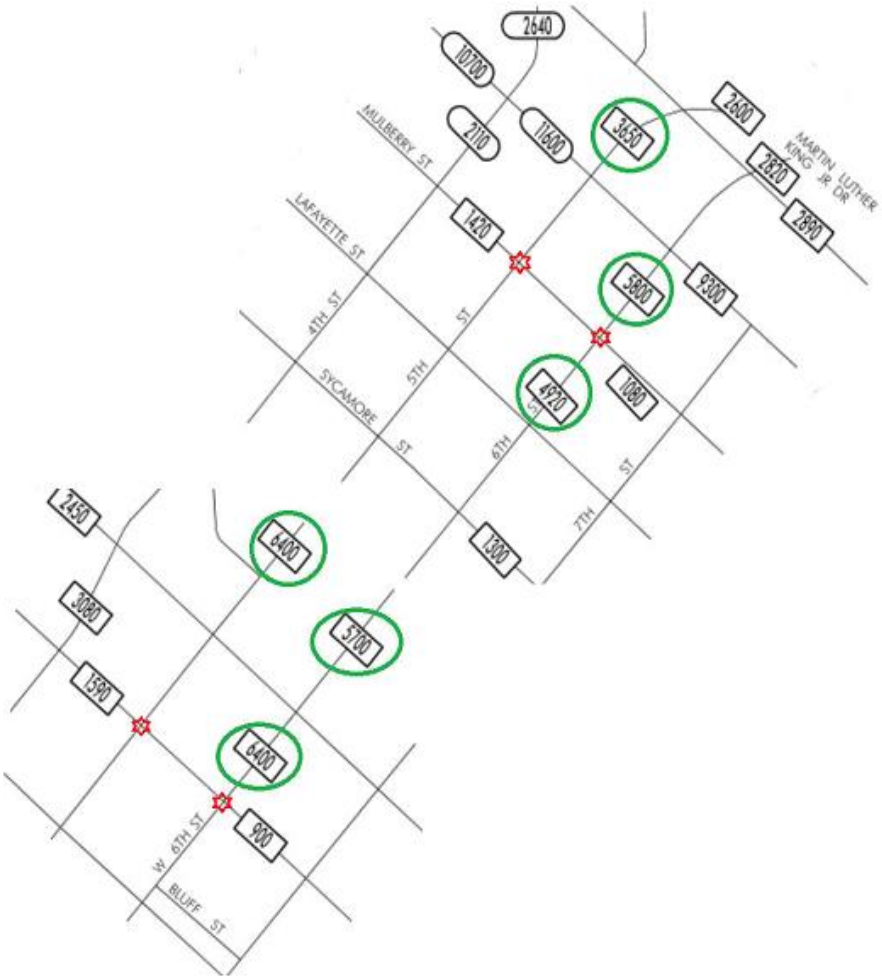


I. ACCIDENT REPORTS

(ATTACHED SEPARATELY)

J. TRAFFIC VOLUMES

(Iowa DOT Traffic Map 2014: www.iowadot.gov/maps/msp/traffic/2014/Cities/Waterloo.pdf)



5500 which is the average of 6 available readings is used.

K. TRAFFIC SIGNALS

No new signals are proposed. Existing 2 phase operation with pedestrian phases will remain. There are no detectors. Existing timings will not change.

L. BENEFIT/COST

Only Target Crashes

Reduction factor was applied to the target crash patterns only. Other types of crashes were assumed to remain unchanged. There were 17 injury crashes but only 6 target crashes were assumed to be improved by the countermeasures. Out of 90 pdo crashes only 44 crashes were assumed to be improved.

Crash Reduction Factor

Install 1 signal head over each approach lane has a CRF of 46% and applies to all crash types.

Countermeasure: Install signals (to have one over each approach lane)

CMF	CRF(%)	Quality	Crash Type	Crash Severity	Area Type	Reference	Comments
0.54	46	★★☆☆☆	Angle	All	Urban	McGee et al., 2002	Author indicated that sites were ... [read more]

The following installations will additionally help reduce the target crash type but they are not included in the benefits calculations.

- Lane Control Signs
- Arrow Symbols on Pavement
- Flashing Yellow Arrow Signal Heads

Discount Rate

Discount Rate is assumed to be 1.2% for 20 years (OMB Circular A-94, President's Office of Management and Budget, January 21, 2015):

Real Discount Rates. A forecast of real interest rates from which the inflation premium has been removed and based on the economic assumptions from the 2016 Budget is presented below. These real rates are to be used for discounting constant-dollar flows, as is often required in cost-effectiveness analysis.

Real Interest Rates on Treasury Notes and Bonds of Specified Maturities (in percent)

3-Year	5-Year	7-Year	10-Year	20-Year	30-Year
0.1	0.4	0.7	0.9	1.2	1.4

B/C & Probability of Attaining CRF benefits: Even at 50% success rate the b-c ratio stays above 1.

Probability of Attaining CRF 46	CRF Value Used	B/C
1	46	21.19
0.75	33	15.2
0.50	23	10.59

Rev. 5/14

Road Segment Benefit / Cost Safety Analysis

Iowa DOT Office of Traffic & Safety

County: Black Hawk | Prepared by: M.E. | Date Prepared: Aug 13, 2015

Location: 5th and 6th Streets between Mulberry Avenue and Jefferson Street in Waterloo

Improvement

Proposed Improvement(s): addition and replacement of signal equipment, pavement marking symbols, and signs

$ 484,000	Estimated Improvement Cost, **EC**	20	Est. Improvement Life, years, **Y**
$ 4,000	Other Annual Cost (after initial year), **AC**	46	Crash Reduction Factor (integer), **CRF**
$ 70,749	Present Value Other Annual Costs, **OC**	1.2%	Discount Rate, **INT**
		$ 554,749	Present Value All Costs, **COST** = EC + OC

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

Traffic Volume Data

Source: _____ Date of traffic count

Length (mi.)	Two-way veh/day	Description
3.00	5,500	average of 6 ADT points
3.00	miles total	

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

16,500	Current Vehicle Miles / Day, **VM**
20,133	End of Life Veh. Miles / Day
6,022,500	Current Veh. Miles / Year, **AM**
132,609,452	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

2012 First full year --> 2015 Last full year — 4.5 years, Time Period, **T**

6 Additional months — values as of May 2014

1	Fatal Crashes	1	Fatalities @	$4,500,000	$ 4,500,000
		2	Major Injuries @	$325,000	$ 650,000
6	Injury Crashes	4	Minor Injuries @	$65,000	$ 260,000
		4	Possible Injuries @	$35,000	$ 140,000
44	Property Damage Only		(assumed cost per crash)	$7,400	$ 377,400
		-OR-	enter all Property Costs of all crashes:		
51	Total Crashes, **TA**			Total $ Loss, **LOSS**	$ 5,927,400

11.33	Current Crashes / Year, **AA** = TA / T	**188.2**	Crashes / HMVM, Crash Rate, **CR** CR = TA x 10^8 / (AM x T)
$ 116,224	Cost per Crash, **AVCR** = LOSS / TA		
249.5	Total Expected Crashes, **TCR** = CR x TVMT/10^8	**$ 11,752,370**	Present Value of Avoided Crashes, **BENEFIT**
5.21	Crashes Avoided First Year **AAR** = AA x CRF / 100		
$ 605,912	Crash Costs Avoided in First Year, AAR x AVCR		
114.8	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 = $11,752,370 : $554,749 = **21.19** : 1

District 3

Application for TRAFFIC SAFETY FUNDS

GENERAL INFORMATION **DATE:** 8/11/15

Location / Title of Project 480th street extension/paving

Applicant Cherokee County

Contact Person Brandon Billings Title Assistant Engineer

Complete Mailing Address 5074 Highway 3, Cherokee, Iowa 51012

Phone 712-225-6712 (Area Code) E-Mail bbillings@co.cherokee.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 Project Cost $ $2,190,000

Safety Funds Requested $ $750,000

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 Cherokee County Secondary Roads

Signed: _____ 8-11-15
Signature Date Signed

Brandon Billings
Typed Name

Attest: _____ 8-11-15
Signature Date Signed

Joel Kohn
Typed Name

A) Attached

B) This road services an ethanol plant, the roads leading into the plant are gravel (except one stub) and traffic is having constant issues with side swipe accidents, off road accidents or roll overs. In my opinion, my boards opinion and the sheriff's department's opinion a fatality on the road is inevitable. To remedy this issue we want to re-align 480th street to pave a route intended to service the vehicle volume and types that are having issues, greatly improving safety. We are going to build a new road that has been added to the FM system in the last FM review board meeting. This road will be paved and connect the paved stub of F ave to state highway 143. This route will greatly improve the safety of the traffic going to the plant and anyone else traveling the area. This road will be designed for 55 mph traffic with turn lanes for the ethanol plant and the seed corn facility. We will have to stop traffic on E ave. This road will have 10ft shoulders (partially paved) and provide room the road system in the area has failed to provide. Currently trucks avoid Highway 3 because it turns into a traffic jam waiting for trucks to turn. That is one of the numerous reasons why they use the narrow gravel roads. This proposed road and paving project will save lives and dramatically improve the safety of the system.

C) for this project we will need to acquire land 5391ft long and 120 ft wide totaling 12.5 acres (there is a wider section near 143 to accommodate the entrance). This land contains a portion of a seed corn business. The county would have to replace the building being taken. The remainder of the land is all agricultural land. $190,000 for ROW is anticipated with special compensation being made for the building in question. The assessment is going on now but we anticipate the building will cost $200,000 to purchase.

Attached is an itemized sheet showing the construction of this road to be near $1.8 million. A total projected project cost with ROW and construction will be $2,190,000.00.

D) We anticipate letting this project May of 2016 with grading being completed by September. The following year we are anticipating the pavement to be finished by September of 2017.

E) Attached
F) Attached
G) Attached
H) Attached

Hide/View Yellow Cells | Full Screen? Y/N

Total of Bid Item Costs $ 1808091.86

ITEM #	ITEM CODE	BID ITEM DESCRIPTION	QUANTITY	UNIT	RATE	TOTAL
1	2102-2710070	EXCAVATION, CL 10, RDWY+BORROW	88412	CY	7.00	618884.00
2	2111-8174100	GRANULAR SUBBASE	31000	SY	5.21	161510.00
3	2113-0001100	SUBGRADE STABIL MAT'L, POLYMER GRID	31000	SY	3.47	107570.00
4	2301-1012090	STD/S-F PCC PAV'T, CL A CL 2, 9"	28500	SY	28.00	798000.00
5	2415-2110404	PRECAST CONC BOX CULV, 4'X4'	75	LF	350.00	26250.00
6	2518-6910000	SAFETY CLOSURE	2	EACH	250.00	500.00
7	2527-9263109	PAINTED PAV'T MARK, WATERBORNE/SOLVENT	427	STA	12.87	5495.49
8	2528-8445110	TRAFFIC CONTROL	1	LS	8314.37	8314.37
9	2533-4980005	MOBILIZATION	1	LS	35000.00	35000.00
10	2601-2634100	MULCH	7	ACRE	1500.00	10500.00
11	2601-2634500	OVERSEED+FERTILIZE	7	ACRE	700.00	4900.00
12	2602-0000020	SILT FENCE	6400	LF	1.72	11008.00
13	2602-0000030	SILT FENCE-DITCH CHECKS	6400	LF	2.14	13696.00
14	2602-0000090	CLEAN-OUT OF SILT FENCE	6400	LF	1.01	6464.00

Section 35 Marcus

Section 2 AMHERST

E-Ave

F-Ave

E Railroad St
E Cedar St
N Radcliff Ave
Shamrock Rd
E Pine St
N Beech St
E Spruce St
E Amherst St
E Section St
Ave
120' Proposed ROW

PLANS OF PROPOSED IMPROVEMENT ON THE

SECONDARY ROAD SYSTEM CHEROKEE COUNTY

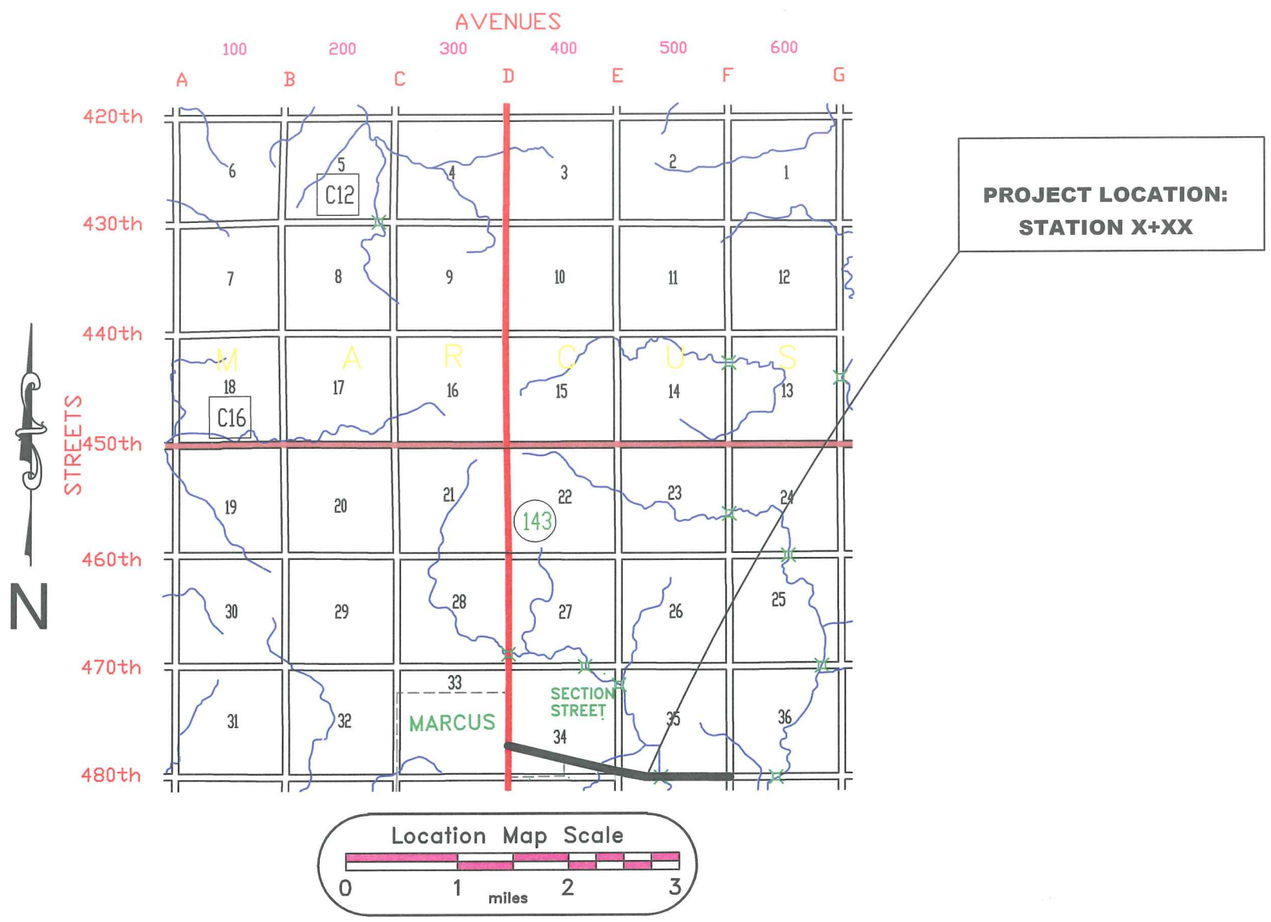
AC PAVING OF 480th STREET

Project # X-XX--X-XX

Location:

From Marcus, IA go 2 miles East on IA Hwy 3 to F avenue, then one mile North on F avenue to 480th street.

The Iowa Department of Transportation Standard Specifications for Highway and Bridge Construction, Series 2012, plus the applicable General Supplemental Specifications, Developmental Specifications, Supplemental Specifications and Special Provisions, shall apply to construction work on this project.



AADT 220 V.P.D.

Rev. 5/14

Road Segment Benefit / Cost Safety Analysis

Iowa DOT Office of Traffic & Safety

County: Cherokee | Prepared by: Brandon Billings | Date Prepared: Aug 11, 2015

Location: 480th street between highway 143 and F ave

Improvement

Proposed Improvement(s): Building a new road segment between E ave and 143 to improve the alignment and pave the section from the F ave stub to highway 143.

$2,180,000	Estimated Improvement Cost, **EC**	50	Est. Improvement Life, years, **Y**
$ 5,000	Other Annual Cost (after initial year), **AC**	159	Crash Reduction Factor (integer), **CRF**
$ 107,411	Present Value Other Annual Costs, **OC**	4.0%	Discount Rate, **INT**
		$ 2,287,411	Present Value All Costs, **COST** = EC + OC

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

Traffic Volume Data

Source: 2011 DOT traffic counts | 2011 Date of traffic count

Length (mi.)	Two-way veh/day	Description
2.00	220	60% trucks
2.00	miles total	

440	Current Vehicle Miles / Day, **VM**
724	End of Life Veh. Miles / Day
160,600	Current Veh. Miles / Year, **AM**
10,352,787	Total Projected Veh. Miles Over Life of Project, **TVMT**
1.0%	Projected Traffic Growth (0%-10%), **G**

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

Crash Data

12 First full year --> 12 Last full year — 1.0 years, Time Period, **T**

12 Additional months — values as of May 2014

0	Fatal Crashes		Fatalities @	$4,500,000	$	-
			Major Injuries @	$325,000	$	-
2	Injury Crashes	2	Minor Injuries @	$65,000	$	130,000
			Possible Injuries @	$35,000	$	-
5	Property Damage Only		(assumed cost per crash)	$7,400	$	51,800
		-OR-	enter all Property Costs of all crashes:			
7	Total Crashes, **TA**			Total $ Loss, **LOSS**	$	181,800

7.00	Current Crashes / Year, **AA** = TA / T	**4,358.7**	Crashes / HMVM, Crash Rate, **CR** CR = TA x 10^8 / (AM x T)
$ 25,971	Cost per Crash, **AVCR** = LOSS / TA		
451.2	Total Expected Crashes, **TCR** = CR x TVMT/10^8	**$ 7,405,571**	Present Value of Avoided Crashes, **BENEFIT**
11.13	Crashes Avoided First Year **AAR** = AA x CRF / 100		
$ 289,062	Crash Costs Avoided in First Year, AAR x AVCR		
717.5	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 = $7,405,571 : $2,287,411 = **3.24** : 1

A

Rev. 5/15

Application for TRAFFIC SAFETY FUNDS

GENERAL INFORMATION **DATE:** _____

Location / Title of Project: West 4th St / Co Rd B-24 Paved Shoulders

Applicant: Clay County

Contact Person: Scott Rinehart Title: County Engineer

Complete Mailing Address: 300 West 4th Street Suite #5
Spencer, IA 51301

Phone: 712-262-2825 (Area Code) E-Mail: srinehart@co.clay.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 Spencer

Contact Person: Mark White Title: Public Works Director

Complete Mailing Address: 418 2nd Avenue West
Spencer, IA 51301

Phone: 712-580-7200 (Area Code) E-Mail: mwhite@spenceriowacity.com

PLEASE COMPLETE THE FOLLOWING PROJECT INFORMATION:

Application Type

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

Funding Amount

Total Project Cost $ 620,000

Safety Funds Requested $ 500,000

Rev. 5/15

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 Spencer, Iowa

Signed: X _____ 7-20-2015
Signature Reynold Peterson, Mayor Date Signed

Reynold Peterson, Mayor
Typed Name

Attest: Theresa E. Reardon 7-22-15
Signature Date Signed

Theresa E. Reardon, City Clerk
Typed Name

Rev. 5/15

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 Clay

Signed: Scott Rinehart 7-28-15

Signature Date Signed

Scott Rinehart

Typed Name

Attest: Pamela S. Doran 7-28-15

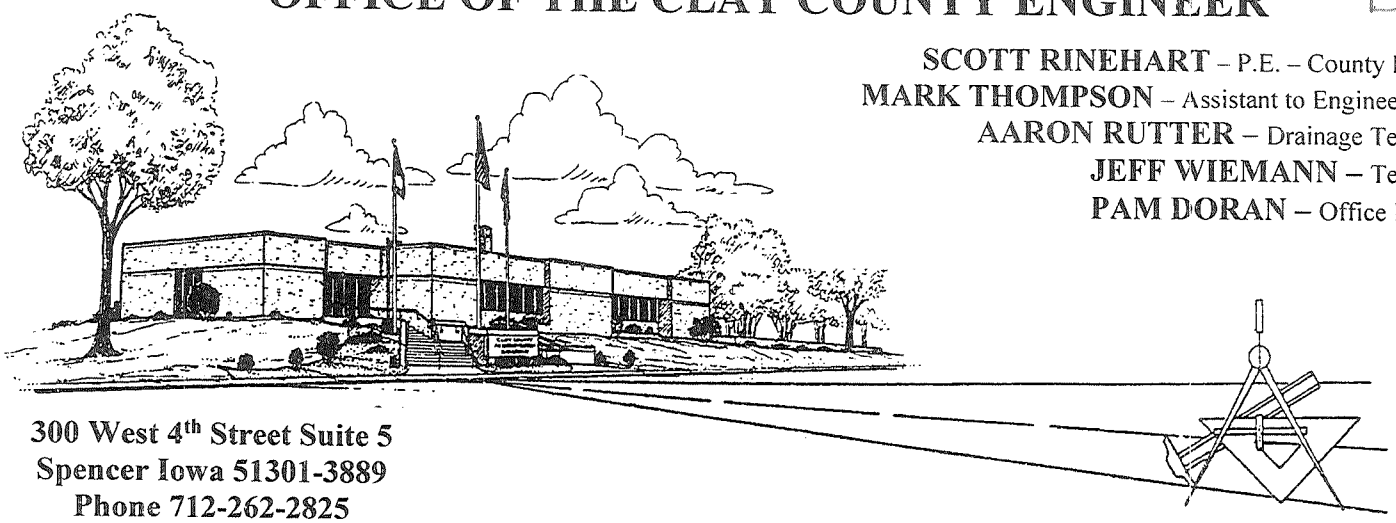
Signature Date Signed

Pamela S. Doran

Typed Name

OFFICE OF THE CLAY COUNTY ENGINEER

B



SCOTT RINEHART – P.E. – County Engineer
MARK THOMPSON – Assistant to Engineer, Roads
AARON RUTTER – Drainage Technician
JEFF WIEMANN – Technician
PAM DORAN – Office Manager

300 West 4th Street Suite 5
Spencer Iowa 51301-3889
Phone 712-262-2825
Fax 712-262-4114

July 10, 2015

Office of Traffic & Safety
IDOT
800 Lincoln Way
Ames IA 50010

Dear Sir/Madam:

We are applying for Traffic Safety Improvement Funds for a section of Clay County Road B-24(350th St.) from M-38(190th Ave) east 2.17 miles. We are proposing to pave the shoulders 6 feet wide on both sides of the road. After this is accomplished we propose to add centerline and edgeline rumble strips.

- The current traffic maps show 1950-4900 vehicles per day.
- Since the 2011 traffic count, a complete re-design of the area occurred in 2012-2013 as part of our West Beltway Project.
- South from the intersection of 350th St / 200th Ave is now a paved road plus river crossing over the Ocheyedan River and links up to 360th Street.
- North from the above intersection is now a regular 2-lane with a center turn lane along the entire mile.
- East and West is a normal 2-lane roadway.
- The convenience of this new route around the West side of Spencer is starting to get found by truck traffic and regular car traffic heading to and from the South end of town. This route also is convenient for traffic turning onto adjacent streets such as West 18th Street and this route (West 4th Street).

We are anticipating this traffic to increase over the next few years and we feel we need to stay ahead of the extra volume. Between 2010 and 2013, we were averaging 3 crashes per year (before the re-design). In the year 2014, that number had jumped to 8 with one being a fatality (Graded and paved).

To come up with the Crash Reduction Factor for the Road Segment Benefit/Cost Safety Analysis sheet we used the cumulative crash reduction factor calculator. We used the counter measure of Add new paved shoulder with a correction factor of 35 and the countermeasure of Install centerline and shoulder rumble strips with a correction factor of 56. The calculator shows a combined CRF of 71.4 or 71.

Clay County has this project scheduled to be let in March of 2016 and to be completed by November 2016.

If you have any questions please feel free to call.

Sincerely,

Scott Rinehart, P.E.
Clay County Engineer

SLR:JMW;psd

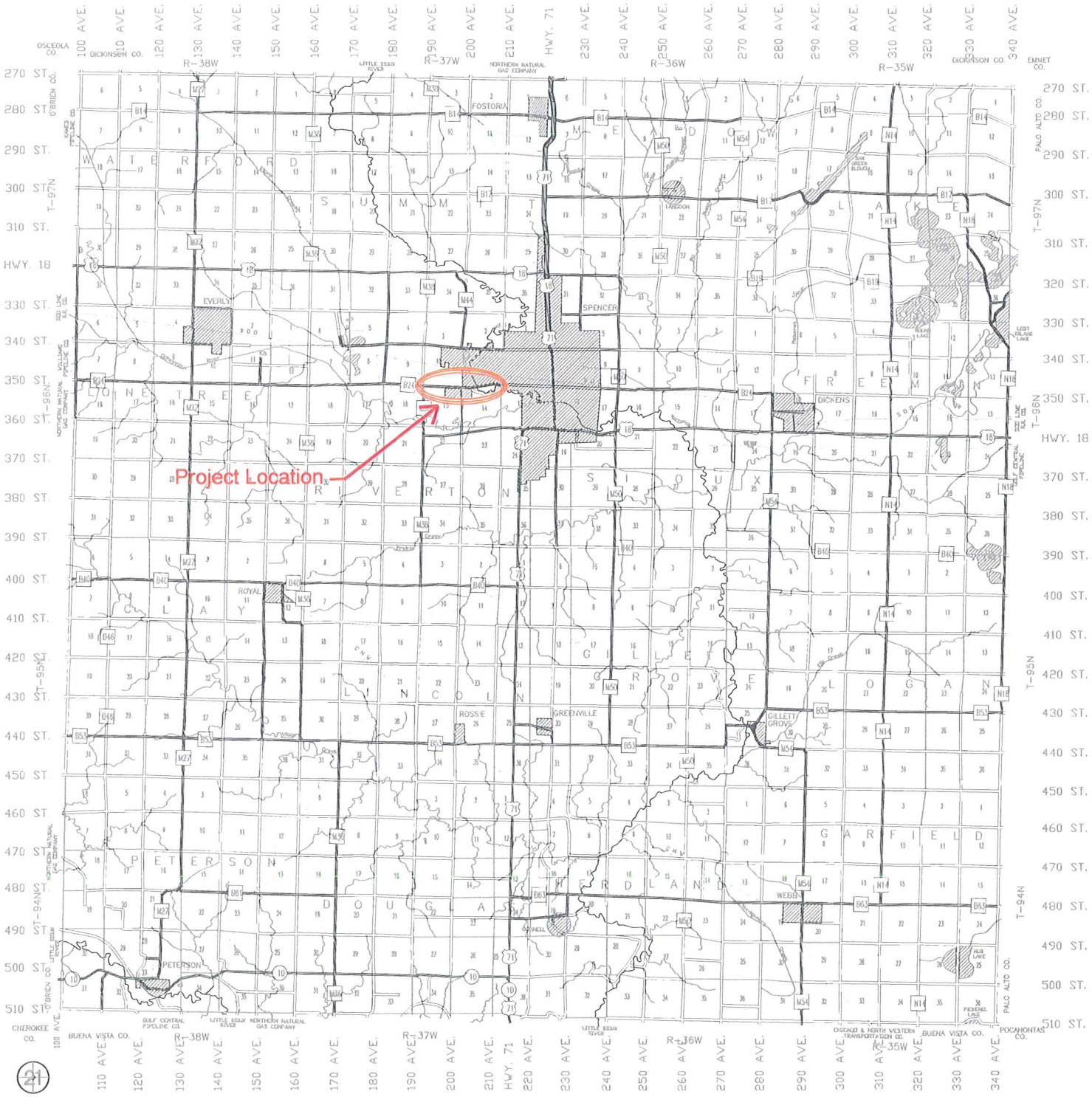
Cost Estimate - Clay County/City of Spencer B-24(West 4th Street) Paved Shoulder Project

Item Number	Description	Units	Quantity	Price per Unit	Total
2102-2710070	Excavation Class 10 - Roadway and Borrow	C.Y.	2,982	$6.00	$17,892.00
2122-5190007	Paved Shoulder, P.C. Concrete 7 in	S.Y.	15,334	$36.00	$552,024.00
2548-0000200	Milled Shoulder Rumble Strips, P.C.C. Surface	STA	230	$28.00	$6,440.00
2548-0000320	Milled Centerline Rumble Strips, P.C.C. Surface	STA	115	$28.00	$3,220.00
2528-8445110	Traffic Control	L.S.	1	$7,000.00	$7,000.00
2533-4980005	Mobilization	L.S.	1	$30,000.00	$30,000.00
				Project Total =	$616,576.00

C

	Week 1 Day 1-5	Week 2 Day 6-10	Week 3 Day 11-15	Week 4 Day 16-20	Week 5 Day 21-25
Excavation Class 10 - Roadway and Borrow					
Paved Shoulder, P.C. Concrete 7 in					
Milled Shoulder Rumble Strips, P.C.C. Surface					
Milled Centerline Rumble Strips, P.C.C. Surface					

E


Project Location
OSCEOLA CO.
DICKINSON CO.
O'BRIEN CO.
CHEROKEE CO.
BUENA VISTA CO.
DICKINSON CO.
EMMET CO.
PALO ALTO CO.
POCAHONTAS CO.
HWY. 71
HWY. 18
T-97N
T-96N
T-95N
T-94N
R-38W
R-37W
R-36W
R-35W
FOSTORIA
EVERLY
SPENCER
DICKENS
ROYAL
ROSSIE
GREENVILLE
GILLETT GROVE
WEBB
PETERSON
W A T E R F O R D
S U M M I T
M E D O W
L A K E
C O N E T R E E
R I V E R T O N
S I O U X
F R E E M A N
C L A Y
L I N C O L N
G I L L E T T G R O V E
L O G A N
P E T E R S O N
H E R D L A N D
G A R F I E L D
D O U G A
GULF CENTRAL PIPELINE CO.
LITTLE SIOUX RIVER
NORTHERN NATURAL GAS COMPANY
CHICAGO & NORTH WESTERN TRANSPORTATION CO.
LOST ISLAND LAKE
PALO LAKE
PICKEREL LAKE
21

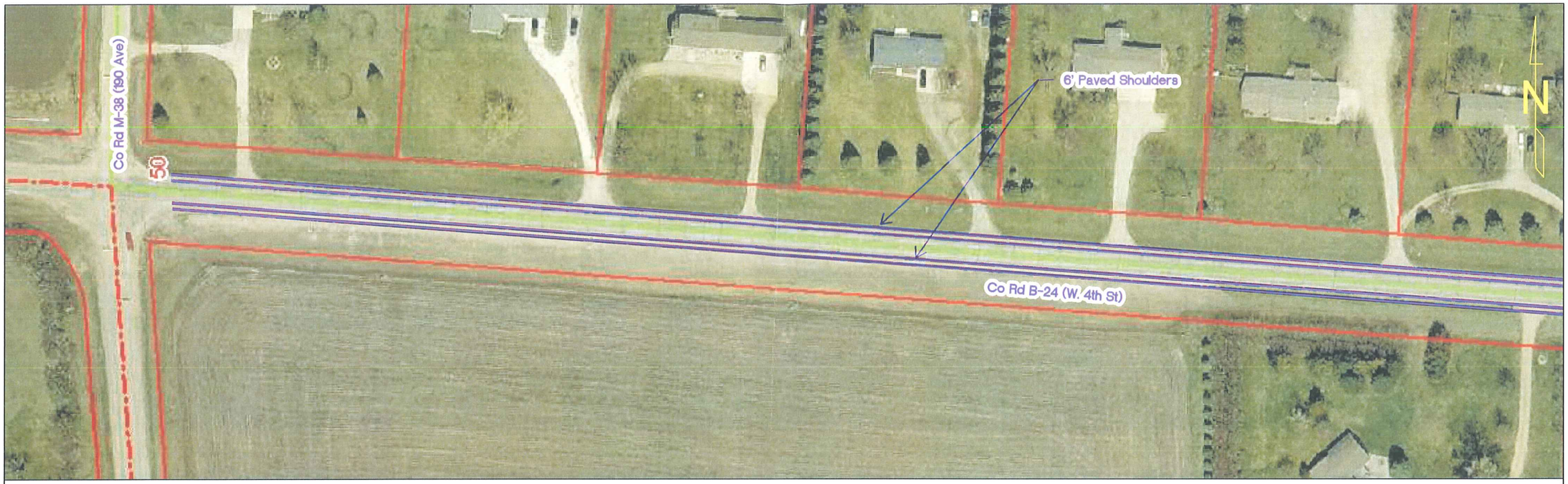
F

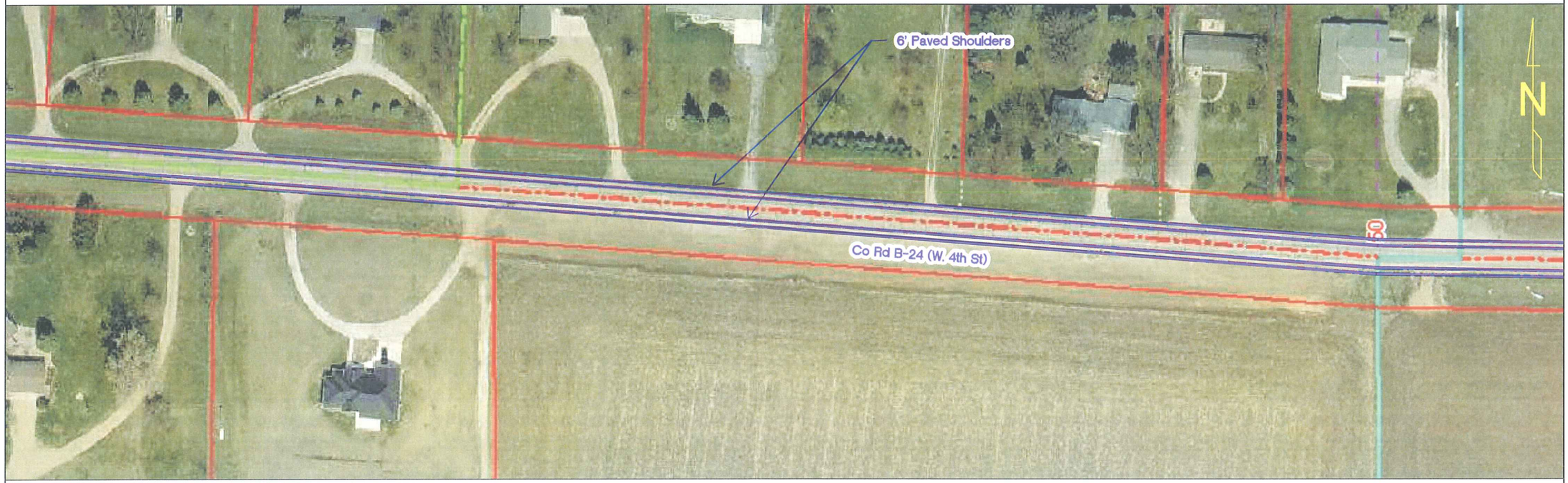
F

F

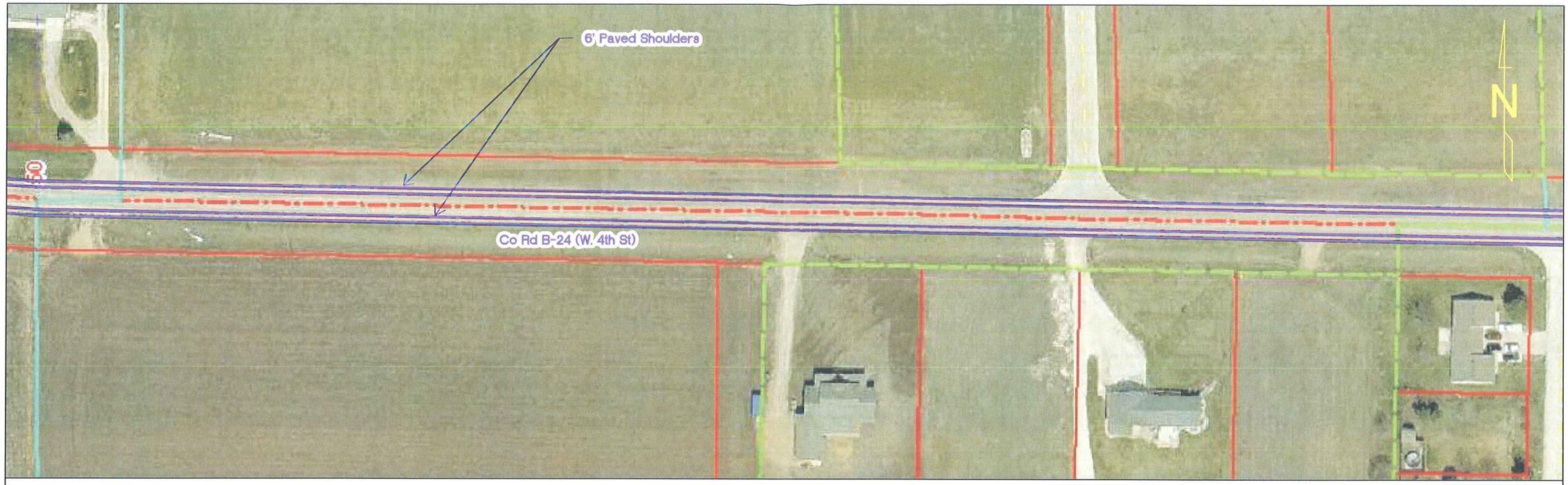
F

G


Co Rd M-38 (190 Ave)
50
6' Paved Shoulders
Co Rd B-24 (W. 4th St)
N


6' Paved Shoulders
Co Rd B-24 (W. 4th St)
50
N

G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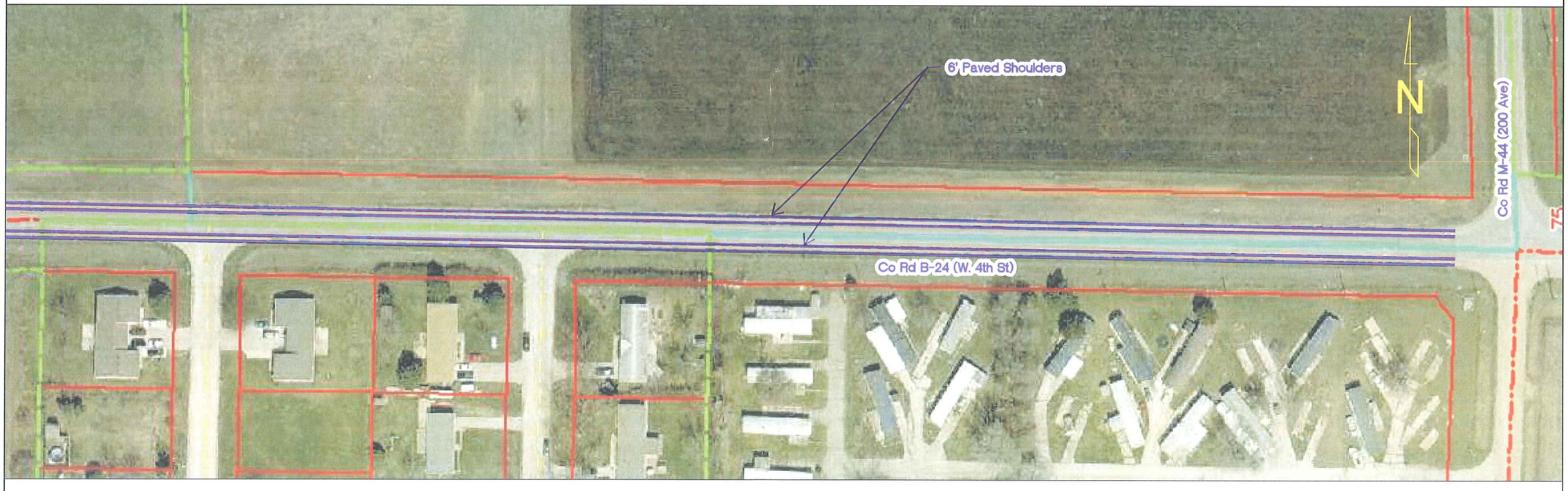
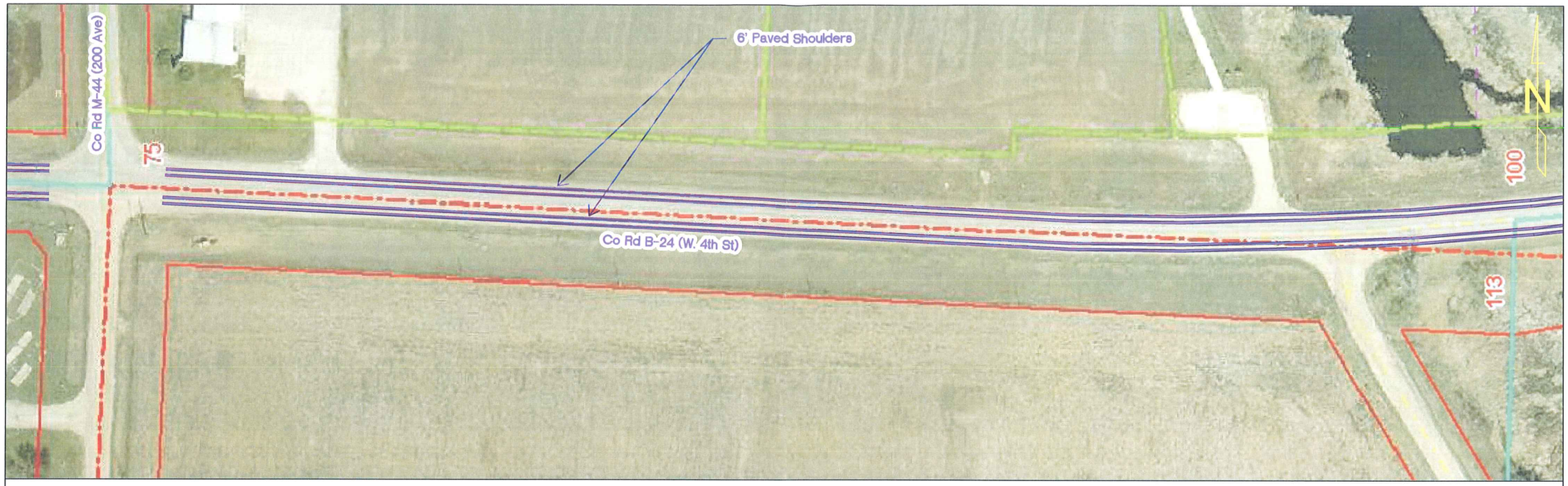
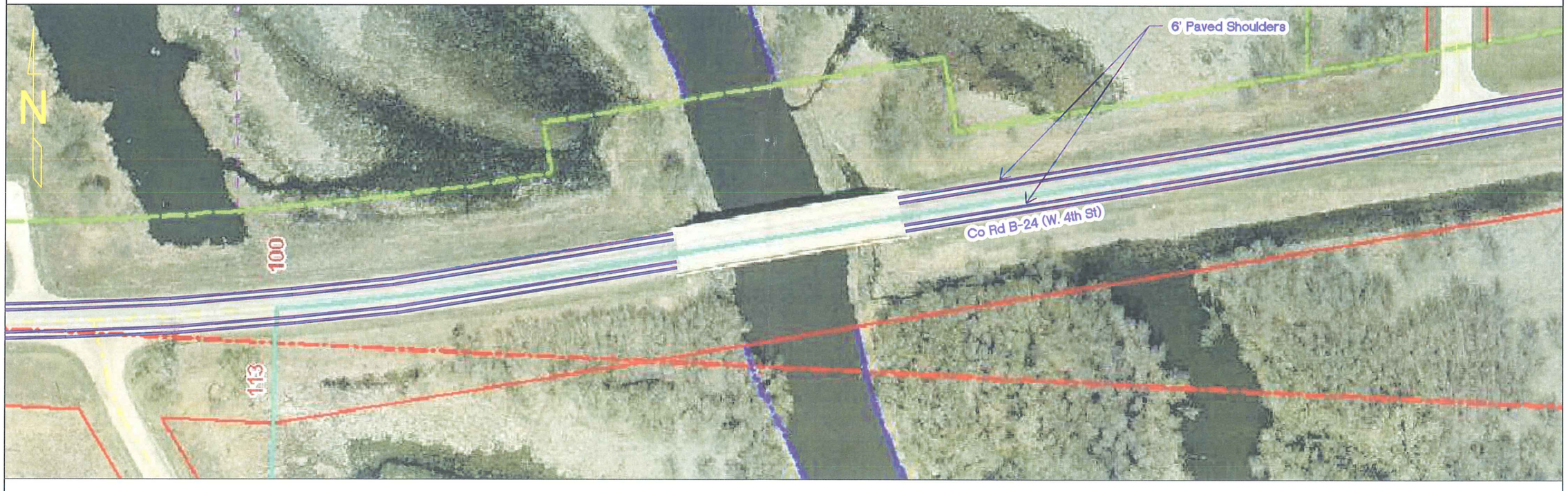
Co Rd B-24 (W. 4th St)
N

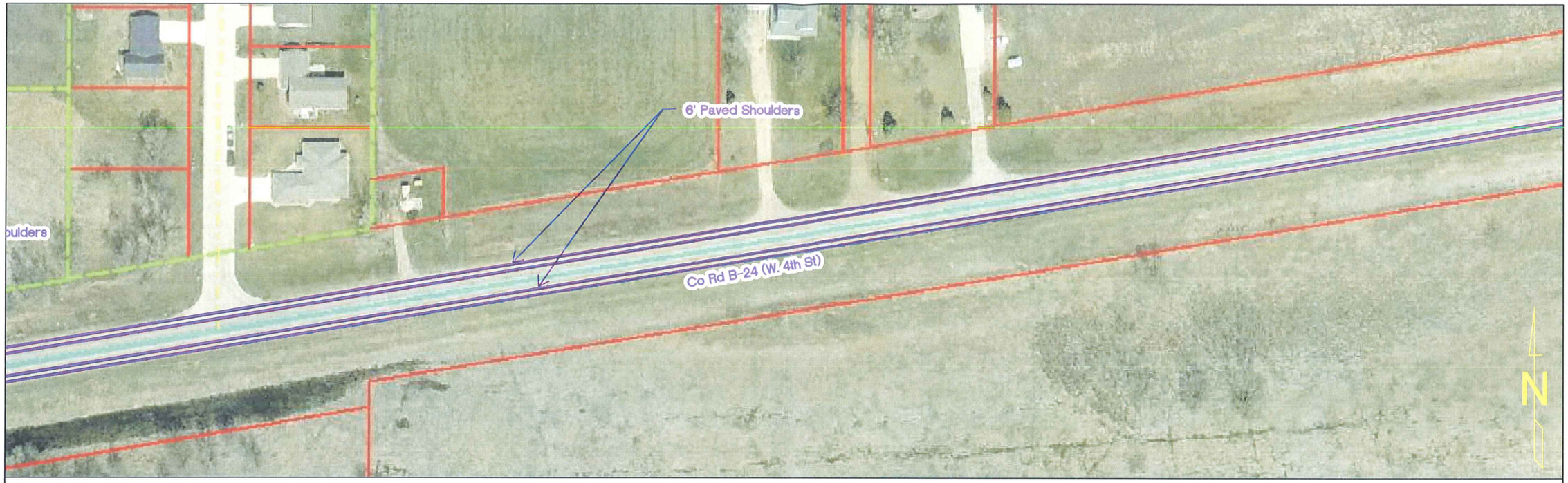

6' Paved Shoulders
Co Rd B-24 (W. 4th St)
Co Rd M-44 (200 Ave)
N

G


6' Paved Shoulders
Co Rd M-44 (200 Ave)
75
Co Rd B-24 (W. 4th St)
100
113
N


6' Paved Shoulders
Co Rd B-24 (W. 4th St)
100
113
N

G


6' Paved Shoulders
ulders
Co Rd B-24 (W. 4th St)
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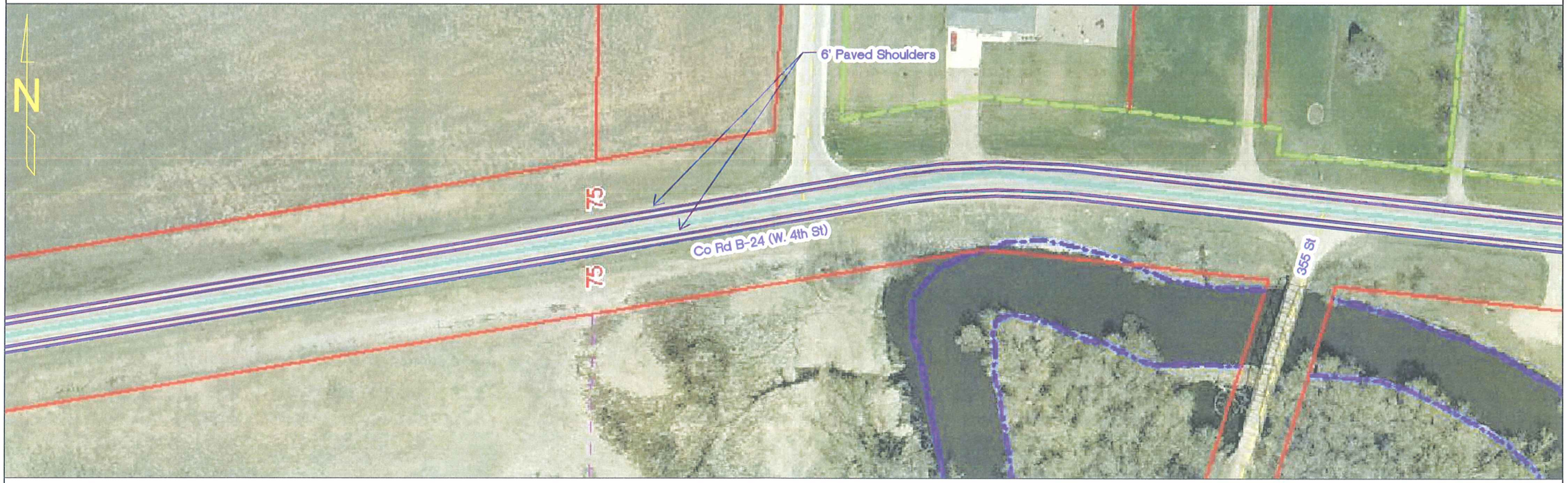
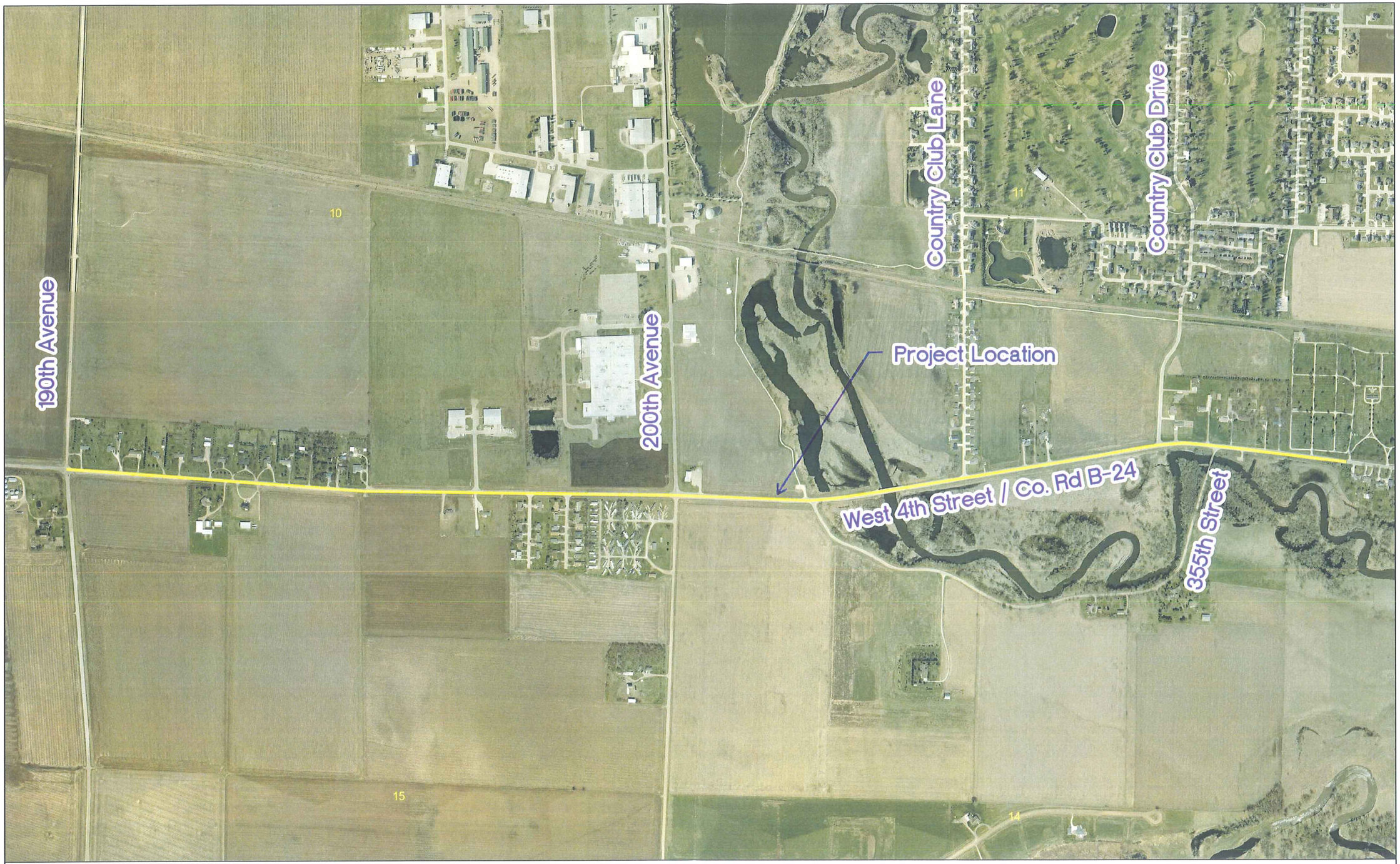

N
6' Paved Shoulders
75
75
Co Rd B-24 (W. 4th St)
355 St

G

H


190th Avenue
200th Avenue
Country Club Lane
Country Club Drive
Project Location
West 4th Street / Co. Rd B-24
355th Street
10
11
15
14

2005 - 2014* Reportable Crash History
B24 between M38 and 1200 ft. East of 355th St.
Spencer, Iowa
(*2014 data downloaded 5/19/2015)

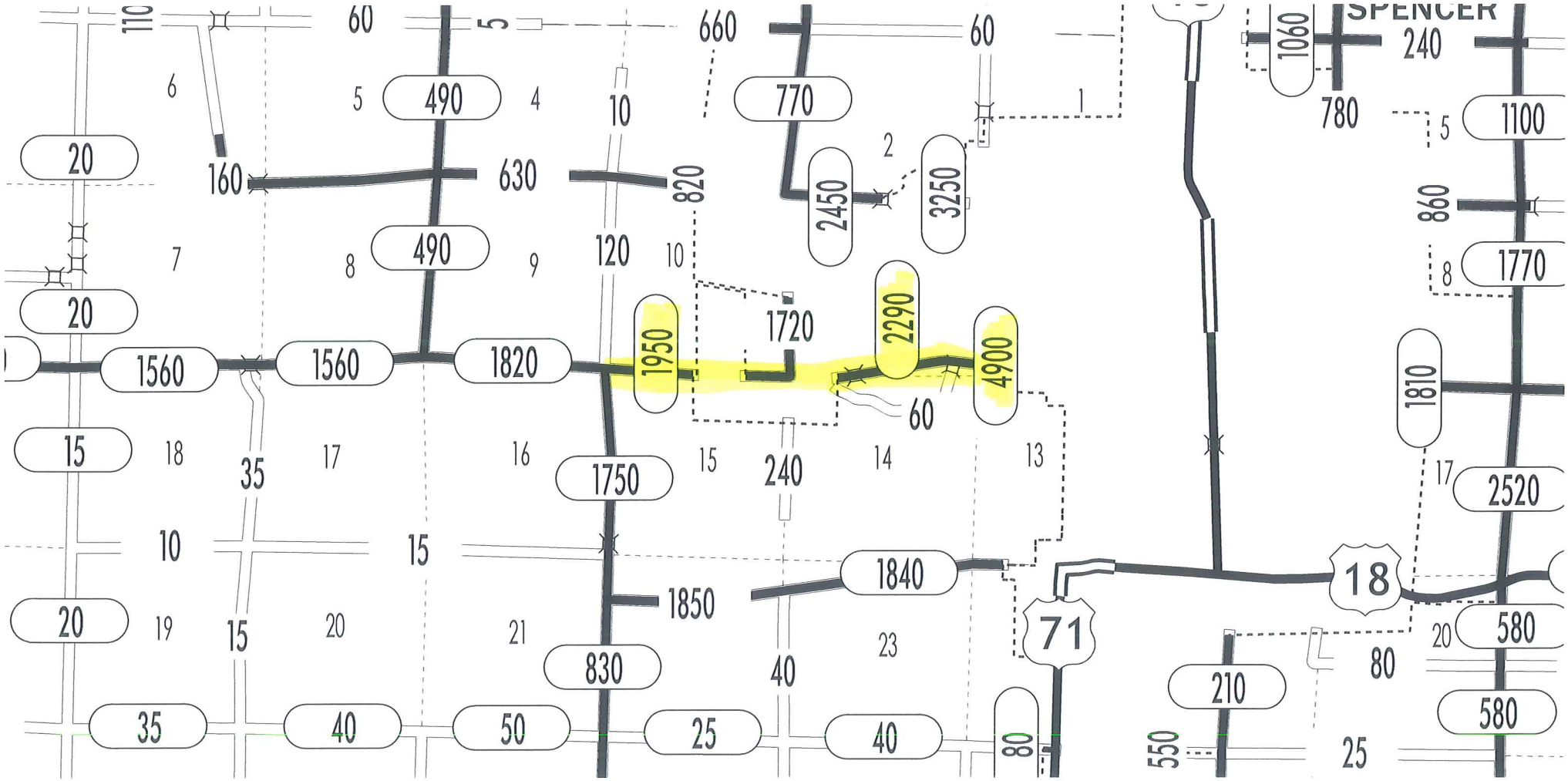
		Crashes						Injuries					
Year	County	Crashes	Fatal	Major	Minor	Poss/Unk	PDO	Injuries	Fatalities	Major	Minor	Possible	Unknown
2005	Clay	3	0	0	0	0	3	0	0	0	0	0	0
2006	Clay	2	0	0	0	0	2	0	0	0	0	0	0
2007	Clay	5	0	0	1	0	4	1	0	0	1	0	0
2008	Clay	5	0	0	1	0	4	1	0	0	1	0	0
2009	Clay	4	0	0	0	0	4	0	0	0	0	0	0
2010	Clay	4	0	0	2	1	1	5	0	0	2	2	1
2011	Clay	2	0	0	0	0	2	0	0	0	0	0	0
2012	Clay	3	0	0	0	1	2	1	0	0	0	1	0
2013	Clay	2	0	0	0	1	1	1	0	0	0	1	0
2014	Clay	8	1	0	1	0	6	3	1	1	1	0	0
	Totals:	38	1	0	5	3	29	12	1	1	5	5	

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

Feature Count Report (Wednesday, July 8, 2015 2:30:42 PM Central Daylight Time)
produced using: Iowa's Safety Analysis, Visualization, and Exploration Resource (SAVER)
by:
Michael D. Pawlovich, Ph.D., P.E.
Traffic Safety/Crash Data Engineer
Iowa Department of Transportation
Highway Division, Engineering Bureau, Traffic and Safety
800 Lincoln Way
Ames, Iowa 50010

copy version

J


SPENCER
110
60
5
660
60
1060
240
780
490
770
10
1100
630
820
2450
3250
860
490
120
1770
1720
2290
1950
4900
1560
1560
1820
60
1810
1750
240
2520
1840
1850
18
71
830
40
580
210
80
580
550
25
35
40
50
25
40
80

R 1-1
Stop Sign
LED lighted
W2-1
Crossroad Symbol
LED lighted
West 4th St / Co Rd B-24
W2-1
Crossroad Symbol
LED lighted
R 1-1
Stop Sign
LED lighted
200th Avenue

K

L

Rev. 5/14

Road Segment Benefit / Cost Safety Analysis

Iowa DOT Office of Traffic & Safety

County: Clay | Prepared by: Jeff Wiemann | Date Prepared: Jul 8, 2015

Location: West 4th St / B-24 - From Co. Road M-38 East to 1200 feet East of 355th Street

Improvement

Proposed Improvement(s): 6' Paved shoulders on both sides of road + add centerline/edgeline rumble strips

$ 620,000	Estimated Improvement Cost, **EC**	20	Est. Improvement Life, years, **Y**
$ -	Other Annual Cost (after initial year), **AC**	71	Crash Reduction Factor (integer), **CRF**
$ -	Present Value Other Annual Costs, **OC**	4.0%	Discount Rate, **INT**
	$$OC = \frac{AC}{INT}\left(1 - \frac{1}{(1+INT)^Y}\right)$$	$ 620,000	Present Value All Costs, **COST** = EC + OC

Traffic Volume Data

Source: Iowa DOT | 2011 Date of traffic count

Length (mi.)	Two-way veh/day	Description
1.00	1,950	
1.00	2,290	
0.17	4,900	
2.17	miles total	

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

5,073 Current Vehicle Miles / Day, **VM**
7,538 End of Life Veh. Miles / Day
1,851,645 Current Veh. Miles / Year, **AM**
44,990,103 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

1	Fatal Crashes →	0.5	Fatalities @	$4,500,000	$ 2,250,000
		0	Major Injuries @	$325,000	$ -
6	Injury Crashes →	3	Minor Injuries @	$65,000	$ 195,000
		3	Possible Injuries @	$35,000	$ 105,000
12	Property Damage Only		(assumed cost per crash)	$7,400	$ 140,600
			-OR- enter all Property Costs of all crashes:		
19	Total Crashes, **TA**			Total $ Loss, **LOSS**	$ 2,690,600

3.80	Current Crashes / Year, **AA** = TA / T	205.2	Crashes / HMVM, Crash Rate, **CR** CR = TA x 10^8 / (AM x T)
$ 141,611	Cost per Crash, **AVCR** = LOSS / TA	$ 6,182,696	Present Value of Avoided Crashes, **BENEFIT**
92.3	Total Expected Crashes, **TCR** = CR x TVMT/10^8		
2.71	Crashes Avoided First Year **AAR** = AA x CRF / 100		
$ 384,218	Crash Costs Avoided in First Year, AAR x AVCR		
65.9	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 = $6,182,696 : $620,000 = **9.97** : 1

CRAWFORD COUNTY ENGINEER'S OFFICE

Paul J. Assman, P.E. & P.L.S., County Engineer

P.O. Box 458 • Denison, Iowa 51442-0458

August 6, 2015

Donna Matulac, P.E.
Office of Traffic and Safety
Iowa Department of Transportation
800 Lincoln Way
Ames, Iowa 50010

RE: Transportation Safety Improvement Program Application
Crawford County, Iowa

Dear Donna:

Attached please find the original and three copies of a TSIP application to fund a portion of the safety improvements proposed for County Road M36 here in Crawford County.

We look forward to your favorable consideration of this application.

Yours truly,

Paul J. Assman, P.E. & P.L.S.
Crawford County Engineer

Cc: file

Phone 712-263-2449 • Fax 712-263-3423 • Email passman@crawfordcounty.org

CRAWFORD COUNTY

Application for
Transportation Safety Improvement Program
COUNTY ROAD M36

August 4, 2015

PREPARED BY: PAUL J. ASSMAN, P.E & P.L.S.

Crawford County
County Road M36 Widening, Shoulder Paving & Resurfacing Project

Table of Contents

Application Certifications.....Section A

Narrative.....Section B

Itemized Breakdown of Costs.....Section C

Map.....Section E

Color Pictures.....Section F

Existing Conditions.....Section G

Motor Vehicle Accident Reports.....Section I

Traffic Volumes.....Section J

Benefit/Cost Worksheet.....Section L

SECTION A

Iowa Department of Transportation

Rev. 3/08

Application for TRAFFIC SAFETY FUNDS

GENERAL INFORMATION

Location / Title of Project: Donna Reed Road (a.k.a. Co. Rd M36) Resurfacing with Paved Shoulders and Milled Edgeline Rumble Strips

Applicant: Crawford County

Contact Person: Paul J. Assman, P.E. & P.L.S Title: County Engineer

Complete Mailing Address: P.O. Box 458, 1202 Broadway, Denison, Iowa 51442

Phone: 712-263-2449 (Area Code) E-Mail: passman@crawfordcounty.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 Project Cost $ 1,734,740

Safety Funds Requested $ 500,000

RESOLUTION NO. 2015-29

WHEREAS, The Crawford County Board of Supervisors recognizes the need to incorporate safety features in pavement resurfacing projects, and

WHEREAS, Transportation Safety Improvement Program (TSIP) Funds are annually made available to qualifying local projects in amounts not to exceed $500,000 to facilitate the incorporation of said safety features, and

WHEREAS, application for said funds must be submitted to the Iowa Department of Transportation for review and approval, and

WHEREAS, as part of the application procedure, a commitment of funds and a commitment to maintain the facility for the useful life of the improvement must be made by the applicant,

THEREFORE, BE IT HEREBY RESOLVED, that the Board of Supervisors of Crawford County, Iowa, as part of the application for TSIP funds, resolve to commit to the additional funds needed above and beyond those granted to Crawford County by the Transportation Safety Improvement Program and to supply the Construction and Engineering cost for the County Road M36 Pavement Resurfacing and Widening Project (extending from US Highway 30 south and east to its intersection with County Road E53) from existing county funding and also resolve to maintain the facility for the useful life of the improvement.

Approved this 4th day of August, 2015

CRAWFORD COUNTY BOARD OF SUPERVISORS

Chairman

ATTEST:

Crawford County Auditor

SECTION B

Application for High-Risk Rural Roads Funding
August 2015

Date: August 5, 2015
County Name: Crawford
County Contact Person: Paul J. Assman, P.E. County Engineer

Project : Donna Reed Rd. (a.k.a.Co. Rd. M36) Base Widening, Shoulder Paving and Resurfacing

Location: Commencing near the intersection with US Hwy 30 on the north end thence south and east to the intersection with Co. Rd. E53.

Existing Conditions: the proposed project represents a roadway typical to many rural areas in Iowa. The pavement, completed in 1960, is one of the first paved roadways in Crawford County. Copies of the original grading and paving cross sections as a well as the overlay cross section is included herewith. The original grading was completed within a 66 foot right- of- way. The fore-slopes were generally constructed at a 2:1 slope with a few areas at a 1.5:1 slope. The original paving was a 20 foot wide 7" thick PCC pavement. In 1997 the 20 foot paved section was overlaid with a 3 ½" to 4" HMA surface. Given the current funding scenario complete reconstruction of the roadway, while the best long term option, is not possible. The necessary level of funding simply does not exist. An HMA overlay incorporating several safety features including paved shoulders, milled edgeline rumble strips and safety edge is considered the overall best affordable option.

Proposed Concept: The proposed concept is to add a 3.0 foot paved shoulder with safety edge and milled edgeline rumble strips in conjunction with 5" painted edgelines along both sides of the existing 20 foot wide pavement. A 4" thick HMA overlay will be placed over the entire width of the widened pavement. The resulting pavement will have 11.0 foot lane widths and 2.0 foot wide paved shoulders for an overall paved width of 26.0 feet. The proposed pavement cross section detail and safety edge details are attached herewith.

Justification: The roadway segment in question is an eligible High Risk Rural Road (HRRR) corridor (see attached HRRR 2011 corridor map). The map showing the "Crashes by Severity" as well as the individual "Crash Detail Reports" are attached to this application.

Cost Estimate and Proposed Funding Sources: A detailed cost estimate and schedule of proposed funding is attached to this application.

SECTION C

CRAWFORD COUNTY ENGINEER'S OFFICE
ENGINEERS CONSTRUCTION COST ESTIMATE

PREPARED BY: PAUL J. ASSMAN
DATE: 7/16/15

M36 (Donna Reed Rd) HMA OVERLAY WITH BASE WIDENING, PAVED SHOULDERS, MILLED RUMBLE STRIPS & SAFETY EDGE

ITEM NO.	ITEM CODE	ITEM	UNITS	TOTAL	UNIT PRICE	Total Project Amount	Paved Shoulder Total	Paved Shoulder & Safety Amount
1	2121-7425020	Granular Shoulders, Type B	Ton	1500	$35.00	$52,500.00	0	$0.00
2	2212-0475095	Cleaning and Preparation of Base	Mile	4.75	$1,000.00	$4,750.00	0	$0.00
3	2122-5500060	Excavation Class 13 for Widening	CY	2323	$15.00	$34,845.00	2323	$34,845.00
4	2213-2713300	Base Widening, Hot Mix Asphalt	Ton	4705	$40.00	$188,200.00	4705	$188,200.00
5	2114-5145150	Pavement Scarification	SY	55758	$1.50	$83,637.00	0	$0.00
6	2303-0001000	HMA MIXTURE, Wedge, Leveling,or Stregthening Course	Ton	500	$50.00	$25,000.00	0	$0.00
7	2303-0021750	HMA Mixture (300,000 ESAL) Base Course 3/4" mix	Ton	10389	$30.00	$311,670.00	2548	$76,440.00
8	2303-0023500	Hot Mix Asphalt Mixture (300,000 ESAL) Interm, Surface 1/2" mix)	Ton	6234	$32.00	$199,488.00	1529	$48,928.00
9	2303-0245828	Asphalt Binder, PG 58-28	Ton	1280	$585.00	$748,800.00	527	$308,295.00
10	2527-9263109	Painted Pavement Markings, Waterborne or Solvent-based	Sta	560	$10.00	$5,600.00	0	$0.00
11	2528-8445110	Traffic Control	LS	1	$15,000.00	$15,000.00	0.5	$7,500.00
12	2528-8445113	Flaggers	Each	70	$350.00	$24,500.00	35	$12,250.00
13	2528-8445115	Pilot Cars	Each	30	$525.00	$15,750.00	15	$7,875.00
14	2533-4980005	Mobilization	LS	1	$20,000.00	$20,000.00	0.5	$10,000.00
15	2548-0000110	Milled (Edgeline) Rumble Strips, HMA	Sta	500	$10.00	$5,000.00	500	$5,000.00
		TOTAL ESTIMATED PROJECT COST				***$1,734,740.00***		***$699,333.00***

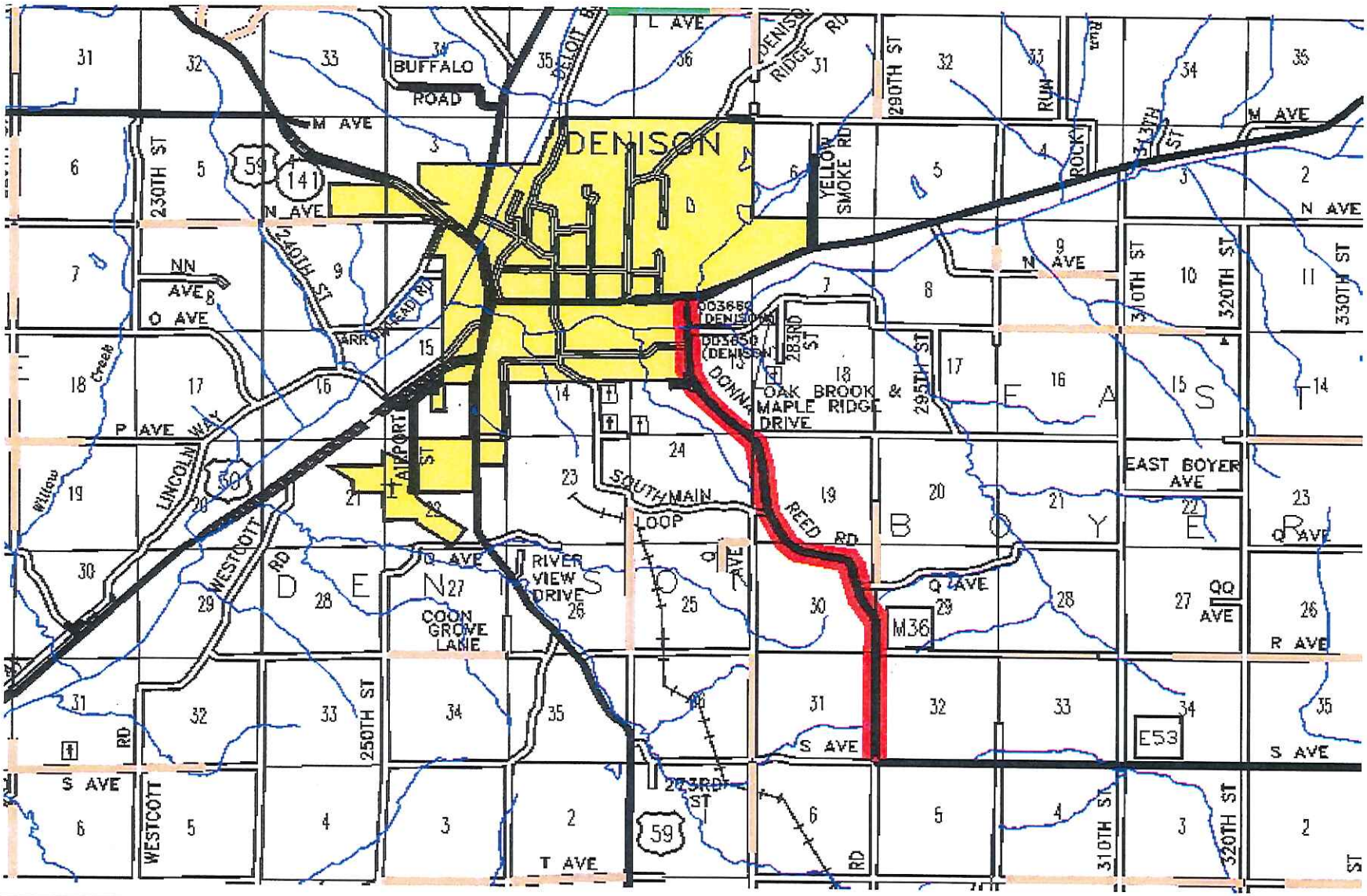
Anticipated Project Funding	
Transportation Safety Improvement Program	***$ 500,000.00***
Crawford County Farm to Market Funds	***$ 1,234,740.00***
TOTAL ANTICIPATED FUNDING	***$ 1,734,740.00***

SECTION E

CRAWFORD COUNTY

COUNTY ROAD M36 BASE WIDENING, SHOULDER PAVING & RESURFACING PROJECT

LOCATION MAP



SECTION F

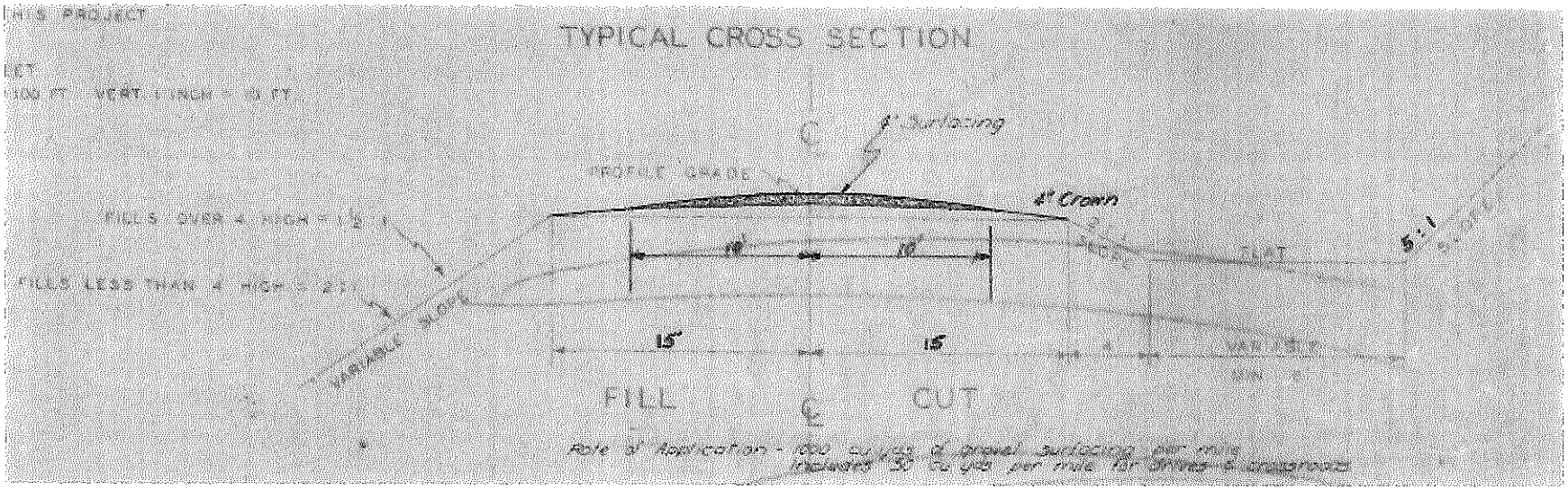
Crawford County
County Road M36 Base Widening, Shoulder Paving & Resurfacing Project

Crawford County
County Road M36 Base Widening, Shoulder Paving & Resurfacing Project

Crawford County
County Road M36 Base Widening, Shoulder Paving & Resurfacing Project

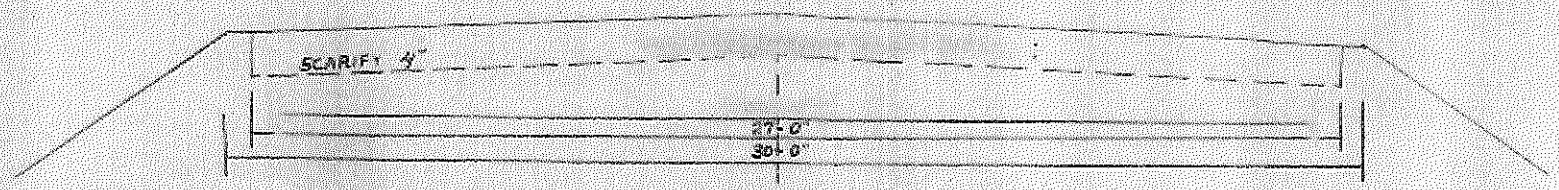
SECTION G

ORIGINAL GRADING CROSS SECTION



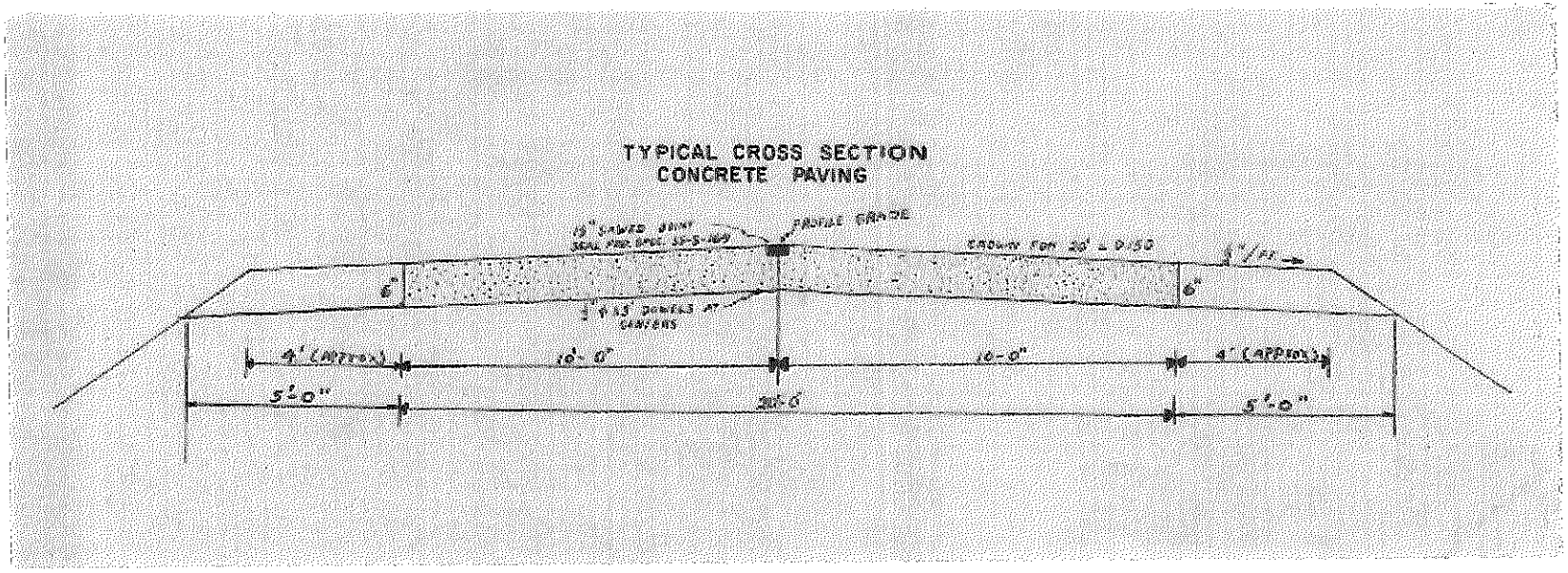
ORIGINAL GRADING CROSS SECTION

TYPICAL CROSS SECTION
GRADING



1. EXCAVATE AS SHOWN ON PLANS AT STATIONS IN LIST AT RIGHT.
2. EXCAVATED MAT'L TO BE USED FOR SHOULDERS.
3. AFTER EXCAVATION, SCARIFY TOP 4" AND MIX IN GRANULAR MATERIAL SUPPLIED BY COUNTY. (1000 Tons per Mile at Stations Shown)
4. COMPACT WITH SHEEPS FOOT ROLLERS MEETING 1960 STD'S SECT. 200/05. ROLLING TO CONTINUE UNTIL FEET DO NOT PENETRATE OVER 1½" IN THE CENTER 27' OF ROADWAY.
5. BRING TO FINAL GRADE AS SHOWN ON PLANS.

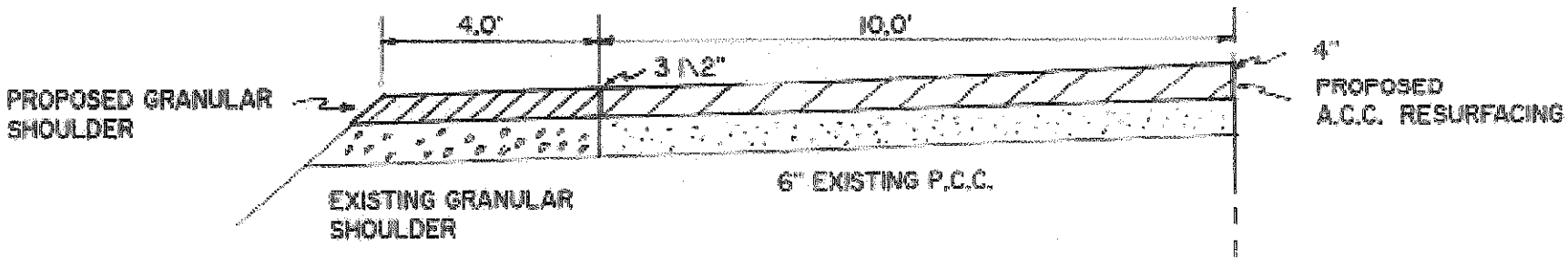
ORIGINAL GRADING CROSS SECTION



CRAWFORD COUNTY
COUNTY ROAD M36 WIDENING, SHOULDER PAVING & RESURFACING PROJECT

1996 HMA OVERLAY CROSS SECTION

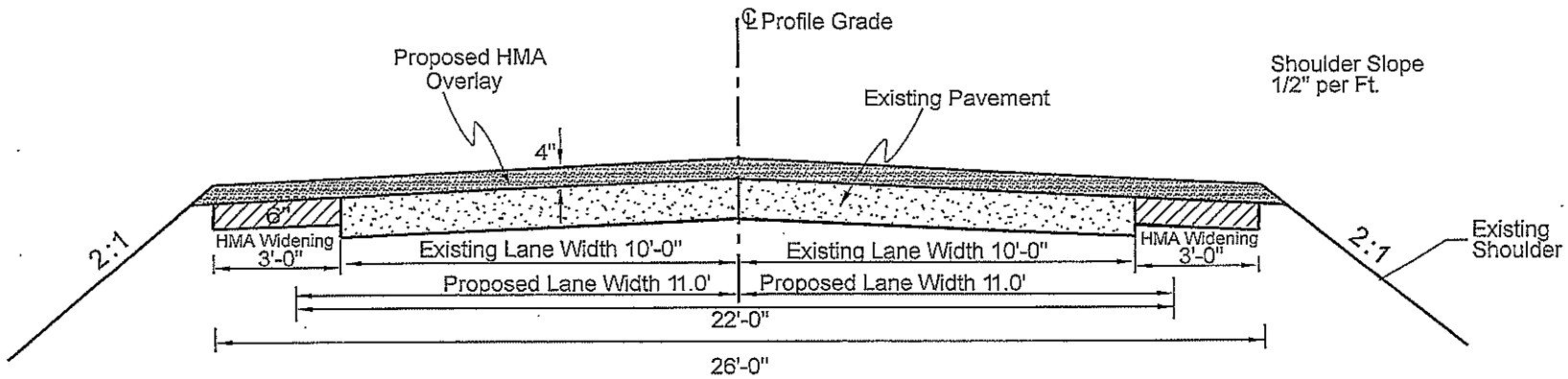
TYPICAL CROSS SECTION



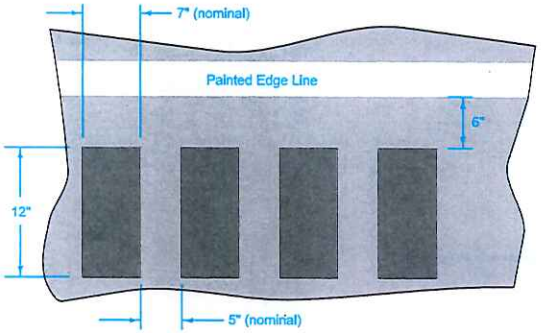
CRAWFORD COUNTY

COUNTY ROAD M36 BASE WIDENING, SHOULDER PAVING & RESURFACING PROJECT

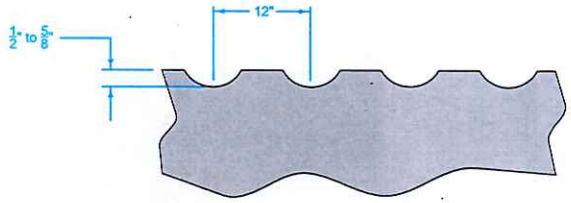
PROPOSED CROSS SECTION



DESIGNER INFO



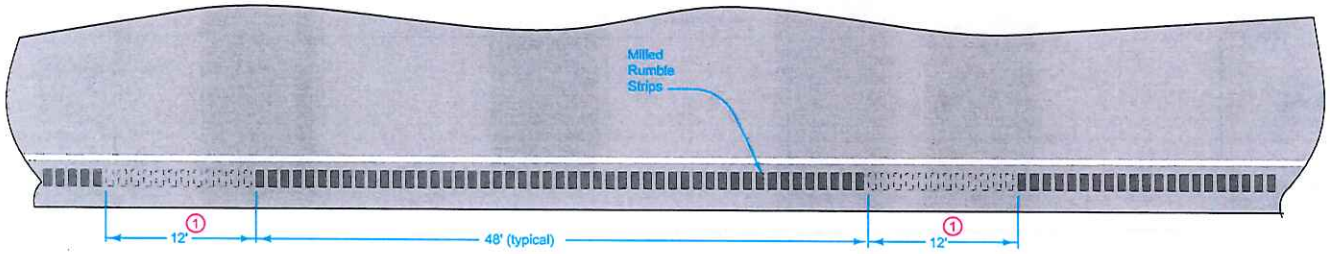
PLAN



SECTION

MILLED RUMBLE STRIP

① Place continuous Milled Rumble Strips (no 12-foot gaps) on all median-side shoulders and on all interstate shoulders.



GAP DETAILS

Possible Contract Items:
Asphalt Emulsion for Fog Seal (Shoulder Rumble Strips)
Milled Shoulder Rumble Strips, HMA Surface
Milled Shoulder Rumble Strips, PCC Surface

Possible Tabulation:
112-10

IOWADOT

STANDARD ROAD PLAN

REVISION	
5	10-20-15

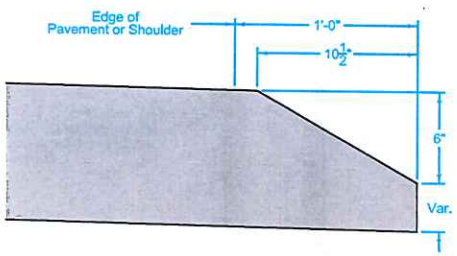
PV-12

SHEET 1 of 2

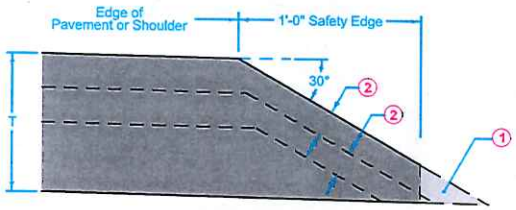
REVISIONS: Added note 2 on page 2.

Brian Smith
APPROVED BY DESIGN METHODS ENGINEER

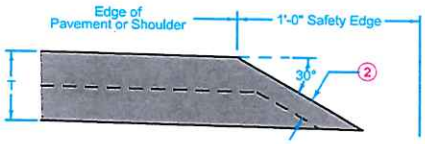
MILLED SHOULDER RUMBLE STRIPS



PCC



T > 8"



T < 8"

HMA

Quantities for Safety Edge are included in the estimated quantity of the pavement or shoulder. For HMA quantities calculated by area, the Safety Edge is measured as one foot of width regardless of thickness.

See paving typicals for placement within roadway.

The number of HMA lifts shown are for illustration purposes only.

1. Material in excess of 1' width is contractor's option.
2. Coverage thickness to exceed nominal maximum aggregate size.

Iowa Department of Transportation

STANDARD ROAD PLAN

REVISION	
1	10-18-11

PV-3

SHEET 1 of 2

REVISIONS: Modified HMA drawings. Added circle notes 1 and 2.

Deanna Maifield

APPROVED BY DESIGN METHODS ENGINEER

SAFETY EDGE

SECTION I

Iowa Department of Transportation

Major Cause Summary

Crawford County Donna Reed Rd. from Hwy. 30 to S

Report Version 1.1 Jan 2005

Analysis Years: 2010 [2], 2011 [3], 2012 [5], 2013 [7], 2014 [9], 2015 [2]

Crash Summary:

Fatal	-
Major Injury	-
Minor Injury	4
Possible/Unknown	7
PDO	17
Total Crashes	28

Injury Summary:

Fatal	-
Major Injury	-
Minor Injury	4
Possible	7
Unknown	-
Total Injuries	11

TOT Property Damage: $153,600

AVG Property Damage: $5,486

Surface Condition Summary:

Dry	13
Wet	3
Ice	4
Snow	1
Slush	-
Sand/Dirt/Oil/Gravel	-
Water	-
Other	1
Unknown	-
Not Reported	6
Total Crashes	28

Major Cause Summary:

8	Animal
	Ran Traffic Signal
	Ran Stop Sign
1	Crossed Centerline
	FTYROW: At Uncontrolled Intersection
	FTYROW: Making Right Turn on Red Signal
1	FTYROW: From Stop Sign
	FTYROW: From Yield Sign
	FTYROW: Making Left Turn
2	FTYROW: From Driveway
	FTYROW: From Parked Position
	FTYROW: To Pedestrian
	FTYROW: Other (explain in narrative)
	Traveling Wrong Way or on Wrong Side of Rd
2	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
4	Swerving/Evasive Action
	Over-Correcting/Over-Steering
	Downhill Runaway
	Equipment Failure
	Separation of Units
4	Ran Off Road - Right
	Ran Off Road - Straight
2	Ran Off Road - Left
3	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
1	Other: No Improper Action
	None Indicated

Selection Filter:

((YEAR <> 2005 and YEAR <> 2006 and YEAR <> 2007 and YEAR <> 2008 and YEAR <> 2009))

Analyst: CM

Notes: All Crashes 2010-2015

Iowa Department of Transportation

Driver and Time Summary

Crawford County Donna Reed Rd. from Hwy. 30 to 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	-	-	-	-	-	-	-	-	-	2	1	-	-	3	11
MON	-	-	-	-	-	1	-	-	-	-	-	-	-	1	4
TUE	-	-	-	1	3	-	-	1	2	-	-	-	-	7	25
WED	-	-	1	-	1	-	-	-	1	-	-	-	-	3	11
THU	-	-	-	-	2	-	-	-	-	-	-	-	-	2	7
FRI	-	-	-	1	-	-	-	1	-	2	-	1	-	5	18
SAT	-	1	-	-	-	1	-	2	-	1	-	2	-	7	25
Tot.		1	1	2	6	2		4	3	5	1	3		28	
%		4	4	7	21	7		14	11	18	4	11			100

Driver Age/Gender Summary:

Age	Male	Female	NR	Drivers	%
<14	-	-	-		
14	-	-	-		
15	-	-	-		
16	-	1	-	1	3
17	-	1	1	2	6
18	-	-	-		
19	-	1	-	1	3
20	-	-	-		
21 to 24	-	-	-		
25 to 29	3	1	-	4	12
30 to 34	2	-	-	2	6
35 to 39	1	1	-	2	6
40 to 44	1	1	-	2	6
45 to 49	3	3	-	6	18
50 to 54	-	1	-	1	3
55 to 59	3	1	-	4	12
60 to 64	2	1	-	3	9
65 to 69	1	-	-	1	3
70 to 74	-	1	-	1	3
75 to 79	-	2	-	2	6
80 to 84	-	-	-		
85 to 89	-	-	-		
90 to 94	-	-	-		
95 plus	-	-	-		
NR	-	-	1	1	3
Drivers	16	15	2	33	
%	48	45	6		100

Drug/Alcohol Summary:

	Total	%
Drug		
Alcohol, Less than Statutory		
Alcohol, Statutory	1	4
Drug/Alcohol, Less than Statutory		
Drug/Alcohol, Statutory		
Refused		
Under Influence of Alc/Drugs/Meds		
None Indicated	27	96
Total Crashes	28	100

Fixed Object Struck Summary:

	Vehs.	%
Bridge/Bridge rail/Overpass	1	3
Underpass/Structure Support		
Culvert	1	3
Ditch/Embankment	8	24
Curb/Island/Raised Median		
Guardrail		
Concrete Barrier		
Tree	2	6
Pole - Utility/Light/Etc	1	3
Sign Post		
Mailbox		
Impact Attenuator		
Other Fixed Object	1	3
None	19	58
Total Vehicles	33	100

Selection Filter:

((YEAR <> 2005 and YEAR <> 2006 and YEAR <> 2007 and YEAR <> 2008 and YEAR <> 2009))

Analyst: CM

Notes: All Crashes 2010-2015

Iowa Department of Transportation

Crash Detail Report

Crawford County Donna Reed Rd. from Hwy. 30 to S

Report Version 1.3 Aug 2006

2010563395 03/20/2010 23:21 DONNA REED DR and M036 / DONNA REED RD
County: 24 City: Denison

Major Cause: Crossed centerline
Roadway Type: Non-intersection: Bridge/overpass/underpass

Severity:	PDO	Manner of Crash:	Non-collision
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:	Alcohol: Statutory
Unknown Injuries:	0	Property Damage:	$2000

Number of Vehicles: 1

	Unit 1	Unit 2	Unit 3
Init Trav Dir:	South	0	0
Veh Action:	Essentially straight	0	0
Configuration:	Passenger car	0	0
Driver Age:	17	0	0
Driver Gender:	F		
Driver Cond:	Infl by alc/drugs/meds	0	0
Drivr Contr 1:	Crossed centerline	0	0
Drivr Contr 2:	Over correcting/steering	0	0
Fixed Object:	Bridge/bridge	0	0

2010605364 12/09/2010 09:21 M036 / DONNA REED RD
County: 24 City:

Major Cause: Ran off road - left
Roadway Type: Non-intersection: No special feature

Severity:	Poss/Unk	Manner of Crash:	Non-collision
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:	$20000

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:	42	0	0
Driver Gender:	M		
Driver Cond:	Asleep/fatigued/etc.	0	0
Drivr Contr 1:	Fatigued/Asleep	0	0
Drivr Contr 2:	not reported	0	0
Fixed Object:	none	0	0

Iowa Department of Transportation

Crash Detail Report

Crawford County Donna Reed Rd. from Hwy. 30 to S

Report Version 1.3 Aug 2006

2011619686 02/27/2011 18:16 M036 / DONNA REED RD
County: 24 City:

Major Cause: Animal
Roadway Type: Not reported

Severity:	PDO	Manner of Crash:	not reported
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:	$2000

Number of Vehicles: 1

	Unit 1	Unit 2	Unit 3
Init Trav Dir:	not reported	0	0
Veh Action:	not reported	0	0
Configuration:	Passenger car	0	0
Driver Age:	46	0	0
Driver Gender:	F		
Driver Cond:	not reported	0	0
Drivr Contr 1:	unknown	0	0
Drivr Contr 2:	not reported	0	0
Fixed Object:	none	0	0

2011623473 03/26/2011 15:53 M036 / DONNA REED RD
County: 24 City:

Major Cause: Ran off road - right
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:	Cloudy
Possible Injuries:	0	Drug/Alc Involved:	none indicated
Unknown Injuries:	0	Property Damage:	$6200

Number of Vehicles: 1

	Unit 1	Unit 2	Unit 3
Init Trav Dir:	South	0	0
Veh Action:	Essentially straight	0	0
Configuration:	Sport utility vehicle	0	0
Driver Age:	60	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:	Ditch/embankment	0	0

Iowa Department of Transportation

Crash Detail Report

Crawford County Donna Reed Rd. from Hwy. 30 to S

Report Version 1.3 Aug 2008

2011639210 07/19/2011 08:59 M036 / DONNA REED RD
County: 24 City:

Major Cause: FTY from driveway
Roadway Type: Non-intersection: Farm/residential drive

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:**	$5000

Number of Vehicles: 2

	Unit 1	Unit 2	Unit 3
Init Trav Dir:	East	South	0
Veh Action:	Entering (merging)	Essentially straight	0
Configuration:	4-tire light truck	Sport utility vehicle	0
Driver Age:	46	57	0
Driver Gender:	M	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

2012666590 01/04/2012 09:50 M036 / DONNA REED RD
County: 24 City:

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

Severity:	Poss/Unk	**Manner of Crash:**	Non-collision
Fatalities:	0	**Surface Conditions:**	Other
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:**	$25000

Number of Vehicles: 1

	Unit 1	Unit 2	Unit 3
Init Trav Dir:	South	0	0
Veh Action:	Essentially straight	0	0
Configuration:	4-tire light truck	0	0
Driver Age:	49	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:	Other fixed object	0	0

Iowa Department of Transportation

Crash Detail Report

Crawford County Donna Reed Rd. from Hwy. 30 to S

Report Version 1.3 Aug 2006

2012670964 02/04/2012 02:49 M036 / DONNA REED RD
County: 24 City:

Major Cause: Ran off road - right
Roadway Type: Non-intersection: No special feature

Severity: PDO
Manner of Crash: Non-collision
Fatalities: 0
Surface Conditions: Ice
Major Injuries: 0
Light Conditions: Dark - roadway not lighted
Minor Injuries: 0
Weather Conditions: Sleet/hail/freezing rain
Possible Injuries: 0
Drug/Alc Involved: none indicated
Unknown Injuries: 0
Property Damage: $3000
Number of Vehicles: 1

	Unit 1	Unit 2	Unit 3
Init Trav Dir:	South	0	0
Veh Action:	Essentially straight	0	0
Configuration:	Sport utility vehicle	0	0
Driver Age:	29	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:	Ditch/embankment	0	0

2012691317 06/22/2012 22:33 M036 / DONNA REED RD
County: 24 City:

Major Cause: Animal
Roadway Type: Not reported

Severity: PDO
Manner of Crash: not reported
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: $5000
Number of Vehicles: 1

	Unit 1	Unit 2	Unit 3
Init Trav Dir:	South	0	0
Veh Action:	Essentially straight	0	0
Configuration:	Sport utility vehicle	0	0
Driver Age:	38	0	0
Driver Gender:	M		
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

Crash Detail Report

Crawford County Donna Reed Rd. from Hwy. 30 to S

Report Version 1.3 Aug 2006

2012714369 11/28/2012 17:19 M036/DONNA REED RD
County: 24 City: Denison

Major Cause: Animal
Roadway Type: Non-intersection: No special feature
Severity: Poss/Unk
Manner of Crash: unknown
Fatalities: 0
Surface Conditions: Dry
Major Injuries: 0
Light Conditions: Dusk
Minor Injuries: 0
Weather Conditions: Clear
Possible Injuries: 1
Drug/Alc Involved: none indicated
Unknown Injuries: 0
Property Damage: $7000
Number of Vehicles: 2

	Unit 1	Unit 2	Unit 3
Init Trav Dir:	South	North	0
Veh Action:	Essentially straight	Essentially straight	0
Configuration:	Van or mini-van	4-tire light truck	0
Driver Age:	27	28	0
Driver Gender:	F	M	
Driver Cond:	Normal	Normal	0
Drivr Contr 1:	none	none	0
Drivr Contr 2:	not reported	not reported	0
Fixed Object:	none	none	0

2012714581 12/01/2012 22:15 M036/DONNA REED RD
County: 24 City: Denison

Major Cause: Animal
Roadway Type: Non-intersection: No special feature
Severity: PDO
Manner of Crash: Non-collision
Fatalities: 0
Surface Conditions: Wet
Major Injuries: 0
Light Conditions: Dark - unknown roadway lighting
Minor Injuries: 0
Weather Conditions: Fog/smoke
Possible Injuries: 0
Drug/Alc Involved: none indicated
Unknown Injuries: 0
Property Damage: $2200
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:	56	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

Iowa Department of Transportation

Crash Detail Report

Crawford County Donna Reed Rd. from Hwy. 30 to S

Report Version 1.3 Aug 2008

2013722125 01/18/2013 06:57 M036 / DONNA REED RD
County: 24 City: Denison

Major Cause: Ran off road - left
Roadway Type: Non-intersection: No special feature

Severity:	Minor	Manner of Crash:	Non-collision
Fatalities:	0	Surface Conditions:	Ice
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:	$3500

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:	51	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

2013725047 02/05/2013 08:27 M036/DONNA REED RD
County: 24 City:

Major Cause: Lost control
Roadway Type: Non-intersection: No special feature

Severity:	PDO	Manner of Crash:	Sideswipe, opposite direction
Fatalities:	0	Surface Conditions:	Ice
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:	$7500

Number of Vehicles: 2

	Unit 1	Unit 2	Unit 3
Init Trav Dir:	North	South	0
Veh Action:	88	Essentially straight	0
Configuration:	Passenger car	Passenger car	0
Driver Age:	44	29	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:	Ditch/embankment	none	0

Iowa Department of Transportation

Crash Detail Report

Crawford County Donna Reed Rd. from Hwy. 30 to S

Report Version 1.3 Aug 2006

2013725669 02/05/2013 17:11 M036/DONNA REED RD
County: 24 City:

Major Cause: FTY from driveway
Roadway Type: Non-intersection: Farm/residential drive

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:**	$4500

Number of Vehicles: 2

	Unit 1	Unit 2	Unit 3
Init Trav Dir:	West	North	0
Veh Action:	Entering (merging)	Essentially straight	0
Configuration:	Sport utility vehicle	4-tire light truck	0
Driver Age:	56	64	0
Driver Gender:	M	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

2013737647 04/18/2013 09:45 M036/DONNA REED RD
County: 24 City:

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

Severity:	PDO	**Manner of Crash:**	Non-collision
Fatalities:	0	**Surface Conditions:**	Wet
Major Injuries:	0	**Light Conditions:**	Daylight
Minor Injuries:	0	**Weather Conditions:**	Sleet/hail/freezing rain
Possible Injuries:	0	**Drug/Alc Involved:**	none indicated
Unknown Injuries:	0	**Property Damage:**	$2000

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:	74	0	0
Driver Gender:	F		
Driver Cond:	Normal	0	0
Drivr Contr 1:	Lost control	0	0
Drivr Contr 2:	Over correcting/steering	0	0
Fixed Object:	Ditch/embankment	0	0

Iowa Department of Transportation

Crash Detail Report

Crawford County Donna Reed Rd. from Hwy. 30 to S

Report Version 1.3 Aug 2006

2013744893 06/18/2013 15:30 M036/DONNA REED RD
County: 24 **City:**

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:**	$3000

Number of Vehicles: 1

	Unit 1	Unit 2	Unit 3
Init Trav Dir:	South	0	0
Veh Action:	Essentially straight	0	0
Configuration:	Passenger car	0	0
Driver Age:	77	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

2013773120 12/14/2013 15:30 M036/DONNA REED RD
County: 24 **City:**

Major Cause: Ran off road - right
Roadway Type: Non-intersection: No special feature

Severity:	Poss/Unk	**Manner of Crash:**	Non-collision
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:**	$3700

Number of Vehicles: 1

	Unit 1	Unit 2	Unit 3
Init Trav Dir:	North	0	0
Veh Action:	88	0	0
Configuration:	Passenger car	0	0
Driver Age:	16	0	0
Driver Gender:	F		
Driver Cond:	Normal	0	0
Drivr Contr 1:	Lost control	0	0
Drivr Contr 2:	not reported	0	0
Fixed Object:	Ditch/embankment	0	0

Iowa Department of Transportation

Crash Detail Report

Crawford County Donna Reed Rd. from Hwy. 30 to S

Report Version 1.3 Aug 2006

2013776501 12/30/2013 11:09 M036/DONNA REED RD
County: 24 City:

Major Cause: Ran off road - right
Roadway Type: Non-intersection: No special feature

Severity:	PDO	Manner of Crash:	Non-collision
Fatalities:	0	Surface Conditions:	Ice
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:	$6000

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:	58	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:	Pole: utility/light/etc	0	0

2014782577 02/02/2014 19:30 M036/DONNA REED RD
County: 24 City:

Major Cause: Swerving/evasive 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:	Dark - roadway not lighted
Minor Injuries:	1	Weather Conditions:	Clear
Possible Injuries:	0	Drug/Alc Involved:	none indicated
Unknown Injuries:	0	Property Damage:	$4200

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:	19	0	0
Driver Gender:	F		
Driver Cond:	Normal	0	0
Drivr Contr 1:	Lost control	0	0
Drivr Contr 2:	Over correcting/steering	0	0
Fixed Object:	Tree	0	0

Iowa Department of Transportation

Crash Detail Report

Crawford County Donna Reed Rd. from Hwy. 30 to S

Report Version 1.3 Aug 2006

2014798237 05/09/2014 19:17 M036/DONNA REED RD
County: 24 City:

Major Cause: Swerving/evasive 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:**	$5000

Number of Vehicles: 1

	Unit 1	Unit 2	Unit 3
Init Trav Dir:	North	0	0
Veh Action:	Essentially straight	0	0
Configuration:	Motorcycle	0	0
Driver Age:	47	0	0
Driver Gender:	F		
Driver Cond:	Normal	0	0
Drivr Contr 1:	Lost control	0	0
Drivr Contr 2:	not reported	0	0
Fixed Object:	Ditch/embankment	0	0

2014831291 08/31/2014 20:00 M036/DONNA REED RD
County: 24 City:

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

Severity:	PDO	**Manner of Crash:**	Non-collision
Fatalities:	0	**Surface Conditions:**	Wet
Major Injuries:	0	**Light Conditions:**	Dark - roadway not lighted
Minor Injuries:	0	**Weather Conditions:**	Rain
Possible Injuries:	0	**Drug/Alc Involved:**	none indicated
Unknown Injuries:	0	**Property Damage:**	$5000

Number of Vehicles: 1

	Unit 1	Unit 2	Unit 3
Init Trav Dir:	North	0	0
Veh Action:	Essentially straight	0	0
Configuration:	Van or mini-van	0	0
Driver Age:	30	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:	Tree	0	0

Iowa Department of Transportation

Crash Detail Report

Crawford County Donna Reed Rd. from Hwy. 30 to S

Report Version 1.3 Aug 2006

2014814912 09/02/2014 07:46 US 30/4TH AVE S AND US 30 AND DONNA REED DR
County: 24 City: Denison

Major Cause: FTY from stop sign
Roadway Type: Intersection: T - 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:**	$3000

Number of Vehicles: 2

	Unit 1	Unit 2	Unit 3
Init Trav Dir:	North	East	0
Veh Action:	Turning right	Essentially straight	0
Configuration:	Passenger car	Tractor/semi-trailer	0
Driver Age:	37	unknown	0
Driver Gender:	F	NR	
Driver Cond:	Normal	unknown	0
Drivr Contr 1:	FTY from stop sign	none	0
Drivr Contr 2:	not reported	not reported	0
Fixed Object:	none	none	0

2014825089 11/04/2014 08:30 M036/DONNA REED RD
County: 24 City:

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:**	$2500

Number of Vehicles: 1

	Unit 1	Unit 2	Unit 3
Init Trav Dir:	not reported	0	0
Veh Action:	not reported	0	0
Configuration:	Sport utility vehicle	0	0
Driver Age:	48	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

Crash Detail Report

Crawford County Donna Reed Rd. from Hwy. 30 to S

Report Version 1.3 Aug 2006

2014825717 11/08/2014 10:24 M036/DONNA REED RD
County: 24 **City:**

Major Cause: Driving too fast for conditions
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:**	$2000

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:	78	0	0
Driver Gender:	F		
Driver Cond:	Normal	0	0
Drivr Contr 1:	Too fast for conditions	0	0
Drivr Contr 2:	not reported	0	0
Fixed Object:	none	0	0

2014825719 11/08/2014 18:23 M036/DONNA REED RD AND BOULDERS DR
County: 24 **City:** Denison

Major Cause: Animal
Roadway Type: Not reported

Severity:	PDO	**Manner of Crash:**	not reported
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:**	$5500

Number of Vehicles: 1

	Unit 1	Unit 2	Unit 3
Init Trav Dir:	North	0	0
Veh Action:	not reported	0	0
Configuration:	4-tire light truck	0	0
Driver Age:	31	0	0
Driver Gender:	M		
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

Crash Detail Report

Crawford County Donna Reed Rd. from Hwy. 30 to S

Report Version 1.3 Aug 2008

2014829676 11/21/2014 15:25 US 30/4TH AVE S AND US 30 AND DONNA REED DR
County: 24 **City:** Denison

Major Cause: Lost control
Roadway Type: Non-intersection: No special feature

Severity:	Poss/Unk	**Manner of Crash:**	Non-collision
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:**	$4000

Number of Vehicles: 1

	Unit 1	Unit 2	Unit 3
Init Trav Dir:	West	0	0
Veh Action:	Essentially straight	0	0
Configuration:	Passenger car	0	0
Driver Age:	17	0	0
Driver Gender:	NR		
Driver Cond:	Normal	0	0
Drivr Contr 1:	Lost control	0	0
Drivr Contr 2:	not reported	0	0
Fixed Object:	Culvert	0	0

2014831014 11/26/2014 05:47 M036 / DONNA REED RD
County: 24 **City:** Denison

Major Cause: Driving too fast for conditions
Roadway Type: Non-intersection: No special feature

Severity:	Poss/Unk	**Manner of Crash:**	Non-collision
Fatalities:	0	**Surface Conditions:**	Snow
Major Injuries:	0	**Light Conditions:**	Dark - unknown roadway lighting
Minor Injuries:	0	**Weather Conditions:**	Snow
Possible Injuries:	1	**Drug/Alc Involved:**	none indicated
Unknown Injuries:	0	**Property Damage:**	$1100

Number of Vehicles: 1

	Unit 1	Unit 2	Unit 3
Init Trav Dir:	South	0	0
Veh Action:	Essentially straight	0	0
Configuration:	4-tire light truck	0	0
Driver Age:	69	0	0
Driver Gender:	M		
Driver Cond:	Normal	0	0
Drivr Contr 1:	Too fast for conditions	0	0
Drivr Contr 2:	Lost control	0	0
Fixed Object:	Ditch/embankment	0	0

Iowa Department of Transportation

Crash Detail Report

Crawford County Donna Reed Rd. from Hwy. 30 to S

Report Version 1.3 Aug 2006

2015842635 01/30/2015 18:31 M036/DONNA REED RD
County: 24 City:

Major Cause: Animal
Roadway Type: Not reported

Severity:	PDO	Manner of Crash:	not reported
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:	$3500

Number of Vehicles: 1

	Unit 1	Unit 2	Unit 3
Init Trav Dir:	not reported	0	0
Veh Action:	not reported	0	0
Configuration:	Passenger car	0	0
Driver Age:	63	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

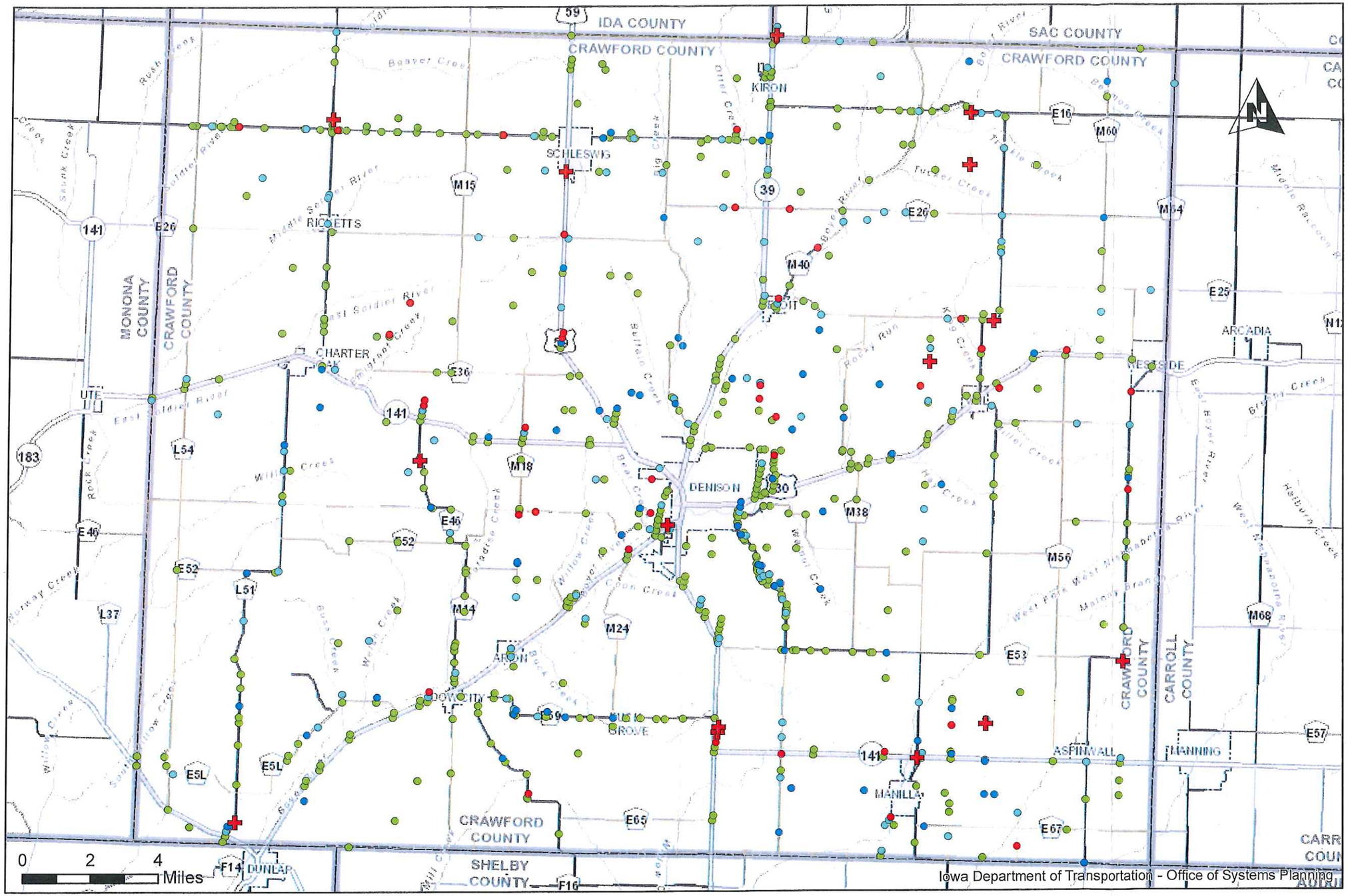
2015852813 03/31/2015 16:09 M036/DONNA REED RD
County: 24 City:

Major Cause: Lost control
Roadway Type: Non-intersection: No special feature

Severity:	Poss/Unk	Manner of Crash:	Non-collision
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:	$10200

Number of Vehicles: 1

	Unit 1	Unit 2	Unit 3
Init Trav Dir:	South	0	0
Veh Action:	88	0	0
Configuration:	Van or mini-van	0	0
Driver Age:	48	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:	Ditch/embankment	0	0



Crash Severity

- Fatal (15)
- Major Injury (42)
- Minor Injury (75)
- Possible/Unknown Injury (123)
- Property Damage Only (476)

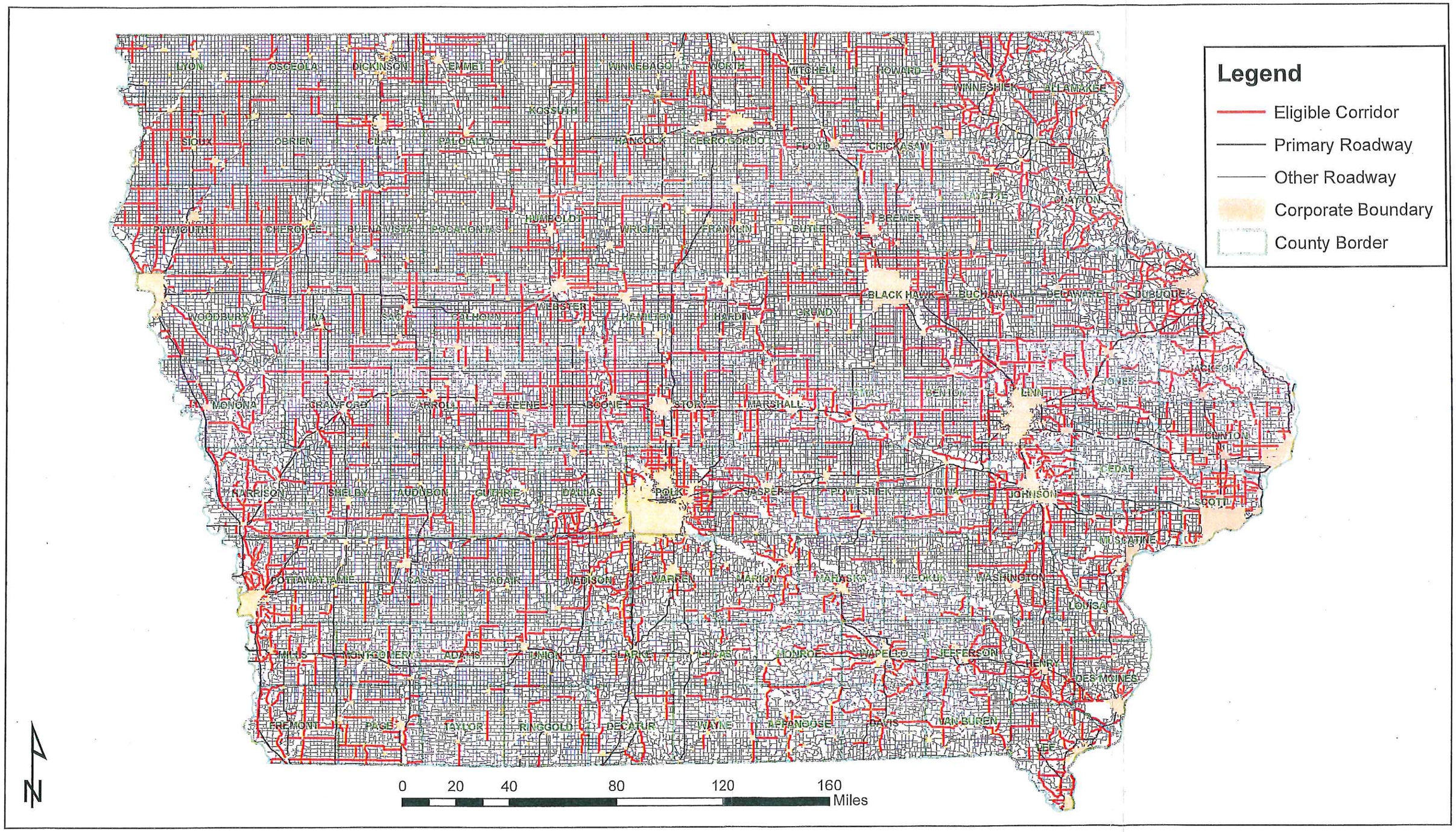
- Primary Roads
- Paved Secondary Roads
- Unpaved Secondary Roads
- County Border

All Secondary Road Crashes*
Crawford County, Iowa
2005-2014

Disclaimer:
The information contained in this report was derived from the July 15, 2015 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).
*Crashes within 150 feet of secondary roadway.

