Traffic Impact Study

Mid-Continent Public Library

Blue Parkway and Battery Drive
Lee's Summit, MO

July 2018

Prepared for:
Mid-Continent Public Library

Prepared by:
Olsson Associates
7301 W. 133rd Street, Suite 200
Overland Park, KS 66213
TEL 913.381.1170
www.olssonassociates.com

Olsson Associates Project No. 018-0330

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1.0 INTRODUCTION AND OBJECTIVE

This study summarizes traffic impacts regarding the Mid-Continent Public Library (MCPL) development located in the northeast quadrant of Blue Parkway and Battery Drive in Lee's Summit, Missouri. The proposed site consists of one library building totaling 25,000 square feet. The approximate location of the development is shown in the vicinity map in **Figure 1**.

The objective of this study is to evaluate the existing traffic and roadway conditions and the traffic impacts expected from the proposed development at study intersections. The appropriate intersection geometrics and traffic control improvements necessary to accommodate the increased traffic due to the proposed development on the study area roadways were identified. For this study, three separate traffic conditions were analyzed:

- Existing plus Approved Conditions
- Existing plus Approved plus Development Conditions
- Future Conditions

Specific recommendations are included at the end of this report to address mitigation of the traffic impacts due to the proposed development.

2.0 DATA COLLECTION

The data collection effort included acquiring AM and PM peak hour turning movement counts and documentation of current roadway geometrics. Intersection turning movement counts were conducted during the AM and PM peak hour periods on Tuesday, May 22nd, 2018 at the following intersections:

- Todd George Parkway and Blue Parkway
- Blue Parkway and Battery Drive
- Shenandoah Drive and Battery Drive

Traffic volumes were not balanced along the study area roadways due to the presence of existing development drives and intersecting roadways between the count locations.

Based on the data collected, the peak hour periods for the study area were determined to be 7:00-8:00 AM and 4:45-5:45 PM. The existing peak hour volumes at the study intersections are illustrated in **Figure 2**. Count data collected for this study can be found in **Appendix A**.

Existing signal timing information for the signalized intersection of Todd George Parkway and Blue Parkway within the study area was obtained from the Missouri Department of Transportation (MoDOT).

FIGURE 1

Vicinity Map

Mid-Continent Public Library
Lee's Summit, MO

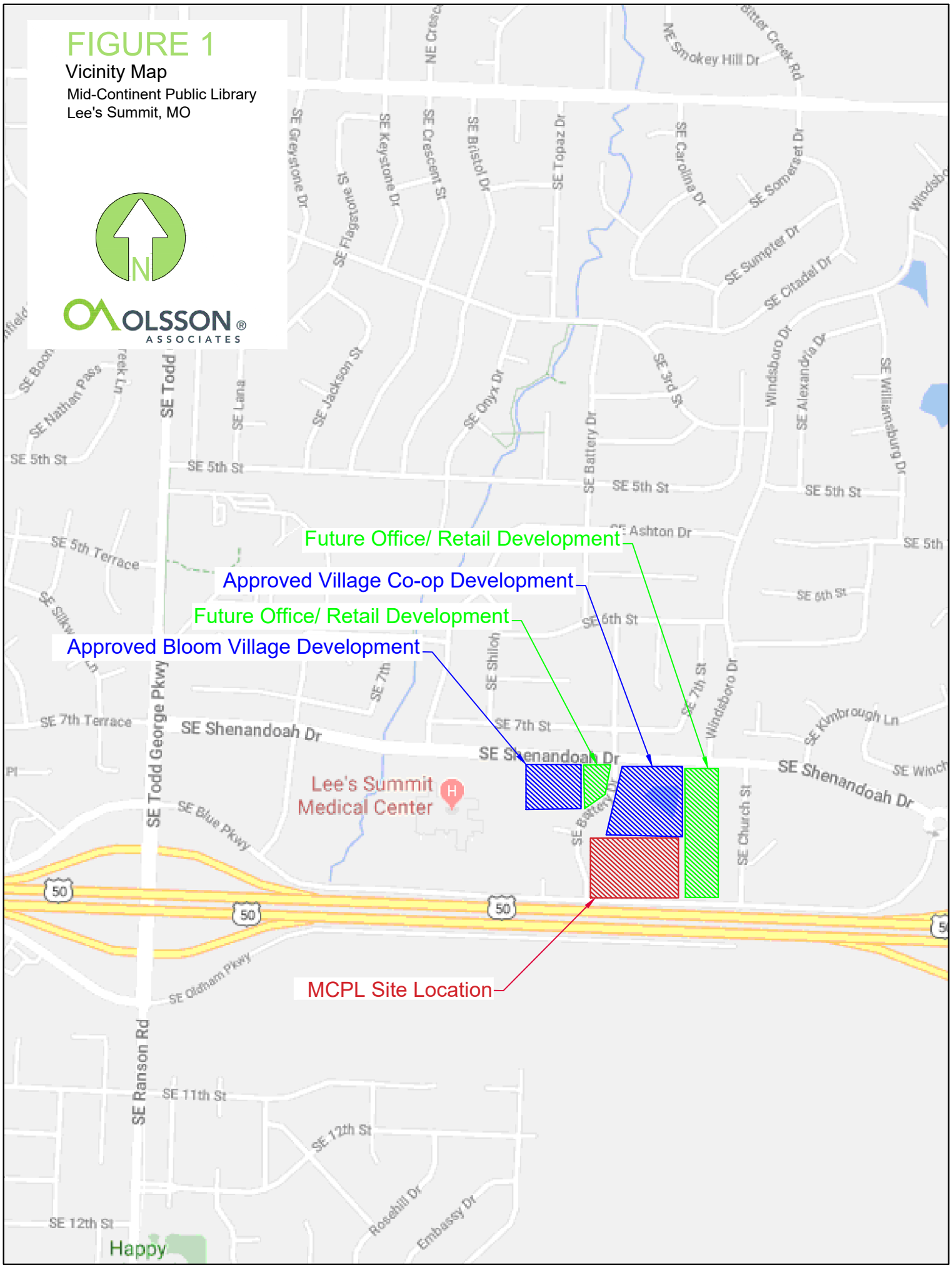
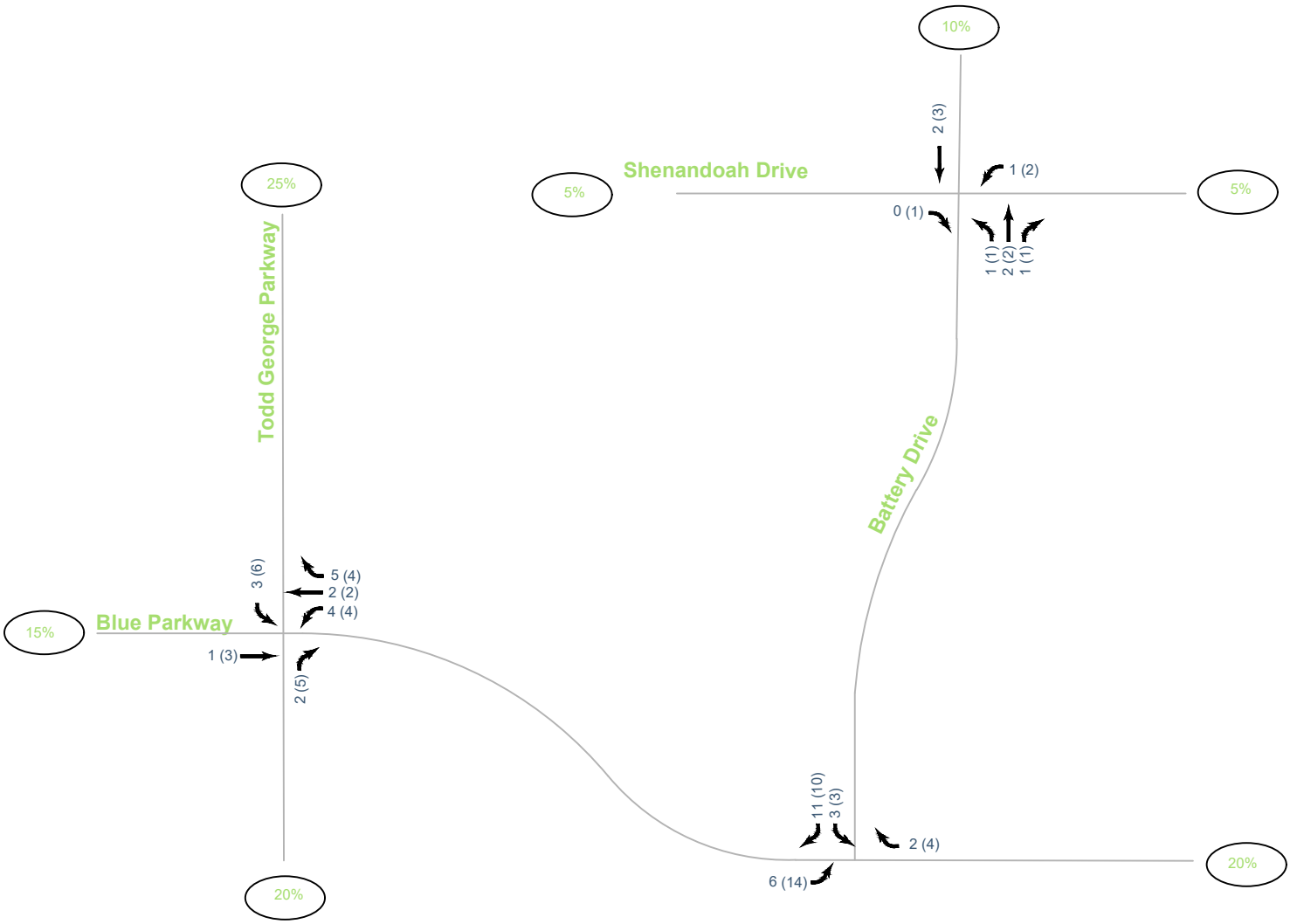


FIGURE 2

Approved Development Distribution

Mid-Continent Public Library
Lee's Summit, MO



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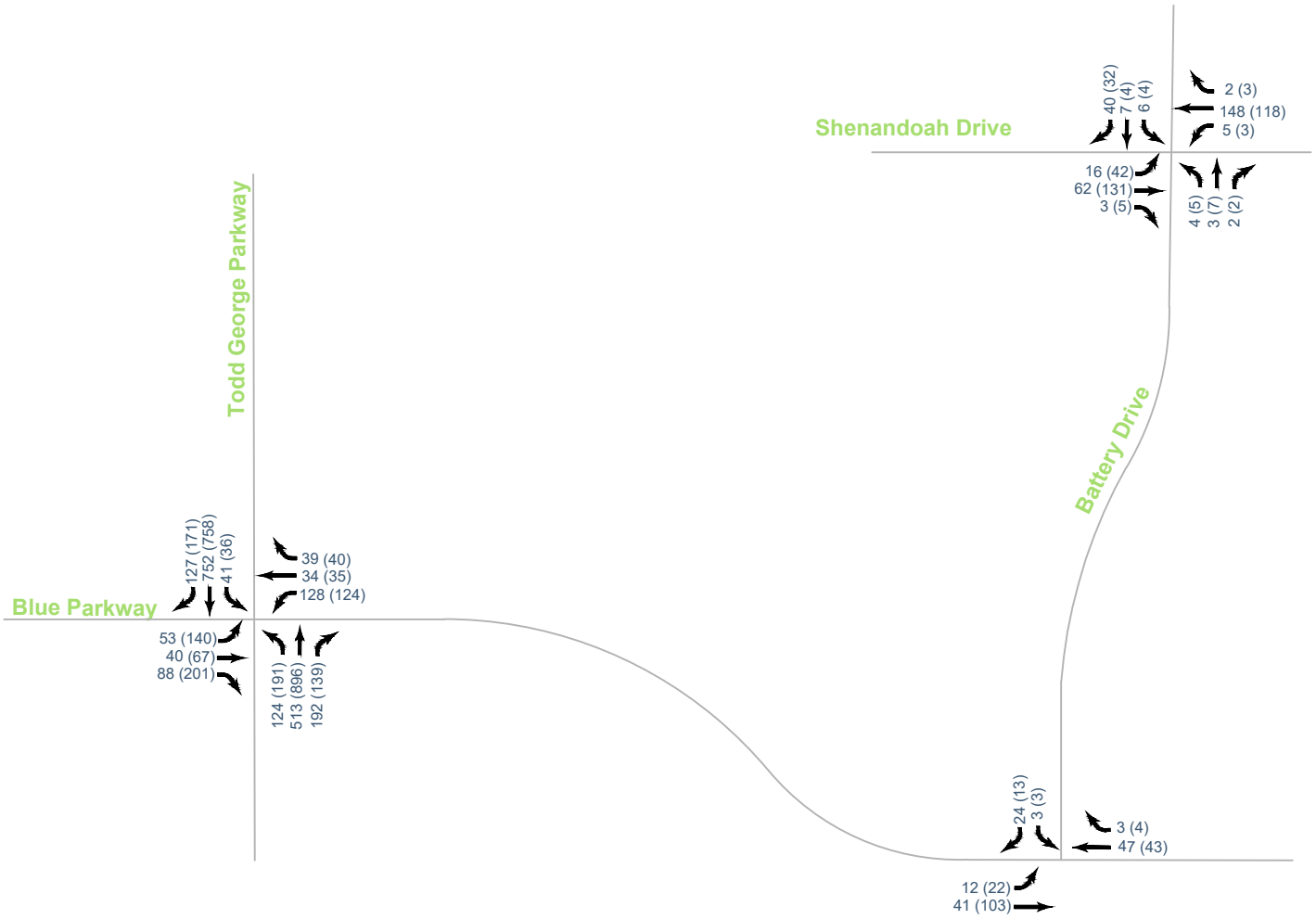
LEGEND

XX (XX)	AM (PM) Peak Hour Trips
XX%	Distribution Percentages

FIGURE 3

Existing + Approved Conditions
Peak Hour Volumes

Mid-Continent Public Library
Lee's Summit, MO



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LEGEND

XX (XX) AM (PM) Peak Hour Volumes

3.0 EXISTING PLUS APPROVED CONDITIONS

To provide a baseline for comparative purposes for the proposed development scenario, existing traffic control operations were reviewed for the study intersections. City staff provided information on unbuilt, approved development projects near the project area. The two approved projects considered in this scenario are the senior living facilities Bloom Village and Village Co-op, located in the southeast and southwest quadrants of Battery Drive and Shenandoah Drive. **Figure 1** illustrates the locations of the approved developments. Trips associated with approved development were added to existing volumes to develop the existing plus approved conditions scenario.

3.1 Network Characteristics

Three roadways within the study area were considered during analysis: Todd George Parkway, Blue Parkway, and Battery Drive. Current network characteristics within the vicinity of the project area are summarized in **Table 1** below. The functional classification for each roadway was acquired from the City of Lee's Summit's 2015 *Thoroughfare Master Plan - Exhibit 2* and Missouri Department of Transportation's (MoDOT) *Existing Functional Classification Map*. The intersection of Todd George Parkway and Blue Parkway is signalized. The intersections of Blue Parkway with Battery Drive and Shenandoah Drive with Battery Drive operate under two-way stop control for north/south movements.

TABLE 1: EXISTING NETWORK SUMMARY

Roadway	Functional Classification	Section	Median Type	Posted Speed
Todd George Parkway	Minor Arterial	4-Lane	Raised	40 mph
Blue Parkway	Local Collector	2-Lane (3-Lane between the intersection of Todd George Parkway with Blue Parkway and the drive located 375' east of the intersection)	N/A	35 mph
Battery Drive	Local Collector	2-Lane	N/A	25 mph

3.2 Approved Development Trip Generation and Distribution

Per discussion with City staff, the baseline conditions reviewed in this report include the approved but unbuilt developments of Bloom Living and Village Co-op. The Bloom Living development is approved to be located in the southwest quadrant of Shenandoah Drive and Battery Drive and will include 95 units of senior living apartments. The Village Co-op development is approved to be located in the southeast quadrant of Shenandoah Drive and Battery Drive and will include 50 senior living condominiums. To account for the expected trips associated with the approved sites in the baseline conditions, trips were generated and applied to the study network. The Institute of Transportation Engineers (ITE) provides methods for estimating traffic volumes of common land uses in the *Trip Generation Manual (10th Edition)*. The land use that most resembles the approved developments was determined to be Land Use Code 252 (Senior Adult Housing).

Based on the *ITE Trip Generation Manual,* trip generation characteristics were developed for the approved sites. Trip generation characteristics expected for each site development are shown in **Table 2**. A full summary of the trip generation can be found in **Appendix B**.

TABLE 2: PROPOSED DEVELOPMENT TRIP GENERATION

Land Use	Size	Average Weekday	AM Peak Hour			PM Peak Hour		
			Total	Enter	Exit	Total	Enter	Exit
Senior Adult Housing (Bloom Living)	95 DU	357	19	7	12	26	15	11
Senior Adult Housing (Village Co-op)	50 DU	176	10	4	6	15	9	6
Total	**145 DU**	**533**	**29**	**11**	**18**	**41**	**24**	**17**

The trips generated by the approved developments were assigned to the roadway network based on the existing traffic gravity and surrounding area. Trip distribution was reviewed and approved by City staff. It is expected that site trips will primarily originate from Todd George Parkway from the north and south and Blue Parkway from the east and west with minor trips generated along nearby local roads such as Shenandoah Drive and Battery Drive.

The expected peak hour trips associated with the approved development, following trip distribution and assignment to the roadway network, are illustrated in **Figure 2**. Existing plus approved development peak hour trips are illustrated in **Figure 3**. Information regarding the expected trip distribution and site trips can be found in **Appendix B**.

3.3 Existing plus Approved Warrant Analysis

Existing plus Approved Signal Warrants: Considering existing plus approved volumes, the unsignalized study intersections are not expected to meet the criteria for signalization during either peak hour period based on Warrant 3 (peak hour warrant). Signal warrant analysis sheets can be found in **Appendix B**

Existing plus Approved Turn Lane Warrants: The City of Lee's Summit *Access Management Code (AMC)*, dated March 2018, was used to determine if any additional turn lanes may be required within the study area. The code provides direction on when turn lanes should be provided based on intersection control, roadway classification and/or traffic volumes.

Based on information provided in the *AMC*, a left-turn lane is required for each approach at signalized intersections. Currently, each approach at Todd George Parkway and Blue Parkway has a left-turn lane. It should be noted that the northbound and westbound left-turn lanes are less than the recommended 150' plus taper turn lane on collector roadways intersecting arterial roadways and 200' plus taper on arterial roadways intersecting collector roadways outlined in the *AMC*. Lengthening the northbound turn bay length is not feasible due to the close proximity of the intersection to the US-50 interchange. Capacity analysis was reviewed in **Section 3.4** for the existing plus approved conditions to determine if these left-turn lanes should be extended to meet the required turn bay length.

Left turn lanes are also provided at the unsignalized intersections of local collector roads, Shenandoah Drive with Battery Drive and Blue Parkway with Battery Drive, with the exception of the northbound and southbound approaches at Shenandoah Drive with Battery Drive and the eastbound and westbound approaches at Blue Parkway and Battery Drive. Per the *AMC* left-turn lane standards, capacity analysis was reviewed in **Section 3.4** to determine if left-turn lanes are needed.

Right-turn lanes are provided at each approach of the signalized intersection of Todd George Parkway and Blue Parkway except for the westbound approach. The *AMC* recommends that a right-turn lane should be installed on a collector street if the existing right-turn volume or projected

volume is greater than 100 vehicles in any hour. Currently, the right turn volume for the westbound approach is less than 100 vehicles, thus a right-turn lane is not recommended.

Analyzing the unsignalized intersections of Shenandoah Drive with Battery Drive and Blue Parkway with Battery Drive, only one right-turn lane is provided for the southbound approach at Blue Parkway with Battery Drive. The right-turn movement volume at these intersections does not exceed 100 vehicles per hour, thus additional right-turn lanes are not recommended at these intersections. Capacity analysis was also reviewed for the existing plus approved conditions to determine if providing a right-turn lane is recommended at any of these locations.

Existing plus approved conditions lane configurations and traffic control for the study network are illustrated in **Figure 4**.

3.4 Existing plus Approved Capacity Analysis

Capacity analysis was performed for the study intersections utilizing the existing lane configurations and traffic control. Analysis was conducted using Synchro, Version 10, based on the Highway Capacity Manual (HCM) delay methodologies. For simplicity, the amount of control delay is equated to a grade or Level of Service (LOS) based on thresholds of driver acceptance. The amount of delay is assigned a letter grade A through F, LOS A representing little or no delay and LOS F representing very high delay. **Table 3** shows the delays associated with each LOS grade for signalized and unsignalized intersections, respectively.

TABLE 3: INTERSECTION LOS CRITERIA

Level-of-Service	Average Control Delay (seconds)	
	Signalized	Unsignalized
A	≤ 10	≤ 10
B	> 10-20	> 10-15
C	> 20-35	> 15-25
D	> 35-55	> 25-35
E	> 55-80	> 35-50
F	> 80	> 50
Highway Capacity Manual (HCM 6th Edition)		

Based on information provided by MoDOT, left-turn phasing for each approach at the intersection of Todd George Parkway and Blue Parkway will be changed to protected/permissive phasing with the use of flashing yellow arrows in summer of 2018. Capacity analysis was conducted considering this phasing change with timings updated as appropriate to accommodate the phasing change. The signalized intersection is expected to operate at an overall LOS C or better during both AM and PM peak hour periods. All individual movements are expected to operate at LOS D or better during both AM and PM peak hour periods with the following exception:

Todd George Parkway and Blue Parkway

- Eastbound right-turn movement is expected to operate at a LOS F during the AM and PM peak hour, respectively.
    - Currently a right-turn lane is provided for the eastbound right-turn movement and queue lengths are expected to be minimal (less than 65' or about two vehicle lengths). No geometric updates are recommended under this scenario.

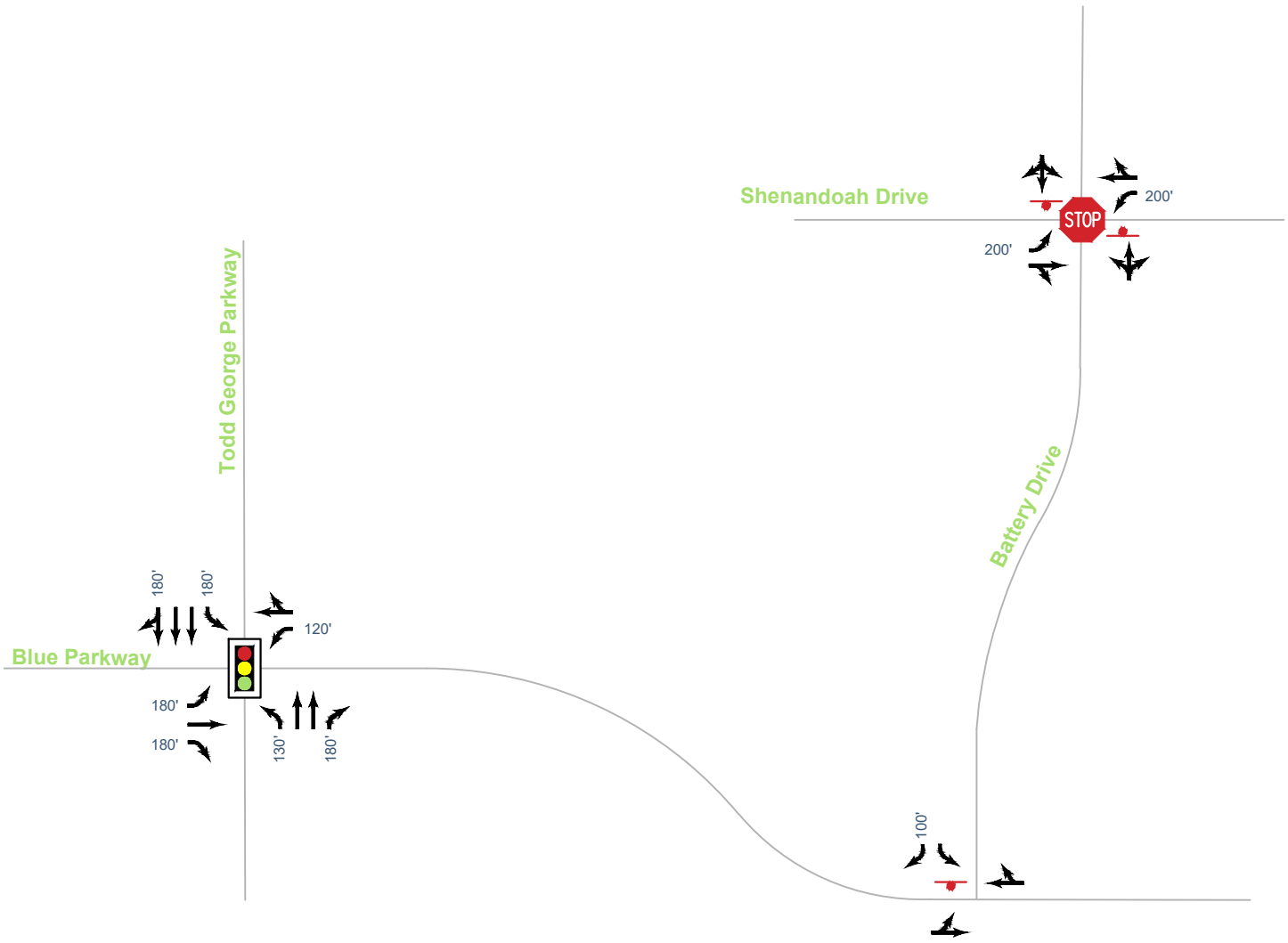
Unsignalized capacity analysis was conducted for the stop-controlled study intersections. Based on capacity analysis, all movements at the unsignalized study intersections are expected to operate at a LOS B or better during both peak hour periods.

Approaches not meeting the *AMC* guidelines for turn lanes as stated in **Section 3.3** are expected to operate at acceptable levels of service.

The existing plus approved capacity analysis summary is illustrated in **Figure 5**. Detailed results may be found in **Appendix B**.

FIGURE 4

Existing + Approved Conditions
Lane Configuration & Traffic Control
Mid-Continent Public Library
Lee's Summit, MO



LEGEND

- XX' — Lane Configuration & Storage Length
- STOP — Stop Controlled Intersection
- Stop Sign
- Signalized Intersection

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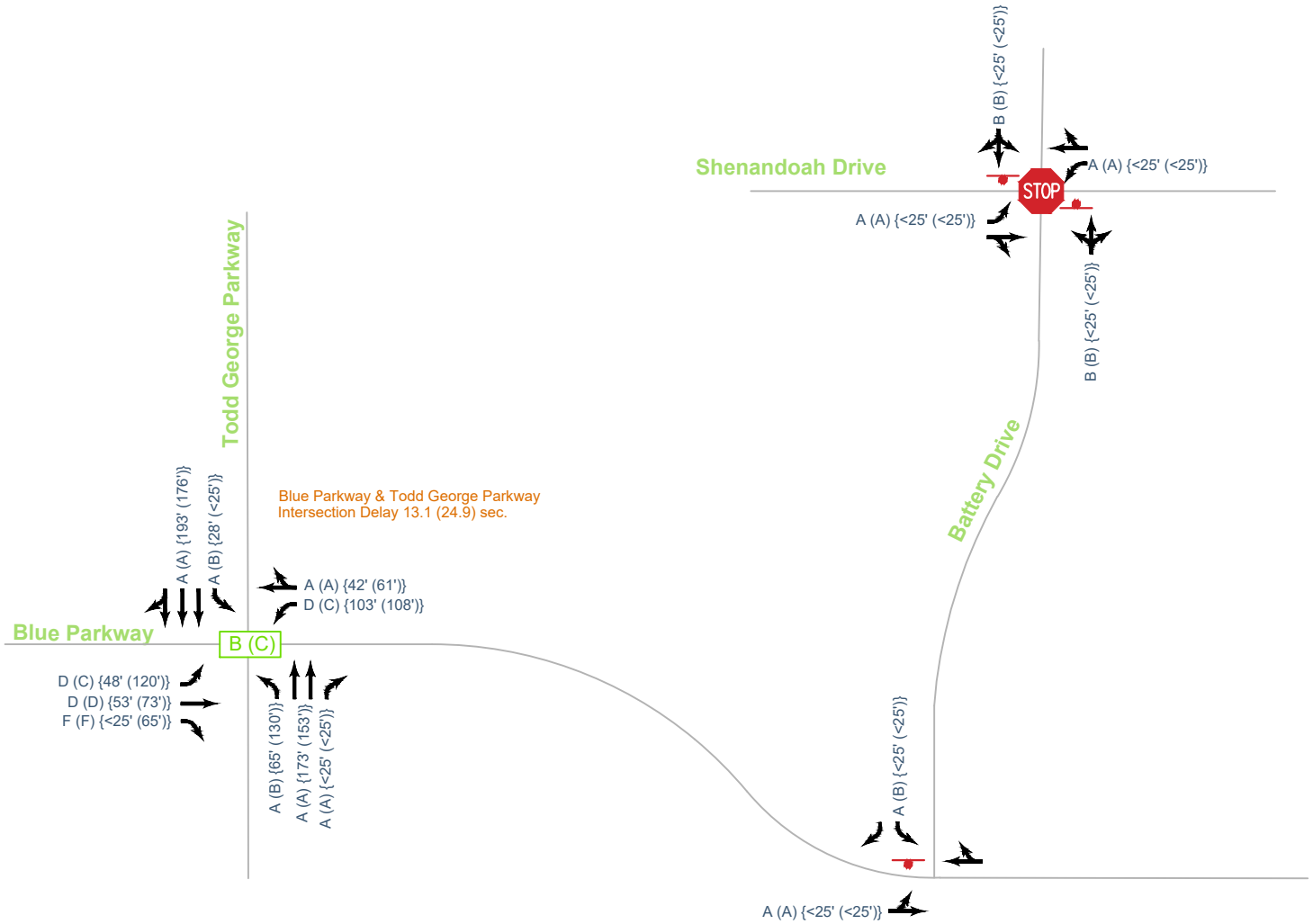
FIGURE 5

Existing + Approved Conditions
Level of Service
Mid-Continent Public Library
Lee's Summit, MO



LEGEND

AM (PM) {AM (PM)}	Movement LOS & {95th Percentile Queue}
AM (PM)	Signalized Intersection LOS
STOP	Stop Controlled Intersection
	Stop Sign
	Lane Geometry

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4.0 SITE CHARACTERISTICS

This scenario considers the proposed library development located in the northeast quadrant of Blue Parkway and Battery Drive. The proposed development consists of a 25,000 square-foot library. The site plan associated with this proposed development is illustrated in **Figure 6**.

