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Traffic Analysis

University Avenue
Windsor Heights, IA

Submitted by:

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Certification

Traffic Analysis

for

University Avenue

City of Windsor Heights, IA
BMI Project No. – A13.114723

November 1, 2017



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 that laws of the State of Iowa.

11/01/2017

Rob J. Haaland

Date

License Number 19529

MY LICENSE RENEWAL DATE IS DECEMBER 31, 2018

Pages or sheets covered by this seal:

Pages 1 to 6, Appendix A to F

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I. Executive Summary

The City of Windsor Heights is looking to reconstruct the University Avenue Corridor through the City. The corridor stretches from the border with Des Moines at 63th Street to the border with Clive at 73rd Street. The City is interested in analyzing the traffic operations and safety to determine the appropriate roadway configuration. The corridor is currently a 4-lane section with left and right turn lanes at some intersections. The city wants to review if a 3-lane roadway would be appropriate to allow a complete streets project for improved bicycle and pedestrian circulation.

The signalized intersections of 63rd Street, 66th Street, 70th Street, Hy-Vee Access, and 73rd Street were included in the study to determine the effect on the delay and queueing of potential 4-lane to 3-lane conversion, the proposed development at 66th Street, and future growth on the system.

The following summarizes the main outcomes of this study:

A. Safety

There have been 102 crashes on the study corridor between 2012 and 2016. The number of crashes and severity of crashes are below the statewide average and do not indicate any significant safety concerns. The conversion from 4-lane to 3-lane could produce a reduction in crash rate based on existing literature.

B. Proposed Site Improvements

The traffic study indicates traffic capacity is sufficient for the existing 4-lane section or the conversion to a 3-lane section with intersections operating within the acceptable level of service. Turning movements show increases in delays for the 4-lane to 3-lane conversion. The delays for the future phases show some LOS below the normally acceptable limit for both scenarios. The 3-lane roadway has lower LOS values, but would still function appropriately, within the acceptable ranges.

C. Pedestrian / Bicyclist / Transit accommodations

Pedestrian facilities and transit are already included in the existing layout. Bicycle traffic is not included in the existing roadway, but would be included in the 4-lane to 3-lane conversion.

II. Introduction

The City of Windsor Heights is looking to reconstruct the University Avenue Corridor through the City. The corridor stretches from the border with Des Moines at 63th Street to the border with Clive at 73rd Street. The City is interested in analyzing the traffic operations and safety to determine the appropriate roadway configuration. The corridor is currently a 4-lane section with left and right turn lanes at some intersections. The city wants to review if a 3-lane roadway would be appropriate to allow a complete streets project for improved bicycle and pedestrian circulation.

The signalized intersections of 63rd Street, 66th Street, 70th Street, Hy-Vee Access, and 73rd Street were included in the study to determine the effect on the delay and queueing of potential 4-lane to 3-lane conversion, the proposed development at 66th Street, and future growth on the system.

The purpose of this traffic impact study is to identify potential transportation issues created as a result of changes to the roadway system and surrounding area and recommend solutions to mitigate the potential issues to provide a safer and efficient transportation facility for vehicular, pedestrian and bicycle traffic.

III. Existing Conditions Review

The proposed study area is the University Avenue Corridor in Windsor Heights, Iowa extending from the border with Des Moines at 63rd Street to the border with Clive at 73rd Street. The roadway is currently 4-lane with left turn lanes at the signalized intersections of 63rd Street, 66th Street, 70th Street, Hy-Vee Access, and 73rd Street and right turn lane for eastbound traffic at 70th Street. University Avenue has varying widths throughout the length of the corridor. There is also a Residential/Commercial development proposed on the Southeast corner of the intersection of University Avenue at 66th Street.

See **Appendix A** for aerial of existing conditions.

University Avenue and 73rd Street have a functional classification of minor arterial, 63rd Street has a functional classification of principal arterial, and 70th Street has a functional classification of Collector. The other streets with the study area are classified as local roads.

As of January 1, 2017, University Avenue has a posted speed limit of 25 mph.

AM and PM Peak Hour Turning Movement Counts were performed by MSA Professional Services on April 12, 2016 for and were used in a previous analysis requested by the City. AADT counts were also performed by MSA just east and west of the 70th street intersection. They provided AADT's of 14,700 and 14,900 vpd at the locations counted. These were different than the numbers from the Iowa DOT AADT maps produced from the 2012 counts, which is likely due to a different counting location than the DOT maps. The DOT released the 2016 AADT maps in 2017 with revised numbers that are more similar to the MSA counts. New AADT counts were performed by Bolton & Menk at the locations shown on the DOT AADT maps to review the accuracy of these counts. The AADT counts were performed on September 12th and 13th of 2017 on University Avenue between 63rd Street and 64th Street, and 67th Street and 68th Street. The counts provided AADTs of 6,900 and 9,500 respectively at locations where the Iowa DOT maps show counts of 12,600 and 16,000, respectively. The Bolton & Menk counts are well below the DOT counts at the same locations and the counts performed by MSA. The time of year between counts can account for about 10% difference. The difference between the DOT numbers is nearly 40%. It was then assumed the difference was due to the photo enforcement cameras installed in January 2017. Because the turning movement counts were performed prior to the camera installation, a conservative 15% diversion to other roadways was assumed and adjustments were made to the turning movement counts.

AM Peak Hour and PM Peak Hour were determined to be 7:15-8:15 am and 4:30-5:30 pm respectively. The turning movement counts were balanced to account for the different days conducted. See **Appendix B** for Peak hour count information.

IV. Safety Review

The crash history review of the studied intersections was completed using the crash data available through the Iowa DOT Crash Mapping Analysis Tool for 2012 to 2016. There were 102 reported crashes along the University Avenue Corridor within the study area. Of those, there was one major injury crash, nine minor injury crashes, 18 possible/unknown injury crashes, and 74 property damage only crashes. A summary follows.

- There were 43 crashes at the intersection of 63rd Street. There was one major injury crash, four minor injury crashes, five possible/unknown injury crashes, and 33 property damage only crashes. The major injury crash was a broadside crash caused by northbound traffic running the traffic signal. The Minor injury crashes were 2 rear end crashes, 1 left turn crash, and one fixed object. Of the crashes 25 were Rear end, 7 were On-coming Left Turn, 2 were Broadside, 5 were Sideswipe Same Direction, 1 was head on, 3 were other. Nine of the rear end crashes were eastbound traffic. This could be due to the crest of the hill to the west of the

intersection. 3 of the sideswipe same direction crashes were in the southbound direction. There were not apparent trends for the oncoming left crashes. The crash rate at the intersection was calculated as 0.8 crashes per MEV (Million Entering Vehicles) which is below the statewide average of 0.9 crashes per MEV for an intersection of a primary roadway with a city street.

- There were 6 crashes at the intersection of 66th Street. There was one possible/unknown injury crash, and five property damage only crashes. Of the crashes two were Rear end, one was On-coming Left Turn, three were Broadside. The crash rate was calculated as 0.3 crashes per MEV (Million Entering Vehicles) which is below the statewide average of 0.8 crashes per MEV for a city street with city street.
- There were 8 crashes at the intersection of 70th Street. There was one possible/unknown injury crash, and seven property damage only crashes. Of the crashes two were Rear end, two were On-coming Left Turn, two were Broadside, one was Sideswipe Opposite Direction, one was Sideswipe same direction. The crash rate was calculated as 0.2 crashes per MEV (Million Entering Vehicles) which is below the statewide average of 0.8 crashes per MEV for a city street with city street.
- There was 1 crash at the intersection of the Hy-Vee Access. The crash was a possible/unknown injury crash. It was an On-coming Left Turn crash. The crash rate was calculated as 0.1 crashes per MEV (Million Entering Vehicles) which is below the statewide average of 0.8 crashes per MEV for a city street with city street.
- There were 30 crashes at the intersection of 73rd Street. There were four minor injury crashes, six possible/unknown injury crashes, and 20 property damage only crashes. The Minor injury crashes were 1 rear end crash, 1 sideswipe same direction, 1 angle oncoming left, and 1 non-collision. Of the crashes 12 were Rear end, two were On-coming Left Turn, nine were Broadside, four were Sideswipe Opposite Direction, one was Sideswipe same direction, two were other. Six of the rear end crashes were in the northbound direction. There was no trend for the broadside crashes. The crash rate was calculated as 0.6 crashes per MEV (Million Entering Vehicles) which is below the statewide average of 0.9 crashes per MEV for a primary roadway with city street

While the crash rates are below the statewide averages for the type of intersections, the number of crashes can be reduced with mitigation. The conversion of a 4 lane roadway to a 3-lane roadway has shown a potential 18% reduction in crashes according to the available literature. The crashes typically reduced the most for a 4-lane to 3-lane reduction are rear end crashes and sideswipe same direction crashes which make up 60% of the crashes in this corridor.

V. Project Scenario Review

The project scenarios for this analysis include additions of one proposed development, lane reconfiguration, and future growth.

A. PROPOSED DEVELOPMENT

There is a proposed development for the southeast corner of the University Avenue and 66th Street intersection. The development is planned to have 18,210 SF of commercial space on the ground floors and 46,674 SF of residential area on the 3 upper levels. Parking will be contained on the site with some spaces in a surface lot adjacent to the building and some spaces under the east end of the building.

The development is assumed to be constructed for all options but the existing conditions. The Project Layout can be found in **Appendix C**.

Trip generation was completed using the Trip Generation Manual, 8th Edition, Institute of Transportation Engineers, 2008. Trip generation rates were evaluated using data for Mid Rise Apartment (ITE 223) and Shopping Center (ITE 820). The Trip Generation Manual includes a trip generation type for Strip Mall (ITE 814), but it was determined the information was not appropriate due to the small study size. The trip generation results are contained in **Appendix D** and summarized in **Table 1**.

Table 1: Trip Generation Summary

Land Use	ITE Code	Proposed Size	AM Peak Hour		PM Peak Hour		Weekday	
			Entering	Exiting	Entering	Exiting	Entering	Exiting
Mid-Rise Apartment	223	242 Dwelling Units	3	5	7	6	205	205
Shopping Center	710	46,400 SF	32	7	91	151	1022	999
			AM Peak Hour total	47	PM Peak Hour total	255	Weekday total	2431

Number of Dwelling Units were not given for the proposed development, therefore it was assumed the residential would be 1 dwelling unit per 1000 SF.

The site will have access from the south leg of 66th Street. Traffic was routed through the intersections based on existing percentages of turning movement counts for each intersection.

B. LANE CONFIGURATION

The corridor is currently a 4 lane section with left turn lanes at the signalized intersections and right turn lane for eastbound traffic at 70th Street. The City requested a review of the lane configuration in coordination with a complete streets plan to improve bicycle and pedestrian facilities along the corridor. A concept created by Alta Design for a 3-lane roadway with center turn lane, bike lanes and intersection revisions was utilized. The concept is subject to change as the development of the project progress to include input from the traffic study as well as input from a stakeholders group.

On a 3-lane section scenario, a 10% traffic diversion can be expected because of slower traffic and perceived delays, with however more consistent travel speeds.

The City of Des Moines is reviewing the possibility of a 4-lane to 3-lane conversion for University Avenue to the east of 63rd Street. Bike lanes may be used such as installed in various other locations in the Des Moines Metro area.

C. FUTURE YEAR GROWTH

The AADT Maps generated by the DOT were used to determine the potential growth on the system for the future. The growth rates were reviewed along the corridor within the study area. The Growth rates varied throughout the corridor with most near 0.5% per year. The Des Moines Area MPO provided modeling maps of the corridor that show minimal or no growth of traffic. There are areas along the corridor that have been discussed as potential redevelopment, therefore the more conservative 0.50% growth rate was determined to be appropriate for future increase of traffic volumes.

Turning Movement information can be found in **Appendix E**.

VI. Traffic Modeling

The traffic operations analysis for the intersections consider the following measures to determine the adequacy of the intersection design to meet acceptable operations: intersection delay/Level of Service (LOS) and volume-to-capacity ratios (V/C). An explanation of each of these measures is provided below:

D. LEVEL OF SERVICE AND DELAY

The operational analysis results are described as a Level of Service (LOS) ranging from A to F. These letters serve to describe a range of operating conditions for different types of facilities. Levels of Service are calculated based on the 2010 Highway Capacity Manual, which defines the level of service, based on control delay. 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. The control delay is modeled within the analysis software, Trafficware Synchro. Level of Service D is commonly taken as an acceptable design year LOS. The level of service and its associated intersection delays for signalized and unsignalized intersections are presented below. 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.

Table 2: 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

Note: If V/C > 1.0, then LOS will be equal to F, independently of the delay.

Six Scenarios were analyzed to determine the effects of the traffic on the transportation system. The scenarios analyzed were:

- 1.Existing conditions – The existing conditions were analyzed to determine if there were preexisting issues. This also provides a basis for improvements required for the Design Year Build Phase
- 2.Opening Day Build phase – The Opening Day Build Phase conditions were analyzed to determine improvements required due to the additional traffic to the system from development and lane configuration change.
- 3.Design Year existing conditions - The Design Year Existing Conditions were analyzed to determine improvements required due to development and traffic growth in the future. The scenario includes background growth as well as trips generated by the development.
- 4.Design Year Build Phase - The Design Year Build Phase conditions were analyzed to determine improvements required due to lane configuration change. The scenario includes background growth as well as trips generated by the development and lane configuration. Mitigation of adding right turn lanes in the eastbound/westbound directions at the study intersections and adding northbound/southbound left turn lanes at the 66th Street intersection were included. At 73rd Street the westbound left turn lane was extended from 150 ft to 250 ft and an additional left turn lane was added.

The Level of service and queueing tabulations for the scenarios described can be found in

Appendix F.

The existing conditions provide low delays/level of service and acceptable queueing.

The added traffic from the development and the lane configuration increase the delays/level of service and queueing, but they remain within acceptable range for the intersection with some movements having delays increase above the generally acceptable level.

The added traffic due to growth over time increased delays on the system with the existing configuration. The intersections as a whole function within the generally acceptable range, but the movements begin having delays increase above the generally acceptable level.

The added traffic due to growth over time increased delays on the system with the optional 3-lane configuration. The intersections as a whole function within the generally acceptable range, but the movements have delays increase above the generally acceptable level.

The PM Peak hour shows the longest delays for all models, with delays nearing the acceptable limit for certain movements in all models.

VII. Multimodal Review

University Avenue is currently utilized by Des Moines Area Regional Transit and planned to remain part of the transit system in the DART Forward 2035 planning document.

There currently are not bike accommodations within the University Avenue Corridor being studied. The Colby Woods Trail crosses the corridor at the west end at the signalized intersection of 73rd Street. If the project is done in conjunction with the city of Des Moines it could add connections between the trail system at the west and other on-street accommodations to the east.

Pedestrian facilities are currently provided along the length of the corridor.

VIII. Conclusions & Recommendations

The purpose of this traffic impact study is to identify potential transportation issues created as a result of changes to the roadway system and surrounding area and recommend solutions to mitigate the potential issues to provide a safer transportation facility for vehicular, pedestrian and bicycle traffic.

A. Safety

There have been 102 crashes on the study corridor between 2012 and 2016. The crash rates and severity of crashes are below the statewide average and do not indicate any significant safety concerns. The conversion from 4-lane to 3-lane could produce a reduction in crash rate based on the existing literature.

B. Proposed Site Improvements

The traffic study indicates traffic capacity is sufficient for either scenario with intersections operating within the acceptable level of service. Turning movements show increases in delays for the 4-lane to 3-lane conversions. The delays for the future phases show some LOS below the normally acceptable range for both scenarios. The 3-lane roadway has lower LOS values, but would still function appropriately.

C. Pedestrian / Bicyclist / Transit accommodations

Pedestrian facilities and transit are already included in the existing layout. Bicycle traffic is not included in the existing roadway, but would be included in the 4-lane to 3-lane conversion scenario.