High Risk Rural Roads -- 2011

Eligible Corridors Based on 2001-2010 Fatal and Major Injury Crash Density/Rate



Produced by: Michael Morisette

Date produced: December 1, 2011

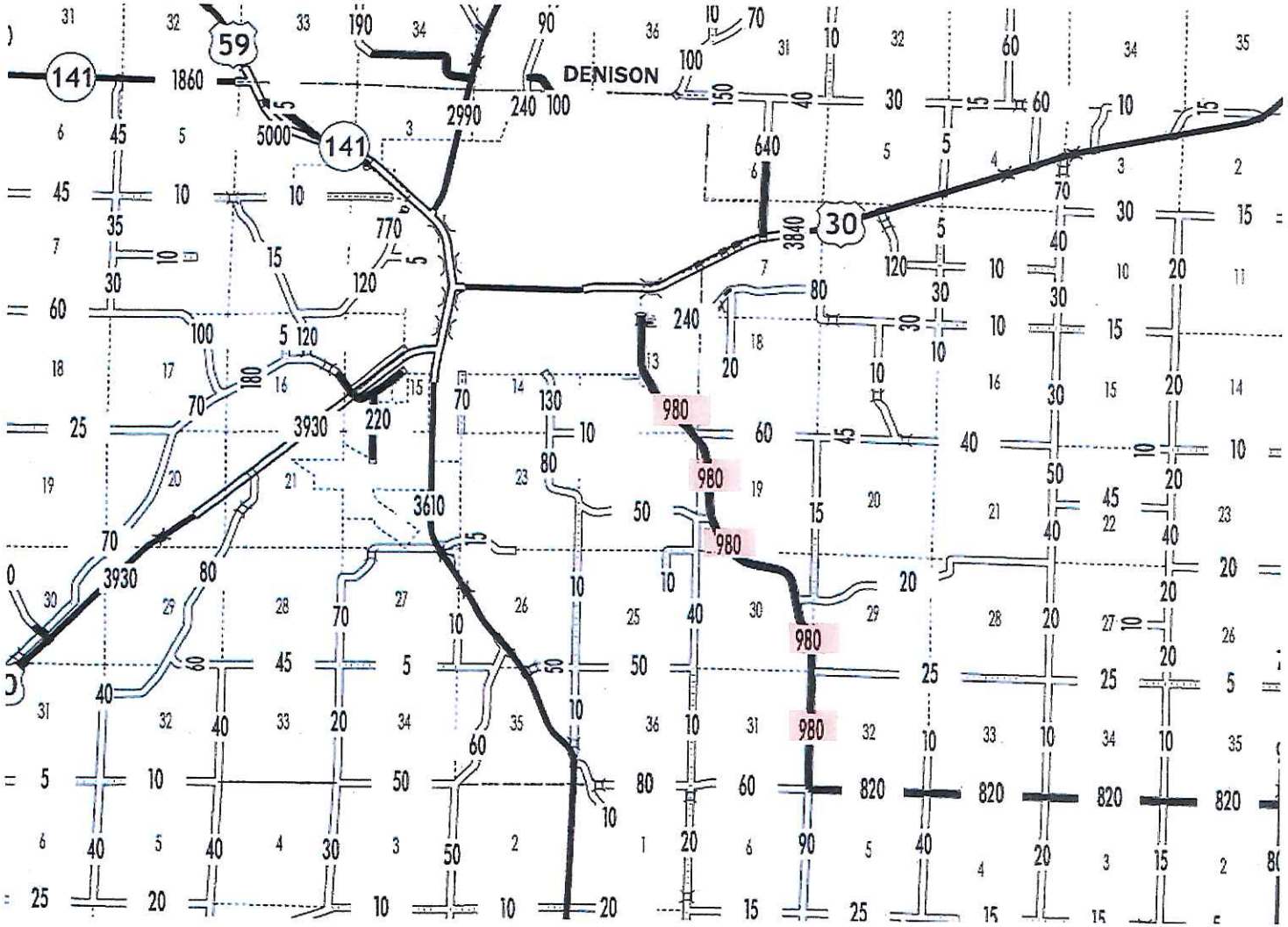
Iowa Department of Transportation

SECTION J

CRAWFORD COUNTY

COUNTY ROAD M36 BASE WIDENING, SHOULDER PAVING & RESURFACING PROJECT

2012 IDOT TRAFFIC COUNT MAP



TRAFFIC COUNT SUMMARY
On M36 (Donna Reed Rd.) Just South of R Ave.
Counter #4

DAY	DATE	ADT NB	ADT SB	% TRUCKS NB	% TRUCKS SB
Tuesday	7/23/2013	480	446	6.5	12.9
Wednesday	7/24/2013	426	417	4.8	13.0
Thursday	7/25/2013	460	459	4.5	10.6
Friday	7/26/2013	501	468	5.6	13.1
Saturday	7/27/2013	452	403	7.9	15.4
Sunday	7/28/2013	363	323	5.5	10.9

AVERAGE # OF VEHICLES NB: 447

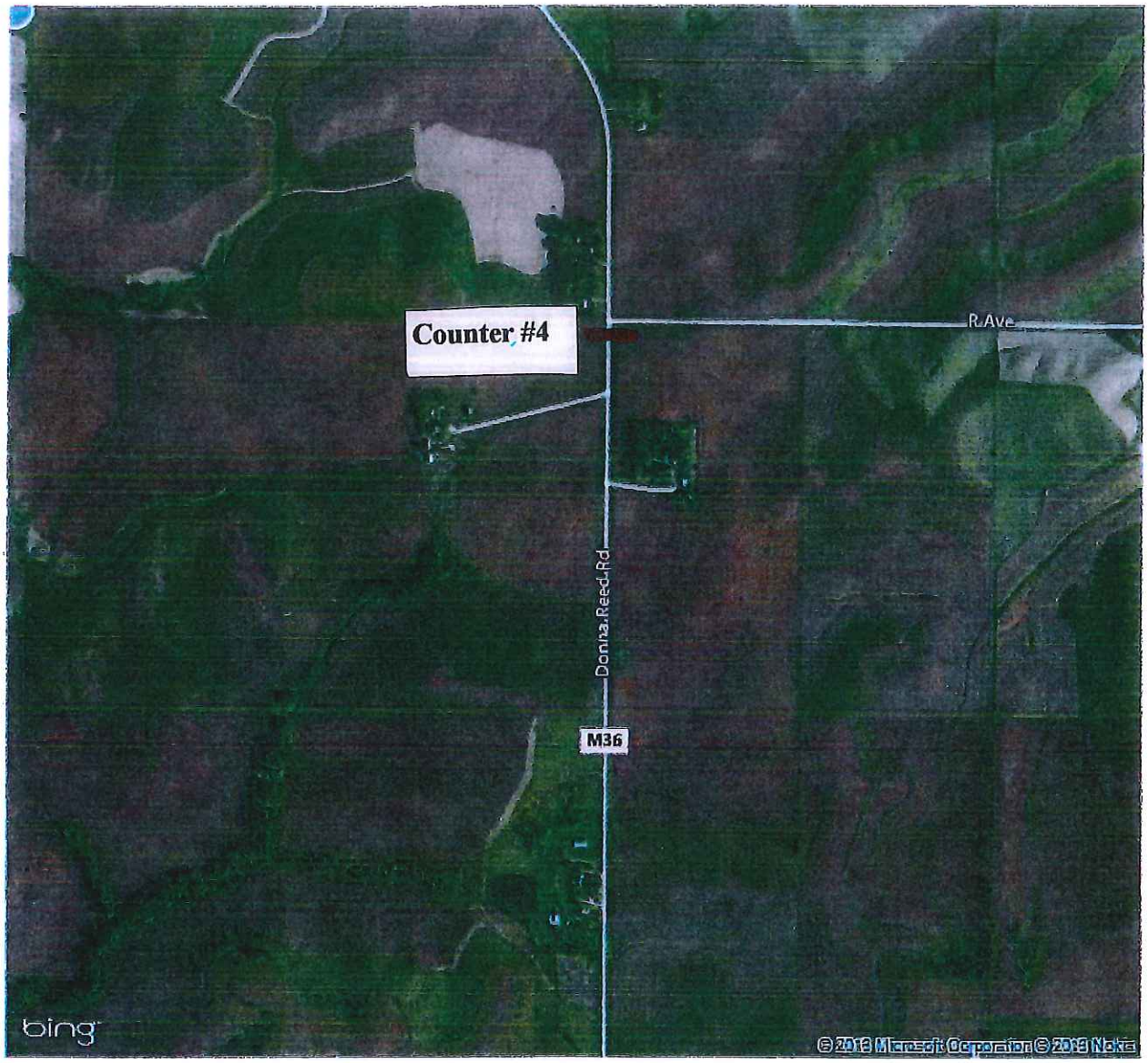
AVERAGE # OF VEHICLES SB: 419

ADT COMBINED: 866

AVERAGE % OF NB TRUCKS: 6%

AVERAGE % OF SB TRUCKS: 13%

AVERAGE % TRUCKS: 10%


Counter #4
R Ave
Donna Reed Rd
M36
bing
© 2013 Microsoft Corporation © 2013 Nokia

Counter #4 : Site: R Ave. & Donna Reed Rd.

Seven Day Volume, per Channel

Northbound

Interval Start	Tue 7/23/2013	Wed 7/24/2013	Thu 7/25/2013	Fri 7/26/2013	Sat 7/27/2013	Sun 7/28/2013	Mon 7/29/2013	Mon - Fri Average	7 Day Average
12:00 AM	2	1	0	5	6	7	-	2.0	3.5
1:00 AM	1	2	1	2	4	1	-	1.5	1.8
2:00 AM	1	1	1	2	1	0	-	1.3	1.0
3:00 AM	2	2	1	2	2	0	-	1.8	1.5
4:00 AM	3	3	2	5	3	0	-	3.3	2.7
5:00 AM	13	13	13	15	3	4	-	13.5	10.2
6:00 AM	18	15	13	17	9	6	-	15.8	13.0
7:00 AM	24	11	18	14	17	7	-	16.8	15.2
8:00 AM	18	17	14	21	22	12	-	17.5	17.3
9:00 AM	26	16	18	25	27	16	-	21.3	21.3
10:00 AM	25	21	25	15	31	29	-	21.5	24.3
11:00 AM	31	23	21	29	28	23	-	26.0	25.8
12:00 PM	25	28	30	38	34	36	-	30.3	31.8
1:00 PM	30	28	27	36	38	31	-	30.3	31.7
2:00 PM	43	35	45	45	22	31	-	42.0	36.8
3:00 PM	53	45	58	39	29	30	-	48.8	42.3
4:00 PM	43	47	40	55	23	29	-	46.3	39.5
5:00 PM	23	21	28	29	29	25	-	25.3	25.8
6:00 PM	15	29	27	26	18	8	-	24.3	20.5
7:00 PM	32	18	36	19	23	13	-	26.3	23.5
8:00 PM	26	17	24	21	27	12	-	22.0	21.2
9:00 PM	16	9	7	13	28	27	-	11.3	16.7
10:00 PM	7	21	5	21	23	12	-	13.5	14.8
11:00 PM	3	3	6	7	5	4	-	4.8	4.7
Totals	480	426	460	501	452	363	0	466.8	447.0

Peak Hours

12:00 AM - 12:00 PM	11:00 AM	11:00 AM	10:00 AM	11:00 AM	10:00 AM	10:00 AM	-	11:00 AM	11:00 AM
Volume	31	23	25	29	31	29	-	26.0	25.8
12:00 PM - 12:00 AM	3:00 PM	4:00 PM	3:00 PM	4:00 PM	1:00 PM	12:00 PM	-	3:00 PM	3:00 PM
Volume	53	47	58	55	38	36	-	48.8	42.3

Counter #4 :

Site: R Ave. & Donna Reed Rd.

Seven Day Volume, per Channel

Southbound

Interval Start	Tue 7/23/2013	Wed 7/24/2013	Thu 7/25/2013	Fri 7/26/2013	Sat 7/27/2013	Sun 7/28/2013	Mon 7/29/2013	Mon - Fri Average	7 Day Average
12:00 AM	0	2	0	0	2	0	-	0.5	0.7
1:00 AM	0	0	1	0	2	2	-	0.3	0.8
2:00 AM	3	3	4	5	1	3	-	3.8	3.2
3:00 AM	7	6	6	6	1	1	-	6.3	4.5
4:00 AM	14	10	12	9	3	2	-	11.3	8.3
5:00 AM	26	28	25	31	10	3	-	27.5	20.5
6:00 AM	47	48	45	46	17	8	-	46.5	35.2
7:00 AM	32	28	35	27	31	12	-	30.5	27.5
8:00 AM	26	20	33	25	45	21	-	26.0	28.3
9:00 AM	29	27	23	25	40	20	-	26.0	27.3
10:00 AM	14	14	18	27	23	32	-	18.3	21.3
11:00 AM	16	21	28	24	28	23	-	22.3	23.3
12:00 PM	26	21	23	31	21	18	-	25.3	23.3
1:00 PM	23	26	32	29	22	23	-	27.5	25.8
2:00 PM	26	23	41	32	20	25	-	30.5	27.8
3:00 PM	24	20	25	31	25	19	-	25.0	24.0
4:00 PM	27	26	29	34	30	27	-	29.0	28.8
5:00 PM	46	29	28	34	24	25	-	34.3	31.0
6:00 PM	25	26	21	18	16	22	-	22.5	21.3
7:00 PM	19	14	10	15	14	18	-	14.5	15.0
8:00 PM	8	14	12	9	10	9	-	10.8	10.3
9:00 PM	5	4	3	5	8	6	-	4.3	5.2
10:00 PM	2	6	3	0	7	2	-	2.8	3.3
11:00 PM	1	1	2	5	3	2	-	2.3	2.3
Totals	446	417	459	468	403	323	0	447.5	419.3

Peak Hours

12:00 AM - 12:00 PM	6:00 AM	6:00 AM	6:00 AM	6:00 AM	8:00 AM	10:00 AM	-	6:00 AM	6:00 AM
Volume	47	48	45	46	45	32	-	46.5	35.2
12:00 PM - 12:00 AM	5:00 PM	5:00 PM	2:00 PM	4:00 PM	4:00 PM	4:00 PM	-	5:00 PM	5:00 PM
Volume	46	29	41	34	30	27	-	34.3	31.0

TRAFFIC COUNT SUMMARY
On M36 (Donna Reed Rd.) Approx. 1/4 Mile South of S. Main Loop
Counter #5

DAY	DATE	ADT NB	ADT SB	% TRUCKS NB	% TRUCKS SB
Tuesday	7/23/2013	536	499	4.0	22.4
Wednesday	7/24/2013	477	468	4.3	21.3
Thursday	7/25/2013	502	499	5.6	18.8
Friday	7/26/2013	549	513	5.3	21.2
Saturday	7/27/2013	487	437	4.9	21.0
Sunday	7/28/2013	388	344	3.2	14.9

AVERAGE # OF VEHICLES NB: 490

AVERAGE # OF VEHICLES SB: 460

ADT COMBINED: 950

AVERAGE % OF NB TRUCKS: 5%

AVERAGE % OF SB TRUCKS: 20%

AVERAGE % TRUCKS: 13%

P Ave
P Ave
Donna Reed Rd
S Main Loop
Counter #5
290th St
Q Ave
M36
280th St
Q Ave
R Ave
R Ave
bing
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Counter #5 : Just South of South Main Loop Site: Donna Reed Rd & South Main Loop

Seven Day Volume, per Channel

Northbound

Interval Start	Tue 7/23/2013	Wed 7/24/2013	Thu 7/25/2013	Fri 7/26/2013	Sat 7/27/2013	Sun 7/28/2013	Mon 7/29/2013	Mon - Fri Average	7 Day Average
12:00 AM	3	3	3	7	6	7	-	4.0	4.8
1:00 AM	2	2	2	3	9	5	-	2.3	3.8
2:00 AM	1	2	0	2	3	1	-	1.3	1.5
3:00 AM	1	1	2	2	2	0	-	1.5	1.3
4:00 AM	2	2	0	2	1	0	-	1.5	1.2
5:00 AM	4	3	4	6	3	0	-	4.3	3.3
6:00 AM	12	13	11	17	3	4	-	13.3	10.0
7:00 AM	21	17	16	18	12	7	-	18.0	15.2
8:00 AM	26	14	17	14	18	8	-	17.8	16.2
9:00 AM	19	19	18	19	22	11	-	18.8	18.0
10:00 AM	30	22	24	30	29	17	-	26.5	25.3
11:00 AM	32	26	26	22	35	33	-	26.5	29.0
12:00 PM	33	27	24	34	35	26	-	29.5	29.8
1:00 PM	26	31	32	34	39	36	-	30.8	33.0
2:00 PM	35	33	37	44	38	34	-	37.3	36.8
3:00 PM	44	40	43	50	24	28	-	44.3	38.2
4:00 PM	58	50	64	47	31	37	-	54.8	47.8
5:00 PM	50	50	43	62	25	33	-	51.3	43.8
6:00 PM	23	23	31	29	34	25	-	26.5	27.5
7:00 PM	20	28	30	24	16	8	-	25.5	21.0
8:00 PM	43	21	39	23	24	15	-	31.5	27.5
9:00 PM	26	18	23	21	27	14	-	22.0	21.5
10:00 PM	16	11	7	15	33	31	-	12.3	18.8
11:00 PM	9	21	6	24	18	8	-	15.0	14.3
Totals	536	477	502	549	487	388	0	516.0	489.8

Peak Hours

12:00 AM - 12:00 PM	11:00 AM	11:00 AM	11:00 AM	10:00 AM	11:00 AM	11:00 AM	-	10:00 AM	11:00 AM
Volume	32	26	26	30	35	33	-	26.5	29.0
12:00 PM - 12:00 AM	4:00 PM	4:00 PM	4:00 PM	5:00 PM	1:00 PM	4:00 PM	-	4:00 PM	4:00 PM
Volume	58	50	64	62	39	37	-	54.8	47.8

Counter #5 : Just South of South Main Loop Site: Donna Reed Rd & South Main Loop

Seven Day Volume, per Channel

Southbound

Interval Start	Tue 7/23/2013	Wed 7/24/2013	Thu 7/25/2013	Fri 7/26/2013	Sat 7/27/2013	Sun 7/28/2013	Mon 7/29/2013	Mon - Fri Average	7 Day Average
12:00 AM	2	1	1	2	5	3	-	1.5	2.3
1:00 AM	0	2	0	0	2	0	-	0.5	0.7
2:00 AM	0	0	1	0	2	2	-	0.3	0.8
3:00 AM	3	3	4	5	1	3	-	3.8	3.2
4:00 AM	9	8	8	8	1	1	-	8.3	5.8
5:00 AM	14	11	12	9	3	4	-	11.5	8.8
6:00 AM	27	34	27	33	13	3	-	30.3	22.8
7:00 AM	50	49	54	49	17	9	-	50.5	38.0
8:00 AM	38	31	32	24	34	13	-	31.3	28.7
9:00 AM	26	24	37	28	49	21	-	28.8	30.8
10:00 AM	37	32	27	26	42	20	-	30.5	30.7
11:00 AM	18	14	22	32	25	31	-	21.5	23.7
12:00 PM	23	24	29	28	31	24	-	26.0	26.5
1:00 PM	29	28	26	35	29	20	-	29.5	27.8
2:00 PM	27	28	35	35	23	22	-	31.3	28.3
3:00 PM	26	25	41	33	22	25	-	31.3	28.7
4:00 PM	21	25	30	34	28	21	-	27.5	26.5
5:00 PM	32	29	29	41	31	31	-	32.8	32.2
6:00 PM	49	33	31	36	25	27	-	37.3	33.5
7:00 PM	30	27	24	23	17	25	-	26.0	24.3
8:00 PM	20	14	10	17	12	19	-	15.3	15.3
9:00 PM	9	15	12	9	10	9	-	11.3	10.7
10:00 PM	6	4	3	5	8	9	-	4.5	5.8
11:00 PM	3	7	4	1	7	2	-	3.8	4.0
Totals	499	468	499	513	437	344	0	494.8	460.0

Peak Hours

12:00 AM - 12:00 PM	7:00 AM	7:00 AM	7:00 AM	7:00 AM	9:00 AM	11:00 AM	-	7:00 AM	7:00 AM
Volume	50	49	54	49	49	31	-	50.5	38.0
12:00 PM - 12:00 AM	6:00 PM	6:00 PM	3:00 PM	5:00 PM	12:00 PM	5:00 PM	-	6:00 PM	6:00 PM
Volume	49	33	41	41	31	31	-	37.3	33.5

TRAFFIC COUNT SUMMARY
On M36 (Donna Reed Rd.) Approx. 1/2 Mile So. Of O Ave. (Maple Ridge Dr.)
Counter #6

DAY	DATE	ADT NB	ADT SB	% TRUCKS NB	% TRUCKS SB
Tuesday	7/23/2013	763	710	4.7	29.8
Wednesday	7/24/2013	725	563	4.3	31.1
Thursday	7/25/2013	772	238	6.5	24.4
Friday	7/26/2013	901	859	4.5	25.0
Saturday	7/27/2013	768	705	3.8	25.1
Sunday	7/28/2013	616	572	2.8	19.5

AVERAGE # OF VEHICLES NB: 758

AVERAGE # OF VEHICLES SB: 608

ADT COMBINED: 1366

AVERAGE % OF NB TRUCKS: 4%

AVERAGE % OF SB TRUCKS: 26%

AVERAGE % TRUCKS: 15%

Donna Reed Dr
Donna Reed Rd
Maple Ridge Dr
E46
283rd St
12th Ave S
12th St S
Majestic Hills Golf Course
Counter #6
M36
Fair Ln
P Ave
bing
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Counter #6 : 1/2 Mile South of O Ave.(Maple Ridge Dr) Site: Donna Reed Rd So. of O Ave

Seven Day Volume, per Channel

Northbound

Interval Start	Tue 7/23/2013	Wed 7/24/2013	Thu 7/25/2013	Fri 7/26/2013	Sat 7/27/2013	Sun 7/28/2013	Mon 7/29/2013	Mon - Fri Average	7 Day Average
12:00 AM	5	5	4	7	6	15	-	5.3	7.0
1:00 AM	3	2	3	8	10	11	-	4.0	6.2
2:00 AM	1	2	1	3	6	5	-	1.8	3.0
3:00 AM	2	1	2	3	4	1	-	2.0	2.2
4:00 AM	3	2	0	2	1	1	-	1.8	1.5
5:00 AM	6	4	3	6	4	1	-	4.8	4.0
6:00 AM	12	17	15	19	4	5	-	15.8	12.0
7:00 AM	23	19	16	25	16	8	-	20.8	17.8
8:00 AM	30	19	21	24	31	18	-	23.5	23.8
9:00 AM	31	29	41	49	38	17	-	37.5	34.2
10:00 AM	41	46	61	38	59	32	-	46.5	46.2
11:00 AM	49	50	60	49	52	51	-	52.0	51.8
12:00 PM	47	47	53	50	57	42	-	49.3	49.3
1:00 PM	44	41	47	54	63	49	-	46.5	49.7
2:00 PM	50	52	55	66	59	44	-	55.8	54.3
3:00 PM	61	53	21	86	46	44	-	55.3	51.8
4:00 PM	82	78	92	82	44	59	-	83.5	72.8
5:00 PM	72	73	69	81	42	47	-	73.8	64.0
6:00 PM	39	36	49	64	58	40	-	47.0	47.7
7:00 PM	28	40	50	45	35	23	-	40.8	36.8
8:00 PM	62	36	56	37	40	24	-	47.8	42.5
9:00 PM	35	29	36	36	40	24	-	34.0	33.3
10:00 PM	24	20	11	31	32	39	-	21.5	26.2
11:00 PM	13	24	6	36	21	16	-	19.8	19.3
Totals	763	725	772	901	768	616	0	790.3	757.5

Peak Hours

12:00 AM - 12:00 PM	11:00 AM	11:00 AM	10:00 AM	9:00 AM	10:00 AM	11:00 AM	-	11:00 AM	11:00 AM
Volume	49	50	61	49	59	51	-	52.0	51.8
12:00 PM - 12:00 AM	4:00 PM	4:00 PM	4:00 PM	3:00 PM	1:00 PM	4:00 PM	-	4:00 PM	4:00 PM
Volume	82	78	92	86	63	59	-	83.5	72.8

Counter #6 : 1/2 Mile South of O Ave.(Maple Ridge Dr) Site: Donna Reed Rd So. of O Ave

Seven Day Volume, per Channel

Southbound

Interval Start	Tue 7/23/2013	Wed 7/24/2013	Thu 7/25/2013	Fri 7/26/2013	Sat 7/27/2013	Sun 7/28/2013	Mon 7/29/2013	Mon - Fri Average	7 Day Average
12:00 AM	4	2	0	2	5	7	-	2.0	3.3
1:00 AM	0	3	0	1	6	0	-	1.0	1.7
2:00 AM	0	0	0	1	2	5	-	0.3	1.3
3:00 AM	5	4	0	8	2	1	-	4.3	3.3
4:00 AM	9	10	0	8	5	1	-	6.8	5.5
5:00 AM	25	21	0	14	10	11	-	15.0	13.5
6:00 AM	39	44	0	49	20	6	-	33.0	26.3
7:00 AM	64	74	1	81	33	15	-	55.0	44.7
8:00 AM	58	53	0	47	54	33	-	39.5	40.8
9:00 AM	51	42	0	46	74	36	-	34.8	41.5
10:00 AM	44	47	0	48	58	42	-	34.8	39.8
11:00 AM	36	35	0	56	43	47	-	31.8	36.2
12:00 PM	35	38	0	56	47	42	-	32.3	36.3
1:00 PM	45	41	1	54	49	30	-	35.3	36.7
2:00 PM	42	37	0	53	28	29	-	33.0	31.5
3:00 PM	32	26	23	53	40	34	-	33.5	34.7
4:00 PM	32	38	46	48	35	37	-	41.0	39.3
5:00 PM	43	36	48	64	57	57	-	47.8	50.8
6:00 PM	58	8	36	59	40	43	-	40.3	40.7
7:00 PM	34	1	34	34	25	38	-	25.8	27.7
8:00 PM	24	0	16	31	24	27	-	17.8	20.3
9:00 PM	15	2	17	18	24	11	-	13.0	14.5
10:00 PM	10	1	12	14	14	15	-	9.3	11.0
11:00 PM	5	0	4	14	10	5	-	5.8	6.3
Totals	710	563	238	859	705	572	0	592.5	607.8

Peak Hours

12:00 AM - 12:00 PM	7:00 AM	7:00 AM	7:00 AM	7:00 AM	9:00 AM	11:00 AM	-	7:00 AM	7:00 AM
Volume	64	74	1	81	74	47	-	55.0	44.7
12:00 PM - 12:00 AM	6:00 PM	1:00 PM	5:00 PM	5:00 PM	5:00 PM	5:00 PM	-	5:00 PM	5:00 PM
Volume	58	41	48	64	57	57	-	47.8	50.8

TRAFFIC COUNT SUMMARY
On M36 (Donna Reed Rd.) just North of O Ave. (Maple Ridge Dr.)
Counter #7

DAY	DATE	ADT NB	ADT SB	% TRUCKS NB	% TRUCKS SB
Tuesday	7/23/2013	1156	1170	8.2	7.5
Wednesday	7/24/2013	1149	1171	7.5	8.5
Thursday	7/25/2013	1220	1247	5.8	6.2
Friday	7/26/2013	1441	1430	5.8	7.2
Saturday	7/27/2013	1199	1215	4.9	5.0
Sunday	7/28/2013	912	897	5	4.3

AVERAGE # OF VEHICLES NB: 1180

AVERAGE # OF VEHICLES SB: 1188

ADT COMBINED: 2368

AVERAGE % OF NB TRUCKS: 6%

AVERAGE % OF SB TRUCKS: 6%

AVERAGE % TRUCKS: 6%

Counter #7
4th Ave S
30
Opportunity Dr
2nd Ave S
20th St
S 24th St
S 25th St
S 26th St
27th St
Donna Reed Dr
Maple Ridge Dr
E46
Oak Brook Dr
O Ave
283rd St
12th Ave S
12th St S
Boulders Dr
Majestic Hills Golf Course
M36
Fair Ln
bing
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Counter #7 : Just North of Maple Ridge Dr. Site: Donna Reed Rd & Maple Ridge Dr

Seven Day Volume, per Channel

Northbound

Interval Start	Tue 7/23/2013	Wed 7/24/2013	Thu 7/25/2013	Fri 7/26/2013	Sat 7/27/2013	Sun 7/28/2013	Mon 7/29/2013	Mon - Fri Average	7 Day Average
12:00 AM	6	9	7	7	18	19	-	7.3	11.0
1:00 AM	5	3	5	12	8	16	-	6.3	8.2
2:00 AM	2	4	4	2	6	8	-	3.0	4.3
3:00 AM	2	4	3	3	4	2	-	3.0	3.0
4:00 AM	4	5	2	5	2	2	-	4.0	3.3
5:00 AM	9	8	4	10	4	1	-	7.8	6.0
6:00 AM	19	22	22	33	9	8	-	24.0	18.8
7:00 AM	47	38	32	47	27	14	-	41.0	34.2
8:00 AM	52	48	37	46	51	31	-	45.8	44.2
9:00 AM	57	49	64	63	67	60	-	58.3	60.0
10:00 AM	67	59	75	51	79	49	-	63.0	63.3
11:00 AM	71	84	96	88	77	61	-	84.8	79.5
12:00 PM	76	70	84	89	82	58	-	79.8	76.5
1:00 PM	58	66	73	88	81	69	-	71.3	72.5
2:00 PM	63	81	96	98	85	63	-	84.5	81.0
3:00 PM	70	72	89	100	86	62	-	82.8	79.8
4:00 PM	122	126	119	117	84	85	-	121.0	108.8
5:00 PM	121	122	107	118	144	63	-	117.0	112.5
6:00 PM	74	66	82	171	84	57	-	98.3	89.0
7:00 PM	51	64	68	89	54	41	-	68.0	61.2
8:00 PM	80	52	77	57	40	32	-	66.5	56.3
9:00 PM	46	40	45	61	43	37	-	48.0	45.3
10:00 PM	36	34	20	42	36	49	-	33.0	36.2
11:00 PM	18	23	9	44	28	25	-	23.5	24.5
Totals	1156	1149	1220	1441	1199	912	0	1241.5	1179.5

Peak Hours

12:00 AM - 12:00 PM	11:00 AM	11:00 AM	11:00 AM	11:00 AM	10:00 AM	11:00 AM	-	11:00 AM	11:00 AM
Volume	71	84	96	88	79	61	-	84.8	79.5
12:00 PM - 12:00 AM	4:00 PM	4:00 PM	4:00 PM	6:00 PM	5:00 PM	4:00 PM	-	4:00 PM	5:00 PM
Volume	122	126	119	171	144	85	-	121.0	112.5

Counter #7 : Just North of Maple Ridge Dr. Site: Donna Reed Rd & Maple Ridge Dr

Seven Day Volume, per Channel

Southbound

Interval Start	Tue 7/23/2013	Wed 7/24/2013	Thu 7/25/2013	Fri 7/26/2013	Sat 7/27/2013	Sun 7/28/2013	Mon 7/29/2013	Mon - Fri Average	7 Day Average
12:00 AM	6	9	5	2	21	10	-	5.5	8.8
1:00 AM	6	4	4	5	19	8	-	4.8	7.7
2:00 AM	1	1	6	3	5	6	-	2.8	3.7
3:00 AM	5	6	5	9	4	2	-	6.3	5.2
4:00 AM	17	14	13	15	7	2	-	14.8	11.3
5:00 AM	33	26	25	17	13	11	-	25.3	20.8
6:00 AM	54	61	58	63	28	10	-	59.0	45.7
7:00 AM	96	101	98	106	47	22	-	100.3	78.3
8:00 AM	72	85	78	63	72	54	-	74.5	70.7
9:00 AM	73	62	79	88	91	50	-	75.5	73.8
10:00 AM	72	61	75	67	84	63	-	68.8	70.3
11:00 AM	51	56	76	83	70	76	-	66.5	68.7
12:00 PM	60	67	84	99	93	52	-	77.5	75.8
1:00 PM	95	74	80	94	73	49	-	85.8	77.5
2:00 PM	66	61	93	84	58	51	-	76.0	68.8
3:00 PM	73	62	89	90	59	61	-	78.5	72.3
4:00 PM	63	61	69	79	81	71	-	68.0	70.7
5:00 PM	71	74	82	106	82	87	-	83.3	83.7
6:00 PM	110	73	58	90	63	62	-	82.8	76.0
7:00 PM	55	63	65	59	61	57	-	60.5	60.0
8:00 PM	40	72	49	60	61	46	-	55.3	54.7
9:00 PM	28	52	24	71	57	17	-	43.8	41.5
10:00 PM	15	15	25	50	35	24	-	26.3	27.3
11:00 PM	8	11	7	27	31	6	-	13.3	15.0
Totals	1170	1171	1247	1430	1215	897	0	1254.5	1188.3

Peak Hours

12:00 AM - 12:00 PM	7:00 AM	7:00 AM	7:00 AM	7:00 AM	9:00 AM	11:00 AM	-	7:00 AM	7:00 AM
Volume	96	101	98	106	91	76	-	100.3	78.3
12:00 PM - 12:00 AM	6:00 PM	1:00 PM	2:00 PM	5:00 PM	12:00 PM	5:00 PM	-	1:00 PM	5:00 PM
Volume	110	74	93	106	93	87	-	85.8	83.7

SECTION L

Rev. 5/14

Road Segment Benefit / Cost Safety Analysis

Iowa DOT Office of Traffic & Safety

County: Crawford Prepared by: Paul J. Assman Date Prepared: Aug 6, 2015

Location: Donna Reed Rd(Co. Rd. M36) From US Hwy 30 to Co. Rd E53

Improvement

Proposed Improvement(s): 3' HMA Base Widening in conjunction with a 4" HMA overlay including milled rumble strips, increased lane width, increased width of edge line and safety edge

$ 699,333	Estimated Improvement Cost, **EC**	20	Est. Improvement Life, years, **Y**
$ -	Other Annual Cost (after initial year), **AC**	74	Crash Reduction Factor (integer), **CRF**
$ -	Present Value Other Annual Costs, **OC**	4.0%	Discount Rate, **INT**
	$$OC = \frac{AC}{INT}\left(1 - \frac{1}{(1+INT)^Y}\right)$$	**$ 699,333**	Present Value All Costs, **COST** = EC + OC

Traffic Volume Data

Source: Iowa DOT traffic count 2012 Date of traffic count

Length (mi.)	Two-way veh/day	Description
4.75	980	
4.75	miles total	

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

4,655	Current Vehicle Miles / Day, **VM**
5,680	End of Life Veh. Miles / Day
1,699,075	Current Veh. Miles / Year, **AM**
37,411,939	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 --> 2015 Last full year 6.0 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	$ -
11	Injury Crashes →	4	Minor Injuries @	$65,000	$ 260,000
		7	Possible Injuries @	$35,000	$ 245,000
17	Property Damage Only		(assumed cost per crash)	$7,400	$ 207,200
			-OR- enter all Property Costs of all crashes:		
28	Total Crashes, **TA**			Total $ Loss, **LOSS**	$ 712,200

4.67	Current Crashes / Year, **AA** = TA / T	**274.7**	Crashes / HMVM, Crash Rate, **CR** CR = TA x 10^8 / (AM x T)
$ 25,436	Cost per Crash, **AVCR** = LOSS / TA	**$ 1,304,092**	Present Value of Avoided Crashes, **BENEFIT**
102.8	Total Expected Crashes, **TCR** = CR x TVMT/10^8		
3.47	Crashes Avoided First Year **AAR** = AA x CRF / 100		
$ 88,289	Crash Costs Avoided in First Year, AAR x AVCR		
76.4	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 = $1,304,092 : $699,333 = **1.86** : 1

Approximate Improvement Service Life

Spot Location Improvements

Improvement	Service Life (years)
INTERSECTIONS	
Roundabout	20
Add Signals	15
Upgrade Signals	15
Channelize / Add Turning Lanes	15
Improve Sight Distance	15
Upgrade Signs / Markings	6 / 2
New Signs / Markings (None previously)	6 / 2
Illuminate	15
Add Accel / Decel Lane	20
Rumble Strips (Applies only to accidents involving stop)	A.C. - 5 P.C. - 10
Reconstruct Approach Angle	20
Add Beacons	10
CURVES	
Vertical Realignment	20
Horizontal Realignment	20
Horizontal / Vertical Realignment / Correct Superelevation	20
Pavement Markings / Delineate	2 / 6
BRIDGES	
Widen	20
Guardrail	15
Impact Attenuator	10
Replace	50
Eliminate	50
CULVERTS	
Lengthen	20
Guardrail or Grate	15
Remove Headwall & Delineate (outside shoulder line)	20
HIGH FILLS	
Guardrail	10
Delineate	6
Flatten Foreslopes	20

Spot Location Improvements

Improvement	Service Life (years)
RAILROAD CROSSINGS	
Add Signals	10
Upgrade Warning Devices	10
Illuminate	15
Replace with Grade Separation	50
Eliminate	50

Road Segment Improvements

Improvement	Service Life (years)
Add Lanes	20
Widen Pavement	20
Widen Shoulder	20
Widen Pavement / Shoulder	20
Flatten Foreslopes	20
Widen Shoulder / Flatten Foreslope	20
FRICTION IMPROVEMENT	
Overlay	10
P.C. Grooving, Diamond Profiling, Texturing	10
Signing	6
Edgeline Markings	2
Horizontal Realignment	20
Vertical Realignment	20
Horizontal / Vertical Realignment / Correct Superelevation	20
Roadway Lighting	15
Relocate Driveways	20
Flatten Enterance Slopes	20
Right of Way	100

Iowa DOT Office of Traffic & Safety, July 2009

B/C ANALYSIS INSTRUCTIONS

revised 5/2015
Office of Traffic & Safety, Iowa DOT

Document all values and assumptions and include with application.

Use either the "Road Segment" or "Intersections" worksheet and only enter values in the YELLOW cells.

Crash Reduction Factors
Crash Reduction Factors should be obtained from the "Crash Modification Factors Clearinghouse."

http://www.cmfclearinghouse.org/

Be sure to use the CRF (**not the CMF**) in these spreadsheets. A CRF of 10 means a 10% reduction in crashes is expected with that improvement.

Start with a conservative (low) CRF value. If your benefit/cost ratio is greater than 1.8 you are finished. If the benefit/cost ratio is lower, try less conservative values of CRF. You will have to decide how realistic the CRF is for your particular location and situation.

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:	37	24.28	37.7	5	9.26
Cummulative CRF =	74.38103				

If the improvements have different service lives, the shortest value must be used.

Yearly Worksheet
The "Yearly" worksheet is not part of the analysis, but can be used to check and better understand the results.

Discount Rate
The discount rate of 4% excludes inflation and comes from the St. Louis Federal Reserve Bank. It should not be changed without proper justification and documentation.

August 2009 - Changed Property Cost calculations to include ALL crashes, rather than just PDO crashes.

April 2010 - Changed source for Crash Reduction Factors from Desktop Reference to CMF Clearinghouse web site.

July 2010 - Removed shadows from arrows on B/C sheets.

CRASH MODIFICATION FACTORS CLEARINGHOUSE

CMF / CRF Details

CMF ID: 2831

Install paved shoulder and rumble strips

Description: Pave shoulders and install rumble strips

Prior Condition: *No Prior Condition(s)*

Category: Shoulder treatments

Study: *Benefit-Cost Analysis of In-Vehicle Technologies and Infrastructure Modifications as a Means to Prevent Crashes Along Curves and Shoulders*, Pitale et al., 2009

Star Quality Rating: ★★☆☆☆ [View score details]

Crash Modification Factor (CMF)

Value: 0.63

Adjusted Standard Error:

Unadjusted Standard Error:

Crash Reduction Factor (CRF)

Value: 37 *(This value indicates a **decrease** in crashes)*

Adjusted Standard Error:

Unadjusted Standard Error:

Applicability

Crash Type: All

Crash Severity: All

Roadway Types: Principal Arterial Other

Number of Lanes: 2

Road Division Type:

Speed Limit:

CRASH MODIFICATION FACTORS CLEARINGHOUSE

CMF / CRF Details

CMF ID: 4328

Installation of safety edge treatment

Description: The safety edge is a low-cost treatment that is implemented in conjunction with pavement resurfacing and is intended to help minimize drop-off-related crashes.

Prior Condition: Rural highways prior to resurfacing and installation of safety edge treatment

Category: Shoulder treatments

Study: *Safety Evaluation of the Safety Edge Treatment*, Graham et al., 2011

Star Quality Rating: ★★★★☆ [View score details]

Crash Modification Factor (CMF)

Value: 0.757

Adjusted Standard Error:

Unadjusted Standard Error: 0.101

Crash Reduction Factor (CRF)

Value: 24.281 *(This value indicates a **decrease** in crashes)*

Adjusted Standard Error:

Unadjusted Standard Error: 10.078

Applicability

Crash Type: All

Crash Severity: Property damage only (PDO)

Roadway Types: Principal Arterial Other

Number of Lanes: 2

Road Division Type:

Speed Limit:

CRASH MODIFICATION FACTORS CLEARINGHOUSE

CMF / CRF Details

CMF ID: 4751

Install wider edgelines (4 in to 5 in)

Description: Widen edgelines from 4 inches to 5 inches

Prior Condition: Compares 4 in to 5 in wide edgelines

Category: Delineation

Study: *Safety effects of wider edge lines on rural, two-lane highways*, Park et al., 2012

Star Quality Rating: ★★★☆☆ [View score details]

Crash Modification Factor (CMF)

Value: 0.623

Adjusted Standard Error:

Unadjusted Standard Error: 0.061

Crash Reduction Factor (CRF)

Value: 37.7 *(This value indicates a **decrease** in crashes)*

Adjusted Standard Error:

Unadjusted Standard Error: 6.1

Applicability

Crash Type: All

Crash Severity: Fatal,Serious injury,Minor injury

Roadway Types: Not specified

Number of Lanes: 2

Road Division Type:

Speed Limit:

Area Type: Rural

CRASH MODIFICATION FACTORS CLEARINGHOUSE

Study Details

Study Title: Safety Evaluation of Multilane Arterials in Florida

Authors: Abdel-Aty et al.

Publication Date: JUL, 2009

Abstract: Resurfacing is one of the more common construction activities on highways. While its effect on riding quality on any type of roadway is obviously positive; its impact on safety as measured in terms of crashes is far from obvious. This study examines the safety effects of the resurfacing projects on multilane arterials with partially limited access. Empirical Bayes method, which is one of the most accepted approaches for conducting before–after evaluations, has been used to assess the safety effects of the resurfacing projects. Safety effects are estimated not only in terms of all crashes but also rear-end as well as severe crashes (crashes involving incapacitating and fatal injuries). The safety performance functions (SPFs) used in this study are negative binomial crash frequency estimation models that use the information on ADT, length of the segments, speed limit and number of lanes. These SPFs are segregated by crash groups (all, rear-end, and severe), length of the segments being evaluated, and land use (urban, suburban, and rural). The results of the analysis show that the resulting changes in safety following resurfacing projects vary widely. Evaluating additional improvements carried out with resurfacing activities showed that all (other than sidewalk improvements for total crashes) of them consistently led to improvements in safety of multilane arterial sections. It leads to the inference that it may be a good idea to take up additional improvements if it is cost effective to do them along with resurfacing. It was also found that the addition of turning lanes (left and/or right) and paving shoulders were two improvements associated with a project's relative performance in terms of reduction in rear-end crashes.

Study Citation: Abdel-Aty, M., Devarasetty, P. C., and Pande, A., "Safety Evaluation of Multilane Arterials in Florida." Accident Analysis and Prevention, Vol. 41, No. 4, Elsevier, (2009) pp. 777-788.

CMFs Associated With This Study

Category: Roadway

Countermeasure: Resurface pavement

CMF	CRF(%)	Quality	Crash Type	Crash Severity	Roadway Type	Area Type
1.01	-1	★★★★☆	All	All	Not Specified	
0.95	5	★★★★☆	All	Fatal,Serious injury	Not Specified	
0.99	1	★★★★☆	Rear end	All	Not Specified	

This site is funded by the U.S. Department of Transportation Federal Highway Administration and maintained by the University of North Carolina Highway Safety Research Center

The information contained in the Crash Modification Factors (CMF) Clearinghouse is disseminated under the sponsorship of the U.S. Department of Transportation in the interest of information exchange. The U.S. Government assumes no liability for the use of the information contained in the CMF Clearinghouse. The information contained in the CMF Clearinghouse does not constitute a standard, specification, or regulation, nor is it a substitute for sound engineering judgment.

CRASH MODIFICATION FACTORS CLEARINGHOUSE

CMF / CRF Details

CMF ID: 4811

Change lane width from X to Y (in feet)

Description: Change lane width on rural two-lane highways from X to Y (in feet)

Prior Condition: Rural two-lane highway with lane width X (in feet)

Category: Roadway

Study: *Efficacies of roadway safety improvements across functional subclasses of rural two-lane highways*, Labi, 2011

Star Quality Rating: ★★☆☆☆ [View score details]

Crash Modification Factor (CMF)

Value: $CMF = e^{(-0.0972(Y-X))}$

$Y = 11$

$X = 10$

Adjusted Standard Error:

Unadjusted Standard Error:

Crash Reduction Factor (CRF)

Value: $CRF = 100 \times \left(1 - e^{(-0.0972(Y-X))}\right)$

Adjusted Standard Error:

CRF = 9.26

Unadjusted Standard Error:

Applicability

Crash Type:	All
Crash Severity:	Serious injury,Minor injury
Roadway Types:	Minor Arterial
Number of Lanes:	2

Application for TRAFFIC SAFETY FUNDS

GENERAL INFORMATION **DATE:** August 10, 2015

Location / Title of Project C-60 Reconstruction - From C-66 West 3.25 Mi.

Applicant Plymouth County

Contact Person Thomas Rohe Title County Engineer

Complete Mailing Address P.O. Box 1227
Le Mars, Iowa 51031

Phone 712-546-4559 (Area Code) E-Mail trohe@co.plymouth.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) NA

Contact Person Thomas Rohe Title County Engineer

Complete Mailing Address P.O. Box 1227
Le Mars, Iowa 51031

Phone 712-546-4559 (Area Code) E-Mail trohe@co.plymouth.ia.us

PLEASE COMPLETE THE FOLLOWING PROJECT INFORMATION:

Application Type

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

Funding Amount

Total Project Cost $ 1,740,000

Safety Funds Requested $ 500,000

Rev. 5/15

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 Plymouth County Board of Supervisors

Signed: Jim Henrich 8-11-15

Signature Date Signed

Jim Henrich

Typed Name

Attest: Stacey Feldman 8-11-15

Signature Date Signed

Stacey Feldman

Typed Name

B. Narrative

C-60 From NW Cor NE1/4 NE1/4 Sec 7-90-44 east 3.25 miles to the NE Cor Sec 10-90-44

This section of roadway was graded in 1950 with a 28 ft. top width and 1 1/2:1 foreslopes. The road was paved in 1952 with a 22 ft. wide asphalt emulsion base and was resurfaced in 1960, 1974, and 1988. The grade line of this road essentially follows the existing topography but in some places will only meet a 35-40 mph design standard for vertical curve lengths. There is also a large deflection at the west end of the project where C-60 intersects with K-64. The deflection at this intersection is just under 3 degrees and with the vertical alignment results in cars going off the edge of the roadway. Chevron signs have been placed in order to alert motorists of the change in direction. The enclosed photo shows this situation.

Many of the accidents along this roadway result in rollovers because of the narrow shoulders and steep foreslopes. It is very difficult to redirect a vehicle back onto the roadway once leaving the pavement surface. The shoulder width along the roadway is 2 ½ to 3 ft. The enclosed photo's should show typical shoulder areas.

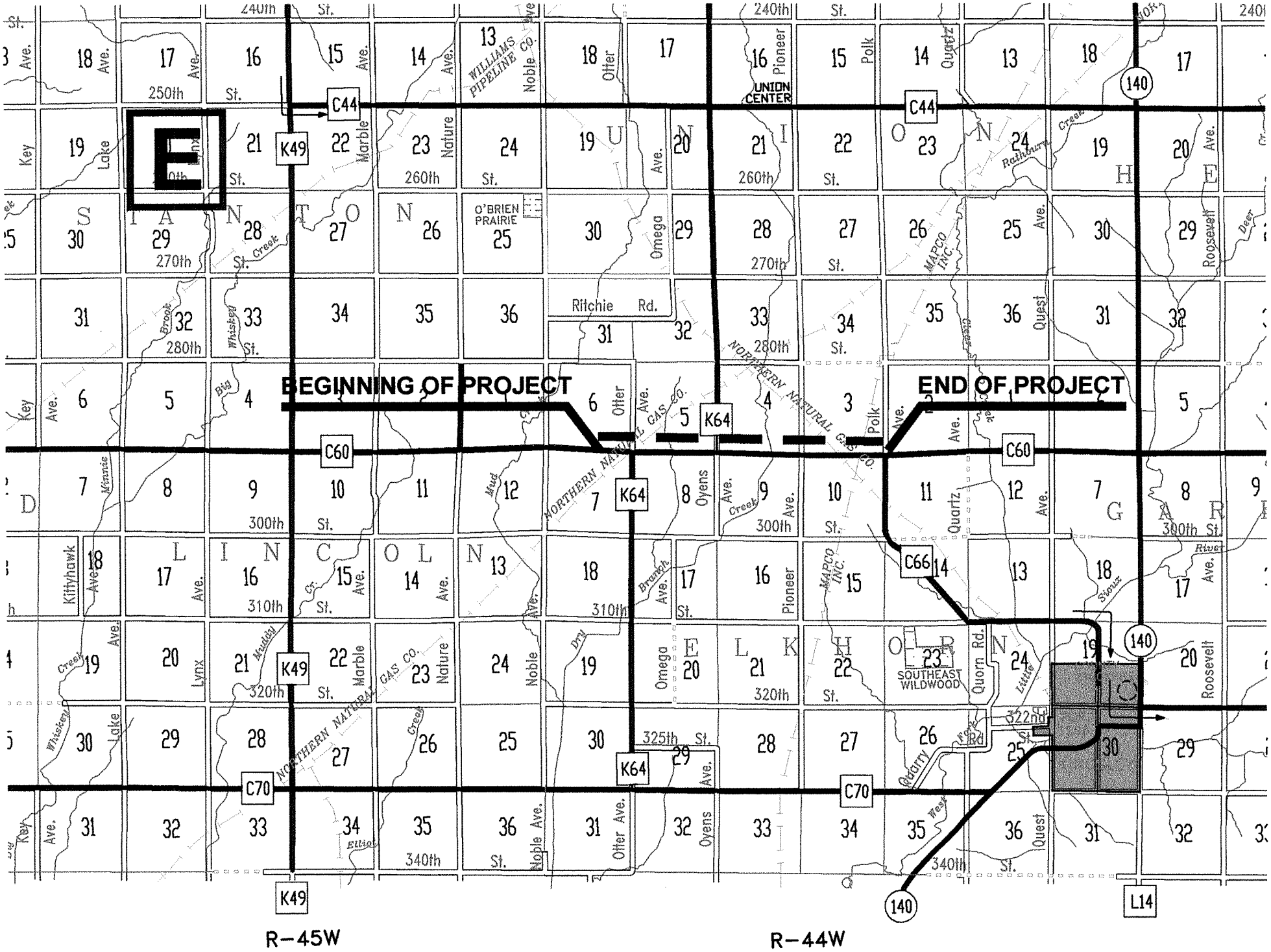
The proposed project will reconstruct this roadway in 2016 to meet current design standards. The shoulder width will be widened to 8 ft. and the foreslopes will be constructed to 3:1 which would allow any vehicles leaving the roadway to stay upright and not overturn. The vertical curves will be constructed to a 55 mph design standard to allow adequate sight distance for proper turning and passing maneuvers. The intersection at the west end of the project will be reconstructed with a longer horizontal and vertical curve, correcting the accident prone situation we currently have. We anticipate that approximately one half of this project will be shoulder grading/widening work while the other half will be complete reconstruction.

C. Cost

The cost of this project is estimated at $ 1,740,000. This will include all necessary work to bring the shoulders, foreslopes and gradeline up to current design standards. This estimate is only for the reconstruction and does not include the repaving of the roadway. We do not at this time have our preliminary design completed in order to give a detailed breakdown of quantities. The amount of traffic safety funds we are requesting is $500,000. This project will be paved in 2017 under a separate contract.

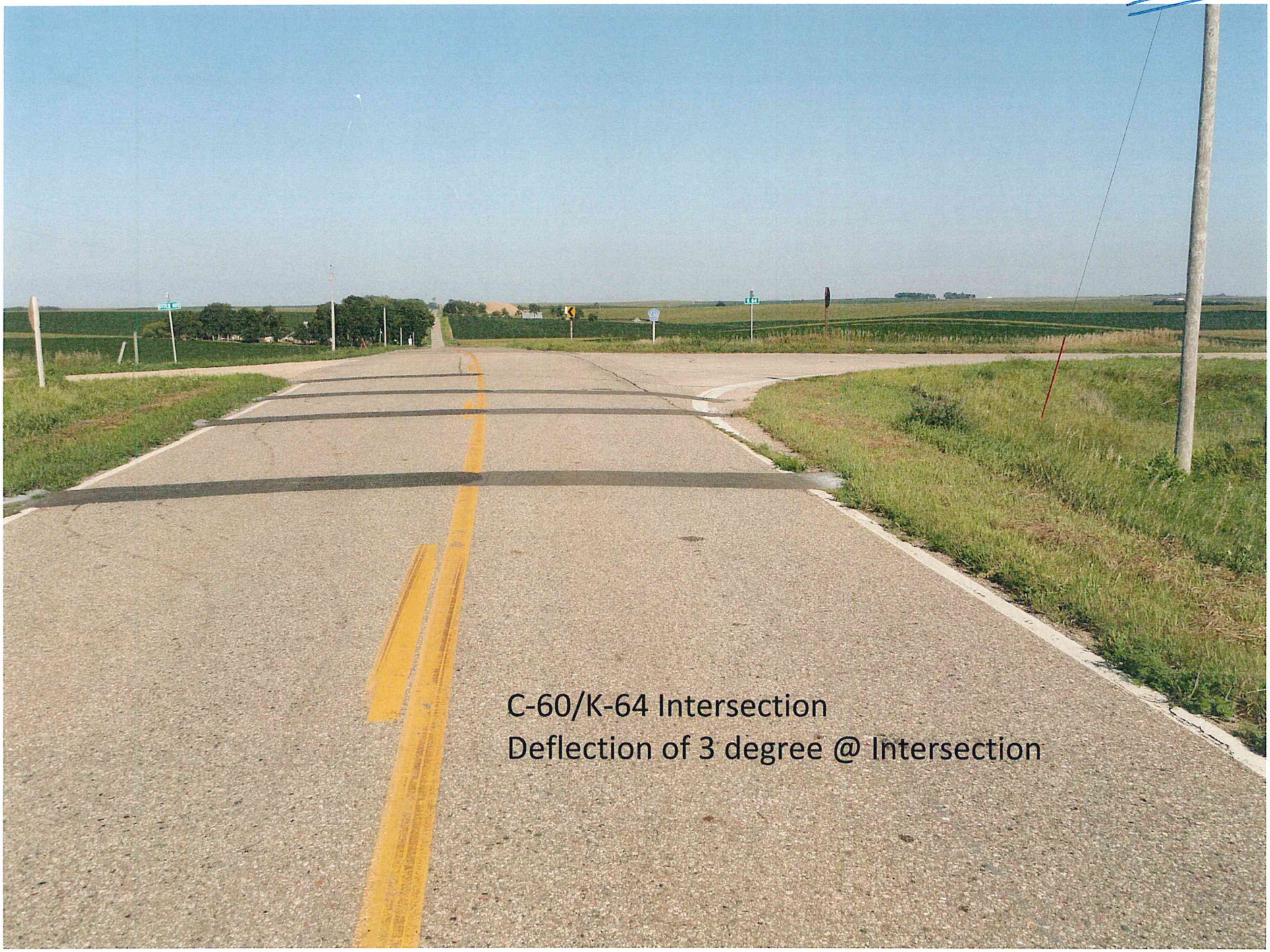
D. Time Schedule

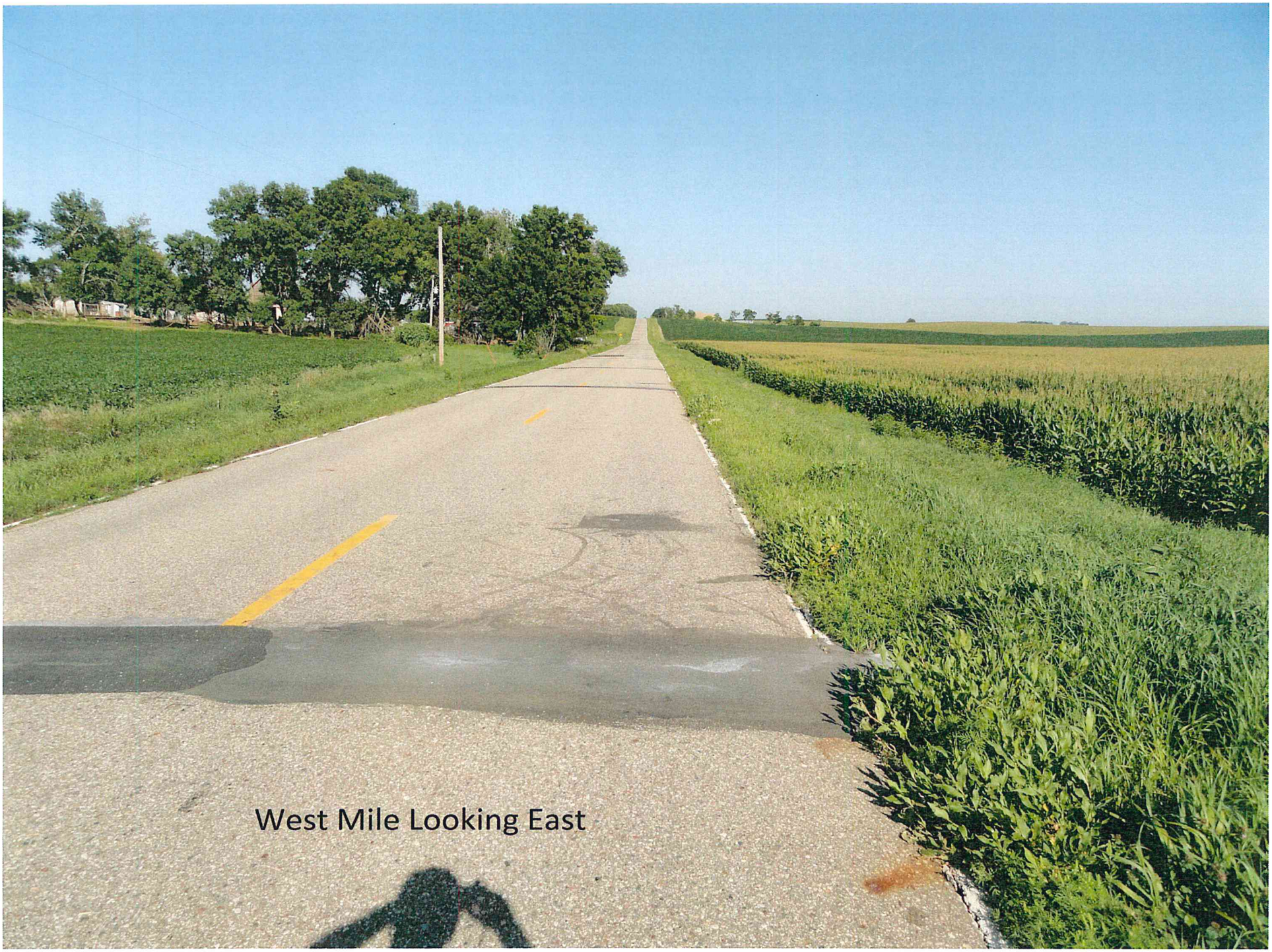
This project is scheduled for the 2016 construction season. Preliminary survey work has been completed. Design work began in the fall of 2014 and will be completed by fall of 2015. Right of Way purchase will begin in the late fall/winter months of 2015.


BEGINNING OF PROJECT
END OF PROJECT
C44
K49
C60
K64
C66
C70
140
L14
UNION CENTER
O'BRIEN PRAIRIE
SOUTHEAST WILDWOOD
WILLIAMS PIPELINE CO.
NORTHERN NATURAL GAS CO.
MAPCO INC.
Ritchie Rd.
Quorn Rd.
Gdarry Rd.
250th St.
260th St.
270th St.
280th St.
300th St.
310th St.
320th St.
322nd St.
325th St.
340th St.
Pioneer Ave.
Polk Ave.
Quartz Ave.
Quest Ave.
Roosevelt Ave.
Otter Ave.
Omega Ave.
Oyens Ave.
Noble Ave.
Nature Ave.
Marble Ave.
Lake Ave.
Lynx Ave.
Key Ave.
Kittyhawk Ave.
Minnie Ave.
Big Creek
Whiskey Creek
Muddy Creek
Mud Creek
Dry Creek
Brooke Ave.
Rathburn Creek
Deer Creek
Little Sioux River
West Fork
Elliot
S I A N T O N
L I N C O L N
E L K H O R N
O N E H E A D
R-45W
R-44W

H
BEGIN PROJECT
OTTER AVE.
OYENS AVE.
K-64
PIONEER AVE.
END PROJECT
POLK AVE.
C-66

F




West Mile Looking East

East View--2 1/2 - 3 feet of shoulder

End of Culvert 2 1/2 feet from Edge of Road

Center Mile--East View--Showing 1 1/2 :1 F.S. and 2 1/2 - 3 foot shoulder

East View--2 1/2 Feet schoulder

East View--East Mile

East View of shoulder

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Iowa Department of Transportation

Crash Detail Report

CMAT Version 3.4.0

Report Version 1.3 Aug 2008

2009497860 02/14/2009 11:25
County: 75 **City:**

C060 / C60 measuring 0.1 Miles East from C060 / C60 and OTTER AVE and K064 / OTTER AVE

Major Cause: Ran off road - right
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: $11250
Number of Vehicles: 1

	Unit 1	Unit 2	Unit 3
Init Trav Dir:	East	0	0
Veh Action:	Essentially straight	0	0
Configuration:	2-axle 6-tire truck	0	0
Driver Age:	33	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:	Pole: utility/light/etc	0	0

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Iowa Department of Transportation

Crash Detail Report

CMAT Version 3.4.0

Report Version 1.3 Aug 2006

2006229082 07/06/2006 08:06 C060 / C60
County: 75 **City:**

Major Cause: Ran off road - right
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: Daylight
Weather Conditions: Clear
Drug/Alc Involved: none indicated
Property Damage: $9050

Number of Vehicles: 1

	Unit 1	Unit 2	Unit 3
Init Trav Dir:	East	0	0
Veh Action:	Essentially straight	0	0
Configuration:	Passenger car	0	0
Driver Age:	20	0	0
Driver Gender:	M		
Driver Cond:	Normal	0	0
Drivr Contr 1:	unknown	0	0
Drivr Contr 2:	not reported	0	0
Fixed Object:	Ditch/embankment	0	0

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Iowa Department of Transportation

Crash Detail Report

CMAT Version 3.4.0

Report Version 1.3 Aug 2005

2007378439 06/12/2007 13:55 C060 / C60
County: 75 **City:**

Major Cause: Ran off road - right
Roadway Type: Non-intersection: No special feature

Severity: Major
Manner of Crash: Non-collision
Fatalities: 0
Surface Conditions: Dry
Major Injuries: 1
Light Conditions: Daylight
Minor Injuries: 0
Weather Conditions: Partly cloudy
Possible Injuries: 0
Drug/Alc Involved: none indicated
Unknown Injuries: 0
Property Damage: $75100
Number of Vehicles: 1

	Unit 1	Unit 2	Unit 3
Init Trav Dir:	West	0	0
Veh Action:	Essentially straight	0	0
Configuration:	Truck/trailer	0	0
Driver Age:	27	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

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Iowa Department of Transportation

Crash Detail Report

CMAT Version 3.4.0

Report Version 1.3 Aug 2006

2011632376 05/23/2011 22:30 1/2 WEST OF OYENS AVE ON C60
County: 75 **City:**

Major Cause: Animal
Roadway Type: Not reported

Severity:	PDO	**Manner of Crash:**	not reported
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:**	$2000

Number of Vehicles: 1

	Unit 1	Unit 2	Unit 3
Init Trav Dir:	not reported	0	0
Veh Action:	not reported	0	0
Configuration:	Passenger car	0	0
Driver Age:	19	0	0
Driver Gender:	M		
Driver Cond:	not reported	0	0
Drivr Contr 1:	unknown	0	0
Drivr Contr 2:	not reported	0	0
Fixed Object:	none	0	0

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Iowa Department of Transportation

Crash Detail Report

CMAT Version 3.4.0

Report Version 1.3 Aug 2006

2011613704 01/24/2011 05:30
County: 75 **City:**

C060 / C60 measuring 0.3 Miles East from K064 / OYENS AVE and C060 / C60 and OYENS AVE

Major Cause: Ran off road - right

Roadway Type: Non-intersection: No special feature

Severity: PDO

Manner of Crash: Non-collision

Fatalities: 0

Surface Conditions: Snow

Major Injuries: 0

Light Conditions: Dark - roadway not lighted

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:	West	0	0
Veh Action:	Essentially straight	0	0
Configuration:	Passenger car	0	0
Driver Age:	42	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

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Iowa Department of Transportation

Crash Detail Report

CMAT Version 3.4.0

Report Version 1.3 Aug 2006

2006215102 04/11/2006 19:00
County: 75 **City:**

C060 / C60 AND DRY BRANCH MEASURING 0.67 MILES EAST FROM OYENS AVE AND K064 / OYENS AVE AND C060 / C60

Major Cause: Ran off road - left

Roadway Type: Non-intersection: Bridge/overpass/underpass

Severity: Poss/Unk
Manner of Crash: Non-collision
Fatalities: 0
Surface Conditions: Dry
Major Injuries: 0
Light Conditions: Dusk
Minor Injuries: 0
Weather Conditions: unknown
Possible Injuries: 0
Drug/Alc Involved: none indicated
Unknown Injuries: 1
Property Damage: $3500
Number of Vehicles: 1

	Unit 1	Unit 2	Unit 3
Init Trav Dir:	East	0	0
Veh Action:	Essentially straight	0	0
Configuration:	4-tire light truck	0	0
Driver Age:	53	0	0
Driver Gender:	F		
Driver Cond:	Asleep/fatigued/etc.	0	0
Drivr Contr 1:	Lost control	0	0
Drivr Contr 2:	Fatigued/Asleep	0	0
Fixed Object:	Bridge/bridge	0	0

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Iowa Department of Transportation

Crash Detail Report

CMAT Version 3.4.0

Report Version 1.3 Aug 2006

2004261108 12/16/2004 10:00
County: 75 **City:**

C060 / C60 MEASURING 0.7 MILES EAST FROM K064 / OYENS AVE AND C060 / C60 AND OYENS AVE

Major Cause: Ran off road - right

Roadway Type: Non-intersection: No special feature

Severity: Poss/Unk

Manner of Crash: Non-collision

Fatalities: 0

Surface Conditions: Ice

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: $5000

Number of Vehicles: 1

	Unit 1	Unit 2	Unit 3
Init Trav Dir:	West	0	0
Veh Action:	Essentially straight	0	0
Configuration:	Passenger car	0	0
Driver Age:	83	0	0
Driver Gender:	F		
Driver Cond:	Normal	0	0
Drivr Contr 1:	Lost control	0	0
Drivr Contr 2:	not reported	0	0
Fixed Object:	none	0	0

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Iowa Department of Transportation

Crash Detail Report

CMAT Version 3.4.0

Report Version 1.3 Aug 2006

2006215102 04/11/2006 19:00
County: 75 **City:**

C060 / C60 AND DRY BRANCH MEASURING 0.67 MILES EAST FROM OYENS AVE AND K064 / OYENS AVE AND C060 / C60

Major Cause: Ran off road - left

Roadway Type: Non-intersection: Bridge/overpass/underpass

Severity: Poss/Unk **Manner of Crash:** Non-collision

Fatalities: 0 **Surface Conditions:** Dry

Major Injuries: 0 **Light Conditions:** Dusk

Minor Injuries: 0 **Weather Conditions:** unknown

Possible Injuries: 0 **Drug/Alc Involved:** none indicated

Unknown Injuries: 1 **Property Damage:** $3500 **Number of Vehicles:** 1

	Unit 1	Unit 2	Unit 3
Init Trav Dir:	East	0	0
Veh Action:	Essentially straight	0	0
Configuration:	4-tire light truck	0	0
Driver Age:	53	0	0
Driver Gender:	F		
Driver Cond:	Asleep/fatigued/etc.	0	0
Drivr Contr 1:	Lost control	0	0
Drivr Contr 2:	Fatigued/Asleep	0	0
Fixed Object:	Bridge/bridge	0	0

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Iowa Department of Transportation

Crash Detail Report

CMAT Version 3.4.0

Report Version 1.3 Aug 2005

2004261108 12/16/2004 10:00
County: 75 **City:**

C060 / C60 MEASURING 0.7 MILES EAST FROM K064 / OYENS AVE AND C060 / C60 AND OYENS AVE

Major Cause: Ran off road - right

Roadway Type: Non-intersection: No special feature

Severity: Poss/Unk

Manner of Crash: Non-collision

Fatalities: 0

Surface Conditions: Ice

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: $5000

Number of Vehicles: 1

	Unit 1	Unit 2	Unit 3
Init Trav Dir:	West	0	0
Veh Action:	Essentially straight	0	0
Configuration:	Passenger car	0	0
Driver Age:	83	0	0
Driver Gender:	F		
Driver Cond:	Normal	0	0
Drivr Contr 1:	Lost control	0	0
Drivr Contr 2:	not reported	0	0
Fixed Object:	none	0	0

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Iowa Department of Transportation

Crash Detail Report

CMAT Version 3.4.0

Report Version 1.3 Aug 2005

2012702108 09/08/2012 07:17 C060/C60 MEASURING 681 FEET EAST FROM C060/C60 AND PIONEER AVE
County: 75 **City:** Kingsley

Major Cause: Swerving/evasive 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:**	$8300

Number of Vehicles: 1

	Unit 1	Unit 2	Unit 3
Init Trav Dir:	East	0	0
Veh Action:	Essentially straight	0	0
Configuration:	Passenger car	0	0
Driver Age:	27	0	0
Driver Gender:	F		
Driver Cond:	Normal	0	0
Drivr Contr 1:	Lost control	0	0
Drivr Contr 2:	Other improper action	0	0
Fixed Object:	none	0	0

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Iowa Department of Transportation

Crash Detail Report

CMAT Version 3.4.0

Report Version 1.3 Aug 2005

2012695667 07/23/2012 16:00
County: 75 **City:**

C060/C60 MEASURING 2114 FEET EAST FROM PIONEER AVE AND C060/C60

Major Cause: Ran off road - right

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: $4200
Number of Vehicles: 1

	Unit 1	Unit 2	Unit 3
Init Trav Dir:	East	0	0
Veh Action:	Essentially straight	0	0
Configuration:	4-tire light truck	0	0
Driver Age:	65	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:	Pole: utility/light/etc	0	0

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Iowa Department of Transportation

Crash Detail Report

CMAT Version 3.4.0

Report Version 1.3 Aug 2006

2009517472 07/25/2009 12:30 C060 / C60
County: 75 **City:**

Major Cause: Ran off road - right
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: Daylight
Weather Conditions: Partly cloudy
Drug/Alc Involved: none indicated
Property Damage: $2000

Number of Vehicles: 1

	Unit 1	Unit 2	Unit 3
Init Trav Dir:	East	0	0
Veh Action:	Essentially straight	0	0
Configuration:	Tractor/semi-trailer	0	0
Driver Age:	40	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

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Iowa Department of Transportation

Crash Detail Report

CMAT Version 3.4.0

Report Version 1.3 Aug 2008

2012671139 02/06/2012 01:38
County: 75 **City:**

C060 / C60 measuring 0.33 Miles West from Off Roadway/Roadway Not Found

Major Cause: Ran off road - right
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 not lighted
Weather Conditions: Fog/smoke
Drug/Alc Involved: Alcohol: Statutory
Property Damage: $3000

Number of Vehicles: 1

	Unit 1	Unit 2	Unit 3
Init Trav Dir:	East	0	0
Veh Action:	Essentially straight	0	0
Configuration:	Passenger car	0	0
Driver Age:	18	0	0
Driver Gender:	M		
Driver Cond:	Infl by alc/drugs/meds	0	0
Drivr Contr 1:	Lost control	0	0
Drivr Contr 2:	not reported	0	0
Fixed Object:	Culvert	0	0

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Iowa Department of Transportation

Crash Detail Report

CMAT Version 3.4.0

Report Version 1.3 Aug 2008

2009489269 01/17/2009 14:55
County: 75 **City:**

C060 / C60 measuring 0.1 Miles West from C066 / POLK AVE and C60 and C060 / C60 and POLK AVE

Major Cause: Ran off road - right

Roadway Type: Non-intersection: No special feature

Severity: PDO
Manner of Crash: Non-collision
Fatalities: 0
Surface Conditions: Snow
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: $2500
Number of Vehicles: 1

	Unit 1	Unit 2	Unit 3
Init Trav Dir:	West	0	0
Veh Action:	Essentially straight	0	0
Configuration:	Van or mini-van	0	0
Driver Age:	18	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

(15)

Iowa Department of Transportation

Crash Detail Report

CMAT Version 3.4.0

Report Version 1.3 Aug 2005

2007399531 10/26/2007 15:27 POLK AVE and C060 / C60 and C066 / POLK AVE and C60
County: 75 **City:**

Major Cause: Other improper action
Roadway Type: Intersection: Four-way intersection

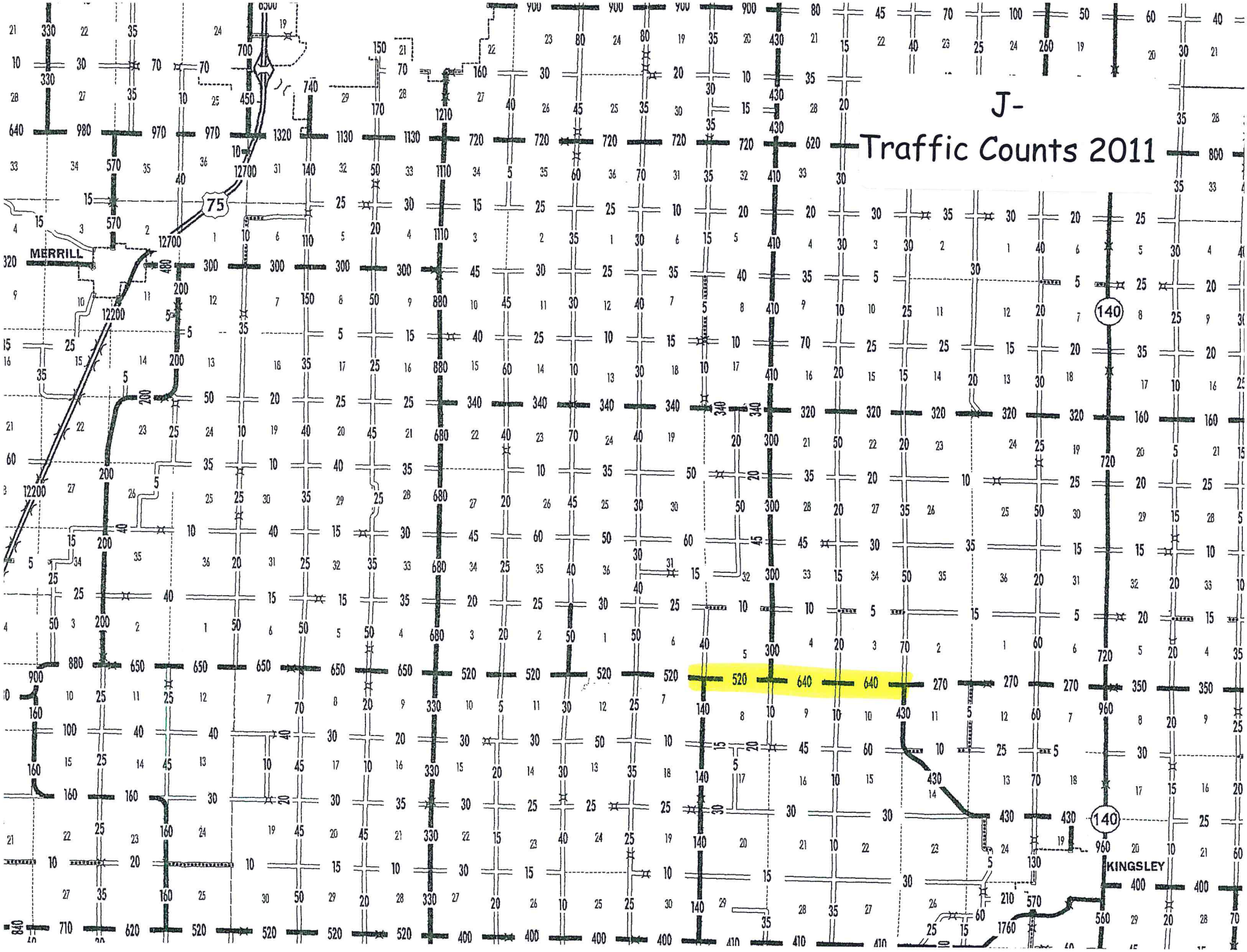
Severity: Major
Manner of Crash: Rear-end
Fatalities: 0
Surface Conditions: Dry
Major Injuries: 1
Light Conditions: Daylight
Minor Injuries: 0
Weather Conditions: Clear
Possible Injuries: 0
Drug/Alc Involved: none indicated
Unknown Injuries: 0
Property Damage: $9000
Number of Vehicles: 2

	Unit 1	Unit 2	Unit 3
Init Trav Dir:	East	East	0
Veh Action:	Turning left	Overtaking/passing	0
Configuration:	Passenger car	Tractor/semi-trailer	0
Driver Age:	21	61	0
Driver Gender:	M	M	
Driver Cond:	Normal	Normal	0
Drivr Contr 1:	none	Other improper action	0
Drivr Contr 2:	not reported	not reported	0
Fixed Object:	none	none	0

I

8/10/2015			C-60	Safety Fund Application			
-	-	Injuries					
Accident Yr.	Report #	Fatalities	Major	Minor	Possible	Unknown	P.D. O.
2009	1						11,250
2006	2						9,050
2007	3		1				75,100
2011	4						2,000
2011	5						6,000
2006	6				1		3,500
2004	7				1		5,000
2006	8				1		3,500
2004	9				1		5,000
2012	10			1			8,300
2012	11						4,200
2009	12						2,000
2012	13						3,000
2009	14						2,500
2007	15		1				9,000
						Total	149,400
	ADT	520-640 VPD					
	CRF	Crash Reduction Factors					
		Flatten V.C	Crest	20	Horizontal	67	
		Flatten Foreslope		15			
		Change Shoulder Width		47			
			Cumulative	63.96			

J-
Traffic Counts 2011



L

B/C ANALYSIS INSTRUCTIONS

revised 5/2014
Office of Traffic & Safety, Iowa DOT

Document all values and assumptions and include with application.

Use either the "Road Segment" or "Intersections" worksheet and only enter values in the YELLOW cells.

Crash Reduction Factors
Crash Reduction Factors should be obtained from the "Crash Modification Factors Clearinghouse."

http://www.cmfclearinghouse.org/

Be sure to use the CRF (**not the CMF**) in these spreadsheets. A CRF of 10 means a 10% reduction in crashes is expected with that improvement.

Start with a conservative (low) CRF value. If your benefit/cost ratio is greater than 1.8 you are finished. If the benefit/cost ratio is lower, try less conservative values of CRF. You will have to decide how realistic the CRF is for your particular location and situation.

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:	20	15	47		
Cummulative CRF =	63.96				

If the improvements have different service lives, the shortest value must be used.

Yearly Worksheet
The "Yearly" worksheet is not part of the analysis, but can be used to check and better understand the results.

Discount Rate
The discount rate of 4% excludes inflation and comes from the St. Louis Federal Reserve Bank. It should not be changed without proper justification and documentation.

August 2009 - Changed Property Cost calculations to include ALL crashes, rather than just PDO crashes.

April 2010 - Changed source for Crash Reduction Factors from Desktop Reference to CMF Clearinghouse web site.

L.

Rev. 5/14

Road Segment Benefit / Cost Safety Analysis

Iowa DOT Office of Traffic & Safety

County: Plymouth Prepared by: Thomas Rohe Date Prepared: Aug 10, 2015

Location: On Plymouth County Road C-60 From 1/4 West of NE Cor Sec 7-90-44 east to NE Cor Sec 10-90-44

Improvement

Proposed Improvement(s): Reconstruction of County Road C-60 which will widen the shoulders, flatten foreslopes, and improve vertical and horizontal alignment from current 35-45 mph design to current 55 mph design.

$ 500,000	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**
	$$OC = \frac{AC}{INT}\left(1 - \frac{1}{(1+INT)^Y}\right)$$	$ 500,000	Present Value All Costs, **COST** = EC + OC

Traffic Volume Data

Source: Iowa Department of Transportation 2011 Date of traffic count

Length (mi.)	Two-way veh/day	Description
3.25	640	22 Ft. Widen Asphalt Pav't
3.25	miles total	

2,080 Current Vehicle Miles / Day, **VM**

2,538 End of Life Veh. Miles / Day

759,200 Current Veh. Miles / Year, **AM**

16,716,828 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**

0 Additional months values as of May 2014

2	Fatal Crashes		Fatalities @	$4,500,000	$ -
		2	Major Injuries @	$325,000	$ 650,000
5	Injury Crashes	1	Minor Injuries @	$65,000	$ 65,000
		4	Possible Injuries @	$35,000	$ 140,000
8	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**	$ 966,000

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

$ 64,400 Cost per Crash, **AVCR** = LOSS / TA

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

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

$ 61,824 Crash Costs Avoided in First Year, AAR x AVCR

21.1 Total Avoided Crashes, TCR x CRF/ 100

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

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

$ 913,184 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 = $913,184 : $500,000 = 1.83 : 1

District 4

Iowa Department of Transportation

Rev. 3/08

Application for TRAFFIC SAFETY FUNDS

GENERAL INFORMATION

Location / Title of Project H34 East Pavement Widening

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 $ 695,644

Safety Funds Requested $ 400,000

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: _____ 8/12/15
Signature — Date Signed

Bradley Skinner, County Engineer
Typed Name

Attest: Denise Manard 8/12/15
Signature — Date Signed

Denise Manard, Office Manager
Typed Name

Montgomery County Secondary Roads

P.O. Box 95, Red Oak, Iowa 51566

Phone: (712) 623-5197 / Fax: (712) 623-9477

August 12, 2015

2014 TSIP Application Narrative
H34 Lane Widening East of Red Oak
Montgomery County, Iowa

The proposed project entails County Highway H34 (Montgomery County 200th Street), from the intersection with US Highway 34, four and one-half miles east to the intersection with N Avenue. The existing roadway is comprised of an Iowa Highway Commission built ten inch thick PCC slab, originally built 18-feet wide with curbs in 1930. The pavement was in-filled with asphalt and slurry mixtures over the last fifty years to provide for drainage. As an integral link between Red Oak and US Highway 71, this highway carries over 500 vehicles per day including significant truck traffic.

Numerous 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 adjacent sections* in recent years. It is nearly impossible for a vehicle to meet an on-coming semi-truck without departing the pavement. This highway has been a major priority for shoulder maintenance over the years, however, edge ruts develop quickly and hazards frequently develop after rainstorms or just from routine traffic. In short, the roadway is insufficient with safety issues for current traffic demands.

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 24-foot wide pavement 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.

Montgomery County will continue work on the corridor with an HMA overlay, as appropriate, once the widening has been accomplished.

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, 2015

Location: H34 from US34 to O Avenue

Improvement

Proposed Improvement(s): Pavement Widening, 3 ft Symmetrical

$ 400,000	Estimated Improvement Cost, **EC**	20	Est. Improvement Life, years, **Y**
$ -	Other Annual Cost (after initial year), **AC**	42	Crash Reduction Factor (integer), **CRF**
$ -	Present Value Other Annual Costs, **OC**	4.0%	Discount Rate, **INT**
	$OC = \frac{AC}{INT}\left(1 - \frac{1}{(1+INT)^Y}\right)$	$ 400,000	Present Value All Costs, **COST** = EC + OC

Traffic Volume Data

Source: IDOT 2012 Traffic Counts 530 Date of traffic count

Length (mi.)	Two-way veh/day	Description
3.80	530	Secondar FM/FA Paved Route
3.80	miles total	

2,014 Current Vehicle Miles / Day, **VM**

2,457 End of Life Veh. Miles / Day

735,110 Current Veh. Miles / Year, **AM**

16,186,390 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
4	Injury Crashes →	4	Minor Injuries @	$65,000	$ 260,000
		6	Possible Injuries @	$35,000	$ 210,000
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**	$ 928,200

1.80	Current Crashes / Year, **AA** = TA / T	**244.9**	Crashes / HMVM, Crash Rate, **CR** CR = TA x 10^8 / (AM x T)
$ 51,567	Cost per Crash, **AVCR** = LOSS / TA	$ 575,827	Present Value of Avoided Crashes, **BENEFIT**
39.6	Total Expected Crashes, **TCR** = CR x TVMT/10^8		
0.76	Crashes Avoided First Year **AAR** = AA x CRF / 100		
$ 38,984	Crash Costs Avoided in First Year, AAR x AVCR		
16.6	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 = $575,827 : $400,000 = **1.44** : 1

District 5

SHIVEHATTERY
ARCHITECTURE + ENGINEERING

August 14, 2015

Donna Matulac, P.E.
Office of Traffic and Safety
Iowa Department of Transportation
800 Lincoln Way
Ames, Iowa 50010

Dear Donna,

Included is the Traffic Safety Improvement Application for a spot improvement in the City of Ottumwa, Iowa. The intersection identified for the improvements is S Marion Street and 2nd Street W. 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.

Justin Campbell, PE
Civil Engineer
(319) 364-0227
jcampbell@shive-hattery.com

Project # 415354P

Traffic Safety Improvement Program Application

S Marion Street and 2nd Street W
Ottumwa, Iowa
August 14, 2015

Prepared by:
SHIVEHATTERY
ARCHITECTURE + ENGINEERING
316 2nd Street, Suite 500
Cedar Rapids, Iowa 52406
(800) 798-0227

Iowa Department of Transportation

Rev. 3/08

Application for TRAFFIC SAFETY FUNDS

GENERAL INFORMATION

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 Project Cost $ 223,700

Safety Funds Requested $ 223,700

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 City of Ottumwa

Signed: Tom X. Lazio 8-4-15

Signature Date Signed

Tom X. Lazio, Mayor

Typed Name

Attest: Amanda Valent 8.4.15

Signature Date Signed

Amanda Valent, City Clerk

Typed Name

RESOLUTION #181-2015

A RESOLUTION APPROVING THE TRAFFIC SAFETY IMPROVEMENT PROGRAM APPLICATION FOR THE MARION STREET AND WEST SECOND STREET INTERSECTION ENHANCEMENTS

WHEREAS, This resolution approves the Traffic Safety Improvement Program Application for Traffic Safety Funds through the Iowa Department of Transportation for enhancements to the intersection of Marion Street and West Second Street; and,

WHEREAS, The proposed intersection improvements include construction of a mini-roundabout which will serve as a traffic calming measure. Splitter islands will be installed to reduce the intersection speeds and notify motorists of the intersection. Improvements will also provide for accommodations for pedestrians and bicyclists and will aid in providing acceptable gaps; and,

WHEREAS, The proposed improvements are expected to result in a safer intersection and reduce the number of injury crashes per year; and,

WHEREAS, The City of Ottumwa is requesting Safety Funds in the amount of $223,700.00.

NOW, THEREFORE, BE IT RESOLVED, BY THE CITY COUNCIL OF THE CITY OF OTTUMWA, IOWA THAT: The Traffic Safety Improvement Program Application for the Marion Street and West Second Street Intersection Enhancements is hereby approved and adopted.

APPROVED, PASSED, AND ADOPTED, this 4th day of August 2015.

CITY OF OTTUMWA, IOWA

Tom X. Lazio, Mayor

ATTEST:

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. Most recently 2nd Street has been 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. See **Exhibit H** for existing conditions.

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. 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.

Crash history for this intersection was collected from Iowa DOT CMAT software, and City of Ottumwa

Police Department, and has been evaluated from 2004 to 2014 to identify trends and safety issues with the current geometry. In the past 10 years 34 crashes have been reported at this location resulting in 10 minor and 11 possible injuries. 30 of the 34 (88%) were broadside crashes. The City has reported that the trend of broadside crashes in 2015 is continuing. Refer to **Section I** for crash history, officer accident reports and post-crash photos of recent accidents.

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.

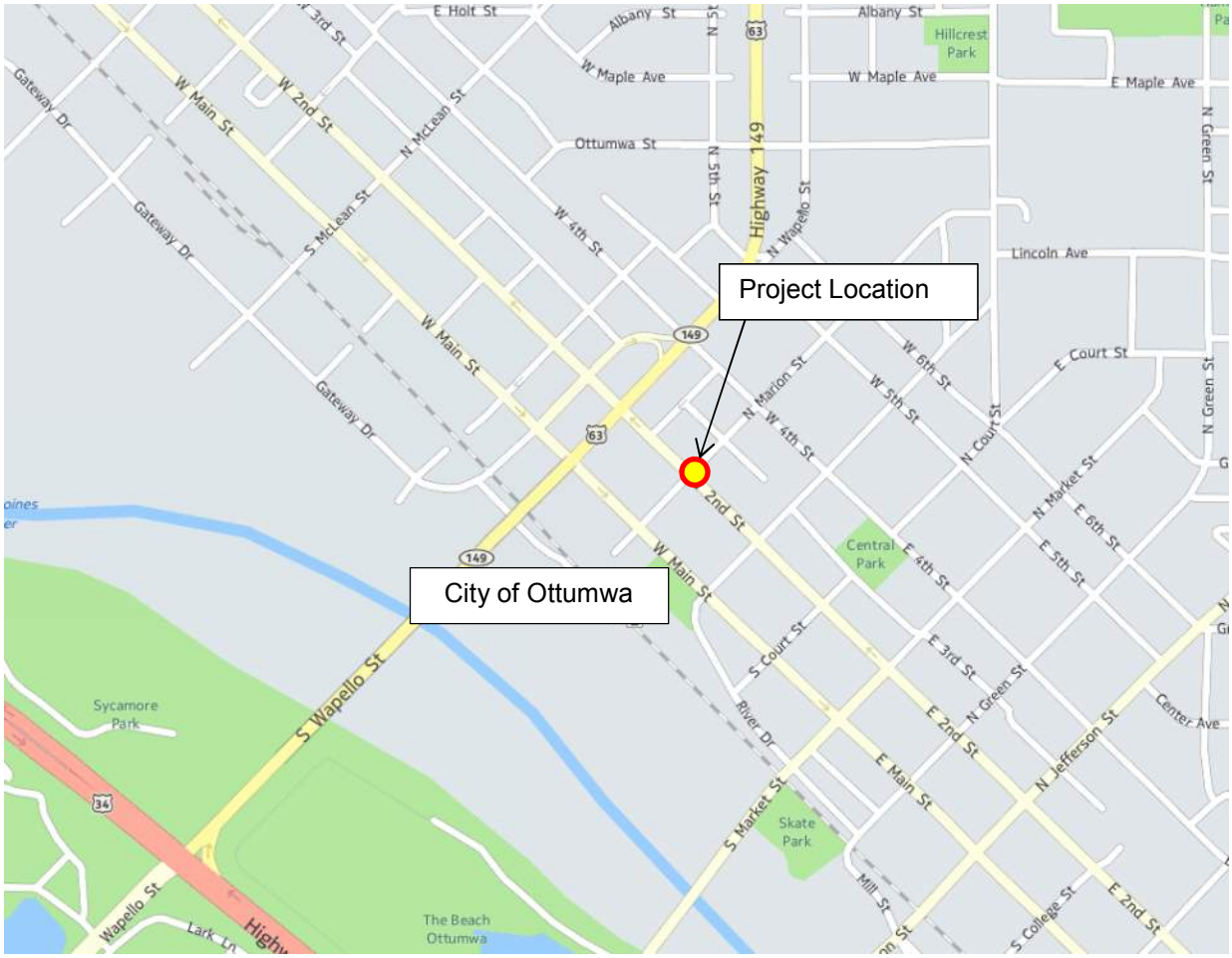
SHIVEHATTERY
ARCHITECTURE + ENGINEERING

Proposed Public Improvements - Mini-Roundabout
Second Street & Marion Street
Ottumwa, Iowa
Engineer's Rough Order Magnitude of Cost
Estimate of Quantities - July 21, 2015

Item No	Description	Unit	Unit Price	Quantity	Cost
1	Removal of Pavement	SY	$ 10	1,300	$ 13,000
2	Removal of Sidewalk	SY	$ 8	300	$ 2,400
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	1,200	$ 108,000
7	PCC Sidewalk, 4"	SY	$ 35	300	$ 10,500
8	PCC Sidewalk Ramp	SY	$ 50	50	$ 2,500
9	Granular Subbase, 6"	SY	$ 7	800	$ 5,600
10	Storm Improvements	LS	$ 15,000	1	$ 15,000
11	Pavement Markings and Signage	LS	$ 5,000	1	$ 5,000
12	Street Lighting	EA	$ 4,000	8	$ 32,000
13	Erosion Control & Administration	LS	$ 500	1	$ 500
14	Construction Survey	LS	$ 5,000	1	$ 5,000
15	Traffic Control	LS	$ 5,000	1	$ 5,000
16	Mobilization	LS	$ 10,000	1	$ 10,000
	Rough Order of Magnitude Construction Cost				$ 223,700

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 2015** – Submit for 2015 TSIP Funds
- **September 2015 – January 2016** – Proceed with design of improvements
- **December 2015** – TSIP Funds are awarded
- **February 2016** –Let intersection project
- **Summer 2016** – Construction begins
- **July 2016** –TSIP funds are available for the 2nd Street and Marion Street Intersection Improvements
- **August 2016** – Construction complete for mini roundabout.


