TRAFFIC ENGINEERING ASSISTANCE PROGRAM

1st Street Intersection Study

Prepared for:

City of Independence

In Cooperation With:
Iowa Department of Transportation &
Iowa Department of Public Safety
Governor's Traffic Safety Bureau

February 19, 2016

ENGINEERS & PLANNERS
SNYDER & ASSOCIATES, INC.
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February 19, 2016

Mr. Al Roder
City Manager
City of Independence
331 1st Street East
Independence, Iowa 50644

RE: 1ST STREET INTERSECTION STUDY
INDEPENDENCE, IOWA
IOWA TRAFFIC ENGINEERING ASSISTANCE PROGRAM
S&A PROJECT NO.: 112.0600S

Dear Mr. Roder:

Snyder & Associates has completed the 1st Street Intersection Study. Enclosed, for your use, are three copies of the final report.

The study was requested by the City of Independence and completed as part of Iowa's Traffic Engineering Assistance Program (TEAP). TEAP is managed by the Iowa Department of Transportation and is partially funded through the Iowa Governor's Traffic Safety Bureau, as provided by the U.S. Department of Transportation, in accordance with the provisions of Section 402, Title 23, United States Code. The opinions, findings and conclusions expressed in this report are those of Snyder & Associates, Inc.

We are pleased to provide assistance to the City of Independence through the completion of this study. Should you have any questions regarding this study, please contact us.

Sincerely,

SNYDER & ASSOCIATES, INC.

Anthony J. Boes, P.E., PTOE
Project Manager

Enclosures

cc: Steven Schroder, P.E., Iowa DOT, Office of Traffic & Safety (w/ 2 copies)
Kent Ellis, P.E., Iowa DOT District 6 (w/ 1 copy)

2727 SW Snyder Boulevard | P.O. Box 1159 | Ankeny, IA 50023-0974
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1ST STREET INTERSECTION STUDY
INDEPENDENCE, IOWA

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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.

Anthony J. Boes 2/19/16

Anthony J. Boes, P.E. Date
License Number 12387
My License Renewal Date is December 31, 2017
Pages or sheets covered by this seal

All

At the request of the Iowa DOT and the City of Independence, through the Iowa DOT Traffic Engineering Assistance Program (TEAP), this study addressed traffic operational and safety concerns at the 1st Street intersections with 16th Avenue NW, 3rd Avenue E, 5th Avenue E and 8th Avenue NE. The City is primarily concerned with pedestrian safety at these locations. The study locations are shown in Figure 1.

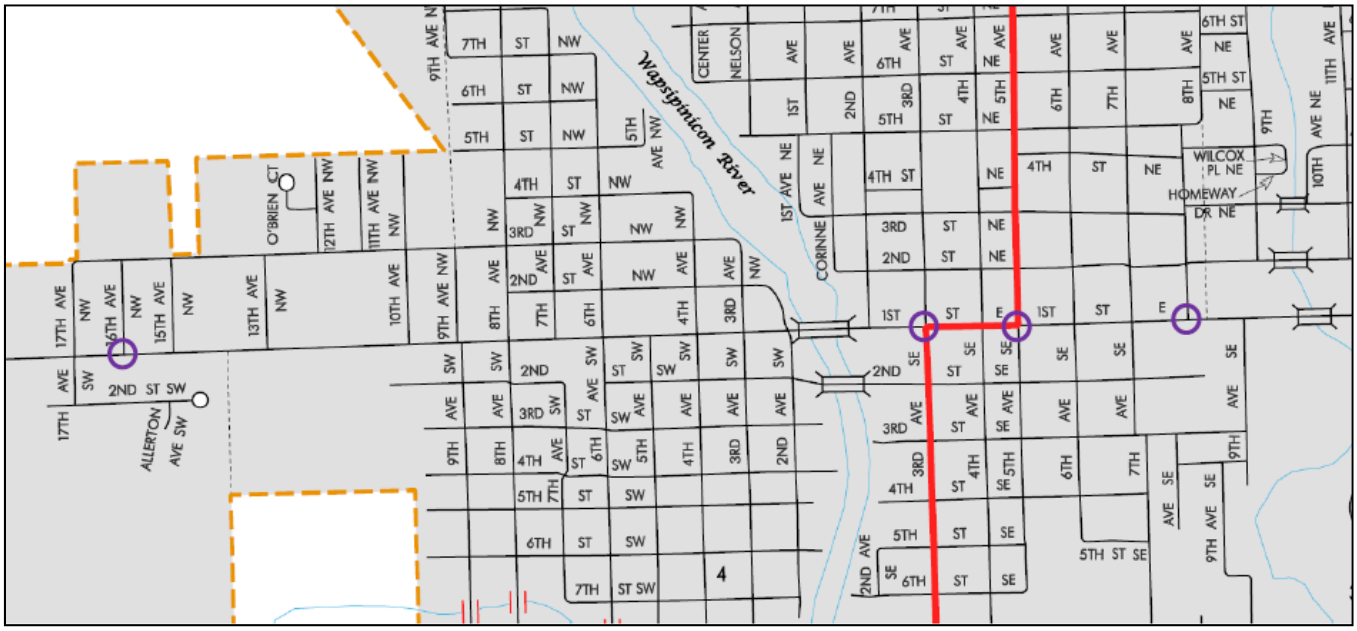


Figure 1: Study Locations

Existing Conditions

Within the study area, 1st Street is a three-lane urban section roadway with two-way left turn lanes (TWLTL) or dedicated left turn lanes. The speed limit for most of the corridor is 30 mph, with a 25 mph speed limit between 3rd Avenue W and 6th Avenue E. Per Iowa DOT 2013 traffic count data, average annual daily traffic (AADT) along 1st Street varies from approximately 6,700 vehicles per day (vpd) east of 16th Avenue NW to 11,300 vpd between 3rd Avenue E and 5th Avenue E. East of 5th Avenue E, the AADT was 7,600 vpd. The portion of 1st Street between 3rd Avenue E and 5th Avenue E is also Iowa Highway 150, running mostly north-south through the City.

16th Avenue NW

All Independence public schools are located in the area south of 1st Street W, generally between 15th Avenue NW and 10th Avenue NW. There are two apartment complexes north of 1st Street W, west of 16th Avenue NW. The City has reported concerns with school children crossing 1st Street W in this area. At the 16th Avenue NW intersection, STOP sign control is provided on the north leg of the T-intersection. There are currently no sidewalks along 1st Street W, 16th Avenue NW, or between 1st Street W and the school site. Refer to Figure 2 for an aerial photo of the area.

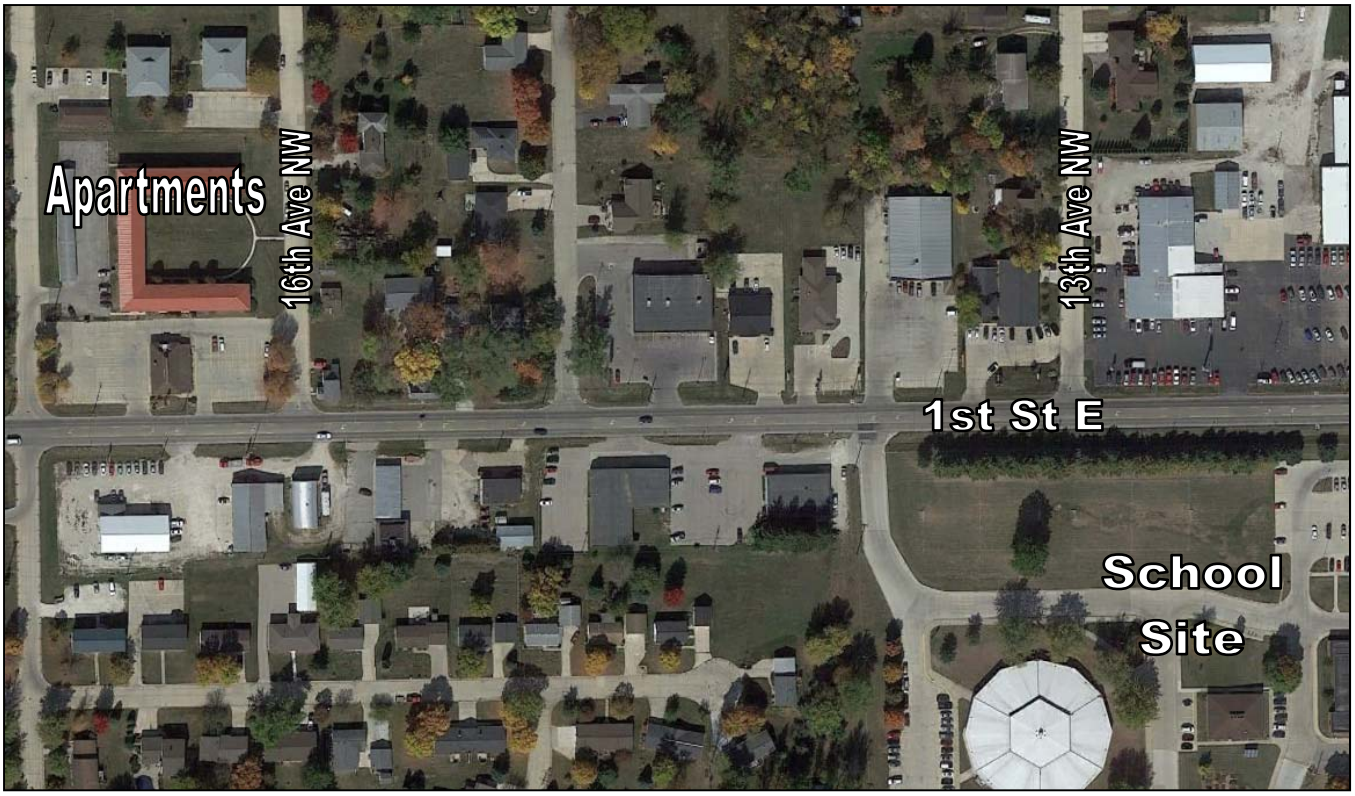


Figure 2: 16th Ave NW and School Area

Elementary school classes begin at 8:15 AM and dismiss at 2:45 PM. Middle and high school classes begin at 8:20 AM and dismiss at 2:50 PM. According to pedestrian counts near the 16th Avenue NW intersection performed by the City of Independence in May 2015, only two pedestrians crossed 1st Street W between 7:30 AM and 8:15 AM. Between 3:15 PM and 4:00 PM, 10 pedestrians crossed the street. It is likely that higher pedestrian crossing volumes occurred in the 2:45 PM - 3:15 PM period, but this period was not counted.

3rd Avenue E and 5th Avenue E

The 3rd Avenue E and 5th Avenue E intersections with 1st Street W are signalized with pedestrian signals and painted crosswalks for all four legs of each intersection. The traffic signal operation is pre-timed coordinated, with leading left turn phases westbound at 3rd Avenue W and eastbound at 5th Avenue W. The intersection radii in the southeast corner of the 3rd Avenue intersection and the northwest corner of the 5th Avenue intersection have been increased to approximately 50-60' to accommodate truck right turns along the IA 150 route. This has resulted in longer and somewhat skewed crosswalks connecting to these radii. The City is concerned that drivers making right turns on red along these radii are not watching for pedestrians. Refer to Figure 3 for an aerial photo of the intersections.

Figure 3: 3rd Ave E and 5th Ave E Intersections

Peak hour turning movement traffic counts at the two intersections were conducted by the City of Independence in May 2015. Due to discrepancies in the count data provided for the 3rd Avenue E intersection, Iowa DOT 2013 count data was used and adjusted to 2015 traffic levels for analysis purposes at this intersection. Existing (estimated at 3rd Avenue E) AM and PM peak hour turning movement traffic volumes are shown in Figures 4-5.