Appendix A: Existing Conditions



Appendix B: Peak Hour Count Information



PROFESSIONAL SERVICES

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More Ideas, Better Solutions

Count Name: 63rd Street & University Avenue
Site Code:
Start Date: 04/12/2016
Page No: 1

Turning Movement Data

Start Time	63rd Street Southbound						University Avenue Westbound						63rd Street Northbound						University Avenue Eastbound						Int. Total
	Right	Thru	Left	U-Turn	Peds	App. Total	Right	Thru	Left	U-Turn	Peds	App. Total	Right	Thru	Left	U-Turn	Peds	App. Total	Right	Thru	Left	U-Turn	Peds	App. Total	
6:00 AM	0	78	4	0	0	82	2	11	17	0	0	30	14	22	3	0	0	39	11	11	0	0	0	22	173
6:15 AM	5	119	3	0	1	127	3	18	32	0	0	53	19	40	8	0	0	67	16	12	5	0	0	33	280
6:30 AM	5	165	2	0	0	172	0	36	48	0	0	84	14	57	9	0	0	80	21	15	3	0	0	39	375
6:45 AM	8	135	3	0	1	146	4	44	52	0	0	100	13	68	15	0	0	96	21	25	3	0	0	49	391
Hourly Total	18	497	12	0	2	527	9	109	149	0	0	267	60	187	35	0	0	282	69	63	11	0	0	143	1219
7:00 AM	5	157	20	0	0	182	10	50	52	0	0	112	31	73	15	1	0	120	23	40	6	0	1	69	483
7:15 AM	5	212	28	0	0	245	9	62	77	0	0	148	36	111	20	0	1	167	30	63	8	0	0	101	661
7:30 AM	7	233	21	0	0	261	12	78	108	0	0	198	28	96	28	0	0	152	40	61	4	0	0	105	716
7:45 AM	11	198	16	0	0	225	13	84	102	0	0	199	35	80	30	0	0	145	37	87	11	0	0	135	704
Hourly Total	28	800	85	0	0	913	44	274	339	0	0	657	130	360	93	1	1	584	130	251	29	0	1	410	2564
8:00 AM	5	171	10	0	1	186	12	86	76	0	0	174	46	90	31	0	0	167	32	80	5	0	0	117	644
8:15 AM	10	168	23	0	4	201	24	71	73	0	0	168	37	123	28	0	0	188	25	63	4	0	0	92	649
8:30 AM	8	151	14	0	1	173	3	63	62	0	0	128	30	76	24	0	2	130	27	57	8	0	1	92	523
8:45 AM	10	133	8	0	0	151	5	50	59	0	0	114	36	83	29	0	0	148	14	43	2	0	0	59	472
Hourly Total	33	623	55	0	6	711	44	270	270	0	0	584	149	372	112	0	2	633	98	243	19	0	1	360	2288
*** BREAK ***	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
3:00 PM	9	124	14	0	2	147	18	96	44	0	0	158	64	129	41	0	3	234	32	85	12	0	0	129	668
3:15 PM	17	128	23	0	5	168	17	104	64	0	2	185	49	146	32	0	1	227	38	97	17	0	0	152	732
3:30 PM	16	115	9	0	10	140	19	116	61	0	2	196	55	152	41	0	5	248	27	106	16	0	7	149	733
3:45 PM	16	117	6	0	0	139	15	74	53	0	0	142	69	162	53	0	0	284	41	95	19	0	0	155	720
Hourly Total	58	484	52	0	17	594	69	390	222	0	4	681	237	589	167	0	9	993	138	383	64	0	7	585	2853
4:00 PM	11	128	6	0	1	145	16	88	60	0	0	164	80	172	38	0	1	290	31	102	26	0	0	159	758
4:15 PM	15	132	5	0	0	152	37	194	43	0	0	274	64	155	45	0	0	264	36	105	17	0	0	158	848
4:30 PM	15	133	12	0	1	160	44	198	49	0	1	291	66	137	26	0	0	229	36	113	27	0	0	176	856
4:45 PM	8	157	14	0	3	179	41	234	79	0	0	354	76	178	30	1	0	285	31	108	22	0	0	161	979
Hourly Total	49	550	37	0	5	636	138	714	231	0	1	1083	286	642	139	1	1	1068	134	428	92	0	0	654	3441
5:00 PM	13	164	11	0	2	188	38	200	73	0	2	311	91	175	43	0	3	309	33	103	26	0	2	162	970
5:15 PM	17	140	12	0	2	169	29	202	67	0	0	298	90	194	59	0	3	343	50	128	25	0	0	203	1013
5:30 PM	14	136	5	0	3	155	25	154	65	0	1	244	78	202	52	1	3	333	38	126	16	0	0	180	912
5:45 PM	16	132	10	0	0	158	16	72	47	0	0	135	50	153	49	0	0	252	37	102	13	0	1	152	697
Hourly Total	60	572	38	0	7	670	108	628	252	0	3	988	309	724	203	1	9	1237	158	459	80	0	3	697	3592
Grand Total	246	3526	279	0	37	4051	412	2385	1463	0	8	4260	1171	2874	749	3	22	4797	727	1827	295	0	12	2849	15957
Approach %	6.1	87.0	6.9	0.0	-	-	9.7	56.0	34.3	0.0	-	-	24.4	59.9	15.6	0.1	-	-	25.5	64.1	10.4	0.0	-	-	-
Total %	1.5	22.1	1.7	0.0	-	25.4	2.6	14.9	9.2	0.0	-	26.7	7.3	18.0	4.7	0.0	-	30.1	4.6	11.4	1.8	0.0	-	17.9	-
Lights	243	3477	275	0	-	3995	406	2352	1447	0	-	4205	1155	2823	732	3	-	4713	719	1791	293	0	-	2803	15716
% Lights	98.8	98.6	98.6	-	-	98.6	98.5	98.6	98.9	-	-	98.7	98.6	98.2	97.7	100.0	-	98.2	98.9	98.0	99.3	-	-	98.4	98.5

Buses	1	24	3	0	-	28	4	21	9	0	-	34	6	25	3	0	-	34	2	21	1	0	-	24	120
% Buses	0.4	0.7	1.1	-	-	0.7	1.0	0.9	0.6	-	-	0.8	0.5	0.9	0.4	0.0	-	0.7	0.3	1.1	0.3	-	-	0.8	0.8
Trucks	2	25	1	0	-	28	2	11	7	0	-	20	10	26	14	0	-	50	6	13	1	0	-	20	118
% Trucks	0.8	0.7	0.4	-	-	0.7	0.5	0.5	0.5	-	-	0.5	0.9	0.9	1.9	0.0	-	1.0	0.8	0.7	0.3	-	-	0.7	0.7
Bicycles on Road	0	0	0	0	-	0	0	1	0	0	-	1	0	0	0	0	-	0	0	2	0	0	-	2	3
% Bicycles on Road	0.0	0.0	0.0	-	-	0.0	0.0	0.0	0.0	-	-	0.0	0.0	0.0	0.0	0.0	-	0.0	0.0	0.1	0.0	-	-	0.1	0.0
Bicycles on Crosswalk	-	-	-	-	6	-	-	-	-	-	2	-	-	-	-	-	0	-	-	-	-	-	0	-	-
% Bicycles on Crosswalk	-	-	-	-	16.2	-	-	-	-	-	25.0	-	-	-	-	-	0.0	-	-	-	-	-	0.0	-	-
Pedestrians	-	-	-	-	31	-	-	-	-	-	6	-	-	-	-	-	22	-	-	-	-	-	12	-	-
% Pedestrians	-	-	-	-	83.8	-	-	-	-	-	75.0	-	-	-	-	-	100.0	-	-	-	-	-	100.0	-	-



Count Name: 63rd Street & University Avenue
Site Code:
Start Date: 04/12/2016
Page No: 3





PROFESSIONAL SERVICES

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More Ideas, Better Solutions

Count Name: 63rd Street & University Avenue
Site Code:
Start Date: 04/12/2016
Page No: 4

Turning Movement Peak Hour Data (7:15 AM)

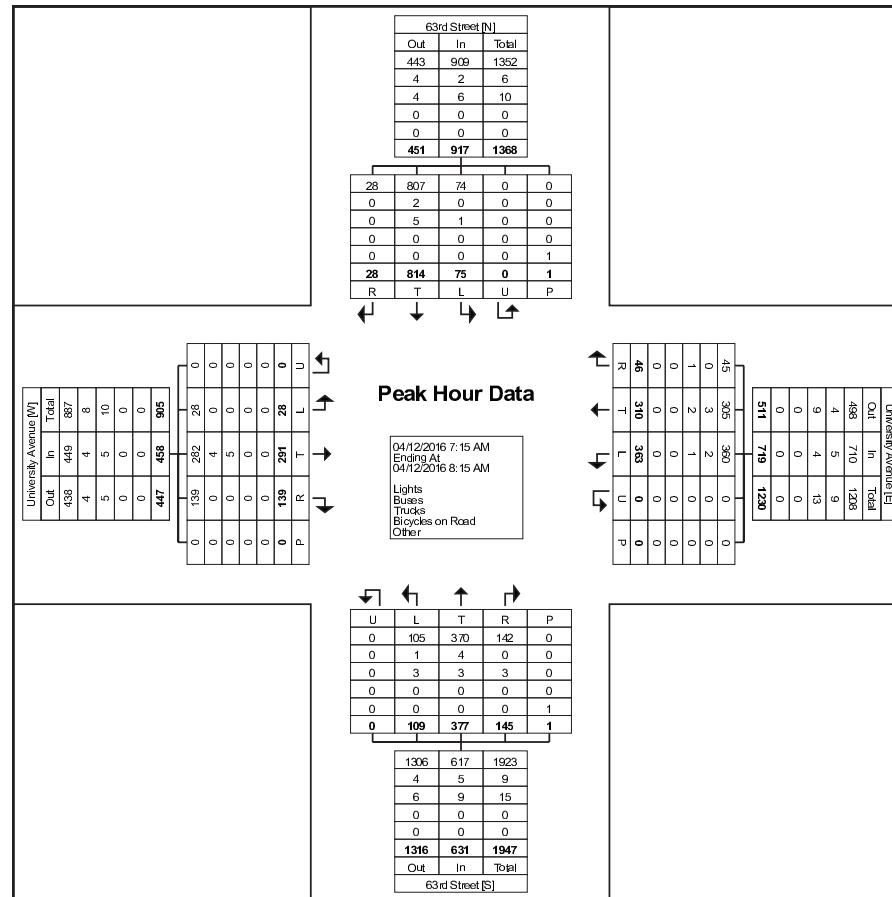
Start Time	63rd Street Southbound						University Avenue Westbound						63rd Street Northbound						University Avenue Eastbound						Int. Total
	Right	Thru	Left	U-Turn	Peds	App. Total	Right	Thru	Left	U-Turn	Peds	App. Total	Right	Thru	Left	U-Turn	Peds	App. Total	Right	Thru	Left	U-Turn	Peds	App. Total	
7:15 AM	5	212	28	0	0	245	9	62	77	0	0	148	36	111	20	0	1	167	30	63	8	0	0	101	661
7:30 AM	7	233	21	0	0	261	12	78	108	0	0	198	28	96	28	0	0	152	40	61	4	0	0	105	716
7:45 AM	11	198	16	0	0	225	13	84	102	0	0	199	35	80	30	0	0	145	37	87	11	0	0	135	704
8:00 AM	5	171	10	0	1	186	12	86	76	0	0	174	46	90	31	0	0	167	32	80	5	0	0	117	644
Total	28	814	75	0	1	917	46	310	363	0	0	719	145	377	109	0	1	631	139	291	28	0	0	458	2725
Approach %	3.1	88.8	8.2	0.0	-	-	6.4	43.1	50.5	0.0	-	-	23.0	59.7	17.3	0.0	-	-	30.3	63.5	6.1	0.0	-	-	-
Total %	1.0	29.9	2.8	0.0	-	33.7	1.7	11.4	13.3	0.0	-	26.4	5.3	13.8	4.0	0.0	-	23.2	5.1	10.7	1.0	0.0	-	16.8	-
PHF	0.636	0.873	0.670	0.000	-	0.878	0.885	0.901	0.840	0.000	-	0.903	0.788	0.849	0.879	0.000	-	0.945	0.869	0.836	0.636	0.000	-	0.848	0.951
Lights	28	807	74	0	-	909	45	305	360	0	-	710	142	370	105	0	-	617	139	282	28	0	-	449	2685
% Lights	100.0	99.1	98.7	-	-	99.1	97.8	98.4	99.2	-	-	98.7	97.9	98.1	96.3	-	-	97.8	100.0	96.9	100.0	-	-	98.0	98.5
Buses	0	2	0	0	-	2	0	3	2	0	-	5	0	4	1	0	-	5	0	4	0	0	-	4	16
% Buses	0.0	0.2	0.0	-	-	0.2	0.0	1.0	0.6	-	-	0.7	0.0	1.1	0.9	-	-	0.8	0.0	1.4	0.0	-	-	0.9	0.6
Trucks	0	5	1	0	-	6	1	2	1	0	-	4	3	3	3	0	-	9	0	5	0	0	-	5	24
% Trucks	0.0	0.6	1.3	-	-	0.7	2.2	0.6	0.3	-	-	0.6	2.1	0.8	2.8	-	-	1.4	0.0	1.7	0.0	-	-	1.1	0.9
Bicycles on Road	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	0
% Bicycles on Road	0.0	0.0	0.0	-	-	0.0	0.0	0.0	0.0	-	-	0.0	0.0	0.0	0.0	-	-	0.0	0.0	0.0	0.0	-	-	0.0	0.0
Bicycles on Crosswalk	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-
% Bicycles on Crosswalk	-	-	-	-	0.0	-	-	-	-	-	-	-	-	-	-	-	0.0	-	-	-	-	-	-	-	-
Pedestrians	-	-	-	-	1	-	-	-	-	-	0	-	-	-	-	-	1	-	-	-	-	-	0	-	-
% Pedestrians	-	-	-	-	100.0	-	-	-	-	-	-	-	-	-	-	-	100.0	-	-	-	-	-	-	-	-



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Turning Movement Peak Hour Data Plot (7:15 AM)



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Turning Movement Peak Hour Data (4:45 PM)

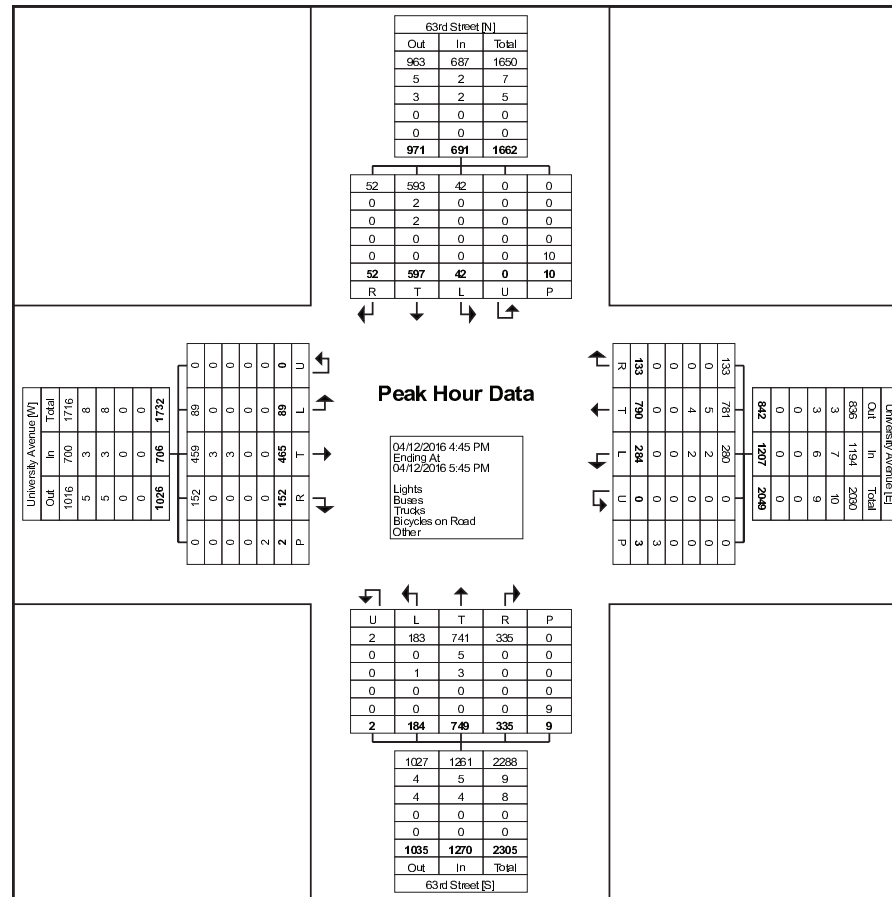
Start Time	63rd Street Southbound						University Avenue Westbound						63rd Street Northbound						University Avenue Eastbound						Int. Total	
	Right	Thru	Left	U-Turn	Peds	App. Total	Right	Thru	Left	U-Turn	Peds	App. Total	Right	Thru	Left	U-Turn	Peds	App. Total	Right	Thru	Left	U-Turn	Peds	App. Total		
4:45 PM	8	157	14	0	3	179	41	234	79	0	0	354	76	178	30	1	0	285	31	108	22	0	0	161	979	
5:00 PM	13	164	11	0	2	188	38	200	73	0	2	311	91	175	43	0	3	309	33	103	26	0	2	162	970	
5:15 PM	17	140	12	0	2	169	29	202	67	0	0	298	90	194	59	0	3	343	50	128	25	0	0	203	1013	
5:30 PM	14	136	5	0	3	155	25	154	65	0	1	244	78	202	52	1	3	333	38	126	16	0	0	180	912	
Total	52	597	42	0	10	691	133	790	284	0	3	1207	335	749	184	2	9	1270	152	465	89	0	2	706	3874	
Approach %	7.5	86.4	6.1	0.0	-	-	11.0	65.5	23.5	0.0	-	-	26.4	59.0	14.5	0.2	-	-	21.5	65.9	12.6	0.0	-	-	-	-
Total %	1.3	15.4	1.1	0.0	-	17.8	3.4	20.4	7.3	0.0	-	31.2	8.6	19.3	4.7	0.1	-	32.8	3.9	12.0	2.3	0.0	-	-	18.2	-
PHF	0.765	0.910	0.750	0.000	-	0.919	0.811	0.844	0.899	0.000	-	0.852	0.920	0.927	0.780	0.500	-	0.926	0.760	0.908	0.856	0.000	-	0.869	0.956	
Lights	52	593	42	0	-	687	133	781	280	0	-	1194	335	741	183	2	-	1261	152	459	89	0	-	700	3842	
% Lights	100.0	99.3	100.0	-	-	99.4	100.0	98.9	98.6	-	-	98.9	100.0	98.9	99.5	100.0	-	99.3	100.0	98.7	100.0	-	-	99.2	99.2	
Buses	0	2	0	0	-	2	0	5	2	0	-	7	0	5	0	0	-	5	0	3	0	0	-	3	17	
% Buses	0.0	0.3	0.0	-	-	0.3	0.0	0.6	0.7	-	-	0.6	0.0	0.7	0.0	0.0	-	0.4	0.0	0.6	0.0	-	-	0.4	0.4	
Trucks	0	2	0	0	-	2	0	4	2	0	-	6	0	3	1	0	-	4	0	3	0	0	-	3	15	
% Trucks	0.0	0.3	0.0	-	-	0.3	0.0	0.5	0.7	-	-	0.5	0.0	0.4	0.5	0.0	-	0.3	0.0	0.6	0.0	-	-	0.4	0.4	
Bicycles on Road	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	0	
% Bicycles on Road	0.0	0.0	0.0	-	-	0.0	0.0	0.0	0.0	-	-	0.0	0.0	0.0	0.0	0.0	-	0.0	0.0	0.0	0.0	-	-	0.0	0.0	
Bicycles on Crosswalk	-	-	-	-	4	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-	
% Bicycles on Crosswalk	-	-	-	-	40.0	-	-	-	-	-	0.0	-	-	-	-	-	0.0	-	-	-	-	-	0.0	-	-	
Pedestrians	-	-	-	-	6	-	-	-	-	-	3	-	-	-	-	-	9	-	-	-	-	-	2	-	-	
% Pedestrians	-	-	-	-	60.0	-	-	-	-	-	100.0	-	-	-	-	-	100.0	-	-	-	-	-	100.0	-	-	