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

Looking Northeast from Marion Street NE Bound Approach

Looking Northwest from 2nd Street NW Bound Approach*

Looking Southeast from 2nd Street SE Bound Approach

Looking Southwest from Marion Street SW Bound Approach

Broadside Collision: 6/18/2015 (1)

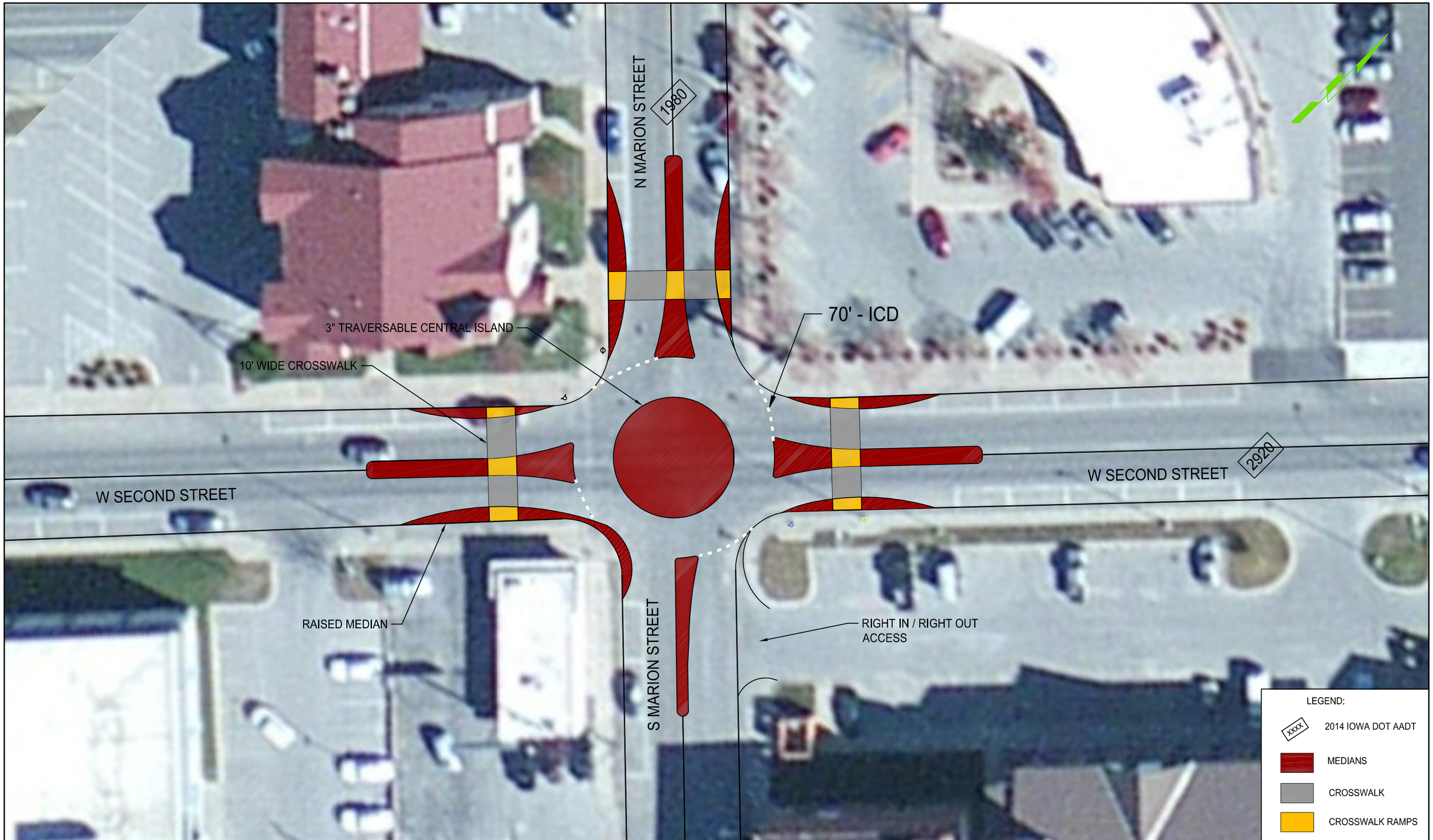
Broadside Collision: 6/18/2015 (2)

Broadside Collision: 6/18/2015 (3)

Broadside Collision: Date Unknown (1)

Broadside Collision: Date Unknown (2)

*Source: Google®



SHIVEHATTERY
ARCHITECTURE + ENGINEERING

OTTUMWA
CITY OF BRIDGES...RIVER OF OPPORTUNITY

SECOND AND MARION
OTTUMWA, IOWA

08-14-2015

415354P

ROUNDABOUT IMPROVEMENTS CONCEPT

SCALE
0 30 60
SCALE IN FEET

EXHIBIT: G

Project Location
Ottumwa
Google earth

Iowa Department of Transportation

Major Cause Summary

Report Version 1.1 Jan 2005

Analysis Years: 2004 [6], 2005 [4], 2006 [4], 2007 [3], 2008 [3], 2009 [1], 2010 [3], 2011 [3], 2012 [3], 2013 [2], 2014 [2]

Crash Summary:

Fatal	-
Major Injury	-
Minor Injury	6
Possible/Unknown	9
PDO	19
Total Crashes	34

Injury Summary:

Fatal	-
Major Injury	-
Minor Injury	10
Possible	11
Unknown	-
Total Injuries	21

TOT Property Damage: $135,729

AVG Property Damage: $3,992

Surface Condition Summary:

Dry	29
Wet	2
Ice	1
Snow	2
Slush	-
Sand/Dirt/Oil/Gravel	-
Water	-
Other	-
Unknown	-
Not Reported	-
Total Crashes	34

Major Cause Summary:

	Animal		Improper Backing
	Ran Traffic Signal		Illegally Parked/Unattended
14	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
	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
1	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	1	Other: Other Improper Action
	Disregarded Railroad Signal	1	Unknown
	Disregarded Warning Sign	1	Other: No Improper Action
	Operating Vehicle in Reckless/Aggressive Manner		None Indicated

Selection Filter:

None

Analyst:

Notes:

Iowa Department of Transportation

Abbreviated Crash Report

Report Version 1.2Mai@005

Date	DOT Case #	Agency Case #	City	Crash Sev.	Literal Description
02/07/2004	2004209126	20040000527	Ottumwa	PDO	ON SECOND ST AND SO MARION ST AND NO MARION
06/30/2004	2004229948	20040002603	Ottumwa	PDO	SECOND ST AND SO MARION ST AND NO MARION
07/02/2004	2004230831	20040002629	Ottumwa	PDO	SECOND ST AND SO MARION ST AND NO MARION
09/22/2004	2004244403	20040003790	Ottumwa	Poss/Unk	SECOND ST AND SO MARION ST AND NO MARION
10/20/2004	2004250210	20040004173	Ottumwa	PDO	SECOND ST AND SO MARION ST AND NO MARION
12/16/2004	2004266708	20040004922	Ottumwa	Poss/Unk	SECOND ST AND SO MARION ST AND NO MARION
08/09/2005	2005236714	20050003130	Ottumwa	PDO	SECOND ST AND SO MARION ST AND NO MARION
09/30/2005	2005244655	20050003847	Ottumwa	PDO	SECOND ST AND SO MARION ST AND NO MARION
12/12/2005	2005259428	20050004769	Ottumwa	PDO	SECOND ST AND SO MARION ST AND NO MARION
12/30/2005	2005265108	20050004994	Ottumwa	PDO	SECOND ST and SO MARION ST and NO MARION
09/05/2006	2006237655	20060003764	Ottumwa	Poss/Unk	SECOND ST AND 0 / S MARION ST AND 0 / N MARION
10/16/2006	2006245501	20060004378	Ottumwa	PDO	SECOND ST AND 0 / S MARION ST AND 0 / N MARION
10/30/2006	2006248062	20060004566	Ottumwa	Poss/Unk	SECOND ST AND 0 / S MARION ST AND 0 / N MARION
11/07/2006	2006250872	20060004677	Ottumwa	PDO	SECOND ST AND 0 / S MARION ST AND 0 / N MARION
01/12/2007	2007201610	20070000167	Ottumwa	Poss/Unk	SECOND ST AND 0 / S MARION ST AND 0 / N MARION
11/19/2007	2007405241	20070005152	Ottumwa	Minor	W 2ND ST and 0 / S MARION ST and 0 / N MARION ST
12/08/2007	2007408743	20070005450	Ottumwa	PDO	W 2ND ST and 0 / S MARION ST and 0 / N MARION ST
02/21/2008	2008428045	20080000818	Ottumwa	Minor	W 2ND ST and 0 / S MARION ST and 0 / N MARION ST
03/28/2008	2008434645	20080001408	Ottumwa	PDO	SECOND AND MARION
06/02/2008	2008444079	20080002577	Ottumwa	Minor	W 2ND ST and 0 / S MARION ST and 0 / N MARION ST
05/14/2009	2009507098	20090002157	Ottumwa	Poss/Unk	0 / N MARION ST and 0 / S MARION ST and W 2ND ST
04/22/2010	2010575500	20100001716	Ottumwa	PDO	W 2ND ST
08/04/2010	2010584650	20100003378	Ottumwa	Poss/Unk	N MARION ST and W 2ND ST and S MARION ST
12/22/2010	2010609585	20100005637	Ottumwa	PDO	N MARION ST and W 2ND ST and S MARION ST
03/11/2011	2011622921	20110001111	Ottumwa	Poss/Unk	W 2ND ST AND S MARION ST
10/20/2011	2011654869	20110004741	Ottumwa	PDO	W 2ND ST AND S MARION ST
11/03/2011	2011654870	20110004951	Ottumwa	Minor	N MARION ST and W 2ND ST and S MARION ST
05/07/2012	2012684602	20120002230	Ottumwa	PDO	N MARION ST and S MARION ST and W 2ND ST
05/29/2012	2012687777	20120002613	Ottumwa	Minor	N MARION ST and S MARION ST and W 2ND ST
07/31/2012	2012697270	20120003674	Ottumwa	PDO	N MARION ST and S MARION ST and W 2ND ST
06/15/2013	2013744811	20130002889	Ottumwa	PDO	W 2ND ST AND N MARION ST AND S MARION ST
09/19/2013	2013759863	20130004670	Ottumwa	PDO	W 2ND ST AND N MARION ST AND S MARION ST

Iowa Department of Transportation

Abbreviated Crash Report

Report Version 1.2Mai@005

Date	DOT Case #	Agency Case #	City	Crash Sev.	Literal Description
07/11/2014	2014807536	20140003349	Ottumwa	Minor	W 2ND ST AND N MARION ST AND S MARION ST
10/02/2014	2014819625	20140004860	Ottumwa	Poss/Unk	W 2ND ST AND N MARION ST AND S MARION ST

Selection Filter:

None

Analyst:

Notes:

Iowa Department of Transportation

Crash Detail Report

Report Version 1.3 Aug 2006

2005236714 08/09/2005 12:29 SECOND ST AND SO MARION ST AND NO MARION
County: 90 **City:** Ottumwa

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:	West	North	0
Veh Action:	Essentially straight	Essentially straight	0
Configuration:	Passenger car	Van or mini-van	0
Driver Age:	49	25	0
Driver Gender:	F	F	
Driver Cond:	Normal	Normal	0
Drivr Contr 1:	none	Ran stop sign	0
Drivr Contr 2:	not reported	not reported	0
Fixed Object:	none	none	0

2005244655 09/30/2005 12:44 SECOND ST AND SO MARION ST AND NO MARION
County: 90 **City:** Ottumwa

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:**	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	North	0
Veh Action:	Essentially straight	Essentially straight	0
Configuration:	Passenger car	Passenger car	0
Driver Age:	35	77	0
Driver Gender:	M	M	
Driver Cond:	Normal	Normal	0
Drivr Contr 1:	none	Ran stop sign	0
Drivr Contr 2:	not reported	not reported	0
Fixed Object:	none	none	0

Iowa Department of Transportation

Crash Detail Report

Report Version 1.3 Aug 2006

2005259428 12/12/2005 11:41 SECOND ST AND SO MARION ST AND NO MARION
County: 90 **City:** Ottumwa

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:**	$4500

Number of Vehicles: 2

	Unit 1	Unit 2	Unit 3
Init Trav Dir:	North	West	0
Veh Action:	Essentially straight	Essentially straight	0
Configuration:	Passenger car	Passenger car	0
Driver Age:	41	22	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

2005265108 12/30/2005 20:50 SECOND ST and SO MARION ST and NO MARION
County: 90 **City:** Ottumwa

Major Cause: Other improper action
Roadway Type: Intersection: Four-way intersection

Severity:	PDO	**Manner of Crash:**	Sideswipe, same direction
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:**	$1300

Number of Vehicles: 2

	Unit 1	Unit 2	Unit 3
Init Trav Dir:	West	West	0
Veh Action:	Turning left	Essentially straight	0
Configuration:	Passenger car	4-tire light truck	0
Driver Age:	16	44	0
Driver Gender:	M	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

Iowa Department of Transportation

Crash Detail Report

Report Version 1.3 Aug 2006

2006237655 09/05/2006 10:27 SECOND ST AND 0 / S MARION ST AND 0 / N MARION
County: 90 **City:** Ottumwa

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:**	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:	North	West	0
Veh Action:	Essentially straight	Essentially straight	0
Configuration:	Passenger car	Passenger car	0
Driver Age:	48	76	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

2006245501 10/16/2006 16:50 SECOND ST AND 0 / S MARION ST AND 0 / N MARION
County: 90 **City:** Ottumwa

Major Cause: Ran stop sign
Roadway Type: Intersection: Other intersection

Severity:	PDO	**Manner of Crash:**	Broadside
Fatalities:	0	**Surface Conditions:**	Wet
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:**	$2500

Number of Vehicles: 2

	Unit 1	Unit 2	Unit 3
Init Trav Dir:	North	West	0
Veh Action:	Essentially straight	Essentially straight	0
Configuration:	Passenger car	Passenger car	0
Driver Age:	66	44	0
Driver Gender:	F	M	
Driver Cond:	Normal	Normal	0
Drivr Contr 1:	Ran stop sign	none	0
Drivr Contr 2:	FTY from stop sign	not reported	0
Fixed Object:	none	none	0

Iowa Department of Transportation

Crash Detail Report

Report Version 1.3 Aug 2006

2006248062 10/30/2006 16:47 SECOND ST AND 0 / S MARION ST AND 0 / N MARION
County: 90 **City:** Ottumwa

Major Cause: Ran stop sign
Roadway Type: Intersection: Other intersection

Severity:	Poss/Unk	**Manner of Crash:**	Broadside
Fatalities:	0	**Surface Conditions:**	Dry
Major Injuries:	0	**Light Conditions:**	Dusk
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:	North	West	0
Veh Action:	Essentially straight	Essentially straight	0
Configuration:	4-tire light truck	4-tire light truck	0
Driver Age:	21	17	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

2006250872 11/07/2006 13:00 SECOND ST AND 0 / S MARION ST AND 0 / N MARION
County: 90 **City:** Ottumwa

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:**	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	West	0
Veh Action:	Essentially straight	Essentially straight	0
Configuration:	Sport utility vehicle	Sport utility vehicle	0
Driver Age:	69	21	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

Iowa Department of Transportation

Crash Detail Report

Report Version 1.3 Aug 2006

2007201610 01/12/2007 13:46 SECOND ST AND 0 / S MARION ST AND 0 / N MARION
County: 90 **City:** Ottumwa

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:**	Cloudy
Possible Injuries:	1	**Drug/Alc Involved:**	none indicated
Unknown Injuries:	0	**Property Damage:**	$2429

Number of Vehicles: 2

	Unit 1	Unit 2	Unit 3
Init Trav Dir:	North	West	0
Veh Action:	Essentially straight	Essentially straight	0
Configuration:	Passenger car	4-tire light truck	0
Driver Age:	24	41	0
Driver Gender:	F	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

2007405241 11/19/2007 14:29 W 2ND ST and 0 / S MARION ST and 0 / N MARION ST
County: 90 **City:** Ottumwa

Major Cause: Ran 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:**	Partly cloudy
Possible Injuries:	0	**Drug/Alc Involved:**	none indicated
Unknown Injuries:	0	**Property Damage:**	$1400

Number of Vehicles: 2

	Unit 1	Unit 2	Unit 3
Init Trav Dir:	North	East	0
Veh Action:	Essentially straight	Essentially straight	0
Configuration:	Passenger car	Passenger car	0
Driver Age:	56	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

Iowa Department of Transportation

Crash Detail Report

Report Version 1.3 Aug 2006

2007408743 12/08/2007 14:06 W 2ND ST and 0 / S MARION ST and 0 / N MARION ST
County: 90 **City:** Ottumwa

Major Cause: FTY from stop sign
Roadway Type: Intersection: Four-way intersection

Severity:	PDO	**Manner of Crash:**	Broadside
Fatalities:	0	**Surface Conditions:**	Snow
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:**	$5500

Number of Vehicles: 2

	Unit 1	Unit 2	Unit 3
Init Trav Dir:	West	North	0
Veh Action:	Essentially straight	Essentially straight	0
Configuration:	Passenger car	Passenger car	0
Driver Age:	41	75	0
Driver Gender:	M	F	
Driver Cond:	Normal	Normal	0
Drivr Contr 1:	none	FTY from stop sign	0
Drivr Contr 2:	not reported	not reported	0
Fixed Object:	none	none	0

2008428045 02/21/2008 01:48 W 2ND ST and 0 / S MARION ST and 0 / N MARION ST
County: 90 **City:** Ottumwa

Major Cause: FTY from stop sign
Roadway Type: Intersection: Four-way intersection

Severity:	Minor	**Manner of Crash:**	Broadside
Fatalities:	0	**Surface Conditions:**	Snow
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:**	$2300

Number of Vehicles: 2

	Unit 1	Unit 2	Unit 3
Init Trav Dir:	West	North	0
Veh Action:	Essentially straight	Essentially straight	0
Configuration:	Passenger car	4-tire light truck	0
Driver Age:	32	52	0
Driver Gender:	F	F	
Driver Cond:	Normal	Normal	0
Drivr Contr 1:	none	FTY from stop sign	0
Drivr Contr 2:	not reported	not reported	0
Fixed Object:	none	none	0

Iowa Department of Transportation

Crash Detail Report

Report Version 1.3 Aug 2006

2008434645 03/28/2008 16:51 SECOND AND MARION
County: 90 **City:** Ottumwa

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:	West	North	0
Veh Action:	Essentially straight	Essentially straight	0
Configuration:	Van or mini-van	Passenger car	0
Driver Age:	64	57	0
Driver Gender:	F	F	
Driver Cond:	Normal	Normal	0
Drivr Contr 1:	none	Ran stop sign	0
Drivr Contr 2:	not reported	not reported	0
Fixed Object:	none	none	0

2008444079 06/02/2008 14:40 W 2ND ST and 0 / S MARION ST and 0 / N MARION ST
County: 90 **City:** Ottumwa

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:	3	**Weather Conditions:**	Partly cloudy
Possible Injuries:	0	**Drug/Alc Involved:**	none indicated
Unknown Injuries:	0	**Property Damage:**	$2700

Number of Vehicles: 2

	Unit 1	Unit 2	Unit 3
Init Trav Dir:	West	North	0
Veh Action:	Essentially straight	Essentially straight	0
Configuration:	4-tire light truck	Passenger car	0
Driver Age:	49	26	0
Driver Gender:	M	F	
Driver Cond:	Normal	Normal	0
Drivr Contr 1:	none	FTY from stop sign	0
Drivr Contr 2:	not reported	not reported	0
Fixed Object:	none	none	0

Iowa Department of Transportation

Crash Detail Report

Report Version 1.3 Aug 2006

2009507098 05/14/2009 15:22 — 0 / N MARION ST and 0 / S MARION ST and W 2ND ST
County: 90 **City:** Ottumwa

Major Cause: Inattentive/distracted by: Use of phone or other device
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:**	Partly cloudy
Possible Injuries:	1	**Drug/Alc Involved:**	none indicated
Unknown Injuries:	0	**Property Damage:**	$10000

Number of Vehicles: 2

	Unit 1	Unit 2	Unit 3
Init Trav Dir:	North	West	0
Veh Action:	Essentially straight	Essentially straight	0
Configuration:	Van or mini-van	Sport utility vehicle	0
Driver Age:	35	38	0
Driver Gender:	F	F	
Driver Cond:	Normal	Normal	0
Drivr Contr 1:	Distracted phone/device	none	0
Drivr Contr 2:	not reported	not reported	0
Fixed Object:	none	none	0

2010575500 04/22/2010 11:15 — W 2ND ST
County: 90 **City:** Ottumwa

Major Cause: unknown
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:**	$2500

Number of Vehicles: 2

	Unit 1	Unit 2	Unit 3
Init Trav Dir:	West	West	0
Veh Action:	Turning left	Essentially straight	0
Configuration:	Van or mini-van	Passenger car	0
Driver Age:	51	80	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

Iowa Department of Transportation

Crash Detail Report

Report Version 1.3 Aug 2006

2010584650 08/04/2010 11:51 N MARION ST and W 2ND ST and S MARION ST
County: 90 **City:** Ottumwa

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:**	Cloudy
Possible Injuries:	2	**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	West	0
Veh Action:	Essentially straight	Essentially straight	0
Configuration:	Sport utility vehicle	4-tire light truck	0
Driver Age:	57	34	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

2010609585 12/22/2010 10:20 N MARION ST and W 2ND ST and S MARION ST
County: 90 **City:** Ottumwa

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:**	$6000

Number of Vehicles: 2

	Unit 1	Unit 2	Unit 3
Init Trav Dir:	West	North	0
Veh Action:	Essentially straight	Essentially straight	0
Configuration:	Passenger car	Passenger car	0
Driver Age:	74	28	0
Driver Gender:	M	F	
Driver Cond:	Normal	Normal	0
Drivr Contr 1:	none	FTY from stop sign	0
Drivr Contr 2:	not reported	not reported	0
Fixed Object:	none	none	0

Iowa Department of Transportation

Crash Detail Report

Report Version 1.3 Aug 2006

2011622921 03/11/2011 18:38 W 2ND ST AND S MARION ST
County: 90 **City:** Ottumwa

Major Cause: Made improper turn
Roadway Type: Non-intersection: No special feature

Severity:	Poss/Unk	**Manner of Crash:**	Sideswipe, same direction
Fatalities:	0	**Surface Conditions:**	Dry
Major Injuries:	0	**Light Conditions:**	Dusk
Minor Injuries:	0	**Weather Conditions:**	Partly cloudy
Possible Injuries:	1	**Drug/Alc Involved:**	none indicated
Unknown Injuries:	0	**Property Damage:**	$3000

Number of Vehicles: 2

	Unit 1	Unit 2	Unit 3
Init Trav Dir:	West	West	0
Veh Action:	Turning left	Essentially straight	0
Configuration:	4-tire light truck	Passenger car	0
Driver Age:	65	41	0
Driver Gender:	M	M	
Driver Cond:	Normal	Normal	0
Drivr Contr 1:	Made improper turn	unknown	0
Drivr Contr 2:	not reported	not reported	0
Fixed Object:	none	none	0

2011654869 10/20/2011 15:26 W 2ND ST AND S MARION ST
County: 90 **City:** Ottumwa

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:**	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:	North	West	0
Veh Action:	Essentially straight	Essentially straight	0
Configuration:	Passenger car	Passenger car	0
Driver Age:	72	45	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

Iowa Department of Transportation

Crash Detail Report

Report Version 1.3 Aug 2006

2011654870 11/03/2011 11:36 N MARION ST and W 2ND ST and S MARION ST
County: 90 **City:** Ottumwa

Major Cause: Ran 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:**	Cloudy
Possible Injuries:	0	**Drug/Alc Involved:**	none indicated
Unknown Injuries:	0	**Property Damage:**	$8000

Number of Vehicles: 2

	Unit 1	Unit 2	Unit 3
Init Trav Dir:	West	North	0
Veh Action:	Essentially straight	Essentially straight	0
Configuration:	Passenger car	Sport utility vehicle	0
Driver Age:	62	26	0
Driver Gender:	M	F	
Driver Cond:	Normal	Normal	0
Drivr Contr 1:	none	Ran stop sign	0
Drivr Contr 2:	not reported	not reported	0
Fixed Object:	none	none	0

2012684602 05/07/2012 19:15 N MARION ST and S MARION ST and W 2ND ST
County: 90 **City:** Ottumwa

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:	North	West	0
Veh Action:	Essentially straight	Essentially straight	0
Configuration:	Passenger car	Sport utility vehicle	0
Driver Age:	24	32	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

Iowa Department of Transportation

Crash Detail Report

Report Version 1.3 Aug 2006

2012687777 05/29/2012 10:47 N MARION ST and S MARION ST and W 2ND ST
County: 90 **City:** Ottumwa

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:	3	**Weather Conditions:**	Clear
Possible Injuries:	0	**Drug/Alc Involved:**	none indicated
Unknown Injuries:	0	**Property Damage:**	$550

Number of Vehicles: 1

	Unit 1	Unit 2	Unit 3
Init Trav Dir:	South	0	0
Veh Action:	Turning right	0	0
Configuration:	Sport utility vehicle	0	0
Driver Age:	48	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

2012697270 07/31/2012 16:51 N MARION ST and S MARION ST and W 2ND ST
County: 90 **City:** Ottumwa

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:**	$9500

Number of Vehicles: 2

	Unit 1	Unit 2	Unit 3
Init Trav Dir:	West	North	0
Veh Action:	Essentially straight	Essentially straight	0
Configuration:	4-tire light truck	Sport utility vehicle	0
Driver Age:	48	18	0
Driver Gender:	M	F	
Driver Cond:	Normal	Normal	0
Drivr Contr 1:	none	Ran stop sign	0
Drivr Contr 2:	not reported	not reported	0
Fixed Object:	none	none	0

Iowa Department of Transportation

Crash Detail Report

Report Version 1.3 Aug 2006

2013744811 06/15/2013 09:44 W 2ND ST AND N MARION ST AND S MARION ST
County: 90 **City:** Ottumwa

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:	West	North	0
Veh Action:	Essentially straight	Essentially straight	0
Configuration:	Van or mini-van	Passenger car	0
Driver Age:	54	57	0
Driver Gender:	M	F	
Driver Cond:	Normal	Normal	0
Drivr Contr 1:	none	Ran stop sign	0
Drivr Contr 2:	not reported	not reported	0
Fixed Object:	none	none	0

2013759863 09/19/2013 12:57 W 2ND ST AND N MARION ST AND S MARION ST
County: 90 **City:** Ottumwa

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:**	Partly cloudy
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	West	0
Veh Action:	Essentially straight	Essentially straight	0
Configuration:	Passenger car	Passenger car	0
Driver Age:	53	65	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

Iowa Department of Transportation

Crash Detail Report

Report Version 1.3 Aug 2006

2014807536 07/11/2014 12:15 W 2ND ST AND N MARION ST AND S MARION ST
County: 90 **City:** Ottumwa

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:**	Partly cloudy
Possible Injuries:	1	**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	East	0
Veh Action:	Essentially straight	Essentially straight	0
Configuration:	Passenger car	4-tire light truck	0
Driver Age:	42	40	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

2014819625 10/02/2014 13:05 W 2ND ST AND N MARION ST AND S MARION ST
County: 90 **City:** Ottumwa

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:**	Rain
Possible Injuries:	1	**Drug/Alc Involved:**	none indicated
Unknown Injuries:	0	**Property Damage:**	$9000

Number of Vehicles: 2

	Unit 1	Unit 2	Unit 3
Init Trav Dir:	West	South	0
Veh Action:	Essentially straight	Slowing/stopping	0
Configuration:	Passenger car	Sport utility vehicle	0
Driver Age:	67	45	0
Driver Gender:	M	NR	
Driver Cond:	Normal	Normal	0
Drivr Contr 1:	none	Ran stop sign	0
Drivr Contr 2:	not reported	not reported	0
Fixed Object:	none	none	0

Iowa Department of Transportation

Crash Detail Report

Report Version 1.3 Aug 2006

2015840328 01/13/2015 07:56 W 2ND ST AND N MARION ST AND S MARION ST
County: 90 **City:** Ottumwa

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:**	$21000

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	Sport utility vehicle	0
Driver Age:	50	48	0
Driver Gender:	F	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

2015848126 02/27/2015 12:04 W 2ND ST AND N MARION ST AND S MARION ST
County: 90 **City:** Ottumwa

Major Cause: unknown
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:**	$1750

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:	24	39	0
Driver Gender:	M	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

Iowa Department of Transportation

Crash Detail Report

Report Version 1.3 Aug 2006

2015850655 03/14/2015 12:58 W 2ND ST AND N MARION ST AND S MARION ST
County: 90 **City:** Ottumwa

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:**	$3500

Number of Vehicles: 2

	Unit 1	Unit 2	Unit 3
Init Trav Dir:	West	North	0
Veh Action:	Essentially straight	Essentially straight	0
Configuration:	Passenger car	4-tire light truck	0
Driver Age:	48	51	0
Driver Gender:	F	F	
Driver Cond:	Normal	Normal	0
Drivr Contr 1:	none	FTY from stop sign	0
Drivr Contr 2:	not reported	not reported	0
Fixed Object:	none	none	0

2015866227 05/08/2015 11:29 W 2ND ST AND N MARION ST AND S MARION ST
County: 90 **City:** Ottumwa

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:**	Cloudy
Possible Injuries:	0	**Drug/Alc Involved:**	none indicated
Unknown Injuries:	0	**Property Damage:**	$9500

Number of Vehicles: 2

	Unit 1	Unit 2	Unit 3
Init Trav Dir:	North	West	0
Veh Action:	Essentially straight	Essentially straight	0
Configuration:	Passenger car	Van or mini-van	0
Driver Age:	26	45	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

Iowa Department of Transportation

Crash Detail Report

Report Version 1.3 Aug 2006

2015863347 05/17/2015 16:32 W 2ND ST AND N MARION ST AND S MARION ST
County: 90 **City:** Ottumwa

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:**	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	West	0
Veh Action:	Essentially straight	Essentially straight	0
Configuration:	Passenger car	Van or mini-van	0
Driver Age:	27	84	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

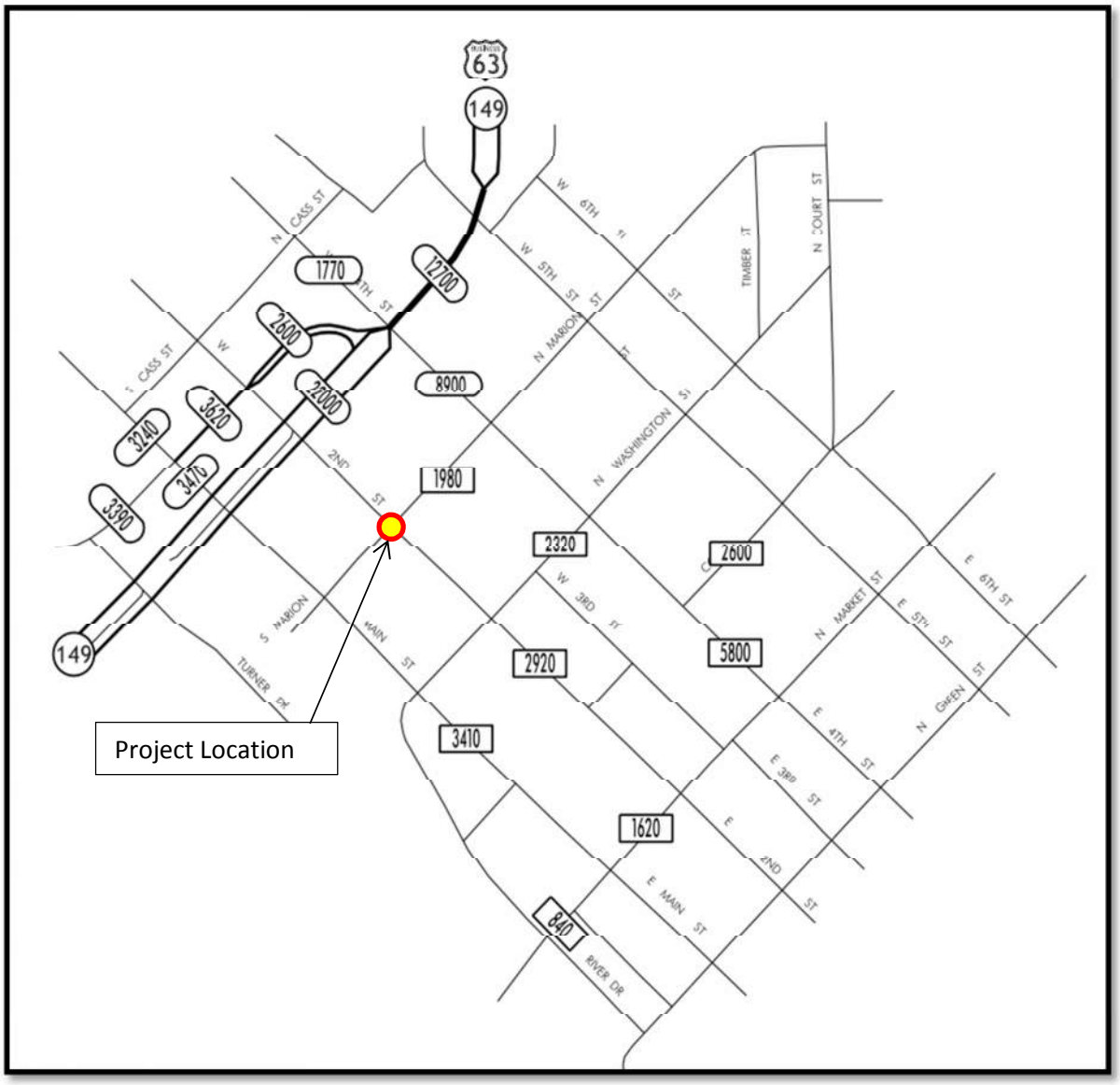
2015865153 06/18/2015 14:15 W 2ND ST AND N MARION ST AND S MARION ST
County: 90 **City:** Ottumwa

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:	1	**Drug/Alc Involved:**	none indicated
Unknown Injuries:	0	**Property Damage:**	$10000

Number of Vehicles: 2

	Unit 1	Unit 2	Unit 3
Init Trav Dir:	North	West	0
Veh Action:	Essentially straight	Essentially straight	0
Configuration:	4-tire light truck	Sport utility vehicle	0
Driver Age:	75	26	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



2014 Iowa DOT Traffic Map

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

Rev. 5/14

Intersection or Spot Benefit / Cost Safety Analysis

Iowa DOT Office of Traffic & Safety

County: Wapello Prepared by: Shive-Hattery Date Prepared: Aug 14, 2015

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

Improvement

Proposed Improvement(s): Conversion to Mini Roundabout

Existing 2-way Stop at 4-way intersection

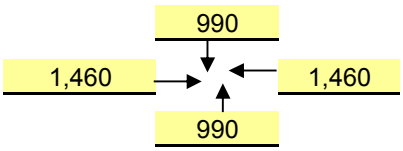
$ 223,700	Estimated Improvement Cost, **EC**	20	Est. Improvement Life, years, **Y**
	Other Annual Cost (after initial year), **AC**	65	Crash Reduction Factor (integer), **CRF**
$ -	Present Value Other Annual Costs, **OC**	4.0%	Discount Rate (time value of $), **INT**
		$ 223,700	Present Value Cost, **COST** = 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)



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

2004 First full year --> 2014 Last full year 11.0 years, Time Period, **T**

Additional months values as of May 2014

0	Fatal Crashes	0	Fatalities @	$4,500,000	$	-
		0	Major Injuries @	$325,000	$	-
15	Injury Crashes	10	Minor Injuries @	$65,000	$	650,000
		11	Possible Injuries @	$35,000	$	385,000
19	Property Damage Only		(assumed cost per crash)	$7,400	$	251,600
		-OR-	enter all Property Costs of all crashes:			
34	Total Crashes, **TA**			Total $ Loss, **LOSS**	$	1,286,600

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

$ 37,841 Cost per Crash, **AVC** = LOSS / TA

68.1 Total Expected Crashes, **TECR** = CR x TMEV

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

$ 76,026 Crash Costs Avoided in First Year, AAR x AVC

44.2 Total Avoided Crashes, TECR x CRF/ 100

1.73 Crashes / MEV, Crash Rate, **CR**

CR = TA x 10^6 / (DEV x 365 x T)

$ 1,122,963 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 = $1,122,963 : $223,700 = **5.02** : 1

Application for TRAFFIC SAFETY FUNDS

GENERAL INFORMATION **DATE:** August 6, 2015

Location / Title of Project: Phase 1 Riverside Rd, PCC Overlay w/ Paved 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) _____

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 $ 2,039,026.93

Safety Funds Requested $ 500,000.00

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: Jack Seward Jr. — 11 Aug '15

Signature — Date Signed

Jack Seward, Jr.

Typed Name

Attest: Daniel L. Widmer — 8-11-15

Signature — Date Signed

Daniel L. Widmer

Typed Name

RESOLUTION 15-34
APPROVAL OF TRANSPORTATION SAFETY IMPROVEMENT PROGRAM APPLICATION FOR RIVERSIDE ROAD, PHASE 1

WHEREAS, the Iowa Department of Transportation has adopted Administrative Rule 761 – Chapter 164, which created the Traffic Safety Improvement Program (TSIP) to allow for funding to be provided to local jurisdictions for eligible traffic safety improvement projects; and

WHEREAS, past traffic data shows the existing W61 corridor has an accident history and safety for the traveling public could be improved by incorporating safety improvements such as roadway widening and paved shoulders; and

WHEREAS, the overlay of W61 between G36 and G26 is included in the Washington County Five (5) Year Construction Program; and

WHEREAS, the Washington County Engineer recommends the TSIP application be submitted to the Iowa Department of Transportation for possible safety funding of the above mentioned project.

IT IS THEREFORE RESOLVED by the Washington County Board of Supervisors to endorse the above mentioned project and authorize the maintenance of the improvement after construction is complete;

BE IT FURTHER RESOLVED that the Chairperson of the Washington County Board of Supervisors be authorized to sign said funding application and direct the County Engineer to submit the application to the Iowa Department of Transportation for possible Traffic Safety Improvement Funding.

Adopted this 11th day of August, 2015.

The vote on the resolution:
Aye Seward Stoops Young Yoder Miller
Nay _____
Abstain _____

JACK SEWARD, JR
Chair, Board of Supervisors

Attest:

DANIEL L. WIDMER
County Auditor

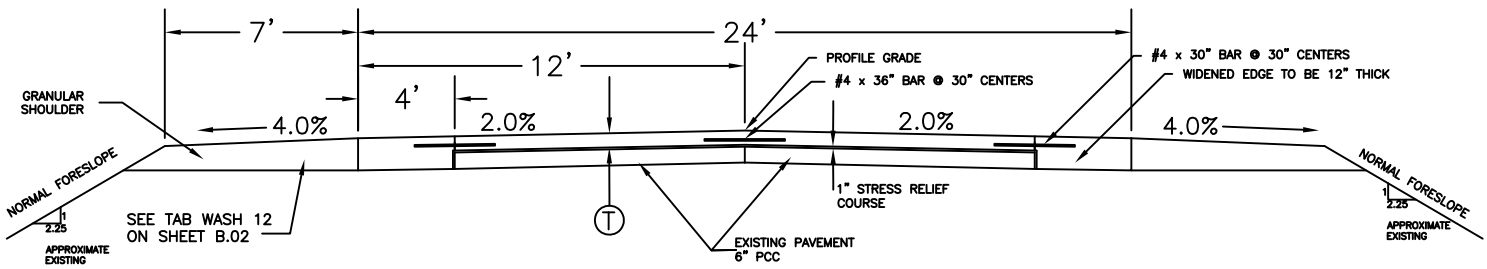
Narrative of Proposed Project:

Washington County is applying for Traffic Safety Improvement Program (TSIP) funds to be used for improving the safety on W61 (Riverside Road) from G36 (220th Street) to G26 (190th Street), approximately 4.0 miles. TSIP funds are being sought to aid in the placement of a 24 foot PCC overlay with 2 foot paved shoulders and 8" rumble strips. 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 gravel and/or an edge rut.

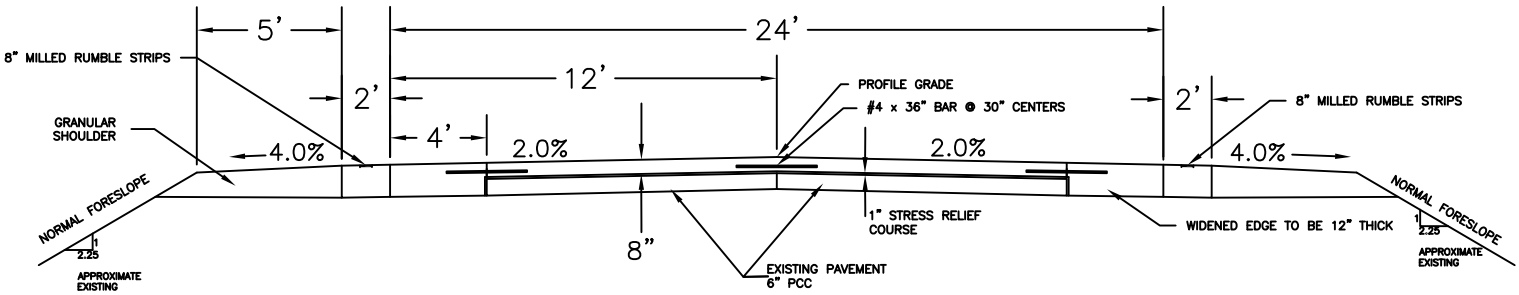
Currently the road is a 20 foot wide PCC pavement with 8 foot granular shoulders that was originally constructed in 1962. This stretch of road has seven curves, of which two are ninety degree changes in direction, and numerous patches have been placed on this aging pavement. When this road was originally constructed, the standards used to build the road called for 10' lanes with 2:1 foreslopes and variable backslopes. The narrowness of the lanes and the curves in the road contribute to edge ruts developing from the wind whip created by passing vehicles and their tires dropping off the edge of the pavement as they drift around curves. The combination of the edge rut, which tends to cause a driver to over correct if they drop off the pavement in to the rut, and the existing slopes create a safety hazard for the public. W61 is the main road from Washington to Riverside and the annual average traffic count on this stretch of road between G36 and G26 is 390 vpd.

The majority of the reported accidents over the last five years have been minor in nature and have involved the driver over correcting and swerving to avoid 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. 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. This will 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.

PAVEMENT OVERLAY



PAVEMENT OVERLAY W/ PAVED SHOULDER



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)	$1,231,000		Federal Aid (STP)	$1,254,000
Farm to Market (FM)	$308,000		Farm to Market (FM)	$313,000
TSIP	$500,000		TSIP	$0
Total	$2,039,000		Total	$1,567,000

ITEMIZED BREAKDOWN OF ALL COSTS

C.

Project Number: STP-S-C092(85)--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	12,398.00	$ 20.00	$ 247,960.00	12,398.00	$ 20.00	$ 247,960.00
3	2123-7450000	SHOULDER CONSTRUCTION, EARTH	STA	209.00	$ 64.00	$ 13,376.00	209.00	$ 64.00	$ 13,376.00
4	2213-2713300	EXCAVATION, CLASS 13, FOR WIDENING	CY	2,536.00	$ 15.00	$ 38,040.00	2,536.00	$ 15.00	$ 38,040.00
5	2213-7100400	RELOCATION OF MAIL BOXES	EACH	8.00	$ 150.00	$ 1,200.00	8.00	$ 150.00	$ 1,200.00
6	2301-9091000	RUMBLE STRIP PANEL (PCC SURFACE)	EACH	2.00	$ 175.00	$ 350.00	2.00	$ 175.00	$ 350.00
7	2303-0245828	ASPHALT BINDER, PG 58-28	TON	3.00	$ 605.00	$ 1,815.00	141.00	$ 605.00	$ 85,305.00
8	2310-5151040	PORTLAND CEMENT CONCRETE OVERLAY, FURNISH ONLY	CY	13,558.00	$ 70.00	$ 949,060.00	16,687.00	$ 70.00	$ 1,168,090.00
9	2310-5151251	PORTLAND CEMENT CONCRETE OVERLAY, PLACEMENT ONLY (UNBONDED)	SY	56,320.00	$ 4.00	$ 225,280.00	65,706.00	$ 4.00	$ 262,824.00
10	2310-8300540	HOT MIX ASPHALT STRESS RELIEF COURSE	TON	48.00	$ 60.00	$ 2,880.00	2,246.00	$ 60.00	$ 134,760.00
11	2315-8275025	SURFACING, DRIVEWAY, CLASS A CRUSHED STONE	TON	206.00	$ 19.50	$ 4,017.00	206.00	$ 19.50	$ 4,017.00
12	2510-6745850	REMOVAL OF PAVEMENT	SY	1,626.70	$ 6.50	$ 10,573.55	1,626.70	$ 6.50	$ 10,573.55
13	2518-6910000	SAFETY CLOSURE	EACH	6.00	$ 125.00	$ 750.00	6.00	$ 125.00	$ 750.00
14	2527-9263109	PAINTED PAVEMENT MARKING, WATERBORNE OR SOLVENT-BASED	STA	771.73	$ 15.25	$ 11,768.88	771.73	$ 15.25	$ 11,768.88
15	2528-8445110	TRAFFIC CONTROL	LS	1.00	$ 5,500.00	$ 5,500.00	1.00	$ 5,500.00	$ 5,500.00
16	2528-8445113	FLAGGERS	EACH	1.00	$ 295.00	$ 295.00	1.00	$ 295.00	$ 295.00
17	2533-4980005	MOBILIZATION	LS	1.00	$ 35,000.00	$ 35,000.00	1.00	$ 35,000.00	$ 35,000.00
18	2601-2634100	MULCHING	ACRE	3.10	$ 700.00	$ 2,170.00	3.10	$ 700.00	$ 2,170.00
19	2601-2636041	SEEDING AND FERTILIZING	ACRE	3.10	$ 800.00	$ 2,480.00	3.10	$ 800.00	$ 2,480.00
20	2601-2642100	STABILIZING CROP - SEEDING AND FERTILIZING	ACRE	3.10	$ 300.00	$ 930.00	3.10	$ 300.00	$ 930.00
21	2602-0000020	SILT FENCE	LF	100.00	$ 2.00	$ 200.00	100.00	$ 2.00	$ 200.00
22	2602-0000030	SILT FENCE FOR DITCH CHECKS	LF	100.00	$ 2.00	$ 200.00	100.00	$ 2.00	$ 200.00
23	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
24	2602-0010010	MOBILIZATIONS, EROSION CONTROL	EACH	1.00	$ 500.00	$ 500.00	1.00	$ 500.00	$ 500.00
25	2602-0010020	MOBILIZATIONS, EMERGENCY EROSION CONTROL	EACH	1.00	$ 1,000.00	$ 1,000.00	1.00	$ 1,000.00	$ 1,000.00
						$ 1,567,082.93			$ 2,039,026.93

D

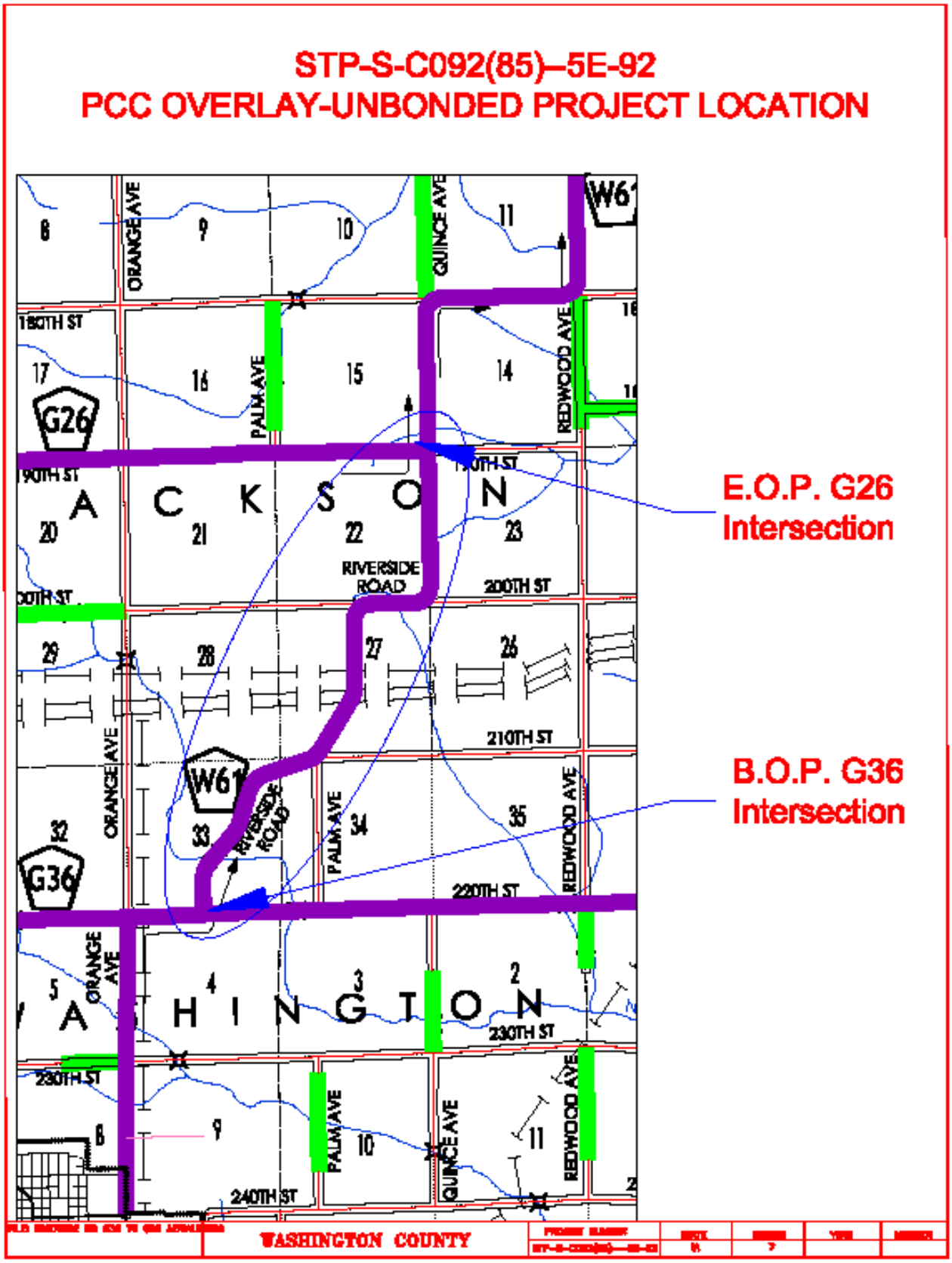
Time Schedule:

TSIP Application	August 15, 2015
Preliminary Project Design	October 2015
TSIP Funding Award	December 2015
Final Project Design	March 2016
TSIP Funds Available	July 2016
Project Letting	November 2016
Project Construction	April 2017-September 2017

If the project is awarded TSIP funds, the letting and construction date may be pushed back one to two years in order to tie this project in with some additional overlay work. This would be done to try and obtain better unit price for a larger funded set of projects.

E

Map:


STP-S-C092(85)–5E-92
PCC OVERLAY-UNBONDED PROJECT LOCATION
E.O.P. G26
Intersection
B.O.P. G36
Intersection
ORANGE AVE
QUINCE AVE
PALM AVE
REDWOOD AVE
RIVERSIDE ROAD
180TH ST
190TH ST
200TH ST
210TH ST
220TH ST
230TH ST
240TH ST
G26
G36
W61
A C K S O N
A H I N G T O N
WASHINGTON COUNTY

Color Pictures:

Typical section of existing pavement; notice edge rutting that is developing along edge of pavement.

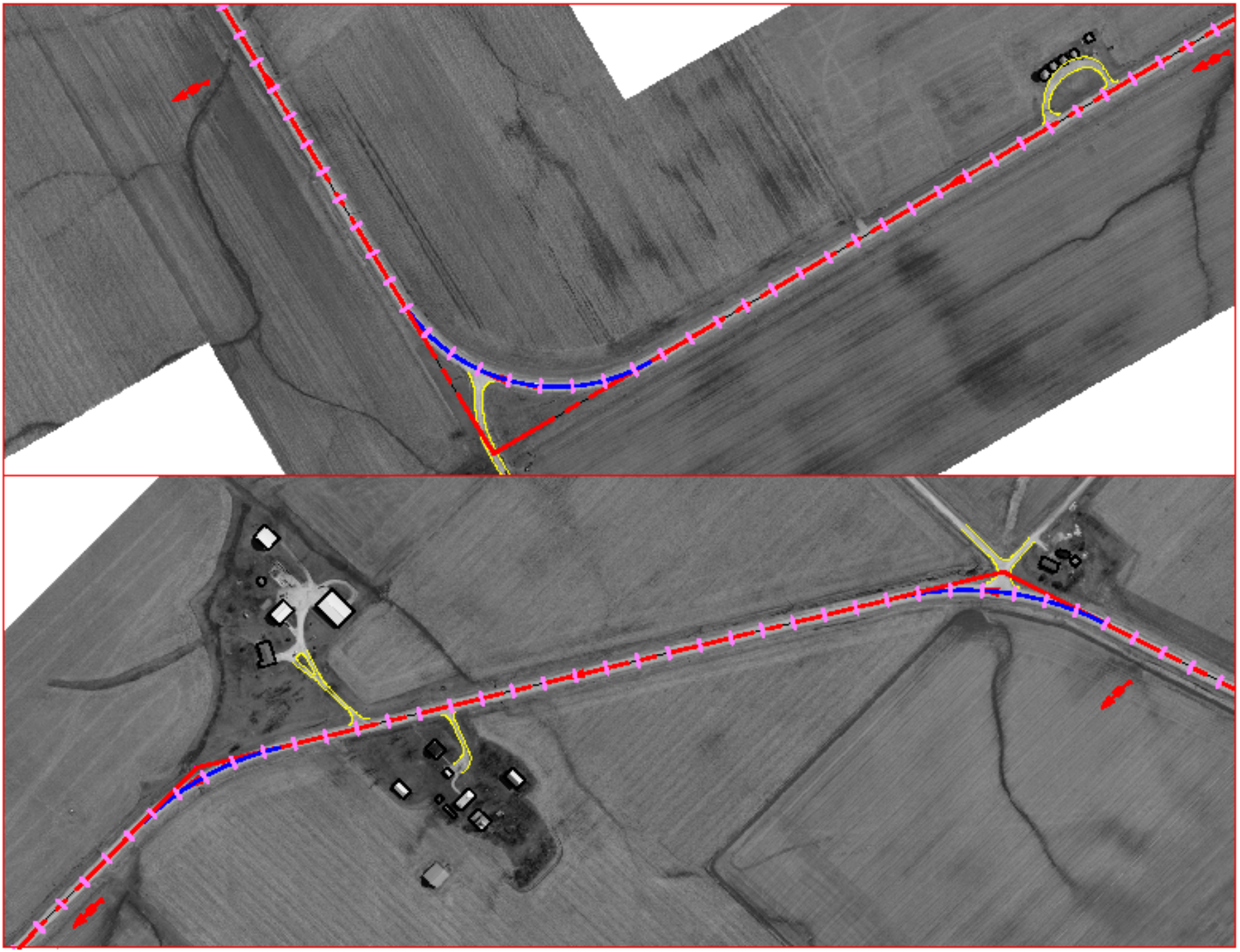
Edge rutting developing on topside of curve because of narrowness of the pavement.

Typical intersection of pavement and rock road, notice the rock that is tracked on to the driving surface, creating a safety hazard, in the center of the picture.

Typical section, notice edge rutting developing along straight stretch of pavement.

G & H

Plan View & Aerial:



INTERSECTION

I

Copies of Actual Investigating Officer's Report of Motor Vehicle Accident:

See attached set of accident reports supplied by the Washington County Sheriff's Office

J

Traffic Volume:

The 2014 AADT for this stretch of the Riverside Road (W61) is 390

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" PCC Unbonded Overlay; the widening unit and paved shoulder will be approximately 12" thick. The B/C Ratio was calculated to be 1.92.

A CMF for widening the existing pavement from 20' to 24' 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 2.82.

Iowa Department of Transportation

Crash Detail Report

Riverside Road 190th St-G36 2004-2014 Crash Details

Report Version 1.3 Aug 2006

2010558438 02/10/2010 17:06 — W061 / RIVERSIDE ROAD and 190TH ST and G026 / 190TH ST

County: 92 **City:**

Major Cause: Ran stop sign
Roadway Type: Intersection: Four-way intersection
Severity: Major
Fatalities: 0
Major Injuries: 1
Minor Injuries: 0
Possible Injuries: 0
Unknown Injuries: 0
Manner of Crash: Broadside
Surface Conditions: Wet
Light Conditions: Daylight
Weather Conditions: Clear
Drug/Alc Involved: none indicated
Property Damage: $5600
Number of Vehicles: 2

	Unit 1	Unit 2	Unit 3
Init Trav Dir:	South	East	0
Veh Action:	Essentially straight	Essentially straight	0
Configuration:	4-tire light truck	4-tire light truck	0
Driver Age:	54	45	0
Driver Gender:	M	M	
Driver Cond:	Normal	Normal	0
Drivr Contr 1:	none	Ran stop sign	0
Drivr Contr 2:	not reported	not reported	0
Fixed Object:	none	none	0

2010590381 07/25/2010 02:00 — W061 / RIVERSIDE RD

County: 92 **City:**

Major Cause: Driving too fast for conditions
Roadway Type: Non-intersection: No special feature
Severity: Poss/Unk
Fatalities: 0
Major Injuries: 0
Minor Injuries: 0
Possible Injuries: 1
Unknown Injuries: 0
Manner of Crash: Non-collision
Surface Conditions: Dry
Light Conditions: Dark - roadway not lighted
Weather Conditions: Clear
Drug/Alc Involved: Drug/Alcohol: Statutory
Property Damage: $1000
Number of Vehicles: 1

	Unit 1	Unit 2	Unit 3
Init Trav Dir:	South	0	0
Veh Action:	Essentially straight	0	0
Configuration:	Passenger car	0	0
Driver Age:	23	0	0
Driver Gender:	M		
Driver Cond:	Infl by alc/drugs/meds	0	0
Drivr Contr 1:	Too fast for conditions	0	0
Drivr Contr 2:	Swerved to avoid	0	0
Fixed Object:	Ditch/embankment	0	0

Iowa Department of Transportation

Crash Detail Report

Riverside Road 190th St-G36 2004-2014 Crash Details

Report Version 1.3 Aug 2006

2011620432 01/25/2011 15:40 W061 / RIVERSIDE RD
County:92 City:

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

Severity:	Minor	**Manner of Crash:**	Non-collision
Fatalities:	0	**Surface Conditions:**	Ice
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: 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:	16	0	0
Driver Gender:	F		
Driver Cond:	Normal	0	0
Drivr Contr 1:	Lost control	0	0
Drivr Contr 2:	Swerved to avoid	0	0
Fixed Object:	Ditch/embankment	0	0

2012700627 08/08/2012 14:35 W061 / RIVERSIDE RD
County:92 City:

Major Cause: Swerving/evasive 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:**	$3500

Number of Vehicles: 1

	Unit 1	Unit 2	Unit 3
Init Trav Dir:	North	0	0
Veh Action:	Leaving traffic lane	0	0
Configuration:	Passenger car	0	0
Driver Age:	19	0	0
Driver Gender:	F		
Driver Cond:	Normal	0	0
Drivr Contr 1:	Lost control	0	0
Drivr Contr 2:	Over correcting/steering	0	0
Fixed Object:	none	0	0

Rev. 5/14

Road Segment Benefit / Cost Safety Analysis

Iowa DOT Office of Traffic & Safety

County: Washington | Prepared by: Jacob Thorius | Date Prepared: Jul 29, 2015

Location: W61 (Riverside Road) from G36 (220th Street) north to G26 (190th Street)

Improvement

Proposed Improvement(s): 28' PCC Overlay with lanes widened to 12' from 10', paved shoulders 2' wide, and edgeline 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**
		$ 500,000	Present Value All Costs, **COST** = EC + OC

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

Traffic Volume Data

Source: DOT Traffic Count Data | 2014 Date of traffic count

Length (mi.)	Two-way veh/day	Description
3.99	390	From G36 to G26
3.99	miles total	

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

1,556 Current Vehicle Miles / Day, **VM**

2,204 End of Life Veh. Miles / Day

567,977 Current Veh. Miles / Year, **AM**

23,662,058 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**

0 Additional months | values as of May 2014

0	Fatal Crashes →	0	Fatalities @	$4,500,000	$ -
		1	Major Injuries @	$325,000	$ 325,000
4	Injury Crashes →	2	Minor Injuries @	$65,000	$ 130,000
		1	Possible Injuries @	$35,000	$ 35,000
4	Property Damage Only		(assumed cost per crash)	$7,400	$ 59,200
			-OR- enter all Property Costs of all crashes:		
8	Total Crashes, **TA**			Total $ Loss, **LOSS**	$ 549,200

1.60	Current Crashes / Year, **AA** = TA / T	**281.7**	Crashes / HMVM, Crash Rate, **CR** CR = TA x 10^8 / (AM x T)
$ 68,650	Cost per Crash, **AVCR** = LOSS / TA		
66.7	Total Expected Crashes, **TCR** = CR x TVMT/10^8	**$ 961,313**	Present Value of Avoided Crashes, **BENEFIT**
0.66	Crashes Avoided First Year **AAR** = AA x CRF / 100		
$ 44,990	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 = $961,313 : $500,000 = **1.92** : 1

District 6

Rev. 5/15

IOWA DOT

Application for TRAFFIC SAFETY FUNDS

GENERAL INFORMATION DATE: AUGUST 14, 2015

Location / Title of Project OTTERVILLE BLACKTOP SHOULDERS

Applicant BUCHANAN COUNTY SECONDARY ROADS

Contact Person BRIAN T. KEIERLEBER Title BUCHANAN COUNTY ENGINEER

Complete Mailing Address 1511 1ST ST E
INDEPENDENCE, IOWA

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 Project Cost $ 1,160,000

Safety Funds Requested $ 500,000

Rev. 5/15

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

Signed: _____ August 14, 2015
Signature Date Signed

BRIAN KEIERLEBER
Typed Name

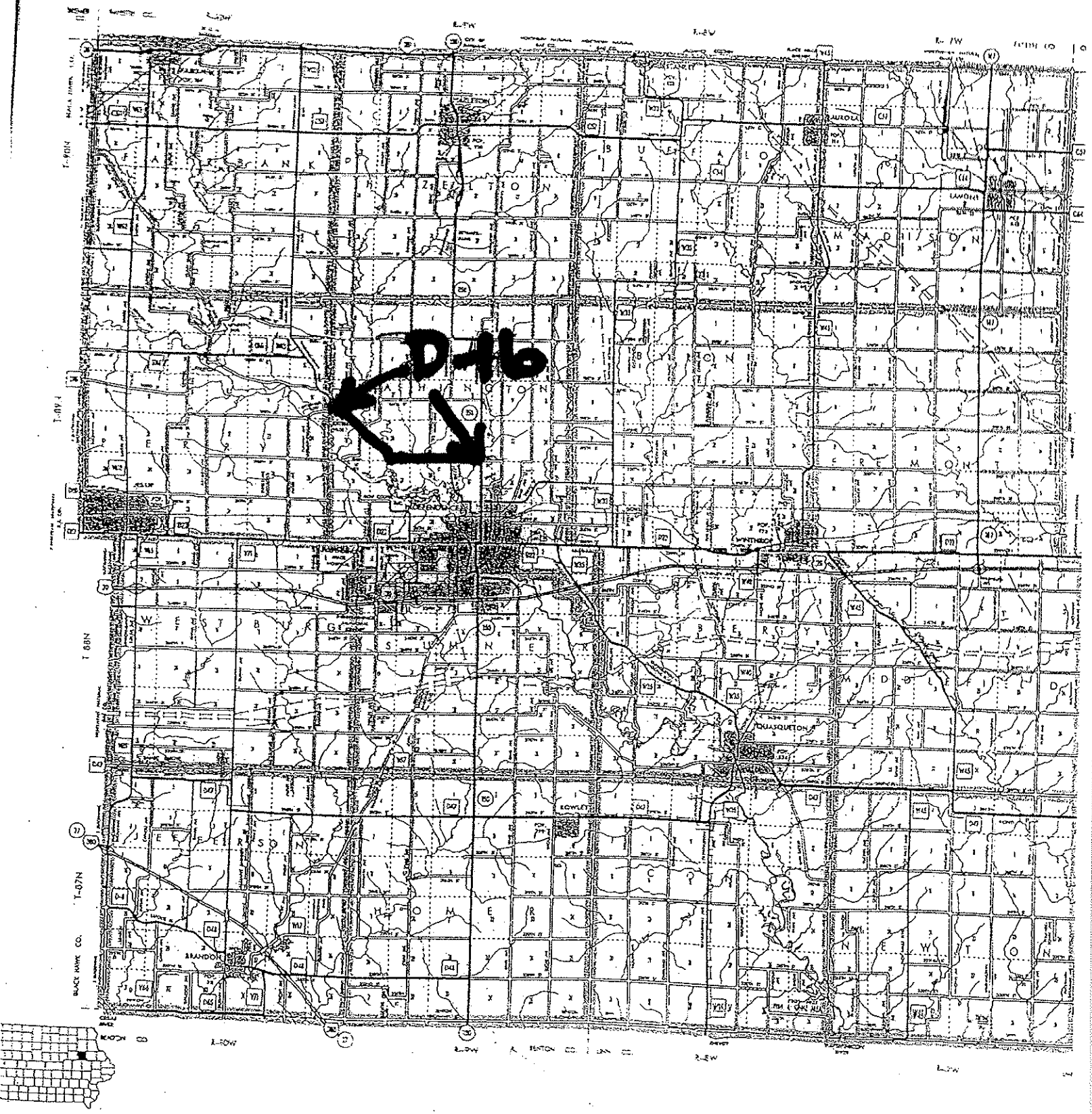
Attest: Ellen Gaffney August 14, 2015
Signature Date Signed

ELLEN GAFFNEY
Typed Name

TSIP Application August 14, 2015

Buchanan County is requesting funds to assist in constructing shoulders, flattening slopes and flattening driveways from IA 150 to W-13 on D-16 (Otterville Blacktop) in Buchanan County Iowa. The distance is 5.25 miles. Recent state law requires the strip, salvage and stockpile of soil driving costs up. This in addition to wetlands mitigation has caused the costs of constructing shoulders to become very expensive. Without funding assistance from other sources projects such as proposed will not occur. Currently there is approximately a 4' shoulder and 2:1 slopes. We are proposing to construct aa 8 ft. shoulder and 3:1 fore slopes in addition to 6:1 slopes on driveways. This allows for a future construction project of a 6" PCC overlay with 4' paved shoulders and a safety edge. This would allow for a 1.5 ft. earth shoulder outside the paved shoulder to be up against the safety edge.

BUCHANAN COUNTY



Rev. 5/14

Road Segment Benefit / Cost Safety Analysis

Iowa DOT Office of Traffic & Safety

County: Buchanan Prepared by: Brian Keierleber Date Prepared: Aug 27, 2015

Location: D-16 (Otteville Blacktop) W-13 to IA 150

Improvement

Proposed Improvement(s): Construct 10 ft. shoulders, pave the shoulders place a safety edge, center rumbles and e

$1,160,000	Estimated Improvement Cost, **EC**	20	Est. Improvement Life, years, **Y**
$ -	Other Annual Cost (after initial year), **AC**	1	Crash Reduction Factor (integer), **CRF**
$ -	Present Value Other Annual Costs, **OC**	4.0%	Discount Rate, **INT**
	$$OC = \frac{AC}{INT}\left(1 - \frac{1}{(1+INT)^Y}\right)$$	$ 1,160,000	Present Value All Costs, **COST** = EC + OC

Traffic Volume Data

Source: IDOT Traffic Counts from Service Bureau _____ Date of traffic count

Length (mi.)	Two-way veh/day	Description
4.22	870	
0.75	600	
4.97	miles total	

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

4,121 Current Vehicle Miles / Day, **VM**

5,029 End of Life Veh. Miles / Day

1,504,311 Current Veh. Miles / Year, **AM**

33,123,430 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

_____	Fatal Crashes →	0	Fatalities @	$4,500,000	$	-
		_____	Major Injuries @	$325,000	$	-
6	Injury Crashes →	3	Minor Injuries @	$65,000	$	195,000
		3	Possible Injuries @	$35,000	$	105,000
18	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**	$	477,600

4.80	Current Crashes / Year, **AA** = TA / T	**319.1**	Crashes / HMVM, Crash Rate, **CR** CR = TA x 10^8 / (AM x T)
$ 19,900	Cost per Crash, **AVCR** = LOSS / TA	$ 10,836	Present Value of Avoided Crashes, **BENEFIT**
105.7	Total Expected Crashes, **TCR** = CR x TVMT/10^8		
0.04	Crashes Avoided First Year **AAR** = AA x CRF / 100		
$ 734	Crash Costs Avoided in First Year, AAR x AVCR		
0.8	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 = $10,836 : $1,160,000 = **0.01** : 1

2010 - 2014* Reportable Crash History
D-16 Between W-13 and IA 150
Buchanan County, Iowa
(*2014 data downloaded 5/19/2015)

		Crashes						Injuries					
Year	County	Crashes	Fatal	Major	Minor	Poss/Unk	PDO	Injuries	Fatalities	Major	Minor	Possible	Unknown
2010	Buchanan	7	0	0	1	1	5	3	0	0	2	1	0
2011	Buchanan	5	0	0	0	2	3	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
2014	Buchanan	6	0	0	0	0	6	0	0	0	0	0	0
Totals:		23	0	0	2	3	18	6	0	0	3	3	

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

Feature Count Report (Monday, August 17, 2015 4:45:54 PM Central Daylight Time)
produced using: Iowa's Safety Analysis, Visualization, and Exploration Resource (SAVER)
by:
Michael D. Pawlovich, Ph.D., P.E.
Traffic Safety/Crash Data Engineer
Iowa Department of Transportation
Highway Division, Engineering Bureau, Traffic and Safety
800 Lincoln Way
Ames, Iowa 50010

copy version

CSEVERITY	FATALIT	INJURIE:	MAJINJ(	MININJ(	POSSINJ	UNKINJ(	PROPDMG	VEHICLE	TOCCUF
Property Damage Only	0	0	0	0	0	0	2000	1	777
Minor Injury	0	2	0	2	0	0	18100	2	4
	0	0	0	0	0	0	0	0	0
Property Damage Only	0	0	0	0	0	0	3800	1	1
Property Damage Only	0	0	0	0	0	0	3500	1	2
Possible/Unknown	0	1	0	0	1	0	8100	1	2
Property Damage Only	0	0	0	0	0	0	2000	1	1
Property Damage Only	0	0	0	0	0	0	5000	1	1
Property Damage Only	0	0	0	0	0	0	5100	2	2
	0	0	0	0	0	0	0	0	0
Property Damage Only	0	0	0	0	0	0	3000	1	777
Property Damage Only	0	0	0	0	0	0	2000	1	777
Possible/Unknown	0	1	0	0	1	0	8000	2	2
	0	0	0	0	0	0	0	0	0
Possible/Unknown	0	1	0	0	1	0	6500	1	1
Property Damage Only	0	0	0	0	0	0	2000	1	1
Property Damage Only	0	0	0	0	0	0	1500	1	1
Property Damage Only	0	0	0	0	0	0	5000	1	1
Property Damage Only	0	0	0	0	0	0	2000	1	1
Minor Injury	0	1	0	1	0	0	0	1	2
Property Damage Only	0	0	0	0	0	0	1500	1	1
Property Damage Only	0	0	0	0	0	0	5500	2	3
	0	0	0	0	0	0	0	0	0
Property Damage Only	0	0	0	0	0	0	5000	2	2
	0	0	0	0	0	0	0	0	0
Property Damage Only	0	0	0	0	0	0	5000	1	1
Property Damage Only	0	0	0	0	0	0	2500	1	1
Property Damage Only	0	0	0	0	0	0	10000	1	1

FIRSTHARM	CRCOMANNER
Collision with: Animal	Not Reported
Collision with: Vehicle in/from other roadway	Broadside
Collision with fixed object: Ditch/embankment	Non-collision
Collision with: Animal	Non-collision
Collision with fixed object: Bridge/bridge rail/overpass	Non-collision
Collision with fixed object: Tree	Non-collision
Collision with: Animal	Not Reported
Collision with: Vehicle in traffic	Rear-end
Collision with: Animal	Not Reported
Collision with: Animal	Not Reported
Collision with: Vehicle in traffic	Sideswipe - opposite direction
Collision with fixed object: Ditch/embankment	Non-collision
Collision with fixed object: Ditch/embankment	Non-collision
Collision with: Animal	Not Reported
Collision with: Animal	Not Reported
Collision with: Animal	Not Reported
Non-collision events: Other non-collision (explain in narrative)	Non-collision
Collision with: Animal	Not Reported
Collision with: Vehicle in/from other roadway	Broadside
Collision with: Vehicle in traffic	Rear-end
Collision with: Animal	Not Reported
Collision with: Animal	Not Reported
Non-collision events: Overturn/rollover	Non-collision

Brian Keierleber

From:	Georges Bou-Saab <gbousaab@iastate.edu>
Sent:	Wednesday, August 26, 2015 5:25 PM
To:	Brian Keierleber
Subject:	Fwd: Rumble Strip Paper
Attachments:	15-0179 - Safety Impacts of Michigan's Statewide Centerline Rumble Strip Program (Final Submit).docx

Greetings Brian,

I hope that you are doing great and I apologize for the late response regarding the combined CMF value for the county roadway segment in Buchanan County. I did my research and found a very useful NCHRP report that was published in 2008. The report presented Crash Modification Factors (CMFs) research performed for various roadway improvement strategies/countermeasures. However, CMF values for the following treatment, "***Adding Shoulder Rumble Strips***", were only based on rural and urban freeways and it is not applicable to other road classes such as two-lane or multilane. On the positive side, I was able to find another report published by the University of Central Florida where a before-and-after Empirical Bayes study on rural two-lane roads demonstrated an improvement (reduction in crashes) for both total and severe (fatal and major) crashes. Researchers calculated a Florida-specific simple SPF for rural two-lane roads and the CMF value for all crash type is 0.768 and 0.778 for severe crashes. In addition, I had the opportunity to meet with Dr. Peter Savolainen from our department and he is proficient researcher in the field of safety. He mentioned that INTRANS started working on a project with the Iowa DOT where they will study the impact of installing both centerline and shoulder rumble strips on county roads rather than just focusing on implementing the latter countermeasures separately. The project is still in the first phase where they are surveying all 99 counties in Iowa to determine the best locations for installing the combination of both treatments. I remember that you talked about adding both centerline and shoulder rumble strips on your county roadways but you are concerned about this particular segment since it is accessible by the Amish community. I forwarded the email by Dr. Savolainen and hopefully you find it helpful. He believes that the combination of both centerline and shoulder rumble strips would have a better result on crashes (i.e. lower CMF).

Moreover, the NCHRP report provided the CMF values for ***Changing Roadside Slope*** treatment and the minimum recommended side slope improvement (after condition) is 1:4 ratio (but you wanted to change the side slope from 1:2 existing condition to 1:3). I was not able to find a study that presented a CMF value for 1:3 side slope improvement, hence you might want to re-evaluate the countermeasure requirement for side slope. The CMF value for total crashes is 0.94 for changing the side slope from 1:2 (before condition) to 1:4 (after condition).

I also calculated the CMF for shoulder width and type from the Highway Safety Manual (HSM). According to the information you provided (changing 4 ft. gravel shoulder to 8 ft. composite), the CMF value turned out to be equal to 1.00.

Brian Keierleber

From:	Georges Bou-Saab <gbousaab@iastate.edu>
Sent:	Wednesday, August 26, 2015 5:25 PM
To:	Brian Keierleber
Subject:	Fwd: Rumble Strip Paper
Attachments:	15-0179 - Safety Impacts of Michigan's Statewide Centerline Rumble Strip Program (Final Submit).docx

Greetings Brian,

I hope that you are doing great and I apologize for the late response regarding the combined CMF value for the county roadway segment in Buchanan County. I did my research and found a very useful NCHRP report that was published in 2008. The report presented Crash Modification Factors (CMFs) research performed for various roadway improvement strategies/countermeasures. However, CMF values for the following treatment, "***Adding Shoulder Rumble Strips***", were only based on rural and urban freeways and it is not applicable to other road classes such as two-lane or multilane. On the positive side, I was able to find another report published by the University of Central Florida where a before-and-after Empirical Bayes study on rural two-lane roads demonstrated an improvement (reduction in crashes) for both total and severe (fatal and major) crashes. Researchers calculated a Florida-specific simple SPF for rural two-lane roads and the CMF value for all crash type is 0.768 and 0.778 for severe crashes. In addition, I had the opportunity to meet with Dr. Peter Savolainen from our department and he is proficient researcher in the field of safety. He mentioned that INTRANS started working on a project with the Iowa DOT where they will study the impact of installing both centerline and shoulder rumble strips on county roads rather than just focusing on implementing the latter countermeasures separately. The project is still in the first phase where they are surveying all 99 counties in Iowa to determine the best locations for installing the combination of both treatments. I remember that you talked about adding both centerline and shoulder rumble strips on your county roadways but you are concerned about this particular segment since it is accessible by the Amish community. I forwarded the email by Dr. Savolainen and hopefully you find it helpful. He believes that the combination of both centerline and shoulder rumble strips would have a better result on crashes (i.e. lower CMF).

Moreover, the NCHRP report provided the CMF values for ***Changing Roadside Slope*** treatment and the minimum recommended side slope improvement (after condition) is 1:4 ratio (but you wanted to change the side slope from 1:2 existing condition to 1:3). I was not able to find a study that presented a CMF value for 1:3 side slope improvement, hence you might want to re-evaluate the countermeasure requirement for side slope. The CMF value for total crashes is 0.94 for changing the side slope from 1:2 (before condition) to 1:4 (after condition).

I also calculated the CMF for shoulder width and type from the Highway Safety Manual (HSM). According to the information you provided (changing 4 ft. gravel shoulder to 8 ft. composite), the CMF value turned out to be equal to 1.00.

Thanks!

Peter T. Savolainen, Ph.D., P.E.
Associate Professor
Civil, Construction and Environmental Engineering
Iowa State University
482A Town Engineering Bldg
Ames, IA 50011
(515) 294-3381
pts@iastate.edu

--

Georges Bou-Saab

Graduate Research Assistant and President of Transportation Student Association

DoubleCheck identified this as **CLEAN**. Give feedback: This is SPAM · More

Application for TRAFFIC SAFETY FUNDS

GENERAL INFORMATION **DATE:** August 3, 2015

Location / Title of Project Safety Improvements - 11th St & Maynard Way, DeWitt, IA

Applicant City of DeWitt

Contact Person Steve Lindner Title City Administrator

Complete Mailing Address PO Box 407
DeWitt, IA 52742-0407

Phone 563-659-3811 (Area Code) E-Mail cdadmin@gmtel.net

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 $ 445,700

Safety Funds Requested $ 300,000

Rev. 5/15

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 DeWitt

Signed: _____ 8/10/15
Signature — Date Signed

Steve Lindner
Typed Name

Attest: _____ 8-10-15
Signature — Date Signed

Deanna Rokemeyer
Typed Name

RESOLUTION NO. 2015-67

RESOLUTION APPROVING THE SUBMITTAL OF AN APPLICATION TO THE IOWA DEPARTMENT OF TRANSPORATION (IDOT) TRAFFIC SAFETY IMPROVEMENT PROGRAM (TSIP) FOR FUNDING TRAFFIC SAFETY IMPROVEMENTS TO THE 11TH STREET MAYNARD WAY INTERSECTION INCLUDING THE INSTALLATION OF TRAFFIC SIGNALS

WHEREAS, the IDOT has established the TSIP program that provided funding to local governments to assist in funding projects that improve traffic safety where warranted; and,

WHEREAS, the intersection of 11th Street and Maynard Way has been identified as an intersection that experiences operational problems and a high crash rate; and,

WHEREAS, a report (dated September 26, 2013) funded with TEAP funds confirmed the problems identified above; and,

WHEREAS, the City of DeWitt commissioned IIW to further analyze the intersection and recommend improvements to improve the safety and operation of the intersection.; and,

WHEREAS, IIW presented its analyses in July of 2015 recommending the installation of signals to the intersection and to construct additional lane capacity allowing for east bound and west bound left turn lanes at the intersection; and,

WHEREAS, the estimated costs for the intersection improvements include $107,000.00 for design and engineering fees, and $338,700 for construction with a total estimated cost of $445,700.00.

NOW, THEREFORE, IT IS RESOLVED by the City Council of the City of DeWitt, Iowa, that:

1. The City Council approves the application for TSIP funding.
2. The City Council commits $150,000.00 to the project for design, engineering fees and construction costs.
3. The City Council commits to accepting and maintaining the improvements funded by the TSIP funds at the 11th Street Maynard Way intersection.

PASSED AND APPROVED this 3rd day of July, 2015.

Verlyn R. Scheckel

VERLYN SCHECKEL, MAYOR PRO TEM

ATTEST:

DEANNA REKEMEYER, ACTING CITY CLERK

The intersection of 11th Street, Maynard Way and Casey's General Store business driveway experience both operational problems and a high crash rate. In an attempt to identify solutions, the City of DeWitt, in cooperation with the Iowa DOT utilized TEAP funding; resulting in a report dated September 26th, 2013. The report outlined potential solutions for mitigating the relatively high crash rate at the Maynard Way & 11th Street intersection. The 2013 report suggested the following recommendations:

Short Term:

A. Remove/modify sight distance obstruction located in the southwest quadrant.
B. Install "DO NOT BLOCK INTERSECTION" regulatory sign.
C. Monitor installation of "DO NOT BLOCK INTERSECTION" pavement markings.
D. Convert 11th Street from a 4-lane cross section facility to a 3-lane cross section in combination with item E.
E. Install a split-phased traffic signal.

Long Term:

A. Realign the south leg of the intersection.
B. Implement access management along 11th Street corridor.

Short Term items A, B, & C have been implemented; however, crashes and motorists complaints continue to occur. The "DO NOT BLOCK INTERSECTION" pavement markings were installed in the fall of 2012. The sign was installed shortly after the pavement markings.

EXISTING CONDITIONS

11th Street (old Highway 30) is an east-west 4-lane facility, with two eastbound and two westbound lanes through DeWitt, and is classified as a major collector on federal functional classification maps. 11th Street, in the area of Maynard Way, is 45-feet wide with curbs on both sides. There are sidewalks on the north and south side of 11th Street. The speed limit on 11th Street is posted at 35 mph, and traffic is free-flow at the Maynard Way intersection.

Maynard Way, the north leg of the intersection, is an average width of 36-feet with a posted speed limit of 25 mph. At the intersection, a 12 foot lane exists in the northbound direction and two 12 foot lanes are marked southbound for left and right turns. Although no lane is marked for through traffic, a few vehicles do travel through the intersection into the driveway servicing Casey's General Store, typically from the right turn lane. Maynard Way has curb and gutter on both sides. There is a sidewalk on the east side of Maynard Way. Maynard Way is controlled by a stop sign at 11th Street.

The south leg of the intersection is the eastern-most of two access points to Casey's General Store. This 36 foot wide 2-way driveway functions as the northbound approach on this intersection, and is skewed to the west from Maynard Way approximately 20- feet from centerline to centerline. Casey's General Store driveway does not have any traffic control devices or pavement markings.

SUMMARY OF CRASH HISTORY

Copies of crash reports from January, 2010 to December, 2014 were provided by the City of DeWitt Police Department for the intersection study. There were 19 crashes reported at the intersection during that period. 15 of the 19 reported crashes were angle or broadside type crashes, 3 were rear-end crashes, and 1 non-collision involving a motorcycle driver that lost control. The following is a summary of the crash history.

By year:

- 19 Total crashes
    - 2010 – 5
        - 3 angle
        - 2 rear-end
    - 2011 – 3
        - 2 angle
        - 1 rear-end
    - 2012 – 4
        - 2 angle
        - 1 broadside
        - 1 non-collision
    - 2013 – 3
        - 1 angle
        - 2 broadside
    - 2014 – 4
        - 4 angle

7 of the 15 angle or broadside crashes were directly attributed to another vehicle in the intersection blocking the view of one of the drivers involved in the crash. Also, the non-collision was attributed to another vehicle obstructing the view of the driver.

Contributing Factors:

- 19 Total Crashes
    - 7 angle/broadside – view obstructed by another vehicles in the intersection.
    - 5 angle/broadside – failure to yield making a left turn, the narrative did not state any cause.
    - 2 angle/broadside – driver blinded by morning sun.
    - 1 angle – involved an ambulance traveling fast.
    - 1 non-collision – motorcycle took evasive action and lost control. Driver turning left did not see motorcycle due to another vehicle blocking view.
    - 2 rear-end – icy conditions.
    - 1 rear-end – vehicle on 11th St. turning right, had to come to a complete stop due to a pedestrian and was rear ended.

Injuries

- 0 Fatalities
- 8 Injury Crashes
    - The 8 crashes resulted in 5 minor injuries and 8 possible injuries.
- 11 Property Damage Only
    - $115,600 Property Damage for all 19 crashes.

There was no apparent pattern of accidents based on time of day, or age of driver.

Since the above crash history has been compiled, 2 additional angle-type crashes have occurred at this intersection. One occurred on January 28, 2015 and the other occurred on April 2, 2015. These crashes are not included in the above summary nor are they included in the benefit/cost ratio; however, the reports are included in Section I of this report.

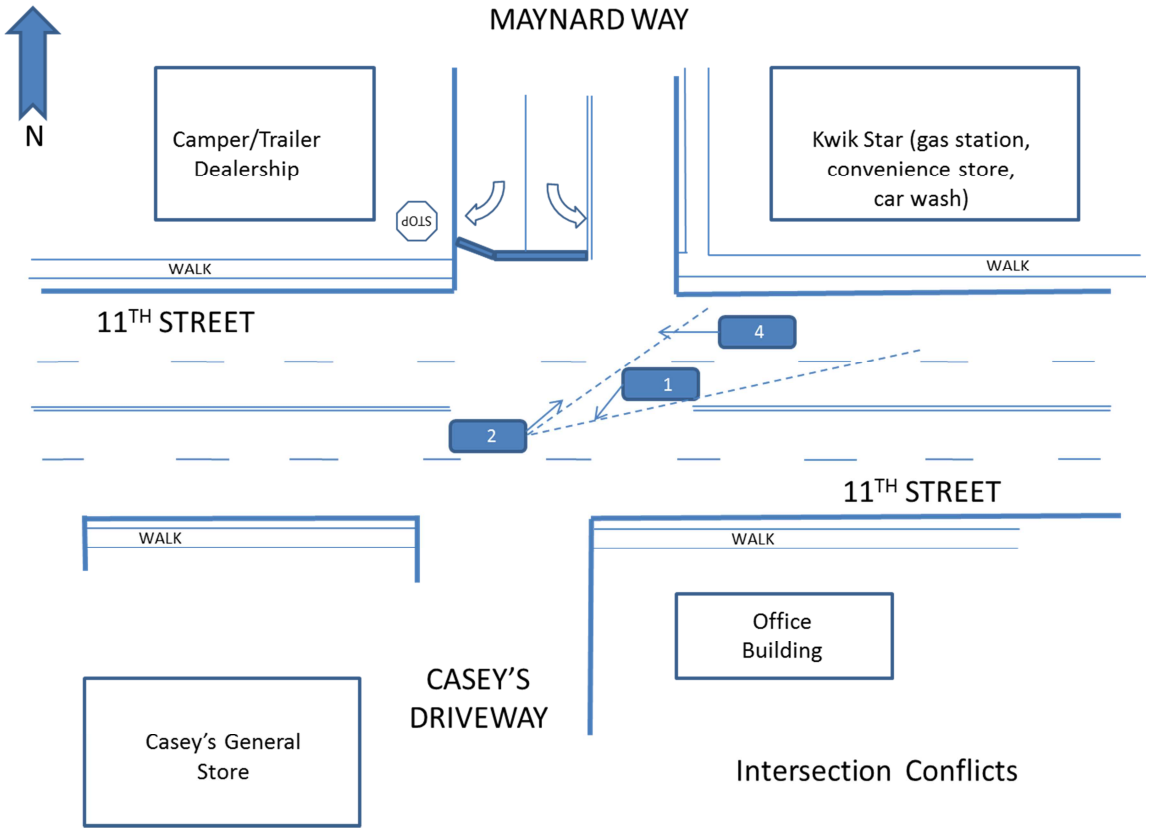
APPARENT CAUSES OF CRASHES

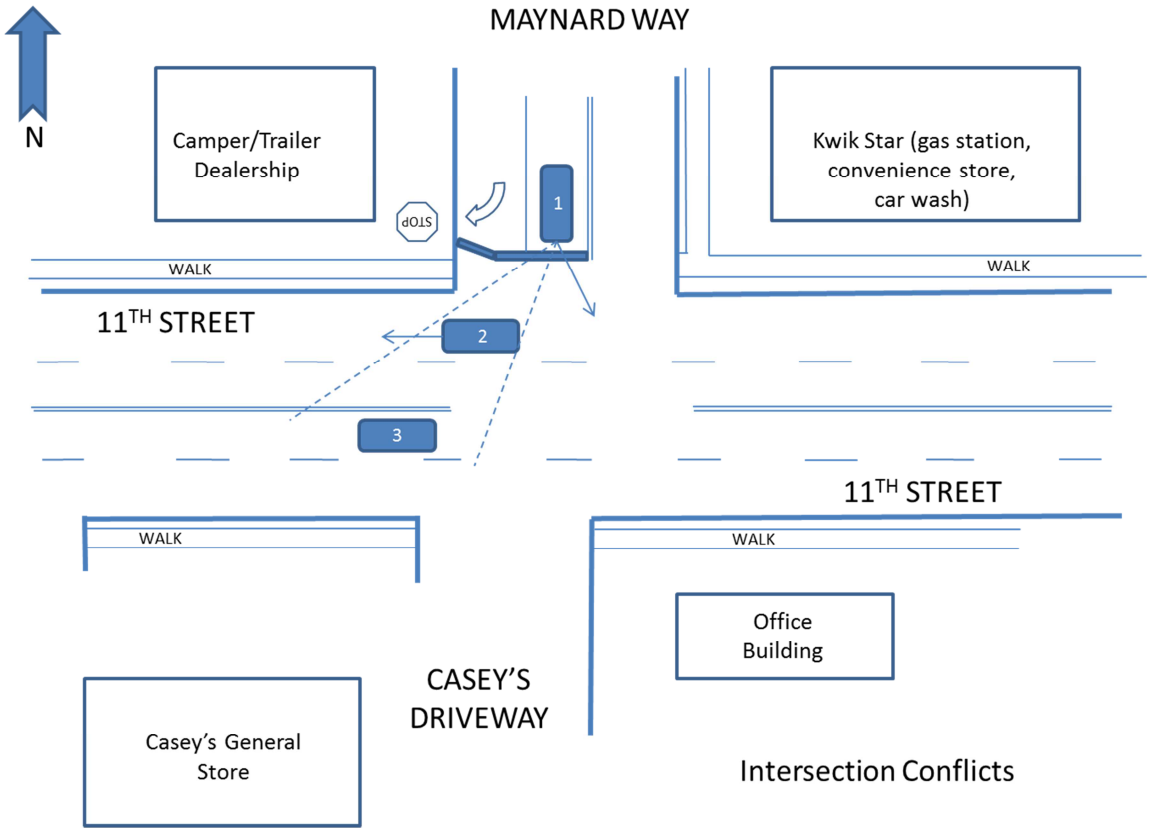
There appear to be 3 primary causes of a majority of the crashes. First, the geometry of the intersection can be confusing with the north and south legs, Maynard Way and Casey's driveway, offset. Second, because of the 4-lane configuration of 11th Street, vehicles in the intersection block the view for other motorists; and third, there is a relatively large volume of traffic using the intersection.

The non-typical geometrics of the intersection can be confusing. With the offset northbound and southbound approach, drivers may be confused as to who has the right-of-way. The driving paths for the left turns from 11th Street overlap such that eastbound and westbound left turns cannot occur simultaneously. Also, northbound vehicles from Casey's to Maynard Way must make a jog through the intersection since the approaches do not line up. Finally, drivers on 11th Street turning onto Maynard Way or into Casey's parking lot may not understand where they should stop to wait for a gap in traffic so the intersection can continue to be accessed by other drivers who have the right-of-way. For example, the police commented that drivers do not understand what the "DO NOT BLOCK INTERSECTION" hatch marks mean.

The second primary cause of crashes appears to be that vehicles stopped or traveling through the intersection block the view for other motorists trying to navigate the intersection. It was specifically noted in 7 of the accident reports that the drivers cited for failure to yield making a left turn did not see the approaching vehicle because of another vehicle in the intersection blocking their view (See diagrams on page 4 of 6).

And the third cause of crashes appears to be the relatively large volume of traffic on 11th Street reduces the opportunity of vehicles on Maynard Way or Casey's driveway to enter 11th Street. Currently, the north and south legs of the intersection operate at a level of service of 'D' and 'F' respectively. Drivers become impatient and take more chances.


MAYNARD WAY
N
Camper/Trailer Dealership
STOP
Kwik Star (gas station, convenience store, car wash)
WALK
WALK
11TH STREET
4
1
2
11TH STREET
WALK
WALK
Office Building
CASEY'S DRIVEWAY
Casey's General Store
Intersection Conflicts


MAYNARD WAY
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WALK
11TH STREET
2
3
11TH STREET
WALK
WALK
Office Building
CASEY'S DRIVEWAY
Casey's General Store
Intersection Conflicts

PROPOSED SOLUTION

The City of DeWitt asked IIW, P.C. to further explore the traffic signal option which was recommended in the TEAP funded September 26th, 2013 report, with and without changing the cross section from a 4-lane facility to a 3-lane or 5-lane facility. Agricultural traffic was also a consideration. 11th Street is the only viable route for agricultural traffic to get from the west side of DeWitt to the east side of town, because slow moving vehicles are prohibited from using US 30 and US 61 around DeWitt. IIW concurred with the 2013 report that a traffic signal would provide the best solution to reduce the angle type crashes. IIW also determined that changing the cross section to a 5-lane facility would offer the most safety impacts with the highest Crash Reduction Factor, and would provide the best level of service. Additionally, this proposed solution accommodates agricultural traffic and is planning to provide a pedestrian crossing across 11th Street. Currently, the closest place for pedestrians to cross 11th Street is 1,500-feet to the east or 1,900-feet to the west. Their report is included in this application package.

SAFETY JUSTIFICATION

The justification for a traffic signal is based on the crash history and on traffic counts taken in both 2013 and 2015. Between October, 2010 and June, 2011, 5 angle crashes occurred. Also, between May, 2014 and April, 2015, 5 angle crashes occurred.

Two hours of turning movement counts were taken on May 14, 2013 from 7:00 AM to 9:00 AM, and 3 hours of turning movement counts were taken on April 30, 2013 from 3:00 PM to 6:00 PM. Since 2013, Kwik Star has opened on the northeast quadrant of the intersection, therefore it is expected that traffic volumes have increased with this new traffic generator. In order to confirm that the traffic signal meets signal warrants, additional counts were taken on July 31, 2015 from 10:00 AM to 1:00 PM.

With these 8 hours of turning movement counts and a crash history of 5 reported crashes in a 12-month period, which are susceptible to correction by a traffic signal, this intersection meets Warrant 7, Crash Experience. The following table is from the MUTCD, Table 4C-1, Condition B. The population of DeWitt is less than 10,000 so the traffic volumes in the 56% column were used.

Condition B—Interruption of Continuous Traffic									
Number of lanes for moving traffic on each approach		**Vehicles per hour on major street (total of both approaches)**				**Vehicles per hour on higher-volume minor-street approach (one direction only)**			
Major Street	Minor Street	100%[a]	80%[b]	70%[c]	56%[d]	100%[a]	80%[b]	70%[c]	56%[d]
1	1	750	600	525	420	75	60	53	42
2 or more	1	900	720	630	504	75	60	53	42
2 or more	2 or more	900	720	630	504	100	80	70	56
1	2 or more	750	600	525	420	100	80	70	56

DESIGN CONSIDERATIONS

All traffic signal poles will be out of the clear zone and detection will be provided on all approaches. The traffic signal will include protected left turn phases on 11th Street. Because of the offset intersection, the left turn phases will be lead/lag. A phasing diagram is included on the conceptual traffic signal layout in Section K. By widening Casey's General Store driveway, the north and south through movements are better aligned which will permit the northbound and southbound traffic to share green time and reduce overall intersection delay. The detection for Casey's driveway is currently shown outside of the right-of-way. If a maintenance easement agreement cannot be negotiated, then other forms of detection will be explored. It is also expected that a temporary construction easement will be needed from Casey's. The traffic signal concept also includes pedestrian crossings with pedestrian detection on the northbound, southbound, and westbound approaches.

Because this traffic signal design is only in the conceptual stage, no topographic survey has been taken and it is difficult to determine the exact costs associated with this project. An itemized breakdown of all costs is included in Section C. This also includes a contingency to address the unforeseen items expected to be discovered in the design phase. $300,000 of the $338,700 estimated construction costs are expected to be funded by this grant application. The additional $38,700 construction costs plus $107,000 for design, survey, construction staking, and construction administration will be funded by the City of DeWitt.

11th Street & Maynard Way
City of DeWitt, Iowa
15064

IIW, P.C.
4155 Pennsylvania Avenue
Dubuque, IA 52002-2628
563-556-2464 Voice / 563-556-7811 Fax
www.iiwengr.com

C

Preliminary Cost Estimate - 5-lane cross section with traffic signal and realign Casey's driveway
June, 2015

NO.	DESCRIPTION	QUANTITY	UNIT PRICE	TOTAL PRICE
	HANDHOLES AND JUNCTION BOXES	9 EA	$1,150.00	$10,350.00
	CONTROL CABINET AND FOUNDATION	1 EA	$14,000.00	$14,000.00
	PAINTED PAVEMENT MARKING, WATERBORNE OR SOLVENT-BASED	15 STA	$100.00	$1,500.00
	SIGNAL POLE, WITH 2 MAST ARMS, INSTALLED WITH FOUNDATION	2 EA	$15,000.00	$30,000.00
	PEDESTRIAN SIGNAL POLE, INSTALLED WITH FOUNDATION	3 EA	$4,000.00	$12,000.00
	4" CONDUIT, BORED	250 LF	$40.00	$10,000.00
	2" CONDUIT, TRENCHED	80 LF	$10.00	$800.00
	5 SECTION TRAFFIC SIGNAL HEAD, INSTALLED	2 EA	$1,400.00	$2,800.00
	3 SECTION TRAFFIC SIGNAL HEAD, INSTALLED	8 EA	$1,200.00	$9,600.00
	STREET NAME SIGN, D3-1, VARIES X 18"	4 EA	$950.00	$3,800.00
	COUNTDOWN PEDESTRIAN SIGNAL HEAD, INSTALLED	6 EA	$850.00	$5,100.00
	PEDESTRIAN PUSH BUTTONS, INSTALLED	6 EA	$300.00	$1,800.00
	PEDESTRIAN PUSH BUTTON SIGN, INSTALLED, 10-3E, 9"X15"	6 EA	$210.00	$1,260.00
	ELECTRICAL CONDUCTORS	1,050 LF	$7.00	$7,350.00
	LOOP DETECTORS	31 EA	$1,000.00	$31,000.00
	TRAFFIC CONTROL	1 LS	$5,000.00	$5,000.00
	MOBILIZATION	1 LS	$20,000.00	$20,000.00
	SAWCUT, FULL DEPTH	1,130 LF	$1.00	$1,130.00
	PAVEMENT REMOVAL	385 SY	$20.00	$7,700.00
	PCC WALK REMOVAL	235 SY	$15.00	$3,525.00
	EXCAVATION	220 CY	$8.00	$1,760.00
	8" PCC W/ INTEGRAL CURB	845 SY	$48.00	$40,560.00
	6" PCC DRIVE	175 SY	$40.00	$7,000.00
	4" PCC WALK	240 SY	$35.00	$8,400.00
	DETECTABLE WARNINGS	40 SF	$40.00	$1,600.00
	TOPSOIL; STRIP, STOCKPILE AND RESPREAD	60 CY	$22.00	$1,320.00
	MODIFIED SUBBASE	425 TON	$20.00	$8,500.00
	STORM SEWER INTAKE (101-B)	2 EA	$3,500.00	$7,000.00
	18" STORM SEWER, GRAVITY MAIN, TRENCHED, 2000D	24 LF	$100.00	$2,400.00
	SEED, FERTILIZE, AND MULCH	500 SY	$2.00	$1,000.00
	ADJUST UTILITY POLE	1 EA	$750.00	$750.00
	ADJUST HYDRANT	1 EA	$1,000.00	$1,000.00
	ADJUST UTILITY MANHOLE FRAME AND COVER	1 EA	$500.00	$500.00
				$260,500.00
	CONTINGENCY	30%		$78,200
	TOTAL ESTIMATED CONSTRUCTION COST			**$338,700.00**
	ESTIMATED COST OF DESIGN, SURVEY, STAKING, CONSTRUCTION ADMINISTRATION, LEGAL AND MISC.			**$107,000**
	TOTAL PROJECT COST			**$445,700**
	GRANT REQUEST			**$300,000**
	CITY COSTS			**$145,700**
				$445,700

Time Schedule

Funding Approval

- December, 2015

Development of Construction Plans and Specifications

- March, 2016 – July, 2016

Bidding

- August, 2016

Construction

- Fall, 2016

Intersection or Spot Benefit / Cost Safety Analysis

Rev. 5/14

Iowa DOT Office of Traffic & Safety

County: Clinton | Prepared by: JMV | Date Prepared: Jun 16, 2015

Intersection: 11th Street & Maynard Way, DeWitt

Improvement

Proposed Improvement(s): Traffic Signal Installation and change 4 lane cross section to 5 lane cross section with left turn lanes at the intersection. Realign Casey's driveway.

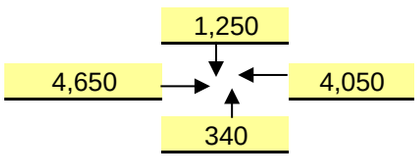
$ 338,700	Estimated Improvement Cost, **EC**	15	Est. Improvement Life, years, **Y**
$ 1,000	Other Annual Cost (after initial year), **AC**	51	Crash Reduction Factor (integer), **CRF**
$ 11,118	Present Value Other Annual Costs, **OC**	4.0%	Discount Rate (time value of $), **INT**
		$ 349,818	Present Value Cost, **COST** = EC + OC

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

Traffic Volume Data

Source: Iowa DOT Traffic Count | 2014 Date of traffic count

Daily Entering Vehicles by Approach (or AADT / 2)



3,755,850	Current Annual Entering Veh., **AEV** = DEV * 365
10,290	veh / day, Final Year DEV, **FDEV**
56.34	MEV, Total Million Entering Veh. Over life of Project, **TMEV**
0.0%	Projected Traffic Growth (0%-10%), **G**
10,290	Current Daily Entering Vehicles, **DEV**

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

Crash Data

2010 First full year --> 2014 Last full year — 5.0 years, Time Period, **T**

Additional months — values as of May 2014

0	Fatal Crashes	0	Fatalities @	$4,500,000	$	-
		0	Major Injuries @	$325,000	$	-
8	Injury Crashes	5	Minor Injuries @	$65,000	$	325,000
		8	Possible Injuries @	$35,000	$	280,000
11	Property Damage Only		(assumed cost per crash)	$7,400	$	-
		-OR-	enter all Property Costs of all crashes:		$	115,600
19	Total Crashes, **TA**			Total $ Loss, **LOSS**	$	720,600

3.80	Current Crashes / Year, **AA** = TA / T	**1.01**	Crashes / MEV, Crash Rate, **CR** CR = TA x 10^6 / (DEV x 365 x T)
$ 37,926	Cost per Crash, **AVC** = LOSS / TA		
57.0	Total Expected Crashes, **TECR** = CR x TMEV	**$ 818,817**	Present Value of Avoided Crashes, **BENEFIT**
1.94	Crashes Avoided First Year **AAR** = AA x CRF / 100		
$ 73,645	Crash Costs Avoided in First Year, AAR x AVC		
29.1	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 = $818,817 : $349,818 = **2.34** : 1

Traffic Impact Analysis
Intersection of 11th Street
&
Maynard Way / Casey's Driveway
City of DeWitt, Clinton County, Iowa

July, 2015

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

Julie P. Neebel, P.E. 7-9-15
Iowa License No. 14690
My License Renewal Date is December 31, 2016
Parts covered by the seal: All

Jeri Vondera
Transportation Design Engineer

TRAFFIC ENGINEERING ASSISTANCE PROGRAM

FINAL

11th Street & Maynard Way Intersection Safety Study

Prepared for:

City of DeWitt, IA

In Cooperation With:
Iowa Department of Transportation &
U.S. Department of Transportation
Federal Highway Administration

September 26, 2013

HRGreen

INFORMATION SHEET
IOWA DEPARTMENT OF TRANSPORTATION
TRAFFIC ENGINEERING ASSISTANCE PROGRAM

11th STREET AND MAYNARD WAY INTERSECTION SAFETY STUDY

September 26, 2013

1. Local Jurisdiction: City of DeWitt, IA

2. Reason TEAP Study Originated: Concerns at 11th Street & Maynard Way intersection regarding lack of sight lines for left-turning vehicles.

3. Scope of Services Provided: Performed field review and observation of existing conditions; performed turning movement counts, evaluated relevant crash history and traffic operations; developed recommendations; and prepared illustrative drawings of proposed improvements.

4. The Consultant, HR Green, submitted a final report dated September 26, 2013 with the following recommendations:

   Short-Term:
   A. Remove/modify sight distance obstruction located in the southwest quadrant
   B. Install “DO NOT BLOCK INTERSECTION” regulatory sign (MUTCD R10-7)
   C. Monitor installation of “DO NOT BLOCK INTERSECTION” pavement markings
   D. Convert 11th Street from a four-lane cross section facility to a three-lane cross section in combination with the final short-term bullet
   E. Install a split-phased traffic signal (it is understood however that the installation of a traffic signal is not a low-cost measure)

   Long-Term:
   A. Realign the south leg of the intersection
   B. Implement access management along 11th Street corridor

5. The order of magnitude construction cost opinions for recommended improvements:

   Short-Term:
   A. “DO NOT BLOCK INTERSECTION” Regulatory Sign: $300 - $500
   B. 4-Lane to 3-Lane Conversion: $7,500 - $15,000
   C. Traffic Signal System: $150,000

   Long-Term:
   A. South Leg Realignment: Further Study Necessary
   B. Access Management along Corridor: Further Study Necessary

6. Potential funding sources include the Iowa Clean Air Attainment Program (ICAAP) and Traffic Safety Improvement Program (TSIP).

Traffic Engineering Assistance Program

11th Street and Maynard Way Intersection Safety Study

DeWitt, Iowa

FINAL Report

September 26, 2013

Prepared For:

City of DeWitt, Iowa

In Cooperation with:

Iowa Department of Transportation

LICENSED PROFESSIONAL ENGINEER J. ANDREW SWISHER 17928 IOWA	I hereby certify that this engineering document was prepared by me or under my direct personal supervision and that I am a duly licensed Professional Engineer under the laws of the State of Iowa. 9/26/13 J. ANDREW SWISHER, P.E. DATE License Number: 17928 My license renewal date is DECEMBER 31, 2013 Pages or sheets covered by this seal: Entire Document

Prepared By:

HRGreen

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INTRODUCTION

Purpose and Study Objective

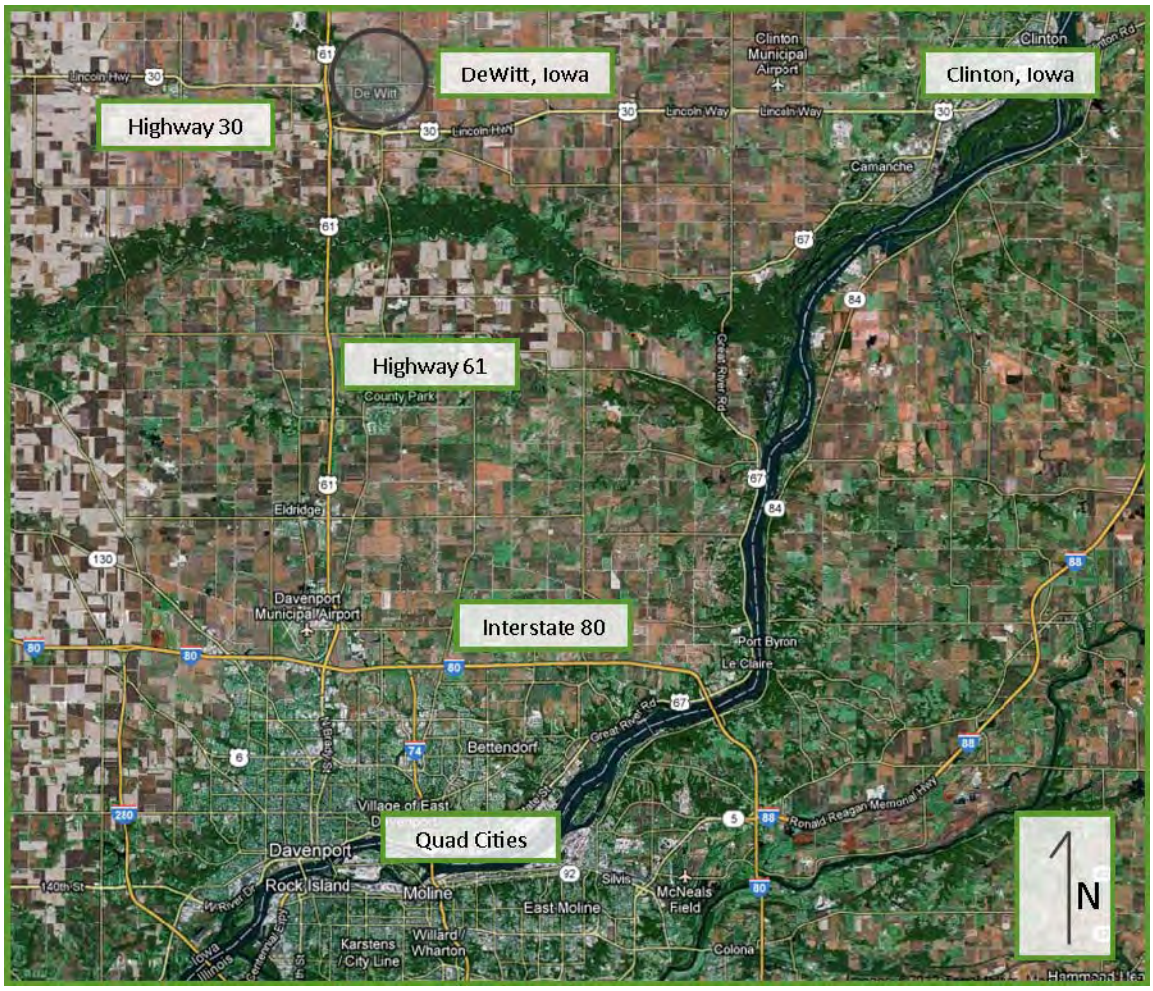
At the request of the Iowa Department of Transportation (DOT) and the City of DeWitt, Iowa, through the Iowa DOT Traffic Engineering Assistance Program (TEAP), this study evaluated the safety of left-turn movements off of 11th Street onto Maynard Way (north) or into the convenience store parking lot (south). The study examined existing physical and traffic conditions at the intersection, and proposed improvements of intersection geometry and traffic control.

BACKGROUND

Study Location

DeWitt is located in Clinton County and is approximately twenty-miles north of the Quad Cities and twenty-miles west of Clinton, Iowa. In 2011, the population of DeWitt was approximately 5,300 people. The location of DeWitt is shown in **Exhibit 1**.

Exhibit 1 – Location of DeWitt, Iowa



The study area includes the intersection of 11th Street (also known as Old Highway 30 and State Highway 948) and Maynard Way as well as the local business access point to the south of the intersection.

Exhibit 2 shows the location of study area in relation to primary locations in the City of DeWitt. **Exhibit 3** shows greater detail of the study intersection including the business corridor along 11th Street.

Exhibit 2 – Project Study Area

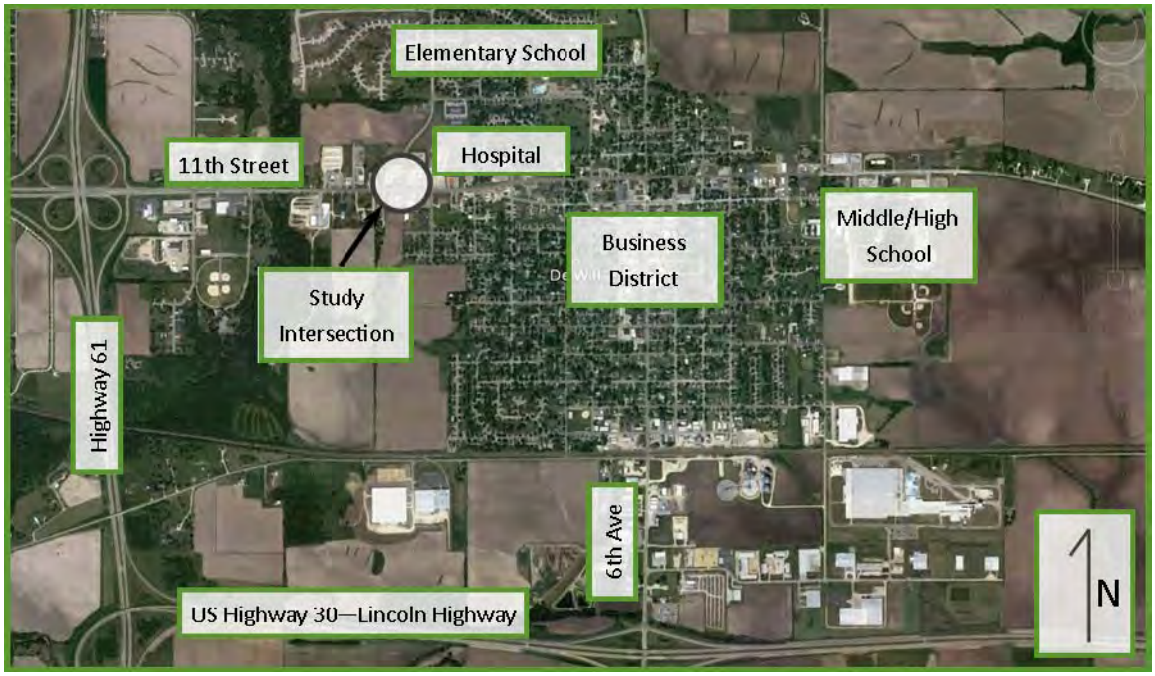
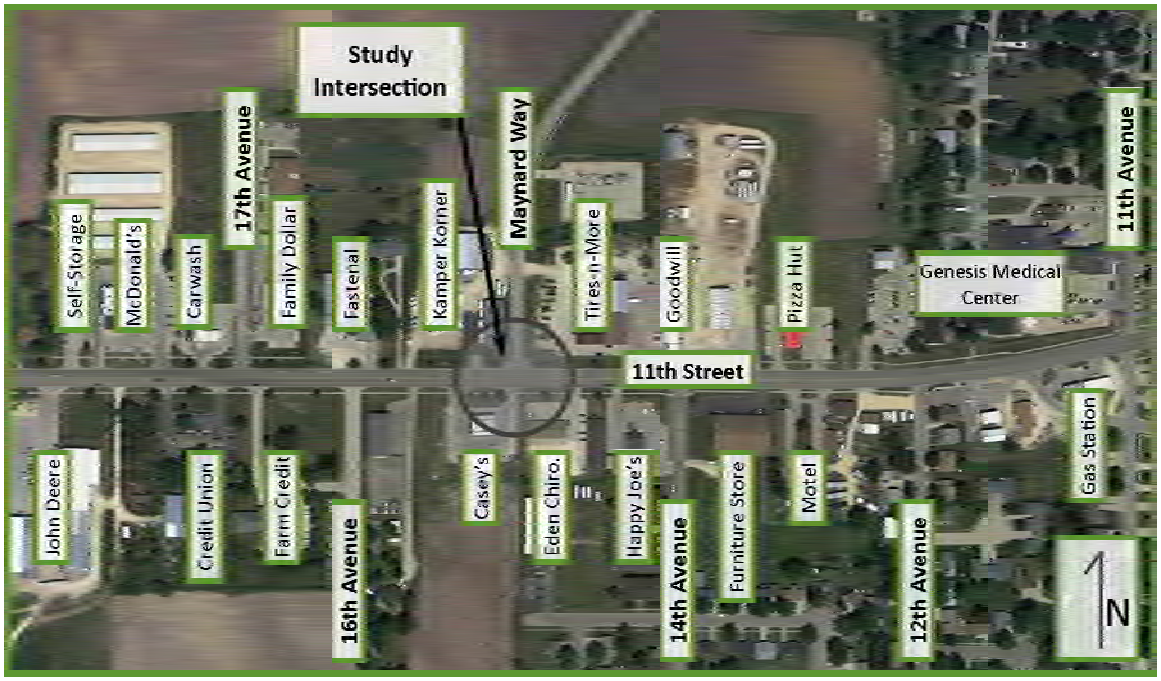


Exhibit 3 – Study Intersection & 11th Street Corridor



Study Area Existing Conditions

11th Street (Old Highway 30) is an east-west four-lane facility through DeWitt and is classified as a major collector on federal functional classification maps. The cross section of 11th Street in the vicinity of the study area is 48 feet wide with curbs on both sides. Two 12 foot lanes exist in each direction with an undivided centerline. One street light exists in the northeast quadrant of the 11th Street & Maynard Way study intersection. A 5 foot sidewalk exists on the south side of 11th Street an average of 12 feet from the back of curb. A sidewalk has recently been added along the north side of 11th Street.

Maynard Way is a north/south two-lane facility with a cross section in the vicinity of the study area of an average of 36 feet between face of curbs. At the study intersection, a 12 foot lane exists in the northbound direction and the southbound approach is split into 12 foot left-turn and right-turn lanes. The cross section returns to a single 18 foot lane in each direction 300 feet north of 11th Street. No sidewalks exist along Maynard Way.

Across 11th Street to the south of Maynard Way lies the eastern-most of the two access points to a convenience store. This 36 foot two-way segment functions as the northbound approach to the study intersection. The access point (south leg of intersection) is skewed to the west from Maynard Way approximately twenty feet from center line to center line.

The 11th Street corridor is lined with local businesses that access 11th Street. Over the half-mile stretch from 11th Avenue westward to the John Deere dealership there are 30 access points and 7 cross street intersections (including Maynard Way). Access point for the purpose of this study refers to a connection to a street that allows vehicles to enter or exit the street.

Study Intersection Existing Conditions

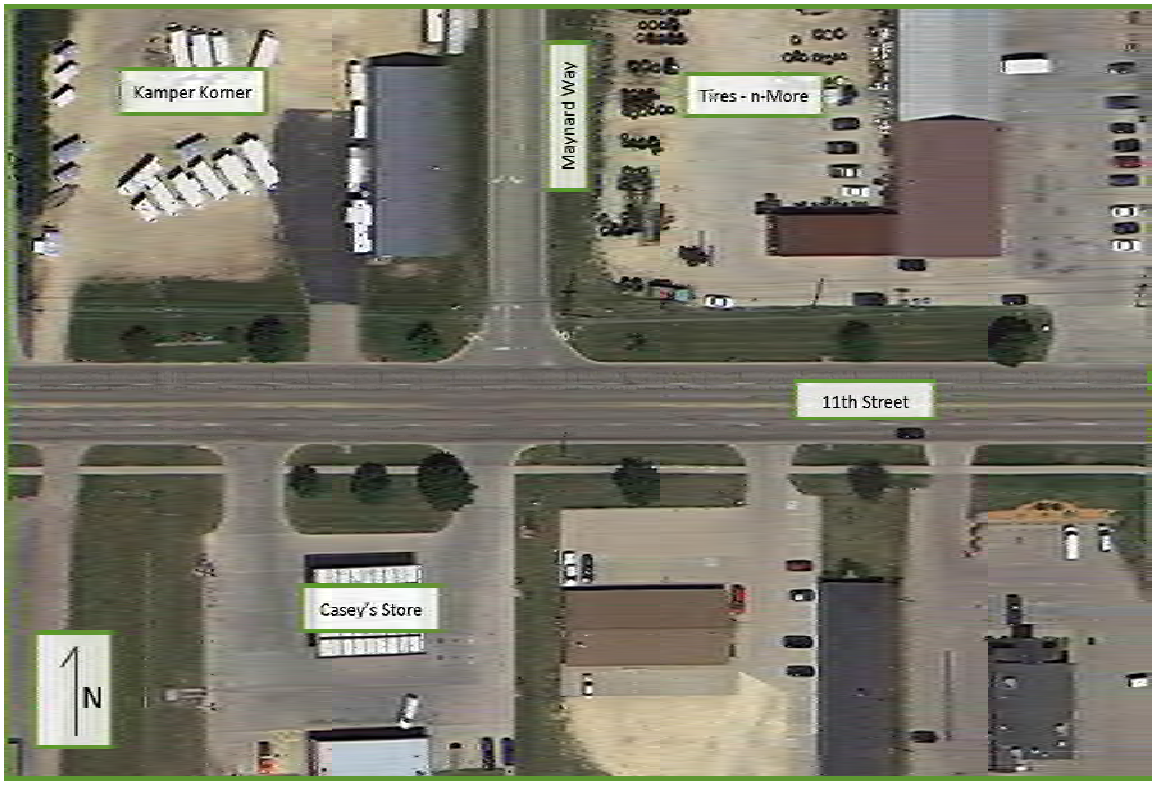
At the study intersection, curbs exist along the southbound, eastbound and westbound approaches. The radius of the corners at 11th Street & Maynard Way intersection is approximately 40 feet (northwest and northeast quadrants). A sidewalk is located along the south and north sides of 11th street. Sidewalks do not exist along either side of Maynard Way.

Existing traffic control at the study intersection is one-way STOP controlled at Maynard Way, with the sign adjacent to the southbound approach. The access point to the convenience store does not have any traffic control or pavement markings. This is considered typical at private access points. The speed limit along 11th Street through the study area is 35 mph in both directions, which transitions to/from 55 mph at the extents of DeWitt. The speed limit along Maynard Way is 25 mph in both directions.

Land uses at the study intersection include large commercial properties on the northwest and northeast quadrants, and smaller commercial properties on the south side of the intersection (including the convenience store – *Casey's General Store*).

Exhibit 4 illustrates the 11th Street & Maynard Way intersection and its features.

Exhibit 4 – Study Intersection



In the summer/fall of 2013, the Iowa DOT resurfaced 11th Street and refreshed pavement markings along the corridor. Afterwards, the City of DeWitt added a pavement marking feature along the inside lane of the westbound travel lanes at the study intersection. The feature is referred to as "DO NOT BLOCK INTERSECTION" pavement markings. This feature is not shown in **Exhibit 4** above; however, photos of the marking feature can be seen in the following exhibits. Discussion of the feature can be found within the Study Area Field Review section of this study.

Exhibits 5 and 6 provide photos of the westbound and eastbound approaches of the intersection and **Exhibits 7 and 8** provide photos of the southbound and northbound approaches of the intersection

Exhibit 5 – 11th Street Westbound Approach Viewing West and East

Exhibit 6 – 11th Street Eastbound Approach Viewing West and East

Exhibit 7 – Maynard Way Southbound Approach Viewing South and North

Exhibit 8 – Convenience Store Access Approach Viewing North

CRASH HISTORY/INFORMATION

HR Green compiled and reviewed crash data within the study area. The crash data was compiled using the Crash Mapping Analysis Tool (CMAT) software distributed by the Iowa DOT. The crash data review includes the most recent five years of available crash data (2008-2012). Further examination of CMAT data near the study intersection revealed a large group of crashes mapped slightly to the west of the 150 foot radius typically used to identify crashes at a study intersection. The radius was extended to 200 feet from the intersection of 11th Street & Maynard Way to capture all incidents related to the two access driveways of the convenience store on the south side of 11th Street.

The following is a summary of the crash history for the study intersection. Crash reports from CMAT for the study intersection are contained in **Appendix A**.

- 11th Street and Maynard Way Intersection
  - 21 Total crashes
  - 3/21 = Minor Injury crashes
  - 3/21 = Possible Injury crashes (4 total possible injuries)
  - 12/21 = Failure to yield making left turn
    - 9/12 = Angle crashes, oncoming left turn
    - 2/12 = Broadside crashes
  - 5/21 = Crashes occurring under icy/snowy/wet surface conditions

Overall, the main crash types along the study intersection were broadside or angle accidents due to failure to yield making a left turn. The "angle crashes" caused by left-turn vehicles which fail to yield are representative of the concerns voiced about this intersection and can be serious depending on vehicle speed and angle of collision. The pattern of turning-movement direction causing these accidents could not be determined due to ambiguity of the accident description in the CMAT Crash Detail Report.

A total of 21 crashes were found to occur within 200 feet of the study intersection resulting in a crash rate of 1.86 crashes/MEV (Million Entering Vehicles) using 2010 ADT traffic volumes. The crash rate calculated above that occurred over the five most recent years at the study intersection is above the statewide average of 0.8 crashes/MEV with respect to the study roadway traffic volumes and roadway classification types.

TRAFFIC HISTORY/INFORMATION

Intersection movement count data was attained from the Iowa DOT for the years of 2006, and 2010 at the study intersection. From the DOT traffic volume counts, an annual growth rate of -13% was calculated for the study intersection between 2006 and 2010. Annual average daily traffic (2010 AADT) along 11th Street in the vicinity of Maynard Way is approximately 5,100 vehicles per day (vpd). In 2006 the AADT was 8,900 vpd.

Annual average daily traffic (2010 AADT) along Maynard Way north of 11th Street is approximately 2,150 vpd. In 2006 the AADT was 1,630 vpd. Annual count data for the convenience store access point was not available. Count data attained by the Iowa DOT can be found within **Appendix B**.

In addition, traffic counts were conducted by the City of DeWitt on the following dates and timeframes:

- April 25th, 2013: AM timeframe counts
- April 30th, 2013: PM timeframe counts
- May 14th, 2013: AM timeframe counts
- June 10th, 2013: PM timeframe counts

AM timeframe counts were conducted between 7:00-9:00 AM. In the afternoon, PM timeframe counts were conducted between 3:00-6:00 PM. According to the Central Community School District of Clinton County, which includes the elementary school located to the northeast of the study intersection, the last day of school for the 2012-2013 school year was May 22nd. It was observed that the provided counts from the AM timeframe on April 25th did not include truck composition broken out. Desiring to have the counts conducted during the school year, the counts of April 30th and May 14th were used for traffic analysis within this study.

Both the April 30th and May 14th counts included breakouts between the following:

- Turning movements by approach
- Composition of passenger vehicles and trucks
- Pedestrian crossings by approach

The movements by approach are shown in **Exhibit 9** for both the AM and PM timeframes. In the AM timeframe, it was found that the peak hour of traffic was between 7:15-8:15 AM and during the PM timeframe, the peak hour was found to be between 4:30-5:30 PM. **Exhibits 10 and 11** include graphs of traffic volumes entering the intersection during the AM and PM timeframes, segmented by fifteen minute intervals. The turning movement count data collected by the City of DeWitt and the HR Green peak hour analysis can be found within **Appendix C**.