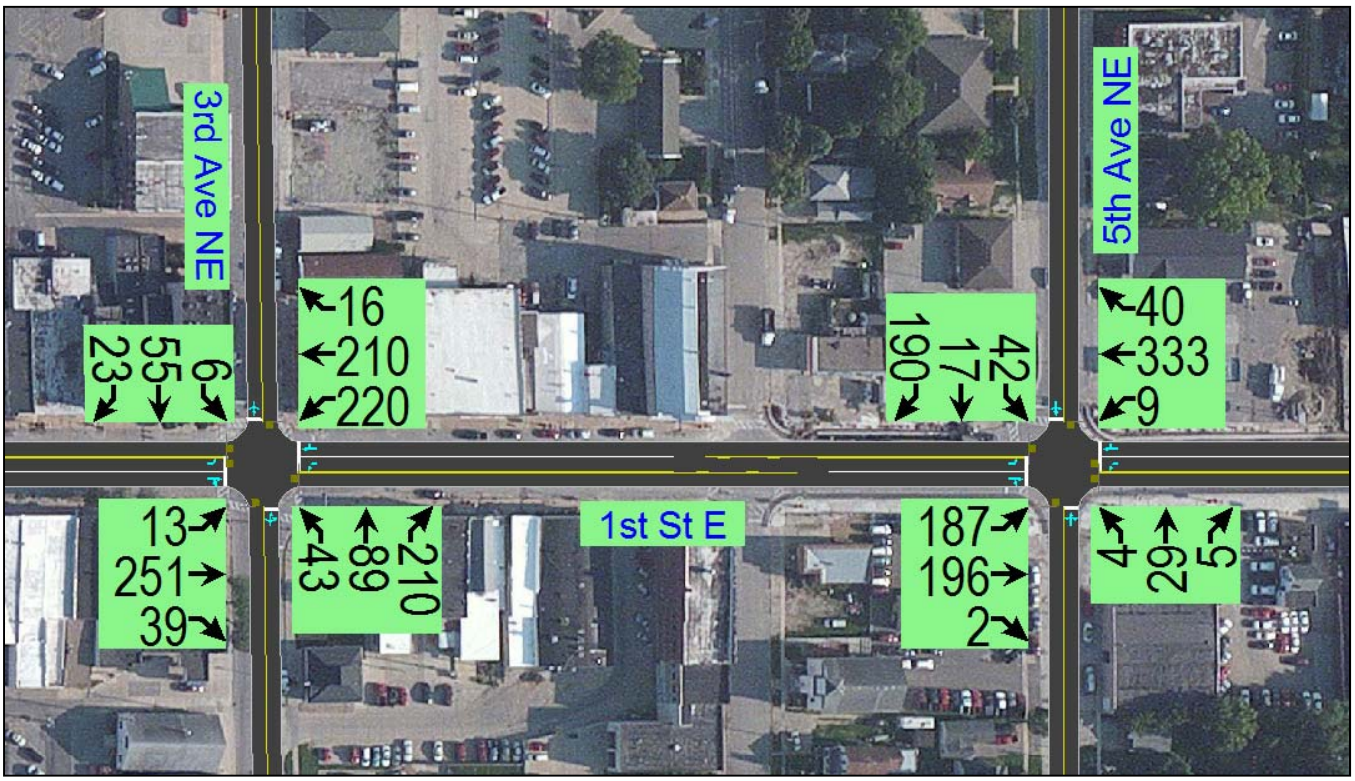


Figure 4: 2015 AM Peak Hour Traffic

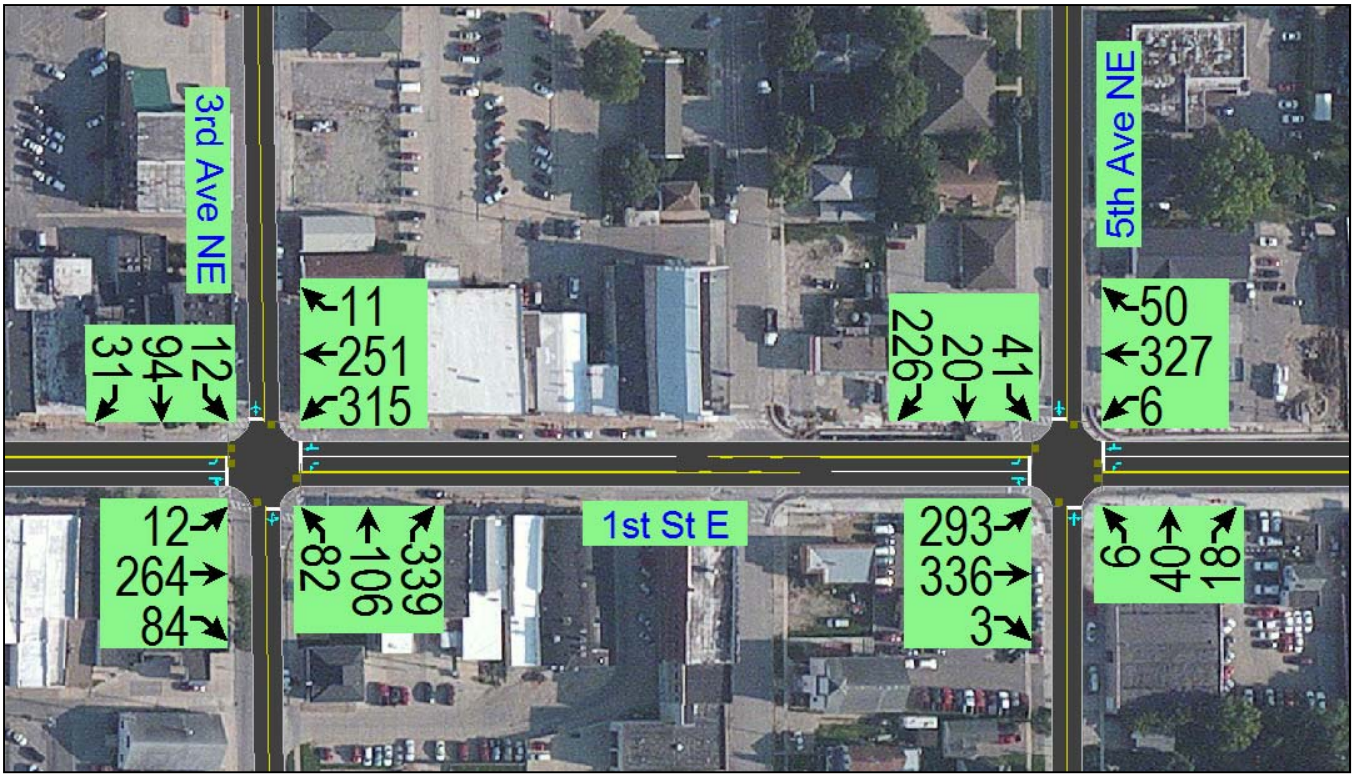


Figure 5: 2015 PM Peak Hour Traffic

8th Avenue NE

The 1st Street E and 8th Avenue NE intersection is a T-intersection with STOP sign control provided on the north leg. Painted crosswalks are provided across all three legs of the intersection. Advance school crossing signs (with crosswalk lines) and in-street schoolchildren crossing signs (post-mounted) are provided on 1st Street in advance of the intersection, as shown in Photo 1.

Directly south of the intersection is the Cedar Valley Hospice building. This site includes a parking lot to the west and a single parking stall and adjacent building entrance ramp on the northeast corner of the site. This parking stall is accessed from 1st Street E at the intersection, and vehicles exiting this parking stall must back out into the intersection, across the crosswalk on the east leg of the intersection. Approximately 10' east of the east leg crosswalk is a driveway to the public library parking lot, directly southeast of the Cedar Valley Hospice. Refer to Figure 6 and Photos 2-3 showing the existing layout.

Photo 1: Existing Advance School Crossing Signs

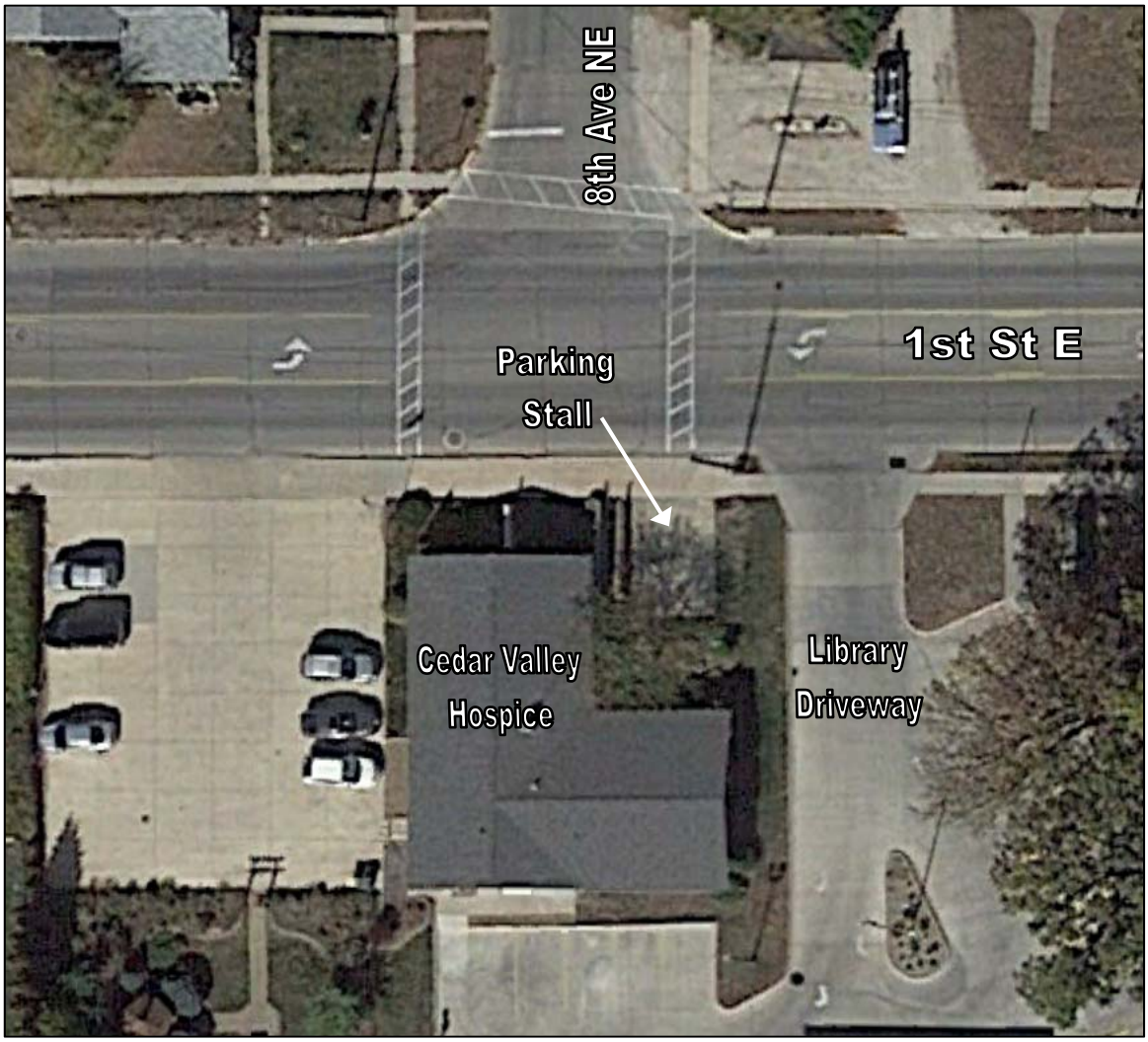


Figure 6: 1st St E & 8th Ave NE Intersection

Photo 2: Looking West Towards Intersection

Photo 3: CV Hospice NE Parking Stall

Crash History

Iowa DOT crash data for the five-year period from 2010 through 2014 were reviewed using Iowa DOT CMAT and SAVER software. Crash data for the study intersections is summarized in Table 1. The data includes two pedestrian crashes; one at 5th Ave E, and one at 8th Ave NE. Both crashes occurred in 2014. The 5th Ave pedestrian crash involved a southbound right turning semi truck striking an 18 year old pedestrian, resulting in a major injury. The 8th Avenue pedestrian crash involved a westbound pickup truck striking a six year old bicyclist, resulting in a minor injury.

Table 1: Intersection Crash History 2010-2014

Location	No. of Crashes	Crash Rate*	Injuries	Predominant Crash Types (Quantity)	Predominant Major Causes (Quantity)
16th Ave NW	0	--	--	--	--
3rd Ave E	21	0.80	6 possible	Rear end (9) Broadside (4) Angle-oncoming left (4)	Other Improper Action (5) Ran traffic signal (2) Followed too close (2) FTYROW making left turn (2)
5th Ave E	19	0.79	1 major 1 minor 7 possible	Rear end (8) Broadside (4) Angle-oncoming left (4)	Other Improper Action (5) Followed too close (2) FTYROW making left turn (2) FTYROW from driveway (2)
8th Ave NE	1	0.06	1 minor	Non-collision (1)	Swerving/Evasive Action (1)

*Crashes per million entering vehicles (MEV)
FTYROW = Failure to yield right-of-way

The crash rates for the 3rd Avenue E and 5th Avenue E intersections (0.79 - 0.80 crashes per MEV) are comparable to the 1983-1987 statewide average for primary highway/ city street intersections (0.9 crashes per MEV). There were no reported crashes in the five-year period at the 16th Avenue NW intersection. The pedestrian crash at 8th Avenue NE was the only crash reported at this intersection.

Intersection Capacity Analysis

Capacity analysis was performed for the signalized 1st Street E intersections with 3rd Avenue E and 5th Avenue E using *Highway Capacity Manual* (HCM) methodology incorporated into the traffic analysis and modeling program, *Synchro 8*. Intersection delay, caused by traffic volume, turning vehicles, number of lanes, arrival patterns, and traffic control is qualitatively described by a performance measure called 'Level of Service' (LOS), which 'grades' delay on a scale of A-F. LOS A is considered the most desirable level, with the least delay, while LOS F is least desirable, with the most delay. LOS D is generally considered to be the minimum acceptable level of service in urban areas. LOS criteria defined by the HCM for signalized and unsignalized intersections are shown in Table 2.

Table 2: Level of Service (LOS) Definition

LOS	Average Delay per Vehicle (sec)	
	Unsignalized Intersection	Signalized Intersection
A	Less than 10	Less than 10
B	10-15	10-20
C	15-25	20-35
D	25-35	35-55
E	35-50	55-80
F	Greater than 50	Greater than 80

Capacity analyses of existing conditions were performed for the AM and PM peak hours with existing traffic signal timing and coordination. A review of existing traffic signal timing determined that existing pedestrian change intervals (flashing don't walk) are significantly shorter than recommended by the *Manual on Uniform Traffic Control Devices* (MUTCD). Red clearance intervals, recommended by the MUTCD, are currently not provided. Additional capacity analyses were performed with recommended pedestrian change intervals, yellow change intervals, and red clearance intervals and optimized timings. These changes resulted in increasing the signal cycle lengths from 54 seconds to 75 seconds. Capacity analysis results for existing and recommended signal timings are summarized in Tables 3 and 4.

Table 3: Capacity Analysis Results – Existing Signal Timings

Intersection	Control	Approach/ Lane	AM Peak		PM Peak	
			Average Delay (sec)	LOS	Average Delay (sec)	LOS
1st St E & 3rd Ave E	Signal	EB	15.9	B	17.5	B
		WB	13.7	B	19.5	B
		NB	22.2	C	65.6	E
		SB	13.1	B	14.0	B
		Overall	16.7	B	33.8	C
1st St E & 5th Ave E	Signal	EB	9.4	A	10.4	B
		WB	16.4	B	17.1	B
		NB	14.7	B	15.3	B
		SB	21.2	C	24.1	C
		Overall	14.9	B	15.4	B

Table 4: Capacity Analysis Results – Recommended Signal Timings

Intersection	Control	Approach/ Lane	AM Peak		PM Peak	
			Average Delay (sec)	LOS	Average Delay (sec)	LOS
1st St E & 3rd Ave E	Signal	EB	29.3	C	33.9	C
		WB	21.6	C	31.5	C
		NB	23.5	C	48.5	D
		SB	15.4	B	16.3	B
		Overall	23.7	C	36.3	D
1st St E & 5th Ave E	Signal	EB	16.9	B	21.7	C
		WB	31.5	C	33.6	C
		NB	18.5	B	19.2	B
		SB	25.1	C	27.7	C
		Overall	24.2	C	26.1	C

Analysis results show that providing change and clearance intervals per MUTCD recommendations would increase delays somewhat, but acceptable operations would still be provided. Analysis results, per HCM methodology, assume no right turns on red.

Recommendations

Based on review of existing conditions and analyses performed, the following recommendations are provided.

16th Avenue NW

1. Sidewalks should be constructed along 16th Avenue NW, between 1st Street W and the apartment buildings, along 1st Street west between 16th Avenue NW and the school entrance, and along the school entrance to the school site as shown in Figure 7.

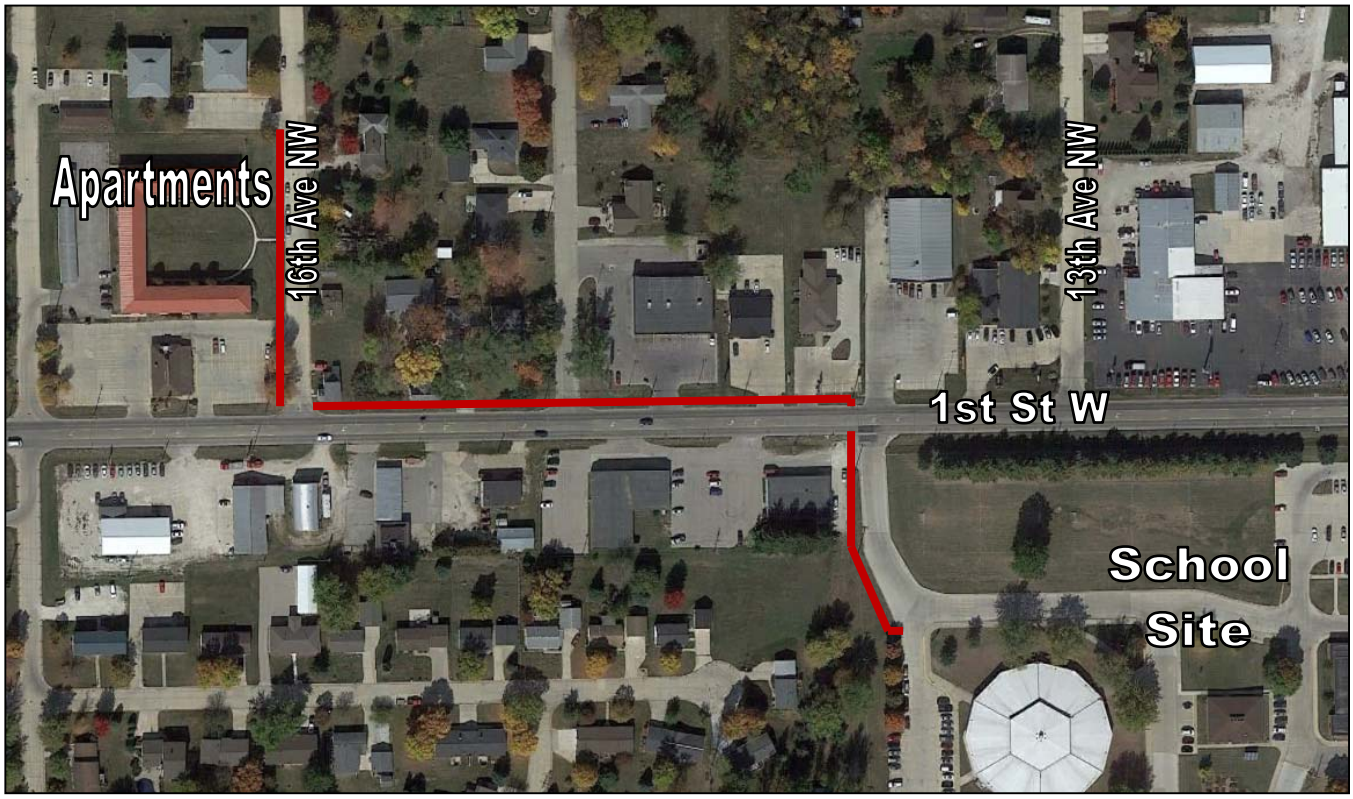


Figure 7: Recommended Sidewalk

2. ADA compliant pedestrian ramps, a painted crosswalk with school crossing signs and advance school crossing signs should be provided on the west leg of the school entrance intersection. Longitudinal (continental) crosswalk markings should be provided. Recommended school advance and school crossing signs are shown in Figure 8.