Proposed Access

Access to the site is proposed via two full access drives. Drive 1 is proposed to be located 430' north of the intersection of Blue Parkway and Battery Drive along Battery Drive. Drive 2 is proposed to be located 330' east of the intersection of Blue Parkway and Battery Drive along Blue Parkway. The spacing of these proposed drives exceeds the minimum separation requirements of 300' (measured center to center) from other accesses or intersections along industrial/commercial collector roadways as outlined in the *AMC Section 15.1.D.*

Access Throat Length and Driveway Width

Throat length of an access point refers to the length of approach provided within the development site approaching the intersection with the public roadway. The proposed throat length for each development access point is provided in **Table 4**. Each access is proposed with one entering and one exiting lane of traffic. Minimum required driveway throat lengths provided in the *AMC* are determined by the projected peak hour volumes. Trip generation completed in **Section 4.1** anticipates both Drives 1 and 2 will service close to or over 100 vehicles per hour (vph) during the maximum peak hour period. According to *Table 18-2* of the *AMC,* driveways servicing 100 vph or more should have a throat length of 100 feet or greater if needed to accommodate anticipated queue lengths as indicated in the capacity analysis results of this study. Capacity analysis results will be reviewed to determine if the recommended 100' throat length is adequate for the proposed development.

TABLE 4: PROPOSED ACCESS THROAT LENGTH

Proposed Access	Public Roadway Intersected	Access Type	Proposed Throat Length	Median Divided
Drive 1	Battery Drive	Full Access	30 feet	No
Drive 2	Blue Parkway	Full Access	215 feet	No

Both Drives 1 and 2 have a proposed driveway width of 30'. According to *Table 18-1* of the *AMC,* a minimum driveway width of 28' is recommended for low volume driveways providing two-way access. The driveway widths of Drives 1 and 2 as outlined in the proposed site plan is expected to be sufficient for the development.

4.1 Trip Generation

To determine the impact of potential site traffic on the roadway network, expected trips associated with the proposed site were generated and applied to the study network. As discussed with the previous scenario, the *ITE Trip Generation Manual (10th Edition)* was used to estimate trips. The land use that most resembles that which is planned for this site is Land Use Code 590 (Library).

Based on the *ITE Trip Generation Manual*, trip generation characteristics were developed for the proposed site. Trip generation characteristics expected for the site are shown in **Table 5**. Detailed ITE trip generation information can be found in **Appendix B.**

Table 5: Proposed Development Trip Generation

Land Use	Size	Average Weekday	AM Peak Hour			PM Peak Hour		
			Total	Enter	Exit	Total	Enter	Exit
Library	25,000 SQ. FT.	1,749	30	22	8	217	105	112

4.2 Trip Distribution

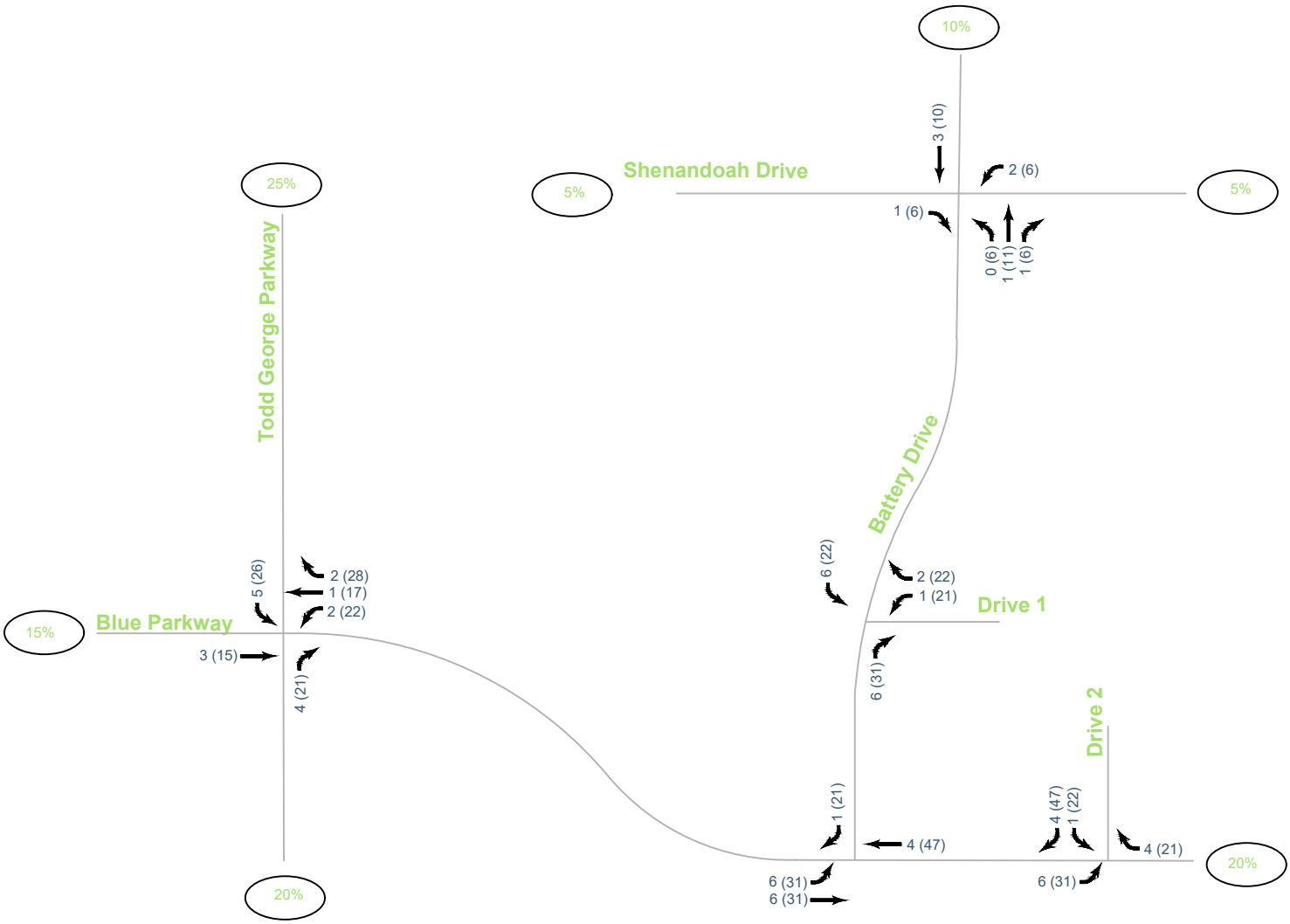
The trips generated by the proposed development were assigned to the roadway network based on the existing traffic gravity and characteristics of the surrounding area. City staff approved trip generation and distribution.

The expected peak hour trips associated with the proposed site developments, following trip distribution and assignment to the roadway network, are illustrated in **Figure 7**. Information regarding the expected trip distribution and site trips can be found in **Appendix C**.

FIGURE 7

Proposed Distribution

Mid-Continent Public Library
Lee's Summit, MO



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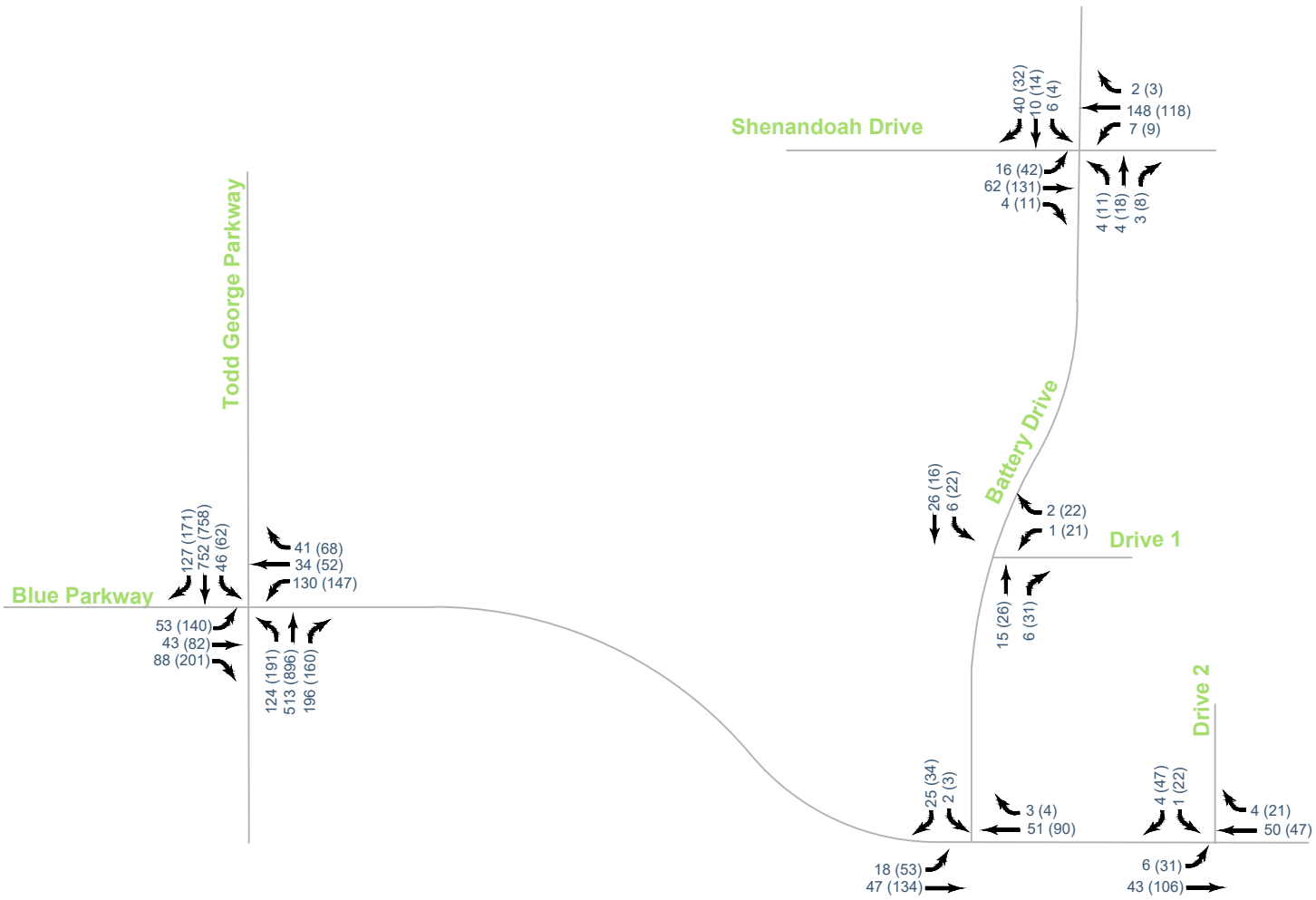
LEGEND

XX (XX)	AM (PM) Peak Hour Trips
XX%	Distribution Percentages

FIGURE 8

Existing + Approved + Development Conditions
Peak Hour Volumes

Mid-Continent Public Library
Lee's Summit, MO



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LEGEND

XX (XX) AM (PM) Peak Hour Volumes

5.0 EXISTING PLUS APPROVED PLUS DEVELOPMENT CONDITIONS

Traffic conditions were reviewed to identify any potential geometric improvements that could be attributed to additional traffic associated with proposed development.

5.1 Existing plus Approved plus Development Warrants

Existing plus Development Signal Warrants: Considering existing plus approved plus development volumes, the unsignalized study intersections are not expected to meet the criteria for signalization during either peak hour period based on Warrant 3 (peak hour warrant). Signal warrant analysis sheets can be found in **Appendix C**.

Existing plus Development Turn Lane Warrants: Following the Lee's Summit *Access Management Code* and based on trips associated with the proposed development, right-turn lanes are not warranted. Capacity analysis will be reviewed to determine if left-turn lanes are needed.

As discussed with the existing plus approved conditions scenario, the northbound and westbound left-turn lanes at the intersection of Todd George Parkway and Blue Parkway do not meet the standards provided in the *Access Management Code*. Existing plus approved plus development operations were reviewed for these movements in **Section 5.2.**

Existing plus approved plus development conditions lane configurations and traffic control for the study network are illustrated in **Figure 9**.

5.2 Existing plus Approved plus Development Capacity Analysis

For the existing plus approved plus development scenario, capacity analysis was performed considering the addition of development traffic to the roadway network. Split times for the traffic signal at Todd George Parkway and Blue Parkway were updated to accommodate development traffic. Results of the capacity analysis indicate similar operations to existing conditions. The overall operations of the signalized intersection of Todd George Parkway and Blue Parkway and the associated individual movements at the intersection are expected to operate at LOS D or better overall during both the AM and PM peak hour periods with the following exceptions:

Todd George Parkway and Blue Parkway

- Westbound right-turn movement is expected to operate at a LOS E during the PM peak hour
    - During the PM peak hour this movement is projected to service less than 100 vehicles. The shared through/right-turn movement is expected to have a queue length of 100' or 4 vehicle lengths. No geometric updates are recommended under this scenario.
- Eastbound right-turn movement is expected to operate at a LOS F during the AM and PM peak hour, respectively.
    - Currently a right-turn lane is provided for the eastbound right-turn movement and queue lengths are expected to be minimal (less than 65' or about three vehicle lengths). No geometric updates are recommended under this scenario.
- These movements are expected to operate at a lower LOS as the higher volume of traffic along Todd George Parkway is serviced.

The individual movements at the unsignalized intersections are expected to continue operating at a LOS B or better during the AM and PM peak hour periods. Traffic operations are expected to be acceptable under this scenario thus additional turn lanes are not recommended.

The throat length of Drive 1 does not meet recommended minimums provided in the *AMC.* Based on a review of capacity analysis, the queue length for exiting traffic at this drive is expected to be less than 25 feet, or one vehicle, during the AM and PM peak hour periods. The current throat length of 30 feet is adequate to accommodate the expected queue. Based on plans provided for future development adjacent to this site, Drive 1 is not proposed to be a shared drive with future development. Considering that this drive is expected to serve only library traffic and that the expected queue length is one vehicle, a deviation from the standard reducing the throat length from 100 feet to 30 feet is expected to operate sufficiently.

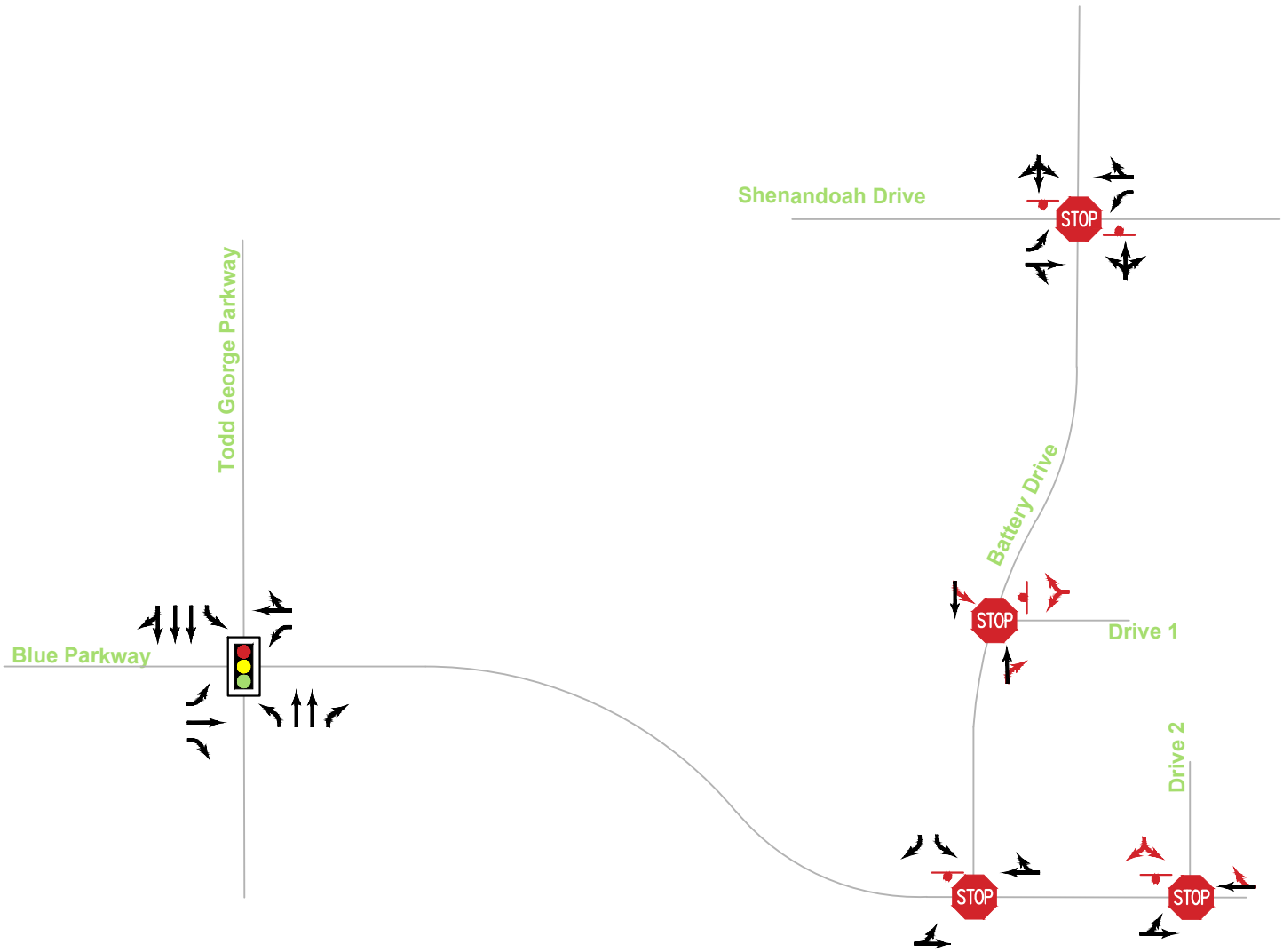
The City and MoDOT recently completed an interchange project along Blackwell Road at US-50, east of the proposed site. Trips generated by the proposed library development are expected to be minimal and have a negligible impact on operations at the new interchange. The interchange should have adequate capacity to support the proposed library development.

The existing plus approved plus development capacity analysis summary is illustrated in **Figure 10**. Detailed results may be found in **Appendix C**.

FIGURE 9

Existing + Approved + Development Conditions
Lane Configuration & Traffic Control

Mid-Continent Public Library
Lee's Summit, MO



LEGEND

- *Lane Configuration*
- *Proposed Lane Configuration*
- STOP *Stop Controlled Intersection*
- *Stop Sign*
- *Signalized Intersection*

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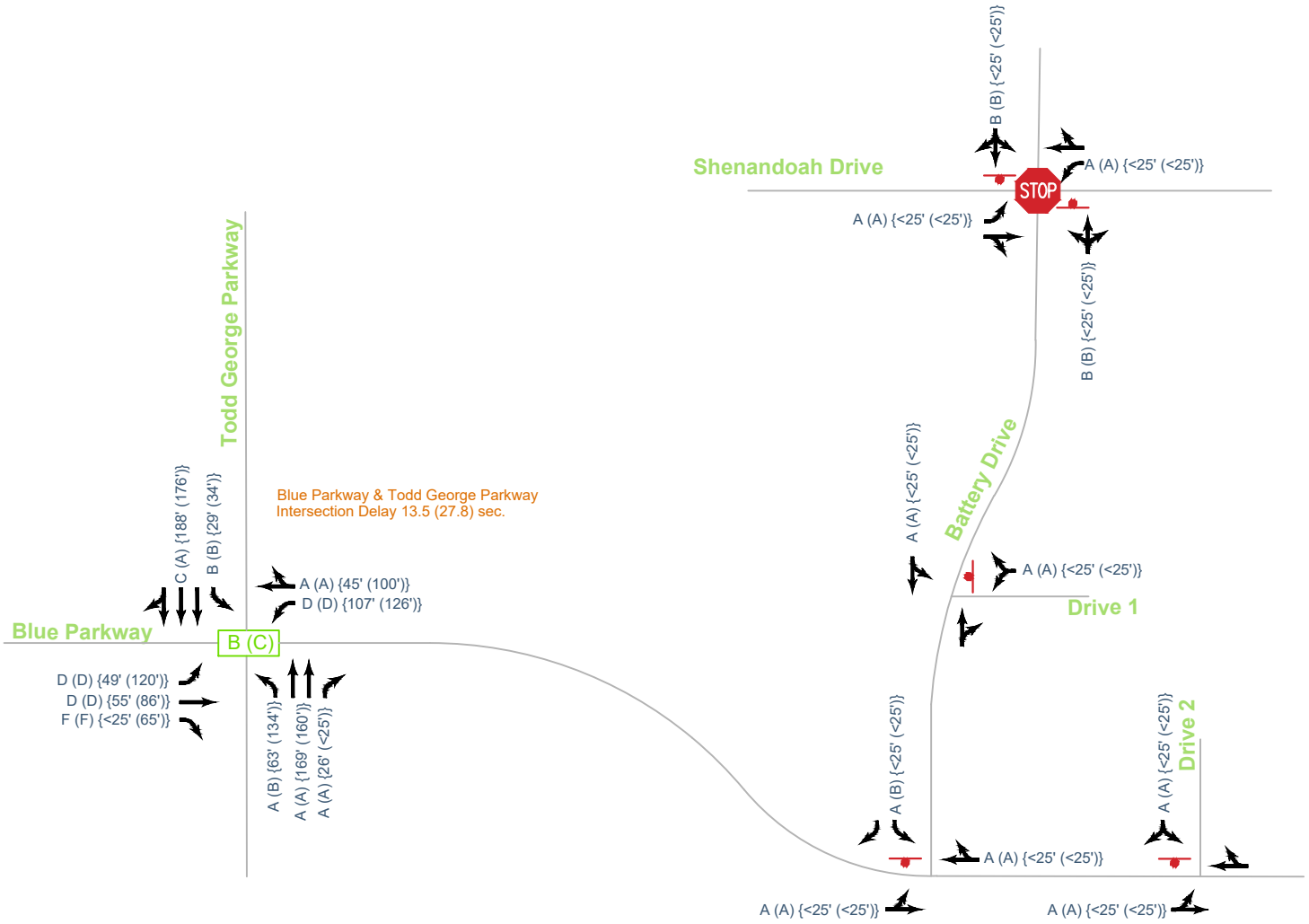
FIGURE 10

Existing + Approved + Development Conditions
Level of Service
Mid-Continent Public Library
Lee's Summit, MO



LEGEND

AM (PM) {AM (PM)}	Movement LOS & {95th Percentile Queue}
AM (PM)	Signalized Intersection LOS
STOP	Stop Controlled Intersection
	Stop Sign
	Lane Geometry

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6.0 FUTURE DEVELOPMENT CONDITIONS

Per the City's request, a scenario that included all approved developments, the proposed library development, and future adjacent office and retail developments within the study area was reviewed. It should be noted, only the operations of the study intersections listed in **Section 1.0** were reviewed. Based on a site plan provided by the City, with the construction of the future adjacent office and retail developments additional driveways will also be constructed. Future driveways shown on the future scenario site plan provided by the City were considered when distributing development trips but were not reviewed as a part of this study. The future site plan provided by the City can be found in **Appendix D.**

6.1 Future Development Trip Generation and Distribution

To determine the impact of future development traffic on the roadway network, expected trips associated with the proposed site were generated and applied to the study network. As discussed with the previous scenario, the *ITE Trip Generation Manual (10th Edition)* was used to estimate trips. The land uses that most resemble future planned uses are Land Use Code 820 (Shopping Center) and Land Use Code 710 (General Office Building).

Based on the *ITE Trip Generation Manual*, trip generation characteristics were developed for the future site. Trip generation characteristics expected for the site are shown in **Table 6**. Detailed ITE trip generation information can be found in **Appendix D.**

Table 6: Future Development Trip Generation

Land Use	Size	Average Weekday	AM Peak Hour			PM Peak Hour		
			Total	Enter	Exit	Total	Enter	Exit
Shopping Center	31,000 SQ. FT.	2,712	168	105	63	229	110	119
General Office Building	19,200 SQ. FT.	215	45	39	6	24	4	20
Total	50,200 SQ. FT.	2,927	213	144	69	253	114	139

The trips generated by the future development were assigned to the roadway network based on the previous scenarios outlined in this report.

The expected peak hour trips associated with the future site developments, following trip distribution and assignment to the roadway network, are illustrated in **Figure 11**. Information regarding the expected trip distribution and site trips can be found in **Appendix D**.

6.2 Future Conditions Warrant Analysis

Future Conditions Signal Warrants: Considering future development volumes, the unsignalized study intersections are not expected to meet the criteria for signalization during either peak hour period based on Warrant 3 (peak hour warrant). Signal warrant analysis sheets can be found in **Appendix D**.

Future Conditions Turn Lane Warrants: Following the Lee's Summit *Access Management Code* and based on trips associated with future development, the westbound right-turn movement approaches the threshold for warranting a right-turn lane during the PM peak hour for the westbound approach at the intersection of Todd George Parkway and Blue Parkway. Capacity analysis will be reviewed to determine if left-turn lanes are needed.

As discussed in the previous scenarios, the northbound and westbound left-turn lanes at the intersection of Todd George Parkway and Blue Parkway do not meet the standards provided in the *Access Management Code*. Future operations were reviewed for these movements in **Section 6.2.**

Future conditions lane configurations and traffic control for the study network are illustrated in **Figure 13**.

6.3 Future Conditions Capacity Analysis

For the future scenario, capacity analysis was performed considering the addition of future development traffic to the roadway network. Split times at the signalized intersection of Todd George Parkway and Blue Parkway were updated to accommodate future development traffic. Results of the capacity analysis indicate similar operations to existing plus approved plus development conditions. The overall operations of the signalized intersection of Todd George Parkway and Blue Parkway and the associated individual movements at the intersection are expected to operate at LOS D or better overall during both the AM and PM peak hour periods with the following exceptions:

Todd George Parkway and Blue Parkway

- Westbound right-turn movement is expected to operate at a LOS F during the PM peak hour
    - During the PM peak hour this movement is projected to service less than 100 vehicles. The shared through/right-turn movement is expected to have a queue length of 161' or 7 vehicle lengths. Based on the expected operations of the westbound through/right-turn movement during the future scenario a minimum 100' plus taper right turn lane is recommended. This is attributed to the addition of the future development volumes and not the proposed library studied in previous scenarios.
- Eastbound right-turn movement is expected to operate at a LOS E and F during the AM and PM peak hour, respectively.
    - Currently a right-turn lane is provided for the eastbound right-turn movement and queue lengths are expected to be minimal (less than 65' or about three vehicle lengths). No geometric updates are recommended under this scenario.
- As stated in the previous scenario, these movements are expected to operate at a lower LOS as the higher volume of traffic along Todd George Parkway is serviced.

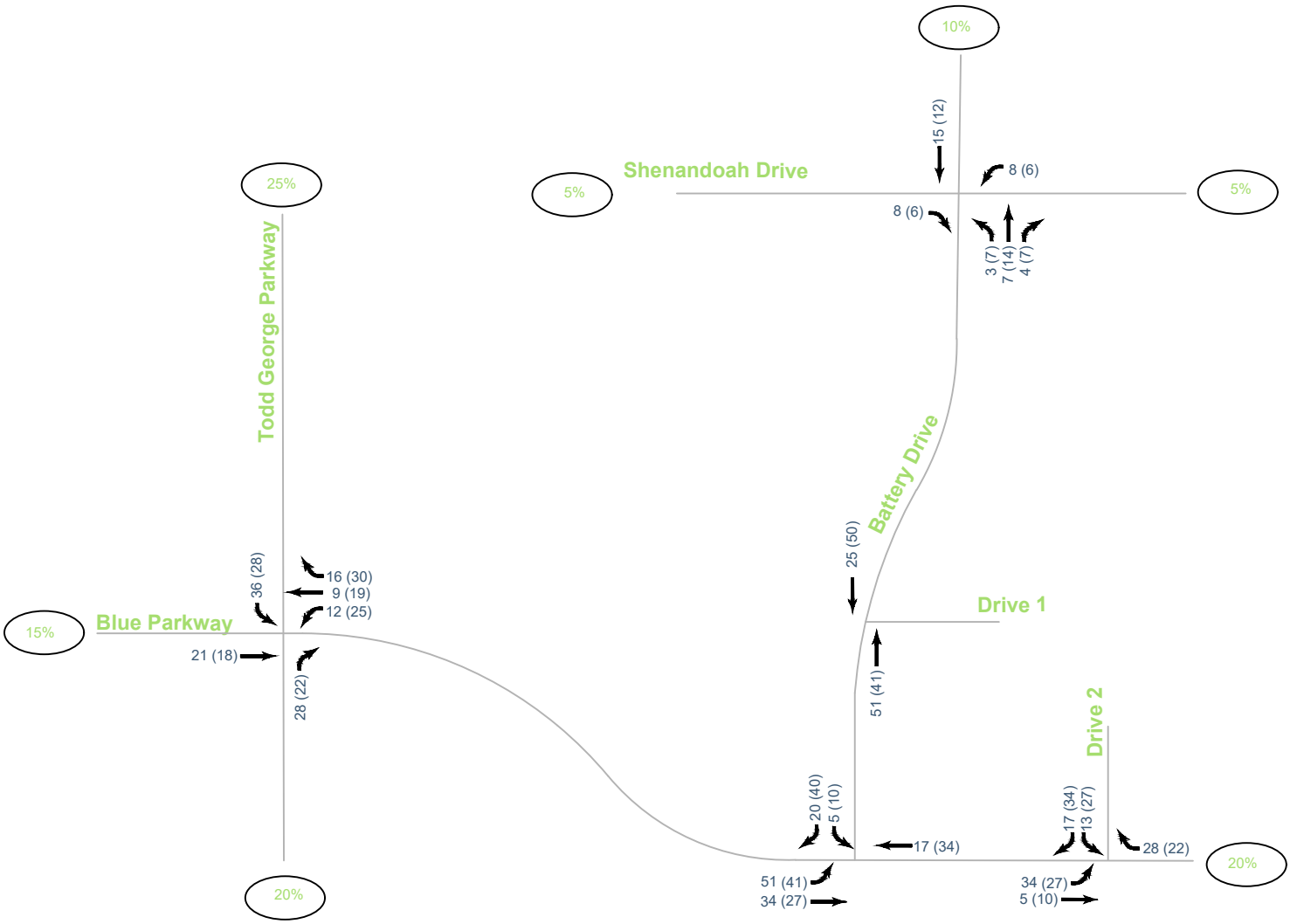
The individual movements at the unsignalized intersections are expected to operate at a LOS C or better during the AM and PM peak hour periods. Traffic operations are expected to be acceptable under this scenario thus additional turn lanes are not recommended.