Exhibit 9 –AM and PM Peak Hour Turning Movement Counts

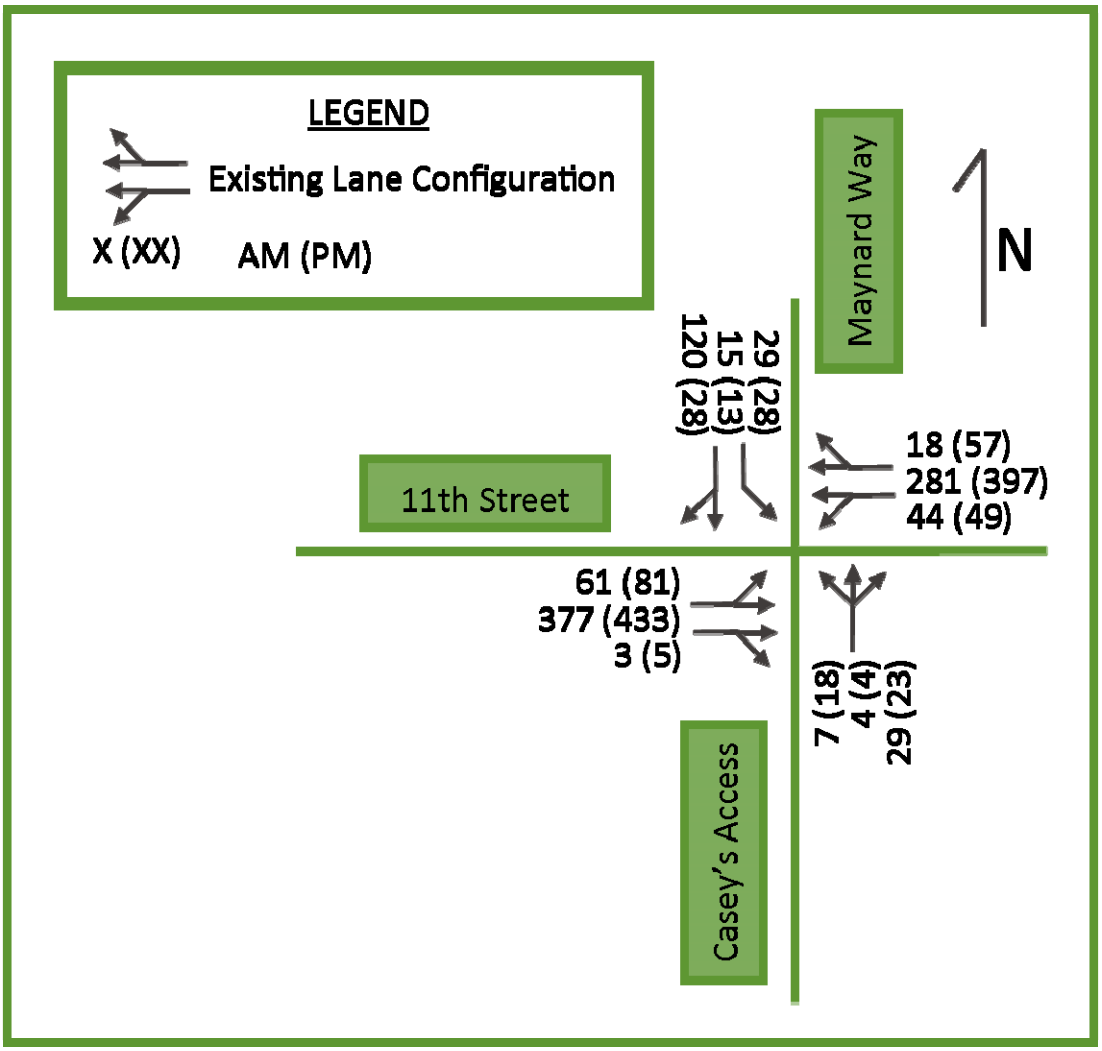


Exhibit 10 – AM Peak Period - Intersection Entering Vehicles by 15-Minute Intervals

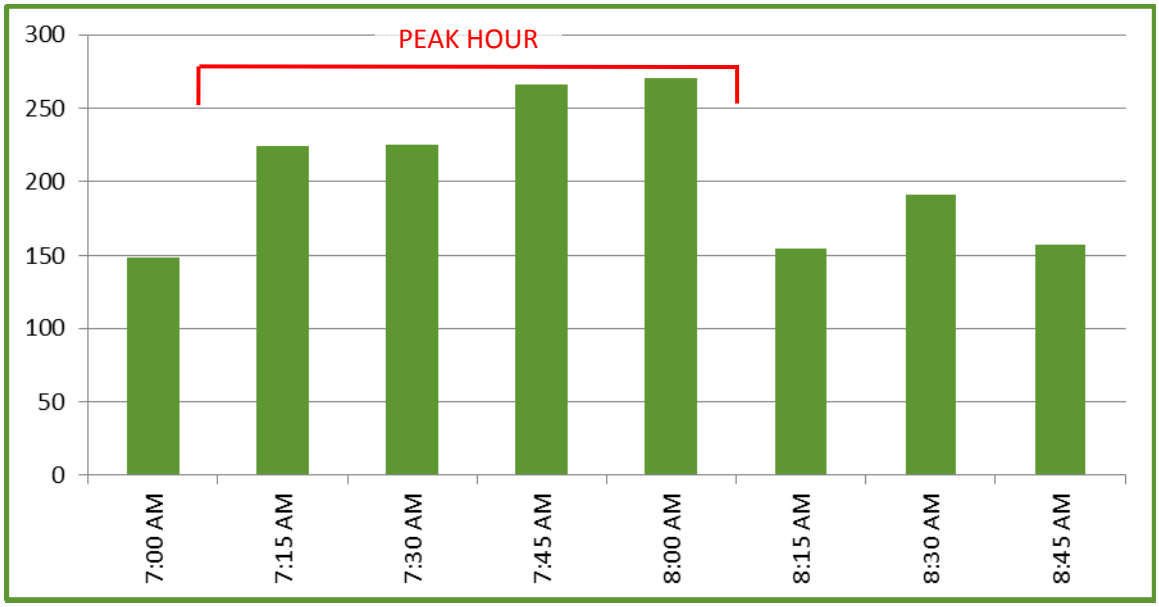
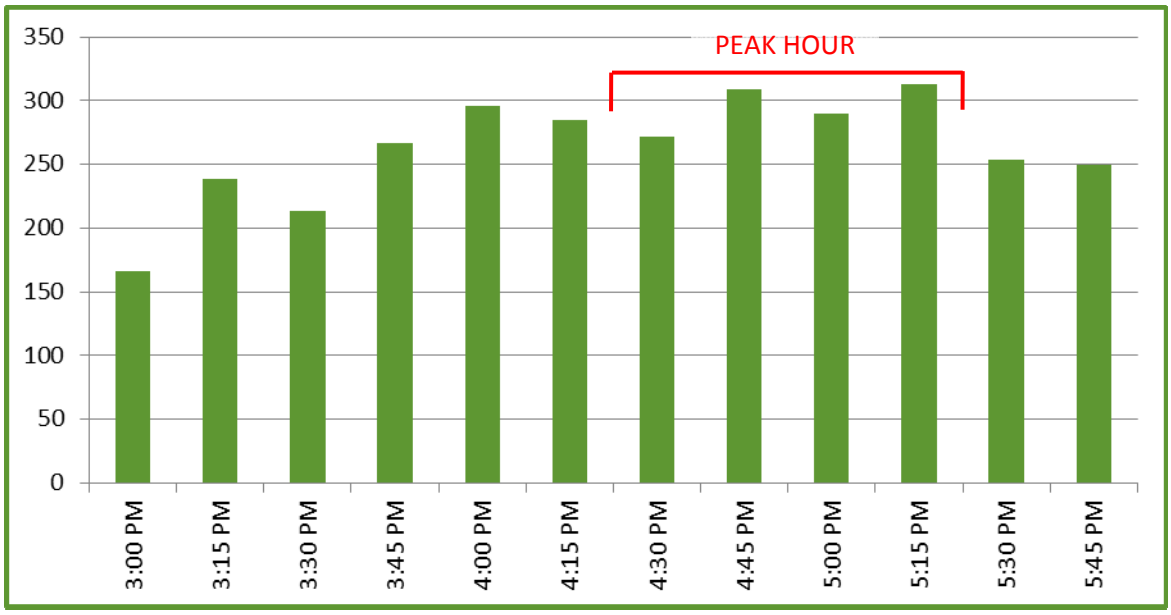


Exhibit 11 – PM Peak Period - Intersection Entering Vehicles by 15-Minute Intervals



Observations from the study intersection traffic data include the following:

- In both the AM and PM peak hours, the dominant movements observed included eastbound and westbound through movements.
- In both the AM and PM peak hours, the dominant turning movements observed included eastbound to northbound left-turns, southbound to westbound right-turn movements and westbound to southbound left-turn movements.

- Although the southbound turn lane pavement markings do not include through movement arrows, vehicles still completed southbound through movements.
- The truck traffic turning percentages at the intersection are shown below.

	Peak Hour	SB			WB			NB			EB		
		RT	ST	LT	RT	ST	LT	RT	ST	LT	RT	ST	LT
Heavy Vehicle %	AM	0%	0%	0%	6%	1%	0%	0%	0%	0%	0%	2%	0%
	PM	4%	0%	0%	0%	2%	0%	0%	0%	0%	0%	1%	0%

INTERSECTION CAPACITY ANALYSIS

Level of service (LOS) at intersections is primarily a function of peak hour turning movement volumes, intersection lane configuration, and traffic control. For intersection analysis, the Highway Capacity Manual (HCM) defines LOS in terms of the average control delay at the intersection in seconds per vehicle. The results of an HCM analysis are typically presented in the form of a letter grade (A-F) that provides a qualitative estimate of the operational efficiency or effectiveness of the intersection. Much like an academic report card, LOS A represents the best range of operating conditions (i.e., motorists experiencing little delay or congestion) and LOS F represents the worst (i.e., extreme delay or severe congestion). **Exhibit 12** defines the control delay range corresponding to each LOS for unsignalized and signalized intersection locations. LOS E is considered to be at capacity and, typically, LOS D is considered acceptable operations in urban environments.

For unsignalized intersections, the worst-case stop-controlled LOS is reported. For instance, if an intersection experienced LOS D on one approach and LOS B on another, the LOS D would be reported for the intersection.

Exhibit 12 – Level of Service vs. Control Delay (Unsignalized & Signalized Intersections)

	Signalized Intersections	Two-Way Stop Control Or All-Way Stop Control
LOS	**Delay / Vehicle (s)**	**Delay / Vehicle (s)**
A	0 – 10	0 – 10
B	> 10 – 20	> 10 – 15
C	> 20 – 35	> 15 – 25
D	> 35 – 55	> 25 – 35
E	> 55 – 80	> 35 – 50
F	> 80	> 50

Traffic models for the study intersections were created using Synchro Version 8 software. The 2010 Highway Capacity Manual (HCM 2010) reporting function of Synchro was used to obtain the average delay and corresponding Level-of-Service for each intersection movement. Intersection reports from the Synchro software are available in **Appendix D**.

The results of the current intersection capacity analysis are documented in **Exhibit 13**.

Exhibit 13 – Existing Conditions Capacity Analysis

Scenario	Peak Hour	Intersection	M.O.E.	EB	WB	NB	SB		Overall
Existing Conditions	AM	11th Street & Maynard Way	Delay	1.4	1.5	16.1	17.8		-
			LOS	A	A	C	C		C
	PM	11th Street & Maynard Way	Delay	2.1	0.9	32.2	25.6		-
			LOS	A	A	**D**	**D**		**D**

Exhibit 13 above indicates the study intersection operates at a LOS C in the AM peak hour and a LOS D in the PM peak hour. Both westbound and eastbound movements operate at a LOS A in both the AM and PM peak hours. LOS D is typically considered acceptable operations in an urban environment.

Traffic Signal Warrant Evaluation

Traffic signal warrants criteria were evaluated at the study intersection according to the *Manual on Uniform Traffic Control Devices (MUTCD)*, 2009 Edition. Traffic data utilized for the analysis included the peak hour count data collected by the City of DeWitt.

The analysis indicates that two of the nine MUTCD warrants are satisfied. The satisfaction of a traffic signal warrant or warrants shall not in itself require the installation of a traffic signal.

Exhibit 14 below summarizes the results of the traffic signal warrant evaluation.

Exhibit 14 – MUTCD Traffic Signal Warrant Analysis of Study Intersection

Traffic Signal Warrant	Satisfied ?
Warrant 1 (Eight Hour Vehicular Volume)	NO
Warrant 2 (Four Hour Vehicular Volume)	YES
Warrant 3 (Peak Hour Vehicular Volume)	YES
Warrant 4 (Pedestrian Volume)	NO
Warrant 5 (School Crossing)	NO
Warrant 6 (Coordinated Signal System)	N/A
Warrant 7 (Crash Experience)	NO
Warrant 8 (Roadway Network)	N/A
Warrant 9 (Intersection near RR Crossing)	N/A

Additional details of the study intersection traffic signal warrant evaluation can be found within **Appendix E**. Specific warrant notes include:

- Warrant 1 (Eight Hour Vehicle): The City of DeWitt collected turning movement counts include five of the eight necessary hours. The data of the collected five hours confirm that traffic volumes do not satisfy Warrant 1 volume criteria for either Condition A or Condition B. Due to the City of DeWitt having a population of less than 10,000, the 70% factor of required traffic levels was used.
- Warrant 2 (Four Hour Vehicle): The City of DeWitt collected turning movement counts include four of the four necessary hours. The data of the collected four hours confirm that traffic volumes satisfy Warrant 2 volume criteria. Due to the

City of DeWitt having a population of less than 10,000, the 70% factor of required traffic levels was used.

- Warrant 3 (Peak Hour Vehicle): The City of DeWitt collected turning movement counts include AM peak hour and PM peak hour data. The 4-5PM hour data confirm that traffic volumes satisfy Warrant 3 volume criteria. Due to the City of DeWitt having a population of less than 10,000, the 70% factor of required traffic levels was used.
- Warrant 4 (Pedestrian): Based on traffic volumes at this location, Warrant 4 would require at least 75 pedestrians per hour for four different hours or greater than 93 pedestrians in a peak hour. Pedestrian volumes were counted for five hours combined between the AM and PM peak hours. The necessary pedestrian volumes did not satisfy Warrant 4 volume criteria.
- Warrant 5 (School Crossing): Warrant 5 would require at least 25 pedestrians per hour during the highest crossing hour. Pedestrian volumes were counted for five hours combined between the AM and PM peak hours. The necessary pedestrian volumes did not satisfy Warrant 5 volume criteria.
- Warrant 6 (Coordinated Signal System): Not applicable
- Warrant 7 (Crash Experience): Warrant 7 would require multiple sets of criteria to be satisfied. The data does not satisfy Warrant 7 criteria.
- Warrant 8 (Roadway Network): Not applicable
- Warrant 9 (Intersection near RR Crossing): Not applicable

STUDY AREA FIELD REVIEW

HR Green staff conducted a field review of the study intersection on Wednesday, December 12th, 2012. The field review included site observations of the traffic characteristics at the study intersection. Through the field review, three primary study considerations emerged for the study. The considerations include:

- Available sight distance at the study intersection
- Current “DO NOT BLOCK INTERSECTION” pavement markings
- Movement of left-turning vehicles from 11th Street

Each of the evaluation topics is detailed further in sections below.

Sight Distance Available for Vehicles

As-built data along 11th Street corridor in the vicinity of the study intersection was not available from the DOT or the City of DeWitt. Therefore, a proper sight distance review from the horizontal plan sheets along with the vertical grade profile sheets was not able to be conducted. From the study area field review, significant horizontal geometric sight line obstructions were not apparent. However, the presence of a vertical curve along 11th Street east of Maynard Way was identified which may reduce visibility of the intersection from the perspective of westbound motorists.

Ideally, vertical profiles of the intersecting roadways exist that provide the recommended sight distance for points on the intersection approaches and obstructions such as buildings, parked cars, roadside structures, hedges, trees, walls, and the terrain itself do not exist within the sight triangle.

Exhibit 15 and 16 demonstrate the vantage points of northbound and southbound vehicles stopped at the study intersection. The photos were shot from the approximate point of where the driver would be located within a stopped vehicle desiring to enter/cross 11th Street.

Exhibit 15 – South Leg (Northbound) – Sight lines

Exhibit 16 – North Leg (Southbound) – Sight lines

From the study area field review, it was identified that the sight line in the southwest quadrant may be jeopardized by the presence of overgrown vegetation. The left-most photo shown in **Exhibit 15** illustrates the observed concern. The photo was taken in December with minimal foliage on the existing tree; however it is likely that much more foliage exist at other times of the year. Sight lines available for northbound/eastbound vehicles turning on and off of 11th Street are jeopardized by the presence of the sight line obstruction.

Current "DO NOT BLOCK INTERSECTION" Pavement Markings

As mentioned previously, "DO NOT BLOCK INTERSECTION" style pavement markings have been installed on the inside lane of the westbound travel lanes at the study intersection. **Exhibit 17** is a picture of the existing pavement marking feature.

Exhibit 17 – Existing "DO NOT BLOCK INTERSECTION"

Pavement Marking Feature

The feature is intended to prevent westbound to southbound left-turn motorists from queuing or blocking traffic at the intersection. The feature is based off of the Manual on Uniform Traffic Control Devices (MUTCD) recognized style of marking referred to as "DO NOT BLOCK INTERSECTION" pavement markings. Section 3B.17 of the MUTCD states that the pavement marking feature shall be accompanied by a sign (MUTCD R10-7) that reads "DO NOT BLOCK INTERSECTION" in advance of the pavement marking feature. As of the date of the field review, an accompanying sign was not installed at the intersection

Driver expectancy and education potentially may be a concern due to the lack/infrequent use of "DO NOT BLOCK INTERSECTION" pavement marking features in the region. An accompanying sign would likely assist with potential driver lack of comprehension and unexpected reactions.

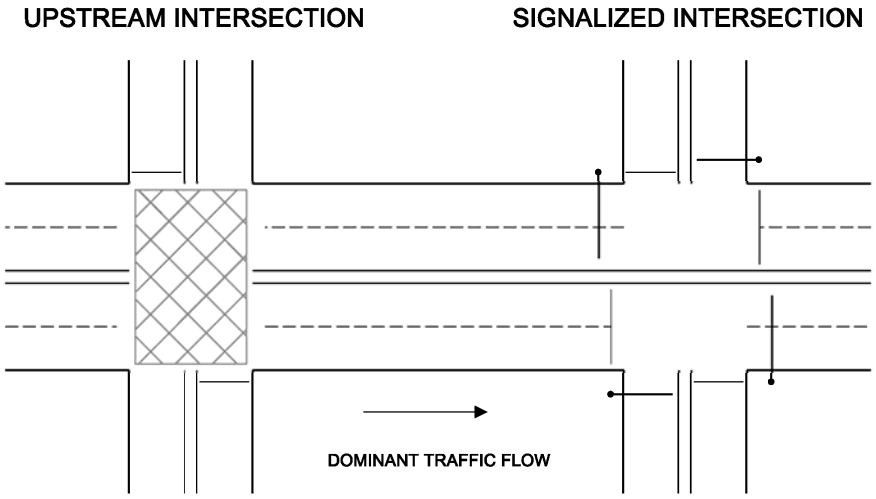
It should also be noted that the current pavement marking feature is not a typical application of the "DO NOT BLOCK INTERSECTION" feature. The typical application is used across all travel lanes in a particular direction, not just one lane, at an intersection which is upstream of a signalized intersection or other feature that may cause traffic to queue and therefore block the upstream intersection. The intent of the application is not to prevent vehicles from completing a turning movement along a free-flow corridor, but rather to minimize the risk of queuing vehicles impeding the potential movements of conflicting movements. See **Exhibit 18** for an illustrative view of the typical use of "DO NOT BLOCK INTERSECTION" pavement markings and the current application deployed in DeWitt.

The compliance rate of "DO NOT BLOCK INTERSECTION" signing has also been investigated through research publications. As part of the Transportation Research

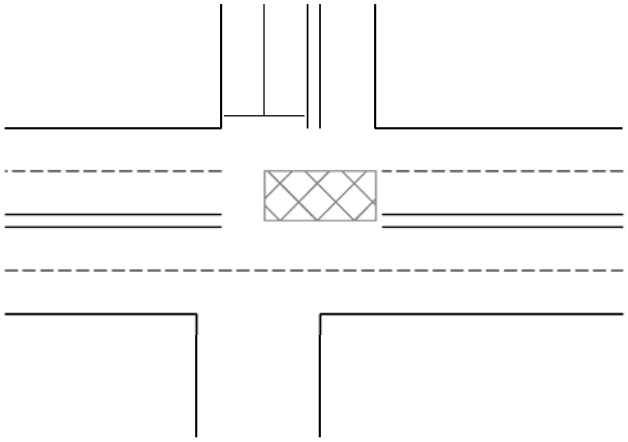
Record No. 1456, a research paper titled "Effectiveness of Do Not Block Intersection Signs"[1] four sites were studied along an arterial roadway. The study found that three of the four sites to where the signs were deployed experienced no change in driver behavior. The fourth site experienced a minimal impact when the sign was installed. Although the study was focused on the use of signing as opposed to pavement marking, the results could potentially be inferred to the use of "DO NOT BLOCK INTERSECTION" pavement markings.

After-data of crash reports at the study intersection are not yet available to determine if potential trends/benefits exist from the application of the pavement marking feature.

Exhibit 18 – Uses of "DO NOT BLOCK INTERSECTION" Pavement Markings



TYPICAL APPLICATION



DEWITT APPLICATION

[1] "Effectiveness of Do Not Block Intersection Signs", Transportation Research Record No. 1456, Authors: Gattis, JL & Iqbal, Z, 1994

Movement of Left-Turning Vehicles from 11th Street

During the field review, multiple vehicles were observed completing the following turning movements:

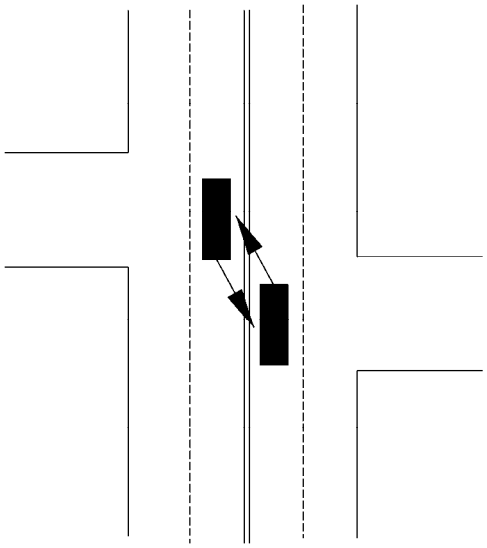
- Eastbound to northbound left-turn movements onto Maynard Way; and
- Westbound to southbound left-turn movements into the convenience store.

The observations are supported by the turning movement count information collected by the City of DeWitt as shown in **Exhibit 9**. **Exhibit 19** provides a picture of a westbound to southbound left-turning vehicle yielding to an oncoming eastbound through vehicle (traveling in the inside lane) observed during the field review. As can be seen from **Exhibit 19**, the westbound left-turning vehicle is stopped over the "DO NOT BLOCK INTERSECTION" pavement markings.

Exhibit 19 – Example of Westbound Left-Turning Movement

Currently, left turning vehicles desiring to complete a left-turn movement utilize the inside lane of the through lanes to complete the movement. Due to the alignment skew of Maynard Way (north leg of intersection) and the convenience store access point (south leg of intersection), opposing left-turning vehicles which meet each other at the same time must decide right-of-way between them and compete for the same pavement area at the intersection. This unfavorable scenario is likely a large component of the large percentage of failure to yield right-of-way crashes at the study intersection. This scenario is illustrated within **Exhibit 20**.

Exhibit 20 – Conflicting Left-Turn Movement Scenario



CONSIDERED OPTIONS

Concerns were noted and observations were made at the study intersection and have been described in the previous section. The following section explores options that were considered and may be of interest for improving the safety at the study intersection as well as along the 11th Street corridor. The proceeding mentioned options are not recommendations, but rather items that may have associated benefits as well as potential disadvantages. The proceeding mentioned options are arranged in no particular order. Final recommendations for the study intersection can be found within the Final Recommendations section of this report.

Sight Distance Triangle Obstruction Modification

The existing vegetation located in the southwest quadrant of the study intersection should be trimmed. The trimming of the overgrown vegetation would aid in the visibility of and from northbound vehicles stopped along the convenience store access point.

The trimming of the overgrown vegetation would also increase the visibility and awareness of pedestrians using the sidewalk facilities along the south side of 11th Street.

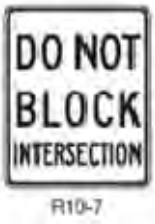
The trimming of sight line restrictions along 11th Street within the City of DeWitt corporate limits is a function of the City and if the tree is located on private property, the actions should be coordinated with the property owner.

"DO NOT BLOCK INTERSECTION" Pavement Markings

Due to the "DO NOT BLOCK INTERSECTION" pavement marking feature being recently installed, the City of DeWitt may desire to monitor the application to determine the effects of the pavement markings. At a later date, a before and after crash analysis comparison may be beneficial to determine the effects.

As per the MUTCD, it is recommended that the City of DeWitt install the accompanying regulatory sign (MUTCD R10-7) which reads "DO NOT BLOCK INTERSECTION". It is

recommended that the sign be installed in the northeast quadrant in advance of the pavement marking feature. The sign would assist with driver expectancy concerns and levels of compliance with regards to the intent of the pavement markings.



The image at right provides an illustrative view of the appearance of the "DO NOT BLOCK INTERSECTION" sign.

11th Street 4-Lane to 3-Lane Conversion

Overview:

The 11th Street corridor could potentially be converted from a four-lane cross section to a three-lane cross section. The extents of the conversion could possibly terminate at the following locations:

- Between Iowa Highway 61 interchange and directly east of Maynard Way
- Between Iowa Highway 61 interchange and east of 4th Avenue East (location of existing 4-Lane to 2-Lane transition)

Peak hour turning movement counts were not available for other intersections along 11th Street. However from the Iowa DOT 2010 AADT information along 11th Street in the vicinity of Maynard Way, AADT is approximately 5,100 vehicles per day (vpd). The AADT between 8th and 9th Avenue, which are east of Maynard Way and closer to the central business district, is approximately 3,800 vpd. A three-lane cross section would likely provide benefits throughout the 11th Street corridor.

A three-lane cross section consists of one lane in each direction with a continuous two-way left turn lane between the two through lanes. See **Exhibit 21** for an illustrative view of the 11th Street three-lane cross section through the study intersection.

The proposed cross section includes 4' shoulders, 12' through lanes, and a 16' two-way left turn lane. The Iowa DOT design manual requires a minimum of 12' for the two-way left turn lane.

It has been found that the conversion can improve safety and maintain acceptable Level-of-Service along corridors. Four-lane to three-lane undivided cross section conversion case study research has indicated a reduction of 85th percentile speeds of less than five miles per hour. However, a relatively dramatic 60 to 70 percent reduction in excessive speeding (traveling more than five miles per hour over the posted speed limit) was recorded. The total number of accidents was reduced by 17 to 62 percent along the corridors[2].

It is recommended that a four-lane undivided cross section to a three-lane cross section conversion be considered feasible when the bi-directional peak-hour volumes are less than 1,500 vehicles per hour. Caution and extra consideration are warranted for potential conversions when the bi-directional peak-hour volume is between 1,500 and 1,750 vehicles per hour. Above 1,750 vehicles per hour, research has found a reduction in the Level-of-Service of the major roadway.

[2] Compliments of Guidelines for the Conversion of Urban Four-Lane Undivided Roadways to Three-Lane Two-Way Left-Turn Lane Facilities, Iowa State University Center for Transportation Research and Education

NOTE:
THIS DRAWING IS FOR
ILLUSTRATIVE PURPOSES ONLY.

NORTH
NOT TO SCALE

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TRAFFIC ENGINEERING ASSISTANCE PROGRAM
11TH STREET & MAYNARD WAY INTERSECTION STUDY
DEWITT, IOWA
--THREE-LANE CROSS SECTION--

AUGUST 2013

EXHIBIT #21

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Capacity:

From the peak hour traffic count data collected by the City of DeWitt, the bi-directional peak hour volumes west of Maynard Way are 849 vehicles per hour in the AM peak hour and 962 vehicles per hour in the PM peak hour. The bi-directional volumes east of Maynard Way are 778 vehicles per hour in the AM peak hour and 987 vehicles per hour in the PM peak hour. The peak hour volumes along 11th Street in the vicinity of the study intersection are below the recommended caution levels.

A capacity analysis at the study intersection was performed including the three-lane cross section along 11th Street and the results of the analysis are documented in **Exhibit 22**.

Exhibit 22 – Study Intersection - Two-Way Left-Turn Lane Capacity Analysis

Scenario	Peak Hour	Intersection	M.O.E.	EB	WB	NB	SB		Overall
With Two-Way Left-Turn Lane	AM	11th Street & Maynard Way	Delay	1.1	1.3	19.3	21.7		-
			LOS	A	A	C	C		C
	PM	11th Street & Maynard Way	Delay	1.7	0.8	47.5	29.7		-
			LOS	A	A	**E**	**D**		**E**

Exhibit 22 above indicates that the study intersection continues to operate at a LOS C in AM peak hour. In the PM peak hour, operations decrease along the northbound approach (convenience store access) of the intersection. The delay increases from 32.2 seconds/vehicle to 47.5 seconds/vehicle resulting in a LOS E. The LOS E occurs for the northbound approach from the private access point of the convenience store and does not negatively influence the delay incurred along 11th Street.

In both peak hours, the dominant movements at the study intersection (eastbound and westbound movements) continue to operate with minimal delay. The delay incurred in fact decreases for both eastbound and westbound directions in both peak hours. This is due to left-turning motorists off of 11th Street utilizing a dedicated left-turn lane rather than obstructing the same direction through lane(s).

Operations Benefits/Concerns:

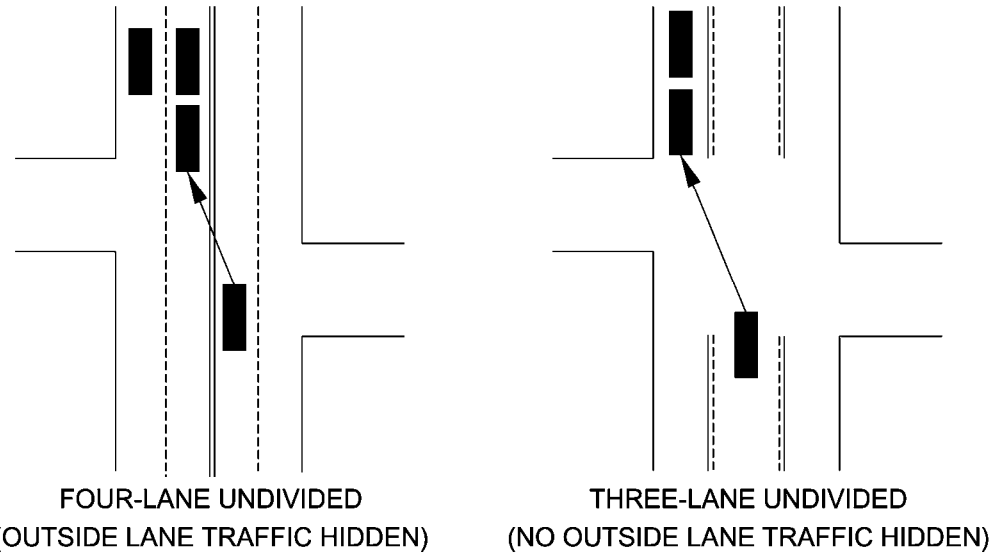
Although operations slightly decrease along the minor roadways at the study intersection, the conversion to a three-lane cross section would offer many benefits along the 11th Street corridor. From field observations, the following benefits were noted:

- Improves pedestrian comfort and safety.
- Reduces pedestrian crossing distance across 11th Street.
- One lane in each direction would lend to a pace-car setting through the corridor. This phenomenon exists as one vehicle traveling the speed limit leads following vehicles and prevents them from driving at excessive speeds.
- The shy distance or comfortable distance between the vehicle and curb, for the outside lane traveling motorists along 11th Street would be increased.
- Semi-truck and passenger vehicle traffic would be shifted away from the 11th Street adjacent curb and sidewalk facilities, lending to increased pedestrian safety and homeowner/business quality of life.

- One lane in each direction would decrease/eliminate the dangerous overtaking scenarios. Overtaking is when a large vehicle is traveling in the outside lane and a smaller vehicle is traveling at a higher speed in the inside travel lane. A pedestrian or stopped vehicle along a side street may not notice the smaller vehicle, or its higher rate of speed, due to the vehicle being blocked by the slower moving large vehicle.
- One lane in each direction would offer safety benefits for vehicles making a left turn from 11th Street. Not only would the turning vehicles enjoy the benefit of a dedicated turn lane by removing them from the through lane(s), the vehicle would also have fewer 11th Street approach lanes to interpret. Also, the reduction of 11th Street approach lanes from two to one lane would eliminate the potential for higher speed vehicle traveling in the outside travel lane being blocked by slower moving or multiple vehicles in the inside lane. See **Exhibit 23** for an illustrative view of this scenario.

As a result of the benefits listed above, the number of failure to yield caused crashes and broadside manner of crashes along the 11th Street corridor may be reduced.

Exhibit 23 – Hidden Vehicle Scenario

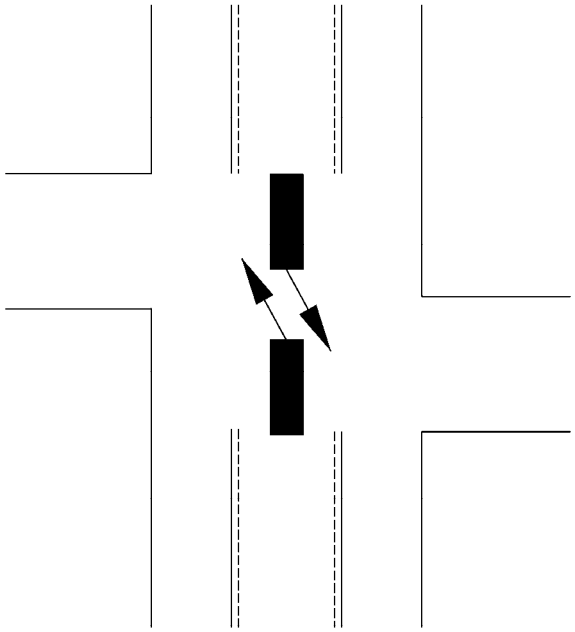


Although it is expected the conversion would improve the safety through corridor, the use of a three-lane cross section at the study intersection does still pose potential operations concerns pertaining to left-turn movements from 11th Street.

From research, the safety at the study intersection would be expected to be improved by the inclusion of dedicated left-turn lanes as part of the three-lane cross section. Installation of dedicated left-turn lanes increases the safety of the intersection. The 2010 Highway Safety Manual reports a 19 percent potential reduction of crashes by installing left-turn lanes along both major-road approaches. Crash types that would particularly benefit from the installation of dedicated left-turn lanes are rear-end and left-turn crashes. It should be noted however that the preceding research findings were likely conducted at intersections with typical non-skewed geometry.

With the conversion from a 4-lane cross section to a three-lane cross section, opposing direction left-turning vehicles off of 11th Street could potentially meet one another as illustrated within **Exhibit 24**.

Exhibit 24 – 3-Lane Cross Section Opposing Direction Left-Turn Movements



THREE-LANE UNDIVIDED
(CONFLICTING LEFT-TURN)

Under the three-lane cross section scenario, the opposing direction left-turning vehicles would still need to decide right-of-way amongst them as there is a potential that they would need to utilize the same pavement surface area in order to complete their movement.

It is anticipated however that the three-lane cross section left-turning movement scenario is superior to the four-lane cross section scenario due to the 11th Street left-turning vehicles being in-line across from one another and therefore decreasing the distance required to cross in front of one another. Additionally, as previously stated as a benefit along the corridor, the left-turning vehicles would have one fewer 11th Street approach lanes to interpret as well as eliminating the potential for higher speed vehicle traveling in the outside travel lane being blocked by slower moving or multiple vehicles in the inside lane.

Sensitivity Analysis:

A sensitivity capacity analysis was conducted which included the addition of dedicated left-turn lanes in addition to the two through movement travel lanes in each direction at the study intersection. The addition of dedicated left-turn lanes would require reconstruction of the roadway cross section through the study intersection in order to accommodate the five-lane cross section. The results of the capacity analysis are documented in **Exhibit 25**.

Exhibit 25 – Study Intersection – Dedicated Left-Turn Lane Addition Capacity Analysis

Scenario	Peak Hour	Intersection	M.O.E.	EB	WB	NB	SB		Overall
With Dedicated Left-Turn Lane Addition	AM	11th Street & Maynard Way	Delay	1.1	1.3	15.8	17.5		-
			LOS	A	A	C	C		C
	PM	11th Street & Maynard Way	Delay	1.7	0.8	30.2	24.3		-
			LOS	A	A	**D**	C		**D**

From **Exhibit 25** above, the overall study intersection continues to operate at a LOS C in AM peak hour. In the PM peak hour, operations improve along the northbound approach (convenience store access) of the intersection. The delay decreases from 47.5 seconds/vehicle to 30.2 seconds/vehicle resulting in a LOS D.

In both peak hours, the dominant movements at the study intersection (eastbound and westbound movements) continue to operate with the same minimal delay as the two-way left-turn lane three-lane cross section scenario.

Summary:

The conversion from a 4-lane cross section to a 3-lane cross section along the corridor provides many potential benefits. At the study intersection itself under the 3-lane cross section scenario, concerns do still exist regarding the transfer of right-of-way between 11th Street opposing direction left-turning vehicles. It is however anticipated that the 3-lane cross section would provide safer accommodations for left-turning vehicles from 11th Street at the study intersection.

Sensitivity analysis determined that dominant movements along the 11th Street corridor experience the same minimal delay traveling through the study intersection regardless of a 3-lane or 5-lane 11th Street cross section.

As part of further study of the 3-lane cross section, the following items should be included, implications to existing pavement markings, signing and traffic signal head locations along the 11th Street corridor.

Access Management along 11th Street Corridor

As defined by the *Access Management Manual*, published by the Transportation Research Board in 2003, "access management is the systematic control of the location, spacing, design and operation of driveways, median openings, interchanges, and street connections to a roadway. As previously mentioned, there are 30 access points and 7 cross street intersections (including Maynard Way) along 11th Street along the half-mile stretch from 11th Avenue westward to the John Deere dealership. Each access point creates an intersection condition with regards to traffic operations.

Over time, the City of DeWitt should consider the principals of access management to reduce the number of access points along the 11th Street corridor. The principals of access management recognize that access-related vehicular maneuvers and traffic volumes can pose serious, specific and accumulative consequences to the flow and safety of the street for all user types. The major benefits of access management include reduction in crash rates and improvements to traffic capacity through the corridor.

Consulting the *Access Management Manual* in should be considered while developing and implementing a long-range access management program. More information regarding the *Access Management Manual* can be found within **Appendix F**.

Installation of Traffic Signal

From Chapter 4B of the MUTCD, a traffic signal provides the following advantages that could potentially yield safety benefits at the study intersection.

- Provide for the orderly movement of traffic: In the context of the study intersection, a traffic signal would assist with the transfer of right-of-way between 11th Street opposing direction left-turning vehicles.
- Reduce the frequency and severity of certain types of crashes, especially right-angle collisions: In the context of the study intersection, a traffic signal would decrease the probability of broadside/right-angle, failure to yield crashes.

A traffic signal warrant analysis was performed at the study intersection and concluded that the study intersection satisfied two of the nine warrants for traffic signal installation as described in the MUTCD.

It is recommended that a traffic signal be considered and potentially programmed for as funding becomes available. Installation of a traffic signal would increase the safety of the study intersection. *NCHRP Report 491*[3] reports a 33 percent reduction in all crashes when a traffic signal is installed at a 4-leg intersection not previously controlled by a traffic signal. The same study determined a 67 percent reduction with regards to right-angle crashes.

The use of split phase left-turn signal phasing along 11th Street is recommended. Under this three-phase signal pattern, eastbound and westbound movements would have separate assignment of right-of-way and the northbound and southbound movements would share a phase. The *ITE Traffic Signal Timing Manual (2009)* acknowledges the use of split phasing when intersection geometry results in partially conflicting vehicle paths through the same space to complete their movements. Split phasing avoids the conflicts of opposing left turn vehicle paths. The use of split phasing would likely assist with the westbound and eastbound left-turn failure to yield to oncoming through motorist pattern of crashes that was observed through review of the crash data.

Two capacity analyses of the study intersection were performed, both including the installation of a traffic signal system utilizing split phasing westbound/eastbound left-turn movements. One analysis included the existing geometry and four-lane cross section along 11th Street and the second included the three-lane cross section along 11th Street. The results of the study intersection capacity analyses are documented in **Exhibit 26 and Exhibit 27**.

Exhibit 26 – Capacity Analysis with Traffic Signal and Existing Four-Lane Cross Section

Scenario	Peak Hour	Intersection	M.O.E.	EB	WB	NB	SB		Overall
Existing Lane Use With Signal System	AM	11th Street & Maynard Way	Delay	4.9	4.6	7.0	8.5		-
			LOS	A	A	A	A		A
	PM	11th Street & Maynard Way	Delay	4.4	4.5	7.8	8.7		-
			LOS	A	A	A	A		A

[3] McGee, Hugh and Taori,Sunil. NCHRP Report 491: Crash Experience Warrant for Traffic Signals. National Cooperative Highway Research Program (NCHRP), TRB, NRC. Washington, DC: National Academy Press, 2003.

Exhibit 27 – Capacity Analysis with Traffic Signal and Two-Way Left-Turn Lane

Scenario	Peak Hour	Intersection	M.O.E.	EB	WB	NB	SB		Overall
With Two-Way Left-Turn Lane & Signal	AM	11th Street & Maynard Way	Delay	5.5	4.8	8.1	9.5		-
			LOS	A	A	A	A		A
	PM	11th Street & Maynard Way	Delay	4.5	5.0	9.1	10.3		-
			LOS	A	A	A	B		A

Exhibits 26 and 27 above indicate that the study intersection would operate at a LOS A in both the AM and PM peak hours regardless of the intersection geometry. In both the peak hours, delays along 11th Street increase slightly from the non-signalized intersection analyses; however the northbound and southbound approach delays are significantly reduced. Under both scenarios above, minimal delays are encountered along any of the four intersection approaches. The capacity of the study intersection would benefit from the use of a traffic signal system.

The list below contains items that should be evaluated as part of further study and/or design of the signal system.

- Vehicle Signal Heads – The following items should be considered:
    - Use of LED signal heads to reduce energy consumption.
    - Use of split phasing east/west movements.
- Street Name Signs – Use of street names signs mounted to all traffic signal mast arms to aid in motorist navigation.
- Pedestrian Accommodations – Use of pedestrian signal heads and push buttons for movements across 11th Street and Maynard Way. The pedestrian devices would aid in orderly and safe movement of pedestrians across the legs of the intersection. Crosswalks across 11th Street at the study intersection do not currently exist.
- Signal Poles - Evaluate the placement of the signal poles with respect to pedestrian push button access and lateral sidewalk accessibility needs. Chapter 4E of the MUTCD could be used as reference.
- Vehicle Detection Equipment - Evaluate the use of vehicle detection equipment to be consistent with the City of DeWitt's existing traffic signal systems.

With any potential traffic signal addition or modification, consideration should be given to Section 12A-2 of the Iowa DOT Design Manual regarding accessible sidewalk requirements. Section 12A-2 contains requirements based upon the *Proposed Accessibility Guidelines for Pedestrian Facilities in the Public Right-of-Way (July 26th, 2011) (PROWAG).* The DOT Manual and PROWAG state that where elements are altered or added (traffic or pedestrian signal) to existing pedestrian facilities, the pedestrian circulation path is not required to be modified, however, elements that are added shall be made accessible to the maximum extent feasible.

South Leg Realignment

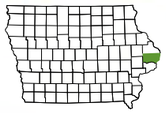
Due to the alignment skew of Maynard Way (north leg of intersection) and the convenience store access point (south leg of intersection) opposing eastbound and westbound left-turning vehicles which meet each other at the same time must decide right-of-way between themselves at the intersection. This unfavorable scenario is likely a large component of the large percentage of failure to yield right-of-way crashes at the study intersection.

The overall safety of the intersection would likely improve if the north and south legs of the intersection were not skewed. It is recommended that the south leg (convenience store access) be shifted to the east and aligned with the north leg of the intersection to achieve a typical intersection orientation.

It is understood however that this improvement would require substantial geometric modifications and would likely require right-of-way alterations with the affected property owners (Casey's and adjacent light commercial building). The two properties could potentially share the realigned south leg of the intersection. Other infrastructure obstacles include, but are not limited to, associated commercial signing, fire hydrant and overhead utility lines/poles.

It should be noted that the traffic signal system could be installed at the study intersection under current geometric conditions and the traffic signal safety benefits would still exist.

See **Exhibit 28** for an illustrative view of the south leg realignment improvements. The inclusion of the recommended traffic signal and three-lane cross section is also shown to demonstrate the overall improvement recommendation.



TRAFFIC SIGNAL

DEMOLISHED PAVEMENT

NOTE:
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NORTH

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TRAFFIC ENGINEERING ASSISTANCE PROGRAM
11TH STREET & MAYNARD WAY INTERSECTION STUDY
DEWITT, IOWA
–REALIGNED SOUTH LEG WITH TRAFFIC SIGNAL--

AUGUST 2013

EXHIBIT #28

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RECOMMENDED IMPROVEMENTS

Below is a list of recommendations that should be considered in the short term and longer term. Traditionally, short term recommendations are those that should be able to be implemented fairly quickly and inexpensively; whereas long term recommendations are those that may require additional prior consideration and planning as well as procurement of funding.

The following recommendations are anticipated to improve the safe passage of vehicles through the study intersection. The list is arranged in order of suggested implementation as funding becomes available. Refer to the Considered Options section of the report for more detail regarding the individual recommendations.

Short Term Recommendations

- Remove/modify sight distance obstruction located in the southwest quadrant
- Install “DO NOT BLOCK INTERSECTION” regulatory sign (MUTCD R10-7)
- Monitor installation of “DO NOT BLOCK INTERSECTION” pavement markings
- Convert 11th Street from a four-lane cross section facility to a three-lane cross section in combination with the final short term bullet.
- Install a split-phased traffic signal (it is understood however that the installation of a traffic signal is not a low-cost measure)

Long Term Recommendations

- Realign the south leg of the intersection
- Implement access management along 11th Street corridor

In summary, the corridor would achieve substantial benefits from the implementation of a three-lane cross section. However at the study intersection, the installation of a split-phase traffic signal would most significantly improve traffic flow and safety from the orderly assignment of right-of-way. Furthermore, the realignment of the south leg of the intersection would also reduce safety risk of 11th Street opposing direction left-turn movements through the study intersection.

OPINION OF PROBABLE COSTS

An order of magnitude opinion of probable cost for the short and long term recommendations presented above is included below.

	Cost Estimate	Notes
SHORT TERM:		
"DO NOT BLOCK INTERSECTION" Signing	$300 - $500	Construction costs only
4-Lane to 3-Lane Conversion	$20,000 - $30,000 Per Mile	Construction costs only
Traffic Signal System	$150,000	Further study necessary
LONG TERM:		
South Leg Realignment	-	Further study necessary
Access Management	-	Further study necessary
NOTES:		
* This opinion represents approximate construction quantities only and does not provided a detailed list of expected project pay items. The opinion is to be used as a planning number only. Actual costs may vary, as detailed design plans are prepared.		
* Cost do not include any permanent right-of-way and temporary construction easement costs.		
* Costs represent current dollars as of report date.		

Although the recommended traffic signal system needs further evaluation to determine a more accurate cost estimate, an industry typical figure of $150,000 can be used as an installation cost of the complete traffic signal system at the study intersection for use within a benefit/cost analysis. A benefit/cost analysis was performed using the monetary figure presented above along with an estimated improvement life of 15 years. Crash reduction factors (CRF) for various safety countermeasures are available from the Crash Modification Factors Clearinghouse website which is sponsored by the Federal Highway Administration (FHWA). A crash reduction factor is used to compute the expected number of crashes after implementing a given countermeasure at a specific site. The following crash reduction factor was obtained from the clearinghouse for the benefit/cost analysis:

- Install a Traffic Signal (Stop Controlled Prior) – 33% CRF

From the information presented above, a benefit-cost ratio of 1.68 was calculated for the study Intersection. Through additional analysis, a cumulative reduction factor of 20% was determined to be necessary to achieve a benefit-cost ratio over 1.0 for the study intersection.

The benefit-cost analysis can be found in **Appendix G** of this report.

POTENTIAL FUNDING SOURCES

Many funding sources may be available while pursuing funding for elements of the project recommendations.

ICAAP

Funding may be available under the “Iowa Clean Air Attainment Program” (ICAAP) which funds highway/street projects which help maintain Iowa’s clean air quality by reducing transportation-related emissions. Eligible highway/street projects must be on the federal-aid system, which includes all federal functional class routes except local and rural minor collectors. 11th Street is classified as rural major collector under the Clinton

County region Iowa DOT Federal Functional Classification System Map (Dated - Revised June 14, 2010). The application deadline for ICAAP funding is October 1st of each year. The average length of time for acceptance decision is four months. In order to qualify for funding, a local match of at least 20 percent is required and the project should fall within one of four categories. The intersection improvement project would fall into the category of reducing emissions via traffic flow improvements providing a direct benefit to air quality by addressing ozone, carbon monoxide, or particulate matter PM-2.5 or PM-10. Each of the preceding pollutants must be addressed, and a reduction calculation must be provided within the application.

TSIP

Funding for traffic safety improvements on public roads under county, city or state jurisdiction may be available through the "Traffic Safety Improvement Program" (TSIP). The application deadline for TSIP funding is August 15th of each year (recently changed from June 15th to August 15th). The crash history for the intersection showed a higher rate than the statewide average which may assist in competing for site specific funding due to accident history. Also, the second qualification category for funding line includes the "purchase of materials for installation of new traffic control devices such as signs or signals, or replacement of obsolete signs or signals". Site-specific funding cannot exceed $500,000 per project. Application forms are available from the Iowa DOT, and application is made to the Iowa DOT Office of Traffic and Safety.

Further information on potential funding sources is available on the Iowa DOT website at http://www.iowadot.gov/fundguid.htm, Information sheets on each of the programs mentioned are provided in **Appendix H** of this report.

Appendix A – CMAT Crash Reports

Intersection or Spot Benefit / Cost Safety Analysis

Rev. 7/10

Iowa DOT Office of Traffic & Safety

County: Clinton County Prepared by: Cory Shannon Date Prepared: Aug 1, 2013

Intersection: 11th Street and Maynard Way

Improvement

Proposed Improvement(s):

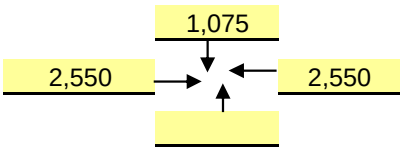
	Estimated Improvement Cost, **EC**		Est. Improvement Life, years, **Y**
	Other Annual Cost (after initial year), **AC**		Crash Reduction Factor (integer), **CRF**
$ -	Present Value Other Annual Costs, **OC**	4.0%	Discount Rate (time value of $), **INT**
		$ -	Present Value Cost, **COST** = EC + OC

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

Traffic Volume Data

Source: Iowa DOT 2010 Traffic Count Maps 2010 Date of traffic count

Daily Entering Vehicles by Approach (or AADT / 2)



	Projected Traffic Growth (0%-10%), **G**	2,253,875	Current Annual Entering Veh., **AEV** = DEV * 365
6,175	Current Daily Entering Vehicles, **DEV**	6,175	veh / day, Final Year DEV, **FDEV**
		-	MEV, Total Million Entering Veh. Over life of Project, **TMEV**

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

Crash Data

2008	First full year -->	2012	Last full year	5.0 years, Time Period, **T**		
	Additional months			values as of Dec. 2007		
0	Fatal Crashes	0	Fatalities @	$3,500,000	$	-
		0	Major Injuries @	$240,000	$	-
6	Injury Crashes	3	Minor Injuries @	$48,000	$	144,000
		4	Possible Injuries @	$25,000	$	100,000
15	Property Damage Only		(assumed cost per crash)	$2,700	$	-
		-OR-	enter all Property Costs of all crashes:		$	98,400
21	Total Crashes, **TA**			Total $ Loss, **LOSS**	$	342,400

4.20	Current Crashes / Year, **AA** = TA / T	**1.86**	Crashes / MEV, Crash Rate, **CR**
$ 16,305	Cost per Crash, **AVC** = LOSS / TA		CR = TA x 10^6 / (DEV x 365 x T)
-	Total Expected Crashes, **TECR** = CR x TMEV	$ -	Present Value of Avoided Crashes, **BENEFIT**
-	Crashes Avoided First Year **AAR** = AA x CRF / 100		
$ -	Crash Costs Avoided in First Year, AAR x AVC		
-	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 = $0 : $0 = - : 1

ACCIDENT AND RELATED DATA FOR RURAL AND MUNICIPAL INTERSECTIONS IN IOWA

Based on 1983 thru 1987 Data

BY INTERSECTION CLASS

Field Description	RURAL				MUNICIPAL			
	Primary with Primary	Primary with Secondary	Secondary with Secondary	Total Rural	Primary with Primary	Primary with City Street	City Street with City Street	Total Municipal
Number of Intersections	93	345	134	572	162	1,129	1,553	2,844
Average Number of Accidents / Year	1.6	1.1	0.8	1.1	4.8	4.1	3.0	3.6
Average Dollar Loss / Year *	$52,200	$44,200	$37,300	$43,900	$53,800	$43,100	$26,800	$34,800
Average Daily Entering Vehicles	4,500	4,000	2,200	3,600	12,800	12,800	10,500	11,500
Average Accident Rate / MEV	1.0	0.8	1.0	0.9	1.0	0.9	0.8	0.8
Lower Limits of Statistical Rates								
90 % Confidence Level (K=1.282)	1.9	1.8	2.8	2.1	1.7	1.6	1.6	1.6
95 % Confidence Level (K=1.645)	2.1	2.0	3.2	2.4	1.9	1.8	1.8	1.8
99.5 % Confidence Level (K=2.576)	2.8	2.7	4.1	3.2	2.4	2.3	2.4	2.4

BY TRAFFIC VOLUME CLASS

Field Description	RURAL						MUNICIPAL					
	1 - 999	1,000 - 2,499	2,500 - 4,999	5,000 - 9,999	10,000 & Over	Total Rural	1 - 2,499	2,500 - 4,999	5,000 - 9,999	10,000 - 24,999	25,000 & Over	Total Municip.
Number of Intersections	68	191	191	97	25	572	85	363	988	1,238	170	2,844
Average Number of Accidents / Year	0.5	0.8	1.1	1.7	3.8	1.1	0.9	1.5	2.0	4.6	10.6	3.6
Average Dollar Loss / Year *	$46,400	$38,200	$43,700	$47,600	$67,100	$43,900	$20,600	$20,500	$20,100	$43,500	$94,700	$34,800
Average Daily Entering Vehicles	650	1,750	3,600	6,750	14,500	3,650	1,900	3,900	7,450	15,050	30,450	11,500
Average Accident Rate / MEV	2.1	1.2	0.9	0.7	0.7	0.9	1.3	1.0	0.7	0.8	1.0	0.8
Lower Limits of Statistical Rates												
90% Confidence Level (K=1.282)	3.7	2.1	1.4	1.3	1.3	2.1	2.9	1.9	1.4	1.5	1.6	1.6
95% Confidence Level (K=1.645)	4.1	2.4	1.6	1.5	1.5	2.4	3.3	2.2	1.6	1.7	1.8	1.8
99.5% Confidence Level (K=2.576)	5.2	3.0	2.0	1.9	1.9	3.2	4.3	2.8	2.1	2.2	2.2	2.4

* Dollar Loss Value Based on: Fatality - $435,000
Injury - $ 15,000
Plus Actual Property Damage

Bureau of Transportation Safety
Iowa Department of Transportation
Prepared January, 1989

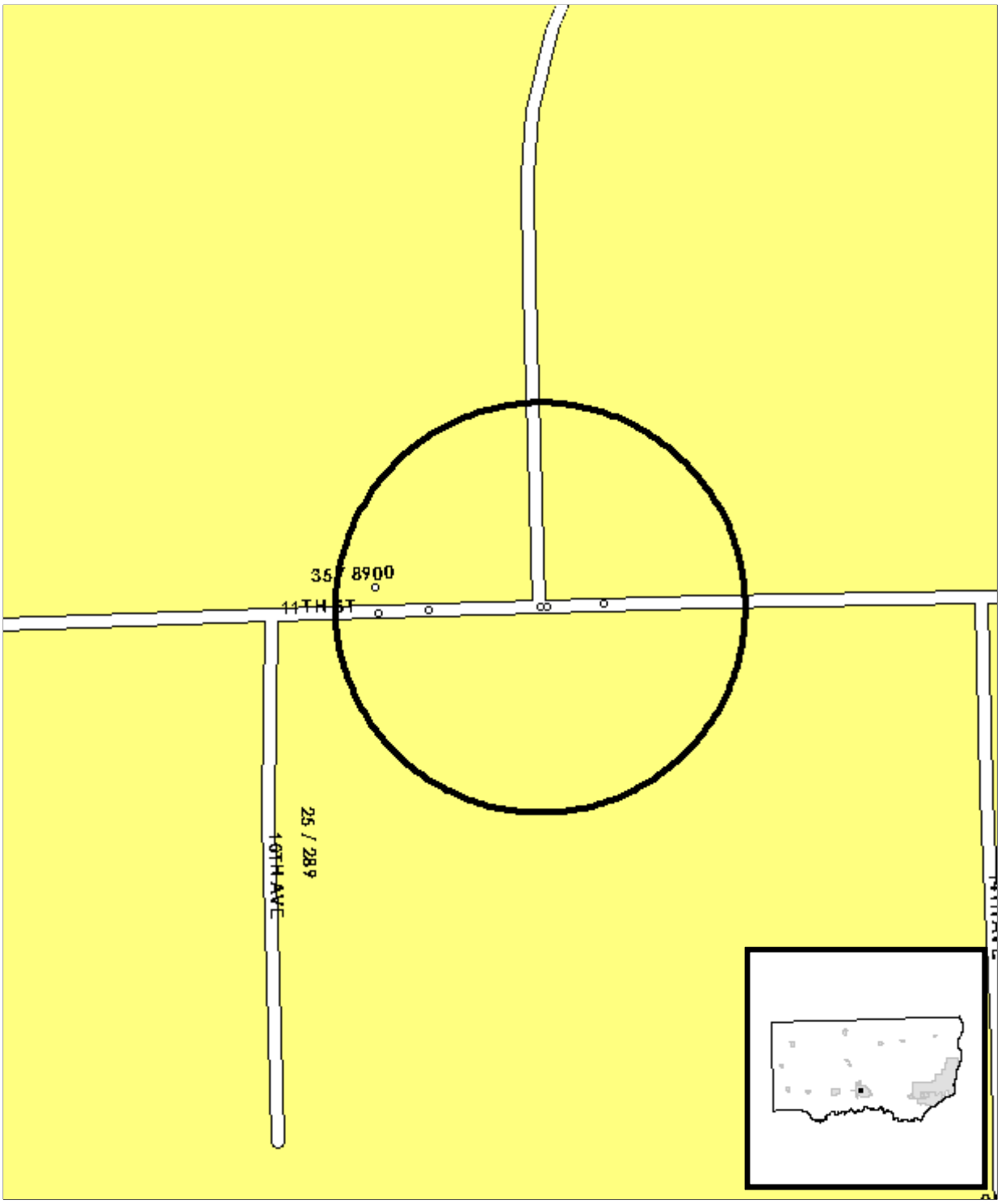
Iowa Department of Transportation

Location Map

City of DeWitt TEAP

Incidents: 21

Report Version 1.1 Mar 2005



Analyst: Shannon	**Notes:** 11th Street & Maynard Way

Iowa Department of Transportation

Driver and Time Summary

City of DeWitt TEAP

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	-	-	-	-	-	-	2	10
MON	-	-	-	-	-	-	-	-	2	-	-	-	-	2	10
TUE	-	-	-	1	-	-	-	-	1	-	-	-	-	2	10
WED	-	-	-	-	-	-	1	-	-	1	-	-	-	2	10
THU	-	-	-	-	1	-	-	-	-	-	-	-	-	1	5
FRI	-	-	-	1	3	1	3	-	2	-	-	-	-	10	48
SAT	-	-	-	-	-	-	1	-	-	1	-	-	-	2	10
Tot.				2	4	2	6		5	2				21	
%				10	19	10	29		24	10					100

Driver Age/Gender Summary:

Age	Male	Female	NR	Drivers	%
<14	-	-	-		
14	-	1	-	1	2
15	-	-	-		
16	-	2	-	2	5
17	-	-	-		
18	1	-	-	1	2
19	-	3	-	3	7
20	1	-	-	1	2
21 to 24	1	2	-	3	7
25 to 29	2	-	-	2	5
30 to 34	3	-	-	3	7
35 to 39	2	2	-	4	10
40 to 44	1	2	-	3	7
45 to 49	2	1	-	3	7
50 to 54	-	-	-		
55 to 59	2	3	-	5	12
60 to 64	-	1	-	1	2
65 to 69	1	-	-	1	2
70 to 74	3	-	-	3	7
75 to 79	-	1	-	1	2
80 to 84	-	-	-		
85 to 89	1	1	-	2	5
90 to 94	-	1	-	1	2
95 plus	-	-	-		
NR	1	-	-	1	2
Drivers	21	20	0	41	
%	51	49	0		100

Drug/Alcohol Summary:

	Total	%
Drug		
Alcohol, Less than Statutory		
Alcohol, Statutory	1	5
Drug/Alcohol, Less than Statutory		
Drug/Alcohol, Statutory		
Refused		
Under Influence of Alc/Drugs/Meds		
None Indicated	20	95
Total Crashes	21	100

Fixed Object Struck Summary:

	Vehs.	%
Bridge/Bridge rail/Overpass		
Underpass/Structure Support		
Culvert		
Ditch/Embankment		
Curb/Island/Raised Median	1	2
Guardrail		
Concrete Barrier		
Tree		
Pole - Utility/Light/Etc		
Sign Post		
Mailbox		
Impact Attenuator		
Other Fixed Object		
None	40	98
Total Vehicles	41	100

Selection Filter:

((YEAR = 2008 or YEAR = 2009 or YEAR = 2010 or YEAR = 2011 or YEAR = 2012))

Analyst: Shannon

Notes: 11th Street & Maynard Way

Iowa Department of Transportation

Major Cause Summary

City of DeWitt TEAP

Report Version 1.1 Jan 2005

Analysis Years: 2008 [4], 2009 [6], 2010 [5], 2011 [2], 2012 [4]

Crash Summary:

Fatal	-
Major Injury	-
Minor Injury	3
Possible/Unknown	3
PDO	15
Total Crashes	21

Injury Summary:

Fatal	-
Major Injury	-
Minor Injury	3
Possible	4
Unknown	-
Total Injuries	7

TOT Property Damage: $98,400

AVG Property Damage: $4,686

Surface Condition Summary:

Dry	15
Wet	2
Ice	1
Snow	2
Slush	-
Sand/Dirt/Oil/Gravel	-
Water	-
Other	1
Unknown	-
Not Reported	-
Total Crashes	21

Major Cause Summary:

	Animal		Improper Backing
	Ran Traffic Signal		Illegally Parked/Unattended
1	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
2	FTYROW: From Stop Sign		Separation of Units
	FTYROW: From Yield Sign		Ran Off Road - Right
12	FTYROW: Making Left Turn		Ran Off Road - Straight
	FTYROW: From Driveway		Ran Off Road - Left
1	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
	Followed Too Close	2	Other: Other Improper Action
	Disregarded Railroad Signal		Unknown
	Disregarded Warning Sign	1	Other: No Improper Action
	Operating Vehicle in Reckless/Aggressive Manner		None Indicated

Selection Filter:

((YEAR = 2008 or YEAR = 2009 or YEAR = 2010 or YEAR = 2011 or YEAR = 2012))

Analyst: Shannon

Notes: 11th Street & Maynard Way

Crash Detail Report

City of DeWitt TEAP

Report Version 1.3 Aug 2006

2008418540 01/11/2008 17:40 11TH ST and MAYNARD WAY
County: 23 **City:** De Witt

Major Cause: FTY from parked position
Roadway Type: Intersection: T - 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:**	$8000

Number of Vehicles: 2

	Unit 1	Unit 2	Unit 3
Init Trav Dir:	not reported	South	0
Veh Action:	Turning left	Essentially straight	0
Configuration:	Van or mini-van	4-tire light truck	0
Driver Age:	60	14	0
Driver Gender:	F	F	
Driver Cond:	Normal	Normal	0
Drivr Contr 1:	FTY from parked position	none	0
Drivr Contr 2:	not reported	not reported	0
Fixed Object:	none	none	0

2008443910 05/27/2008 16:05 11TH ST and MAYNARD WAY
County: 23 **City:** De Witt

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:**	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:**	$7300

Number of Vehicles: 2

	Unit 1	Unit 2	Unit 3
Init Trav Dir:	South	West	0
Veh Action:	Essentially straight	Turning left	0
Configuration:	Passenger car	Passenger car	0
Driver Age:	19	59	0
Driver Gender:	F	F	
Driver Cond:	Normal	Normal	0
Drivr Contr 1:	unknown	FTY making left turn	0
Drivr Contr 2:	not reported	not reported	0
Fixed Object:	none	none	0

Crash Detail Report

City of DeWitt TEAP

Report Version 1.3 Aug 2006

2008455318 08/08/2008 13:10 11TH ST and MAYNARD WAY
County: 23 **City:** De Witt

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:**	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:	West	West	0
Veh Action:	Essentially straight	Slowing/stopping	0
Configuration:	Passenger car	Passenger car	0
Driver Age:	85	49	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

2008455317 08/09/2008 18:18 11TH ST and MAYNARD WAY
County: 23 **City:** De Witt

Major Cause: FTY making left turn
Roadway Type: Not reported

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:**	Alcohol: Statutory
Unknown Injuries:	0	**Property Damage:**	$5500

Number of Vehicles: 2

	Unit 1	Unit 2	Unit 3
Init Trav Dir:	not reported	South	0
Veh Action:	Turning left	Essentially straight	0
Configuration:	Passenger car	Passenger car	0
Driver Age:	29	32	0
Driver Gender:	M	M	
Driver Cond:	Infl by alc/drugs/meds	Normal	0
Drivr Contr 1:	FTY making left turn	Vision obstructed	0
Drivr Contr 2:	not reported	not reported	0
Fixed Object:	Curb/island/raised median	none	0

Crash Detail Report

City of DeWitt TEAP

Report Version 1.3 Aug 2006

2009489654 01/15/2009 08:35 — 11TH ST and MAYNARD WAY
County: 23 **City:** De Witt

Major Cause: FTY from stop sign
Roadway Type: Intersection: T - intersection

Severity:	PDO	**Manner of Crash:**	Broadside
Fatalities:	0	**Surface Conditions:**	Snow
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:**	$2000

Number of Vehicles: 2

	Unit 1	Unit 2	Unit 3
Init Trav Dir:	South	not reported	0
Veh Action:	Stopped for sign/signal	Essentially straight	0
Configuration:	Passenger car	4-tire light truck	0
Driver Age:	41	35	0
Driver Gender:	F	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

2009499699 03/23/2009 16:30 — 11TH ST measuring 50 Feet East from 11TH ST and MAYNARD WAY
County: 23 **City:** De Witt

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

Severity:	PDO	**Manner of Crash:**	Non-collision
Fatalities:	0	**Surface Conditions:**	Wet
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:**	$1000

Number of Vehicles: 1

	Unit 1	Unit 2	Unit 3
Init Trav Dir:	South	0	0
Veh Action:	Essentially straight	0	0
Configuration:	Sport utility vehicle	0	0
Driver Age:	30	0	0
Driver Gender:	M		
Driver Cond:	unknown	0	0
Drivr Contr 1:	none	0	0
Drivr Contr 2:	not reported	0	0
Fixed Object:	none	0	0

Crash Detail Report

City of DeWitt TEAP

Report Version 1.3 Aug 2006

2009502509 04/17/2009 07:40
County: 23 **City:** De Witt

11TH ST and MAYNARD WAY measuring 25 Feet North from 11TH ST and MAYNARD WAY

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:**	Clear
Possible Injuries:	1	**Drug/Alc Involved:**	none indicated
Unknown Injuries:	0	**Property Damage:**	$10000

Number of Vehicles: 2

	Unit 1	Unit 2	Unit 3
Init Trav Dir:	West	South	0
Veh Action:	Turning left	Essentially straight	0
Configuration:	Passenger car	Passenger car	0
Driver Age:	24	56	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

2009513569 06/26/2009 10:30
County: 23 **City:** De Witt

11TH ST and MAYNARD WAY

Major Cause: FTY making left turn
Roadway Type: Intersection: T - 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:	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:	West	South	0
Veh Action:	Essentially straight	Turning left	0
Configuration:	Passenger car	Passenger car	0
Driver Age:	90	unknown	0
Driver Gender:	F	M	
Driver Cond:	Normal	Normal	0
Drivr Contr 1:	unknown	FTY making left turn	0
Drivr Contr 2:	not reported	not reported	0
Fixed Object:	none	none	0

Crash Detail Report

City of DeWitt TEAP

Report Version 1.3 Aug 2006

2009543223 12/08/2009 07:55 — 11TH ST and MAYNARD WAY
County: 23 **City:** De Witt

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

Severity:	PDO	**Manner of Crash:**	Broadside
Fatalities:	0	**Surface Conditions:**	Wet
Major Injuries:	0	**Light Conditions:**	Daylight
Minor Injuries:	0	**Weather Conditions:**	Snow
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:	West	South	0
Veh Action:	Essentially straight	Slowing/stopping	0
Configuration:	2-axle 6-tire truck	Sport utility vehicle	0
Driver Age:	55	36	0
Driver Gender:	M	F	
Driver Cond:	Normal	Normal	0
Drivr Contr 1:	none	Too fast for conditions	0
Drivr Contr 2:	not reported	not reported	0
Fixed Object:	none	none	0

2009546961 12/11/2009 16:41 — 11TH ST and MAYNARD WAY
County: 23 **City:** De Witt

Major Cause: Ran stop sign
Roadway Type: Intersection: T - intersection

Severity:	Poss/Unk	**Manner of Crash:**	Broadside
Fatalities:	0	**Surface Conditions:**	Other
Major Injuries:	0	**Light Conditions:**	Dark - roadway lighted
Minor Injuries:	0	**Weather Conditions:**	Clear
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:	South	West	0
Veh Action:	Turning left	Essentially straight	0
Configuration:	Passenger car	Passenger car	0
Driver Age:	16	58	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

Crash Detail Report

City of DeWitt TEAP

Report Version 1.3 Aug 2006

2010596821 10/20/2010 18:10 MAYNARD WAY and 11TH ST
County: 23 **City:** De Witt

Major Cause: FTY making left turn
Roadway Type: Non-intersection: Business drive

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:**	$2500

Number of Vehicles: 2

	Unit 1	Unit 2	Unit 3
Init Trav Dir:	West	South	0
Veh Action:	Turning left	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 making left turn	none	0
Drivr Contr 2:	not reported	not reported	0
Fixed Object:	none	none	0

2010604124 11/28/2010 10:00 11TH ST
County: 23 **City:** De Witt

Major Cause: FTY making left turn
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:**	not reported
Possible Injuries:	2	**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	South	0
Veh Action:	Turning left	Essentially straight	0
Configuration:	Sport utility vehicle	Passenger car	0
Driver Age:	45	69	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

Crash Detail Report

City of DeWitt TEAP

Report Version 1.3 Aug 2006

2010605292 12/10/2010 08:15 MAYNARD WAY and 11TH ST
County: 23 **City:** De Witt

Major Cause: Swerving/evasive action
Roadway Type: Intersection: T - intersection

Severity:	PDO	**Manner of Crash:**	Rear-end
Fatalities:	0	**Surface Conditions:**	Ice
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:**	$5000

Number of Vehicles: 2

	Unit 1	Unit 2	Unit 3
Init Trav Dir:	South	South	0
Veh Action:	Stopped for sign/signal	Slowing/stopping	0
Configuration:	4-tire light truck	Sport utility vehicle	0
Driver Age:	32	35	0
Driver Gender:	M	F	
Driver Cond:	Normal	Normal	0
Drivr Contr 1:	none	Lost control	0
Drivr Contr 2:	not reported	not reported	0
Fixed Object:	none	none	0

2010607989 12/10/2010 08:20 MAYNARD WAY and 11TH ST
County: 23 **City:** De Witt

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

Severity:	PDO	**Manner of Crash:**	Rear-end
Fatalities:	0	**Surface Conditions:**	Snow
Major Injuries:	0	**Light Conditions:**	Daylight
Minor Injuries:	0	**Weather Conditions:**	Snow
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:	Slowing/stopping	Stopped for sign/signal	0
Configuration:	4-tire light truck	Sport utility vehicle	0
Driver Age:	71	38	0
Driver Gender:	M	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

Crash Detail Report

City of DeWitt TEAP

Report Version 1.3 Aug 2006

2010608386 12/22/2010 12:10 MAYNARD WAY and 11TH ST
County: 23 **City:** De Witt

Major Cause: FTY making left turn
Roadway Type: Intersection: T - 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:**	Cloudy
Possible Injuries:	0	**Drug/Alc Involved:**	none indicated
Unknown Injuries:	0	**Property Damage:**	$8000

Number of Vehicles: 2

	Unit 1	Unit 2	Unit 3
Init Trav Dir:	West	South	0
Veh Action:	Essentially straight	Turning left	0
Configuration:	4-tire light truck	2-axle 6-tire truck	0
Driver Age:	74	48	0
Driver Gender:	M	M	
Driver Cond:	Normal	Normal	0
Drivr Contr 1:	none	FTY making left turn	0
Drivr Contr 2:	not reported	not reported	0
Fixed Object:	none	none	0

2011641670 07/29/2011 08:40 11TH ST
County: 23 **City:** De Witt

Major Cause: FTY making left turn
Roadway Type: Non-intersection: Business drive

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:**	$6000

Number of Vehicles: 2

	Unit 1	Unit 2	Unit 3
Init Trav Dir:	South	West	0
Veh Action:	Essentially straight	Turning left	0
Configuration:	Passenger car	Passenger car	0
Driver Age:	19	20	0
Driver Gender:	F	M	
Driver Cond:	Normal	Normal	0
Drivr Contr 1:	none	FTY making left turn	0
Drivr Contr 2:	not reported	not reported	0
Fixed Object:	none	none	0

Crash Detail Report

City of DeWitt TEAP

Report Version 1.3 Aug 2006

2011642908 08/06/2011 12:55 MAYNARD WAY and 11TH ST
County: 23 **City:** De Witt

Major Cause: FTY making left turn
Roadway Type: Intersection: T - 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:**	$7000

Number of Vehicles: 2

	Unit 1	Unit 2	Unit 3
Init Trav Dir:	South	West	0
Veh Action:	Essentially straight	Turning left	0
Configuration:	Passenger car	Passenger car	0
Driver Age:	19	16	0
Driver Gender:	F	F	
Driver Cond:	Normal	Normal	0
Drivr Contr 1:	none	FTY making left turn	0
Drivr Contr 2:	not reported	not reported	0
Fixed Object:	none	none	0

2012682774 04/20/2012 12:55 MAYNARD WAY and 11TH ST
County: 23 **City:** De Witt

Major Cause: FTY making left turn
Roadway Type: Intersection: T - 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:**	Clear
Possible Injuries:	0	**Drug/Alc Involved:**	none indicated
Unknown Injuries:	0	**Property Damage:**	$2100

Number of Vehicles: 2

	Unit 1	Unit 2	Unit 3
Init Trav Dir:	South	West	0
Veh Action:	Turning left	Essentially straight	0
Configuration:	Passenger car	Van or mini-van	0
Driver Age:	22	58	0
Driver Gender:	F	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

Crash Detail Report

City of DeWitt TEAP

Report Version 1.3 Aug 2006

2012686140 05/13/2012 12:45 MAYNARD WAY and 11TH ST
County: 23 **City:** De Witt

Major Cause: FTY making left turn
Roadway Type: Non-intersection: Business drive

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:**	$2000

Number of Vehicles: 2

	Unit 1	Unit 2	Unit 3
Init Trav Dir:	West	East	0
Veh Action:	Essentially straight	Turning left	0
Configuration:	Motorcycle	Passenger car	0
Driver Age:	41	73	0
Driver Gender:	M	M	
Driver Cond:	Normal	Normal	0
Drivr Contr 1:	Swerved to avoid	FTY making left turn	0
Drivr Contr 2:	not reported	not reported	0
Fixed Object:	none	none	0

2012688353 05/25/2012 13:45 11TH ST and MAYNARD WAY
County: 23 **City:** De Witt

Major Cause: FTY making left turn
Roadway Type: Non-intersection: Business drive

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:	West	East	0
Veh Action:	Turning left	Essentially straight	0
Configuration:	Passenger car	Passenger car	0
Driver Age:	75	88	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

Iowa Department of Transportation

Crash Detail Report

City of DeWitt TEAP

Report Version 1.3 Aug 2006

2012694945 07/16/2012 17:53 MAYNARD WAY and 11TH ST
County: 23 **City:** De Witt

Major Cause: FTY from stop sign
Roadway Type: Intersection: T - 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:**	$7000

Number of Vehicles: 2

	Unit 1	Unit 2	Unit 3
Init Trav Dir:	West	South	0
Veh Action:	Essentially straight	Essentially straight	0
Configuration:	Sport utility vehicle	Sport utility vehicle	0
Driver Age:	28	18	0
Driver Gender:	M	M	
Driver Cond:	Normal	Normal	0
Drivr Contr 1:	none	FTY from stop sign	0
Drivr Contr 2:	not reported	not reported	0
Fixed Object:	none	none	0

Appendix B – Iowa DOT Provided Count Data

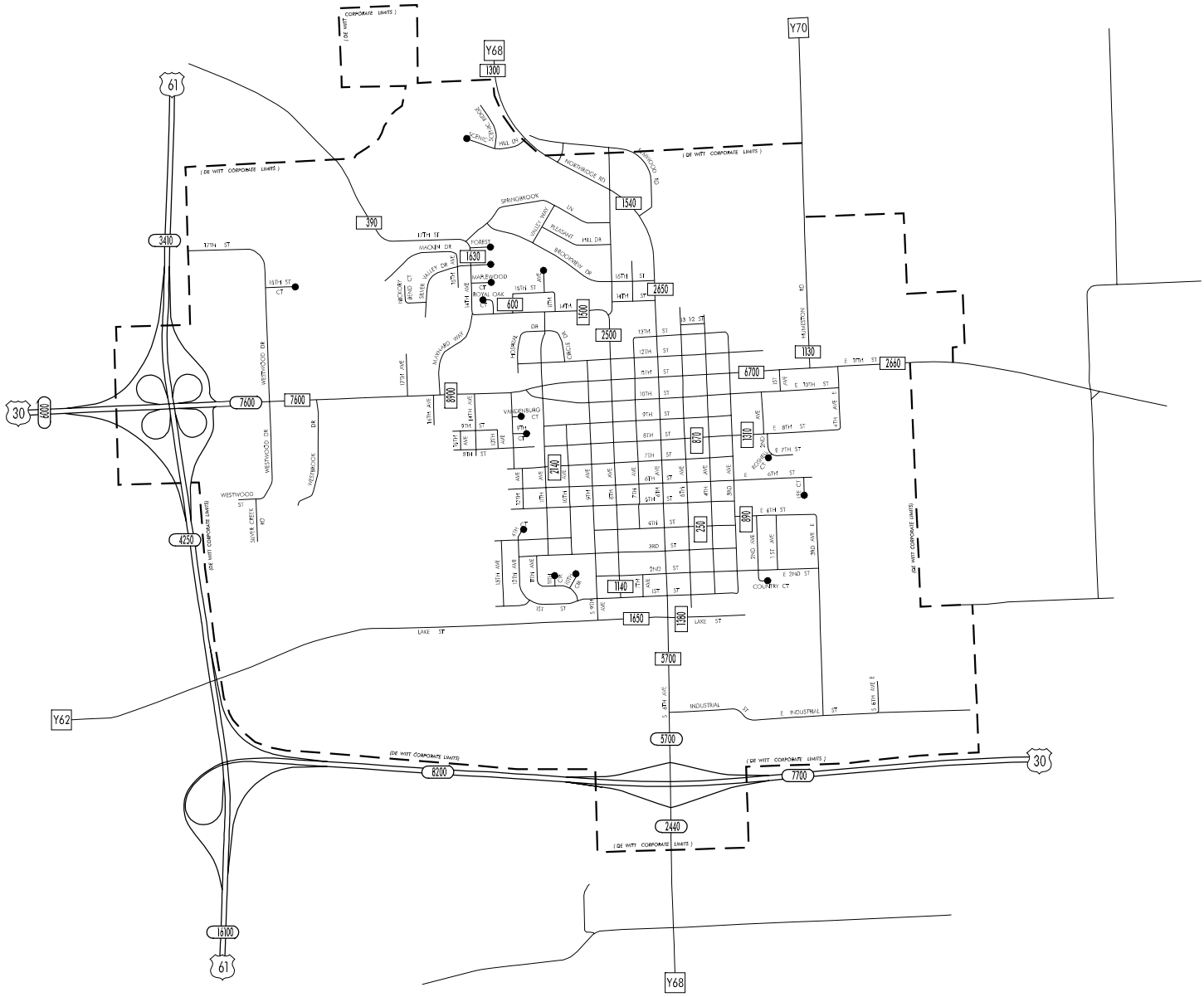
Iowa Department of Transportation

TRAFFIC FLOW MAP OF

DEWITT

CLINTON COUNTY

2006 ANNUAL AVERAGE DAILY TRAFFIC



PREPARED BY
IOWA DEPARTMENT OF TRANSPORTATION
DIVISION OF PLANNING AND PROGRAMMING
OFFICE OF TRANSPORTATION DATA
PHONE (515) 239-1289

LEGEND

RECORDER ONLY
MANUAL COUNT

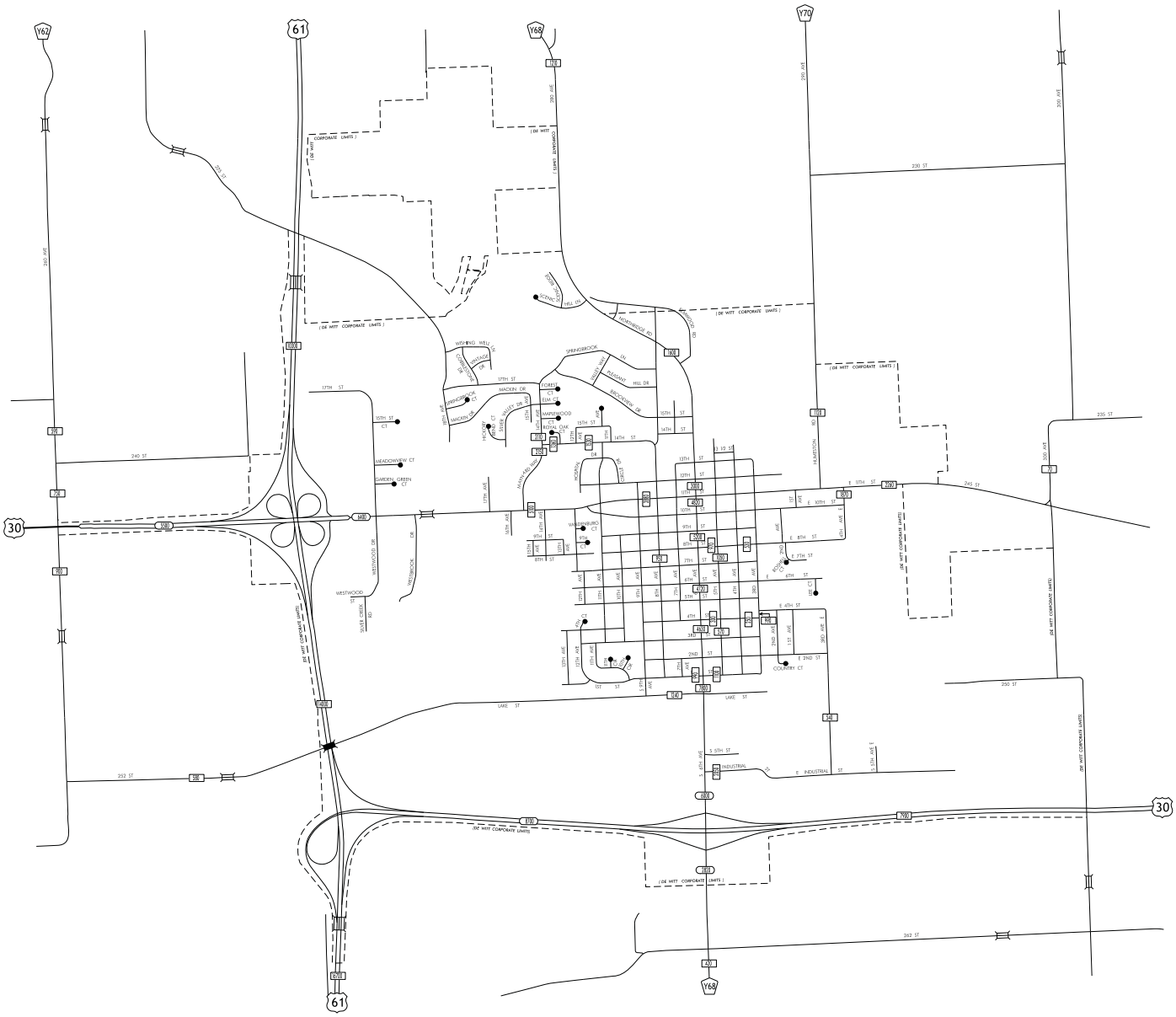
Iowa Department of Transportation

TRAFFIC FLOW MAP OF

DE WITT

CLINTON COUNTY

2010 ANNUAL AVERAGE DAILY TRAFFIC



PREPARED BY

IOWA DEPARTMENT OF TRANSPORTATION

DIVISION OF PLANNING AND PROGRAMMING

OFFICE OF TRANSPORTATION DATA

PHONE (515) 239-1289

LEGEND

RECORDER ONLY

MANUAL COUNT

Appendix C – City of DeWitt Collected Count Data

Location:	11th Street & Maynard Way
Start Date:	4/25/2013
Start Time:	7:00 AM
Site Code:	

TURNING MOVEMENT COUNT

HRGreen

	Eastbound							Westbound							Northbound							Southbound						
	Across Leg	Left		Thru		Right		Across Leg	Left		Thru		Right		Across Leg	Left		Thru		Right		Across Leg	Left		Thru		Right	
	Pedestrians	Cars	Trucks	Cars	Trucks	Cars	Trucks	Pedestrians	Cars	Trucks	Cars	Trucks	Cars	Trucks	Pedestrians	Cars	Trucks	Cars	Trucks	Cars	Trucks	Pedestrians	Cars	Trucks	Cars	Trucks	Cars	Trucks
Start Time																												
6:30 AM																												
6:45 AM																												
7:00 AM		6	0	52	0	3	0		11	0	59	0	8	0		5	0	1	0	2	0		0	0	9	0	25	0
7:15 AM		11	0	70	0	1	0	1	9	0	63	0	6	0		4	0	1	0	6	0		4	0	1	0	30	0
7:30 AM		13	0	81	0	2	0		15	0	68	0	5	0		5	0	3	0	3	0		3	0	1	0	15	0
7:45 AM		20	0	106	0	1	0		10	0	73	0	9	0		3	0	3	0	7	0		2	0	3	0	35	0
8:00 AM		22	0	67	0	3	0		4	0	79	0	7	0		7	0	3	0	4	0		4	0	5	0	37	0
8:15 AM		4	0	45	0	2	0		8	0	48	0	4	0		2	0	0	0	7	0		7	0	0	0	15	0
8:30 AM		4	0	70	0	0	0		15	0	42	0	6	0		2	0	0	0	1	0		5	0	0	0	10	0
8:45 AM		7	0	57	0	0	0	1	5	0	82	0	6	0		2	0	0	0	2	0		3	0	1	0	10	0
Total:	0	87	0	548	0	12	0	2	77	0	514	0	51	0	0	30	0	11	0	32	0	0	28	0	20	0	177	0
TOTAL ENTERING VEH.		647							642							73							225					
% OF ENTERING VEH.		40.77%							40.45%							4.60%							14.18%					
TURN MOVEMENT %		13.45%		84.70%		1.85%			11.99%		80.06%		7.94%			41.10%		15.07%		43.84%			12.44%		8.89%		78.67%	
PEAK HOUR TRUCK VOL.		0		0		0			0		0		0			0		0		0			0		0		0	
PEAK HOUR TOTAL VOL.		66		324		7			38		283		27			19		10		20			13		10		117	
MAX PERIOD		22		106		3			15		79		9			7		3		7			4		5		37	
PEAK HOUR FACTOR		0.75		0.76		0.58			0.63		0.90		0.75			0.68		0.83		0.71			0.81		0.50		0.79	
% TRUCKS - PEAK HOUR		0.00%		0.00%		0.00%			0.00%		0.00%		0.00%			0.00%		0.00%		0.00%			0.00%		0.00%		0.00%	

Location:	11th Street & Maynard Way
Start Date:	4/25/2013
Start Time:	7:00 AM
Site Code:	

TURNING MOVEMENT COUNT

HRGreen

	Eastbound							Westbound							Northbound							Southbound						
	Across Leg	Left		Thru		Right		Across Leg	Left		Thru		Right		Across Leg	Left		Thru		Right		Across Leg	Left		Thru		Right	
	Pedestrians	Cars	Trucks	Cars	Trucks	Cars	Trucks	Pedestrians	Cars	Trucks	Cars	Trucks	Cars	Trucks	Pedestrians	Cars	Trucks	Cars	Trucks	Cars	Trucks	Pedestrians	Cars	Trucks	Cars	Trucks	Cars	Trucks
Start Time																												
6:30 AM																												
6:45 AM																												
7:00 AM		3	0	33	1	0	0		6	0	65	0	3	0		6	0	2	0	3	0		4	0	2	0	21	0
7:15 AM		14	0	79	1	1	0		11	0	65	1	2	0	1	2	0	1	0	7	0	1	7	0	2	0	32	0
7:30 AM		12	0	89	0	0	0		11	0	70	0	5	0		1	0	1	0	3	0		3	0	4	0	27	0
7:45 AM		20	0	118	3	2	0		6	0	67	1	2	0	1	2	0	2	0	7	0		11	0	6	0	19	0
8:00 AM		15	0	83	4	0	0		16	0	76	1	8	1	1	2	0	0	0	12	0		8	0	3	0	42	0
8:15 AM		11	0	45	1	1	0		10	0	53	2	2	1	1	5	0	1	0	5	0		3	0	1	0	14	0
8:30 AM		3	0	75	1	0	0		9	0	58	1	8	0	1	4	0	0	0	5	0		8	0	3	0	15	1
8:45 AM		12	0	65	1	1	0		6	0	48	1	0	0		1	0	0	0	6	0	1	10	0	1	0	5	0
Total:	0	90	0	587	12	5	0	0	75	0	502	7	30	2	5	23	0	7	0	48	0	2	54	0	22	0	175	1
TOTAL ENTERING VEH.		694							616							78							252					
% OF ENTERING VEH.		42.32%							37.56%							4.76%							15.37%					
TURN MOVEMENT %		12.97%		86.31%		0.72%			12.18%		82.63%		5.19%			29.49%		8.97%		61.54%			21.43%		8.73%		69.84%	
PEAK HOUR TRUCK VOL.		0		8		0			0		3		1			0		0		0			0		0		0	
PEAK HOUR TOTAL VOL.		61		377		3			44		281		18			7		4		29			29		15		120	
MAX PERIOD		20		121		2			16		77		9			2		2		12			11		6		42	
PEAK HOUR FACTOR		0.76		0.78		0.38			0.69		0.91		0.50			0.88		0.50		0.60			0.66		0.63		0.71	
% TRUCKS - PEAK HOUR		0.00%		2.12%		0.00%			0.00%		1.07%		5.56%			0.00%		0.00%		0.00%			0.00%		0.00%		0.00%	

Location:	11th Street & Maynard Way
Start Date:	4/30/2013
Start Time:	3:00 PM
Site Code:	

TURNING MOVEMENT COUNT

HRGreen

	Eastbound							Westbound							Northbound							Southbound						
	Across Leg	Left		Thru		Right		Across Leg	Left		Thru		Right		Across Leg	Left		Thru		Right		Across Leg	Left		Thru		Right	
	Pedestrians	Cars	Trucks	Cars	Trucks	Cars	Trucks	Pedestrians	Cars	Trucks	Cars	Trucks	Cars	Trucks	Pedestrians	Cars	Trucks	Cars	Trucks	Cars	Trucks	Pedestrians	Cars	Trucks	Cars	Trucks	Cars	Trucks
Start Time																												
3:00 PM		12	0	69	0	0	0		3	0	46	0	7	0		2	0	0	0	4	0		8	0	1	0	14	0
3:15 PM		12	0	63	0	1	0		14	0	89	1	10	0		6	0	1	0	8	0		6	0	3	0	25	0
3:30 PM		8	1	80	3	1	0	2	10	0	74	4	7	1		3	0	1	0	7	0		4	1	1	0	7	0
3:45 PM		18	0	95	3	2	0		13	0	86	1	10	0		6	0	2	0	5	0		6	0	3	0	17	0
4:00 PM		21	1	117	2	1	0		11	0	89	2	18	0		5	0	1	0	5	0		4	0	5	0	13	1
4:15 PM		19	1	79	3	2	0		10	0	117	2	12	0		6	0	1	1	7	0		6	0	4	0	15	0
4:30 PM		16	0	110	0	3	0		12	0	78	2	12	0		1	0	0	0	8	0	1	8	0	3	0	18	1
4:45 PM		22	0	112	0	2	0		14	0	97	2	23	0		4	0	2	0	5	0		6	0	0	0	20	0
5:00 PM		15	0	107	0	0	0		10	0	107	1	12	0	3	7	0	1	0	6	0	1	8	0	3	0	12	1
5:15 PM		28	0	102	2	0	0		13	0	108	2	10	0	1	6	0	1	0	4	0		6	0	7	0	23	1
5:30 PM		28	0	95	1	0	0		6	0	82	0	10	0	6	2	0	3	0	3	0		4	0	3	0	16	1
5:45 PM		23	0	78	1	2	0		11	0	83	0	13	0	2	0	0	0	0	2	0		11	0	3	0	23	0
Total:	0	222	3	1107	15	14	0	2	127	0	1056	17	144	1	12	48	0	13	1	64	0	2	77	1	36	0	203	5
TOTAL ENTERING VEH.		1361							1345							126							322					
% OF ENTERING VEH.		43.15%							42.64%							3.99%							10.21%					
TURN MOVEMENT %		16.53%		82.44%		1.03%			9.44%		79.78%		10.78%			38.10%		11.11%		50.79%			24.22%		11.18%		64.60%	
PEAK HOUR TRUCK VOL.		0		2		0			0		7		0			0		0		0			0		0		3	
PEAK HOUR TOTAL VOL.		81		433		5			49		397		57			18		4		23			28		13		76	
MAX PERIOD		28		112		3			14		110		23			7		2		8			8		7		24	
PEAK HOUR FACTOR		0.72		0.97		0.42			0.88		0.90		0.62			0.64		0.50		0.72			0.88		0.46		0.79	
% TRUCKS - PEAK HOUR		0.00%		0.46%		0.00%			0.00%		1.76%		0.00%			0.00%		0.00%		0.00%			0.00%		0.00%		3.95%	

Location:	11th Street & Maynard Way
Start Date:	6/10/2013
Start Time:	3:00 PM
Site Code:	

TURNING MOVEMENT COUNT

HRGreen

	Eastbound							Westbound							Northbound							Southbound						
	Across Leg	Left		Thru		Right		Across Leg	Left		Thru		Right		Across Leg	Left		Thru		Right		Across Leg	Left		Thru		Right	
	Pedestrians	Cars	Trucks	Cars	Trucks	Cars	Trucks	Pedestrians	Cars	Trucks	Cars	Trucks	Cars	Trucks	Pedestrians	Cars	Trucks	Cars	Trucks	Cars	Trucks	Pedestrians	Cars	Trucks	Cars	Trucks	Cars	Trucks
Start Time																												
3:00 PM		11	0	55	0	0	0		10	0	51	2	6	0		1	0	0	0	4	0	4	6	0	1	0	8	0
3:15 PM		8	0	65	1	0	0		5	0	56	0	7	0		2	0	0	0	4	0	1	6	0	3	0	13	0
3:30 PM		12	0	64	0	0	0		7	0	76	3	6	0		6	0	0	0	8	0	1	6	0	2	0	12	0
3:45 PM		15	0	65	1	0	0		7	0	80	2	8	0		2	0	2	0	7	0	1	14	0	0	0	6	0
4:00 PM		13	0	76	0	2	0		7	0	98	1	7	0		1	0	1	0	3	0		2	0	0	0	14	0
4:15 PM		8	0	87	4	1	0		10	0	61	0	7	0		3	0	2	0	2	0		3	0	3	0	15	0
4:30 PM		15	0	87	0	1	1		12	0	99	0	12	0		4	0	1	0	8	0	3	13	0	3	0	8	0
4:45 PM		10	0	92	1	1	0		8	0	94	2	11	0		1	0	0	0	4	0		6	0	1	0	11	0
5:00 PM		14	0	98	1	4	0		12	0	73	0	14	0		3	0	0	0	5	0	2	4	0	2	0	15	2
5:15 PM		29	0	94	2	0	0		11	0	76	0	14	0		11	0	0	0	3	0		5	0	1	0	16	0
5:30 PM		30	0	103	0	7	0		7	0	95	0	20	0		1	0	2	0	11	0	6	9	0	4	0	15	0
5:45 PM		24	0	75	0	0	0		8	0	86	1	3	0		2	0	0	0	7	0	7	8	0	9	0	34	0
Total:	0	189	0	961	10	16	1	0	104	0	945	11	115	0	0	37	0	8	0	66	0	25	82	0	29	0	167	2
TOTAL ENTERING VEH.		1177							1175							111							280					
% OF ENTERING VEH.		42.91%							42.84%							4.05%							10.21%					
TURN MOVEMENT %		16.06%		82.50%		1.44%			8.85%		81.36%		9.79%			33.33%		7.21%		59.46%			29.29%		10.36%		60.36%	
PEAK HOUR TRUCK VOL.		0		3		0			0		1		0			0		0		0			0		0		2	
PEAK HOUR TOTAL VOL.		97		373		11			38		331		51			17		2		26			26		16		82	
MAX PERIOD		30		103		7			12		95		20			11		2		11			9		9		34	
PEAK HOUR FACTOR		0.81		0.91		0.39			0.79		0.87		0.64			0.39		0.25		0.59			0.72		0.44		0.60	
% TRUCKS - PEAK HOUR		0.00%		0.80%		0.00%			0.00%		0.30%		0.00%			0.00%		0.00%		0.00%			0.00%		0.00%		2.44%	

Appendix D – Synchro Analysis Results

Intersection	
Intersection Delay, s/veh	5.2

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Vol, veh/h	61	377	3	44	281	18	7	4	29	29	15	120
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	100	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	76	78	38	69	91	50	88	50	60	66	63	71
Heavy Vehicles, %	0	2	0	0	1	6	0	0	0	0	0	0
Mvmt Flow	80	483	8	64	309	36	8	8	48	44	24	169

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	345	0	0	491	0	0	942	1120	246	860	1106	172
Stage 1	-	-	-	-	-	-	648	648	-	454	454	-
Stage 2	-	-	-	-	-	-	294	472	-	406	652	-
Follow-up Headway	2.2	-	-	2.2	-	-	3.5	4	3.3	3.5	4	3.3
Pot Capacity-1 Maneuver	1225	-	-	1083	-	-	221	208	760	253	212	848
Stage 1	-	-	-	-	-	-	430	469	-	560	573	-
Stage 2	-	-	-	-	-	-	695	562	-	598	467	-
Time blocked-Platoon, %		-	-		-	-						
Mov Capacity-1 Maneuver	1225	-	-	1083	-	-	140	175	760	201	179	848
Mov Capacity-2 Maneuver	-	-	-	-	-	-	140	175	-	201	179	-
Stage 1	-	-	-	-	-	-	391	427	-	510	531	-
Stage 2	-	-	-	-	-	-	493	521	-	500	425	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	1.4	1.5	16.1	17.8
HCM LOS			C	C

Minor Lane / Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	387	1225	-	-	1083	-	-	201	512
HCM Lane V/C Ratio	0.166	0.066	-	-	0.059	-	-	0.146	0.405
HCM Control Delay (s)	16.1	8.145	0.3	-	8.532	0.2	-	25.9	16.7
HCM Lane LOS	C	A	A		A	A		D	C
HCM 95th %tile Q(veh)	0.589	0.21	-	-	0.187	-	-	0.5	1.945

Notes

~ : Volume Exceeds Capacity; $: Delay Exceeds 300 Seconds; Error : Computation Not Defined

Intersection	
Intersection Delay, s/veh	5.7

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Vol, veh/h	81	433	5	49	397	57	18	4	23	28	13	76
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	100	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	72	97	42	88	90	62	64	50	72	88	46	79
Heavy Vehicles, %	0	1	0	0	2	0	0	0	0	0	0	4
Mvmt Flow	112	446	12	56	441	92	28	8	32	32	28	96

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	533	0	0	458	0	0	1023	1321	229	1050	1281	267
Stage 1	-	-	-	-	-	-	677	677	-	598	598	-
Stage 2	-	-	-	-	-	-	346	644	-	452	683	-
Follow-up Headway	2.2	-	-	2.2	-	-	3.5	4	3.3	3.5	4	3.34
Pot Capacity-1 Maneuver	1045	-	-	1114	-	-	193	158	780	184	167	725
Stage 1	-	-	-	-	-	-	414	455	-	461	494	-
Stage 2	-	-	-	-	-	-	649	471	-	562	452	-
Time blocked-Platoon, %		-	-		-	-						
Mov Capacity-1 Maneuver	1045	-	-	1114	-	-	119	125	780	141	133	725
Mov Capacity-2 Maneuver	-	-	-	-	-	-	119	125	-	141	133	-
Stage 1	-	-	-	-	-	-	354	389	-	394	458	-
Stage 2	-	-	-	-	-	-	490	437	-	451	386	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	2.1	0.9	32.2	25.6
HCM LOS			D	D

Minor Lane / Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	199	1045	-	-	1114	-	-	141	321
HCM Lane V/C Ratio	0.342	0.108	-	-	0.05	-	-	0.15	0.421
HCM Control Delay (s)	32.2	8.86	0.4	-	8.402	0.2	-	35	24.1
HCM Lane LOS	D	A	A		A	A		E	C
HCM 95th %tile Q(veh)	1.434	0.361	-	-	0.158	-	-	0.514	2.006

Notes
~ : Volume Exceeds Capacity; $: Delay Exceeds 300 Seconds; Error : Computation Not Defined

Intersection	
Intersection Delay, s/veh	5.9

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Vol, veh/h	61	377	3	44	281	18	7	4	29	29	15	120
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	150	-	-	150	-	-	-	-	-	100	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	76	78	38	69	91	50	88	50	60	66	63	71
Heavy Vehicles, %	0	2	0	0	1	6	0	0	0	0	0	0
Mvmt Flow	80	483	8	64	309	36	8	8	48	44	24	169

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	345	0	0	491	0	0	1199	1120	487	1130	1106	327
Stage 1	-	-	-	-	-	-	648	648	-	454	454	-
Stage 2	-	-	-	-	-	-	551	472	-	676	652	-
Follow-up Headway	2.2	-	-	2.2	-	-	3.5	4	3.3	3.5	4	3.3
Pot Capacity-1 Maneuver	1225	-	-	1083	-	-	164	208	585	183	212	719
Stage 1	-	-	-	-	-	-	462	469	-	589	573	-
Stage 2	-	-	-	-	-	-	522	562	-	446	467	-
Time blocked-Platoon, %		-	-		-	-						
Mov Capacity-1 Maneuver	1225	-	-	1083	-	-	103	183	585	147	186	719
Mov Capacity-2 Maneuver	-	-	-	-	-	-	103	183	-	147	186	-
Stage 1	-	-	-	-	-	-	432	438	-	551	539	-
Stage 2	-	-	-	-	-	-	359	529	-	375	437	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	1.1	1.3	19.3	21.7
HCM LOS			C	C

Minor Lane / Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	316	1225	-	-	1083	-	-	147	448
HCM Lane V/C Ratio	0.203	0.066	-	-	0.059	-	-	0.199	0.463
HCM Control Delay (s)	19.3	8.145	-	-	8.532	-	-	35.5	19.8
HCM Lane LOS	C	A			A			E	C
HCM 95th %tile Q(veh)	0.748	0.21	-	-	0.187	-	-	0.712	2.397

Notes

~ : Volume Exceeds Capacity; $: Delay Exceeds 300 Seconds; Error : Computation Not Defined

Intersection	
Intersection Delay, s/veh	6.7

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Vol, veh/h	81	433	5	49	397	57	18	4	23	28	13	76
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	150	-	-	150	-	-	-	-	-	100	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	72	97	42	88	90	62	64	50	72	88	46	79
Heavy Vehicles, %	0	1	0	0	2	0	0	0	0	0	0	4
Mvmt Flow	112	446	12	56	441	92	28	8	32	32	28	96

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	533	0	0	458	0	0	1338	1321	452	1295	1281	487
Stage 1	-	-	-	-	-	-	677	677	-	598	598	-
Stage 2	-	-	-	-	-	-	661	644	-	697	683	-
Follow-up Headway	2.2	-	-	2.2	-	-	3.5	4	3.3	3.5	4	3.336
Pot Capacity-1 Maneuver	1045	-	-	1114	-	-	131	158	612	141	167	576
Stage 1	-	-	-	-	-	-	446	455	-	492	494	-
Stage 2	-	-	-	-	-	-	455	471	-	435	452	-
Time blocked-Platoon, %		-	-		-	-						
Mov Capacity-1 Maneuver	1045	-	-	1114	-	-	82	134	612	113	141	576
Mov Capacity-2 Maneuver	-	-	-	-	-	-	82	134	-	113	141	-
Stage 1	-	-	-	-	-	-	398	406	-	439	469	-
Stage 2	-	-	-	-	-	-	338	447	-	360	403	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	1.7	0.8	47.5	29.7
HCM LOS			E	D

Minor Lane / Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	150	1045	-	-	1114	-	-	113	293
HCM Lane V/C Ratio	0.454	0.108	-	-	0.05	-	-	0.188	0.461
HCM Control Delay (s)	47.5	8.86	-	-	8.402	-	-	44.1	27.4
HCM Lane LOS	E	A			A			E	D
HCM 95th %tile Q(veh)	2.073	0.361	-	-	0.158	-	-	0.656	2.298

Notes
~ : Volume Exceeds Capacity; $: Delay Exceeds 300 Seconds; Error : Computation Not Defined

Intersection	
Intersection Delay, s/veh	4.9

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Vol, veh/h	61	377	3	44	281	18	7	4	29	29	15	120
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	150	-	-	150	-	-	-	-	-	100	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	76	78	38	69	91	50	88	50	60	66	63	71
Heavy Vehicles, %	0	2	0	0	1	6	0	0	0	0	0	0
Mvmt Flow	80	483	8	64	309	36	8	8	48	44	24	169

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	345	0	0	491	0	0	942	1120	246	860	1106	172
Stage 1	-	-	-	-	-	-	648	648	-	454	454	-
Stage 2	-	-	-	-	-	-	294	472	-	406	652	-
Follow-up Headway	2.2	-	-	2.2	-	-	3.5	4	3.3	3.5	4	3.3
Pot Capacity-1 Maneuver	1225	-	-	1083	-	-	221	208	760	253	212	848
Stage 1	-	-	-	-	-	-	430	469	-	560	573	-
Stage 2	-	-	-	-	-	-	695	562	-	598	467	-
Time blocked-Platoon, %		-	-		-	-						
Mov Capacity-1 Maneuver	1225	-	-	1083	-	-	145	183	760	208	186	848
Mov Capacity-2 Maneuver	-	-	-	-	-	-	145	183	-	208	186	-
Stage 1	-	-	-	-	-	-	402	438	-	523	539	-
Stage 2	-	-	-	-	-	-	500	529	-	514	437	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	1.1	1.3	15.8	17.5
HCM LOS			C	C

Minor Lane / Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	396	1225	-	-	1083	-	-	208	522
HCM Lane V/C Ratio	0.162	0.066	-	-	0.059	-	-	0.141	0.397
HCM Control Delay (s)	15.8	8.145	-	-	8.532	-	-	25.1	16.4
HCM Lane LOS	C	A			A			D	C
HCM 95th %tile Q(veh)	0.573	0.21	-	-	0.187	-	-	0.481	1.888

Notes

~ : Volume Exceeds Capacity; $: Delay Exceeds 300 Seconds; Error : Computation Not Defined

Intersection	
Intersection Delay, s/veh	5.3

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Vol, veh/h	81	433	5	49	397	57	18	4	23	28	13	76
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	150	-	-	150	-	-	-	-	-	100	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	72	97	42	88	90	62	64	50	72	88	46	79
Heavy Vehicles, %	0	1	0	0	2	0	0	0	0	0	0	4
Mvmt Flow	112	446	12	56	441	92	28	8	32	32	28	96

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	533	0	0	458	0	0	1023	1321	229	1050	1281	267
Stage 1	-	-	-	-	-	-	677	677	-	598	598	-
Stage 2	-	-	-	-	-	-	346	644	-	452	683	-
Follow-up Headway	2.2	-	-	2.2	-	-	3.5	4	3.3	3.5	4	3.34
Pot Capacity-1 Maneuver	1045	-	-	1114	-	-	193	158	780	184	167	725
Stage 1	-	-	-	-	-	-	414	455	-	461	494	-
Stage 2	-	-	-	-	-	-	649	471	-	562	452	-
Time blocked-Platoon, %		-	-		-	-						
Mov Capacity-1 Maneuver	1045	-	-	1114	-	-	126	134	780	149	141	725
Mov Capacity-2 Maneuver	-	-	-	-	-	-	126	134	-	149	141	-
Stage 1	-	-	-	-	-	-	369	406	-	411	469	-
Stage 2	-	-	-	-	-	-	502	447	-	471	403	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	1.7	0.8	30.2	24.3
HCM LOS			D	C

Minor Lane / Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	210	1045	-	-	1114	-	-	149	334
HCM Lane V/C Ratio	0.324	0.108	-	-	0.05	-	-	0.142	0.404
HCM Control Delay (s)	30.2	8.86	-	-	8.402	-	-	33.1	22.9
HCM Lane LOS	D	A			A			D	C
HCM 95th %tile Q(veh)	1.338	0.361	-	-	0.158	-	-	0.483	1.893

Notes

~ : Volume Exceeds Capacity; $: Delay Exceeds 300 Seconds; Error : Computation Not Defined

HCM 2010 Signalized Intersection Summary
4: Casey's/Maynard Way & 11th Street

7/22/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	61	377	3	44	281	18	7	4	29	29	15	120
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow veh/h/ln	190.0	186.8	190.0	190.0	187.6	190.0	190.0	190.0	190.0	190.0	190.0	190.0
Lanes	0	2	0	0	2	0	0	1	0	1	1	0
Cap, veh/h	205	1303	23	227	1148	140	203	71	282	532	47	333
Arrive On Green	0.41	0.41	0.41	0.41	0.41	0.41	0.23	0.23	0.23	0.23	0.23	0.23
Sat Flow, veh/h	495	3153	54	549	2778	338	100	307	1221	1369	205	1441
Grp Volume(v), veh/h	298	0	273	215	0	194	64	0	0	44	0	193
Grp Sat Flow(s),veh/h/ln	1844	0	1859	1848	0	1816	1627	0	0	1369	0	1646
Q Serve(g_s), s	2.5	0.0	2.3	1.7	0.0	1.6	0.0	0.0	0.0	0.6	0.0	2.3
Cycle Q Clear(g_c), s	2.5	0.0	2.3	1.7	0.0	1.6	0.7	0.0	0.0	2.3	0.0	2.3
Prop In Lane	0.27		0.03	0.30		0.19	0.12		0.75	1.00		0.88
Lane Grp Cap(c), veh/h	762	0	768	764	0	751	556	0	0	532	0	381
V/C Ratio(X)	0.39	0.00	0.36	0.28	0.00	0.26	0.12	0.00	0.00	0.08	0.00	0.51
Avail Cap(c_a), veh/h	1475	0	1487	1479	0	1453	1454	0	0	581	0	439
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	0.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	4.6	0.0	4.5	4.4	0.0	4.3	6.9	0.0	0.0	8.3	0.0	7.5
Incr Delay (d2), s/veh	0.3	0.0	0.3	0.2	0.0	0.2	0.1	0.0	0.0	0.1	0.0	1.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile Back of Q (50%), veh/ln	0.5	0.0	0.4	0.3	0.0	0.3	0.2	0.0	0.0	0.2	0.0	0.8
Lane Grp Delay (d), s/veh	4.9	0.0	4.8	4.6	0.0	4.5	7.0	0.0	0.0	8.4	0.0	8.6
Lane Grp LOS	A		A	A		A	A			A		A
Approach Vol, veh/h		571			409			64			237	
Approach Delay, s/veh		4.9			4.6			7.0			8.5	
Approach LOS		A			A			A			A	

Timer				
Assigned Phs	4	8	2	6
Phs Duration (G+Y+Rc), s	13.3	13.3	8.9	8.9
Change Period (Y+Rc), s	4.0	4.0	4.0	4.0
Max Green Setting (Gmax), s	18.0	18.0	18.0	6.0
Max Q Clear Time (g_c+I1), s	4.5	3.7	2.7	4.3
Green Ext Time (p_c), s	4.8	5.0	1.5	0.3

Intersection Summary	
HCM 2010 Ctrl Delay	5.6
HCM 2010 LOS	A

Notes

HCM 2010 Signalized Intersection Summary
4: Casey's/Maynard Way & 11th Street

7/22/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	81	433	5	49	397	57	18	4	23	28	13	76
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow veh/h/ln	190.0	188.5	190.0	190.0	187.2	190.0	190.0	190.0	190.0	190.0	184.3	190.0
Lanes	0	2	0	0	2	0	0	1	0	1	1	0
Cap, veh/h	315	1326	37	149	1218	267	301	89	154	502	76	261
Arrive On Green	0.45	0.45	0.45	0.45	0.45	0.45	0.21	0.21	0.21	0.21	0.21	0.21
Sat Flow, veh/h	697	2941	82	330	2700	592	407	428	741	1389	366	1255
Grp Volume(v), veh/h	297	0	273	314	0	275	68	0	0	32	0	124
Grp Sat Flow(s),veh/h/ln	1850	0	1871	1855	0	1767	1576	0	0	1389	0	1621
Q Serve(g_s), s	2.5	0.0	2.2	2.6	0.0	2.4	0.0	0.0	0.0	0.5	0.0	1.5
Cycle Q Clear(g_c), s	2.5	0.0	2.2	2.6	0.0	2.4	0.7	0.0	0.0	2.1	0.0	1.5
Prop In Lane	0.38		0.04	0.18		0.34	0.41		0.47	1.00		0.77
Lane Grp Cap(c), veh/h	834	0	844	837	0	797	545	0	0	502	0	338
V/C Ratio(X)	0.36	0.00	0.32	0.38	0.00	0.34	0.12	0.00	0.00	0.06	0.00	0.37
Avail Cap(c_a), veh/h	1498	0	1514	1502	0	1431	1501	0	0	1396	0	1382
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	0.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	4.2	0.0	4.1	4.3	0.0	4.2	7.7	0.0	0.0	8.9	0.0	8.0
Incr Delay (d2), s/veh	0.3	0.0	0.2	0.3	0.0	0.3	0.1	0.0	0.0	0.1	0.0	0.7
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile Back of Q (50%), veh/ln	0.4	0.0	0.4	0.4	0.0	0.4	0.2	0.0	0.0	0.1	0.0	0.5
Lane Grp Delay (d), s/veh	4.5	0.0	4.4	4.5	0.0	4.4	7.8	0.0	0.0	8.9	0.0	8.6
Lane Grp LOS	A		A	A		A	A			A		A
Approach Vol, veh/h		570			589			68			156	
Approach Delay, s/veh		4.4			4.5			7.8			8.7	
Approach LOS		A			A			A			A	

Timer												
Assigned Phs		4			8			2			6	
Phs Duration (G+Y+Rc), s		14.6			14.6			9.0			9.0	
Change Period (Y+Rc), s		4.0			4.0			4.0			4.0	
Max Green Setting (Gmax), s		19.0			19.0			20.0			20.0	
Max Q Clear Time (g_c+I1), s		4.5			4.6			2.7			4.1	
Green Ext Time (p_c), s		6.0			6.0			1.1			1.1	

Intersection Summary												
HCM 2010 Ctrl Delay			5.1									
HCM 2010 LOS			A									

Notes

HCM 2010 Signalized Intersection Summary
4: Casey's/Maynard Way & 11th Street

7/22/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	61	377	3	44	281	18	7	4	29	29	15	120
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow veh/h/ln	190.0	186.3	190.0	190.0	187.2	190.0	190.0	190.0	190.0	190.0	190.0	190.0
Lanes	1	1	0	1	1	0	0	1	0	1	1	0
Cap, veh/h	832	840	14	832	757	88	177	74	286	554	48	337
Arrive On Green	0.46	0.46	0.46	0.46	0.46	0.46	0.23	0.23	0.23	0.23	0.23	0.23
Sat Flow, veh/h	1810	1828	30	1810	1646	192	91	317	1224	1369	205	1441
Grp Volume(v), veh/h	80	0	491	64	0	345	64	0	0	44	0	193
Grp Sat Flow(s),veh/h/ln	1810	0	1858	1810	0	1838	1632	0	0	1369	0	1646
Q Serve(g_s), s	0.7	0.0	5.1	0.5	0.0	3.3	0.0	0.0	0.0	0.7	0.0	2.7
Cycle Q Clear(g_c), s	0.7	0.0	5.1	0.5	0.0	3.3	0.8	0.0	0.0	1.5	0.0	2.7
Prop In Lane	1.00		0.02	1.00		0.10	0.12		0.75	1.00		0.88
Lane Grp Cap(c), veh/h	832	0	854	832	0	845	536	0	0	554	0	384
V/C Ratio(X)	0.10	0.00	0.57	0.08	0.00	0.41	0.12	0.00	0.00	0.08	0.00	0.50
Avail Cap(c_a), veh/h	1527	0	1568	1249	0	1269	1257	0	0	1180	0	1136
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	0.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	4.0	0.0	5.2	3.9	0.0	4.7	8.0	0.0	0.0	8.6	0.0	8.7
Incr Delay (d2), s/veh	0.0	0.0	0.6	0.0	0.0	0.3	0.1	0.0	0.0	0.1	0.0	1.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile Back of Q (50%), veh/ln	0.1	0.0	1.2	0.1	0.0	0.7	0.2	0.0	0.0	0.2	0.0	0.9
Lane Grp Delay (d), s/veh	4.0	0.0	5.8	4.0	0.0	5.0	8.1	0.0	0.0	8.6	0.0	9.7
Lane Grp LOS	A		A	A		A	A			A		A
Approach Vol, veh/h		571			409			64			237	
Approach Delay, s/veh		5.5			4.8			8.1			9.5	
Approach LOS		A			A			A			A	

Timer				
Assigned Phs	4	8	2	6
Phs Duration (G+Y+Rc), s	16.0	16.0	10.1	10.1
Change Period (Y+Rc), s	4.0	4.0	4.0	4.0
Max Green Setting (Gmax), s	22.0	18.0	18.0	18.0
Max Q Clear Time (g_c+I1), s	7.1	5.3	2.8	4.7
Green Ext Time (p_c), s	4.9	4.6	1.5	1.4

Intersection Summary	
HCM 2010 Ctrl Delay	6.2
HCM 2010 LOS	A

Notes

HCM 2010 Signalized Intersection Summary
4: Casey's/Maynard Way & 11th Street

7/22/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	81	433	5	49	397	57	18	4	23	28	13	76
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow veh/h/ln	190.0	188.2	190.0	190.0	186.9	190.0	190.0	190.0	190.0	190.0	184.3	190.0
Lanes	1	1	0	1	1	0	0	1	0	1	1	0
Cap, veh/h	916	923	25	916	759	158	266	84	142	442	71	245
Arrive On Green	0.51	0.51	0.51	0.51	0.51	0.51	0.20	0.20	0.20	0.20	0.20	0.20
Sat Flow, veh/h	1810	1824	49	1810	1501	313	390	430	729	1389	366	1255
Grp Volume(v), veh/h	112	0	458	56	0	533	68	0	0	32	0	124
Grp Sat Flow(s),veh/h/ln	1810	0	1873	1810	0	1814	1550	0	0	1389	0	1621
Q Serve(g_s), s	0.9	0.0	4.3	0.4	0.0	5.5	0.0	0.0	0.0	0.6	0.0	1.8
Cycle Q Clear(g_c), s	0.9	0.0	4.3	0.4	0.0	5.5	1.9	0.0	0.0	2.4	0.0	1.8
Prop In Lane	1.00		0.03	1.00		0.17	0.41		0.47	1.00		0.77
Lane Grp Cap(c), veh/h	916	0	948	916	0	918	492	0	0	442	0	317
V/C Ratio(X)	0.12	0.00	0.48	0.06	0.00	0.58	0.14	0.00	0.00	0.07	0.00	0.39
Avail Cap(c_a), veh/h	1419	0	1469	1554	0	1558	1257	0	0	1156	0	1151
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	0.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	3.5	0.0	4.3	3.4	0.0	4.6	9.0	0.0	0.0	10.5	0.0	9.4
Incr Delay (d2), s/veh	0.1	0.0	0.4	0.0	0.0	0.6	0.1	0.0	0.0	0.1	0.0	0.8
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile Back of Q (50%), veh/ln	0.2	0.0	0.9	0.1	0.0	1.2	0.3	0.0	0.0	0.2	0.0	0.6
Lane Grp Delay (d), s/veh	3.5	0.0	4.7	3.4	0.0	5.2	9.1	0.0	0.0	10.6	0.0	10.2
Lane Grp LOS	A		A	A		A	A			B		B
Approach Vol, veh/h		570			589			68			156	
Approach Delay, s/veh		4.5			5.0			9.1			10.3	
Approach LOS		A			A			A			B	

Timer				
Assigned Phs	4	8	2	6
Phs Duration (G+Y+Rc), s	17.6	17.6	9.4	9.4
Change Period (Y+Rc), s	4.0	4.0	4.0	4.0
Max Green Setting (Gmax), s	21.0	23.0	19.0	19.0
Max Q Clear Time (g_c+I1), s	6.3	7.5	3.9	4.4
Green Ext Time (p_c), s	6.0	6.1	1.0	1.0

Intersection Summary	
HCM 2010 Ctrl Delay	5.6
HCM 2010 LOS	A

Notes

Appendix E – Traffic Signal Warrant Analysis Results

Signal Warrant Analysis

Location: City of DeWitt, IA
Intersection: 11th Street & Maynard Way
Project # 40120022.04

COUNTY:	CLINTON	WARRANTS MET	2
PREPARED BY:	TYLER WILES	WARRANTS NOT MET	7
DATE:	Jul-13	85th %ILE SPEED	<40

WARRANTS				Meets	
Warrant 1 - Eight Hour Vehicular Volume (See Page 3)					NO
Condition A	100%	N/A	70%	NO	
Condition B	100%	N/A	70%	NO	
Warrant 2 - Four Hour Vehicular Volume (See Page 2)					YES
70% of Warrant if 85th %ile >40 MPH or Pop. <10,000	100%	N/A	70%	YES	
Warrant 3 - Peak Hour (See Figures 4C-3 and 4C-4 on Page 2)					YES
70% of Warrant if 85th %ile >40 MPH or Pop. <10,000	100%	N/A	70%	YES	
Warrant 4 - Pedestrian Volume				NO	NO
Warrant 5 - School Crossing				NO	NO
Warrant 6 - Coordinated Signal System				N/A	NO
Warrant 7 - Crash Experience				N/A	NO
Warrant 8 - Roadway Network				N/A	NO
Warrant 9 - Intersection Near Railroad Crossing				N/A	NO

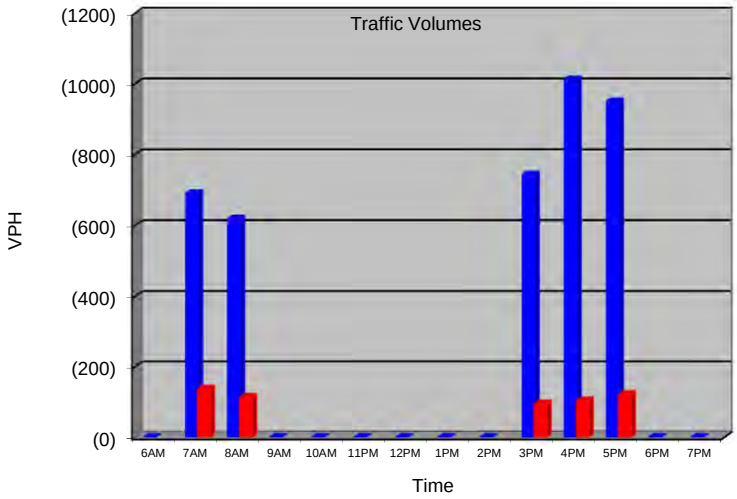
Signal Warrant Analysis

Location: City of DeWitt, IA
Intersection: 11th Street & Maynard Way
Project # 40120022.04

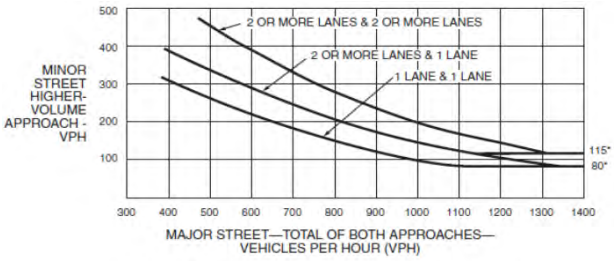
COUNTY	CLINTON	WARRANTS MET	2
PREPARED BY	TYLER WILES	WARRANTS NOT MET	7
DATE	Jul-13	85th %ILE SPEED	<40

TRAFFIC VOLUMES

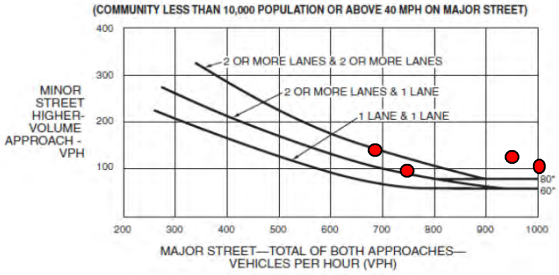
Time	Main Street EB	Main Street WB	Main Street Total	Side Street Major App.
6AM			(0)	
7AM	376	315	(691)	138
8AM	318	301	(619)	114
9AM			(0)	
10AM			(0)	
11PM			(0)	
12PM			(0)	
1PM			(0)	
2PM			(0)	
3PM	368	376	(744)	96
4PM	511	501	(1012)	104
5PM	482	468	(950)	122
6PM			(0)	
7PM			(0)	
	2055	**1961**	**(4016)**	**574**



FOUR HOUR VOLUME WARRANT

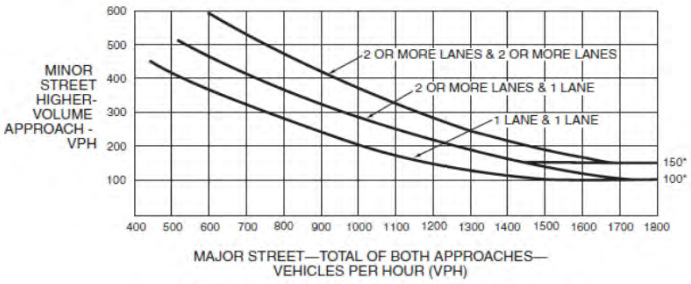


*Note: 115 vph applies as the lower threshold volume for a minor-street approach with two or more lanes and 80 vph applies as the lower threshold volume for a minor-street approach with one lane.