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Turning Movement Peak Hour Data Plot (4:45 PM)



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Turning Movement Data

Start Time	HyVee Southbound						University Avenue Westbound						Driveway Northbound						University Avenue Eastbound						Int. Total
	Right	Thru	Left	U-Turn	Peds	App. Total	Right	Thru	Left	U-Turn	Peds	App. Total	Right	Thru	Left	U-Turn	Peds	App. Total	Right	Thru	Left	U-Turn	Peds	App. Total	
6:00 AM	7	0	0	0	3	7	0	16	0	0	0	16	0	0	0	0	0	0	0	17	2	0	0	19	42
6:15 AM	3	0	0	0	1	3	3	38	0	0	0	41	0	0	0	0	1	0	1	14	3	0	0	18	62
6:30 AM	2	0	0	0	3	2	0	63	0	0	0	63	0	0	0	0	0	0	0	18	5	0	0	23	88
6:45 AM	6	0	0	0	0	6	3	79	0	0	0	82	0	0	0	0	0	0	0	27	6	0	0	33	121
Hourly Total	18	0	0	0	7	18	6	196	0	0	0	202	0	0	0	0	1	0	1	76	16	0	0	93	313
7:00 AM	8	0	0	0	5	8	1	73	0	0	0	74	0	0	0	0	0	0	0	41	5	0	0	46	128
7:15 AM	9	0	0	0	0	9	1	129	0	0	0	130	0	0	0	0	0	0	0	65	8	0	1	73	212
7:30 AM	5	0	1	0	0	6	2	122	1	0	0	125	0	0	0	0	0	0	0	75	8	0	0	83	214
7:45 AM	10	0	2	0	0	12	4	170	0	0	0	174	0	0	0	0	0	0	0	110	8	0	0	118	304
Hourly Total	32	0	3	0	5	35	8	494	1	0	0	503	0	0	0	0	0	0	0	291	29	0	1	320	858
8:00 AM	10	0	1	0	1	11	4	126	0	0	0	130	0	0	0	0	0	0	0	92	9	0	0	101	242
8:15 AM	8	0	0	0	0	8	1	120	1	0	0	122	0	0	0	0	0	0	0	67	15	0	0	82	212
8:30 AM	6	0	1	0	2	7	7	86	0	0	0	93	0	0	0	0	0	0	0	58	9	0	0	67	167
8:45 AM	10	0	0	0	0	10	5	89	0	0	0	94	0	0	0	0	0	0	0	66	9	0	0	75	179
Hourly Total	34	0	2	0	3	36	17	421	1	0	0	439	0	0	0	0	0	0	0	283	42	0	0	325	800
*** BREAK ***	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
3:00 PM	9	0	3	0	0	12	6	103	0	0	0	109	1	0	3	0	0	4	0	135	22	0	2	157	282
3:15 PM	15	0	5	0	0	20	7	130	2	0	0	139	3	0	0	0	0	3	0	132	26	0	3	158	320
3:30 PM	13	0	1	0	4	14	8	136	2	0	0	146	0	0	0	0	0	0	1	123	34	0	1	158	318
3:45 PM	25	0	8	0	0	33	8	111	5	0	0	124	3	0	1	0	0	4	0	133	36	0	3	169	330
Hourly Total	62	0	17	0	4	79	29	480	9	0	0	518	7	0	4	0	0	11	1	523	118	0	9	642	1250
4:00 PM	15	1	3	0	0	19	8	118	1	0	0	127	7	0	0	0	0	7	2	176	32	0	3	210	363
4:15 PM	14	1	4	0	3	19	12	164	5	0	0	181	2	0	0	0	0	2	1	153	29	0	1	183	385
4:30 PM	13	0	3	0	0	16	7	192	5	0	0	204	3	1	0	0	2	4	1	159	33	0	2	193	417
4:45 PM	22	0	2	0	0	24	11	207	1	0	0	219	1	1	3	0	1	5	2	156	33	0	0	191	439
Hourly Total	64	2	12	0	3	78	38	681	12	0	0	731	13	2	3	0	3	18	6	644	127	0	6	777	1604
5:00 PM	22	0	5	0	0	27	7	213	8	0	0	228	0	0	2	0	0	2	0	176	37	0	0	213	470
5:15 PM	23	0	4	0	0	27	17	213	9	0	0	239	6	0	2	0	0	8	7	147	34	0	1	188	462
5:30 PM	22	0	5	0	2	27	12	175	8	0	0	195	2	0	2	0	0	4	2	132	30	0	0	164	390
5:45 PM	16	0	4	0	0	20	7	99	4	0	0	110	2	0	2	0	0	4	3	115	25	0	1	143	277
Hourly Total	83	0	18	0	2	101	43	700	29	0	0	772	10	0	8	0	0	18	12	570	126	0	2	708	1599
Grand Total	293	2	52	0	24	347	141	2972	52	0	0	3165	30	2	15	0	4	47	20	2387	458	0	18	2865	6424
Approach %	84.4	0.6	15.0	0.0	-	-	4.5	93.9	1.6	0.0	-	-	63.8	4.3	31.9	0.0	-	-	0.7	83.3	16.0	0.0	-	-	-
Total %	4.6	0.0	0.8	0.0	-	5.4	2.2	46.3	0.8	0.0	-	49.3	0.5	0.0	0.2	0.0	-	0.7	0.3	37.2	7.1	0.0	-	44.6	-
Lights	291	2	52	0	-	345	141	2910	51	0	-	3102	30	2	15	0	-	47	20	2341	457	0	-	2818	6312
% Lights	99.3	100.0	100.0	-	-	99.4	100.0	97.9	98.1	-	-	98.0	100.0	100.0	100.0	-	-	100.0	100.0	98.1	99.8	-	-	98.4	98.3

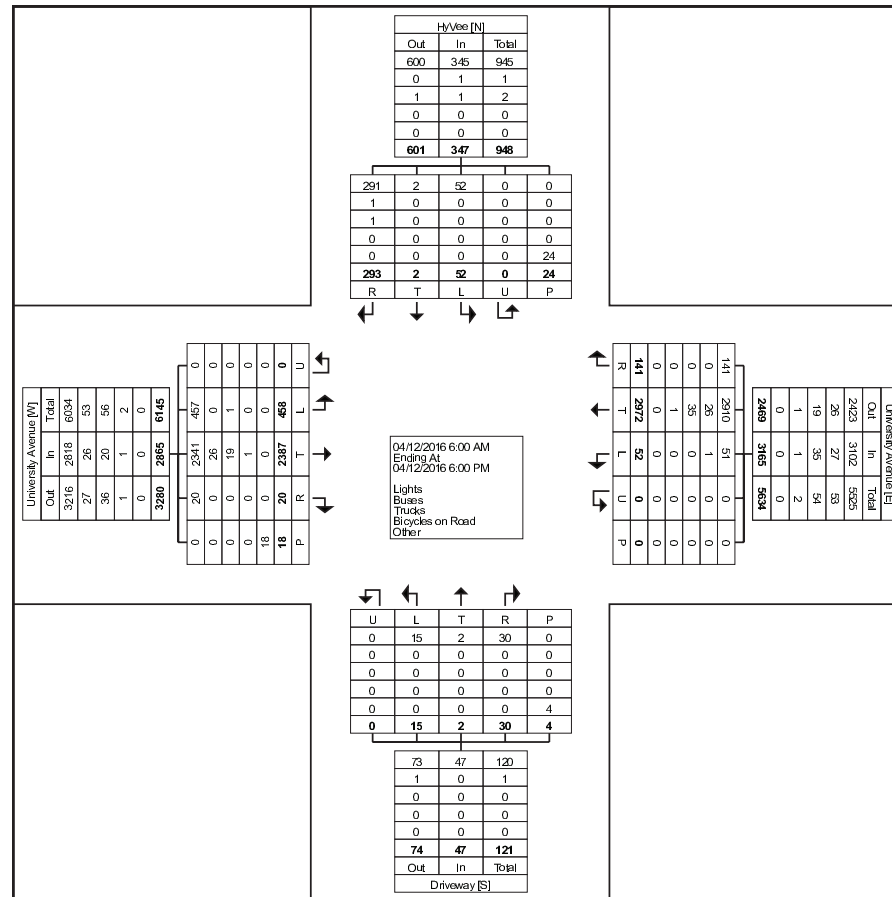
Buses	1	0	0	0	-	1	0	26	1	0	-	27	0	0	0	0	-	0	0	26	0	0	-	26	54
% Buses	0.3	0.0	0.0	-	-	0.3	0.0	0.9	1.9	-	-	0.9	0.0	0.0	0.0	-	-	0.0	0.0	1.1	0.0	-	-	0.9	0.8
Trucks	1	0	0	0	-	1	0	35	0	0	-	35	0	0	0	0	-	0	0	19	1	0	-	20	56
% Trucks	0.3	0.0	0.0	-	-	0.3	0.0	1.2	0.0	-	-	1.1	0.0	0.0	0.0	-	-	0.0	0.0	0.8	0.2	-	-	0.7	0.9
Bicycles on Road	0	0	0	0	-	0	0	1	0	0	-	1	0	0	0	0	-	0	0	1	0	0	-	1	2
% Bicycles on Road	0.0	0.0	0.0	-	-	0.0	0.0	0.0	0.0	-	-	0.0	0.0	0.0	0.0	-	-	0.0	0.0	0.0	0.0	-	-	0.0	0.0
Bicycles on Crosswalk	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-
% Bicycles on Crosswalk	-	-	-	-	0.0	-	-	-	-	-	-	-	-	-	-	-	0.0	-	-	-	-	-	0.0	-	-
Pedestrians	-	-	-	-	24	-	-	-	-	-	0	-	-	-	-	-	4	-	-	-	-	-	18	-	-
% Pedestrians	-	-	-	-	100.0	-	-	-	-	-	-	-	-	-	-	-	100.0	-	-	-	-	-	100.0	-	-



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Turning Movement Data Plot



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Turning Movement Peak Hour Data (7:15 AM)

Start Time	HyVee Southbound						University Avenue Westbound						Driveway Northbound						University Avenue Eastbound						Int. Total
	Right	Thru	Left	U-Turn	Peds	App. Total	Right	Thru	Left	U-Turn	Peds	App. Total	Right	Thru	Left	U-Turn	Peds	App. Total	Right	Thru	Left	U-Turn	Peds	App. Total	
7:15 AM	9	0	0	0	0	9	1	129	0	0	0	130	0	0	0	0	0	0	0	65	8	0	1	73	212
7:30 AM	5	0	1	0	0	6	2	122	1	0	0	125	0	0	0	0	0	0	0	75	8	0	0	83	214
7:45 AM	10	0	2	0	0	12	4	170	0	0	0	174	0	0	0	0	0	0	0	110	8	0	0	118	304
8:00 AM	10	0	1	0	1	11	4	126	0	0	0	130	0	0	0	0	0	0	0	92	9	0	0	101	242
Total	34	0	4	0	1	38	11	547	1	0	0	559	0	0	0	0	0	0	0	342	33	0	1	375	972
Approach %	89.5	0.0	10.5	0.0	-	-	2.0	97.9	0.2	0.0	-	-	NaN	NaN	NaN	NaN	-	-	0.0	91.2	8.8	0.0	-	-	-
Total %	3.5	0.0	0.4	0.0	-	3.9	1.1	56.3	0.1	0.0	-	57.5	0.0	0.0	0.0	0.0	-	0.0	0.0	35.2	3.4	0.0	-	38.6	-
PHF	0.850	0.000	0.500	0.000	-	0.792	0.688	0.804	0.250	0.000	-	0.803	0.000	0.000	0.000	0.000	-	0.000	0.000	0.777	0.917	0.000	-	0.794	0.799
Lights	34	0	4	0	-	38	11	535	1	0	-	547	0	0	0	0	-	0	0	330	33	0	-	363	948
% Lights	100.0	-	100.0	-	-	100.0	100.0	97.8	100.0	-	-	97.9	-	-	-	-	-	-	-	96.5	100.0	-	-	96.8	97.5
Buses	0	0	0	0	-	0	0	7	0	0	-	7	0	0	0	0	-	0	0	3	0	0	-	3	10
% Buses	0.0	-	0.0	-	-	0.0	0.0	1.3	0.0	-	-	1.3	-	-	-	-	-	-	-	0.9	0.0	-	-	0.8	1.0
Trucks	0	0	0	0	-	0	0	5	0	0	-	5	0	0	0	0	-	0	0	9	0	0	-	9	14
% Trucks	0.0	-	0.0	-	-	0.0	0.0	0.9	0.0	-	-	0.9	-	-	-	-	-	-	-	2.6	0.0	-	-	2.4	1.4
Bicycles on Road	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	0
% Bicycles on Road	0.0	-	0.0	-	-	0.0	0.0	0.0	0.0	-	-	0.0	-	-	-	-	-	-	-	0.0	0.0	-	-	0.0	0.0
Bicycles on Crosswalk	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-
% Bicycles on Crosswalk	-	-	-	-	0.0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.0	-	-
Pedestrians	-	-	-	-	1	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	1	-	-
% Pedestrians	-	-	-	-	100.0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	100.0	-	-



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Turning Movement Peak Hour Data (4:30 PM)

