

To: Steve Gramm, SDDOT; Shannon Ausen, City of Sioux Falls	
From: Rick Laughlin, HDR	Project: I-29 Exit 77 (41 <sup>st</sup> St.) Crossroad Corridor Study
CC:	
Date: 7/22/11	Job No: PL0100(91); PCN 033D

**RE: Crash Analysis**

This memorandum documents the crash and safety analysis conducted as part of the 41<sup>st</sup> Street Crossroad Corridor Study. The study calls for an analysis of crash data within the study area and identification of safety problems. Figure 1 illustrates the 2007 to 2009 crash data.

Crash data was provided by the State of South Dakota records system via GIS files. Statistics were prepared and analyzed for the following roadway segments and intersections:

**SEGMENT**

- 41<sup>st</sup> – Valley View to Terry
- 41<sup>st</sup> – Terry to Louise
- 41<sup>st</sup> – Louise to Kiwanis
- Louise – 34<sup>th</sup> to 41<sup>st</sup>
- Louise – 41<sup>st</sup> to 49<sup>th</sup>

**INTERSECTION**

- 41<sup>st</sup>/Valley View
- 41<sup>st</sup>/Marion
- 41<sup>st</sup>/Terry
- 41<sup>st</sup>/I-29
- 41<sup>st</sup>/Mall
- 41<sup>st</sup>/Shirley
- 41<sup>st</sup>/Louise
- 41<sup>st</sup>/Kiwanis
- 34<sup>th</sup>/Louise
- Wal-Mart/Louise
- Empire/Louise
- 49<sup>th</sup>/Louise

The segment analysis shows a fairly high number of crashes, particularly in the segment from Terry Avenue to Louise Avenue. The Terry-Louise segment contains the most turning activity in the study area, with many intersections, driveways, and the Interstate 29 interchange. Research indicates that safety is compromised by the lack of access controls, particularly the lack of a median on a roadway with six through-lanes. That research appears to mesh with the crash history on 41<sup>st</sup> Street. Fewer crashes were noted on the Louise Avenue segments within the study area, where access is more limited than on 41<sup>st</sup> Street. The crash statistics for study area segments are shown in the following table.

**CRASH COMPARISON**

SEGMENT	2007	2008	2009	SEGMENT TOTAL
41 <sup>st</sup> – Valley View to Terry	36	53	42	131
41 <sup>st</sup> – Terry to Louise	135	158	142	435
41 <sup>st</sup> – Louise to Kiwanis	68	83	80	231
Louise – 34 <sup>th</sup> to 41 <sup>st</sup>	17	32	28	77
Louise – 41 <sup>st</sup> to 49 <sup>th</sup>	37	57	41	135
ANNUAL TOTAL	293	383	333	

Analysis of crash type shows patterns in the study area typical of congested arterial streets, with angle and rear-end crashes making up about 85% to 95% of the total number of crashes. The highest incidence of rear-end crashes occurs in the Terry-Louise and Louise-Kiwanis corridor segments, where long queues have been noted during peak demand periods. Measures to reduce queues will also serve to reduce rear-end crashes. Access management measures will help reduce angle crashes, as noted previously. Crash types for each study area segment are shown in the following table.

## CRASH TYPES

SEGMENT	REAR-END	HEAD-ON	ANGLE	SIDESWIPE-SAME	SIDESWIPE-OPPOSITE	OTHER
41 <sup>st</sup> – Valley View to Terry	44%	2%	46%	<1%	<1%	7%
41 <sup>st</sup> – Terry to Louise	54%	<1%	39%	2%	<1%	4%
41 <sup>st</sup> – Louise to Kiwanis	58%	0%	28%	8%	0%	6%
Louise – 34 <sup>th</sup> to 41 <sup>st</sup>	38%	0%	57%	1%	0%	4%
Louise – 41 <sup>st</sup> to 49 <sup>th</sup>	43%	0%	53%	3%	0%	1%

Crash rates for study area intersections were calculated and compared to city-wide critical crash rates for similar intersections. The intersection crash rate statistics show that several study area intersections were slightly above the critical rate. The locations of many of these intersection crashes, however, appear to be in the intersection queues, indicating that they are related to intersection capacity more than to intersection geometrics. The highest crash rate occurred at 41<sup>st</sup>/Shirley, which has limited movements. A closer examination shows that most of the 41<sup>st</sup>/Shirley crashes are rear-end crashes on 41<sup>st</sup> Street, east or west of the actual intersection. While intersection-related, the crashes are due to the need for additional capacity and smoother traffic flow on 41<sup>st</sup> Street. The intersection crash statistics are summarized in the following table.