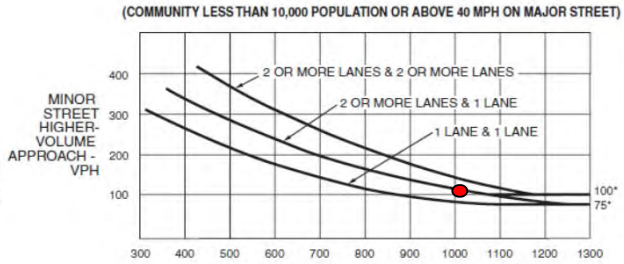


*Note: 80 vph applies as the lower threshold volume for a minor-street approach with two or more lanes and 60 vph applies as the lower threshold volume for a minor-street approach with one lane.

PEAK HOUR VOLUME WARRANT



*Note: 150 vph applies as the lower threshold volume for a minor-street approach with two or more lanes and 100 vph applies as the lower threshold volume for a minor-street approach with one lane.



*Note: 100 vph applies as the lower threshold volume for a minor-street approach with two or more lanes and 75 vph applies as the lower threshold volume for a minor-street approach with one lane.

Signal Warrant Analysis

Location: City of DeWitt, IA
Intersection: 11th Street & Maynard Way
Project # 40120022.04

COUNTY	CLINTON	WARRANTS MET	2
PREPARED BY	TYLER WILES	WARRANTS NOT MET	7
DATE	Jul-13	85th %ILE SPEED	<40

WARRANT 1 - CONDITION A

Condition A—Minimum Vehicular Volume

Number of lanes for moving traffic on each approach		Vehicles per hour on major street (total of both approaches)				Vehicles per hour on higher-volume minor-street approach (one direction only)			
Major Street	Minor Street	100%[a]	80%[b]	70%[c]	56%[d]	100%[a]	80%[b]	70%[c]	56%[d]
1	1	500	400	350	280	150	120	105	84
2 or more	1	600	480	420	336	150	120	105	84
2 or more	2 or more	600	480	420	336	200	160	140	112
1	2 or more	500	400	350	280	200	160	140	112

WARRANT 1 - CONDITION B

Condition B—Interruption of Continuous Traffic

Number of lanes for moving traffic on each approach		Vehicles per hour on major street (total of both approaches)				Vehicles per hour on higher-volume minor-street approach (one direction only)			
Major Street	Minor Street	100%[a]	80%[b]	70%[c]	56%[d]	100%[a]	80%[b]	70%[c]	56%[d]
1	1	750	600	525	420	75	60	53	42
2 or more	1	900	720	630	504	75	60	53	42
2 or more	2 or more	900	720	630	504	100	80	70	56
1	2 or more	750	600	525	420	100	80	70	56

[a] Basic minimum hourly volume
[b] Used for combination of Conditions A and B after adequate trial of other remedial measures
[c] May be used when the major-street speed exceeds 40 mph or in an isolated community with a population of less than 10,000
[d] May be used for combination of Conditions A and B after adequate trial of other remedial measures when the major-street speed exceeds 40 mph or in an isolated community with a population of less than 10,000

Signal Warrant Analysis

Location: City of DeWitt, IA
Intersection: 11th Street & Maynard Way
Project # 40120022.04

COUNTY	CLINTON	WARRANTS MET	2
PREPARED BY	TYLER WILES	WARRANTS NOT MET	7
DATE	Jul-13	85th %ILE SPEED	<40

NOTES

Turning movement counts collected by the City of DeWitt in May and June of 2013 at the intersection were used for the traffic signal warrant analysis.

RECOMMENDATION

The analysis indicates that a traffic signal is warranted by two of the nine MUTCD warrants.

Specific warrant notes include:
• Warrant 1 (Eight Hour Vehicle): The City of DeWitt collected turning movement counts include five of the eight necessary hours. The data of the collected five hours confirm that traffic volumes do not satisfy Warrant 1 volume criteria for either Condition A or Condition B.
• Warrant 2 (Four Hour Vehicle): The City of DeWitt collected turning movement counts include four of the four necessary hours. The data of the collected four hours confirm that traffic volumes satisfy Warrant 2 volume criteria.
• Warrant 3 (Peak Hour Vehicle): The City of DeWitt collected turning movement counts include AM peak hour and PM peak hour data. The 4-5PM hour data confirm that traffic volumes satisfy Warrant 3 volume criteria.
• Warrant 4 (Pedestrian): Based on traffic volumes at this location, Warrant 4 would require at least 75 pedestrians per hour for four different hours or greater than 93 pedestrians in a peak hour. Pedestrian volumes were counted for five hours combined between the AM and PM peak hours. The necessary pedestrian volumes did not satisfy Warrant 4 volume criteria.
• Warrant 5 (School Crossing): Warrant 5 would require at least 25 pedestrians per hour during the highest crossing hour. Pedestrian volumes were counted for five hours combined between the AM and PM peak hours. The necessary pedestrian volumes did not satisfy Warrant 5 volume criteria.

*See attached capacity Analysis

Appendix F – Additional Information on the Access Management Manual

NEW TRB REPORT

Access Management Manual

TRB Committee Documents the State of the Art

KRISTINE M. WILLIAMS

The author is Program Director, Planning and Corridor Management, Center for Urban Transportation Research, University of South Florida, Tampa. She is a member of the TRB Committee on Access Management.

With growing congestion and traffic demand, the need for effective corridor management strategies is greater than ever. These strategies include access management, which involves the systematic control of the location, spacing, design, and operation of driveways, median openings, interchanges, and street connections, as well as median and auxiliary lane treatments and the spacing of traffic signals.

Agencies are updating or expanding access management activities to realize a variety of benefits:

- Preserving or improving public safety,
- Extending the life of major roadways,
- Reducing traffic congestion and delay,
- Supporting alternative transportation modes, and
- Improving the appearance and quality of the built environment.

In the past few decades, substantial research has advanced the state of the practice. This research, combined with new agency policies, plans, and programs, has provided insights into the impacts of access management techniques, has identified best practices, and has produced guidelines. The information, however, is dispersed across a variety of sources, making it difficult for practitioners to locate, evaluate, and apply.

In 1996, the TRB Committee on Access Management initiated a project to compile the best information on the subject into a single, comprehensive resource documenting the state of the art. The *Access Management Manual,* published by TRB in May, is the culmination of this multiyear effort. The manual was prepared by the Center for Urban Transportation Research at the University of South Florida, with oversight and assistance from the committee and its subcommittees. The Federal

Aesthetics with access management and without (*inset*).

Why Is Access Management Necessary?

Failure to manage access is associated with the following adverse social, economic, and environmental impacts:

- Increased numbers of vehicle crashes;
- More collisions involving pedestrians and cyclists;
- Accelerated reduction in roadway efficiency;
- Unsightly commercial strip development;
- Degradation of scenic landscapes;
- More cut-through traffic in residential areas, because arterials are overburdened;
- Homes and businesses adversely affected by the widening of roads; and
- Increased commuting time, fuel consumption, and vehicle emissions, as driveways and traffic signals intensify congestion and delay along major roads.

The *Access Management Manual* is available in print and in CD-ROM from TRB [www.TRB.org/trb/bookstore/ or call 202-339-3213; book, $80 ($60, affiliates); CD-ROM, $60 ($45, affiliates); book and CD-ROM, $100 ($75, affiliates)].

Highway Administration provided funding for the project, and the Florida Department of Transportation served as project manager.

Practitioners and Stakeholders

Access management has many dimensions, cutting across jurisdictions, organizational lines, and professions. A goal of the project, therefore, was to provide information for a diverse audience.

The primary audience is the practitioner engaged in access management with a state transportation agency, local government, or metropolitan planning organization (MPO), or as a consultant in planning, engineering, or urban design. The manual offers practical information about the development and implementation of programs, including corridor access management plans, codes, and access design.

Another key audience consists of stakeholders, such as developers, elected and appointed officials, attorneys, and neighborhood groups involved in or affected by access management actions. The manual provides information to help stakeholders understand and evaluate proposed access management actions and potential alternatives. Educational information covers principles of access management, the impacts of access management techniques, regulatory best practices, right-of-way and legal considerations, and effective access design.

Techniques and Guidance

The *Access Management Manual* presents techniques for implementation, as well as guidance on how to develop and administer effective access management programs. The manual addresses a variety of circumstances that state, regional, and local agencies may encounter. The chapters offer practical information that draws on the knowledge of the many experienced practitioners who participated in development of the manual.

In particular, the manual presents detailed information on

- Principles and effects of access management;
- Steps in developing an access management program or corridor access management plan;
- Access management techniques and their potential advantages, disadvantages, and applications, with examples;
- How to develop and assign access categories to roadways;
- The role of states, MPOs, and local governments;
- The interrelationship with land development and how to address access management in the context of comprehensive planning and land development regulation;
- The rationale for spacing standards and how to choose appropriate standards for connections, signals, corner clearance at intersections, and interchange areas;
- Information on the location and design of access features, such as driveways, medians, auxiliary lanes, and service roads (Figure 1);
- When to choose a median instead of a continuous two-way left-turn lane;
- Case examples of agency policies, plans, practices, and programs;
- State statute and regulatory prototypes;
- The permitting and administrative processes and how to handle deviations from standards;
- How to work with the public on access management issues; and
- Legal considerations that guide program development and implementation.

Updating and Advancing

The manual is part of an ongoing effort by the TRB Committee on Access Management to disseminate useful, high-quality information on the state of the art. Plans are under way to promote access management research and to identify best practices; case studies and field studies are being encouraged.

Other initiatives look to integrate access management into traditional transportation processes and programs. The committee plans to update the manual regularly, to incorporate the latest research findings and agency experiences.

Access Management Manual Table of Contents

1 Introduction and Concepts
2 Effects of Access Management
3 Developing a State Access Management Program
4 Local and Regional Programs
5 Roadway Classification and Access Categories
6 Corridor Access Management Plans
7 Land Development and Access
8 Access Location
9 Access Spacing
10 Access Design
11 Medians and Continuous Two-Way Left-Turn Lanes
12 Access Permitting
13 Internal and Intergovernmental Coordination
14 Public Involvement in Access Management
15 Right-of-Way and Legal Considerations
Appendix A: Access Management Techniques
Appendix B: Case Examples of Access Categories
Appendix C: Access Management Statute Prototypes and Regulatory Elements
Appendix D: Glossary

Appendix G – Benefit/Cost Analysis Results

Intersection or Spot Benefit / Cost Safety Analysis

Rev. 7/10

Iowa DOT Office of Traffic & Safety

County: Clinton County Prepared by: Tyler Wiles Date Prepared: Aug 2, 2013

Intersection: 11th Street and Maynard Way

Improvement

Proposed Improvement(s): Intersection Upgrades Include: Installation of Traffic Signal

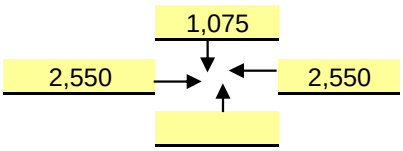
$ 150,000	Estimated Improvement Cost, **EC**	15	Est. Improvement Life, years, **Y**
	Other Annual Cost (after initial year), **AC**	33	Crash Reduction Factor (integer), **CRF**
$ -	Present Value Other Annual Costs, **OC**	4.0%	Discount Rate (time value of $), **INT**
		$ 150,000	Present Value Cost, **COST** = EC + OC

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

Traffic Volume Data

Source: Iowa DOT 2010 Traffic Count Maps 2010 Date of traffic count

Daily Entering Vehicles by Approach (or AADT / 2)



2,253,875 Current Annual Entering Veh., **AEV** = DEV * 365

6,175 veh / day, Final Year DEV, **FDEV**

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

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

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

6,175 Current Daily Entering Vehicles, **DEV**

Crash Data

2008 First full year --> 2012 Last full year 5.0 years, Time Period, **T**

Additional months values as of Dec. 2007

0	Fatal Crashes	0	Fatalities @	$3,500,000	$	-
		0	Major Injuries @	$240,000	$	-
6	Injury Crashes	3	Minor Injuries @	$48,000	$	144,000
		4	Possible Injuries @	$25,000	$	100,000
15	Property Damage Only		(assumed cost per crash)	$2,700	$	-
		-OR-	enter all Property Costs of all crashes:		$	98,400
21	Total Crashes, **TA**			Total $ Loss, **LOSS**	$	342,400

4.20	Current Crashes / Year, **AA** = TA / T	**1.86**	Crashes / MEV, Crash Rate, **CR**
$ 16,305	Cost per Crash, **AVC** = LOSS / TA		CR = TA x 10^6 / (DEV x 365 x T)
63.0	Total Expected Crashes, **TECR** = CR x TMEV	**$ 251,258**	Present Value of Avoided
1.39	Crashes Avoided First Year **AAR** = AA x CRF / 100		Crashes, **BENEFIT**
$ 22,598	Crash Costs Avoided in First Year, AAR x AVC		
20.8	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 = $251,258 : $150,000 = **1.68** : 1

Appendix H – Potential Funding Sources

Iowa Clean Air Attainment Program (ICAAP)

Intent of program
This program funds highway/street, transit, bicycle/pedestrian, or freight projects or programs which help maintain Iowa's clean air quality by reducing transportation-related emissions. Eligible highway/street projects must be on the federal-aid system, which includes all federal functional class routes except local and rural minor collectors.

Who is eligible to request funding?
The state, a county or a city may sponsor an application or may co-sponsor for private, non-profit organizations and individuals. Transit systems may apply directly.

Qualifications for funding

- A local match of at least 20 percent is required.
- Eligible projects will fall into one of the following categories:
  - those which reduce emissions via traffic flow improvements and provide a direct benefit to air quality by addressing ozone, carbon monoxide, or particulate matter PM-2.5 or PM-10 (all of these pollutant emissions must be addressed, and a reduction calculation must be provided by the applicant for all types of projects listed);
  - those which reduce vehicle miles of travel;
  - those which reduce single-occupant vehicle trips; or
  - other transportation improvement projects to improve air quality or reduce congestion.

Net operating costs of new transit services are eligible for up to three years (at 80 percent federal/20 percent local participation).

Type of submittal required
Application forms must be submitted with emission reduction calculations and supporting documentation of congestion reduction and/or travel reduction assumptions. Applications are available from the DOT at www.iowadot.gov/forms/index.htm or at www.iowadot.gov/systems_planning/icaap.htm

Requested amount – minimum/maximum
Minimum $20,000 total project cost

Application deadline
October 1, statewide competitive application

Special project requirements - *Highway projects*

- Projects must be let by the DOT.
- Federal Highway Administration (FHWA) environmental concurrence is required.
- Right-of-way activities must comply with applicable federal and state laws.
- Plans and specifications must be prepared by an Iowa licensed professional engineer.
- If federal-aid dollars are used for a consulting engineer, the Federal-Aid Consultant Selection Process must be used.
- DOT design criteria should be used for the appropriate road classification.
- Approval by the DOT of plans and specifications is required.
- Compliance with regulations regarding the following is required:
  - federal equal employment opportunity;
  - use of disadvantaged business enterprises;
  - Occupational Safety and Health Administration provisions; and
  - federal (Davis-Bacon) wage rates.

(continued on next page)

For those projects on federal-aid routes, refer to FHWA form 1273, "Required Contract Provisions, Federal-Aid Construction Contracts," for more information. Materials testing, construction inspection and final project acceptance must be done according to DOT procedures.

Special Project Requirements - *Transit projects*

- Capital improvements require adherence to approved transit procurement procedures and equipment specifications.
- Project candidates must be part of an approved five-year Capital Improvement Program.
- Federally funded projects must comply with requirements regarding:
  - civil rights protections;
  - use of disadvantaged business enterprises;
  - competitive procurement;
  - bus testing;
  - pre- and post-procurement audits; and
  - drug and alcohol testing.

Type of approval required

- project evaluation committee/DOT staff recommendation, with Iowa Transportation Commission approval
- inclusion of selected projects in the Statewide Transportation Improvement Program
- Regional Planning Affiliations and Metropolitan Planning Organizations must also include selected projects in their respective Transportation Improvement Program
- FHWA and FTA final approval of the STIP
- authorization by FHWA of projects prior to proceeding with work or with advertisement of the project for receipt of bids

Transit projects must be approved by FTA as part of either a direct or a statewide grant.

Average length of time for acceptance decision
Four months

Program's annual funding level
Approximately $4.7 million

More information/applications
Iowa Department of Transportation
Office of Systems Planning
800 Lincoln Way
Ames, Iowa 50010
515-239-1681
www.iowadot.gov/systems_planning/icaap.htm

Traffic Safety Improvement Program - Also known as "TSIP," "Traffic Safety Funds," "TSF," or "Half-Percent"

Intent of program
The Traffic Safety Improvement Program provides funding for traffic safety improvements or studies on any public roads under county, city or state jurisdiction.

Who is eligible to request funding?
State, county or city

Qualifications for funding
Eligible projects will fall into one of three categories:

- construction or improvement of traffic safety and operations at a specific site with an accident history;
- purchase of materials for installation of new traffic control devices such as signs or signals, or replacement of obsolete signs or signals; or
- transportation safety research, studies or public information initiatives such as sign inventory, work zone safety and accident data.

Type of submittal required
Application forms are available from the DOT or at www.iowadot.gov/tsip.htm.

Application amount minimum/maximum
Site-specific project funding cannot exceed $500,000 per project.

Application deadline
June 15 is the deadline for all types of projects.

Special project requirements
Refer to the Iowa Administrative Code, Sec. 761, Chapter 164.

Type of approval required
DOT staff, along with a city/county committee, recommends prioritization of projects to the Iowa Transportation Commission, which then approves funding of specific projects.

- Site-specific projects are evaluated by benefit/cost ratio analysis and other criteria.
- Funding for traffic control devices is awarded on the basis of safety benefits of eligible applications, the annual funding level and other criteria.
- Funding for research, studies and public information initiatives is awarded on the basis of safety research needs, impact on safety, the annual funding level, and other criteria.

Average length of time for acceptance decision
Applications due: June 15
Iowa Transportation Commission decision: usually by December
Funding available: July 1 (Funds may be available sooner for special cases.)

Program's annual funding level
The program's annual funding level is one-half percent of Iowa's Road Use Tax Fund (approximately $5.4 million per year). Total funding for all traffic control device projects cannot exceed $500,000 annually. Total funding for all research studies and public information initiatives cannot exceed $500,000 annually.

More information/applications
Iowa Department of Transportation
Office of Traffic and Safety
800 Lincoln Way
Ames, Iowa 50010
515-239-1267

Federal Functional Classification Map

Clinton County
IOWA

Prepared by

IOWA DEPARTMENT OF TRANSPORTATION

Phone (515) 239-1669

In Cooperation With

United States Department of Transportation

FEDERAL HIGHWAY ADMINISTRATION

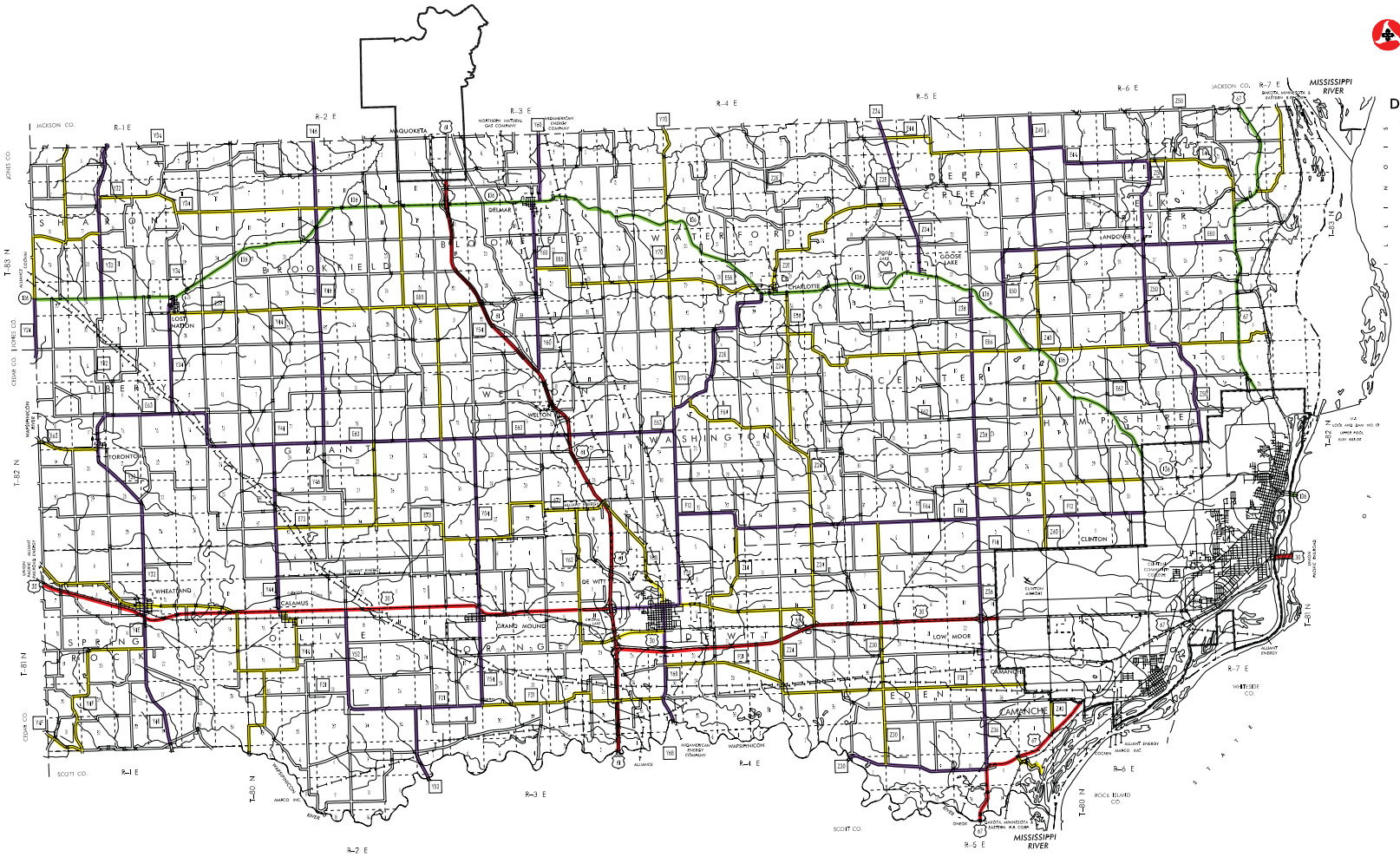
DECEMBER 31, 1992

REVISED JUNE 14, 2010

SCALE IN MILES

SCALE IN KILOMETERS

PRODUCED WITH CADD 06-15-10 Systems Planning



RURAL FEDERAL FUNCTIONAL CLASSIFICATIONS

- Interstate
- Other Principal Arterial
- Minor Arterial
- Major Collector
- Minor Collector
- Local

Future classified routes shown as dashed lines.

County line roads on the south and east are classified by the adjacent county.

rfc23.wms

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Federal Functional Classification Map

PROJECT DESCRIPTION

The intersection of 11th Street, Maynard Way and Casey's business driveway experiences both operational problems and a high crash rate. In an attempt to identify solutions, the City of DeWitt, in cooperation with the Iowa DOT utilized TEAP funding resulting in a report dated September 26th, 2013. The report outlined potential solutions for mitigating the relatively high crash rate at the Maynard Way & 11th Street intersection. Having deliberated and explored the potential solutions offered in the report, the City has asked IIW, P.C. to evaluate other potential solutions including various lane configurations and traffic signals. IIW, P.C. also investigated funding of the proposed improvements through the Iowa DOT Traffic Safety Improvement Program (TSIP).

The 2013 report suggested the following recommendations:

Short Term:

A. Remove/modify sight distance obstruction located in the southwest quadrant.
B. Install "DO NOT BLOCK INTERSECTION" regulatory sign.
C. Monitor installation of "DO NOT BLOCK INTERSECTION" pavement markings.
D. Convert 11th Street from a 4-lane cross section facility to a 3-lane cross section in combination with item E.
E. Install a split-phased traffic signal.

Long Term:

A. Realign the south leg of the intersection.
B. Implement access management along 11th Street corridor.

Short Term items A, B, & C have been implemented; however, crashes and motorists complaints continue to occur. The "Do Not Block Intersection" pavement markings were installed in the fall of 2012. The sign was installed sometime after the pavement markings.

This report further explores the traffic signal option, with and without changing the cross section from a 4-lane facility to a 3-lane or 5-lane facility.

EXISTING CONDITIONS

11th Street (old Highway 30) is an east-west 4-lane facility, with two eastbound and two westbound lanes, through DeWitt and is classified as a major collector on federal functional classification maps. 11th Street, in the area of Maynard Way, is 45 feet wide with curbs on both sides. There are sidewalks on the north and south side of 11th Street. The speed limit on 11th Street is posted at 35 mph, and traffic is free flow at the Maynard Way intersection.

Maynard Way, the north leg of the intersection, is an average width of 36 feet with a posted speed limit of 25 mph. At the intersection, a 12 foot lane exists in the northbound direction and two 12 foot lanes are marked southbound for left and right turns. Although no lane is marked for through traffic, a few vehicles do travel through the intersection into the driveway servicing Casey's General Store, typically from the right turn lane.

Maynard Way has curb and gutter on both sides. There is a sidewalk on the east side of Maynard Way. Maynard Way is controlled by a stop sign at 11th Street.

The south leg of the intersection is the eastern-most of two access points to Casey's General Store. This 36 foot wide 2-way driveway functions as the northbound approach on this intersection, and is skewed to the west from Maynard Way approximately 20 feet from centerline to centerline. Casey's driveway does not have any traffic control devices or pavement markings.

SUMMARY OF CRASH HISTORY

Copies of crash reports from January, 2010 to Present were provided to IIW, P.C. by the City of DeWitt Police Department for the study intersection. There were 19 crashes reported at the intersection during that period. 15 of the 19 reported crashes were angle or broadside type crashes, 3 were rear-end crashes, and 1 non-collision involving a motorcycle driver that lost control. The following is a summary of the crash history.

By year:

- 19 Total crashes
    - 2010 – 5
        - 3 angle
        - 2 rear-end
    - 2011 – 3
        - 2 angle
        - 1 rear-end
    - 2012 – 4
        - 2 angle
        - 1 broadside
        - 1 non-collision
    - 2013 – 3
        - 1 angle
        - 2 broadside
    - 2014 – 4 angle

7 of the 15 angle or broadside crashes were directly attributed to another vehicle in the intersection blocking the view of one of the drivers involved in the crash. Also, the non-collision was attributed to another vehicle obstructing the view of the driver.

Contributing Factors:

- 19 Total Crashes
    - 7 angle/broadside – view obstructed by another vehicles in the intersection.
    - 5 angle/broadside – failure to yield making a left turn, the narrative did not state any cause.
    - 2 angle/broadside – driver blinded by morning sun.
    - 1 angle – involved an ambulance traveling fast.
    - 1 non-collision – motorcycle took evasive action and lost control. Driver turning left did not see motorcycle due to another vehicle blocking view.

- 2 rear-end – icy conditions.
- 1 rear-end – vehicle on 11th St. turning right, had to come to a complete stop due to a pedestrian and was rear ended.

Injuries

- 0 Fatalities
- 8 Injury Crashes
  - The 8 crashes resulted in 5 minor injuries and 8 possible injuries.
- 11 Property Damage Only
  - $115,600 Property Damages for all 19 crashes

There was no apparent pattern of accidents based on time of day, or age of driver. See Exhibit 1 - Crash Diagram.

APPARENT CAUSES OF CRASHES

There appear to be 3 primary causes of a majority of the crashes. First, the geometry of the intersection can be confusing with the north and south legs, Maynard Way and Casey's driveway, offset. Second, because of the 4-lane configuration of 11th Street, vehicles in the intersection block the view for other motorists; and third, there is a relatively large volume of traffic using the intersection.

The non-typical geometrics of the intersection can be confusing. With the offset northbound and southbound approach, drivers may be confused as to who has the right-of-way. The driving paths for the left turns from 11th Street overlap such that eastbound and westbound left turns cannot occur simultaneously. Also, northbound vehicles from Casey's to Maynard Way must make a jog through the intersection since the approaches do not line up. Finally, drivers on 11th Street turning onto Maynard Way or into Casey's parking lot may not understand where they should stop to wait for a gap in traffic so the intersection can continue to be accessed by other drivers who have the right-of-way. For example, the police commented that drivers do not understand what the DO NOT BLOCK INTERSECTION hatch marks mean. See Exhibit 2.

The second primary cause of crashes appears to be that vehicles stopped or traveling through the intersection block the view for other motorists trying to navigate the intersection. It was specifically noted in 7 of the accident reports that the drivers cited for failure to yield making a left turn did not see the approaching vehicle because of another vehicle in the intersection blocking their view. See Exhibit 3 & 4.

And the third cause of crashes appears to be the relatively large volume of traffic on 11th Street reduces the opportunity of vehicles on Maynard Way or Casey's driveway to enter 11th Street. Currently, the North and South legs of the intersection operate at a level of service of 'D' and 'F' respectively. Drivers become impatient and take more chances. The intersection delay is calculated by using the Highway Capacity Manual (HCM). It is the estimated average delay that motorists will experience. According to the HCM, a delay of 0-10 seconds is equivalent to a level of service (LOS) 'A', 11-20 seconds is 'B', 21-35 seconds is 'C', 36-55 seconds is 'D', 55-80 seconds is 'E', and 81 seconds or more delay is 'F'. Level of service 'A' is free flow traffic and level of service 'E' & 'F' are typically unacceptable and improvements are needed.

PRACTICAL OPTIONS

When properly used, traffic control signals are valuable devices for the control of vehicular and pedestrian traffic. They assign the right-of-way to the various traffic movements and therefore greatly influence traffic flow. They also reduce the frequency of angle collisions, but may increase the frequency of rear-end crashes. There are 9 traffic signal warrants listed in the *Manual on Uniform Traffic Control Devices*, (MUTCD). While a traffic signal should not be installed unless one or more of the warrants are met, the satisfaction of a traffic signal warrant does not require the installation of a traffic signal.

An analysis by HR Green in 2013 of the intersection of 11th Street and Maynard Way shows that 2 of the 9 signal warrants were met, Warrant 2-4 Hour Vehicular Volume and Warrant 3 - Peak Hour. With the addition of Kwik Star at the intersection since those counts were taken, it can be assumed that the traffic volumes within the intersection have increased, and those 2 traffic signal warrants will still be met.

Another consideration when evaluating the practical options is agricultural traffic. 11th Street is the only viable route for agricultural traffic to get from the west side of town to the east side of town, since slow moving equipment is prohibited from using US 30 and US 61 around DeWitt.

With the installation of a traffic signal, pedestrian traffic should be a consideration. Traffic counts showed some pedestrians using the intersection, and it can be assumed that more will cross at this location with a traffic signal installed. P.M. traffic counts have 12 pedestrians crossing Casey's driveway, 2 pedestrians crossing Maynard Way approach, and 2 pedestrians crossing 11th Street on the east side of the intersection, between 3:00 P.M. and 6:00 P.M. Each option below will assume that pedestrian signals will be installed as part of the traffic signal; however, without a topographic survey of this area, it is difficult to determine if pedestrian crossings can be constructed to meet ADA requirements.

The benefit/cost ratio used in each option below is from the Iowa DOT TSIP funding instructions. The cost involves the construction cost of the solution, and other annual costs, i.e. cost of operating and maintaining a traffic signal, over the estimated service life. For the purpose of a life-cycle analysis, the estimated service life of a traffic signal is 15 years.

The benefit is derived by evaluating the costs of crashes over a specific time frame and using a crash reduction factor to try to determine the number of crashes avoided by implementing the improvement. The crash reduction factor is dependent on the type of improvement and changes with each option below. A higher crash reduction factor indicates that more crashes will be reduced, and the benefit side of the ratio will increase. However, as the crash reduction factor goes up, the cost of the improvement will generally rise also.

The cycle length shown for each option is the estimated maximum time it will take for the traffic signal to cycle through green, yellow, and red for each approach. The cycle length will be less if traffic volumes are low. It is assumed that there will be vehicle detection on each intersection approach leg, which means the green indication for any approach will only be activated if a vehicle is present, and the length of time the signal stays green will depend on the number of vehicles present.

The preliminary construction cost estimate is only an estimate. Without a topographic survey, assumptions were made regarding right-of-way, underground utilities, etc. Also, bid prices were estimated based on previous projects, but may differ from future projects. TSIP funding covers construction cost up to $500,000; however, engineering and design costs are the responsibility of the municipality. That cost is estimated as Unfunded Additional Cost below and includes approximate cost for design, survey, construction staking and construction inspection.

Option #1

Install a traffic signal at the intersection of 11th Street and Maynard Way with a separate phase for each approach. This is referred to as a 4-phase option. When each approach would have a green indication, the other 3 approaches would have a red indication. See Exhibit 5.

- Pros
  - Would address all angle collisions occurring at the intersection.
  - Would not involve any geometric changes at the intersection, so it would be less costly than other options.
  - 11th Street would continue to have 2 through lanes in each direction which would not restrict agricultural traffic.
  - A traffic signal will provide a pedestrian crossing of 11h Street.
- Cons
  - By allowing only one approach to go at a time, vehicle delay (average length of time a motorist waits at a red light) would be higher than some other options.
  - At least one direction on 11th Street will always be stopped.
  - Would not improve the offset geometry of the north/south leg.
- Cost
  - Preliminary Construction Cost Estimate is $184,700. Unfunded Additional Cost is $61,500.
  - Crash reduction factor is 34.4.
  - Benefit/Cost Ratio is 2.81 (A benefit/cost ratio of 1.8 has been funded by TSIP in the past).
- Intersection Level of Service
  - 85 second cycle length for the traffic signal.
  - Intersection Delay 28.3 seconds.
  - Level of Service C.

Option #2

Install traffic signal at the intersection of 11th Street and Maynard Way, and widen Casey's driveway to better align with Maynard Way. With Casey's driveway and Maynard Way aligned, both northbound and southbound traffic could have a green light at the same time, and share green time, thereby reducing delay compared to Option 1. This would be a 3 phase traffic signal. See Exhibit 6.

- Pros
    - Would address all angle collisions occurring at the intersection.
    - 3 traffic signal phases, resulting in less time waiting at a red light.
    - 11th Street would continue to have 2 through lanes in each direction, which would not restrict agricultural traffic.
    - A traffic signal will provide a pedestrian crossing of 11h Street.
- Cons
    - Geometric improvements are more costly than some options.
    - At least one direction on 11th Street will always be stopped.
- Cost
    - Preliminary Construction Cost Estimate is $199,600, Unfunded Additional Cost is $63,000.
    - Crash reduction factor is 34.4.
    - Benefit/Cost Ratio is 2.62 (A benefit/cost ratio of 1.8 has been funded by TSIP in the past).
- Intersection Level of Service
    - 65 second cycle length for the traffic signal.
    - Intersection Delay 18.1 seconds.
    - Level of Service B.

Option #3

Install a traffic signal at the intersection of 11th Street and Maynard Way and adjust pavement markings on 11th Street to have a 3 lane cross section, 1 through lane, and 1 left turn lane in each direction. Prior to the intersection, the middle lane would be a Two-way Left Turn Lane (TWLTL). Changing from a 4 lane cross section to a 3 lane cross section is referred to by the Federal Highway Administration (FHWA) as a Road Diet. See Exhibit 7.

According to the FHWA, there is strong research that shows Road Diets promote safety by reducing vehicle speeds and reducing vehicle conflicts. Studies indicate a 19 to 47 percent reduction in overall crashes when a Road Diet is installed on a previously 4 lane undivided facility. On a 4 lane undivided road, vehicle speeds can vary between travel lanes, and drivers frequently slow or change lanes due to slower or stopped vehicles. Drivers may also weave in and out of traffic lanes at high speeds. In contrast, on 3 lane roads with TWLTL's, the vehicle speed differential is limited by the speed of the lead vehicle in the through lane, and though vehicles are separated from left turning vehicles.

Also, there is better visibility for left turning traffic. Currently, vehicles on 11th Street turning left have to yield to two lanes of traffic, and their view of oncoming traffic in the outside lane may be obscured by vehicles in the inside lane. For Option 3, the left turn lanes are opposite each other allowing left turning motorists to better see approaching traffic in the oncoming thru lane. Thus Road Diets can reduce the vehicle speed differential and vehicle interactions, which can reduce the number and severity of vehicle-to-vehicle crashes.

An option that may be included with a Road Diet is bike lanes. 11th street is currently 44' wide from face of curb to face of curb, with (4) 11' lanes. With a TWLTL, a possible configuration is a 5' bike lane, 11' travel lane, 12' two-way left turn lane, 11' travel lane, and 5' bike lane for a total of 44'. The beginning and ending of the TWLTL along 11th Street would be evaluated and a recommendation given to the Council if this option is chosen.

- Pros
  - Would address all angle collisions occurring at the intersection and at other driveways and intersections within the 3 lane section.
  - Could accommodate a bicycle lane in each direction.
  - According to FHWA, could improve safety along 11th Street corridor, not just at the Maynard Way intersection.
  - A traffic signal will provide a pedestrian crossing of 11th Street.
- Cons
  - By putting all through traffic into one lane, would have to give through traffic a longer green time than if 2 through lanes, thus increasing delay.
  - Very dependent on driver behavior. If drivers are not familiar with a TWLTL, may cause problems elsewhere along the corridor.
  - Unsure of impact to agricultural traffic. With bicycle lane, ag traffic would have 16', without impacting on TWLTL.
- Cost
  - Preliminary Construction Cost Estimate is $224,800, Unfunded Additional Cost is $70,000.
  - Crash reduction factor is 46.7.
  - Benefit/Cost Ratio is 2.98 (A benefit/cost ratio of 1.8 has been funded by TSIP in the past).
- Intersection Level of Service
  - 85 second cycle length for the traffic signal.
  - Intersection Delay 31.9 seconds.
  - Level of Service C.

Option #3A

By combining Option 2 & 3, the operation of the intersection will be better than Option 3 alone. By widening Casey's driveway and better aligning it with Maynard Way, both north bound and south bound traffic could go at the same time, and share green time, thereby reducing delay compared to Option 3.

- Combining Option 2 (Widening Casey's driveway) with Option 3 (TWLTL)
  - 60 second cycle length for the traffic signal.
  - Intersection Delay 19.0 seconds.
  - Intersection Level of Service B.
  - Preliminary Construction Cost Estimate is $234,400. Unfunded Additional Cost is $71,000.
  - Crash reduction factor is 46.7.

- Benefit/Cost Ratio is 2.86 (A benefit/cost ratio of 1.8 has been funded by TSIP in the past).

Option #4

Widen the intersection by 6' on both sides and install a traffic signal to accommodate 2 through lanes and a left turn lane in each direction (5 lane cross section). See Exhibit 8.

- Pros
  - Would address all angle collisions occurring at the intersection.
  - Less delay at the intersection with 2 through lanes and a dedicated left turn lane.
  - Intersection would appear more like a typical urban intersection and reduce confusion.
  - Would not restrict agricultural traffic.
  - A traffic signal will provide a pedestrian crossing of 11h Street.
- Cons
  - Most costly. Would have to widen intersection for 300' taper plus length of turn lanes in both directions.
- Cost
  - Preliminary Construction Cost Estimate is $336,300. Unfunded Additional Cost is $107,000.
  - Crash reduction factor is 52.1.
  - Benefit/Cost Ratio is 2.41 (A benefit/cost ratio of 1.8 has been funded by TSIP in the past).
- Intersection Level of Service
  - 85 second cycle length for the traffic signal.
  - Intersection Delay 21.2 seconds.
  - Level of Service C.

Option #4A

By combining Option 2 & 4, the operation of the intersection will be better than option 4 alone. By widening Casey's driveway and better aligning it with Maynard Way, both north bound and south bound traffic could go at the same time, and share green time, thereby reducing delay compared to Option 4.

- Combining Option 2 (Widening Casey's driveway with Option 4 (5 lane cross-section)
  - 65 second cycle length for the traffic signal.
  - Intersection Delay 13.6 seconds.
  - Intersection Level of Service B.
  - Preliminary Construction Cost Estimate is $338,700. Unfunded Additional Cost is $107,000.
  - Crash reduction factor is 52.1.

- Benefit/Cost Ratio is 2.39 (A benefit/cost ratio of 1.8 has been funded by TSIP in the past).

Summary

The following table breaks down the delay for each option by approach. The second table summarizes the overall results for the intersection.

SUMMARY OF DELAY PER APPROACH							
	Existing Conditions (sec,LOS)	Option 1 (sec,LOS)	Option 2 (sec,LOS)	Option 3 (sec,LOS)	Option 3A (sec,LOS)	Option 4 (sec,LOS)	Option 4A (sec,LOS)
Eastbound 11th Street	3.1, A	26.6, C	16.7, B	31.2, C	14.1, B	19.0, B	11.5, B
Westbound 11th Street	0.9, A	25.9, C	15.9, B	23.1, C	17.5, B	17.2, B	11.0, B
Northbound Casey's	85.0, F	28.1, C	19.4, B	30.5, C	19.8, B	27.3, C	18.6, B
Southbound Maynard Way	39.7, D	26.5, C	20.1, C	29.2, C	20.6, C	23.6, C	19.3, B

SUMMARY OF OVERALL INTERSECTION PER OPTION								
Option	Cycle Length (sec.)	Average Intersection Delay (sec.)	Level of Service of overall intersection	Crash Reduction Factor	Benefit, average cost of crashes avoided (dollars)	Estimated Construction Cost (dollars)	Unfunded Add'l Cost (dollars)*	Benefit/ Cost Ratio **
1	85	28.3	C	34.4	551,219	184,700	61,500	2.81
2	65	18.1	B	34.4	551,219	199,600	63,000	2.62
3	85	31.9	C	46.7	701,130	224,800	70,000	2.98
3	60	19.0	B	46.7	701,130	234,400	71,000	2.86
4	85	21.2	C	52.1	836,443	336,300	107,000	2.41
4	65	13.6	B	52.1	836,443	338,700	107,000	2.39

* Approximate cost including Design, Survey, Construction Staking and Construction Inspection

** Cost used in ratio is Estimated Construction Cost plus other annual costs such as maintenance or operating expenses

OPTIONS CONSIDERED, BUT NOT PRACTICAL

- No Action
  - Operationally, the side street approaches do not work well. Maynard Way has a delay of 39.7 seconds for southbound traffic, and Casey's driveway has a delay of 85.0 seconds for northbound traffic. This is a level of service of 'D' and 'F' respectively, and is typically unacceptable. As delays increase, drivers sometimes become impatient and take more risks. The benefit for this option would be the dollars saved by not making any improvements. The cost would be a societal cost of the future crashes. Currently, 3.8 crashes are occurring per year, with an average cost of $38,000 per crash, for a total cost to society of $144,400 per year. By implementing one of the options above, the reduction in the societal costs would cover the cost of the improvement in a just a few years.
- Roundabout
  - For a double lane roundabout, the outer edges of the circulatory roadway would be a minimum of 150' diameter. Right-of-way in this area is approximately 100', so a roundabout would greatly infringe on private property.
- Realign Casey's driveway without installing a traffic signal
  - This would address the confusion of the offset intersection, but would not address almost half of the crashes occurring to vehicles turning onto 11th Street from Maynard Way or Casey's driveway. Casey's was approached about this option, but was not receptive to the idea.
- 3 Phase Traffic Signal with Current Roadway configuration
  - Without dedicated left turn lanes on 11th Street, or separate phases for Eastbound/Westbound traffic, drivers making a left turn into Casey's or Maynard Way would continue to yield to oncoming traffic, the same as they do without a traffic signal. While this option would address the crashes occurring to vehicles turning onto 11th Street from Maynard Way or Casey's driveway, it would not address almost half of the crashes occurring from vehicles on 11th Street turning into Casey's or Maynard Way.

RECOMMENDATIONS

Operationally, the intersection functions well with Option 2 or 4A because 11th Street continues to have 4-lane capacity and with the realignment of the North/South intersections the signal timing can be most efficient. Both Option 2 and 4A have a Benefit/Cost Ratio over 1.8, which has been the criteria for funding in the past.

Option 2 is a lower cost option, but does not provide the full safety impacts (is not predicted to reduce the same number of crashes) as Option 4A. Option 4A provides the highest Crash Reduction Factor, which means that it is predicted to prevent the most crashes. By combining safety with the intersection operation, Option 4A is the recommended option if the funding of that level is available. If funding for Option 4A is not available, Option 2 is recommended.

TSIP REQUIREMENTS

The Traffic Safety Improvement Program (TSIP) is administered by the Iowa DOT and allocates Traffic Safety Funds for qualified improvements. To be considered for funding, an application has to be received by the Office of Traffic & Safety by August 15. Final approval is given by mid-December, and funds are available for use on July 1. TSIP Program Funding Level comes from one half of one percent (0.5%) of Iowa's Road Use Tax Fund. Approximately $5 million per year is available for site specific projects, such as this location in DeWitt. TSIP awards cannot exceed $500,000 per project and cannot be used for routine maintenance, contract administration, design, or construction engineering and inspection. Below, the specific application requirements are addressed.

A. Application Certifications or Resolutions – Approval by the applying local government must be dated within the past 12 months.

B. Narrative describing existing conditions, the proposed concept, and safety justification – A narrative describing existing conditions is contained in Attachment 1, and a description of the proposed concept and safety justification will be included after a concept is chosen.

C. Itemized breakdown of all costs – An approximate cost of each option has been included, and the itemized costs will be included in the application once an option is chosen.

D. Time Schedule – This will be developed after an option is chosen.

E. Map – Included in Attachment 2.

F. Color pictures of the project site – Included in Attachment 3.

G. Plan view – Included as exhibits for each option.

H. Aerial Photograph – Included in Attachment 4.

I. Copies of Actual Investigating Officer's Report of Motor Vehicle Accident – Obtained and will be submitted with application.

J. Recent traffic volumes and/or turning movement counts – Traffic counts from 2013 were used in this report along with a trip generation analysis. Kwik Star has been built since the traffic counts were taken, so a customary method of estimating trips generated by Kwik Star was performed and those additional traffic volumes were added to the 2013 counts. The customary method used the Institute of Transportation Engineers (ITE) Trip Generation Manual for a Gasoline/Service Station with Convenience Market and Car Wash. Traffic count data will be submitted with the application along with a detailed explanation of trip generation assumptions.

K. Traffic Signal Layout, Phasing, and Detector Locations – Layouts and phasing are included as exhibits with each option. Once an option is chosen, vehicle detector locations will be established. However, it is assumed that all approaches will have vehicle detectors.

L. Benefit/Cost Ratio worksheet – Historically, funded applications have had B/C ratios of 1.8:1, or more. A benefit/cost ratio was developed for each option using the approximate cost developed. Once an option is chosen, the benefit/cost ratio worksheet will be completed and included in the application.

ATTACHMENT 1

Existing Conditions

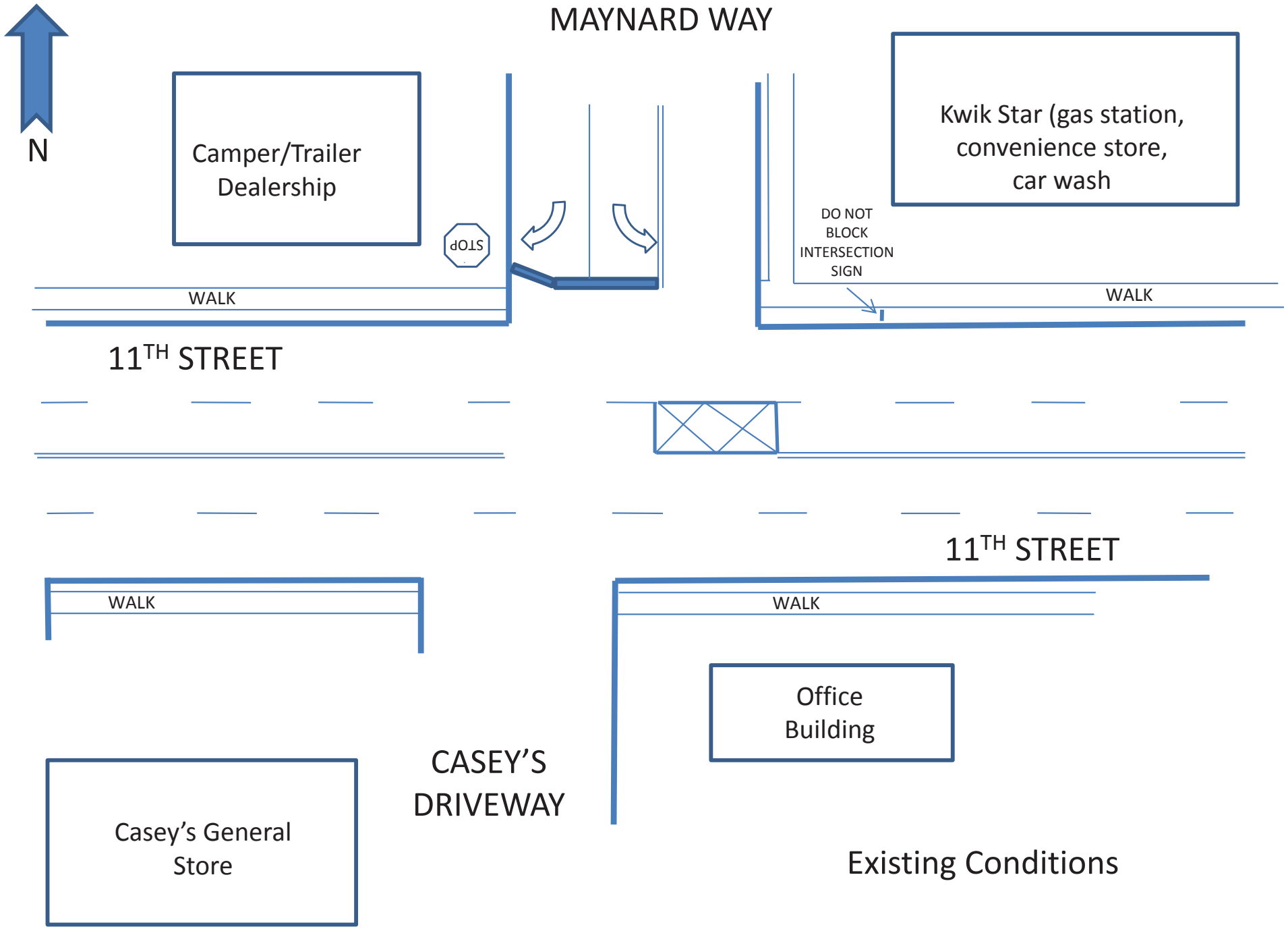
11th Street (old Highway 30) is an east-west 4-lane facility through DeWitt and is classified as a major collector on federal functional classification maps. 11th Street, in the area of Maynard Way, is 45 feet wide with curbs on both sides. There are sidewalks on the north and south side of 11th Street. The speed limit on 11th Street is posted at 35 mph.

Maynard Way is a north-south 2-lane facility, and is an average of 36 feet wide. At the intersection, a 12 foot lane exists in the northbound direction and two 12 foot lanes are marked southbound for left and right turns. Although no lane is marked for through traffic, a few vehicles do travel through the intersection into Casey's General Store, typically from the right turn lane. Maynard Way has curb and gutter on both sides. There is a sidewalk on the east side of Maynard Way. Maynard Way is controlled by a stop sign. The speed limit posted on Maynard Way is 25 mph.

On the south side of the intersection is the eastern-most of two access points to Casey's General Store. This 36 foot wide two-way driveway functions as the northbound approach on this intersection, and is skewed to the west from Maynard Way approximately twenty feet from centerline to centerline. Casey's driveway does not have any traffic control devices or pavement markings.

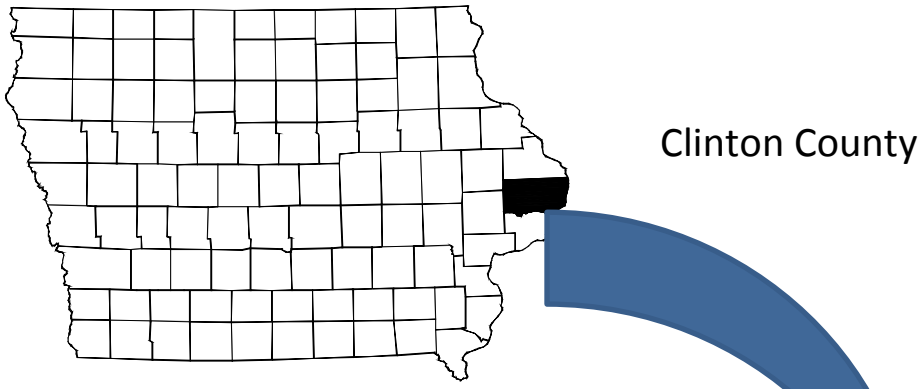
Land uses at the intersection consists of trailer/camper dealership on the northwest quadrant, Kwik Star gas station with convenience store and car wash on the northeast quadrant, Casey's General Store with gas station on the southwest quadrant, and a small office building on the southeast quadrant.

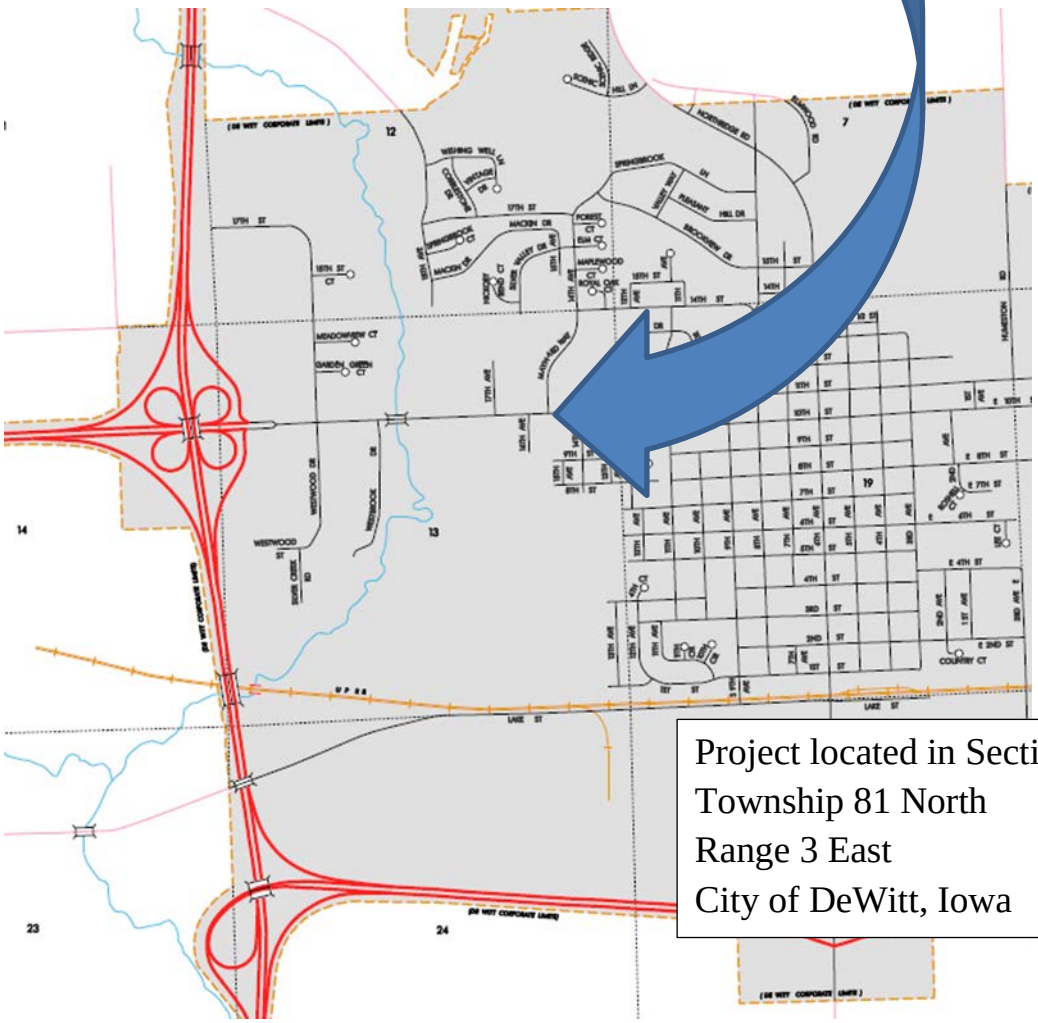
Due to the alignment skew of Maynard Way and Casey's General Store access, westbound vehicles stopped in the inside lane waiting to make a left turn into Casey's block the view for other motorists trying to navigate the intersection. It was specifically noted in 7 of the accident reports that the drivers cited for failure to yield making a left turn did not see the approaching vehicle because of another vehicle in the intersection blocking their view. Therefore, a Do Not Block Intersection sign was installed by the City for westbound vehicles, and Do Not Block Intersection pavement markings were installed in the inside westbound through lane as shown on the next page. The Do Not Block Intersection pavement markings were installed in Fall, 2012. The sign was installed sometime after the pavement markings.



Existing Conditions

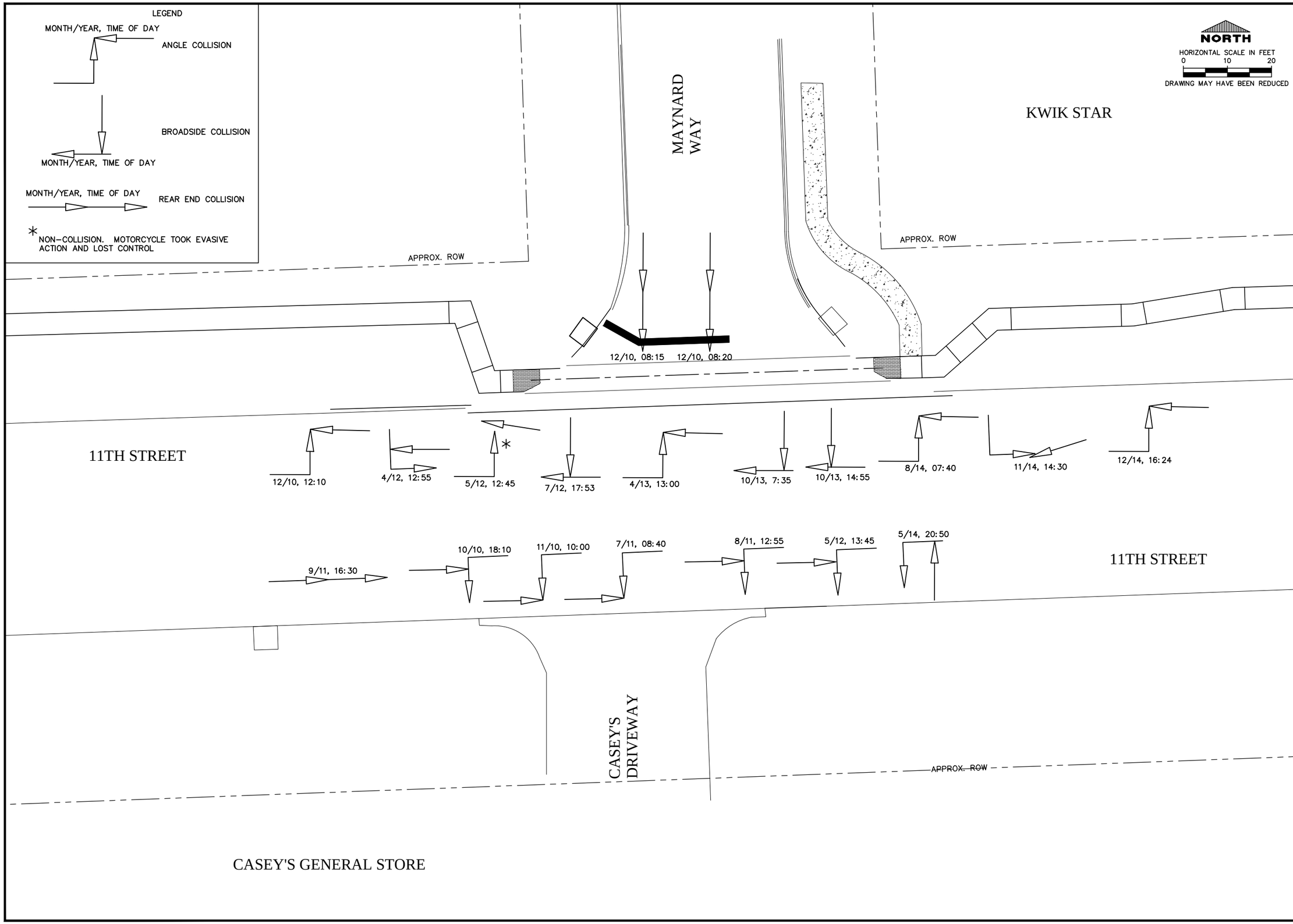
ATTACHMENT 2 – Location of Project (Intersection of 11th Street & Maynard Way)





Attachment 3

Attachment 4



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Project Description

CRASH DIAGRAM
EXHIBIT 1

11TH STREET & MAYNARD WAY INTERSECTION
TRAFFIC STUDY
CITY OF DEWITT, IOWA

P:\15\064\DRAWINGS\CIVIL\15064 CRASH DIAGRAM.DWG 6/17/2015 1:14 PM JERI M. VONDERA

Drawing Issue Information

Project Mgr: GTB
Issued For Bidding: .

Drawn By: .
Issued For Construction: .

Rev	Description	Date	By
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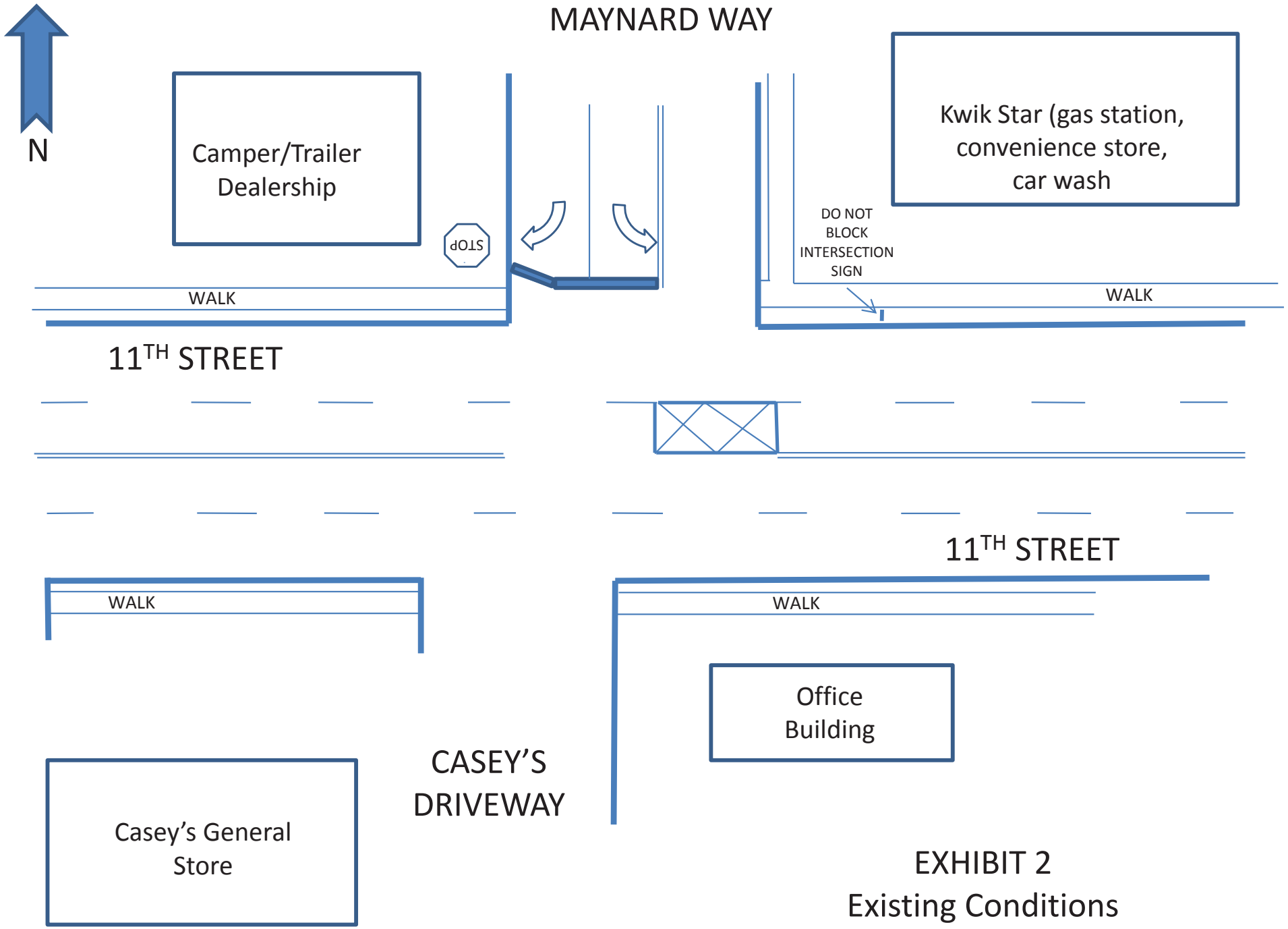


EXHIBIT 2
Existing Conditions

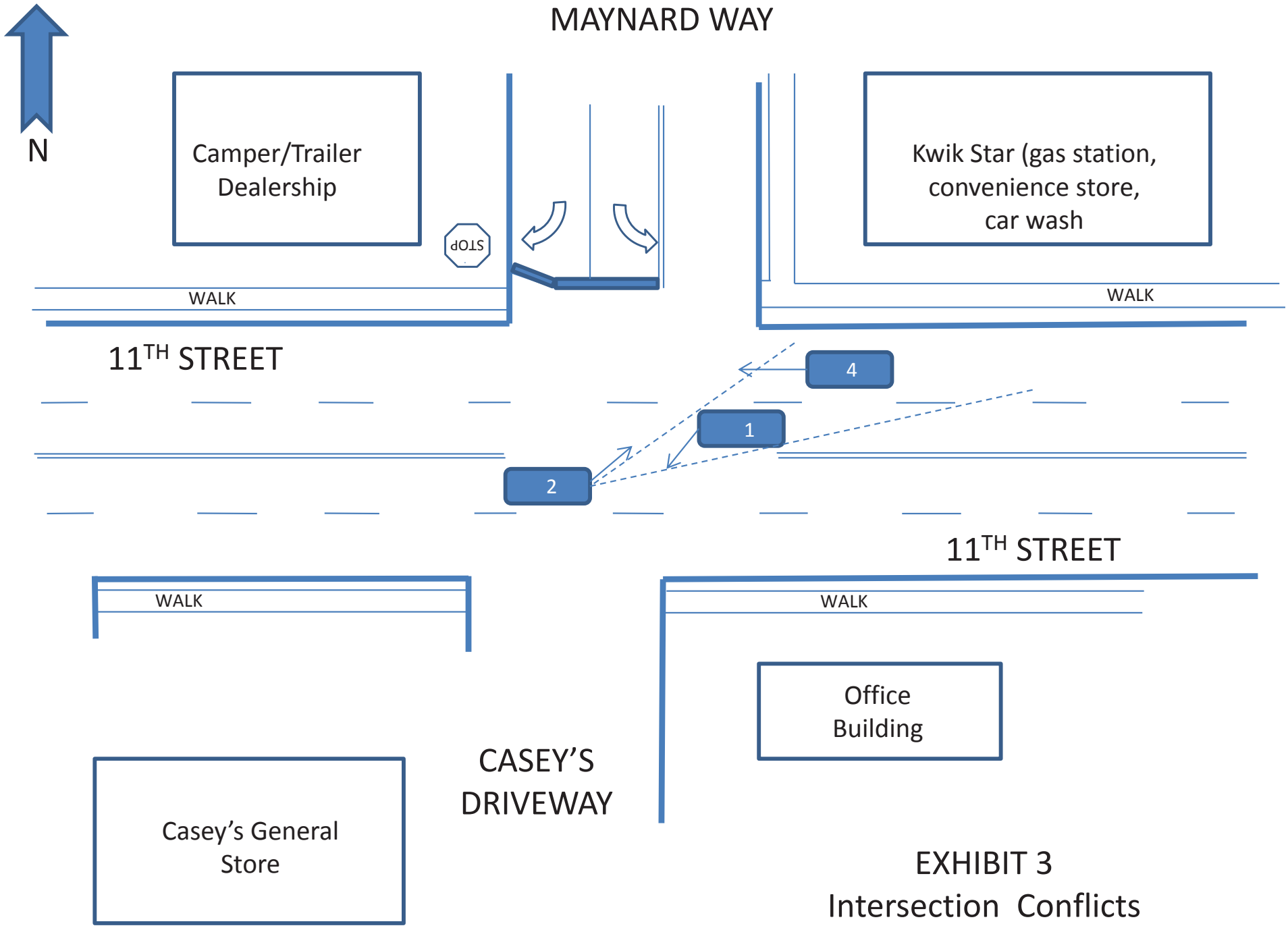


EXHIBIT 3
Intersection Conflicts

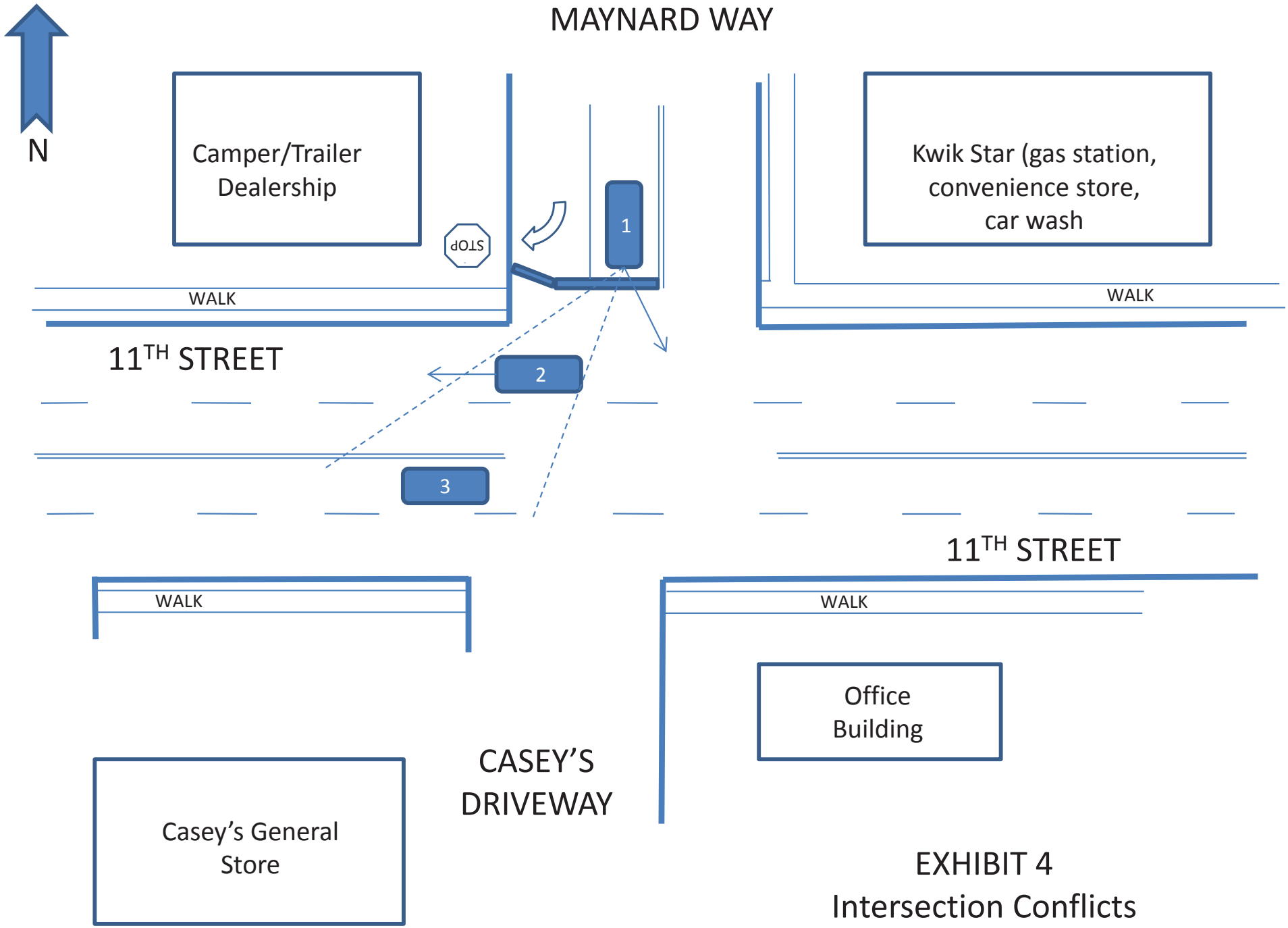
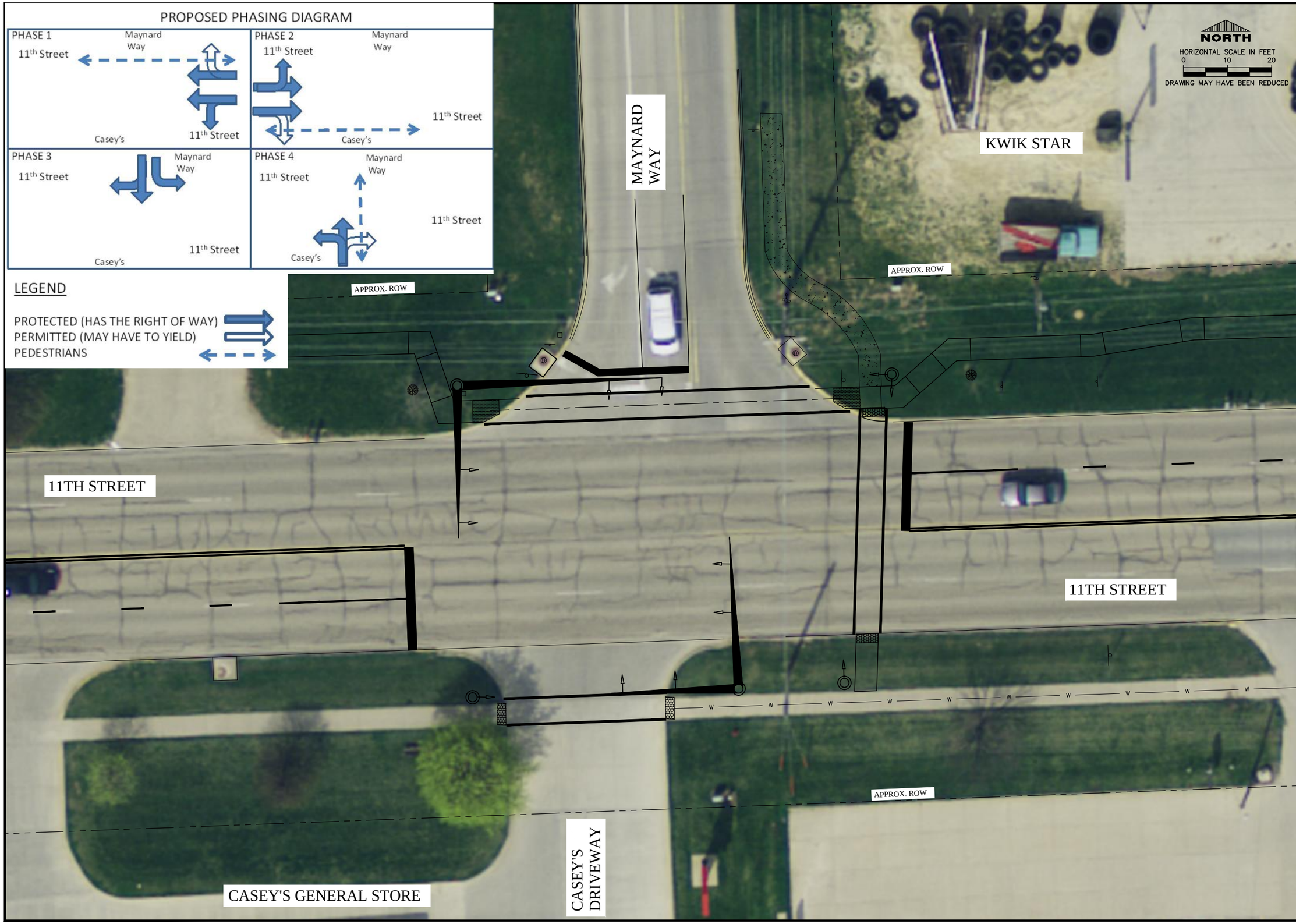


EXHIBIT 4
Intersection Conflicts



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Project Description

OPTION 1
NO GEOMETRIC CHANGES
EXHIBIT 5
11TH STREET & MAYNARD WAY INTERSECTION
TRAFFIC STUDY
CITY OF DEWITT, IOWA

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Drawing Issue Information

Project Mgr: GTB
Issued For Bidding: .
Drawn By: .
Issued For Construction: .

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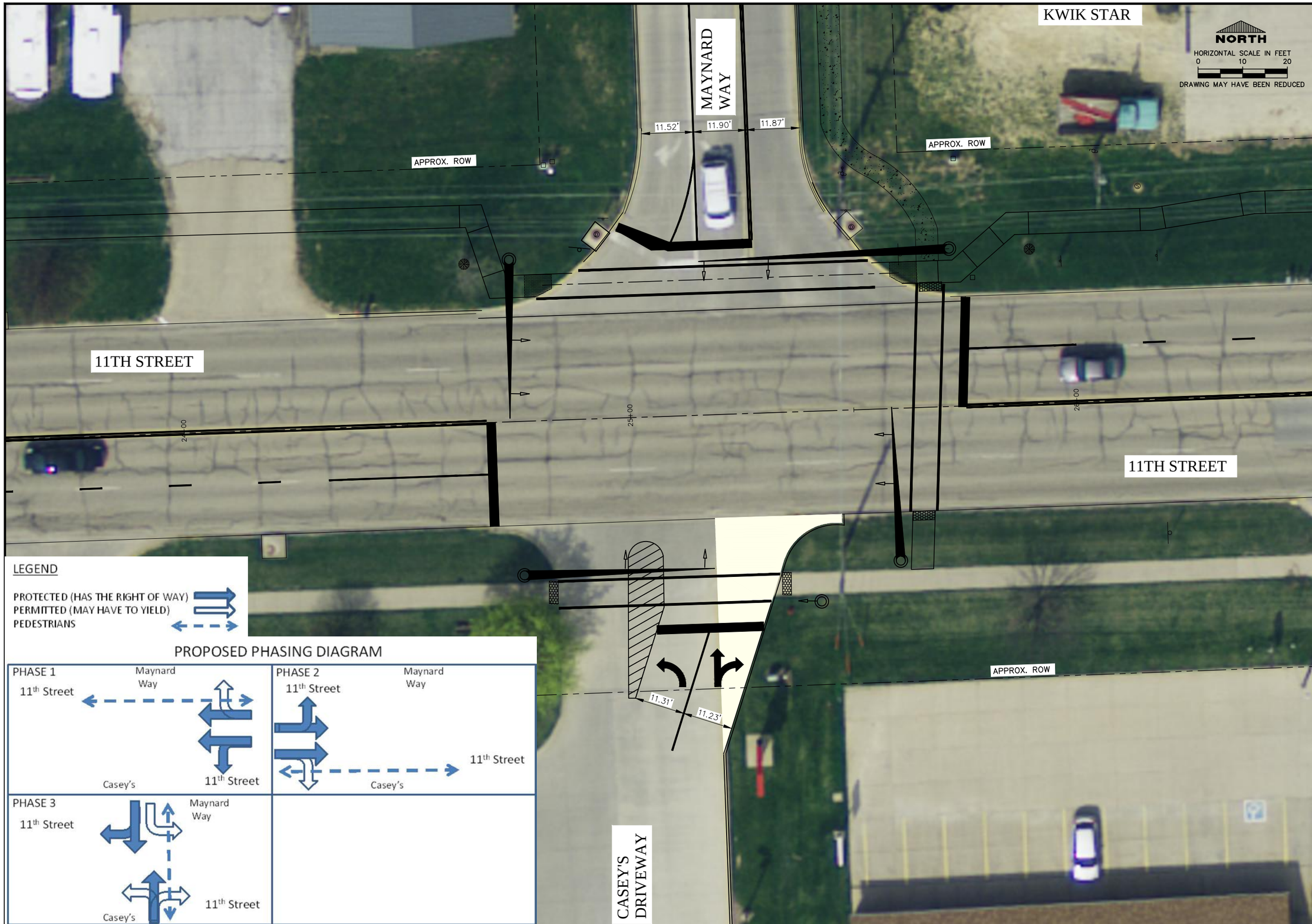

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Project Description

OPTION 2
WIDEN CASEY'S DRIVEWAY
EXHIBIT 6
11TH STREET & MAYNARD WAY INTERSECTION
TRAFFIC STUDY
CITY OF DEWITT, IOWA

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Drawing Issue Information

Drawn By: .
Issued For Construction: .
Project Mgr: GTB
Issued For Bidding: .

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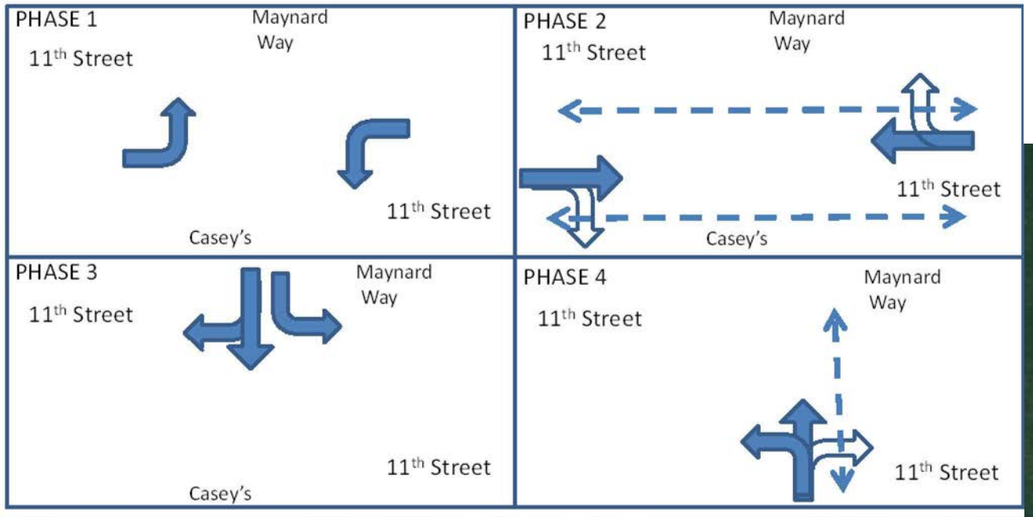
PROPOSED PHASING DIAGRAM

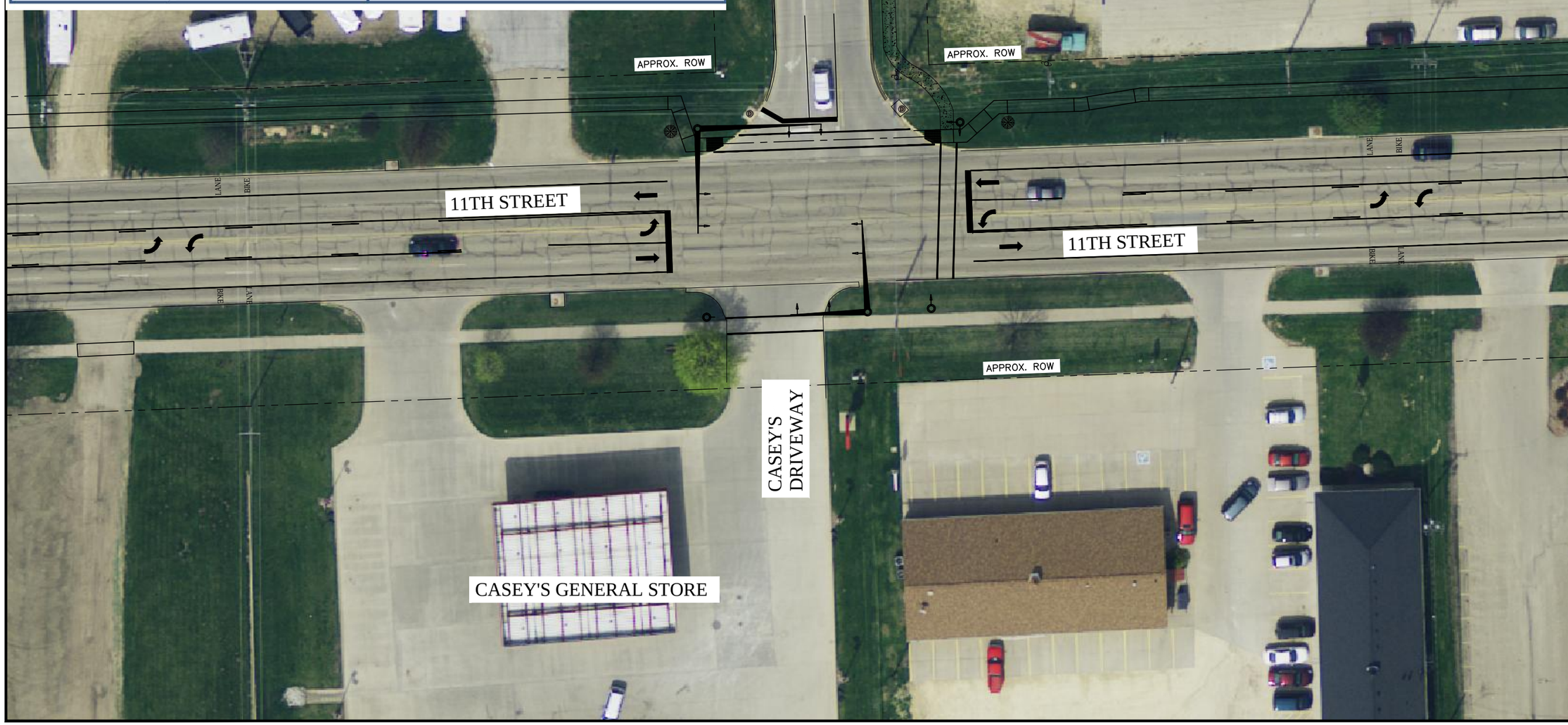


LEGEND

PROTECTED (HAS THE RIGHT OF WAY)
PERMITTED (MAY HAVE TO YIELD)
PEDESTRIANS

NORTH

HORIZONTAL SCALE IN FEET
0 20 40
DRAWING MAY HAVE BEEN REDUCED



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Project Description

OPTION 3
TWLTL
EXHIBIT 7
11TH STREET & MAYNARD WAY INTERSECTION
TRAFFIC STUDY
CITY OF DEWITT, IOWA

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Drawing Issue Information

Drawn By: .
Issued For Construction: .
Project Mgr: GTB
Issued For Bidding: .

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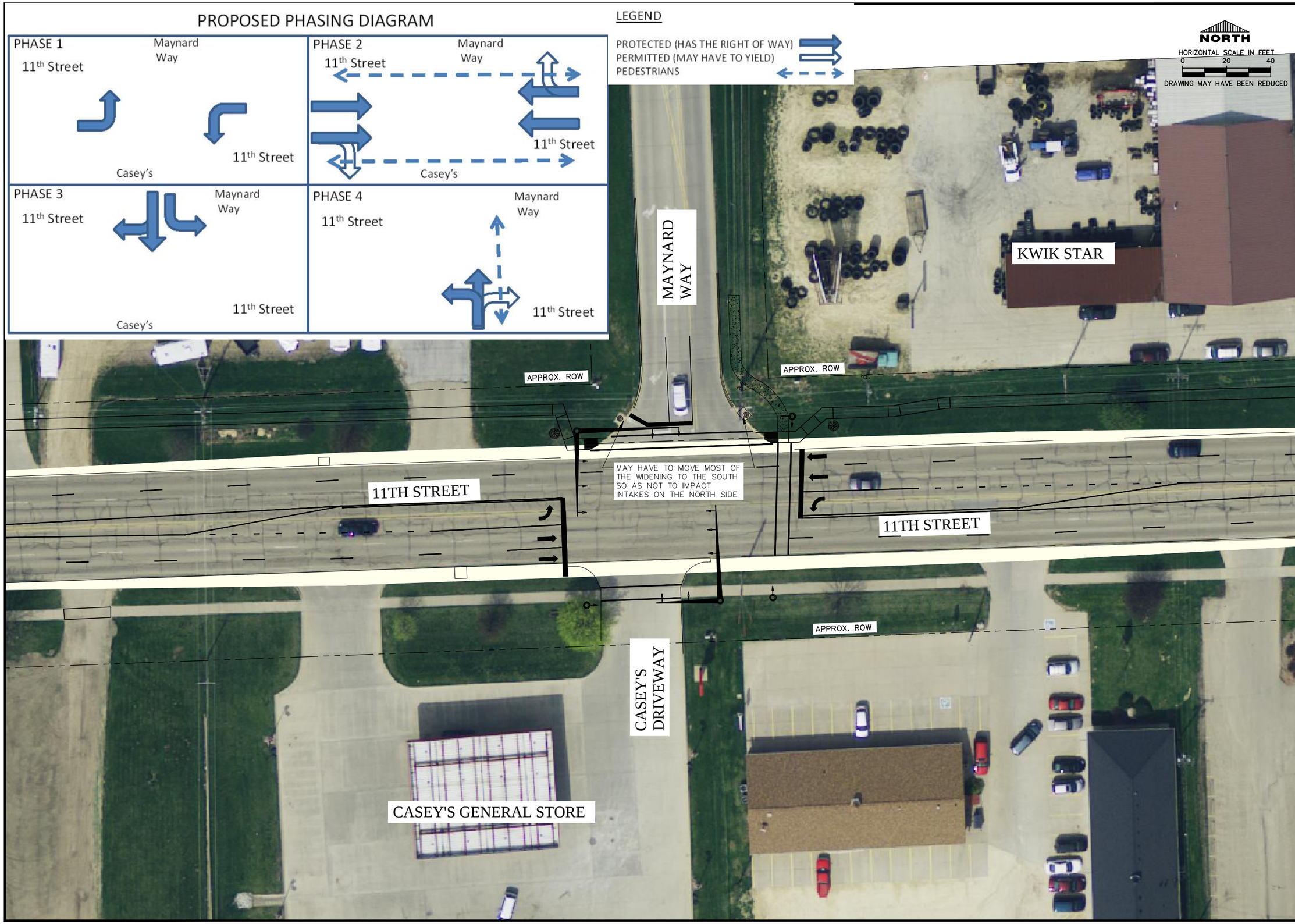

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Project Description

OPTION 4
WIDEN 11TH STREET
EXHIBIT 8
11TH STREET & MAYNARD WAY INTERSECTION
TRAFFIC STUDY
CITY OF DEWITT, IOWA

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Drawing Issue Information

Project Mgr: GTB
Issued For Bidding: .
Drawn By: .
Issued For Construction: .

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EX. 8

Project No: ----

13TH AVENUE NORTH
(NORTH 2ND STREET TO NORTH 4TH STREET)

4 LANE TO 3 LANE CONVERSION FEASIBILITY STUDY

To be used as Narrative for the 2015 Traffic Safety Improvement Program Grant Application.

August 11, 2015

Prepared by,

Jason Craft, P.E.
City Engineer

LICENSED PROFESSIONAL ENGINEER
JASON A. CRAFT
20273
IOWA

8/11/15

APPENDIX A

Application Resolution

RESOLUTION NO. 2015-320

RESOLUTION APPROVING OFFICIAL ENDORSEMENT OF FUNDING APPLICATION TO IOWA DEPARTMENT OF TRANSPORTRAION FOR THE 2015 TRAFFIC SAFETY IMPROVEMENT PROGRAM FOR THE 13TH AVENUE NORTH THREE-LANE CONVERSION PROJECT

WHEREAS, the Iowa Department of Transportation is accepting applications for the Traffic Safety Improvement Program (TSIP) on August 15, 2015; and,

WHEREAS, the TSIP allows cities and counties throughout Iowa to apply for funding for traffic safety improvements on public roads under local jurisdiction; and,

WHEREAS, the crash history and traffic volumes along 13th Avenue North, from North 2nd Street to North 4th Street, indicate that conversion to a Three-Lane Road with a Two-Way Center Left-Turn Lane would improve safety and efficiency of the roadway segment; and,

WHEREAS, the City Engineering Department has prepared a TSIP grant application in the amount of **$200,000** to the Iowa DOT, which would fund the conversion of 13th Avenue North to a Three-Lane Road with a Two-Way Center Left-Turn Lane, from North 2nd Street to North 4th Street; and,

THEREFORE, BE IT RESOLVED BY THE CITY COUNCIL OF THE CITY OF CLINTON, IOWA that the that the City Council is supportive of the Traffic Safety Improvement Program Funding Application for the 13th Avenue North Three-Lane Conversion Project in the amount of **$200,000**. The City Engineering Department is hereby authorized to submit the funding application on or before August 15, 2015.

BE IT FURTHER RESOLVED BY THE CITY COUNCIL OF THE CITY OF CLINTON, IOWA that the City of Clinton will be fully responsible for the maintenance of all improvements constructed related to the 13th Avenue North Three-Lane Conversion Project.

_____, MAYOR

ATTEST:

_____
CITY CLERK

ADOPTED: August 11, 2015

APPENDIX B

Narrative

Feasibility Study Introduction

The objective of this study is to investigate the feasibility of converting 13th Avenue North from a four-lane roadway to a three-lane roadway from North 2nd Street to 200' west of North 4th Street, or a distance of approximately 1/4 mile. This study was done in advance of application for the Traffic Safety Improvement Program Grant. This study serves as a narrative for the 2015 TSIP Grant Application.

The conversion of four-lane roadways to three-lanes has occurred in many cases throughout the State of Iowa over the past several years. In certain situations, conversion of a four-lane undivided roadway to a three-lane cross-section has been proven to produce acceptable operational results and improved safety results.

Attached to this report in **Appendix M-1** is a four page tech transfer summary entitled "Four-Lane to Three-Lane Conversions", published by the Center for Transportation Research and Education (CTRE), Iowa State University in April of 2006. The findings of the CTRE study included a 21% reduction in total crash frequency and a 29% reduction in total crash rate. For this reason, along with additional operational benefits, the feasibility of converting Springdale Drive to a three-lane road should be considered.

Attached to this report, in **Appendix M-2,** is a federal highway administration one page statistical report of four-lane to three-lane conversions in the State of Iowa. Fifteen different sites across the state show drastic crash reduction statistics in the years after the conversions. The data from that study (attached) shows an average of 23.74 crashes/mile in the years before the conversion, and 12.19 crashes/mile in the years after the conversion, or an approximate 47% total crash reduction.

It is postulated that a conversion of 13th Avenue North in Clinton, Iowa to a three-lane roadway with a two-way center left-turn lane would yield tangible safety and operational benefits if implemented. The following feasibility study will quantify this assumption so that the proper decision can be made.

Overview of Existing Conditions

The existing cross-section of 13th Avenue North is a 41-foot wide roadway, from back of curb to back of curb, including four 10-foot wide through lanes which are very narrow by today's standards. The inside lanes function as shared through lanes and left turn lanes at all intersections and driveways along 13th Avenue North. This has caused many accidents over the past ten years, as is shown below in this report. The speed limit is now posted at 30 mph along this stretch of 13th Avenue North from North 4th Street to North 2nd Street, but increases to 35 mph west of North 4th Street.

The 13th Avenue North corridor has experienced an increase in traffic volume over the past several years. The following table shows a summary of traffic counts on the various sections of 13th Avenue North. The most recent Iowa DOT traffic count conducted in 2014 (*preliminary*) was used. Approximated Traffic Counts for 2035 were calculated using 2% traffic growth per year. Traffic is not expected to increase at this pace for 20 consecutive years, so this is a very conservative estimate, developed in order to project the highest possible volume of traffic generated over this time period.

13th Avenue North Traffic Counts 2015		
From	To	AADT
N 2ND STREET	PERSHING BLVD	4,721
PERSHING BLVD	N 3RD STREET	5,179
N 3RD STREET	N 4TH STREET	6,516

13th Avenue North Traffic Counts 2035		
From	To	AADT
N 2ND STREET	PERSHING BLVD	7,015
PERSHING BLVD	N 3RD STREET	7,696
N 3RD STREET	N 4TH STREET	9,682

Generally, three-lane roadways have the capacity to carry up to 17,000 vpd without problems. The traffic volume along 13th Avenue North is not expected to increase to that extent over the next twenty, and probably forty years.

Four-lane to Three-lane Conversions

The strategy associated with the 4-lane to 3-lane conversion is best discussed in the 2001 CTRE Report. The following is an excerpt from this report:

Four-lane undivided roadways in urban areas can experience a degradation of service and/or safety as traffic volumes increase. In fact, the existence of turning vehicles on this type of roadway has a dramatic effect on both of these factors. The solution identified for these problems is typically the addition of a raised median or two-way left-turn lane (TWLTL). The mobility and safety benefits of these actions have been proven and are discussed in this report along with some general cross section selection guidelines. The cost and right-of-way impacts of these actions are widely accepted. These guidelines focus on the evaluation and analysis of an alternative to the typical four-lane undivided cross section improvement approach described above. It has been found that the conversion of a four-lane undivided cross section to three-lanes (i.e., one lane in each direction and a TWLTL) can improve safety and maintain an acceptable level of service. Please refer to the diagram below for a visual explanation of the conversion.

Figure 1b. Four-Lane Undivided Roadway Conversion to a Three-Lane Cross Section.

There is a misconception that a four-lane roadway will invariably provide necessary capacity and safety as traffic continues to increase. In fact, as urban traffic volumes increase, so can the propensity for left-turning traffic to create the opposite effect. That is, a large amount of left-turning traffic is actually known to cause congestion and vehicle accidents. These left-turning vehicles stop in the inside through lane, which causes last-second lane changes by oncoming vehicles. With a conversion to a three-lane roadway, this occurrence would cease as the center left turn lane would allow a safe queue of left-turning traffic, whilst allowing through traffic to pass safely in each of the dedicated through lanes. There is also a drastic reduction in conflict points, as shown by the diagrams below.

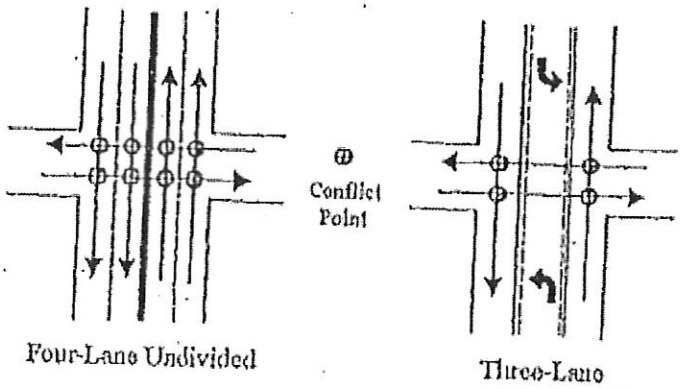


Figure 4. Crossing Through Traffic Conflict Points for Urban Four-Lane Undivided Roadway and Three-Lane Cross Section (10).

In addition to the benefit of adding a queueing lane, the conversion will provide other safety benefits. With the conversion to a three-lane, the through lanes are reduced from 2 to 1 lane in each direction. This eliminates the common "shadowing" effect caused by two lanes of traffic moving in each direction. The shadowing effect, as depicted in the diagram below, is when a left-turning vehicle is impaired from viewing traffic in the opposite outside lane because of vehicle obstruction traveling in the inside lane. This shadowing effect would be eliminated by conversion to a three-lane roadway.

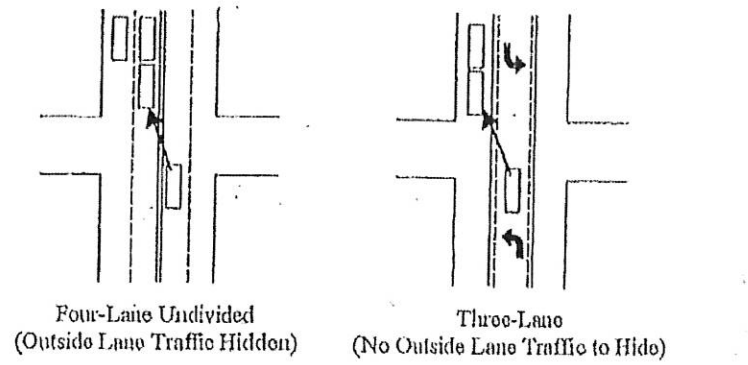


Figure 5. Major-Street Left-Turn Sight Distance for Urban Four-Lane Undivided Roadway and Three-Lane Cross Section (*10*).

The most frequent concern voiced by citizens when discussing the conversion of a four-lane road to a three-lane road is the ceding of capacity born from reducing lanes from 4 to 3. However, for certain volumes of traffic, in certain urban areas, a three-lane roadway will actually provide a safer operational benefit than a four-lane roadway. For corridors with a high rate of left turning vehicles, a three-lane roadway, inclusive of a center turn lane, is a safer and more efficient alternative to a traditional four-lane roadway.

Feasibility Determination Factors

The Engineering Policy used in this report is the feasibility determination method, which has been used in previous projects in Clinton, with respect to the decision of converting an existing four-lane road to a three-lane road with a two-way center left turn lane. The following feasibility determination factors are considered to determine if 13th Avenue North should be recommended for conversion to a three-lane roadway with a TWLTL from North 2nd Street to North 4th Street.

1. Roadway Function

The objective of this function is to match the intended roadway function to the actual designed function of roadway provided to the public. In the case of a typical four-lane undivided roadway, the intended function is increased mobility of traffic. That is, four-lane roadways are intended to convey large amounts of traffic from Point A to Point B. Conversely, three-lane roadways with TWLTL serve less of a mobility function and more of an access function. For roadways with a significant number of existing accesses along the route, a three-lane roadway with a center TWLTL is possibly a better match of roadway function.