Start Time	HyVee Southbound						University Avenue Westbound						Driveway Northbound						University Avenue Eastbound						Int. Total
	Right	Thru	Left	U-Turn	Peds	App. Total	Right	Thru	Left	U-Turn	Peds	App. Total	Right	Thru	Left	U-Turn	Peds	App. Total	Right	Thru	Left	U-Turn	Peds	App. Total	
4:30 PM	13	0	3	0	0	16	7	192	5	0	0	204	3	1	0	0	2	4	1	159	33	0	2	193	417
4:45 PM	22	0	2	0	0	24	11	207	1	0	0	219	1	1	3	0	1	5	2	156	33	0	0	191	439
5:00 PM	22	0	5	0	0	27	7	213	8	0	0	228	0	0	2	0	0	2	0	176	37	0	0	213	470
5:15 PM	23	0	4	0	0	27	17	213	9	0	0	239	6	0	2	0	0	8	7	147	34	0	1	188	462
Total	80	0	14	0	0	94	42	825	23	0	0	890	10	2	7	0	3	19	10	638	137	0	3	785	1788
Approach %	85.1	0.0	14.9	0.0	-	-	4.7	92.7	2.6	0.0	-	-	52.6	10.5	36.8	0.0	-	-	1.3	81.3	17.5	0.0	-	-	-
Total %	4.5	0.0	0.8	0.0	-	5.3	2.3	46.1	1.3	0.0	-	49.8	0.6	0.1	0.4	0.0	-	1.1	0.6	35.7	7.7	0.0	-	43.9	-
PHF	0.870	0.000	0.700	0.000	-	0.870	0.618	0.968	0.639	0.000	-	0.931	0.417	0.500	0.583	0.000	-	0.594	0.357	0.906	0.926	0.000	-	0.921	0.951
Lights	79	0	14	0	-	93	42	816	22	0	-	880	10	2	7	0	-	19	10	629	137	0	-	776	1768
% Lights	98.8	-	100.0	-	-	98.9	100.0	98.9	95.7	-	-	98.9	100.0	100.0	100.0	-	-	100.0	100.0	98.6	100.0	-	-	98.9	98.9
Buses	0	0	0	0	-	0	0	2	1	0	-	3	0	0	0	0	-	0	0	6	0	0	-	6	9
% Buses	0.0	-	0.0	-	-	0.0	0.0	0.2	4.3	-	-	0.3	0.0	0.0	0.0	-	-	0.0	0.0	0.9	0.0	-	-	0.8	0.5
Trucks	1	0	0	0	-	1	0	7	0	0	-	7	0	0	0	0	-	0	0	3	0	0	-	3	11
% Trucks	1.3	-	0.0	-	-	1.1	0.0	0.8	0.0	-	-	0.8	0.0	0.0	0.0	-	-	0.0	0.0	0.5	0.0	-	-	0.4	0.6
Bicycles on Road	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	0
% Bicycles on Road	0.0	-	0.0	-	-	0.0	0.0	0.0	0.0	-	-	0.0	0.0	0.0	0.0	-	-	0.0	0.0	0.0	0.0	-	-	0.0	0.0
Bicycles on Crosswalk	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-
% Bicycles on Crosswalk	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.0	-	-	-	-	-	0.0	-	-
Pedestrians	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	3	-	-	-	-	-	3	-	-
% Pedestrians	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	100.0	-	-	-	-	-	100.0	-	-



Count Name: HyVee & University Avenue
Site Code:
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Count Name: 66th Street & University Avenue
Site Code:
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Turning Movement Data

Start Time	66th Street Southbound						University Avenue Westbound						66th Street Northbound						University Avenue Eastbound						Int. Total
	Right	Thru	Left	U-Turn	Peds	App. Total	Right	Thru	Left	U-Turn	Peds	App. Total	Right	Thru	Left	U-Turn	Peds	App. Total	Right	Thru	Left	U-Turn	Peds	App. Total	
6:00 AM	1	0	1	0	0	2	2	12	0	0	0	14	3	0	0	0	0	3	0	16	1	0	0	17	36
6:15 AM	1	0	3	0	0	4	0	32	0	0	1	32	3	0	2	0	1	5	1	26	0	0	0	27	68
6:30 AM	2	0	5	0	2	7	0	48	1	0	0	49	1	0	2	0	0	3	0	32	1	0	0	33	92
6:45 AM	4	0	4	0	0	8	4	64	3	0	1	71	3	1	1	0	0	5	2	37	1	0	2	40	124
Hourly Total	8	0	13	0	2	21	6	156	4	0	2	166	10	1	5	0	1	16	3	111	3	0	2	117	320
7:00 AM	3	0	10	0	0	13	4	55	1	0	0	60	0	1	2	0	0	3	0	50	3	0	0	53	129
7:15 AM	3	1	12	0	0	16	5	89	2	0	0	96	2	0	2	0	0	4	4	73	3	0	0	80	196
7:30 AM	4	0	10	0	0	14	6	101	2	0	0	109	2	1	3	0	0	6	4	92	3	0	0	99	228
7:45 AM	5	0	8	0	0	13	8	121	6	0	0	135	8	1	4	0	0	13	8	109	3	0	0	120	281
Hourly Total	15	1	40	0	0	56	23	366	11	0	0	400	12	3	11	0	0	26	16	324	12	0	0	352	834
8:00 AM	5	0	14	0	1	19	9	94	3	0	2	106	3	1	2	0	0	6	3	83	3	0	1	89	220
8:15 AM	1	1	9	0	2	11	5	104	5	0	0	114	3	2	1	0	0	6	7	68	0	0	0	75	206
8:30 AM	7	2	10	0	1	19	7	95	3	0	0	105	5	1	2	0	1	8	3	71	0	0	0	74	206
8:45 AM	0	1	3	0	0	4	5	73	8	0	0	86	1	1	6	0	0	8	8	52	3	0	1	63	161
Hourly Total	13	4	36	0	4	53	26	366	19	0	2	411	12	5	11	0	1	28	21	274	6	0	2	301	793
*** BREAK ***	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
3:00 PM	2	0	13	0	1	15	13	119	3	0	0	135	4	0	9	0	2	13	3	126	3	0	2	132	295
3:15 PM	11	1	15	0	2	27	10	131	3	0	0	144	6	1	8	0	0	15	2	128	4	0	0	134	320
3:30 PM	5	1	6	0	2	12	13	161	2	0	0	176	6	1	6	0	4	13	2	138	4	0	0	144	345
3:45 PM	6	0	10	0	6	16	10	125	1	0	1	136	6	0	5	0	1	11	5	130	8	0	2	143	306
Hourly Total	24	2	44	0	11	70	46	536	9	0	1	591	22	2	28	0	7	52	12	522	19	0	4	553	1266
4:00 PM	0	2	7	0	0	9	15	124	1	0	0	140	4	2	4	0	1	10	7	164	5	0	2	176	335
4:15 PM	0	0	11	0	1	11	14	207	5	0	0	226	3	1	8	0	2	12	6	140	3	0	1	149	398
4:30 PM	4	3	9	0	1	16	9	222	2	0	0	233	8	2	10	0	1	20	3	155	5	0	2	163	432
4:45 PM	2	2	15	0	3	19	14	251	8	0	0	273	4	1	6	0	2	11	7	150	7	0	3	164	467
Hourly Total	6	7	42	0	5	55	52	804	16	0	0	872	19	6	28	0	6	53	23	609	20	0	8	652	1632
5:00 PM	7	2	8	0	2	17	10	222	4	0	1	236	4	3	8	0	0	15	7	166	5	0	0	178	446
5:15 PM	3	7	9	0	4	19	11	262	6	0	2	279	7	0	6	0	3	13	7	183	6	0	2	196	507
5:30 PM	4	0	8	0	0	12	11	209	6	0	3	226	3	1	6	0	0	10	3	174	1	0	0	178	426
5:45 PM	5	0	10	0	0	15	11	130	4	0	0	145	3	0	2	0	0	5	5	143	7	0	0	155	320
Hourly Total	19	9	35	0	6	63	43	823	20	0	6	886	17	4	22	0	3	43	22	666	19	0	2	707	1699
Grand Total	85	23	210	0	28	318	196	3051	79	0	11	3326	92	21	105	0	18	218	97	2506	79	0	18	2682	6544
Approach %	26.7	7.2	66.0	0.0	-	-	5.9	91.7	2.4	0.0	-	-	42.2	9.6	48.2	0.0	-	-	3.6	93.4	2.9	0.0	-	-	-
Total %	1.3	0.4	3.2	0.0	-	4.9	3.0	46.6	1.2	0.0	-	50.8	1.4	0.3	1.6	0.0	-	3.3	1.5	38.3	1.2	0.0	-	41.0	-
Lights	83	22	207	0	-	312	193	3003	79	0	-	3275	92	19	104	0	-	215	96	2461	78	0	-	2635	6437
% Lights	97.6	95.7	98.6	-	-	98.1	98.5	98.4	100.0	-	-	98.5	100.0	90.5	99.0	-	-	98.6	99.0	98.2	98.7	-	-	98.2	98.4

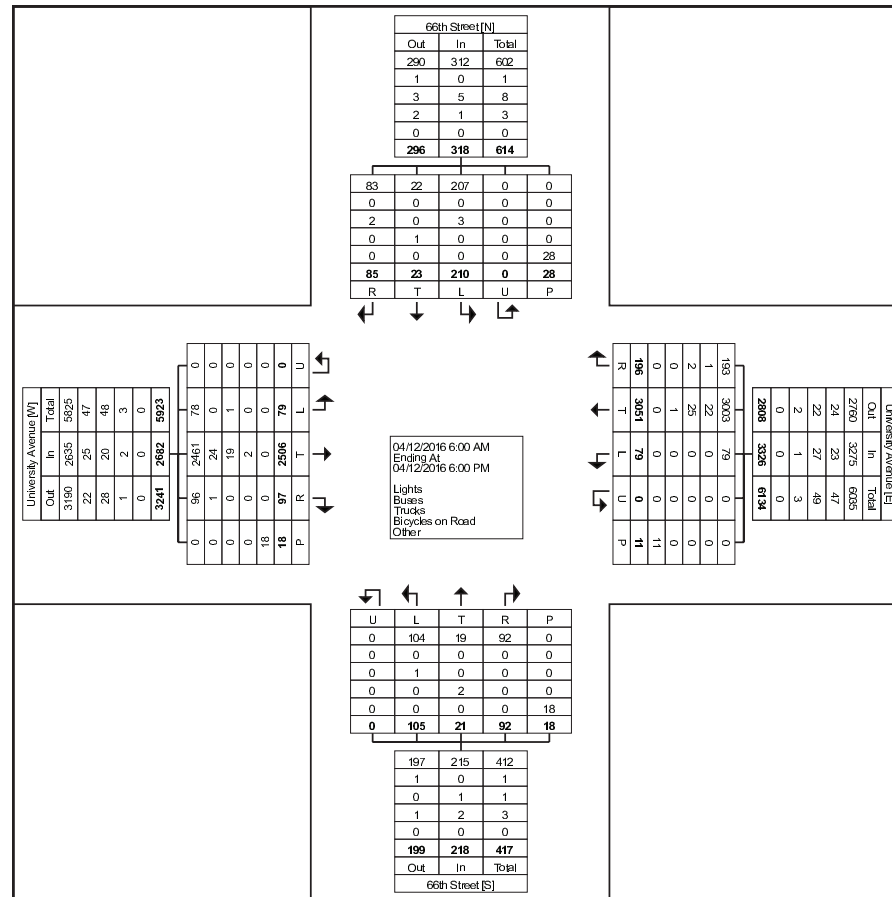
Buses	0	0	0	0	-	0	1	22	0	0	-	23	0	0	0	0	-	0	1	24	0	0	-	25	48
% Buses	0.0	0.0	0.0	-	-	0.0	0.5	0.7	0.0	-	-	0.7	0.0	0.0	0.0	-	-	0.0	1.0	1.0	0.0	-	-	0.9	0.7
Trucks	2	0	3	0	-	5	2	25	0	0	-	27	0	0	1	0	-	1	0	19	1	0	-	20	53
% Trucks	2.4	0.0	1.4	-	-	1.6	1.0	0.8	0.0	-	-	0.8	0.0	0.0	1.0	-	-	0.5	0.0	0.8	1.3	-	-	0.7	0.8
Bicycles on Road	0	1	0	0	-	1	0	1	0	0	-	1	0	2	0	0	-	2	0	2	0	0	-	2	6
% Bicycles on Road	0.0	4.3	0.0	-	-	0.3	0.0	0.0	0.0	-	-	0.0	0.0	9.5	0.0	-	-	0.9	0.0	0.1	0.0	-	-	0.1	0.1
Bicycles on Crosswalk	-	-	-	-	3	-	-	-	-	-	2	-	-	-	-	-	3	-	-	-	-	-	0	-	-
% Bicycles on Crosswalk	-	-	-	-	10.7	-	-	-	-	-	18.2	-	-	-	-	-	16.7	-	-	-	-	-	0.0	-	-
Pedestrians	-	-	-	-	25	-	-	-	-	-	9	-	-	-	-	-	15	-	-	-	-	-	18	-	-
% Pedestrians	-	-	-	-	89.3	-	-	-	-	-	81.8	-	-	-	-	-	83.3	-	-	-	-	-	100.0	-	-



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Turning Movement Peak Hour Data (7:30 AM)

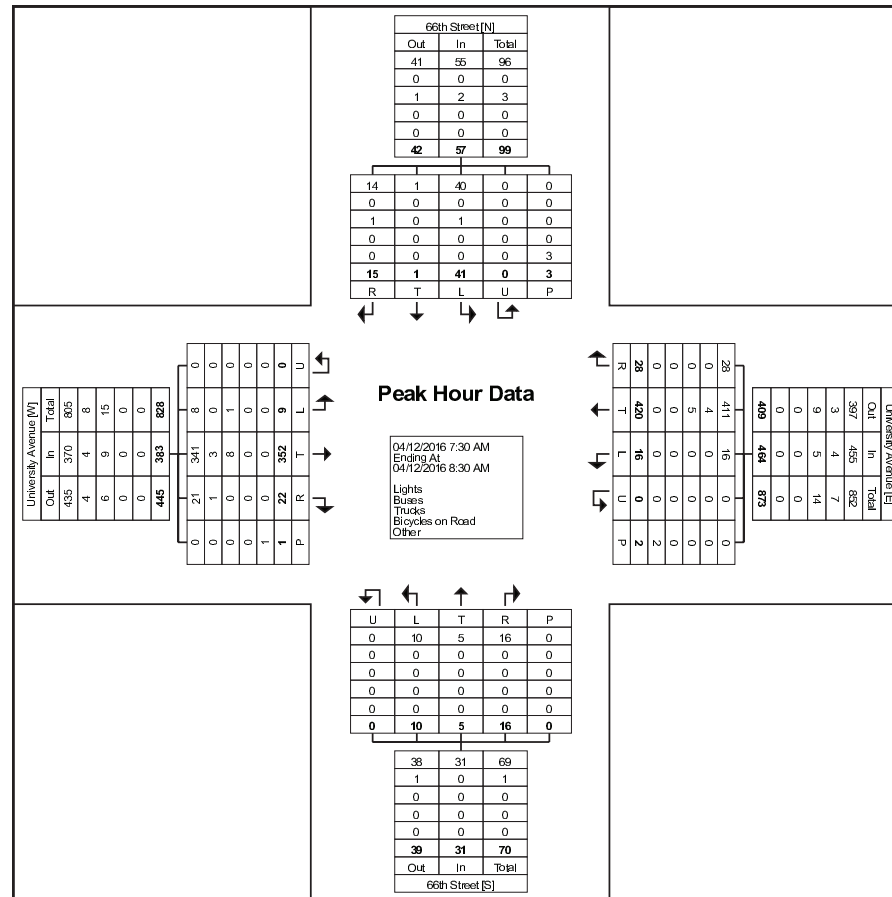
Start Time	66th Street Southbound						University Avenue Westbound						66th Street Northbound						University Avenue Eastbound						Int. Total
	Right	Thru	Left	U-Turn	Peds	App. Total	Right	Thru	Left	U-Turn	Peds	App. Total	Right	Thru	Left	U-Turn	Peds	App. Total	Right	Thru	Left	U-Turn	Peds	App. Total	
7:30 AM	4	0	10	0	0	14	6	101	2	0	0	109	2	1	3	0	0	6	4	92	3	0	0	99	228
7:45 AM	5	0	8	0	0	13	8	121	6	0	0	135	8	1	4	0	0	13	8	109	3	0	0	120	281
8:00 AM	5	0	14	0	1	19	9	94	3	0	2	106	3	1	2	0	0	6	3	83	3	0	1	89	220
8:15 AM	1	1	9	0	2	11	5	104	5	0	0	114	3	2	1	0	0	6	7	68	0	0	0	75	206
Total	15	1	41	0	3	57	28	420	16	0	2	464	16	5	10	0	0	31	22	352	9	0	1	383	935
Approach %	26.3	1.8	71.9	0.0	-	-	6.0	90.5	3.4	0.0	-	-	51.6	16.1	32.3	0.0	-	-	5.7	91.9	2.3	0.0	-	-	-
Total %	1.6	0.1	4.4	0.0	-	6.1	3.0	44.9	1.7	0.0	-	49.6	1.7	0.5	1.1	0.0	-	3.3	2.4	37.6	1.0	0.0	-	41.0	-
PHF	0.750	0.250	0.732	0.000	-	0.750	0.778	0.868	0.667	0.000	-	0.859	0.500	0.625	0.625	0.000	-	0.596	0.688	0.807	0.750	0.000	-	0.798	0.832
Lights	14	1	40	0	-	55	28	411	16	0	-	455	16	5	10	0	-	31	21	341	8	0	-	370	911
% Lights	93.3	100.0	97.6	-	-	96.5	100.0	97.9	100.0	-	-	98.1	100.0	100.0	100.0	-	-	100.0	95.5	96.9	88.9	-	-	96.6	97.4
Buses	0	0	0	0	-	0	0	4	0	0	-	4	0	0	0	0	-	0	1	3	0	0	-	4	8
% Buses	0.0	0.0	0.0	-	-	0.0	0.0	1.0	0.0	-	-	0.9	0.0	0.0	0.0	-	-	0.0	4.5	0.9	0.0	-	-	1.0	0.9
Trucks	1	0	1	0	-	2	0	5	0	0	-	5	0	0	0	0	-	0	0	8	1	0	-	9	16
% Trucks	6.7	0.0	2.4	-	-	3.5	0.0	1.2	0.0	-	-	1.1	0.0	0.0	0.0	-	-	0.0	0.0	2.3	11.1	-	-	2.3	1.7
Bicycles on Road	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	0
% Bicycles on Road	0.0	0.0	0.0	-	-	0.0	0.0	0.0	0.0	-	-	0.0	0.0	0.0	0.0	-	-	0.0	0.0	0.0	0.0	-	-	0.0	0.0
Bicycles on Crosswalk	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-
% Bicycles on Crosswalk	-	-	-	-	0.0	-	-	-	-	-	0.0	-	-	-	-	-	-	-	-	-	-	-	0.0	-	-
Pedestrians	-	-	-	-	3	-	-	-	-	-	2	-	-	-	-	-	0	-	-	-	-	-	1	-	-
% Pedestrians	-	-	-	-	100.0	-	-	-	-	-	100.0	-	-	-	-	-	-	-	-	-	-	-	100.0	-	-