The future conditions capacity analysis summary is illustrated in **Figure 14**. Detailed results may be found in **Appendix D**.

FIGURE 11

Proposed Future Development Distribution

Mid-Continent Public Library
Lee's Summit, MO



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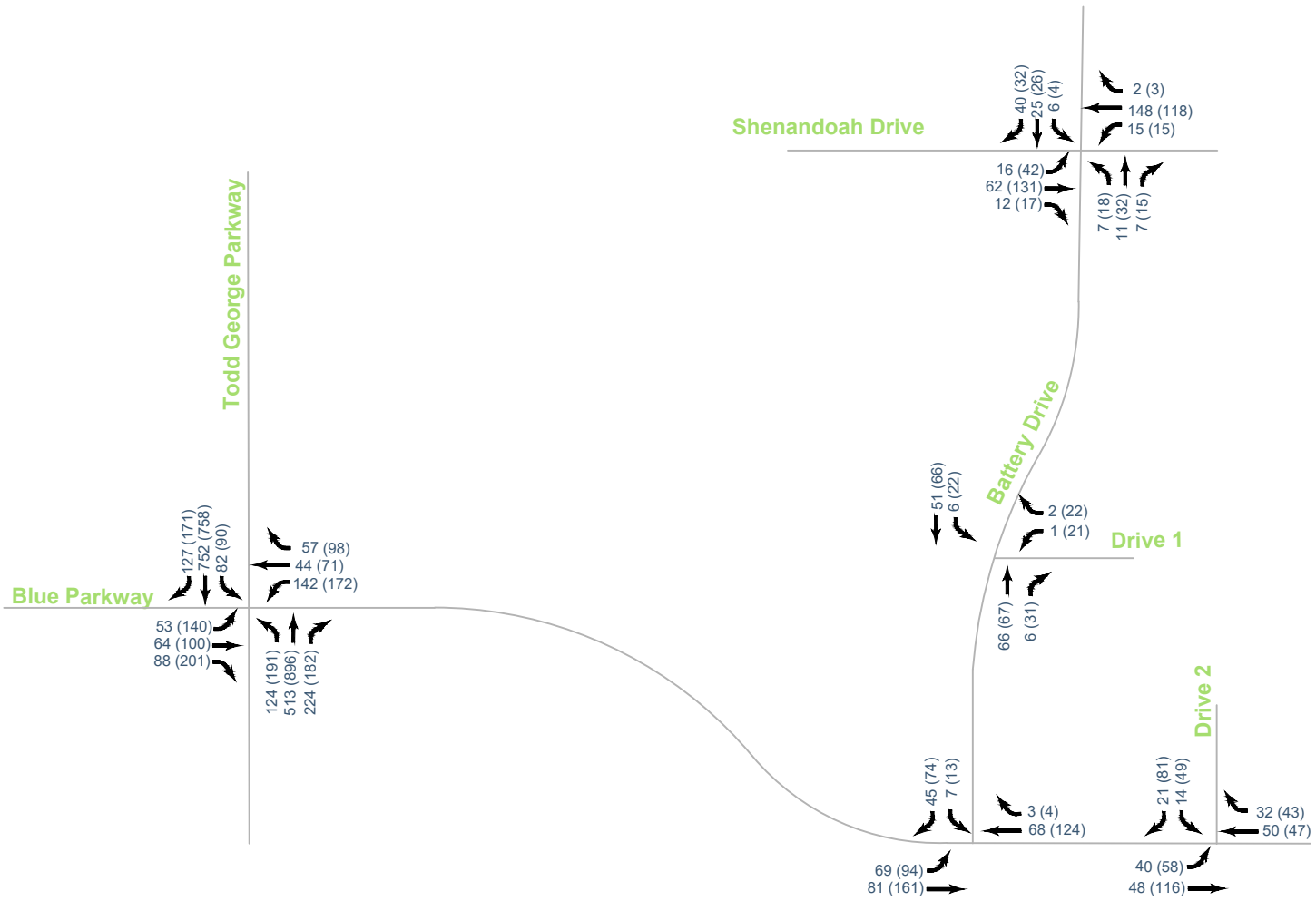
LEGEND

XX (XX)	AM (PM) Peak Hour Trips
XX%	Distribution Percentages

FIGURE 12

Future Conditions
Peak Hour Volumes

Mid-Continent Public Library
Lee's Summit, MO



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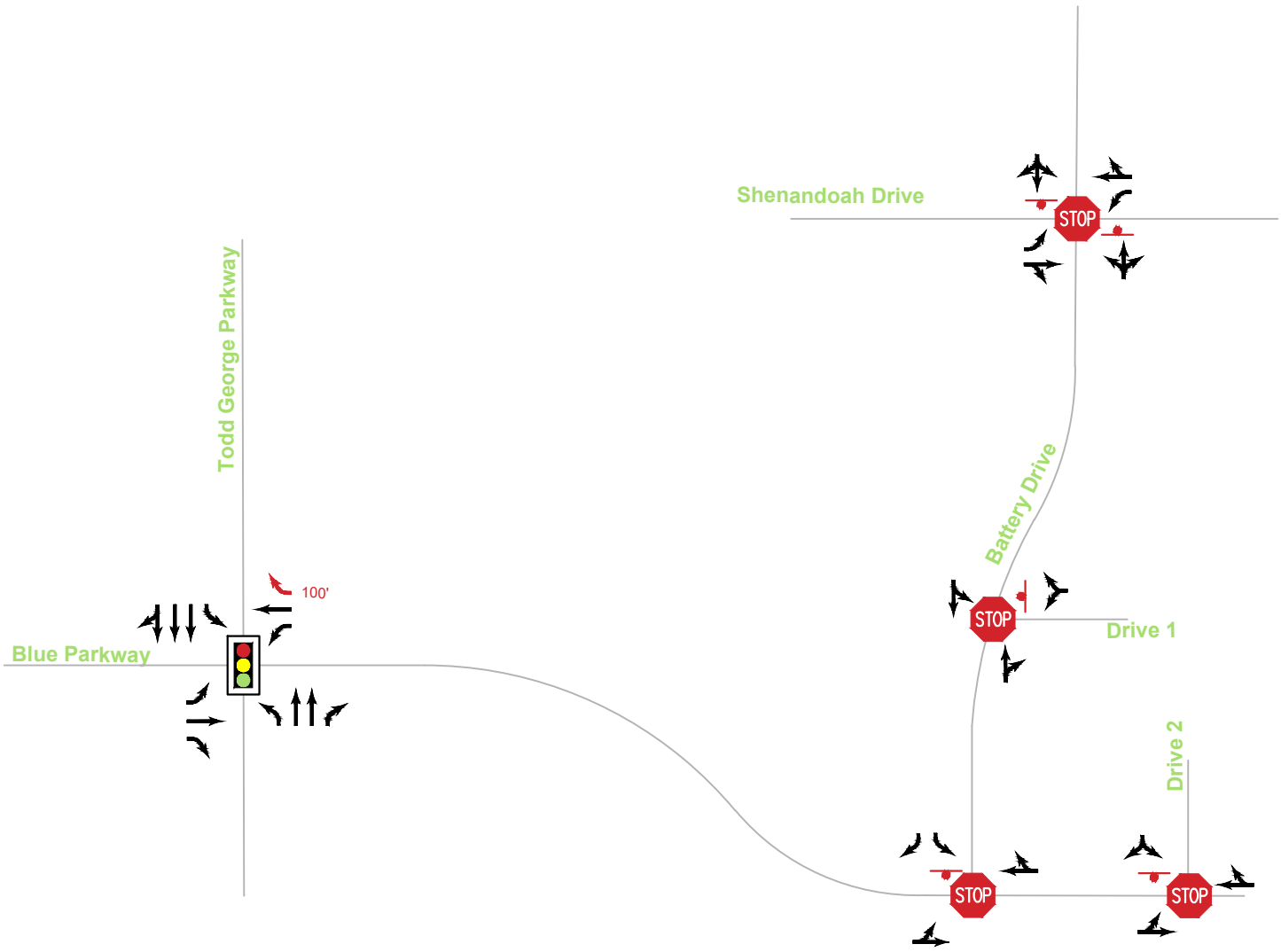
LEGEND

XX (XX) AM (PM) Peak Hour Volumes

FIGURE 13

Future Conditions
Lane Configuration & Traffic Control
Mid-Continent Public Library
Lee's Summit, MO



LEGEND

- *Lane Configuration*
- XXX' *Proposed Lane Configuration*
- STOP *Stop Controlled Intersection*
- *Stop Sign*
- *Signalized Intersection*

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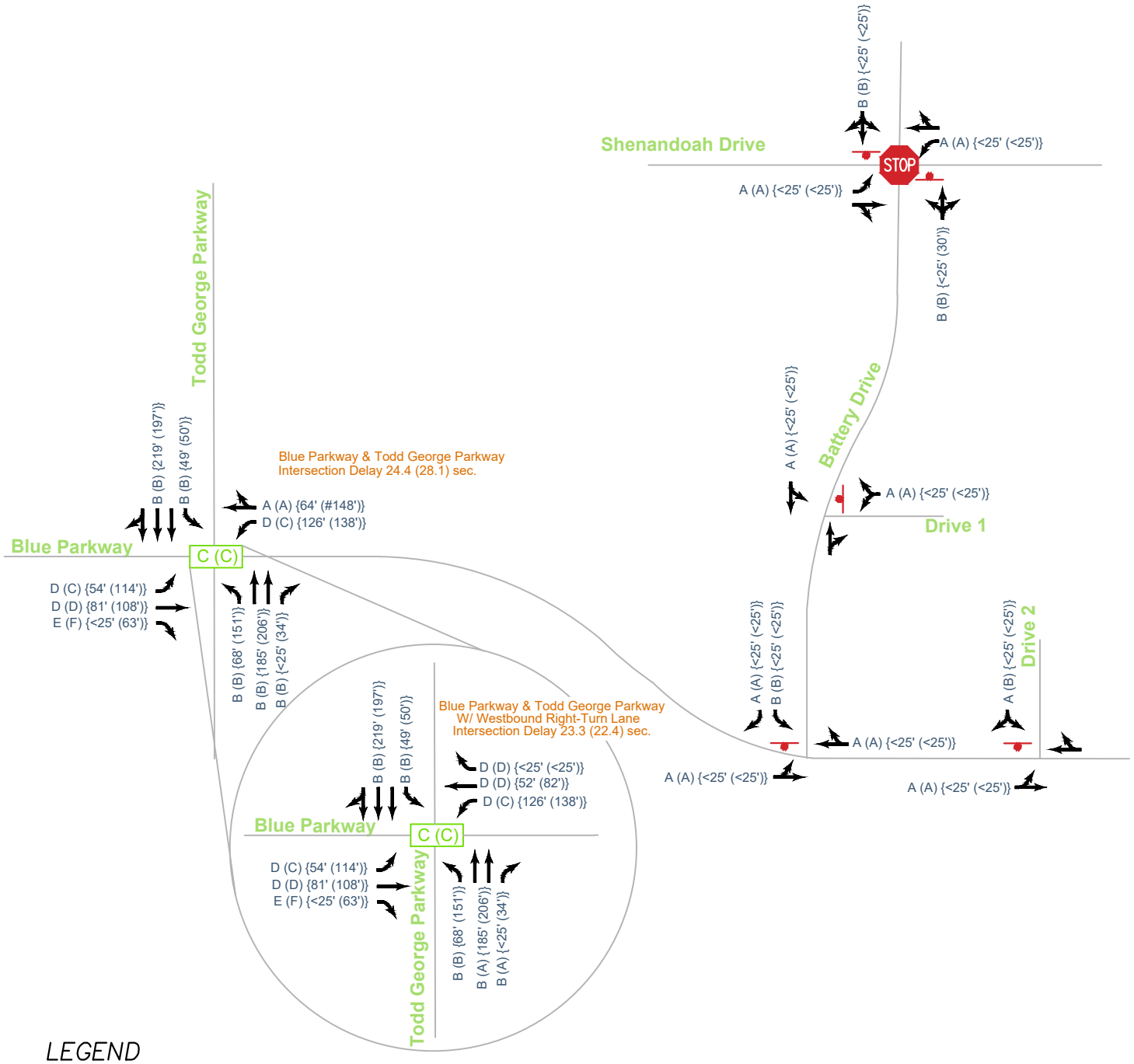
FIGURE 14

Future Conditions
Level of Service
Mid-Continent Public Library
Lee's Summit, MO



LEGEND

AM (PM) {AM (PM)}	Movement LOS & {95th Percentile Queue}
AM (PM)	Signalized Intersection LOS
STOP	Stop Controlled Intersection
	Stop Sign
	Lane Geometry
#	95th Percentile Queue Exceeds Capacity

N

OLSSON ASSOCIATES

7.0 Conclusions and Recommendations

The purpose of this study was to summarize the traffic impacts regarding the proposed construction of the Mid Continent Public Library (MCPL) development located in the northeast quadrant of Blue Parkway and Battery Drive in Lee's Summit, Missouri.

7.1 Conclusions

The general findings of this traffic impact study can be summarized by the following points:

1. In general, traffic operations after the development of the proposed MCPL site are expected to be acceptable and be similar to existing conditions.
    a. The City and MoDOT recently completed an interchange project along Blackwell Road at US-50, east of the proposed site. Trips generated by the proposed library development are expected to be minimal and have a negligible impact on operations at the new interchange. The interchange should have adequate capacity to support the proposed library development.

2. The existing westbound and northbound left-turn lanes at the signalized intersection of Todd George Parkway and Blue Parkway do not meet turn lane length recommendations provided in the City of Lee's Summit *Access Management Code (AMC).* Lengthening the northbound turn bay length is not feasible due to the close proximity of the intersection to the US-50 interchange. Based on a review of current and expected operations, the turn lane lengths are adequate to service expected vehicular queuing.

3. MoDOT is planning to install protected/permissive left-turn phasing for every approach at the intersection of Todd George Parkway and Blue Parkway summer 2018. For the purposes of this report, capacity analysis considered this improvement for all scenarios of development.

7.2 Recommendations

Given the review of information, list of conclusions and intersection specific capacity analysis, the following items are recommended for the study area:

Existing plus Approved plus Development Conditions

1. The throat length of Drive 1 does not meet recommended minimums provided in the *AMC.* Based on a review of capacity analysis, the queue length for exiting traffic at this drive is expected to be less than 25 feet, or one vehicle, during the AM and PM peak hour periods. The current throat length of 30 feet is adequate to accommodate the expected queue. Based on plans provided for future development adjacent to this site, Drive 1 is not proposed to be a shared drive with future development. Considering that this drive is expected to serve only library traffic and that the expected queue length is one vehicle, a deviation from the standard reducing the throat length from 100 feet to 30 feet is expected to operate sufficiently.

Future Conditions

2. Projected future volumes of the westbound right-turn movement approach the threshold for warranting a right-turn lane for the westbound approach at the intersection of Todd George Parkway and Blue Parkway during the PM peak hour per criteria outlined in Lee's Summit *AMC*. Based on future volumes, it is recommended that this turn lane be provided with a minimum of 100' plus taper. This improvement is based on future volumes and is not necessarily attributed to the proposed library development.

Appendix A

Count Data

Olsson Associates : Overland Park
7301 West 133rd St

Overland Park, Kansas, United States 66213
913.381.1170 tmchenry@olssonassociates.com

Count Name: Battery Dr & Blue Pkwy
Site Code:
Start Date: 05/22/2018

Turning Movement Data

Start Time	Battery Dr Southbound				Blue Pkwy Westbound				Blue Pkwy Eastbound				
	Right	Left	U-Turn	App. Total	Right	Thru	U-Turn	App. Total	Thru	Left	U-Turn	App. Total	Int. Total
7:00 AM	3	0	0	3	0	13	0	13	8	3	0	11	27
7:15 AM	4	0	0	4	0	15	0	15	7	0	0	7	26
7:30 AM	2	0	0	2	0	6	0	6	14	1	0	15	23
7:45 AM	4	0	0	4	1	11	0	12	12	2	0	14	30
Hourly Total	13	0	0	13	1	45	0	46	41	6	0	47	106
8:00 AM	1	0	0	1	0	7	0	7	5	3	0	8	16
8:15 AM	0	0	0	0	0	8	0	8	6	2	0	8	16
8:30 AM	0	0	0	0	0	7	0	7	6	1	0	7	14
8:45 AM	4	0	0	4	0	7	0	7	8	0	0	8	19
Hourly Total	5	0	0	5	0	29	0	29	25	6	0	31	65
*** BREAK ***	-	-	-	-	-	-	-	-	-	-	-	-	-
4:00 PM	3	0	0	3	1	6	0	7	13	3	0	16	26
4:15 PM	4	0	0	4	0	4	0	4	11	2	0	13	21
4:30 PM	1	0	0	1	0	10	0	10	18	2	0	20	31
4:45 PM	0	0	0	0	0	7	0	7	32	1	0	33	40
Hourly Total	8	0	0	8	1	27	0	28	74	8	0	82	118
5:00 PM	1	0	0	1	0	13	0	13	26	2	0	28	42
5:15 PM	1	0	0	1	0	12	0	12	24	3	0	27	40
5:30 PM	1	0	0	1	0	7	0	7	21	2	0	23	31
5:45 PM	2	0	0	2	0	6	0	6	11	1	0	12	20
Hourly Total	5	0	0	5	0	38	0	38	82	8	0	90	133
Grand Total	31	0	0	31	2	139	0	141	222	28	0	250	422
Approach %	100.0	0.0	0.0	-	1.4	98.6	0.0	-	88.8	11.2	0.0	-	-
Total %	7.3	0.0	0.0	7.3	0.5	32.9	0.0	33.4	52.6	6.6	0.0	59.2	-
Lights	31	0	0	31	1	136	0	137	218	27	0	245	413
% Lights	100.0	-	-	100.0	50.0	97.8	-	97.2	98.2	96.4	-	98.0	97.9
Mediums	0	0	0	0	1	3	0	4	4	0	0	4	8
% Mediums	0.0	-	-	0.0	50.0	2.2	-	2.8	1.8	0.0	-	1.6	1.9
Articulated Trucks	0	0	0	0	0	0	0	0	0	1	0	1	1
% Articulated Trucks	0.0	-	-	0.0	0.0	0.0	-	0.0	0.0	3.6	-	0.4	0.2

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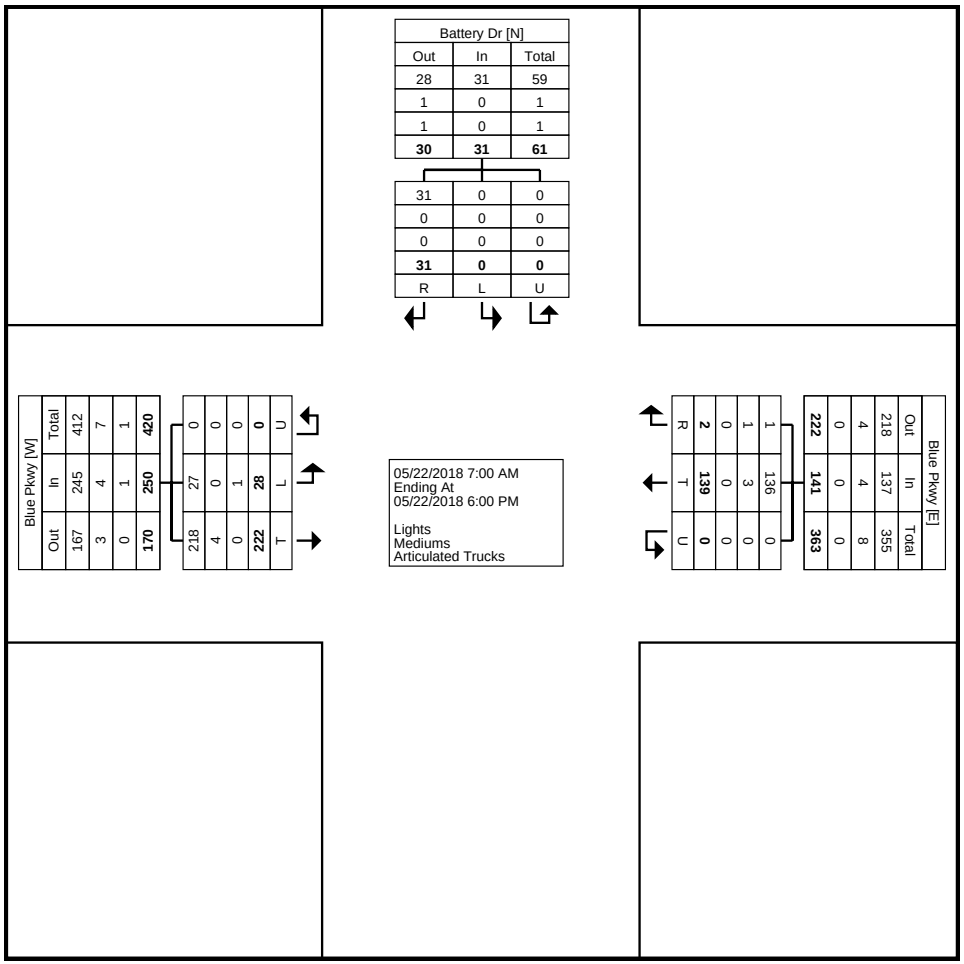

Turning Movement Data Plot

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Count Name: Battery Dr & Blue Pkwy
Site Code:
Start Date: 05/22/2018

Turning Movement Peak Hour Data (7:00 AM)

Start Time	Battery Dr Southbound				Blue Pkwy Westbound				Blue Pkwy Eastbound				
	Right	Left	U-Turn	App. Total	Right	Thru	U-Turn	App. Total	Thru	Left	U-Turn	App. Total	Int. Total
7:00 AM	3	0	0	3	0	13	0	13	8	3	0	11	27
7:15 AM	4	0	0	4	0	15	0	15	7	0	0	7	26
7:30 AM	2	0	0	2	0	6	0	6	14	1	0	15	23
7:45 AM	4	0	0	4	1	11	0	12	12	2	0	14	30
Total	13	0	0	13	1	45	0	46	41	6	0	47	106
Approach %	100.0	0.0	0.0	-	2.2	97.8	0.0	-	87.2	12.8	0.0	-	-
Total %	12.3	0.0	0.0	12.3	0.9	42.5	0.0	43.4	38.7	5.7	0.0	44.3	-
PHF	0.813	0.000	0.000	0.813	0.250	0.750	0.000	0.767	0.732	0.500	0.000	0.783	0.883
Lights	13	0	0	13	0	44	0	44	39	6	0	45	102
% Lights	100.0	-	-	100.0	0.0	97.8	-	95.7	95.1	100.0	-	95.7	96.2
Mediums	0	0	0	0	1	1	0	2	2	0	0	2	4
% Mediums	0.0	-	-	0.0	100.0	2.2	-	4.3	4.9	0.0	-	4.3	3.8
Articulated Trucks	0	0	0	0	0	0	0	0	0	0	0	0	0
% Articulated Trucks	0.0	-	-	0.0	0.0	0.0	-	0.0	0.0	0.0	-	0.0	0.0

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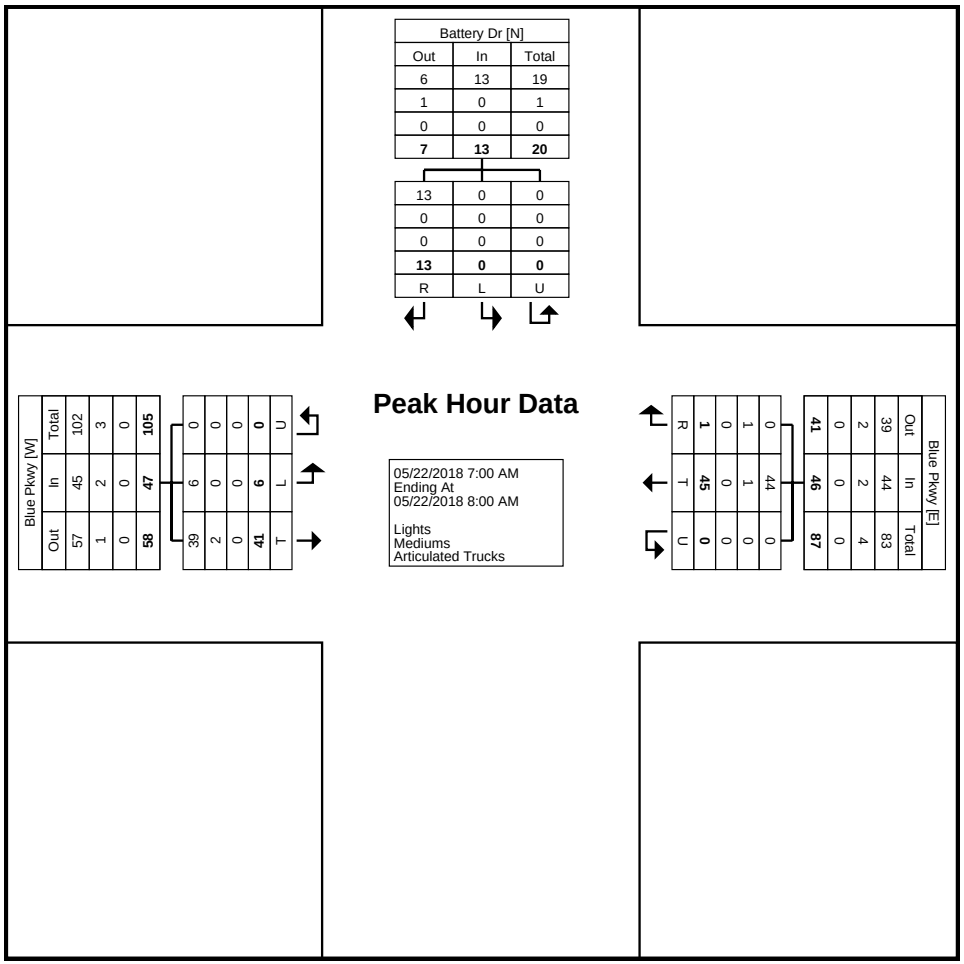

Turning Movement Peak Hour Data Plot (7:00 AM)

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Count Name: Battery Dr & Blue Pkwy
Site Code:
Start Date: 05/22/2018

Turning Movement Peak Hour Data (4:30 PM)

Start Time	Battery Dr Southbound				Blue Pkwy Westbound				Blue Pkwy Eastbound				
	Right	Left	U-Turn	App. Total	Right	Thru	U-Turn	App. Total	Thru	Left	U-Turn	App. Total	Int. Total
4:30 PM	1	0	0	1	0	10	0	10	18	2	0	20	31
4:45 PM	0	0	0	0	0	7	0	7	32	1	0	33	40
5:00 PM	1	0	0	1	0	13	0	13	26	2	0	28	42
5:15 PM	1	0	0	1	0	12	0	12	24	3	0	27	40
Total	3	0	0	3	0	42	0	42	100	8	0	108	153
Approach %	100.0	0.0	0.0	-	0.0	100.0	0.0	-	92.6	7.4	0.0	-	-
Total %	2.0	0.0	0.0	2.0	0.0	27.5	0.0	27.5	65.4	5.2	0.0	70.6	-
PHF	0.750	0.000	0.000	0.750	0.000	0.808	0.000	0.808	0.781	0.667	0.000	0.818	0.911
Lights	3	0	0	3	0	42	0	42	100	8	0	108	153
% Lights	100.0	-	-	100.0	-	100.0	-	100.0	100.0	100.0	-	100.0	100.0
Mediums	0	0	0	0	0	0	0	0	0	0	0	0	0
% Mediums	0.0	-	-	0.0	-	0.0	-	0.0	0.0	0.0	-	0.0	0.0
Articulated Trucks	0	0	0	0	0	0	0	0	0	0	0	0	0
% Articulated Trucks	0.0	-	-	0.0	-	0.0	-	0.0	0.0	0.0	-	0.0	0.0

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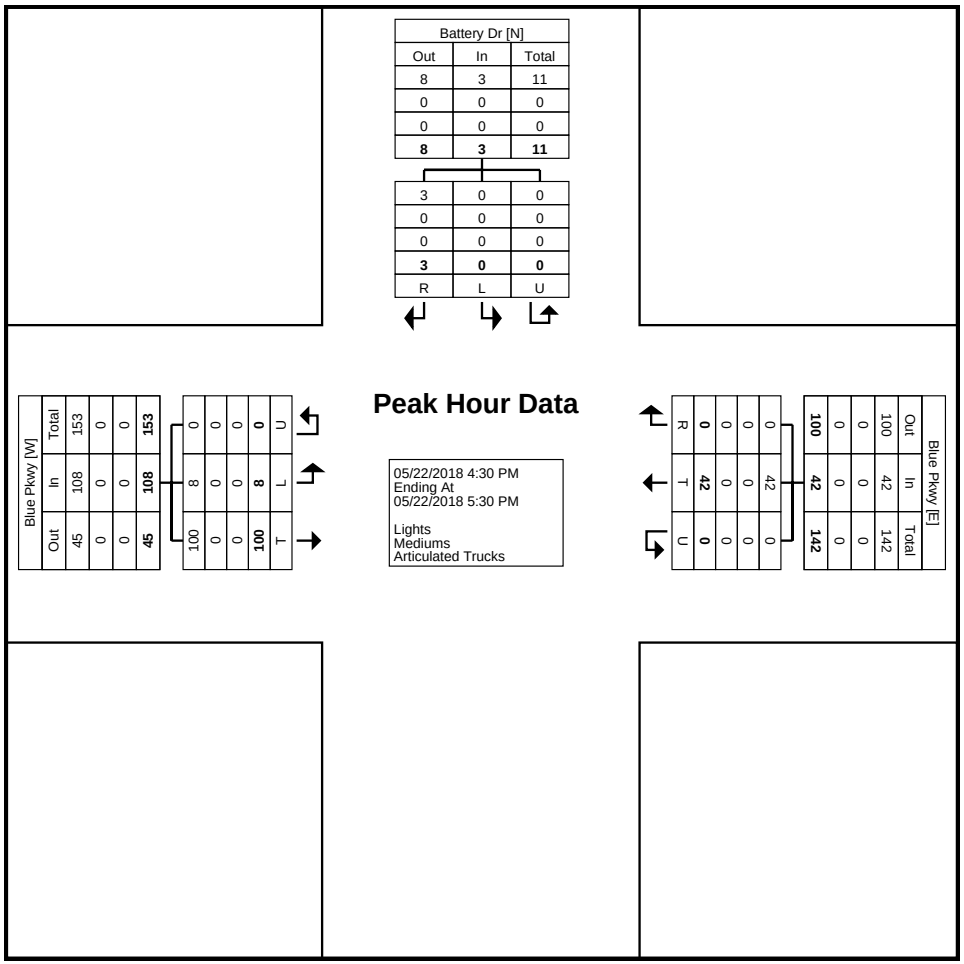