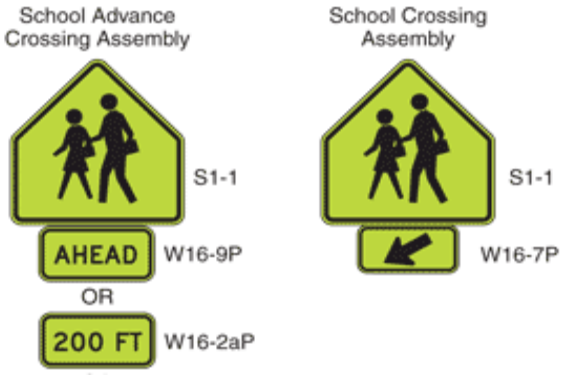


Figure 8: School Signs

3. In order to warrant a traffic signal at the intersection, per MUTCD School Crossing (Warrant 5) criteria, a minimum of 20 schoolchildren crossing the street during the highest crossing hour is required. Pedestrian count data provided indicates that this is not the case. MUTCD criteria for installation of pedestrian hybrid beacons are also not met. Once recommended sidewalk, signing and pavement marking improvements are installed, the need for additional traffic control improvements should be further evaluated. Additional future traffic control improvements may include the use of an adult crossing guard and/or pedestrian activated flashing beacons on the school crossing signs, at the crosswalk.

3rd Avenue E and 5th Avenue E

4. Traffic signal timings at the 3rd Avenue E and 5th Avenue E intersections should be adjusted to provide pedestrian change, yellow change and red clearance intervals, as recommended by the MUTCD. Recommended timings are shown in Table 4. Timings at the 3rd Avenue SE and 2nd Street E intersection will also need to be adjusted for coordinated operation along 3rd Avenue SE.

Table 4: Capacity Analysis Results – Recommended Signal Timings

1st St E & 3rd Ave E	East-West	North-South	Westbound Left
Walk	7	7	--
Pedestrian Change	14	18	--
Yellow Change	3.4	3.4	3.0
Red Clearance	1.8	1.8	1.0
Split	27	34	14
Cycle Length	75		
Offset	34		

1st St E & 3rd Ave E	East-West	North-South	Eastbound Left
Walk	7	7	--
Pedestrian Change	15	16	--
Yellow Change	3.4	3.4	3.0
Red Clearance	1.6	1.3	2.0
Split	28	28	19
Cycle Length	75		
Offset	0		

5. As shown in Photo 4, the building in the SW corner of the 3rd Avenue E intersection obstructs sight distance for northbound right turns on red. Therefore, a NO TURN ON RED (R10-11) sign should be installed adjacent to the right signal head on the mast arm of the signal pole in the NE corner of the intersection.

Photo 4: Looking West at 3rd Ave E

6. A TURNING VEHICLES yield TO pedestrians (R10-15) sign should be installed on the signal pole mast arm in the SW corner of the 5th Avenue E intersection, for southbound traffic. This sign is not recommended for northbound traffic at 3rd Avenue E because NO THRU TRUCKS and lane use signs are currently in place, and a NO TURN ON RED sign is recommended. Additional signing would likely provide too much information for drivers to process, and would not be effective. Refer to Figure 9 for recommended mast arm signs.

7. The possibility of installing right turn pedestrian refuge islands in the SE corner of the 3rd Avenue E intersection and the NW corner of the 5th Avenue E intersection was reviewed. It was determined that significant increases to the radii would be required at these intersections to accommodate truck turning paths with right turn islands, and property impacts would be extensive. Therefore, right turn islands are not recommended.

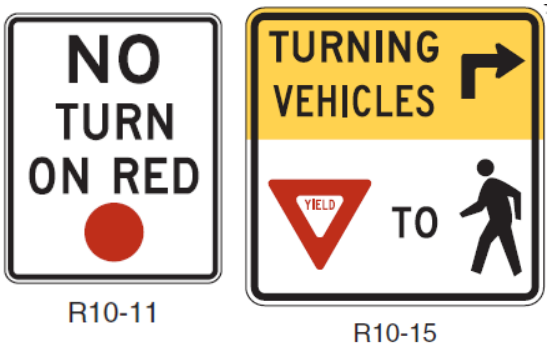


Figure 9: Mast Arm Signs

8. After recommended traffic signal timings are implemented, if there are still concerns with pedestrian crossings, construction of bump-outs in the other three corners of each intersection should be considered. The bump-outs would reduce pedestrian crossing distances and may create a traffic calming effect. Construction of the bumps-outs would require reconstruction of pedestrian ramps, repainting crosswalks, and storm sewer modifications. Refer to Figure 10, a conceptual drawing of possible curb bump-outs.

Figure 10: Intersection Bump-Outs

9. Potential future improvements include upgrading or replacing traffic signals at the 3rd Avenue E and 5th Avenue E intersections. Signal installations with vehicle detection and pedestrian pushbuttons would better accommodate variable traffic and pedestrian demands, and allow more flexibility in signal timing. Upgrades should include pedestrian count-down signals.

8th Avenue NE

10. Existing advance school crossing signing at the intersection (Photo 1 on Page 4) should be removed. The crosswalks crossing 1st Street E at 8th Avenue NE are not used or needed for school children walking to or from school. Also, the school sign (with crosswalk lines shown) does not comply with the current MUTCD. The in-street sign (STATE LAW STOP for schoolchildren WITHIN CROSSWALK) is designated for use only within the street, and Iowa Code requires yielding (not necessarily stopping) to pedestrians within a crosswalk or at an intersection.

    Pedestrian warning signs (W11-2) with downward arrow plaques (W16-7P) should be installed at the 1st Street E crosswalks, on the right hand side of the street, for eastbound and westbound traffic. These signs are shown in Figure 11.

11. The City should work with Cedar Valley Hospice to remove the parking stall in the NE corner of their site. Vehicles backing out of the parking stall, through the crosswalk, and into the intersection is a safety concern.

12. The traffic signal at the adjacent 1st Street E and 9th Ave SE intersection was originally installed to accommodate schoolchildren crossing 1st Street east to/from East Elementary School. After East Elementary School closed, the signal was placed into flashing operation, with yellow flash for 1st Street and red flash for 9th Avenue SE. Yellow-red flashing operation is generally not recommended due to the possibility that drivers on the flashing red approach may believe that opposing traffic also is required to stop. It is recommended that the traffic signal be removed, and a STOP sign be provided for northbound traffic.

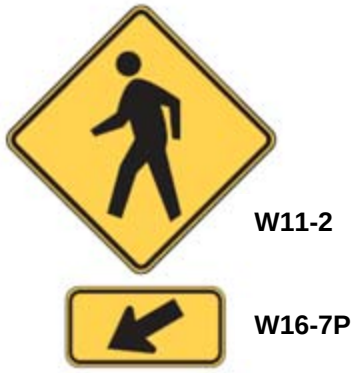


Figure 11: Pedestrian Crossing Sign Assembly

General

13. A 2013 Independence Pedestrian Safety Panel and Street, Alleys & Sidewalk Committee presentation document provided to the City Council shows several recommended signs that are not compliant with the MUTCD (refer to Figure 12). Per Iowa Code, traffic control devices on public streets and highways are required to be in compliance with the MUTCD. Therefore, these signs should not be used.

Figure 12: Non-MUTCD Signs

Construction Cost Opinions

Order of magnitude construction cost opinions for recommended improvements and possible future improvements are shown in Tables 5 and 6. Item numbers refer to numbered recommendations in this report. Actual costs may vary as detailed improvement plans are prepared.

Table 5: Construction Cost Opinion – Recommended Improvements

Item	Description	Quantity	Unit Cost	Unit	Total
1	Sidewalk along 16th Ave NW, 1st St W and School Entrance	720	$45	SY	$32,400
	ADA Pedestrian Ramp	8	$800	EA	$6,400
2	Painted Crosswalk (Continental)	1	$1,500	EA	$1,500
	School Sign Assemblies	4	$600	EA	$2,400
4	Signal Timing Adjustments - 3rd Ave SE & 2nd St E	1	$3,000	LS	$3,000
5	NO TURN ON RED sign	1	$400	EA	$400
6	TURNING VEHICLES yield TO pedestrians sign	1	$400	EA	$400
10	Remove School Advance Signs	2	$100	EA	$200
	Pedestrian Crossing Sign Assemblies	2	$600	EA	$1,200
12	Remove Traffic Signal	1	$5,000	LS	$5,000
	STOP sign	1	$400	EA	$400
Subtotal					$53,300
Contingency (15 % of Subtotal)					$7,995
Engineering (15% of Subtotal)					$7,995
Total					$69,290

Table 6: Construction Cost Opinion – Possible Future Improvements

Item	Description	Quantity	Unit Cost	Unit	Total
3	Pedestrian Activated Flashing Beacons	2	$5,000	SY	$10,000
8	Intersection Bump-outs	6	$5,000	EA	$30,000
	ADA Pedestrian Ramp	12	$800	EA	$9,600
	Painted Crosswalk (Continental)	8	$1,500	EA	$12,000
	Storm Sewer Modifications	1	$12,000	LS	$12,000
9	Replace Traffic Signals	2	$180,000	LS	$360,000
Subtotal					$433,600
Contingency (15 % of Subtotal)					$65,040
Engineering (15% of Subtotal)					$65,040
Total					$563,680

Potential Funding Sources

Potential funding sources to assist with construction of identified improvements include the Iowa DOT "Traffic Safety Improvement Program" (TSIP), the "Transportation Alternatives Program" (TAP) and the "Urban State Traffic Engineering Program" (U-STEP). Following is additional information regarding these funding programs.

TSIP – Application forms are available from the Iowa DOT. Application is submitted to the Iowa DOT Office of Traffic and Safety. TSIP funding for safety improvements is provided in two categories:

- Site-specific Improvements: Projects are selected based on a crash reduction benefit/ cost ratio and other criteria. Maximum funding is $500,000 per project. No local match is required.

- Traffic Control Devices: Funding is provided to purchase materials for new or replacement of obsolete traffic control devices (such as signs or signal). Funding is awarded based on expected safety benefits, annual funding level and other criteria. Benefit/ cost analysis is not required. The local agency is responsible for installation costs.

TAP – A federal-aid program for non-motorized transportation modes, including providing safe routes to school. Application is submitted to the local MPO or RPA (INRCOG). A 20% local match is required. Projects must follow federal-aid project development requirements.

U-STEP – Funding is available to solve traffic operation or safety problems on primary roads in Iowa cities. Project must be on a State Route (such as IA 150). Maximum project funding is $200,000 for spot improvements and $400,000 for linear improvements. A 45% local match is required. An engineering analysis of the problem area (such as this TEAP study) is required. Letters of request are submitted to the Iowa DOT District Engineer.

Further information on potential funding sources is available on the Iowa DOT website at http://www.iowadot.gov/fundguid.htm and http://www.iowadot.gov/systems_planning/trans_enhance.htm.

TRAFFIC ENGINEERING ASSISTANCE PROGRAM

S&A PROJECT NO.: 112.0600S

1st STREET INTERSECTION STUDY

INDEPENDENCE, IOWA

Appendix

Traffic Count Data

2010-2014 Crash Data Summaries

Capacity Analysis Worksheets

Iowa Department of Transportation

Turning Movement Traffic Count Summary

Annualized Daily Traffic For All Vehicles

Station Number:

10320159099

Count Date:

Tuesday, August 20, 2013

County:

Buchanan

Location Description:

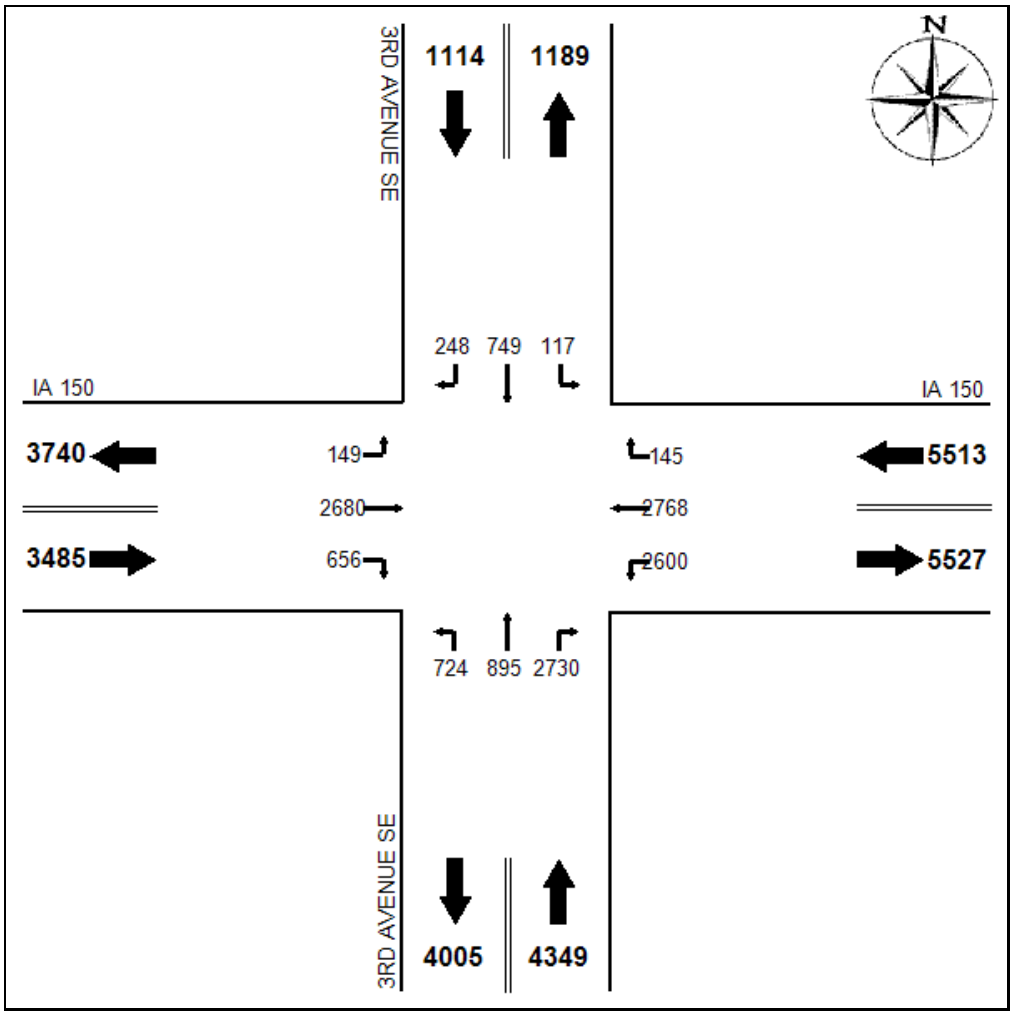
IA 150, 1st St E & 3rd Ave NE

Volume Factor: 1.884

Pass Class Factor: 1.902

SU Class Factor: 1.491

Combo Class Factor: 1.542



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	4	29	14	195	266	9	29	63	130	11	158	25
08:00	5	45	19	180	172	13	35	73	172	11	205	32
11:00	10	55	12	204	150	13	58	53	199	11	144	57
12:00	9	58	18	190	221	13	74	62	187	16	172	51
15:00	12	64	27	210	224	10	69	73	266	9	261	60
16:00	10	77	25	257	205	9	67	87	277	10	216	69
17:00	12	70	16	162	230	10	52	64	237	11	270	55