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Site Code:
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Turning Movement Peak Hour Data (4:30 PM)

Start Time	66th Street Southbound						University Avenue Westbound						66th Street Northbound						University Avenue Eastbound						Int. Total
	Right	Thru	Left	U-Turn	Peds	App. Total	Right	Thru	Left	U-Turn	Peds	App. Total	Right	Thru	Left	U-Turn	Peds	App. Total	Right	Thru	Left	U-Turn	Peds	App. Total	
4:30 PM	4	3	9	0	1	16	9	222	2	0	0	233	8	2	10	0	1	20	3	155	5	0	2	163	432
4:45 PM	2	2	15	0	3	19	14	251	8	0	0	273	4	1	6	0	2	11	7	150	7	0	3	164	467
5:00 PM	7	2	8	0	2	17	10	222	4	0	1	236	4	3	8	0	0	15	7	166	5	0	0	178	446
5:15 PM	3	7	9	0	4	19	11	262	6	0	2	279	7	0	6	0	3	13	7	183	6	0	2	196	507
Total	16	14	41	0	10	71	44	957	20	0	3	1021	23	6	30	0	6	59	24	654	23	0	7	701	1852
Approach %	22.5	19.7	57.7	0.0	-	-	4.3	93.7	2.0	0.0	-	-	39.0	10.2	50.8	0.0	-	-	3.4	93.3	3.3	0.0	-	-	-
Total %	0.9	0.8	2.2	0.0	-	3.8	2.4	51.7	1.1	0.0	-	55.1	1.2	0.3	1.6	0.0	-	3.2	1.3	35.3	1.2	0.0	-	37.9	-
PHF	0.571	0.500	0.683	0.000	-	0.934	0.786	0.913	0.625	0.000	-	0.915	0.719	0.500	0.750	0.000	-	0.738	0.857	0.893	0.821	0.000	-	0.894	0.913
Lights	16	13	41	0	-	70	44	947	20	0	-	1011	23	4	30	0	-	57	24	644	23	0	-	691	1829
% Lights	100.0	92.9	100.0	-	-	98.6	100.0	99.0	100.0	-	-	99.0	100.0	66.7	100.0	-	-	96.6	100.0	98.5	100.0	-	-	98.6	98.8
Buses	0	0	0	0	-	0	0	5	0	0	-	5	0	0	0	0	-	0	0	6	0	0	-	6	11
% Buses	0.0	0.0	0.0	-	-	0.0	0.0	0.5	0.0	-	-	0.5	0.0	0.0	0.0	-	-	0.0	0.0	0.9	0.0	-	-	0.9	0.6
Trucks	0	0	0	0	-	0	0	5	0	0	-	5	0	0	0	0	-	0	0	4	0	0	-	4	9
% Trucks	0.0	0.0	0.0	-	-	0.0	0.0	0.5	0.0	-	-	0.5	0.0	0.0	0.0	-	-	0.0	0.0	0.6	0.0	-	-	0.6	0.5
Bicycles on Road	0	1	0	0	-	1	0	0	0	0	-	0	0	2	0	0	-	2	0	0	0	0	-	0	3
% Bicycles on Road	0.0	7.1	0.0	-	-	1.4	0.0	0.0	0.0	-	-	0.0	0.0	33.3	0.0	-	-	3.4	0.0	0.0	0.0	-	-	0.0	0.2
Bicycles on Crosswalk	-	-	-	-	2	-	-	-	-	-	2	-	-	-	-	-	2	-	-	-	-	-	0	-	-
% Bicycles on Crosswalk	-	-	-	-	20.0	-	-	-	-	-	66.7	-	-	-	-	-	33.3	-	-	-	-	-	0.0	-	-
Pedestrians	-	-	-	-	8	-	-	-	-	-	1	-	-	-	-	-	4	-	-	-	-	-	7	-	-
% Pedestrians	-	-	-	-	80.0	-	-	-	-	-	33.3	-	-	-	-	-	66.7	-	-	-	-	-	100.0	-	-



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More Ideas, Better Solutions

Count Name: 70th Street & University Avenue
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Turning Movement Data

Start Time	70th Street Southbound						University Avenue Westbound						70th Street Northbound						University Avenue Eastbound						Int. Total
	Right	Thru	Left	U-Turn	Peds	App. Total	Right	Thru	Left	U-Turn	Peds	App. Total	Right	Thru	Left	U-Turn	Peds	App. Total	Right	Thru	Left	U-Turn	Peds	App. Total	
6:00 AM	1	1	7	0	1	9	3	13	1	0	0	17	0	2	2	0	0	4	0	12	1	0	0	13	43
6:15 AM	7	3	9	0	0	19	5	33	3	0	0	41	1	0	1	0	1	2	0	16	3	0	0	19	81
6:30 AM	11	2	13	0	2	26	7	53	0	0	0	60	3	1	1	0	0	5	0	16	2	0	0	18	109
6:45 AM	17	3	11	0	0	31	6	66	5	0	0	77	4	1	1	0	0	6	0	23	4	0	0	27	141
Hourly Total	36	9	40	0	3	85	21	165	9	0	0	195	8	4	5	0	1	17	0	67	10	0	0	77	374
7:00 AM	15	2	9	0	0	26	8	62	5	0	0	75	3	3	0	0	0	6	0	39	5	0	0	44	151
7:15 AM	27	1	13	0	0	41	9	101	3	0	0	113	6	2	0	0	1	8	0	58	7	0	1	65	227
7:30 AM	38	8	23	0	0	69	6	89	5	0	0	100	4	1	0	0	0	5	0	67	4	0	0	71	245
7:45 AM	44	8	26	0	0	78	13	132	5	0	0	150	2	2	1	0	0	5	0	100	17	0	0	117	350
Hourly Total	124	19	71	0	0	214	36	384	18	0	0	438	15	8	1	0	1	24	0	264	33	0	1	297	973
8:00 AM	42	2	15	0	0	59	7	90	14	0	0	111	3	2	0	0	0	5	4	77	8	0	0	89	264
8:15 AM	26	7	13	0	0	46	10	99	9	0	0	118	5	5	3	0	0	13	1	63	4	0	0	68	245
8:30 AM	17	6	17	0	1	40	17	75	12	0	0	104	11	2	3	0	0	16	0	50	6	0	0	56	216
8:45 AM	27	11	10	0	1	48	12	64	16	0	0	92	5	4	4	0	0	13	1	48	10	0	0	59	212
Hourly Total	112	26	55	0	2	193	46	328	51	0	0	425	24	13	10	0	0	47	6	238	28	0	0	272	937
*** BREAK ***	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
3:00 PM	20	6	19	0	0	45	19	90	16	0	0	125	9	7	3	0	0	19	1	106	27	0	0	134	323
3:15 PM	18	16	35	0	0	69	23	121	18	0	0	162	14	6	1	0	0	21	2	98	25	0	0	125	377
3:30 PM	19	14	31	0	0	64	27	126	15	0	0	168	20	9	3	0	0	32	1	101	27	0	0	129	393
3:45 PM	24	7	31	0	2	62	31	100	18	0	1	149	18	12	3	0	2	33	4	123	25	0	0	152	396
Hourly Total	81	43	116	0	2	240	100	437	67	0	1	604	61	34	10	0	2	105	8	428	104	0	0	540	1489
4:00 PM	31	11	32	0	1	74	17	94	18	0	0	129	21	9	7	0	0	37	0	151	33	0	0	184	424
4:15 PM	14	10	25	0	0	49	32	167	24	0	1	223	15	13	5	0	2	33	4	116	26	0	0	146	451
4:30 PM	13	9	32	0	0	54	28	182	23	0	1	233	23	7	3	0	0	33	3	122	28	0	0	153	473
4:45 PM	28	14	37	0	0	79	36	199	23	0	0	258	20	10	2	0	1	32	1	128	29	0	0	158	527
Hourly Total	86	44	126	0	1	256	113	642	88	0	2	843	79	39	17	0	3	135	8	517	116	0	0	641	1875
5:00 PM	20	14	35	0	1	69	37	209	13	0	1	259	20	7	1	0	0	28	2	148	33	0	0	183	539
5:15 PM	24	9	47	0	0	80	45	213	20	0	0	278	24	13	4	0	1	41	2	137	27	0	0	166	565
5:30 PM	26	10	38	0	3	74	38	167	19	0	1	224	32	9	2	0	0	43	1	123	9	0	1	133	474
5:45 PM	20	4	40	0	1	64	39	87	13	0	0	139	19	7	1	0	1	27	0	118	19	0	1	137	367
Hourly Total	90	37	160	0	5	287	159	676	65	0	2	900	95	36	8	0	2	139	5	526	88	0	2	619	1945
Grand Total	529	178	568	0	13	1275	475	2632	298	0	5	3405	282	134	51	0	9	467	27	2040	379	0	3	2446	7593
Approach %	41.5	14.0	44.5	0.0	-	-	14.0	77.3	8.8	0.0	-	-	60.4	28.7	10.9	0.0	-	-	1.1	83.4	15.5	0.0	-	-	-
Total %	7.0	2.3	7.5	0.0	-	16.8	6.3	34.7	3.9	0.0	-	44.8	3.7	1.8	0.7	0.0	-	6.2	0.4	26.9	5.0	0.0	-	32.2	-
Lights	521	177	565	0	-	1263	472	2588	294	0	-	3354	279	134	43	0	-	456	26	1999	375	0	-	2400	7473
% Lights	98.5	99.4	99.5	-	-	99.1	99.4	98.3	98.7	-	-	98.5	98.9	100.0	84.3	-	-	97.6	96.3	98.0	98.9	-	-	98.1	98.4

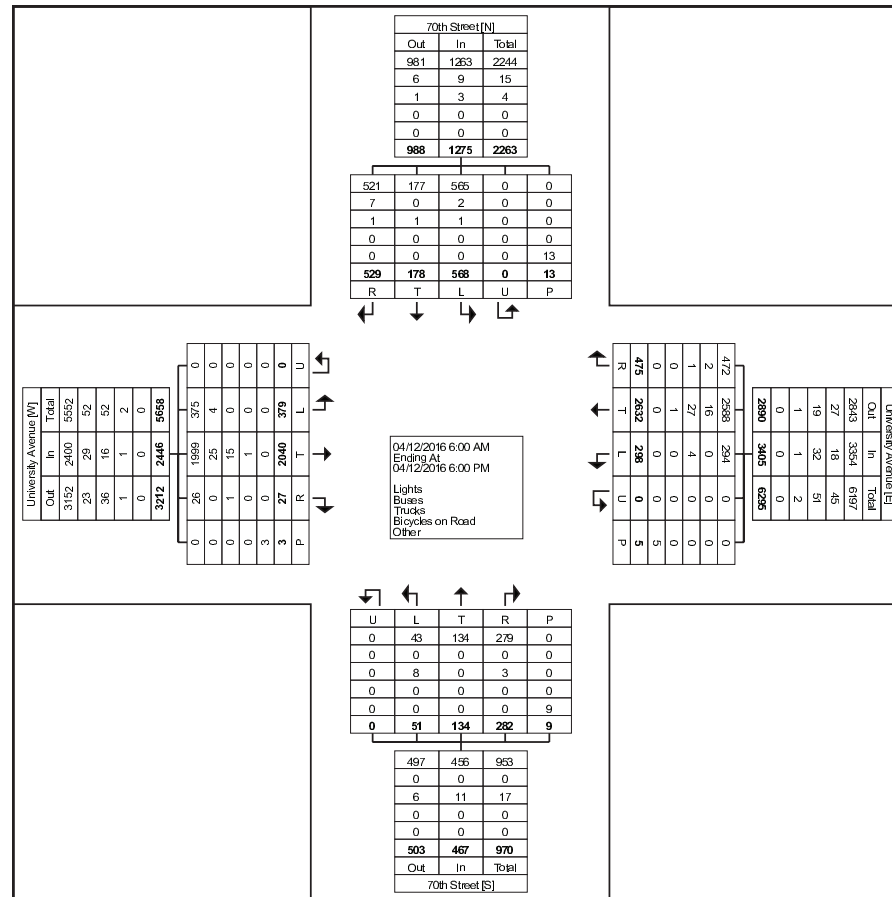
Buses	7	0	2	0	-	9	2	16	0	0	-	18	0	0	0	0	-	0	0	25	4	0	-	29	56
% Buses	1.3	0.0	0.4	-	-	0.7	0.4	0.6	0.0	-	-	0.5	0.0	0.0	0.0	-	-	0.0	0.0	1.2	1.1	-	-	1.2	0.7
Trucks	1	1	1	0	-	3	1	27	4	0	-	32	3	0	8	0	-	11	1	15	0	0	-	16	62
% Trucks	0.2	0.6	0.2	-	-	0.2	0.2	1.0	1.3	-	-	0.9	1.1	0.0	15.7	-	-	2.4	3.7	0.7	0.0	-	-	0.7	0.8
Bicycles on Road	0	0	0	0	-	0	0	1	0	0	-	1	0	0	0	0	-	0	0	1	0	0	-	1	2
% Bicycles on Road	0.0	0.0	0.0	-	-	0.0	0.0	0.0	0.0	-	-	0.0	0.0	0.0	0.0	-	-	0.0	0.0	0.0	0.0	-	-	0.0	0.0
Bicycles on Crosswalk	-	-	-	-	1	-	-	-	-	-	0	-	-	-	-	-	2	-	-	-	-	-	1	-	-
% Bicycles on Crosswalk	-	-	-	-	7.7	-	-	-	-	-	0.0	-	-	-	-	-	22.2	-	-	-	-	-	33.3	-	-
Pedestrians	-	-	-	-	12	-	-	-	-	-	5	-	-	-	-	-	7	-	-	-	-	-	2	-	-
% Pedestrians	-	-	-	-	92.3	-	-	-	-	-	100.0	-	-	-	-	-	77.8	-	-	-	-	-	66.7	-	-



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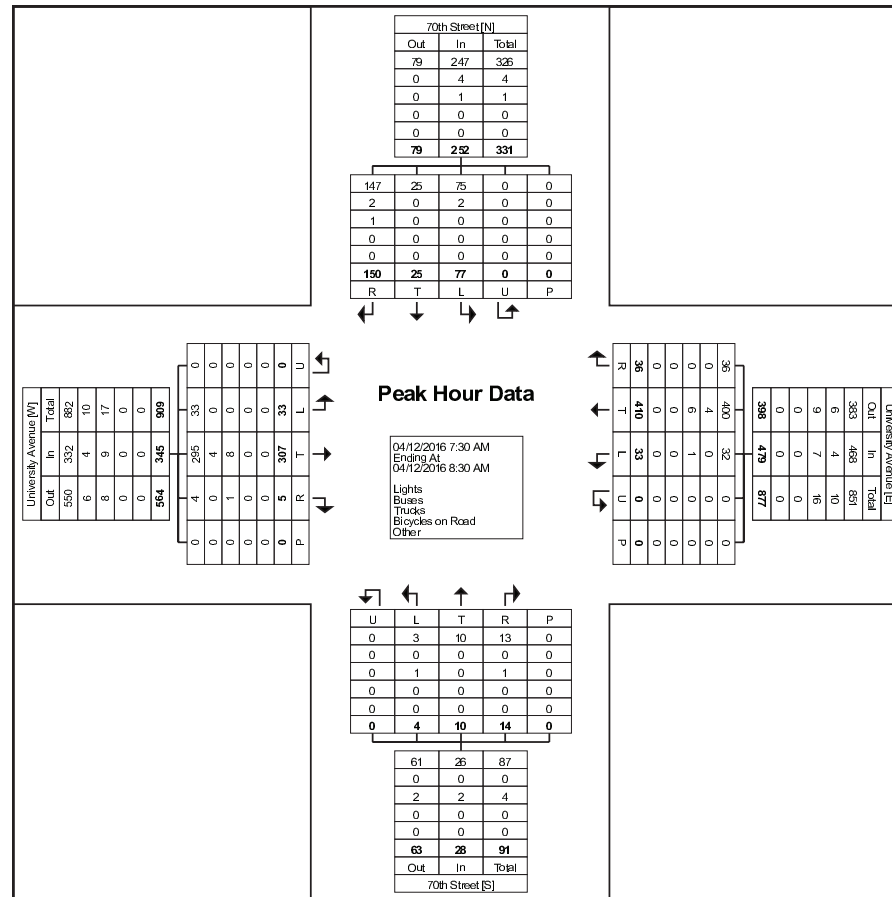
[illegible]



