TRAFFIC STUDY

2550 University Avenue Redevelopment
City of Madison, Wisconsin

Prepared for:
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Madison, WI

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[A] Better Experience

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October 2010

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INTRODUCTION

The Mullins Group LLC is proposing a mixed use development in the 2500 block of University Avenue on the west side of the City of Madison, Dane County, Wisconsin. This proposal includes the construction of a combination apartment/townhouse building on the northwest corner of University Avenue and Highland Avenue. The apartment building also includes neighborhood retail on the first floor in addition to the apartments and townhouses and street level and underground parking in a ramp structure under most of the residential complex.

The proposed project is on the north side of University Avenue between Highland Avenue and Grand Avenue and will replace a combination of small vacant retail and small surface parking lots. The south side of University Avenue currently consists of a combination of multi-family residential and commercial uses with a single family residential neighborhood further to the south. To the north is Campus Drive, a four lane access controlled arterial, which was constructed in 1968 as a bypass for this segment of University Avenue. Highland Avenue borders the proposed development on the east with the InnTowner Hotel and other commercial and multi-family residential uses east of Highland Avenue. To the west of the proposed complex is a small Wisconsin Department of Transportation (WisDOT) owned surface parking lot which is currently leased to the City of Madison who rents out spaces monthly.

The site consists of 1.08 acres and the development is planned to be constructed in 2011-2012. Six buildings, which include some commercial and residential uses and three small private parking lots (accommodating approximately 50 vehicles) currently exist on the site. Five of the six buildings are currently vacant. These will be demolished to make way for the new development. The existing Lombardinos Restaurant and its small parking lot located right on the northwest corner of the intersection of University Avenue and Highland Avenue will remain in addition to the WisDOT owned surface parking lot to the immediate west of the proposed development. The remainder of the block will be occupied by the new development.

The proposed development includes a total of approximately 208,000 square feet which includes approximately 113,000 square feet of proposed residential net leasable area, approximately 29,000 square feet of common residential area, approximately 8,500 square feet of proposed commercial, and approximately 57,500 square feet of parking ramp including storage, mechanicals, etc. Several neighborhood meetings have been held to discuss the development and its impacts. The site plan has been modified several times to address the neighborhood desires. An aerial view showing the location of the proposed development is included as Exhibit 1 and a sketch of the proposed development is included as Exhibit 2.

The purpose of this study is to evaluate the effect of the proposed development on the adjacent street network including the following intersections:

University Avenue and Highland Avenue
Highland Avenue and Campus Drive
University Avenue and Grand Avenue

The intersections of Highland Avenue with University Avenue and Campus Drive are both controlled by a traffic signal. The intersection of University Avenue and Grand Avenue is controlled by a stop sign on Grand Avenue.

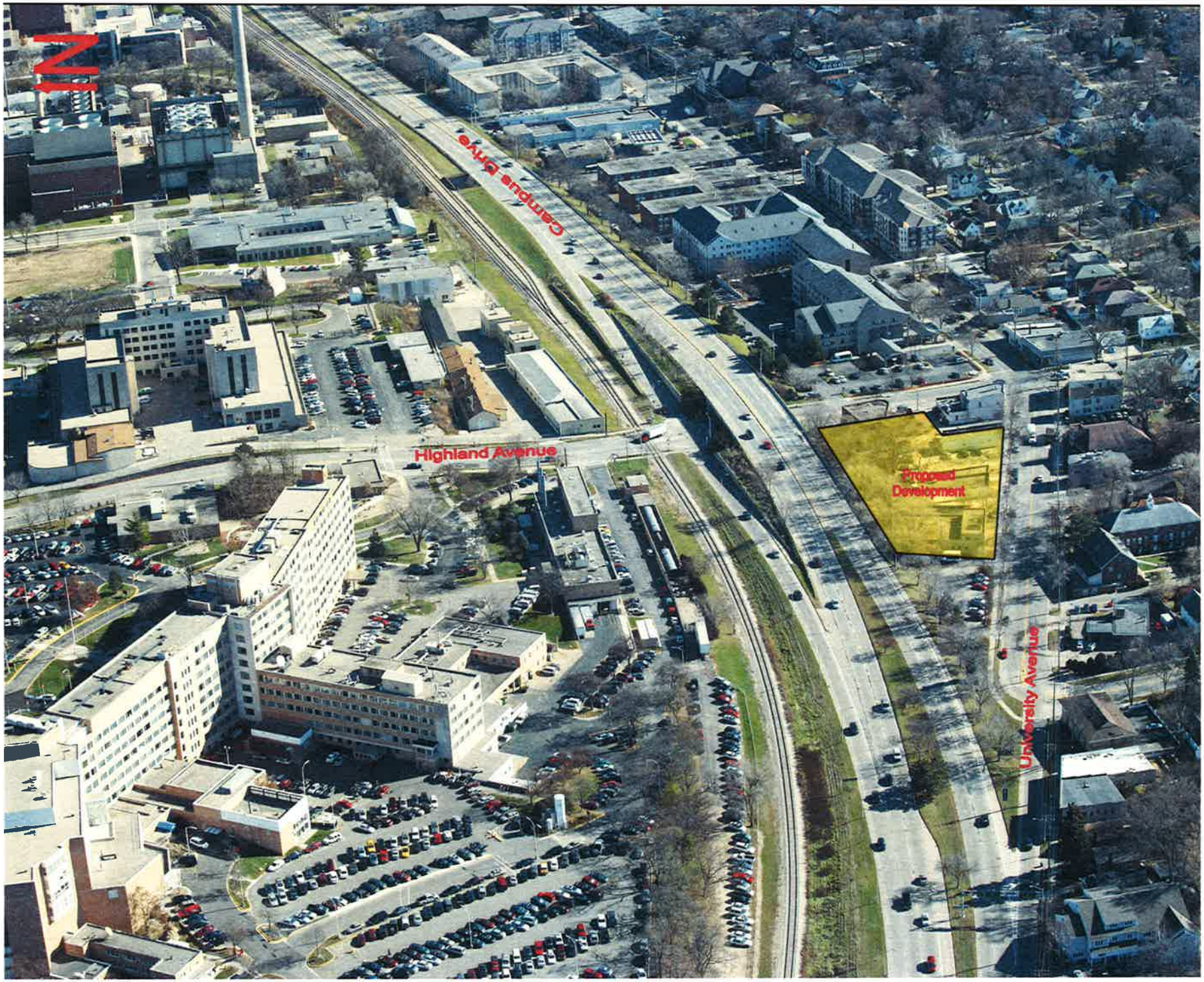
There are currently four driveways which serve the existing development site, three on University Avenue and one on Highland Avenue. The proposed development would maintain the driveway access on Highland Avenue. It is proposed that the University Avenue access be combined with the existing eastern access to the WisDOT owned surface parking lot resulting in a net loss of three curb cuts on University Avenue. This access is expected to serve about one quarter of the vehicles parking in the proposed ramp and the Highland Avenue access is projected to serve the remaining three quarters of the parking spaces in the ramp. The ramp consists mostly of parking for residents of the proposed apartments and townhouses with limited parking for the commercial employees. Customers of the proposed neighborhood commercial businesses who arrive by motor vehicle will be expected to utilize on street parking or parking in the existing WisDOT owned parking lot to the west.

Multi-modal transportation will be encouraged for this development and automobile use will be discouraged. Residents will be required to pay for motor vehicle parking at assigned spaces in the ramp and the City of Madison will not issue residential parking permits for on-street parking. A community car and bicycles will be provided for residents to use on a shared basis. Adequate parking will be provided for privately owned bicycles.

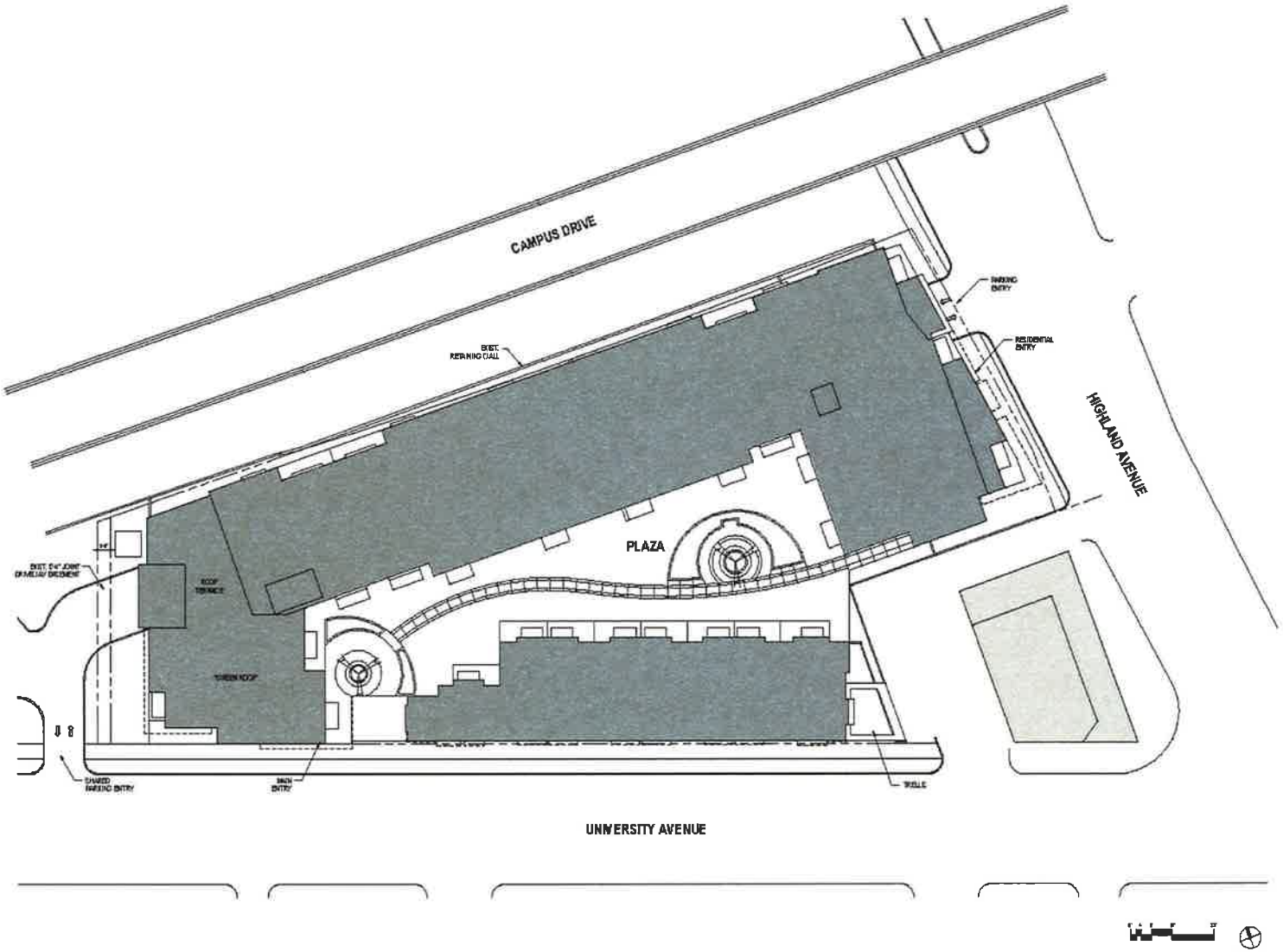
Although close to a single family residential neighborhood to the south, this development is on the western and southern edge of a highly urban area. Parking is currently difficult to find and many people travel through the area by bicycle or on foot. Recent traffic counts show over 200 pedestrians and bicyclists travel through this area during each of the peak hours.

The residential portion of this development will be marketed to young professionals working in the vicinity. Along with being easily accessible by bicycle or on foot to thousands of employment opportunities in the area, the proposed development is located on multiple transit routes.

The commercial portion of the development is intended to be "neighborhood-oriented" retail that would attract local residents including those in the apartments and townhouses and the high number of bicyclists and pedestrians passing through the area.



Mullins: 2550 University Avenue Development **Exhibit 1**



SITE PLAN

VANDEWALLE & ASSOCIATES INC

Mullins Group, LLC

eua

2550 UNIVERSITY AVENUE APARTMENTS

20 OCTOBER 2010

Exhibit 2

DATA COLLECTED

Existing hourly counts for University Avenue and Highland Avenue were obtained from the City of Madison for the past several years. In addition, KL Engineering conducted peak hour traffic counts and observations at the University Avenue – Highland Avenue intersection; the Highland Avenue – Campus Drive intersection; and the University Avenue – Grand Avenue intersection. Copies of these counts, including bicycle and pedestrian counts, are included in Appendix A.

TRIP GENERATION AND DISTRIBUTION

Trip generation was determined by using average trip generation rates obtained from the Institute of Transportation Engineers (ITE) report, Trip Generation, 8th Edition, published by the Institute of Transportation Engineers (ITE) in 2008. This publication is based on more than 4,800 trip generation studies submitted to the Institute by public agencies, developers, consulting firms, and associations. A trip is defined as a single or one-directional movement, with either the origin or destination of the trip being from the proposed development. The trip generation categories from the ITE Trip Generation Manual considered for the residential portion of this project were: Land Use 220 for the apartments and Land Use 230 for the residential townhouses. Although at the time of this report it was undetermined what the specific commercial uses will be, some assumptions were made based on what the Mullins Group anticipate the uses to be. Based on these assumptions, the following land use categories were considered for the commercial portion of the development: Land Use 492, Health/Fitness Club; Land Use 814, Specialty Retail Center; Land Use 932, High Turnover Restaurant; and Land Use 936, Coffee/Donut Shop without Drive-Through Window.

Multi-Use and Pass-By Trips

Trip generation rates for the individual uses were determined based on the ITE rates. Some of the traffic for the new development will be making multiple stops in the development and some trips will be internal to the development and will not require the use of the street system. The commercial uses are intended to attract local area residents including those in the proposed residential units in this development. For purposes of our calculations, the total trips were reduced by 20% to reflect these multiple–use and internal trips.

In addition, some of the trips will be "pass-by trips" which are defined by the ITE Handbook "as intermediate stops on the way from an origin to a primary trip destination without a route diversion. Pass-By trips are attracted from traffic passing the site on an adjacent street or roadway that offers direct access to the generator. Pass-by trips are not diverted from another roadway." These pass-by trips will not be new trips to the surrounding streets. For this development, pass-by trips were estimated to be 20% for the commercial portion of the development. No pass-by trips were assumed for the residential portion.

Both the multi-use reduction and the pass-by adjustments are consistent with ITE standards and are as discussed and agreed upon with the City of Madison Traffic Engineering staff.

Reduction for Multi-Modal Transportation Uses

In addition to the above reductions, a 20 to 50% reduction was taken for multi-modal uses. As stated in the ITE 8th edition Trip Generation User's Guide, ITE trip generation rates are derived from data that is "primarily collected at suburban locations having little or no transit service, nearby pedestrian amenities, or travel demand management (TDM) programs." The proposed development is well served by Madison Metro Transit and is located along multiple citywide and campus transit routes on both University Avenue and Highland Avenue. There are sidewalks along all streets in the area. In addition, a bicycle path on the north side of Campus Drive connects this area to the downtown and the bicycle route to the west along University Avenue. Kendall Avenue, one block to the south, is currently part of a "bicycle boulevard" test pilot where bicycles have the right to use the entire roadway.

One of the Madison area's largest employers, the University of Wisconsin, is located to the north and east of the proposed development. Much of the University, including the University of Wisconsin Hospitals and Clinics and the attached Veterans Administration Hospital, located directly to the north of this project, are within short walking distance. Parking is limited and costly on the University campus while Madison Metro buses, including campus buses, are free to University employees. Therefore few employees are likely to drive from the proposed complex to their employment if it is in the campus area. The developer plans to market the residential units to employees of these facilities, and easy alternative mode access to employment is considered to be one of the prime factors for prospective residents desiring to live in this vicinity. The developer has plans to include a community car and have bicycles available for use by residents to minimize the need for them to have a personal motor vehicle. In addition, the City of Madison does not plan to issue on-street "residential parking permits" to residents of the proposed apartments/townhouses so it is unlikely that residents will own more vehicles than are able to park in the proposed ramp since on-street parking storage will be difficult. All of these factors indicate that this development is likely to have less vehicle trips generated than the "typical" development which was likely studied in the ITE sample data used to calculate average rates.

Considering the above factors, a multi-modal reduction rate of 20% is a conservative estimate for the residential portion of this development. There are approximately 136 proposed parking stalls for the 130 proposed residences and just over one stall per residence. With the 20% reduction rate applied for multi-modal trips, an estimated 547 trips per day will be generated by these 130 proposed residences, an average of just over four trips per day. Since many of the work trips are anticipated to be by alternative modes of transportation (bicycles, pedestrians and transit), it is likely the peak hour reduction could be even greater. The analyses were completed with the 20% reduction to provide a conservative estimate.

In addition, there are already multiple bicycle and walking commuters using the streets in this area either walking from home or parking spots on nearby streets. The manual turning movement count that was completed by KL Engineering in September show that there were 145 pedestrian crossings and 62 bicycles at the intersection of University Avenue and Highland Avenue during the PM peak hour. At the Highland Avenue and Campus Drive intersection and the adjacent bike path, over 135 pedestrians and 140 bicycles crossed in the PM peak hour. The commercial portion of the development is anticipated to be the type that these commuters might utilize on their way past the development and with limited parking in the area, the pedestrian and bicycle commuters are likely to be the primary consumers at these businesses, at least during the peak hours. The combination of these factors and the City of Madison's stated goals of increased use of alternative modes of transportation indicate that a 20 to 50% reduction for multi-modal uses is reasonable. Based on the ITE rates and the type of commercial developments used in this model, a 50% reduction was assumed for the coffee shop and a 20% reduction was assumed for the remainder of the commercial uses.

A summary of the trip generation for this development, for an average daily weekday (residential use only due to the uncertainty of the commercial uses), PM peak hour, and AM peak hour; including the reduction for combined trips, pass-by trips, and multi-modal trips is included as Exhibit 3.

After the above reductions are applied, the proposed development is anticipated to generate approximately 118 motor vehicle trips in the AM peak hour and 94 motor vehicle trips in the PM peak hour. Approximately 15 of the AM peak hour trips are anticipated to be "pass-by" trips and approximately 103 of the AM peak hour trips are anticipated to be "new" trips. In the PM peak hour, approximately 9 of the trips are anticipated to be "pass-by" trips and approximately 85 are anticipated to be new trips.

These trips were assigned to the existing roadway system using current street system geometrics, existing travel patterns, proposed development access and parking layout, and engineering judgment. The proposed development includes two access points, one on Highland Avenue across from the Best Western InnTowner Hotel, approximately 200 feet from both the University Avenue and the Campus Drive intersections; and one on University Avenue approximately halfway between the Grand Avenue intersection and the Highland Avenue intersection.

The Highland Avenue access point is anticipated to provide access to approximately 75% of the total proposed 152 parking stalls in the underground parking ramp and the University Avenue access point is anticipated to provide access to the remaining 25% of the stalls. Approximately 136 of the proposed parking ramp spaces will serve the residents of the apartments/condominiums and the remaining spaces will be employee parking for the proposed commercial businesses. There is no customer parking planned for the commercial uses in the proposed parking ramp. Therefore the two proposed access points to the ramp are anticipated to accommodate most of the residential traffic entering and exiting the development area but only a small portion of the commercial traffic entering the area. The remaining traffic is anticipated to park on-street on University Avenue or off-street at the WisDOT parking lot at the west end of the development. Exhibit 4 shows how trips entering and exiting the area to access the development were distributed during the AM peak hour and Exhibit 5 summarizes trip distribution during the PM peak hour.

EXHIBIT 3

MULLINS: 2550 UNIVERSITY AVENUE REDEVELOPMENT
ESTIMATED TRIP GENERATION

AVERAGE DAILY TRAFFIC - RESIDENTIAL ONLY

Land Use Code	Land Use	Independent Variable	Ind. Variable At Full Build Out 2013	Rate	Number of Trips 2013	Multi-Use Reduction	Total Trips After Multi-Use Reduction	Multi-mode Reduction	Veh Trips After Multi-mode Reduction	Split Entering/ %	Split Exiting %	No. Entering	No. Exiting
220	Apartment	Dwelling Units	119	6.65	791	20%	633	20%	506	50%	50%	253	253
230	Residential Townhouse	Dwelling Units	11	5.81	64	20%	51	20%	41	50%	50%	20	20
	TOTAL RESIDENTIAL TRIPS				855		684		547			274	274
							RESIDENTIAL NEW VEHICLE TRIPS AWT						547

AM PEAK HOUR

Land Use Code	Land Use	Independent Variable	Ind. Variable At Full Build Out 2013	Rate	Number of Trips 2013	Multi-Use Reduction	Total Trips After Multi-Use Reduction	Multi-Mode Reduction	Veh Trips After Multi-mode Reduction	Split Entering/ %	Split Exiting %	No. Entering	No. Exiting	Pass-By Reduction %	Pass-By Reduction No.	Pass-By Entering	Pass-By Exiting	New Vehicle Trips Non Pass-by Entering	New Vehicle Trips Non Pass-by Exiting
220	Apartment	Dwelling Units	119	0.51	61	20%	49	20%	39	20%	80%	8	31	0%	0	0	0	8	31
230	Residential Townhouse	Dwelling Units	11	0.44	5	20%	4	20%	3	17%	83%	1	3	0%	0	0	0	1	3
492	Health/Fitness Club	1,000 SF	3.5	1.38	5	20%	4	20%	3	45%	55%	1	2	20%	1	0	0	1	1
814	Specialty Retail Center	1,000 SF	2.3	1.37	3	20%	3	20%	2	48%	52%	1	1	20%	0	0	0	1	1
932	High-Turnover Restaurant	1,000 SF	1.4	11.52	16	20%	13	20%	10	60%	40%	6	4	20%	2	1	1	5	3
936	Coffee/Donut Shop without Drive-Through Window	1,000 SF	1.3	117.23	152	20%	122	50%	61	51%	49%	31	30	20%	12	6	6	25	24
	TOTALS				242		194		118			48	70		15	8	7	40	63
															TOTAL NEW VEHICLE TRIPS AM				103

PM PEAK HOUR

Land Use Code	Land Use	Independent Variable	Ind. Variable At Full Build Out 2013	Rate	Number of Trips 2013	Multi-Use Reduction	Total Trips After Multi-Use Reduction	Multi-Mode Reduction	Veh Trips After Multi-mode Reduction	Split Entering/ %	Split Exiting %	No. Entering	No. Exiting	Pass-By Reduction %	Pass-By Reduction No.	Pass-By Entering	Pass-By Exiting	New Vehicle Trips Non Pass-by Entering	New Vehicle Trips Non Pass-by Exiting
220	Apartment	Dwelling Units	119	0.62	74	20%	59	20%	47	65%	35%	31	17	0%	0	0	0	31	17
230	Residential Townhouse	Dwelling Units	11	0.52	6	20%	5	20%	4	67%	33%	2	1	0%	0	0	0	2	1
492	Health/Fitness Club	1,000 SF	3.5	3.53	12	20%	10	20%	8	57%	43%	5	3	20%	2	1	1	4	3
814	Specialty Retail Center	1,000 SF	2.3	2.71	6	20%	5	20%	4	44%	56%	2	2	20%	1	0	0	1	2
932	High-Turnover Restaurant	1,000 SF	1.4	11.15	16	20%	12	20%	10	51%	49%	5	5	20%	2	1	1	4	4
936	Coffee/Donut Shop without Drive-Through Window	1,000 SF	1.3	40.75	53	20%	42	50%	21	49%	51%	10	11	20%	4	2	2	8	9
	TOTALS				167		133		94			55	39		9	4	4	50	35
															TOTAL NEW VEHICLE TRIPS PM				85

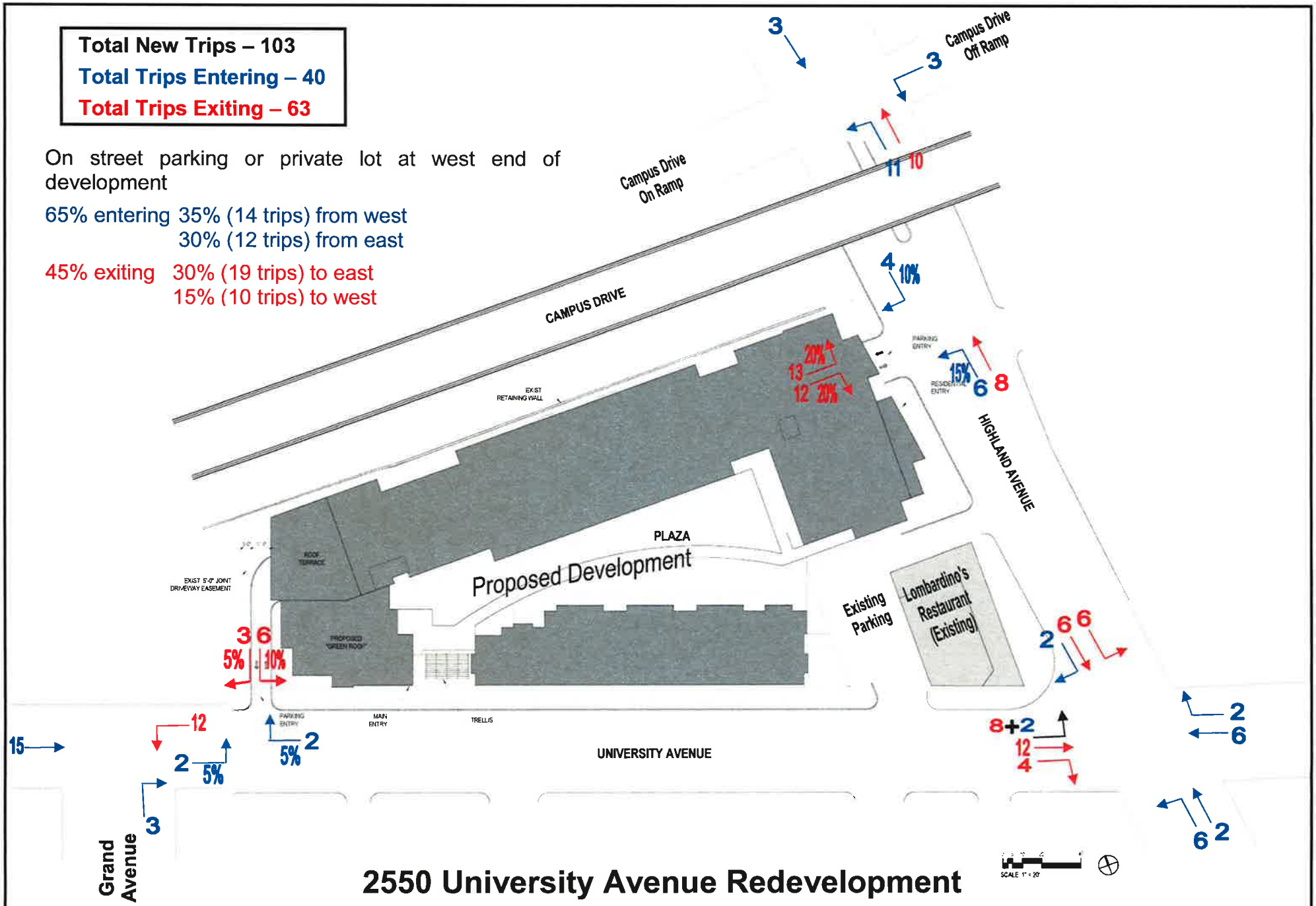
*numbers do not always add up due to rounding

Total New Trips – 103
Total Trips Entering – 40
Total Trips Exiting – 63

On street parking or private lot at west end of development

65% entering 35% (14 trips) from west
30% (12 trips) from east

45% exiting 30% (19 trips) to east
15% (10 trips) to west



2550 University Avenue Redevelopment
Trip Distribution
AM Peak Hour

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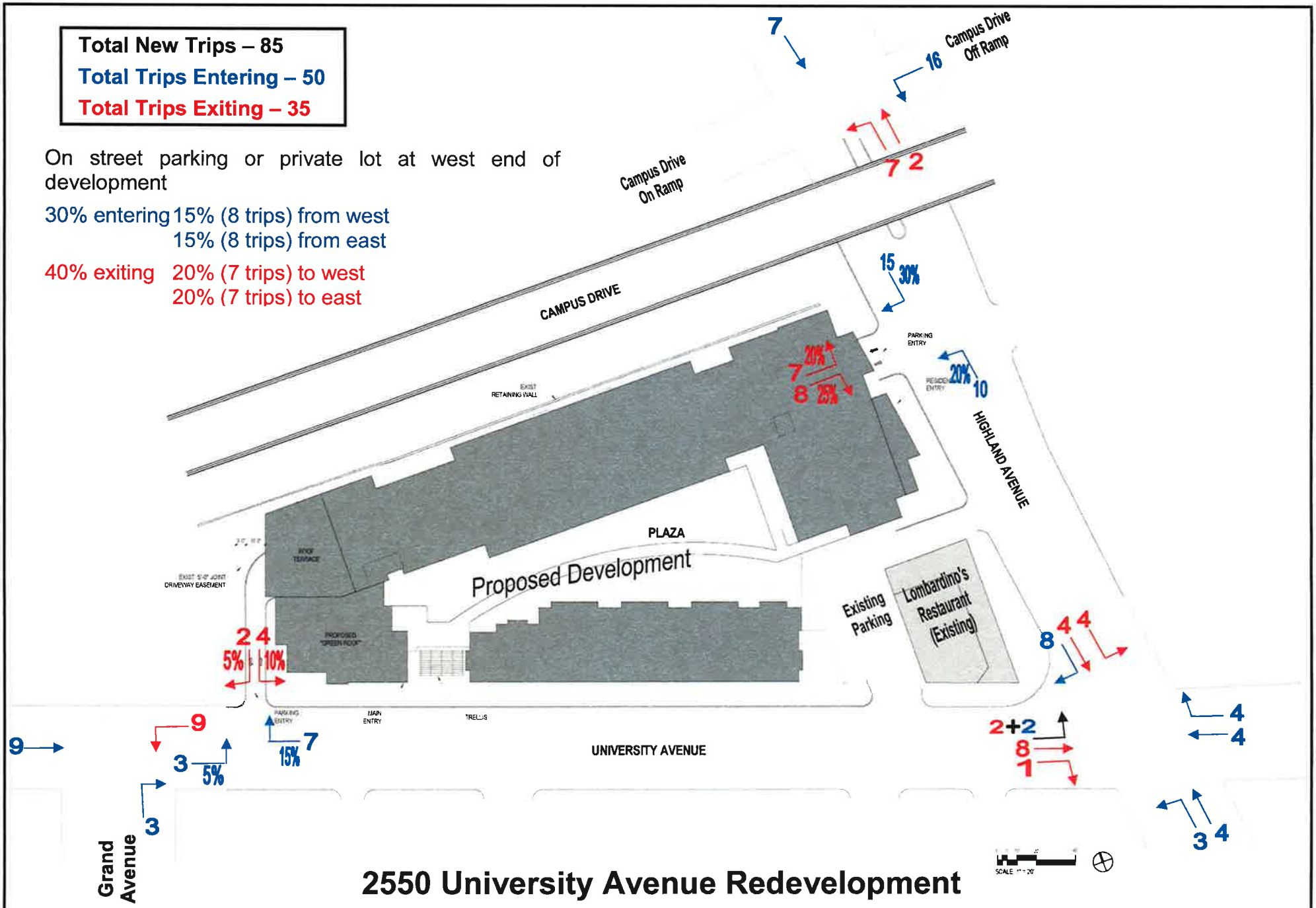
Exhibit 4

Total New Trips – 85
Total Trips Entering – 50
Total Trips Exiting – 35

On street parking or private lot at west end of development

30% entering 15% (8 trips) from west
15% (8 trips) from east

40% exiting 20% (7 trips) to west
20% (7 trips) to east



2550 University Avenue Redevelopment
Trip Distribution
PM Peak Hour

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Exhibit 5

EXISTING ROADWAYS AND CAPACITY ANALYSES

Existing Conditions

University Avenue serves as a one way eastbound exit from Campus Drive on the west end of the analysis area. It becomes a 42 foot roadway at the Grand Avenue intersection. With the exception of the AM peak hour when all parking is prohibited on the south side, parking is allowed on both sides of University Avenue from Grand Avenue to just west of the Highland Avenue intersection. Because of the allowed parking, which is heavily occupied, University Avenue operates as a one lane roadway in each direction west of Highland Avenue with the exception of the AM peak hour. During the AM peak hour, there are two westbound lanes from Grand Avenue to the west. At the Highland Avenue intersection, parking is prohibited at all times within approximately 80 feet of the intersection, resulting in a short two lane approach to the intersection. There are no lane restrictions here therefore the two lanes operate as a right/through lane and a left/through lane with the capability of bypassing vehicles to the right when the left lane is occupied by a vehicle waiting to turn left.