Iowa Department of Transportation

Turning Movement Traffic Count Summary

Vehicle Type: Passenger Vehicles

Station Number:

10320159099

Count Date:

Tuesday, August 20, 2013

County:

Buchanan

Location Description:

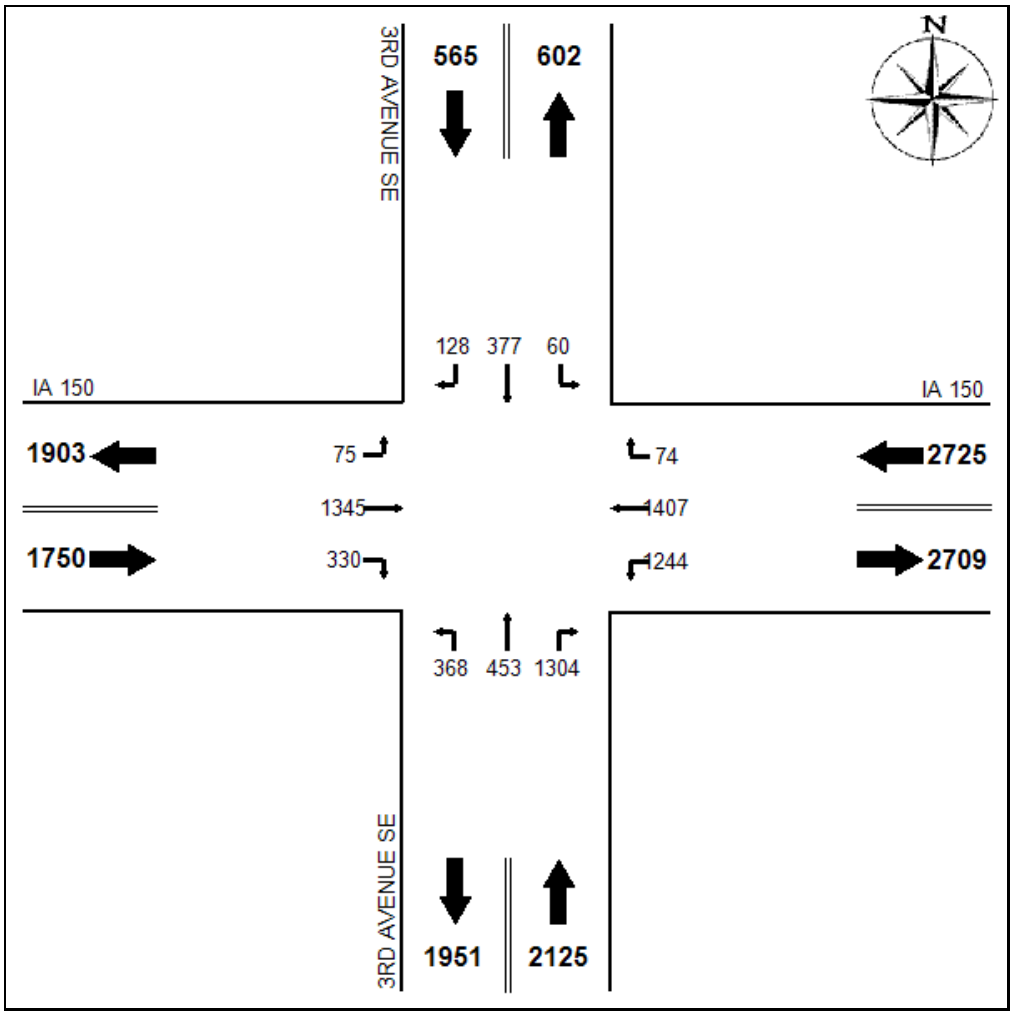
IA 150, 1st St E & 3rd Ave NE

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	4	27	13	176	247	9	28	60	108	11	148	22
08:00	5	42	19	147	161	12	32	68	139	11	182	29
11:00	10	50	11	182	144	13	54	48	175	10	127	51
12:00	7	55	18	162	210	12	70	61	162	14	165	50
15:00	12	62	26	191	218	9	68	69	249	8	250	57
16:00	10	73	25	239	201	9	64	86	243	10	209	67
17:00	12	68	16	147	226	10	52	61	228	11	264	54

Iowa Department of Transportation

Turning Movement Traffic Count Summary

Vehicle Type: Single-Unit Trucks

Station Number:

10320159099

Count Date:

Tuesday, August 20, 2013

County:

Buchanan

Location Description:

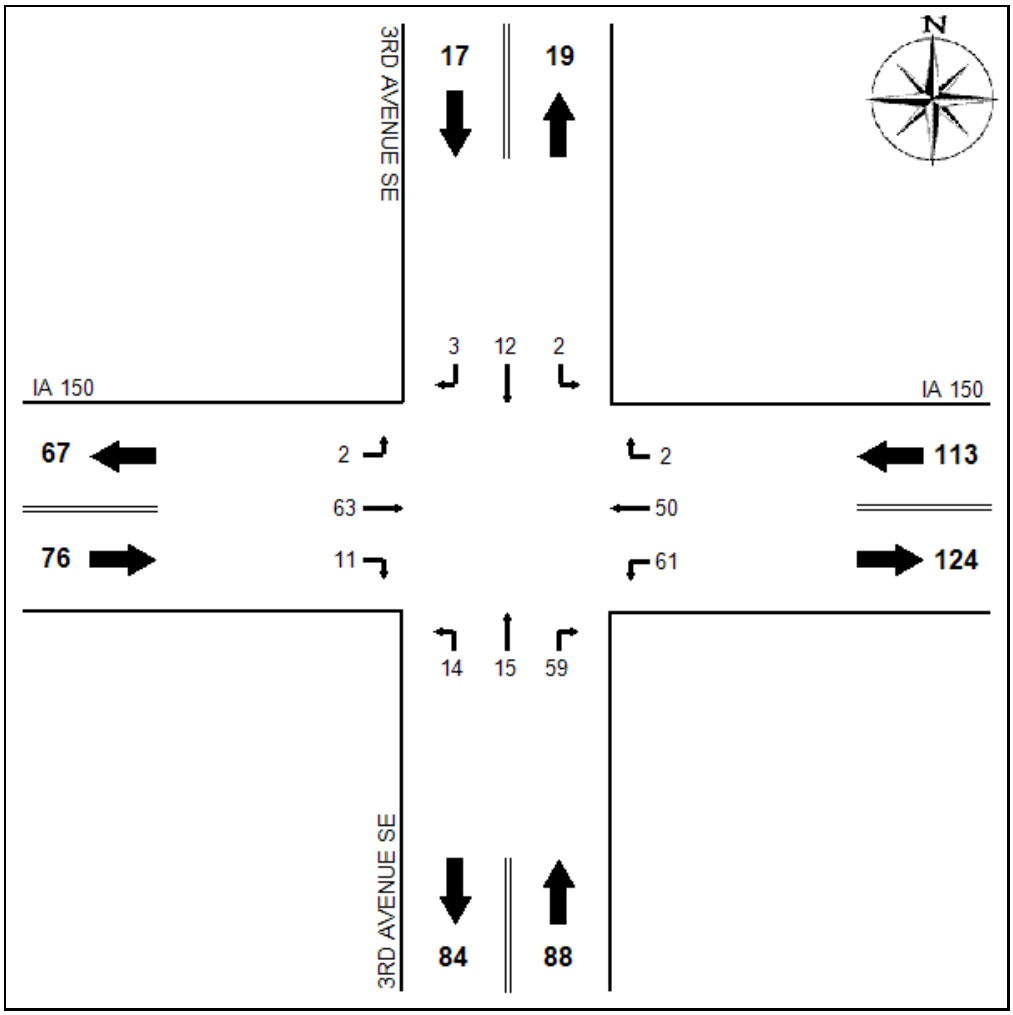
IA 150, 1st St E & 3rd Ave NE

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

Iowa Department of Transportation

Turning Movement Traffic Count Summary

Vehicle Type: Combination Trucks

Station Number:

10320159099

Count Date:

Tuesday, August 20, 2013

County:

Buchanan

Location Description:

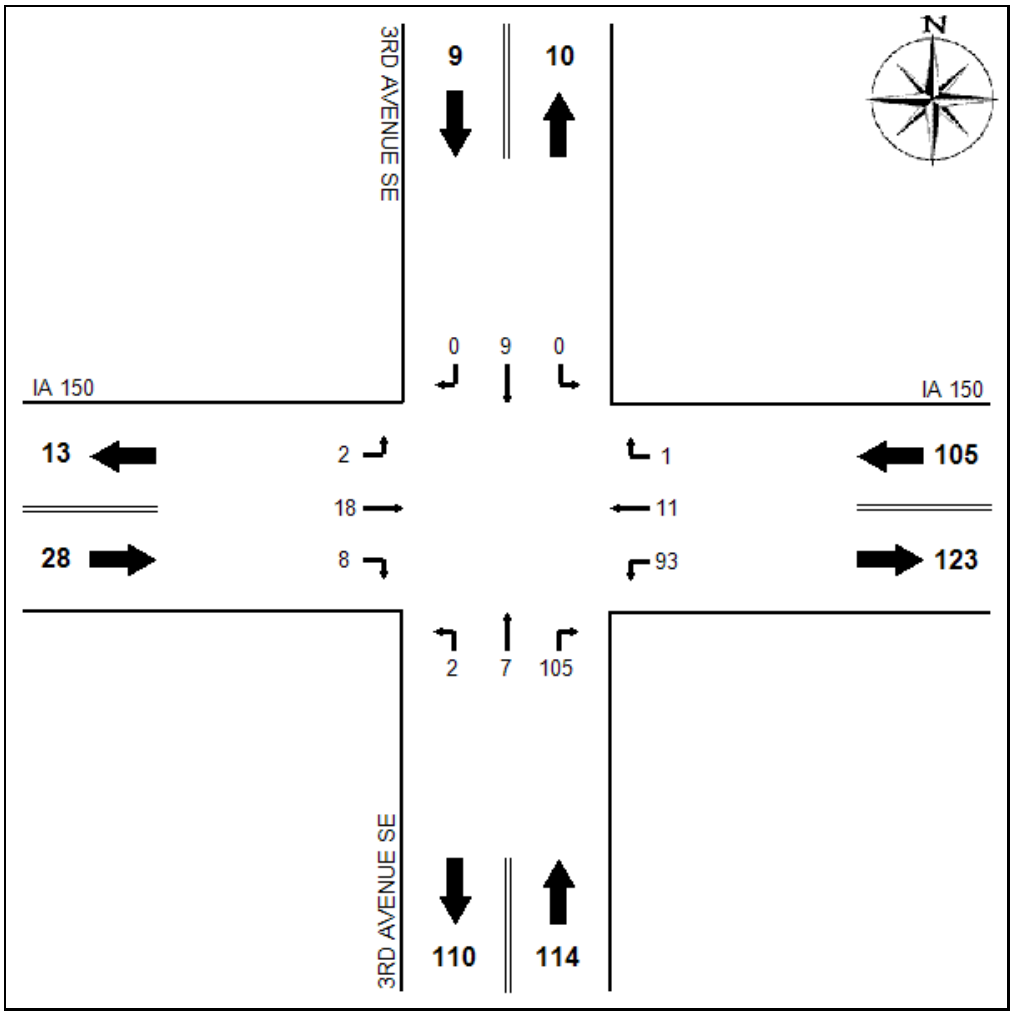
IA 150, 1st St E & 3rd Ave NE

Volume Factor: N/A

Pass Class Factor: N/A

SU Class Factor: N/A

Combo Class Factor: N/A



Raw Data-Combination Trucks:

	N Leg			E Leg			S Leg			W Leg		
	L	*T*	*R*	*L*	*T*	*R*	*L*	*T*	*R*	*L*	*T*	*R*
07:00	0	1	0	6	2	0	0	1	18	0	4	1
08:00	0	0	0	16	3	0	0	2	16	0	2	0
11:00	0	3	0	18	1	0	0	3	17	1	8	4
12:00	0	3	0	20	2	1	1	0	17	1	2	0
15:00	0	1	0	12	1	0	0	0	8	0	0	1
16:00	0	1	0	8	2	0	1	1	23	0	1	1
17:00	0	0	0	13	0	0	0	0	6	0	1	1

Iowa Department of Transportation

Turning Movement Traffic Count Summary

Annualized Daily Traffic For All Vehicles

Station Number:

10320161099

Count Date:

Tuesday, August 27, 2013

County:

Buchanan

Location Description:

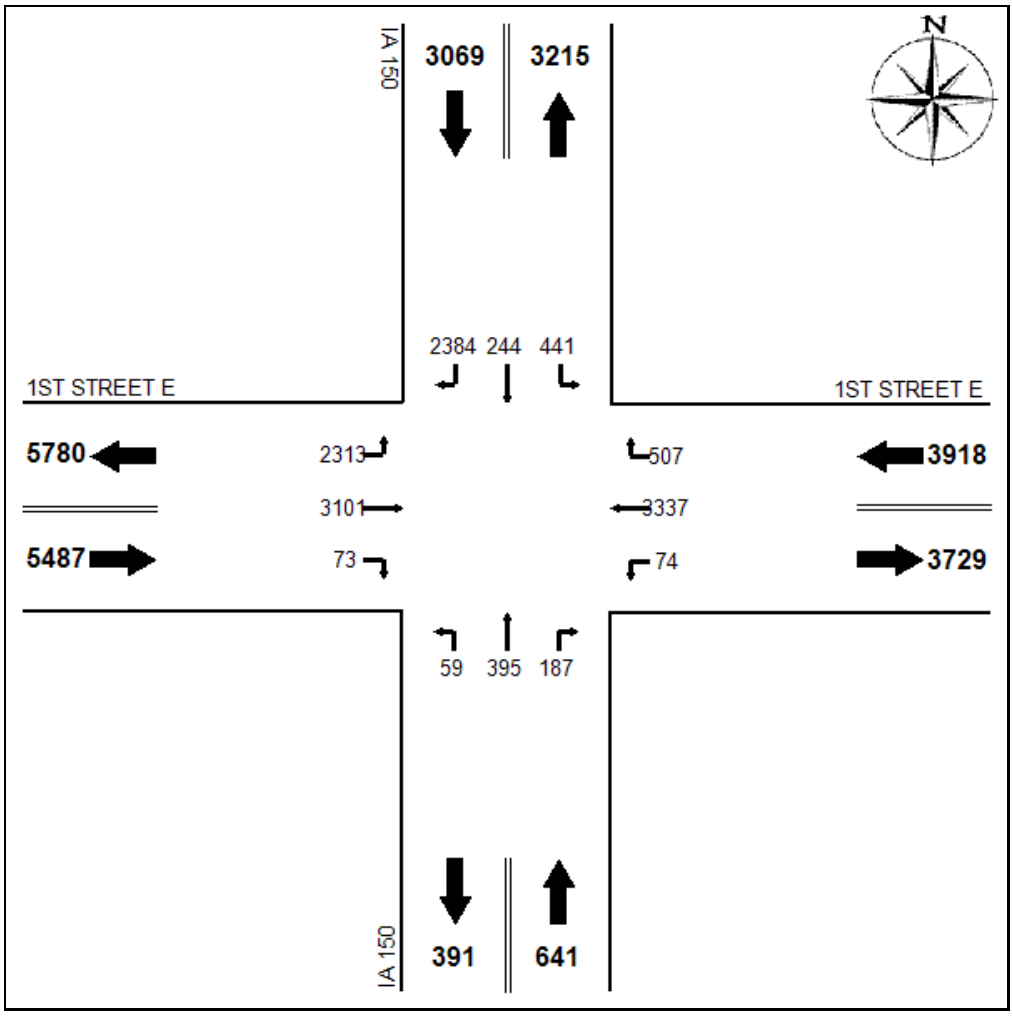
IA 150 & 5th Ave E

Volume Factor: 1.884

Pass Class Factor: 1.902

SU Class Factor: 1.491

Combo Class Factor: 1.542



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	22	14	198	7	276	53	3	17	6	133	133	2
08:00	37	14	172	4	247	42	10	22	10	172	259	8
11:00	36	18	164	4	247	39	3	8	14	157	206	3
12:00	39	17	204	4	239	31	7	28	12	174	206	6
15:00	34	19	188	7	214	34	2	45	15	199	267	5
16:00	42	22	184	6	248	47	4	45	23	230	300	8
17:00	30	25	178	7	304	28	2	45	19	188	282	7

Iowa Department of Transportation

Turning Movement Traffic Count Summary

Vehicle Type: Passenger Vehicles

Station Number:

10320161099

Count Date:

Tuesday, August 27, 2013

County:

Buchanan

Location Description:

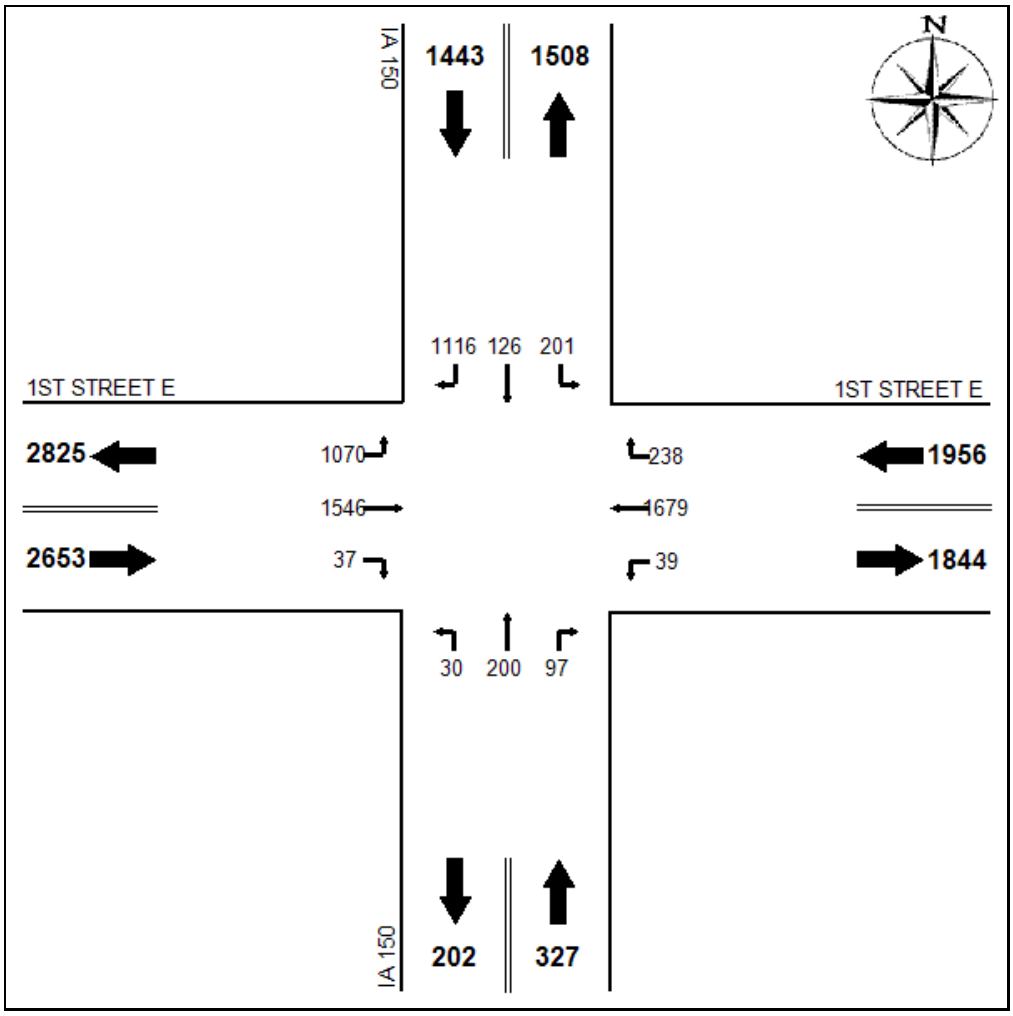
IA 150 & 5th Ave E

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	17	13	176	7	262	44	3	13	6	104	124	1
08:00	30	13	131	4	224	33	10	19	10	138	231	8
11:00	27	18	145	4	226	34	3	8	14	135	183	3
12:00	32	17	174	4	221	23	7	27	11	142	190	6
15:00	26	19	169	7	202	32	1	43	15	179	249	5
16:00	41	22	162	6	242	45	4	45	22	200	291	7
17:00	28	24	159	7	302	27	2	45	19	172	278	7

Iowa Department of Transportation

Turning Movement Traffic Count Summary

Vehicle Type: Single-Unit Trucks

Station Number:

10320161099

Count Date:

Tuesday, August 27, 2013

County:

Buchanan

Location Description:

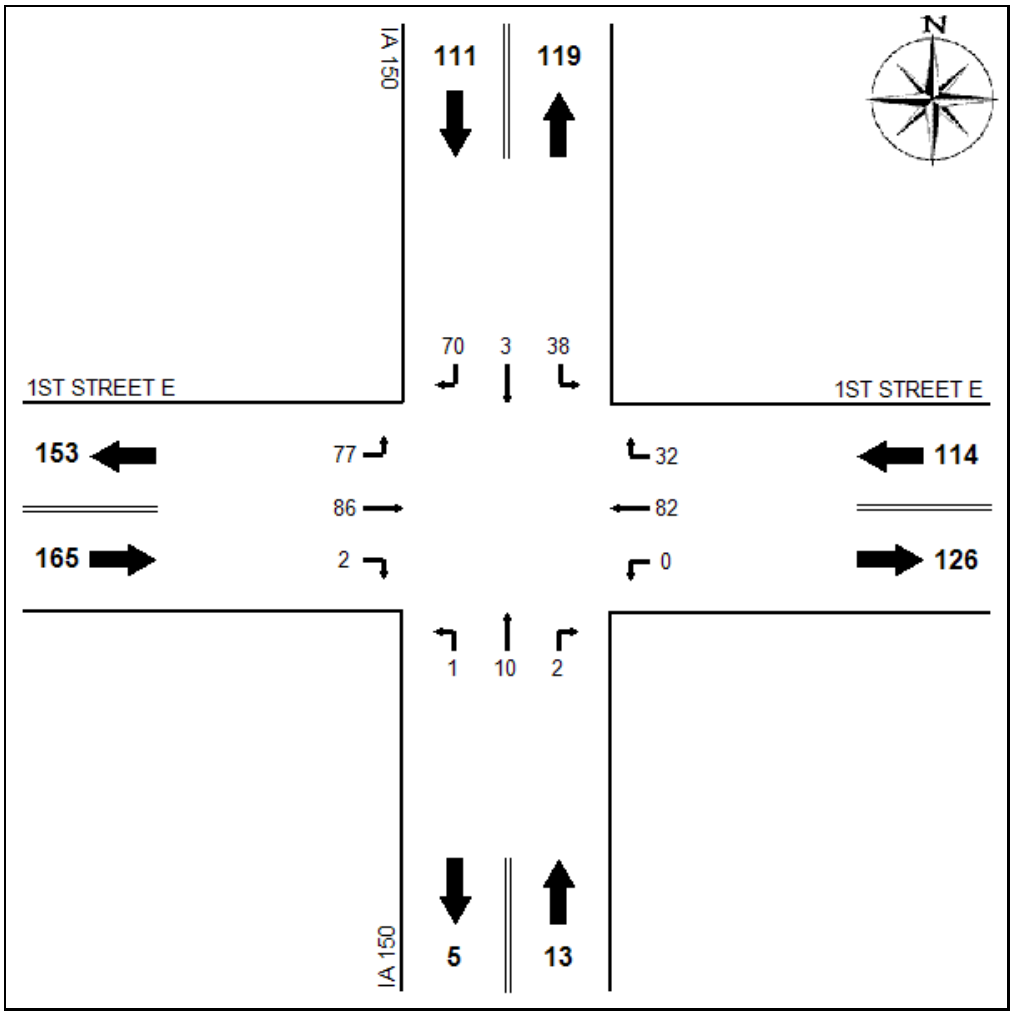
IA 150 & 5th Ave E

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	5	1	7	0	12	8	0	4	0	9	5	1
08:00	6	1	15	0	17	8	0	3	0	13	23	0
11:00	9	0	8	0	17	5	0	0	0	12	17	0
12:00	7	0	11	0	17	7	0	1	1	14	14	0
15:00	8	0	10	0	11	2	1	2	0	7	15	0
16:00	1	0	13	0	6	1	0	0	1	15	8	1
17:00	2	1	6	0	2	1	0	0	0	7	4	0

Iowa Department of Transportation

Turning Movement Traffic Count Summary

Vehicle Type: Combination Trucks

Station Number:

10320161099

Count Date:

Tuesday, August 27, 2013

County:

Buchanan

Location Description:

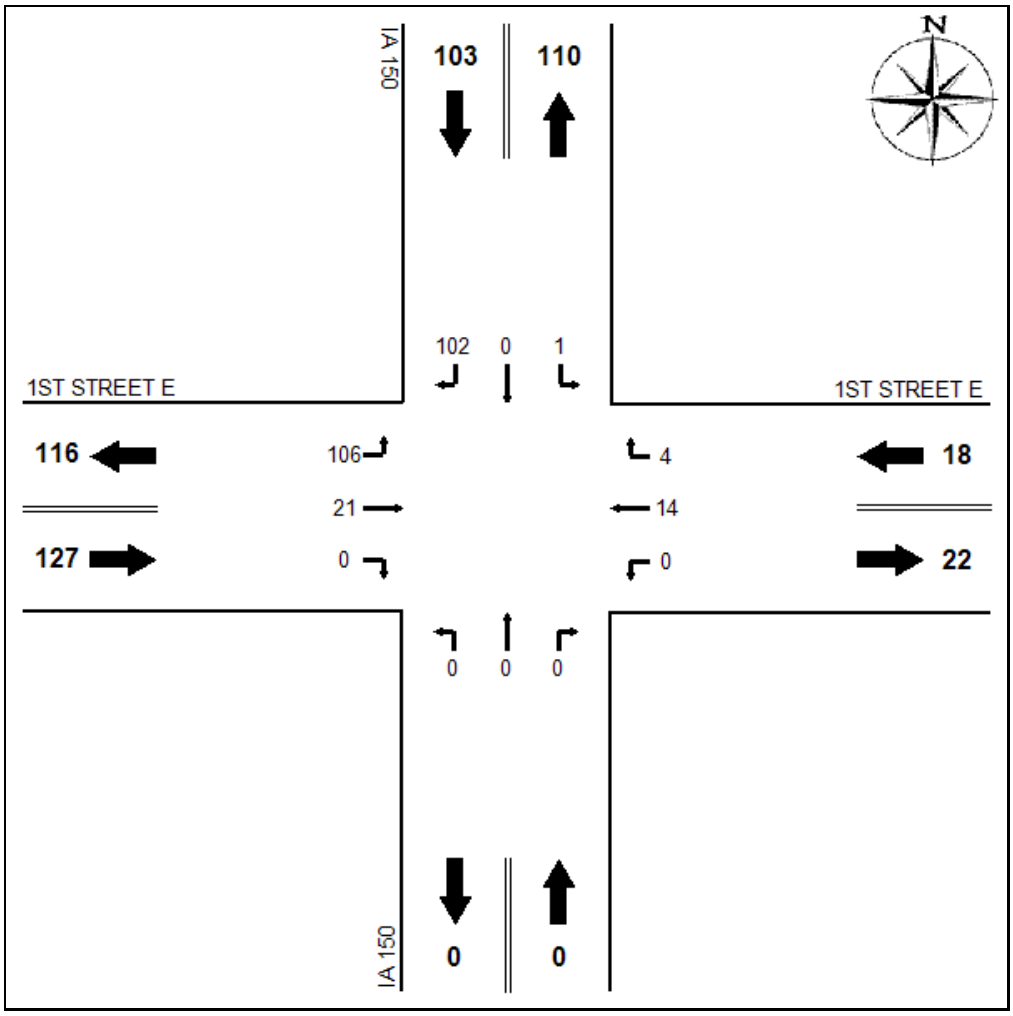
IA 150 & 5th Ave E

Volume Factor: N/A

Pass Class Factor: N/A

SU Class Factor: N/A

Combo Class Factor: N/A



Raw Data-Combination Trucks:

	N Leg			E Leg			S Leg			W Leg		
	L	*T*	*R*	*L*	*T*	*R*	*L*	*T*	*R*	*L*	*T*	*R*
07:00	0	0	15	0	2	1	0	0	0	20	4	0
08:00	1	0	26	0	6	1	0	0	0	21	5	0
11:00	0	0	11	0	4	0	0	0	0	10	6	0
12:00	0	0	19	0	1	1	0	0	0	18	2	0
15:00	0	0	9	0	1	0	0	0	0	13	3	0
16:00	0	0	9	0	0	1	0	0	0	15	1	0
17:00	0	0	13	0	0	0	0	0	0	9	0	0

SNYDER & ASSOCIATES
Engineers and Planners

Snyder & Associates

2727 Snyder Blvd.
Ankeny, Iowa, 50023

1st St E and 5th Ave
Independence, IA
Independence TEAP Study

File Name : 1st St E and 5th Ave 150501
Site Code :
Start Date : 5/1/2015
Page No : 1