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Turning Movement Peak Hour Data Plot (7:30 AM)



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Turning Movement Peak Hour Data (4:45 PM)

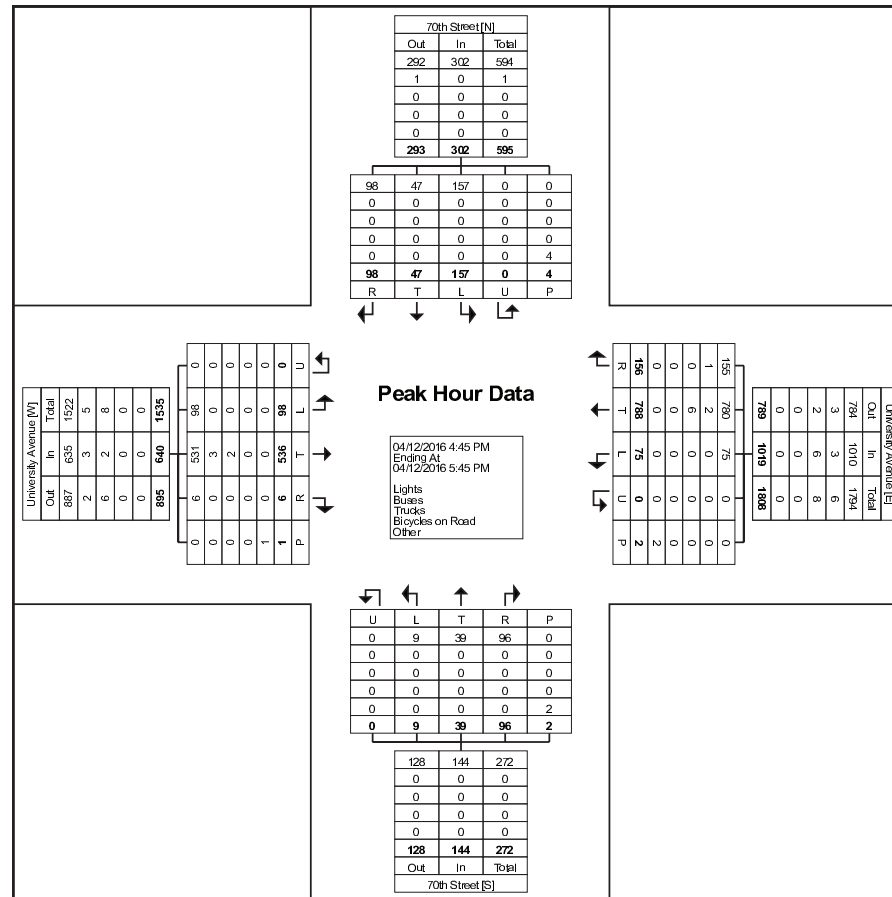
Start Time	70th Street Southbound						University Avenue Westbound						70th Street Northbound						University Avenue Eastbound						Int. Total
	Right	Thru	Left	U-Turn	Peds	App. Total	Right	Thru	Left	U-Turn	Peds	App. Total	Right	Thru	Left	U-Turn	Peds	App. Total	Right	Thru	Left	U-Turn	Peds	App. Total	
4:45 PM	28	14	37	0	0	79	36	199	23	0	0	258	20	10	2	0	1	32	1	128	29	0	0	158	527
5:00 PM	20	14	35	0	1	69	37	209	13	0	1	259	20	7	1	0	0	28	2	148	33	0	0	183	539
5:15 PM	24	9	47	0	0	80	45	213	20	0	0	278	24	13	4	0	1	41	2	137	27	0	0	166	565
5:30 PM	26	10	38	0	3	74	38	167	19	0	1	224	32	9	2	0	0	43	1	123	9	0	1	133	474
Total	98	47	157	0	4	302	156	788	75	0	2	1019	96	39	9	0	2	144	6	536	98	0	1	640	2105
Approach %	32.5	15.6	52.0	0.0	-	-	15.3	77.3	7.4	0.0	-	-	66.7	27.1	6.3	0.0	-	-	0.9	83.8	15.3	0.0	-	-	-
Total %	4.7	2.2	7.5	0.0	-	14.3	7.4	37.4	3.6	0.0	-	48.4	4.6	1.9	0.4	0.0	-	6.8	0.3	25.5	4.7	0.0	-	30.4	-
PHF	0.875	0.839	0.835	0.000	-	0.944	0.867	0.925	0.815	0.000	-	0.916	0.750	0.750	0.563	0.000	-	0.837	0.750	0.905	0.742	0.000	-	0.874	0.931
Lights	98	47	157	0	-	302	155	780	75	0	-	1010	96	39	9	0	-	144	6	531	98	0	-	635	2091
% Lights	100.0	100.0	100.0	-	-	100.0	99.4	99.0	100.0	-	-	99.1	100.0	100.0	100.0	-	-	100.0	100.0	99.1	100.0	-	-	99.2	99.3
Buses	0	0	0	0	-	0	1	2	0	0	-	3	0	0	0	0	-	0	0	3	0	0	-	3	6
% Buses	0.0	0.0	0.0	-	-	0.0	0.6	0.3	0.0	-	-	0.3	0.0	0.0	0.0	-	-	0.0	0.0	0.6	0.0	-	-	0.5	0.3
Trucks	0	0	0	0	-	0	0	6	0	0	-	6	0	0	0	0	-	0	0	2	0	0	-	2	8
% Trucks	0.0	0.0	0.0	-	-	0.0	0.0	0.8	0.0	-	-	0.6	0.0	0.0	0.0	-	-	0.0	0.0	0.4	0.0	-	-	0.3	0.4
Bicycles on Road	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	0
% Bicycles on Road	0.0	0.0	0.0	-	-	0.0	0.0	0.0	0.0	-	-	0.0	0.0	0.0	0.0	-	-	0.0	0.0	0.0	0.0	-	-	0.0	0.0
Bicycles on Crosswalk	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-
% Bicycles on Crosswalk	-	-	-	-	0.0	-	-	-	-	-	0.0	-	-	-	-	-	0.0	-	-	-	-	-	0.0	-	-
Pedestrians	-	-	-	-	4	-	-	-	-	-	2	-	-	-	-	-	2	-	-	-	-	-	1	-	-
% Pedestrians	-	-	-	-	100.0	-	-	-	-	-	100.0	-	-	-	-	-	100.0	-	-	-	-	-	100.0	-	-



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Count Name: 73rd Street & University Avenue
Site Code:
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Turning Movement Data

Start Time	73rd Street Southbound						University Avenue Westbound						73rd Street Northbound						University Avenue Eastbound						Int. Total
	Right	Thru	Left	U-Turn	Peds	App. Total	Right	Thru	Left	U-Turn	Peds	App. Total	Right	Thru	Left	U-Turn	Peds	App. Total	Right	Thru	Left	U-Turn	Peds	App. Total	
6:00 AM	3	27	3	0	0	33	2	9	10	0	0	21	8	9	15	0	0	32	12	8	0	0	0	20	106
6:15 AM	3	38	4	0	1	45	1	13	15	0	0	29	10	13	8	0	0	31	20	5	1	0	0	26	131
6:30 AM	7	61	6	0	0	74	4	23	23	0	0	50	8	20	25	0	0	53	34	8	3	0	0	45	222
6:45 AM	9	72	5	0	0	86	6	30	38	0	0	74	15	38	38	0	0	91	44	20	2	0	0	66	317
Hourly Total	22	198	18	0	1	238	13	75	86	0	0	174	41	80	86	0	0	207	110	41	6	0	0	157	776
7:00 AM	10	96	5	0	4	111	6	38	23	0	0	67	9	42	37	0	0	88	43	22	10	0	0	75	341
7:15 AM	19	102	8	0	0	129	3	63	61	0	0	127	25	53	51	0	0	129	56	29	5	0	0	90	475
7:30 AM	14	109	8	0	0	131	8	64	58	0	0	130	31	48	54	0	0	133	81	40	13	0	0	134	528
7:45 AM	22	119	11	0	3	152	10	72	74	0	0	156	45	49	59	0	0	153	63	60	14	0	0	137	598
Hourly Total	65	426	32	0	7	523	27	237	216	0	0	480	110	192	201	0	0	503	243	151	42	0	0	436	1942
8:00 AM	12	118	12	0	1	142	7	38	91	0	1	136	46	59	34	0	0	139	61	41	6	0	0	108	525
8:15 AM	16	64	9	0	1	89	4	47	58	0	0	109	35	52	49	0	1	136	47	30	10	0	1	87	421
8:30 AM	13	87	9	0	0	109	7	39	32	0	0	78	25	51	27	0	0	103	43	24	6	0	0	73	363
8:45 AM	30	106	12	0	0	148	14	32	48	0	0	94	25	56	36	0	1	117	70	32	15	0	1	117	476
Hourly Total	71	375	42	0	2	488	32	156	229	0	1	417	131	218	146	0	2	495	221	127	37	0	2	385	1785
*** BREAK ***	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
3:00 PM	13	53	9	0	0	75	11	51	37	0	1	99	61	89	53	0	0	203	67	52	9	0	0	128	505
3:15 PM	8	62	11	0	0	81	16	66	62	0	2	144	61	71	53	0	0	185	52	58	12	0	0	122	532
3:30 PM	6	75	10	0	2	91	12	73	62	0	0	147	72	92	66	0	0	230	52	57	23	0	6	132	600
3:45 PM	11	73	16	0	1	100	25	52	43	0	1	120	63	101	54	0	0	218	54	65	28	0	2	147	585
Hourly Total	38	263	46	0	3	347	64	242	204	0	4	510	257	353	226	0	0	836	225	232	72	0	8	529	2222
4:00 PM	49	124	18	0	0	191	11	60	46	0	0	117	65	79	58	0	0	202	100	96	26	0	0	222	732
4:15 PM	9	72	13	0	0	94	14	102	61	0	0	177	54	95	60	0	0	209	63	75	15	0	9	153	633
4:30 PM	12	85	19	0	0	116	20	98	56	0	0	174	68	92	62	0	0	222	69	80	20	0	0	169	681
4:45 PM	9	79	8	0	1	96	28	120	89	0	0	237	60	77	53	0	0	190	80	90	23	0	1	193	716
Hourly Total	79	360	58	0	1	497	73	380	252	0	0	705	247	343	233	0	0	823	312	341	84	0	10	737	2762
5:00 PM	8	81	19	0	0	108	29	131	65	0	2	225	91	111	50	0	0	252	75	91	19	0	2	185	770
5:15 PM	10	74	15	0	2	99	28	106	91	0	1	225	74	117	65	0	0	256	78	77	22	0	1	177	757
5:30 PM	11	69	10	0	0	90	18	91	85	0	0	194	63	85	53	0	0	201	79	71	18	0	1	168	653
5:45 PM	14	101	12	0	0	127	15	42	39	0	1	96	61	93	50	0	1	204	59	60	14	0	1	133	560
Hourly Total	43	325	56	0	2	424	90	370	280	0	4	740	289	406	218	0	1	913	291	299	73	0	5	663	2740
Grand Total	318	1947	252	0	16	2517	299	1460	1267	0	9	3026	1075	1592	1110	0	3	3777	1402	1191	314	0	25	2907	12227
Approach %	12.6	77.4	10.0	0.0	-	-	9.9	48.2	41.9	0.0	-	-	28.5	42.1	29.4	0.0	-	-	48.2	41.0	10.8	0.0	-	-	-
Total %	2.6	15.9	2.1	0.0	-	20.6	2.4	11.9	10.4	0.0	-	24.7	8.8	13.0	9.1	0.0	-	30.9	11.5	9.7	2.6	0.0	-	23.8	-
Lights	312	1920	248	0	-	2480	298	1434	1246	0	-	2978	1061	1575	1087	0	-	3723	1365	1178	311	0	-	2854	12035
% Lights	98.1	98.6	98.4	-	-	98.5	99.7	98.2	98.3	-	-	98.4	98.7	98.9	97.9	-	-	98.6	97.4	98.9	99.0	-	-	98.2	98.4

Buses	3	19	1	0	-	23	0	3	8	0	-	11	6	9	7	0	-	22	3	3	1	0	-	7	63
% Buses	0.9	1.0	0.4	-	-	0.9	0.0	0.2	0.6	-	-	0.4	0.6	0.6	0.6	-	-	0.6	0.2	0.3	0.3	-	-	0.2	0.5
Trucks	3	8	3	0	-	14	1	22	13	0	-	36	8	3	16	0	-	27	34	10	2	0	-	46	123
% Trucks	0.9	0.4	1.2	-	-	0.6	0.3	1.5	1.0	-	-	1.2	0.7	0.2	1.4	-	-	0.7	2.4	0.8	0.6	-	-	1.6	1.0
Bicycles on Road	0	0	0	0	-	0	0	1	0	0	-	1	0	5	0	0	-	5	0	0	0	0	-	0	6
% Bicycles on Road	0.0	0.0	0.0	-	-	0.0	0.0	0.1	0.0	-	-	0.0	0.0	0.3	0.0	-	-	0.1	0.0	0.0	0.0	-	-	0.0	0.0
Bicycles on Crosswalk	-	-	-	-	2	-	-	-	-	-	6	-	-	-	-	-	2	-	-	-	-	-	4	-	-
% Bicycles on Crosswalk	-	-	-	-	12.5	-	-	-	-	-	66.7	-	-	-	-	-	66.7	-	-	-	-	-	16.0	-	-
Pedestrians	-	-	-	-	14	-	-	-	-	-	3	-	-	-	-	-	1	-	-	-	-	-	21	-	-
% Pedestrians	-	-	-	-	87.5	-	-	-	-	-	33.3	-	-	-	-	-	33.3	-	-	-	-	-	84.0	-	-



