



# Traffic Impact Study

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*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. 133<sup>rd</sup> Street, Suite 200  
Overland Park, KS 66213  
TEL 913.381.1170  
[www.olssonassociates.com](http://www.olssonassociates.com)



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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 22<sup>nd</sup>, 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).

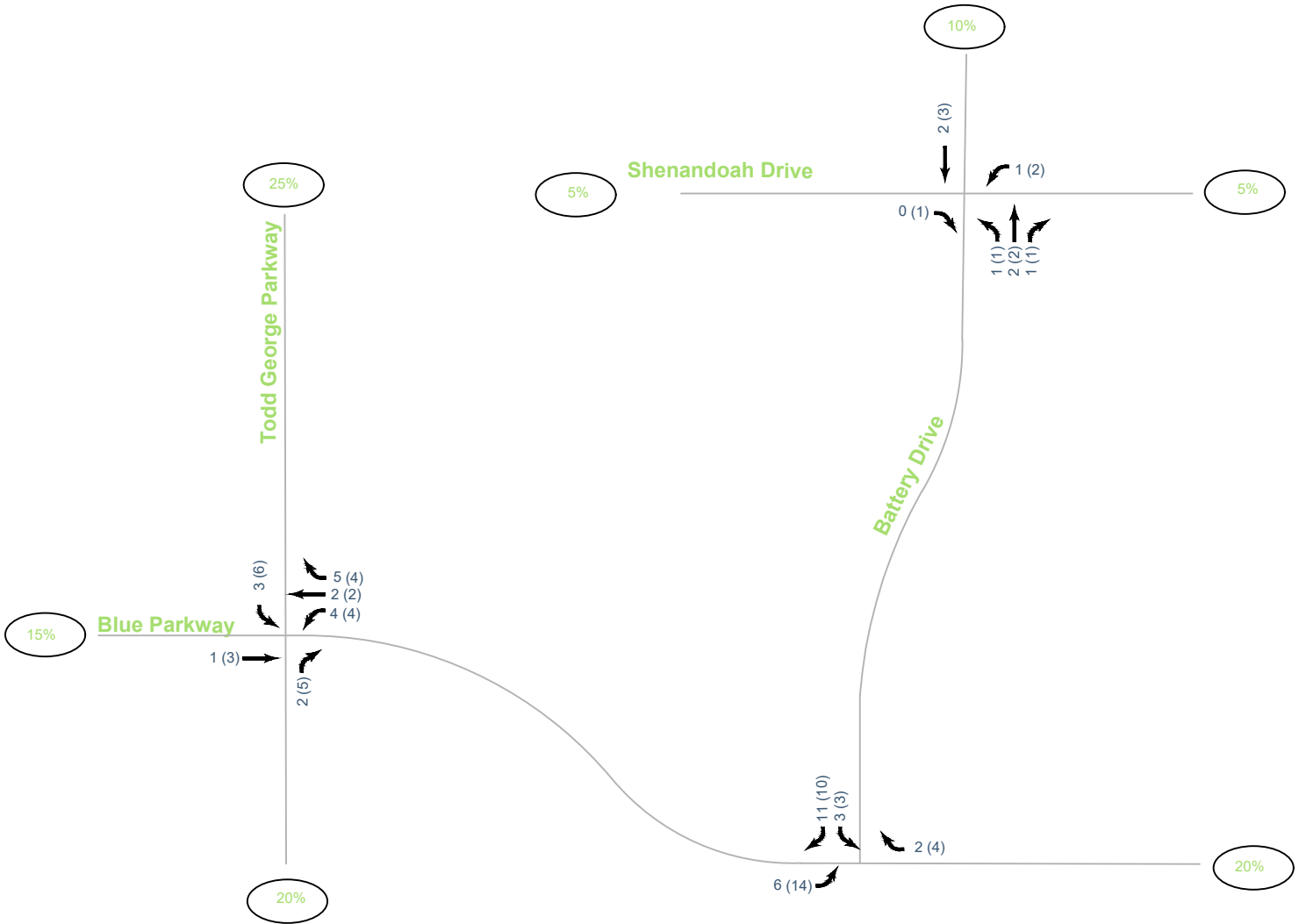


# FIGURE 2

## Approved Development Distribution

Mid-Continent Public Library