In the case of 13th Avenue North, over 26 access points exist from North 2nd Street to 200′ west of North 4th Street, or an access about every 50′. This includes three public street intersections in both directions, three alleyway intersections in both directions, and 14 private driveways. For the purpose of this feasibility study, I have concluded that 13th Avenue North matches the roadway function for a three-lane roadway with a TWLTL. Though a considerable amount traffic is conveyed through the entire corridor with mobility in mind, the relatively low traffic counts would indicate that a three-lane roadway with a TWLTL is a tenable change to the community. Further, this stretch of 13th Avenue North is at the far east end of the route, which means that most drivers must prepare to turn onto 4th Street, 3rd Street, or 2nd Street when traveling this segment of 13th.

2. Total Traffic Volume

Successful case study conversions of four-lane undivided roadways to three-lane cross-sections have been done on roadways in Iowa with volumes between 2,200 and 13,700 vpd. Research has shown that the three-lane conversion should be considered feasible with volumes of less than 17,000 vpd. As shown above in the traffic volume tables, current traffic counts are between 4,700 and 6,600 along this segment of 13th Avenue North.

Further, using a traffic growth factor of 2% per year for the next 20 years, traffic is not expected to increase to even 10,000 vpd, still far below the threshold of 17,000 vpd. As stated earlier in the report, the 2% per year for 20 years is a conservative estimate. There will likely be no need to widen to 5 lanes at any time during the period covered in this study, if ever. It is very likely that this road would see improved safety and operational level of service after the conversion to a three-lane road with a TWLTL.

The traffic data indicates that there should be no mobility challenges or reduced levels of service due to conversion of 13th Avenue North to a three-lane roadway with a TWLTL. For the purposes of this feasibility study, I have concluded that 13th Avenue North matches the total traffic volume determination factor for a three-lane roadway with a TWLTL, and this should not change in the future.

3. Turning Volume & Patterns

Existing left-turning volumes are high at the following locations, per the attached Iowa DOT turning movement exhibits:

- Intersection with North 4th Street (11 Left Turns during Peak 15 minute period)
- Intersection with North 3rd Street (49 Left Turns during Peak 15 minute period)
- Intersection with North 2nd Street (42 Left Turns during Peak 15 minute period)

A "shadowing" effect is currently present at intersections with North 4th Street, Pershing Blvd, and North 3rd Street, due to the two parallel through lanes opposite the left-turning vehicles. There are also traffic backups experienced at each of these intersections due to the left-turn queue in a non-dedicated lane. If converted to a three-lane roadway with a TWLTL, the functionality of these intersections would actually increase with respect to left-turning vehicles. Following are brief descriptions of the major shadowing issue existing at 13th Avenue North & North 3rd Street.

- Intersection of 13th Avenue North & North 3rd Street.

This is a signalized intersection, with only permissive left turns from east-bound directions on 13th Avenue North. This intersection shows up on the Iowa DOT's Top 200 list of possible traffic safety improvement candidates, currently ranked #106. The crash data at this intersection is discussed later in the report. Many of the crashes at the intersection are related to left-turning traffic operating in a permissive-only function in a narrow, inside shared lane. Traffic safety would be greatly enhanced by a protected left turn lane on 13th Avenue North, which could be accomplished with the conversion of 13th Avenue North to a three-lane road. The data compiled by the Iowa DOT for the Top 200 list is included within the appendix of this report.

All other intersections and driveways within the project area would receive a safety and operation benefit from a three-lane conversion. With the abundance of access points along 13th Avenue North, left turns are quite prevalent along almost any section of the roadway. For the purposes of this feasibility study, I have concluded that 13th Avenue North matches the turning volume and pattern determination factor for a three-lane roadway with a TWLTL. Left-turning traffic during 15 minute peak periods are high at several intersections. Further, the combination of all left-turning movements related to total traffic counts are enough to suggest that the corridor would benefit from a TWLTL throughout the corridor.

4. Weaving, Speed, & Queue

Traffic on 13th Avenue North has a propensity to weave in and out of the narrow lanes, which can at times be dangerous. Traffic will no longer be able to conduct this weaving maneuver with the reduction to one through lane in each direction that comes with a three-lane conversion. This would have an added safety benefit to through traffic throughout the corridor.

Traffic exiting driveways and un-signalized intersections may experience added delay due to the reduction in through lanes. However, this inconvenient delay is likely to be tempered due to the decreased complexity in exiting onto 13th Avenue North. Traffic would no longer need to consider or negotiate multiple lanes of traffic when turning onto 13th Avenue North.

Speeding is a problem on 13th Avenue North, as evidenced by the 85th percentile speed on the roadway of over 40 mph. There are also instances of speeders traveling at reckless speeds of over 45 mph on 13th Avenue North, when trying to make it through all traffic signals on the current four lane corridor. Speed would be effectively controlled by the conversion to a three-lane road, as the through lane reduction to one in each direction would limit vehicle passing.

For the purposes of this feasibility study, I have concluded that 13th Avenue North matches the speeding determination factor for a three-lane roadway with a TWLTL. Speeding is expected to be mitigated by a three-lane conversion, as excessive speeders will have no through lane in which to overtake slower traffic.

5. Accident Type & Patterns

Overall, accident rates along this 13th Avenue North corridor have been well above the statewide average over the past ten years. When breaking the corridor down into four segments, the patterns are more easily discussed as follows.

Crash data was available throughout the corridor from the Iowa Crash Mapping Analysis Tool. Table 1, on the following page, provides a summary of the computed crash severities and types for the years 2004 through 2013. A summary of the intersection and corridor segment crash rates can be found in Table 2 and Table 3 on the following Page.

Table 1: Intersection Crash Summary (2004-2013)

Intersection		Crash Severity					Common Crash Types		
	Total	Fatal	Major	Minor	Possible	Property	Rear End	FTY	Other
North 4th Street	42	0	0	10	7	30	4	21	17
North 3rd Street	48	0	3	6	32	27	1	26	21
North 2nd Street	27	0	1	3	8	18	3	11	13

Table 2: Intersection Crash Analysis (2004-2013)

Intersection	ADT	Total Crashes	Crash Rate	Average Crash Rate
North 4th Street	12661	42	0.91	0.7
North 3rd Street	11932	48	1.10	0.7
North 2nd Street	15234	27	0.49	0.7

Table 3: Corridor Segment Crash Analysis (2004-2013)

Section	ADT	Total Crashes	Crash Rate	Average Crash Rate
4th St to 3rd St	6628	89	53.96	4.3
3rd St to 2nd St	5229	51	21.38	4.3

As shown on Tables #2 and #3 above, traffic accidents are above the state wide averages for accidents at similar intersections and road types. Based on this data, it is evident that improvements are warranted along 13th Avenue North.

North 4th Street to North 2nd Street general traffic accident discussion

Over the past ten years, there have been 140 reported incidents of variable cause, which equates to 34.69 accidents per Million Vehicle Miles Traveled. This number of crashes is nearly ten times the statewide average, which is significant enough to warrant further investigation into the cause of the accidents.

An Iowa DOT Traffic Accident report for North 3rd Street and 13th Avenue North is included within the **Appendix M-3** of this report. This report shows accidents involving 59 vehicles within the 5-year window of 2009-2013. The majority of these accidents were caused by "Ran Traffic Signal".

Upon investigation of accidents within the corridor of 13th Avenue North from North 2nd Street to North 4th Street, using CMAT, it was discovered that almost half of these crashes involved either a left-turning vehicle on 13th Avenue North to North 3rd Street or North 4th Street or two vehicles traveling in the same direction on 13th Avenue North. It is very likely that these types of accidents will be avoided in the future if 13th Avenue North is converted to a three-lane roadway.

For the benefit cost analysis included within the appendix of this report, we use the previous five years of accident data throughout the corridor, as determined by CMAT. The total number of crashes within this roadway segment is 53, which is shown on Table 4 below.

Table 4: Corridor Crash Analysis (2010-2014)

		Crash Severity				
	Total	Fatal	Major	Minor	Possible	Property
13th Avenue North	53	0	2	8	11	31

The 53 crashes on the above table equate to a total loss value of $1,947,200 as shown on the attached Cost Benefit Analysis Sheet. When cross referenced with the total cost of improvements, a benefit cost analysis above a 4:1 is given for this three lane conversion project. The crash reduction factor (CRF) of 25 is taken from the Crash Modification Factors Clearinghouse.

Accident Data Conclusions:

There is enough historical accident data to suggest that a reduction in traffic accidents throughout this corridor would be reduced with a conversion of 13th Avenue North to a three-lane road with a TWLTL. Judging by the data research along this corridor and the police officer accident reports attached, there have been numerous accidents over the past ten years that are directly related to the following features of the 13th Avenue North corridor:

- A lack of a dedicated left-turn lane for east- and west-bound traffic at North 4th Street, North 3rd Street, and Pershing Blvd. These inside lanes are now shared with through traffic. This causes a majority of left turns to be permissive at the signalized intersections, which is a concern when turning traffic is dealing with the shadowing effect presented by the two opposing lanes of traffic.

- The existence of narrow, parallel, side by side through lanes on 13th Avenue North; which causes speeding and weaving types of traffic. This is another cause of accidents on the roadway. The conversion to a three lane road would limit these types of accidents.

For the purposes of this feasibility study, I have concluded that 13th Avenue North matches the accident type and pattern determination factor for a three-lane roadway with a TWLTL. It can be said with confidence that the accident rates along this corridor would decrease in the future if 13th Avenue North were converted to a three-lane road from North 2nd Street to North 4th Street.

6. Pedestrian & Bike Activity

An additional benefit to the proposed conversion is a safer pedestrian crossing at all intersections. Presently, pedestrians must cross four lanes of through traffic. Upon implementation of the three-lane road conversion, the crossing would be much safer, as the number of crossed through lanes would be reduced to two. For the purposes of this feasibility study, I have concluded that 13th Avenue North matches the pedestrian activity determination factor for a three-lane roadway with a TWLTL.

7. Right of Way Availability and Cost

There is little Right of Way available to pursue other options when considering the conversion of treatments along this corridor. Adding a median or converting to five lanes will be cost prohibitive in the future. Converting to three lanes will be a minor cost relative to other more substantial improvements.

8. Signalization Factors

Traffic signal infrastructure will need to be adjusted to account for a changed lane at the intersections North 4th Street, and North 3rd Street. Upon inspection, all of the poles and mast arms at 4th Street and 3rd Street are rusted and dented, which could create additional problems.

It is necessary to replace the signal pole and install a longer mast arm at the NW corner of N 4th St and the SE corner of N 3rd St, so that the arrows protected left-turn phase for these protected left-turn movements are directly above the center line of the road.

In fact; all poles, mast arms, and signalization components should be replaced at N 3rd St & N 4th St as a part of this project, due to the obsolete and degraded nature of the existing signalization components. It would not be advisable to replace only one pole & mast arm per intersection, as it could cause additional confusion to motorists.

It is known that the signalization at North 2nd Street will not need to be replaced, as it was installed in 2005 and it set up with video detection and for a three lane westerly approach. Also, the controllers at North 4th Street and North 3rd Street were installed in 2014, in order to provide wireless coordination between all three intersections. All other signalization infrastructure at North 4th Street and North 3rd Street should be replaced as part of this project, if a three-lane conversion is to occur, including video detection and LED luminaires.

10. Project Benefits

The problems currently facing 13th Avenue North are described as follows, along with mitigation factors to be expected by converting 13th Avenue North to a three-lane road with a center, left-turn lane:

1. Too much speeding traffic between North 4th Street and North 2nd Street. This is a location frequently enforced by the Clinton Police Department. The most recent speed study done on 13th Avenue North (from North 4th Street to Springdale Drive) showed 85th percentile speeds of over 40 mph.

   Without the ability to pass in the inside or outside through lane (because only one through lane exists), traffic will drive at a speed consistent with the normal flow of traffic. Though the overall 85th percentile speeds are not expected to decrease much, the excessive high-end speeding will assuredly decrease, due to the inability of vehicles to pass in paralleling through lanes.

2. 13th Avenue North is 41 feet wide, from back of curb to back of curb, causing unfortunately narrow lanes between North 2nd Street and North 4th Street. All four lanes are 10 feet wide, which does not allow for safe side-by-side travel, contributing to the relatively high crash rate in this corridor.

   Lanes need to be at least 11 feet wide, and are normally designed at 12 feet wide to safely accommodate modern vehicles. If a four-lane roadway were to be designed by today's engineering standards, it would need to be a minimum of 51 feet wide, and preferably 55 feet wide.

3. There are presently 26 access points from North 2nd Street to just west of North 4th Street (intersections, alleys, and residential driveways). This is a higher than usual number for the present standard of roadway. This causes a higher number of left-turning vehicles than the street can handle in its current layout, when comingled with through traffic in the center lane.

   The increased visibility and decreased delay of turning traffic are factors that will contribute most to fewer accidents.

4. The inside lanes accommodate a combination of through traffic and left turning traffic. This causes confusion and delay at busy intersections, especially at the intersection of 13th Avenue North and North 3rd Street.

   The current layout contributes to the need for a dedicated left-turn lane at certain intersections. Luckily, instead of costly pavement improvements, the roadway can be re-striped to include a two-way, center left-turn lane at minimal cost. The City is constructing an asphalt overlay in 2015, which will be an opportune time to convert to a three-lane road.

5. The relatively high number of vehicle accidents, for current traffic volumes, is discussed in the three-lane conversion report. Traffic accidents are expected to be reduced throughout the corridor if this project is constructed.

   - The three-lane conversion involves two, 12–foot-wide outer lanes and a 13-foot center turn lane. This allows a 1.5′ offset of traveled way from the curb line. This alone will decrease accidents, as traffic will have more room for error as the lane widens.

   - The inclusion of dedicated left-turn lanes throughout the corridor will allow for safe queuing of left-turning vehicles. Further, the left-turning vehicles will only have to judge one lane of opposing, oncoming traffic, which will lead to fewer poor decisions and decreased traffic accidents.

- Without the ability to pass in the inside or outside through lane (because only 1 through lane exists), traffic will drive at a speed consistent with the normal flow of traffic. This will lower average speeds by at least 5 mph, which will decrease accidents.

- Through traffic will no longer be adversely impacted by turning vehicles using the same lane. All through traffic will be allowed to free flow in the outside lane. This results in decreased delays throughout the corridor, and fewer accidents due to impatient road decisions.

As described in the four bullet points above, traffic accidents will decrease due to the conversion from four lanes to three lanes on 13th Avenue North.

A federal highway administration report of four-lane to three-lane conversions in the State of Iowa, at 15 different sites across the state, shows drastic crash reduction statistics in the years after the conversions. The data from that study (attached) shows an average of 23.74 crashes/mile in the years before the conversion, and 12.19 crashes/mile in the years after, or a 47% decrease in accidents. Further, the Crash Modification Factors Clearinghouse gives a value of 25.2 for a decrease in accidents when converted to a three-lane road.

Conclusions & Recommendations

The 13th Avenue North corridor, from North 4th Street to North 2nd Street appears to be a good candidate for a four-lane to three-lane conversion. The traffic volumes do not appear to be headed for the capacity threshold of 17,000 vpd. I do not see any reason for concern with regard to the perceived capacity reduction from a four-lane road to a three-lane roadway with a TWLTL. Upon converting to a three-lane roadway, the following benefits would be seen immediately:

1. Traffic would flow smoothly in the outside through lanes, without substantial conflict or delay. This is due to the lack of through traffic in the left turn lane and the elimination of the existing narrow lanes.

2. Left turning traffic from 13th Avenue North would be safer in a dedicated lane. This is due to relieved pressure from elimination of through vehicles stuck in the queue, and also due to the elimination of the "shadowing" effect caused by the reduction of opposing through lanes from 2 to 1.

3. Speeding is expected to be reduced by approximately 4-5 mph by this three-lane conversion. This should increase safety throughout the corridor.

4. The total crash frequency rate is expected to be reduced by up to 25% after the three-lane conversion, due to the factors discussed above. Many of the types of accidents that have occurred along this segment of roadway will be avoided in the future if this three-lane conversion occurs.

Grant Application and Implementation Discussion

Based on the existing conditions discussed in the contents of this feasibility study, the City Engineering Department has recommended conversion of 13th Avenue North to a Three-Lane Road with a Two-Way Center Left-Turn Lane. The City Council has authorized the City Engineering Department to proceed with a 2015 TSIP Grant Application for this project.

The project would be constructed in conjunction with an asphalt overlay of 13th Avenue North from 2nd Street to 4th Street, so minimal pavement marking removal would be necessary. The asphalt overlay will be fully financed by the City of Clinton, along with ADA curb ramp improvements at intersections of 3rd Street and 4th Street.

New pavement markings would be applied as shown on the attachment within this grant application. High durability pavement markings would be used for all lane markings and symbols, in order to avoid confusion when paint would typically fade. The City is including all costs for new pavement markings in the grant application as DOT funded, and is expected to cost approximately $16,000.

New poles, mast arms, and signalization heads would be needed at NW corner of North 4th Street and the SE corner of North 3rd Street, in order to extend the signal heads out over the center line of the street to control traffic in the center turn lane. The other signal poles and mast arms at North 4th Street and North 3rd Street are also included within the grant application as Iowa DOT funded, due to their existing obsolete and degraded nature. The existing traffic signal infrastructure is all far past its useful life, and should be replaced as part of this project for consistency. The cost of signalization infrastructure at North 3rd Street and North 4th Street is approximately $147,000 including removals.

We would also propose a switch to video detection at 3rd Street and 4th Street, which is more reliable than loop detection, as part of this project. All costs for this conversion would be included in the grant application as DOT funded, at an approximate cost of $25,000.

Contingencies of $12,000 have also been added to the project budget, to cover factors not presently included within the conceptual design.

The signals at North 2nd Street do not need to be replaced. Further, the existing signal controller units at 4th Street and 3rd Street were installed and interconnected in 2014, so they can be saved and used for this project. New signal timings would be designed as part of this project, with priority given to traffic safety. All three signalized intersections will remain interconnected. A discussion of Traffic Signal Phasing and a discussion of the Traffic Signal Timings are included in the appendix of this report.

In conclusion, the City of Clinton is applying for a grant totaling a maximum of $200,000 to fund the 3-lane conversion project on 13th Avenue North, including signalization improvements at North 3rd Street and North 4th Street. This project has a B/C Ration of over 4:1, making it a project well worth the investment. This grant would finance all new pavement markings from 200′ west of 4th Street to 2nd Street on 13th Avenue North, six new signal poles and mast arms (at North 3rd St & North 4th St intersections with 13th Avenue North), and video detection at 3rd Street & 4th Street.

All improvements done as part of this project would be maintained in full by the City of Clinton, Iowa for their entire life cycle, with no exceptions.

Please contact Jason Craft, P.E., City Engineer, City of Clinton, Iowa, for any questions related to this report. He can be reached at 563-244-3423.

APPENDIX C

Breakdown of all Costs

City of Clinton Engineering Department
3 Lane Road Conversion 13th Avenue North
North 4th Street to North 2nd Street

		Engineer's Estimate			
		Unit	Qty.	Unit Price	Total Price
1	High Durable Pavement Markings	1	LS	$ 16,000.00	$ 16,000.00
2	Signal Pole & Mast Arm Removals	6	EA	$ 1,500.00	$ 9,000.00
3	Signal Pole & Mast Arm Installation	6	EA	$ 23,000.00	$ 138,000.00
4	Video Detection at 3rd Street & 4th Street	2	EA	$ 12,500.00	$ 25,000.00
5	Contingencies	1	LS	$ 12,000.00	$ 12,000.00
	BASE BID TOTAL				$ 200,000.00

APPENDIX D

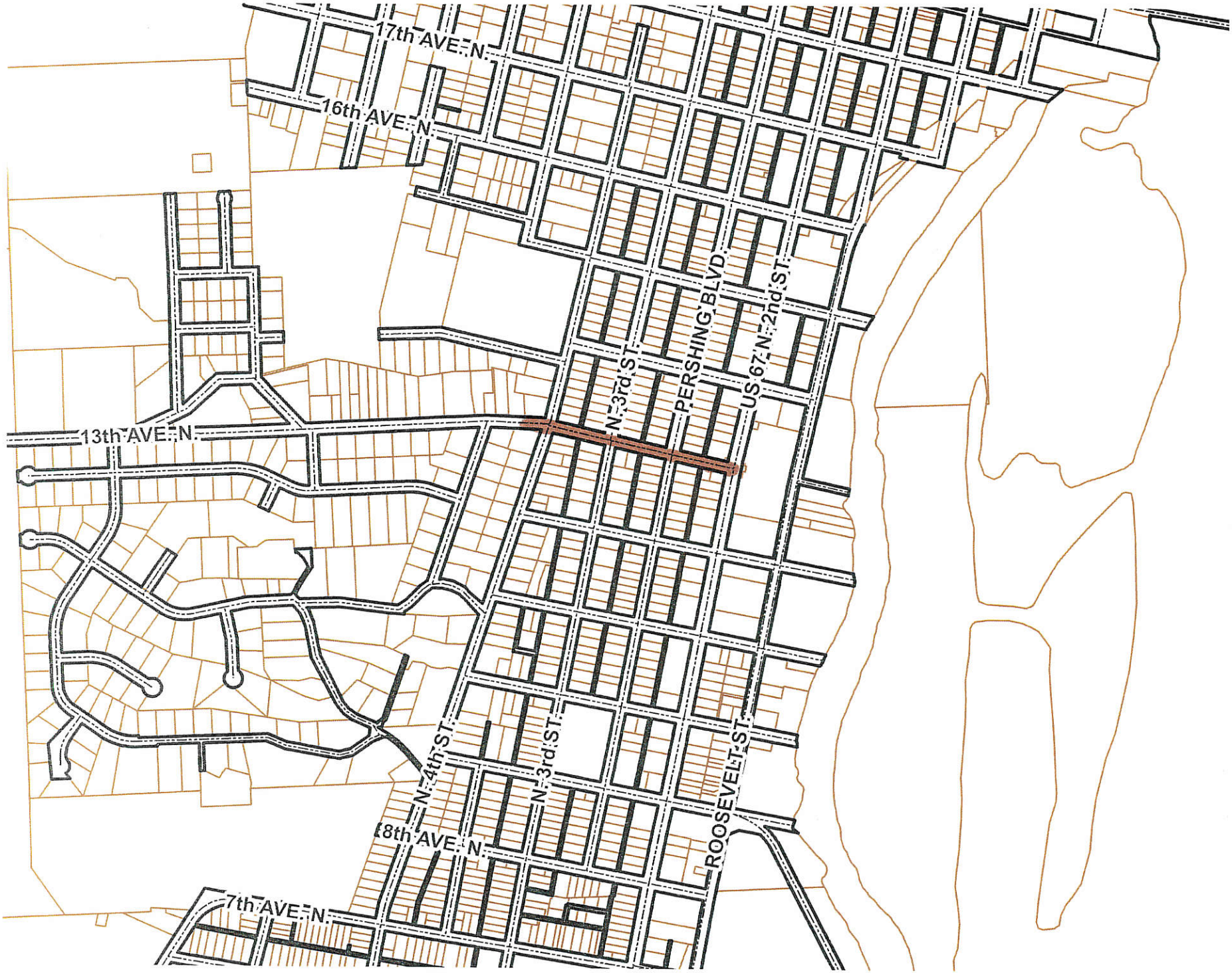
Time Schedule

Project Schedule
for
CITY OF CLINTON TSIP PROJECT
13TH AVE NORTH 3 LANE CONVERSION PROJECT

Item No.	Description	YEAR 2015					YEAR 2016								
		Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar	April	May	June	July	Aug.	Sept.
1	Planning, Grant Application Submission, Approval, & Funding														
2	Design Phase														
3	Bid & Award Phase														
4	Construction Phase														

APPENDIX E

Map


17th AVE N
16th AVE N
13th AVE N
8th AVE N
7th AVE N
N 4th ST
N 3rd ST
N 3rd ST
PERSHING BLVD
US 67 N 2nd ST
ROOSEVELT ST

APPENDIX F

Color Pictures

13th Avenue North & North 4th Street

Note: Picture taken facing westerly, from proposed center of left turning lane.

Improvements to the signal need to be made as follows:

- Construction of all new poles and mast arms (existing are obsolete).

- Addition of Protected Left Turn Arrows for 13th Avenue North traffic.

13th Avenue North & North 3rd Street

Note: Picture taken facing easterly, from proposed center of left turning lane.

Improvements to the signal need to be made as follows:

- Construction of all new poles and mast arms (existing are obsolete).
- Addition of Protected Left Turn Arrows for 13th Avenue North traffic.

APPENDIX G

Plan View

REPLACEMENT SIGNALIZATION

SIGNALIZATION TO REMAIN

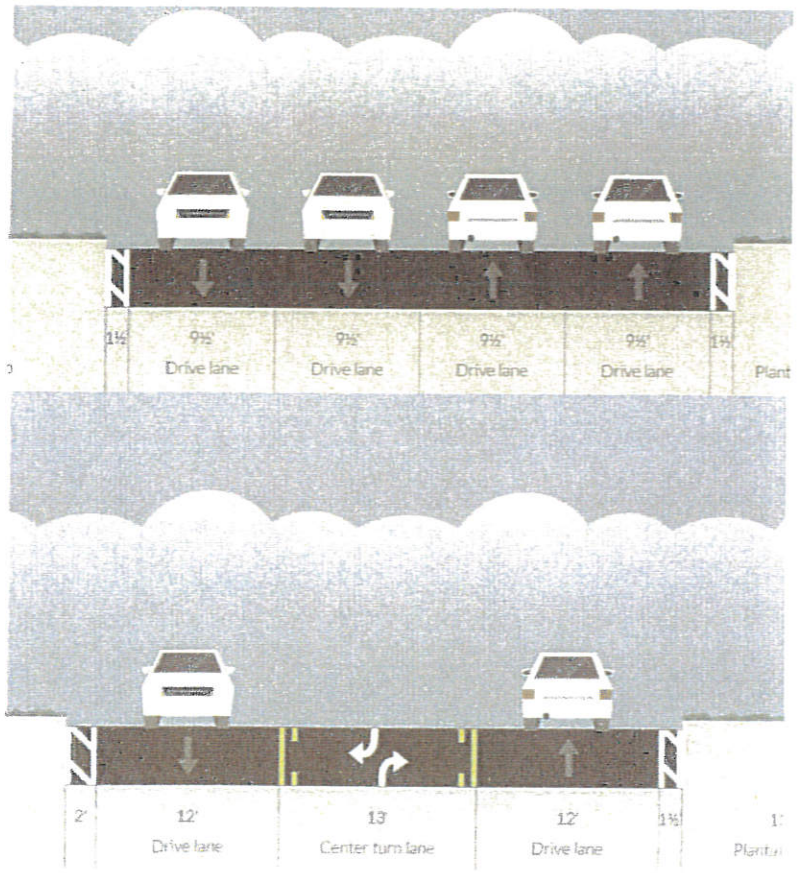
PROPOSED DURABLE PAVEMENT MARKINGS

13TH AVENUE NORTH 3-LANE CONVERSION
SIGNALIZATION & PAVEMENT MARKING PLAN

13th Avenue North

3 Lane Conversion Cross Sections

EXISTING & PROPOSED



APPENDIX H

Aerial Photograph

17th AVE. N.
16th AVE. N.
13th AVE. N.
8th AVE. N.
7th AVE. N.
N. 3rd ST.
PERSHING BLVD.
US 67 N. 2nd ST.
N. 4th ST.
N. 3rd ST.
ROOSEVELT ST.

APPENDIX J

Traffic Volumes and Turning Movements

Iowa Department of Transportation

Turning Movement Traffic Count Summary PRELIMINARY

Annualized Daily Traffic For All Vehicles

Station Number:
23270110099

Count Date:
Tuesday, July 08, 2014

County:
Clinton

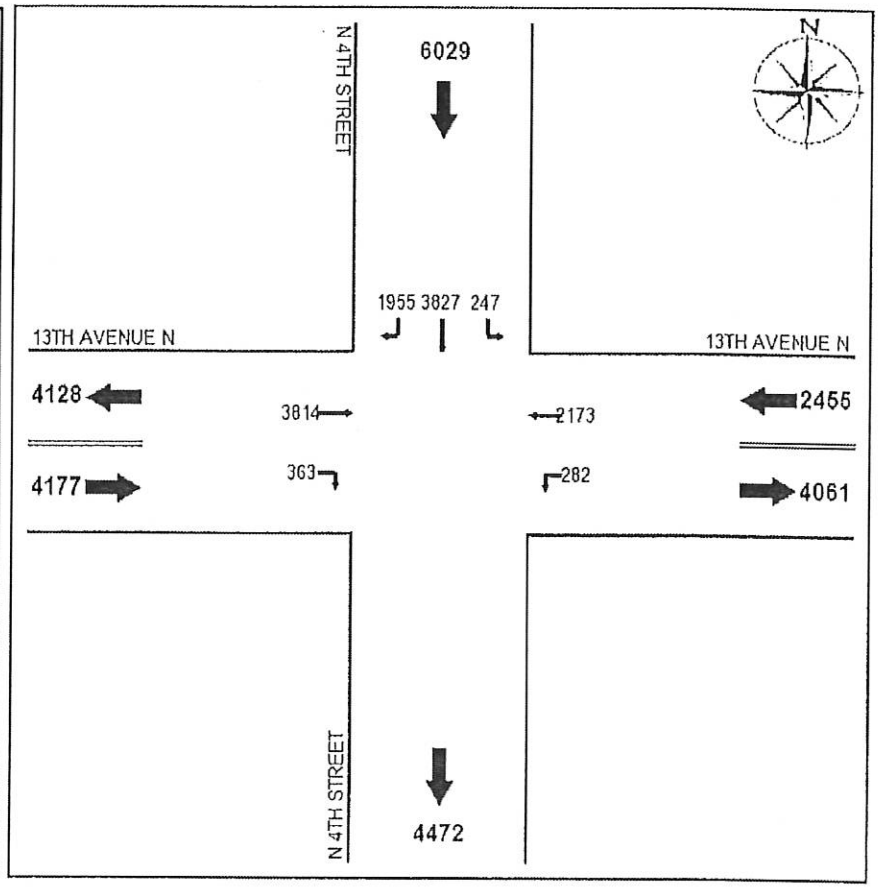
Location Description:
13TH AVE N & N 4TH ST

Volume Factor: 1.953

Pass Class Factor: 1.980

SU Class Factor: 1.737

Combo Class Factor: 1.506



Raw Data-All Vehicles:

	N Leg			E Leg		W Leg	
	L	*T*	*R*	*L*	*T*	*T*	*R*
07:00	2	51	15	1	15	32	1
07:15	2	49	29	2	22	38	3
07:30	2	57	31	7	31	44	2
07:45	1	76	32	2	37	63	8
08:00	3	56	20	4	26	45	6
08:15	5	39	23	2	31	36	7
08:30	5	56	20	3	31	47	3
08:45	2	66	40	4	33	62	6
11:00	10	68	37	9	36	76	7
11:15	7	58	30	11	37	92	9
11:30	4	61	31	3	46	70	9
11:45	3	81	33	4	36	102	3
12:00	1	68	43	9	44	93	4
12:15	12	67	33	2	61	75	8
12:30	5	86	36	4	57	82	3
12:45	6	60	36	6	46	64	6
15:00	8	75	32	2	35	49	7
15:15	1	85	37	6	38	69	4

Iowa Department of Transportation

Turning Movement Traffic Count Summary PRELIMINARY

Annualized Daily Traffic For All Vehicles

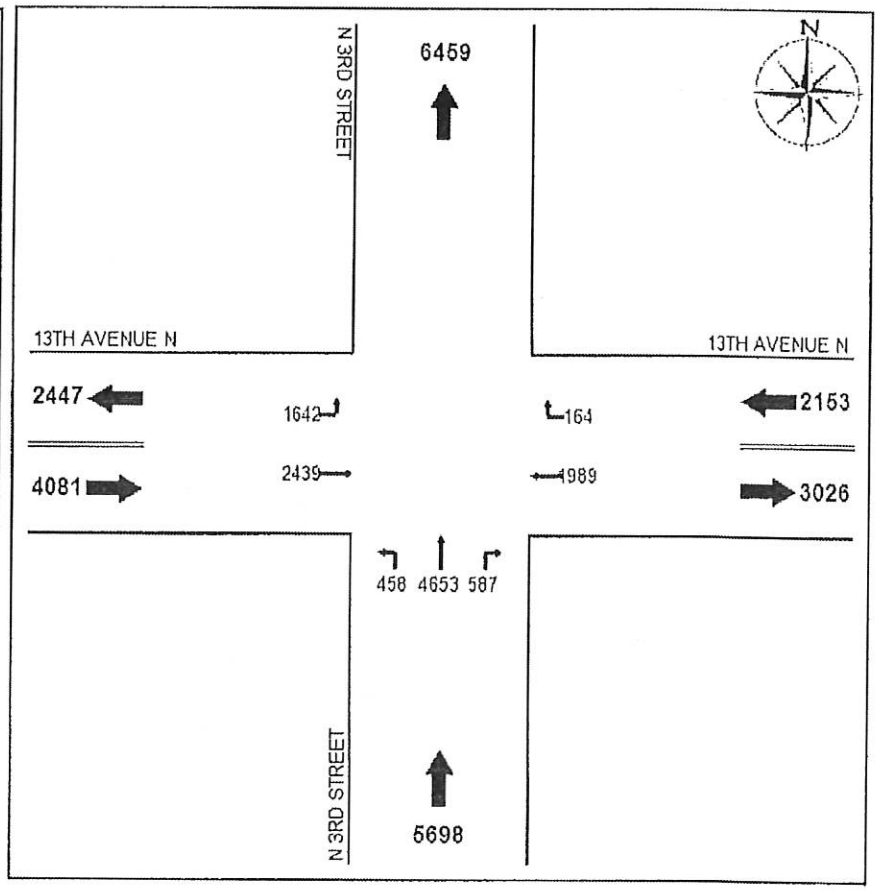
Station Number:
23179610099

Count Date:
Tuesday, July 08, 2014

County:
Clinton

Location Description:
13th Ave N & N 3rd St

Volume Factor: 1.953
Pass Class Factor: 1.980
SU Class Factor: 1.737
Combo Class Factor: 1.506



Raw Data-All Vehicles:

	E Leg		S Leg			W Leg	
	T	*R*	*L*	*T*	*R*	*L*	*T*
07:00	14	1	3	34	5	22	12
07:15	18	1	6	54	7	19	23
07:30	33	0	3	41	5	18	28
07:45	37	1	1	66	13	28	36
08:00	27	3	4	43	3	25	24
08:15	28	1	4	59	5	18	22
08:30	27	3	3	55	3	20	31
08:45	31	2	6	59	7	24	40
11:00	33	1	13	65	11	36	44
11:15	36	4	13	81	12	49	55
11:30	42	3	4	88	17	29	45
11:45	36	4	7	93	11	29	79
12:00	46	8	7	81	19	25	66
12:15	44	1	16	85	15	31	59
12:30	54	3	7	97	13	26	58
12:45	39	4	16	105	6	33	42
15:00	30	1	10	68	16	28	33
15:15	31	3	13	100	11	27	40

Iowa Department of Transportation

Turning Movement Traffic Count Summary PRELIMINARY

Annualized Daily Traffic For All Vehicles

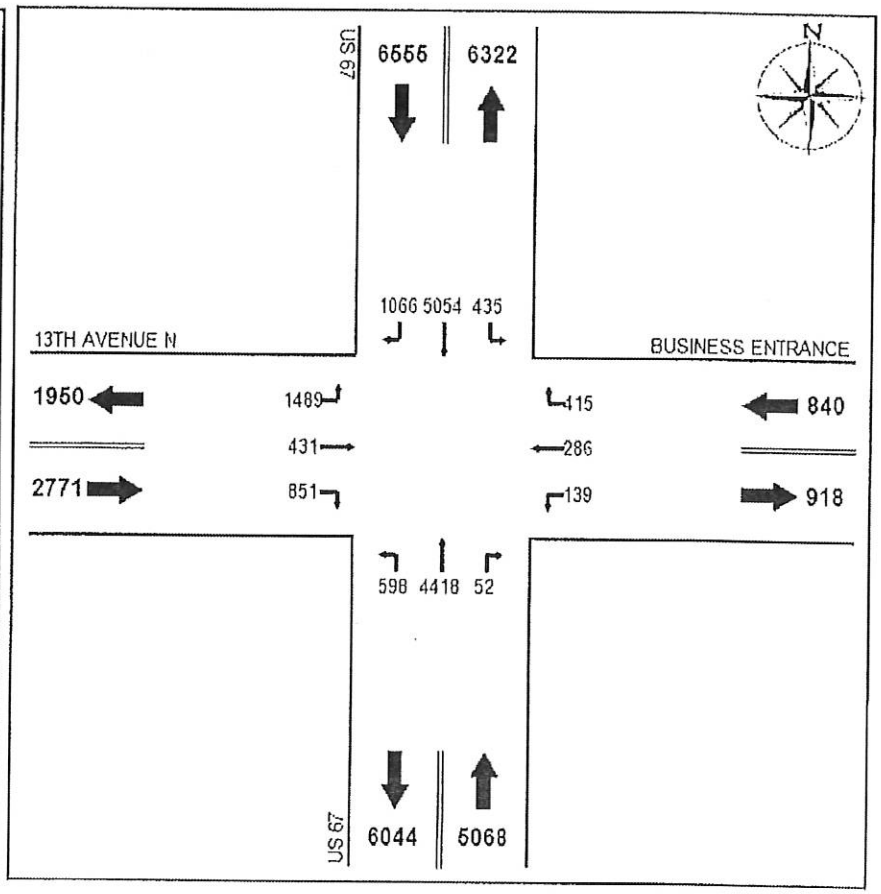
Station Number:
23179612099

Count Date:
Tuesday, July 08, 2014

County:
Clinton

Location Description:
US 67 and 13th Ave N

Volume Factor: 1.861
Pass Class Factor: 1.909
SU Class Factor: 1.500
Combo Class Factor: 1.579



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	0	50	10	0	1	0	2	24	0	10	2	1
07:15	3	75	18	0	1	3	3	32	0	19	2	6
07:30	2	81	25	0	5	3	7	39	0	17	5	9
07:45	2	95	28	0	2	3	3	42	0	35	4	10
08:00	2	68	16	0	1	4	8	39	1	19	0	7
08:15	4	64	21	2	2	5	5	45	0	11	4	9
08:30	7	69	20	3	4	4	7	45	0	20	2	14
08:45	5	71	26	2	3	6	7	43	0	25	5	11
11:00	7	90	14	3	2	5	9	88	1	28	5	19
11:15	4	129	17	5	9	3	12	92	1	25	9	31
11:30	7	130	19	4	6	9	18	89	2	21	16	18
11:45	6	118	17	1	7	6	13	110	1	39	14	34
12:00	9	150	19	1	10	5	17	118	0	42	15	31
12:15	6	139	19	4	5	12	21	123	0	35	7	24
12:30	10	139	15	1	1	7	26	136	1	28	5	22
12:45	5	103	19	3	3	6	13	89	0	22	3	16
15:00	9	83	12	1	2	4	8	82	1	27	5	9
15:15	13	90	21	1	7	13	12	86	2	27	5	18

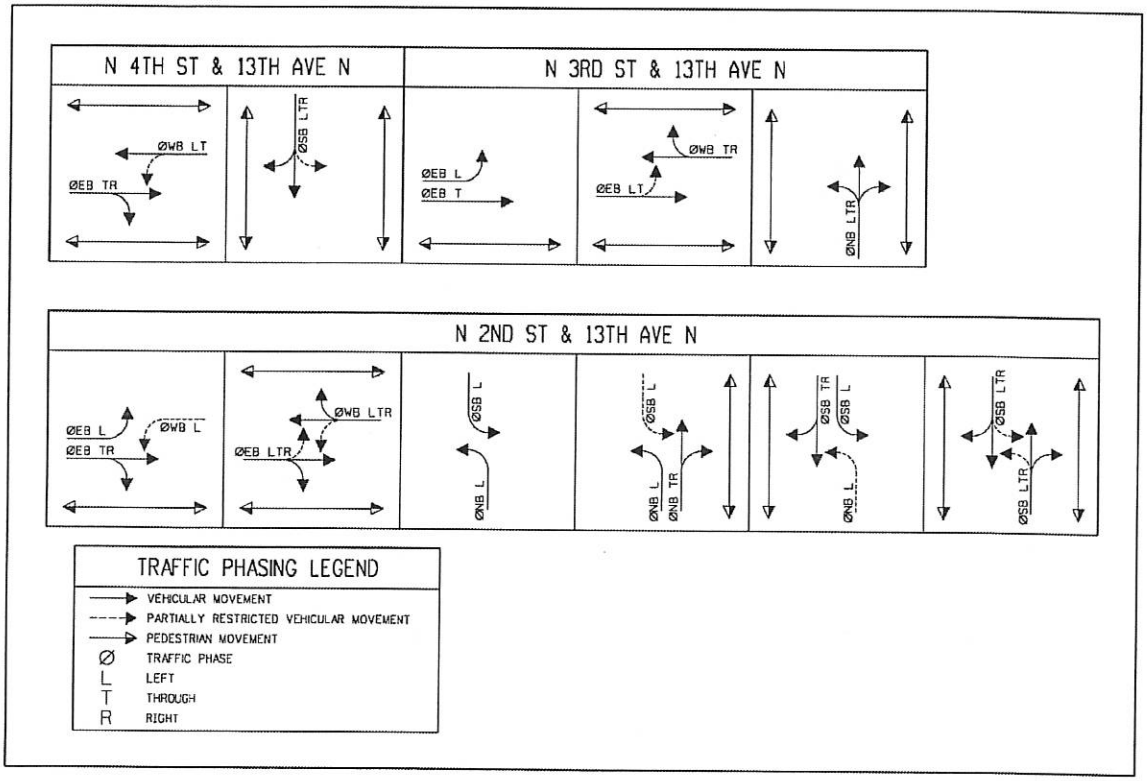
APPENDIX K

Traffic Signal Layout, Type, Proposed Phasing and Detector Locations

13th Ave North TSIP Application

Traffic Signal Phasing

The traffic signal phasing at the intersections of 13th Ave N with N 4th St, N 3rd St, and N 2nd St are based on current traffic demands. The corridor traffic signals will be part of a coordinated traffic signal system and independently fully actuated traffic signal based on traffic demand. The proposed traffic signal phasing along 13th Avenue North at the intersections of N 4th St, N 3rd St, and N 2nd St are shown below in 13th Ave N Phasing Diagram. Protected left turn phasing will be per green arrow indication and permissive left turn will be per flashing yellow arrow indication.



13TH AVENUE NORTH TRAFFIC SIGNAL PHASING

Traffic Signal Timings

Traffic signal timings will be based on existing traffic volumes for individual intersection timings and corridor coordinated timing plans. Coordination of signal controllers along 13th Avenue North at N 4th St, N 3rd St, and N 2nd St will be based on time of day. Coordination timings will be implemented for AM, Noon, and PM plans with priority given to moving traffic along 13th Ave N. Traffic volume demand and direction will be used to determine at what time a particular timing plan will start and stop. During the low traffic volume portions of the day, the traffic signals will operate independently with intersection traffic actuating the traffic signal operations.

APPENDIX L

Benefit/Cost

Road Segment Benefit / Cost Safety Analysis

Iowa DOT Office of Traffic & Safety

Rev. 5/14

County: Clinton Prepared by: Chandra Ravada Date Prepared: Aug 6, 2015

Location: The 13th Avenue North corridor, from North 4th Street to North 2nd Street

Improvement

Proposed Improvement(s): Converting four lane to three lane with center turn lane

$ 200,000	Estimated Improvement Cost, **EC**	15	Est. Improvement Life, years, **Y**
$ 10,000	Other Annual Cost (after initial year), **AC**	25	Crash Reduction Factor (integer), **CRF**
$ 111,184	Present Value Other Annual Costs, **OC**	4.0%	Discount Rate, **INT**
		$ 311,184	Present Value All Costs, **COST** = EC + OC

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

Traffic Volume Data

Source: IADOT Date of traffic count

Length (mi.)	Two-way veh/day	Description
0.20	6,500	
0.20	miles total	

1,300	Current Vehicle Miles / Day, **VM**
1,883	End of Life Veh. Miles / Day
474,500	Current Veh. Miles / Year, **AM**
8,508,699	Total Projected Veh. Miles Over Life of Project, **TVMT**

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

2.5% Projected Traffic Growth (0%-10%), **G**

Crash Data

2010 First full year --> 2014 Last full year 5.0 years, Time Period, **T**

Additional months values as of May 2014

	Fatal Crashes →		Fatalities @	$4,500,000	$ -
		2	Major Injuries @	$325,000	$ 650,000
22	Injury Crashes →	8	Minor Injuries @	$65,000	$ 520,000
		11	Possible Injuries @	$35,000	$ 385,000
31	Property Damage Only		(assumed cost per crash)	$7,400	$ 392,200
			-OR- enter all Property Costs of all crashes:		
53	Total Crashes, **TA**			Total $ Loss, **LOSS**	$ 1,947,200

10.60	Current Crashes / Year, **AA** = TA / T	**2,233.9**	Crashes / HMVM, Crash Rate, **CR** CR = TA x 10^8 / (AM x T)
$ 36,740	Cost per Crash, **AVCR** = LOSS / TA	**$ 1,281,114**	Present Value of Avoided Crashes, **BENEFIT**
190.1	Total Expected Crashes, **TCR** = CR x TVMT/10^8		
2.67	Crashes Avoided First Year **AAR** = AA x CRF / 100		
$ 98,139	Crash Costs Avoided in First Year, AAR x AVCR		
47.9	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 = $1,281,114 : $311,184 = **4.12** : 1

APPENDIX M

Iowa 3 Lane Conversion Data
And
DOT Crash Report at 13th Ave. No. & No. 3rd St.

CRASH MODIFICATION FACTORS CLEARINGHOUSE

CMF / CRF Details

CMF ID: 5553

Converting four-lane roadways to three-lane roadways with center turn lane (road diet)

Description: Conversion of road segments from a four-lane to a three-lane cross-section with two-way left-turn lanes (also known as road diets).

Prior Condition: 4 lane roadway

Category: Roadway

Study: *Iowa's Experience with Road Diet Measures - Use of Bayesian Approach to Assess Impacts on Crash Frequencies and Crash Rates*, Pawlovich et al., 2006

Star Quality Rating: [View score details]

Crash Modification Factor (CMF)

Value: 0.748

Adjusted Standard Error:

Unadjusted Standard Error: 0.012

Crash Reduction Factor (CRF)

Value: 25.2 *(This value indicates a decrease in crashes)*

Adjusted Standard Error:

Unadjusted Standard Error: 1.17

Applicability

Crash Type:	All
Crash Severity:	All
Roadway Types:	Not specified
Number of Lanes:	4
Road Division Type:	Undivided

Speed Limit:	
Area Type:	Urban
Traffic Volume:	Minimum of 2030 to Maximum of 15350 Annual Average Daily Traffic (AADT)
Time of Day:	All

If countermeasure is intersection-based

Intersection Type:	
Intersection Geometry:	
Traffic Control:	
Major Road Traffic Volume:	
Minor Road Traffic Volume:	

Development Details

Date Range of Data Used:	1982 to 2004
Municipality:	
State:	IA
Country:	USA
Type of Methodology Used:	Before/after using empirical Bayes or full Bayes
Sample Size Used:	
Before Sample Size Used:	377
After Sample Size Used:	426

Other Details

Included in Highway Safety Manual?	No
Date Added to Clearinghouse:	
Comments:	CMF calculation is for reduction in crash frequency per mile

Crash Reduction Study Results
Three Lane Conversions in Iowa Communities

Below is a table which shows data from 15 of the 3 lane road conversions in Iowa. As shown, traffic counts range from 2,950 to 17,400 ADT, and all report a reduction in crashes since the conversion.

IOWA 4-LANE TO 3-LANE CONVERSION STUDY
SUMMARY OF STUDY RESULTS
BEFORE AND AFTER CONVERSION

		ANNUAL AVERAGE CRASHES			CRASH RATE (PER MVM)		
CITY	AADT(range)	BEFORE	AFTER	%CHANGE	BEFORE	AFTER	%CHANGE
Storm Lake	5100 - 9100	64	34	-47	13.40	8.18	-39
Clear Lake	11900 - 12000	34			5.42		
Mason City	7100	9	4	-56	1.67	0.87	-48
Osceola	6100 - 9900	47	22	-53	7.70	3.50	-55
Manchester	11200	15	11	-27	12.26	7.60	-38
Iowa Falls	9400 - 11700	21	8	-62	4.82		
Rock Rapids	3910 - 5100	6	2	-67	10.23	3.31	-68
Glenwood	2950 - 7100	30	15	-50	12.60	6.28	-50
Des Moines	12300 - 17400	67	39	-42	11.13	6.57	-41
Council Bluffs	9600	8	2	-75	10.36	2.70	-74
Blue Grass	9400 - 10000	12	3	-75	6.23	2.86	-54
Sioux Center	7200 - 10500	65	23	-65	11.13	4.45	-60
Indianola	7500 - 12800	29	24	-17	4.85	3.18	-34
Lawton	8400 - 9800	6	2	-67	2.97	0.80	-73
Sioux City	9300 - 11100	5	3	-40	1.94	1.34	-31

Center for Transportation Research and Education

Four-Lane to Three-Lane Conversions

tech transfer summary

Converting a four-lane, undivided urban roadway to three lanes with a continuous left-turn lane results in a safety benefit on Iowa roadways, which will help inform future

April 2006

ABOUT THIS T² SUMMARY
This document summarizes two projects sponsored by the Iowa DOT, one conducted by CTRE and one by Iowa State University's Department of Statistics.

SPONSORS
Iowa Department of Transportation, Office of Traffic and Safety

MORE INFORMATION
www.ctre.iastate.edu/research/4laneto3lane.htm

Objective

Assess whether converting an undivided urban roadway from four lanes to three lanes (one through lane in each direction and a two-way, continuous left-turn lane) results in a safety benefit on Iowa roads.

Problem Statement

Anecdotal evidence from various sources in Iowa suggested that conversions of undivided, four-lane roadways to three lanes had a safety benefit. Previous research conducted by Huang et al., who evaluated 12 conversion sites and 25 comparison sites in Washington and California, showed less benefit. Their research showed an average crash frequency that was only 6 percent lower on the conversion sites versus the comparison sites. They also found that crash rates did not change from before to after, that crash severities were not affected, and that crash types did not change significantly.

The Iowa Department of Transportation's Office of Traffic and Safety (TAS) funded two independent effectiveness evaluations to find out if there really is a significant safety benefit.

Research Description

Two independent effectiveness evaluations were conducted. The first, conducted by CTRE, used a classical before-and-after study with "yoked-pair" control sites. The second used a Bayesian before-and-after analysis and was conducted by Iowa State University's Department of Statistics in cooperation with TAS.

Both studies started with the same 15 conversion sites and 15 comparison (unconverted) sites. The conversion and comparison sites had traffic volumes ranging from 2,000 to 17,400 annual daily traffic (ADT) from 1982–2004 and were mostly located in smaller urbanized areas (ranging in population from 1,169 to 198,682 according to the 2000 Census). Table 1 lists the study sites, including average annual daily traffic (AADT), population, length of the study segment, and brief description of the land use within the study corridor.

The classical study examined 10 years of annual data (crashes, crash types, and volumes) with comparisons to annual crash trends both citywide and to similar, unconverted roadways (i.e., "yoked pair" control sites). The Bayesian study used monthly crash data and estimated volumes obtained from TAS for the 30 sites over 23 years (1982–2004).

CTRE
Iowa State University
2901 South Loop Drive, Suite 3100
Ames, IA 50010-8634
515-294-8103

The mission of the Center for Transportation Research and Education (CTRE) at Iowa State University is to develop and implement innovative methods, materials, and technologies for improving transportation efficiency, safety, and reliability while improving the learning environment of students, faculty, and staff in transportation-related fields.

The sponsors of this research are not responsible for the accuracy of the information presented herein. The conclusions expressed in this publication are not necessarily those of the sponsors.

IOWA STATE UNIVERSITY

Continued on next page

Table 1. Description of conversion sites

City	AADT	Population	Length	Land use
Storm Lake	7,333	10,076	1.41	Primarily commercial and industrial
Clear Lake	12,000	8,161	1.51	Mostly strip commercial, with some residential remnants
Mason City	7,100	29,172	1.78	Primarily agricultural and industrial
Osceola	6,100	4,659	2.04	Residential, strip commercial, and downtown
Manchester	11,200	5,257	0.35	Downtown commercial
Iowa Falls	10,422	5,193	1.23	Industrial, with some residential street access at one end
Rock Rapids	4,532	2,573	0.35	Downtown commercial and office
Glenwood	6,313	5,358	1.09	Strip commercial, residential, and transition between two
Des Moines	13,767	198,682	1.19	Mixed residential and commercial
Council Bluffs	10,900	58,268	0.20	Residential (few drives) and open space
Blue Grass	2,218	1,169	0.72	Residential with commercial and industrial
Sioux Center	9,231	6,002	1.52	Single-residential through downtown commercial
Indianola	13,069	12,998	1.57	Strip commercial with some residential
Lawton	9,233	697	0.64	Residential, access to side streets only
Sioux City	10,650	85,013	0.77	Residential, access to side streets or alleys only

(AADT and population data from year 2000)

Key Findings

- The two study methods produced similar results. The classical study found a 21 percent reduction in total crash frequency and 29 percent reduction in total crash rate, when compared to the overall city crashes. The Bayesian study observed that, despite the fact that both converted and comparison sites experienced reductions, the converted sites' experience was greater, resulting in a 25 percent reduction in crash density and a 19 percent reduction in crash rate.
- When compared to crashes citywide, major injury crashes at the converted sites were reduced by 11 percent, minor injury crashes by 30 percent, and possible injury crashes by 31 percent.

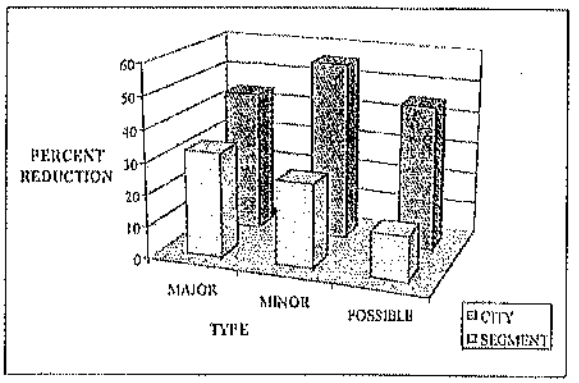


Figure 1. Before and after comparison of injury crashes

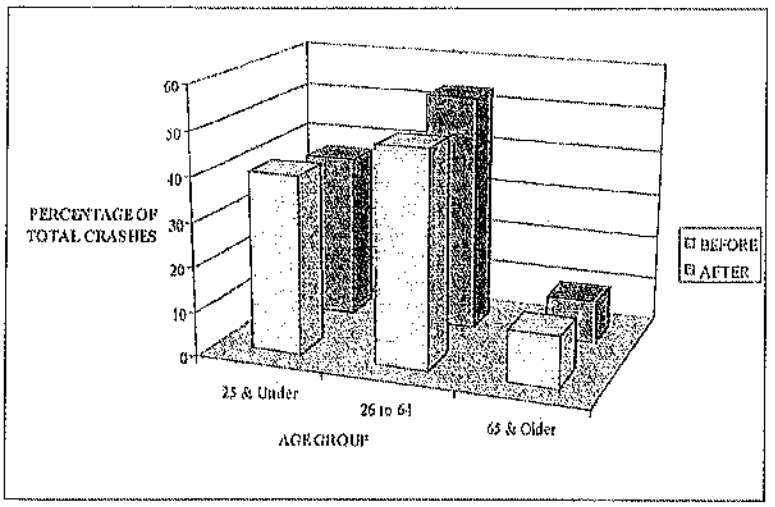


Figure 2. Driver involvement by age for all sites, in percent

Implementation Benefits

- Potential for a 25 percent reduction in crash frequency per mile and a 19 percent reduction in crash rate.
- A 34 percent reduction in the number of all injury crashes and lower severity of the crashes that do occur.
- Less involvement of age groups that are traditionally at risk—drivers 25 and under and 65 and older.
- A significant reduction in the number of crash types related to left turns and stopped traffic.

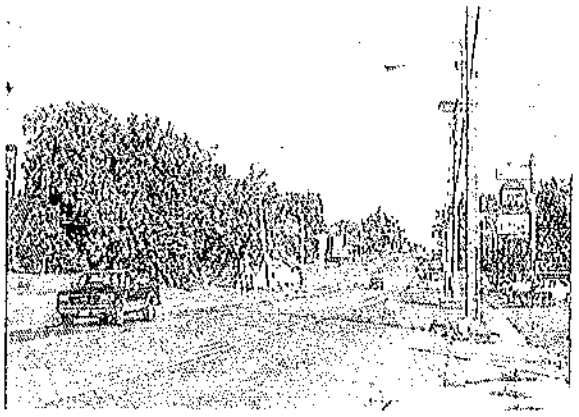


Figure 3. Study site in Osceola after conversion

Conversion Guidelines

- Determine the feasibility of converting a four-lane undivided roadway to a three-lane roadway on a case-by-case basis.
- From an operational point of view, a conversion is feasible when bi-directional peak-hour volumes are less than 1,500 vehicles per hour (vph), which is equivalent to about 15,000 vehicles per day. For volumes over 1,750 vph, the feasibility should be considered even more closely.
- Follow the feasibility determination factors in the CTRE report "Guidelines for the Conversion of 4-lane Undivided Roadways to 3-lane 2-way Left-turn Lane Facilities" available on the web: http://www.ctre.iastate.edu/reports/4to3lane.pdf.
- If a three-lane conversion is feasible, consider it along with other alternatives within a detailed engineering study.

Continued on next page

Why the Iowa Results Differ

Results of the Iowa studies differ from a previous study by Huang, et al., which indicated little reduction in crash rate or density after conversion. Following are reasons that may explain this:

- The "raw" data from the Bayesian study suggest that the effect of conversion in Iowa roads was much more dramatic than in the roads Huang considered.
- Although Huang began with 12 conversion sites and 25 comparison sites, the numbers were reduced to eight and 14, respectively, for the crash rate analysis due to unavailability of data.
- Huang used just three years of data for both the before and after period whereas the Bayesian analysis used 23 years of data.
- The Iowa sites were all located in smaller cities, and a number of these cities had no possible diversion route or comparison "untreated" site.
- The ADT range of the Iowa sites was 2,200 to about 13,700. The range in the Huang study was about 10,000 to 16,000.

Figure 4. US 18 in Clear Lake after conversion

Intersection of 13TH AVE N & N 3RD ST
City of Clinton, Clinton County, Iowa from 2009-2013
Composite Rank=106 Frequency Rank=401 Rate Rank=6829 Severity Rank=112

Severity of All Crashes by Year
Intersection of 13TH AVE N & N 3RD ST
City of Clinton, Clinton County, Iowa from 2009-2013

Severity	Year					Total
	2009	2010	2011	2012	2013	
Fatal						
Major Injury			2			2
Minor Injury		2		1		3
Possible/Unknown Injury	3		2	1	4	10
Property Damage Only		4	2	2	5	13
Total	3	6	6	4	9	28

Injury Severity						
Fatal						
Major Injury			3			3
Minor Injury		2		1		3
Possible Injury	4	1	6	1	17	29
Unknown Injury						
Total Injuries	4	3	9	2	17	35
Estimated Property Damage (thousands of $)	26,000	24,800	52,000	38,550	56,500	197,850
Total Vehicles	6	12	14	8	19	59

Time of Day of All Crashes by Day of Week
Intersection of 13TH AVE N & N 3RD ST
City of Clinton, Clinton County, Iowa from 2009-2013

Time of Day	Day of Week							Total
	Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	
Midnight–12:59 AM								
1:00 AM–1:59 AM							1	1
2:00 AM–2:59 AM								
3:00 AM–3:59 AM								
4:00 AM–4:59 AM								
5:00 AM–5:59 AM								
6:00 AM–6:59 AM			1					1
7:00 AM–7:59 AM		1	1					2
8:00 AM–8:59 AM	1							1
9:00 AM–9:59 AM	1							1
10:00 AM–10:59 AM				1				1
11:00 AM–11:59 AM					1		1	2
Noon–12:59 PM			1			1		2
1:00 PM–1:59 PM			1	1				2
2:00 PM–2:59 PM		1				1	1	3
3:00 PM–3:59 PM			1				2	3
4:00 PM–4:59 PM	1							1
5:00 PM–5:59 PM		1						1
6:00 PM–6:59 PM	1	1				1		3
7:00 PM–7:59 PM	1	1			1			3
8:00 PM–8:59 PM								
9:00 PM–9:59 PM								
10:00 PM–10:59 PM								
11:00 PM–11:59 PM						1		1
Total	5	5	5	2	2	4	5	28

Intersection of 13TH AVE N & N 3RD ST
City of Clinton, Clinton County, Iowa from 2009-2013
Composite Rank=106 Frequency Rank=401 Rate Rank=6829 Severity Rank=112

Major Cause of All Crashes by Severity Intersection of 13TH AVE N & N 3RD ST City of Clinton, Clinton County, Iowa from 2009-2013						
Major Cause	Severity					Total
	Fatal	Major Injury	Minor Injury	Possible/ Unknown Injury	Property Damage	
Animal						
Ran Traffic Signal		2	1	7	6	16
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						
FTYROW:From Driveway						
FTYROW:From Parked Position						
FTYROW:To Pedestrian						
FTYROW:Other					1	1
Traveling Wrong Way or On Wrong Side of Road						
Driving Too Fast For Conditions					1	1
Exceeded Authorized Speed						
Made Improper Turn					1	1
Improper Lane Change						
Followed Too Close						
Disregarded RR Signal						
Disregarded Warning Sign						
Erratic/Reckless/Careless/Negligent/Aggressive					1	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						
Lost Control						
Inattentive/Distracted by:Passenger						
Inattentive/Distracted by:Phone/Device					1	1
Inattentive/Distracted by:Fallen Object						
Inattentive/Distracted by:Fatigued/Asleep						
Other:Vision Obstructed						
Oversized Load/Vehicle						
Cargo/Equipment Loss or Shift						
Other Improper Action			1		1	2
Unknown			1	3	1	5
No Improper Action						
Not Reported						
Total		2	3	10	13	28

Intersection of 13TH AVE N & N 3RD ST
City of Clinton, Clinton County, Iowa from 2009-2013
Composite Rank=106 Frequency Rank=401 Rate Rank=6829 Severity Rank=112

Manner of Collision of Crashes by Year
Intersection of 13TH AVE N & N 3RD ST
City of Clinton, Clinton County, Iowa from 2009-2013

Manner of Collision	Year					Total
	2009	2010	2011	2012	2013	
Non-Collision						
Head-on						
Rear-end		2			2	4
Angle, oncoming left turn					1	1
Broadside	3	3	6	3	6	21
Sideswipe, same direction		1		1		2
Sideswipe, opposite direction						
Unknown						
Not Reported						
Total	3	6	6	4	9	28

Weather Condition of Crashes by Year
Intersection of 13TH AVE N & N 3RD ST
City of Clinton, Clinton County, Iowa from 2009-2013

Weather Condition	Year					Total
	2009	2010	2011	2012	2013	
Clear	2	5	4	2	4	17
Partly Cloudy	1		1	1	3	6
Cloudy				1	1	2
Fog/Smoke						
Mist						
Rain		1	1			2
Sleet/Hail/Freezing Rain						
Snow					1	1
Severe Winds						
Blowing Sand/Soil/Dirt/Snow						
Not Reported						
Other						
Unknown						
Total	3	6	6	4	9	28

Surface Condition of Crashes by Year
Intersection of 13TH AVE N & N 3RD ST
City of Clinton, Clinton County, Iowa from 2009-2013

Surface Condition	Year					Total
	2009	2010	2011	2012	2013	
Dry	3	4	4	3	7	21
Wet		2	2	1		5
Ice						
Snow					2	2
Slush						
Sand/Mud/Dirt/Oil/Gravel						
Water (Standing/Moving)						
Other						
Unknown						
Not Reported						
Total	3	6	6	4	9	28

Intersection of 13TH AVE N & N 3RD ST
City of Clinton, Clinton County, Iowa from 2009-2013
Composite Rank=106 Frequency Rank=401 Rate Rank=6829 Severity Rank=112

Drug or Alcohol Related Crashes by Year
Intersection of 13TH AVE N & N 3RD ST
City of Clinton, Clinton County, Iowa from 2009-2013

Drug/Alcohol	Year					Total
	2009	2010	2011	2012	2013	
Drug						
Alcohol (<Statutory)						
Alcohol (Statutory)		1				1
Drug/Alcohol (<Statutory)						
Drug/Alcohol (Statutory)						
Refused					1	1
Under Influence of Alcohol/Drugs/Medications						
None Indicated	3	5	6	4	8	26
Total	3	6	6	4	9	28

Vehicle Action of Drivers Involved in Crashes by Initial Direction of Travel
Intersection of 13TH AVE N & N 3RD ST
City of Clinton, Clinton County, Iowa from 2009-2013

Vehicle Action	Initial Direction of Travel						Total
	North	East	South	West	Unknown	Not Reported	
Movement Essentially Straight	25	16		7			48
Turning Left	1	2					3
Turning Right							
Making U-turn							
Overtake/Passing							
Changing Lanes	1						1
Entering Traffic Lane (Merging)							
Leaving Traffic Lane							
Backing							
Slowing/Stopping	1			1			2
Stopped for Stop Sign/Signal	1			3			4
Legally Parked	1						1
Illegally Parked/Unattended							
Other							
Not Reported							
Unknown							
Total	30	18		11			59

Intersection of 13TH AVE N & N 3RD ST
City of Clinton, Clinton County, Iowa from 2009-2013
Composite Rank=106 Frequency Rank=401 Rate Rank=6829 Severity Rank=112

Driver Contributing Circumstances of Drivers by Severity
Intersection of 13TH AVE N & N 3RD ST
City of Clinton, Clinton County, Iowa from 2009-2013

Driver Contributing Circumstances	Severity					Total
	Fatal	Major Injury	Minor Injury	Possible/ Unknown Injury	Property Damage	
Ran Traffic Signal		2	1	7	7	17
Ran Stop Sign						
Exceeded Authorized Speed						
Driving Too Fast For Conditions					1	1
Made Improper Turn					1	1
Traveling Wrong Way or On Wrong Side Of Road						
Crossed Centerline						
Lost Control						
Followed Too Close						
Swerved To Avoid: Vehicle/Object/Non-motorist/or Animal						
Over Correcting/Over Steering						
Operating Vehicle in an					1	1
FTYROW: From Stop Sign						
FTYROW: From Yield Sign						
FTYROW: Making Left Turn						
FTYROW: Making Right Turn On Red Signal						
FTYROW: From Driveway						
FTYROW: From Parked Position						
FTYROW: To Pedestrian						
FTYROW: At Uncontrolled Intersection						
FTYROW: Other					1	1
Inattentive/Distracted By: Passenger						
Inattentive/Distracted By: Use of Phone or Other Device					1	1
Inattentive/Distracted By: Fallen Object						
Inattentive/Distracted By:Fatigued/Asleep						
Other: Vision Obstructed						
Other Improper Action			1		1	2
No Improper Action		2	2	8	13	25
Not Reported						
Unknown			2	6	2	10
Total		4	6	21	28	59

Intersection of 13TH AVE N & N 3RD ST
City of Clinton, Clinton County, Iowa from 2009-2013
Composite Rank=106 Frequency Rank=401 Rate Rank=6829 Severity Rank=112

Driver Age of All Crashes by Year
Intersection of 13TH AVE N & N 3RD ST
City of Clinton, Clinton County, Iowa from 2009-2013

Driver Age	Year					Total
	2009	2010	2011	2012	2013	
< 14						
= 14						
= 15						
= 16						
= 17						
= 18		1				1
= 19	1				2	3
= 20		2				2
21-24	2	3	1	1	1	8
25-29		1	2	2	2	7
30-34			2		4	6
35-39					2	2
40-44	1	1	1	1	2	6
45-49	1		1			2
50-54		1	1		1	3
55-59			1	2		3
60-64		1	1	2	1	5
65-69			1			1
70-74	1	1	1		1	4
75-79			1		1	2
80-84			1			1
85-89		1			1	2
90-94						
> 95						
Not Reported						
Unknown					1	1
Total	6	12	14	8	19	59

Intersection of 13TH AVE N & N 3RD ST
City of Clinton, Clinton County, Iowa from 2009-2013
Composite Rank=106 Frequency Rank=401 Rate Rank=6829 Severity Rank=112

Vehicle Configuration of Drivers Involved in Crashes by Year
Intersection of 13TH AVE N & N 3RD ST
City of Clinton, Clinton County, Iowa from 2009-2013

Vehicle Configuration	Year					Total
	2009	2010	2011	2012	2013	
Passenger Car	3	8	7	2	8	28
Four-tire Light Truck (Pick-up/Panel)	1	2	5	2	4	14
Van or Mini-van			1	3	3	7
Sport Utility Vehicle	2	2	1		3	8
Single-unit Truck (2-axle/6-tire)						
Single-unit Truck (>= 3 axle)				1		1
Truck/Trailer						
Truck Tractor (Bobtail)						
Tractor/Semi-trailer						
Tractor/Doubles						
Tractor/Triples						
Other Heavy Truck (cannot classify)						
Motor Home/Recreational Vehicle						
Motorcycle						
Moped/All-Terrain Vehicle						
School Bus (seats>15)						
Small School Bus (seats 9-15)					1	1
Other Bus (seats>15)						
Other Small Bus (seats 9-15)						
Farm Vehicle/Equipment						
Maintenance/Construction Vehicle						
Train						
Other						
Not Reported						
Unknown						
Total	6	12	14	8	19	59

REPLACEMENT SIGNALIZATION

SIGNALIZATION TO REMAIN

PROPOSED DURABLE PAVEMENT MARKINGS

13TH AVENUE NORTH 3-LANE CONVERSION
SIGNALIZATION & PAVEMENT MARKING PLAN

Application for TRAFFIC SAFETY FUNDS

GENERAL INFORMATION **DATE:** 08/12/2015

Location / Title of Project: Northwest Arterial and Pennsylvania Avenue Intersection Improvements

Applicant: City of Dubuque

Contact Person: Bob Schisel Title: Assitant City Engineer

Complete Mailing Address: 50 W 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): Iowa DOT District 6

Contact Person: Sam Shea Title: District Planner

Complete Mailing Address: Iowa DOT District 6

5455 Kirkwood Blvd S.W., Cedar Rapids, Iowa 52404

Phone: 319-364-0235 (Area Code) E-Mail: sam.shea@dot.iowa.gov

PLEASE COMPLETE THE FOLLOWING PROJECT INFORMATION:

Application Type

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

Funding Amount

Total Project Cost $ 415,005.13

Safety Funds Requested $ 364,005.13

Rev. 5/15

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 The City of Dubuque

Signed: Robert Schisel 8-13-2015

Signature Date Signed

Bob Schisel

Typed Name

Attest: David Ness 8-13-2015

Signature Date Signed

David Ness

Typed Name

RESOLUTION NO. 280-15

RESOLUTION AUTHORIZING THE FILING OF A GRANT APPLICATION WITH THE IOWA DEPARTMENT OF TRANSPORTATION FOR TRAFFIC SAFETY IMPROVEMENTS FUNDING FOR THE CITY OF DUBUQUE NW ARTERIAL AND PENNSYLVANIA AVENUE RIGHT TURN LANE IMPROVEMENT

Whereas, the increasing growth of traffic volumes, along with operational and safety concerns, at the intersection of NW Arterial and Pennsylvania Avenue in the City of Dubuque could be improved by adding a westbound right turn lane; and

Whereas, the City of Dubuque has determined that improvements to this intersection, as recommended by the Iowa Department of Transportation office of Traffic Safety, will improve traffic flow; and

Whereas, the City of Dubuque is seeking the necessary funding for project implementation, and upon completion, in cooperation with the Iowa Department of Transportation, be responsible for adequately maintaining and operating the project for public use during the project's useful life.

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

Section 1. The City files this grant application for funds through the Traffic Safety Improvement Program to fund NW Arterial and Pennsylvania Avenue right turn lane improvement.

Passed, approved and adopted this 17th day of August, 2015.

Roy D. Buol, Mayor

Attest:

Kevin S. Firnstahl, CMC, City Clerk

B. NARRATIVE

Existing Conditions

The project proposed in this application will improve safety at the intersection of Northwest Arterial and Pennsylvania Avenue in Dubuque, Iowa. Iowa Highway 32 (Northwest Arterial) is a five-mile long state highway that primarily runs north and south across the western portion of the City of Dubuque. Northwest Arterial's northern terminus is at its intersection with US Highway 52 and its southern terminus is at its intersection with US Highway 20. Pennsylvania Ave is a Minor Arterial that runs east and west across the City of Dubuque. Pennsylvania Ave is a vital transportation corridor in Dubuque, as it one of three corridors that carry the majority east/west traffic in the city.

Geometry of the Intersection

- The intersection of Northwest Arterial and Pennsylvania Ave is a four-way signalized intersection.
- The north leg of Northwest Arterial at the intersection has one left turn lane, one right turn lane only lanes and two through lanes.
- The south leg of Northwest Arterial at the intersection has one left turn lane, one right turn lane only lanes and two through lanes.
- The west leg of Pennsylvania Ave at the intersection has one left turn lane, one right turn lane only lanes and two through lanes.
- The east leg of Pennsylvania Ave at the intersection has one left turn lane, one through lane and one through/right turn lane.

The east leg approach of the Northwest Arterial and Pennsylvania Avenue intersection has one through lane, one left turn lane, and one through/right turn lane. The through/right turn movement to go north is a very heavy movement. This shared through/right turn lane is favored by many drivers going west (through) because it leads to a major housing development 1/4 mile to the west. Unfortunately it only takes one westbound vehicle queued at the light to block all free right turn movements. Once blocked this lane rapidly backs up 400+ feet and beyond. The queued vehicles block adjacent business entrances which lead to poor decisions and accidents. Most of these accidents are property damage

In April 2006 HDR Engineering, Inc.(HDR) completed and Existing Conditions Analysis in 2006 and a Future Conditions Analysis in 2007. The Iowa Department of Transportation commissioned both studies. The both studies indicated that operational and safety concerns will continue to increase with the dramatic growth of traffic volumes in this corridor. The statistical data of the 2035 and 2040 Dubuque Metropolitan Area Transportation Study Long Range Plans validates that Northwest Arterial at Pennsylvania Ave intersection has a significant "crash interest".

Project Concept

The proposed improvements at Northwest Arterial and Pennsylvania Ave consist of adding right turn only lane on east leg of Pennsylvania Ave with traffic signal adjustments. Adding a dedicated right turn lane would allow free right turn movements during the red phase, and would allow overlapping turn movements to occur during southbound left turn movements. This improvement in efficiency would result in minimized queue lengths and blockages of adjacent business entrances. These lane improvements would also allow sustained coordination of Northwest Arterial, which would minimize rear end accidents.

B. NARRATIVE

The City of Dubuque in partnership with Iowa DOT District 6 is seeking Traffic Safety Improvement Program Funds to make these improvements. With secured funding, it is anticipated that construction could begin in April 2017, with completion in November 2017.

The Future Conditions Analysis for the Northwest Arterial completed by HDR for the Iowa Department of Transportation recommends the following based on existing conditions to improve corridor operations and/or safety:

On Pennsylvania Avenue at Northwest Arterial intersection (Page 22, Detailed year 2020 proposed improvements along the Northwest Arterial of Arterial Traffic Operations Study)

- Construct westbound right-turn lane and lengthen westbound left-turn lane
- Storage length of the westbound left-turn lane is limited by need to provide access to adjacent commercial properties.
- Improvements will include construction of raised median, which terminates prematurely on the west leg to provide access to the north side businesses.

Traffic

With the growth of the City of Dubuque to the west, the daily traffic volume entering the intersection has increased. A review of the Iowa DOT Annual Average Daily Traffic (AADT) maps for the City of Dubuque found that over 76,900 vehicles per day traveled through the intersection in 2013. A review of historical AADT data for the intersection is shown in the following table.

Annual Average Daily Traffic (AADT) Historical Counts					
Count Year	Pennsylvania Ave		NW Arterial		Entering Vehicles
	East Leg	West Leg	North Leg	South Leg	
2001	13,700	12,700	12,700	19,900	59,000
2005	14,500	13,100	15,200	20,700	63,500
2013	15,500	15,600	20,800	25,000	76,900
Source: IADOT Traffic Counts					

The increase in traffic volumes over time shown in the above table equates to an approximate 2.3% annual growth in traffic volumes from the year 2001 to 2013. This increase in traffic through the intersection contributes to the overall safety concerns

Future Traffic Volumes

The future traffic volumes for this intersection are based on projection provided in HDR study. The projection shows that the intersection will have 116,300 vehicles per day. The projections show that there will be 3% growth rate from 2013 to 2030.

B. NARRATIVE

Annual Average Daily Traffic (AADT) Historical Counts					
Count Year	Pennsylvania Ave		z Arterial		Entering Vehicles
	East Leg	West Leg	North Leg	South Leg	
2020	20,400	13,800	30,400	35,800	100,400
2030	19,900	15,100	36,500	44,800	116,300
Source: HDR study					

Using the results of the HDR study, staff calculated an annual average traffic growth rate of 2.3%. Staff used this rate in the Benefit/Cost Safety Analysis

Crashes

Crash data for the intersection was compiled using the Crash Mapping Analysis Tool (CMAT) software distributed by the Iowa DOT. There have been a total of 115 crashes at this intersection over the last 11 years, an average of 10.4 crashes per year from 2004 through 2014. While none of these crashes have involved fatalities, approximately 26% (34 of the 115 crashes) have resulted in personal injuries and 74% are Property Damage.

Of 155 crashes 21 of them happened as the vehicles are following close to each other and did not have sufficient time to react to a situation, 14 of them ran the traffic signal as the wait is too long at the intersection and 41 accidents happened due to lost control.

The intersection also has pedestrian safety concerns due to geometry (wide intersection) and allowance of right turns on red. Many children cross the intersection before and after school as this intersection is located between a high school, middle school and elementary school. However, there is no notable crash history. The Dubuque Multidisciplinary Safety Team and IADOT staff Terry Ostendorf and Chris Poole conducted a Safety Assessment on June 5th, 2014 and made the following recommendations:

- The group was able to witness the crossing guards assisting school children cross Northwest Arterial, and was able to speak to the guards about their concerns
- The westbound right turn movement onto Northwest Arterial can be problematic due to a lack of dedicated right turn lane (it is a right/through lane) on Pennsylvania Ave
- It was reiterated that pedestrian safety could be improved by restricting southbound right turns onto Pennsylvania Ave when pedestrians/children are present. Another option would be to display a red arrow whenever the pedestrian crossing button is pressed

The attachment A will have a copy of the Safety Assessment report for IADOT.

Clear Zone Requirements
The proposed improvement along Northwest Arterial includes a 20-foot clear zone, as measured from the outside pavement edge, for determination of embankment width. While Iowa Statewide Urban Design and Specifications (SUDAS) guidelines recommend an 18-foot distance for higher speed transitional facilities, 15-feet plus a 3-foot curb and gutter. Whereas, the American Association of State Highway and Transportation Officials (AASHTO) Roadside Design Guide suggest a range of values for the given traffic and design speed of 20 to 22 feet. The slightly larger value was considered appropriate for the current operational charter of Northwest Arterial.

B. NARRATIVE

Manual on Uniform Traffic Control Devices Requirements
The 2009 Manual on Uniform Traffic Control Devices (MUTCD) with Revision Numbers 1 and 2 incorporated, dated May 2012 will be utilized for the construction and design of the proposed improvements. Traffic control (temporary and permanent), signing and pavement marking guidelines from the MUTCD will be used.

Preferred Alternative

The recommended alternative from the HDR study (Page 22 of Northwest Arterial Traffic Operations Study) and Safety Assessment (Page 3 of City of Dubuque Safety Assessment was to provide a dedicated right turn line on the east leg of Pennsylvania Ave and make improvements to traffic signal to accommodate more pedestrian crossings.

Adding a dedicated right turn lane would allow free right turn movements during the red phase, and would allow overlapping turn movements to occur during southbound left turn movements. This improvement in efficiency would result in minimized queue lengths and blockages of these business entrances. These lane improvements would also allow sustained coordination of Northwest Arterial, which would minimize rear end accidents and allow pedestrians to cross the intersection safely.

Documentation from the Crash Modification Factors Clearinghouse shows that this improvement can reduce the total number of crashes at the intersection by 30% (http://www.cmfclearinghouse.org/detail.cfm?facid=5650)

Benefit

A Benefit-Cost analysis was completed to assess the overall effectiveness of the proposed improvements. The analysis assumed a combined crash reduction factor (CRF) of 30 based on available research from the Crash Modification Factors Clearinghouse and the documented annual growth in traffic volumes of 2.3%. Based on the estimated cost of the project of $410,000 and the historical crash data for the intersection, the calculated benefit of the project was $818,782 equating to a Benefit-Cost Ratio of 1.65 for the proposed improvements.

A sensitivity test was completed on the assumed variables included in the calculation including the CRF value. The sensitivity test showed that with 2.3% annual growth in traffic, a crash reduction factor of 68.3 for right turn lane with signal coordination (http://www.cmfclearinghouse.org/detail.cfm?facid=3073) would result in a Benefit-Cost Ratio of 2.69.

However staff used the crash reduction factor of 30 for addition right turn lanes to the intersection for most of the needed crash reduction.

C. ITEMIZED BREAKDOWN OF COSTS

THE CITY OF DUBUQUE
Masterpiece on the Mississippi

City of Dubuque, Iowa

Construction Cost Estimate

Date: 12-Aug-15

Project Name: GRANT PROJECT (RIGHT TURN LANE) PENN AVE & NW ARTERIAL

CIP Funding Amount: $ -

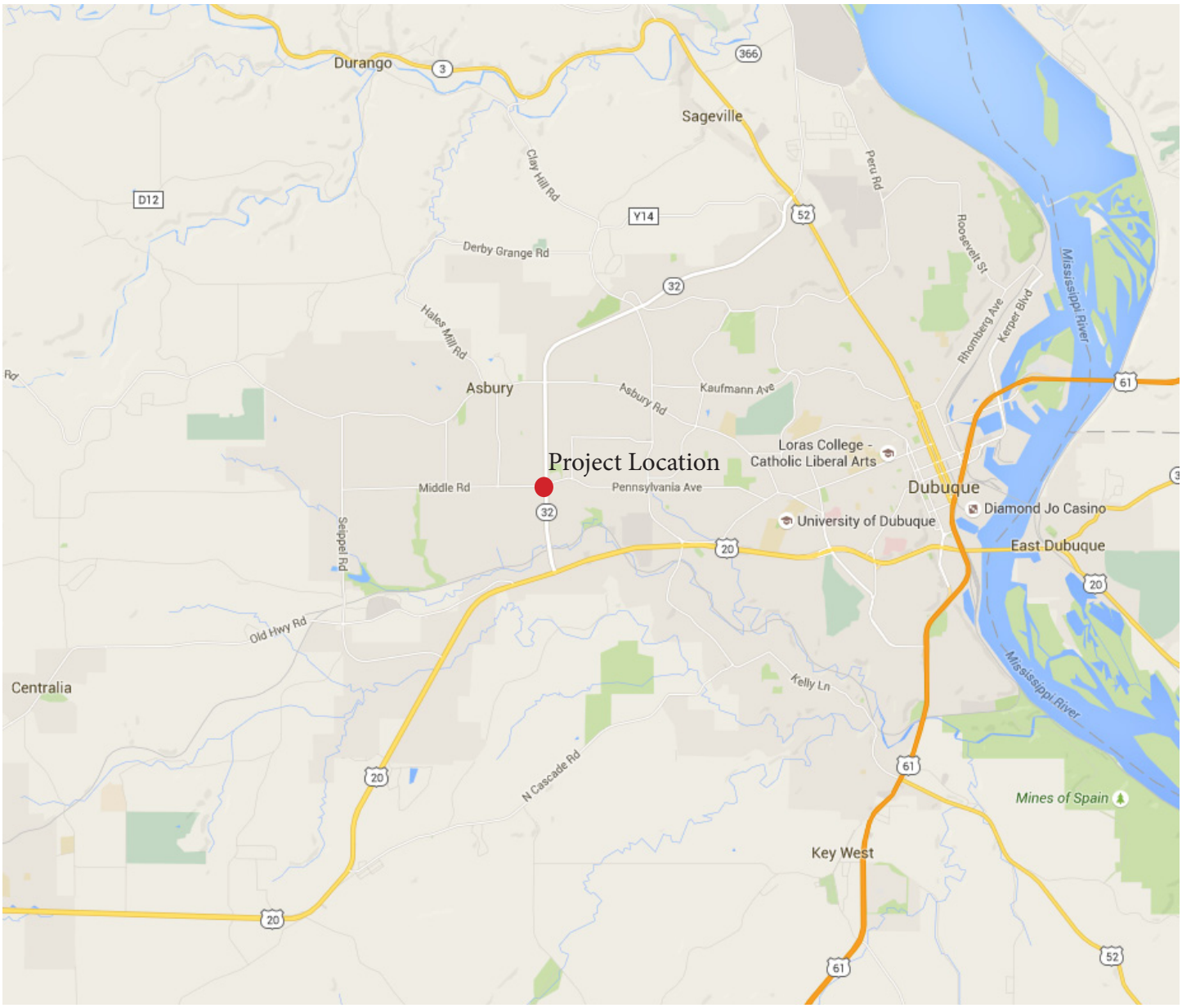
Project Completion Date: 0-Jan-00

LINE NO.	REFERENCE NUMBER	DESCRIPTION	PLAN QUANTITY	UNIT	UNIT PRICE	TOTAL PRICE
		Division 1 - General Provisions				
1	1090-105-D	Mobilization	1.00	LS	$ 15,925.00	$ 15,925.00
					Sub Total	$ 15,925.00
		Division 2010 - Earthwork, Subgrade, and Subbase				
2	2010-108-D-1	Topsoil, On-site	75.00	CY	$ 70.00	$ 5,250.00
3	2010-108-E-0	Excavation, Class 10	930.00	CY	$ 12.50	$ 11,625.00
4	2010-108-I-0	Subbase, Modified Subbase - Gradation 14	500.00	TON	$ 22.00	$ 11,000.00
5	2010-108-I-0	Subbase, Coarse Aggregate Subbase - 3" Breaker	950.00	TON	$ 25.00	$ 23,750.00
					Sub Total	$ 51,625.00
		Division 6010 - Structures for Sanitary and Storm Sewers				
6	6010-108-F-0	Intake Adjustment, Major	1.00	EA	$ 3,000.00	$ 3,000.00
					Sub Total	$ 3,000.00
		Division 7010 - Portland Cement Concrete Pavement				
7	7010-108-A-0	Pavement, PCC, 9" (Thickness)	1105.00	SY	$ 90.00	$ 99,450.00
					Sub Total	$ 99,450.00
		Division 7030 - Sidewalks, Shared Use Paths, and Driveways				
8	7030-108-A-0	Removal of Sidewalk	258.00	SY	$ 18.00	$ 4,644.00
9	7030-108-A-0	Removal of Driveway	145.00	SY	$ 20.00	$ 2,900.00
10	7030-108-E-0	Sidewalk, PCC, 4" (Thickness)	258.00	SY	$ 32.50	$ 8,385.00
11	7030-108-H-1	Driveway, Paved, PCC, 6" (Thickness)	93.00	SY	$ 55.00	$ 5,115.00
12	7030-108-G-0	Detectable Warning	32.00	SF	$ 35.50	$ 1,136.00
					Sub Total	$ 22,180.00
		Division 7040 - Pavement Rehabilitation				
13	7040-108-H-0	Removal - Pavement	418.00	SY	$ 22.00	$ 9,196.00
					Sub Total	$ 9,196.00
		Division 8010 - Traffic Signals & Lighting				
14	8010-108-A.1	Handhole, PC, Rectangular	1.00	EA	$ 1,500.00	$ 1,500.00
15	8010-108-F.1	Fiber Optic Vault Precast Concrete	2.00	EA	$ 3,000.00	$ 6,000.00
16	0	Relocate Mastarm	1.00	EA	$ 100,000.00	$ 100,000.00
					Sub Total	$ 107,500.00
		IDOT Division 2527 - Pavement Marking				
17	IDOT 2527.04-A-1	CHW8: Channelizing Line (White)	7.10	STA	$ 200.00	$ 1,420.00
18	IDOT 2527.04-A-1	SLW2: Stop Line (White)	0.90	STA	$ 200.00	$ 180.00
19	IDOT 2527.04-A-4	Painted Symbols and Legends	6.00	EA	$ 200.00	$ 1,200.00
20	IDOT 2527.04-A-1	CLW6: Crosswalk Line (White)	0.62	STA	$ 200.00	$ 124.00
					Sub Total	$ 2,924.00
		IDOT Division 2528 - Traffic Control				
21	IDOT 2528.04-A	Traffic Control	1.00	LS	$ 5,000.00	$ 5,000.00
					Sub Total	$ 5,000.00
		Division 9010 - Seeding				
22	9010-108-A-0	Conventional - Seeding, Fertilizing, and Mulching, Type 1	0.14	AC	$ 13,000.00	$ 1,820.00
					Sub Total	$ 1,820.00
		Division 9040 - Erosion and Sediment Control				
23	9040-108-D-1	Filter Socks, 12"	595.00	LF	$ 7.50	$ 4,462.50
24	9040-108-D-2	Filter Socks, Removal	595.00	LF	$ 3.75	$ 2,231.25
					Sub Total	$ 6,693.75
		Division 8040 - Signing Materials				
25	0	Existing Sign, Remove and Reinstall	3.00	EA	$ 200.00	$ 600.00
					Sub Total	$ 600.00
		Division 5020 - Valves, Fire Hydrants, and Appurtenances				
26	0	Fire Hydrant, Relocate	1.00	EA	$ 5,000.00	$ 5,000.00
					Sub Total	$ 5,000.00
					TOTAL	$ 330,913.75
				CONTINGENCY	**10.00%**	$ 33,091.38
					TOTAL CONSTRUCTION ESTIMATE	$ 364,005.13
27		**Engineering**				$ 51,000
					Sub Total	$ 51,000
					TOTAL PROJECT COST	$ 415,005.13

D. TIME SCHEDULE

Description	Date
Grant Application	August 2015
Notice of Funding	December 2015
Approval of Agreement	July 2016
Construction Plan Preparation	September - April 2016
Plans Approval	May 2016
Advertise for Bids	October 2016
Open Bid & Award Contract	November 2016
Notice to Proceed	December 2016
Construction	April - November 2017
Project Closeout	December 2017

E. MAP



F. PICTURES

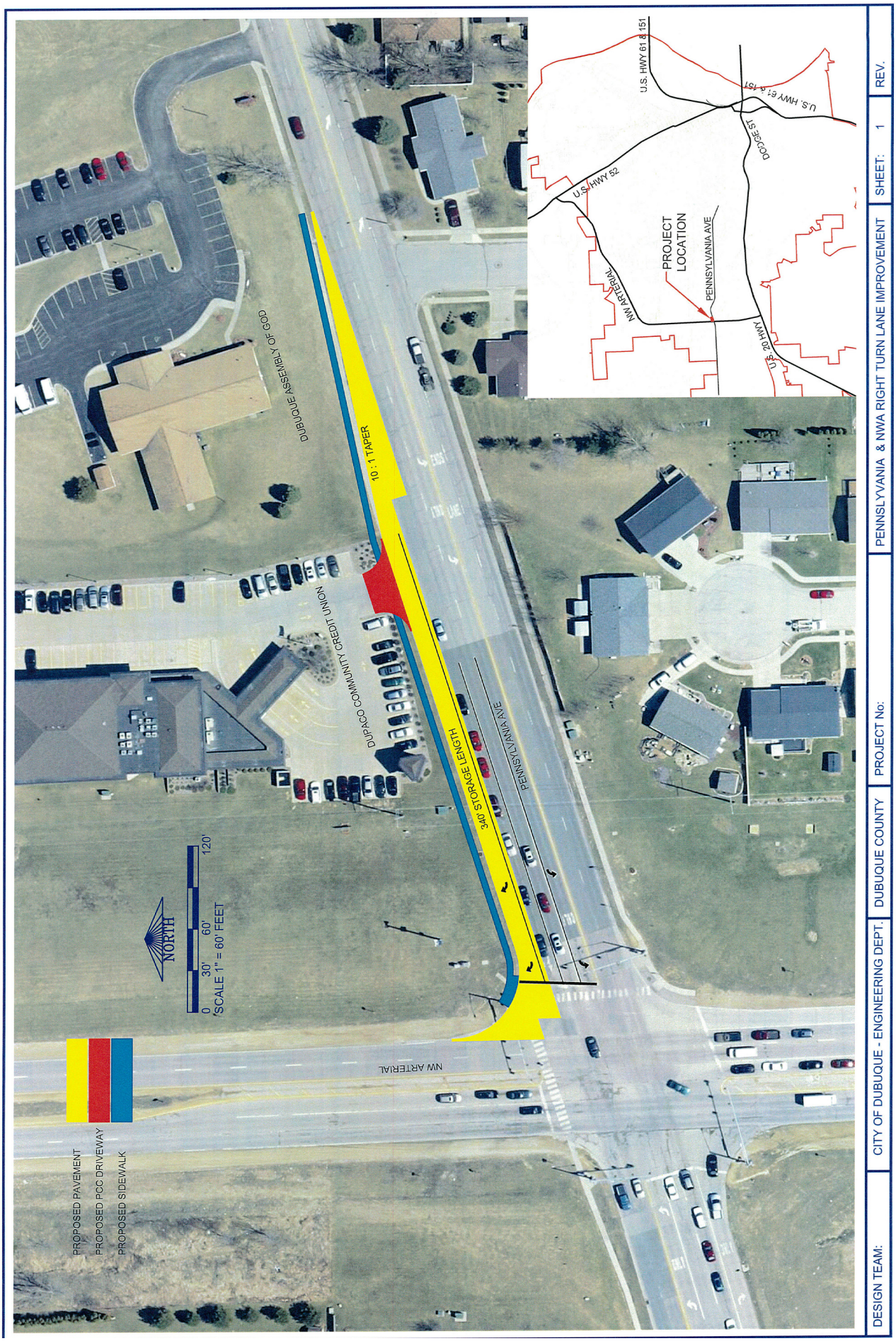
Intersection of Northwest Arterial and Pennsylvania Ave looking east

Intersection of Northwest Arterial and Pennsylvania Ave looking northeast

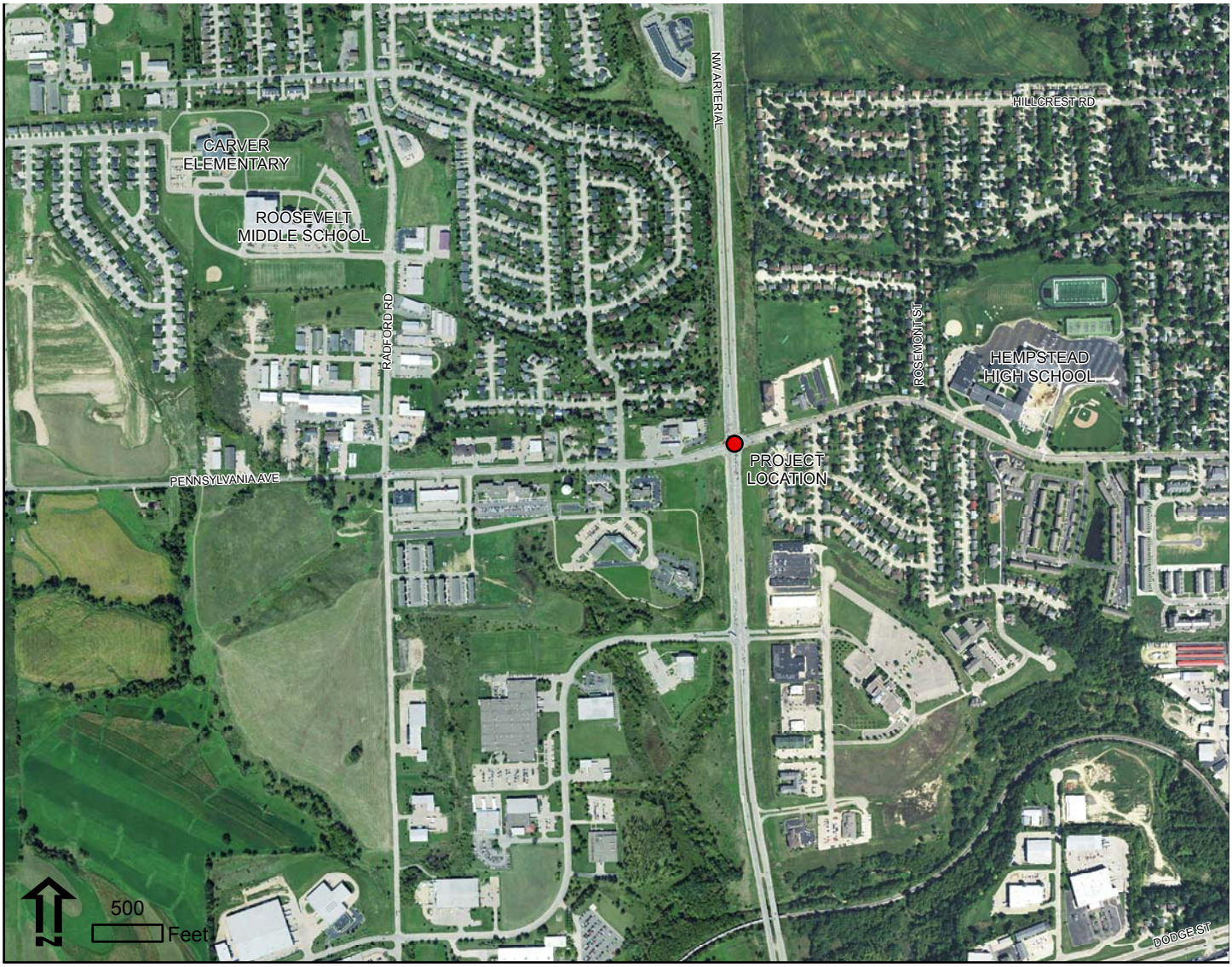
F. PICTURES

Intersection of Northwest Arterial and Pennsylvania Ave looking east

G. PLAN VIEW


PROPOSED PAVEMENT
PROPOSED PCC DRIVEWAY
PROPOSED SIDEWALK
NORTH
0 30' 60' 120'
SCALE 1" = 60' FEET
NW ARTERIAL
DUPACO COMMUNITY CREDIT UNION
DUBUQUE ASSEMBLY OF GOD
10 : 1 TAPER
340' STORAGE LENGTH
PENNSYLVANIA AVE
U.S. HWY 61 & 151
U.S. HWY 52
NW ARTERIAL
PROJECT LOCATION
PENNSYLVANIA AVE
DODGE ST
U.S. HWY 61 & 151
U.S. HWY 20
DESIGN TEAM:
CITY OF DUBUQUE - ENGINEERING DEPT.
DUBUQUE COUNTY
PROJECT No:
PENNSLYVANIA & NWA RIGHT TURN LANE IMPROVEMENT
SHEET: 1
REV.

H. AERIAL PHOTOGRAPH



J. TRAFFIC VOLUMES

Iowa Department of Transportation

Turning Movement Traffic Count Summary

Annualized Daily Traffic For All Vehicles

Station Number:

31343332099

Count Date:

Thursday, June 20, 2013

County:

Dubuque

Location Description:

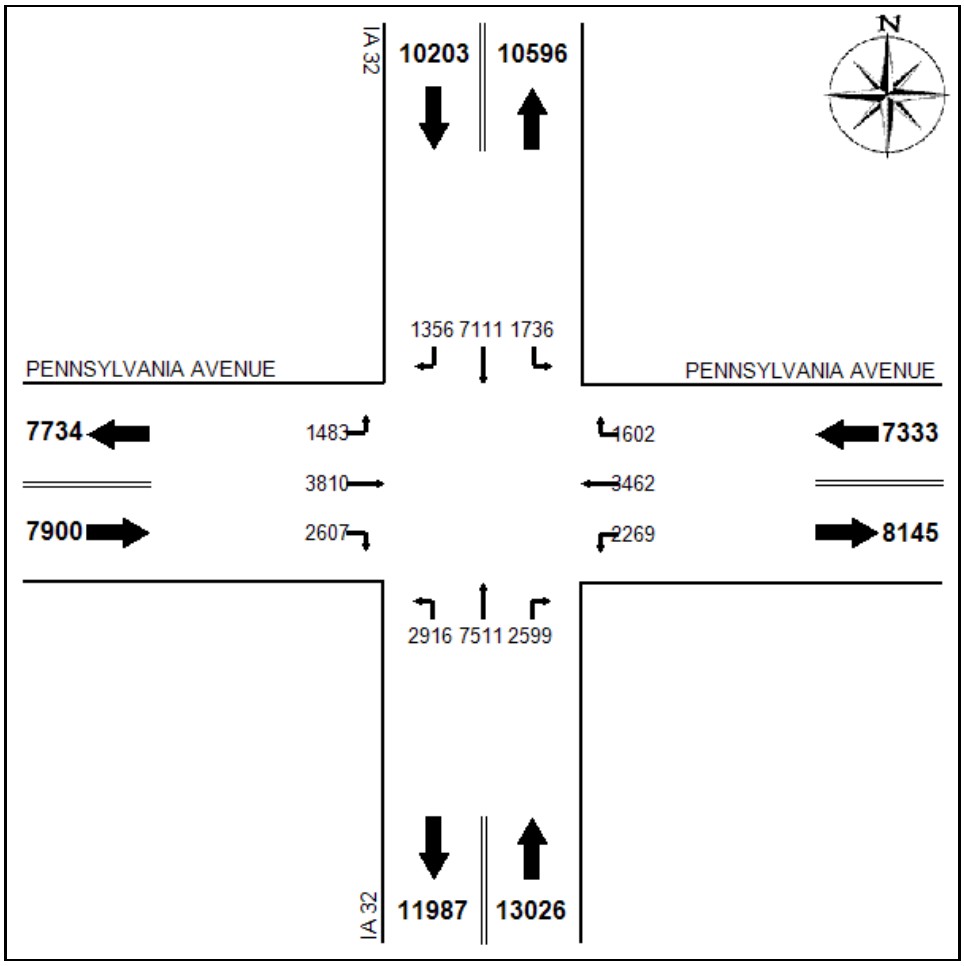
IA 32 & Pennsylvania Ave

Volume Factor: 1.812

Pass Class Factor: 1.839

SU Class Factor: 1.553

Combo Class Factor: 1.555



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	63	438	141	188	238	55	188	370	109	100	275	261
08:00	101	386	84	143	212	75	228	334	114	72	283	200
11:00	119	533	92	160	223	120	185	606	207	95	248	166
12:00	166	622	139	200	292	148	227	659	212	117	276	197
15:00	151	611	112	181	266	130	198	670	268	117	276	169
16:00	168	685	88	182	329	152	296	792	266	184	389	238
17:00	179	617	86	195	332	194	271	681	249	126	330	193

L. BENEFIT-COST WORKSHEET

Rev. 5/14

Intersection or Spot Benefit / Cost Safety Analysis

Iowa DOT Office of Traffic & Safety

County: Dubuque Prepared by: ECIA Date Prepared: Aug 10, 2015

Intersection: NW Arterial/ Pennsylvania Ave

Improvement

Proposed Improvement(s): Right turn lane with traffic signal improvements

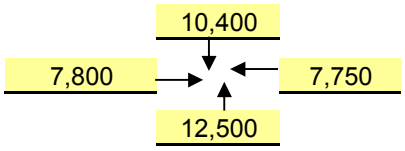
$ 364,000	Estimated Improvement Cost, **EC**	20	Est. Improvement Life, years, **Y**
$ 5,000	Other Annual Cost (after initial year), **AC**	30	Crash Reduction Factor (integer), **CRF**
$ 67,952	Present Value Other Annual Costs, **OC**	4.0%	Discount Rate (time value of $), **INT**
		$ 431,952	Present Value 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)



14,034,250 Current Annual Entering Veh., **AEV** = DEV * 365

60,591 veh / day, Final Year DEV, **FDEV**

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

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

2.3% Projected Traffic Growth (0%-10%), **G**

38,450 Current Daily Entering Vehicles, **DEV**

Crash Data

2004 First full year --> 2014 Last full year 11.5 years, Time Period, **T**

6 Additional months values as of May 2014

	Fatal Crashes		Fatalities @	$4,500,000	$ -
			Major Injuries @	$325,000	$ -
30	Injury Crashes	5	Minor Injuries @	$65,000	$ 325,000
		25	Possible Injuries @	$35,000	$ 875,000
85	Property Damage Only		(assumed cost per crash)	$7,400	$ 851,000
		-OR-	enter all Property Costs of all crashes:		
115	Total Crashes, **TA**		Total $ Loss, **LOSS**		$ 2,051,000

10.00	Current Crashes / Year, **AA** = TA / T	**0.71**	Crashes / MEV, Crash Rate, **CR**
$ 17,835	Cost per Crash, **AVC** = LOSS / TA		CR = TA x 10^6 / (DEV x 365 x T)
250.4	Total Expected Crashes, **TECR** = CR x TMEV	**$ 883,786**	Present Value of Avoided
3.00	Crashes Avoided First Year **AAR** = AA x CRF / 100		Crashes, **BENEFIT**
$ 53,504	Crash Costs Avoided in First Year, AAR x AVC		
75.1	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 = $883,786 : $431,952 = **2.05** : 1

City of Dubuque Safety Assessment

On the morning of June 5, 2014, a meeting was held at Dubuque City Hall to discuss traffic safety concerns within the city of Dubuque. The following individuals were in attendance:

Dan Fox, Transportation Planner, East Central Intergovernmental Association
Gus Psihoyos, City Engineer, City of Dubuque
Dave Ness, City Traffic Engineer, City of Dubuque
Troy Kress, GIS/Traffic Technician, City of Dubuque
Bob Schiesl, Assistant City Engineer, City of Dubuque
Terry Ostendorf, Iowa DOT Office of Traffic & Safety
Chris Poole, Iowa DOT Office of Traffic & Safety

The group discussed several intersection locations identified by city representatives as having safety and/or operational concerns.

Northwest Arterial (NWA) at Pennsylvania Avenue:

- Pedestrian safety concerns due to geometry (wide intersection) and allowance of right turns on red
- Lots of children present due to nearby schools
- Crossing guards stationed before/after school
- Numerous public requests for change
- Lacks notable crash history
- Considering safety strategies to reduce potential conflicts between traffic and pedestrians
- Shared Tim Crouch's (Iowa DOT) suggestions on increasing all-red time and signing for "No Right Turn on Red when Pedestrians/Children are Present"

Asbury Road at Carter Road:

- Spike in crashes in 2012-2013
- 10 of 16 crashes occurred under daylight conditions
- April and May make up half of the crashes
- Might benefit from protected left turn phasing
- Asbury Road anticipated to become a major East-West route in 5-10 years based on long-range planning study by HDR

US 20 at Bryant Street:

- History of eastbound traffic on US 20 losing control under the overpass during icy conditions, resulting in vehicles running off the road to the right and sometimes impacting a light pole
- Some drivers stop to assist and their vehicles can also end up getting hit
- Iowa DOT maintenance is aware of this concern and works to keep area clear of ice/snow
- History of eastbound traffic on US 20 backing up at the bottom of the hill. If it backs up far enough, drivers coming around the curve may be unable to stop in time and results in rear-end crashes
- Consider installation of a Dynamic Message Sign or flashing sign that gets triggered to alert drivers when the area is slippery or when traffic is backed up beyond a certain point

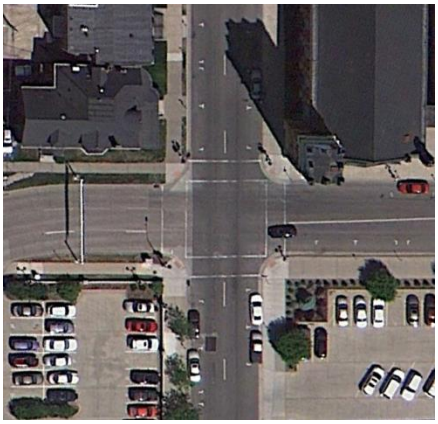
US 20 at Bluff Street:

- Difficult for drivers to find gaps to enter onto US 20
- Discussed possibility of acceleration lane for entering traffic
- Intakes are along westbound US 20 would need to be relocated

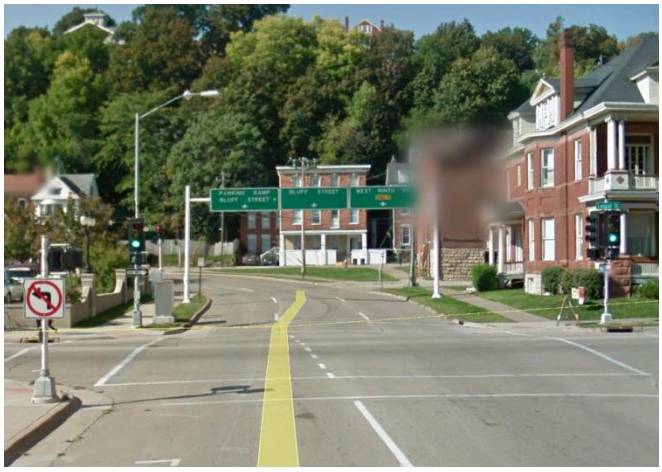
Grandview Avenue at Delhi Street:

- Existing 5-leg intersection
- 10 of 17 crashes were broadsides
- Definite candidate for a roundabout
- Suggested the city submit a TSIP application for project funding

10th Street at Locust Street:



- 33 of 37 crashes are broadsides
- Both 10th and Locust are one-way streets
- Side-mounted street lights and signs on 10th Street could be blocking the view of the side-mounted signals from certain angles
- Possibility that large green interstate-style lane assignment signs beyond the intersection may be distracting westbound drivers on 10th Street, making them not "see" the side-mounted signals



Following lunch, the group walked the downtown area and reviewed several intersections. It was noted during this time that several of the city's one-way streets would be converted to two-way streets later this year.

Finally, the group got in a van and drove to review several of the intersections in person:

Grandview Avenue at Delhi Street:

- It was agreed that this intersection would be well-served by a roundabout, which would provide an operational and safety improvement over the current 5-way stop configuration
- If a roundabout were considered, it was suggested that a free right turn be constructed in the NE (hospital) corner

NWA at Pennsylvania Avenue:

- The group was able to witness the crossing guards assisting school children cross NWA, and was able to speak to the guards about their concerns
- The westbound right turn movement onto NWA can be problematic due to a lack of dedicated right turn lane (it is a right/through lane) on Pennsylvania Ave

- It was reiterated that pedestrian safety could be improved by restricting southbound right turns onto Pennsylvania Ave when pedestrians/children are present. Another option would be to display a red arrow whenever the pedestrian crossing button is pressed

Followup: Iowa DOT will send the city any information it has on the safety performance of switching signals to flashing yellow operation after hours

Application for TRAFFIC SAFETY FUNDS

GENERAL INFORMATION **DATE:** 08/06/2015

Location / Title of Project: US 52 Safety improvements from Dubuque/Jackson County line to the northern city limits of Bellevue in Jackson County.

Applicant: Regional Planning Affiliation 8 (RPA 8)

Contact Person: Chandra Ravada Title: Director of Transportation

Complete Mailing Address: Regional Planning Affiliation 8
7600 Commerce Park, Dubuque, IA 52002

Phone: 563-556-4166 (Area Code) E-Mail: cravada@ecia.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): Iowa DOT

Contact Person: Sam Shea Title: District Planner

Complete Mailing Address: Iowa DOT District 6
5455 Kirkwood Blvd S.W., Cedar Rapids, Iowa 52404

Phone: 319-364-0235 (Area Code) E-Mail: sam.shea@dot.iowa.gov

PLEASE COMPLETE THE FOLLOWING PROJECT INFORMATION:

Application Type

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

Funding Amount

Total Project Cost $ 1,800,000

Safety Funds Requested $ 500,000

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 Regional Panning Afiliation 8

Signed: _____ 08/12/2015
Signature Date Signed

Chandra Ravada
Typed Name

Attest: _____ 8-12-15
Signature Date Signed

Dan Fox
Typed Name

A. APPLICATION CERTIFICATIONS OR RESOLUTIONS

Schnoebelen, Jim [DOT]
To 'Ravada_c@yahoo.com' cravada@ecia.org
CC Yanna, Kenneth [DOT] Shea, Sam [DOT]
Jun 30 at 4:15 PM
Chandra,

The Iowa DOT District Six staff supports the project to pave shoulders on US 52 between Bellevue and the Dubuque County line. If approved and constructed, the DOT will maintain these shoulders, as we would any other paved shoulders on the primary highway system, for the minimum 20 years required by the grant.

Jim Schnoebelen, P.E.
District Engineer
District 6
iowadot.gov Iowa Department of Transportation
Office: 319-364-0235 @iowadot
Jim.Schnoebelen@dot.iowa.gov

B. NARRATIVE

Purpose

The Regional Planning Affiliation 8 (RPA 8) in partnership with the Iowa Department of Transportation (IADOT) and Jackson County seeks to provide safe and efficient transportation within the RPA 8 region. With this project RPA 8 and IADOT will address one of the region's primary safety concerns by constructing six foot paved shoulders with edge line rumble strips on US 52. The project will follow US 52 from the Dubuque/Jackson County line to the northern city limits of St Donatus, and from the southern city limits of Saint Donatus to the northern city limits of Bellevue in Jackson County.

The project will improve safety on the roadway by reducing the number of run off the road crashes and by providing a safe on-road bicycle facility for the many cyclists who use US 52 as part of the Mississippi River Trail.

Existing Conditions

US 52 is an undivided highway in Dubuque and Jackson counties within RPA 8 region with soft shoulders. The route is narrow and often winding road. While scenic, the road has been the scene of numerous accidents over the years. The RPA 8 and IADOT staff agreed that paved shoulders are a potential countermeasure for run-off-road crashes as several studies have indicated that paved shoulders are effective in reducing crashes.

The RPA 8 and IADOT District 6 staff agreed to improve safety of this corridor by adding 6 ft. shoulders rather than 4 foot shoulders as this is a prominent bicycle route (Mississippi River Trail) on either side of US 52.

Project Concept:

Project Description

The additional 9.14 miles of paved shoulders described in this application will complete a three-phase project that will complete paved shoulders on an 18-mile stretch of US 52 between the City of Dubuque and the City of Bellevue.

Phase I

In the spring/summer of 2015, the Iowa DOT resurfaced 8.3 miles of US 52 between US 151/61 and the Dubuque County line. Original project plans called for a four foot paved shoulder on either side of the roadway. The Dubuque Metropolitan Area Transportation Study (DMATS) has contributed $400,000 in Transportation Alternative Program (TAP) to pave an additional two feet on both sides of the road, thus creating a six foot shoulders.

Phase II

Iowa DOT resurfaced 0.49 miles of US 52 within the City of Saint Donatus. The RPA 8 has approved $30,000 in TAP funds to join efforts with Iowa DOT to install six foot shoulders on US 52 in the City of Saint Donatus.