Count Name: 73rd Street & University Avenue
Site Code:
Start Date: 04/12/2016
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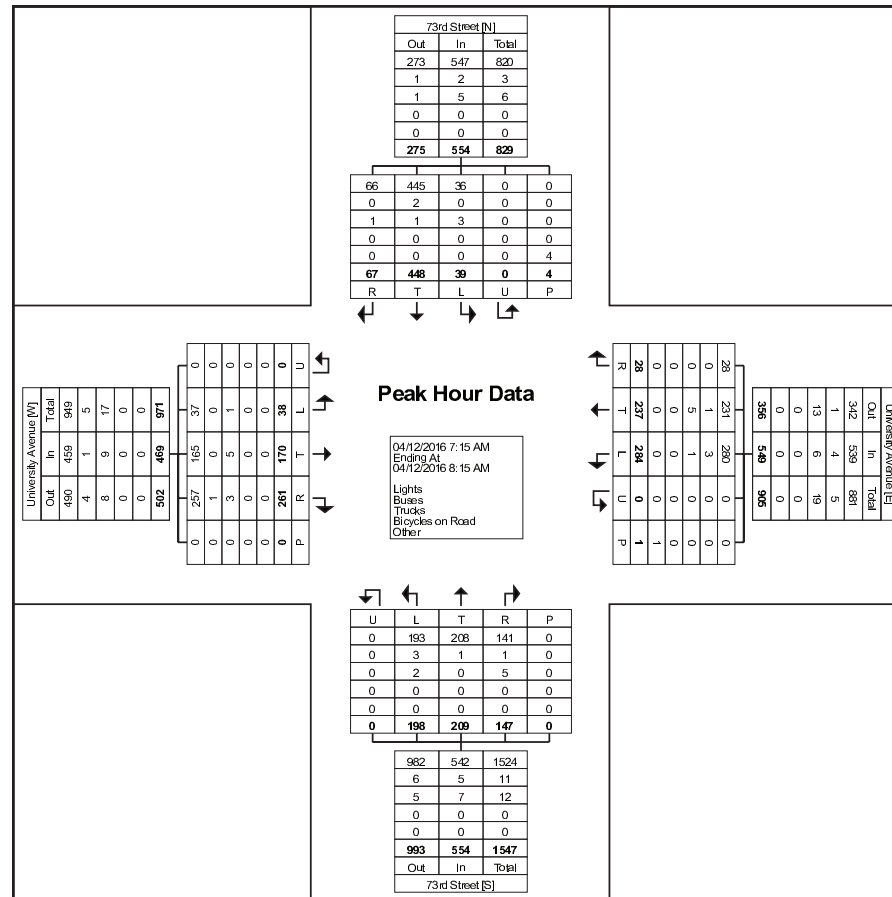
Start Time	73rd Street Southbound						University Avenue Westbound						73rd Street Northbound						University Avenue Eastbound						Int. Total
	Right	Thru	Left	U-Turn	Peds	App. Total	Right	Thru	Left	U-Turn	Peds	App. Total	Right	Thru	Left	U-Turn	Peds	App. Total	Right	Thru	Left	U-Turn	Peds	App. Total	
7:15 AM	19	102	8	0	0	129	3	63	61	0	0	127	25	53	51	0	0	129	56	29	5	0	0	90	475
7:30 AM	14	109	8	0	0	131	8	64	58	0	0	130	31	48	54	0	0	133	81	40	13	0	0	134	528
7:45 AM	22	119	11	0	3	152	10	72	74	0	0	156	45	49	59	0	0	153	63	60	14	0	0	137	598
8:00 AM	12	118	12	0	1	142	7	38	91	0	1	136	46	59	34	0	0	139	61	41	6	0	0	108	525
Total	67	448	39	0	4	554	28	237	284	0	1	549	147	209	198	0	0	554	261	170	38	0	0	469	2126
Approach %	12.1	80.9	7.0	0.0	-	-	5.1	43.2	51.7	0.0	-	-	26.5	37.7	35.7	0.0	-	-	55.7	36.2	8.1	0.0	-	-	-
Total %	3.2	21.1	1.8	0.0	-	26.1	1.3	11.1	13.4	0.0	-	25.8	6.9	9.8	9.3	0.0	-	26.1	12.3	8.0	1.8	0.0	-	22.1	-
PHF	0.761	0.941	0.813	0.000	-	0.911	0.700	0.823	0.780	0.000	-	0.880	0.799	0.886	0.839	0.000	-	0.905	0.806	0.708	0.679	0.000	-	0.856	0.889
Lights	66	445	36	0	-	547	28	231	280	0	-	539	141	208	193	0	-	542	257	165	37	0	-	459	2087
% Lights	98.5	99.3	92.3	-	-	98.7	100.0	97.5	98.6	-	-	98.2	95.9	99.5	97.5	-	-	97.8	98.5	97.1	97.4	-	-	97.9	98.2
Buses	0	2	0	0	-	2	0	1	3	0	-	4	1	1	3	0	-	5	1	0	0	0	-	1	12
% Buses	0.0	0.4	0.0	-	-	0.4	0.0	0.4	1.1	-	-	0.7	0.7	0.5	1.5	-	-	0.9	0.4	0.0	0.0	-	-	0.2	0.6
Trucks	1	1	3	0	-	5	0	5	1	0	-	6	5	0	2	0	-	7	3	5	1	0	-	9	27
% Trucks	1.5	0.2	7.7	-	-	0.9	0.0	2.1	0.4	-	-	1.1	3.4	0.0	1.0	-	-	1.3	1.1	2.9	2.6	-	-	1.9	1.3
Bicycles on Road	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	0
% Bicycles on Road	0.0	0.0	0.0	-	-	0.0	0.0	0.0	0.0	-	-	0.0	0.0	0.0	0.0	-	-	0.0	0.0	0.0	0.0	-	-	0.0	0.0
Bicycles on Crosswalk	-	-	-	-	0	-	-	-	-	-	1	-	-	-	-	-	0	-	-	-	-	-	0	-	-
% Bicycles on Crosswalk	-	-	-	-	0.0	-	-	-	-	-	100.0	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Pedestrians	-	-	-	-	4	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-
% Pedestrians	-	-	-	-	100.0	-	-	-	-	-	0.0	-	-	-	-	-	-	-	-	-	-	-	-	-	-



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MSA Professional Services, Inc.
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Turning Movement Peak Hour Data Plot (7:15 AM)



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Page No: 6

Turning Movement Peak Hour Data (4:30 PM)

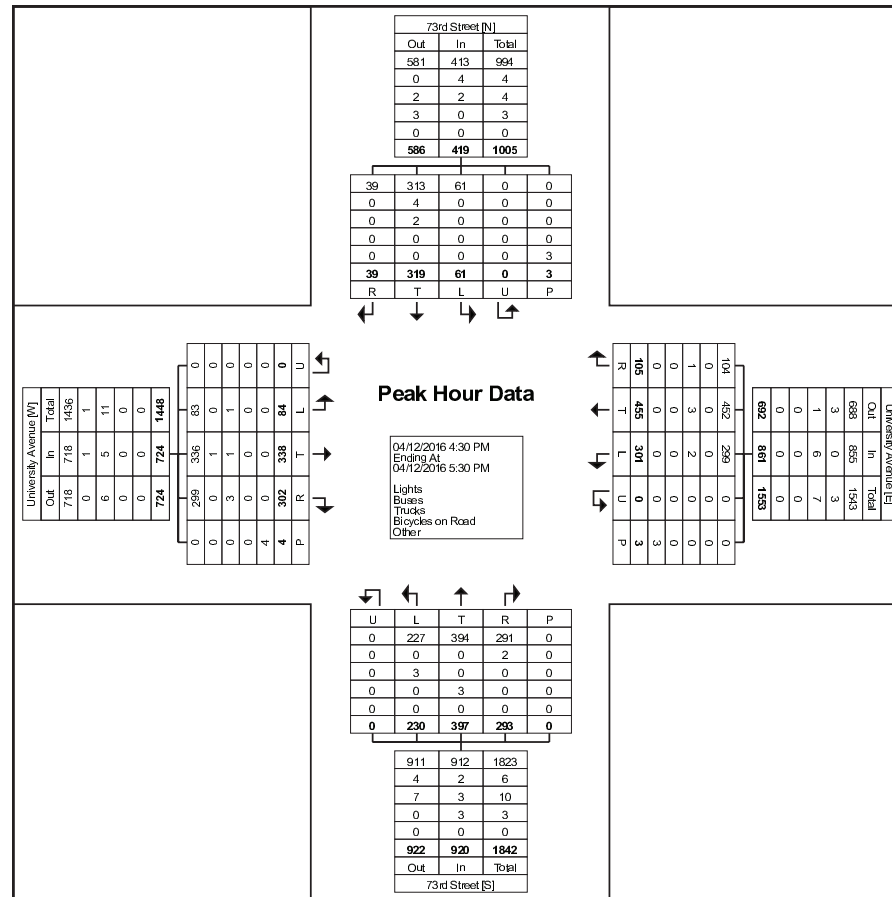
Start Time	73rd Street Southbound						University Avenue Westbound						73rd Street Northbound						University Avenue Eastbound						Int. Total
	Right	Thru	Left	U-Turn	Peds	App. Total	Right	Thru	Left	U-Turn	Peds	App. Total	Right	Thru	Left	U-Turn	Peds	App. Total	Right	Thru	Left	U-Turn	Peds	App. Total	
4:30 PM	12	85	19	0	0	116	20	98	56	0	0	174	68	92	62	0	0	222	69	80	20	0	0	169	681
4:45 PM	9	79	8	0	1	96	28	120	89	0	0	237	60	77	53	0	0	190	80	90	23	0	1	193	716
5:00 PM	8	81	19	0	0	108	29	131	65	0	2	225	91	111	50	0	0	252	75	91	19	0	2	185	770
5:15 PM	10	74	15	0	2	99	28	106	91	0	1	225	74	117	65	0	0	256	78	77	22	0	1	177	757
Total	39	319	61	0	3	419	105	455	301	0	3	861	293	397	230	0	0	920	302	338	84	0	4	724	2924
Approach %	9.3	76.1	14.6	0.0	-	-	12.2	52.8	35.0	0.0	-	-	31.8	43.2	25.0	0.0	-	-	41.7	46.7	11.6	0.0	-	-	-
Total %	1.3	10.9	2.1	0.0	-	14.3	3.6	15.6	10.3	0.0	-	29.4	10.0	13.6	7.9	0.0	-	31.5	10.3	11.6	2.9	0.0	-	24.8	-
PHF	0.813	0.938	0.803	0.000	-	0.903	0.905	0.868	0.827	0.000	-	0.908	0.805	0.848	0.885	0.000	-	0.898	0.944	0.929	0.913	0.000	-	0.938	0.949
Lights	39	313	61	0	-	413	104	452	299	0	-	855	291	394	227	0	-	912	299	336	83	0	-	718	2898
% Lights	100.0	98.1	100.0	-	-	98.6	99.0	99.3	99.3	-	-	99.3	99.3	99.2	98.7	-	-	99.1	99.0	99.4	98.8	-	-	99.2	99.1
Buses	0	4	0	0	-	4	0	0	0	0	-	0	2	0	0	0	-	2	0	1	0	0	-	1	7
% Buses	0.0	1.3	0.0	-	-	1.0	0.0	0.0	0.0	-	-	0.0	0.7	0.0	0.0	-	-	0.2	0.0	0.3	0.0	-	-	0.1	0.2
Trucks	0	2	0	0	-	2	1	3	2	0	-	6	0	0	3	0	-	3	3	1	1	0	-	5	16
% Trucks	0.0	0.6	0.0	-	-	0.5	1.0	0.7	0.7	-	-	0.7	0.0	0.0	1.3	-	-	0.3	1.0	0.3	1.2	-	-	0.7	0.5
Bicycles on Road	0	0	0	0	-	0	0	0	0	0	-	0	0	3	0	0	-	3	0	0	0	0	-	0	3
% Bicycles on Road	0.0	0.0	0.0	-	-	0.0	0.0	0.0	0.0	-	-	0.0	0.0	0.8	0.0	-	-	0.3	0.0	0.0	0.0	-	-	0.0	0.1
Bicycles on Crosswalk	-	-	-	-	2	-	-	-	-	-	3	-	-	-	-	-	0	-	-	-	-	-	0	-	-
% Bicycles on Crosswalk	-	-	-	-	66.7	-	-	-	-	-	100.0	-	-	-	-	-	-	-	-	-	-	-	0.0	-	-
Pedestrians	-	-	-	-	1	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	4	-	-
% Pedestrians	-	-	-	-	33.3	-	-	-	-	-	0.0	-	-	-	-	-	-	-	-	-	-	-	100.0	-	-



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Start Date: 04/12/2016
Page No: 7



Appendix C: Project Layout

introducing.....

midTOWN

in

Windsor Heights



July 12, 2017

Urban Mix-Use Project:

Commercial Space	18,210 SF	27%
Atrium	2,410 SF	4%
Residential Space	46,674 SF	69%
Subtotal Gross	67,294 SF	100%
Interior Garage Space	8,727 SF	
Total Gross Building	76,021 SF	

Fulcrum Building - Phase 1 Development

6580 University Ave., Windsor Heights, IA 50324

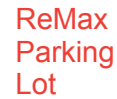
report by:

Koester Development
6500 University Ave. Suite 308
Windsor Heights, IA



VdW, Inc.
1163 24th St. Suite 100
Des Moines, IA 50311

Building Height Request Does Not Effect Visibility or Safety at Intersection



VdW, Inc.
1163 24th St. Suite 100
Des Moines, IA 50311

**Building Height Request Does Not
Effect Visibility or Safety at
Intersection**



Fulcrum Building - Phase 1 Development
6580 University Ave., Windsor Heights, IA 50324

Koester Development
6500 University Ave. Suite 308
Windsor Heights, IA

VdW, Inc.
1163 24th St. Suite 100
Des Moines, IA 50311

Appendix D: Trip Generation

Trip Generation

University Avenue, Windsor Heights, IA

Mid-Rise Apartment

47 Dwelling Units +

ITE Code

223

Internal-to-Internal Reduction

Based on Dwelling Units

Pass-by		New Trips	
entering	exiting	entering	exiting
0	0	3	5
0	0	7	6
0	0	205	205

	Average Rate	Fitted Curve Equation	#	% enter	% exit	entering	exiting	entering	exiting	entering	exiting	
AM	0.3	T = 0.41 X-13.06	7	31	69	2	5	0%	0%	3	5	0%
PM	0.39	T = 0.48 X-11.07	12	58	42	7	5	0%	0%	7	6	0%
Weekday*	6.65	T = 6.06 X+123.56	409	50	50	205	205	0%	0%	205	205	0%

* Weekday trips based on land use 220 - Apartment because land use 223 - Mid-Rise Apartment does not include weekday calculations

+ dwelling units assumed to be 1000 sf

Shopping Center

18.2 per 1000 SF

ITE Code

710

Internal-to-Internal Reduction

Based on Square Feet

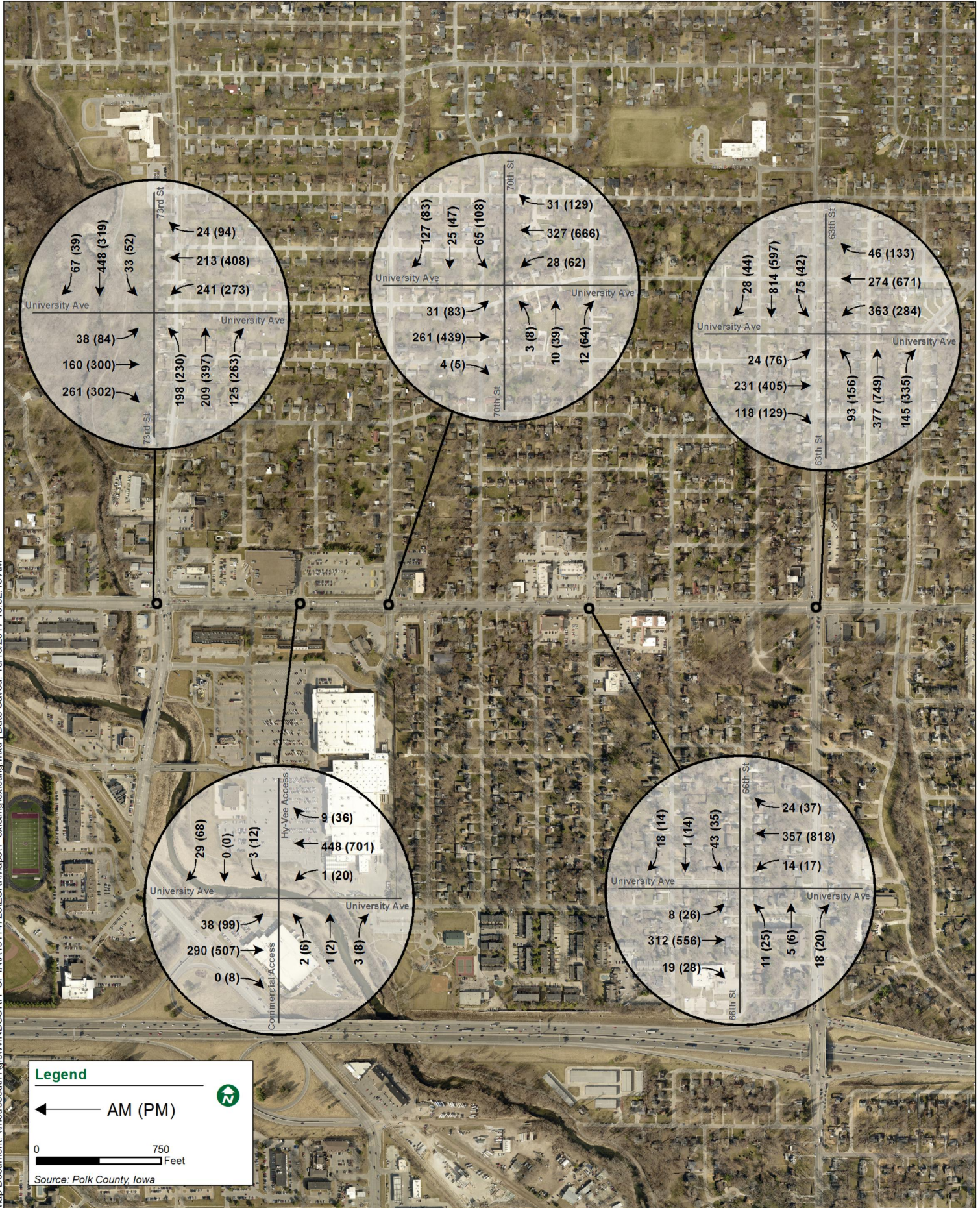
Pass-by		New Trips	
entering	exiting	entering	exiting
0	0	32	7
0	0	91	151
0	0	1022	999

	Average Rate	Fitted Curve Equation	#	% enter	% exit	entering	exiting	entering	exiting	entering	exiting	
AM	1	Ln(T) = 0.59 Ln(X)+2.32	57	61	12	35	7	9%	11%	32	7	0%
PM	3.73	Ln(T) = 0.67 Ln(X)+3.37	204	49	83	100	169	9%	11%	91	151	0%
Weekday	42.94	Ln(T) = 0.65 Ln(X)+5.83	2244	50	50	1122	1122	9%	11%	1022	999	0%

	Pass-by		New Trips	
	entering	exiting	entering	exiting
AM	0	0	35	12
PM	0	0	98	157
Weekday	0	0	1227	1204