Parking is not allowed on either side of University Avenue from just west of the Highland Avenue intersection to the east. University Avenue on the east approach to the Highland Avenue intersection currently operates as a two lane approach with the right lane marked as a "right turn only" lane and the left lane operating as a left/through lane. Although the right turn lane is marked as a "right turn only" lane, it essentially operates as a combination right turn lane and through lane at the intersection as vehicles use it to bypass vehicles stopped in the left lane to turn south on Highland Ave.

Highland Avenue is a 36 foot wide roadway to the south with the centerline marked to give northbound traffic 22 feet. With the 22 foot width northbound, right turning vehicles are able to bypass vehicles waiting at a red signal and through vehicles are able to bypass vehicles stopped to turn left.

Highland Avenue north of the University Avenue intersection is 44 feet wide and has two marked lanes for southbound traffic. The left lane is designated as a "left turn only" lane and the right lane serves as a combination through/right turn lane. Although parking is allowed on the west side of Highland Avenue approximately 100 feet north of the University Avenue intersection during most of the day, no parking is allowed on Highland Avenue north of University Avenue during the PM peak hour. There is a private drive approximately 80 feet north of University Avenue on the west side of Highland Avenue. This drive, which will remain, currently serves a small parking lot for the existing Lombardinos restaurant and is also one of two access points to a 30 car private parking lot between existing buildings. There is an additional private drive, approximately 80 feet north of the Lombardinos drive, which currently serves a small (10-12 vehicle) private parking lot and is proposed to be the location of the main access point to the proposed development. Opposite it is a driveway serving the Best Western InnTowner Hotel on the east side of Highland Avenue. These drives are approximately halfway between the University Avenue and the Campus Drive intersections. Highland Avenue widens to two lanes in each direction just north of this location.

The intersection of Campus Drive and Highland Avenue serves the westbound on and off ramps from Campus Drive. Both approaches of Highland Avenue and the Campus Drive off-ramp have two lane approaches to this intersection with no lanes restricted to specific traffic movements. There is no parking allowed on any of the approaches to this intersection.

Grand Avenue is a residential street that intersects University Avenue just east of where University Avenue serves as a one-way exit from Campus Drive. University Avenue has a one lane approach from both directions at this location. Westbound traffic is forced to turn left onto Grand Avenue.

The University Avenue / Highland Avenue intersection is planned for reconstruction in 2011. Specific details of the proposed design are not currently available from the City of Madison Engineering Division.

Capacity Analyses

Highway Capacity Analyses were completed for the intersections of University Avenue and Highland Avenue; Highland Avenue and Campus Drive; and University Avenue and Grand Avenue in the AM and PM peak hours. An explanation of the level of service (LOS) is included in Appendix B. The analyses were completed for existing traffic and for total traffic with added development trips at each intersection. To determine existing traffic, automatic hose counts for the past four years were compared to the manual turning counts. It appears that construction on University Avenue to the west of the proposed development and the downturn in the economy may have resulted in the manual counts and the 2010 automatic hose counts being low when compared to automatic hose counts from previous years for University Avenue traffic. As a result, traffic on University Avenue was increased by 30% for the PM peak hour and 20% for the AM peak hour from the manual counts. Manual traffic counts did not appear low for Highland Avenue, Grand Avenue, or Campus Drive, so those volumes were not adjusted.

These analyses show that in the AM peak hour all intersections and all traffic movements operate at LOS C or better currently and are anticipated to continue to do so with added development traffic. In the PM peak hour, the analyses show that the westbound approach on University Avenue at Highland Avenue operates at LOS C but the left lane, which serves as a combined left/through lane, operates at LOS D. The right lane on this approach is currently marked as a "right turn only" lane which would theoretically force all through vehicles, in addition to all left turning vehicles, to use the left lane. However, observations during the peak hours indicate that straight through vehicles typically will use the right lane to bypass vehicles waiting to turn left and therefore in practice the lanes operate as unmarked lanes with through vehicles using either lane depending on the traffic in the adjacent lane. When the intersection was modeled this way, all traffic movements improved to LOS C or better. Given the volume of left turns at this location, consideration should be given to leaving the lanes as unmarked rather than designating a separate right turn lane. The capacity analyses for these intersections are included in Appendix C.

The proposed development generates a total of 85 new vehicle trips in the PM peak hour and 103 new vehicle trips in the AM peak hour. The maximum effect on one intersection is 56 additional vehicles at the intersection of University Avenue and Highland Avenue in the AM peak hour. In reality, the margin of error and daily variability of the traffic exceeds the number of trips expected to be generated by this development in the peak hours. The proposed development will have minimal effect on these intersections and on the street system in this area.

AM & PM PEAK HOUR
LEVEL OF SERVICE TRAFFIC OPERATIONS
UNIVERSITY AVENUE AND HIGHLAND AVENUE

Intersection	Intersection	Northbound Approach	Southbound Approach	Eastbound Approach	Westbound Approach
University Ave./ Highland Ave. **Existing AM Peak Hour**	LOS B 13.5 sec delay	Approach LOS A 8.4 sec delay	Approach LOS B 13.0 sec delay Left LOS B 16.3 sec delay Thru/Right LOS A 9.5 sec delay	Approach LOS B 18.7 sec delay	Approach LOS A 5.9 sec delay Left/Through LOS B 11.9 sec delay Right LOS A 2.8 sec delay
University Ave./ Highland Ave. **AM Peak Hour with proposed development**	LOS B 14.0 sec delay	Approach LOS A 8.6 sec delay	Approach LOS B 14.0 sec delay Left LOS B 17.8 sec delay Thru/Right LOS B 10.0 sec delay	Approach LOS B 19.3 sec delay	Approach LOS A 6.0 sec delay Left/Through LOS B 12.0 sec delay Right LOS A 2.8 sec delay
University Ave./ Highland Ave. **Existing PM Peak Hour**	LOS B 16.9 sec delay	Approach LOS A 8.5 sec delay	Approach LOS B 15.3 sec delay Left LOS B 17.3 sec delay Thru/Right LOS B 14.0 sec delay	Approach LOS B 14.2 sec delay	Approach LOS C 25.3 sec delay Left/Through LOS D 42.9 sec delay Right LOS A 3.0 sec delay

Intersection	Intersection	Northbound Approach	Southbound Approach	Eastbound Approach	Westbound Approach
University Ave./ Highland Ave. **PM Peak Hour with proposed development**	LOS B 17.3 sec delay	Approach LOS A 8.7 sec delay	Approach LOS B 15.7 sec delay Left LOS B 17.9 sec delay Thru/Right LOS B 14.4 sec delay	Approach LOS B 14.2 sec delay	Approach LOS D 26.1 sec delay Left/Through LOS D 44.3 sec delay Right LOS A 3.0 sec delay
University Ave./ Highland Ave. **Existing PM Peak Hour** **No marked RT lane on WB University (all lanes unmarked)**	LOS B 15.2 sec delay	Approach LOS A 4.9 sec delay	Approach LOS A 8.0 sec delay Left LOS A 9.1 sec delay Thru/Right LOS A 7.3 sec delay	Approach LOS C 26.6 sec delay	Left/Through LOS C 20.8 sec delay
University Ave./ Highland Ave. **PM Peak Hour with proposed development** **No marked RT lane on WB University (all lanes unmarked)**	LOS B 15.8 sec delay	Approach LOS A 4.9 sec delay	Approach LOS A 8.6 sec delay Left LOS A 9.8 sec delay Thru/Right LOS A 7.9 sec delay	Approach LOS C 27.7 sec delay	Approach LOS C 21.2 sec delay

AM & PM PEAK HOUR
LEVEL OF SERVICE TRAFFIC OPERATIONS
UNIVERSITY AVENUE AND CAMPUS DRIVE

Intersection	Intersection	Northbound Approach	Southbound Approach	Eastbound Approach	Westbound Approach
University Ave./Campus Dr. **Existing AM Peak Hour**	LOS A 6.2 sec delay	Approach LOS A 3.6 sec delay	Approach LOS A 3.0 sec delay	N/A	Approach LOS B 12.2 sec delay
University Ave./Campus Dr. **AM Peak Hour with proposed development**	LOS A 6.4 sec delay	Approach LOS A 4.2 sec delay	Approach LOS A 3.0 sec delay	N/A	Approach LOS B 12.2 sec delay
University Ave./Campus Dr. **Existing PM Peak Hour**	LOS A 3.0 sec delay	Approach LOS A 1.5 sec delay	Approach LOS A 2.1 sec delay	N/A	Approach LOS B 11.2 sec delay
University Ave./Campus Dr. **PM Peak Hour with proposed development**	LOS A 3.5 sec delay	Approach LOS A 2.2 sec delay	Approach LOS A 2.3 sec delay	N/A	Approach LOS B 12.5 sec delay

AM & PM PEAK HOUR
LEVEL OF SERVICE TRAFFIC OPERATIONS
UNIVERSITY AVENUE AND GRAND AVENUE

Intersection	Intersection	Northbound Approach	Southbound Approach	Eastbound Approach	Westbound Approach
University Ave./Grand Ave. **Existing AM Peak Hour**	N/A	Approach LOS C 15.1 sec delay	N/A	N/A	Left LOS A 8.9 sec delay
University Ave./Grand Ave. **AM Peak Hour with proposed development**	N/A	Approach LOS C 18.3 sec delay	N/A	N/A	Left LOS A 9.5 sec delay
University Ave./Grand Ave. **Existing PM Peak Hour**	N/A	Approach LOS B 10.9 sec delay	N/A	N/A	Left LOS A 8.5 sec delay
University Ave./Grand Ave. **PM Peak Hour with proposed development**	N/A	Approach LOS B 11.0 sec delay	N/A	N/A	Left LOS A 8.6 sec delay

To evaluate the proposed development access point on Highland Avenue, an analysis was completed using the technique for gap analysis and queue theory from "Fundamentals of Traffic Engineering." The following table is excerpted from that document. Based on this table, with a flow rate of approximately 1000 vehicles during each of the peak hours on Highland Avenue, an acceptable gap of 7 seconds with a 4 second follow up gap, there are expected to be approximately 200 acceptable gaps per hour on Highland Avenue. The driveway access at this location is anticipated to generate approximately 25 vehicles exiting during the AM peak hour and 15 vehicles exiting during the PM peak hour. In addition, approximately six vehicles during the AM peak hour and ten vehicles during the PM peak hour are anticipated to turn left into this access point. Therefore approximately 31 gaps are required during the AM peak hour and 25 gaps are required during the PM peak hour.

MAXIMUM FLOW RATES CROSSING STREAMS OF UNINTERRUPTED TRAFFIC

Assumed Value of		Value of Q (veh/h)			Typical Situation
T (s)	t (s)	800	1200	1600	
8	4.5	200	90	40	STOP sign control
7	4	270	135	65	
6	3.5	365	200	105	

where Q = total flow rate on the uncontrolled street in both directions (veh/h)
T = average gap acceptable to the first driver on side street (s)
t = average follow-up gap for other drivers to follow first driver into the intersection when a large gap occurs (s).

A separate Highway Capacity Analysis was completed for this access point which projects a LOS A for the left turn into this access point and LOS C for vehicles exiting this access point in both the AM and PM peak hours. This analysis is included in Appendix D.

Based on these two studies, under free flow traffic conditions, the access point on Highland Avenue would be able to adequately accommodate the increase in traffic expected to result from the development entering and exiting at this location. With this access point midway between the closely spaced traffic signals at University Avenue and Campus Drive, observations during the peak hours indicate that queues occasionally extend beyond this access point. However, the traffic signals at these intersections are coordinated and these backups are usually quickly cleared when Highland Avenue traffic receives a green light. Vehicles entering and exiting the InnTowner Hotel on the east side of Highland Avenue opposite this proposed access location were not observed having difficulty entering the flow of traffic or turning left across traffic here.

CONCLUSIONS

The Mullins Group 2550 University Avenue Redevelopment, at the northwest quadrant of the intersection of University Avenue and Highland Avenue, is proposed to be completed in 2012. This development includes a combination of apartments and townhouses with some first floor neighborhood retail. The residential portion of the development will be marketed for young professionals employed nearby within easy walking and biking distance and the commercial portion of the development will be marketed towards neighborhood-oriented businesses. After reductions for internal, mixed use and multi-modal trips, the proposed development is anticipated to generate approximately 103 new motor vehicle trips in the AM peak hour and approximately 85 new motor vehicle trips in the PM peak hour.

The proposed development includes two access points, one on Highland Avenue approximately 200 feet from both the University Avenue and the Campus Drive intersections, and one on University Avenue approximately halfway between the Grand Avenue intersection and the Highland Avenue intersection.

With the relatively low volume of traffic projected to be generated by this development; additional vehicular traffic is less than 5% of the existing traffic in each of the peak hours; there is no expected adverse effect on nearby streets or intersections. Any change in level of service or delay expected is negligible. In reality, the traffic generated by this development at any one intersection is less than the margin of error of the traffic counts and the variability of traffic on a daily basis.

Current parking lots, which will be demolished as part of this redevelopment, have a capacity of over 50 vehicles and are primarily used by people who work in the vicinity during the day and by area restaurant customers at night. Trips currently generated by these parking lots were not taken into account for purposes of this study but it is likely that the new trips generated by this development will be offset considerably by the decrease in trips currently accessing these lots.

Although the development won't have a significant effect on area roadways, the intersections of Highland Avenue with University Avenue and Campus Drive, as well as the intersection of Grand Avenue with University Avenue were evaluated using Synchro and Highway Capacity Analyses software. According to these analyses, all three of these intersections operate at a level of service (LOS) C or better in both peak hours and are expected to remain at LOS C with development traffic. All traffic movements at these intersections also operate at LOS C or better with the exception of the westbound left lane at the intersection of Highland Avenue and University Avenue. This lane serves as a combination through/left turn lane with the right lane marked as a "right turn only" lane. When the intersection is modeled by Syncho with this existing lane designation, the left lane operates at LOS D in the PM peak hour. However, field observations indicate that motorists will usually use the right turn lane to bypass left turning vehicles even if they are proceeding straight on University Avenue. When modeled as it is currently operating, this left turn operates at LOS C in the PM peak hour. Because the intersection is currently operating this way and considering the

volume of left turning traffic, consideration should be given to removing the "right turn only" designation for the right lane on the westbound approach to University Avenue and leaving both lanes as unmarked when the intersection is reconstructed in 2011. This would essentially result in the markings being consistent with what is currently motorists' practice. An alternative to this would be to create a separate left turn lane on westbound University Avenue so through vehicles do not have to share a lane with the left turning vehicles.

Neighborhood issues include additional traffic on Grand Avenue and other neighborhood streets to the south. The traffic volume increase projected for Grand Avenue is less than 15 vehicles in each of the peak hours. This represents approximately ten percent of the existing volume on this street.

A Highway Capacity analysis was also completed for the proposed access point on Highland Avenue located opposite the driveway for the InnTowner Hotel approximately midway between the intersections of Highland Avenue with University Avenue and Campus Drive. This analysis shows an acceptable level of service for traffic exiting and entering at this location. Traffic volumes are projected to be low with a maximum of 25 exiting or 25 entering during the peak hours. This should result in minimal adverse effect on Highland Avenue traffic. To enhance the flow of traffic on Highland Avenue, the location of the bus stop on the east side of Highland Avenue just south of this access point should be reviewed with Madison Metro. Traffic would move more efficiently if buses were not allowed to linger for long periods of time as was observed during the traffic counts. This would also have a positive effect for the high number of bicyclists using this corridor.

In order for retail businesses to survive, short term parking is necessary. On-street parking in this area is all posted with a two-hour maximum time limit, however the nature of the businesses are such that shorter term parking is desirable. Currently, the WisDOT owned parking lot is leased by the City of Madison and rented as monthly parking. Consideration should be given to converting this lot to short-term parking for the existing and proposed commercial uses and also possibly converting some of the existing on-street parking to shorter term parking. If this is done, removal of the four parking spaces on the west side of Highland Avenue north of the University Avenue intersection could be considered during heavy travel periods. Parking is already prohibited here during the PM peak hour, but both vehicular and bicycle travel flow would be improved if this restriction was extended to other heavy travel periods of the day.

Because of the large employers in the immediate vicinity, many of the residents are expected to find alternative modes of transportation to get to work. This development is close to transit routes and existing bike routes. Additional residents and the businesses which will attract neighborhood residents to the south will likely increase pedestrian and bicycle usage through this area. Consideration should be given to improving accommodations for bicycles and pedestrians. Recent counts show between 35 and 45 bicycles in a north/south direction on Highland Ave. in each of the peak hours. Currently, although Highland Avenue is part of a marked bike route, there are no marked bike lanes. As space permits, bike lanes or a wider outside lane on Highland

Avenue should be considered as part of the redesign of the University Avenue – Highland Avenue intersection.

Counts at the intersection of University Avenue and Highland Avenue show approximately 150 pedestrian crossings in each of the peak hours. The traffic signals here provide adequate time for these crossings. To emphasize the need to yield for pedestrian crossings, especially for the large number of turning vehicles proceeding on a green light, enhanced crosswalks should be considered as part on the planned reconstruction at this intersection.

Traffic Demand Management techniques will be implemented as part of the development. Limited motor vehicle traffic will be encouraged by providing a community car and bicycles; requiring payment for assigned parking spaces; and providing parking for bicycles and mopeds. Transit use will be promoted by education of available routes and assistance in obtaining passes. Route maps may be available on-site.

APPENDIX A
Traffic Volumes

KL Engineering, Inc.

5950 Seminole Centre Court
Madison, WI 53711

Highland Avenue - University Avenue
AM Peak Hour
Madison, Dane County WI
Turning Movement Count

File Name : Highland Ave. - University Ave. AM
Site Code : 10030031
Start Date : 9/21/2010
Page No : 1

Groups Printed- Cars - Trucks & Buses

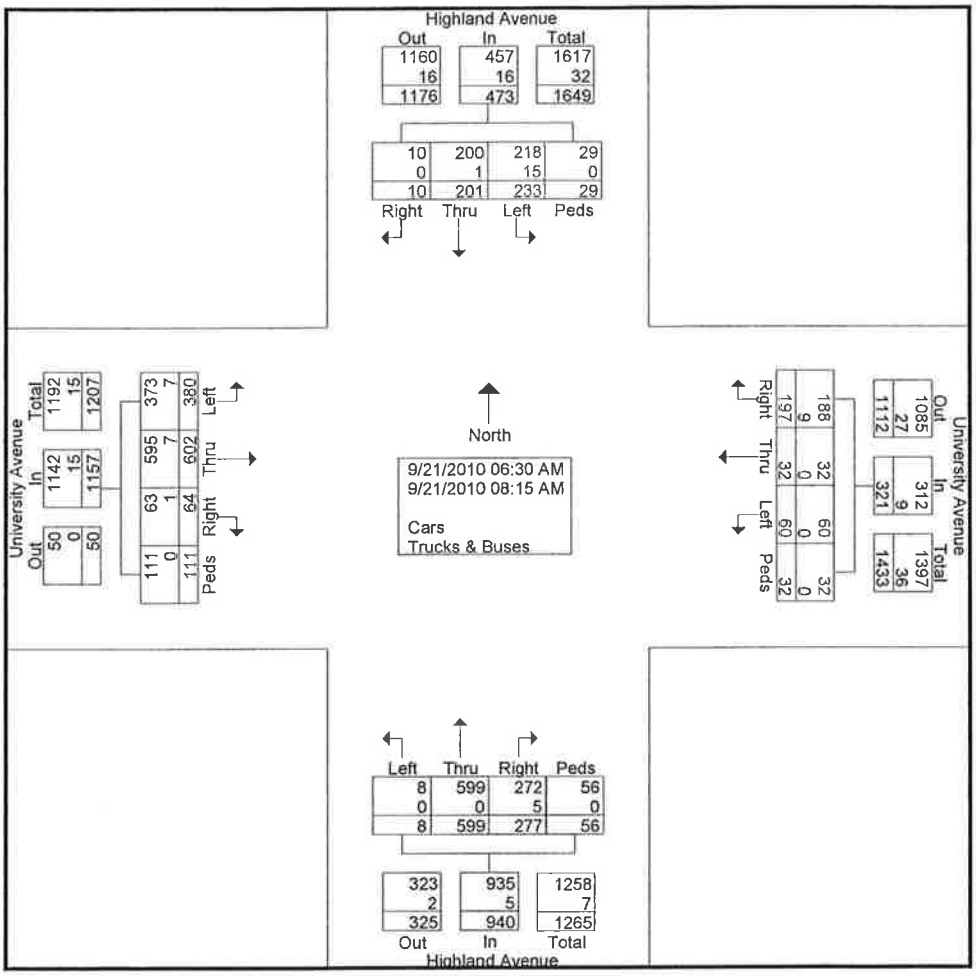
	Highland Avenue From North					University Avenue From East					Highland Avenue From South					University Avenue From West					
Start Time	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Int. Total
06:30 AM	0	6	13	0	19	14	2	2	0	18	34	64	0	2	100	4	35	36	7	82	219
06:45 AM	0	18	18	2	38	10	1	4	2	17	33	84	1	2	120	3	44	41	13	101	276
Total	0	24	31	2	57	24	3	6	2	35	67	148	1	4	220	7	79	77	20	183	495
07:00 AM	0	24	24	4	52	25	4	5	4	38	23	70	2	5	100	8	48	32	13	101	291
07:15 AM	1	15	22	9	47	20	3	5	3	31	46	87	0	3	136	4	73	55	20	152	366
07:30 AM	1	38	50	8	97	28	6	7	5	46	36	79	2	7	124	10	81	51	18	160	427
07:45 AM	0	49	37	3	89	41	4	17	8	70	28	62	2	20	112	12	115	59	21	207	478
Total	2	126	133	24	285	114	17	34	20	185	133	298	6	35	472	34	317	197	72	620	1562
08:00 AM	5	23	31	2	61	32	8	9	6	55	36	88	1	6	131	20	99	60	11	190	437
08:15 AM	3	28	38	1	70	27	4	11	4	46	41	65	0	11	117	3	107	46	8	164	397
Grand Total	10	201	233	29	473	197	32	60	32	321	277	599	8	56	940	64	602	380	111	1157	2891
Apprch %	2.1	42.5	49.3	6.1		61.4	10	18.7	10		29.5	63.7	0.9	6		5.5	52	32.8	9.6		
Total %	0.3	7	8.1	1	16.4	6.8	1.1	2.1	1.1	11.1	9.6	20.7	0.3	1.9	32.5	2.2	20.8	13.1	3.8	40	
Cars	10	200	218	29	457	188	32	60	32	312	272	599	8	56	935	63	595	373	111	1142	2846
% Cars	100	99.5	93.6	100	96.6	95.4	100	100	100	97.2	98.2	100	100	100	99.5	98.4	98.8	98.2	100	98.7	98.4
Trucks & Buses	0	1	15	0	16	9	0	0	0	9	5	0	0	0	5	1	7	7	0	15	45
% Trucks & Buses	0	0.5	6.4	0	3.4	4.6	0	0	0	2.8	1.8	0	0	0	0.5	1.6	1.2	1.8	0	1.3	1.6

KL Engineering, Inc.

5950 Seminole Centre Court
Madison, WI 53711

Highland Avenue - University Avenue
AM Peak Hour
Madison, Dane County WI
Turning Movement Count

File Name : Highland Ave. - University Ave. AM
Site Code : 10030031
Start Date : 9/21/2010
Page No : 2



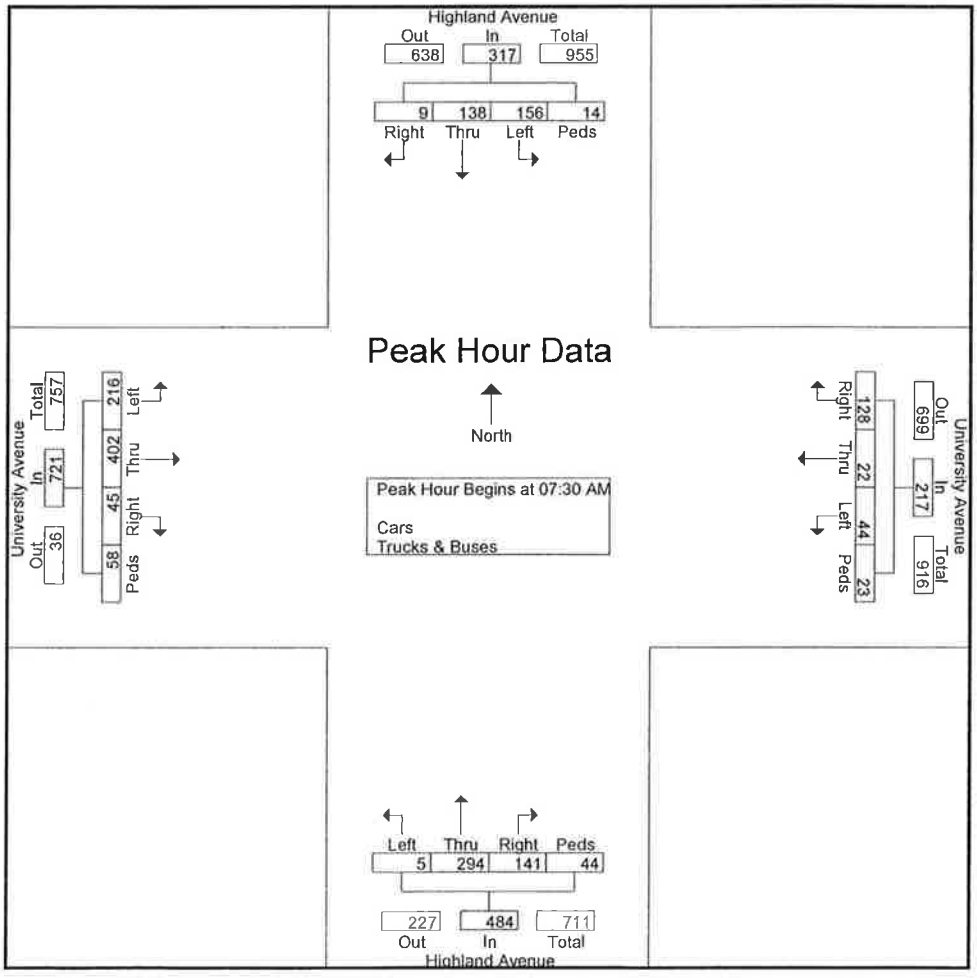
KL Engineering, Inc.

5950 Seminole Centre Court
Madison, WI 53711

Highland Avenue - University Avenue
AM Peak Hour
Madison, Dane County WI
Turning Movement Count

File Name : Highland Ave. - University Ave. AM
Site Code : 10030031
Start Date : 9/21/2010
Page No : 3

	Highland Avenue From North					University Avenue From East					Highland Avenue From South					University Avenue From West					
Start Time	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Int. Total
Peak Hour Analysis From 06:30 AM to 08:15 AM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 07:30 AM																					
07:30 AM	1	38	**50**	**8**	**97**	28	6	7	5	46	36	79	**2**	7	124	10	81	51	18	160	427
07:45 AM	0	**49**	37	3	89	**41**	**4**	**17**	**8**	**70**	28	62	2	**20**	112	12	**115**	59	**21**	**207**	**478**
08:00 AM	**5**	23	31	2	61	32	**8**	9	6	55	36	**88**	1	6	**131**	**20**	99	**60**	11	190	437
08:15 AM	3	28	38	1	70	27	4	11	4	46	**41**	65	0	11	117	3	107	46	8	164	397
Total Volume	9	138	156	14	317	128	22	44	23	217	141	294	5	44	484	45	402	216	58	721	1739
% App. Total	2.8	43.5	49.2	4.4		59	10.1	20.3	10.6		29.1	60.7	1	9.1		6.2	55.8	30	8		
PHF	.450	.704	.780	.438	.817	.780	.688	.647	.719	.775	.860	.835	.625	.550	.924	.563	.874	.900	.690	.871	.910



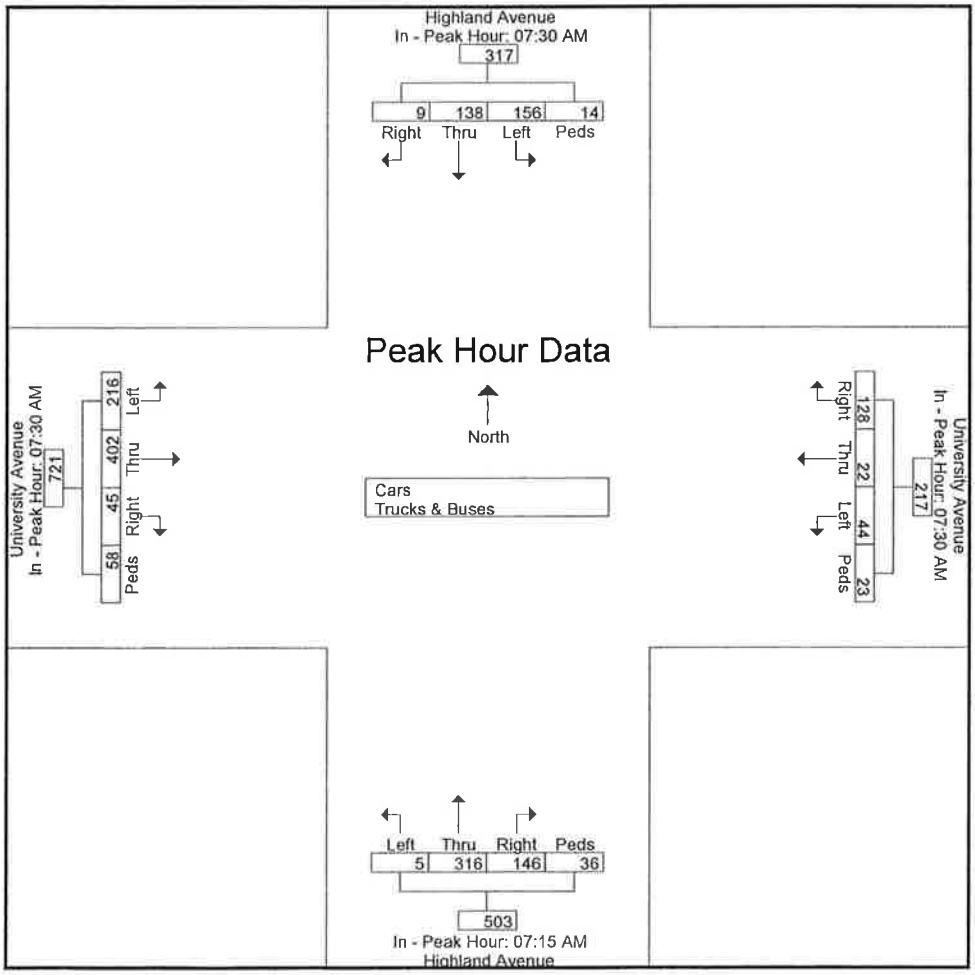
KL Engineering, Inc.