Groups Printed- Cars+ - Heavy Vehicles

	5th Ave NE SB					1st St E WB					5th Ave SE NB					1st St E EB					
Start Time	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Int. Total
07:30 AM	2	4	46	1	53	4	70	12	0	86	1	8	0	2	11	27	36	3	0	66	216
07:45 AM	9	8	56	0	73	7	119	8	0	134	1	4	0	0	5	37	39	1	1	78	290
Total	11	12	102	1	126	11	189	20	0	220	2	12	0	2	16	64	75	4	1	144	506
08:00 AM	10	4	49	0	63	0	86	7	1	94	1	10	2	1	14	57	58	0	0	115	286
08:15 AM	13	1	40	1	55	1	63	10	0	74	0	5	1	0	6	47	57	1	0	105	240
08:30 AM	10	4	45	1	60	1	65	15	0	81	2	10	2	1	15	46	42	0	1	89	245
08:45 AM	11	6	38	0	55	0	51	8	0	59	0	7	1	0	8	48	40	0	0	88	210
Total	44	15	172	2	233	2	265	40	1	308	3	32	6	2	43	198	197	1	1	397	981
09:00 AM	6	3	33	0	42	4	50	6	0	60	0	2	2	0	4	54	48	0	0	102	208
09:15 AM	8	9	46	0	63	2	48	4	0	54	1	3	5	0	9	31	35	0	1	67	193
Total	14	12	79	0	105	6	98	10	0	114	1	5	7	0	13	85	83	0	1	169	401
03:30 PM	15	8	32	0	55	0	67	7	0	74	0	17	4	2	23	44	81	1	1	127	279
03:45 PM	10	7	66	0	83	2	76	10	0	88	4	11	3	0	18	91	100	0	7	198	387
Total	25	15	98	0	138	2	143	17	0	162	4	28	7	2	41	135	181	1	8	325	666
04:00 PM	5	3	45	0	53	1	91	9	0	101	0	13	6	0	19	69	83	2	1	155	328
04:15 PM	7	5	59	0	71	1	79	20	0	100	0	7	5	0	12	58	82	0	1	141	324
04:30 PM	19	5	56	0	80	2	81	11	0	94	2	9	4	0	15	75	71	1	4	151	340
04:45 PM	7	4	53	0	64	4	85	8	0	97	3	10	8	0	21	60	68	3	1	132	314
Total	38	17	213	0	268	8	336	48	0	392	5	39	23	0	67	262	304	6	7	579	1306
05:00 PM	13	2	52	0	67	1	70	6	1	78	1	10	6	0	17	53	65	1	0	119	281
05:15 PM	7	7	66	0	80	2	59	8	1	70	0	15	10	0	25	104	97	0	0	201	376
Grand Total	152	80	782	3	1017	32	1160	149	3	1344	16	141	59	6	222	901	1002	13	18	1934	4517
Apprch %	14.9	7.9	76.9	0.3		2.4	86.3	11.1	0.2		7.2	63.5	26.6	2.7		46.6	51.8	0.7	0.9		
Total %	3.4	1.8	17.3	0.1	22.5	0.7	25.7	3.3	0.1	29.8	0.4	3.1	1.3	0.1	4.9	19.9	22.2	0.3	0.4	42.8	
Cars+	141	78	732	3	954	32	1126	132	3	1293	15	120	55	6	196	811	958	13	18	1800	4243
% Cars+	92.8	97.5	93.6	100	93.8	100	97.1	88.6	100	96.2	93.8	85.1	93.2	100	88.3	90	95.6	100	100	93.1	93.9
Heavy Vehicles	11	2	50	0	63	0	34	17	0	51	1	21	4	0	26	90	44	0	0	134	274
% Heavy Vehicles	7.2	2.5	6.4	0	6.2	0	2.9	11.4	0	3.8	6.2	14.9	6.8	0	11.7	10	4.4	0	0	6.9	6.1

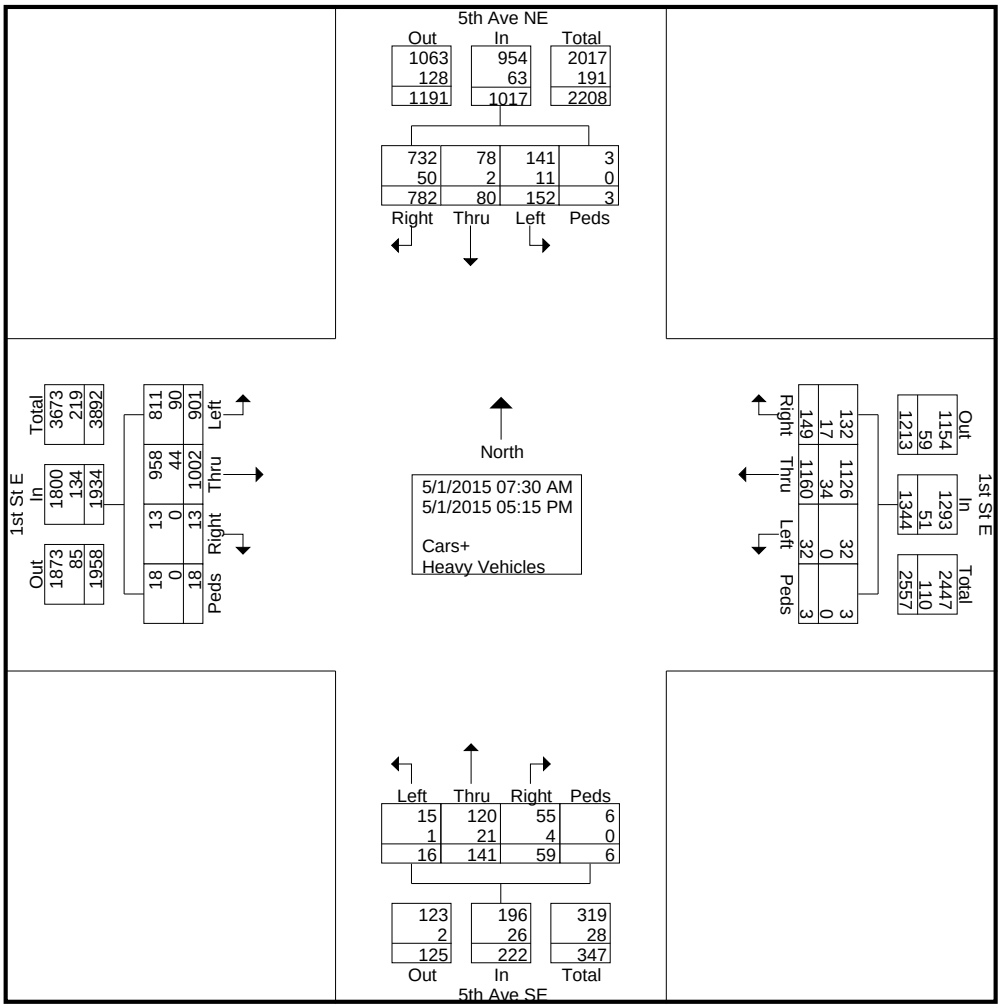
Snyder & Associates
Engineers and Planners

Snyder & Associates

2727 Snyder Blvd.
Ankeny, Iowa, 50023

1st St E and 5th Ave
Independence, IA
Independence TEAP Study

File Name : 1st St E and 5th Ave 150501
Site Code :
Start Date : 5/1/2015
Page No : 2



SNYDER & ASSOCIATES
Engineers and Planners

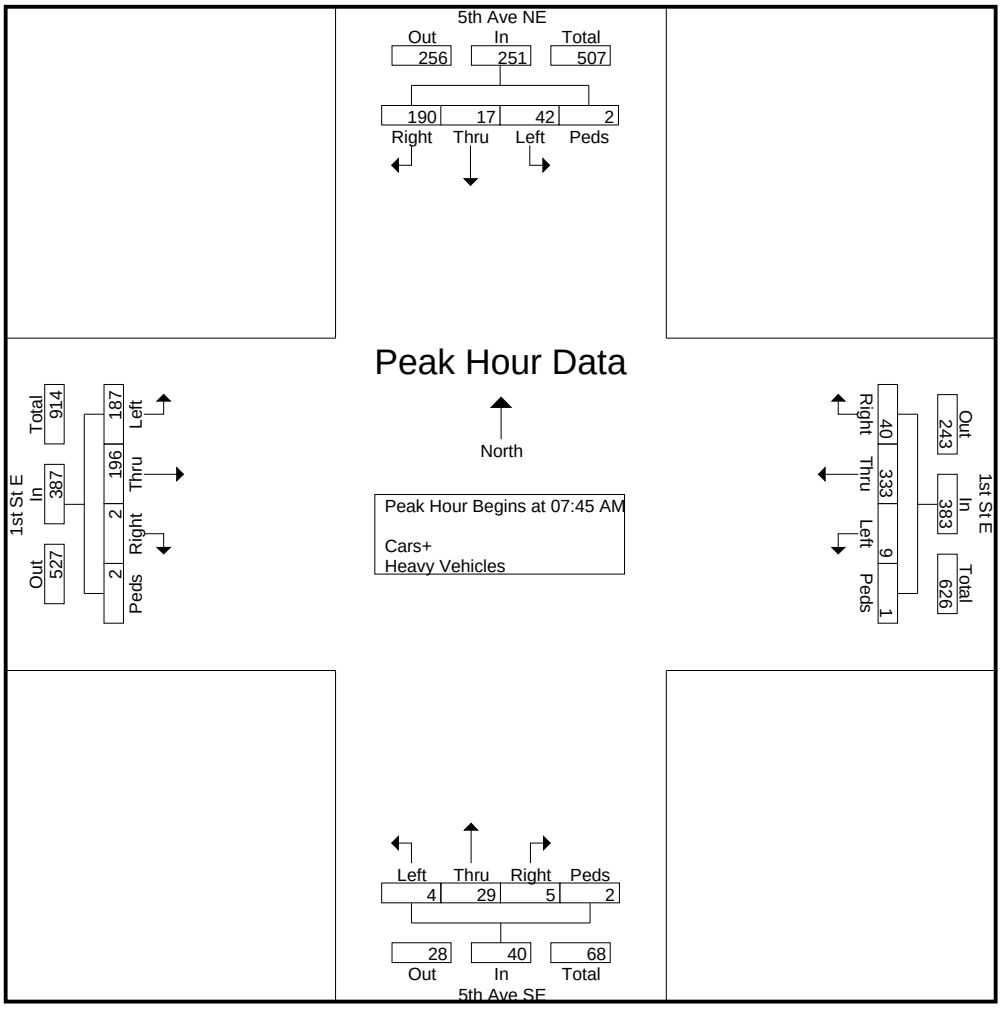
Snyder & Associates

2727 Snyder Blvd.
Ankeny, Iowa, 50023

1st St E and 5th Ave
Independence, IA
Independence TEAP Study

File Name : 1st St E and 5th Ave 150501
Site Code :
Start Date : 5/1/2015
Page No : 3

	5th Ave NE SB					1st St E WB					5th Ave SE NB					1st St E EB					
Start Time	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Int. Total
Peak Hour Analysis From 07:30 AM to 11:45 AM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 07:45 AM																					
07:45 AM	9	**8**	**56**	0	**73**	**7**	**119**	8	0	**134**	1	4	0	0	5	37	39	**1**	**1**	78	**290**
08:00 AM	10	4	49	0	63	0	86	7	**1**	94	1	**10**	**2**	**1**	14	**57**	**58**	0	0	**115**	286
08:15 AM	**13**	1	40	**1**	55	1	63	10	0	74	0	5	1	0	6	47	57	1	0	105	240
08:30 AM	10	4	45	1	60	1	65	**15**	0	81	**2**	10	2	1	**15**	46	42	0	1	89	245
Total Volume	42	17	190	2	251	9	333	40	1	383	4	29	5	2	40	187	196	2	2	387	1061
% App. Total	16.7	6.8	75.7	0.8		2.3	86.9	10.4	0.3		10	72.5	12.5	5		48.3	50.6	0.5	0.5		
PHF	.808	.531	.848	.500	.860	.321	.700	.667	.250	.715	.500	.725	.625	.500	.667	.820	.845	.500	.500	.841	.915



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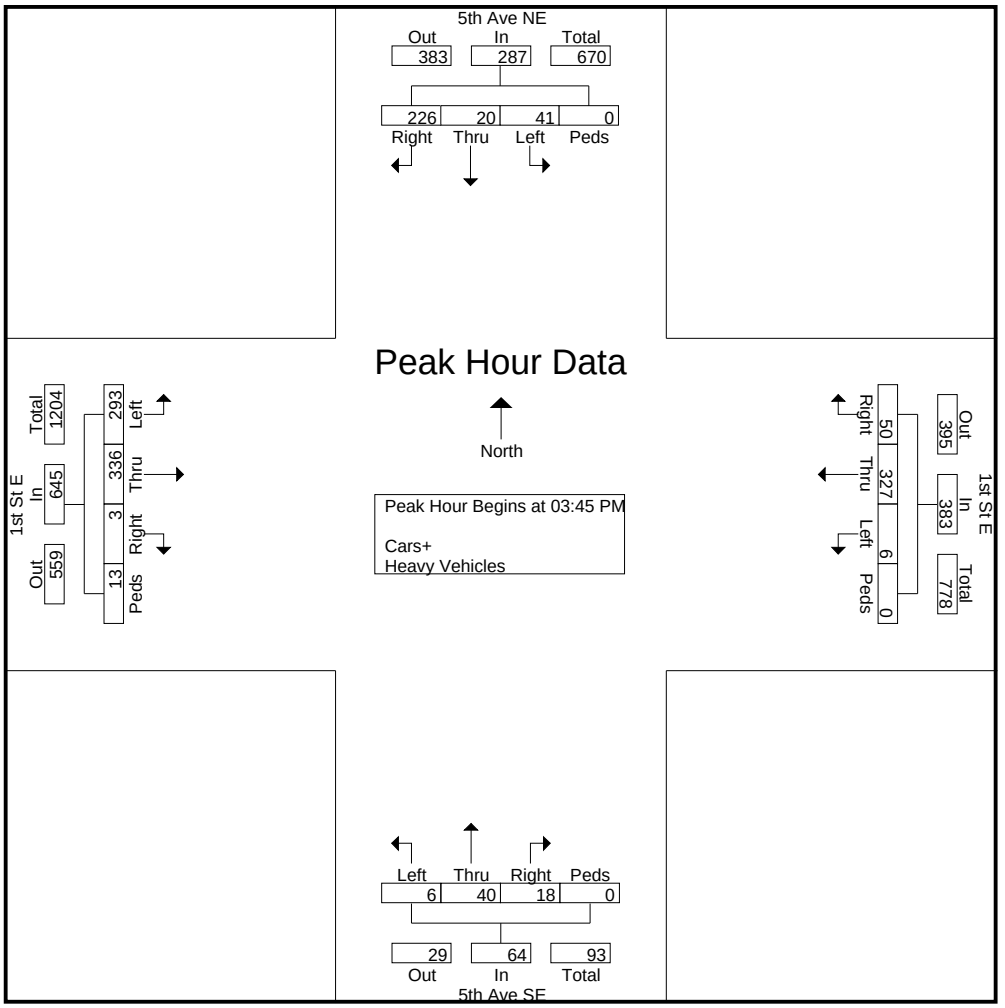
2727 Snyder Blvd.
Ankeny, Iowa, 50023

1st St E and 5th Ave
Independence, IA
Independence TEAP Study

File Name : 1st St E and 5th Ave 150501
Site Code :
Start Date : 5/1/2015
Page No : 4