## INTERSECTION CRASH RATE (2007-2009)

INTERSECTION	NUMBER CRASHES	ENTERING VEHICLES	CRASH RATE	CRITICAL RATE	PERCENT DIFFERENCE
41 <sup>st</sup> /Valley View	16	22200	0.66	0.59	12%
41 <sup>st</sup> /Marion	45	37100	1.11	0.94	18%
41 <sup>st</sup> /Terry	18	29600	0.56	0.59	-6%
41 <sup>st</sup> /I-29 SB	37	38100	0.89	0.94	-6%
41 <sup>st</sup> /I-29 NB	34	35450	0.88	0.94	-7%
41 <sup>st</sup> /Mall	22	32850	0.61	0.59	4%
41 <sup>st</sup> /Shirley	45	35200	1.17	0.94	24%
41 <sup>st</sup> /Louise	65	58500	1.01	0.94	8%
41 <sup>st</sup> /Kiwanis	38	46200	0.75	0.94	-20%
34 <sup>th</sup> /Louise	8	22400	0.33	0.59	-45%
Wal-Mart/Louise	0	26000	0.00	0.59	-100%
Empire/Louise	23	32750	0.64	0.59	9%
49 <sup>th</sup> /Louise	28	35700	0.72	0.94	-24%

Overall, safety in the 41<sup>st</sup> Street and Louise Avenue corridors could be enhanced by employing techniques to improve traffic flow and manage access. Specific safety improvement recommendations include:

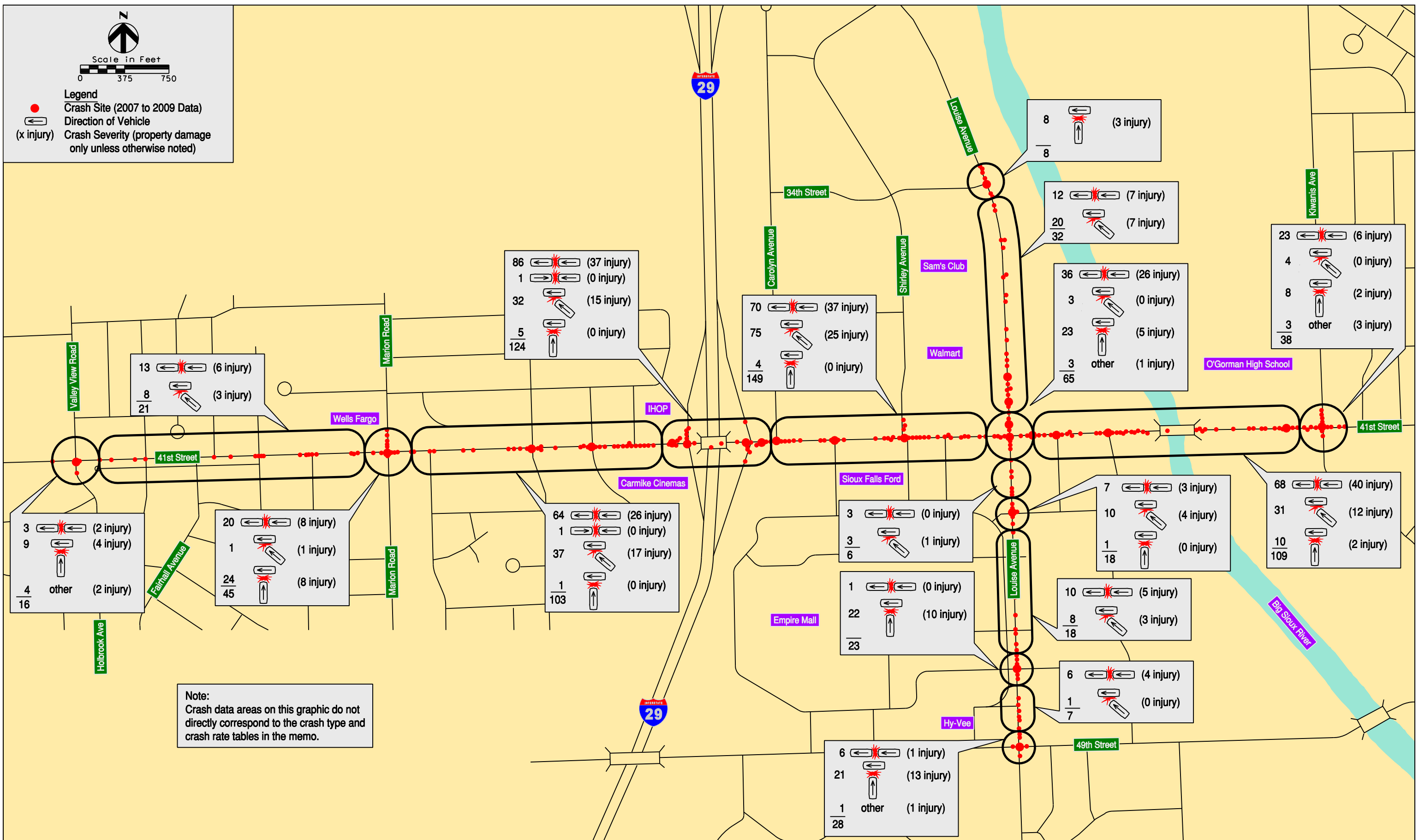
- Reconfigure I-29/41<sup>st</sup> Street interchange to add turning capacity and reduce queues.
- Add capacity at other intersections, especially turn lanes.
- Introduce a median in the sections of 41<sup>st</sup> Street planned for six through-lanes to reduce the most hazardous movements.
- Consolidate and eliminate driveways where possible.

Additional details of capacity and access improvements will be provided in the other phases of the corridor analysis and the study report.



Scale in Feet  
0 375 750

- Legend**
- Crash Site (2007 to 2009 Data)
  - Direction of Vehicle
  - (x injury) Crash Severity (property damage only unless otherwise noted)



Drawn By: B. Miller  
Date: 7/22/11  
Checked By: J. Unruh  
Date: 7/22/11  
Revisions:



**Crash Analysis Summary Graphic**  
for years 2007 to 2009

I-29 Exit 77 (41st Street) Crossroad Corridor Study

Sioux Falls, SD