5950 Seminole Centre Court
Madison, WI 53711

Highland Avenue - University Avenue
AM Peak Hour
Madison, Dane County WI
Turning Movement Count

File Name : Highland Ave. - University Ave. AM
Site Code : 10030031
Start Date : 9/21/2010
Page No : 4

	Highland Avenue From North					University Avenue From East					Highland Avenue From South					University Avenue From West					
Start Time	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Int. Total
Peak Hour Analysis From 06:30 AM to 08:15 AM - Peak 1 of 1																					
Peak Hour for Each Approach Begins at:																					
	07:30 AM					07:30 AM					07:15 AM					07:30 AM					
+0 mins.	1	38	**50**	**8**	**97**	28	6	7	5	46	**46**	87	0	3	**136**	10	81	51	18	160	
+15 mins.	0	**49**	37	3	89	**41**	4	**17**	**8**	**70**	36	79	**2**	7	124	12	**115**	59	**21**	**207**	
+30 mins.	**5**	23	31	2	61	32	**8**	9	6	55	28	62	2	**20**	112	**20**	99	**60**	11	190	
+45 mins.	3	28	38	1	70	27	4	11	4	46	36	**88**	1	6	131	3	107	46	8	164	
Total Volume	9	138	156	14	317	128	22	44	23	217	146	316	5	36	503	45	402	216	58	721	
% App. Total	2.8	43.5	49.2	4.4		59	10.1	20.3	10.6		29	62.8	1	7.2		6.2	55.8	30	8		
PHF	.450	.704	.780	.438	.817	.780	.688	.647	.719	.775	.793	.898	.625	.450	.925	.563	.874	.900	.690	.871	



KL Engineering, Inc.

5950 Seminole Centre Court
Madison, WI 53711

Campus Drive ramps & Highland Ave.
AM Peak Hour
Madison, Dane County Wisconsin
Turning Movement Count

File Name : Campus Dr - Highland AM
Site Code : 10030011
Start Date : 9/21/2010
Page No : 1

Groups Printed- Cars - Trucks & Buses

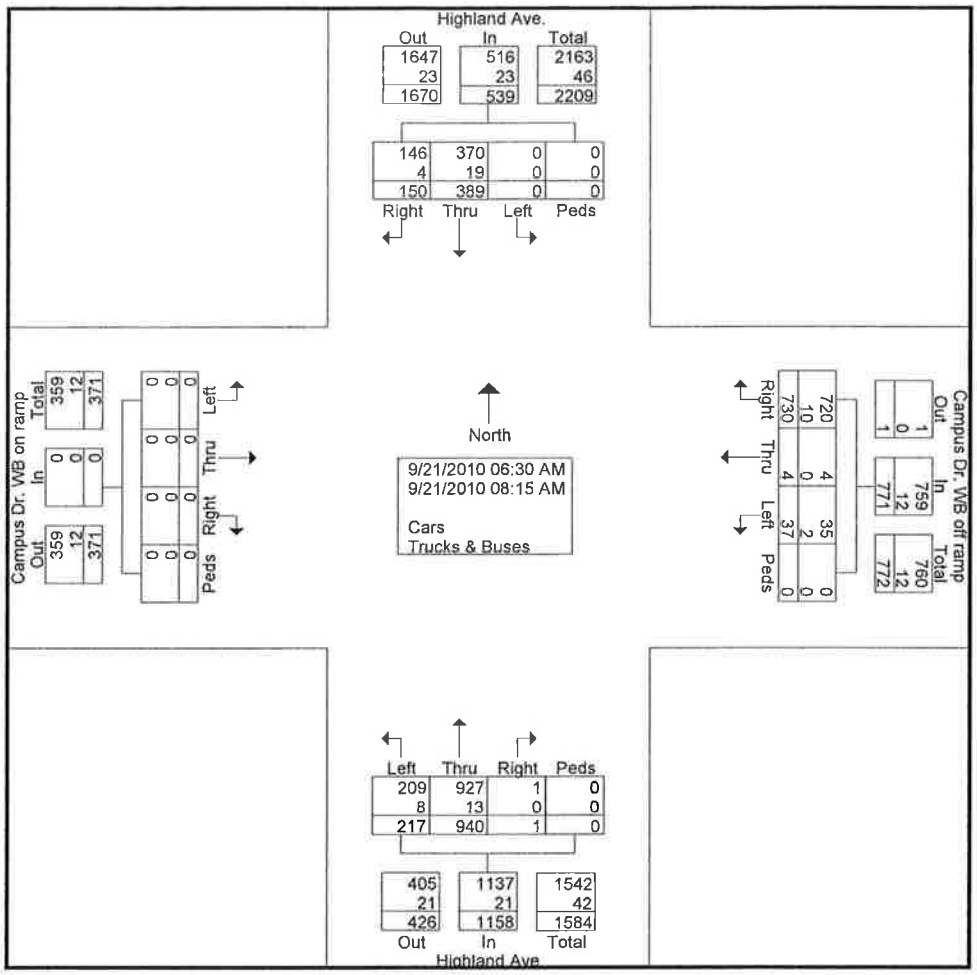
	Highland Ave. From North					Campus Dr. WB off ramp From East					Highland Ave. From South					Campus Dr. WB on ramp From West					
Start Time	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Int. Total
06:30 AM	10	16	0	0	26	98	0	1	0	99	0	104	6	0	110	0	0	0	0	0	235
06:45 AM	14	38	0	0	52	84	1	2	0	87	0	124	10	0	134	0	0	0	0	0	273
Total	24	54	0	0	78	182	1	3	0	186	0	228	16	0	244	0	0	0	0	0	508
07:00 AM	17	30	0	0	47	61	0	6	0	67	1	101	23	0	125	0	0	0	0	0	239
07:15 AM	12	47	0	0	59	107	0	4	0	111	0	122	30	0	152	0	0	0	0	0	322
07:30 AM	33	80	0	0	113	78	1	5	0	84	0	125	33	0	158	0	0	0	0	0	355
07:45 AM	17	73	0	0	90	114	1	8	0	123	0	127	43	0	170	0	0	0	0	0	383
Total	79	230	0	0	309	360	2	23	0	385	1	475	129	0	605	0	0	0	0	0	1299
08:00 AM	25	50	0	0	75	101	1	7	0	109	0	123	47	0	170	0	0	0	0	0	354
08:15 AM	22	55	0	0	77	87	0	4	0	91	0	114	25	0	139	0	0	0	0	0	307
Grand Total	150	389	0	0	539	730	4	37	0	771	1	940	217	0	1158	0	0	0	0	0	2468
Apprch %	27.8	72.2	0	0		94.7	0.5	4.8	0		0.1	81.2	18.7	0		0	0	0	0		
Total %	6.1	15.8	0	0	21.8	29.6	0.2	1.5	0	31.2	0	38.1	8.8	0	46.9	0	0	0	0	0	
Cars	146	370	0	0	516	720	4	35	0	759	1	927	209	0	1137	0	0	0	0	0	2412
% Cars	97.3	95.1	0	0	95.7	98.6	100	94.6	0	98.4	100	98.6	96.3	0	98.2	0	0	0	0	0	97.7
Trucks & Buses	4	19	0	0	23	10	0	2	0	12	0	13	8	0	21	0	0	0	0	0	56
% Trucks & Buses	2.7	4.9	0	0	4.3	1.4	0	5.4	0	1.6	0	1.4	3.7	0	1.8	0	0	0	0	0	2.3

KL Engineering, Inc.

5950 Seminole Centre Court
Madison, WI 53711

Campus Drive ramps & Highland Ave.
AM Peak Hour
Madison, Dane County Wisconsin
Turning Movement Count

File Name : Campus Dr - Highland AM
Site Code : 10030011
Start Date : 9/21/2010
Page No : 2



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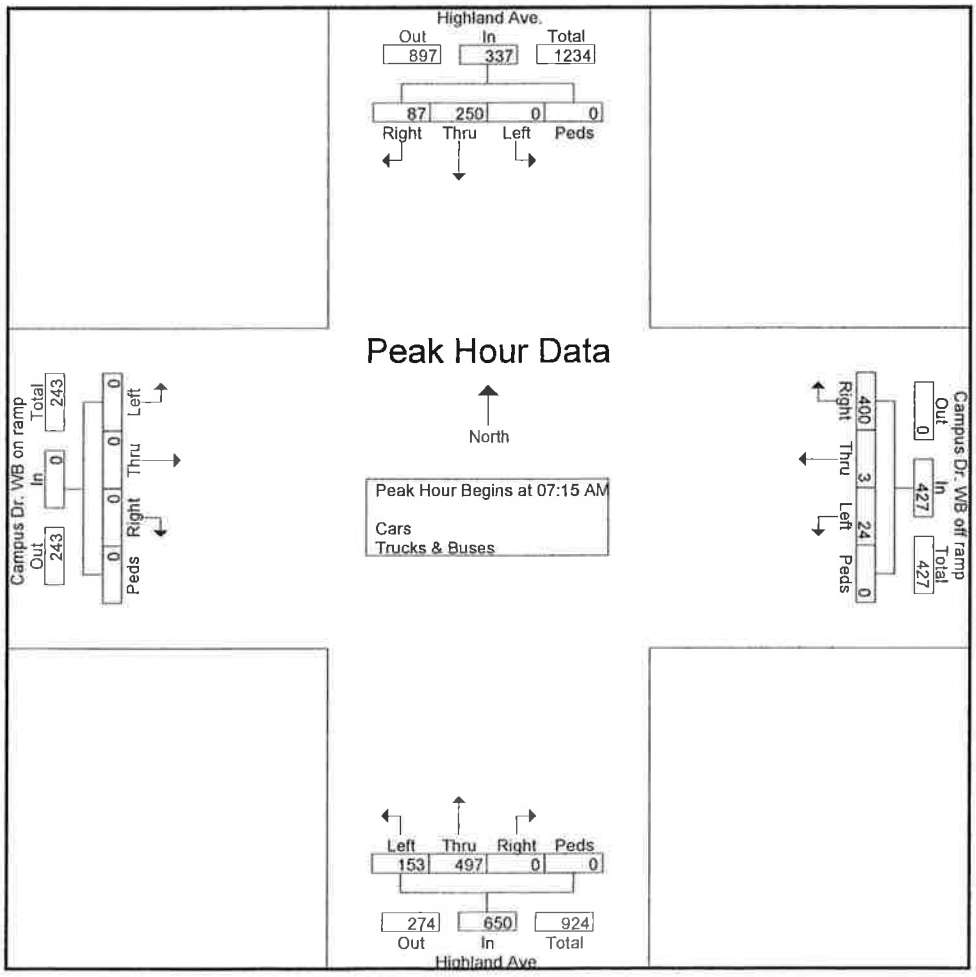
5950 Seminole Centre Court
Madison, WI 53711

Campus Drive ramps & Highland Ave.
AM Peak Hour
Madison, Dane County Wisconsin
Turning Movement Count

File Name : Campus Dr - Highland AM
Site Code : 10030011
Start Date : 9/21/2010
Page No : 3

	Highland Ave. From North					Campus Dr. WB off ramp From East					Highland Ave. From South					Campus Dr. WB on ramp From West					
Start Time	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Int. Total
Peak Hour Analysis From 06:30 AM to 08:15 AM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 07:15 AM																					
07:15 AM	12	47	0	0	59	107	0	4	0	111	0	122	30	0	152	0	0	0	0	0	322
07:30 AM	**33**	**80**	0	0	**113**	78	**1**	5	0	84	0	125	33	0	158	0	0	0	0	0	355
07:45 AM	17	73	0	0	90	**114**	1	**8**	0	**123**	0	**127**	43	0	**170**	0	0	0	0	0	**383**
08:00 AM	25	50	0	0	75	101	1	7	0	109	0	123	**47**	0	170	0	0	0	0	0	354
Total Volume	87	250	0	0	337	400	3	24	0	427	0	497	153	0	650	0	0	0	0	0	1414
% App. Total	25.8	74.2	0	0		93.7	0.7	5.6	0		0	76.5	23.5	0		0	0	0	0		
PHF	.659	.781	.000	.000	.746	.877	.750	.750	.000	.868	.000	.978	.814	.000	.956	.000	.000	.000	.000	.000	.923



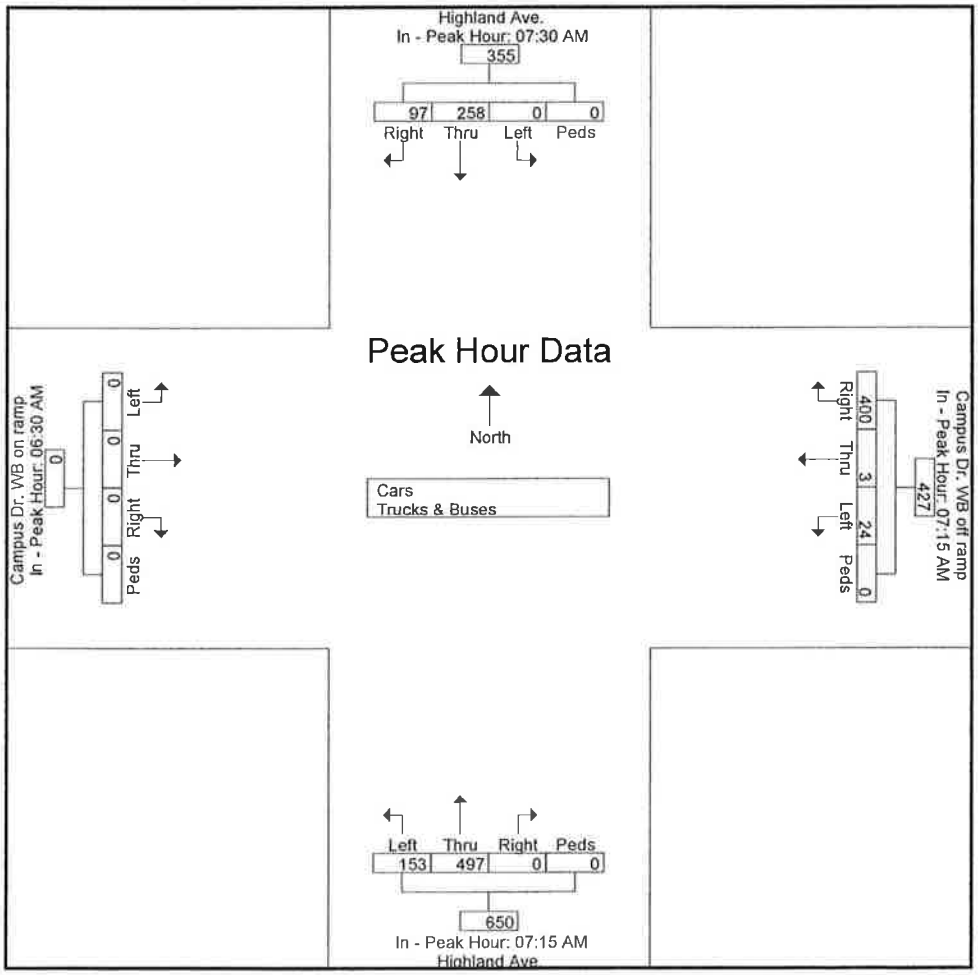
KL Engineering, Inc.

5950 Seminole Centre Court
Madison, WI 53711

Campus Drive ramps & Highland Ave.
AM Peak Hour
Madison, Dane County Wisconsin
Turning Movement Count

File Name : Campus Dr - Highland AM
Site Code : 10030011
Start Date : 9/21/2010
Page No : 4

	Highland Ave. From North					Campus Dr. WB off ramp From East					Highland Ave. From South					Campus Dr. WB on ramp From West					
Start Time	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Int. Total
Peak Hour Analysis From 06:30 AM to 08:15 AM - Peak 1 of 1																					
Peak Hour for Each Approach Begins at:																					
	07:30 AM					07:15 AM					07:15 AM					06:30 AM					
+0 mins.	**33**	**80**	0	0	**113**	107	0	4	0	111	0	122	30	0	152	0	0	0	0	0	
+15 mins.	17	73	0	0	90	78	**1**	5	0	84	0	125	33	0	158	0	**0**	0	0	0	
+30 mins.	25	50	0	0	75	**114**	1	**8**	0	**123**	0	**127**	**43**	0	**170**	0	**0**	0	0	0	
+45 mins.	22	55	0	0	77	101	1	7	0	109	0	123	**47**	0	170	0	**0**	0	0	0	
Total Volume	97	258	0	0	355	400	3	24	0	427	0	497	153	0	650	0	0	0	0	0	
% App. Total	27.3	72.7	0	0		93.7	0.7	5.6	0		0	76.5	23.5	0		0	0	0	0		
PHF	.735	.806	.000	.000	.785	.877	.750	.750	.000	.868	.000	.978	.814	.000	.956	.000	.000	.000	.000	.000	



KL Engineering, Inc.

5950 Seminole Centre Court
Madison, WI 53711

Grand Avenue - University Avenue
AM Peak Hour
Madison, Dane County, WI
Turning Movement Count

File Name : Grand Ave. - University Ave. AM
Site Code : 10030021
Start Date : 9/21/2010
Page No : 1

Groups Printed- Cars - Trucks & Buses

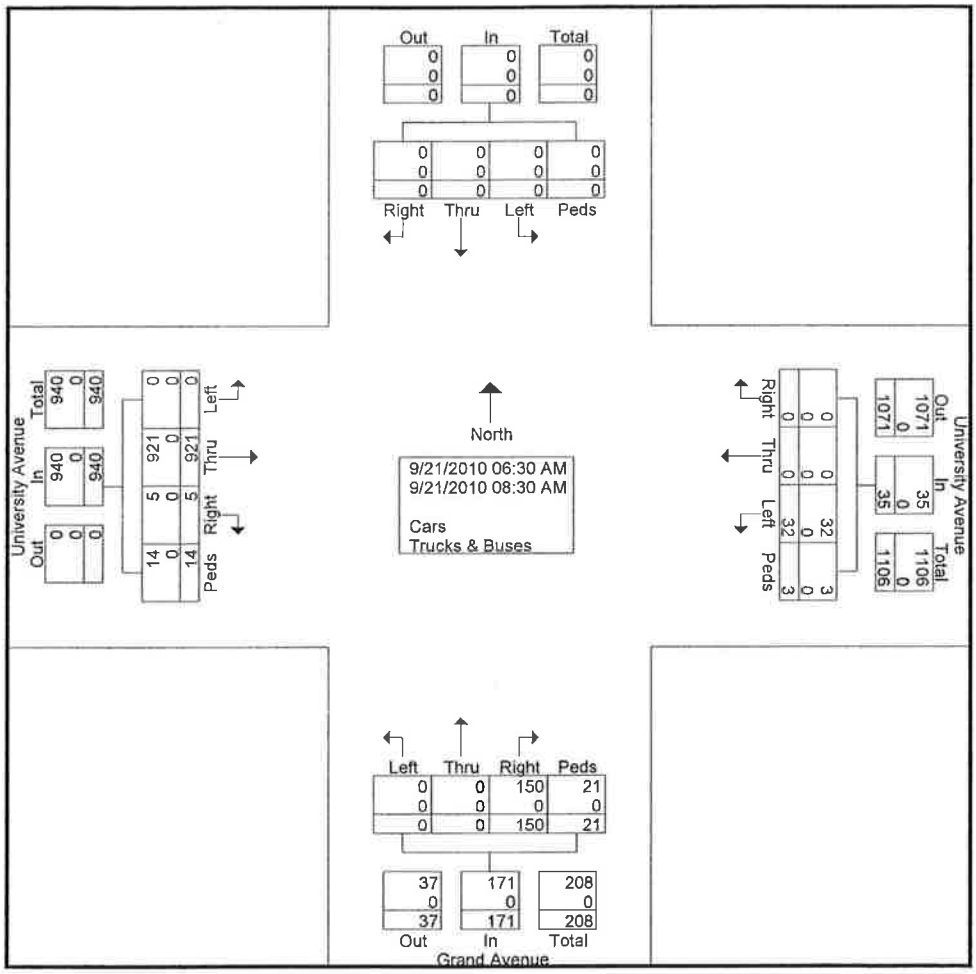
	From North					University Avenue From East					Grand Avenue From South					University Avenue From West					
Start Time	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Int. Total
06:30 AM	0	0	0	0	0	0	0	1	0	1	1	0	0	0	1	0	73	0	1	74	76
06:45 AM	0	0	0	0	0	0	0	1	1	2	6	0	0	1	7	1	89	0	1	91	100
Total	0	0	0	0	0	0	0	2	1	3	7	0	0	1	8	1	162	0	2	165	176
07:00 AM	0	0	0	0	0	0	0	1	0	1	5	0	0	2	7	2	77	0	0	79	87
07:15 AM	0	0	0	0	0	0	0	2	1	3	19	0	0	1	20	1	109	0	4	114	137
07:30 AM	0	0	0	0	0	0	0	5	1	6	20	0	0	2	22	0	122	0	2	124	152
07:45 AM	0	0	0	0	0	0	0	7	0	7	44	0	0	5	49	1	149	0	3	153	209
Total	0	0	0	0	0	0	0	15	2	17	88	0	0	10	98	4	457	0	9	470	585
08:00 AM	0	0	0	0	0	0	0	9	0	9	20	0	0	5	25	0	157	0	2	159	193
08:15 AM	0	0	0	0	0	0	0	5	0	5	29	0	0	5	34	0	123	0	1	124	163
08:30 AM	0	0	0	0	0	0	0	1	0	1	6	0	0	0	6	0	22	0	0	22	29
Grand Total	0	0	0	0	0	0	0	32	3	35	150	0	0	21	171	5	921	0	14	940	1146
Apprch %	0	0	0	0		0	0	91.4	8.6		87.7	0	0	12.3		0.5	98	0	1.5		
Total %	0	0	0	0	0	0	0	2.8	0.3	3.1	13.1	0	0	1.8	14.9	0.4	80.4	0	1.2	82	
Cars	0	0	0	0	0	0	0	32	3	35	150	0	0	21	171	5	921	0	14	940	1146
% Cars	0	0	0	0	0	0	0	100	100	100	100	0	0	100	100	100	100	0	100	100	100
Trucks & Buses	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
% Trucks & Buses	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

KL Engineering, Inc.

5950 Seminole Centre Court
Madison, WI 53711

Grand Avenue - University Avenue
AM Peak Hour
Madison, Dane County, WI
Turning Movement Count

File Name : Grand Ave. - University Ave. AM
Site Code : 10030021
Start Date : 9/21/2010
Page No : 2



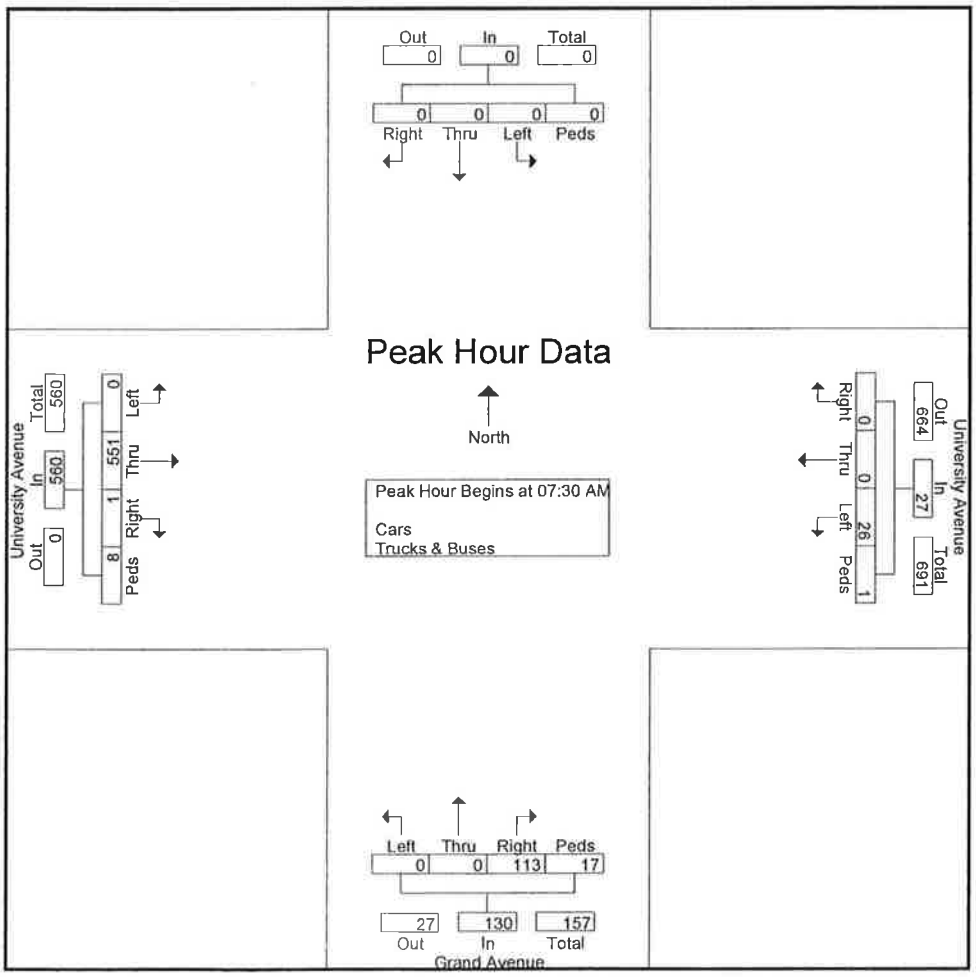
KL Engineering, Inc.

5950 Seminole Centre Court
Madison, WI 53711

Grand Avenue - University Avenue
AM Peak Hour
Madison, Dane County, WI
Turning Movement Count

File Name : Grand Ave. - University Ave. AM
Site Code : 10030021
Start Date : 9/21/2010
Page No : 3

	From North					University Avenue From East					Grand Avenue From South					University Avenue From West					
Start Time	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Int. Total
Peak Hour Analysis From 06:30 AM to 08:30 AM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 07:30 AM																					
07:30 AM	0	0	0	0	0	0	0	5	1	6	20	0	0	2	22	0	122	0	2	124	152
07:45 AM	0	0	0	0	0	0	0	7	0	7	**44**	0	0	**5**	**49**	**1**	149	0	**3**	153	**209**
08:00 AM	0	0	0	0	0	0	0	**9**	0	**9**	20	0	0	5	25	0	**157**	0	2	**159**	193
08:15 AM	0	0	0	0	0	0	0	5	0	5	29	0	0	5	34	0	123	0	1	124	163
Total Volume	0	0	0	0	0	0	0	26	1	27	113	0	0	17	130	1	551	0	8	560	717
% App. Total	0	0	0	0		0	0	96.3	3.7		86.9	0	0	13.1		0.2	98.4	0	1.4		
PHF	.000	.000	.000	.000	.000	.000	.000	.722	.250	.750	.642	.000	.000	.850	.663	.250	.877	.000	.667	.881	.858



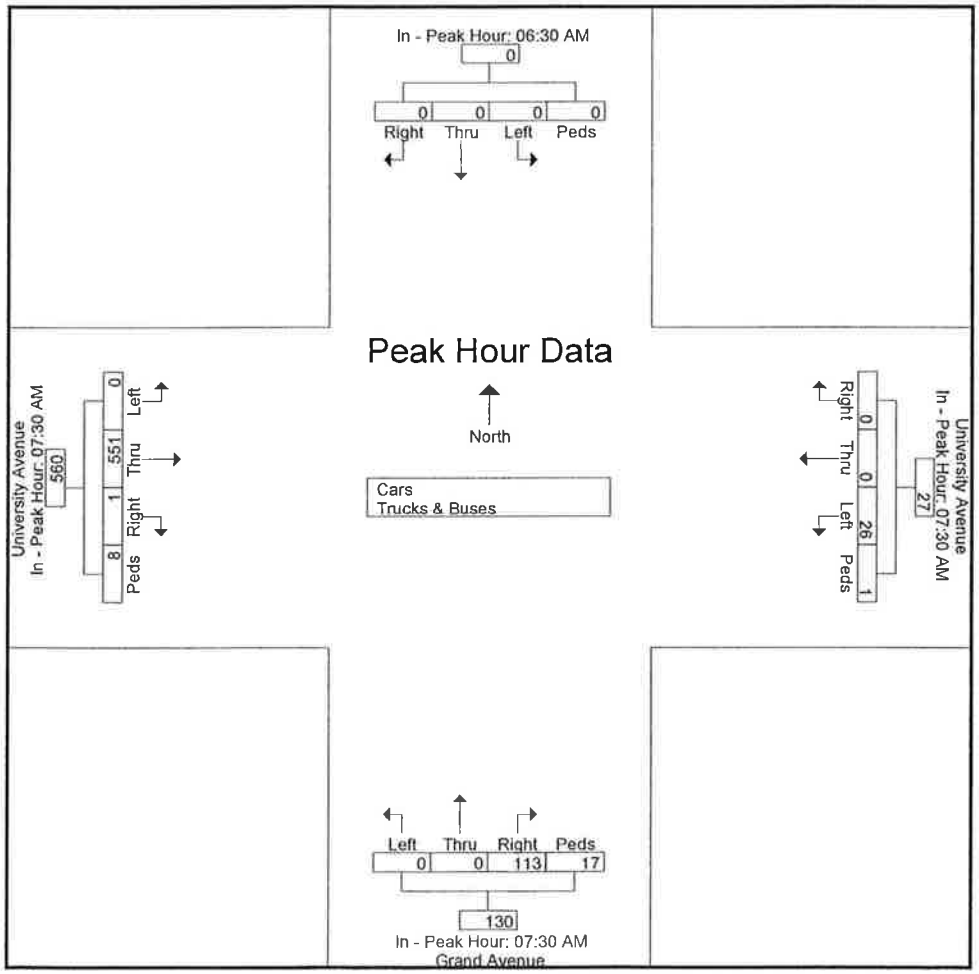
KL Engineering, Inc.