Turning Movement Peak Hour Data Plot (4:30 PM)

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Site Code:
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Count Name: Battery Dr & Shenandoah Dr
Site Code:
Start Date: 05/22/2018

Turning Movement Data

Start Time	Battery Dr Southbound					Shenandoah Dr Westbound					Battery Dr Northbound					Shenandoah Dr Eastbound					
	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Int. Total
7:00 AM	9	1	3	0	13	1	46	0	0	47	1	1	0	0	2	2	10	2	0	14	76
7:15 AM	17	2	1	0	20	0	37	2	0	39	0	0	0	0	0	0	19	4	0	23	82
7:30 AM	7	2	2	0	11	1	36	1	0	38	0	0	1	0	1	0	16	6	0	22	72
7:45 AM	7	0	0	0	7	0	29	1	0	30	0	0	2	0	2	1	17	4	0	22	61
Hourly Total	40	5	6	0	51	2	148	4	0	154	1	1	3	0	5	3	62	16	0	81	291
8:00 AM	6	1	0	0	7	2	33	1	0	36	1	0	1	0	2	0	5	3	0	8	53
8:15 AM	15	0	0	0	15	1	22	0	0	23	0	0	1	0	1	1	12	4	0	17	56
8:30 AM	6	0	0	0	6	1	26	0	0	27	0	0	1	0	1	0	7	3	0	10	44
8:45 AM	7	0	0	0	7	0	19	1	0	20	0	0	0	0	0	1	9	2	0	12	39
Hourly Total	34	1	0	0	35	4	100	2	0	106	1	0	3	0	4	2	33	12	0	47	192
*** BREAK ***	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
4:00 PM	5	0	0	0	5	0	21	1	0	22	4	0	1	0	5	2	26	3	0	31	63
4:15 PM	5	1	2	0	8	1	24	0	0	25	2	1	1	0	4	1	33	6	0	40	77
4:30 PM	4	1	0	0	5	2	24	0	0	26	2	1	0	0	3	2	32	11	0	45	79
4:45 PM	8	0	1	0	9	0	22	0	0	22	0	1	1	0	2	3	36	11	0	50	83
Hourly Total	22	2	3	0	27	3	91	1	0	95	8	3	3	0	14	8	127	31	0	166	302
5:00 PM	6	1	0	0	7	1	22	1	0	24	0	1	1	0	2	1	27	14	0	42	75
5:15 PM	10	0	3	0	13	0	27	0	0	27	0	3	1	0	4	0	33	7	0	40	84
5:30 PM	8	0	0	0	8	2	47	0	0	49	1	0	1	0	2	0	35	10	0	45	104
5:45 PM	6	1	1	0	8	0	26	0	0	26	0	1	0	0	1	1	38	13	0	52	87
Hourly Total	30	2	4	0	36	3	122	1	0	126	1	5	3	0	9	2	133	44	0	179	350
Grand Total	126	10	13	0	149	12	461	8	0	481	11	9	12	0	32	15	355	103	0	473	1135
Approach %	84.6	6.7	8.7	0.0	-	2.5	95.8	1.7	0.0	-	34.4	28.1	37.5	0.0	-	3.2	75.1	21.8	0.0	-	-
Total %	11.1	0.9	1.1	0.0	13.1	1.1	40.6	0.7	0.0	42.4	1.0	0.8	1.1	0.0	2.8	1.3	31.3	9.1	0.0	41.7	-
Lights	126	10	13	0	149	12	458	8	0	478	11	9	11	0	31	15	351	102	0	468	1126
% Lights	100.0	100.0	100.0	-	100.0	100.0	99.3	100.0	-	99.4	100.0	100.0	91.7	-	96.9	100.0	98.9	99.0	-	98.9	99.2
Mediums	0	0	0	0	0	0	3	0	0	3	0	0	1	0	1	0	4	1	0	5	9
% Mediums	0.0	0.0	0.0	-	0.0	0.0	0.7	0.0	-	0.6	0.0	0.0	8.3	-	3.1	0.0	1.1	1.0	-	1.1	0.8
Articulated Trucks	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
% Articulated Trucks	0.0	0.0	0.0	-	0.0	0.0	0.0	0.0	-	0.0	0.0	0.0	0.0	-	0.0	0.0	0.0	0.0	-	0.0	0.0

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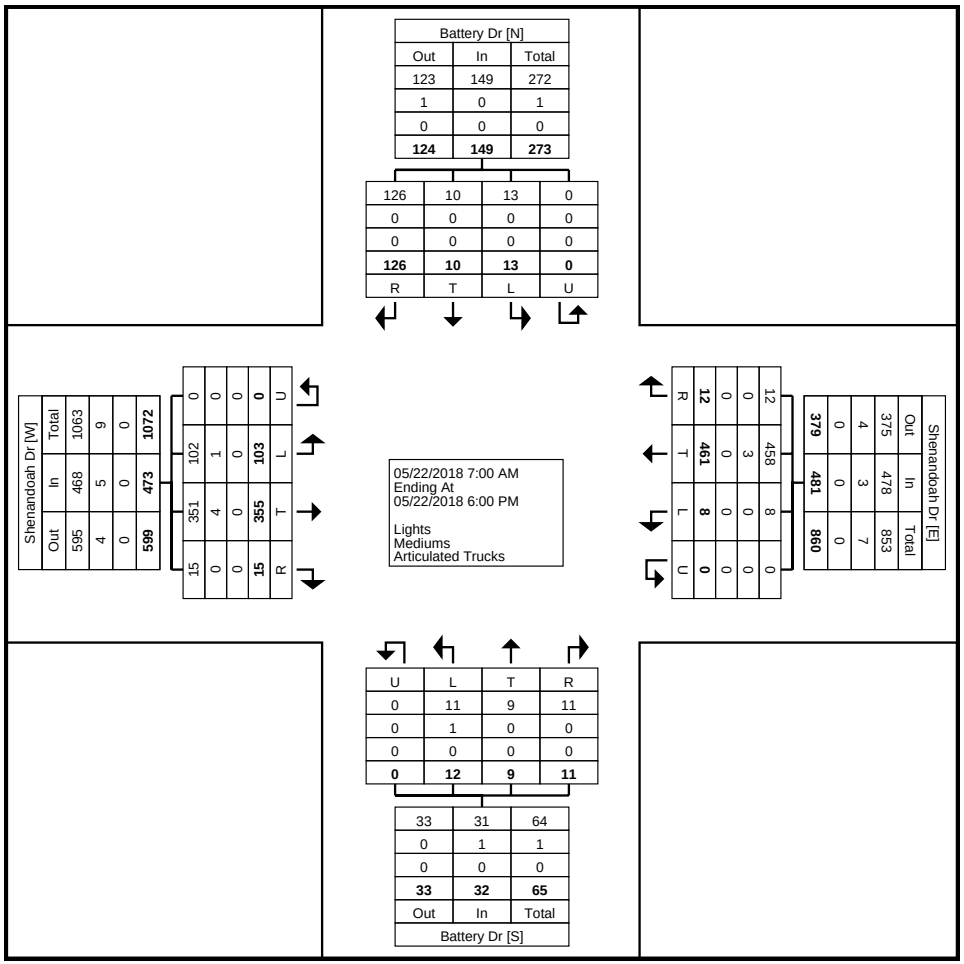
Start Date: 05/22/2018



Turning Movement Data Plot

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Start Date: 05/22/2018

Turning Movement Peak Hour Data (7:00 AM)

Start Time	Battery Dr Southbound					Shenandoah Dr Westbound					Battery Dr Northbound					Shenandoah Dr Eastbound					
	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Int. Total
7:00 AM	9	1	3	0	13	1	46	0	0	47	1	1	0	0	2	2	10	2	0	14	76
7:15 AM	17	2	1	0	20	0	37	2	0	39	0	0	0	0	0	0	19	4	0	23	82
7:30 AM	7	2	2	0	11	1	36	1	0	38	0	0	1	0	1	0	16	6	0	22	72
7:45 AM	7	0	0	0	7	0	29	1	0	30	0	0	2	0	2	1	17	4	0	22	61
Total	40	5	6	0	51	2	148	4	0	154	1	1	3	0	5	3	62	16	0	81	291
Approach %	78.4	9.8	11.8	0.0	-	1.3	96.1	2.6	0.0	-	20.0	20.0	60.0	0.0	-	3.7	76.5	19.8	0.0	-	-
Total %	13.7	1.7	2.1	0.0	17.5	0.7	50.9	1.4	0.0	52.9	0.3	0.3	1.0	0.0	1.7	1.0	21.3	5.5	0.0	27.8	-
PHF	0.588	0.625	0.500	0.000	0.638	0.500	0.804	0.500	0.000	0.819	0.250	0.250	0.375	0.000	0.625	0.375	0.816	0.667	0.000	0.880	0.887
Lights	40	5	6	0	51	2	147	4	0	153	1	1	2	0	4	3	60	16	0	79	287
% Lights	100.0	100.0	100.0	-	100.0	100.0	99.3	100.0	-	99.4	100.0	100.0	66.7	-	80.0	100.0	96.8	100.0	-	97.5	98.6
Mediums	0	0	0	0	0	0	1	0	0	1	0	0	1	0	1	0	2	0	0	2	4
% Mediums	0.0	0.0	0.0	-	0.0	0.0	0.7	0.0	-	0.6	0.0	0.0	33.3	-	20.0	0.0	3.2	0.0	-	2.5	1.4
Articulated Trucks	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
% Articulated Trucks	0.0	0.0	0.0	-	0.0	0.0	0.0	0.0	-	0.0	0.0	0.0	0.0	-	0.0	0.0	0.0	0.0	-	0.0	0.0

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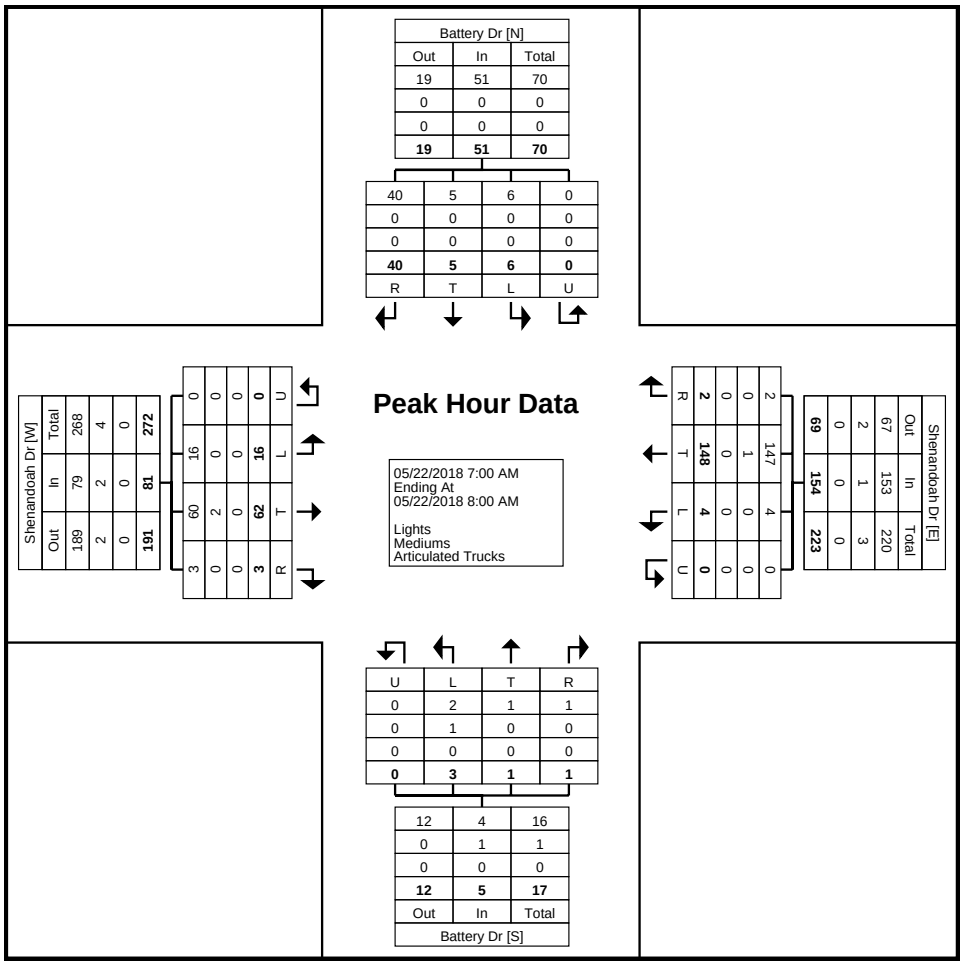

Turning Movement Peak Hour Data Plot (7:00 AM)

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Count Name: Battery Dr & Shenandoah Dr
Site Code:
Start Date: 05/22/2018

Turning Movement Peak Hour Data (5:00 PM)

Start Time	Battery Dr Southbound					Shenandoah Dr Westbound					Battery Dr Northbound					Shenandoah Dr Eastbound					
	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Int. Total
5:00 PM	6	1	0	0	7	1	22	1	0	24	0	1	1	0	2	1	27	14	0	42	75
5:15 PM	10	0	3	0	13	0	27	0	0	27	0	3	1	0	4	0	33	7	0	40	84
5:30 PM	8	0	0	0	8	2	47	0	0	49	1	0	1	0	2	0	35	10	0	45	104
5:45 PM	6	1	1	0	8	0	26	0	0	26	0	1	0	0	1	1	38	13	0	52	87
Total	30	2	4	0	36	3	122	1	0	126	1	5	3	0	9	2	133	44	0	179	350
Approach %	83.3	5.6	11.1	0.0	-	2.4	96.8	0.8	0.0	-	11.1	55.6	33.3	0.0	-	1.1	74.3	24.6	0.0	-	-
Total %	8.6	0.6	1.1	0.0	10.3	0.9	34.9	0.3	0.0	36.0	0.3	1.4	0.9	0.0	2.6	0.6	38.0	12.6	0.0	51.1	-
PHF	0.750	0.500	0.333	0.000	0.692	0.375	0.649	0.250	0.000	0.643	0.250	0.417	0.750	0.000	0.563	0.500	0.875	0.786	0.000	0.861	0.841
Lights	30	2	4	0	36	3	121	1	0	125	1	5	3	0	9	2	133	44	0	179	349
% Lights	100.0	100.0	100.0	-	100.0	100.0	99.2	100.0	-	99.2	100.0	100.0	100.0	-	100.0	100.0	100.0	100.0	-	100.0	99.7
Mediums	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	1
% Mediums	0.0	0.0	0.0	-	0.0	0.0	0.8	0.0	-	0.8	0.0	0.0	0.0	-	0.0	0.0	0.0	0.0	-	0.0	0.3
Articulated Trucks	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
% Articulated Trucks	0.0	0.0	0.0	-	0.0	0.0	0.0	0.0	-	0.0	0.0	0.0	0.0	-	0.0	0.0	0.0	0.0	-	0.0	0.0

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7301 West 133rd St

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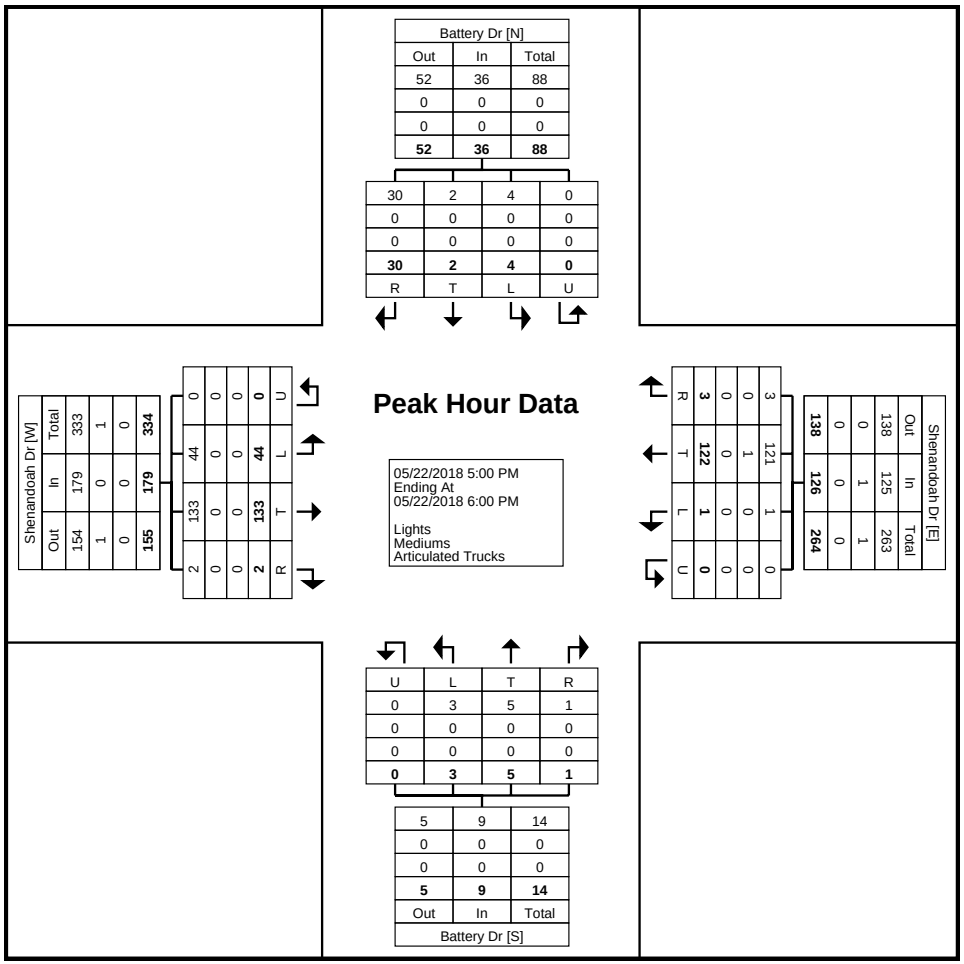
913.381.1170 tmchenry@olssonassociates.com

Count Name: Battery Dr & Shenandoah Dr
Site Code:
Start Date: 05/22/2018



Turning Movement Peak Hour Data Plot (5:00 PM)

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Start Date: 05/22/2018

Olsson Associates : Overland Park
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Overland Park, Kansas, United States 66213
913.381.1170 tmchenry@olssonassociates.com

Count Name: Blue Pkwy & Todd George Pkwy
Site Code:
Start Date: 05/22/2018

Turning Movement Data

Start Time	Todd George Rd Southbound					Blue Pkwy Westbound					Todd George Rd Northbound					Blue Pkwy Eastbound					
	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Int. Total
7:00 AM	42	203	10	0	255	5	17	24	0	46	35	89	46	0	170	28	9	10	0	47	518
7:15 AM	39	193	9	0	241	11	8	31	0	50	42	123	36	0	201	18	8	15	0	41	533
7:30 AM	22	180	9	0	211	7	3	33	0	43	62	141	24	0	227	18	15	11	0	44	525
7:45 AM	24	176	10	0	210	11	4	36	0	51	51	160	18	0	229	24	7	17	0	48	538
Hourly Total	127	752	38	0	917	34	32	124	0	190	190	513	124	0	827	88	39	53	0	180	2114
8:00 AM	15	205	13	0	233	8	7	24	0	39	35	127	11	0	173	19	4	19	0	42	487
8:15 AM	24	167	16	0	207	7	2	20	0	29	33	101	25	0	159	18	7	4	0	29	424
8:30 AM	23	135	10	0	168	10	7	19	0	36	34	115	23	1	173	22	3	8	0	33	410
8:45 AM	21	138	15	0	174	8	9	29	0	46	29	109	25	0	163	23	9	8	0	40	423
Hourly Total	83	645	54	0	782	33	25	92	0	150	131	452	84	1	668	82	23	39	0	144	1744
*** BREAK ***	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
4:00 PM	28	173	8	0	209	13	8	34	0	55	25	162	43	0	230	54	10	30	0	94	588
4:15 PM	34	131	4	0	169	9	7	31	0	47	22	211	40	0	273	34	9	33	0	76	565
4:30 PM	40	184	12	0	236	11	8	29	0	48	18	198	34	0	250	46	12	26	0	84	618
4:45 PM	32	194	9	0	235	13	10	26	0	49	27	221	41	0	289	42	28	43	0	113	686
Hourly Total	134	682	33	0	849	46	33	120	0	199	92	792	158	0	1042	176	59	132	0	367	2457
5:00 PM	43	170	7	0	220	11	7	37	0	55	26	226	57	0	309	55	14	19	0	88	672
5:15 PM	42	196	7	0	245	3	7	34	0	44	38	231	38	0	307	51	15	38	0	104	700
5:30 PM	54	198	7	0	259	9	9	24	0	42	43	218	55	0	316	53	7	40	0	100	717
5:45 PM	52	166	7	0	225	4	5	14	0	23	18	243	39	0	300	52	11	36	0	99	647
Hourly Total	191	730	28	0	949	27	28	109	0	164	125	918	189	0	1232	211	47	133	0	391	2736
Grand Total	535	2809	153	0	3497	140	118	445	0	703	538	2675	555	1	3769	557	168	357	0	1082	9051
Approach %	15.3	80.3	4.4	0.0	-	19.9	16.8	63.3	0.0	-	14.3	71.0	14.7	0.0	-	51.5	15.5	33.0	0.0	-	-
Total %	5.9	31.0	1.7	0.0	38.6	1.5	1.3	4.9	0.0	7.8	5.9	29.6	6.1	0.0	41.6	6.2	1.9	3.9	0.0	12.0	-
Lights	531	2739	153	0	3423	138	115	441	0	694	533	2635	549	1	3718	552	166	350	0	1068	8903
% Lights	99.3	97.5	100.0	-	97.9	98.6	97.5	99.1	-	98.7	99.1	98.5	98.9	100.0	98.6	99.1	98.8	98.0	-	98.7	98.4
Mediums	4	66	0	0	70	1	3	4	0	8	4	36	4	0	44	3	2	6	0	11	133
% Mediums	0.7	2.3	0.0	-	2.0	0.7	2.5	0.9	-	1.1	0.7	1.3	0.7	0.0	1.2	0.5	1.2	1.7	-	1.0	1.5
Articulated Trucks	0	4	0	0	4	1	0	0	0	1	1	4	2	0	7	2	0	1	0	3	15
% Articulated Trucks	0.0	0.1	0.0	-	0.1	0.7	0.0	0.0	-	0.1	0.2	0.1	0.4	0.0	0.2	0.4	0.0	0.3	-	0.3	0.2

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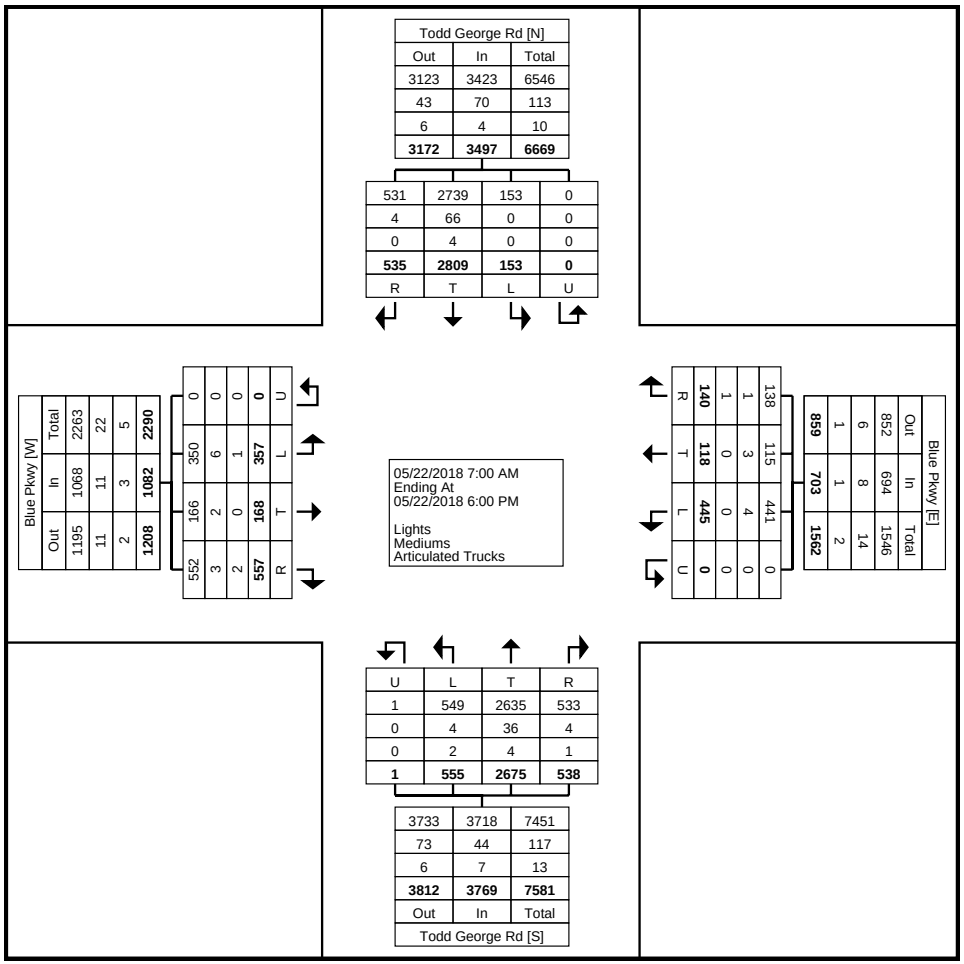
Count Name: Blue Pkwy & Todd George Pkwy
Site Code:
Start Date: 05/22/2018



Turning Movement Data Plot

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Count Name: Blue Pkwy & Todd George Pkwy
Site Code:
Start Date: 05/22/2018

Turning Movement Peak Hour Data (7:00 AM)

Start Time	Todd George Rd Southbound					Blue Pkwy Westbound					Todd George Rd Northbound					Blue Pkwy Eastbound					
	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Int. Total
7:00 AM	42	203	10	0	255	5	17	24	0	46	35	89	46	0	170	28	9	10	0	47	518
7:15 AM	39	193	9	0	241	11	8	31	0	50	42	123	36	0	201	18	8	15	0	41	533
7:30 AM	22	180	9	0	211	7	3	33	0	43	62	141	24	0	227	18	15	11	0	44	525
7:45 AM	24	176	10	0	210	11	4	36	0	51	51	160	18	0	229	24	7	17	0	48	538
Total	127	752	38	0	917	34	32	124	0	190	190	513	124	0	827	88	39	53	0	180	2114
Approach %	13.8	82.0	4.1	0.0	-	17.9	16.8	65.3	0.0	-	23.0	62.0	15.0	0.0	-	48.9	21.7	29.4	0.0	-	-
Total %	6.0	35.6	1.8	0.0	43.4	1.6	1.5	5.9	0.0	9.0	9.0	24.3	5.9	0.0	39.1	4.2	1.8	2.5	0.0	8.5	-
PHF	0.756	0.926	0.950	0.000	0.899	0.773	0.471	0.861	0.000	0.931	0.766	0.802	0.674	0.000	0.903	0.786	0.650	0.779	0.000	0.938	0.982
Lights	126	740	38	0	904	34	31	123	0	188	189	500	122	0	811	87	37	51	0	175	2078
% Lights	99.2	98.4	100.0	-	98.6	100.0	96.9	99.2	-	98.9	99.5	97.5	98.4	-	98.1	98.9	94.9	96.2	-	97.2	98.3
Mediums	1	12	0	0	13	0	1	1	0	2	1	13	1	0	15	1	2	2	0	5	35
% Mediums	0.8	1.6	0.0	-	1.4	0.0	3.1	0.8	-	1.1	0.5	2.5	0.8	-	1.8	1.1	5.1	3.8	-	2.8	1.7
Articulated Trucks	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	0	0	0	0	0	1
% Articulated Trucks	0.0	0.0	0.0	-	0.0	0.0	0.0	0.0	-	0.0	0.0	0.0	0.8	-	0.1	0.0	0.0	0.0	-	0.0	0.0

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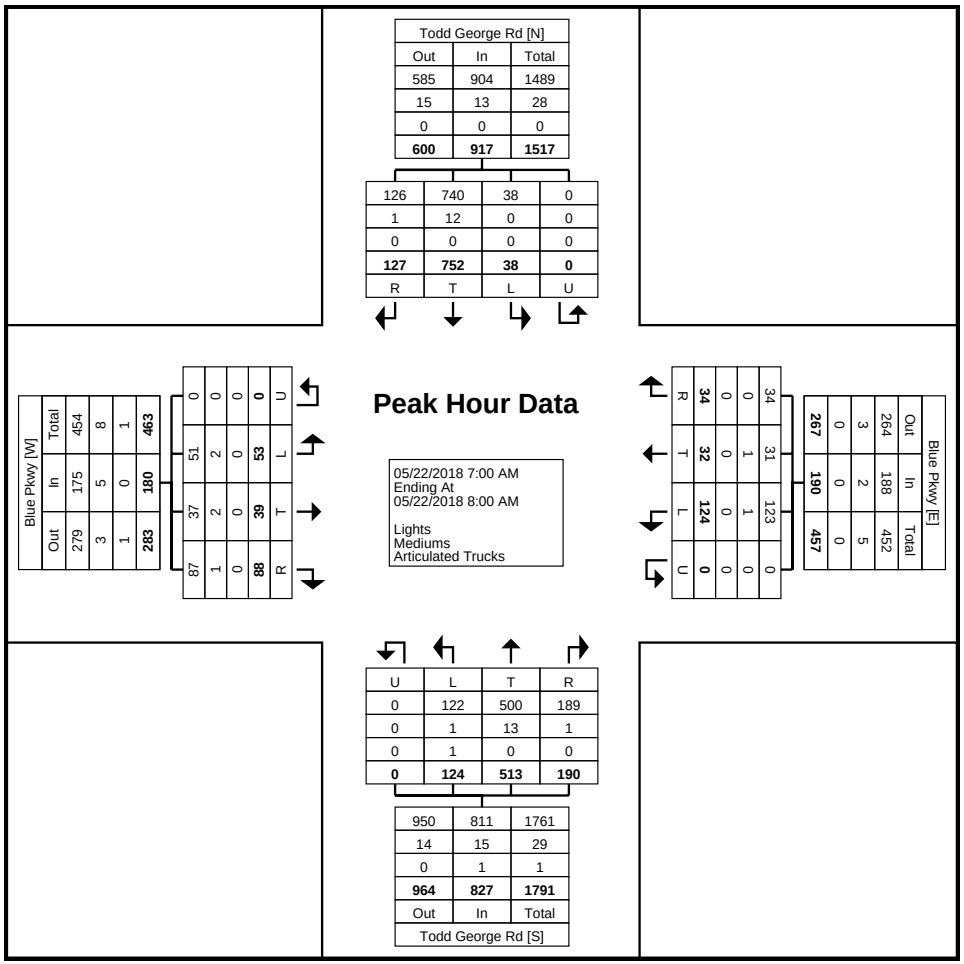
Start Date: 05/22/2018