	5th Ave NE SB					1st St E WB					5th Ave SE NB					1st St E EB					
Start Time	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Int. Total
Peak Hour Analysis From 12:00 PM to 05:15 PM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 03:45 PM																					
03:45 PM	10	**7**	**66**	0	**83**	**2**	76	10	0	88	**4**	11	3	0	18	**91**	**100**	0	**7**	**198**	**387**
04:00 PM	5	3	45	0	53	1	**91**	9	0	**101**	0	**13**	**6**	0	**19**	69	83	**2**	1	155	328
04:15 PM	7	5	59	0	71	1	79	**20**	0	100	0	7	5	0	12	58	82	0	1	141	324
04:30 PM	**19**	5	56	0	80	2	81	11	0	94	2	9	4	0	15	75	71	1	4	151	340
Total Volume	41	20	226	0	287	6	327	50	0	383	6	40	18	0	64	293	336	3	13	645	1379
% App. Total	14.3	7	78.7	0		1.6	85.4	13.1	0		9.4	62.5	28.1	0		45.4	52.1	0.5	2		
PHF	.539	.714	.856	.000	.864	.750	.898	.625	.000	.948	.375	.769	.750	.000	.842	.805	.840	.375	.464	.814	.891



Iowa Department of Transportation

Major Cause Summary

1st St E & 3rd Ave E

Report Version 1.1 Jan 2005

Analysis Years: 2010 [2], 2011 [5], 2012 [6], 2013 [5], 2014 [3]

Crash Summary:

Fatal	-
Major Injury	-
Minor Injury	-
Possible/Unknown	4
PDO	17
Total Crashes	21

Injury Summary:

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

TOT Property Damage: $79,076

AVG Property Damage: $3,766

Surface Condition Summary:

Dry	18
Wet	-
Ice	1
Snow	2
Slush	-
Sand/Dirt/Oil/Gravel	-
Water	-
Other	-
Unknown	-
Not Reported	-
Total Crashes	21

Major Cause Summary:

	Animal		Improper Backing
2	Ran Traffic Signal		Illegally Parked/Unattended
	Ran Stop Sign		Swerving/Evasive Action
	Crossed Centerline	1	Over-Correcting/Over-Steering
	FTYROW: At Uncontrolled Intersection		Downhill Runaway
	FTYROW: Making Right Turn on Red Signal		Equipment Failure
	FTYROW: From Stop Sign		Separation of Units
	FTYROW: From Yield Sign		Ran Off Road - Right
2	FTYROW: Making Left Turn	1	Ran Off Road - Straight
	FTYROW: From Driveway		Ran Off Road - Left
1	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
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
2	Followed Too Close	5	Other: Other Improper Action
	Disregarded Railroad Signal	1	Unknown
	Disregarded Warning Sign		Other: No Improper Action
3	Operating Vehicle in Reckless/Aggressive Manner		None Indicated

Selection Filter:

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

Analyst:

Notes:

Iowa Department of Transportation

Major Cause Summary

1st St E & 5th Ave E

Report Version 1.1 Jan 2005

Analysis Years: 2010 [2], 2011 [4], 2012 [3], 2013 [4], 2014 [6]

Crash Summary:

Fatal	-
Major Injury	1
Minor Injury	1
Possible/Unknown	5
PDO	12
Total Crashes	19

Injury Summary:

Fatal	-
Major Injury	1
Minor Injury	1
Possible	7
Unknown	-
Total Injuries	9

TOT Property Damage: $77,610

AVG Property Damage: $4,085

Surface Condition Summary:

Dry	13
Wet	4
Ice	1
Snow	1
Slush	-
Sand/Dirt/Oil/Gravel	-
Water	-
Other	-
Unknown	-
Not Reported	-
Total Crashes	19

Major Cause Summary:

	Animal		Improper Backing
1	Ran Traffic Signal		Illegally Parked/Unattended
	Ran Stop Sign	1	Swerving/Evasive Action
1	Crossed Centerline	1	Over-Correcting/Over-Steering
	FTYROW: At Uncontrolled Intersection		Downhill Runaway
	FTYROW: Making Right Turn on Red Signal		Equipment Failure
	FTYROW: From Stop Sign		Separation of Units
	FTYROW: From Yield Sign		Ran Off Road - Right
2	FTYROW: Making Left Turn		Ran Off Road - Straight
2	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
2	Followed Too Close	5	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 = 2010 or YEAR = 2011 or YEAR = 2012 or YEAR = 2013 or YEAR = 2014))

Analyst:

Notes:

Iowa Department of Transportation

Major Cause Summary

1st St E & 8th Ave NE

Report Version 1.1 Jan 2005

Analysis Years: 2014 [1]

Crash Summary:

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

Injury Summary:

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

TOT Property Damage: $0,000

AVG Property Damage: $0,000

Surface Condition Summary:

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

Major Cause Summary:

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

Selection Filter:

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

Analyst:

Notes:

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	13	251	39	220	210	16	43	89	210	6	55	23
Number	5	2	12	1	6	16	3	8	18	7	4	14
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	1712	1712	1900	1696	1696	1900	1900	1652	1900	1900	1827	1900
Adj Flow Rate, veh/h	14	273	42	239	228	17	47	97	228	7	60	25
Adj No. of Lanes	1	1	0	1	1	0	0	1	0	0	1	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	11	11	11	12	12	12	15	15	15	4	4	4
Cap, veh/h	518	537	83	499	809	60	112	150	296	85	403	155
Arrive On Green	0.37	0.37	0.37	0.03	0.17	0.17	0.33	0.33	0.33	0.33	0.33	0.33
Sat Flow, veh/h	1039	1449	223	1616	1560	116	110	451	888	39	1209	466
Grp Volume(v), veh/h	14	0	315	239	0	245	372	0	0	92	0	0
Grp Sat Flow(s),veh/h/ln	1039	0	1672	1616	0	1676	1449	0	0	1714	0	0
Q Serve(g_s), s	0.5	0.0	7.9	4.5	0.0	6.9	5.3	0.0	0.0	0.0	0.0	0.0
Cycle Q Clear(g_c), s	0.5	0.0	7.9	4.5	0.0	6.9	12.3	0.0	0.0	2.0	0.0	0.0
Prop In Lane	1.00		0.13	1.00		0.07	0.13		0.61	0.08		0.27
Lane Grp Cap(c), veh/h	518	0	619	499	0	869	558	0	0	643	0	0
V/C Ratio(X)	0.03	0.00	0.51	0.48	0.00	0.28	0.67	0.00	0.00	0.14	0.00	0.00
Avail Cap(c_a), veh/h	518	0	619	499	0	869	558	0	0	643	0	0
HCM Platoon Ratio	1.00	1.00	1.00	0.33	0.33	0.33	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	0.00
Uniform Delay (d), s/veh	10.8	0.0	13.2	9.7	0.0	13.6	16.0	0.0	0.0	12.7	0.0	0.0
Incr Delay (d2), s/veh	0.1	0.0	3.0	3.3	0.0	0.8	6.2	0.0	0.0	0.5	0.0	0.0
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 BackOfQ(50%),veh/ln	0.1	0.0	4.1	2.4	0.0	3.4	5.8	0.0	0.0	1.0	0.0	0.0
LnGrp Delay(d),s/veh	10.9	0.0	16.2	13.0	0.0	14.4	22.2	0.0	0.0	13.1	0.0	0.0
LnGrp LOS	B		B	B		B	C			B		
Approach Vol, veh/h		329			484			372			92	
Approach Delay, s/veh		15.9			13.7			22.2			13.1	
Approach LOS		B			B			C			B	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2		4		6		8
Phs Duration (G+Y+Rc), s	8.0	24.0		22.0		32.0		22.0
Change Period (Y+Rc), s	3.0	4.0		4.0		4.0		4.0
Max Green Setting (Gmax), s	5.0	20.0		18.0		28.0		18.0
Max Q Clear Time (g_c+I1), s	0.0	0.0		0.0		0.0		0.0
Green Ext Time (p_c), s	0.0	0.0		0.0		0.0		0.0

Intersection Summary	
HCM 2010 Ctrl Delay	16.7
HCM 2010 LOS	B

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	187	196	2	9	333	40	4	29	5	42	17	190
Number	5	2	12	1	6	16	3	8	18	7	4	14
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	1776	1776	1900	1827	1827	1900	1900	1696	1900	1900	1792	1900
Adj Flow Rate, veh/h	203	213	2	10	362	43	4	32	5	46	18	207
Adj No. of Lanes	1	1	0	1	1	0	0	1	0	0	1	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	7	7	7	4	4	4	12	12	12	6	6	6
Cap, veh/h	548	1008	9	576	623	74	88	383	55	122	56	323
Arrive On Green	0.09	0.38	0.38	0.39	0.39	0.39	0.28	0.28	0.28	0.28	0.28	0.28
Sat Flow, veh/h	1691	1756	16	1137	1602	190	52	1378	199	159	201	1164
Grp Volume(v), veh/h	203	0	215	10	0	405	41	0	0	271	0	0
Grp Sat Flow(s),veh/h/ln	1691	0	1773	1137	0	1793	1628	0	0	1524	0	0
Q Serve(g_s), s	3.3	0.0	4.4	0.3	0.0	9.6	0.0	0.0	0.0	2.7	0.0	0.0
Cycle Q Clear(g_c), s	3.3	0.0	4.4	0.3	0.0	9.6	1.0	0.0	0.0	8.3	0.0	0.0
Prop In Lane	1.00		0.01	1.00		0.11	0.10		0.12	0.17		0.76
Lane Grp Cap(c), veh/h	548	0	1018	576	0	697	526	0	0	501	0	0
V/C Ratio(X)	0.37	0.00	0.21	0.02	0.00	0.58	0.08	0.00	0.00	0.54	0.00	0.00
Avail Cap(c_a), veh/h	548	0	1018	576	0	697	526	0	0	501	0	0
HCM Platoon Ratio	0.67	0.67	0.67	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	0.00
Uniform Delay (d), s/veh	8.1	0.0	8.4	10.2	0.0	13.0	14.4	0.0	0.0	17.0	0.0	0.0
Incr Delay (d2), s/veh	1.9	0.0	0.5	0.1	0.0	3.5	0.3	0.0	0.0	4.1	0.0	0.0
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 BackOfQ(50%),veh/ln	1.8	0.0	2.3	0.1	0.0	5.4	0.5	0.0	0.0	4.1	0.0	0.0
LnGrp Delay(d),s/veh	10.0	0.0	8.9	10.2	0.0	16.5	14.7	0.0	0.0	21.2	0.0	0.0
LnGrp LOS	A		A	B		B	B			C		
Approach Vol, veh/h		418			415			41			271	
Approach Delay, s/veh		9.4			16.4			14.7			21.2	
Approach LOS		A			B			B			C	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4	5	6		8
Phs Duration (G+Y+Rc), s		35.0		19.0	10.0	25.0		19.0
Change Period (Y+Rc), s		4.0		4.0	3.0	4.0		4.0
Max Green Setting (Gmax), s		31.0		15.0	7.0	21.0		15.0
Max Q Clear Time (g_c+I1), s		0.0		0.0	0.0	0.0		0.0
Green Ext Time (p_c), s		0.0		0.0	0.0	0.0		0.0

Intersection Summary	
HCM 2010 Ctrl Delay	14.9
HCM 2010 LOS	B

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	12	264	84	315	251	11	82	106	339	12	94	31
Number	5	2	12	1	6	16	3	8	18	7	4	14
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	1845	1845	1900	1810	1810	1900	1900	1743	1900	1900	1827	1900
Adj Flow Rate, veh/h	13	297	94	354	282	12	92	119	381	13	106	35
Adj No. of Lanes	1	1	0	1	1	0	0	1	0	0	1	0
Peak Hour Factor	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89
Percent Heavy Veh, %	3	3	3	5	5	5	9	9	9	4	4	4
Cap, veh/h	530	498	158	477	894	38	135	119	319	90	431	132
Arrive On Green	0.37	0.37	0.37	0.03	0.17	0.17	0.33	0.33	0.33	0.33	0.33	0.33
Sat Flow, veh/h	1070	1344	425	1723	1723	73	173	357	957	55	1292	396
Grp Volume(v), veh/h	13	0	391	354	0	294	592	0	0	154	0	0
Grp Sat Flow(s),veh/h/ln	1070	0	1770	1723	0	1797	1488	0	0	1742	0	0
Q Serve(g_s), s	0.4	0.0	9.6	5.0	0.0	7.7	13.7	0.0	0.0	0.0	0.0	0.0
Cycle Q Clear(g_c), s	0.4	0.0	9.6	5.0	0.0	7.7	18.0	0.0	0.0	3.5	0.0	0.0
Prop In Lane	1.00		0.24	1.00		0.04	0.16		0.64	0.08		0.23
Lane Grp Cap(c), veh/h	530	0	655	477	0	932	573	0	0	653	0	0
V/C Ratio(X)	0.02	0.00	0.60	0.74	0.00	0.32	1.03	0.00	0.00	0.24	0.00	0.00
Avail Cap(c_a), veh/h	530	0	655	477	0	932	573	0	0	653	0	0
HCM Platoon Ratio	1.00	1.00	1.00	0.33	0.33	0.33	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	0.00
Uniform Delay (d), s/veh	10.8	0.0	13.7	13.4	0.0	14.0	19.1	0.0	0.0	13.2	0.0	0.0
Incr Delay (d2), s/veh	0.1	0.0	4.0	10.0	0.0	0.9	46.5	0.0	0.0	0.8	0.0	0.0
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 BackOfQ(50%),veh/ln	0.1	0.0	5.4	4.2	0.0	4.1	15.8	0.0	0.0	1.8	0.0	0.0
LnGrp Delay(d),s/veh	10.9	0.0	17.7	23.4	0.0	14.9	65.6	0.0	0.0	14.0	0.0	0.0
LnGrp LOS	B		B	C		B	F			B		
Approach Vol, veh/h		404			648			592			154	
Approach Delay, s/veh		17.5			19.5			65.6			14.0	
Approach LOS		B			B			E			B	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2		4		6		8
Phs Duration (G+Y+Rc), s	8.0	24.0		22.0		32.0		22.0
Change Period (Y+Rc), s	3.0	4.0		4.0		4.0		4.0
Max Green Setting (Gmax), s	5.0	20.0		18.0		28.0		18.0
Max Q Clear Time (g_c+I1), s	0.0	0.0		0.0		0.0		0.0
Green Ext Time (p_c), s	0.0	0.0		0.0		0.0		0.0