5950 Seminole Centre Court
Madison, WI 53711

Grand Avenue - University Avenue
AM Peak Hour
Madison, Dane County, WI
Turning Movement Count

File Name : Grand Ave. - University Ave. AM
Site Code : 10030021
Start Date : 9/21/2010
Page No : 4

	From North					University Avenue From East					Grand Avenue From South					University Avenue From West					
Start Time	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Int. Total
Peak Hour Analysis From 06:30 AM to 08:30 AM - Peak 1 of 1																					
Peak Hour for Each Approach Begins at:																					
	06:30 AM					07:30 AM					07:30 AM					07:30 AM					
+0 mins.	0	0	0	0	0	0	0	5	1	6	20	0	0	2	22	0	122	0	2	124	
+15 mins.	0	0	0	0	0	0	0	7	0	7	44	0	0	5	49	1	149	0	3	153	
+30 mins.	0	0	0	0	0	0	0	9	0	9	20	0	0	5	25	0	157	0	2	159	
+45 mins.	0	0	0	0	0	0	0	5	0	5	29	0	0	5	34	0	123	0	1	124	
Total Volume	0	0	0	0	0	0	0	26	1	27	113	0	0	17	130	1	551	0	8	560	
% App. Total	0	0	0	0		0	0	96.3	3.7		86.9	0	0	13.1		0.2	98.4	0	1.4		
PHF	.000	.000	.000	.000	.000	.000	.000	.722	.250	.750	.642	.000	.000	.850	.663	.250	.877	.000	.667	.881	



KL Engineering, Inc.

5950 Seminole Centre Court
Madison, WI 53711

Highland Avenue - University Avenue
PM Peak Hour
Madison, Dane County, WI
Turning Movement Count

File Name : Highland Ave. - University Ave. PM
Site Code : 10030032
Start Date : 9/22/2010
Page No : 1

Groups Printed- Cars - Trucks/Buses

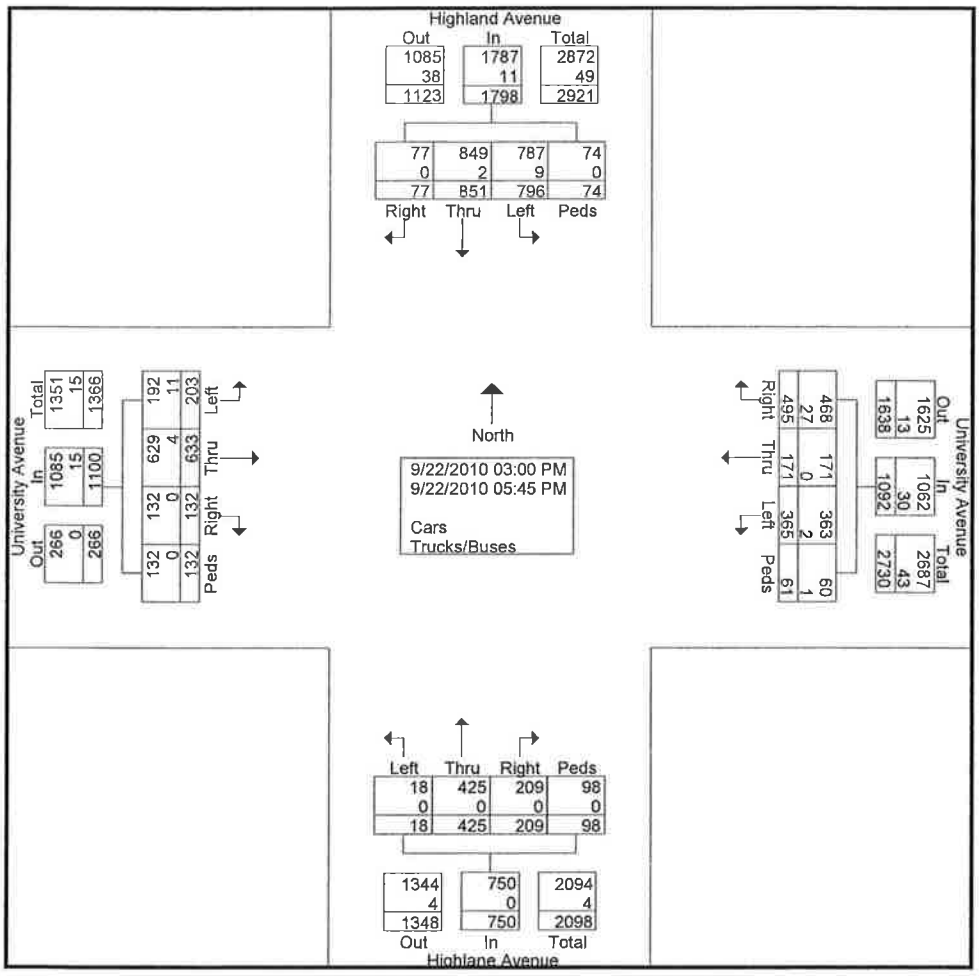
	Highland Avenue From North					University Avenue From East					Highlane Avenue From South					University Avenue From West					
Start Time	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Int. Total
03:00 PM	5	53	74	3	135	43	5	17	8	73	13	35	2	1	51	13	41	26	3	83	342
03:15 PM	2	64	65	3	134	37	14	27	2	80	20	39	0	11	70	14	57	24	13	108	392
03:30 PM	6	63	78	3	150	46	18	31	2	97	17	38	0	8	63	10	53	19	15	97	407
03:45 PM	4	69	90	6	169	34	9	20	4	67	14	34	2	7	57	8	55	20	10	93	386
Total	17	249	307	15	588	160	46	95	16	317	64	146	4	27	241	45	206	89	41	381	1527
04:00 PM	6	73	92	8	179	50	14	31	2	97	19	28	1	7	55	11	44	15	14	84	415
04:15 PM	6	75	57	2	140	29	12	32	6	79	23	31	1	7	62	6	53	20	9	88	369
04:30 PM	5	93	72	6	176	44	11	36	5	96	14	46	1	11	72	13	53	10	13	89	433
04:45 PM	11	96	74	6	187	34	14	37	5	90	23	47	3	10	83	12	52	19	10	93	453
Total	28	337	295	22	682	157	51	136	18	362	79	152	6	35	272	42	202	64	46	354	1670
05:00 PM	13	81	55	3	152	37	20	37	2	96	21	42	1	7	71	11	56	9	12	88	407
05:15 PM	6	71	47	11	135	49	18	35	10	112	12	25	3	14	54	4	65	11	12	92	393
05:30 PM	7	64	46	13	130	48	18	30	9	105	18	29	2	10	59	10	54	13	15	92	386
05:45 PM	6	49	46	10	111	44	18	32	6	100	15	31	2	5	53	20	50	17	6	93	357
Total	32	265	194	37	528	178	74	134	27	413	66	127	8	36	237	45	225	50	45	365	1543
Grand Total	77	851	796	74	1798	495	171	365	61	1092	209	425	18	98	750	132	633	203	132	1100	4740
Apprch %	4.3	47.3	44.3	4.1		45.3	15.7	33.4	5.6		27.9	56.7	2.4	13.1		12	57.5	18.5	12		
Total %	1.6	18	16.8	1.6	37.9	10.4	3.6	7.7	1.3	23	4.4	9	0.4	2.1	15.8	2.8	13.4	4.3	2.8	23.2	
Cars	77	849	787	74	1787	468	171	363	60	1062	209	425	18	98	750	132	629	192	132	1085	4684
% Cars	100	99.8	98.9	100	99.4	94.5	100	99.5	98.4	97.3	100	100	100	100	100	100	99.4	94.6	100	98.6	98.8
Trucks/Buses	0	2	9	0	11	27	0	2	1	30	0	0	0	0	0	0	4	11	0	15	56
% Trucks/Buses	0	0.2	1.1	0	0.6	5.5	0	0.5	1.6	2.7	0	0	0	0	0	0	0.6	5.4	0	1.4	1.2

KL Engineering, Inc.

5950 Seminole Centre Court
Madison, WI 53711

Highland Avenue - University Avenue
PM Peak Hour
Madison, Dane County, WI
Turning Movement Count

File Name : Highland Ave. - University Ave. PM
Site Code : 10030032
Start Date : 9/22/2010
Page No : 2



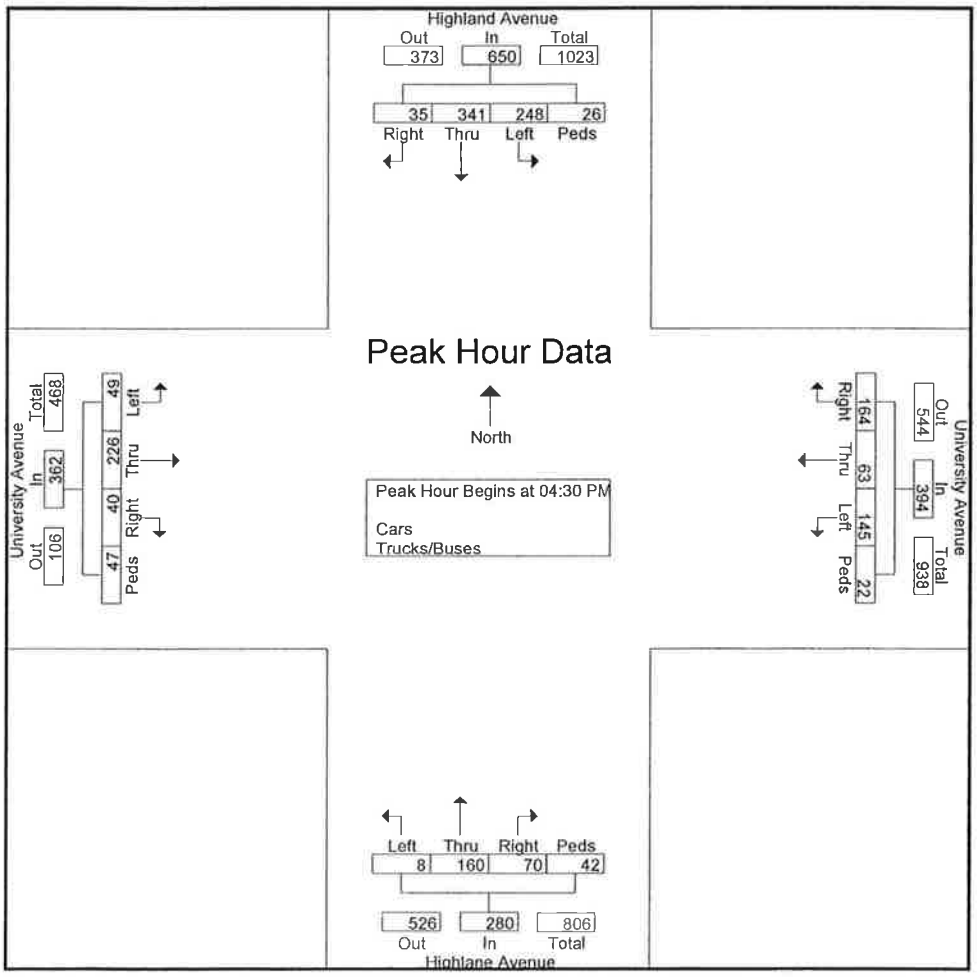
KL Engineering, Inc.

5950 Seminole Centre Court
Madison, WI 53711

Highland Avenue - University Avenue
PM Peak Hour
Madison, Dane County, WI
Turning Movement Count

File Name : Highland Ave. - University Ave. PM
Site Code : 10030032
Start Date : 9/22/2010
Page No : 3

	Highland Avenue From North					University Avenue From East					Highlane Avenue From South					University Avenue From West					
Start Time	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Int. Total
Peak Hour Analysis From 03:00 PM to 05:45 PM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 04:30 PM																					
04:30 PM	5	93	72	6	176	44	11	36	5	96	14	46	1	11	72	13	53	10	13	89	433
04:45 PM	11	96	74	6	187	34	14	37	5	90	23	47	3	10	83	12	52	19	10	93	453
05:00 PM	13	81	55	3	152	37	20	37	2	96	21	42	1	7	71	11	56	9	12	88	407
05:15 PM	6	71	47	11	135	49	18	35	10	112	12	25	3	14	54	4	65	11	12	92	393
Total Volume	35	341	248	26	650	164	63	145	22	394	70	160	8	42	280	40	226	49	47	362	1686
% App. Total	5.4	52.5	38.2	4		41.6	16	36.8	5.6		25	57.1	2.9	15		11	62.4	13.5	13		
PHF	.673	.888	.838	.591	.869	.837	.788	.980	.550	.879	.761	.851	.667	.750	.843	.769	.869	.645	.904	.973	.930



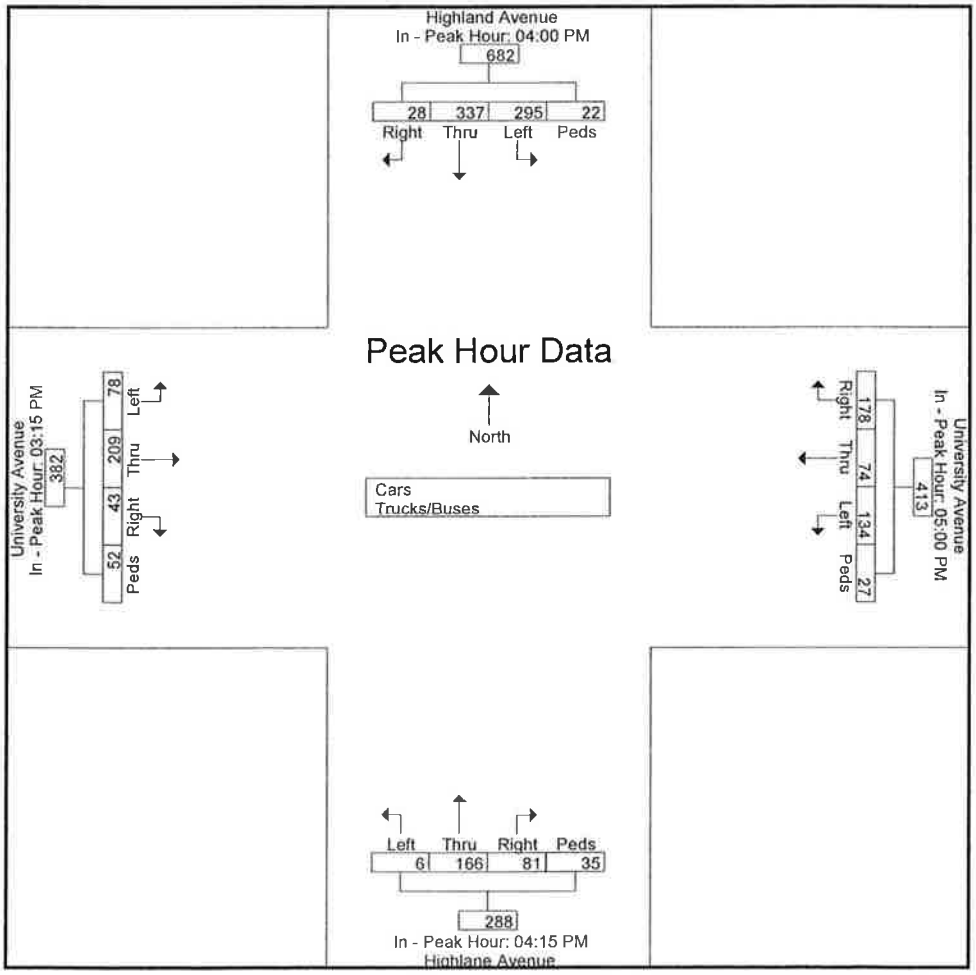
KL Engineering, Inc.

5950 Seminole Centre Court
Madison, WI 53711

Highland Avenue - University Avenue
PM Peak Hour
Madison, Dane County, WI
Turning Movement Count

File Name : Highland Ave. - University Ave. PM
Site Code : 10030032
Start Date : 9/22/2010
Page No : 4

	Highland Avenue From North					University Avenue From East					Highlane Avenue From South					University Avenue From West					
Start Time	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Int. Total
Peak Hour Analysis From 03:00 PM to 05:45 PM - Peak 1 of 1																					
Peak Hour for Each Approach Begins at:																					
	04:00 PM					05:00 PM					04:15 PM					03:15 PM					
+0 mins.	6	73	**92**	**8**	179	37	**20**	**37**	2	96	**23**	31	1	7	62	**14**	**57**	**24**	13	108	
+15 mins.	6	**75**	57	2	140	**49**	18	35	**10**	**112**	14	**46**	1	**11**	72	10	53	19	**15**	97	
+30 mins.	5	93	72	6	176	48	18	30	9	105	23	**47**	**3**	10	**83**	8	55	20	10	93	
+45 mins.	**11**	**96**	74	6	**187**	44	18	32	6	100	21	42	1	7	71	11	44	15	14	84	
Total Volume	28	337	295	22	682	178	74	134	27	**413**	81	166	6	35	288	43	209	78	52	382	
% App. Total	4.1	49.4	43.3	3.2		43.1	17.9	32.4	6.5		28.1	57.6	2.1	12.2		11.3	54.7	20.4	13.6		
PHF	.636	.878	.802	.688	.912	.908	.925	.905	.675	.922	.880	.883	.500	.795	.867	.768	.917	.813	.867	.884	



KL Engineering, Inc.

5950 Seminole Centre Court
Madison, WI 53711

Campus Drive ramps & Highland Avenue
PM Peak Hour
Madison, Dane County, WI
Turning Movement Count

File Name : Campus Dr - Highland PM
Site Code : 10030012
Start Date : 9/22/2010
Page No : 1

Groups Printed- Cars - Trucks/Buses

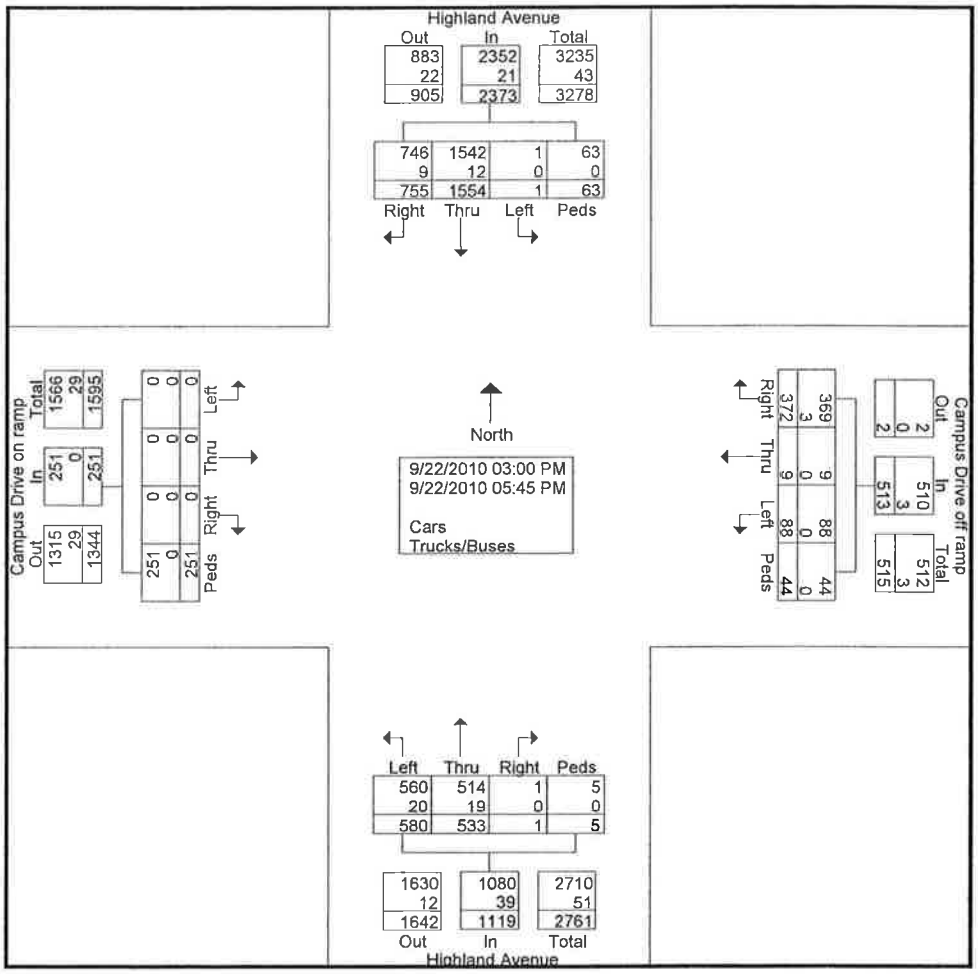
	Highland Avenue From North					Campus Drive off ramp From East					Highland Avenue From South					Campus Drive on ramp From West					
Start Time	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Int. Total
03:00 PM	57	120	0	4	181	28	0	6	4	38	0	47	51	2	100	0	0	0	8	8	327
03:15 PM	56	119	0	8	183	33	1	5	4	43	0	62	38	0	100	0	0	0	21	21	347
03:30 PM	66	149	0	7	222	30	1	5	11	47	0	45	60	2	107	0	0	0	21	21	397
03:45 PM	60	144	0	3	207	35	1	4	2	42	0	42	52	0	94	0	0	0	27	27	370
Total	239	532	0	22	793	126	3	20	21	170	0	196	201	4	401	0	0	0	77	77	1441
04:00 PM	71	162	0	4	237	22	0	7	3	32	0	41	43	0	84	0	0	0	25	25	378
04:15 PM	65	132	0	5	202	39	2	2	7	50	0	50	40	1	91	0	0	0	15	15	358
04:30 PM	86	161	0	2	249	31	0	7	1	39	0	45	52	0	97	0	0	0	34	34	419
04:45 PM	77	166	0	9	252	38	0	7	3	48	1	51	49	0	101	0	0	0	26	26	427
Total	299	621	0	20	940	130	2	23	14	169	1	187	184	1	373	0	0	0	100	100	1582
05:00 PM	65	113	0	8	186	32	1	11	2	46	0	42	49	0	91	0	0	0	17	17	340
05:15 PM	58	119	0	2	179	36	1	10	3	50	0	28	50	0	78	0	0	0	20	20	327
05:30 PM	42	89	0	7	138	30	2	12	3	47	0	43	47	0	90	0	0	0	24	24	299
05:45 PM	52	80	1	4	137	18	0	12	1	31	0	37	49	0	86	0	0	0	13	13	267
Total	217	401	1	21	640	116	4	45	9	174	0	150	195	0	345	0	0	0	74	74	1233
Grand Total	755	1554	1	63	2373	372	9	88	44	513	1	533	580	5	1119	0	0	0	251	251	4256
Apprch %	31.8	65.5	0	2.7		72.5	1.8	17.2	8.6		0.1	47.6	51.8	0.4		0	0	0	100		
Total %	17.7	36.5	0	1.5	55.8	8.7	0.2	2.1	1	12.1	0	12.5	13.6	0.1	26.3	0	0	0	5.9	5.9	
Cars	746	1542	1	63	2352	369	9	88	44	510	1	514	560	5	1080	0	0	0	251	251	4193
% Cars	98.8	99.2	100	100	99.1	99.2	100	100	100	99.4	100	96.4	96.6	100	96.5	0	0	0	100	100	98.5
Trucks/Buses	9	12	0	0	21	3	0	0	0	3	0	19	20	0	39	0	0	0	0	0	63
% Trucks/Buses	1.2	0.8	0	0	0.9	0.8	0	0	0	0.6	0	3.6	3.4	0	3.5	0	0	0	0	0	1.5

KL Engineering, Inc.

5950 Seminole Centre Court
Madison, WI 53711

Campus Drive ramps & Highland Avenue
PM Peak Hour
Madison, Dane County, WI
Turning Movement Count

File Name : Campus Dr - Highland PM
Site Code : 10030012
Start Date : 9/22/2010
Page No : 2



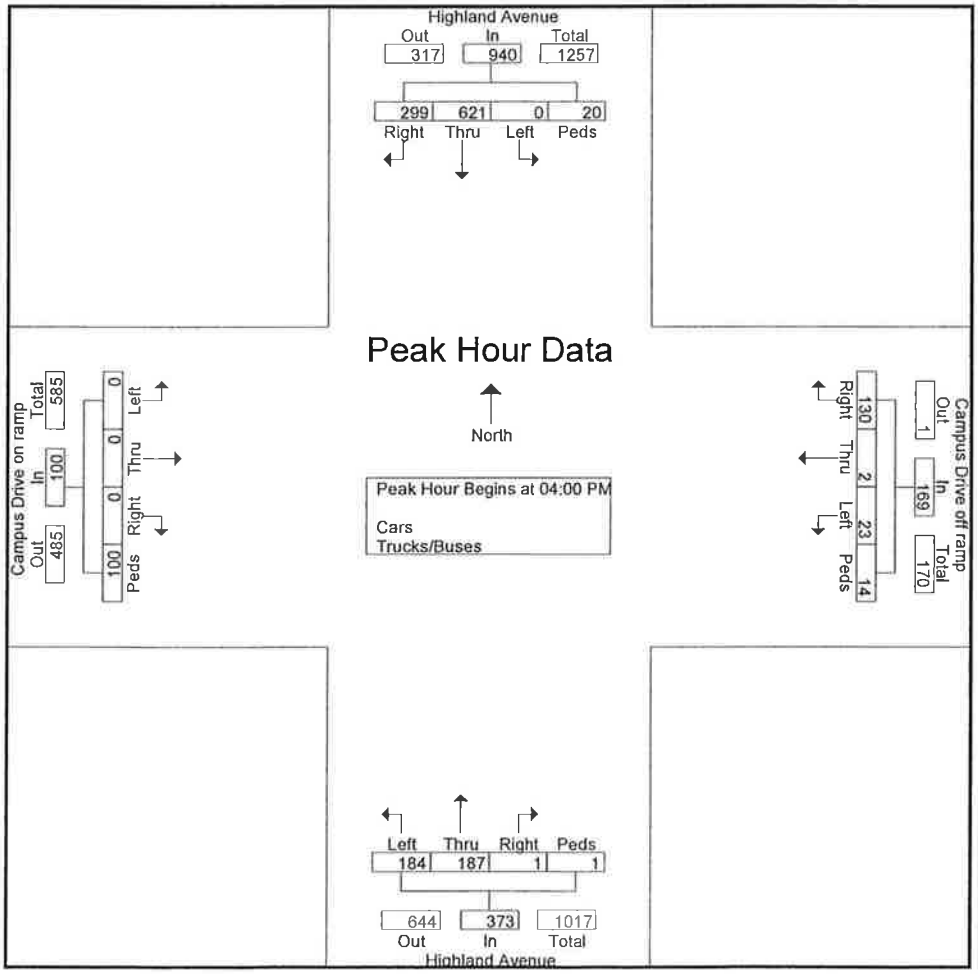
KL Engineering, Inc.

5950 Seminole Centre Court
Madison, WI 53711

Campus Drive ramps & Highland Avenue
PM Peak Hour
Madison, Dane County, WI
Turning Movement Count

File Name : Campus Dr - Highland PM
Site Code : 10030012
Start Date : 9/22/2010
Page No : 3

	Highland Avenue From North					Campus Drive off ramp From East					Highland Avenue From South					Campus Drive on ramp From West					
Start Time	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Int. Total
Peak Hour Analysis From 03:00 PM to 05:45 PM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 04:00 PM																					
04:00 PM	71	162	0	4	237	22	0	7	3	32	0	41	43	0	84	0	0	0	25	25	378
04:15 PM	65	132	0	5	202	39	2	2	7	50	0	50	40	1	91	0	0	0	15	15	358
04:30 PM	86	161	0	2	249	31	0	7	1	39	0	45	52	0	97	0	0	0	34	34	419
04:45 PM	77	166	0	9	252	38	0	7	3	48	1	51	49	0	101	0	0	0	26	26	427
Total Volume	299	621	0	20	940	130	2	23	14	169	1	187	184	1	373	0	0	0	100	100	1582
% App. Total	31.8	66.1	0	2.1		76.9	1.2	13.6	8.3		0.3	50.1	49.3	0.3		0	0	0	100		
PHF	.869	.935	.000	.556	.933	.833	.250	.821	.500	.845	.250	.917	.885	.250	.923	.000	.000	.000	.735	.735	.926



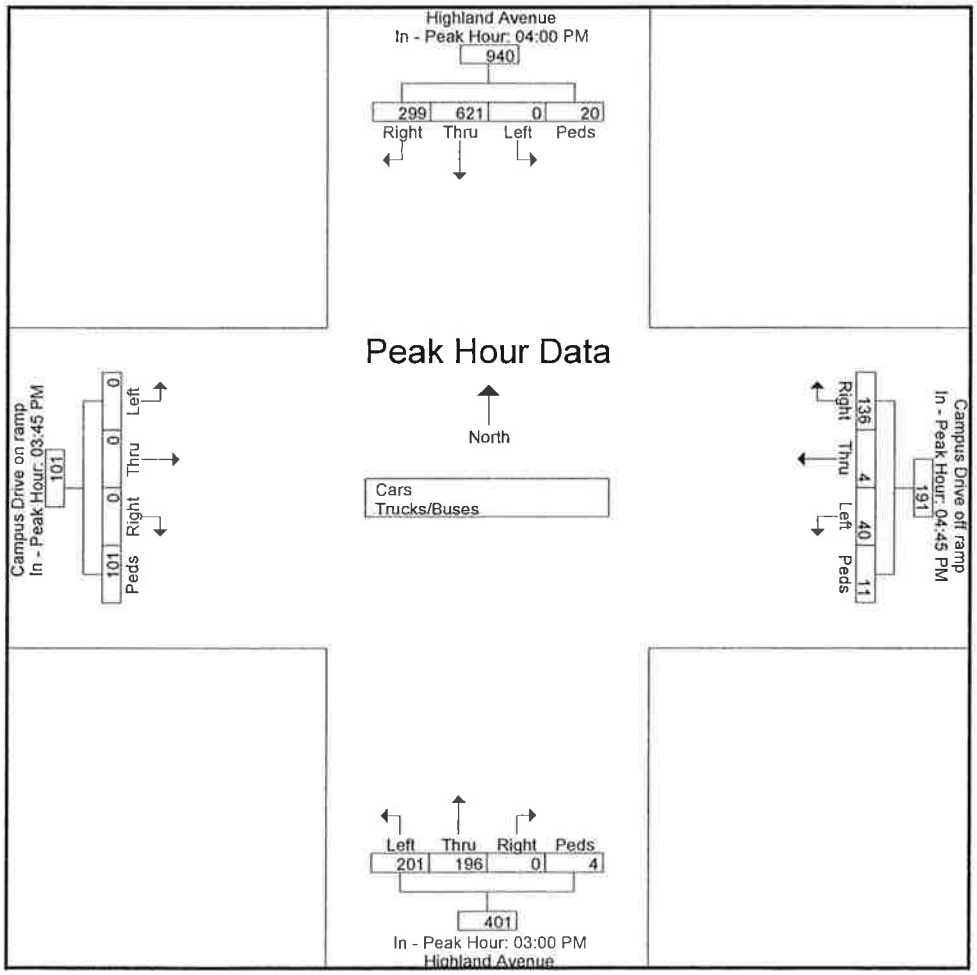
KL Engineering, Inc.