Turning Movement Peak Hour Data Plot (7:00 AM)

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Count Name: Blue Pkwy & Todd George Pkwy
Site Code:
Start Date: 05/22/2018

Turning Movement Peak Hour Data (4:45 PM)

Start Time	Todd George Rd Southbound					Blue Pkwy Westbound					Todd George Rd Northbound					Blue Pkwy Eastbound					
	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Int. Total
4:45 PM	32	194	9	0	235	13	10	26	0	49	27	221	41	0	289	42	28	43	0	113	686
5:00 PM	43	170	7	0	220	11	7	37	0	55	26	226	57	0	309	55	14	19	0	88	672
5:15 PM	42	196	7	0	245	3	7	34	0	44	38	231	38	0	307	51	15	38	0	104	700
5:30 PM	54	198	7	0	259	9	9	24	0	42	43	218	55	0	316	53	7	40	0	100	717
Total	171	758	30	0	959	36	33	121	0	190	134	896	191	0	1221	201	64	140	0	405	2775
Approach %	17.8	79.0	3.1	0.0	-	18.9	17.4	63.7	0.0	-	11.0	73.4	15.6	0.0	-	49.6	15.8	34.6	0.0	-	-
Total %	6.2	27.3	1.1	0.0	34.6	1.3	1.2	4.4	0.0	6.8	4.8	32.3	6.9	0.0	44.0	7.2	2.3	5.0	0.0	14.6	-
PHF	0.792	0.957	0.833	0.000	0.926	0.692	0.825	0.818	0.000	0.864	0.779	0.970	0.838	0.000	0.966	0.914	0.571	0.814	0.000	0.896	0.968
Lights	171	752	30	0	953	36	33	120	0	189	134	895	189	0	1218	200	64	139	0	403	2763
% Lights	100.0	99.2	100.0	-	99.4	100.0	100.0	99.2	-	99.5	100.0	99.9	99.0	-	99.8	99.5	100.0	99.3	-	99.5	99.6
Mediums	0	4	0	0	4	0	0	1	0	1	0	1	1	0	2	1	0	1	0	2	9
% Mediums	0.0	0.5	0.0	-	0.4	0.0	0.0	0.8	-	0.5	0.0	0.1	0.5	-	0.2	0.5	0.0	0.7	-	0.5	0.3
Articulated Trucks	0	2	0	0	2	0	0	0	0	0	0	0	1	0	1	0	0	0	0	0	3
% Articulated Trucks	0.0	0.3	0.0	-	0.2	0.0	0.0	0.0	-	0.0	0.0	0.0	0.5	-	0.1	0.0	0.0	0.0	-	0.0	0.1

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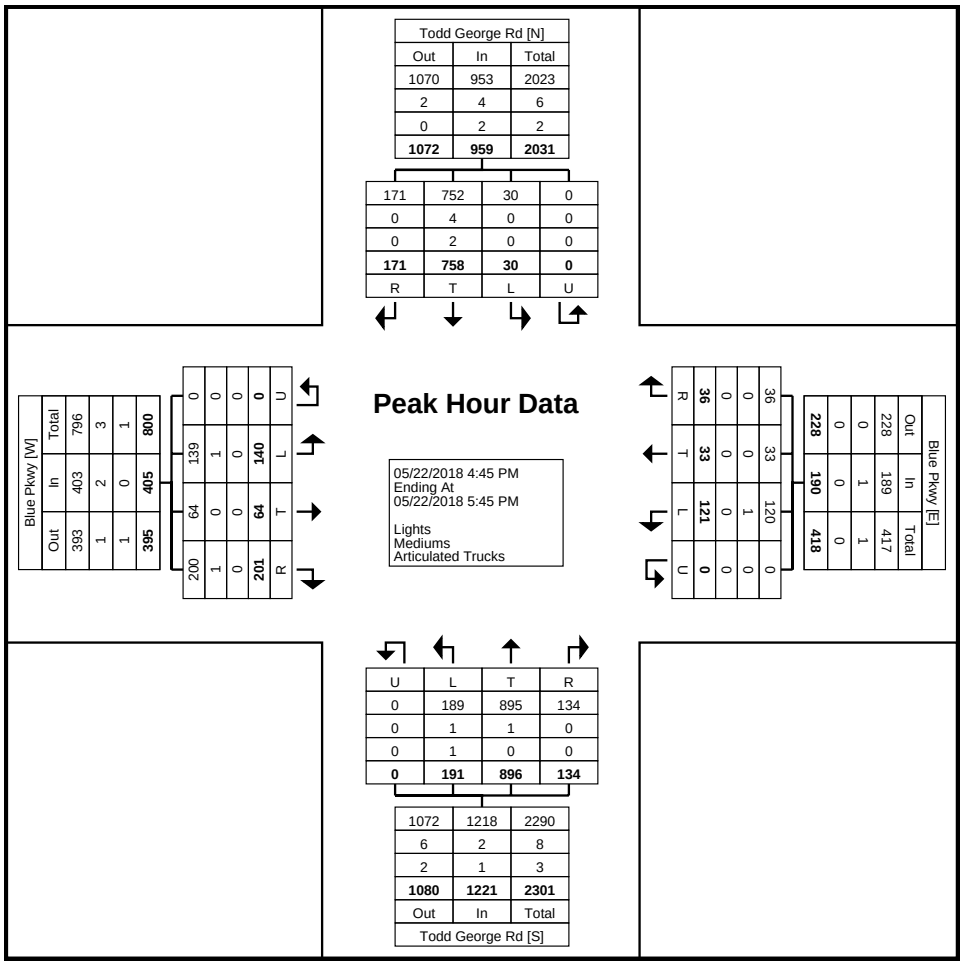

Turning Movement Peak Hour Data Plot (4:45 PM)

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Count Name: Blue Pkwy & Todd George Pkwy
Site Code:
Start Date: 05/22/2018

Appendix B

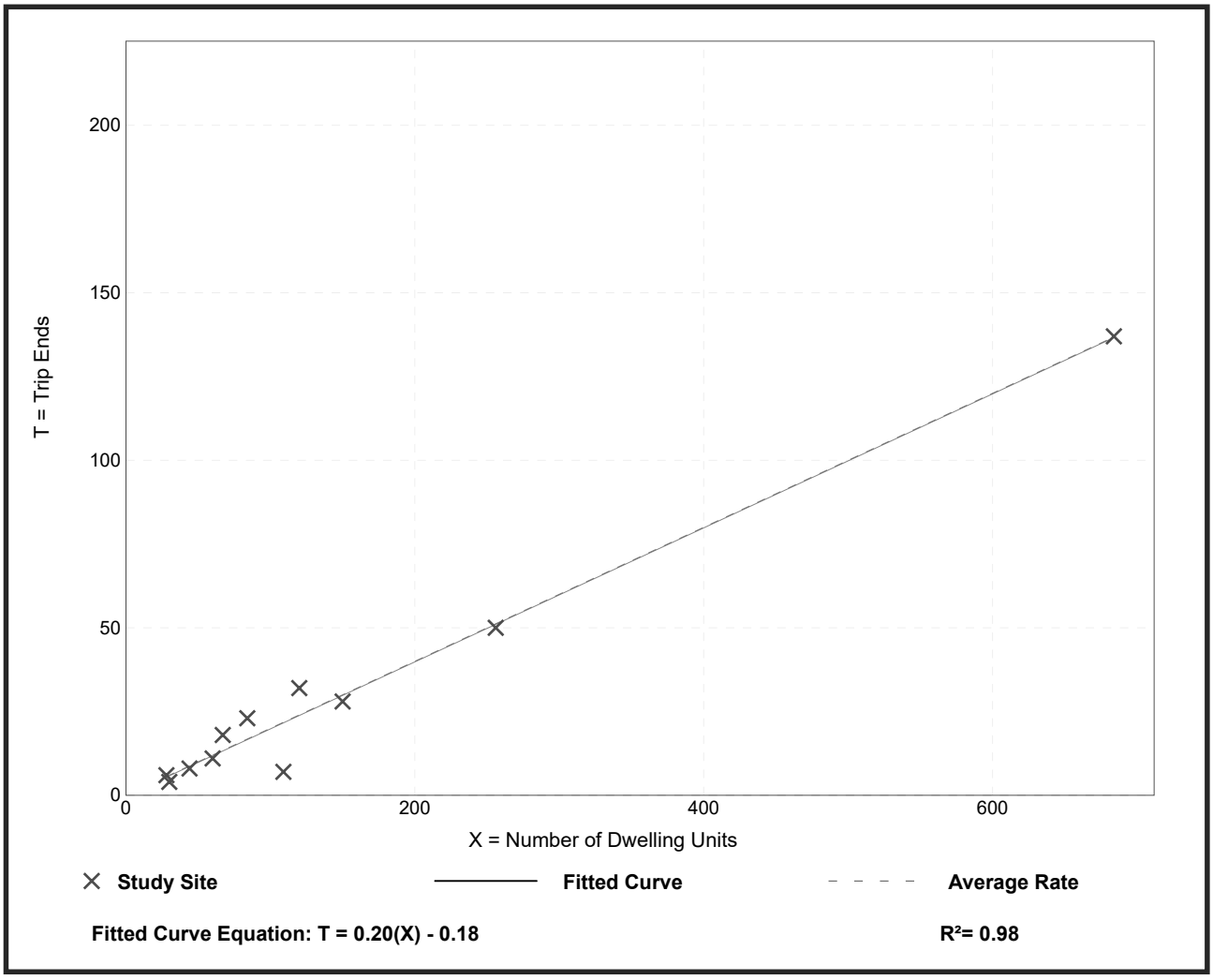
Senior Adult Housing - Attached
(252)

Vehicle Trip Ends vs:	**Dwelling Units**
On a:	**Weekday,**
	Peak Hour of Adjacent Street Traffic,
	One Hour Between 7 and 9 a.m.
Setting/Location:	**General Urban/Suburban**
Number of Studies:	11
Avg. Num. of Dwelling Units:	148
Directional Distribution:	35% entering, 65% exiting

Vehicle Trip Generation per Dwelling Unit

Average Rate	Range of Rates	Standard Deviation
0.20	0.06 - 0.27	0.05

Data Plot and Equation



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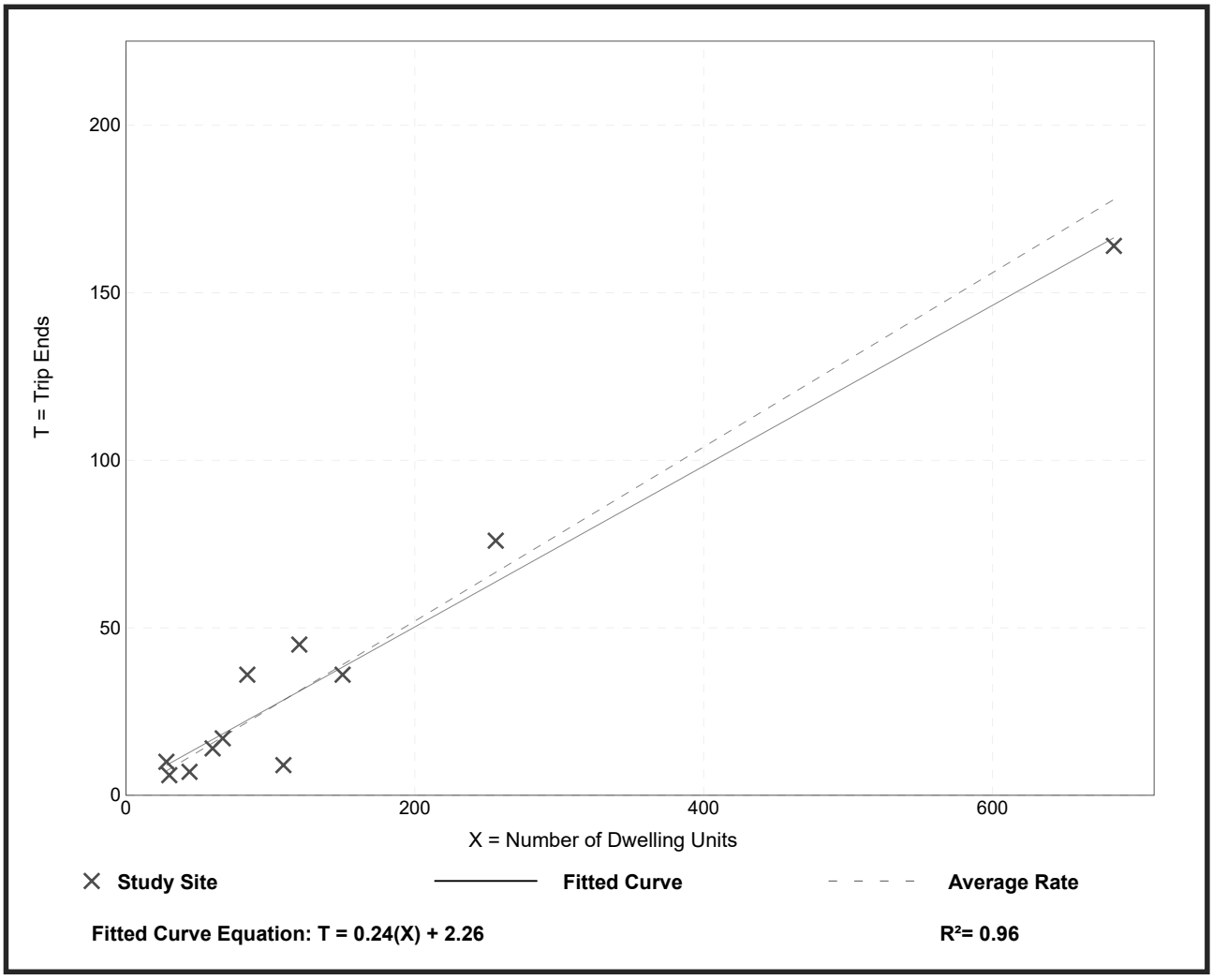
Senior Adult Housing - Attached
(252)

Vehicle Trip Ends vs: **Dwelling Units**
On a: **Weekday,**
Peak Hour of Adjacent Street Traffic,
One Hour Between 4 and 6 p.m.
Setting/Location: **General Urban/Suburban**
Number of Studies: 11
Avg. Num. of Dwelling Units: 148
Directional Distribution: 55% entering, 45% exiting

Vehicle Trip Generation per Dwelling Unit

Average Rate	Range of Rates	Standard Deviation
0.26	0.08 - 0.43	0.08

Data Plot and Equation



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Senior Adult Housing - Attached
(252)

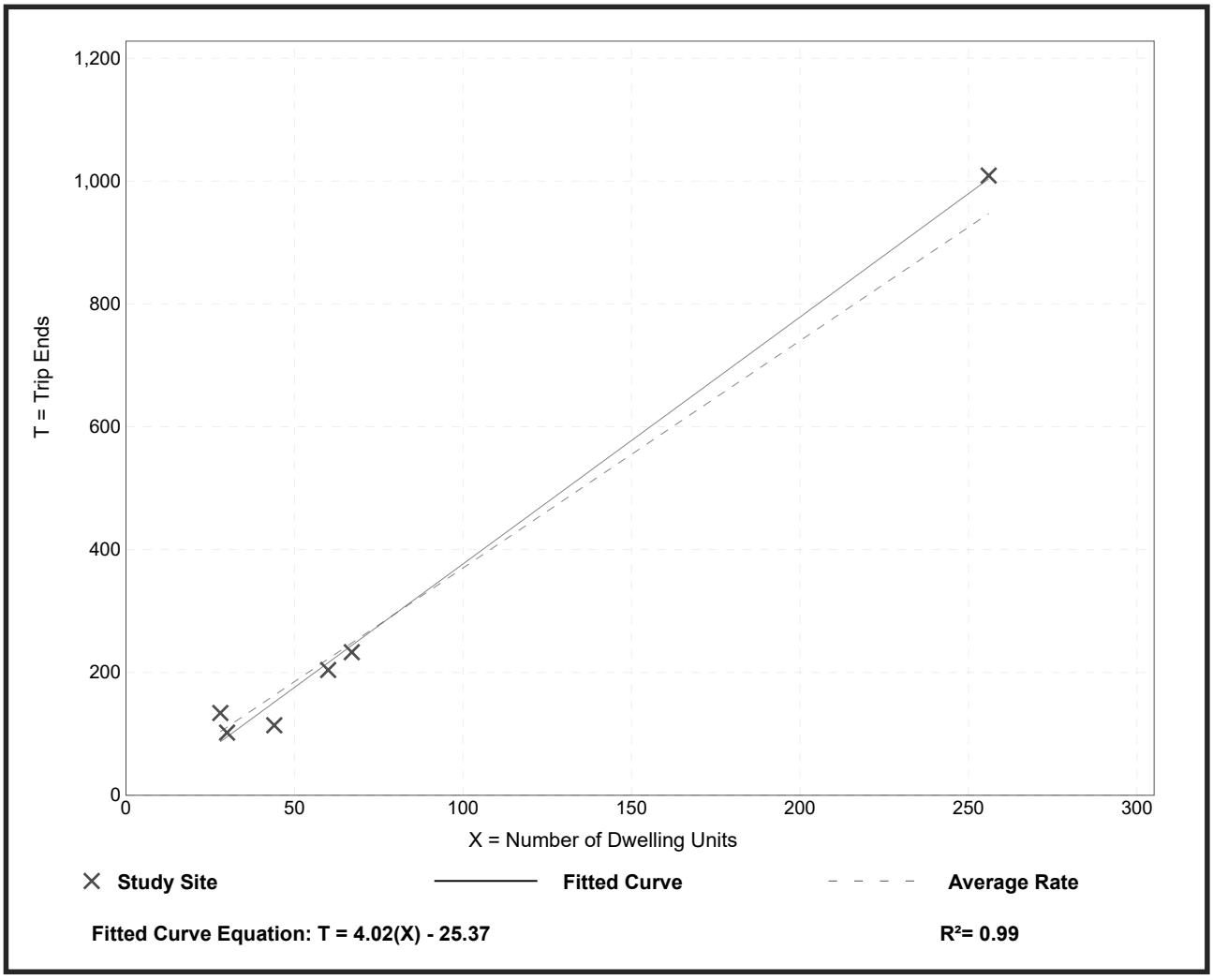
Vehicle Trip Ends vs: **Dwelling Units**
On a: **Weekday**

Setting/Location: **General Urban/Suburban**
Number of Studies: 6
Avg. Num. of Dwelling Units: 81
Directional Distribution: 50% entering, 50% exiting

Vehicle Trip Generation per Dwelling Unit

Average Rate	Range of Rates	Standard Deviation
3.70	2.59 - 4.79	0.53

Data Plot and Equation



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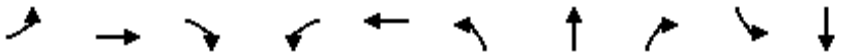
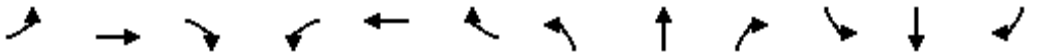
Existing + Approved Capacity Analysis



Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	68	62	111	149	123	185	641	249	43	976
v/c Ratio	0.22	0.38	0.33	0.45	0.49	0.52	0.37	0.28	0.10	0.48
Control Delay	24.0	45.8	2.7	28.9	33.6	16.4	18.4	3.7	11.4	20.9
Queue Delay	0.0	0.0	0.1	0.0	0.0	0.0	0.1	0.1	0.0	0.1
Total Delay	24.0	45.8	2.8	28.9	33.6	16.4	18.5	3.8	11.4	21.0
Queue Length 50th (ft)	28	34	0	64	48	50	138	0	11	147
Queue Length 95th (ft)	48	53	0	103	42	65	173	26	28	193
Internal Link Dist (ft)		470			170		227			433
Turn Bay Length (ft)	180		180	120		130		180	180	
Base Capacity (vph)	305	163	333	333	252	363	1954	985	456	2496
Starvation Cap Reductn	0	0	0	0	0	0	415	168	0	0
Spillback Cap Reductn	0	0	21	0	0	0	0	0	0	509
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.22	0.38	0.36	0.45	0.49	0.51	0.42	0.30	0.09	0.49

Intersection Summary



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	53	40	88	128	34	39	124	513	192	41	752	127
Future Volume (veh/h)	53	40	88	128	34	39	124	513	192	41	752	127
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	68	62	111	149	72	51	185	641	249	43	809	167
Peak Hour Factor	0.78	0.65	0.79	0.86	0.47	0.77	0.67	0.80	0.77	0.95	0.93	0.76
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	185	145	123	235	89	63	493	1808	806	489	2084	427
Arrive On Green	0.05	0.08	0.08	0.06	0.09	0.09	0.15	1.00	1.00	0.10	0.98	0.98
Sat Flow, veh/h	1781	1870	1585	1781	1019	722	1781	3554	1585	1781	4247	870
Grp Volume(v), veh/h	68	62	111	149	0	123	185	641	249	43	647	329
Grp Sat Flow(s),veh/h/ln	1781	1870	1585	1781	0	1740	1781	1777	1585	1781	1702	1714
Q Serve(g_s), s	3.1	2.8	6.3	5.0	0.0	6.2	4.7	0.0	0.0	1.0	0.5	0.5
Cycle Q Clear(g_c), s	3.1	2.8	6.3	5.0	0.0	6.2	4.7	0.0	0.0	1.0	0.5	0.5
Prop In Lane	1.00		1.00	1.00		0.41	1.00		1.00	1.00		0.51
Lane Grp Cap(c), veh/h	185	145	123	235	0	152	493	1808	806	489	1670	841
V/C Ratio(X)	0.37	0.43	0.90	0.63	0.00	0.81	0.38	0.35	0.31	0.09	0.39	0.39
Avail Cap(c_a), veh/h	201	145	123	235	0	152	532	1808	806	560	1670	841
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	2.00	2.00	2.00	2.00	2.00	2.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	0.00	1.00	0.98	0.98	0.98	0.97	0.97	0.97
Uniform Delay (d), s/veh	35.4	39.6	41.2	37.9	0.0	40.4	8.7	0.0	0.0	8.4	0.4	0.4
Incr Delay (d2), s/veh	1.2	2.0	51.7	5.5	0.0	27.3	0.5	0.5	1.0	0.1	0.7	1.3
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.4	1.4	4.2	3.5	0.0	3.8	1.5	0.1	0.2	0.3	0.3	0.4
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	36.6	41.6	92.9	43.4	0.0	67.7	9.2	0.5	1.0	8.5	1.1	1.8
LnGrp LOS	D	D	F	D	A	E	A	A	A	A	A	A
Approach Vol, veh/h		241			272			1075			1019	
Approach Delay, s/veh		63.8			54.4			2.1			1.6	
Approach LOS		E			D			A			A	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	11.4	52.6	11.2	14.8	13.0	51.0	12.0	14.0
Change Period (Y+Rc), s	* 6.8	* 6.8	7.0	7.0	* 6.3	* 6.8	7.0	7.0
Max Green Setting (Gmax), s	* 8.2	* 43	5.0	7.0	* 8.7	* 42	5.0	7.0
Max Q Clear Time (g_c+I1), s	3.0	2.0	5.1	8.2	6.7	2.5	7.0	8.3
Green Ext Time (p_c), s	0.0	5.6	0.0	0.0	0.1	7.3	0.0	0.0

Intersection Summary	
HCM 6th Ctrl Delay	13.1
HCM 6th LOS	B

Notes

User approved pedestrian interval to be less than phase max green.

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

Intersection	
Int Delay, s/veh	2.5

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	12	41	47	3	3	24
Future Vol, veh/h	12	41	47	3	3	24
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	100
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	50	73	75	25	100	81
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	24	56	63	12	3	30

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	75	0	-	0	173	69
Stage 1	-	-	-	-	69	-
Stage 2	-	-	-	-	104	-
Critical Hdwy	4.12	-	-	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	2.218	-	-	-	3.518	3.318
Pot Cap-1 Maneuver	1524	-	-	-	817	994
Stage 1	-	-	-	-	954	-
Stage 2	-	-	-	-	920	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1524	-	-	-	804	994
Mov Cap-2 Maneuver	-	-	-	-	804	-
Stage 1	-	-	-	-	939	-
Stage 2	-	-	-	-	920	-

Approach	EB	WB	SB
HCM Control Delay, s	2.2	0	8.8
HCM LOS			A

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	1524	-	-	-	804	994
HCM Lane V/C Ratio	0.016	-	-	-	0.004	0.03
HCM Control Delay (s)	7.4	0	-	-	9.5	8.7
HCM Lane LOS	A	A	-	-	A	A
HCM 95th %tile Q(veh)	0	-	-	-	0	0.1

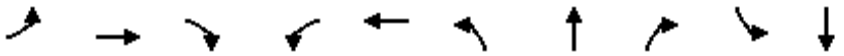
Intersection	
Int Delay, s/veh	3.6

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	16	62	3	5	148	2	4	3	2	6	7	40
Future Vol, veh/h	16	62	3	5	148	2	4	3	2	6	7	40
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	200	-	-	200	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	67	82	38	50	80	50	38	25	25	50	63	59
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	24	76	8	10	185	4	11	12	8	12	11	68

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	189	0	0	84	0	0	375	337	80	345	339	187
Stage 1	-	-	-	-	-	-	128	128	-	207	207	-
Stage 2	-	-	-	-	-	-	247	209	-	138	132	-
Critical Hdwy	4.12	-	-	4.12	-	-	7.12	6.52	6.22	7.12	6.52	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Follow-up Hdwy	2.218	-	-	2.218	-	-	3.518	4.018	3.318	3.518	4.018	3.318
Pot Cap-1 Maneuver	1385	-	-	1513	-	-	582	584	980	609	582	855
Stage 1	-	-	-	-	-	-	876	790	-	795	731	-
Stage 2	-	-	-	-	-	-	757	729	-	865	787	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1385	-	-	1513	-	-	519	570	980	583	568	855
Mov Cap-2 Maneuver	-	-	-	-	-	-	519	570	-	583	568	-
Stage 1	-	-	-	-	-	-	861	777	-	781	726	-
Stage 2	-	-	-	-	-	-	682	724	-	830	774	-

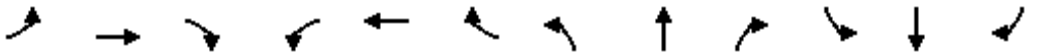
Approach	EB	WB	NB	SB
HCM Control Delay, s	1.7	0.4	11.1	10.4
HCM LOS			B	B

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	617	1385	-	-	1513	-	-	761
HCM Lane V/C Ratio	0.049	0.017	-	-	0.007	-	-	0.119
HCM Control Delay (s)	11.1	7.6	-	-	7.4	-	-	10.4
HCM Lane LOS	B	A	-	-	A	-	-	B
HCM 95th %tile Q(veh)	0.2	0.1	-	-	0	-	-	0.4



Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	173	118	221	151	100	227	924	178	43	1006
v/c Ratio	0.54	0.62	0.61	0.53	0.44	0.67	0.53	0.20	0.13	0.48
Control Delay	34.4	52.9	13.5	34.2	24.9	27.4	15.0	1.3	9.8	18.6
Queue Delay	0.0	0.0	0.3	0.0	0.0	0.0	0.2	0.0	0.0	0.2
Total Delay	34.4	52.9	13.8	34.2	24.9	27.4	15.2	1.3	9.8	18.8
Queue Length 50th (ft)	79	65	0	68	22	70	126	0	10	138
Queue Length 95th (ft)	120	73	65	108	61	130	153	7	22	176
Internal Link Dist (ft)		583			729		227			433
Turn Bay Length (ft)	180		180	120		130		180	180	
Base Capacity (vph)	322	207	372	288	240	342	1734	886	340	2081
Starvation Cap Reductn	0	0	0	0	0	0	227	0	0	0
Spillback Cap Reductn	0	0	16	0	0	0	0	0	0	365
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.54	0.57	0.62	0.52	0.42	0.66	0.61	0.20	0.13	0.59

Intersection Summary



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	140	67	201	124	35	40	191	896	139	36	758	171
Future Volume (veh/h)	140	67	201	124	35	40	191	896	139	36	758	171
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	173	118	221	151	42	58	227	924	178	43	790	216
Peak Hour Factor	0.81	0.57	0.91	0.82	0.83	0.69	0.84	0.97	0.78	0.83	0.96	0.79
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	310	208	176	292	79	109	441	1571	701	365	1607	436
Arrive On Green	0.09	0.11	0.11	0.09	0.11	0.11	0.19	0.88	0.88	0.10	0.80	0.80
Sat Flow, veh/h	1781	1870	1585	1781	711	982	1781	3554	1585	1781	3996	1083
Grp Volume(v), veh/h	173	118	221	151	0	100	227	924	178	43	672	334
Grp Sat Flow(s),veh/h/ln	1781	1870	1585	1781	0	1694	1781	1777	1585	1781	1702	1675
Q Serve(g_s), s	7.7	5.4	10.0	6.7	0.0	5.0	6.9	5.6	1.5	1.1	5.7	5.8
Cycle Q Clear(g_c), s	7.7	5.4	10.0	6.7	0.0	5.0	6.9	5.6	1.5	1.1	5.7	5.8
Prop In Lane	1.00		1.00	1.00		0.58	1.00		1.00	1.00		0.65
Lane Grp Cap(c), veh/h	310	208	176	292	0	188	441	1571	701	365	1369	674
V/C Ratio(X)	0.56	0.57	1.25	0.52	0.00	0.53	0.51	0.59	0.25	0.12	0.49	0.50
Avail Cap(c_a), veh/h	310	208	176	292	0	188	441	1571	701	436	1369	674
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	2.00	2.00	2.00	2.00	2.00	2.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	0.00	1.00	0.83	0.83	0.83	0.97	0.97	0.97
Uniform Delay (d), s/veh	32.1	37.9	40.0	31.7	0.0	37.8	11.9	3.2	3.0	11.4	5.8	5.8
Incr Delay (d2), s/veh	2.2	3.6	152.5	1.6	0.0	2.8	0.9	1.3	0.7	0.1	1.2	2.5
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	3.4	2.6	11.2	2.9	0.0	2.2	2.2	1.4	0.6	0.4	1.6	1.8
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	34.3	41.6	192.5	33.3	0.0	40.6	12.8	4.6	3.7	11.5	7.0	8.4
LnGrp LOS	C	D	F	C	A	D	B	A	A	B	A	A
Approach Vol, veh/h		512			251			1329			1049	
Approach Delay, s/veh		104.3			36.2			5.9			7.6	
Approach LOS		F			D			A			A	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	11.4	46.6	15.0	17.0	15.0	43.0	15.0	17.0
Change Period (Y+Rc), s	* 6.8	* 6.8	7.0	7.0	* 6.3	* 6.8	7.0	7.0
Max Green Setting (Gmax), s	* 8.2	* 37	8.0	10.0	* 8.7	* 36	8.0	10.0
Max Q Clear Time (g_c+I1), s	3.1	7.6	8.7	12.0	8.9	7.8	9.7	7.0
Green Ext Time (p_c), s	0.0	7.7	0.0	0.0	0.0	7.2	0.0	0.1

Intersection Summary	
HCM 6th Ctrl Delay	24.9
HCM 6th LOS	C

Notes

User approved pedestrian interval to be less than phase max green.