Intersection Summary	
HCM 2010 Ctrl Delay	33.8
HCM 2010 LOS	C

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	293	336	3	6	327	50	6	40	18	41	20	226
Number	5	2	12	1	6	16	3	8	18	7	4	14
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	1776	1776	1900	1827	1827	1900	1900	1696	1900	1900	1792	1900
Adj Flow Rate, veh/h	329	378	3	7	367	56	7	45	20	46	22	254
Adj No. of Lanes	1	1	0	1	1	0	0	1	0	0	1	0
Peak Hour Factor	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89
Percent Heavy Veh, %	7	7	7	4	4	4	12	12	12	6	6	6
Cap, veh/h	535	1010	8	513	602	92	87	304	122	113	52	333
Arrive On Green	0.13	0.57	0.57	0.39	0.39	0.39	0.28	0.28	0.28	0.28	0.28	0.28
Sat Flow, veh/h	1691	1759	14	977	1548	236	50	1096	441	134	188	1200
Grp Volume(v), veh/h	329	0	381	7	0	423	72	0	0	322	0	0
Grp Sat Flow(s),veh/h/ln	1691	0	1773	977	0	1785	1587	0	0	1522	0	0
Q Serve(g_s), s	5.8	0.0	6.3	0.2	0.0	10.3	0.0	0.0	0.0	4.8	0.0	0.0
Cycle Q Clear(g_c), s	5.8	0.0	6.3	0.2	0.0	10.3	1.8	0.0	0.0	10.4	0.0	0.0
Prop In Lane	1.00		0.01	1.00		0.13	0.10		0.28	0.14		0.79
Lane Grp Cap(c), veh/h	535	0	1018	513	0	694	514	0	0	499	0	0
V/C Ratio(X)	0.62	0.00	0.37	0.01	0.00	0.61	0.14	0.00	0.00	0.65	0.00	0.00
Avail Cap(c_a), veh/h	535	0	1018	513	0	694	514	0	0	499	0	0
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	0.00
Uniform Delay (d), s/veh	8.8	0.0	6.2	10.2	0.0	13.2	14.7	0.0	0.0	17.8	0.0	0.0
Incr Delay (d2), s/veh	5.2	0.0	1.1	0.0	0.0	4.0	0.6	0.0	0.0	6.3	0.0	0.0
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 BackOfQ(50%),veh/ln	3.3	0.0	3.4	0.1	0.0	5.7	0.9	0.0	0.0	5.3	0.0	0.0
LnGrp Delay(d),s/veh	14.0	0.0	7.3	10.2	0.0	17.2	15.3	0.0	0.0	24.1	0.0	0.0
LnGrp LOS	B		A	B		B	B			C		
Approach Vol, veh/h		710			430			72			322	
Approach Delay, s/veh		10.4			17.1			15.3			24.1	
Approach LOS		B			B			B			C	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4	5	6		8
Phs Duration (G+Y+Rc), s		35.0		19.0	10.0	25.0		19.0
Change Period (Y+Rc), s		4.0		4.0	3.0	4.0		4.0
Max Green Setting (Gmax), s		31.0		15.0	7.0	21.0		15.0
Max Q Clear Time (g_c+I1), s		0.0		0.0	0.0	0.0		0.0
Green Ext Time (p_c), s		0.0		0.0	0.0	0.0		0.0

Intersection Summary	
HCM 2010 Ctrl Delay	15.4
HCM 2010 LOS	B

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	13	251	39	220	210	16	43	89	210	6	55	23
Number	5	2	12	1	6	16	3	8	18	7	4	14
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	1712	1712	1900	1696	1696	1900	1900	1652	1900	1900	1827	1900
Adj Flow Rate, veh/h	14	273	42	239	228	17	47	97	228	7	60	25
Adj No. of Lanes	1	1	0	1	1	0	0	1	0	0	1	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	11	11	11	12	12	12	15	15	15	4	4	4
Cap, veh/h	398	421	65	433	744	56	98	171	340	72	456	178
Arrive On Green	0.29	0.29	0.29	0.04	0.16	0.16	0.38	0.38	0.38	0.38	0.38	0.38
Sat Flow, veh/h	1039	1449	223	1616	1560	116	115	445	887	54	1187	463
Grp Volume(v), veh/h	14	0	315	239	0	245	372	0	0	92	0	0
Grp Sat Flow(s),veh/h/ln	1039	0	1672	1616	0	1676	1447	0	0	1704	0	0
Q Serve(g_s), s	0.7	0.0	12.3	7.1	0.0	9.7	5.4	0.0	0.0	0.0	0.0	0.0
Cycle Q Clear(g_c), s	0.7	0.0	12.3	7.1	0.0	9.7	15.7	0.0	0.0	2.6	0.0	0.0
Prop In Lane	1.00		0.13	1.00		0.07	0.13		0.61	0.08		0.27
Lane Grp Cap(c), veh/h	398	0	486	433	0	800	610	0	0	706	0	0
V/C Ratio(X)	0.04	0.00	0.65	0.55	0.00	0.31	0.61	0.00	0.00	0.13	0.00	0.00
Avail Cap(c_a), veh/h	398	0	486	433	0	800	610	0	0	706	0	0
HCM Platoon Ratio	1.00	1.00	1.00	0.33	0.33	0.33	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	0.00
Uniform Delay (d), s/veh	19.1	0.0	23.2	16.7	0.0	20.6	19.0	0.0	0.0	15.0	0.0	0.0
Incr Delay (d2), s/veh	0.2	0.0	6.5	5.0	0.0	1.0	4.5	0.0	0.0	0.4	0.0	0.0
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 BackOfQ(50%),veh/ln	0.2	0.0	6.6	3.7	0.0	4.7	7.1	0.0	0.0	1.3	0.0	0.0
LnGrp Delay(d),s/veh	19.3	0.0	29.8	21.7	0.0	21.6	23.5	0.0	0.0	15.4	0.0	0.0
LnGrp LOS	B		C	C		C	C			B		
Approach Vol, veh/h		329			484			372			92	
Approach Delay, s/veh		29.3			21.6			23.5			15.4	
Approach LOS		C			C			C			B	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2		4		6		8
Phs Duration (G+Y+Rc), s	14.0	27.0		34.0		41.0		34.0
Change Period (Y+Rc), s	4.0	* 5.2		* 5.2		* 5.2		* 5.2
Max Green Setting (Gmax), s	10.0	* 22		* 29		* 36		* 29
Max Q Clear Time (g_c+I1), s	0.0	0.0		0.0		0.0		0.0
Green Ext Time (p_c), s	0.0	0.0		0.0		0.0		0.0

Intersection Summary	
HCM 2010 Ctrl Delay	23.7
HCM 2010 LOS	C

Notes

* HCM 2010 computational engine requires equal clearance times for the phases crossing the barrier.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	187	196	2	9	333	40	4	29	5	42	17	190
Number	5	2	12	1	6	16	3	8	18	7	4	14
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	1776	1776	1900	1827	1827	1900	1900	1696	1900	1900	1792	1900
Adj Flow Rate, veh/h	203	213	2	10	362	43	4	32	5	46	18	207
Adj No. of Lanes	1	1	0	1	1	0	0	1	0	0	1	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	7	7	7	4	4	4	12	12	12	6	6	6
Cap, veh/h	509	984	9	445	491	58	74	420	61	108	60	361
Arrive On Green	0.06	0.18	0.18	0.31	0.31	0.31	0.31	0.31	0.31	0.31	0.31	0.31
Sat Flow, veh/h	1691	1756	16	1137	1602	190	68	1353	197	166	194	1162
Grp Volume(v), veh/h	203	0	215	10	0	405	41	0	0	271	0	0
Grp Sat Flow(s),veh/h/ln	1691	0	1773	1137	0	1793	1618	0	0	1522	0	0
Q Serve(g_s), s	5.2	0.0	7.7	0.5	0.0	15.2	0.0	0.0	0.0	2.8	0.0	0.0
Cycle Q Clear(g_c), s	5.2	0.0	7.7	0.5	0.0	15.2	1.3	0.0	0.0	10.9	0.0	0.0
Prop In Lane	1.00		0.01	1.00		0.11	0.10		0.12	0.17		0.76
Lane Grp Cap(c), veh/h	509	0	993	445	0	550	555	0	0	529	0	0
V/C Ratio(X)	0.40	0.00	0.22	0.02	0.00	0.74	0.07	0.00	0.00	0.51	0.00	0.00
Avail Cap(c_a), veh/h	509	0	993	445	0	550	555	0	0	529	0	0
HCM Platoon Ratio	0.33	0.33	0.33	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	0.00
Uniform Delay (d), s/veh	14.4	0.0	16.6	18.2	0.0	23.3	18.3	0.0	0.0	21.5	0.0	0.0
Incr Delay (d2), s/veh	2.3	0.0	0.5	0.1	0.0	8.5	0.3	0.0	0.0	3.5	0.0	0.0
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 BackOfQ(50%),veh/ln	2.7	0.0	3.9	0.2	0.0	8.7	0.6	0.0	0.0	5.2	0.0	0.0
LnGrp Delay(d),s/veh	16.8	0.0	17.1	18.3	0.0	31.8	18.5	0.0	0.0	25.1	0.0	0.0
LnGrp LOS	B		B	B		C	B			C		
Approach Vol, veh/h		418			415			41			271	
Approach Delay, s/veh		16.9			31.5			18.5			25.1	
Approach LOS		B			C			B			C	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4	5	6		8
Phs Duration (G+Y+Rc), s		47.0		28.0	19.0	28.0		28.0
Change Period (Y+Rc), s		* 5		* 4.7	5.0	* 5		* 4.7
Max Green Setting (Gmax), s		* 42		* 23	14.0	* 23		* 23
Max Q Clear Time (g_c+I1), s		0.0		0.0	0.0	0.0		0.0
Green Ext Time (p_c), s		0.0		0.0	0.0	0.0		0.0

Intersection Summary	
HCM 2010 Ctrl Delay	24.2
HCM 2010 LOS	C

Notes

* HCM 2010 computational engine requires equal clearance times for the phases crossing the barrier.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	12	264	84	315	251	11	82	106	339	12	94	31
Number	5	2	12	1	6	16	3	8	18	7	4	14
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	1845	1845	1900	1810	1810	1900	1900	1743	1900	1900	1827	1900
Adj Flow Rate, veh/h	13	297	94	354	282	12	92	119	381	13	106	35
Adj No. of Lanes	1	1	0	1	1	0	0	1	0	0	1	0
Peak Hour Factor	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89
Percent Heavy Veh, %	3	3	3	5	5	5	9	9	9	4	4	4
Cap, veh/h	407	391	124	412	823	35	125	134	367	75	472	146
Arrive On Green	0.29	0.29	0.29	0.04	0.16	0.16	0.38	0.38	0.38	0.38	0.38	0.38
Sat Flow, veh/h	1070	1344	425	1723	1723	73	181	348	955	61	1229	379
Grp Volume(v), veh/h	13	0	391	354	0	294	592	0	0	154	0	0
Grp Sat Flow(s),veh/h/ln	1070	0	1770	1723	0	1797	1484	0	0	1669	0	0
Q Serve(g_s), s	0.7	0.0	15.1	10.0	0.0	10.9	22.9	0.0	0.0	0.0	0.0	0.0
Cycle Q Clear(g_c), s	0.7	0.0	15.1	10.0	0.0	10.9	28.8	0.0	0.0	4.4	0.0	0.0
Prop In Lane	1.00		0.24	1.00		0.04	0.16		0.64	0.08		0.23
Lane Grp Cap(c), veh/h	407	0	514	412	0	858	625	0	0	693	0	0
V/C Ratio(X)	0.03	0.00	0.76	0.86	0.00	0.34	0.95	0.00	0.00	0.22	0.00	0.00
Avail Cap(c_a), veh/h	407	0	514	412	0	858	625	0	0	693	0	0
HCM Platoon Ratio	1.00	1.00	1.00	0.33	0.33	0.33	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	0.00
Uniform Delay (d), s/veh	19.1	0.0	24.2	18.9	0.0	21.1	23.5	0.0	0.0	15.6	0.0	0.0
Incr Delay (d2), s/veh	0.1	0.0	10.1	20.3	0.0	1.1	25.0	0.0	0.0	0.7	0.0	0.0
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 BackOfQ(50%),veh/ln	0.2	0.0	8.8	7.1	0.0	5.7	16.5	0.0	0.0	2.3	0.0	0.0
LnGrp Delay(d),s/veh	19.2	0.0	34.4	39.2	0.0	22.2	48.5	0.0	0.0	16.3	0.0	0.0
LnGrp LOS	B		C	D		C	D			B		
Approach Vol, veh/h		404			648			592			154	
Approach Delay, s/veh		33.9			31.5			48.5			16.3	
Approach LOS		C			C			D			B	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2		4		6		8
Phs Duration (G+Y+Rc), s	14.0	27.0		34.0		41.0		34.0
Change Period (Y+Rc), s	4.0	* 5.2		* 5.2		* 5.2		* 5.2
Max Green Setting (Gmax), s	10.0	* 22		* 29		* 36		* 29
Max Q Clear Time (g_c+I1), s	0.0	0.0		0.0		0.0		0.0
Green Ext Time (p_c), s	0.0	0.0		0.0		0.0		0.0

Intersection Summary	
HCM 2010 Ctrl Delay	36.3
HCM 2010 LOS	D

Notes

* HCM 2010 computational engine requires equal clearance times for the phases crossing the barrier.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	293	336	3	6	327	50	6	40	18	41	20	226
Number	5	2	12	1	6	16	3	8	18	7	4	14
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	1776	1776	1900	1827	1827	1900	1900	1696	1900	1900	1792	1900
Adj Flow Rate, veh/h	329	378	3	7	367	56	7	45	20	46	22	254
Adj No. of Lanes	1	1	0	1	1	0	0	1	0	0	1	0
Peak Hour Factor	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89
Percent Heavy Veh, %	7	7	7	4	4	4	12	12	12	6	6	6
Cap, veh/h	495	985	8	396	475	72	73	333	136	98	56	373
Arrive On Green	0.06	0.18	0.18	0.31	0.31	0.31	0.31	0.31	0.31	0.31	0.31	0.31
Sat Flow, veh/h	1691	1759	14	977	1548	236	66	1073	438	139	182	1199
Grp Volume(v), veh/h	329	0	381	7	0	423	72	0	0	322	0	0
Grp Sat Flow(s),veh/h/ln	1691	0	1773	977	0	1784	1577	0	0	1520	0	0
Q Serve(g_s), s	8.6	0.0	14.1	0.4	0.0	16.2	0.0	0.0	0.0	5.6	0.0	0.0
Cycle Q Clear(g_c), s	8.6	0.0	14.1	0.4	0.0	16.2	2.4	0.0	0.0	13.7	0.0	0.0
Prop In Lane	1.00		0.01	1.00		0.13	0.10		0.28	0.14		0.79
Lane Grp Cap(c), veh/h	495	0	993	396	0	547	543	0	0	527	0	0
V/C Ratio(X)	0.66	0.00	0.38	0.02	0.00	0.77	0.13	0.00	0.00	0.61	0.00	0.00
Avail Cap(c_a), veh/h	495	0	993	396	0	547	543	0	0	527	0	0
HCM Platoon Ratio	0.33	0.33	0.33	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	0.00
Uniform Delay (d), s/veh	16.3	0.0	19.2	18.2	0.0	23.6	18.7	0.0	0.0	22.5	0.0	0.0
Incr Delay (d2), s/veh	6.9	0.0	1.1	0.1	0.0	10.2	0.5	0.0	0.0	5.2	0.0	0.0
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 BackOfQ(50%),veh/ln	4.9	0.0	7.3	0.1	0.0	9.4	1.2	0.0	0.0	6.6	0.0	0.0
LnGrp Delay(d),s/veh	23.2	0.0	20.3	18.2	0.0	33.8	19.2	0.0	0.0	27.7	0.0	0.0
LnGrp LOS	C		C	B		C	B			C		
Approach Vol, veh/h		710			430			72			322	
Approach Delay, s/veh		21.7			33.6			19.2			27.7	
Approach LOS		C			C			B			C	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4	5	6		8
Phs Duration (G+Y+Rc), s		47.0		28.0	19.0	28.0		28.0
Change Period (Y+Rc), s		* 5		* 4.7	5.0	* 5		* 4.7
Max Green Setting (Gmax), s		* 42		* 23	14.0	* 23		* 23
Max Q Clear Time (g_c+I1), s		0.0		0.0	0.0	0.0		0.0
Green Ext Time (p_c), s		0.0		0.0	0.0	0.0		0.0

Intersection Summary	
HCM 2010 Ctrl Delay	26.1
HCM 2010 LOS	C

Notes

* HCM 2010 computational engine requires equal clearance times for the phases crossing the barrier.