5950 Seminole Centre Court
Madison, WI 53711

Campus Drive ramps & Highland Avenue
PM Peak Hour
Madison, Dane County, WI
Turning Movement Count

File Name : Campus Dr - Highland PM
Site Code : 10030012
Start Date : 9/22/2010
Page No : 4

	Highland Avenue From North					Campus Drive off ramp From East					Highland Avenue From South					Campus Drive on ramp From West					
Start Time	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Int. Total
Peak Hour Analysis From 03:00 PM to 05:45 PM - Peak 1 of 1																					
Peak Hour for Each Approach Begins at:																					
	04:00 PM					04:45 PM					03:00 PM					03:45 PM					
+0 mins.	71	162	0	4	237	**38**	0	7	**3**	48	0	47	51	**2**	100	0	0	0	27	27	
+15 mins.	65	132	0	5	202	32	1	11	2	46	0	**62**	38	0	100	0	0	0	25	25	
+30 mins.	**86**	161	0	2	249	36	1	10	3	**50**	0	45	**60**	2	**107**	0	0	0	15	15	
+45 mins.	77	**166**	0	**9**	**252**	30	**2**	**12**	3	47	0	42	52	0	94	0	0	0	**34**	**34**	
Total Volume	299	621	0	20	940	136	4	40	11	191	0	196	201	4	401	0	0	0	101	101	
% App. Total	31.8	66.1	0	2.1		71.2	2.1	20.9	5.8		0	48.9	50.1	1		0	0	0	100		
PHF	.869	.935	.000	.556	.933	.895	.500	.833	.917	.955	.000	.790	.838	.500	.937	.000	.000	.000	.743	.743	



KL Engineering, Inc.

5950 Seminole Centre Court
Madison, WI 53711

Grand Avenue - University Avenue
PM Peak Hour
Madison, Dane County , WI
Turning Movement Count

File Name : Grand Ave. - University Ave. PM
Site Code : 10030022
Start Date : 9/22/2010
Page No : 1

Groups Printed- Cars - Trucks/Buses

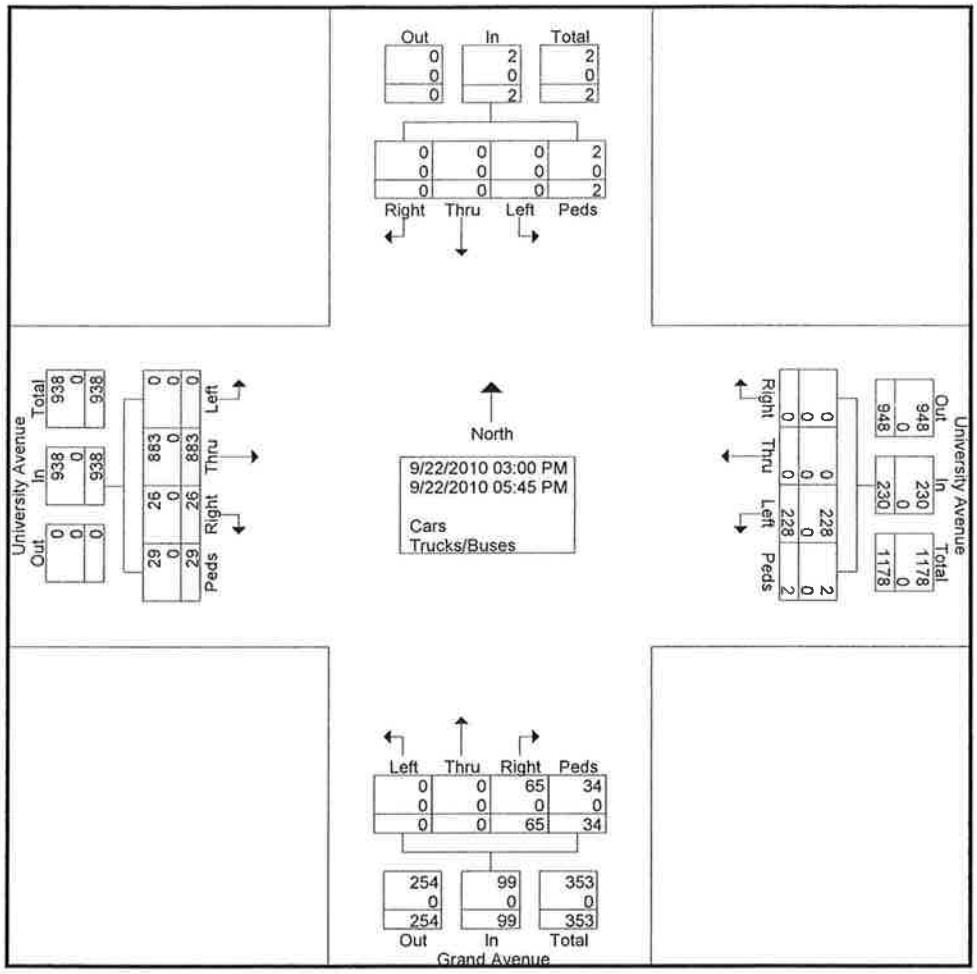
	From North					University Avenue From East					Grand Avenue From South					University Avenue From West					
Start Time	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Int. Total
03:00 PM	0	0	0	0	0	0	0	8	0	8	4	0	0	1	5	1	71	0	1	73	86
03:15 PM	0	0	0	0	0	0	0	17	0	17	2	0	0	0	2	2	85	0	3	90	109
03:30 PM	0	0	0	0	0	0	0	23	0	23	7	0	0	5	12	1	73	0	3	77	112
03:45 PM	0	0	0	0	0	0	0	16	0	16	4	0	0	7	11	2	79	0	0	81	108
Total	0	0	0	0	0	0	0	64	0	64	17	0	0	13	30	6	308	0	7	321	415
04:00 PM	0	0	0	2	2	0	0	22	0	22	7	0	0	0	7	3	64	0	3	70	101
04:15 PM	0	0	0	0	0	0	0	9	0	9	10	0	0	3	13	2	66	0	3	71	93
04:30 PM	0	0	0	0	0	0	0	22	0	22	6	0	0	6	12	1	73	0	2	76	110
04:45 PM	0	0	0	0	0	0	0	26	1	27	3	0	0	0	3	1	79	0	0	80	110
Total	0	0	0	2	2	0	0	79	1	80	26	0	0	9	35	7	282	0	8	297	414
05:00 PM	0	0	0	0	0	0	0	28	1	29	2	0	0	4	6	2	72	0	0	74	109
05:15 PM	0	0	0	0	0	0	0	22	0	22	8	0	0	4	12	3	71	0	1	75	109
05:30 PM	0	0	0	0	0	0	0	18	0	18	8	0	0	3	11	4	74	0	6	84	113
05:45 PM	0	0	0	0	0	0	0	17	0	17	4	0	0	1	5	4	76	0	7	87	109
Total	0	0	0	0	0	0	0	85	1	86	22	0	0	12	34	13	293	0	14	320	440
Grand Total	0	0	0	2	2	0	0	228	2	230	65	0	0	34	99	26	883	0	29	938	1269
Apprch %	0	0	0	100		0	0	99.1	0.9		65.7	0	0	34.3		2.8	94.1	0	3.1		
Total %	0	0	0	0.2	0.2	0	0	18	0.2	18.1	5.1	0	0	2.7	7.8	2	69.6	0	2.3	73.9	
Cars	0	0	0	2	2	0	0	228	2	230	65	0	0	34	99	26	883	0	29	938	1269
% Cars	0	0	0	100	100	0	0	100	100	100	100	0	0	100	100	100	100	0	100	100	100
Trucks/Buses	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
% Trucks/Buses	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

KL Engineering, Inc.

5950 Seminole Centre Court
Madison, WI 53711

Grand Avenue - University Avenue
PM Peak Hour
Madison, Dane County , WI
Turning Movement Count

File Name : Grand Ave. - University Ave. PM
Site Code : 10030022
Start Date : 9/22/2010
Page No : 2



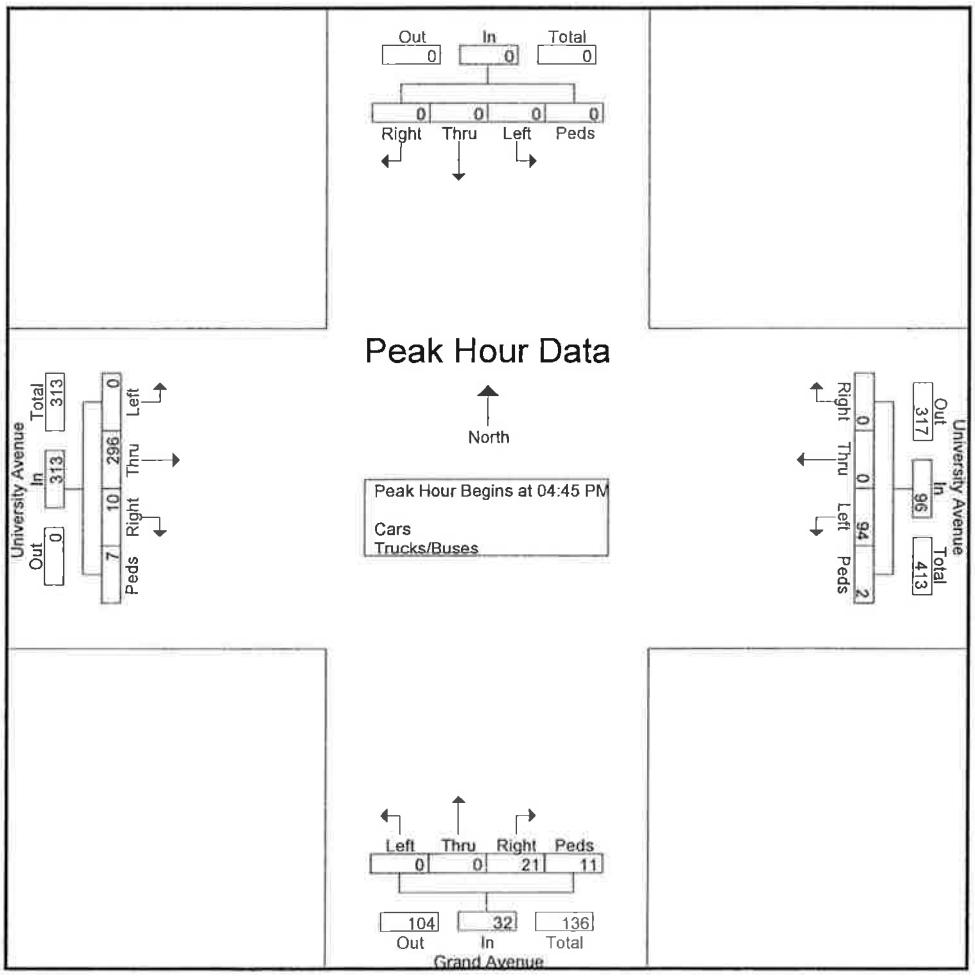
KL Engineering, Inc.

5950 Seminole Centre Court
Madison, WI 53711

Grand Avenue - University Avenue
PM Peak Hour
Madison, Dane County , WI
Turning Movement Count

File Name : Grand Ave. - University Ave. PM
Site Code : 10030022
Start Date : 9/22/2010
Page No : 3

	From North					University Avenue From East					Grand Avenue From South					University Avenue From West					
Start Time	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Int. Total
Peak Hour Analysis From 03:00 PM to 05:45 PM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 04:45 PM																					
04:45 PM	0	0	0	0	0	0	0	26	1	27	3	0	0	0	3	1	79	0	0	80	110
05:00 PM	0	0	0	0	0	0	0	28	1	29	2	0	0	4	6	2	72	0	0	74	109
05:15 PM	0	0	0	0	0	0	0	22	0	22	8	0	0	4	12	3	71	0	1	75	109
05:30 PM	0	0	0	0	0	0	0	18	0	18	8	0	0	3	11	4	74	0	6	84	113
Total Volume	0	0	0	0	0	0	0	94	2	96	21	0	0	11	32	10	296	0	7	313	441
% App. Total	0	0	0	0		0	0	97.9	2.1		65.6	0	0	34.4		3.2	94.6	0	2.2		
PHF	.000	.000	.000	.000	.000	.000	.000	.839	.500	.828	.656	.000	.000	.688	.667	.625	.937	.000	.292	.932	.976



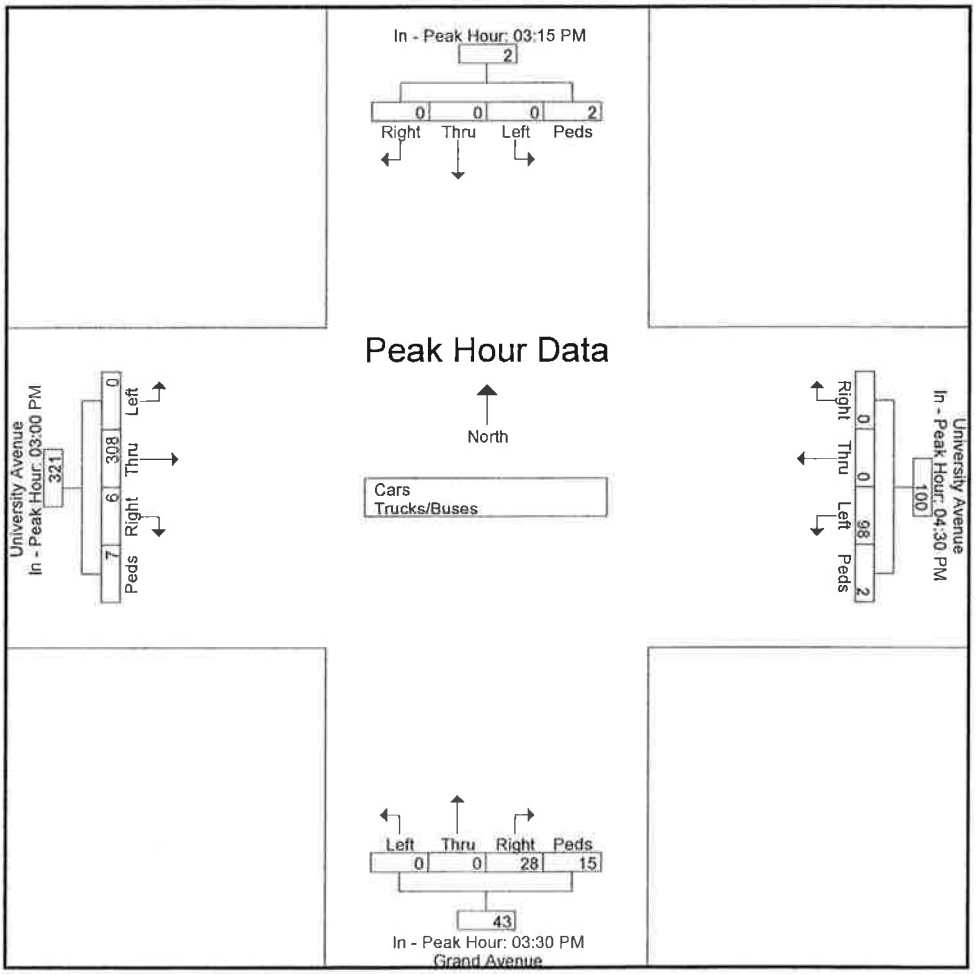
KL Engineering, Inc.

5950 Seminole Centre Court
Madison, WI 53711

Grand Avenue - University Avenue
PM Peak Hour
Madison, Dane County , WI
Turning Movement Count

File Name : Grand Ave. - University Ave. PM
Site Code : 10030022
Start Date : 9/22/2010
Page No : 4

	From North					University Avenue From East					Grand Avenue From South					University Avenue From West					
Start Time	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Int. Total
Peak Hour Analysis From 03:00 PM to 05:45 PM - Peak 1 of 1																					
Peak Hour for Each Approach Begins at:																					
	03:15 PM					04:30 PM					03:30 PM					03:00 PM					
+0 mins.	0	0	0	0	0	0	0	22	0	22	7	0	0	5	12	1	71	0	1	73	
+15 mins.	0	0	0	0	0	0	0	26	1	27	4	0	0	7	11	2	85	0	3	90	
+30 mins.	0	0	0	0	0	0	0	28	1	29	7	0	0	0	7	1	73	0	3	77	
+45 mins.	0	0	0	2	2	0	0	22	0	22	10	0	0	3	13	2	79	0	0	81	
Total Volume	0	0	0	2	2	0	0	98	2	100	28	0	0	15	43	6	308	0	7	321	
% App. Total	0	0	0	100		0	0	98	2		65.1	0	0	34.9		1.9	96	0	2.2		
PHF	.000	.000	.000	.250	.250	.000	.000	.875	.500	.862	.700	.000	.000	.536	.827	.750	.906	.000	.583	.892	



KL Engineering, Inc.

5950 Seminole Centre Court
Madison, WI 53711

Highland Avenue - University Avenue
AM Peak Hour
Madison, Dane County WI
Bicycles Only

File Name : Highland Ave. - University Ave. AM
Site Code : 10030031
Start Date : 9/21/2010
Page No : 1

Groups Printed- Bicycles

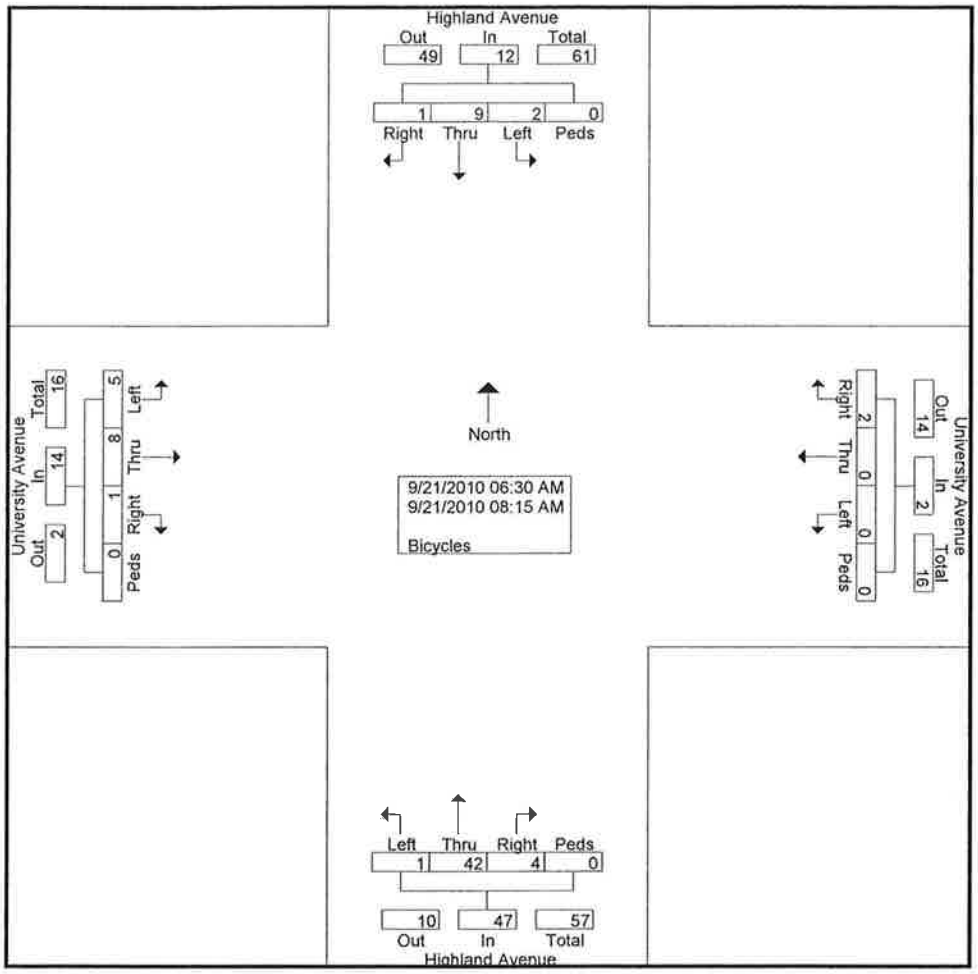
	Highland Avenue From North					University Avenue From East					Highland Avenue From South					University Avenue From West					
Start Time	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Int. Total
06:30 AM	0	0	0	0	0	1	0	0	0	1	0	2	0	0	2	0	1	0	0	1	4
06:45 AM	0	0	0	0	0	0	0	0	0	0	1	4	1	0	6	0	0	0	0	0	6
Total	0	0	0	0	0	1	0	0	0	1	1	6	1	0	8	0	1	0	0	1	10
07:00 AM	0	1	0	0	1	0	0	0	0	0	0	2	0	0	2	0	0	0	0	0	3
07:15 AM	0	0	2	0	2	0	0	0	0	0	1	7	0	0	8	0	1	0	0	1	11
07:30 AM	0	1	0	0	1	0	0	0	0	0	2	5	0	0	7	0	2	2	0	4	12
07:45 AM	1	5	0	0	6	0	0	0	0	0	0	8	0	0	8	0	1	3	0	4	18
Total	1	7	2	0	10	0	0	0	0	0	3	22	0	0	25	0	4	5	0	9	44
08:00 AM	0	2	0	0	2	1	0	0	0	1	0	8	0	0	8	1	3	0	0	4	15
08:15 AM	0	0	0	0	0	0	0	0	0	0	0	6	0	0	6	0	0	0	0	0	6
Grand Total	1	9	2	0	12	2	0	0	0	2	4	42	1	0	47	1	8	5	0	14	75
Apprch %	8.3	75	16.7	0		100	0	0	0		8.5	89.4	2.1	0		7.1	57.1	35.7	0		
Total %	1.3	12	2.7	0	16	2.7	0	0	0	2.7	5.3	56	1.3	0	62.7	1.3	10.7	6.7	0	18.7	

KL Engineering, Inc.

5950 Seminole Centre Court
Madison, WI 53711

Highland Avenue - University Avenue
AM Peak Hour
Madison, Dane County WI
Bicycles Only

File Name : Highland Ave. - University Ave. AM
Site Code : 10030031
Start Date : 9/21/2010
Page No : 2



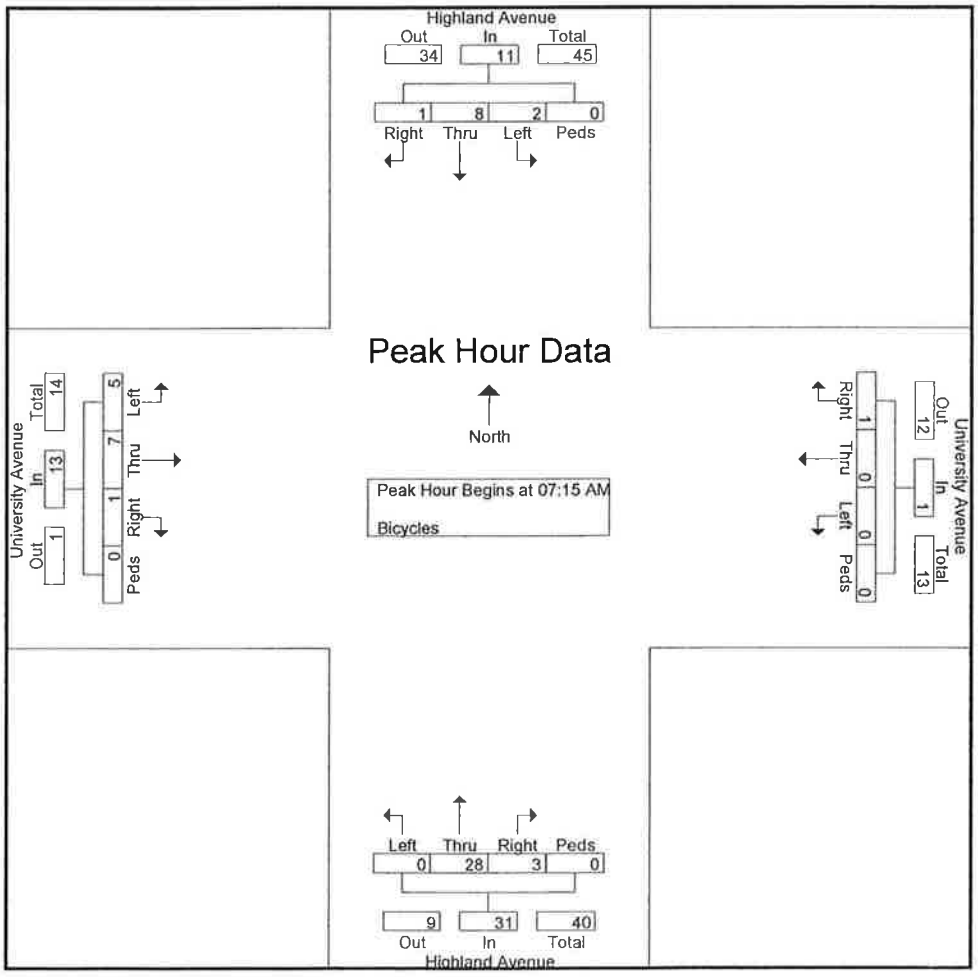
KL Engineering, Inc.

5950 Seminole Centre Court
Madison, WI 53711

Highland Avenue - University Avenue
AM Peak Hour
Madison, Dane County WI
Bicycles Only

File Name : Highland Ave. - University Ave. AM
Site Code : 10030031
Start Date : 9/21/2010
Page No : 3

	Highland Avenue From North					University Avenue From East					Highland Avenue From South					University Avenue From West					
Start Time	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Int. Total
Peak Hour Analysis From 06:30 AM to 08:15 AM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 07:15 AM																					
07:15 AM	0	0	2	0	2	0	0	0	0	0	1	7	0	0	8	0	1	0	0	1	11
07:30 AM	0	1	0	0	1	0	0	0	0	0	2	5	0	0	7	0	2	2	0	4	12
07:45 AM	1	5	0	0	6	0	0	0	0	0	0	8	0	0	8	0	1	3	0	4	18
08:00 AM	0	2	0	0	2	1	0	0	0	1	0	8	0	0	8	1	3	0	0	4	15
Total Volume	1	8	2	0	11	1	0	0	0	1	3	28	0	0	31	1	7	5	0	13	56
% App. Total	9.1	72.7	18.2	0		100	0	0	0		9.7	90.3	0	0		7.7	53.8	38.5	0		
PHF	.250	.400	.250	.000	.458	.250	.000	.000	.000	.250	.375	.875	.000	.000	.969	.250	.583	.417	.000	.813	.778



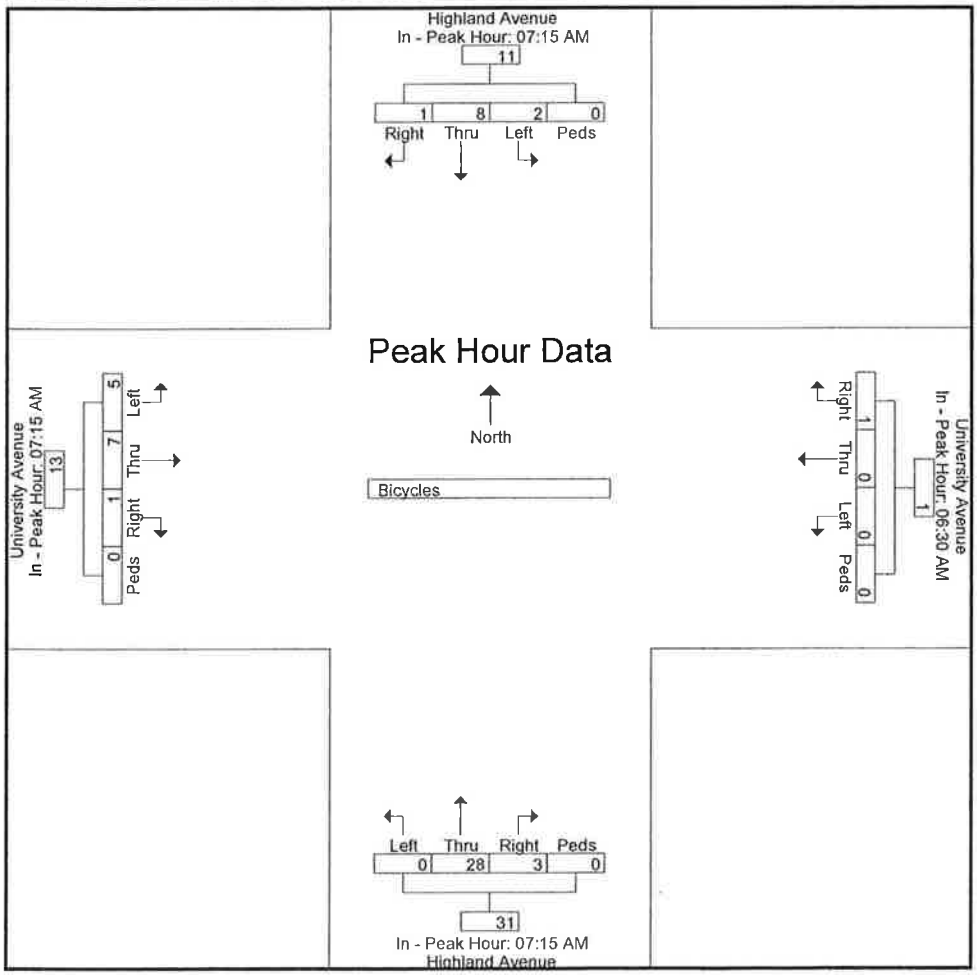
KL Engineering, Inc.

5950 Seminole Centre Court
Madison, WI 53711

Highland Avenue - University Avenue
AM Peak Hour
Madison, Dane County WI
Bicycles Only

File Name : Highland Ave. - University Ave. AM
Site Code : 10030031
Start Date : 9/21/2010
Page No : 4

	Highland Avenue From North					University Avenue From East					Highland Avenue From South					University Avenue From West					
Start Time	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Int. Total
Peak Hour Analysis From 06:30 AM to 08:15 AM - Peak 1 of 1																					
Peak Hour for Each Approach Begins at:																					
	07:15 AM					06:30 AM					07:15 AM					07:15 AM					
+0 mins.	0	0	2	0	2	1	0	0	0	1	1	7	0	0	8	0	1	0	0	1	
+15 mins.	0	1	0	0	1	0	0	0	0	0	2	5	0	0	7	0	2	2	0	4	
+30 mins.	1	5	0	0	6	0	0	0	0	0	0	8	0	0	8	0	1	3	0	4	
+45 mins.	0	2	0	0	2	0	0	0	0	0	0	8	0	0	8	1	3	0	0	4	
Total Volume	1	8	2	0	11	1	0	0	0	1	3	28	0	0	31	1	7	5	0	13	
% App. Total	9.1	72.7	18.2	0		100	0	0	0		9.7	90.3	0	0		7.7	53.8	38.5	0		
PHF	.250	.400	.250	.000	.458	.250	.000	.000	.000	.250	.375	.875	.000	.000	.969	.250	.583	.417	.000	.813	



KL Engineering, Inc.