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

Intersection	
Int Delay, s/veh	1.7

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	22	103	43	4	3	13
Future Vol, veh/h	22	103	43	4	3	13
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	100
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	67	80	75	100	100	75
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	33	129	57	4	3	17

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	61	0	-	0	254	59
Stage 1	-	-	-	-	59	-
Stage 2	-	-	-	-	195	-
Critical Hdwy	4.12	-	-	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	2.218	-	-	-	3.518	3.318
Pot Cap-1 Maneuver	1542	-	-	-	735	1007
Stage 1	-	-	-	-	964	-
Stage 2	-	-	-	-	838	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1542	-	-	-	718	1007
Mov Cap-2 Maneuver	-	-	-	-	718	-
Stage 1	-	-	-	-	942	-
Stage 2	-	-	-	-	838	-

Approach	EB	WB	SB
HCM Control Delay, s	1.5	0	8.8
HCM LOS			A

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	1542	-	-	-	718	1007
HCM Lane V/C Ratio	0.021	-	-	-	0.004	0.017
HCM Control Delay (s)	7.4	0	-	-	10	8.6
HCM Lane LOS	A	A	-	-	B	A
HCM 95th %tile Q(veh)	0.1	-	-	-	0	0.1

Intersection	
Int Delay, s/veh	3.2

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	42	131	5	3	118	3	5	7	2	4	4	32
Future Vol, veh/h	42	131	5	3	118	3	5	7	2	4	4	32
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	200	-	-	200	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	75	91	33	25	63	38	100	42	25	33	25	80
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	56	144	15	12	187	8	5	17	8	12	16	40

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	195	0	0	159	0	0	507	483	152	491	486	191
Stage 1	-	-	-	-	-	-	264	264	-	215	215	-
Stage 2	-	-	-	-	-	-	243	219	-	276	271	-
Critical Hdwy	4.12	-	-	4.12	-	-	7.12	6.52	6.22	7.12	6.52	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Follow-up Hdwy	2.218	-	-	2.218	-	-	3.518	4.018	3.318	3.518	4.018	3.318
Pot Cap-1 Maneuver	1378	-	-	1420	-	-	476	483	894	488	481	851
Stage 1	-	-	-	-	-	-	741	690	-	787	725	-
Stage 2	-	-	-	-	-	-	761	722	-	730	685	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1378	-	-	1420	-	-	425	459	894	453	457	851
Mov Cap-2 Maneuver	-	-	-	-	-	-	425	459	-	453	457	-
Stage 1	-	-	-	-	-	-	711	662	-	755	719	-
Stage 2	-	-	-	-	-	-	703	716	-	677	657	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	2	0.4	12.3	11.5
HCM LOS			B	B

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	520	1378	-	-	1420	-	-	626
HCM Lane V/C Ratio	0.057	0.041	-	-	0.008	-	-	0.109
HCM Control Delay (s)	12.3	7.7	-	-	7.6	-	-	11.5
HCM Lane LOS	B	A	-	-	A	-	-	B
HCM 95th %tile Q(veh)	0.2	0.1	-	-	0	-	-	0.4

Appendix C

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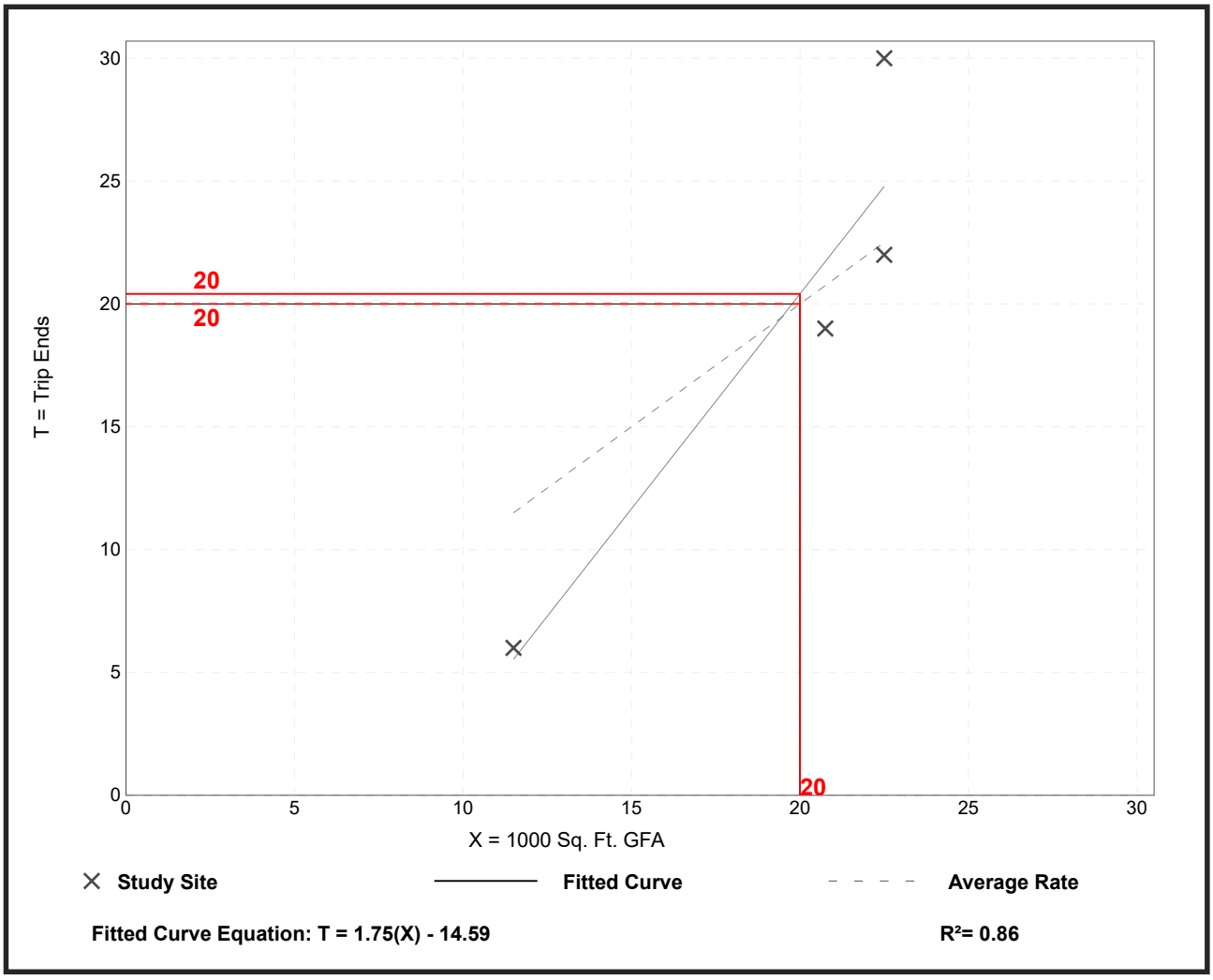
Vehicle Trip Ends vs: **1000 Sq. Ft. GFA**
On a: **Weekday,**
Peak Hour of Adjacent Street Traffic,
One Hour Between 7 and 9 a.m.
Setting/Location: **General Urban/Suburban**
Number of Studies: 4
Avg. 1000 Sq. Ft. GFA: 19
Directional Distribution: 71% entering, 29% exiting

Vehicle Trip Generation per 1000 Sq. Ft. GFA

Average Rate	Range of Rates	Standard Deviation
1.00	0.52 - 1.33	0.30

Data Plot and Equation

Caution – Small Sample Size



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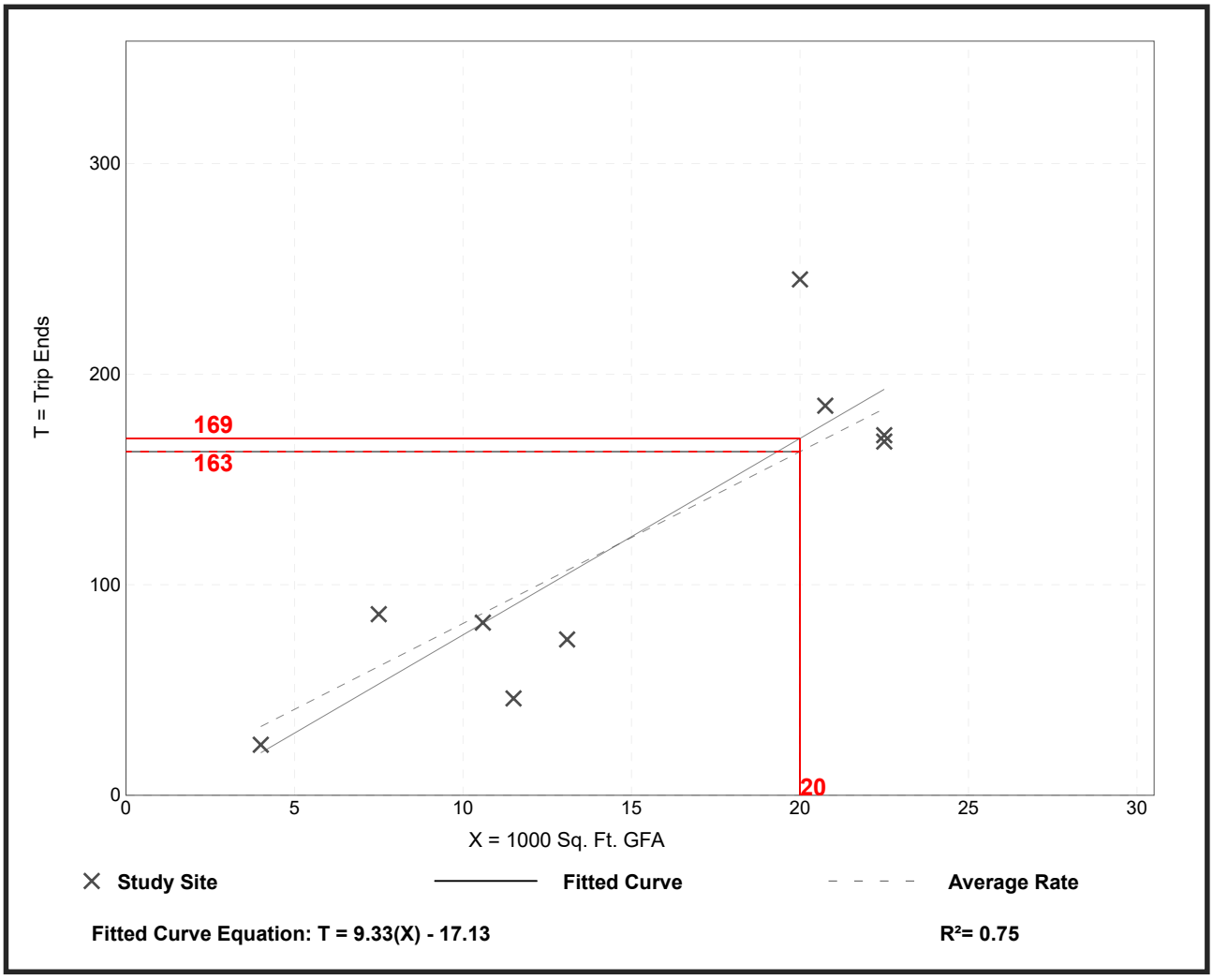
Vehicle Trip Ends vs: **1000 Sq. Ft. GFA**
On a: **Weekday,**
Peak Hour of Adjacent Street Traffic,
One Hour Between 4 and 6 p.m.
Setting/Location: **General Urban/Suburban**
Number of Studies: 9
Avg. 1000 Sq. Ft. GFA: 15
Directional Distribution: 48% entering, 52% exiting

Vehicle Trip Generation per 1000 Sq. Ft. GFA

Average Rate	Range of Rates	Standard Deviation
8.16	4.00 - 12.25	2.52

Data Plot and Equation



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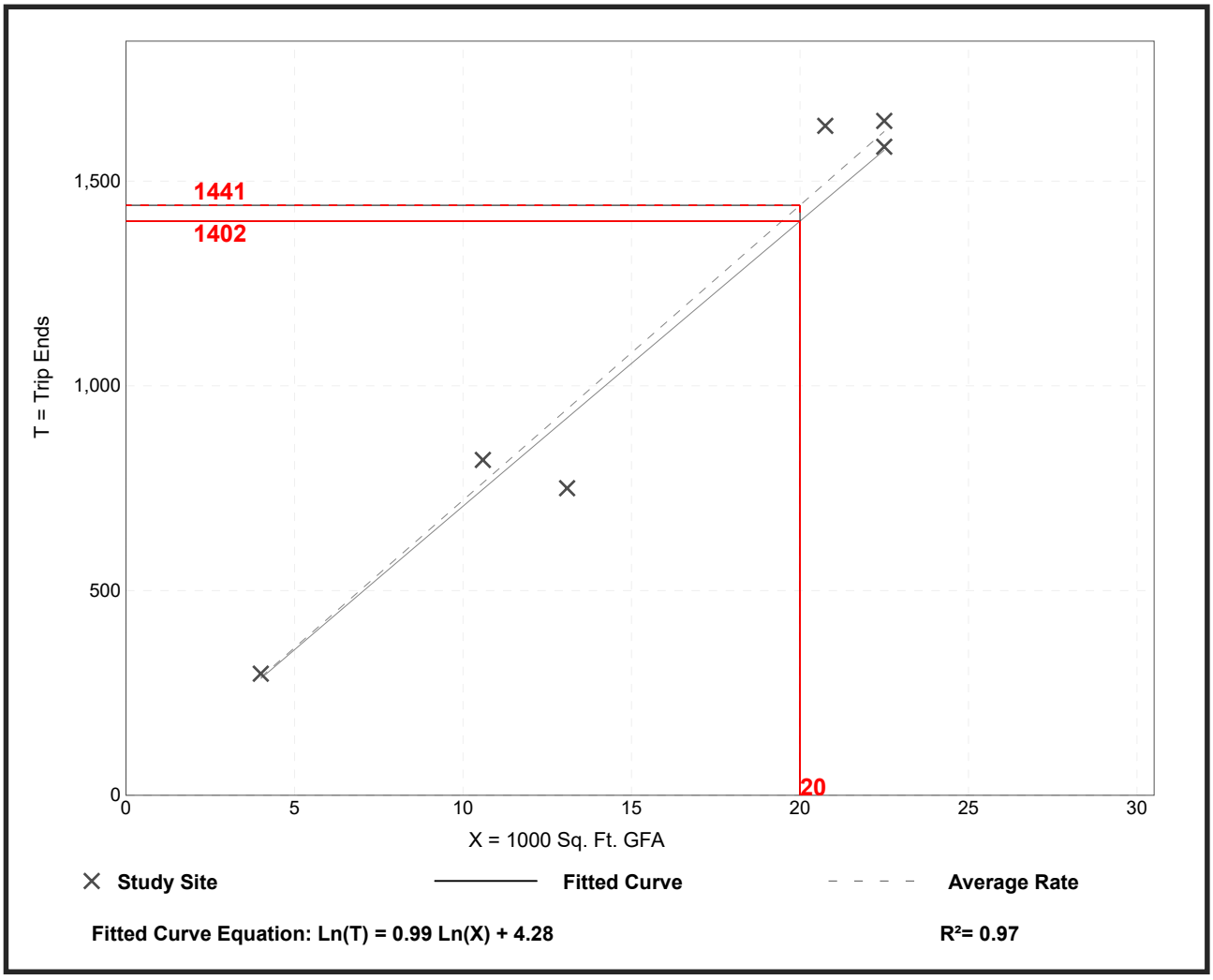
Vehicle Trip Ends vs: 1000 Sq. Ft. GFA
On a: Weekday

Setting/Location: General Urban/Suburban
Number of Studies: 6
Avg. 1000 Sq. Ft. GFA: 16
Directional Distribution: 50% entering, 50% exiting

Vehicle Trip Generation per 1000 Sq. Ft. GFA

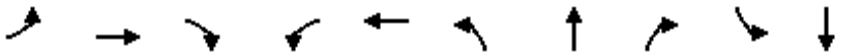
Average Rate	Range of Rates	Standard Deviation
72.05	57.30 - 78.80	7.34

Data Plot and Equation



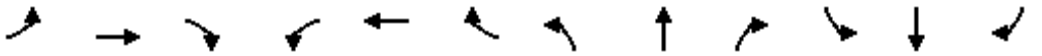
Trip Generation Manual, 10th Edition ● Institute of Transportation Engineers

Existing + Approved + Development Capacity Analysis



Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	68	66	111	151	127	185	641	255	48	976
v/c Ratio	0.22	0.40	0.33	0.45	0.50	0.52	0.37	0.28	0.11	0.48
Control Delay	24.2	46.6	2.7	29.3	34.5	16.3	18.3	3.6	11.3	20.8
Queue Delay	0.0	0.0	0.1	0.0	0.0	0.0	0.1	0.1	0.0	0.1
Total Delay	24.2	46.6	2.8	29.3	34.5	16.3	18.5	3.7	11.3	20.9
Queue Length 50th (ft)	28	36	0	64	50	50	140	0	12	149
Queue Length 95th (ft)	49	55	0	107	45	63	169	26	29	188
Internal Link Dist (ft)		451			170		227			433
Turn Bay Length (ft)	180		180	120		130		180	180	
Base Capacity (vph)	305	163	333	333	252	364	1949	986	455	2494
Starvation Cap Reductn	0	0	0	0	0	0	419	168	0	0
Spillback Cap Reductn	0	0	21	0	0	0	0	0	0	511
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.22	0.40	0.36	0.45	0.50	0.51	0.42	0.31	0.11	0.49

Intersection Summary



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	53	43	88	130	35	41	124	513	196	46	752	127
Future Volume (veh/h)	53	43	88	130	35	41	124	513	196	46	752	127
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	68	66	111	151	74	53	185	641	255	48	809	167
Peak Hour Factor	0.78	0.65	0.79	0.86	0.47	0.77	0.67	0.80	0.77	0.95	0.93	0.76
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	182	145	123	232	88	63	493	1797	801	491	2084	427
Arrive On Green	0.05	0.08	0.08	0.06	0.09	0.09	0.15	1.00	1.00	0.11	0.98	0.98
Sat Flow, veh/h	1781	1870	1585	1781	1014	726	1781	3554	1585	1781	4247	870
Grp Volume(v), veh/h	68	66	111	151	0	127	185	641	255	48	647	329
Grp Sat Flow(s),veh/h/ln	1781	1870	1585	1781	0	1740	1781	1777	1585	1781	1702	1714
Q Serve(g_s), s	3.1	3.0	6.3	5.0	0.0	6.5	4.7	0.0	0.0	1.1	0.5	0.5
Cycle Q Clear(g_c), s	3.1	3.0	6.3	5.0	0.0	6.5	4.7	0.0	0.0	1.1	0.5	0.5
Prop In Lane	1.00		1.00	1.00		0.42	1.00		1.00	1.00		0.51
Lane Grp Cap(c), veh/h	182	145	123	232	0	151	493	1797	801	491	1670	841
V/C Ratio(X)	0.37	0.45	0.90	0.65	0.00	0.84	0.38	0.36	0.32	0.10	0.39	0.39
Avail Cap(c_a), veh/h	198	145	123	232	0	151	532	1797	801	556	1670	841
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	2.00	2.00	2.00	2.00	2.00	2.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	0.00	1.00	0.98	0.98	0.98	0.97	0.97	0.97
Uniform Delay (d), s/veh	35.4	39.7	41.2	38.1	0.0	40.5	8.7	0.0	0.0	8.4	0.4	0.4
Incr Delay (d2), s/veh	1.3	2.2	51.7	6.3	0.0	32.0	0.5	0.5	1.0	0.1	0.7	1.3
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.4	1.5	4.2	1.2	0.0	4.1	1.6	0.1	0.2	0.4	0.3	0.4
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	36.7	41.9	92.9	44.3	0.0	72.5	9.2	0.5	1.0	8.5	1.1	1.8
LnGrp LOS	D	D	F	D	A	E	A	A	A	A	A	A
Approach Vol, veh/h		245			278			1081			1024	
Approach Delay, s/veh		63.5			57.2			2.1			1.7	
Approach LOS		E			E			A			A	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	11.7	52.3	11.2	14.8	13.0	51.0	12.0	14.0
Change Period (Y+Rc), s	* 6.8	* 6.8	7.0	7.0	* 6.3	* 6.8	7.0	7.0
Max Green Setting (Gmax), s	* 8.2	* 43	5.0	7.0	* 8.7	* 42	5.0	7.0
Max Q Clear Time (g_c+I1), s	3.1	2.0	5.1	8.5	6.7	2.5	7.0	8.3
Green Ext Time (p_c), s	0.0	6.2	0.0	0.0	0.1	8.1	0.0	0.0

Intersection Summary	
HCM 6th Ctrl Delay	13.5
HCM 6th LOS	B

Notes

User approved pedestrian interval to be less than phase max green.

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

Intersection	
Int Delay, s/veh	2.6

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	18	47	51	3	2	25
Future Vol, veh/h	18	47	51	3	2	25
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	100
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	50	73	75	25	100	81
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	36	64	68	12	2	31

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	80	0	-	0	210	74
Stage 1	-	-	-	-	74	-
Stage 2	-	-	-	-	136	-
Critical Hdwy	4.12	-	-	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	2.218	-	-	-	3.518	3.318
Pot Cap-1 Maneuver	1518	-	-	-	778	988
Stage 1	-	-	-	-	949	-
Stage 2	-	-	-	-	890	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1518	-	-	-	759	988
Mov Cap-2 Maneuver	-	-	-	-	759	-
Stage 1	-	-	-	-	925	-
Stage 2	-	-	-	-	890	-

Approach	EB	WB	SB
HCM Control Delay, s	2.7	0	8.9
HCM LOS			A

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	1518	-	-	-	759	988
HCM Lane V/C Ratio	0.024	-	-	-	0.003	0.031
HCM Control Delay (s)	7.4	0	-	-	9.8	8.8
HCM Lane LOS	A	A	-	-	A	A
HCM 95th %tile Q(veh)	0.1	-	-	-	0	0.1

Intersection	
Int Delay, s/veh	0.8

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	6	43	50	4	1	4
Future Vol, veh/h	6	43	50	4	1	4
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	78	78	78	78	78	78
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	8	55	64	5	1	5

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	69	0	-	0	138	67
Stage 1	-	-	-	-	67	-
Stage 2	-	-	-	-	71	-
Critical Hdwy	4.12	-	-	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	2.218	-	-	-	3.518	3.318
Pot Cap-1 Maneuver	1532	-	-	-	855	997
Stage 1	-	-	-	-	956	-
Stage 2	-	-	-	-	952	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1532	-	-	-	851	997
Mov Cap-2 Maneuver	-	-	-	-	851	-
Stage 1	-	-	-	-	951	-
Stage 2	-	-	-	-	952	-

Approach	EB	WB	SB
HCM Control Delay, s	0.9	0	8.8
HCM LOS			A

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1532	-	-	-	964
HCM Lane V/C Ratio	0.005	-	-	-	0.007
HCM Control Delay (s)	7.4	0	-	-	8.8
HCM Lane LOS	A	A	-	-	A
HCM 95th %tile Q(veh)	0	-	-	-	0

Intersection	
Int Delay, s/veh	3.9

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	16	62	4	7	148	2	4	4	3	6	10	40
Future Vol, veh/h	16	62	4	7	148	2	4	4	3	6	10	40
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	200	-	-	200	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	67	82	38	50	80	50	38	25	25	50	63	59
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	24	76	11	14	185	4	11	16	12	12	16	68

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	189	0	0	87	0	0	387	347	82	359	350	187
Stage 1	-	-	-	-	-	-	130	130	-	215	215	-
Stage 2	-	-	-	-	-	-	257	217	-	144	135	-
Critical Hdwy	4.12	-	-	4.12	-	-	7.12	6.52	6.22	7.12	6.52	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Follow-up Hdwy	2.218	-	-	2.218	-	-	3.518	4.018	3.318	3.518	4.018	3.318
Pot Cap-1 Maneuver	1385	-	-	1509	-	-	572	576	978	596	574	855
Stage 1	-	-	-	-	-	-	874	789	-	787	725	-
Stage 2	-	-	-	-	-	-	748	723	-	859	785	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1385	-	-	1509	-	-	505	561	978	564	559	855
Mov Cap-2 Maneuver	-	-	-	-	-	-	505	561	-	564	559	-
Stage 1	-	-	-	-	-	-	859	776	-	774	718	-
Stage 2	-	-	-	-	-	-	667	716	-	817	772	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	1.7	0.5	11.1	10.6
HCM LOS			B	B

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	625	1385	-	-	1509	-	-	742
HCM Lane V/C Ratio	0.062	0.017	-	-	0.009	-	-	0.129
HCM Control Delay (s)	11.1	7.6	-	-	7.4	-	-	10.6
HCM Lane LOS	B	A	-	-	A	-	-	B
HCM 95th %tile Q(veh)	0.2	0.1	-	-	0	-	-	0.4

Intersection	
Int Delay, s/veh	1.3

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	1	2	15	6	6	26
Future Vol, veh/h	1	2	15	6	6	26
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	78	78	78	78	78	78
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	1	3	19	8	8	33

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	72	23	0	0	27	0
Stage 1	23	-	-	-	-	-
Stage 2	49	-	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.12	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218	-
Pot Cap-1 Maneuver	932	1054	-	-	1587	-
Stage 1	1000	-	-	-	-	-
Stage 2	973	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	927	1054	-	-	1587	-
Mov Cap-2 Maneuver	927	-	-	-	-	-
Stage 1	995	-	-	-	-	-
Stage 2	973	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	8.6	0	1.4
HCM LOS	A		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	1008	1587	-
HCM Lane V/C Ratio	-	-	0.004	0.005	-
HCM Control Delay (s)	-	-	8.6	7.3	0
HCM Lane LOS	-	-	A	A	A
HCM 95th %tile Q(veh)	-	-	0	0	-

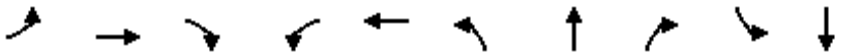
Intersection	
Int Delay, s/veh	3.2

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	31	106	47	21	22	47
Future Vol, veh/h	31	106	47	21	22	47
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	34	115	51	23	24	51

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	74	0	-	0	246	63
Stage 1	-	-	-	-	63	-
Stage 2	-	-	-	-	183	-
Critical Hdwy	4.12	-	-	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	2.218	-	-	-	3.518	3.318
Pot Cap-1 Maneuver	1526	-	-	-	742	1002
Stage 1	-	-	-	-	960	-
Stage 2	-	-	-	-	848	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1526	-	-	-	724	1002
Mov Cap-2 Maneuver	-	-	-	-	724	-
Stage 1	-	-	-	-	937	-
Stage 2	-	-	-	-	848	-

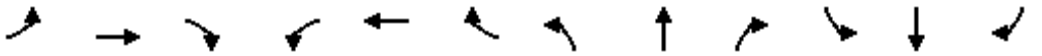
Approach	EB	WB	SB
HCM Control Delay, s	1.7	0	9.4
HCM LOS			A

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1526	-	-	-	893
HCM Lane V/C Ratio	0.022	-	-	-	0.084
HCM Control Delay (s)	7.4	0	-	-	9.4
HCM Lane LOS	A	A	-	-	A
HCM 95th %tile Q(veh)	0.1	-	-	-	0.3



Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	173	144	221	179	162	227	924	205	75	1006
v/c Ratio	0.63	0.72	0.60	0.62	0.66	0.67	0.58	0.25	0.24	0.49
Control Delay	38.6	60.4	13.1	37.7	36.1	27.2	17.0	2.2	11.0	18.8
Queue Delay	0.0	0.0	0.3	0.0	0.0	0.0	0.4	0.2	0.0	0.2
Total Delay	38.6	60.4	13.4	37.7	36.1	27.2	17.4	2.5	11.0	19.0
Queue Length 50th (ft)	79	80	0	82	49	71	133	0	18	138
Queue Length 95th (ft)	120	86	65	126	100	134	160	14	34	176
Internal Link Dist (ft)		583			729		227			433
Turn Bay Length (ft)	180		180	120		130		180	180	
Base Capacity (vph)	274	207	372	290	251	342	1595	832	328	2063
Starvation Cap Reductn	0	0	0	0	0	0	232	219	0	0
Spillback Cap Reductn	0	0	14	0	0	0	0	0	0	336
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.63	0.70	0.62	0.62	0.65	0.66	0.68	0.33	0.23	0.58

Intersection Summary



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	140	82	201	147	52	68	191	896	160	62	758	171
Future Volume (veh/h)	140	82	201	147	52	68	191	896	160	62	758	171
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	173	144	221	179	63	99	227	924	205	75	790	216
Peak Hour Factor	0.81	0.57	0.91	0.82	0.83	0.69	0.84	0.97	0.78	0.83	0.96	0.79
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	259	208	176	276	73	114	441	1519	678	371	1607	436
Arrive On Green	0.09	0.11	0.11	0.09	0.11	0.11	0.19	0.85	0.85	0.13	0.80	0.80
Sat Flow, veh/h	1781	1870	1585	1781	655	1030	1781	3554	1585	1781	3996	1083
Grp Volume(v), veh/h	173	144	221	179	0	162	227	924	205	75	672	334
Grp Sat Flow(s),veh/h/ln	1781	1870	1585	1781	0	1685	1781	1777	1585	1781	1702	1675
Q Serve(g_s), s	7.7	6.7	10.0	8.0	0.0	8.5	6.9	7.1	2.3	1.9	5.7	5.8
Cycle Q Clear(g_c), s	7.7	6.7	10.0	8.0	0.0	8.5	6.9	7.1	2.3	1.9	5.7	5.8
Prop In Lane	1.00		1.00	1.00		0.61	1.00		1.00	1.00		0.65
Lane Grp Cap(c), veh/h	259	208	176	276	0	187	441	1519	678	371	1369	674
V/C Ratio(X)	0.67	0.69	1.25	0.65	0.00	0.87	0.51	0.61	0.30	0.20	0.49	0.50
Avail Cap(c_a), veh/h	259	208	176	276	0	187	441	1519	678	416	1369	674
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	2.00	2.00	2.00	2.00	2.00	2.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	0.00	1.00	0.82	0.82	0.82	0.96	0.96	0.96
Uniform Delay (d), s/veh	32.4	38.5	40.0	32.4	0.0	39.3	11.9	4.2	3.9	11.5	5.8	5.8
Incr Delay (d2), s/veh	6.5	9.5	152.5	5.2	0.0	31.9	0.8	1.5	0.9	0.3	1.2	2.5
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	3.7	3.6	11.3	3.8	0.0	5.1	2.3	1.7	0.8	0.7	1.6	1.9
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	38.8	48.0	192.5	37.6	0.0	71.2	12.7	5.7	4.8	11.8	7.0	8.3
LnGrp LOS	D	D	F	D	A	E	B	A	A	B	A	A
Approach Vol, veh/h		538			341			1356			1081	
Approach Delay, s/veh		104.4			53.6			6.8			7.8	
Approach LOS		F			D			A			A	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	12.7	45.3	15.0	17.0	15.0	43.0	15.0	17.0
Change Period (Y+Rc), s	* 6.8	* 6.8	7.0	7.0	* 6.3	* 6.8	7.0	7.0
Max Green Setting (Gmax), s	* 8.2	* 37	8.0	10.0	* 8.7	* 36	8.0	10.0
Max Q Clear Time (g_c+I1), s	3.9	9.1	10.0	12.0	8.9	7.8	9.7	10.5
Green Ext Time (p_c), s	0.0	8.4	0.0	0.0	0.0	7.9	0.0	0.0

Intersection Summary	
HCM 6th Ctrl Delay	27.8
HCM 6th LOS	C

Notes

User approved pedestrian interval to be less than phase max green.