Phase III

Phase III will finish the remaining connection between the Dubuque County line and the City of Bellevue. The project involves constructing 9.14 miles of six foot wide, six inch thick paved shoulders on

B. NARRATIVE

both sides of US 52. The project will follow US 52 from the north city limits of Bellevue (MP 26.10) to the south end of the Phase II project at St. Donatus (MP 33.30), and from the north end of the Phase II project at St. Donatus (MP 33.93) to the Dubuque County line (MP 35.87).

The Iowa DOT has estimated the cost of Phase III to be $1.8 million. Iowa DOT has agreed to design, engineer, and administer the project. Iowa DOT will also assume responsibility for the long-term maintenance of the shoulders after initial construction, with that responsibility limited to maintenance for highway purposes.

The construction cost of the project is estimated to $1.8 million. The RPA 8 staff is looking at different funding sources. Some are secured and others are yet to be secured. Table below provides different funding source and amounts.

Funding Sources	Amount
Parks to People funds	$300,000
RPA 8 TAP funds	$250,000
RPA 8 Small City STP funds*	$250,000
State Rec Trail Grant*	$500,000
IADOT Traffic Safety Improvement Program (TSIP) Funds*	$500,000
TOTAL	$1,800,000

*Yet to be secured

Project Justification

The safety challenges presented by US 52 have been very costly for the community. IADOT Accident reports show that there have been 63 crashes from Dubuque County line to the City of Bellevue between 2004 and 2014. The accidents resulted in one fatality, seven major injuries, five minor injuries, fourteen possible injuries, and $490,000 in property damage. Crashes along the corridor equate to 243.63 accidents per million vehicle miles traveled without considering property damage accidents. The state average for accidents per million vehicle miles traveled rural US highways in Iowa is 87 (http://www.iowadot.gov/crashanalysis/pdfs/crash_rate-density_comparables_segments_2005-2014_20150513_statewide.pdf)

The Benefit/Cost Safety Analysis (Section L) estimates the total loss resulting from the crashes at $3,331,881. With a projected annual traffic increase of 1%, the cost of future crashes on this corridor is expected to increase.

The US 52 corridor from Dubuque County line to Bellevue has an AADT of 3,000 (IADOT 2013 traffic counts). The Crash Reduction Factor (CRF) used for analysis is 25%

C. ITEMIZED BREAKDOWN OF COSTS

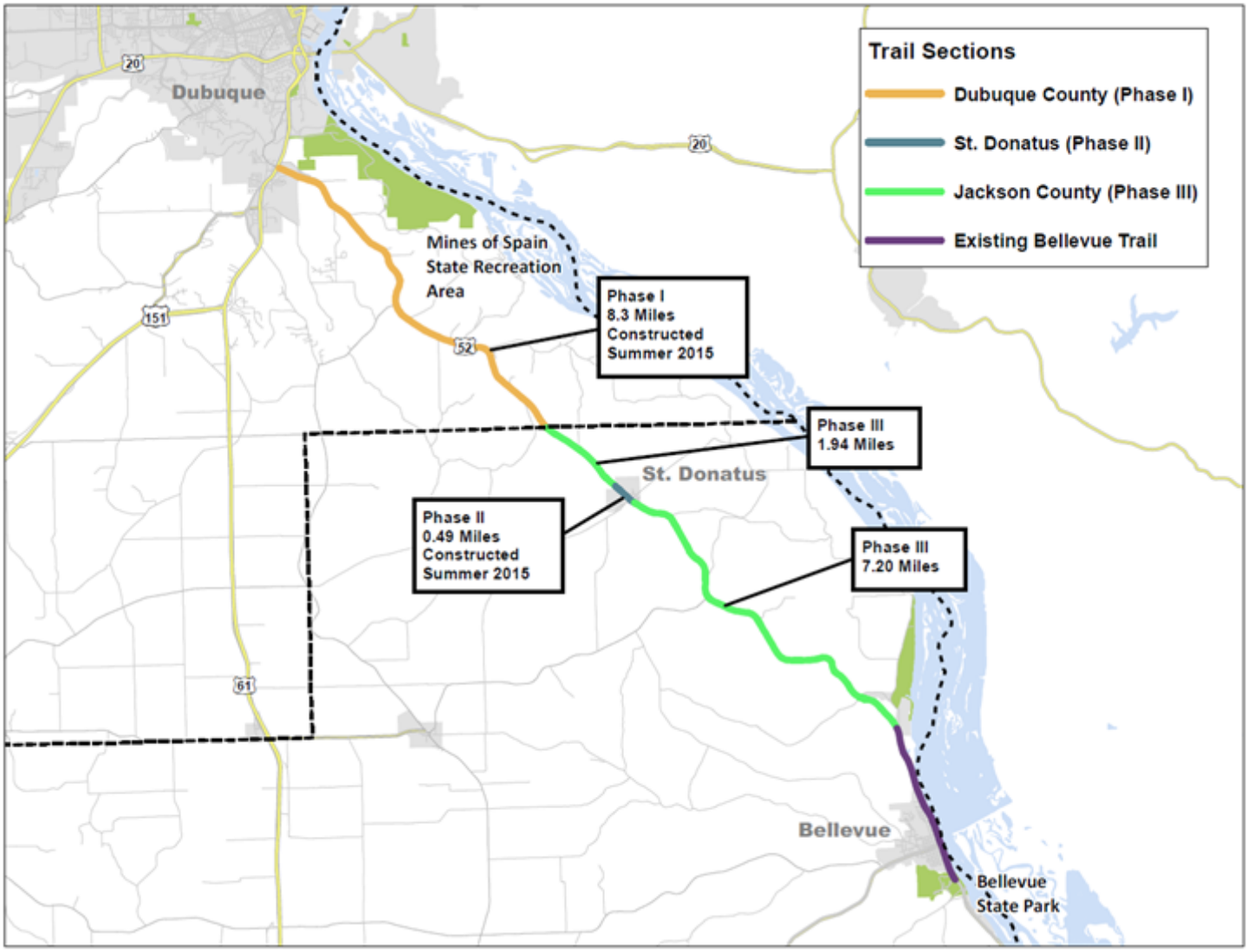
Cost estimate for 6' wide X 6" thick paved shoulders (both sides) - US 52 Jackson County:
Begin project at the end of the existing trail north of Bellevue (MP 26.10) and end at the Dubuque/Jackson County line (MP 35.87). Gap the 2015 project in the St. Donatus area from MP 33.30 to MP 33.93. Total project length = 9.14 miles. 6/26/2015-AFG

Item	Item Quantity	Unit	Unit price	Estimated Cost
Excavation class 13 for widening	10,724	CY	$15.00	$160,860.00
Paved shoulder, HMA mixture, 6 in. (includes rumble strips)	64,345	SY	$21.25	$1,367,331.25
Granular shoulders, type B	2,200	TON	$13.00	$28,600.00
Subtotal =				$1,556,791.25
Traffic Control (5% of subtotal)				$77,839.56
Mobilization (5% of subtotal)				$77,839.56
Miscellaneous & Contingency (5% of subtotal)				$77,839.56
Total =				$1,790,309.94
				Estimated cost for recommended alternative = $1,800,000

D. TIME SCHEDULE

Description	Date
Grant Application	August 2015
Approval of Agreement	December 2015
Construction Plan Preparation	July 2016 - December 2016
Construction	April 2017 - November 2017
Project Closeout	December 2017

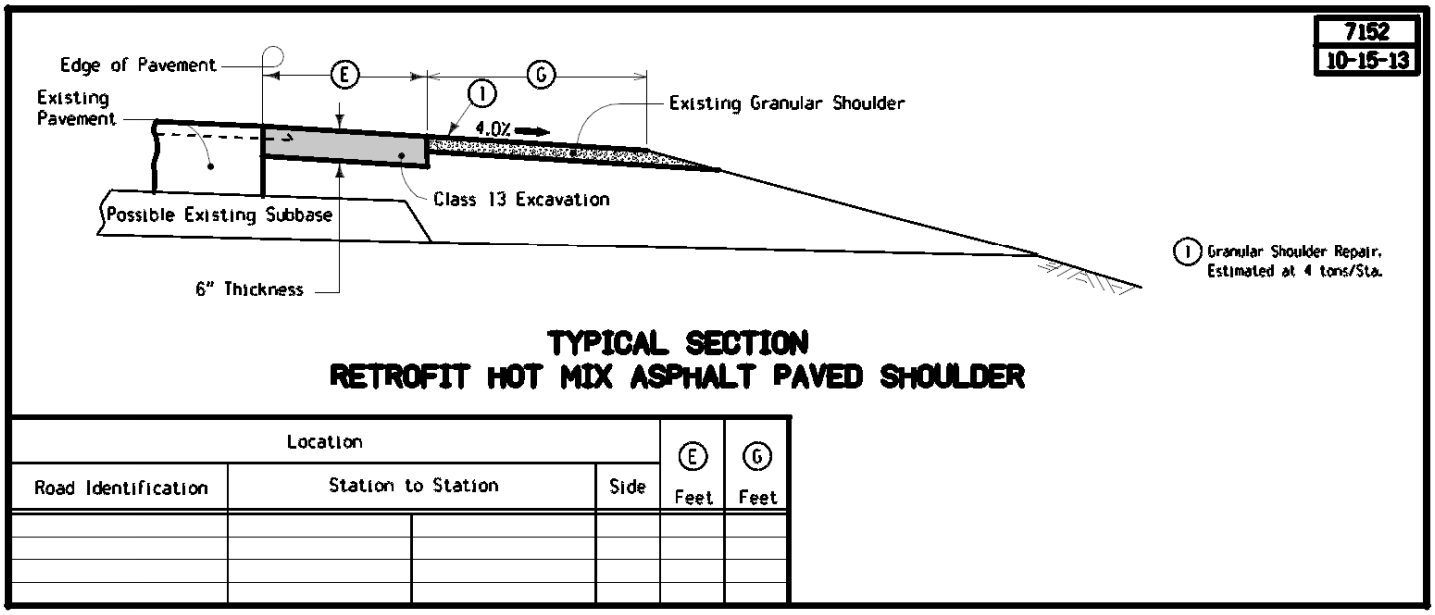
E. MAP


Trail Sections
Dubuque County (Phase I)
St. Donatus (Phase II)
Jackson County (Phase III)
Existing Bellevue Trail
Dubuque
20
20
151
52
61
Mines of Spain
State Recreation
Area
Phase I
8.3 Miles
Constructed
Summer 2015
Phase III
1.94 Miles
St. Donatus
Phase II
0.49 Miles
Constructed
Summer 2015
Phase III
7.20 Miles
Bellevue
Bellevue
State Park

F. PICTURES

F. PICTURES

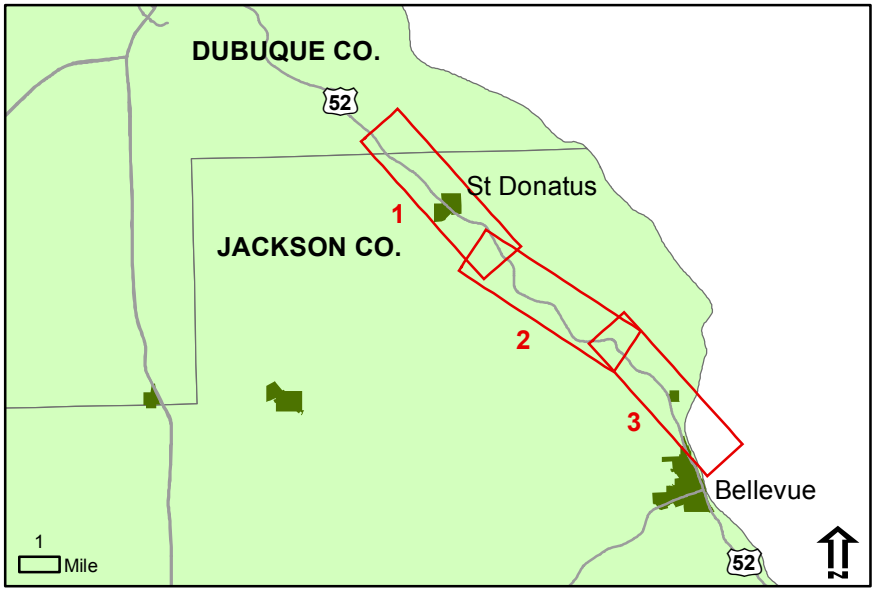
G. PLAN VIEW



TYPICAL SECTION
RETROFIT HOT MIX ASPHALT PAVED SHOULDER

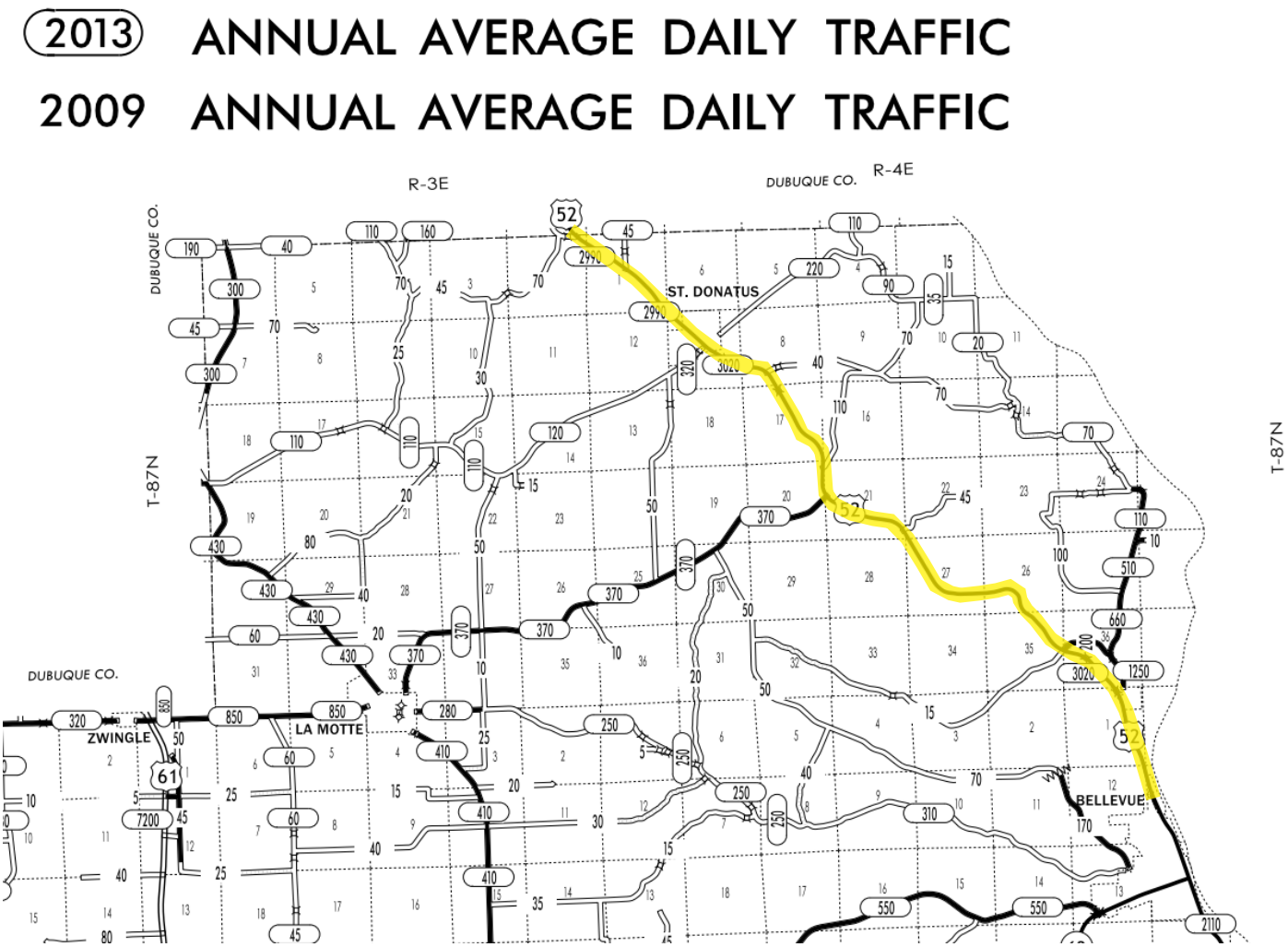
Location				E	G
Road Identification	Station to Station		Side	Feet	Feet

H. AERIAL PHOTOGRAPH



J. TRAFFIC VOLUMES

This map is a clipped section from the Iowa DOT 2013 Jackson County Traffic Flow Map. Map is not to scale.



TRAFFIC FLOW MAP OF

JACKSON COUNTY

IOWA

Prepared By

Iowa Department of Transportation

OFFICE OF TRANSPORTATION DATA
Phone: (515) 239-1289
WWW.IOWADOT.GOV/MAPS

In Cooperation With
United States
Department of Transportation

JANUARY 1, 2013

LEGEND

DIVIDED HIGHWAY
PAVED ROAD
BITUMINOUS ROAD
GRAVEL ROAD
EARTHEN ROAD
LEGAL NOT OPEN ROAD

L. BENEFIT-COST WORKSHEET

Rev. 5/14

Road Segment Benefit / Cost Safety Analysis

Iowa DOT Office of Traffic & Safety

County: Jackson | Prepared by: Chandra Ravada | Date Prepared: Jul 15, 2015

Location: US 52 between Dubuque county line and the City of Bellevue

Improvement

Proposed Improvement(s): Construct 6 foot shoulders on either side of US 52 from dubuque county line to the City of Bellevue city limits

$1,800,000	Estimated Improvement Cost, **EC**	20	Est. Improvement Life, years, **Y**
$ 10,000	Other Annual Cost (after initial year), **AC**	25	Crash Reduction Factor (integer), **CRF**
$ 135,903	Present Value Other Annual Costs, **OC**	4.0%	Discount Rate, **INT**
		$ 1,935,903	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 traffic counts | 2013 Date of traffic count

Length (mi.)	Two-way veh/day	Description
9.14	3,020	
9.14	miles total	

27,603	Current Vehicle Miles / Day, **VM**
33,681	End of Life Veh. Miles / Day
10,075,022	Current Veh. Miles / Year, **AM**
221,841,950	Total Projected Veh. Miles Over Life of Project, **TVMT**
1.0%	Projected Traffic Growth (0%-10%), **G**

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

Crash Data

2004 First full year --> 2014 Last full year | 11.0 years, Time Period, **T**

Additional months | values as of May 2014

1	Fatal Crashes	1	Fatalities @	$4,500,000	$ 4,500,000
		7	Major Injuries @	$325,000	$ 2,275,000
26	Injury Crashes	5	Minor Injuries @	$65,000	$ 325,000
		14	Possible Injuries @	$35,000	$ 490,000
36	Property Damage Only		(assumed cost per crash)	$7,400	$ 466,200
			-OR- enter all Property Costs of all crashes:		
63	Total Crashes, **TA**			Total $ Loss, **LOSS**	$ 8,056,200

5.73	Current Crashes / Year, **AA** = TA / T	**56.8**	Crashes / HMVM, Crash Rate, **CR** CR = TA x 10^8 / (AM x T)
$ 127,876	Cost per Crash, **AVCR** = LOSS / TA	**$ 2,704,449**	Present Value of Avoided Crashes, **BENEFIT**
126.1	Total Expected Crashes, **TCR** = CR x TVMT/10^8		
1.43	Crashes Avoided First Year **AAR** = AA x CRF / 100		
$ 183,095	Crash Costs Avoided in First Year, AAR x AVCR		
31.5	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 = $2,704,449 : $1,935,903 = **1.40** : 1

Rev. 5/15

Application for TRAFFIC SAFETY FUNDS

GENERAL INFORMATION **DATE:** August 13, 2015

Location / Title of Project US 151 / Iowa 13 / US 30 / Ramp D

Applicant Iowa DOT - District 6

Contact Person Tom Storey Title District Staff Engineer

Complete Mailing Address 5455 Kirkwood Blvd. SW

Cedar Rapids IA 52404

Phone (319) 730 - 1511 E-Mail thomas.storey@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 Project Cost $ 450,000

Safety Funds Requested $ 450,000

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 _____

Signed: _____

Signature Date Signed

_____

Typed Name

Attest: _____

Signature Date Signed

_____

Typed Name

B

B.1. Existing Conditions

The proposed project is located on Ramp D at the US 30 / Iowa 13 / US 30 interchange in Linn County, Iowa. Ramp D takes traffic from southbound US 151 / Iowa 13 to eastbound US 30.

Ramp D at this location has two lanes. The two lanes merge into one just beyond the end of the proposed project. There is a paved left side shoulder and a paved right side shoulder. There is steel beam guardrail along the right side shoulder (as viewed in the direction of travel). The ramp geometry includes a horizontal curve to the left (as viewed in the direction of travel) that tightens from a radius of 1,244 ft. to a radius of 671 ft.

The foreslope behind the guardrail is 3:1 within the limits of the 1,244 ft. curve and 2.5:1 within the limits of the 671 ft. curve. The fill height is approximately 36 ft. There is a woodland at the toe of slope and a possible wetland beyond the toe of slope. The Cedar River is nearby.

The posted speed limit is 65 mph. There is a posted advisory speed of 45 mph for all vehicles, and a posted advisory speed of 35 mph for trucks. The traffic volume on Ramp D was 3,256 vpd in 2013.

There are signs warning trucks that the curve tightens. There are chevrons behind the guardrail.

B.2. Proposed Concept

The proposed concept is to:

A. Remove the existing steel beam guardrail and widen and flatten the existing foreslope along the outside of the curve to provide a 6:1 / 3:1 barn roof cross section with a 42 ft. wide clear zone, or

B. Remove the existing steel beam guardrail and the existing HMA paved shoulder along the outside of the curve, and replace with a 10 ft. wide by 10 in. thick PCC paved shoulder and a BA-102 PCC barrier.

If site conditions would prohibit alternate A, then alternate B would be selected in its place. Alternate A would extend the toe of foreslope approximately 40 ft. in the area of the 2.5:1 foreslope. Alternate B would reduce the effective shoulder width to 8 ft.

B.3. Justification

Semi-trucks have penetrated the steel beam guardrail four times since 2013. There was one fatality. Each incident required placement of temporary barrier rail by Iowa DOT and repair the steel beam guardrail by contract.

B.4. Cost Estimate and Proposed Funding Sources

The estimated cost of Alternate A is $450,000. The estimated cost of Alternate B is $450,000. It is proposed to fund 100% of the cost of the project with TSIP funds.

B.5. Proposed Schedule

The project is proposed for letting in fiscal year 2017. Construction would occur in calendar year 2017.

C

C. Cost Estimates

Alternate A:

Item Number	Cat	Description	Units	Quantity	Unit Price	Cost
10		REMOVE STEEL BEAM GUARDRAIL	LF	1,400	$5	$7,000
20		CLEARING AND GRUBBING	ACRE	4	$5,000	$20,000
30		EMBANKMENT-IN-PLACE	CY	25,000	$10	$250,000
40		TOP SOIL	CY	5,000	$15	$75,000
50		SEED, FERTILIZE, AND MULCH	ACRE	4	$2,500	$10,000
60		SILT FENCE	LF	3,200	$5	$16,000
70		TRAFFIC CONTROL	LS	1	$10,000	$10,000
80		MOBILIZATION	LS	1	$20,000	$20,000
		SUBTOTAL				$408,000
		+10% MISCELLANEOUS				$42,000
		TOTAL (Alternate A)				$450,000

C

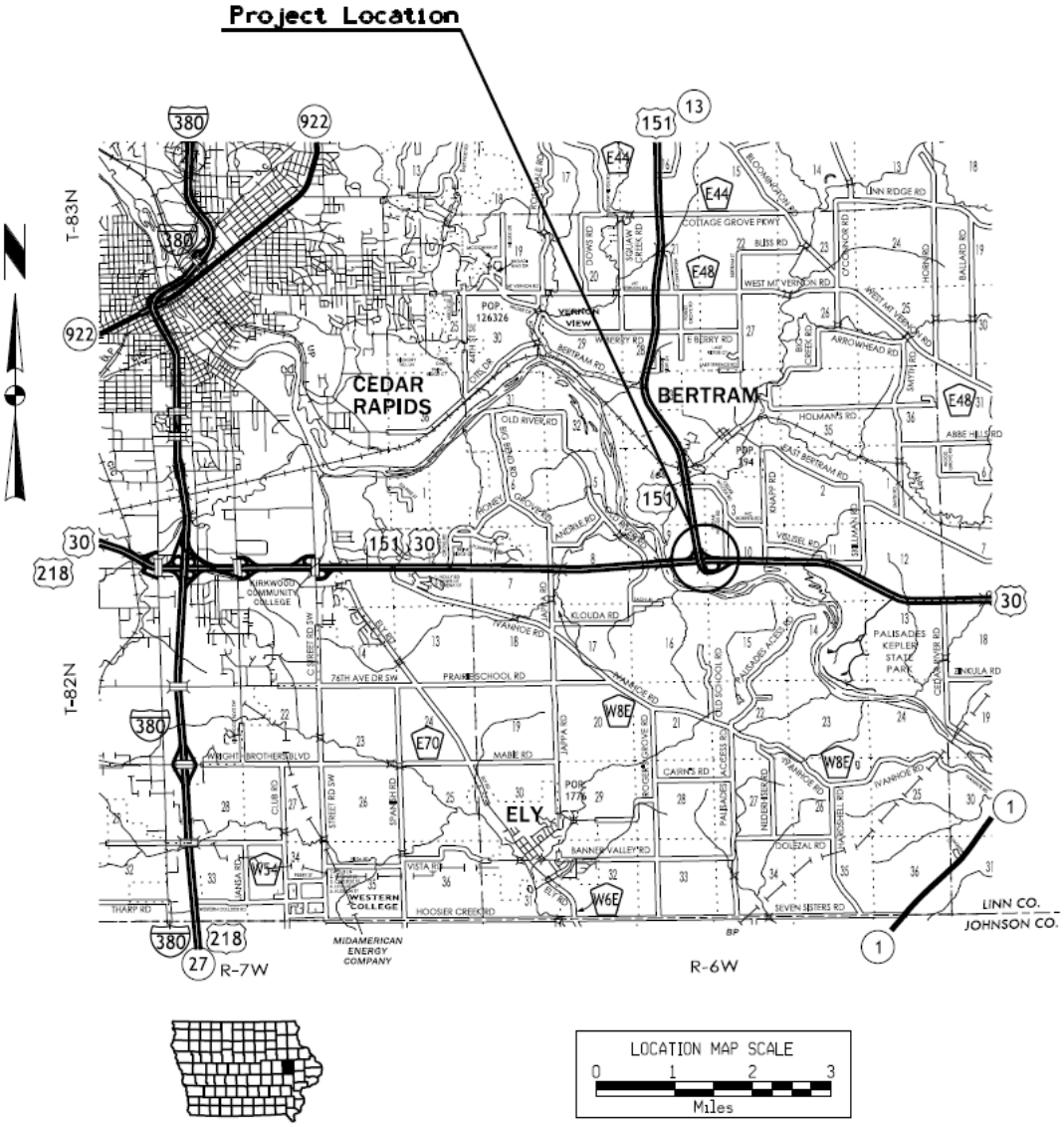
Alternate B:

Item Number	Cat	Description	Units	Quantity	Unit Price	Cost
10		REMOVE STEEL BEAM GUARDRAIL	LF	1,400	$5	$7,000
20		REMOVAL OF PAVEMENT	SY	1,600	$10	$16,000
30		EXCAVATION, CLASS 13	CY	200	$20	$4,000
40		MODIFIED SUBBASE	CY	400	$50	$20,000
50		PCC PAVED SHOULDER	SY	1,600	$100	$160,000
60		BA-102 BARRIER	LF	1,400	$100	$140,000
70		TOP SOIL	CY	100	$20	$2,000
80		SEED, FERTILIZE, AND MULCH	ACRE	1	$5,000	$5,000
90		SILT FENCE	LF	1,600	$5	$8,000
100		TRAFFIC CONTROL	LS	1	$10,000	$10,000
110		MOBILIZATION	LS	1	$20,000	$20,000
		SUBTOTAL				$392,000
		+15% MISCELLANEOUS				$58,000
		TOTAL (Alternate B)				$450,000

D. Time Schedule

The contract letting would be in early 2017. Construction would take place in calendar year 2017 with completion expected by November 15, 2017.

E. Location Map



F

F. Color Pictures (Google Earth images predate chevron installation)

1. **Southbound on US 151 approaching Ramp D**

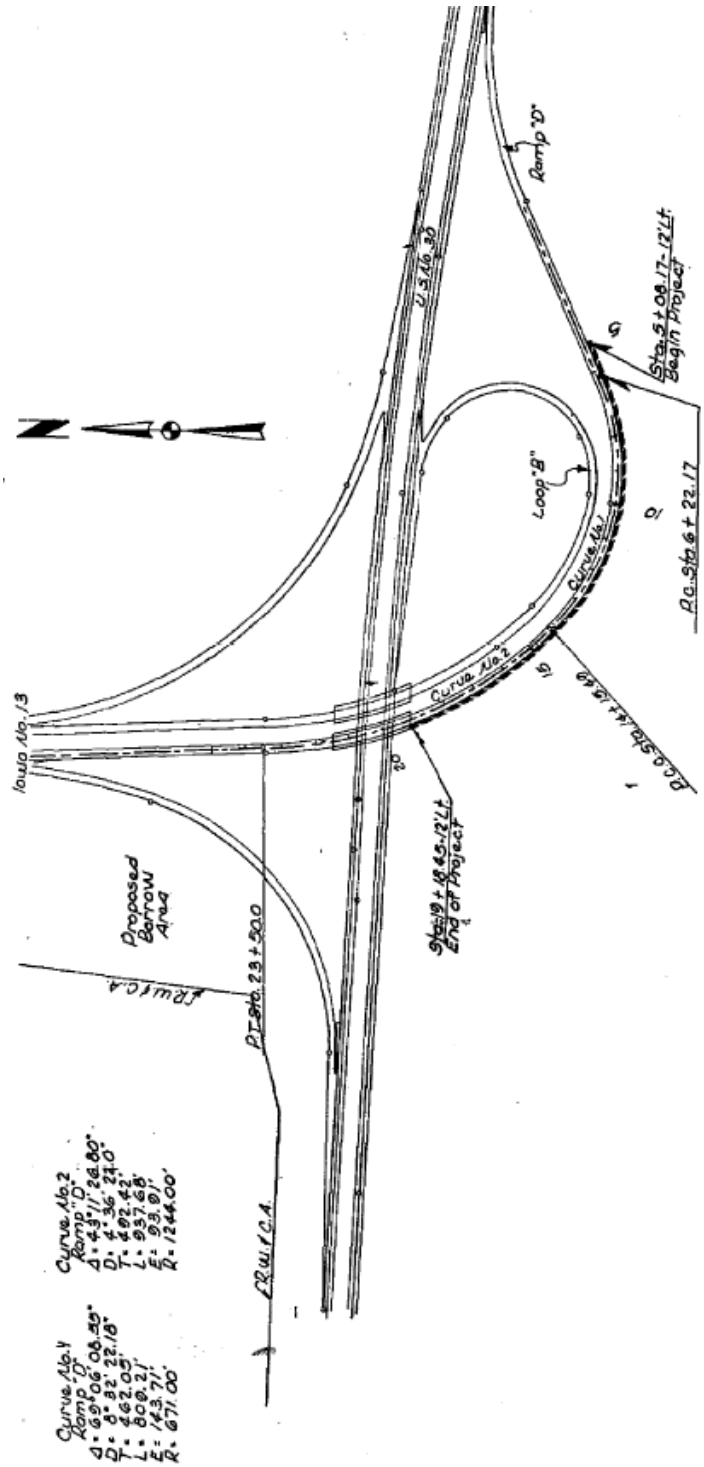
2. **Southbound, entering Ramp D**

F

3. Ramp D (new chevrons not shown)

4. Ramp D (crash site)

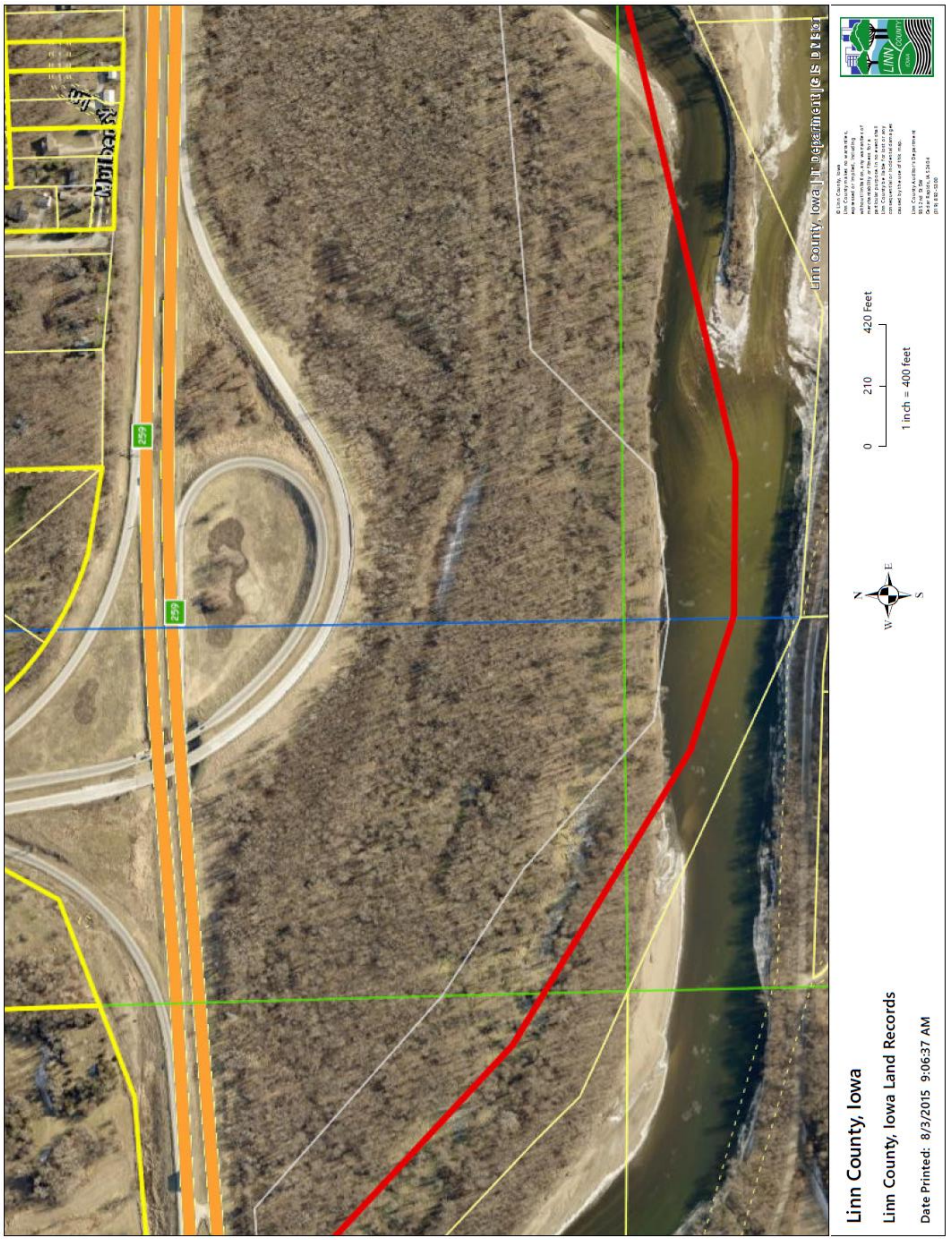
G. Plan View


Iowa No. 13
Curve No. 1
Ramp "D"
Δ = 69°06'08.59"
D = 8° 32' 22.18"
T = 462.05'
L = 808.21'
E = 143.71'
R = 671.00'
Curve No. 2
Ramp "D"
Δ = 43°11'28.80"
D = 4° 36' 24.0"
T = 492.42'
L = 937.68'
E = 93.81'
R = 1244.00'
R.W.R.C.A.
PT Sta. 23+50.0
Proposed Borrow Area
R.W.R.C.A.
Sta. 19+18.45-12'Lt.
End of Project
Curve No. 2
Curve No. 1
Loop "B"
P.C. Sta. 14+18.49
P.C. Sta. 6+22.17
Ramp "D"
Sta. 5+08.17-12'Lt.
Begin Project
U.S. No. 30

H. Aerial Photograph (Google Earth)

H

H. Aerial Photograph (Linn County GIS)



I. Accident History (reports provided as a separate document)

Iowa Department of Transportation

Major Cause Summary

CMaT Version 4.5.1

Analysis Years: 2004 [3], 2005 [2], 2006 [4], 2007 [5], 2008 [1], 2009 [5], 2011 [1], 2012 [2], 2013 [1], 2014 [2]

Crash Summary:

Fatal	1
Major Injury	-
Minor Injury	3
Possible/Unknown	2
PDO	20
Total Crashes	26

Injury Summary:

Fatal	1
Major Injury	-
Minor Injury	3
Possible	1
Unknown	1
Total Injuries	6

TOT Property Damage: $245,319

AVG Property Damage: $9,435

Surface Condition Summary:

Dry	11
Wet	2
Ice	2
Snow	2
Slush	-
Sand/Dirt/Oil/Gravel	-
Water	-
Other	-
Unknown	1
Not Reported	8
Total Crashes	26

Major Cause Summary:

8	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
1	FTYROW: From Yield Sign
	FTYROW: Making Left Turn
	FTYROW: From Driveway
	FTYROW: From Parked Position
	FTYROW: To Pedestrian
	FTYROW: Other (explain in narrative)
	Traveling Wrong Way or on Wrong Side of Rd
4	Driving Too Fast for Conditions
	Exceeded Authorized Speed
	Made Improper Turn
	Improper Lane Change
2	Followed Too Close
	Disregarded Railroad Signal
	Disregarded Warning Sign
1	Operating Vehicle in Reckless/Aggressive Manner
	Improper Backing
	Illegally Parked/Unattended
2	Swerving/Evasive Action
2	Over-Correcting/Over-Steering
	Downhill Runaway
	Equipment Failure
	Separation of Units
1	Ran Off Road - Right
	Ran Off Road - Straight
1	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
2	Unknown
	Other: No Improper Action
1	None Indicated

Selection Filter:

None

Analyst: C. Lohrer

Notes: Major Crash Summary, SB US 151/IA 13 to EB US 30, Linn Co.

2/13/2015 Crash Mapping Analysis Tool Page: 1 of 1

J. Traffic Volumes

Iowa Department of Transportation
Turning Movement Traffic Count Summary
Annualized Daily Traffic For All Vehicles

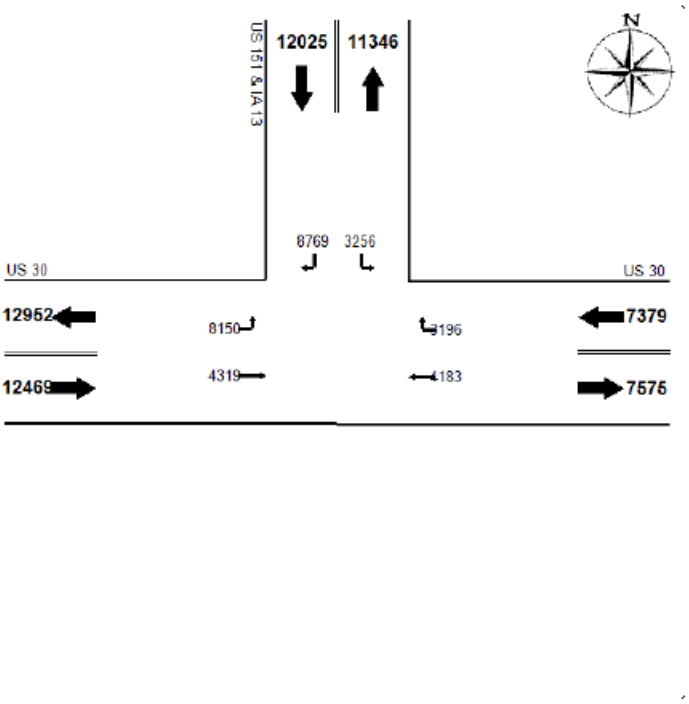
Station Number:
57137348099

Count Date:
Monday, July 08, 2013

County:
Linn

Location Description:
US 30, US 151 & IA 13

Volume Factor: 2.024
Pass Class Factor: 2.087
SU Class Factor: 1.735
Combo Class Factor: 1.773



Raw Data-All Vehicles:

	N Leg		E Leg		W Leg	
	L	*R*	*T*	*R*	*L*	*T*
07:00	229	1,068	596	233	388	208
08:00	203	695	309	203	384	181
11:00	177	444	245	220	404	204
12:00	243	472	206	191	451	213
15:00	216	573	227	224	671	404
16:00	255	579	245	234	908	474
17:00	252	497	210	248	806	421

Rev. 5/14

Road Segment Benefit / Cost Safety Analysis

Iowa DOT Office of Traffic & Safety

County: Linn | Prepared by: Tom Storey | Date Prepared: Aug 13, 2015

Location: Ramp D at the US 151 / Iowa 13 / US 30 interchange.

Improvement

Proposed Improvement(s): Alternate B: Remove existing steel beam guardrail, remove existing HMA paved shoulder, construct PCC paved shoulder and PCC barrier.

$ 450,000	Estimated Improvement Cost, **EC**	20	Est. Improvement Life, years, **Y**
$ -	Other Annual Cost (after initial year), **AC**	51	Crash Reduction Factor (integer), **CRF**
$ -	Present Value Other Annual Costs, **OC**	4.0%	Discount Rate, **INT**
	$OC = \frac{AC}{INT}\left(1 - \frac{1}{(1+INT)^Y}\right)$	**$ 450,000**	Present Value All Costs, **COST** = EC + OC

Traffic Volume Data

Source: Iowa DOT Systems Planning | 7/8/2013 Date of traffic count

Length (mi.)	Two-way veh/day	Description
0.26	3,256	Ramp D Only (One Way)
0.26	miles total	

847 Current Vehicle Miles / Day, **VM**

1,033 End of Life Veh. Miles / Day

308,994 Current Veh. Miles / Year, **AM**

6,803,749 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 --> 2014 Last full year | 11.0 years, Time Period, **T**

0 Additional months | values as of May 2014

1	Fatal Crashes	1	Fatalities @	$4,500,000	$ 4,500,000
		0	Major Injuries @	$325,000	$ -
1	Injury Crashes	1	Minor Injuries @	$65,000	$ 65,000
		0	Possible Injuries @	$35,000	$ -
3	Property Damage Only		(assumed cost per crash)	$7,400	$ 37,000
			-OR- enter all Property Costs of all crashes:		
5	Total Crashes, **TA**			Total $ Loss, **LOSS**	$ 4,602,000

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

$ 920,400 Cost per Crash, **AVCR** = LOSS / TA

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

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

$ 213,365 Crash Costs Avoided in First Year, AAR x AVCR

5.1 Total Avoided Crashes, TCR x CRF/ 100

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

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

$ 3,151,558 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 = $3,151,558 : $450,000 = **7.00** : 1

SHIVEHATTERY
ARCHITECTURE + ENGINEERING

August 14, 2015

Donna Matulac, P.E.
Office of Traffic and Safety
Iowa Department of Transportation
800 Lincoln Way
Ames, Iowa 50010

Dear Donna,

Included is the Traffic Safety Improvement Application for a spot improvement in the City of Cedar Rapids, Iowa. The intersection identified for the improvements is Kirkwood Boulevard and the south access to the College Community School District campus. 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.

Justin Campbell, PE, ENV SP
Civil Engineer
(319) 364-0227
jcampbell@shive-hattery.com

Project # 2151480

Traffic Safety Improvement Program Application

Kirkwood Boulevard SW & College Community School District South Access Drive

Cedar Rapids, Iowa

August 14, 2015

Prepared by:

SHIVEHATTERY

ARCHITECTURE + ENGINEERING

316 2nd Street, Suite 500
Cedar Rapids, Iowa 52406
(800) 798-0227

Rev. 5/15

IOWADOT

Application for TRAFFIC SAFETY FUNDS

GENERAL INFORMATION **DATE:** _____

Location / Title of Project: Kirkwood Blvd SW & CCSD South Access Drive

Applicant: City of Cedar Rapids

Contact Person: Kevin Vrchoticky Title: Project Manager

Complete Mailing Address: 500 15th Ave SW
Cedar Rapids, IA 52404

Phone: (319) 286-5802 (Area Code) E-Mail: k.vrchoticky@cedar-rapids.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 Project Cost $ 636,780

Safety Funds Requested $ 500,000

Rev. 5/15

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 Cedar Rapids

Signed: Matt Myers — 8/14/2015

Signature — Date Signed

Matt Myers

Typed Name

Attest: Sarah Cook — 8/14/15

Signature — Date Signed

Sarah Cook

Typed Name

ENG
FIN
TRS
AUD FILE
301929-00

RESOLUTION NO. 1120-07-15

RESOLUTION AUTHORIZING APPLICATION FOR A TRAFFIC SAFETY IMPROVEMENT PROGRAM (TSIP) GRANT FOR CONSTRUCTION OF KIRKWOOD BOULEVARD ROADWAY IMPROVEMENTPROJECT (CIP NO. 301929)

WHEREAS, the Iowa Department of Transportation has established the Transportation Safety Improvement Program (TSIP) and provides funding for locations where vehicular safety is a concern and documented and

WHEREAS, the City of Cedar Rapids has identified Kirkwood Boulevard and South Access Road to College Community School District campus as a location where vehicular safety could be improved and funded with the TSIP, and

WHEREAS, the improvements installing a roundabout will help reduce crashes, improve traffic safety operation and remove a traffic safety officer, and

WHEREAS, the Community College School District Board passed a Resolution of approval to submit for TSIP funding, and

WHEREAS, the City of Cedar Rapids Public Works Department recommends approval of this resolution,

NOW THEREFORE, BE IT RESOLVED BY THE CITY COUNCIL OF THE CITY OF CEDAR RAPIDS, IOWA that the above noted project is hereby endorsed for submission to the TSIP Grants project, and

BE IT FURTHER RESOLVED BY THE CITY COUNCIL OF CEDAR RAPIDS, IOWA, that the City Manager and Public Works Director or designee is authorized and directed to execute with signature any and all materials required for submission of the subject grant applications including any and all assurances, certifications or other document components as may be related to terms, conditions, etc. of funding agreement(s) stipulating compliance with applicable laws, regulations, etc. which may now or hereafter affect the subject provision of financial assistance.

Passed this 28th day of July, 2015.

Voting: Council member Vernon moved the adoption of the resolution; seconded by Council member Poe. Adopted, Ayes, Council members Gulick, Olson, Poe, Russell, Shey, Shields, Vernon, Weinacht and Mayor Corbett.

Ron J. Corbett, Mayor

Attest:

Amy Stevenson, City Clerk

Background

The City of Cedar Rapids is planning to make intersection improvements at Kirkwood Boulevard SW and the College Community School District south access. The improvements are planned due to the future expansion of College Community School District. The District is planning on building a new intermediate school to accommodate 1,000 new students in 2016 with an expected opening day of 2017. Kirkwood Boulevard is a primary route for students and staff going to and from the Kirkwood Community College and College Community School District campuses. The issues the City and school district are facing, which will increase with future traffic growth are:

- Speeding along Kirkwood Boulevard
    - Feedback message signs have been placed on the corridor to deter motorists from speeding. Observations from school district staff has indicated that even with the addition of signs, motorists continue to speed along Kirkwood Boulevard.
- Access from College Community Campus onto Kirkwood Boulevard
    - A police officer has been hired by the school district, during peak hours, to direct traffic from College Community south access onto Kirkwood Boulevard.
- Safe pedestrian crossings
    - There are currently no safe locations identified for pedestrians/students to cross Kirkwood Boulevard south of 76th St.

Kirkwood Boulevard is primarily a three-lane urban roadway with left-turn lanes from 76th Street to College Community's south access. From the south access south to Woodstone Lane, Kirkwood Boulevard is a rural two-lane roadway. Kirkwood Boulevard currently has sidewalks on both sides of the road and has a posted speed during non-school hours of 40 MPH. During school hours the posted speed is reduced to 25 MPH and feedback message signs have been installed to deter motorists from speeding by the school campus. As a result of the difficulty of getting access onto Kirkwood Boulevard, the school district has hired a police officer to control traffic during the peak hours to ensure that buses, students, parents and staff can safely turn onto Kirkwood Boulevard. In 2013 the Iowa DOT collected Annual Average Daily Traffic (AADT) within the project corridor of 4,090 vehicles. This corridor is expected to see

growth and the Corridor Metropolitan Planning Organization (CMPO) is estimating by 2040 for Kirkwood Boulevard to increase to 9,000 vehicles a day. See **Exhibit H** for existing conditions.

Crash History

Crash history for this intersection was collected from the Iowa DOT Crash Mapping Analysis Tool (CMAT) software and the City of Cedar Rapids Police Department. Crashes were evaluated from 2009 to 2014 to identify trends and safety issues with the current intersection geometry. Even though an officer has been regulating traffic at this intersection, in the past six years six crashes have been reported at this location resulting in two minor injuries. School District staff has also witnessed a number of near misses at this intersection. Three of six crashes were a result of motorists trying to pick inadequate gaps onto Kirkwood Boulevard resulting in broadside collisions and two were related to speeding resulting in a rear-end collision and a non-collision injury . Refer to **Section I** for crash history summaries.

Proposed Improvements

With the police officer regulating traffic, crashes have been minimized; however this form of traffic control is not a practical long-term solution. The additional staff the police department needs as well as the added cost to the District are more reasons improvements are necessary. Traffic signals were evaluated for this intersection and none of the eight warrants were met as required by MUTCD. To address two of the primary issues, speeding along the corridor and access onto Kirkwood Boulevard from the College Community Campus, the City is proposing to construct a single-lane roundabout. This intersection design will address the gap acceptance issue and will also serve as a traffic calming measure and deter motorists from speeding. Splitter islands will be raised to allow for pedestrian refuges which will also reduce the overall crosswalk lengths. The improvements will also include sidewalks to maintain continuous pedestrian access in the area. Also included in the improvements is intersection lighting to illuminate the approaches and pedestrian crossings. Refer to **Section G** for proposed improvements.

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

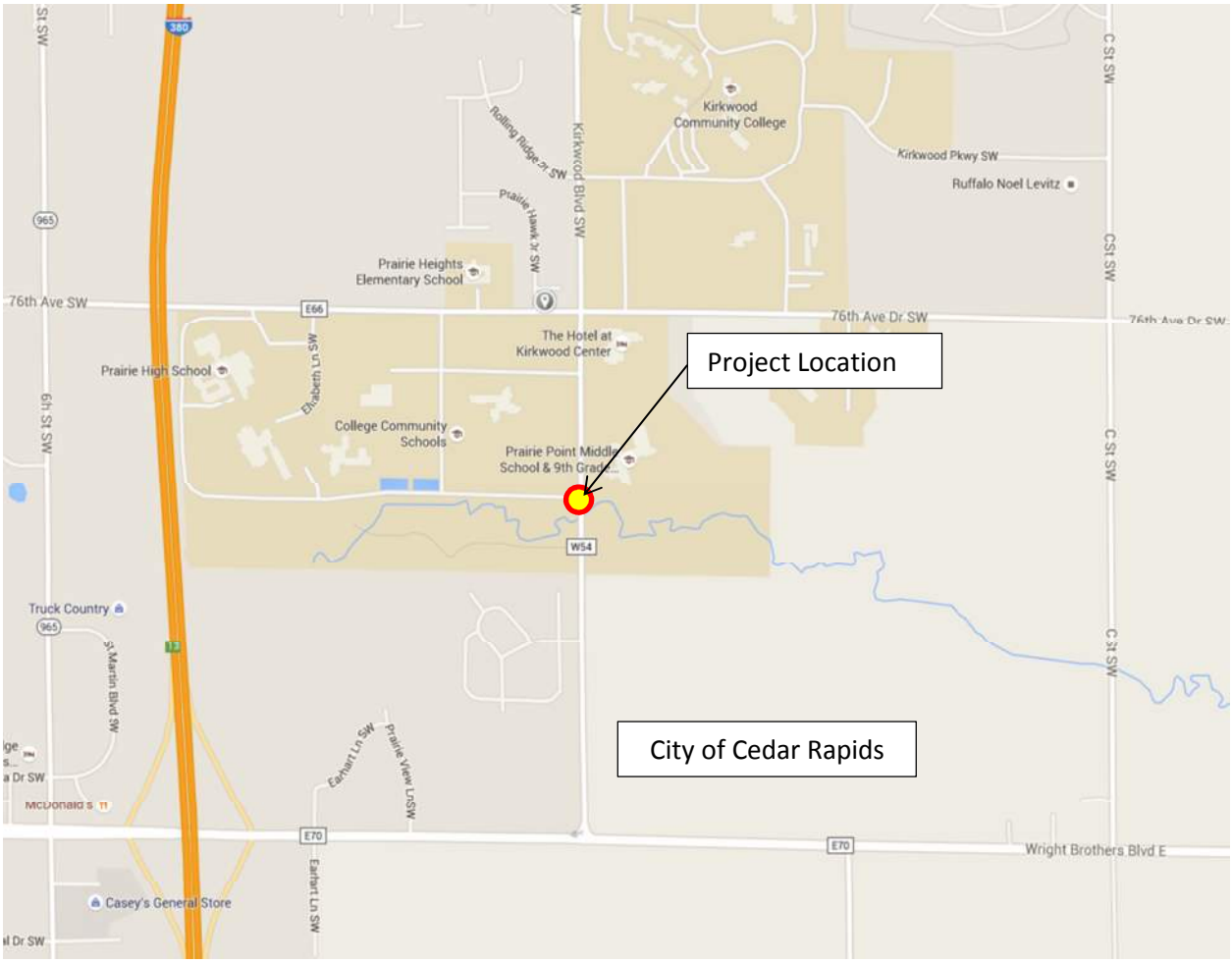
Proposed Public Improvements - Single-Lane Roundabout
Kirkwood Boulevard SW and College Community School District South Access Drive

Cedar Rapids, Iowa
Engineer's Rough Order Magnitude of Cost
Estimate of Quantities - August 14, 2015

Item No	Description	Unit	Unit Price	Quantity	Cost
1	Removal of Pavement	SY	$ 8	4,460	$ 35,680
2	Removal of Tree	EA	$ 200	6	$ 1,200
3	Unclassified Excavation & Embankment	CY	$ 8	4,000	$ 32,000
4	PCC, 10"	SY	$ 55	3,100	$ 170,500
5	PCC, 7"	SY	$ 45	1,700	$ 76,500
6	Granular Subbase, 6"	SY	$ 7	4,800	$ 33,600
7	PCC Truck Apron, 10"	SY	$ 90	370	$ 33,300
8	Storm Sewer	LF	$ 85	900	$ 76,500
9	Subdrain, 6"	LF	$ 15	2,500	$ 37,500
10	Storm Sewer Intake, RA-3	EA	$ 2,500	4	$ 10,000
11	Storm Sewer Intake, RA-5	EA	$ 3,500	4	$ 14,000
12	Imported Top Soil	CY	$ 30	570	$ 17,100
13	Hydroseeding with Liquid Mulch Binder	ACRE	$ 4,000	2	$ 8,000
14	Right of Way Trees	EA	$ 250	30	$ 7,500
15	Pavement Markings and Signage	LS	$ 7,000	1	$ 7,000
16	Silt Fence	LF	$ 2	700	$ 1,400
17	Traffic Control	LS	$ 25,000	1	$ 25,000
18	Mobilization	LS	$ 50,000	1	$ 50,000
	Rough Order of Magnitude Construction Cost				$ 636,780

Improvements to the Kirkwood Boulevard SW and College Community School District South Access Drive which are to be funded through Traffic Safety Improvement Fund. The schedule proposed for the safety improvements is as follows:

- **August 2015** – Submit for 2015 TSIP Funds
- **January 2016 – August 2016** – Proceed with design of improvements
- **December 2015** – TSIP Funds are awarded
- **July 2016** –TSIP funds are available for the intersection improvements
- **November 2016** –Let intersection project
- **May 2017** – Construction begins
- **August 2017** – Construction complete for single-lane roundabout.


Project Location
City of Cedar Rapids
Kirkwood Community College
Kirkwood Pkwy SW
Ruffalo Noel Levitz
Kirkwood Blvd SW
Rolling Ridge Ln SW
Prairie Hawk Ln SW
Prairie Heights Elementary School
76th Ave SW
76th Ave Dr SW
The Hotel at Kirkwood Center
Prairie High School
Elizabeth Ln SW
College Community Schools
Prairie Point Middle School & 9th Grade
C St SW
6th St SW
Truck Country
S Martin Blvd SW
Earhart Ln SW
Prairie View Ln SW
McDonald's
Wright Brothers Blvd E
Casey's General Store

Looking North from Kirkwood Boulevard SW (SB Approach)

Looking South from Kirkwood Boulevard SW (NB Approach)

Looking East from Kirkwood Boulevard SW (WB Approach)

Looking West from Kirkwood Boulevard SW (EB Approach)

Looking North on Kirkwood Boulevard SW*

Looking South on Kirkwood Boulevard SW*

*Source: Google®

SHIVEHATTERY
ARCHITECTURE + ENGINEERING

KIRKWOOD BOULEVARD SW & CCSD SOUTH ACCESS DRIVE
CEDAR RAPIDS, IOWA
7/17/2015

ROADWAY IMPROVEMENT CONCEPT

SCALE
0 100 200
SCALE IN FEET

EXHIBIT: G

Project Location
Google earth

Iowa Department of Transportation

Major Cause Summary

Report Version 1.1 Jan 2005

Analysis Years: 2009 [1], 2010 [1], 2011 [3], 2014 [1]

Crash Summary:

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

Injury Summary:

Fatal	-
Major Injury	-
Minor Injury	2
Possible	2
Unknown	-
Total Injuries	4

TOT Property Damage: $50,000

AVG Property Damage: $8,333

Surface Condition Summary:

Dry	5
Wet	1
Ice	-
Snow	-
Slush	-
Sand/Dirt/Oil/Gravel	-
Water	-
Other	-
Unknown	-
Not Reported	-
Total Crashes	6

Major Cause Summary:

1	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
1	FTYROW: From Stop Sign		Separation of Units
	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	1	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
1	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:

((YEAR <> 2004 and YEAR <> 2005 and YEAR <> 2006 and YEAR <> 2007 and YEAR <> 2008))

Analyst:

Notes:

Iowa Department of Transportation

Abbreviated Crash Report

Report Version 1.2 Mar 2005

Date	DOT Case #	Agency Case #	City	Crash Sev.	Literal Description
11/18/2009	2009537021	200919089	Cedar Rapids	Poss/Unk	7800 BLK KIRKWOOD BLVD SW
11/04/2010	2010598592	201017269	Cedar Rapids	PDO	8300 BLK KIRKWOOD BLVD SW
03/11/2011	2011621579	201103761	Cedar Rapids	Poss/Unk	8015 KIRKWOOD BLVD SW
10/26/2011	2011653676	201116377	Cedar Rapids	Minor	8000 BLK KIRKWOOD BLVD SW
11/01/2011	2011654772	201116743	Cedar Rapids	Minor	7700 BLK KIRKWOOD BLVD SW
05/03/2014	2014797336	201406149	Cedar Rapids	PDO	8000 KIRKWOOD BLVD SW

Selection Filter:

((YEAR <> 2004 and YEAR <> 2005 and YEAR <> 2006 and YEAR <> 2007 and YEAR <> 2008))

Analyst:

Notes:

Iowa Department of Transportation

Crash Detail Report

Report Version 1.3 Aug 2006

2009537021 11/18/2009 07:43 7800 BLK KIRKWOOD BLVD SW
County: 57 **City:** Cedar Rapids

Major Cause: Lost control
Roadway Type: Non-intersection: No special feature

Severity:	Poss/Unk	**Manner of Crash:**	Rear-end
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:**	$7000

Number of Vehicles: 3

	Unit 1	Unit 2	Unit 3
Init Trav Dir:	North	North	North
Veh Action:	Essentially straight	Essentially straight	Essentially straight
Configuration:	Sport utility vehicle	Passenger car	4-tire light truck
Driver Age:	41	48	15
Driver Gender:	F	M	M
Driver Cond:	Normal	Normal	Normal
Drivr Contr 1:	none	none	Lost control
Drivr Contr 2:	not reported	not reported	not reported
Fixed Object:	none	none	none

2010598592 11/04/2010 07:57 8300 BLK KIRKWOOD BLVD SW
County: 57 **City:** Cedar Rapids

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:**	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:	South	West	0
Veh Action:	Essentially straight	Essentially straight	0
Configuration:	4-tire light truck	Sport utility vehicle	0
Driver Age:	34	61	0
Driver Gender:	M	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

Iowa Department of Transportation

Crash Detail Report

Report Version 1.3 Aug 2006

2011621579 03/11/2011 07:55 8015 KIRKWOOD BLVD SW
County: 57 **City:** Cedar Rapids

Major Cause: FTY from driveway
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:**	Fog/smoke
Possible Injuries:	1	**Drug/Alc Involved:**	none indicated
Unknown Injuries:	0	**Property Damage:**	$12000

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	Sport utility vehicle	0
Driver Age:	16	46	0
Driver Gender:	F	F	
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

2011653676 10/26/2011 15:15 8000 BLK KIRKWOOD BLVD SW
County: 57 **City:** Cedar Rapids

Major Cause: Exceeded authorized speed
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:**	Cloudy
Possible Injuries:	0	**Drug/Alc Involved:**	none indicated
Unknown Injuries:	0	**Property Damage:**	$14000

Number of Vehicles: 1

	Unit 1	Unit 2	Unit 3
Init Trav Dir:	South	0	0
Veh Action:	Essentially straight	0	0
Configuration:	Passenger car	0	0
Driver Age:	27	0	0
Driver Gender:	M		
Driver Cond:	Normal	0	0
Drivr Contr 1:	Exceeded speed limit	0	0
Drivr Contr 2:	Lost control	0	0
Fixed Object:	none	0	0

Iowa Department of Transportation

Crash Detail Report

Report Version 1.3 Aug 2006

2011654772 11/01/2011 20:00 7700 BLK KIRKWOOD BLVD SW
County: 57 **City:** Cedar Rapids

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

Severity:	Minor	**Manner of Crash:**	Non-collision
Fatalities:	0	**Surface Conditions:**	Dry
Major Injuries:	0	**Light Conditions:**	Dark - roadway not lighted
Minor Injuries:	1	**Weather Conditions:**	Partly cloudy
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:	North	0	0
Veh Action:	Essentially straight	0	0
Configuration:	Motorcycle	0	0
Driver Age:	30	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

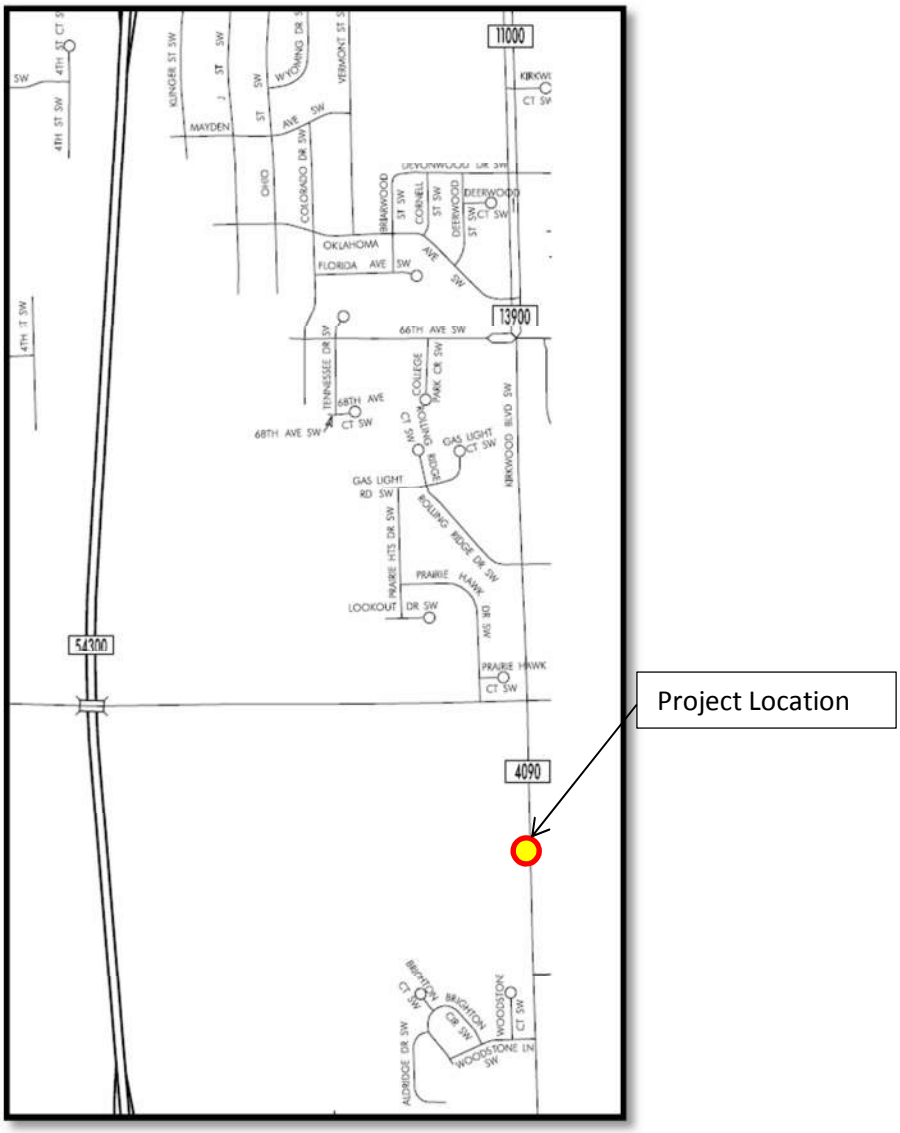
2014797336 05/03/2014 08:49 8000 KIRKWOOD BLVD SW
County: 57 **City:** Cedar Rapids

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:**	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:	North	East	0
Veh Action:	Essentially straight	Essentially straight	0
Configuration:	Van or mini-van	Passenger car	0
Driver Age:	54	18	0
Driver Gender:	M	M	
Driver Cond:	Normal	Normal	0
Drivr Contr 1:	none	FTY from stop sign	0
Drivr Contr 2:	not reported	not reported	0
Fixed Object:	none	none	0



2013 Iowa DOT Traffic Map

Road Name	2013 Iowa DOT ADT	2015 Shive-Hattery ADT
Kirkwood Boulevard	4090	6150
CCSD South Access Drive	-	1700

-Data unavailable

Rev. 5/14

Intersection or Spot Benefit / Cost Safety Analysis

Iowa DOT Office of Traffic & Safety

County: Linn | Prepared by: Shive-Hattery | Date Prepared: Aug 4, 2015

Intersection: Kirkwood Boulevard and CCSD South Access Drive - Cedar Rapids, Iowa

Improvement

Proposed Improvement(s): Conversion to single-lane roundabout

Existing 2-Way stop with left-turn lanes on Kirkwood Boulevard approaches

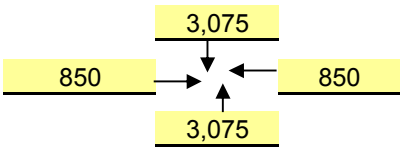
$ 636,780	Estimated Improvement Cost, **EC**	20	Est. Improvement Life, years, **Y**
	Other Annual Cost (after initial year), **AC**	75	Crash Reduction Factor (integer), **CRF**
$ -	Present Value Other Annual Costs, **OC**	4.0%	Discount Rate (time value of $), **INT**
		$ 636,780	Present Value Cost, **COST** = EC + OC

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

Traffic Volume Data

Source: Shive-Hattery | 2015 Date of traffic count

Daily Entering Vehicles by Approach (or AADT / 2)



2,865,250 Current Annual Entering Veh., **AEV** = DEV * 365

11,216 veh / day, Final Year DEV, **FDEV**

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

1.8% Projected Traffic Growth (0%-10%), **G**

7,850 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 6.0 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	2	Minor Injuries @	$65,000	$	130,000
		2	Possible Injuries @	$35,000	$	70,000
2	Property Damage Only		(assumed cost per crash)	$7,400	$	-
		-OR-	enter all Property Costs of all crashes:		$	50,000
6	Total Crashes, **TA**			Total $ Loss, **LOSS**	$	250,000

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

$ 41,667 Cost per Crash, **AVC** = LOSS / TA

23.8 Total Expected Crashes, **TECR** = CR x TMEV

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

$ 31,250 Crash Costs Avoided in First Year, AAR x AVC

17.9 Total Avoided Crashes, TECR x CRF/ 100

0.35 Crashes / MEV, Crash Rate, **CR**

CR = TA x 10^6 / (DEV x 365 x T)

$ 494,230 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 = $494,230 : $636,780 = **0.78** : 1

Application for TRAFFIC SAFETY FUNDS

GENERAL INFORMATION **DATE:** August 13, 2015

Location / Title of Project: US 61 Turn Lanes at Coonhunter's Road

Applicant: Iowa DOT, District 6

Contact Person: Douglas Rick Title: Area Engineer

Complete Mailing Address: PO Box 2626
Davenport , IA 52809

Phone: 563-391-4643 (Area Code) E-Mail: douglas.rick@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 Project Cost $ $170,000

Safety Funds Requested $ $170,000

Document A

Rev. 5/15

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 DOT, District 6

Signed: Douglas L. Rick 8/13/2015

Signature Date Signed

Douglas L Rick

Typed Name

Attest:

Signature Date Signed

Typed Name

Document B

US 61 Turn Lanes at Coonhunter's Road

Existing Conditions:

The US 61/Coonhunter's Road "T" intersection is located one half mile east of the City of Blue Grass. US 61 is a rural 4-lane divided highway with gravel shoulders and a 65 mph speed limit. Coonhunter's Road is a paved Scott County road with gravel shoulders and a 45 mph speed limit. Coonhunter's Rd serves actively growing major rural subdivisions totaling over 300 parcels south of US 61.

There have been numerous crashes at this intersection resulting in many public contacts to the district 6 office and the district 6 Davenport field office. Some of these crashes involve traffic slowing down to make a turn onto Coonhunter's Road. The complaints received are asking for the Iowa DOT to add adequate turn lanes so turning traffic can slow down without the fear of being rear-ended.

Currently southbound US 61 has a minimum length (150') left turn lane at Coonhunter's Road. There is no northbound US 61 right turn lane.

The 2014 average annual daily traffic of Coonhunter's Rd is 1810. This volume has increased an average of 7% per year for the last eight years most likely due to the growing size of the subdivisions.

Proposed Concept:

The district is proposing to provide full deceleration turn lanes for SB US 61 to SB Coonhunter's Rd by increasing the existing left turn lane 420' plus a 15:1 taper. And for NB US 61 to SB Coonhunter's Rd adding a right turn lane of 540' plus a 15:1 taper. The turn lane width will be 12' and will have 6' granular shoulders. The work is to be done within the existing right-of-way.

Safety Justification:

There are 14 crash reports from June 2010 to June 2015. Of the 8 non-animal caused crashes, 7 involved vehicles swerving, losing control, following too close resulting, and/or rear-end collisions. Providing full deceleration turn lanes will make it possible to reduce this frequency of crashes.

One crash that created much attention to this intersection involved a semi-truck rear-ending a passenger car slowing down to make a right turn. Case number 2014-21377 dated 10/21/2014. The crash report showed minor injuries only; however is not what was recorded in the narrative

Document B

of the investigating officer report. The child that was trapped in the passenger vehicle was air lifted to the University of Iowa hospitals for a skull fracture. In the benefit/cost safety analysis spreadsheet, I changed this from a minor injury to a major injury.

In reviewing the Crash Modification Factors Clearinghouse, it was concluded that a crash reduction factor (CRF) of 20 was about the average for adding left and right turn lanes. This results in a 2.12:1 benefit/cost ratio for adding these turn lanes.

US 61 at Coonhunter's Rd east of Blue Grass

	length, ft	taper, ft	width, ft	cl 13, sf	cl 13, cy	embankment, sf	30% shrinkage less class 13 cy embankment, cy	turn lane pavement, sy	granular shoulder, sf	145#/cf plus 20% gran should, tons	
extend SB US 61 left turn lane	420	180	12	4.1	77	11.1	195	680	3.7	164	
new NB US61 right turn lane	540	150	10	5.5	125	11.9	227	683	3.4	182	
estimate of unit cost for 2017					$27		$28	$76		$33	
total cost					$5,474		$11,822	$103,613		$11,421	$132,330

plus 25% (pavement removal, seed & fertilize, pavement marking, blade & shape, traffic control, mobilization, etc.) **$165,412**

SAY:	$170,000

Document C

Document D

Time Schedule

This project is proposed for state fiscal year (FY) 2017 if possible, or otherwise FY 2018.

This project should be considered as a tie to the proposed paved shoulder project in this area. If state 3R funds are used for the shoulder project, the soonest we could get the work accomplished would be FY 2018 unless there is an opportunity to advance the project to FY 2017. Currently the district FY 2017 3R program has no room to add this shoulder project.

The turn lane project could be done independently of the shoulder project in FY 2017 if necessary.

Grant approval: July 2016

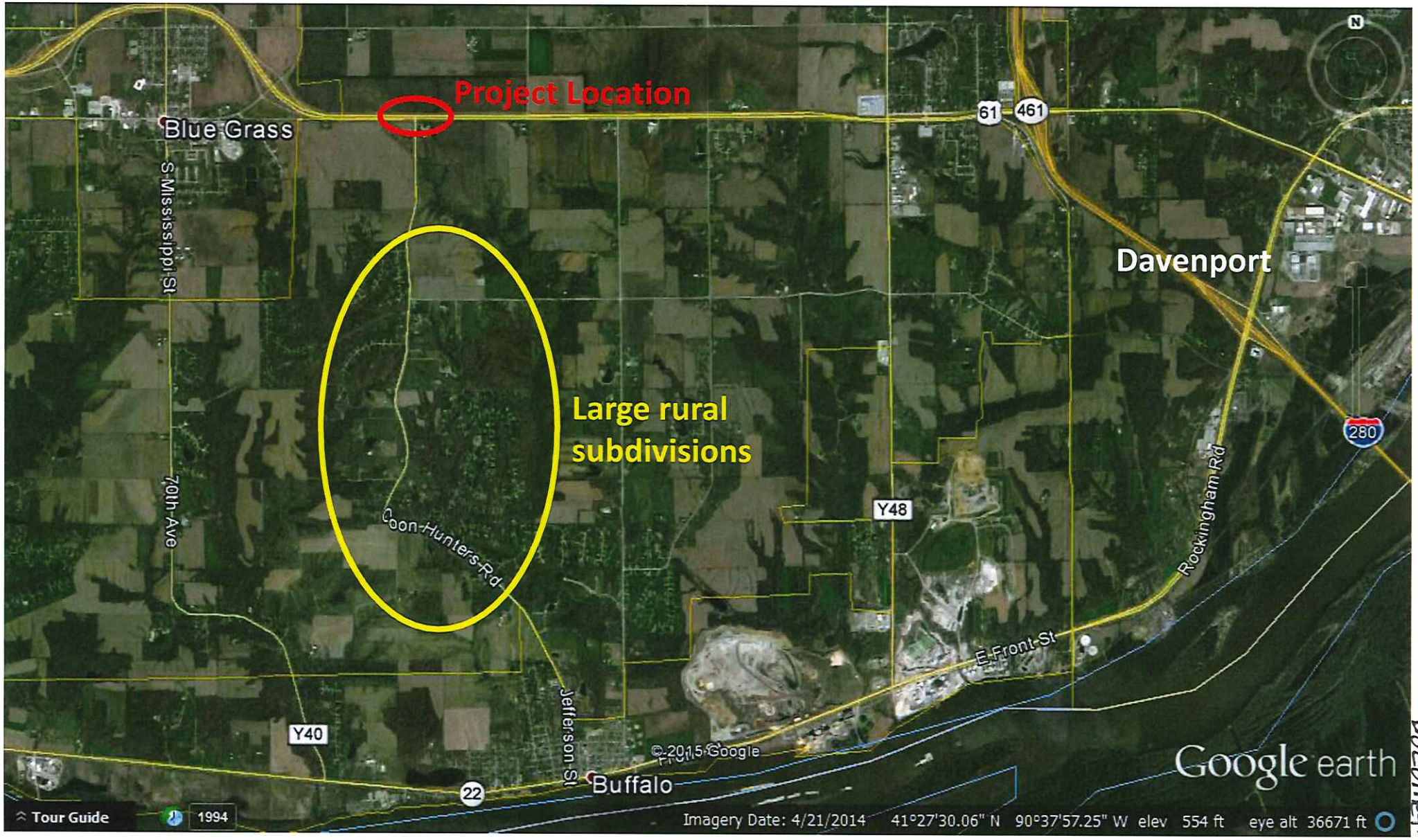
Project development: Summer and fall of 2016

Project Letting: As early as winter 2016 (FY 2017); as late as July 2017 (FY 2018)

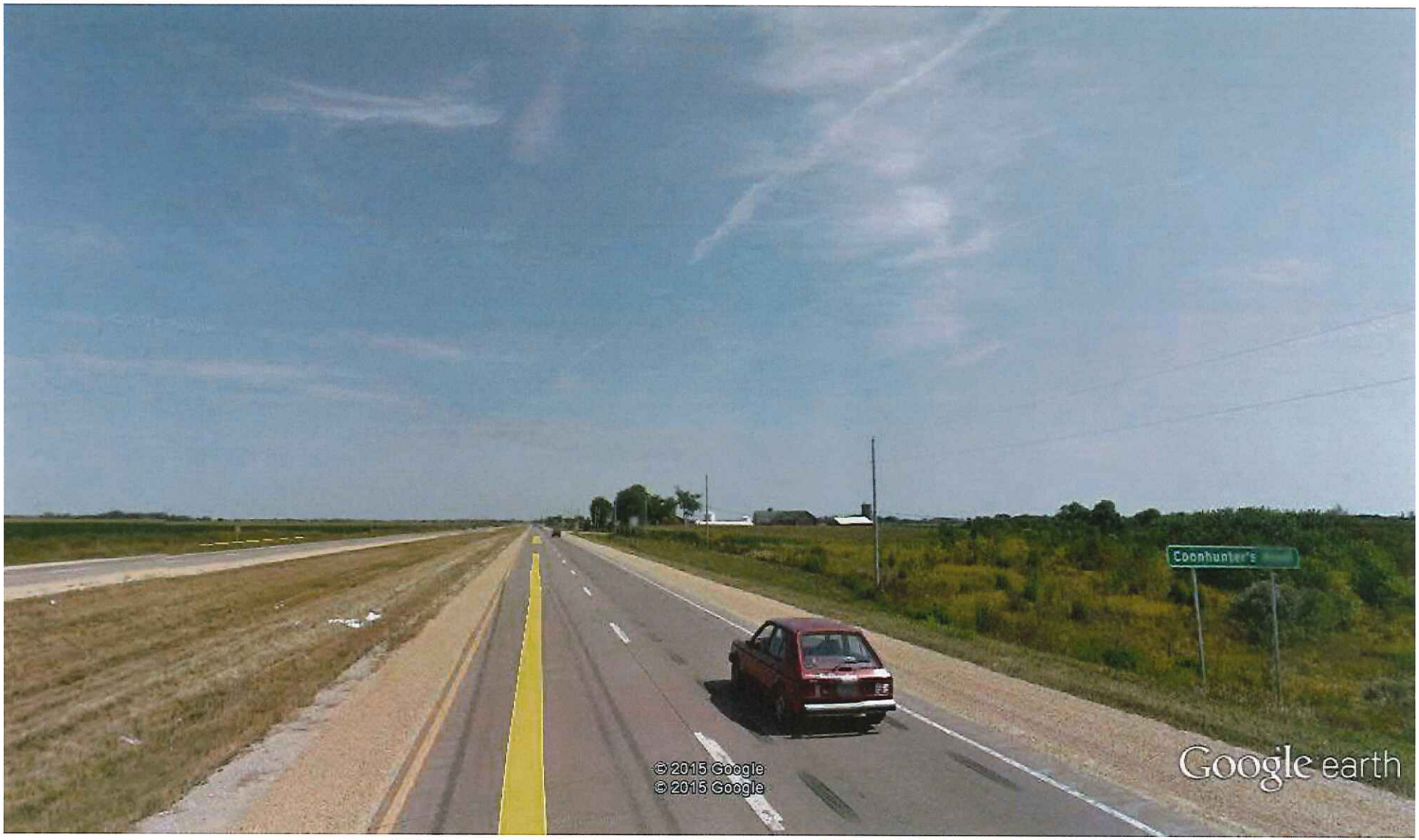
Project construction: Summer or fall 2017

N

US 61 at Coonhunter's Rd, Scott County



Document E



Google earth

feet 20
meters 7

NB US 61

Doc. F

Google earth

feet 10
meters 5

NB US61

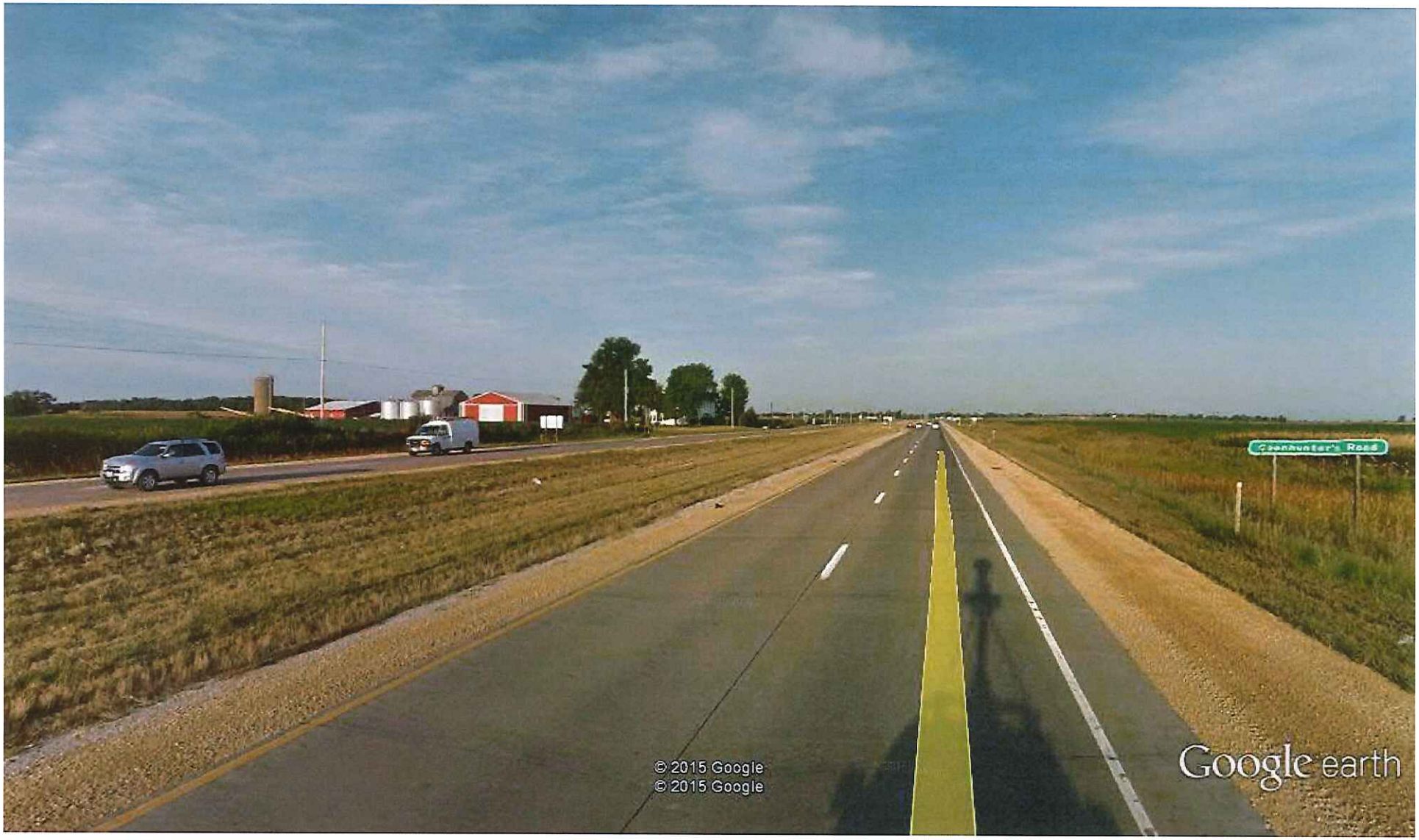
Doc. 11

Google earth

feet 20
meters 6

NB US 61

DOC. F



Google earth

feet 10

meters 6

SB US 61

Doc 5

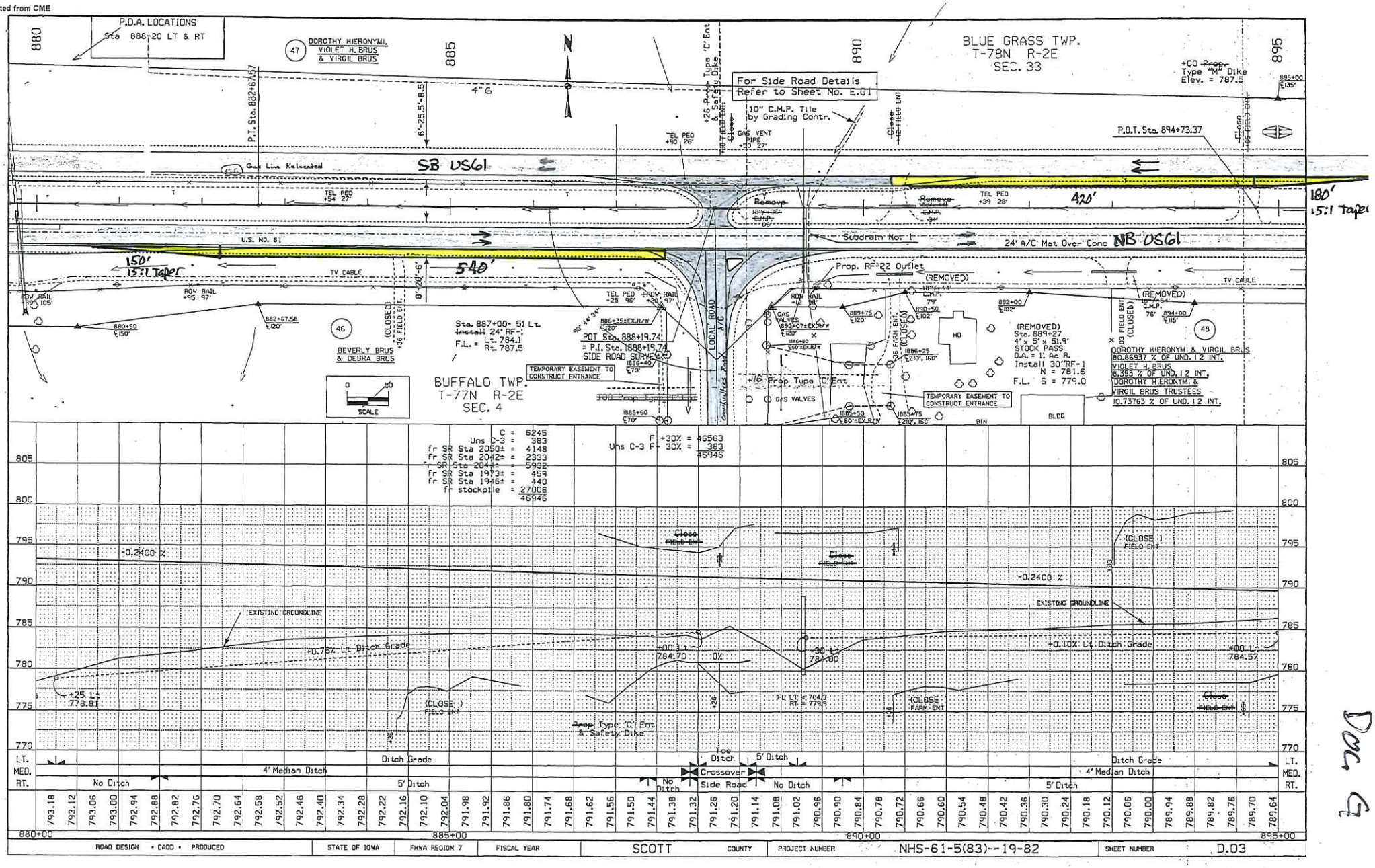
Google earth

feet 10
meters 4

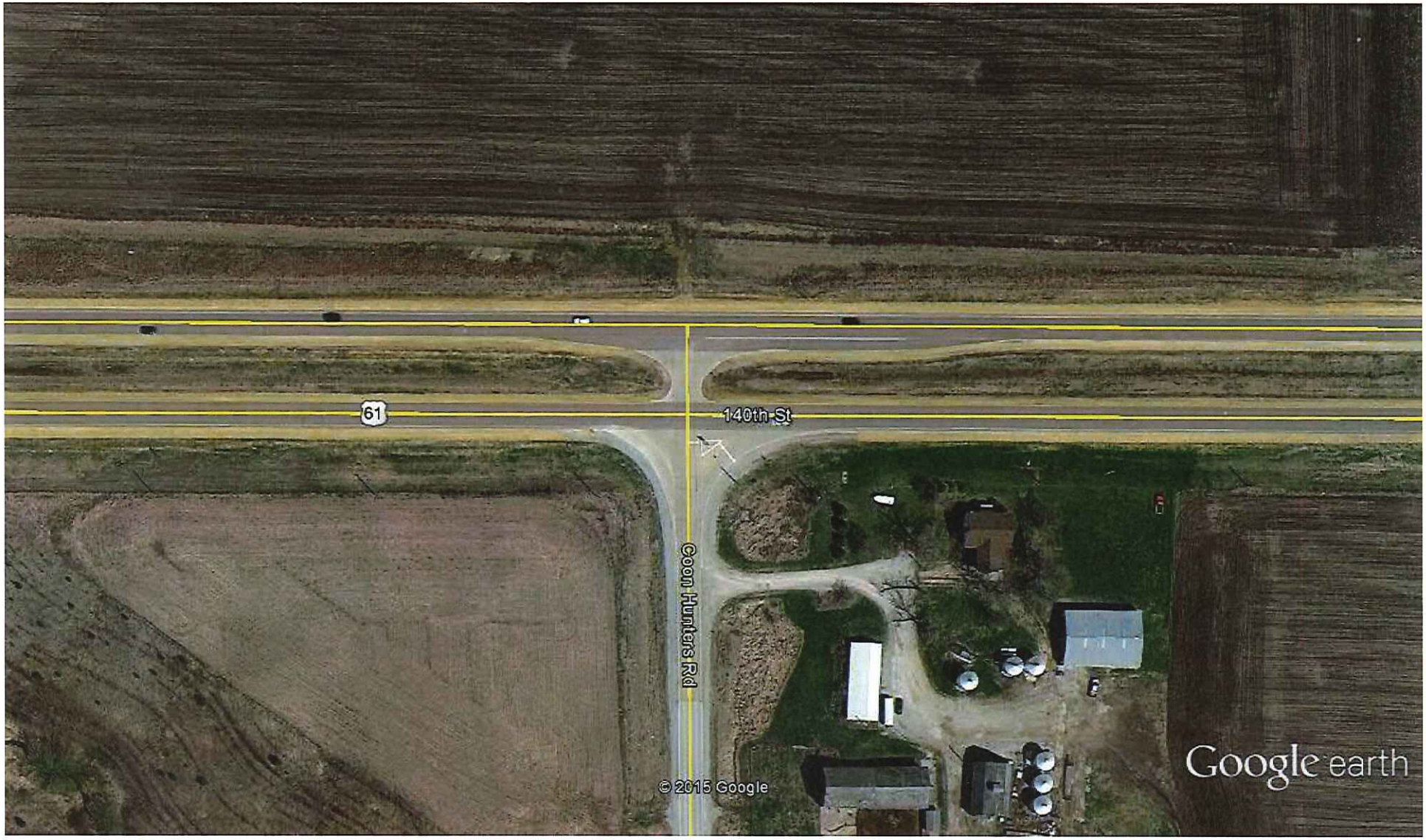
SB US 61

Doc F

rinted from CME



Doc G



Google earth

feet 800
meters 200

Doc 4

Doc I

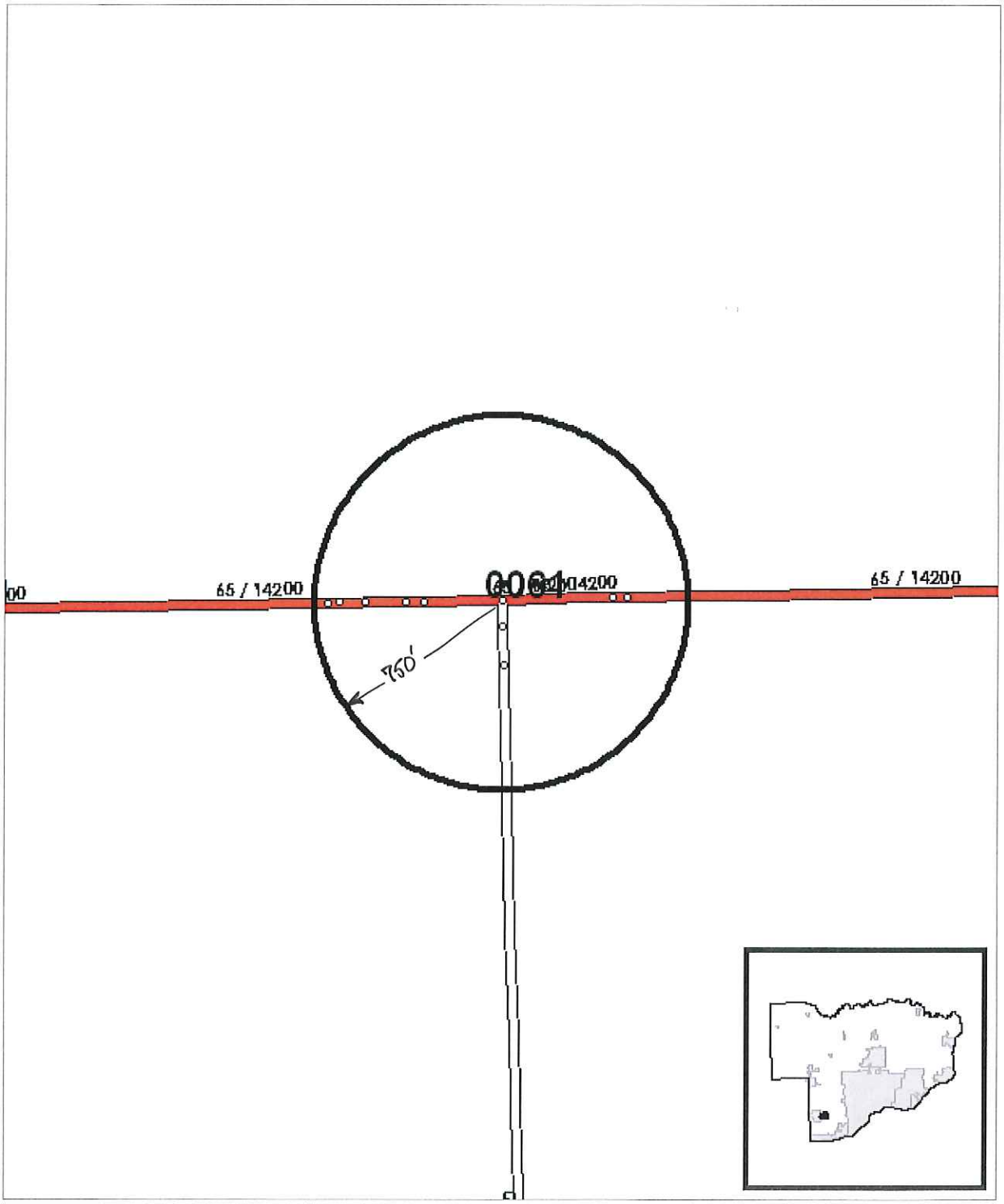
Iowa Department of Transportation

Location Map

CMAT Version 3.4.0

Incidents: 14

Report Version 1.1 Mar 2005



Analyst: DLR

Notes: Coonhunters Rd at US 61

Doc I

Iowa Department of Transportation

Major Cause Summary

CMAT Version 3.4.0

Report Version 1.1 Jan 2005

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

Crash Summary:

Fatal	-
Major Injury	-
Minor Injury	3
Possible/Unknown	-
PDO	11
Total Crashes	14

Injury Summary:

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

Surface Condition Summary:

Dry	7
Wet	-
Ice	-
Snow	-
Slush	-
Sand/Dirt/Oil/Gravel	1
Water	-
Other	-
Unknown	-
Not Reported	6
Total Crashes	14

TOT Property Damage: $63,501

AVG Property Damage: $4,536

Major Cause Summary:

6	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
1	FTYROW: Making Left Turn
	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
2	Followed Too Close
	Disregarded Railroad Signal
	Disregarded Warning Sign
	Operating Vehicle in Reckless/Aggressive Manner
	Improper Backing
	Illegally Parked/Unattended
3	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
	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
1	Other: No Improper Action
1	None Indicated

Selection Filter:

((YEAR <> 2005 and YEAR <> 2006 and YEAR <> 2007 and YEAR <> 2008 and YEAR <> 2009))

Analyst: DLR

Notes: Coonhunters Rd at US 61

Iowa Department of Transportation

Abbreviated Crash Report

CMAT Version 3.4.0

Report Version 1.2 Mar 2005

Date	DOT Case #	Agency Case #	City	Crash Sev.	Literal Description
08/22/2011	2011643727	11-22341		PDO	NB/EB US 0061 / 140 ST
09/04/2011	2011645913	2011-23266		PDO	NB/EB US 0061 / US 61
07/09/2012	2012693719	12-13387		Minor	COONHUNTER S RD
07/10/2012	2012693721	12-13476		PDO	NB/EB US 0061 / US 61
11/25/2012	2012714095	12-23051		PDO	NB/EB US 0061 / 140 ST
04/03/2013	2013733624	13-5744		PDO	NB/EB US 0061 / US 61
12/09/2013	2013772265	13-23562		PDO	US 61/140 ST AND US 61 AND COONHUNTER S RD
02/13/2014	2014786031	14-2993		PDO	US 61/140 ST AND US 61 AND COONHUNTER S RD
10/21/2014	2014822822	2014-21377	Major	Minor	US 61/140 ST AND US 61 AND COONHUNTER S RD
10/22/2014	2014823545	2014-21454		Minor	US 61
11/05/2014	2014825531	14-22634		PDO	US 61/140 ST AND US 61 AND COONHUNTER S RD
06/02/2015	2015861904	2015-11298	Blue Grass	PDO	US 61
06/10/2015	2015863156	15-11970		PDO	COONHUNTER S RD
06/19/2015	2015866495	15-12627		PDO	US 61/140 ST AND US 61 AND COONHUNTER S RD

Selection Filter:

((YEAR <> 2005 and YEAR <> 2006 and YEAR <> 2007 and YEAR <> 2008 and YEAR <> 2009))

Analyst: DLR

Notes: Coonhunters Rd at US 61

Doc I

TRAFFIC FLOW MAP OF
SCOTT COUNTY
IOWA

2014 ANNUAL AVERAGE DAILY TRAFFIC

Prepared By
IOWADOT

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

In Cooperation With
United States
Department of Transportation

JANUARY 1, 2014

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

11-21-14

LEGEND

DIVIDED HIGHWAY
PAVED ROAD
BITUMINOUS ROAD
GRAVEL ROAD
EARTHEN ROAD
LEGAL NOT OPEN ROAD

2014
82

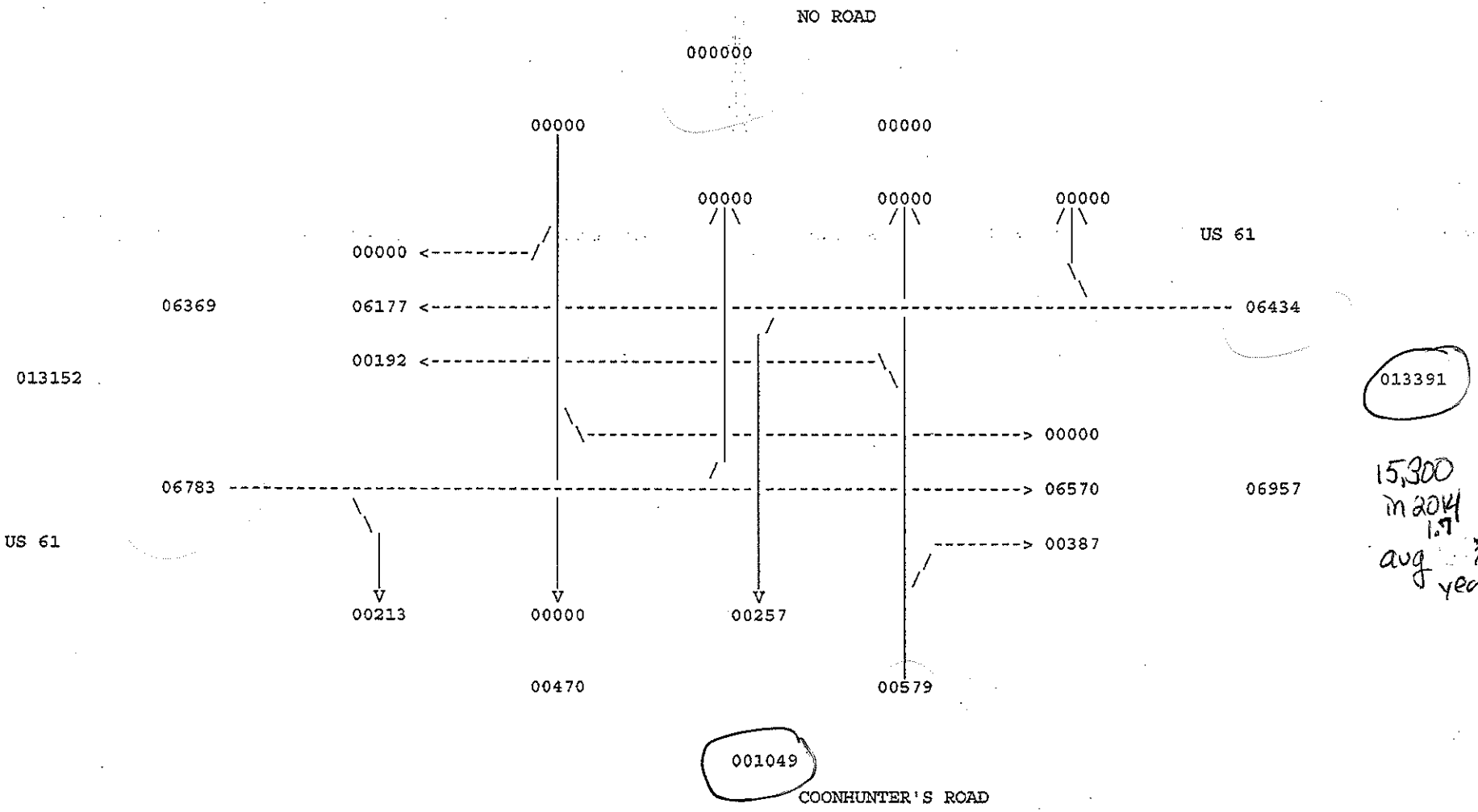
DR 4

DATE: 09-02-2010

IOWA DEPARTMENT OF TRANSPORTATION
VEHICULAR TURNING MOVEMENTS
ANNUAL AVERAGE DAILY TRAFFIC - YEAR 2006
IN BLUE GRASS

COUNTY:SCOTT
US 61 & COONHUNTER'S RD

STATION NO. 82 12 0139 0991



1810 in 2014
average 7 % per year increase

Doc 4

D1530926
COUNTY TOWNSHIP NODE LOCATION YEAR
82 12 0139 0991 2006

TURNING MOVEMENT SYSTEM
TRAFFIC COUNT SUMMARY
ALL VEHICLES

PRINTER ID: TPRT003W PAGE 0001
CITY: BLUE GRASS
COUNTY: SCOTT

HOUR	******* NORTH LEG *******				******* EAST LEG ********				******* SOUTH LEG *******				******* WEST LEG ********			
	NO ROAD				US 61				COONHUNTER'S ROAD				US 61			
	RT	ST	LT	TOTAL	RT	ST	LT	TOTAL	LT	ST	RT	TOTAL	LT	ST	RT	TOTAL
07- 8AM	0	0	0	0	0	502	4	506	20	0	58	78	0	568	3	571
08- 9AM	0	0	0	0	0	399	17	416	13	0	37	50	0	396	13	409
09-10AM	0	0	0	0	0	343	14	357	10	0	26	36	0	403	12	415
11-12PM	0	0	0	0	0	365	13	378	13	0	19	32	0	412	13	425
12-1 PM	0	0	0	0	0	360	13	373	12	0	19	31	0	432	16	448
3- 4PM	0	0	0	0	0	491	25	516	4	0	13	17	0	491	31	522
4- 5PM	0	0	0	0	0	568	56	624	13	0	24	37	0	574	17	591
5- 6PM	0	0	0	0	0	576	8	584	27	0	30	57	0	557	19	576
TOTALS	0	0	0	0	0	3604	150	3754	112	0	226	338	0	3833	124	3957

STATION DISPLAYED
PF4 QUARTER HOUR PF5 CLASS PF7 BKWD PF8 FWD PF15 MAIN MENU PF21 SCREEN PRINT CLEAR EXIT

Doc 4

D1530927

COUNTY	TOWNSHIP	NODE	LOCATION	YEAR
82	12	0139	0991	2006

TURNING MOVEMENT SYSTEM
TRAFFIC COUNT SUMMARY
SINGLE UNIT TRUCKS

PRINTER ID: TPRT003W PAGE 0001
CITY: BLUE GRASS
COUNTY: SCOTT

HOUR	******* NORTH LEG NO ROAD RT	ST	LT	TOTAL	******* EAST LEG US 61 RT	ST	LT	TOTAL	******* SOUTH LEG COONHUNTER'S ROAD LT	ST	RT	TOTAL	******* WEST LEG US 61 LT	ST	RT	TOTAL
7- 8AM	0	0	0	0	0	34	0	34	0	0	0	0	0	27	0	27
8- 9AM	0	0	0	0	0	46	0	46	0	0	1	1	0	37	0	37
9-10AM	0	0	0	0	0	32	0	32	0	0	0	0	0	32	0	32
11-12PM	0	0	0	0	0	21	0	21	0	0	0	0	0	30	0	30
12- 1PM	0	0	0	0	0	16	0	16	0	0	0	0	0	24	0	24
3- 4PM	0	0	0	0	0	23	0	23	0	0	0	0	0	32	0	32
4- 5PM	0	0	0	0	0	19	0	19	0	0	0	0	0	22	0	22
5- 6PM	0	0	0	0	0	6	0	6	0	0	0	0	0	21	0	21
TOTALS	0	0	0	0	0	197	0	197	0	0	1	1	0	225	0	225

STATION DISPLAYED
PF4 QUARTER HOUR PF5 CLASS PF7 BKWD PF8 FWD PF15 MAIN MENU PF21 SCREEN PRINT CLEAR EXIT

Doc J

D1530928

COUNTY	TOWNSHIP	NODE	LOCATION	YEAR
82	12	0139	0991	2006

TURNING MOVEMENT SYSTEM
TRAFFIC COUNT SUMMARY
COMBINATION TRUCKS

PRINTER ID: TPRI003W PAGE 0001
CITY: BLUE GRASS
COUNTY: SCOTT

HOUR	******* NORTH LEG NO ROAD RT	SI	LI	TOTAL	******* US 61 RT	EAST LEG ST	LI	******** TOTAL	******* SOUTH LEG COONHUNTER'S ROAD LT	ST	RT	******* TOTAL	******* US 61 LT	WEST LEG SI	RI	******** TOTAL
7- 8AM	0	0	0	0	0	61	0	61	0	0	0	0	0	32	0	32
8- 9AM	0	0	0	0	0	83	4	87	0	0	0	0	0	44	0	44
9-10AM	0	0	0	0	0	69	0	69	0	0	1	1	0	66	0	66
11-12PM	0	0	0	0	0	69	0	69	0	0	0	0	0	67	0	67
12- 1PM	0	0	0	0	0	73	0	73	0	0	0	0	0	52	0	52
3- 4PM	0	0	0	0	0	49	1	50	0	0	0	0	0	50	1	51
4- 5PM	0	0	0	0	0	47	0	47	0	0	0	0	0	38	0	38
5- 6PM	0	0	0	0	0	37	0	37	0	0	0	0	0	42	0	42
TOTALS	0	0	0	0	0	488	5	493	0	0	1	1	0	391	1	392

STATION DISPLAYED
PF4 QUARTER HOUR PF5 CLASS PF7 BKWD PF8 FWD PF15 MAIN MENU PF21 SCREEN PRINT CLEAR EXIT

Doc 5

Doc K

NA

no signals

DOC L

Rev. 5/14

Intersection or Spot Benefit / Cost Safety Analysis

Iowa DOT Office of Traffic & Safety

County: Scott | Prepared by: Douglas Rick | Date Prepared: Jul 31, 2015

Intersection: US 61 at Coonhunter's Road

Improvement

Proposed Improvement(s): Add a right turn deceleration lane on NB US 61;

And extend an existing left turn storage lane into a full deceleration lane on SB US 61.

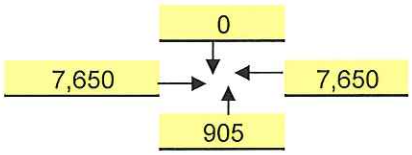
$ 170,000	Estimated Improvement Cost, **EC**	20	Est. Improvement Life, years, **Y**
	Other Annual Cost (after initial year), **AC**	20	Crash Reduction Factor (integer), **CRF**
$ -	Present Value Other Annual Costs, **OC**	4.0%	Discount Rate (time value of $), **INT**
		$ 170,000	Present Value Cost, **COST** = EC + OC

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

Traffic Volume Data

Source: Iowa DOT 2014 | 2014 Date of traffic count

Daily Entering Vehicles by Approach (or AADT / 2)



5,914,825	Current Annual Entering Veh., **AEV** = DEV * 365
24,080	veh / day, Final Year DEV, **FDEV**
143.71	MEV, Total Million Entering Veh. Over life of Project, **TMEV**
2.0%	Projected Traffic Growth (0%-10%), **G**
16,205	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 --> 2014 Last full year — 5.0 years, Time Period, **T**

12 Additional months — values as of May 2014

0	Fatal Crashes	0	Fatalities @	$4,500,000	$ -
		1	Major Injuries @	$325,000	$ 325,000
3	Injury Crashes	2	Minor Injuries @	$65,000	$ 130,000
		0	Possible Injuries @	$35,000	$ -
11	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**	$ 558,600

2.80	Current Crashes / Year, **AA** = TA / T	0.47	Crashes / MEV, Crash Rate, **CR** CR = TA x 10^6 / (DEV x 365 x T)
$ 39,900	Cost per Crash, **AVC** = LOSS / TA	$ 359,552	Present Value of Avoided Crashes, **BENEFIT**
68.0	Total Expected Crashes, **TECR** = CR x TMEV		
0.56	Crashes Avoided First Year **AAR** = AA x CRF / 100		
$ 22,344	Crash Costs Avoided in First Year, AAR x AVC		
13.6	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 = $359,552 : $170,000 = **2.12** : 1

Rev. 5/15

Application for TRAFFIC SAFETY FUNDS

GENERAL INFORMATION **DATE:** August 13, 2015

Location / Title of Project: US 61 paved shoulders, Blue Grass to Davenport

Applicant: Iowa DOT, District 6

Contact Person: Douglas Rick Title: Area Engineer

Complete Mailing Address: PO Box 2646
Davenport, IA 52809

Phone: 563-391-4643 (Area Code) E-Mail: douglas.rick@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 Project Cost $ $1,500,000

Safety Funds Requested $ $500,000

Document A

Rev. 5/15

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 DOT, District 6

Signed: Douglas L. Rick 8/13/2015

Signature Date Signed

Douglas L Rick

Typed Name

Attest:

Signature Date Signed

Typed Name

Document B

US 61 Paved Shoulders, Blue Grass to Davenport

Existing Conditions:

US 61 is a four lane divided highway between Blue Grass and Davenport. The project area is approximately four miles in length and was reconstructed as a four lane highway in 1995. The existing shoulders are predominantly granular with the exception of the I-280 interchange area which is curbed. The right lane was paved 14' wide with portland cement concrete pavement so there exists a 2' portion of the outside shoulder that is paved. This is a 65 mph roadway for the westerly 2.2 miles. It reduces to 55 mph for the next 0.5 miles. And ultimately to 50 mph for the last 1.3 miles that is within the I-280 interchange area. The average annual daily traffic for this project area is 15,300, 13% of which are trucks.

This section of US 61 was included in a FHWA/CTRE/DOT safety audit a number of years ago. One of the recommendations of this audit was to pave the shoulders.

This is the last section of US 61 between Muscatine and Dubuque that has granular shoulders.

Proposed Concept:

Partially pave the inside and outside shoulders 4' in width in both directions. 6" of hot mix asphalt paved shoulders is proposed. This would include some full width shoulders at county road intersections. Also include inside and outside rumble strips in the 65 mph and 55 mph speed limit areas.

Safety Justifications:

In the 3 ½ year period from January 1, 2012 through June 30, 2015, there were 73 reported crashes within the project area. This excludes the I-280 interchange area. 59 out of 73 of these crashes were non-animal related. Of these 59 at least 19 involved vehicles losing control, swerving, and/or running off the road. Some of these crashes could have been avoided if there were paved shoulders to aid in the recovery of vehicle control.

US 61 paved shoulders from Blue Grass ECL to Utah Ave in Davenport

				6" deep	6" HMA	145#/CF
	length, ft	paved sh width, ft	gran sh width, ft.	cl 13, cy	paved shoulder, SY	granular shoulder, tons
BG ECL to w of Y-48	15600	16	16	4622	27733	9048
w of Y-48 to w of 280 EB ramp	4100	8	12	607	3644	1784
e of 280 WB ramps to Utah Ave	600	10	1	111	667	22
total	20300			5341	32044	10853
estimate of unit cost for 2017				$20	$25	$20
total cost				$106,815	$801,111	$217,065

TOTAL	$1,124,991
plus 30% (pavement marking, traffic control, mobilization, rumble strips)	**$1,462,488**

SAY:	$1,500,000

Doc C

Document D

Time Schedule

This project is proposed for state fiscal year (FY) 2017 if possible, or otherwise FY 2018.

This project should be considered as a tie to the proposed US 61/Coonhunter's Road turn lane project. If state 3R funds are used for this shoulder project, the soonest we could get the work accomplished would be FY 2018 unless there is an opportunity to advance the project to FY 2017. Currently the district FY 2017 3R program has no room to add this shoulder project.