5950 Seminole Centre Court
Madison, WI 53711

Highland Avenue - University Avenue
PM Peak Hour
Madison, Dane County, WI
Bicycles

File Name : Highland Ave. - University Ave. PM
Site Code : 10030032
Start Date : 9/22/2010
Page No : 1

Groups Printed- Bicycles

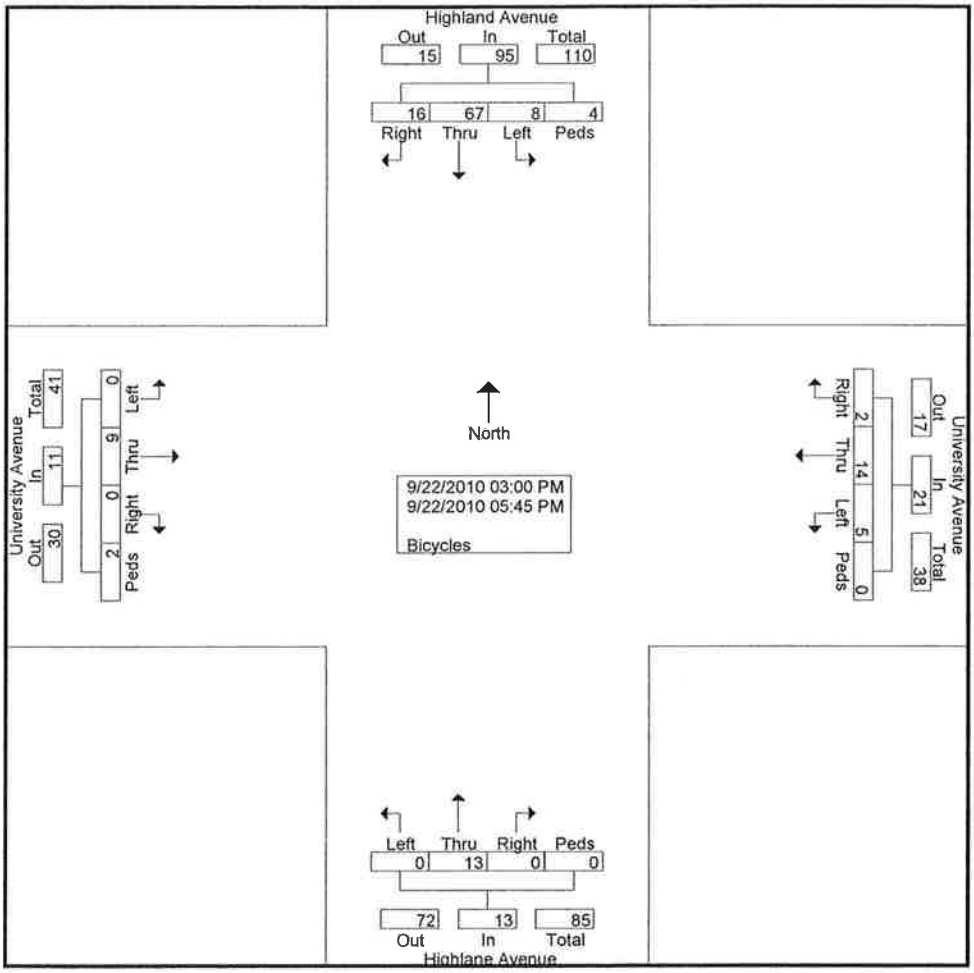
	Highland Avenue From North					University Avenue From East					Highlane Avenue From South					University Avenue From West					
Start Time	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Int. Total
03:00 PM	0	1	1	0	2	0	1	0	0	1	0	2	0	0	2	0	0	0	0	0	5
03:15 PM	0	6	1	0	7	1	1	0	0	2	0	0	0	0	0	0	0	0	0	0	9
03:30 PM	3	6	0	0	9	0	1	0	0	1	0	0	0	0	0	0	1	0	0	1	11
03:45 PM	0	4	0	0	4	0	1	0	0	1	0	1	0	0	1	0	1	0	0	1	7
Total	3	17	2	0	22	1	4	0	0	5	0	3	0	0	3	0	2	0	0	2	32
04:00 PM	4	4	0	0	8	1	0	0	0	1	0	0	0	0	0	0	1	0	0	1	10
04:15 PM	1	5	2	0	8	0	1	0	0	1	0	2	0	0	2	0	1	0	0	1	12
04:30 PM	1	7	1	0	9	0	2	0	0	2	0	1	0	0	1	0	0	0	0	0	12
04:45 PM	2	6	2	0	10	0	1	0	0	1	0	1	0	0	1	0	0	0	0	0	12
Total	8	22	5	0	35	1	4	0	0	5	0	4	0	0	4	0	2	0	0	2	46
05:00 PM	2	9	0	0	11	0	2	0	0	2	0	3	0	0	3	0	1	0	0	1	17
05:15 PM	2	2	0	0	4	0	3	0	0	3	0	0	0	0	0	0	0	0	0	0	7
05:30 PM	1	13	1	0	15	0	0	2	0	2	0	1	0	0	1	0	4	0	0	4	22
05:45 PM	0	4	0	4	8	0	1	3	0	4	0	2	0	0	2	0	0	0	2	2	16
Total	5	28	1	4	38	0	6	5	0	11	0	6	0	0	6	0	5	0	2	7	62
Grand Total	16	67	8	4	95	2	14	5	0	21	0	13	0	0	13	0	9	0	2	11	140
Apprch %	16.8	70.5	8.4	4.2		9.5	66.7	23.8	0		0	100	0	0		0	81.8	0	18.2		
Total %	11.4	47.9	5.7	2.9	67.9	1.4	10	3.6	0	15	0	9.3	0	0	9.3	0	6.4	0	1.4	7.9	

KL Engineering, Inc.

5950 Seminole Centre Court
Madison, WI 53711

Highland Avenue - University Avenue
PM Peak Hour
Madison, Dane County, WI
Bicycles

File Name : Highland Ave. - University Ave. PM
Site Code : 10030032
Start Date : 9/22/2010
Page No : 2



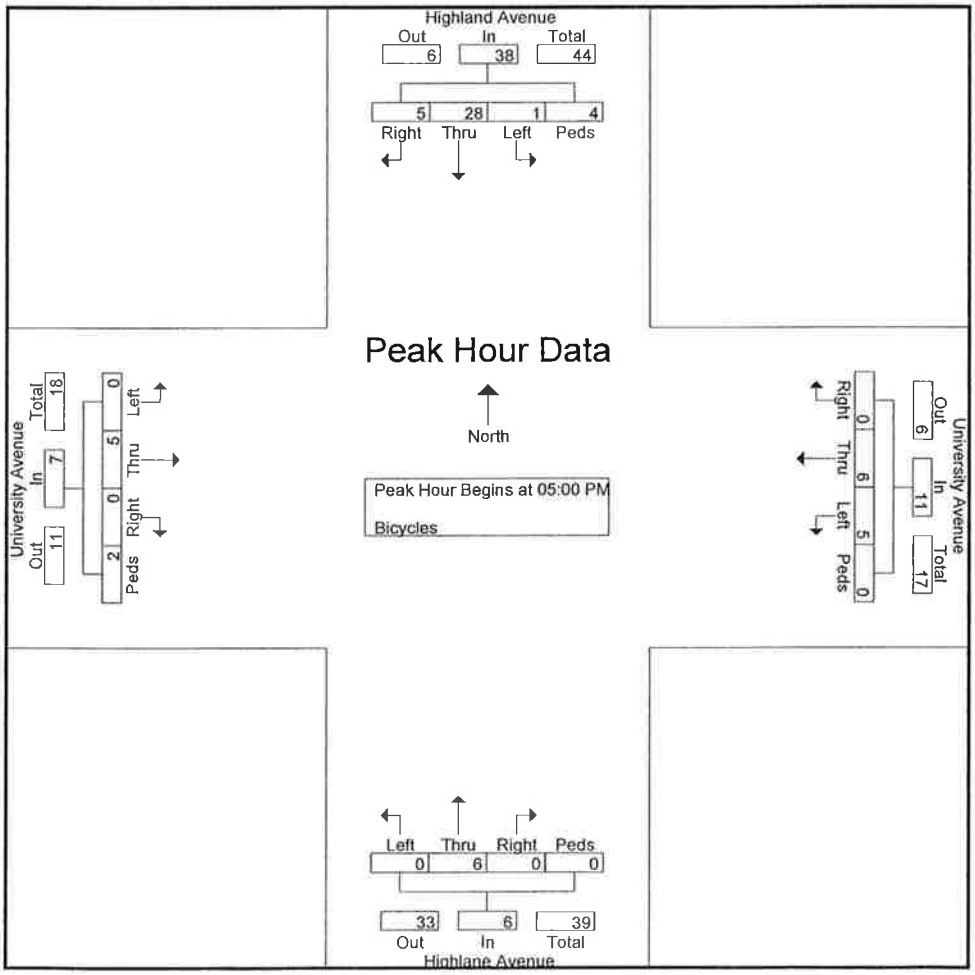
KL Engineering, Inc.

5950 Seminole Centre Court
Madison, WI 53711

Highland Avenue - University Avenue
PM Peak Hour
Madison, Dane County, WI
Bicycles

File Name : Highland Ave. - University Ave. PM
Site Code : 10030032
Start Date : 9/22/2010
Page No : 3

	Highland Avenue From North					University Avenue From East					Highlane Avenue From South					University Avenue From West					
Start Time	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Int. Total
Peak Hour Analysis From 03:00 PM to 05:45 PM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 05:00 PM																					
05:00 PM	**2**	9	0	0	11	0	2	0	0	2	0	**3**	0	0	**3**	0	1	0	0	1	17
05:15 PM	2	2	0	0	**4**	0	**3**	0	0	3	0	0	0	0	0	0	**0**	0	0	0	7
05:30 PM	1	**13**	**1**	0	**15**	0	0	2	0	2	0	**1**	0	0	1	0	**4**	0	0	**4**	**22**
05:45 PM	0	4	0	**4**	8	0	1	**3**	0	**4**	0	2	0	0	2	0	0	0	**2**	2	16
Total Volume	5	28	1	4	38	0	6	5	0	11	0	6	0	0	6	0	5	0	2	7	62
% App. Total	13.2	73.7	2.6	10.5		0	54.5	45.5	0		0	100	0	0		0	71.4	0	28.6		
PHF	.625	.538	.250	.250	.633	.000	.500	.417	.000	.688	.000	.500	.000	.000	.500	.000	.313	.000	.250	.438	.705



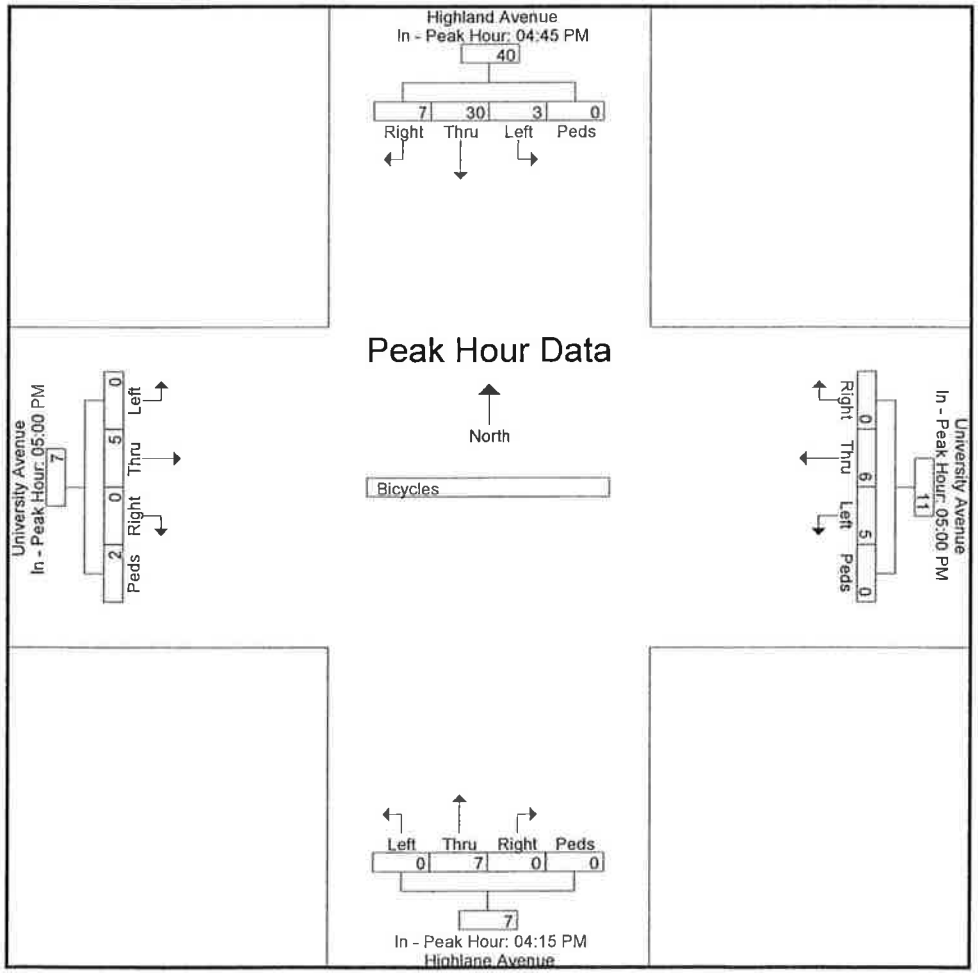
KL Engineering, Inc.

5950 Seminole Centre Court
Madison, WI 53711

Highland Avenue - University Avenue
PM Peak Hour
Madison, Dane County, WI
Bicycles

File Name : Highland Ave. - University Ave. PM
Site Code : 10030032
Start Date : 9/22/2010
Page No : 4

	Highland Avenue From North					University Avenue From East					Highlane Avenue From South					University Avenue From West					
Start Time	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Int. Total
Peak Hour Analysis From 03:00 PM to 05:45 PM - Peak 1 of 1																					
Peak Hour for Each Approach Begins at:																					
	04:45 PM					05:00 PM					04:15 PM					05:00 PM					
+0 mins.	2	6	2	0	10	0	2	0	0	2	0	2	0	0	2	0	1	0	0	1	
+15 mins.	2	9	0	0	11	0	3	0	0	3	0	1	0	0	1	0	0	0	0	0	
+30 mins.	2	2	0	0	4	0	0	2	0	2	0	1	0	0	1	0	4	0	0	4	
+45 mins.	1	13	1	0	15	0	1	3	0	4	0	3	0	0	3	0	0	0	2	2	
Total Volume	7	30	3	0	40	0	6	5	0	11	0	7	0	0	7	0	5	0	2	7	
% App. Total	17.5	75	7.5	0		0	54.5	45.5	0		0	100	0	0		0	71.4	0	28.6		
PHF	.875	.577	.375	.000	.667	.000	.500	.417	.000	.688	.000	.583	.000	.000	.583	.000	.313	.000	.250	.438	



KL Engineering, Inc.

5950 Seminole Centre Court
Madison, WI 53711

Campus Drive ramps & Highland Avenue
PM Peak Hour
Madison, Dane County, WI
Bicycles

File Name : Campus Dr - Highland PM
Site Code : 10030012
Start Date : 9/22/2010
Page No : 1

Groups Printed- Bicycles

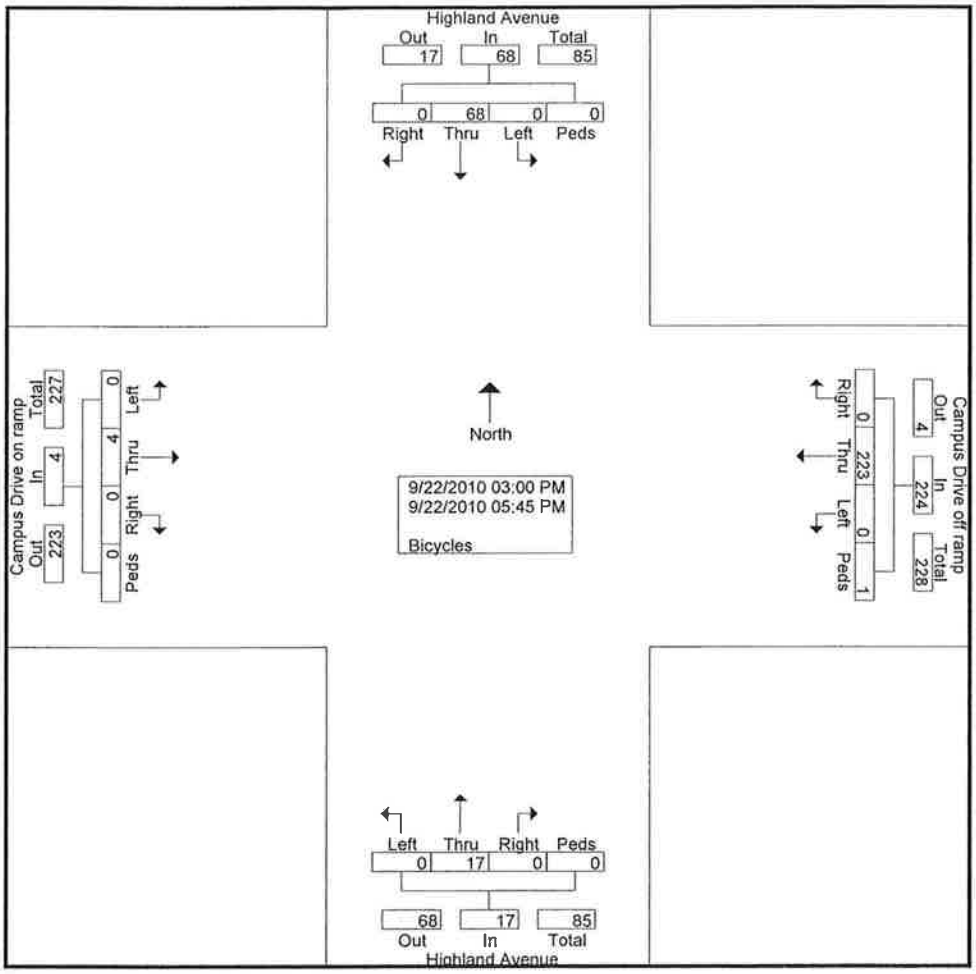
	Highland Avenue From North					Campus Drive off ramp From East					Highland Avenue From South					Campus Drive on ramp From West					
Start Time	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Int. Total
03:00 PM	0	2	0	0	2	0	1	0	0	1	0	2	0	0	2	0	0	0	0	0	5
03:15 PM	0	7	0	0	7	0	6	0	0	6	0	1	0	0	1	0	4	0	0	4	18
03:30 PM	0	7	0	0	7	0	5	0	0	5	0	0	0	0	0	0	0	0	0	0	12
03:45 PM	0	3	0	0	3	0	10	0	1	11	0	1	0	0	1	0	0	0	0	0	15
Total	0	19	0	0	19	0	22	0	1	23	0	4	0	0	4	0	4	0	0	4	50
04:00 PM	0	7	0	0	7	0	18	0	0	18	0	1	0	0	1	0	0	0	0	0	26
04:15 PM	0	4	0	0	4	0	22	0	0	22	0	3	0	0	3	0	0	0	0	0	29
04:30 PM	0	3	0	0	3	0	35	0	0	35	0	2	0	0	2	0	0	0	0	0	40
04:45 PM	0	6	0	0	6	0	21	0	0	21	0	1	0	0	1	0	0	0	0	0	28
Total	0	20	0	0	20	0	96	0	0	96	0	7	0	0	7	0	0	0	0	0	123
05:00 PM	0	5	0	0	5	0	25	0	0	25	0	3	0	0	3	0	0	0	0	0	33
05:15 PM	0	4	0	0	4	0	23	0	0	23	0	0	0	0	0	0	0	0	0	0	27
05:30 PM	0	15	0	0	15	0	27	0	0	27	0	2	0	0	2	0	0	0	0	0	44
05:45 PM	0	5	0	0	5	0	30	0	0	30	0	1	0	0	1	0	0	0	0	0	36
Total	0	29	0	0	29	0	105	0	0	105	0	6	0	0	6	0	0	0	0	0	140
Grand Total	0	68	0	0	68	0	223	0	1	224	0	17	0	0	17	0	4	0	0	4	313
Apprch %	0	100	0	0		0	99.6	0	0.4		0	100	0	0		0	100	0	0		
Total %	0	21.7	0	0	21.7	0	71.2	0	0.3	71.6	0	5.4	0	0	5.4	0	1.3	0	0	1.3	

KL Engineering, Inc.

5950 Seminole Centre Court
Madison, WI 53711

Campus Drive ramps & Highland Avenue
PM Peak Hour
Madison, Dane County, WI
Bicycles

File Name : Campus Dr - Highland PM
Site Code : 10030012
Start Date : 9/22/2010
Page No : 2



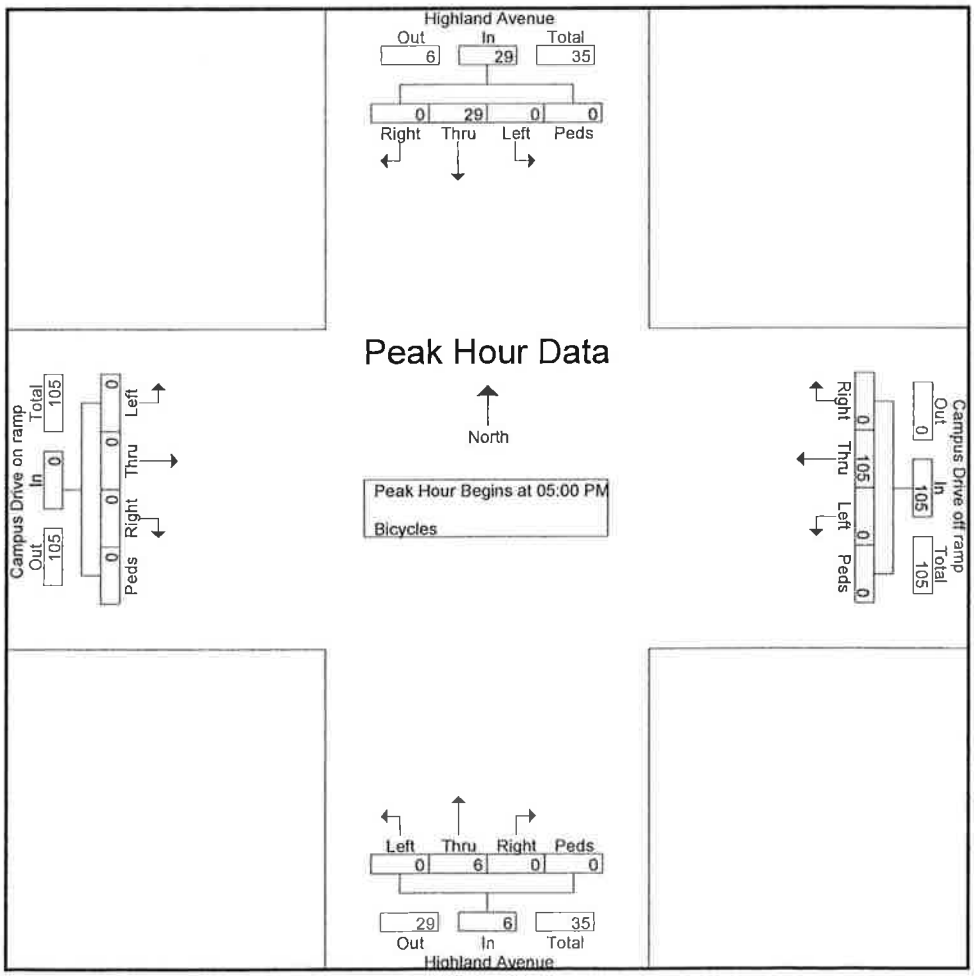
KL Engineering, Inc.

5950 Seminole Centre Court
Madison, WI 53711

Campus Drive ramps & Highland Avenue
PM Peak Hour
Madison, Dane County, WI
Bicycles

File Name : Campus Dr - Highland PM
Site Code : 10030012
Start Date : 9/22/2010
Page No : 3

	Highland Avenue From North					Campus Drive off ramp From East					Highland Avenue From South					Campus Drive on ramp From West					
Start Time	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Int. Total
Peak Hour Analysis From 03:00 PM to 05:45 PM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 05:00 PM																					
05:00 PM	0	5	0	0	5	0	25	0	0	25	0	3	0	0	3	0	0	0	0	0	33
05:15 PM	0	4	0	0	4	0	23	0	0	23	0	0	0	0	0	0	0	0	0	0	27
05:30 PM	0	15	0	0	15	0	27	0	0	27	0	2	0	0	2	0	0	0	0	0	44
05:45 PM	0	5	0	0	5	0	30	0	0	30	0	1	0	0	1	0	0	0	0	0	36
Total Volume	0	29	0	0	29	0	105	0	0	105	0	6	0	0	6	0	0	0	0	0	140
% App. Total	0	100	0	0		0	100	0	0		0	100	0	0		0	0	0	0		
PHF	.000	.483	.000	.000	.483	.000	.875	.000	.000	.875	.000	.500	.000	.000	.500	.000	.000	.000	.000	.000	.795



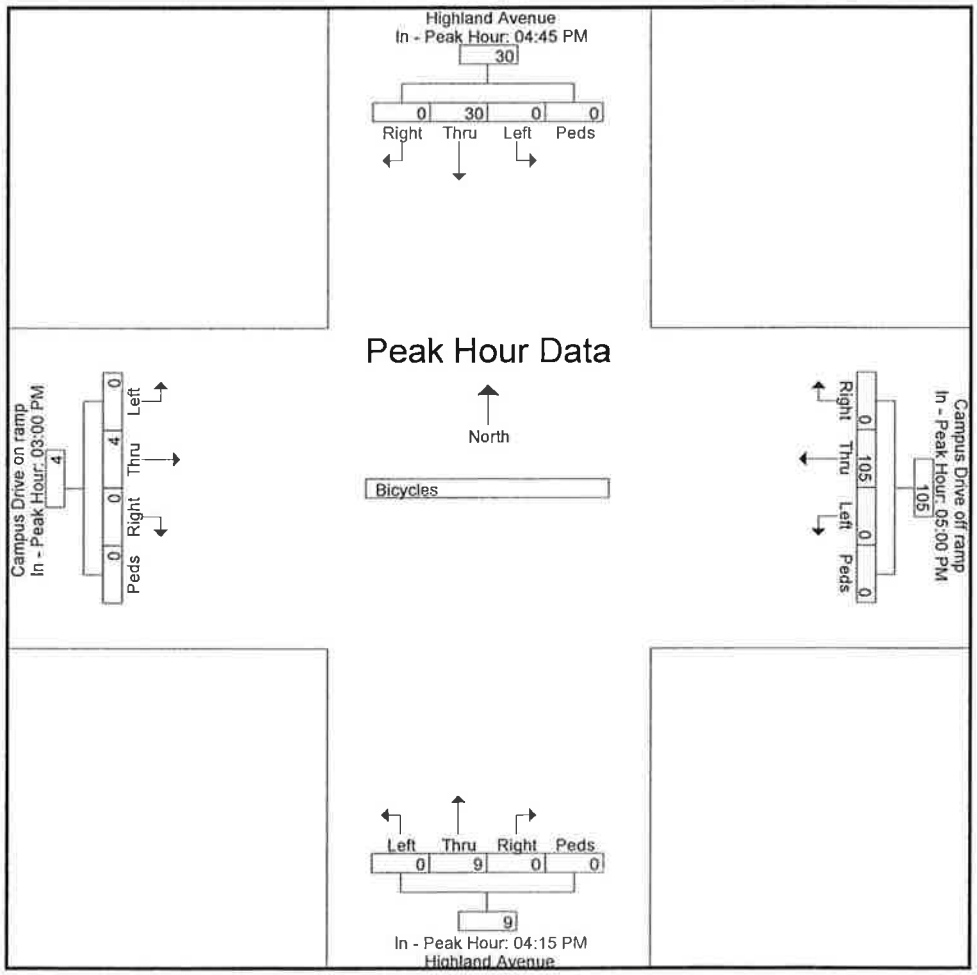
KL Engineering, Inc.