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

Intersection	
Int Delay, s/veh	2.5

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	53	134	90	4	3	34
Future Vol, veh/h	53	134	90	4	3	34
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	100
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	67	80	75	100	100	75
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	79	168	120	4	3	45

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	124	0	-	0	448	122
Stage 1	-	-	-	-	122	-
Stage 2	-	-	-	-	326	-
Critical Hdwy	4.12	-	-	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	2.218	-	-	-	3.518	3.318
Pot Cap-1 Maneuver	1463	-	-	-	568	929
Stage 1	-	-	-	-	903	-
Stage 2	-	-	-	-	731	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1463	-	-	-	534	929
Mov Cap-2 Maneuver	-	-	-	-	534	-
Stage 1	-	-	-	-	849	-
Stage 2	-	-	-	-	731	-

Approach	EB	WB	SB
HCM Control Delay, s	2.4	0	9.3
HCM LOS			A

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	1463	-	-	-	534	929
HCM Lane V/C Ratio	0.054	-	-	-	0.006	0.049
HCM Control Delay (s)	7.6	0	-	-	11.8	9.1
HCM Lane LOS	A	A	-	-	B	A
HCM 95th %tile Q(veh)	0.2	-	-	-	0	0.2

Intersection	
Int Delay, s/veh	5.2

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	42	131	11	9	118	3	11	18	8	4	14	32
Future Vol, veh/h	42	131	11	9	118	3	11	18	8	4	14	32
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	200	-	-	200	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	75	91	33	25	63	38	100	42	25	33	25	80
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	56	144	33	36	187	8	11	43	32	12	56	40

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	195	0	0	177	0	0	584	540	161	573	552	191
Stage 1	-	-	-	-	-	-	273	273	-	263	263	-
Stage 2	-	-	-	-	-	-	311	267	-	310	289	-
Critical Hdwy	4.12	-	-	4.12	-	-	7.12	6.52	6.22	7.12	6.52	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Follow-up Hdwy	2.218	-	-	2.218	-	-	3.518	4.018	3.318	3.518	4.018	3.318
Pot Cap-1 Maneuver	1378	-	-	1399	-	-	423	449	884	430	442	851
Stage 1	-	-	-	-	-	-	733	684	-	742	691	-
Stage 2	-	-	-	-	-	-	699	688	-	700	673	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1378	-	-	1399	-	-	343	419	884	363	413	851
Mov Cap-2 Maneuver	-	-	-	-	-	-	343	419	-	363	413	-
Stage 1	-	-	-	-	-	-	703	656	-	712	673	-
Stage 2	-	-	-	-	-	-	595	670	-	605	645	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	1.9	1.2	13.6	14.2
HCM LOS			B	B

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	503	1378	-	-	1399	-	-	501
HCM Lane V/C Ratio	0.171	0.041	-	-	0.026	-	-	0.216
HCM Control Delay (s)	13.6	7.7	-	-	7.6	-	-	14.2
HCM Lane LOS	B	A	-	-	A	-	-	B
HCM 95th %tile Q(veh)	0.6	0.1	-	-	0.1	-	-	0.8

Intersection	
Int Delay, s/veh	4

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	21	22	26	31	22	16
Future Vol, veh/h	21	22	26	31	22	16
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	23	24	28	34	24	17

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	110	45	0	0	62	0
Stage 1	45	-	-	-	-	-
Stage 2	65	-	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.12	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218	-
Pot Cap-1 Maneuver	887	1025	-	-	1541	-
Stage 1	977	-	-	-	-	-
Stage 2	958	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	873	1025	-	-	1541	-
Mov Cap-2 Maneuver	873	-	-	-	-	-
Stage 1	961	-	-	-	-	-
Stage 2	958	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	9	0	4.3
HCM LOS	A		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	945	1541	-
HCM Lane V/C Ratio	-	-	0.049	0.016	-
HCM Control Delay (s)	-	-	9	7.4	0
HCM Lane LOS	-	-	A	A	A
HCM 95th %tile Q(veh)	-	-	0.2	0	-

Appendix D

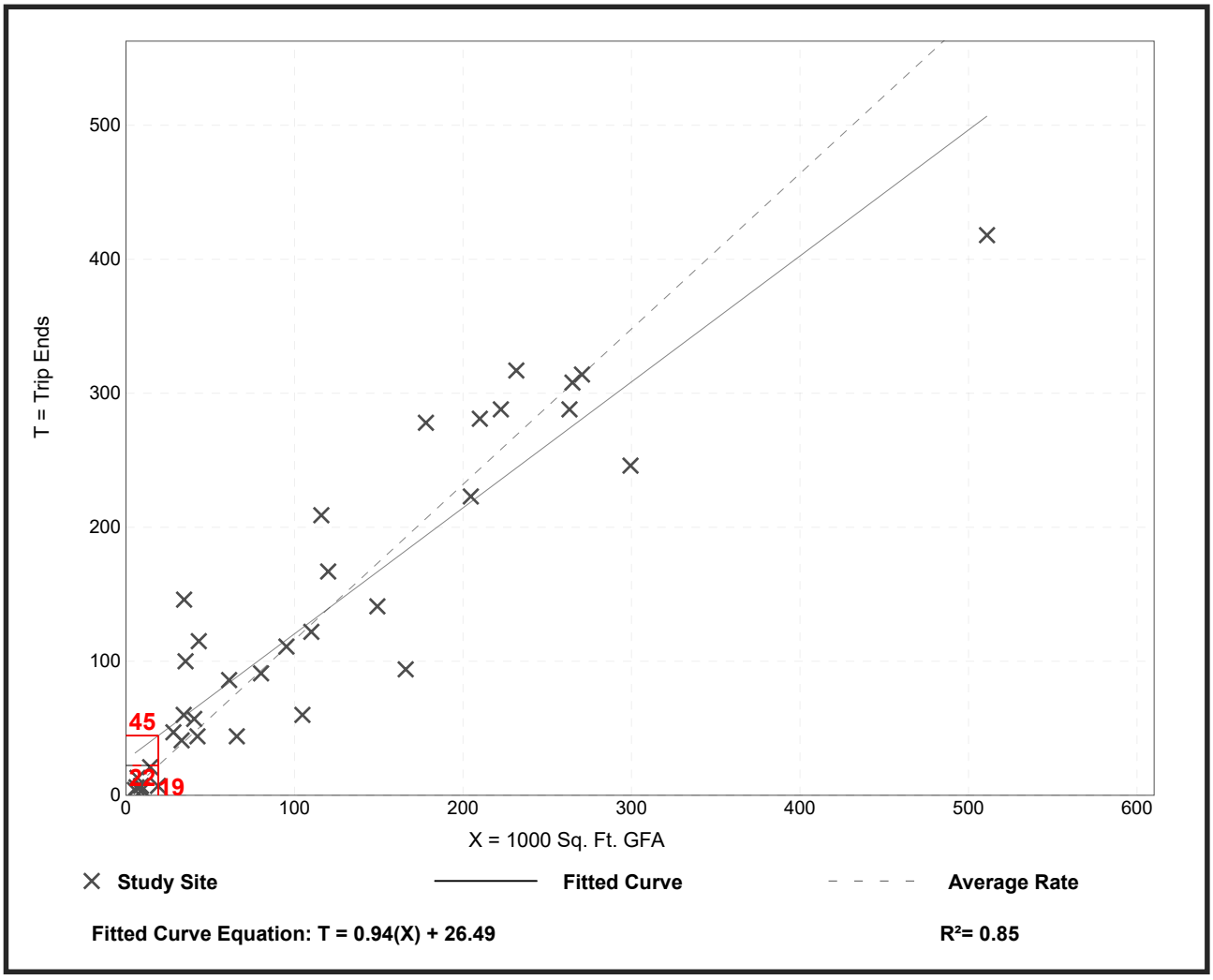
General Office Building
(710)

Vehicle Trip Ends vs: **1000 Sq. Ft. GFA**
On a: **Weekday,**
Peak Hour of Adjacent Street Traffic,
One Hour Between 7 and 9 a.m.
Setting/Location: **General Urban/Suburban**
Number of Studies: 35
Avg. 1000 Sq. Ft. GFA: 117
Directional Distribution: 86% entering, 14% exiting

Vehicle Trip Generation per 1000 Sq. Ft. GFA

Average Rate	Range of Rates	Standard Deviation
1.16	0.37 - 4.23	0.47

Data Plot and Equation



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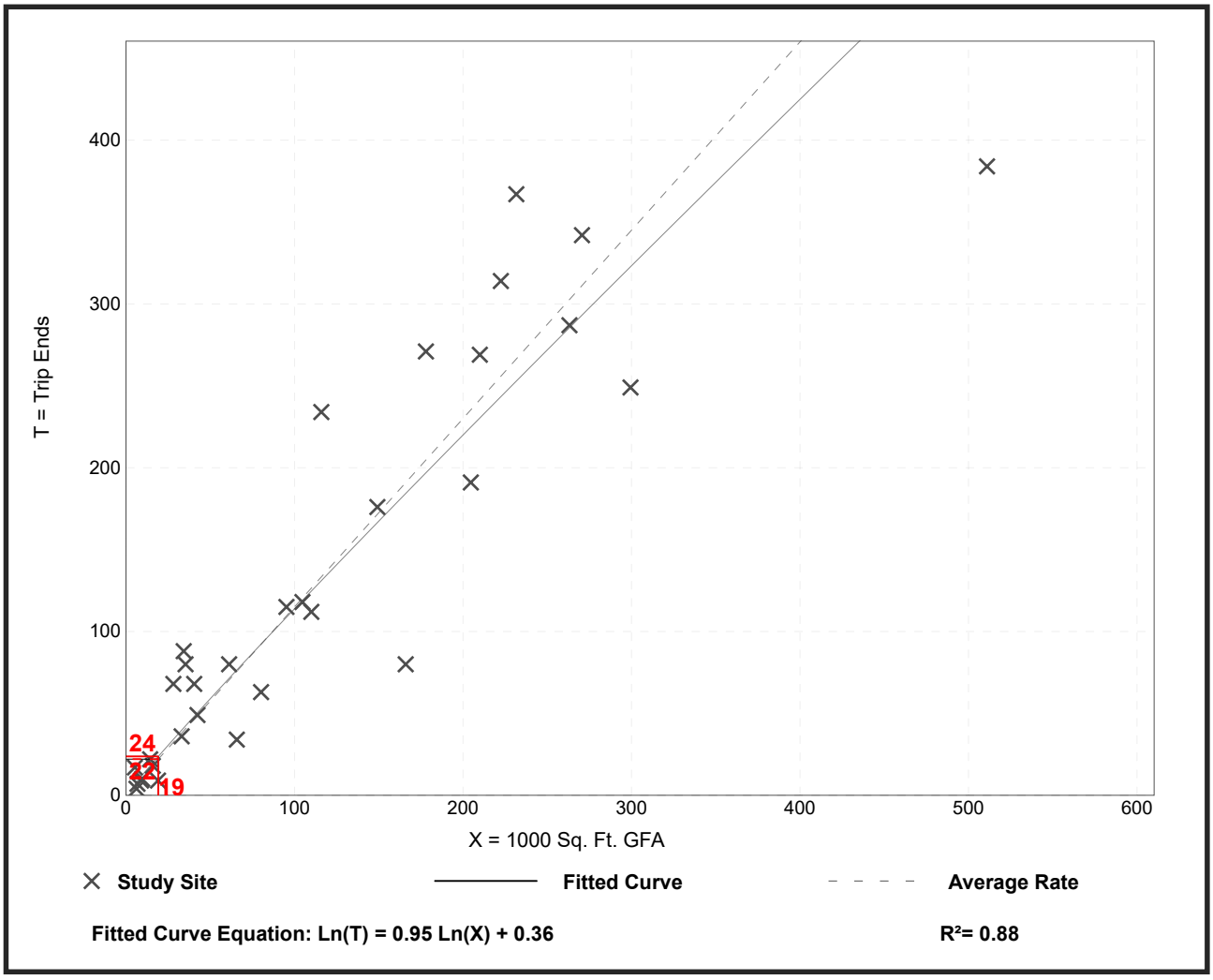
Vehicle Trip Ends vs: **1000 Sq. Ft. GFA**
On a: **Weekday,**
Peak Hour of Adjacent Street Traffic,
One Hour Between 4 and 6 p.m.
Setting/Location: **General Urban/Suburban**
Number of Studies: 32
Avg. 1000 Sq. Ft. GFA: 114
Directional Distribution: 16% entering, 84% exiting

Vehicle Trip Generation per 1000 Sq. Ft. GFA

Average Rate	Range of Rates	Standard Deviation
1.15	0.47 - 3.23	0.42

Data Plot and Equation



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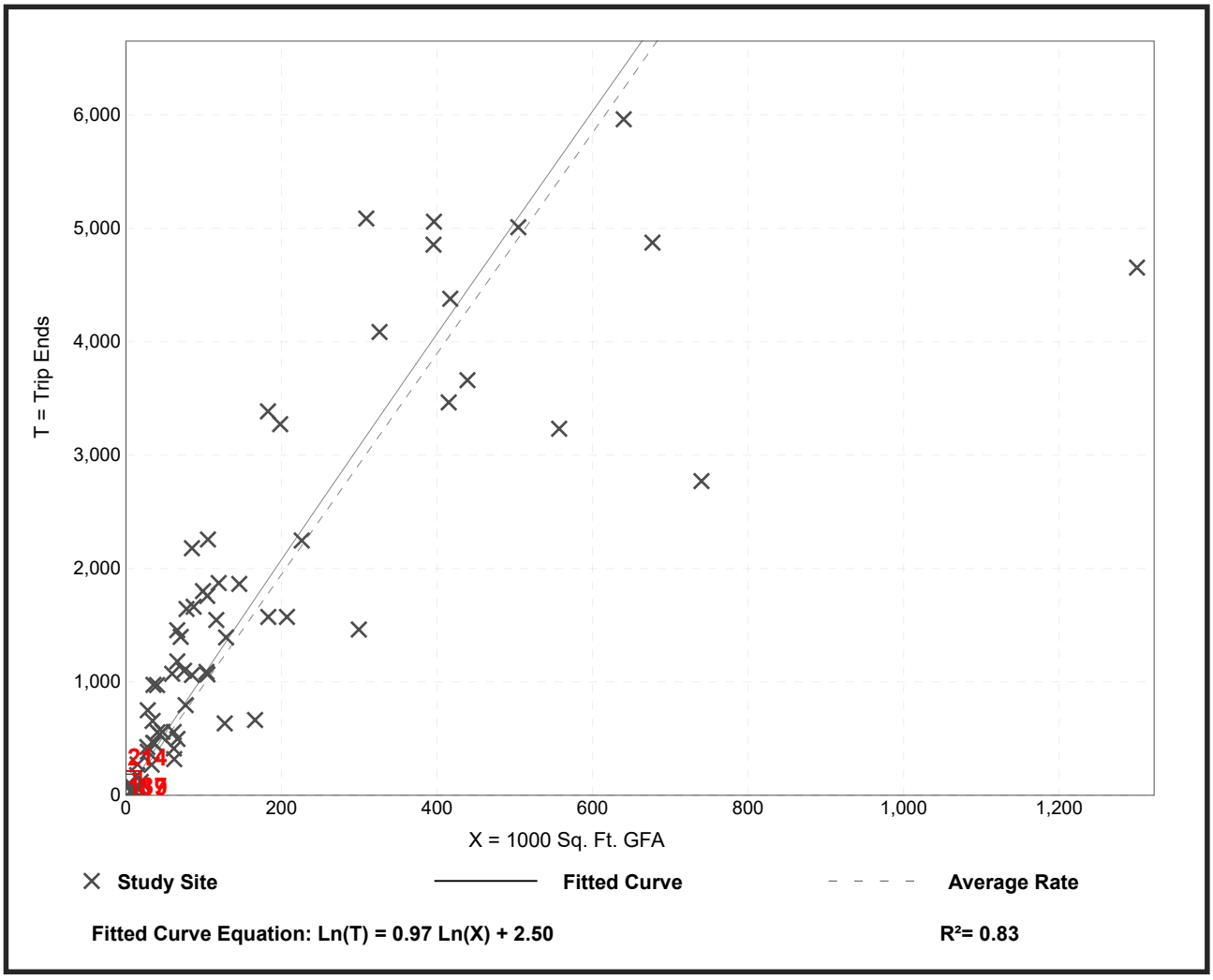
Vehicle Trip Ends vs: **1000 Sq. Ft. GFA**
On a: **Weekday**

Setting/Location: **General Urban/Suburban**
Number of Studies: 66
Avg. 1000 Sq. Ft. GFA: 171
Directional Distribution: 50% entering, 50% exiting

Vehicle Trip Generation per 1000 Sq. Ft. GFA

Average Rate	Range of Rates	Standard Deviation
9.74	2.71 - 27.56	5.15

Data Plot and Equation



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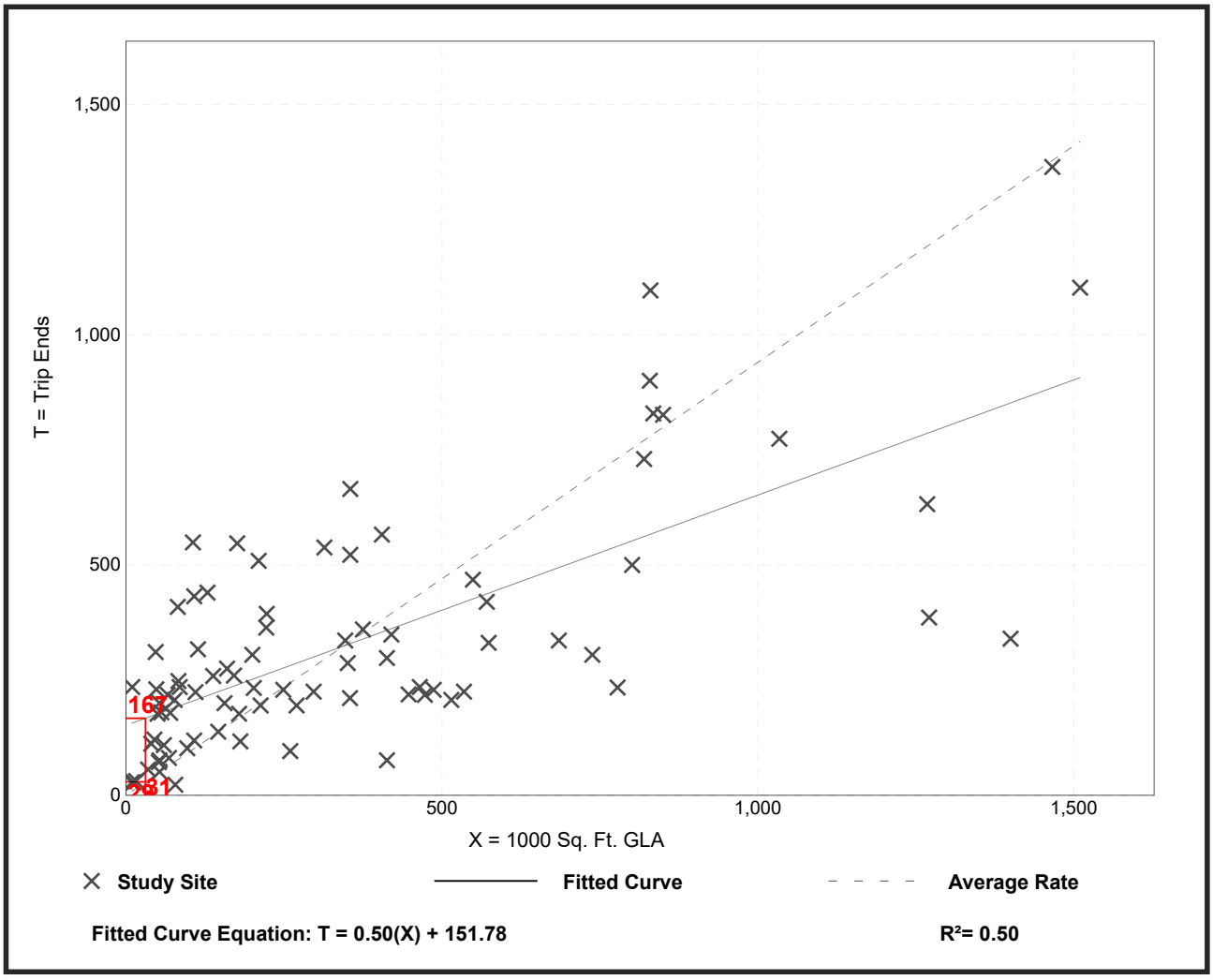
Shopping Center
(820)

Vehicle Trip Ends vs: **1000 Sq. Ft. GLA**
On a: **Weekday,**
Peak Hour of Adjacent Street Traffic,
One Hour Between 7 and 9 a.m.
Setting/Location: **General Urban/Suburban**
Number of Studies: 84
Avg. 1000 Sq. Ft. GLA: 351
Directional Distribution: 62% entering, 38% exiting

Vehicle Trip Generation per 1000 Sq. Ft. GLA

Average Rate	Range of Rates	Standard Deviation
0.94	0.18 - 23.74	0.87

Data Plot and Equation



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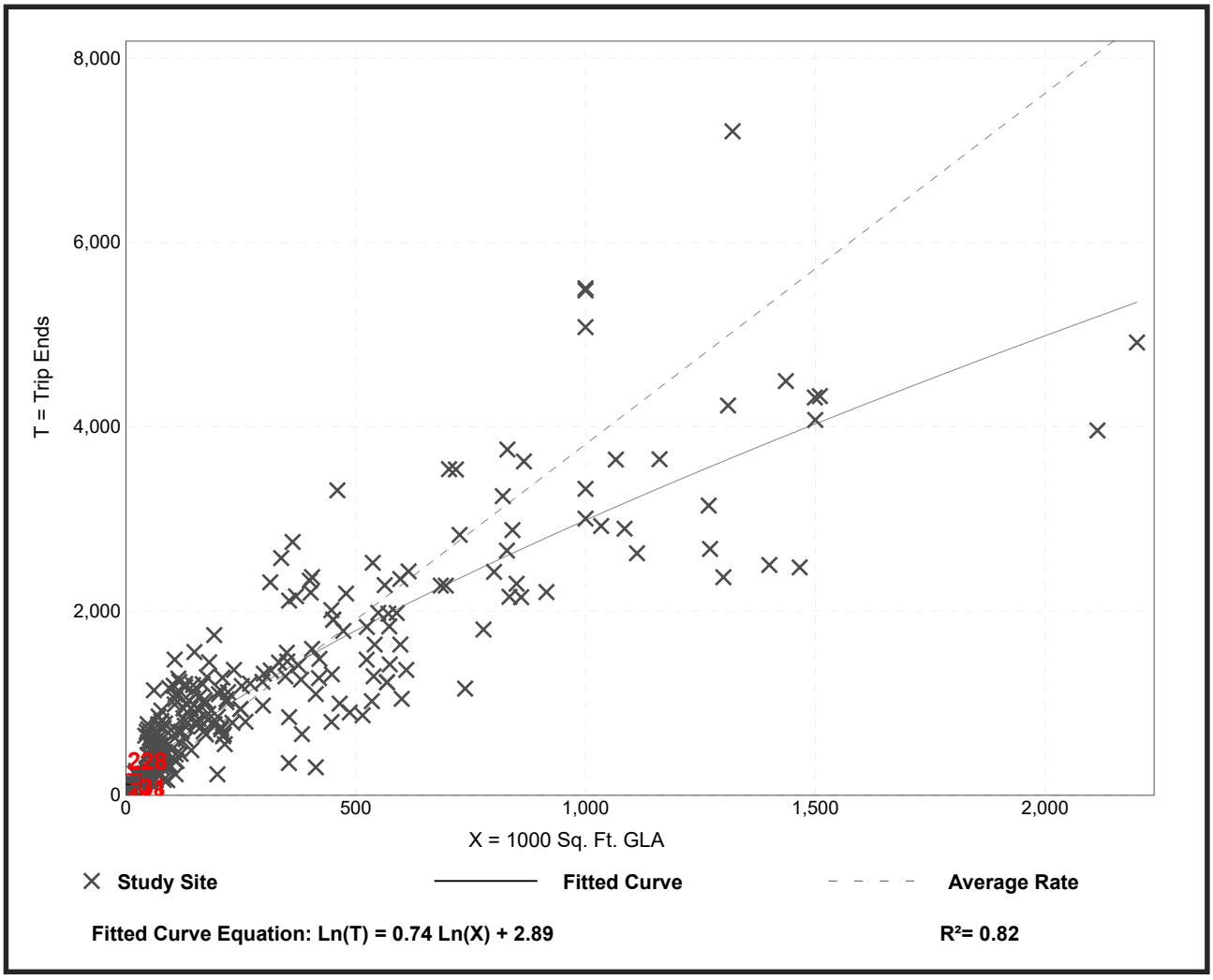
Vehicle Trip Ends vs: **1000 Sq. Ft. GLA**
On a: **Weekday,**
Peak Hour of Adjacent Street Traffic,
One Hour Between 4 and 6 p.m.
Setting/Location: **General Urban/Suburban**
Number of Studies: 261
Avg. 1000 Sq. Ft. GLA: 327
Directional Distribution: 48% entering, 52% exiting

Vehicle Trip Generation per 1000 Sq. Ft. GLA

Average Rate	Range of Rates	Standard Deviation
3.81	0.74 - 18.69	2.04

Data Plot and Equation



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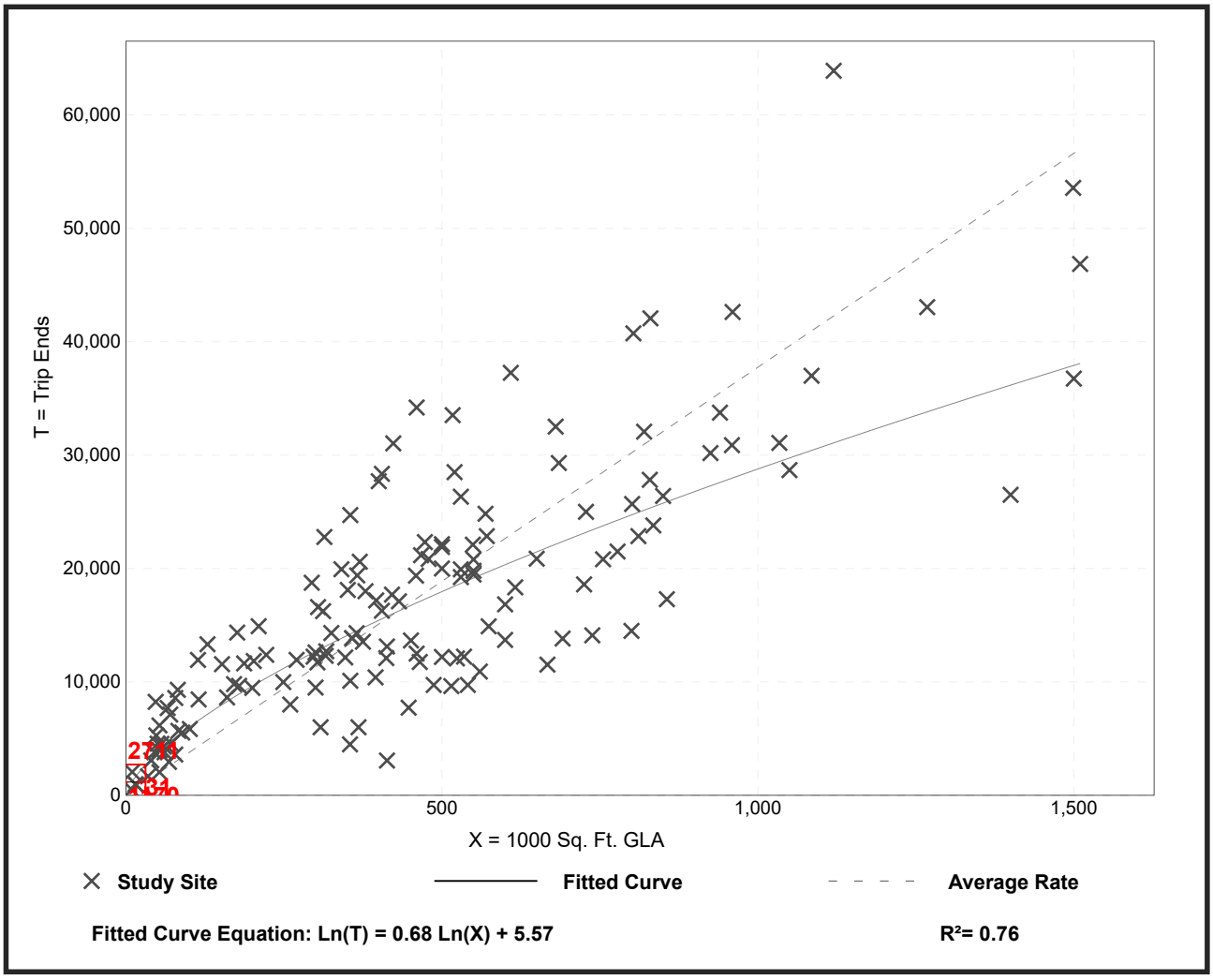
Vehicle Trip Ends vs: **1000 Sq. Ft. GLA**
On a: **Weekday**