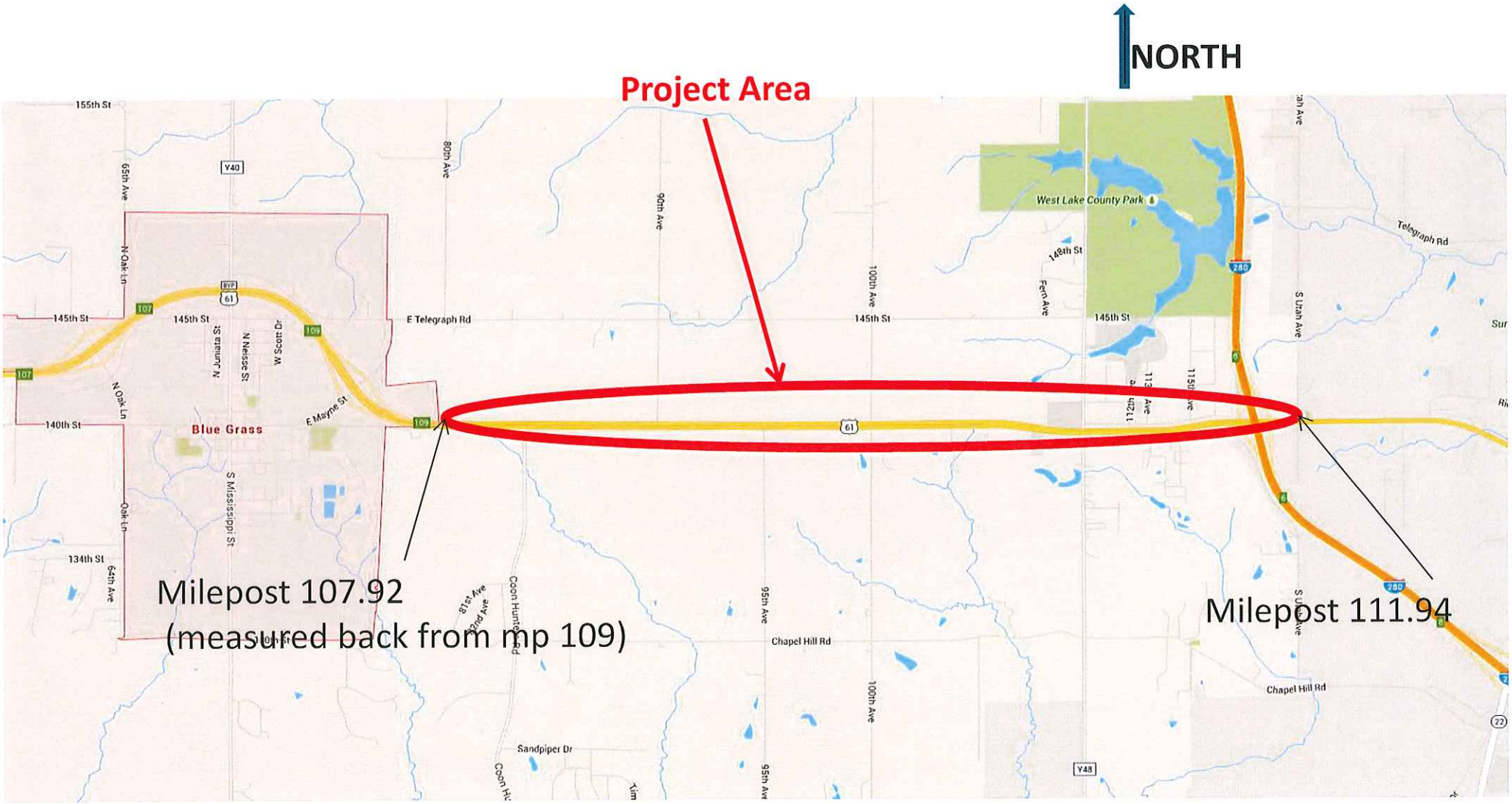
The turn lane project could be done independently of the shoulder project in FY 2017 if necessary.

Grant approval: July 2016

Project development: Summer and fall of 2016

Project Letting: As early as winter 2016 (FY 2017); as late as July 2017 (FY 2018)

Project construction: Summer or fall 2017


NORTH
Project Area
Milepost 107.92
(measured back from mp 109)
Milepost 111.94
155th St
145th St
140th St
134th St
Blue Grass
E Telegraph Rd
Telegraph Rd
West Lake County Park
Chapel Hill Rd
Sandpiper Dr
65th Ave
80th Ave
90th Ave
100th Ave
95th Ave
N Oak Ln
Oak Ln
64th Ave
N Juniata St
N Neosse St
W Scott Dr
E Mayne St
S Mississippi St
Fern Ave
S Utah Ave
Y40
Y48
61
107
109
280
22

DOC E

Doc F

Google earth

feet 10
meters 4

Looking east near beginning of project

Doc F

Google earth

feet 10
meters 4

Looking east
near 95th ave

Doc F

Google earth

feet 10
meters 4

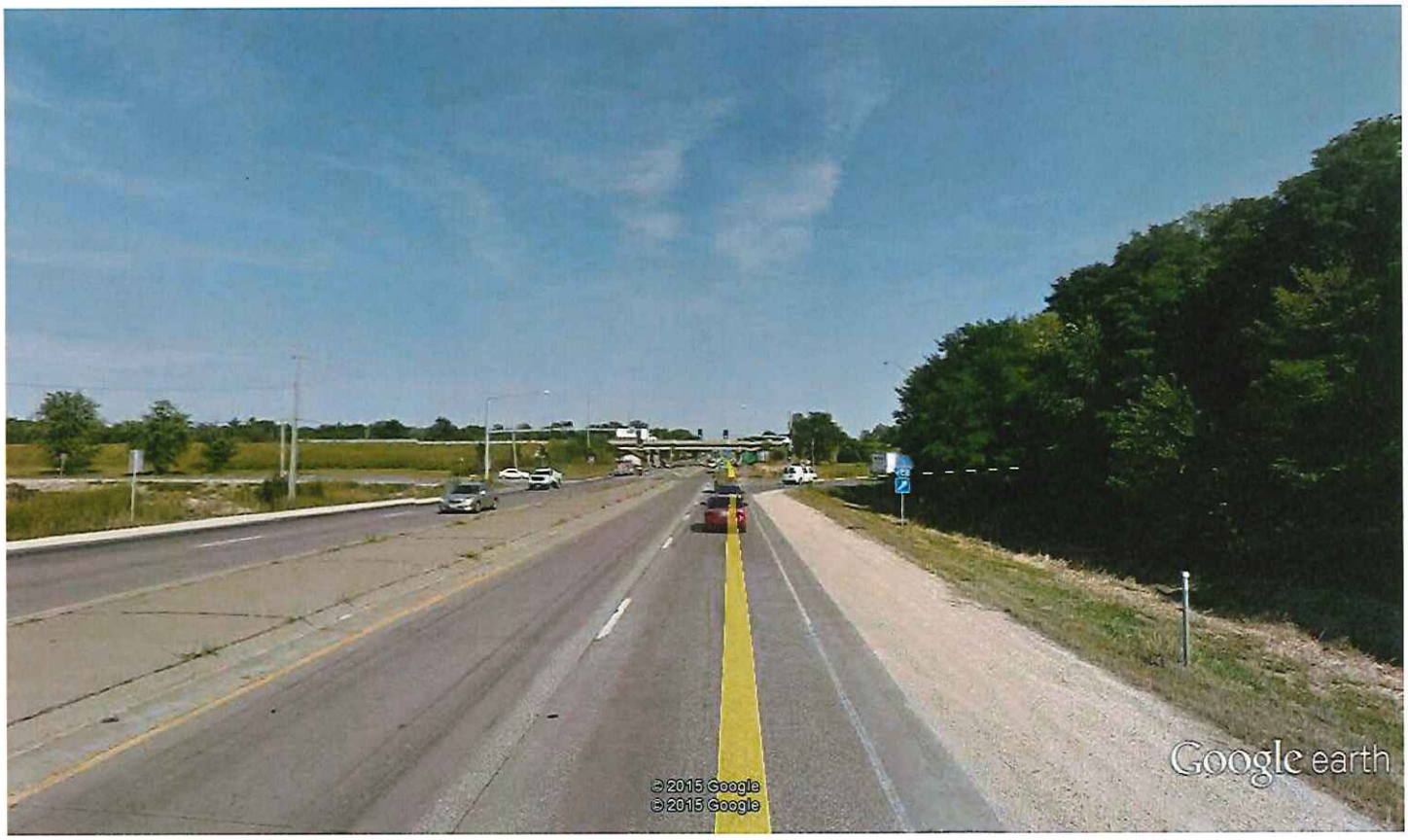
Looking east
near 100th Ave

Doc F

Google earth feet 10 meters 4

Looking east
near 110th ave (Y-40)

Doc F



Google earth

feet 10
meters 4

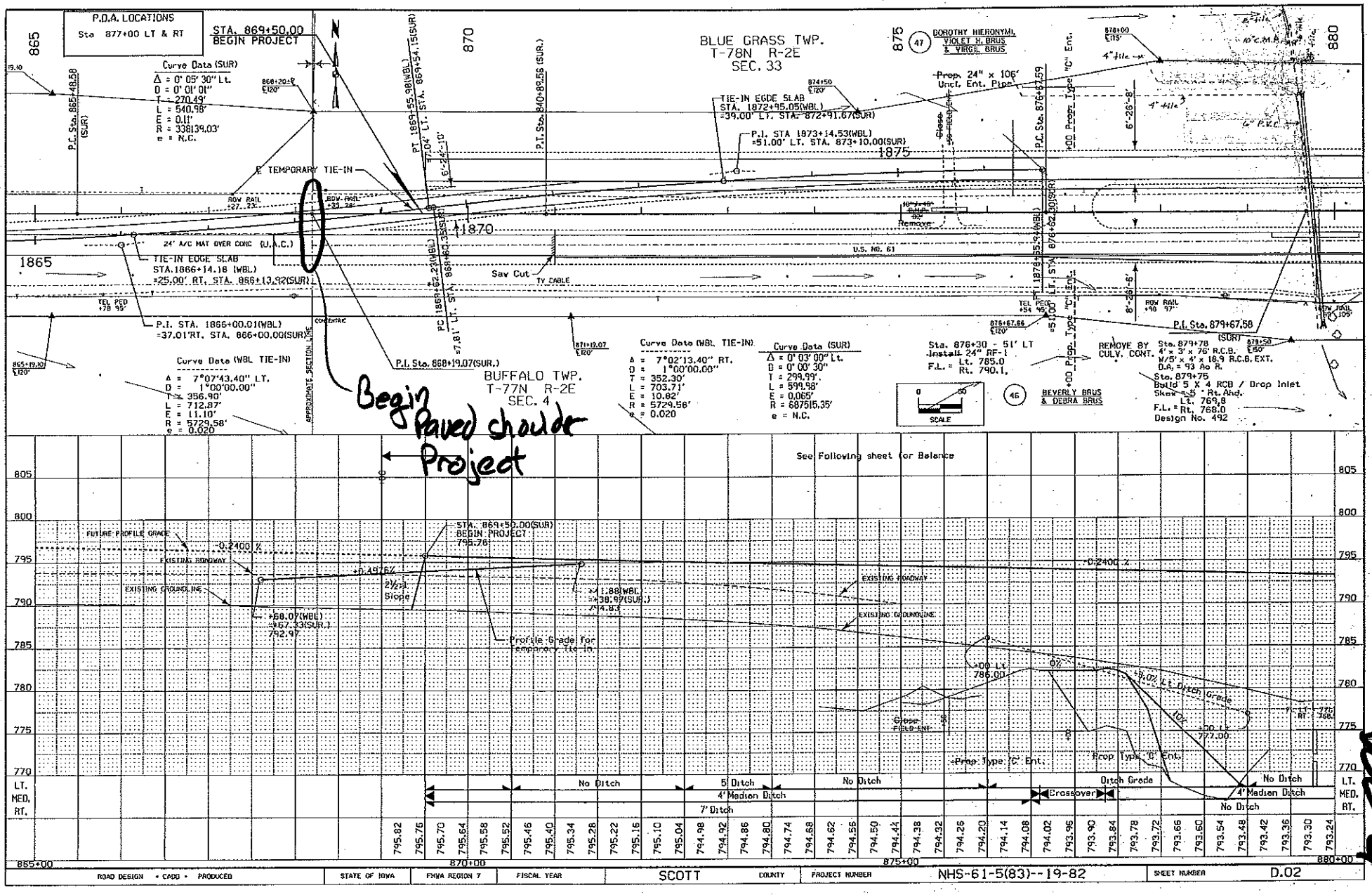
Looking east
just west of EB I280 ramps

Doc F

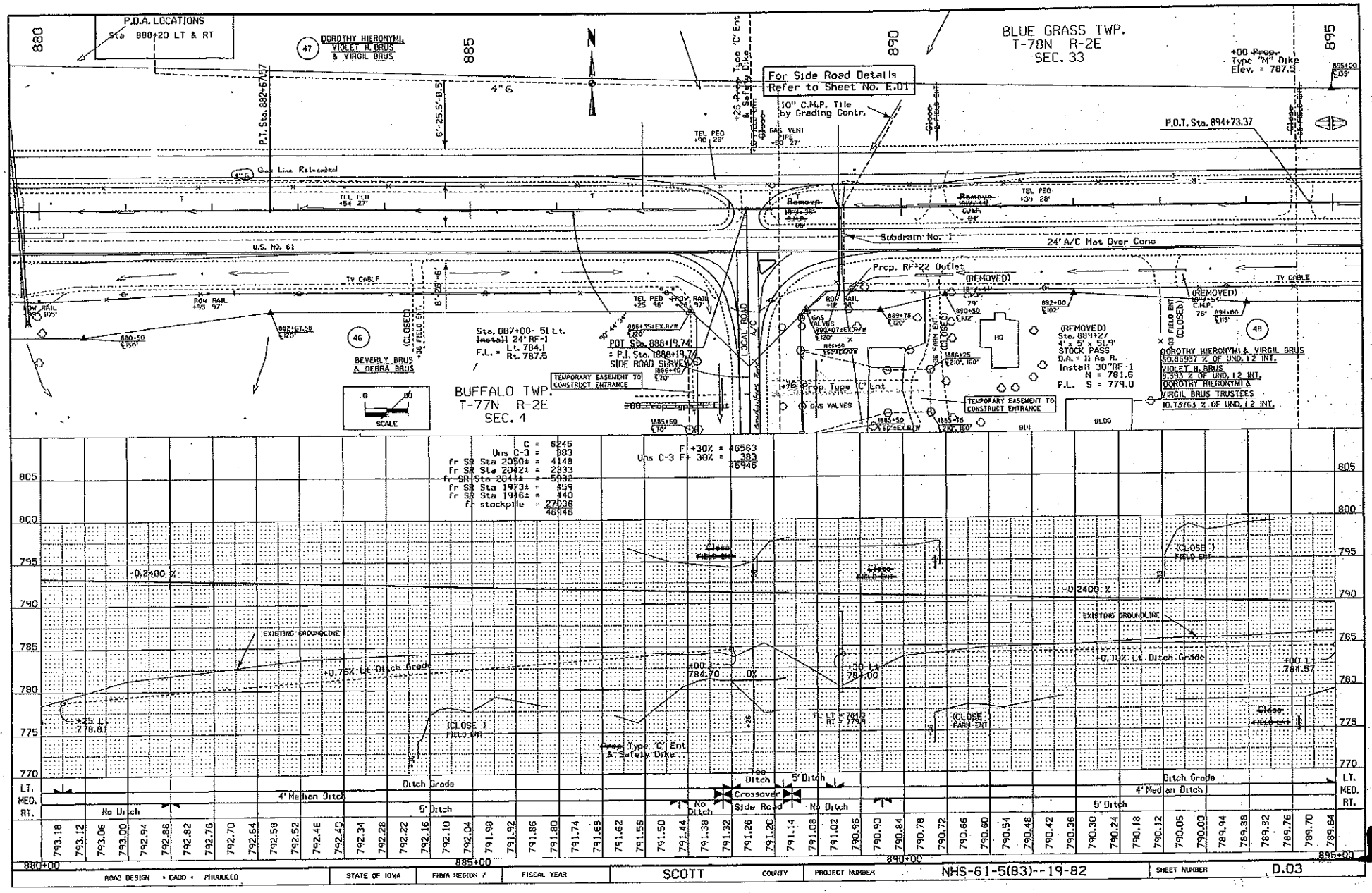
Google earth

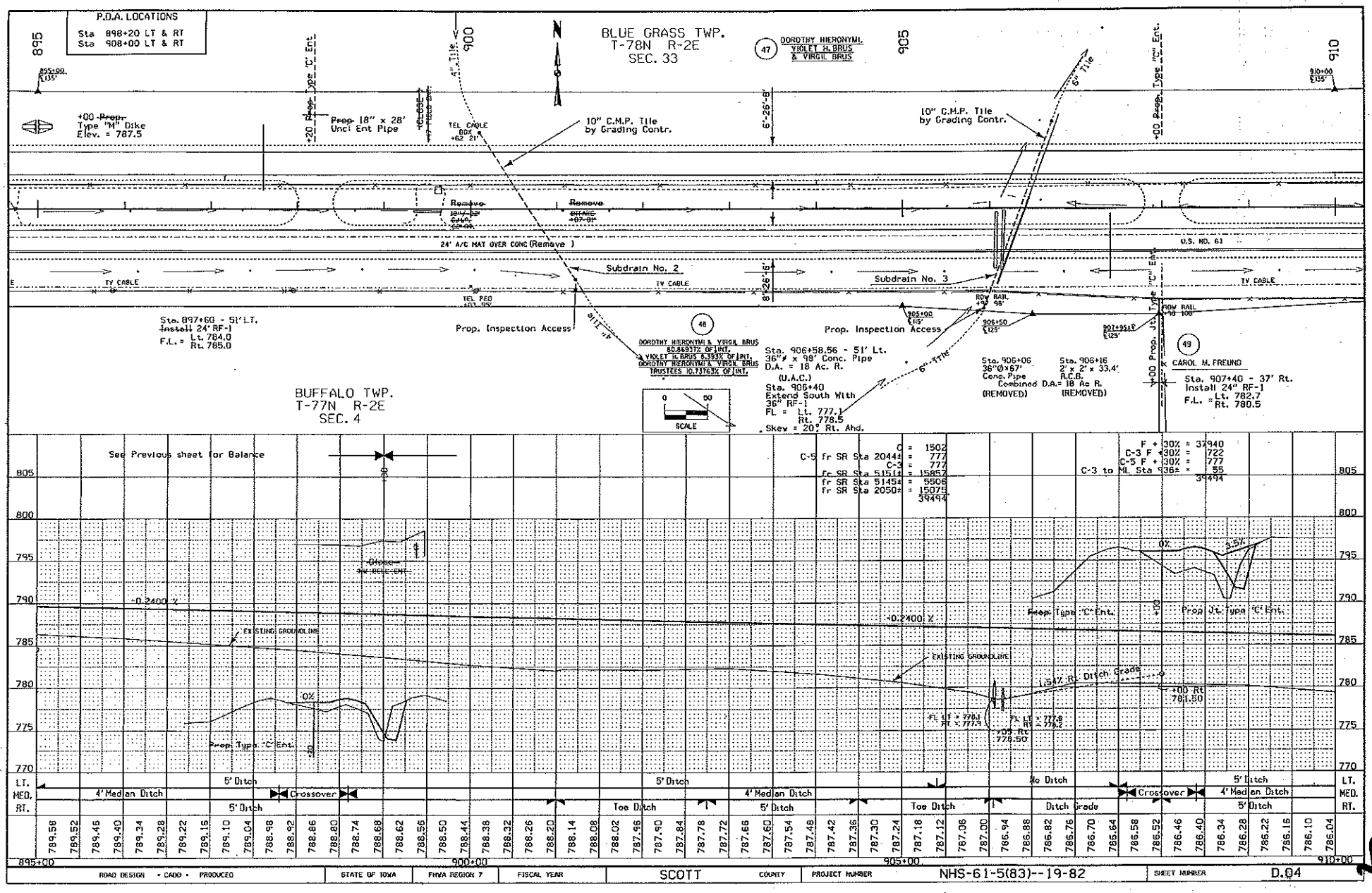
feet 10
meters 5

Looking east
just ~~to~~ east of I280 WB ramps
Towards Utah Ave
(end of Project)

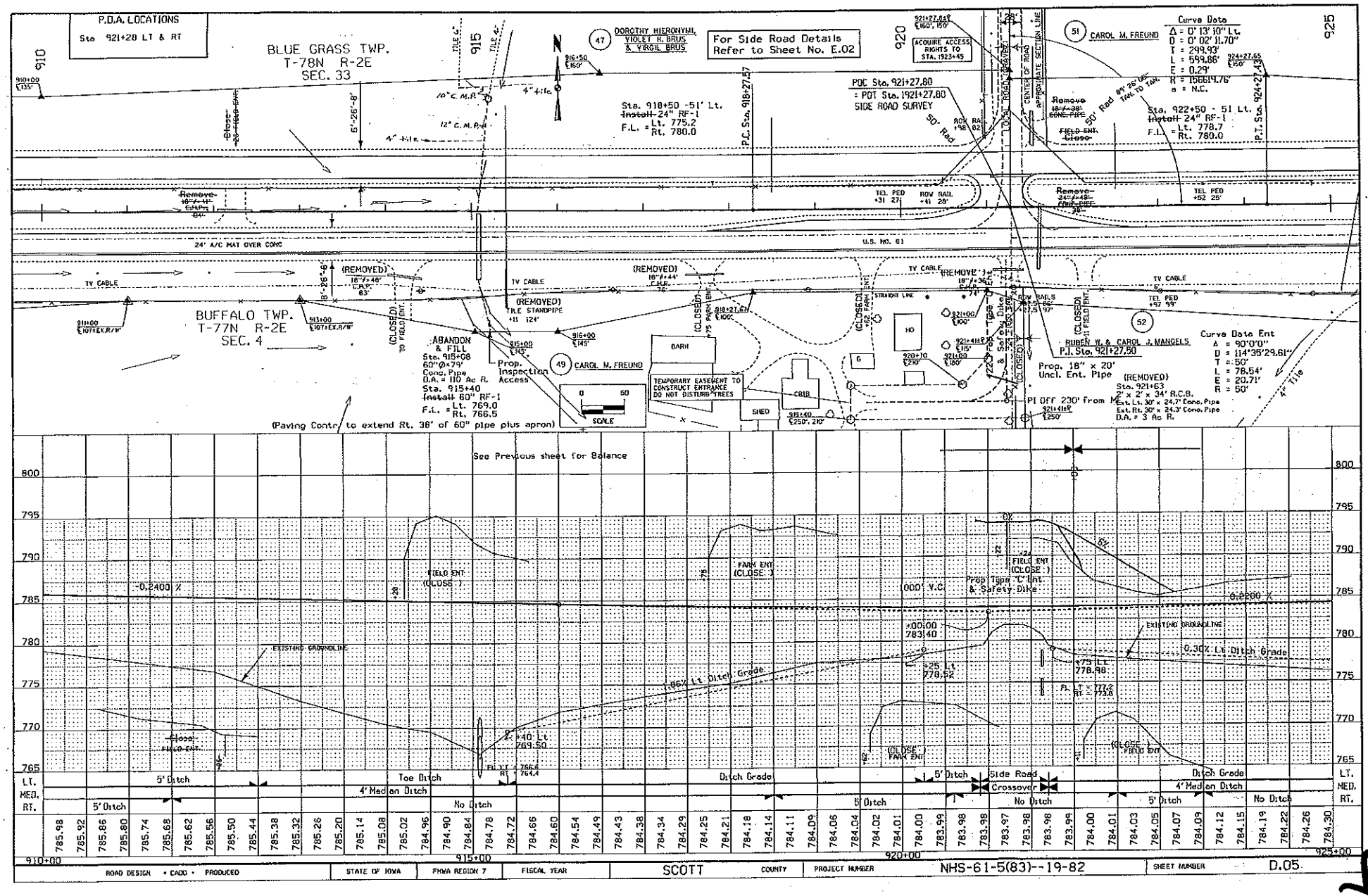

P.O.A. LOCATIONS
Sta 877+00 LT & RT
STA. 869+50.00
BEGIN PROJECT
BLUE GRASS TWP.
T-78N R-2E
SEC. 33
BUFFALO TWP.
T-77N R-2E
SEC. 4
DOROTHY HIERONYMI, VIOLET H. BRUS & VIRGIL BRUS
BEVERLY BRUS & DEBRA BRUS
Curve Data (SUR)
Δ = 0° 05' 30" Lt.
D = 0° 01' 01"
T = 270.49'
L = 540.98'
E = 0.11'
R = 338139.03'
e = N.C.
TEMPORARY TIE-IN
TIE-IN EDGE SLAB
STA. 1872+95.05(WBL)
=39.00' LT. STA. 872+91.67(SUR)
P.I. STA 1873+14.53(WBL)
=51.00' LT. STA. 873+10.00(SUR)
Prop. 24" x 106' Uncl. Ent. Pipe
24' A/C MAT OVER CONC (U.A.C.)
TIE-IN EDGE SLAB
STA.1866+14.18 (WBL.)
=25.00' RT. STA. 866+13.92(SUR)
P.I. STA. 1866+00.01(WBL)
=37.01'RT. STA. 866+00.00(SUR)
P.I. Sta. 868+19.07(SUR.)
U.S. NO. 61
Saw Cut
TV CABLE
Curve Data (WBL TIE-IN)
Δ = 7°07'43.40" LT.
D = 1°00'00.00"
T = 356.90'
L = 712.87'
E = 11.10'
R = 5729.58'
e = 0.020
Curve Data (WBL TIE-IN)
Δ = 7°02'13.40" RT.
D = 1°00'00.00"
T = 352.30'
L = 703.71'
E = 10.82'
R = 5729.58'
e = 0.020
Curve Data (SUR)
Δ = 0° 03' 00" Lt.
D = 0° 00' 30"
T = 299.99'
L = 599.98'
E = 0.065'
R = 687515.35'
e = N.C.
Sta. 876+30 - 51' LT
Install 24" RF-1
Lt. 785.0
F.L. = Rt. 790.1
REMOVE BY Sta. 879+78
CULV. CONT. 4' x 3' x 76' R.C.B.
W/5' x 4' x 18.9 R.C.B. EXT.
D.A. = 93 Ac R.
Sta. 879+75
Build 5 x 4 RCB / Drop Inlet
Skew = 5° Rt. Ahd.
Lt. 769.8
F.L. = Rt. 768.0
Design No. 492
P.I. Sta. 879+67.58 (SUR)
Begin Paved shoulder Project
See Following sheet for Balance
FUTURE PROFILE GRADE
EXISTING ROADWAY
EXISTING GROUNDLINE
STA. 869+50.00(SUR)
BEGIN PROJECT
798.76
Profile Grade for Temporary Tie-In
Prop. Type "C" Ent.
Prop. Type "G" Ent.
Ditch Grade
No Ditch
5' Ditch
4' Median Ditch
7' Ditch
Crossover
LT.
MED.
RT.
ROAD DESIGN • CADD • PRODUCED
STATE OF IOWA
FHWA REGION 7
FISCAL YEAR
SCOTT
COUNTY
PROJECT NUMBER
NHS-61-5(83)--19-82
SHEET NUMBER
D.02

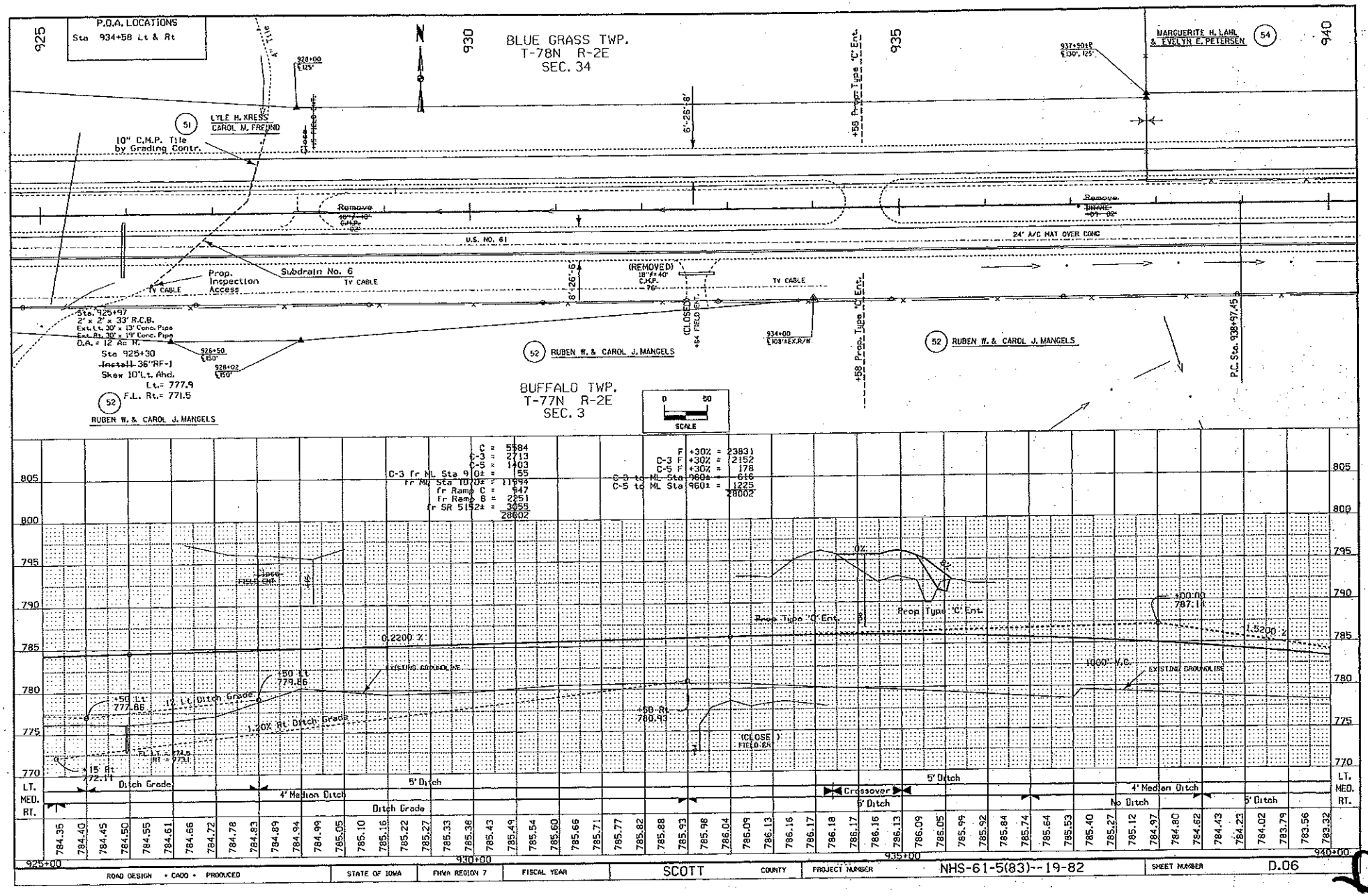
Doc 6


P.D.A. LOCATIONS
Sta 888+20 LT & RT
DOROTHY HIERONYMI, VIOLET H. BRUS & VIRGIL BRUS
BLUE GRASS TWP.
T-78N R-2E
SEC. 33
For Side Road Details Refer to Sheet No. E.01
10" C.M.P. Tile by Grading Contr.
P.O.T. Sta. 894+73.37
Gas Line Relocated
U.S. NO. 61
TV CABLE
Subdrain No. 1
24' A/C Mat Over Conc
Prop. RF-22 Outlet
(REMOVED)
Sta. 887+00- 51 Lt.
Install 24" RF-1
Lt. 784.1
F.L. = Rt. 787.5
POT Sta. 888+19.74
= P.I. Sta. 1888+19.74
SIDE ROAD SURVEY
BEVERLY BRUS & DEBRA BRUS
TEMPORARY EASEMENT TO CONSTRUCT ENTRANCE
BUFFALO TWP.
T-77N R-2E
SEC. 4
LOCAL ROAD
A/C
HQ
(REMOVED)
Sta. 889+27
4' x 5' x 51.9'
STOCK PASS
D.A. = 11 Ac R.
Install 30"RF-1
N = 781.6
F.L. S = 779.0
DOROTHY HIERONYMI & VIRGIL BRUS
80.6937 % OF UND. 1/2 INT.
VIOLET H. BRUS
9.333 % OF UND. 1/2 INT.
DOROTHY HIERONYMI & VIRGIL BRUS TRUSTEES
10.7363 % OF UND. 1/2 INT.
BLDG
BIN
SCALE
C = 6245
Uns C-3 = 383
fr SR Sta 2050± = 4148
fr SR Sta 2042± = 2833
fr SR Sta 2044± = 5082
fr SR Sta 1973± = 459
fr SR Sta 1986± = 840
fr stockpile = 27006
46946
F +30% = 46563
Uns C-3 F 30% = 383
46946
EXISTING GROUNDLINE
-0.2400 %
+0.75% Lt. Ditch Grade
+0.10% Lt. Ditch Grade
+25 Lt. 778.8
+00 Lt. 784.70
+30 Lt. 780.00
+00 Lt. 784.57
Prop. Type 'C' Ent & Safety Dike
Toe Ditch
5' Ditch
Ditch Grade
4' Median Ditch
No Ditch
Crossover
Side Road
LT.
MED.
RT.
880+00
885+00
890+00
895+00
ROAD DESIGN • CADD • PRODUCED
STATE OF IOWA
FHWA REGION 7
FISCAL YEAR
SCOTT
COUNTY
PROJECT NUMBER
NHS-61-5(83)--19-82
SHEET NUMBER
D.03

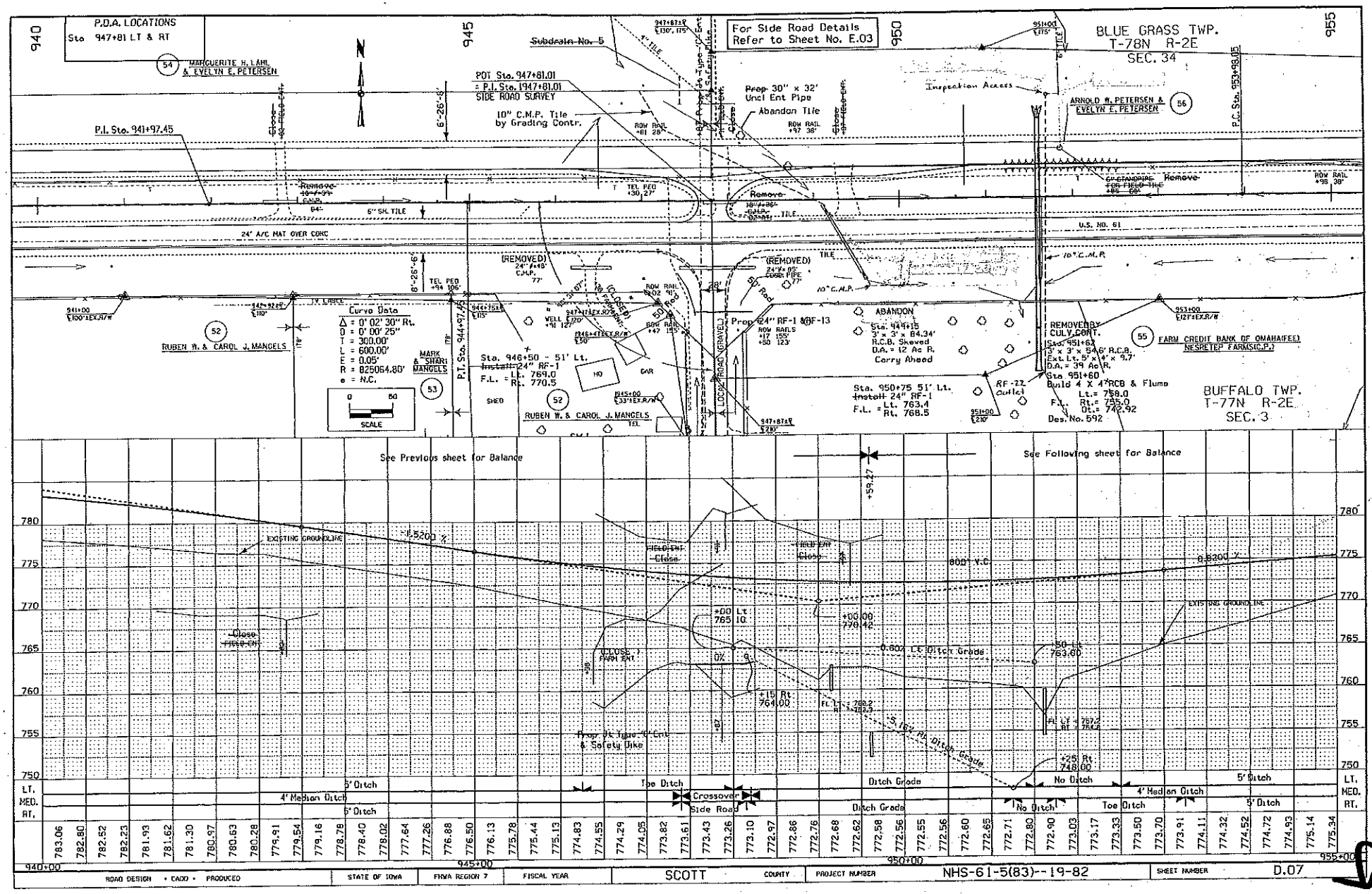


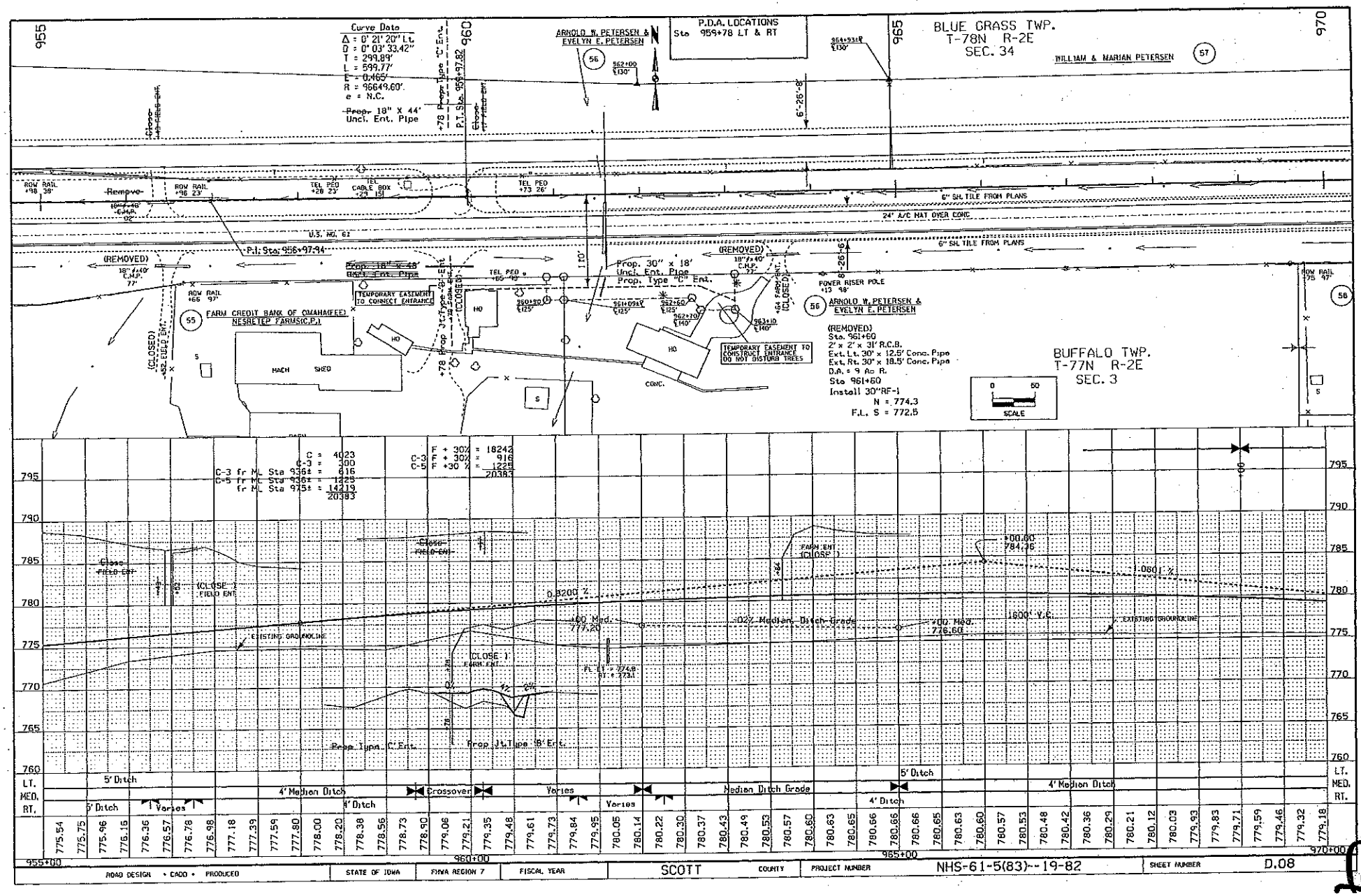
ROAD DESIGN • CADD • PRODUCED	STATE OF IOWA	FHWA REGION 7	FISCAL YEAR	SCOTT COUNTY	PROJECT NUMBER NHS-61-5(83)--19-82	SHEET NUMBER D.04

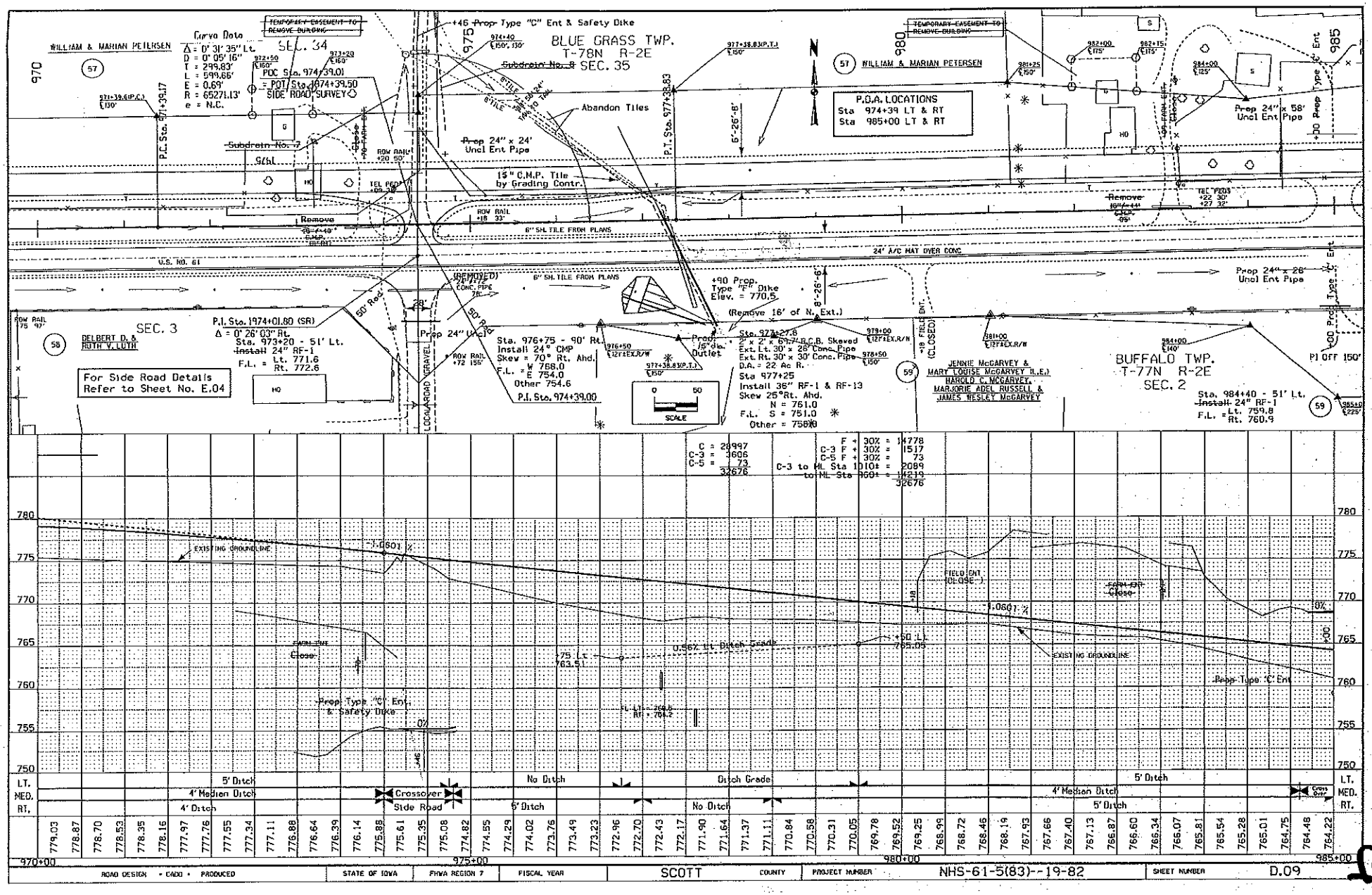

P.D.A. LOCATIONS
Sta 921+28 LT & RT
BLUE GRASS TWP.
T-78N R-2E
SEC. 33
BUFFALO TWP.
T-77N R-2E
SEC. 4
For Side Road Details
Refer to Sheet No. E.02
DOROTHY HIERONYMUS, VIOLET H. BRUS & VIRGIL BRUS
CAROL M. FREUND
RUBEN W. & CAROL J. MANGELS
Curve Data
Δ = 0° 13' 10" Lt.
D = 0° 02' 11.70"
T = 299.93'
L = 599.86'
E = 0.29'
R = 156619.76'
a = N.C.
Sta. 922+50 - 51 Lt.
Install 24" RF-1
F.L. = Lt. 778.7
Rt. 780.0
Sta. 918+50 -51' Lt.
Install 24" RF-1
F.L. = Lt. 775.2
Rt. 780.0
POC Sta. 921+27.80
= POT Sta. 1921+27.80
SIDE ROAD SURVEY
ACQUIRE ACCESS RIGHTS TO STA. 1923+45
Curve Data Ent
Δ = 90°0'0"
D = 114°35'29.61"
T = 50'
L = 78.54'
E = 20.71'
R = 50'
Prop. 18" x 20' Uncl. Ent. Pipe
(REMOVED) Sta. 921+63 2' x 2' x 34' R.C.B.
Ext. Lt. 30" x 24.7' Conc. Pipe
Ext. Rt. 30" x 24.3' Conc. Pipe
D.A. = 3 Ac R.
ABANDON & FILL
Sta. 915+08
60"Ø x 79' Conc. Pipe
D.A. = 110 Ac R.
Sta. 915+40
Install 60" RF-1
F.L. = Lt. 769.0
Rt. 766.5
Prop. Inspection Access
(Paving Contr. to extend Rt. 38' of 60" pipe plus apron)
See Previous sheet for Balance
0.2400 %
0.2250 %
0.30% Lt. Ditch Grade
.86% Lt. Ditch Grade
EXISTING GROUNDLINE
Toe Ditch
Ditch Grade
Side Road
Crossover
No Ditch
SCOTT
NHS-61-5(83)--19-82
D.05



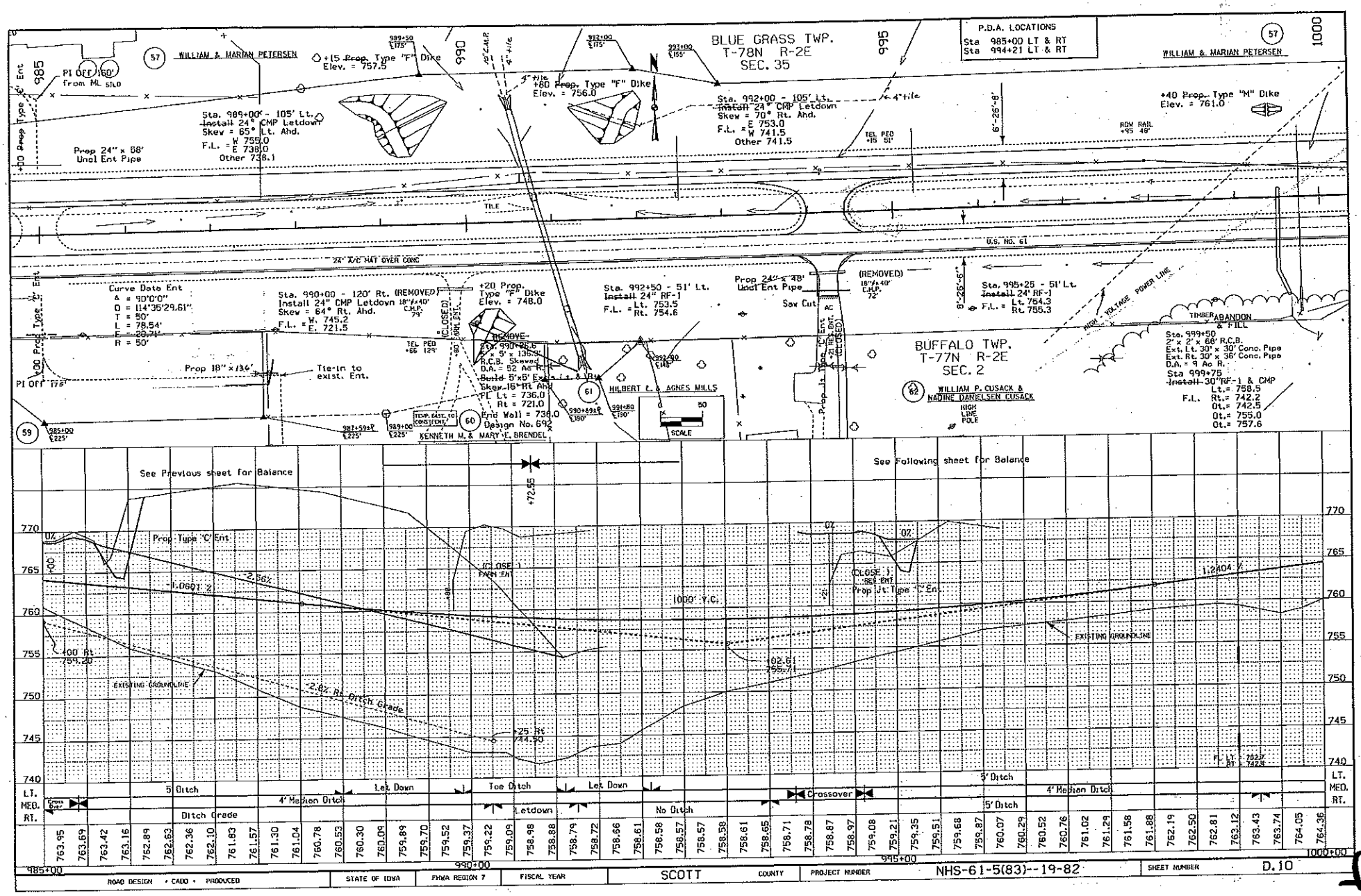
ROAD DESIGN • CADD • PRODUCED	STATE OF IOWA	FHWA REGION 7	FISCAL YEAR	SCOTT	COUNTY	PROJECT NUMBER	NHS-61-5(83)--19-82	SHEET NUMBER	D.06

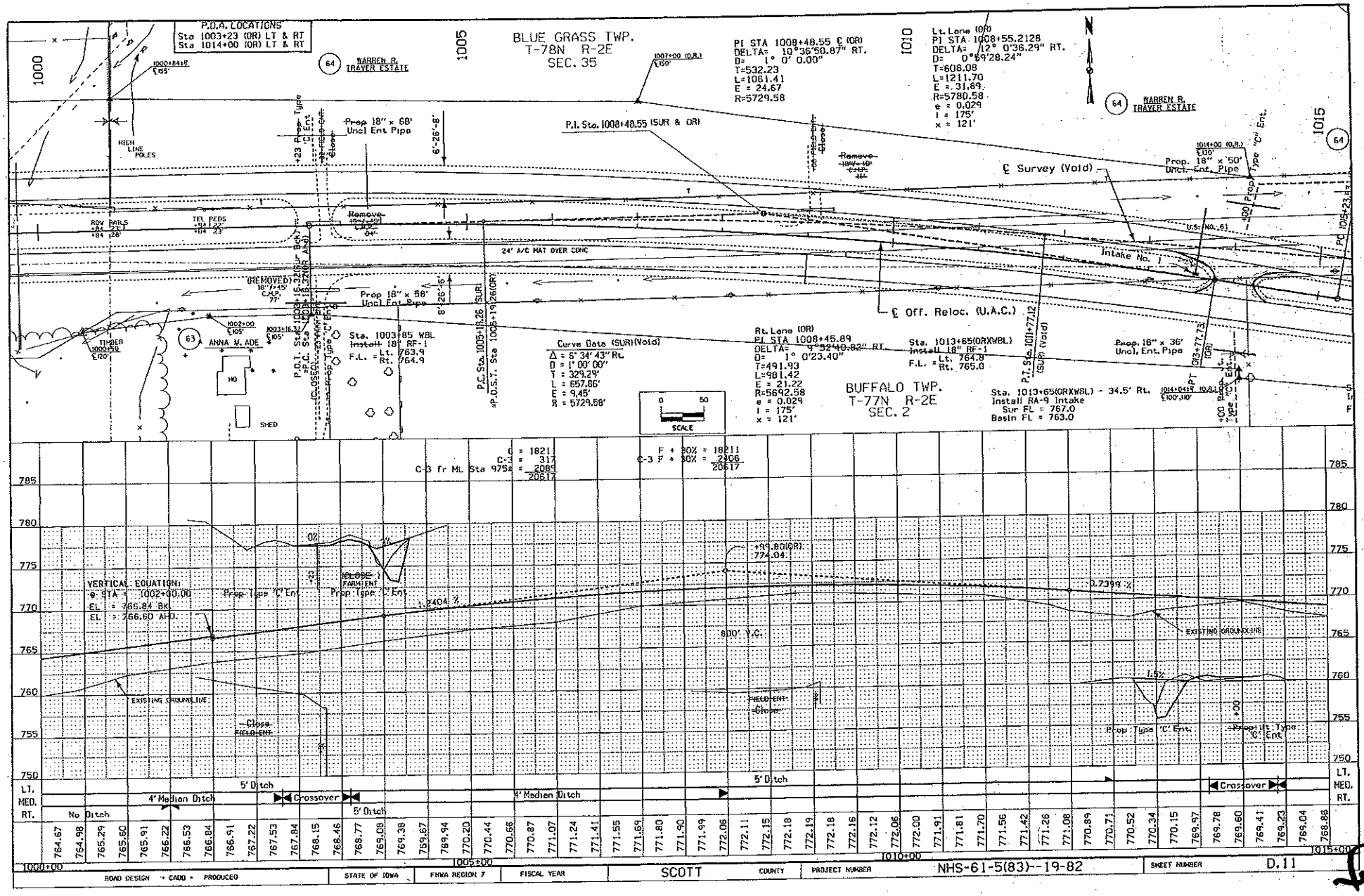

P.D.A. LOCATIONS
Sta 947+81 LT & RT
For Side Road Details
Refer to Sheet No. E.03
BLUE GRASS TWP.
T-78N R-2E
SEC. 34
BUFFALO TWP.
T-77N R-2E
SEC. 3
MARGUERITE H. LAHL & EVELYN E. PETERSEN
ARNOLD W. PETERSEN & EVELYN E. PETERSEN
RUBEN W. & CAROL J. MANGELS
MARK & SHARI MANGELS
FARM CREDIT BANK OF OMAHA(FEE) NESPETER FARMS(C.P.)
Subdrain No. 5
POT Sta. 947+81.01
= P.I. Sta. 1947+81.01
SIDE ROAD SURVEY
10" C.M.P. Tile by Grading Contr.
Prop. 30" x 32' Uncl Ent Pipe
Abandon Tile
Inspection Access
P.I. Sta. 941+97.45
P.C. Sta. 953+93.05
P.T. Sta. 944+97.45
U.S. NO. 61
24" A/C MAT OVER CONC
Curve Data
Δ = 0° 02' 30" Rt.
D = 0° 00' 25"
T = 300.00'
L = 600.00'
E = 0.05'
R = 825064.80'
e = N.C.
Sta. 946+50 - 51' Lt.
Install 24" RF-1
F.L. = Lt. 769.0
Rt. 770.5
Prop. 24" RF-1 & RF-13
ABANDON
Sta. 949+15
3' x 3' x 84.34'
R.C.B. Skewed
D.A. = 12 Ac R.
Carry Ahead
REMOVE BY CULV. CONT.
Sta. 951+63
3' x 3' x 54.6' R.C.B.
Ext. Lt. 5' x 4' x 9.7'
D.A. = 39 Ac R.
Sta. 951+60
Build 4 X 4' RCB & Flume
Lt.= 758.0
Rt.= 755.0
Dt.= 742.92
Des. No. 592
Sta. 950+75 51' Lt.
Install 24" RF-1
F.L. = Lt. 763.4
Rt. 768.5
RF-22 Outlet
See Previous sheet for Balance
See Following sheet for Balance
EXISTING GROUNDLINE
-1.5200 %
0.8200 %
800' V.C.
0.60% Lt. Ditch Grade
Prop. 24" Type "C" Ent. & Safety Dike
Ditch Grade
5' Ditch
4' Median Ditch
Toe Ditch
Crossover
Side Road
No Ditch
LT.
MED.
RT.
940+00
945+00
950+00
955+00
SCALE
ROAD DESIGN • CADD • PRODUCED
STATE OF IOWA
FHWA REGION 7
FISCAL YEAR
SCOTT
COUNTY
PROJECT NUMBER
NHS-61-5(83)--19-82
SHEET NUMBER
D.07

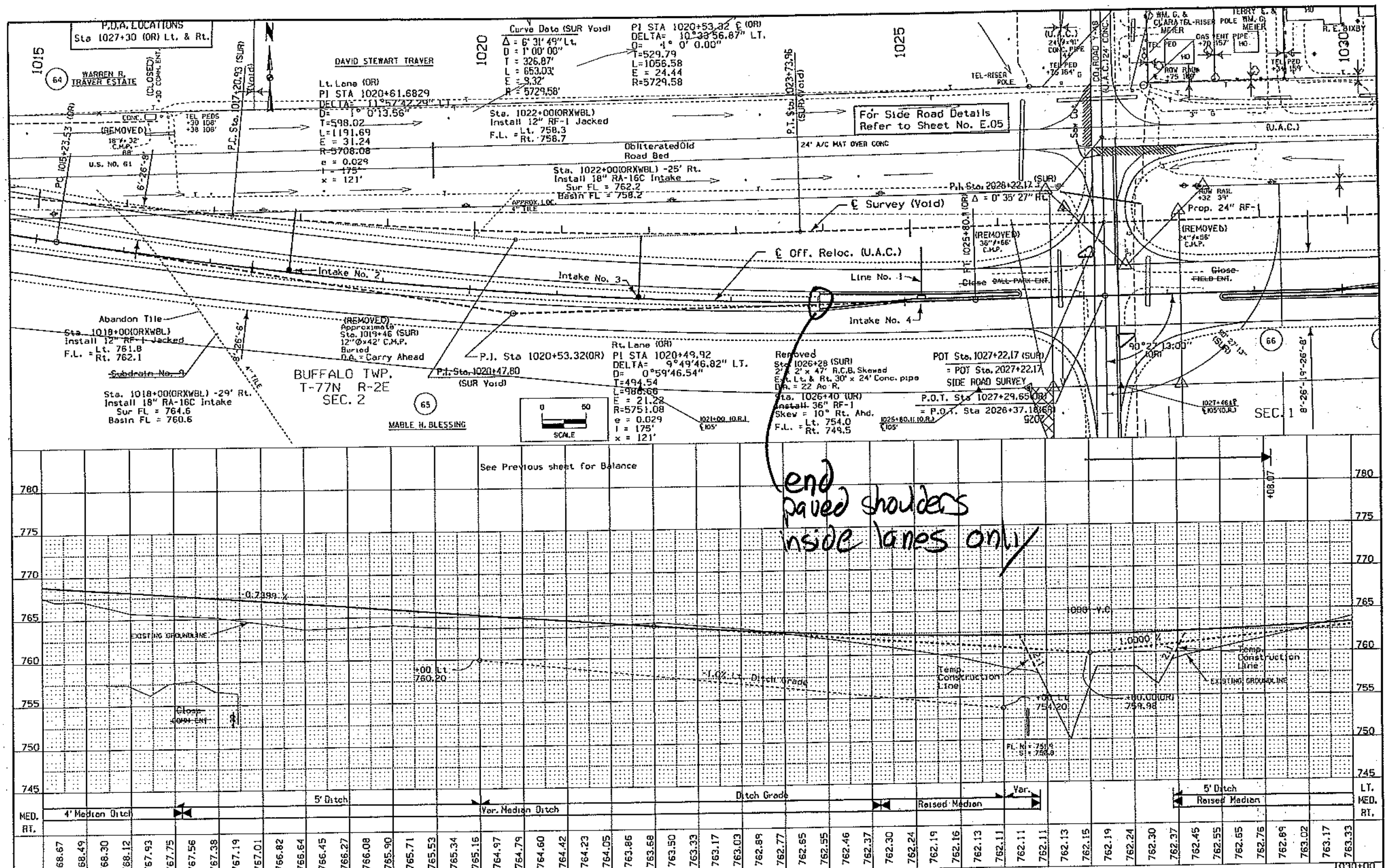

Curve Data
Δ = 0° 21' 20" Lt.
D = 0° 03' 33.42"
T = 299.89'
L = 599.77'
E = 0.465'
R = 96649.60'
e = N.C.
~~Prop.~~ 18" X 44'
Uncl. Ent. Pipe
P.D.A. LOCATIONS
Sta 959+78 LT & RT
BLUE GRASS TWP.
T-78N R-2E
SEC. 34
WILLIAM & MARIAN PETERSEN
ARNOLD W. PETERSEN & EVELYN E. PETERSEN
U.S. HO. 61
24' A/C HAT OVER CONC.
6" SH. TILE FROM PLANS
P.I. Sta. 956+97.94
Prop. 30" x 18' Uncl. Ent. Pipe
Prop. Type "C" Ent.
TEMPORARY EASEMENT TO CONSTRUCT ENTRANCE
FARM CREDIT BANK OF OMAHA(FEE)
NESRETEP FARMS(C.P.)
HACH SHED
TEMPORARY EASEMENT TO CONSTRUCT ENTRANCE DO NOT DISTURB TREES
(REMOVED)
Sta. 961+60
2' x 2' x 31' R.C.B.
Ext. Lt. 30' x 12.5' Conc. Pipe
Ext. Rt. 30' x 18.5' Conc. Pipe
D.A. = 9 Ac R.
Sta 961+60
Install 30"RF-1
N = 774.3
F.L. S = 772.5
BUFFALO TWP.
T-77N R-2E
SEC. 3
SCALE
C = 4023
C-3 = 300
C-3 fr ML Sta 936± = 616
C-5 fr ML Sta 936± = 1229
fr ML Sta 975± = 14219
20383
F + 30% = 18242
C-3 F + 30% = 916
C-5 F +30 % = 1229
20383
0.8200 %
+00 Med. 777.20
-02% Median Ditch Grade
+00 Med. 776.60
1600' V.C.
EXISTING GROUNDLINE
+00.00 784.16
.080 %
Prop. Type "C" Ent.
Prop. Jt. Type "B" Ent.
5' Ditch
4' Median Ditch
Crossover
Varies
Median Ditch Grade
4' Ditch
LT.
MED.
RT.
ROAD DESIGN • CADD • PRODUCED
STATE OF IOWA
FHWA REGION 7
FISCAL YEAR
SCOTT
COUNTY
PROJECT NUMBER
NHS-61-5(83)--19-82
SHEET NUMBER
D.08



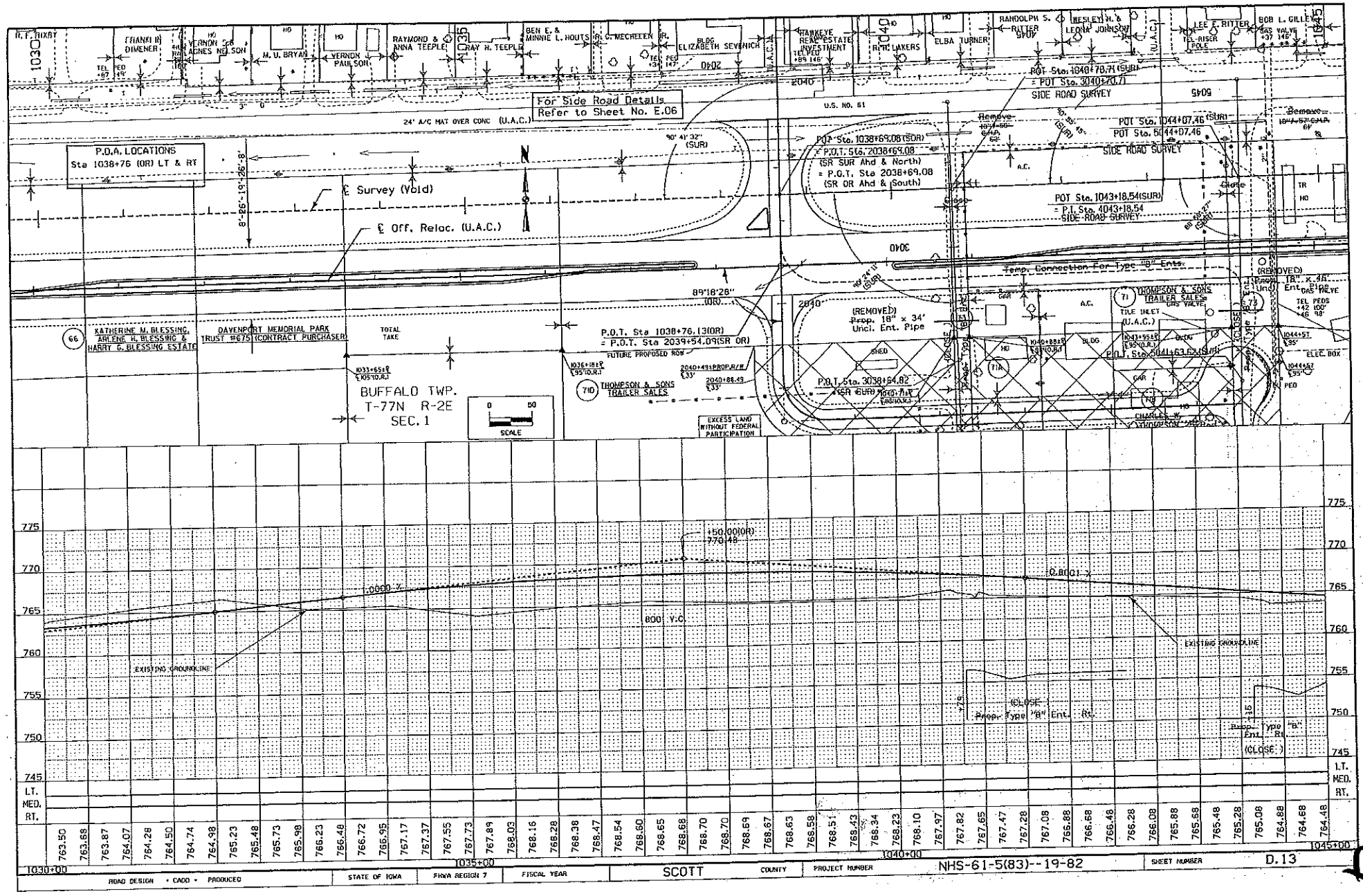
ROAD DESIGN • CADD • PRODUCED	STATE OF IOWA	FHWA REGION 7	FISCAL YEAR	SCOTT	COUNTY	PROJECT NUMBER	NHS-61-5(83)--19-82	SHEET NUMBER	D.09


BLUE GRASS TWP.
T-78N R-2E
SEC. 35
BUFFALO TWP.
T-77N R-2E
SEC. 2
P.D.A. LOCATIONS
Sta 985+00 LT & RT
Sta 994+21 LT & RT
WILLIAM & MARIAN PETERSEN
WILLIAM P. CUSACK & NADINE DANIELSEN CUSACK
HILBERT L. & AGNES MILLS
KENNETH W. & MARY E. BRENDEL
+15 Prop. Type "F" Dike Elev. = 757.5
+80 Prop. Type "F" Dike Elev. = 756.0
+40 Prop. Type "M" Dike Elev. = 761.0
+20 Prop. Type "F" Dike Elev. = 748.0
Sta. 989+00 - 105' Lt. Install 24" CMP Letdown Skew = 65° Lt. Ahd. F.L. = W 759.0 E 738.0 Other 738.1
Prop 24" x 58' Uncl Ent Pipe
Sta. 992+00 - 105' Lt. Install 24" CMP Letdown Skew = 70° Rt. Ahd. F.L. = E 753.0 W 741.5 Other 741.5
Sta. 990+00 - 120' Rt. (REMOVED) Install 24" CMP Letdown 18"x40' C.M.P. 79' Skew = 64° Rt. Ahd. F.L. = W. 745.2 E. 721.5
Sta. 992+50 - 51' Lt. Install 24" RF-1 F.L. = Lt. 753.5 Rt. 754.6
Prop 24" x 48' Uncl Ent Pipe
(REMOVED) 18"x40' C.M.P. 72'
Sta. 995+25 - 51' Lt. Install 24" RF-1 F.L. = Lt. 764.3 Rt 755.3
Curve Data Ent Δ = 90°0'0" D = 114°35'29.61" T = 50' L = 78.54' E = 20.71' R = 50'
Prop 18" x 136'
Tie-in to exist. Ent.
Sta. 990+66.6 5' x 5' x 136.3' R.C.B. Skewed D.A. = 52 Ac R. Build 5'x5' Ext. Lt. & Rt. Skew 15° Rt Ahd FL Lt = 736.0 Rt = 721.0 End Wall = 738.0 Design No. 692
Sta. 999+50 2' x 2' x 68' R.C.B. Ext. Lt. 30' x 30' Conc. Pipe Ext. Rt. 30' x 36' Conc. Pipe D.A. = 9 Ac R. Sta 999+75 Install 30" RF-1 & CMP Lt.= 758.5 F.L. Rt.= 742.2 Dt.= 742.5 Dt.= 755.0 Dt.= 757.6
TIMBER ABANDON & FILL
HIGH VOLTAGE POWER LINE
U.S. NO. 61
24" X/C MAT OVER CONC
TILE
See Previous sheet for Balance
See Following sheet for Balance
Prop Type "C" Ent
1.0601 %
2.56%
1000' V.C.
1.2404 %
EXISTING GROUNDLINE
-2.62 Rt Ditch Grade
+72.55
+25 Rt 744.30
LT. MED. RT.
5' Ditch
Lex Down
Toe Ditch
4' Median Ditch
Crossover
Ditch Grade
Letdown
No Ditch
763.95 763.69 763.42 763.16 762.89 762.63 762.36 762.10 761.83 761.57 761.30 761.04 760.78 760.53 760.30 760.09 759.89 759.70 759.52 759.37 759.22 759.09 758.98 758.88 758.79 758.72 758.66 758.61 758.58 758.57 758.57 758.59 758.61 758.65 758.71 758.78 758.87 758.97 759.08 759.21 759.35 759.51 759.68 759.87 760.07 760.29 760.52 760.76 761.02 761.29 761.58 761.88 762.19 762.50 762.81 763.12 763.43 763.74 764.05 764.36
985+00
990+00
995+00
1000+00
ROAD DESIGN • CADD • PRODUCED
STATE OF IOWA
FHWA REGION 7
FISCAL YEAR
SCOTT
COUNTY
PROJECT NUMBER
NHS-61-5(83)--19-82
SHEET NUMBER
D.10

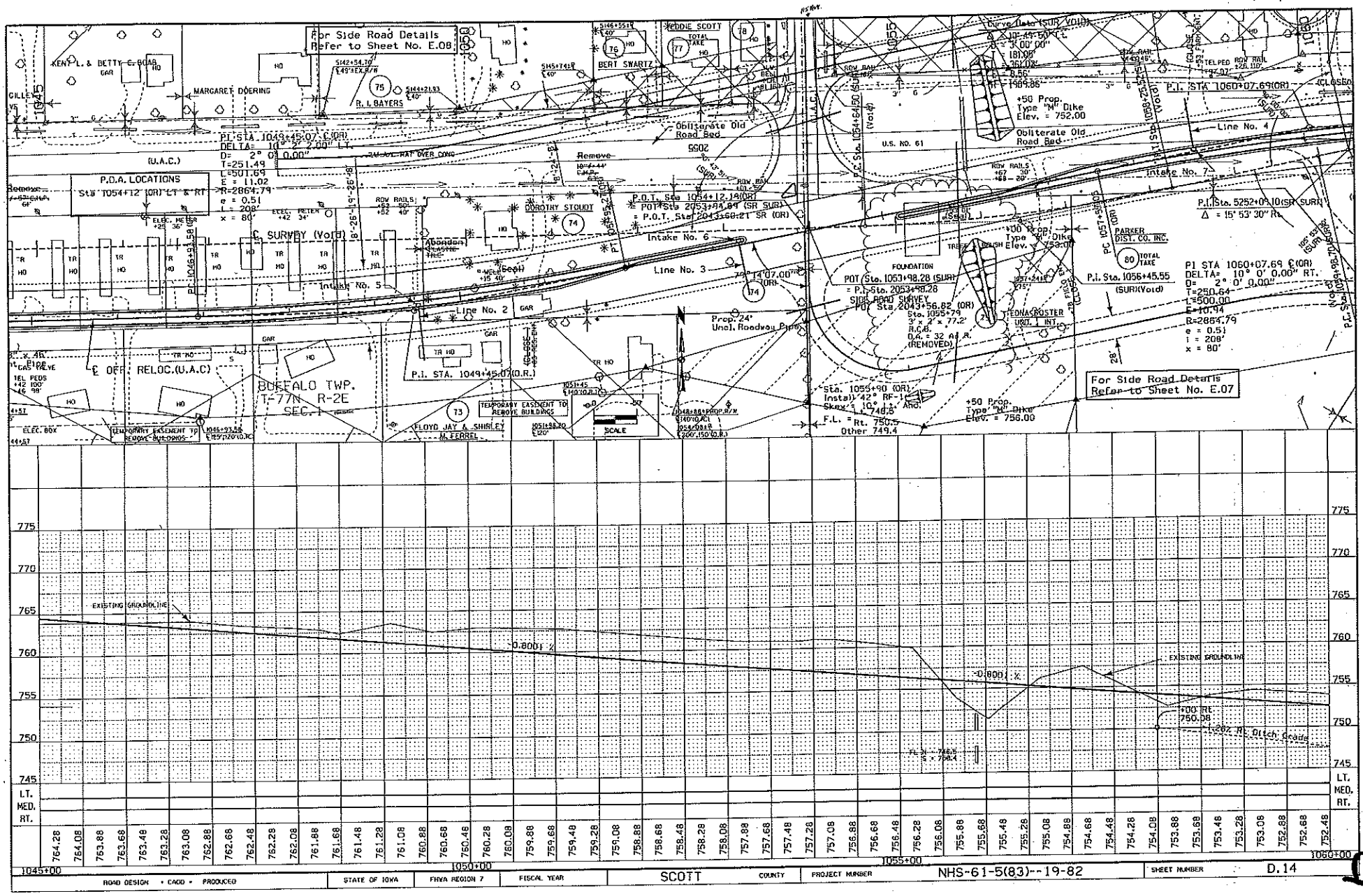

P.O.A. LOCATIONS
Sta 1003+23 (OR) LT & RT
Sta 1014+00 (OR) LT & RT
BLUE GRASS TWP.
T-78N R-2E
SEC. 35
WARREN R. TRAVER ESTATE
PI STA 1008+48.55 ℄ (OR)
DELTA= 18°36'50.87" RT.
D= 1° 0' 0.00"
T=532.23
L=1061.41
E = 24.67
R=5729.58
Lt. Lane (OR)
PI STA 1008+55.2128
DELTA= 12° 0'36.29" RT.
D= 0°59'28.24"
T=608.08
L=1211.70
E = 31.89
R=5780.58
e = 0.029
I = 175'
x = 121'
P.I. Sta. 1008+48.55 (SUR & OR)
℄ Survey (Void)
Prop. 18" x 50' Uncl. Ent. Pipe
Intake No. 1
℄ Off. Reloc. (U.A.C.)
24' A/C MAT OVER CONC
Prop 18" x 68' Uncl Ent Pipe
Sta. 1003+85 WBL
Install 18" RF-1
F.L. = Lt. 763.9
Rt. 764.9
Curve Data (SUR)(Void)
Δ = 8° 34' 43" Rt.
D = 1° 00' 00"
T = 329.29'
L = 657.86'
E = 9.45'
R = 5729.58'
Rt. Lane (OR)
PI STA 1008+45.89
DELTA= 9°32'40.82" RT.
D= 1° 0'23.49"
T=491.93
L=981.42
E = 21.22
R=5692.58
e = 0.029
I = 175'
x = 121'
Sta. 1013+65(OR)(WBL)
Install 18" RF-1
F.L. = Lt. 764.9
Rt. 765.0
Prop. 18" x 36' Uncl. Ent. Pipe
BUFFALO TWP.
T-77N R-2E
SEC. 2
Sta. 1013+65(OR)(WBL) - 34.5' Rt.
Install RA-9 Intake
Sur FL = 767.0
Basin FL = 763.0
SCALE
VERTICAL EQUATION:
℄ STA = 1002+00.00
EL = 766.84 BK
EL = 766.60 AHD
Prop. Type "C" Ent.
EXISTING GROUNDLINE
800' V.C.
+99.80(OR) 774.04
0.7399 %
1.2404 %
1.5%
Close Field Ent.
5' Ditch
4' Median Ditch
Crossover
No Ditch
LT.
MED.
RT.
764.67 764.98 765.29 765.60 765.91 766.22 766.53 766.84 766.91 767.22 767.53 767.84 768.15 768.46 768.77 769.08 769.38 769.67 769.94 770.20 770.44 770.66 770.87 771.07 771.24 771.41 771.55 771.69 771.80 771.90 771.99 772.06 772.11 772.15 772.18 772.19 772.18 772.16 772.12 772.06 772.00 771.91 771.81 771.70 771.56 771.42 771.26 771.08 770.89 770.71 770.52 770.34 770.15 769.97 769.78 769.60 769.41 769.23 769.04 768.86
1000+00
1005+00
1010+00
1015+00
ROAD DESIGN • CADD • PRODUCED
STATE OF IOWA
FHWA REGION 7
FISCAL YEAR
SCOTT
COUNTY
PROJECT NUMBER
NHS-61-5(83)--19-82
SHEET NUMBER
D.11



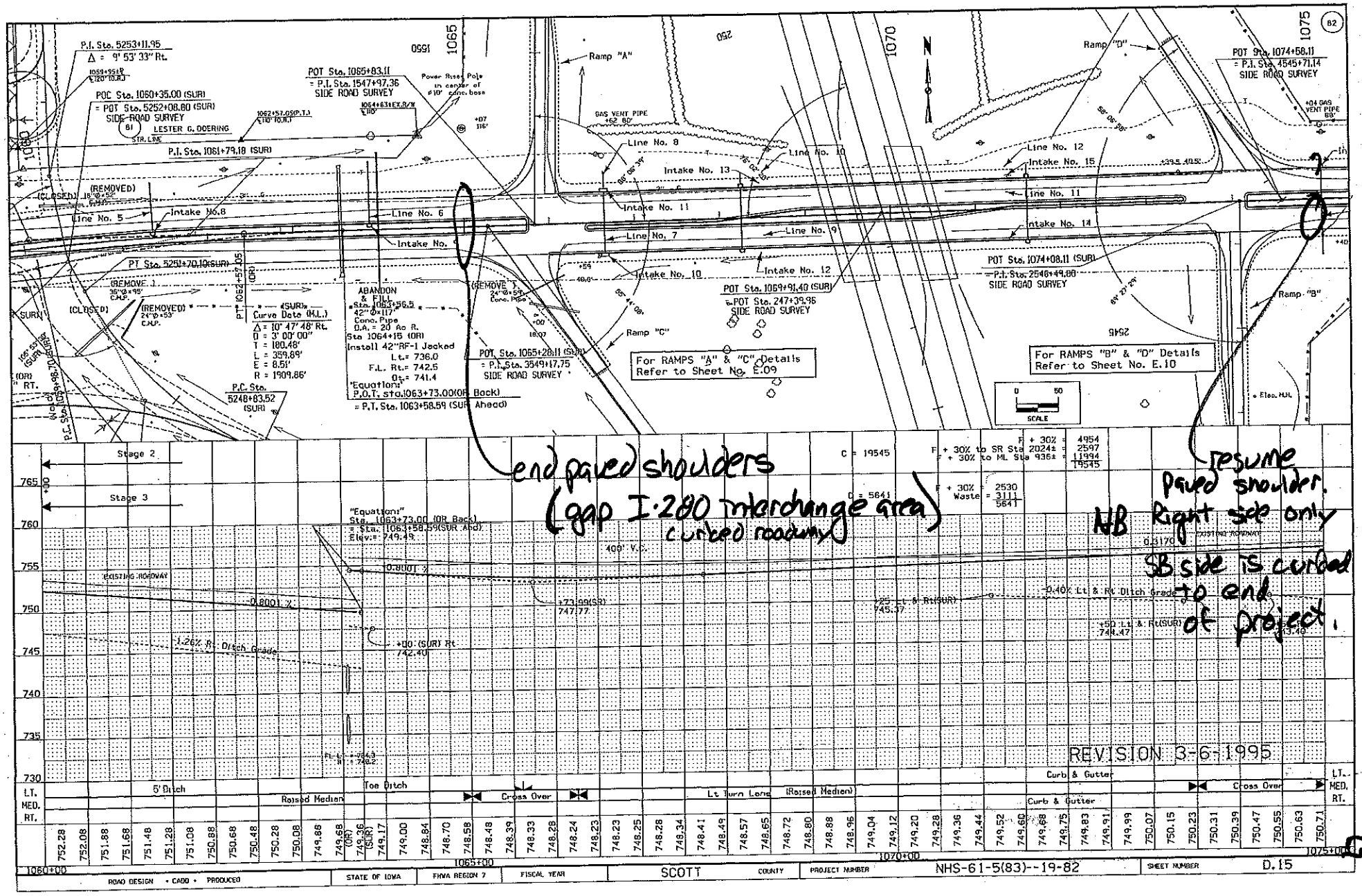
ROAD DESIGN • CADD • PRODUCED	STATE OF IOWA	FHWA REGION 7	FISCAL YEAR	SCOTT	COUNTY	PROJECT NUMBER	NHS-61-5(83)--19-82	SHEET NUMBER	D.12



ROAD DESIGN • CADD • PRODUCED	STATE OF IOWA	FHWA REGION 7	FISCAL YEAR	SCOTT	COUNTY	PROJECT NUMBER	NHS-61-5(83)--19-82	SHEET NUMBER	D.13

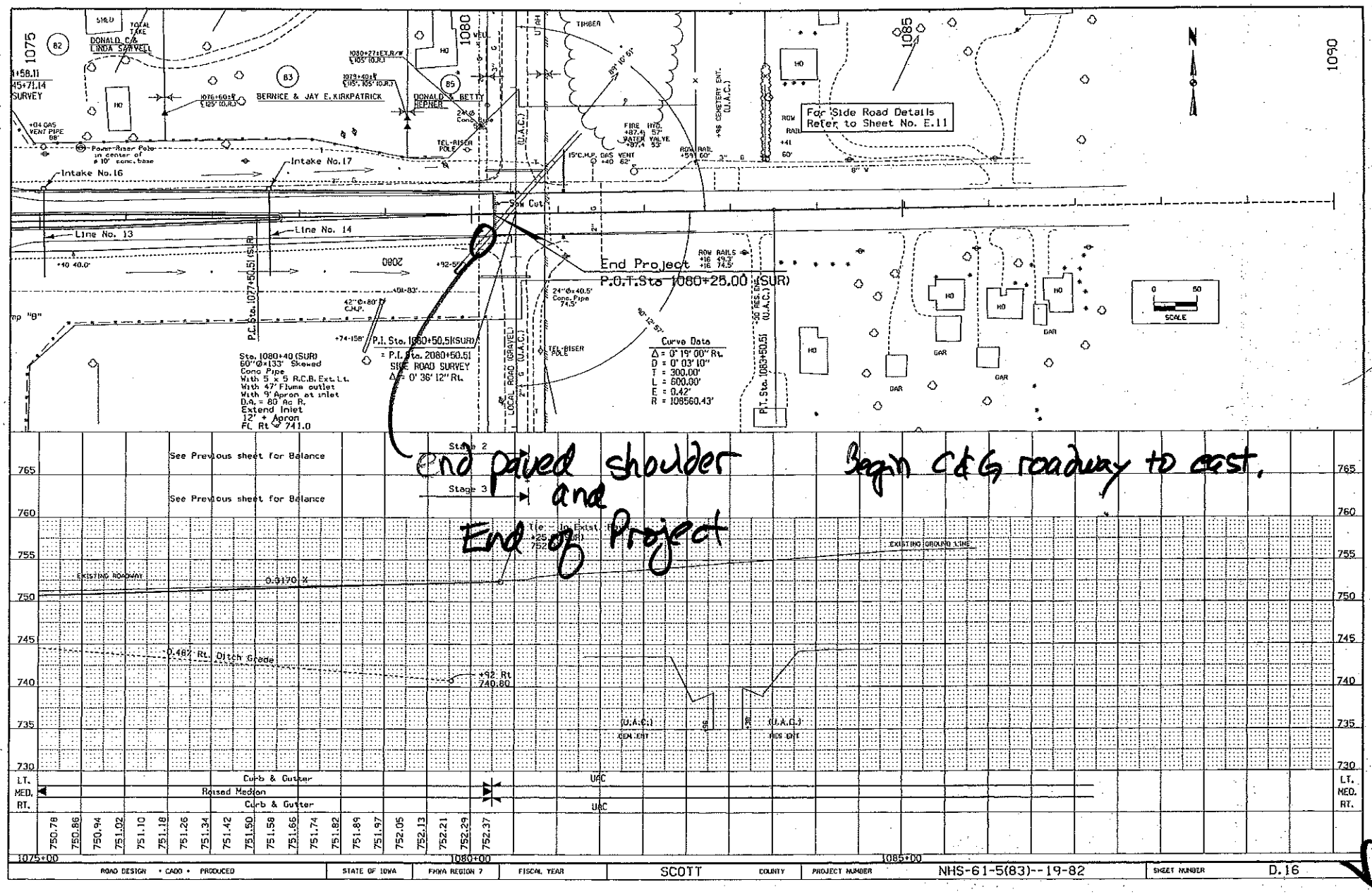


ROAD DESIGN • CADD • PRODUCED	STATE OF IOWA	FHWA REGION 7	FISCAL YEAR	SCOTT	COUNTY	PROJECT NUMBER	NHS-61-5(83)--19-82	SHEET NUMBER	D.14



end paved shoulders
(gap I-280 Interchange area)
curbed roadway

resume paved shoulder.
NB Right side only
SB side is curbed to end of project.

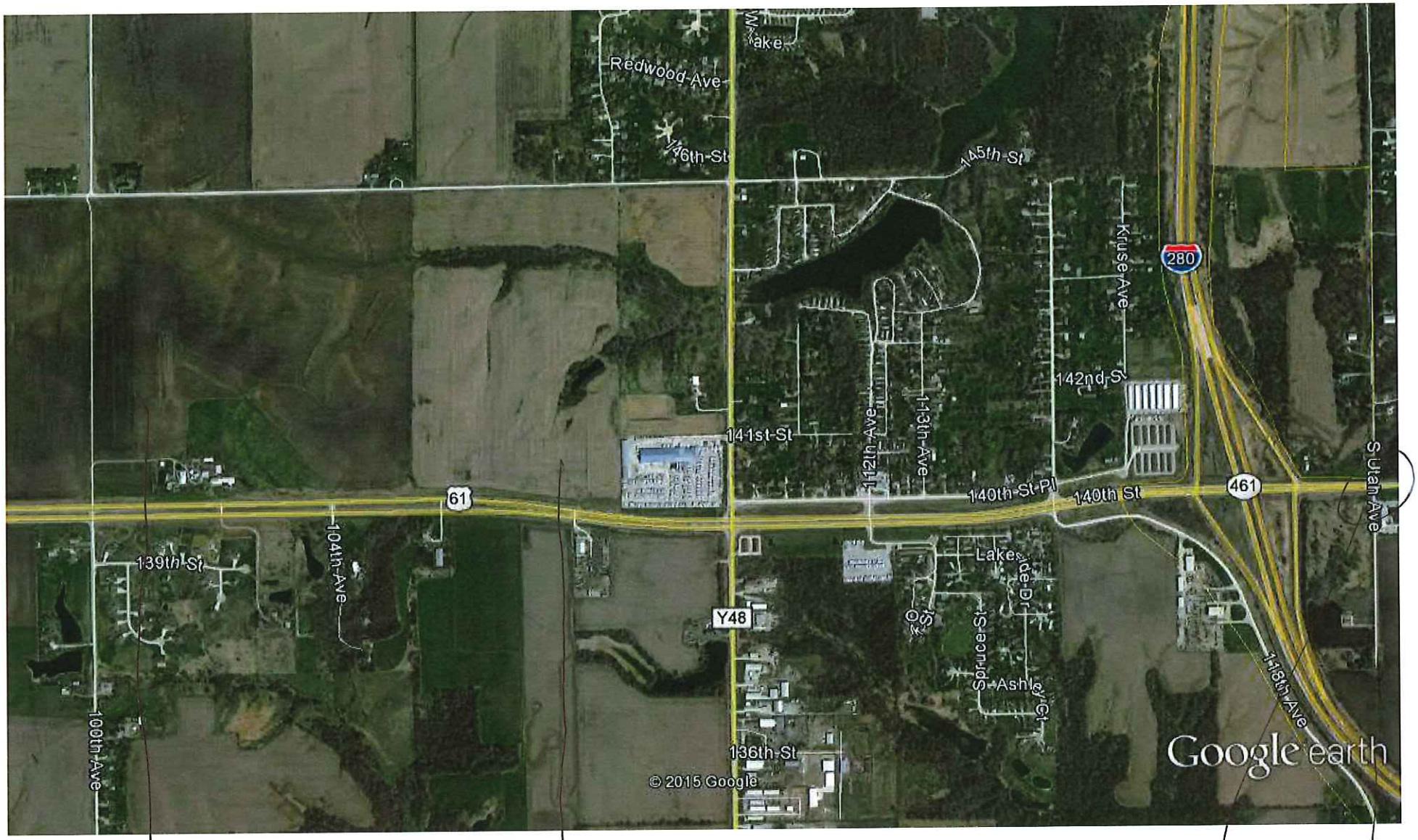

DONALD C. & LINDA SARVELL
BERNICE & JAY E. KIRKPATRICK
DONALD & BETTY HEPNER
Intake No. 16
Intake No. 17
Line No. 13
Line No. 14
Saw Cut
End Project
P.O.T. Sta. 1080+25.00 (SUR)
For Side Road Details Refer to Sheet No. E.11
Sta. 1080+40 (SUR) 60"Ø×133' Skewed Conc. Pipe With 5 x 5 R.C.B. Ext. Lt. With 47' Flume outlet With 9' Apron at inlet D.A. = 80 Ac R. Extend Inlet 12' + Apron FL Rt @ 741.0
P.I. Sta. 1080+50.5(SUR) = P.I. Sta. 2080+50.51 SIDE ROAD SURVEY Δ = 0° 36' 12" Rt.
Curve Data
Δ = 0° 19' 00" Rt.
D = 0° 03' 10"
T = 300.00'
L = 600.00'
E = 0.42'
R = 108560.43'
See Previous sheet for Balance
Stage 2
Stage 3
End paved shoulder and End of Project
Begin C&G roadway to east.
EXISTING ROADWAY
EXISTING GROUND LINE
0.3170 %
0.48% Rt. Ditch Grade
+92 Rt 740.80
Curb & Gutter
Raised Median
UAC
LT. MED. RT.
750.78 750.86 750.94 751.02 751.10 751.18 751.26 751.34 751.42 751.50 751.58 751.66 751.74 751.82 751.89 751.97 752.05 752.13 752.21 752.29 752.37
1075+00 1080+00 1085+00
ROAD DESIGN • CADD • PRODUCED
STATE OF IOWA
FHWA REGION 7
FISCAL YEAR
SCOTT COUNTY
PROJECT NUMBER NHS-61-5(83)--19-82
SHEET NUMBER D.16

Google earth

miles 1
km 2

65mph →

Exc H



Google earth

miles 1

km 2

65mph | 55 mph → ← 55 mph ← 50 mph →

end project

Dec 4

3YR + ½ 2015 DOC I

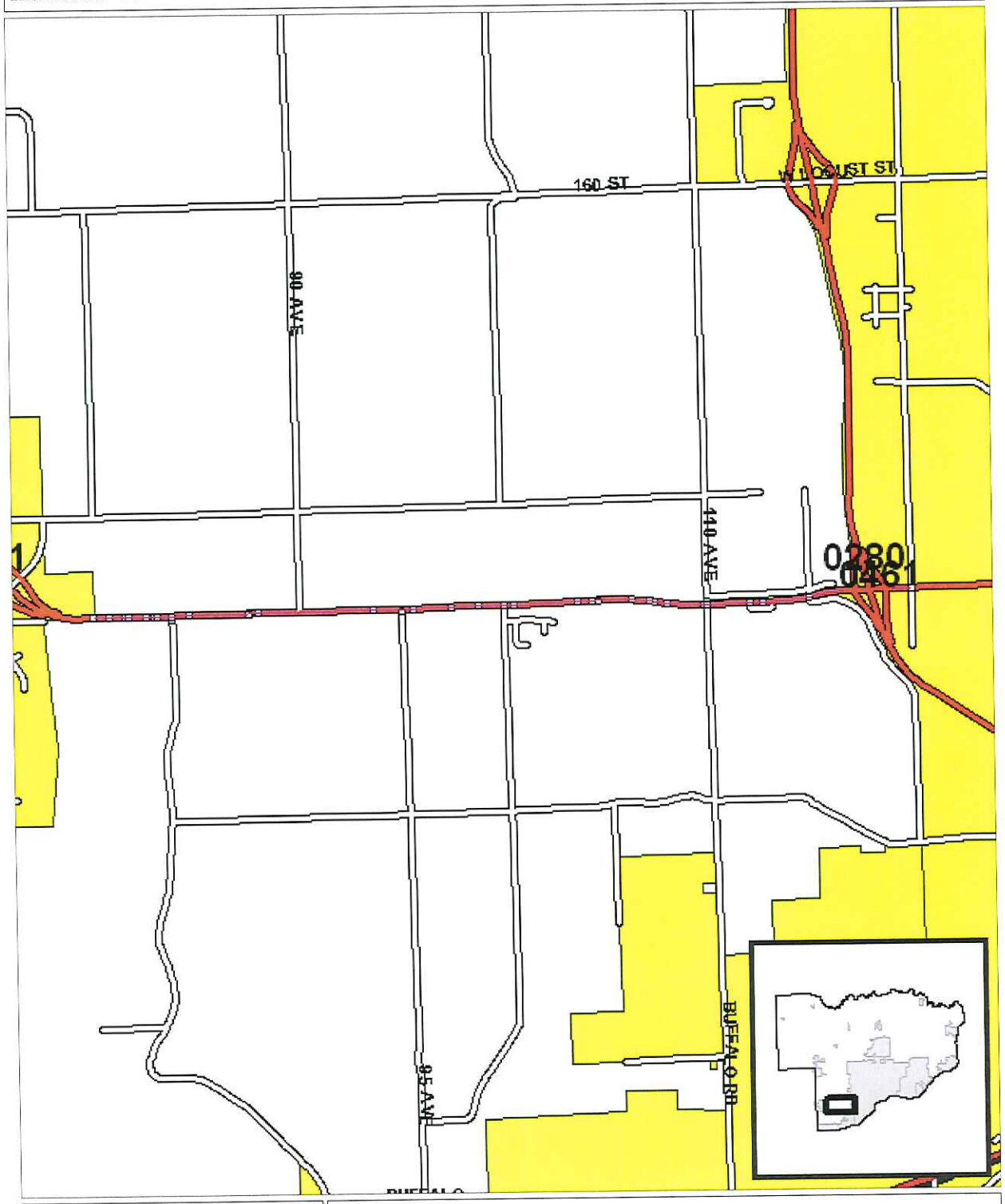
Iowa Department of Transportation

Location Map

CMAT Version 3.4.0

Report Version 1.1 Mar 2005

Incidents: 73



Analyst: DLR

Notes: BG to Utah (gap I-280 interchange)

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Iowa Department of Transportation

Major Cause Summary

CMAT Version 3.4.0

Report Version 1.1 Jan 2005

Analysis Years: 2012 [21], 2013 [22], 2014 [19], 2015 [11]

Crash Summary:

Fatal	-
Major Injury	6
Minor Injury	12
Possible/Unknown	6
PDO	49
Total Crashes	73

Injury Summary:

Fatal	-
Major Injury	7
Minor Injury	13
Possible	7
Unknown	-
Total Injuries	27

TOT Property Damage: $402,507

AVG Property Damage: $5,514

Surface Condition Summary:

Dry	47
Wet	7
Ice	3
Snow	1
Slush	-
Sand/Dirt/Oil/Gravel	1
Water	-
Other	-
Unknown	-
Not Reported	14
Total Crashes	73

Major Cause Summary:

14	Animal
1	Ran Traffic Signal
	Ran Stop Sign
1	Crossed Centerline
1	FTYROW: At Uncontrolled Intersection
1	FTYROW: Making Right Turn on Red Signal
6	FTYROW: From Stop Sign
	FTYROW: From Yield Sign
9	FTYROW: Making Left Turn
	FTYROW: From Driveway
	FTYROW: From Parked Position
	FTYROW: To Pedestrian
2	FTYROW: Other (explain in narrative)
	Traveling Wrong Way or on Wrong Side of Rd
3	Driving Too Fast for Conditions
	Exceeded Authorized Speed
2	Made Improper Turn
	Improper Lane Change
12	Followed Too Close
	Disregarded Railroad Signal
	Disregarded Warning Sign
1	Operating Vehicle in Reckless/Aggressive Manner
	Improper Backing
	Illegally Parked/Unattended
6	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
6	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
1	Other: Other Improper Action
1	Unknown
1	Other: No Improper Action
2	None Indicated

Selection Filter:

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

Analyst: DLR

Notes: BG to Utah (gap I-280 interchange)

Iowa Department of Transportation

Abbreviated Crash Report

CMAT Version 3.4.0

Report Version 1.2 Mar 2005

Date	DOT Case #	Agency Case #	City	Crash Sev.	Literal Description
01/11/2012	2012674677	2012001823	Davenport	PDO	UTAH AVE AND 118 AVE AND SB/WB US 0061 / 140 ST
02/13/2012	2012672500	12-3035		PDO	118TH ST UTAH AVE and NB/EB US 0061 / 140 ST and 118 AVE
03/18/2012	2012678059	2012-5225	Blue Grass	PDO	SB/WB US 0061 / US 61
04/11/2012	2012681208	12-7119		PDO	SB/WB US 0061 / 140 ST and Y048 / 110 AVE
04/27/2012	2012683400	12-8237		PDO	NB/EB US 0061 / 140 ST
06/06/2012	2012689342	12-10826		PDO	FRONTAGE RD and SB/WB US 0061 / 140 ST
07/05/2012	2012693275	12-13122		PDO	FRONTAGE RD and SB/WB US 0061 / 140 ST
07/09/2012	2012693719	12-13387		Minor	COONHUNTER S RD
07/09/2012	2012693720	12-13394		PDO	100 AVE and NB/EB US 0061 / 140 ST
07/10/2012	2012693721	12-13476		PDO	NB/EB US 0061 / US 61
07/26/2012	2012695990	12-14579		Poss/Unk	Y048 / 110 AVE
08/06/2012	2012697558	12-15447		PDO	NB/EB US 0061 / US 61
09/06/2012	2012701661	12-17665		PDO	SB/WB US 0061 / US 61
10/03/2012	2012708982	2012054196		Major	1/2 E OF 110TH AVE ON HWY 61 SB
10/25/2012	2012709424	12-20972		PDO	SB/WB US 0061 / 140 ST and Y048 / 110 AVE
10/28/2012	2012709545	12-21136		PDO	SB/WB US 0061 / 140 ST and Y048 / 110 AVE
11/04/2012	2012710704	12-21597		PDO	NB/EB US 0061 / US 61
11/25/2012	2012714095	12-23051		PDO	NB/EB US 0061 / 140 ST
11/27/2012	2012714311	12-23132		PDO	118TH ST UTAH AVE and NB/EB US 0061 / 140 ST and 118 AVE
12/13/2012	2012716923	2012-100125	Davenport	PDO	UTAH AVE and US 0061 / W RIVER DR
12/17/2012	2012717236	12-24484		PDO	NB/EB US 0061 / 140 ST
01/24/2013	2013723022	2013-5740	Davenport	PDO	UTAH AVE and US 0061 / W RIVER DR
01/27/2013	2013724055	2013-1517		PDO	NB/EB US 0061 / 140 ST
01/30/2013	2013724056	2013-1717		Poss/Unk	SB/WB US 0061 / 140 ST
02/22/2013	2013740795		Buffalo	PDO	SB/WB US 0061 / 140 ST measuring 1500 Feet West from US 0061 / 140 ST
03/21/2013	2013731419	2103-4807	Davenport	Minor	SB/WB US 0061 / 140 ST and Y048 / 110 AVE
03/23/2013	2013731742	13-4983		PDO	NB/EB US 0061 / 140 ST
03/29/2013	2013732905	2013-5358		PDO	FRONTAGE RD and NB/EB US 0061 / 140 ST
03/30/2013	2013732901	13-5474		Poss/Unk	SB/WB US 0061 / 140 ST
04/03/2013	2013733624	13-5744		PDO	NB/EB US 0061 / US 61
04/07/2013	2013734178	13-6145		Major	NB/EB US 0061 / 140 ST
04/14/2013	2013735363	2013-6600		Minor	SB/WB US 0061 / 140 ST

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Iowa Department of Transportation

Abbreviated Crash Report

CMAT Version 3.4.0

Report Version 1.2 Mar 2005

Date	DOT Case #	Agency Case #	City	Crash Sev.	Literal Description
05/18/2013	2013741202	2013028108		Minor	US 61/140 ST AND FRONTAGE RD
06/16/2013	2013744340	13-00010951		Major	118TH ST UTAH AVE and SB/WB US 0061 / 140 ST and 118 AVE
06/19/2013	2013744996	2013-11144		Minor	FRONTAGE RD and NB/EB US 0061 / 140 ST
08/21/2013	2013754413	13-16047		Major	FRONTAGE RD and SB/WB US 0061 / 140 ST
08/22/2013	2013754412	13-16105		PDO	FRONTAGE RD and SB/WB US 0061 / 140 ST
09/23/2013	2013758862	13-18350		PDO	UTAH AVE AND 118 AVE AND US 61/140 ST
10/07/2013	2013762677	2013-19373	Davenport	PDO	Y048/110 AVE AND US 61/140 ST
11/23/2013	2013769654	2013-22575		Minor	Y048/110 AVE AND US 61/140 ST
12/03/2013	2013770881	13-23161		PDO	US 61/140 ST
12/05/2013	2013771513	2013-23267		PDO	US 61/140 ST
12/09/2013	2013772265	13-23562		PDO	US 61/140 ST AND US 61 AND COONHUNTER S RD
01/07/2014	2014780205	2014001684		Poss/Unk	HWY 61 AND Y48
01/28/2014	2014785413	2014-1840		Minor	95 AVE
02/05/2014	2014784528	2014-2372		PDO	US 61/140 ST
02/13/2014	2014786031	14-2993		PDO	US 61/140 ST AND US 61 AND COONHUNTER S RD
02/17/2014	2014789636	2014-3217		Minor	Y048/110 AVE AND US 61/140 ST
03/10/2014	2014790455	2014-4743		PDO	US 61/140 ST AND FRONTAGE RD
04/18/2014	2014795798	2014-7624		PDO	US 61/140 ST
09/12/2014	2014816841	2014-18876		PDO	Y048/110 AVE AND US 61/140 ST
09/12/2014	2014817908	2014053053		Major	US 61/140 ST AND FRONTAGE RD
09/18/2014	2014817519	14-19268		PDO	US 61/140 ST
09/25/2014	2014819966	14-19670		Minor	Y048/110 AVE AND US 61/140 ST
10/07/2014	2014820576	14-20377		Poss/Unk	Y048/110 AVE AND US 61/140 ST
10/21/2014	2014822822	2014-21377		Minor	US 61/140 ST AND US 61 AND COONHUNTER S RD
10/22/2014	2014823545	2014-21454		Minor	US 61
11/01/2014	2014825062	2014-22323		PDO	Y048/110 AVE AND US 61/140 ST
11/05/2014	2014825531	14-22634		PDO	US 61/140 ST AND US 61 AND COONHUNTER S RD
11/12/2014	2014826834	14-23193		PDO	Y048/110 AVE AND US 61/140 ST
11/21/2014	2014829445	2014-23847		PDO	Y048/110 AVE AND US 61/140 ST
11/27/2014	2014830462	2014-24309		PDO	US 61/140 ST
01/20/2015	2015842381	2015-1267	Davenport	PDO	US 61/140 ST AND FRONTAGE RD
02/05/2015	2015843852	2015-2370	Davenport	Minor	US 61/140 ST

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Iowa Department of Transportation

Abbreviated Crash Report

CMAT Version 3.4.0

Report Version 1 2 Mar 2005

Date	DOT Case #	Agency Case #	City	Crash Sev.	Literal Description
02/14/2015	2015845844	2015-3113		PDO	US 61/140 ST
02/23/2015	2015847339	2015-3716		Poss/Unk	Y048/110 AVE AND US 61/140 ST
03/30/2015	2015852474	2015-6387	Blue Grass	Major	US 61/140 ST
04/27/2015	2015857217	2015022759		PDO	HWY 61 AT 110TH AVE WB
05/24/2015	2015860353	2015-10570	Davenport	PDO	Y048/110 AVE AND US 61/140 ST
06/02/2015	2015861904	2015-11298	Blue Grass	PDO	US 61
06/14/2015	2015863740	2015-12309		PDO	Y048/110 AVE AND US 61/140 ST
06/16/2015	2015864162	15-12410		PDO	Y048/110 AVE AND US 61/140 ST
06/19/2015	2015866495	15-12627		PDO	US 61/140 ST AND US 61 AND COONHUNTER S RD

Selection Filter:

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

Analyst: DLR

Notes: BG to Utah (gap I-280 interchange)

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Abbreviated Crash Report

CMAT Version 3.4.0

Report Version

Date	DOT Case #	Agency Case #	City	Crash Sev.	Literal Description
07/09/2012 07:10	2012693719	12-13387		Minor	COONHUNTER S RD
07/26/2012 11:16	2012695990	12-14579		Poss/Unk	Y048 / 110 AVE
10/03/2012 22:35	2012708982	2012054196		Major	1/2 E OF 110TH AVE ON HWY 61 SB
01/30/2013 15:48	2013724056	2013-1717		Poss/Unk	SB/WB US 0061 / 140 ST
03/21/2013 00:13	2013731419	2103-4807	Davenport	Minor	SB/WB US 0061 / 140 ST and Y048 / 110 AVE
03/30/2013 14:54	2013732901	13-5474		Poss/Unk	SB/WB US 0061 / 140 ST
04/07/2013 22:53	2013734178	13-6145		Major	NB/EB US 0061 / 140 ST
04/14/2013 04:43	2013735363	2013-6600		Minor	SB/WB US 0061 / 140 ST
05/18/2013 12:45	2013741202	2013028108		Minor	US 61/140 ST AND FRONTAGE RD
06/16/2013 11:36	2013744340	13-00010951		Major	118TH ST UTAH AVE and SB/WB US 0061 / 140 ST and 118 AVE
06/19/2013 08:29	2013744996	2013-11144		Minor	FRONTAGE RD and NB/EB US 0061 / 140 ST
08/21/2013 20:41	2013754413	13-16047		Major	FRONTAGE RD and SB/WB US 0061 / 140 ST
11/23/2013 23:30	2013769654	2013-22575		Minor	Y048/110 AVE AND US 61/140 ST
01/07/2014 20:41	2014780205	2014001684		Poss/Unk	HWY 61 AND Y48
01/28/2014 12:22	2014785413	2014-1840		Minor	95 AVE
02/17/2014 11:24	2014789636	2014-3217		Minor	Y048/110 AVE AND US 61/140 ST
09/12/2014 10:40	2014817908	2014053053		Major	US 61/140 ST AND FRONTAGE RD
09/25/2014 11:25	2014819966	14-19670		Minor	Y048/110 AVE AND US 61/140 ST
10/07/2014 15:47	2014820576	14-20377		Poss/Unk	Y048/110 AVE AND US 61/140 ST
10/21/2014 08:08	2014822822	2014-21377		Minor	US 61/140 ST AND US 61 AND COONHUNTER S RD
10/22/2014 17:12	2014823545	2014-21454		Minor	US 61
02/05/2015 04:51	2015843852	2015-2370	Davenport	Minor	US 61/140 ST
02/23/2015 07:29	2015847339	2015-3716		Poss/Unk	Y048/110 AVE AND US 61/140 ST
03/30/2015 21:37					

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2015852474	2015-6387	Blue Grass	Major	US 61/140 ST

Selection Filter:

((CSEVERITY <> 5)) AND ((YEAR = 2012 or YEAR = 2013 or YEAR = 2014 or YEAR = 2015))

Notes:

Analyst:

DLR

BG to Utah (gap I-280 interchange)

Doc C.1

Office of Systems Planning

Back | Introduction | Explanation of headings | PDF for all 2014 routes | Cartography and Traffic Data home

2014

Route	Primary Route Section Description	Rural/Municipal	Section length (miles)	Annual Average Daily Traffic	Vehicle Classification Distribution of Annual Average Daily Traffic: Motorcycles	Cars, Vans and Pickups	Total Trucks and Buses	Buses	Single Unit Trucks: 2 Axle	3 Axle	4 or more Axles	4 or less Axles	Combination Trucks: 5 Axle	6 or more Axles	Multiple Trailer	A V Veh
61	82 SCOTT COUNTY															
61	OAK LANE INTERCHANGE	M	0.398	10800	60	9041	1699	66	302	68	7	113	1054	39	51	
61	EAST-NORTH EAST-SOUTH RAMP	M	0.209	430	3	385	42	3	14	3	0	2	18	1	1	
61	NORTH-EAST SOUTH-EAST RAMP	M	0.225	470	3	411	56	4	19	4	0	3	24	1	1	
61	WEST-NORTH WEST-SOUTH RAMP	M	0.292	450	3	413	34	3	15	3	0	1	10	0	0	
61	NORTH-WEST SOUTH-WEST RAMP	M	0.293	520	3	474	43	2	8	2	0	3	26	1	1	
61	MAYNE STREET INTERCHANGE	M	1.513	10800	60	9054	1686	63	289	65	7	113	1059	39	51	1
61	EAST-NORTH EAST-SOUTH RAMP	M	0.265	1900	12	1810	78	11	48	11	1	1	6	0	0	
61	NORTH-EAST SOUTH-EAST RAMP	M	0.246	2080	13	1978	89	13	59	13	1	0	3	0	0	
61	WEST-NORTH WEST-SOUTH RAMP	M	0.272	80	0	58	21	2	10	2	0	1	6	0	0	
61	NORTH-WEST SOUTH-WEST RAMP	M	0.229	90	1	75	14	1	5	1	0	1	6	0	0	
61	EAST LIMITS OF BLUE GRASS	M	0.338	15300	88	13215	1997	101	463	104	11	118	1107	40	53	
61	INTERSECTION CO RD Y48	R	3.143	15300	88	13215	1997	101	463	104	11	118	1107	40	53	4
61	INTERSECTION 118TH AVE	R	0.506	17700	102	15388	2210	132	608	136	14	118	1107	40	53	
61	WEST LIMITS OF DAVENPORT	R	0.066	18000	104	15636	2260	140	642	144	15	118	1107	40	53	

2010 14000

2016/14

180 to 0th 8100

Doc K

NA

no signals proposed

DOC L

Rev. 5/14

Road Segment Benefit / Cost Safety Analysis

Iowa DOT Office of Traffic & Safety

County: Scott | Prepared by: Douglas L Rick | Date Prepared: Aug 3, 2014

Location: US 61 from the ECL of Blue Grass to Utah Ave in Davenport

Improvement

Proposed Improvement(s): Partially pave existing granular shoulders.

Pave 4' wide all shoulders on this 4-lane divided highway.

$1,500,000	Estimated Improvement Cost, **EC**	20	Est. Improvement Life, years, **Y**
$ -	Other Annual Cost (after initial year), **AC**	37	Crash Reduction Factor (integer), **CRF**
$ -	Present Value Other Annual Costs, **OC**	4.0%	Discount Rate, **INT**
		$ 1,500,000	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 traffic data | 2014 Date of traffic count

Length (mi.)	Two-way veh/day	Description
3.14	15,300	ECL BG to Y48
0.51	17,700	
0.304	18,000	
0.201	8,100	
4.15	miles total	

64,144	Current Vehicle Miles / Day, **VM**
95,315	End of Life Veh. Miles / Day
23,412,633	Current Veh. Miles / Year, **AM**
568,865,402	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

2012 First full year --> 2014 Last full year — 3.5 years, Time Period, **T**

6 Additional months — values as of May 2014

0	Fatal Crashes →	0	Fatalities @	$4,500,000	$ -
		7	Major Injuries @	$325,000	$ 2,275,000
24	Injury Crashes →	13	Minor Injuries @	$65,000	$ 845,000
		7	Possible Injuries @	$35,000	$ 245,000
49	Property Damage Only		(assumed cost per crash)	$7,400	$ 540,200
			-OR- enter all Property Costs of all crashes:		
73	Total Crashes, **TA**			Total $ Loss, **LOSS**	$ 3,905,200

20.86	Current Crashes / Year, **AA** = TA / T	89.1	Crashes / HMVM, Crash Rate, **CR** CR = TA x 10^8 / (AM x T)
$ 53,496	Cost per Crash, **AVCR** = LOSS / TA	$ 6,643,203	Present Value of Avoided Crashes, **BENEFIT**
506.8	Total Expected Crashes, **TCR** = CR x TVMT/10^8		
7.72	Crashes Avoided First Year **AAR** = AA x CRF / 100		
$ 412,835	Crash Costs Avoided in First Year, AAR x AVCR		
187.5	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 = $6,643,203 : $1,500,000 = **4.43** : 1