5950 Seminole Centre Court
Madison, WI 53711

Campus Drive ramps & Highland Avenue
PM Peak Hour
Madison, Dane County, WI
Bicycles

File Name : Campus Dr - Highland PM
Site Code : 10030012
Start Date : 9/22/2010
Page No : 4

	Highland Avenue From North					Campus Drive off ramp From East					Highland Avenue From South					Campus Drive on ramp From West					
Start Time	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Int. Total
Peak Hour Analysis From 03:00 PM to 05:45 PM - Peak 1 of 1																					
Peak Hour for Each Approach Begins at:																					
	04:45 PM					05:00 PM					04:15 PM					03:00 PM					
+0 mins.	0	6	0	0	6	0	25	0	0	25	0	3	0	0	3	0	0	0	0	0	
+15 mins.	0	5	0	0	5	0	23	0	0	23	0	2	0	0	2	0	4	0	0	4	
+30 mins.	0	4	0	0	4	0	27	0	0	27	0	1	0	0	1	0	0	0	0	0	
+45 mins.	0	15	0	0	15	0	30	0	0	30	0	3	0	0	3	0	0	0	0	0	
Total Volume	0	30	0	0	30	0	105	0	0	105	0	9	0	0	9	0	4	0	0	4	
% App. Total	0	100	0	0		0	100	0	0		0	100	0	0		0	100	0	0		
PHF	.000	.500	.000	.000	.500	.000	.875	.000	.000	.875	.000	.750	.000	.000	.750	.000	.250	.000	.000	.250	



LOCATION 2300 UNIVERSITY [CHESTNUT-HIGHLAND]
STATION# 3376
DIRECTION NON-DIR
REMARKS
START TIME 1000 on 10/13/2009
END TIME 1000 on 10/14/2009

TRAFFIC ENGINEERING DIVISION
CITY OF MADISON, WI
AUTOMATIC TRAFFIC COUNTER RECORD

Day	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Sunday	TOTAL M-F	AWT	ADT
Date	19-Oct-09	13-Oct-09	14-Oct-09	15-Oct-09	16-Oct-09	17-Oct-09	18-Oct-09	Volume	Volume	Volume
AM 12-1			69					69	69	69
1-2			79					79	79	79
2-3			30					30	30	30
3-4			18					18	18	18
4-5			22					22	22	22
5-6			97					97	97	97
6-7			390					390	390	390
7-8			1009					1009	1009	1009
8-9			1048					1048	1048	1048
9-10			682					682	682	682
10-11		724						724	724	724
11-12		853						853	853	853
PM 12-1		1000						1000	1000	1000
1-2		825						825	825	825
2-3		912						912	912	912
3-4		1149						1149	1149	1149
4-5		1383						1383	1383	1383
5-6		1250						1250	1250	1250
6-7		921						921	921	921
7-8		734						734	734	734
8-9		480						480	480	480
9-10		427						427	427	427
10-11		254						254	254	254
11-12		222						222	222	222
24 HR TOTAL		11134	3444					14578	14578	14578

Factor 0.98

AAWT

Factored Total 14286

2400

LOCATION 2300 UNIVERSITY [CHESTNUT-HIGHLAND]
STATION# 3376
DIRECTION NON-DIR
REMARKS
START TIME 1100 on 10/7/2008
END TIME 1100 on 10/8/2008

TRAFFIC ENGINEERING DIVISION
CITY OF MADISON, WI
AUTOMATIC TRAFFIC COUNTER RECORD

Day	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Sunday	TOTAL M-F	AWT	ADT
Date	13-Oct-08	07-Oct-08	08-Oct-08	09-Oct-08	10-Oct-08	11-Oct-08	12-Oct-08	Volume	Volume	Volume
AM 12-1			106					106	106	106
1-2			64					64	64	64
2-3			29					29	29	29
3-4			13					13	13	13
4-5			28					28	28	28
5-6			126					126	126	126
6-7			524					524	524	524
7-8			1094					1094	1094	1094
8-9			1027					1027	1027	1027
9-10			739					739	739	739
10-11			697					697	697	697
11-12		843						843	843	843
PM 12-1		957						957	957	957
1-2		842						842	842	842
2-3		1004						1004	1004	1004
3-4		1188						1188	1188	1188
4-5		1297						1297	1297	1297
5-6		1355						1355	1355	1355
6-7		1017						1017	1017	1017
7-8		699						699	699	699
8-9		453						453	453	453
9-10		338						338	338	338
10-11		226						226	226	226
11-12		186						186	186	186
24 HR TOTAL		10405	4447					14852	14852	14852

Factor 0.97
AAWT
Factored Total 14406

LOCATION 2400 Blk. of Old University Ave.
STATION# 291041
DIRECTION combined
REMARKS
START TIME 1200 on 9/21/2010
END TIME 1200 on 9/23/2010

TRAFFIC ENGINEERING DIVISION
CITY OF MADISON, WI
AUTOMATIC TRAFFIC COUNTER RECORD

Day	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Sunday	TOTAL M-F	AWT	ADT
Date	27-Sep-10	21-Sep-10	22-Sep-10	23-Sep-10	24-Sep-10	25-Sep-10	26-Sep-10	Volume	Volume	Volume
AM 12-1			60	54				114	57	57
1-2			62	45				107	54	54
2-3			20	25				45	22	22
3-4			26	17				43	22	22
4-5			20	18				38	19	19
5-6			101	81				182	91	91
6-7			312	324				636	318	318
7-8			644	639				1283	642	642
8-9			692	643				1335	668	668
9-10			544	581				1125	562	562
10-11			502	520				1022	511	511
11-12			596	612				1208	604	604
PM 12-1		670	633					1303	652	652
1-2		558	620					1178	589	589
2-3		599	672					1271	636	636
3-4		701	719					1420	710	710
4-5		743	748					1491	746	746
5-6		702	724					1426	713	713
6-7		550	624					1174	587	587
7-8		451	523					974	487	487
8-9		388	361					749	374	374
9-10		277	321					598	299	299
10-11		178	155					333	166	166
11-12		119	140					259	130	130
24 HR TOTAL		5936	9819	3559				19314	9659	9659

Factor 1
AAWT
Factored Total 9659

LOCATION 2400 Blk. of Old University Ave.
STATION# 291041
DIRECTION E. B.
REMARKS
START TIME 1200 on 9/21/2010
END TIME 1200 on 9/23/2010

TRAFFIC ENGINEERING DIVISION
CITY OF MADISON, WI
AUTOMATIC TRAFFIC COUNTER RECORD

Day	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Sunday	TOTAL M-F	AWT	ADT
Date	27-Sep-10	21-Sep-10	22-Sep-10	23-Sep-10	24-Sep-10	25-Sep-10	26-Sep-10	Volume	Volume	Volume
AM 12-1			42	41				83	42	42
1-2			35	25				60	30	30
2-3			13	20				33	16	16
3-4			14	11				25	12	12
4-5			14	15				29	14	14
5-6			75	66				141	70	70
6-7			255	264				519	260	260
7-8			517	502				1019	510	510
8-9			524	498				1022	511	511
9-10			422	430				852	426	426
10-11			358	368				726	363	363
11-12			397	416				813	406	406
PM 12-1		438	424					862	431	431
1-2		400	428					828	414	414
2-3		424	473					897	448	448
3-4		451	491					942	471	471
4-5		464	487					951	476	476
5-6		430	412					842	421	421
6-7		350	358					708	354	354
7-8		277	332					609	304	304
8-9		242	230					472	236	236
9-10		187	214					401	200	200
10-11		117	99					216	108	108
11-12		83	90					173	86	86
24 HR TOTAL		3863	6704	2656				13223	6609	6609

Factor 1
AAWT
Factored Total 6609

LOCATION 2400 Blk. of Old University Ave.
STATION# 291041
DIRECTION W. B.
REMARKS
START TIME 1200 on 9/21/2010
END TIME 1200 on 9/23/2010

TRAFFIC ENGINEERING DIVISION
CITY OF MADISON, WI
AUTOMATIC TRAFFIC COUNTER RECORD

Day	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Sunday	TOTAL M-F	AWT	ADT
Date	27-Sep-10	21-Sep-10	22-Sep-10	23-Sep-10	24-Sep-10	25-Sep-10	26-Sep-10	Volume	Volume	Volume
AM 12-1			18	13				31	16	16
1-2			27	20				47	24	24
2-3			7	5				12	6	6
3-4			12	6				18	9	9
4-5			6	3				9	4	4
5-6			26	15				41	20	20
6-7			57	60				117	58	58
7-8			127	137				264	132	132
8-9			168	145				313	156	156
9-10			122	151				273	136	136
10-11			144	152				296	148	148
11-12			199	196				395	198	198
PM 12-1		232	209					441	220	220
1-2		158	192					350	175	175
2-3		175	199					374	187	187
3-4		250	228					478	239	239
4-5		279	261					540	270	270
5-6		272	312					584	292	292
6-7		200	266					466	233	233
7-8		174	191					365	182	182
8-9		146	131					277	138	138
9-10		90	107					197	98	98
10-11		61	56					117	58	58
11-12		36	50					86	43	43
24 HR TOTAL		2073	3115	903				6091	3042	3042

Factor 1

AAWT

Factored Total 3042

LOCATION 2400 UNIVERSITY AV [GRAND - HIGHLAND]
STATION# 3375
DIRECTION NON-DIR
REMARKS
START TIME 1000 on 10/13/2009
END TIME 1000 on 10/14/2009

TRAFFIC ENGINEERING DIVISION
CITY OF MADISON, WI
AUTOMATIC TRAFFIC COUNTER RECORD

Day	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Sunday	TOTAL M-F	AWT	ADT
Date	19-Oct-09	13-Oct-09	14-Oct-09	15-Oct-09	16-Oct-09	17-Oct-09	18-Oct-09	Volume	Volume	Volume
AM 12-1			29					29	29	29
1-2			27					27	27	27
2-3			8					8	8	8
3-4			5					5	5	5
4-5			26					26	26	26
5-6			113					113	113	113
6-7			663					663	663	663
7-8			1369					1369	1369	1369
8-9			1482					1482	1482	1482
9-10			878					878	878	878
10-11		805						805	805	805
11-12		824						824	824	824
PM 12-1		1025						1025	1025	1025
1-2		867						867	867	867
2-3		729						729	729	729
3-4		887						887	887	887
4-5		866						866	866	866
5-6		939						939	939	939
6-7		825						825	825	825
7-8		573						573	573	573
8-9		417						417	417	417
9-10		276						276	276	276
10-11		209						209	209	209
11-12		98						98	98	98
24 HR TOTAL		9340	4600					13940	13940	13940

Factor 0.98

AAWT

Factored Total 13661

LOCATION 2400 UNIVERSITY AV [GRAND - HIGHLAND]
STATION# 3375
DIRECTION NON-DIR
REMARKS
START TIME 1100 on 10/7/2008
END TIME 1100 on 10/8/2008

TRAFFIC ENGINEERING DIVISION
CITY OF MADISON, WI
AUTOMATIC TRAFFIC COUNTER RECORD

Day	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Sunday	TOTAL M-F	AWT	ADT
Date	13-Oct-08	07-Oct-08	08-Oct-08	09-Oct-08	10-Oct-08	11-Oct-08	12-Oct-08	Volume	Volume	Volume
AM 12-1			25					25	25	25
1-2			16					16	16	16
2-3			8					8	8	8
3-4			9					9	9	9
4-5			20					20	20	20
5-6			92					92	92	92
6-7			401					401	401	401
7-8			960					960	960	960
8-9			798					798	798	798
9-10			518					518	518	518
10-11			433					433	433	433
11-12		536						536	536	536
PM 12-1		632						632	632	632
1-2		518						518	518	518
2-3		513						513	513	513
3-4		468						468	468	468
4-5		513						513	513	513
5-6		599						599	599	599
6-7		446						446	446	446
7-8		306						306	306	306
8-9		220						220	220	220
9-10		166						166	166	166
10-11		123						123	123	123
11-12		56						56	56	56
24 HR TOTAL		5096	3280					8376	8376	8376

Factor 0.97

AAWT

Factored Total 8125

LOCATION 2500 UNIVERSITY [WEST OF GRAND AV]
STATION# 337501
DIRECTION NON-DIR
REMARKS
START TIME 1000 on 10/13/2009
END TIME 1000 on 10/14/2009

TRAFFIC ENGINEERING DIVISION
CITY OF MADISON, WI
AUTOMATIC TRAFFIC COUNTER RECORD

Day	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Sunday	TOTAL M-F	AWT	ADT
Date	19-Oct-09	13-Oct-09	14-Oct-09	15-Oct-09	16-Oct-09	17-Oct-09	18-Oct-09	Volume	Volume	Volume
AM 12-1			12					12	12	12
1-2			7					7	7	7
2-3			3					3	3	3
3-4			3					3	3	3
4-5			13					13	13	13
5-6			64					64	64	64
6-7			329					329	329	329
7-8			726					726	726	726
8-9			776					776	776	776
9-10			464					464	464	464
10-11		382						382	382	382
11-12		397						397	397	397
PM 12-1		479						479	479	479
1-2		419						419	419	419
2-3		381						381	381	381
3-4		430						430	430	430
4-5		420						420	420	420
5-6		416						416	416	416
6-7		371						371	371	371
7-8		243						243	243	243
8-9		193						193	193	193
9-10		125						125	125	125
10-11		101						101	101	101
11-12		47						47	47	47
24 HR TOTAL		4404	2397					6801	6801	6801

Factor 0.98

AAWT

Factored Total 6665

LOCATION 2500 UNIVERSITY [WEST OF GRAND AV]
STATION# 337501
DIRECTION NON-DIR
REMARKS
START TIME 1100 on 10/7/2008
END TIME 1100 on 10/8/2008

TRAFFIC ENGINEERING DIVISION
CITY OF MADISON, WI
AUTOMATIC TRAFFIC COUNTER RECORD

Day	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Sunday	TOTAL M-F	AWT	ADT
Date	13-Oct-08	07-Oct-08	08-Oct-08	09-Oct-08	10-Oct-08	11-Oct-08	12-Oct-08	Volume	Volume	Volume
AM 12-1			15					15	15	15
1-2			8					8	8	8
2-3			6					6	6	6
3-4			6					6	6	6
4-5			19					19	19	19
5-6			92					92	92	92
6-7			404					404	404	404
7-8			881					881	881	881
8-9			829					829	829	829
9-10			539					539	539	539
10-11			440					440	440	440
11-12		502						502	502	502
PM 12-1		603						603	603	603
1-2		451						451	451	451
2-3		442						442	442	442
3-4		403						403	403	403
4-5		421						421	421	421
5-6		484						484	484	484
6-7		364						364	364	364
7-8		248						248	248	248
8-9		183						183	183	183
9-10		123						123	123	123
10-11		88						88	88	88
11-12		31						31	31	31
24 HR TOTAL		4343	3239					7582	7582	7582

Factor 0.97

AAWT

Factored Total 7355

2500

LOCATION University off ramp (one way) East Bound to Old Univ.
STATION# 290978
DIRECTION
REMARKS
START TIME 1000 on 4/29/2010
END TIME 1000 on 4/30/2010

TRAFFIC ENGINEERING DIVISION
CITY OF MADISON, WI
AUTOMATIC TRAFFIC COUNTER RECORD

Day	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Sunday	TOTAL M-F	AWT	ADT
Date	03-May-10	04-May-10	05-May-10	29-Apr-10	30-Apr-10	01-May-10	02-May-10	Volume	Volume	Volume
12-1 3-4					24			24	24	24
1-2 4-5					5			5	5	5
2-3 5-6					7			7	7	7
3-4 6-7					7			7	7	7
4-5 7-8					18			18	18	18
5-6 8-9					69			69	69	69
6-7 9-10					288			288	288	288
7-8 10-11					611			611	611	611
8-9 11-12					637			637	637	637
9-~~AM~~ 12-1					455			455	455	455
10-11 1-2				389				389	389	389
11-12 2-3				372				372	372	372
12-1 3-4				516				516	516	516
1-2 4-5				407				407	407	407
2-3 5-6				381				381	381	381
3-4 6-7				366				366	366	366
4-5 7-8				405				405	405	405
5-6 8-9				400				400	400	400
6-7 9-10				389				389	389	389
7-8 10-11				302				302	302	302
8-9 11-12				264				264	264	264
~~PM~~ 12-1				169				169	169	169
10-11 1-2				130				130	130	130
11-12 2-3				39				39	39	39
24 HR TOTAL				4529	2121			6650	6650	6650

Factor 1
AAWT
Factored Total 6650

LOCATION 400 HIGHLAND [UNIVERSITY-KENDALL]
STATION# 3380
DIRECTION NON-DIR
REMARKS
START TIME 1400 on 10/8/2009
END TIME 1400 on 10/9/2009

TRAFFIC ENGINEERING DIVISION
CITY OF MADISON, WI
AUTOMATIC TRAFFIC COUNTER RECORD

Day	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Sunday	TOTAL M-F	AWT	ADT
Date	12-Oct-09	13-Oct-09	14-Oct-09	08-Oct-09	09-Oct-09	10-Oct-09	11-Oct-09	Volume	Volume	Volume
AM 12-1					47			47	47	47
1-2					38			38	38	38
2-3					16			16	16	16
3-4					15			15	15	15
4-5					14			14	14	14
5-6					81			81	81	81
6-7					328			328	328	328
7-8					568			568	568	568
8-9					509			509	509	509
9-10					524			524	524	524
10-11					469			469	469	469
11-12					492			492	492	492
PM 12-1					571			571	571	571
1-2					592			592	592	592
2-3				473				473	473	473
3-4				574				574	574	574
4-5				712				712	712	712
5-6				609				609	609	609
6-7				450				450	450	450
7-8				335				335	335	335
8-9				236				236	236	236
9-10				162				162	162	162
10-11				115				115	115	115
11-12				96				96	96	96
24 HR TOTAL				3762	4264			8026	8026	8026

Factor 0.98
AAWT
Factored Total 7865

LOCATION 400 HIGHLAND [UNIVERSITY-KENDALL]
STATION# 3380
DIRECTION NON-DIR
REMARKS
START TIME 1300 on 10/27/2008
END TIME 1300 on 10/28/2008

TRAFFIC ENGINEERING DIVISION
CITY OF MADISON, WI
AUTOMATIC TRAFFIC COUNTER RECORD

Day	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Sunday	TOTAL M-F	AWT	ADT
Date	27-Oct-08	28-Oct-08	29-Oct-08	30-Oct-08	31-Oct-08	01-Nov-08	02-Nov-08	Volume	Volume	Volume
AM 12-1		33						33	33	33
1-2		16						16	16	16
2-3		23						23	23	23
3-4		10						10	10	10
4-5		23						23	23	23
5-6		93						93	93	93
6-7		397						397	397	397
7-8		592						592	592	592
8-9		476						476	476	476
9-10		373						373	373	373
10-11		377						377	377	377
11-12		412						412	412	412
PM 12-1		408						408	408	408
1-2	380							380	380	380
2-3	457							457	457	457
3-4	625							625	625	625
4-5	649							649	649	649
5-6	516							516	516	516
6-7	409							409	409	409
7-8	242							242	242	242
8-9	201							201	201	201
9-10	131							131	131	131
10-11	94							94	94	94
11-12	76							76	76	76
24 HR TOTAL	3780	3233						7013	7013	7013

Factor 0.97

AAWT

Factored Total 6803

LOCATION 500 HIGHLAND [UNIVERSITY-CAMPUS]
STATION# 3381
DIRECTION NON-DIR
REMARKS
START TIME 1100 on 10/26/2009
END TIME 1100 on 10/27/2009

TRAFFIC ENGINEERING DIVISION
CITY OF MADISON, WI
AUTOMATIC TRAFFIC COUNTER RECORD

Day	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Sunday	TOTAL M-F	AWT	ADT
Date	26-Oct-09	27-Oct-09	28-Oct-09	29-Oct-09	30-Oct-09	31-Oct-09	01-Nov-09	Volume	Volume	Volume
AM 12-1		70						70	70	70
1-2		40						40	40	40
2-3		26						26	26	26
3-4		20						20	20	20
4-5		25						25	25	25
5-6		130						130	130	130
6-7		444						444	444	444
7-8		751						751	751	751
8-9		692						692	692	692
9-10		614						614	614	614
10-11		643						643	643	643
11-12	604							604	604	604
PM 12-1	674							674	674	674
1-2	672							672	672	672
2-3	793							793	793	793
3-4	1058							1058	1058	1058
4-5	1111							1111	1111	1111
5-6	792							792	792	792
6-7	526							526	526	526
7-8	347							347	347	347
8-9	236							236	236	236
9-10	165							165	165	165
10-11	161							161	161	161
11-12	151							151	151	151
24 HR TOTAL	7290	3455						10745	10745	10745

Factor 0.98

AAWT

Factored Total 10530

LOCATION 500 HIGHLAND [UNIVERSITY-CAMPUS]
STATION# 3381
DIRECTION NON-DIR
REMARKS
START TIME 1400 on 10/27/2008
END TIME 1400 on 10/28/2008

TRAFFIC ENGINEERING DIVISION
CITY OF MADISON, WI
AUTOMATIC TRAFFIC COUNTER RECORD

Day	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Sunday	TOTAL M-F	AWT	ADT
Date	27-Oct-08	28-Oct-08	29-Oct-08	30-Oct-08	31-Oct-08	01-Nov-08	02-Nov-08	Volume	Volume	Volume
AM 12-1		99						99	99	99
1-2		64						64	64	64
2-3		47						47	47	47
3-4		32						32	32	32
4-5		59						59	59	59
5-6		140						140	140	140
6-7		709						709	709	709
7-8		1317						1317	1317	1317
8-9		1160						1160	1160	1160
9-10		945						945	945	945
10-11		860						860	860	860
11-12		1092						1092	1092	1092
PM 12-1		1106						1106	1106	1106
1-2		998						998	998	998
2-3	1183							1183	1183	1183
3-4	1462							1462	1462	1462
4-5	1706							1706	1706	1706
5-6	1105							1105	1105	1105
6-7	881							881	881	881
7-8	502							502	502	502
8-9	326							326	326	326
9-10	282							282	282	282
10-11	216							216	216	216
11-12	187							187	187	187
24 HR TOTAL	7850	8628						16478	16478	16478

Factor 0.97
AAWT
Factored Total 15984

LOCATION 2600 KENDALL [GRAND-FARLEY]
STATION# 3405
DIRECTION NON-DIR
REMARKS construction count
START TIME 1300 on 10/5/2009
END TIME 1300 on 10/6/2009

TRAFFIC ENGINEERING DIVISION
CITY OF MADISON, WI
AUTOMATIC TRAFFIC COUNTER RECORD

Day	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Sunday	TOTAL M-F	AWT	ADT
Date	05-Oct-09	06-Oct-09	07-Oct-09	08-Oct-09	09-Oct-09	10-Oct-09	11-Oct-09	Volume	Volume	Volume
AM 12-1										
1-2		3						3	3	3
2-3		1						1	1	1
3-4		1						1	1	1
4-5		1						1	1	1
5-6		2						2	2	2
6-7		18						18	18	18
7-8		111						111	111	111
8-9		94						94	94	94
9-10		39						39	39	39
10-11		39						39	39	39
11-12		44						44	44	44
PM 12-1		54						54	54	54
1-2	39							39	39	39
2-3	38							38	38	38
3-4	56							56	56	56
4-5	90							90	90	90
5-6	109							109	109	109
6-7	78							78	78	78
7-8	39							39	39	39
8-9	17							17	17	17
9-10	21							21	21	21
10-11	23							23	23	23
11-12	16							16	16	16
24 HR TOTAL	526	407						933	933	933

Factor 0.98

AAWT

Factored Total 914

LOCATION 2600 KENDALL [GRAND-FARLEY]
STATION# 3405
DIRECTION NON-DIR
REMARKS construction count
START TIME 1100 on 3/31/200
END TIME 1100 on 4/1/2008

TRAFFIC ENGINEERING DIVISION
CITY OF MADISON, WI
AUTOMATIC TRAFFIC COUNTER RECORD

Day	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Sunday	TOTAL M-F	AWT	ADT
Date	31-Mar-08	01-Apr-08	02-Apr-08	03-Apr-08	04-Apr-08	05-Apr-08	06-Apr-08	Volume	Volume	Volume
AM 12-1		1						1	1	1
1-2										
2-3		3						3	3	3
3-4		2						2	2	2
4-5		2						2	2	2
5-6		3						3	3	3
6-7		7						7	7	7
7-8		79						79	79	79
8-9		51						51	51	51
9-10		27						27	27	27
10-11		26						26	26	26
11-12	24							24	24	24
PM 12-1	38							38	38	38
1-2	36							36	36	36
2-3	22							22	22	22
3-4	64							64	64	64
4-5	82							82	82	82
5-6	75							75	75	75
6-7	30							30	30	30
7-8	26							26	26	26
8-9	15							15	15	15
9-10	11							11	11	11
10-11	7							7	7	7
11-12										
24 HR TOTAL	430	201						631	631	631

Factor 1.02

AAWT

Factored Total 644

LOCATION 2800 KENDALL [FRANKLIN-SHEPARD]
STATION# 3404
DIRECTION NON-DIR
REMARKS construction count
START TIME 1100 on 3/31/200
END TIME 1100 on 4/1/2008

TRAFFIC ENGINEERING DIVISION
CITY OF MADISON, WI
AUTOMATIC TRAFFIC COUNTER RECORD

Day	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Sunday	TOTAL M-F	AWT	ADT
Date	31-Mar-08	01-Apr-08	02-Apr-08	03-Apr-08	04-Apr-08	05-Apr-08	06-Apr-08	Volume	Volume	Volume
AM 12-1		7						7	7	7
1-2		5						5	5	5
2-3		2						2	2	2
3-4		2						2	2	2
4-5		2						2	2	2
5-6		15						15	15	15
6-7		50						50	50	50
7-8		237						237	237	237
8-9		207						207	207	207
9-10		139						139	139	139
10-11		115						115	115	115
11-12	103							103	103	103
PM 12-1	124							124	124	124
1-2	157							157	157	157
2-3	150							150	150	150
3-4	225							225	225	225
4-5	317							317	317	317
5-6	260							260	260	260
6-7	147							147	147	147
7-8	90							90	90	90
8-9	63							63	63	63
9-10	47							47	47	47
10-11	34							34	34	34
11-12	14							14	14	14
24 HR TOTAL	1731	781						2512	2512	2512

Factor 1.02

AAWT

Factored Total 2562

APPENDIX B
Introduction to Capacity

INTRODUCTION TO CAPACITY

The main objective of a capacity analysis is to estimate the maximum amount of traffic that can be accommodated by a given facility. Traffic facilities generally operate poorly when they are at or near capacity and are not usually designed to do so. Ranges of operating conditions are defined by levels of service. A capacity analysis was conducted for the aforementioned intersections utilizing the methods in the Highway Capacity Manual, Special Report 209, published by the Transportation Research Board and utilizing software developed by the Federal Highway Administration.

Level of Service is a quantitative measure that refers to the overall quality of flow at an intersection ranging from very good, LOS A, to very poor, LOS F. The various levels of service are defined as follows:

- LOS A is the highest level of service that can be achieved. Under this condition, intersection approaches appear quite open, turning movements are easily made, and nearly all drivers find freedom of operation. The general level of comfort and convenience provided to the motorist, passenger, or pedestrian is excellent. At signalized intersections, average delays are less than or equal to ten seconds. At unsignalized intersections, average delays are zero to ten seconds.

- LOS B represents stable operation. The level of comfort and convenience provided is somewhat less than at LOS A, because the presence of others in the traffic stream begins to affect individual behavior. At signalized intersections, average vehicle delays are ten to twenty seconds. At unsignalized intersections, average delays are ten to fifteen seconds.

- LOS C still represents stable operation, but periodic backups of a few vehicles may develop behind turning vehicles. Most drivers begin to feel restricted, but not severely. The general level of comfort and convenience declines noticeably at this level. At signalized intersections, average vehicle delays are 20 to 35 seconds. At unsignalized intersections, average delays are 15 to 25 seconds.

- LOS D represents increasing traffic restrictions as the intersection approaches instability. Delays to approaching vehicles may be substantial during short peaks within the peak period, but periodic clearance of long lines occurs, this preventing excessive backups. At signalized intersections, average vehicle delays are 35 to 55 seconds. At unsignalized intersections, average delays are 25 to 35 seconds.

- LOS E represents operating conditions at or near the capacity level. Comfort and convenience levels are poor, and driver or pedestrian frustration is generally high. At signalized intersections, average vehicle delays are 55 to 80 seconds. At unsignalized intersections, average delays are 35 to 50 seconds.

- LOS F represents jammed conditions where the intersection is over capacity and acceptable gaps for unsignalized intersections in the mainline traffic flow are minimal. It is defined as forced, or breakdown flow. At signalized intersections, average vehicle delays exceed 80 seconds. At unsignalized intersections, average delays exceed 50 seconds.

APPENDIX C

SYNCHRO Capacity Analyses

University Ave. – Highland Intersection

Highland Avenue – Campus Drive Intersections

Highway Capacity Analyses

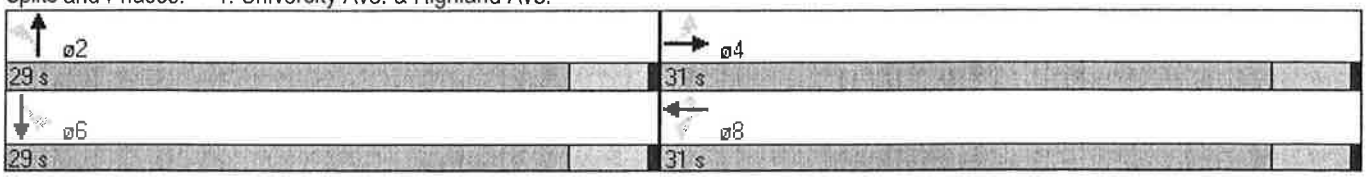
University Avenue – Grand Avenue Intersection

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	259	482	54	53	26	154	5	294	141	156	138	9
Satd. Flow (prot)	0	3428	0	0	1803	1583	0	3329	0	1770	1836	0
Flt Permitted		0.820			0.510			0.953		0.454		
Satd. Flow (perm)	0	2835	0	0	941	1522	0	3174	0	836	1836	0
Satd. Flow (RTOR)		16				175		153			7	
Lane Group Flow (vph)	0	903	0	0	90	175	0	478	0	177	167	0
Turn Type	Perm			Perm		Perm	Perm			Perm		
Protected Phases		4			8			2			6	
Permitted Phases	4			8		8	2			6		
Total Split (s)	31.0	31.0	0.0	31.0	31.0	31.0	29.0	29.0	0.0	29.0	29.0	0.0
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Act Effct Green (s)		25.2			25.2	25.2		26.8		26.8	26.8	
Actuated g/C Ratio		0.42			0.42	0.42		0.45		0.45	0.45	
v/c Ratio		0.75			0.23	0.24		0.32		0.47	0.20	
Control Delay		18.7			11.9	2.8		8.4		16.3	9.5	
Queue Delay		0.0			0.0	0.0		0.0		0.0	0.0	
Total Delay		18.7			11.9	2.8		8.4		16.3	9.5	
LOS		B			B	A		A		B	A	
Approach Delay		18.7			5.9			8.4			13.0	
Approach LOS		B			A			A			B	
Queue Length 50th (ft)		131			19	0		37		46	36	
Queue Length 95th (ft)		183			44	26		67		98	71	
Internal Link Dist (ft)		599			361			487			320	
Turn Bay Length (ft)												
Base Capacity (vph)		1306			430	791		1526		380	838	
Starvation Cap Reductn		0			0	0		0		0	0	
Spillback Cap Reductn		0			0	0		0		0	0	
Storage Cap Reductn		0			0	0		0		0	0	
Reduced v/c Ratio		0.69			0.21	0.22		0.31		0.47	0.20	

Intersection Summary

Cycle Length: 60
Actuated Cycle Length: 60
Offset: 5 (8%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.75
Intersection Signal Delay: 13.5 Intersection LOS: B
Intersection Capacity Utilization 72.1% ICU Level of Service C
Analysis Period (min) 15

Splits and Phases: 1: University Ave. & Highland Ave.