Setting/Location: **General Urban/Suburban**
Number of Studies: 147
Avg. 1000 Sq. Ft. GLA: 453
Directional Distribution: 50% entering, 50% exiting

Vehicle Trip Generation per 1000 Sq. Ft. GLA

Average Rate	Range of Rates	Standard Deviation
37.75	7.42 - 207.98	16.41

Data Plot and Equation



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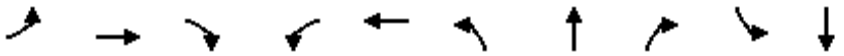
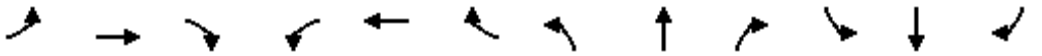
Future Conditions Capacity Analysis



Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	68	98	111	165	168	185	641	291	86	976
v/c Ratio	0.22	0.54	0.34	0.47	0.53	0.52	0.40	0.33	0.21	0.48
Control Delay	26.8	55.0	3.0	32.0	38.8	17.1	21.2	3.7	12.4	23.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.6	0.4	0.0	0.0
Total Delay	26.8	55.0	3.0	32.0	38.8	17.1	21.8	4.1	12.4	23.0
Queue Length 50th (ft)	32	60	0	81	82	55	150	0	24	160
Queue Length 95th (ft)	54	81	0	126	64	68	185	25	49	219
Internal Link Dist (ft)		371			170		227			433
Turn Bay Length (ft)	180		180	120		130		180	180	
Base Capacity (vph)	320	188	331	349	315	407	1696	910	501	2231
Starvation Cap Reductn	0	0	0	0	0	0	640	256	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.21	0.52	0.34	0.47	0.53	0.45	0.61	0.44	0.17	0.44

Intersection Summary



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	53	64	88	142	44	57	124	513	224	82	752	127
Future Volume (veh/h)	53	64	88	142	44	57	124	513	224	82	752	127
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	68	98	111	165	94	74	185	641	291	86	809	167
Peak Hour Factor	0.78	0.65	0.79	0.86	0.47	0.77	0.67	0.80	0.77	0.95	0.93	0.76
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	186	166	140	257	119	94	414	1762	786	415	2087	428
Arrive On Green	0.05	0.09	0.09	0.08	0.12	0.12	0.07	0.50	0.50	0.06	0.49	0.49
Sat Flow, veh/h	1781	1870	1585	1781	970	763	1781	3554	1585	1781	4247	870
Grp Volume(v), veh/h	68	98	111	165	0	168	185	641	291	86	647	329
Grp Sat Flow(s),veh/h/ln	1781	1870	1585	1781	0	1733	1781	1777	1585	1781	1702	1714
Q Serve(g_s), s	3.3	5.1	6.9	8.0	0.0	9.5	5.1	11.2	11.4	2.3	12.1	12.2
Cycle Q Clear(g_c), s	3.3	5.1	6.9	8.0	0.0	9.5	5.1	11.2	11.4	2.3	12.1	12.2
Prop In Lane	1.00		1.00	1.00		0.44	1.00		1.00	1.00		0.51
Lane Grp Cap(c), veh/h	186	166	140	257	0	212	414	1762	786	415	1673	842
V/C Ratio(X)	0.37	0.59	0.79	0.64	0.00	0.79	0.45	0.36	0.37	0.21	0.39	0.39
Avail Cap(c_a), veh/h	247	167	141	257	0	212	527	1762	786	535	1673	842
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	0.00	1.00	0.97	0.97	0.97	0.97	0.97	0.97
Uniform Delay (d), s/veh	36.8	44.3	45.1	39.0	0.0	43.1	11.8	15.7	15.7	11.0	16.1	16.2
Incr Delay (d2), s/veh	1.2	5.4	25.4	5.3	0.0	18.1	0.7	0.6	1.3	0.2	0.7	1.3
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.5	2.6	3.7	4.1	0.0	5.1	2.0	4.5	4.3	0.9	4.7	4.9
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	38.0	49.7	70.5	44.4	0.0	61.2	12.5	16.2	17.0	11.3	16.8	17.5
LnGrp LOS	D	D	E	D	A	E	B	B	B	B	B	B
Approach Vol, veh/h		277			333			1117			1062	
Approach Delay, s/veh		55.2			52.9			15.8			16.6	
Approach LOS		E			D			B			B	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	13.2	56.9	11.6	19.4	13.6	56.4	15.0	15.9
Change Period (Y+Rc), s	* 6.8	* 6.8	7.0	7.0	* 6.3	* 6.8	7.0	7.0
Max Green Setting (Gmax), s	* 13	* 44	8.0	9.0	* 14	* 43	8.0	9.0
Max Q Clear Time (g_c+I1), s	4.3	13.4	5.3	11.5	7.1	14.2	10.0	8.9
Green Ext Time (p_c), s	0.1	6.1	0.0	0.0	0.3	7.6	0.0	0.0

Intersection Summary	
HCM 6th Ctrl Delay	24.4
HCM 6th LOS	C

Notes

User approved pedestrian interval to be less than phase max green.

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

Intersection	
Int Delay, s/veh	3.9

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	69	81	68	3	7	45
Future Vol, veh/h	69	81	68	3	7	45
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	100
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	50	73	75	25	100	81
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	138	111	91	12	7	56

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	103	0	-	0	484	97
Stage 1	-	-	-	-	97	-
Stage 2	-	-	-	-	387	-
Critical Hdwy	4.12	-	-	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	2.218	-	-	-	3.518	3.318
Pot Cap-1 Maneuver	1489	-	-	-	542	959
Stage 1	-	-	-	-	927	-
Stage 2	-	-	-	-	686	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1489	-	-	-	488	959
Mov Cap-2 Maneuver	-	-	-	-	488	-
Stage 1	-	-	-	-	835	-
Stage 2	-	-	-	-	686	-

Approach	EB	WB	SB
HCM Control Delay, s	4.2	0	9.4
HCM LOS			A

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	1489	-	-	-	488	959
HCM Lane V/C Ratio	0.093	-	-	-	0.014	0.058
HCM Control Delay (s)	7.7	0	-	-	12.5	9
HCM Lane LOS	A	A	-	-	B	A
HCM 95th %tile Q(veh)	0.3	-	-	-	0	0.2

Intersection	
Int Delay, s/veh	3.2

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	40	48	50	32	14	21
Future Vol, veh/h	40	48	50	32	14	21
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	78	80	80	80	78	78
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	51	60	63	40	18	27

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	103	0	-	0	245	83
Stage 1	-	-	-	-	83	-
Stage 2	-	-	-	-	162	-
Critical Hdwy	4.12	-	-	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	2.218	-	-	-	3.518	3.318
Pot Cap-1 Maneuver	1489	-	-	-	743	976
Stage 1	-	-	-	-	940	-
Stage 2	-	-	-	-	867	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1489	-	-	-	717	976
Mov Cap-2 Maneuver	-	-	-	-	717	-
Stage 1	-	-	-	-	907	-
Stage 2	-	-	-	-	867	-

Approach	EB	WB	SB
HCM Control Delay, s	3.5	0	9.5
HCM LOS			A

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1489	-	-	-	853
HCM Lane V/C Ratio	0.034	-	-	-	0.053
HCM Control Delay (s)	7.5	0	-	-	9.5
HCM Lane LOS	A	A	-	-	A
HCM 95th %tile Q(veh)	0.1	-	-	-	0.2

Intersection	
Int Delay, s/veh	5.2

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	16	62	12	15	148	2	7	11	7	6	25	40
Future Vol, veh/h	16	62	12	15	148	2	7	11	7	6	25	40
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	200	-	-	200	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	67	82	38	50	80	50	38	25	25	50	63	59
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	24	76	32	30	185	4	18	44	28	12	40	68

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	189	0	0	108	0	0	441	389	92	423	403	187
Stage 1	-	-	-	-	-	-	140	140	-	247	247	-
Stage 2	-	-	-	-	-	-	301	249	-	176	156	-
Critical Hdwy	4.12	-	-	4.12	-	-	7.12	6.52	6.22	7.12	6.52	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Follow-up Hdwy	2.218	-	-	2.218	-	-	3.518	4.018	3.318	3.518	4.018	3.318
Pot Cap-1 Maneuver	1385	-	-	1483	-	-	527	546	965	541	536	855
Stage 1	-	-	-	-	-	-	863	781	-	757	702	-
Stage 2	-	-	-	-	-	-	708	701	-	826	769	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1385	-	-	1483	-	-	444	526	965	478	516	855
Mov Cap-2 Maneuver	-	-	-	-	-	-	444	526	-	478	516	-
Stage 1	-	-	-	-	-	-	848	768	-	744	688	-
Stage 2	-	-	-	-	-	-	602	687	-	743	756	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	1.4	1	12.2	11.7
HCM LOS			B	B

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	587	1385	-	-	1483	-	-	659
HCM Lane V/C Ratio	0.154	0.017	-	-	0.02	-	-	0.181
HCM Control Delay (s)	12.2	7.6	-	-	7.5	-	-	11.7
HCM Lane LOS	B	A	-	-	A	-	-	B
HCM 95th %tile Q(veh)	0.5	0.1	-	-	0.1	-	-	0.7

Intersection	
Int Delay, s/veh	0.6

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	1	2	66	6	6	51
Future Vol, veh/h	1	2	66	6	6	51
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	78	78	83	78	78	80
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	1	3	80	8	8	64

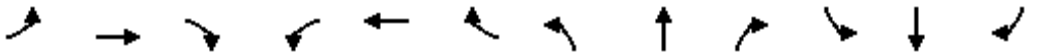
Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	164	84	0	0	88	0
Stage 1	84	-	-	-	-	-
Stage 2	80	-	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.12	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218	-
Pot Cap-1 Maneuver	827	975	-	-	1508	-
Stage 1	939	-	-	-	-	-
Stage 2	943	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	823	975	-	-	1508	-
Mov Cap-2 Maneuver	823	-	-	-	-	-
Stage 1	934	-	-	-	-	-
Stage 2	943	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	8.9	0	0.8
HCM LOS	A		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	918	1508	-
HCM Lane V/C Ratio	-	-	0.004	0.005	-
HCM Control Delay (s)	-	-	8.9	7.4	0
HCM Lane LOS	-	-	A	A	A
HCM 95th %tile Q(veh)	-	-	0	0	-

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	68	98	111	165	94	74	185	641	291	86	976
v/c Ratio	0.20	0.55	0.34	0.48	0.31	0.18	0.52	0.40	0.33	0.20	0.48
Control Delay	26.6	55.9	3.1	32.1	41.1	0.9	17.0	21.1	3.7	12.3	22.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.6	0.4	0.0	0.0
Total Delay	26.6	55.9	3.1	32.1	41.1	0.9	17.0	21.7	4.1	12.3	22.9
Queue Length 50th (ft)	32	61	0	81	55	0	54	150	0	24	160
Queue Length 95th (ft)	54	81	0	126	52	0	68	185	25	49	219
Internal Link Dist (ft)		371			170			227			433
Turn Bay Length (ft)	180		180	120		100	130		180	180	
Base Capacity (vph)	349	184	328	347	307	420	408	1701	912	502	2239
Starvation Cap Reductn	0	0	0	0	0	0	0	642	256	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.19	0.53	0.34	0.48	0.31	0.18	0.45	0.61	0.44	0.17	0.44

Intersection Summary



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	53	64	88	142	44	57	124	513	224	82	752	127
Future Volume (veh/h)	53	64	88	142	44	57	124	513	224	82	752	127
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	68	98	111	165	94	74	185	641	291	86	809	167
Peak Hour Factor	0.78	0.65	0.79	0.86	0.47	0.77	0.67	0.80	0.77	0.95	0.93	0.76
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	244	166	140	257	229	194	414	1762	786	415	2087	428
Arrive On Green	0.05	0.09	0.09	0.08	0.12	0.12	0.07	0.50	0.50	0.06	0.49	0.49
Sat Flow, veh/h	1781	1870	1585	1781	1870	1585	1781	3554	1585	1781	4247	870
Grp Volume(v), veh/h	68	98	111	165	94	74	185	641	291	86	647	329
Grp Sat Flow(s),veh/h/ln	1781	1870	1585	1781	1870	1585	1781	1777	1585	1781	1702	1714
Q Serve(g_s), s	3.3	5.1	6.9	8.0	4.7	4.3	5.1	11.2	11.4	2.3	12.1	12.2
Cycle Q Clear(g_c), s	3.3	5.1	6.9	8.0	4.7	4.3	5.1	11.2	11.4	2.3	12.1	12.2
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		0.51
Lane Grp Cap(c), veh/h	244	166	140	257	229	194	414	1762	786	415	1673	842
V/C Ratio(X)	0.28	0.59	0.79	0.64	0.41	0.38	0.45	0.36	0.37	0.21	0.39	0.39
Avail Cap(c_a), veh/h	305	167	141	257	229	194	527	1762	786	535	1673	842
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	0.97	0.97	0.97	0.97	0.97	0.97
Uniform Delay (d), s/veh	36.5	44.3	45.1	39.0	40.9	40.8	11.8	15.7	15.7	11.0	16.1	16.2
Incr Delay (d2), s/veh	0.6	5.4	25.4	5.3	1.2	1.2	0.7	0.6	1.3	0.2	0.7	1.3
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.5	2.6	3.7	4.1	2.2	1.8	2.0	4.5	4.3	0.9	4.7	4.9
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	37.1	49.7	70.5	44.4	42.1	42.0	12.5	16.2	17.0	11.3	16.8	17.5
LnGrp LOS	D	D	E	D	D	D	B	B	B	B	B	B
Approach Vol, veh/h		277			333			1117			1062	
Approach Delay, s/veh		55.0			43.2			15.8			16.6	
Approach LOS		D			D			B			B	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	13.2	56.9	11.6	19.4	13.6	56.4	15.0	15.9
Change Period (Y+Rc), s	* 6.8	* 6.8	7.0	7.0	* 6.3	* 6.8	7.0	7.0
Max Green Setting (Gmax), s	* 13	* 44	8.0	9.0	* 14	* 43	8.0	9.0
Max Q Clear Time (g_c+I1), s	4.3	13.4	5.3	6.7	7.1	14.2	10.0	8.9
Green Ext Time (p_c), s	0.1	6.1	0.0	0.1	0.3	7.6	0.0	0.0

Intersection Summary	
HCM 6th Ctrl Delay	23.3
HCM 6th LOS	C

Notes

User approved pedestrian interval to be less than phase max green.

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

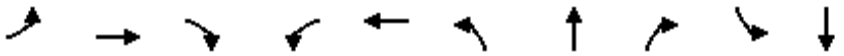
Intersection	
Int Delay, s/veh	4.8

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	58	116	47	43	49	81
Future Vol, veh/h	58	116	47	43	49	81
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	78	83	80	78	78	78
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	74	140	59	55	63	104

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	114	0	-	0	375	87
Stage 1	-	-	-	-	87	-
Stage 2	-	-	-	-	288	-
Critical Hdwy	4.12	-	-	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	2.218	-	-	-	3.518	3.318
Pot Cap-1 Maneuver	1475	-	-	-	626	971
Stage 1	-	-	-	-	936	-
Stage 2	-	-	-	-	761	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1475	-	-	-	592	971
Mov Cap-2 Maneuver	-	-	-	-	592	-
Stage 1	-	-	-	-	885	-
Stage 2	-	-	-	-	761	-

Approach	EB	WB	SB
HCM Control Delay, s	2.6	0	10.8
HCM LOS			B

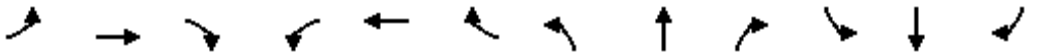
Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1475	-	-	-	782
HCM Lane V/C Ratio	0.05	-	-	-	0.213
HCM Control Delay (s)	7.6	0	-	-	10.8
HCM Lane LOS	A	A	-	-	B
HCM 95th %tile Q(veh)	0.2	-	-	-	0.8



Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	173	120	221	210	204	227	924	233	108	1006
v/c Ratio	0.63	0.54	0.58	0.64	0.78	0.67	0.62	0.29	0.36	0.54
Control Delay	35.9	46.2	11.8	35.8	46.9	30.2	21.3	4.4	14.0	22.1
Queue Delay	0.0	0.0	0.2	0.0	0.0	0.0	0.4	0.2	0.0	0.3
Total Delay	35.9	46.2	12.0	35.8	46.9	30.2	21.7	4.7	14.0	22.4
Queue Length 50th (ft)	75	64	0	93	77	88	150	0	29	154
Queue Length 95th (ft)	114	108	63	138	#148	151	206	34	50	197
Internal Link Dist (ft)		583			729		227			433
Turn Bay Length (ft)	180		180	120		130		180	180	
Base Capacity (vph)	280	248	402	328	281	354	1498	804	306	1864
Starvation Cap Reductn	0	0	0	0	0	0	195	167	0	0
Spillback Cap Reductn	0	0	14	0	0	0	0	0	0	318
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.62	0.48	0.57	0.64	0.73	0.64	0.71	0.37	0.35	0.65

Intersection Summary

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



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	140	100	201	172	71	98	191	896	182	90	758	171
Future Volume (veh/h)	140	100	201	172	71	98	191	896	182	90	758	171
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	173	120	221	210	86	118	227	924	233	108	790	216
Peak Hour Factor	0.81	0.83	0.91	0.82	0.83	0.83	0.84	0.97	0.78	0.83	0.96	0.79
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	275	249	211	335	95	131	415	1377	614	304	1453	394
Arrive On Green	0.10	0.13	0.13	0.10	0.13	0.13	0.14	0.52	0.52	0.15	0.73	0.73
Sat Flow, veh/h	1781	1870	1585	1781	714	980	1781	3554	1585	1781	3996	1083
Grp Volume(v), veh/h	173	120	221	210	0	204	227	924	233	108	672	334
Grp Sat Flow(s),veh/h/ln	1781	1870	1585	1781	0	1694	1781	1777	1585	1781	1702	1675
Q Serve(g_s), s	7.4	5.3	12.0	9.0	0.0	10.7	7.1	17.3	8.0	3.1	8.0	8.1
Cycle Q Clear(g_c), s	7.4	5.3	12.0	9.0	0.0	10.7	7.1	17.3	8.0	3.1	8.0	8.1
Prop In Lane	1.00		1.00	1.00		0.58	1.00		1.00	1.00		0.65
Lane Grp Cap(c), veh/h	275	249	211	335	0	226	415	1377	614	304	1238	609
V/C Ratio(X)	0.63	0.48	1.05	0.63	0.00	0.90	0.55	0.67	0.38	0.36	0.54	0.55
Avail Cap(c_a), veh/h	275	249	211	335	0	226	445	1377	614	337	1238	609
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.33	1.33	1.33	2.00	2.00	2.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	0.00	1.00	0.81	0.81	0.81	0.96	0.96	0.96
Uniform Delay (d), s/veh	30.0	36.1	39.0	30.3	0.0	38.4	14.8	17.6	15.3	14.8	8.9	8.9
Incr Delay (d2), s/veh	4.5	1.4	74.4	3.7	0.0	35.0	1.0	2.1	1.4	0.7	1.6	3.4
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	3.5	2.5	8.9	4.2	0.0	6.5	2.7	6.3	2.8	1.2	2.3	2.6
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	34.5	37.6	113.4	34.0	0.0	73.4	15.8	19.7	16.7	15.5	10.6	12.3
LnGrp LOS	C	D	F	C	A	E	B	B	B	B	B	B
Approach Vol, veh/h		514			414			1384			1114	
Approach Delay, s/veh		69.2			53.4			18.6			11.6	
Approach LOS		E			D			B			B	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	13.3	41.7	16.0	19.0	15.5	39.5	16.0	19.0
Change Period (Y+Rc), s	* 6.8	* 6.8	7.0	7.0	* 6.3	* 6.8	7.0	7.0
Max Green Setting (Gmax), s	* 8.2	* 34	9.0	12.0	* 11	* 31	9.0	12.0
Max Q Clear Time (g_c+I1), s	5.1	19.3	11.0	14.0	9.1	10.1	9.4	12.7
Green Ext Time (p_c), s	0.1	6.4	0.0	0.0	0.1	7.1	0.0	0.0

Intersection Summary	
HCM 6th Ctrl Delay	28.1
HCM 6th LOS	C

Notes

User approved pedestrian interval to be less than phase max green.

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

Intersection	
Int Delay, s/veh	3.6

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	94	161	124	4	13	74
Future Vol, veh/h	94	161	124	4	13	74
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	100
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	67	80	75	100	100	75
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	140	201	165	4	13	99

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	169	0	-	0	648	167
Stage 1	-	-	-	-	167	-
Stage 2	-	-	-	-	481	-
Critical Hdwy	4.12	-	-	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	2.218	-	-	-	3.518	3.318
Pot Cap-1 Maneuver	1409	-	-	-	435	877
Stage 1	-	-	-	-	863	-
Stage 2	-	-	-	-	622	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1409	-	-	-	386	877
Mov Cap-2 Maneuver	-	-	-	-	386	-
Stage 1	-	-	-	-	766	-
Stage 2	-	-	-	-	622	-

Approach	EB	WB	SB
HCM Control Delay, s	3.2	0	10.2
HCM LOS			B

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	1409	-	-	-	386	877
HCM Lane V/C Ratio	0.1	-	-	-	0.034	0.113
HCM Control Delay (s)	7.8	0	-	-	14.7	9.6
HCM Lane LOS	A	A	-	-	B	A
HCM 95th %tile Q(veh)	0.3	-	-	-	0.1	0.4

Intersection	
Int Delay, s/veh	5.6

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	42	131	17	15	118	3	18	32	15	4	26	32
Future Vol, veh/h	42	131	17	15	118	3	18	32	15	4	26	32
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	200	-	-	200	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	75	91	33	78	63	38	100	42	25	33	78	80
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	56	144	52	19	187	8	18	76	60	12	33	40

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	195	0	0	196	0	0	548	515	170	579	537	191
Stage 1	-	-	-	-	-	-	282	282	-	229	229	-
Stage 2	-	-	-	-	-	-	266	233	-	350	308	-
Critical Hdwy	4.12	-	-	4.12	-	-	7.12	6.52	6.22	7.12	6.52	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Follow-up Hdwy	2.218	-	-	2.218	-	-	3.518	4.018	3.318	3.518	4.018	3.318
Pot Cap-1 Maneuver	1378	-	-	1377	-	-	447	464	874	426	450	851
Stage 1	-	-	-	-	-	-	725	678	-	774	715	-
Stage 2	-	-	-	-	-	-	739	712	-	666	660	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1378	-	-	1377	-	-	384	439	874	330	426	851
Mov Cap-2 Maneuver	-	-	-	-	-	-	384	439	-	330	426	-
Stage 1	-	-	-	-	-	-	695	650	-	742	705	-
Stage 2	-	-	-	-	-	-	662	702	-	525	633	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	1.7	0.7	14.5	13.1
HCM LOS			B	B

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	533	1378	-	-	1377	-	-	528
HCM Lane V/C Ratio	0.289	0.041	-	-	0.014	-	-	0.162
HCM Control Delay (s)	14.5	7.7	-	-	7.7	-	-	13.1
HCM Lane LOS	B	A	-	-	A	-	-	B
HCM 95th %tile Q(veh)	1.2	0.1	-	-	0	-	-	0.6

Intersection	
Int Delay, s/veh	2.6

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	21	22	67	31	22	66
Future Vol, veh/h	21	22	67	31	22	66
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	78	78	83	78	78	83
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	27	28	81	40	28	80

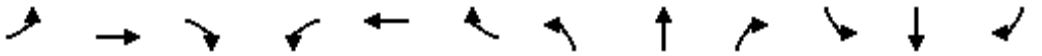
Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	237	101	0	0	121	0
Stage 1	101	-	-	-	-	-
Stage 2	136	-	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.12	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218	-
Pot Cap-1 Maneuver	751	954	-	-	1467	-
Stage 1	923	-	-	-	-	-
Stage 2	890	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	736	954	-	-	1467	-
Mov Cap-2 Maneuver	736	-	-	-	-	-
Stage 1	905	-	-	-	-	-
Stage 2	890	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	9.6	0	2
HCM LOS	A		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	833	1467	-
HCM Lane V/C Ratio	-	-	0.066	0.019	-
HCM Control Delay (s)	-	-	9.6	7.5	0
HCM Lane LOS	-	-	A	A	A
HCM 95th %tile Q(veh)	-	-	0.2	0.1	-

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	173	120	221	210	86	118	227	924	233	108	1006
v/c Ratio	0.53	0.56	0.59	0.65	0.40	0.32	0.66	0.61	0.29	0.36	0.53
Control Delay	31.8	48.0	12.2	36.9	42.0	2.2	29.2	21.0	4.4	13.7	21.8
Queue Delay	0.0	0.0	0.2	0.0	0.0	0.0	0.0	0.4	0.2	0.0	0.3
Total Delay	31.8	48.0	12.4	36.9	42.0	2.2	29.2	21.4	4.6	13.7	22.1
Queue Length 50th (ft)	76	65	0	94	46	0	85	150	0	28	153
Queue Length 95th (ft)	114	108	63	138	82	0	151	206	34	50	197
Internal Link Dist (ft)		583			729			227			433
Turn Bay Length (ft)	180		180	120		120	130		180	180	
Base Capacity (vph)	329	248	402	321	248	395	361	1519	812	312	1884
Starvation Cap Reductn	0	0	0	0	0	0	0	203	173	0	0
Spillback Cap Reductn	0	0	14	0	0	0	0	0	0	0	320
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.53	0.48	0.57	0.65	0.35	0.30	0.63	0.70	0.36	0.35	0.64

Intersection Summary



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	140	100	201	172	71	98	191	896	182	90	758	171
Future Volume (veh/h)	140	100	201	172	71	98	191	896	182	90	758	171
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	173	120	221	210	86	118	227	924	233	108	790	216
Peak Hour Factor	0.81	0.83	0.91	0.82	0.83	0.83	0.84	0.97	0.78	0.83	0.96	0.79
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	366	249	211	335	249	211	416	1377	614	338	1446	392
Arrive On Green	0.10	0.13	0.13	0.10	0.13	0.13	0.21	0.77	0.77	0.15	0.72	0.72
Sat Flow, veh/h	1781	1870	1585	1781	1870	1585	1781	3554	1585	1781	3996	1083
Grp Volume(v), veh/h	173	120	221	210	86	118	227	924	233	108	672	334
Grp Sat Flow(s),veh/h/ln	1781	1870	1585	1781	1870	1585	1781	1777	1585	1781	1702	1675
Q Serve(g_s), s	7.4	5.3	12.0	9.0	3.8	6.3	7.3	11.0	4.2	3.1	8.1	8.3
Cycle Q Clear(g_c), s	7.4	5.3	12.0	9.0	3.8	6.3	7.3	11.0	4.2	3.1	8.1	8.3
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		0.65
Lane Grp Cap(c), veh/h	366	249	211	335	249	211	416	1377	614	338	1232	606
V/C Ratio(X)	0.47	0.48	1.05	0.63	0.34	0.56	0.55	0.67	0.38	0.32	0.55	0.55
Avail Cap(c_a), veh/h	366	249	211	335	249	211	443	1377	614	371	1232	606
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	2.00	2.00	2.00	2.00	2.00	2.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	0.81	0.81	0.81	0.96	0.96	0.96
Uniform Delay (d), s/veh	29.4	36.1	39.0	30.3	35.4	36.5	13.6	7.4	6.7	13.6	9.1	9.1
Incr Delay (d2), s/veh	0.9	1.4	74.4	3.7	0.8	3.3	1.0	2.1	1.4	0.5	1.7	3.4
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	3.2	2.5	8.9	4.2	1.7	2.6	2.5	2.7	1.4	1.2	2.4	2.6
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	30.3	37.6	113.4	34.0	36.2	39.8	14.6	9.6	8.1	14.2	10.7	12.5
LnGrp LOS	C	D	F	C	D	D	B	A	A	B	B	B
Approach Vol, veh/h		514			414			1384			1114	
Approach Delay, s/veh		67.7			36.1			10.1			11.6	
Approach LOS		E			D			B			B	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	13.3	41.7	16.0	19.0	15.6	39.4	16.0	19.0
Change Period (Y+Rc), s	* 6.8	* 6.8	7.0	7.0	* 6.3	* 6.8	7.0	7.0
Max Green Setting (Gmax), s	* 8.2	* 34	9.0	12.0	* 11	* 31	9.0	12.0
Max Q Clear Time (g_c+I1), s	5.1	13.0	11.0	14.0	9.3	10.3	9.4	8.3
Green Ext Time (p_c), s	0.1	7.7	0.0	0.0	0.1	7.1	0.0	0.3

Intersection Summary	
HCM 6th Ctrl Delay	22.4
HCM 6th LOS	C

Notes

User approved pedestrian interval to be less than phase max green.

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.