AM	64	37	12
PM	216	107	174
Weekday	2653	1327	1327

Appendix E: Trip Distribution





WINDSOR
HEIGHTS
the heart of it all

University Traffic Study

City of Windsor Heights, Iowa

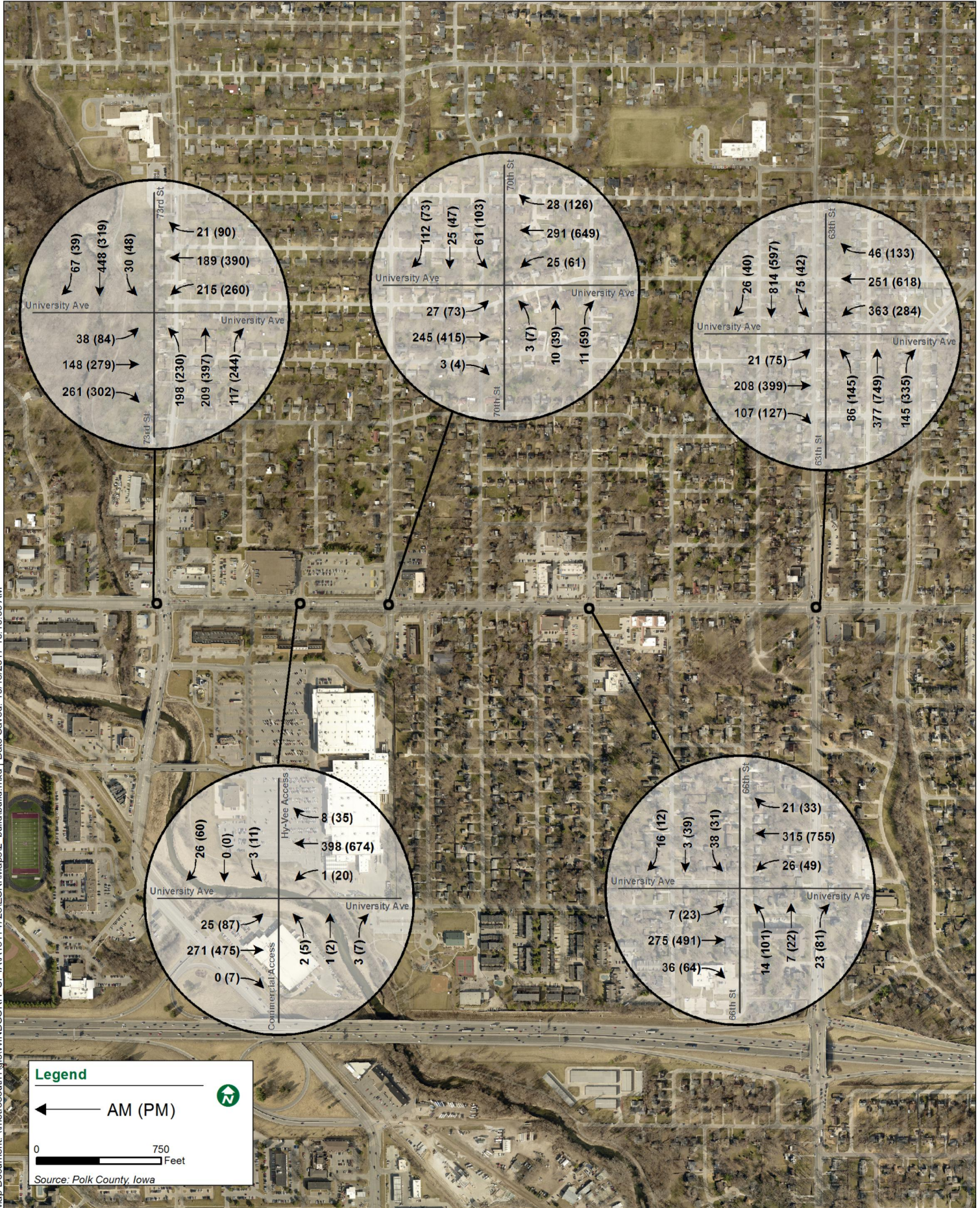
Turning Movements - Existing

October 2017



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& MENK**

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WINDSOR
HEIGHTS
the heart of it all

University Traffic Study

City of Windsor Heights, Iowa

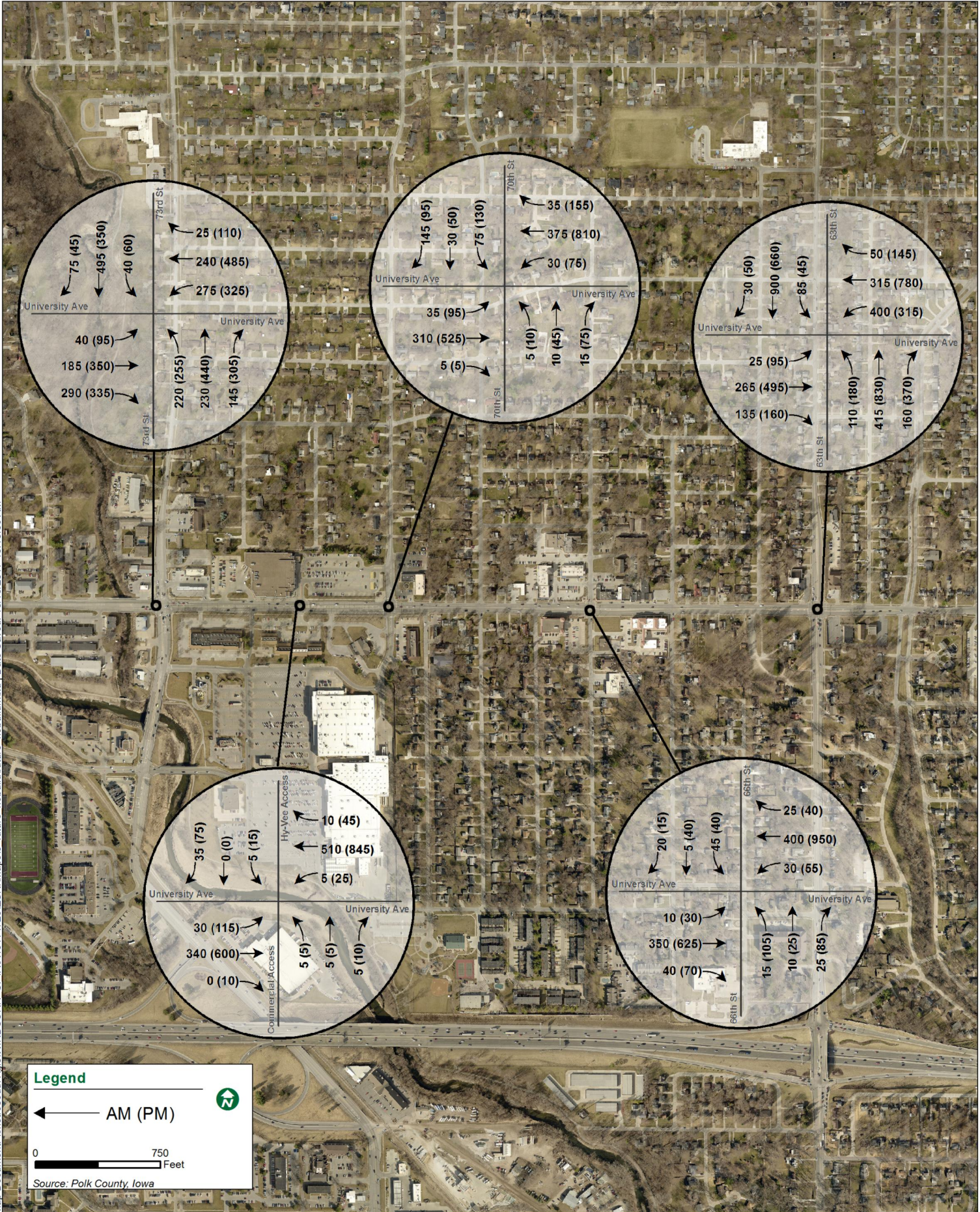
Turning Movements - Future No Build

October 2017



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WINDSOR
HEIGHTS
the heart of it all

University Traffic Study

City of Windsor Heights, Iowa

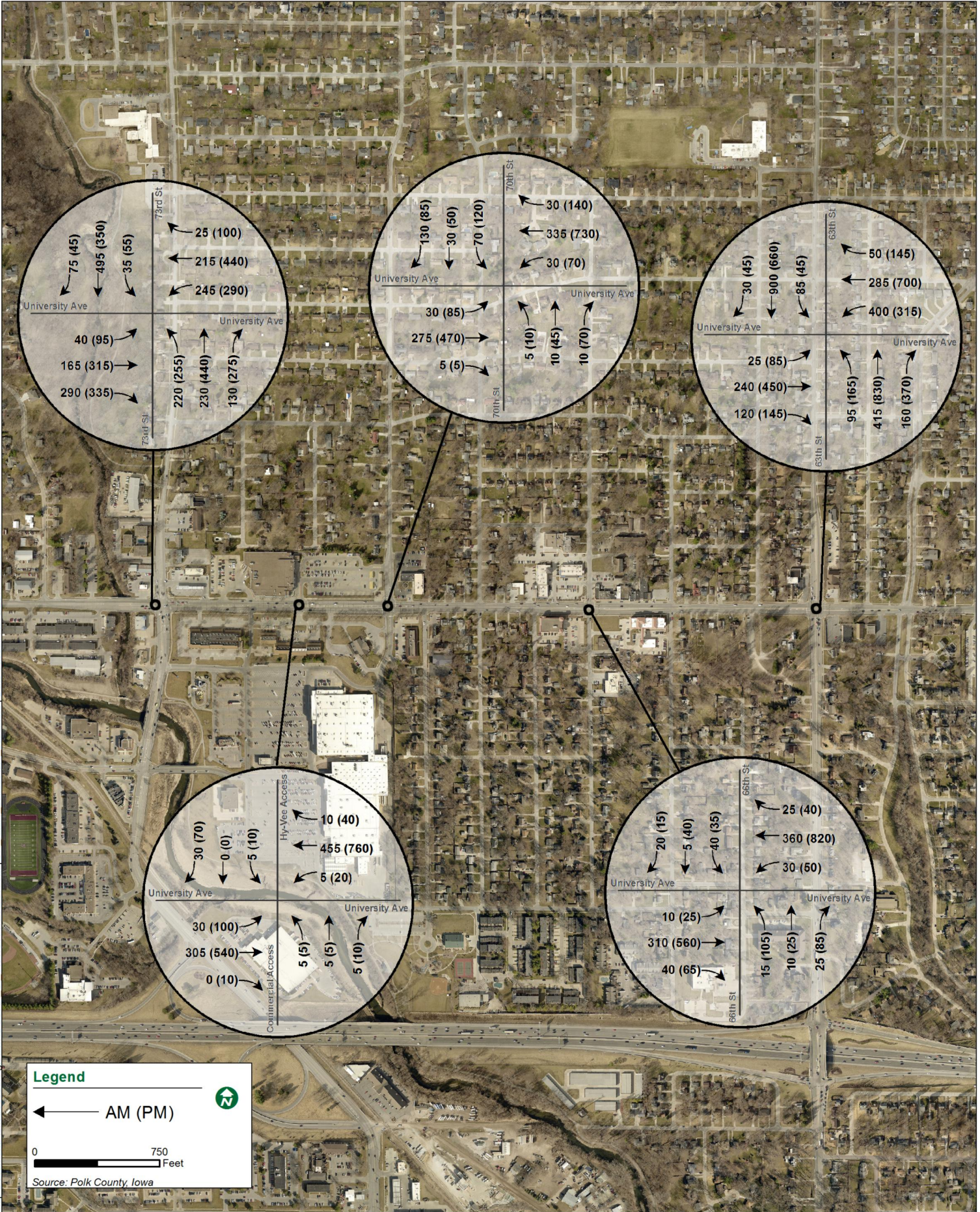
Turning Movements - Future Build

October 2017



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Appendix F: LOS Tables

Traffic Operations Analysis

Table 1: 2017 Existing Conditions Traffic Operations Analysis - University Ave - Windsor Heights, IA

Intersection ID #	Intersection	Peak Hour	Int. Delay*		Movement Delays (sec/veh)											
			INT.	LOS	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
1	University Ave at 73rd St Signalized	AM	18	B	20	31	6	27	20	15	31	13	3	13	20	8
		PM	27	C	27	47	5	49	34	32	36	18	5	18	25	10
2	University Ave at Hy-Vee Signalized	AM	5	A	5	0	4	4	0	5	0	0	0	32	0	6
		PM	8	A	8	7	5	8	8	8	26	19	5	28	0	7
3	University Ave at 70th St Signalized	AM	10	A	7	9	3	8	11	7	23	23	4	16	19	5
		PM	15	B	15	13	3	13	16	13	25	30	10	23	20	7
4	University Ave at 66th St Signalized	AM	12	B	7	11	8	8	11	5	25	24	7	30	45	12
		PM	14	B	11	12	11	10	15	14	30	25	9	30	26	11
5	University Ave at 63rd St Signalized	AM	23	C	21	26	24	29	18	11	24	20	11	23	26	17
		PM	29	C	26	29	26	32	27	23	34	31	31	27	28	16

*Delay in seconds per vehicle

Traffic Operations Analysis

Table 1: 2017 Opening Day Build Traffic Operations Analysis - University Ave - Windsor Heights, IA

Intersection ID #	Intersection	Peak Hour	Int. Delay*		Movement Delays (sec/veh)											
			INT.	LOS	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
1	University Ave at 73rd St Signalized	AM	21	C	20	28	13	22	22	17	42	19	7	20	25	23
		PM	39	D	34	45	14	69	43	47	64	33	14	35	37	36
2	University Ave at Hy-Vee Signalized	AM	3	A	5	4	0	6	3	1	0	0	0	20	0	5
		PM	10	A	17	7	8	10	10	7	38	75	8	52	0	17
3	University Ave at 70th St Signalized	AM	11	B	11	10	8	7	6	5	47	50	6	35	37	13
		PM	28	C	53	24	21	28	22	20	43	59	26	45	44	28
4	University Ave at 66th St Signalized	AM	26	C	21	33	25	14	26	22	16	11	6	14	12	4
		PM	35	C	35	31	26	24	38	35	44	41	31	39	36	28
5	University Ave at 63rd St Signalized	AM	21	C	10	12	8	30	20	3	22	20	9	24	26	17
		PM	40	D	36	30	24	73	60	35	33	33	30	36	34	23

*Delay in seconds per vehicle

Traffic Operations Analysis

Table 1: 2037 Design Year Existing Conditions Traffic Operations Analysis - University Ave - Windsor Heights, IA

Intersection ID #	Intersection	Peak Hour	Int. Delay*		Movement Delays (sec/veh)											
			INT.	LOS	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
1	University Ave at 73rd St Signalized	AM	18	B	20	32	6	24	18	14	30	17	3	16	23	12
		PM	25	C	24	41	6	37	20	23	42	24	6	21	30	14
2	University Ave at Hy-Vee Signalized	AM	6	A	6	5	0	0	6	5	0	0	0	29	0	5
		PM	9	A	9	7	3	9	10	10	35	44	6	32	0	9
3	University Ave at 70th St Signalized	AM	10	A	9	9	4	9	11	8	17	28	6	19	17	6
		PM	16	B	18	14	4	13	15	14	33	35	15	27	22	9
4	University Ave at 66th St Signalized	AM	12	B	9	11	9	8	12	8	27	25	7	26	32	9
		PM	16	B	14	13	11	15	17	14	28	30	17	25	28	14
5	University Ave at 63rd St Signalized	AM	26	C	22	27	24	44	20	11	27	21	11	27	27	21
		PM	36	D	39	36	37	58	38	34	39	33	35	30	29	17

*Delay in seconds per vehicle

Traffic Operations Analysis

Table 1: 2037 Design Year Build Traffic Operations Analysis - University Ave - Windsor Heights, IA

Intersection ID #	Intersection	Peak Hour	Int. Delay*		Movement Delays (sec/veh)											
			INT.	LOS	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
1	University Ave at 73rd St Signalized	AM	23	C	26	32	9	38	42	12	44	12	6	21	20	20
		PM	32	C	30	34	10	33	37	23	48	28	16	75	41	41
2	University Ave at Hy-Vee Signalized	AM	4	A	7	4	0	12	5	2	0	12	0	26	0	5
		PM	8	A	22	6	3	11	7	5	53	80	11	57	0	17
3	University Ave at 70th St Signalized	AM	11	B	10	9	3	7	6	4	50	41	11	36	38	12
		PM	27	C	43	21	5	34	25	19	47	53	27	43	39	24
4	University Ave at 66th St Signalized	AM	25	C	55	32	12	36	24	11	11	10	4	10	14	5
		PM	24	C	62	24	17	36	21	17	37	32	15	35	30	23
5	University Ave at 63rd St Signalized	AM	26	C	15	23	17	35	20	4	28	24	12	29	30	21
		PM	47	D	50	33	28	75	77	48	38	36	37	48	37	22

*Delay in seconds per vehicle