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	269	494	58	53	32	156	11	296	141	162	144	11
Satd. Flow (prot)	0	3424	0	0	1807	1583	0	3333	0	1770	1833	0
Flt Permitted		0.817			0.510			0.949		0.447		
Satd. Flow (perm)	0	2821	0	0	942	1522	0	3162	0	824	1833	0
Satd. Flow (RTOR)		17				177		153			8	
Lane Group Flow (vph)	0	933	0	0	96	177	0	487	0	184	176	0
Turn Type	Perm			Perm		Perm	Perm			Perm		
Protected Phases		4			8			2			6	
Permitted Phases	4			8		8	2			6		
Total Split (s)	31.0	31.0	0.0	31.0	31.0	31.0	29.0	29.0	0.0	29.0	29.0	0.0
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Act Effct Green (s)		25.5			25.5	25.5		26.5		26.5	26.5	
Actuated g/C Ratio		0.42			0.42	0.42		0.44		0.44	0.44	
v/c Ratio		0.77			0.24	0.24		0.33		0.51	0.22	
Control Delay		19.3			12.0	2.8		8.6		17.8	10.0	
Queue Delay		0.0			0.0	0.0		0.0		0.0	0.0	
Total Delay		19.3			12.0	2.8		8.6		17.8	10.0	
LOS		B			B	A		A		B	B	
Approach Delay		19.3			6.0			8.6			14.0	
Approach LOS		B			A			A			B	
Queue Length 50th (ft)		133			20	0		40		49	39	
Queue Length 95th (ft)		192			46	26		68		104	73	
Internal Link Dist (ft)		599			361			487			120	
Turn Bay Length (ft)												
Base Capacity (vph)		1298			430	791		1504		370	827	
Starvation Cap Reductn		0			0	0		0		0	0	
Spillback Cap Reductn		0			0	0		0		0	0	
Storage Cap Reductn		0			0	0		0		0	0	
Reduced v/c Ratio		0.72			0.22	0.22		0.32		0.50	0.21	

Intersection Summary

Cycle Length: 60

Actuated Cycle Length: 60

Offset: 6 (10%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green

Control Type: Actuated-Coordinated

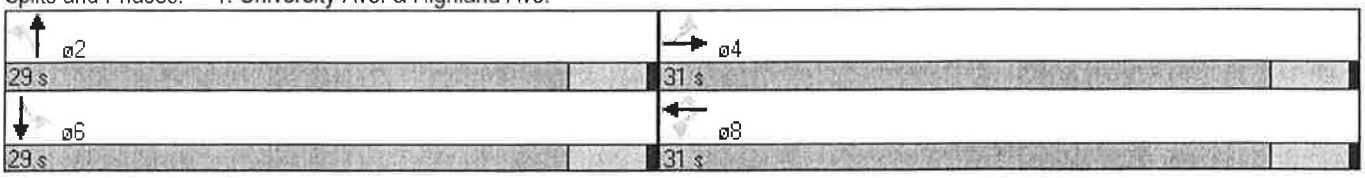
Maximum v/c Ratio: 0.77

Intersection Signal Delay: 14.0 Intersection LOS: B

Intersection Capacity Utilization 73.2% ICU Level of Service D

Analysis Period (min) 15

Splits and Phases: 1: University Ave. & Highland Ave.

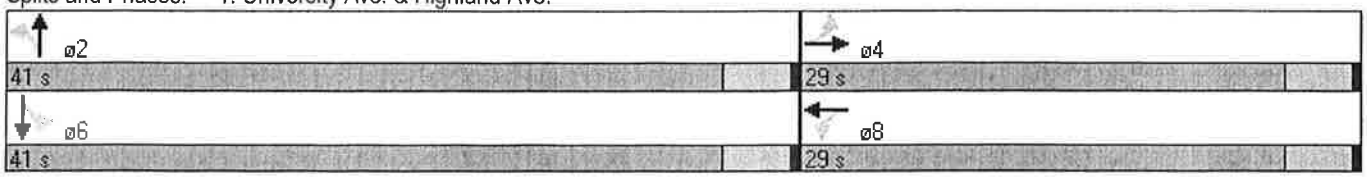


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕		↰	↕	
Volume (vph)	64	294	52	189	82	213	8	160	70	248	341	35
Satd. Flow (prot)	0	3232	0	0	3182	0	0	3172	0	1770	1819	0
Flt Permitted		0.727			0.639			0.944		0.585		
Satd. Flow (perm)	0	2364	0	0	2041	0	0	2996	0	1070	1819	0
Satd. Flow (RTOR)		26			242			80			11	
Lane Group Flow (vph)	0	423	0	0	550	0	0	271	0	282	428	0
Turn Type	Perm			Perm			Perm			Perm		
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Total Split (s)	29.0	29.0	0.0	29.0	29.0	0.0	41.0	41.0	0.0	41.0	41.0	0.0
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Act Effct Green (s)		18.0			18.0			44.0		44.0	44.0	
Actuated g/C Ratio		0.26			0.26			0.63		0.63	0.63	
v/c Ratio		0.67			0.78			0.14		0.42	0.37	
Control Delay		26.6			20.8			4.9		9.1	7.1	
Queue Delay		0.0			0.0			0.0		0.0	0.2	
Total Delay		26.6			20.8			4.9		9.1	7.3	
LOS		C			C			A		A	A	
Approach Delay		26.6			20.8			4.9			8.0	
Approach LOS		C			C			A			A	
Queue Length 50th (ft)		81			64			14		27	39	
Queue Length 95th (ft)		107			98			37		137	169	
Internal Link Dist (ft)		599			361			487			320	
Turn Bay Length (ft)												
Base Capacity (vph)		864			887			1915		674	1149	
Starvation Cap Reductn		0			0			0		0	196	
Spillback Cap Reductn		0			0			0		0	0	
Storage Cap Reductn		0			0			0		0	0	
Reduced v/c Ratio		0.49			0.62			0.14		0.42	0.45	

Intersection Summary

Cycle Length: 70
Actuated Cycle Length: 70
Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.78
Intersection Signal Delay: 15.2 Intersection LOS: B
Intersection Capacity Utilization 75.7% ICU Level of Service D
Analysis Period (min) 15

Splits and Phases: 1: University Ave. & Highland Ave.

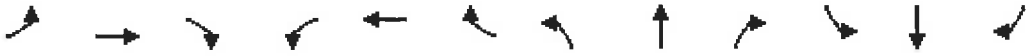


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕				
Volume (vph)	68	302	53	189	86	217	11	164	70	252	345	43
Satd. Flow (prot)	0	3233	0	0	3182	0	0	3176	0	1770	1810	0
Flt Permitted		0.713			0.634			0.938		0.581		
Satd. Flow (perm)	0	2319	0	0	2026	0	0	2980	0	1063	1810	0
Satd. Flow (RTOR)		25			247			80			14	
Lane Group Flow (vph)	0	436	0	0	560	0	0	278	0	286	441	0
Turn Type	Perm			Perm			Perm			Perm		
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Total Split (s)	29.0	29.0	0.0	29.0	29.0	0.0	41.0	41.0	0.0	41.0	41.0	0.0
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Act Effct Green (s)		18.2			18.2			43.8		43.8	43.8	
Actuated g/C Ratio		0.26			0.26			0.63		0.63	0.63	
v/c Ratio		0.70			0.79			0.15		0.43	0.39	
Control Delay		27.7			21.2			4.9		9.8	7.6	
Queue Delay		0.0			0.0			0.0		0.0	0.2	
Total Delay		27.7			21.2			4.9		9.8	7.9	
LOS		C			C			A		A	A	
Approach Delay		27.7			21.2			4.9			8.6	
Approach LOS		C			C			A			A	
Queue Length 50th (ft)		84			65			15		56	66	
Queue Length 95th (ft)		113			101			37		145	180	
Internal Link Dist (ft)		599			361			487			120	
Turn Bay Length (ft)												
Base Capacity (vph)		845			883			1895		665	1138	
Starvation Cap Reductn		0			0			0		0	220	
Spillback Cap Reductn		0			0			0		0	0	
Storage Cap Reductn		0			0			0		0	0	
Reduced v/c Ratio		0.52			0.63			0.15		0.43	0.48	

Intersection Summary

Cycle Length: 70
Actuated Cycle Length: 70
Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.79
Intersection Signal Delay: 15.8 Intersection LOS: B
Intersection Capacity Utilization 76.9% ICU Level of Service D
Analysis Period (min) 15

Splits and Phases: 1: University Ave. & Highland Ave.

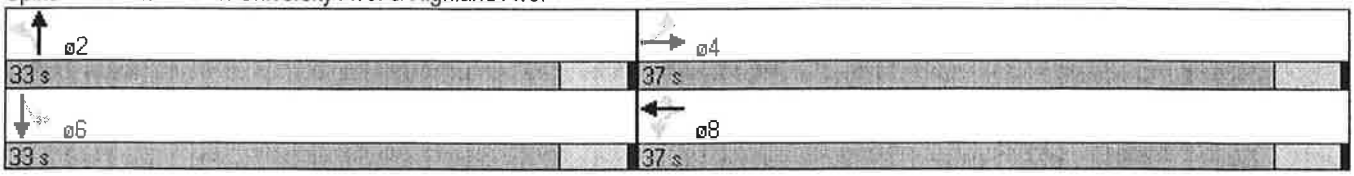


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	64	294	52	189	82	213	8	160	70	248	341	35
Satd. Flow (prot)	0	3232	0	0	1799	1583	0	3172	0	1770	1819	0
Flt Permitted		0.858			0.508			0.943		0.585		
Satd. Flow (perm)	0	2788	0	0	919	1515	0	2994	0	1070	1819	0
Satd. Flow (RTOR)		31				242		80			9	
Lane Group Flow (vph)	0	423	0	0	308	242	0	271	0	282	428	0
Turn Type	Perm			Perm		Perm	Perm			Perm		
Protected Phases		4			8			2			6	
Permitted Phases	4			8		8	2			6		
Total Split (s)	37.0	37.0	0.0	37.0	37.0	37.0	33.0	33.0	0.0	33.0	33.0	0.0
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Act Effct Green (s)		27.2			27.2	27.2		34.8		34.8	34.8	
Actuated g/C Ratio		0.39			0.39	0.39		0.50		0.50	0.50	
v/c Ratio		0.38			0.86	0.33		0.18		0.53	0.47	
Control Delay		14.2			42.9	3.0		8.5		17.3	13.8	
Queue Delay		0.0			0.0	0.0		0.0		0.0	0.2	
Total Delay		14.2			42.9	3.0		8.5		17.3	14.0	
LOS		B			D	A		A		B	B	
Approach Delay		14.2			25.3			8.5			15.3	
Approach LOS		B			C			A			B	
Queue Length 50th (ft)		57			112	0		23		68	100	
Queue Length 95th (ft)		81			#217	31		47		108	147	
Internal Link Dist (ft)		599			361			487			320	
Turn Bay Length (ft)												
Base Capacity (vph)		1331			433	842		1529		532	909	
Starvation Cap Reductn		0			0	0		0		0	85	
Spillback Cap Reductn		0			0	0		0		0	0	
Storage Cap Reductn		0			0	0		0		0	0	
Reduced v/c Ratio		0.32			0.71	0.29		0.18		0.53	0.52	

Intersection Summary	
Cycle Length: 70	
Actuated Cycle Length: 70	
Offset: 44 (63%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 0.86	
Intersection Signal Delay: 16.9	Intersection LOS: B
Intersection Capacity Utilization 74.9%	ICU Level of Service D
Analysis Period (min) 15	

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 1: University Ave. & Highland Ave.

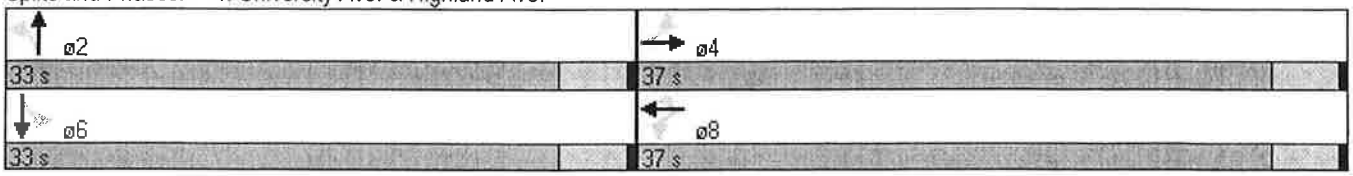


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔			↔	↱		↔		↰	↦	
Volume (vph)	68	302	53	189	86	217	11	164	70	252	345	43
Satd. Flow (prot)	0	3233	0	0	1801	1583	0	3176	0	1770	1810	0
Flt Permitted		0.853			0.503			0.937		0.581		
Satd. Flow (perm)	0	2772	0	0	911	1515	0	2978	0	1063	1810	0
Satd. Flow (RTOR)		31				247		80			11	
Lane Group Flow (vph)	0	436	0	0	313	247	0	278	0	286	441	0
Turn Type	Perm			Perm		Perm	Perm			Perm		
Protected Phases		4			8			2			6	
Permitted Phases	4			8		8	2			6		
Total Split (s)	37.0	37.0	0.0	37.0	37.0	37.0	33.0	33.0	0.0	33.0	33.0	0.0
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Act Effct Green (s)		27.5			27.5	27.5		34.5		34.5	34.5	
Actuated g/C Ratio		0.39			0.39	0.39		0.49		0.49	0.49	
v/c Ratio		0.39			0.87	0.33		0.18		0.55	0.49	
Control Delay		14.2			44.3	3.0		8.7		17.9	14.2	
Queue Delay		0.0			0.0	0.0		0.0		0.0	0.2	
Total Delay		14.2			44.3	3.0		8.7		17.9	14.4	
LOS		B			D	A		A		B	B	
Approach Delay		14.2			26.1			8.7			15.8	
Approach LOS		B			C			A			B	
Queue Length 50th (ft)		59			113	0		24		87	126	
Queue Length 95th (ft)		83			#224	31		48		176	221	
Internal Link Dist (ft)		599			361			487			320	
Turn Bay Length (ft)												
Base Capacity (vph)		1323			429	845		1508		523	897	
Starvation Cap Reductn		0			0	0		0		0	75	
Spillback Cap Reductn		0			0	0		0		0	0	
Storage Cap Reductn		0			0	0		0		0	0	
Reduced v/c Ratio		0.33			0.73	0.29		0.18		0.55	0.54	

Intersection Summary

Cycle Length: 70
Actuated Cycle Length: 70
Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.87
Intersection Signal Delay: 17.3 Intersection LOS: B
Intersection Capacity Utilization 76.0% ICU Level of Service D
Analysis Period (min) 15
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 1: University Ave. & Highland Ave.

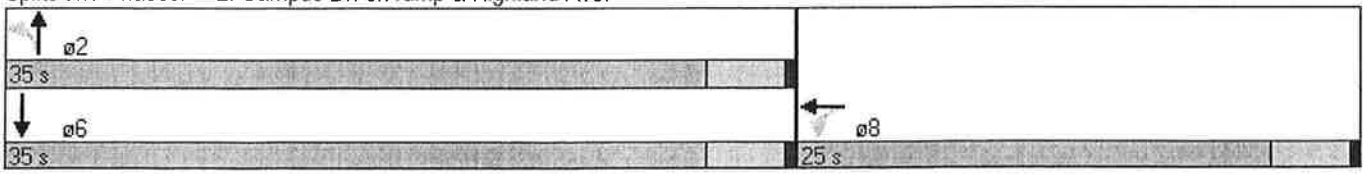


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	0	0	24	3	400	153	497	0	0	250	87
Satd. Flow (prot)	0	0	0	0	3031	0	0	3497	0	0	3401	0
Flt Permitted					0.997			0.769				
Satd. Flow (perm)	0	0	0	0	3031	0	0	2722	0	0	3401	0
Satd. Flow (RTOR)					297						99	
Lane Group Flow (vph)	0	0	0	0	485	0	0	677	0	0	383	0
Turn Type				Perm			Perm					
Protected Phases					8			2			6	
Permitted Phases				8			2					
Total Split (s)	0.0	0.0	0.0	25.0	25.0	0.0	35.0	35.0	0.0	0.0	35.0	0.0
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Act Effct Green (s)					10.3			41.7			41.7	
Actuated g/C Ratio					0.17			0.70			0.70	
v/c Ratio					0.87dr			0.36			0.16	
Control Delay					12.2			3.6			3.0	
Queue Delay					0.0			0.0			0.0	
Total Delay					12.2			3.6			3.0	
LOS					B			A			A	
Approach Delay					12.2			3.6			3.0	
Approach LOS					B			A			A	
Queue Length 50th (ft)					32			23			14	
Queue Length 95th (ft)					60			34			34	
Internal Link Dist (ft)		286			319			320			267	
Turn Bay Length (ft)												
Base Capacity (vph)					1254			1892			2394	
Starvation Cap Reductn					0			0			0	
Spillback Cap Reductn					0			0			0	
Storage Cap Reductn					0			0			0	
Reduced v/c Ratio					0.39			0.36			0.16	

Intersection Summary

Cycle Length: 60
Actuated Cycle Length: 60
Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBT, Start of Green
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.63
Intersection Signal Delay: 6.2 Intersection LOS: A
Intersection Capacity Utilization 51.6% ICU Level of Service A
Analysis Period (min) 15
dr Defacto Right Lane. Recode with 1 though lane as a right lane.

Splits and Phases: 2: Campus Dr. on ramp & Highland Ave.

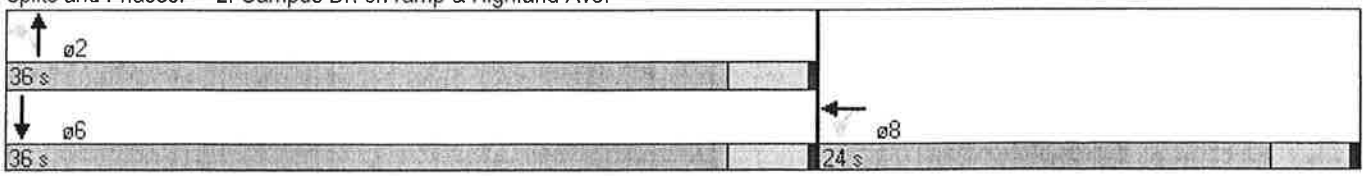


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations					↰↑↑↱			↰↑↑			↑↑↱	
Volume (vph)	0	0	0	27	3	400	164	507	0	0	253	87
Satd. Flow (prot)	0	0	0	0	3035	0	0	3497	0	0	3405	0
Flt Permitted					0.997			0.760				
Satd. Flow (perm)	0	0	0	0	3035	0	0	2690	0	0	3405	0
Satd. Flow (RTOR)					302						99	
Lane Group Flow (vph)	0	0	0	0	489	0	0	699	0	0	387	0
Turn Type				Perm			Perm					
Protected Phases					8			2			6	
Permitted Phases				8			2					
Total Split (s)	0.0	0.0	0.0	24.0	24.0	0.0	36.0	36.0	0.0	0.0	36.0	0.0
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Act Effct Green (s)					10.3			41.7			41.7	
Actuated g/C Ratio					0.17			0.70			0.70	
v/c Ratio					0.87dr			0.37			0.16	
Control Delay					12.2			4.2			3.0	
Queue Delay					0.0			0.0			0.0	
Total Delay					12.2			4.2			3.0	
LOS					B			A			A	
Approach Delay					12.2			4.2			3.0	
Approach LOS					B			A			A	
Queue Length 50th (ft)					32			25			14	
Queue Length 95th (ft)					60			45			34	
Internal Link Dist (ft)		286			319			120			267	
Turn Bay Length (ft)												
Base Capacity (vph)					1213			1871			2399	
Starvation Cap Reductn					0			0			0	
Spillback Cap Reductn					0			0			0	
Storage Cap Reductn					0			0			0	
Reduced v/c Ratio					0.40			0.37			0.16	

Intersection Summary

Cycle Length: 60
Actuated Cycle Length: 60
Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBT, Start of Green
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.64
Intersection Signal Delay: 6.4 Intersection LOS: A
Intersection Capacity Utilization 52.4% ICU Level of Service A
Analysis Period (min) 15
dr Defacto Right Lane. Recode with 1 though lane as a right lane.

Splits and Phases: 2: Campus Dr. on ramp & Highland Ave.

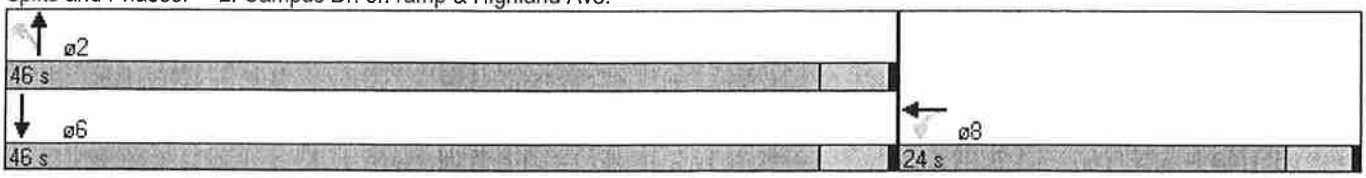


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	0	0	23	2	130	184	187	0	0	621	299
Satd. Flow (prot)	0	0	0	0	3072	0	0	3454	0	0	3366	0
Flt Permitted					0.993			0.541				
Satd. Flow (perm)	0	0	0	0	3072	0	0	1915	0	0	3366	0
Satd. Flow (RTOR)					148						208	
Lane Group Flow (vph)	0	0	0	0	176	0	0	403	0	0	990	0
Turn Type				Perm			Perm					
Protected Phases					8			2			6	
Permitted Phases				8			2					
Total Split (s)	0.0	0.0	0.0	24.0	24.0	0.0	46.0	46.0	0.0	0.0	46.0	0.0
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Act Effct Green (s)					6.6			55.4			55.4	
Actuated g/C Ratio					0.09			0.79			0.79	
v/c Ratio					0.41			0.27			0.37	
Control Delay					11.2			1.5			2.1	
Queue Delay					0.0			0.0			0.0	
Total Delay					11.2			1.5			2.1	
LOS					B			A			A	
Approach Delay					11.2			1.5			2.1	
Approach LOS					B			A			A	
Queue Length 50th (ft)					5			8			30	
Queue Length 95th (ft)					30			14			58	
Internal Link Dist (ft)		286			319			320			267	
Turn Bay Length (ft)												
Base Capacity (vph)					983			1515			2706	
Starvation Cap Reductn					0			0			0	
Spillback Cap Reductn					0			0			0	
Storage Cap Reductn					0			0			0	
Reduced v/c Ratio					0.18			0.27			0.37	

Intersection Summary

Cycle Length: 70
Actuated Cycle Length: 70
Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBT, Start of Green
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.41
Intersection Signal Delay: 3.0 Intersection LOS: A
Intersection Capacity Utilization 52.2% ICU Level of Service A
Analysis Period (min) 15

Splits and Phases: 2: Campus Dr. on ramp & Highland Ave.

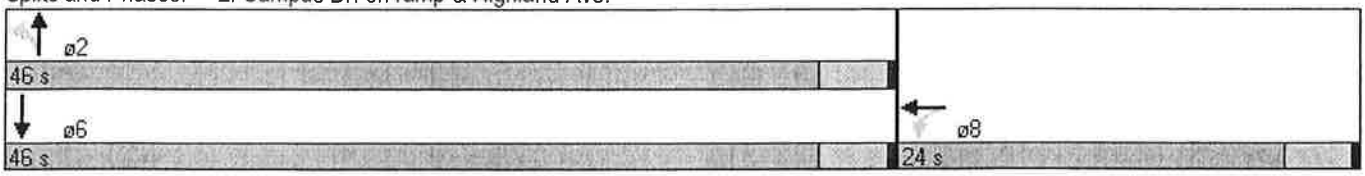


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	0	0	39	2	130	191	189	0	0	628	299
Satd. Flow (prot)	0	0	0	0	3101	0	0	3451	0	0	3369	0
Flt Permitted					0.989			0.535				
Satd. Flow (perm)	0	0	0	0	3101	0	0	1893	0	0	3369	0
Satd. Flow (RTOR)					148						204	
Lane Group Flow (vph)	0	0	0	0	194	0	0	413	0	0	997	0
Turn Type				Perm			Perm					
Protected Phases					8			2			6	
Permitted Phases				8			2					
Total Split (s)	0.0	0.0	0.0	24.0	24.0	0.0	46.0	46.0	0.0	0.0	46.0	0.0
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Act Effct Green (s)					6.9			55.1			55.1	
Actuated g/C Ratio					0.10			0.79			0.79	
v/c Ratio					0.44			0.28			0.37	
Control Delay					12.5			2.2			2.3	
Queue Delay					0.0			0.0			0.0	
Total Delay					12.5			2.2			2.3	
LOS					B			A			A	
Approach Delay					12.5			2.2			2.3	
Approach LOS					B			A			A	
Queue Length 50th (ft)					10			13			32	
Queue Length 95th (ft)					35			21			61	
Internal Link Dist (ft)		286			319			320			267	
Turn Bay Length (ft)												
Base Capacity (vph)					992			1489			2694	
Starvation Cap Reductn					0			0			0	
Spillback Cap Reductn					0			0			0	
Storage Cap Reductn					0			0			0	
Reduced v/c Ratio					0.20			0.28			0.37	

Intersection Summary

Cycle Length: 70
Actuated Cycle Length: 70
Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBT, Start of Green
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.44
Intersection Signal Delay: 3.5 Intersection LOS: A
Intersection Capacity Utilization 53.1% ICU Level of Service A
Analysis Period (min) 15

Splits and Phases: 2: Campus Dr. on ramp & Highland Ave.



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑		↰			↱
Volume (veh/h)	551	1	26	0	0	113
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88
Hourly flow rate (vph)	626	1	30	0	0	128
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (ft)				791		
pX, platoon unblocked						
vC, conflicting volume			627		686	627
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			627		686	627
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			97		100	73
cM capacity (veh/h)			955		401	484

Direction, Lane #	EB 1	WB 1	NB 1
Volume Total	627	30	128
Volume Left	0	30	0
Volume Right	1	0	128
cSH	1700	955	484
Volume to Capacity	0.37	0.03	0.27
Queue Length 95th (ft)	0	2	26
Control Delay (s)	0.0	8.9	15.1
Lane LOS		A	C
Approach Delay (s)	0.0	8.9	15.1
Approach LOS			C

Intersection Summary			
Average Delay	2.8		
Intersection Capacity Utilization	42.7%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑		↰			↱
Volume (veh/h)	676	1	38	0	0	116
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88
Hourly flow rate (vph)	768	1	43	0	0	132
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (ft)				791		
pX, platoon unblocked						
vC, conflicting volume			769		855	769
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			769		855	769
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			95		100	67
cM capacity (veh/h)			845		312	401

Direction, Lane #	EB 1	WB 1	NB 1
Volume Total	769	43	132
Volume Left	0	43	0
Volume Right	1	0	132
cSH	1700	845	401
Volume to Capacity	0.45	0.05	0.33
Queue Length 95th (ft)	0	4	35
Control Delay (s)	0.0	9.5	18.3
Lane LOS		A	C
Approach Delay (s)	0.0	9.5	18.3
Approach LOS			C

Intersection Summary			
Average Delay	3.0		
Intersection Capacity Utilization	49.5%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (veh/h)	385	10	94	0	0	21
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.93	0.93	0.88	0.88	0.88	0.88
Hourly flow rate (vph)	414	11	107	0	0	24
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (ft)				791		
pX, platoon unblocked						
vC, conflicting volume			425		633	419
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			425		633	419
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			91		100	96
cM capacity (veh/h)			1135		402	634

Direction, Lane #	EB 1	WB 1	NB 1
Volume Total	425	107	24
Volume Left	0	107	0
Volume Right	11	0	24
cSH	1700	1135	634
Volume to Capacity	0.25	0.09	0.04
Queue Length 95th (ft)	0	8	3
Control Delay (s)	0.0	8.5	10.9
Lane LOS		A	B
Approach Delay (s)	0.0	8.5	10.9
Approach LOS			B

Intersection Summary			
Average Delay		2.1	
Intersection Capacity Utilization		32.7%	ICU Level of Service A
Analysis Period (min)		15	

HCM Unsignalized Intersection Capacity Analysis
3: University Ave. & Grand Ave.

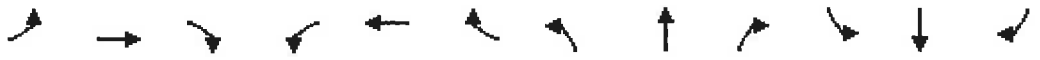
10/20/2010

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑		↰			↱
Volume (veh/h)	391	10	103	0	0	24
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.93	0.93	0.88	0.88	0.88	0.88
Hourly flow rate (vph)	420	11	117	0	0	27
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (ft)				791		
pX, platoon unblocked						
vC, conflicting volume			431		660	426
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			431		660	426
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			90		100	96
cM capacity (veh/h)			1128		384	629

Direction, Lane #	EB 1	WB 1	NB 1
Volume Total	431	117	27
Volume Left	0	117	0
Volume Right	11	0	27
cSH	1700	1128	629
Volume to Capacity	0.25	0.10	0.04
Queue Length 95th (ft)	0	9	3
Control Delay (s)	0.0	8.6	11.0
Lane LOS		A	B
Approach Delay (s)	0.0	8.6	11.0
Approach LOS			B

Intersection Summary			
Average Delay	2.3		
Intersection Capacity Utilization	33.6%	ICU Level of Service	A
Analysis Period (min)	15		

APPENDIX D
Highway Capacity Analyses
Highland Avenue Development Access



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔			↔			↕↔			↔	
Volume (veh/h)	13	0	12	13	0	12	6	700	4	6	300	4
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			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
Hourly flow rate (vph)	14	0	13	14	0	13	7	761	4	7	326	4
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)								252			160	
pX, platoon unblocked	0.95	0.95	0.95	0.95	0.95		0.95					
vC, conflicting volume	748	1120	328	1130	1120	383	330			765		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	711	1101	271	1112	1101	383	273			765		
tC, single (s)	7.5	6.5	6.9	7.5	6.5	6.9	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	95	100	98	91	100	98	99			99		
cM capacity (veh/h)	296	198	693	151	198	615	1227			844		

Direction, Lane #	EB 1	WB 1	NB 1	NB 2	SB 1
Volume Total	27	27	387	385	337
Volume Left	14	14	7	0	7
Volume Right	13	13	0	4	4
cSH	408	237	1227	1700	844
Volume to Capacity	0.07	0.11	0.01	0.23	0.01
Queue Length 95th (ft)	5	10	0	0	1
Control Delay (s)	14.5	22.1	0.2	0.0	0.3
Lane LOS	B	C	A		A
Approach Delay (s)	14.5	22.1	0.1		0.3
Approach LOS	B	C			

Intersection Summary				
Average Delay	1.0			
Intersection Capacity Utilization	31.9%	ICU Level of Service	A	
Analysis Period (min)	15			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Volume (veh/h)	7	0	8	7	0	8	10	400	10	10	660	10
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			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
Hourly flow rate (vph)	8	0	9	8	0	9	11	435	11	11	717	11
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)								253			159	
pX, platoon unblocked	0.96	0.96	0.96	0.96	0.96		0.96					
vC, conflicting volume	992	1212	364	851	1212	223	728			446		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	916	1144	264	769	1144	223	642			446		
tC, single (s)	7.5	6.5	6.9	7.5	6.5	6.9	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	96	100	99	97	100	99	99			99		
cM capacity (veh/h)	213	187	708	272	187	781	904			1111		

Direction, Lane #	EB 1	WB 1	NB 1	NB 2	SB 1	SB 2
Volume Total	16	16	228	228	370	370
Volume Left	8	8	11	0	11	0
Volume Right	9	9	0	11	0	11
cSH	340	417	904	1700	1111	1700
Volume to Capacity	0.05	0.04	0.01	0.13	0.01	0.22
Queue Length 95th (ft)	4	3	1	0	1	0
Control Delay (s)	16.1	14.0	0.5	0.0	0.3	0.0
Lane LOS	C	B	A		A	
Approach Delay (s)	16.1	14.0	0.3		0.2	
Approach LOS	C	B				

Intersection Summary			
Average Delay	0.6		
Intersection Capacity Utilization	35.7%	ICU Level of Service	A
Analysis Period (min)	15		