Lee's Summit, MO



### LEGEND

xx (xx) AM (PM) Peak Hour Trips

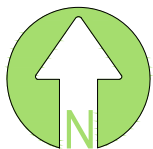
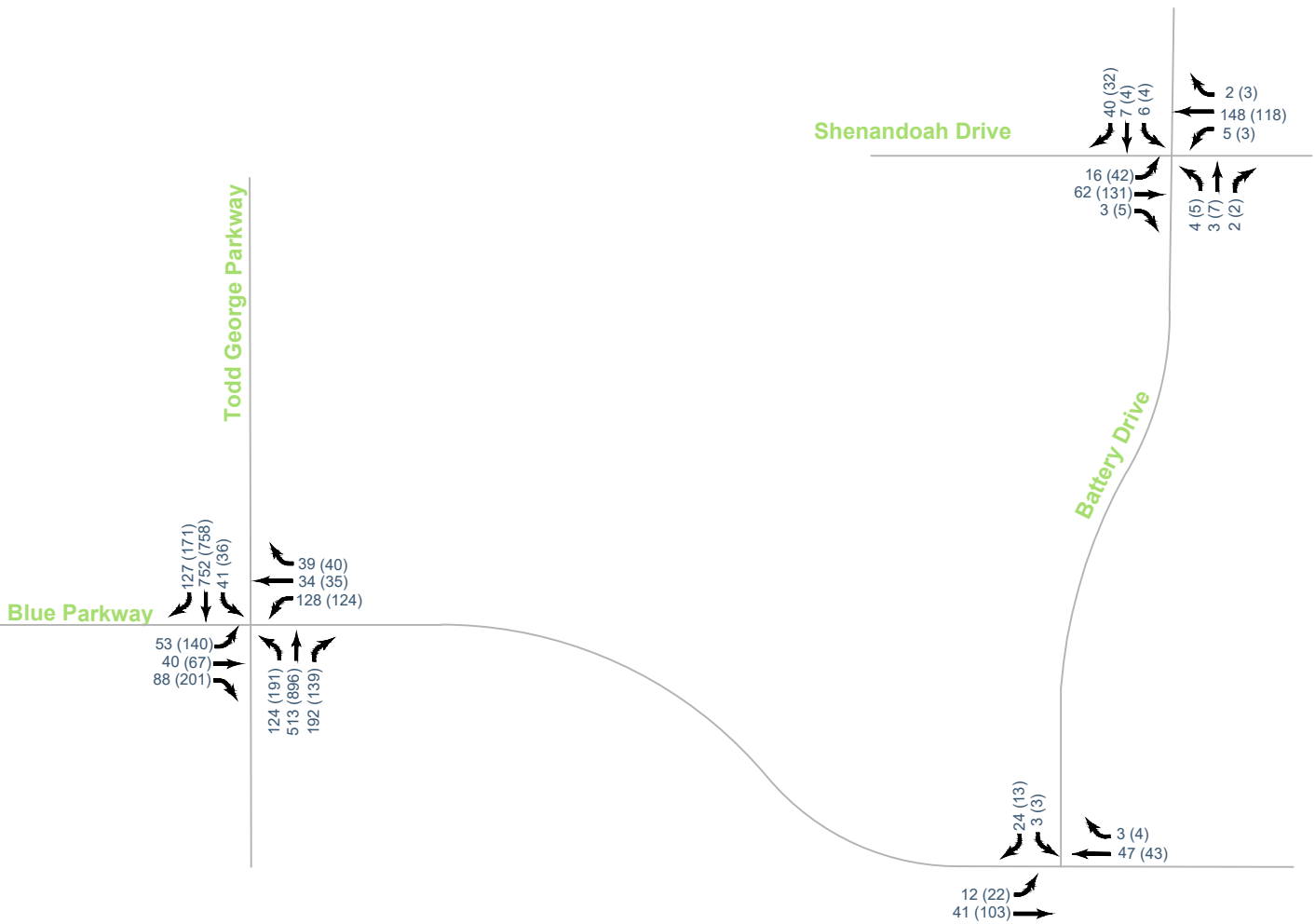
xx% Distribution Percentages

# FIGURE 3

Existing + Approved Conditions

Peak Hour Volumes

Mid-Continent Public Library  
Lee's Summit, MO



## 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
<b>Total</b>	<b>145 DU</b>	<b>533</b>	<b>29</b>	<b>11</b>	<b>18</b>	<b>41</b>	<b>24</b>	<b>17</b>

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 6<sup>th</sup> 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.

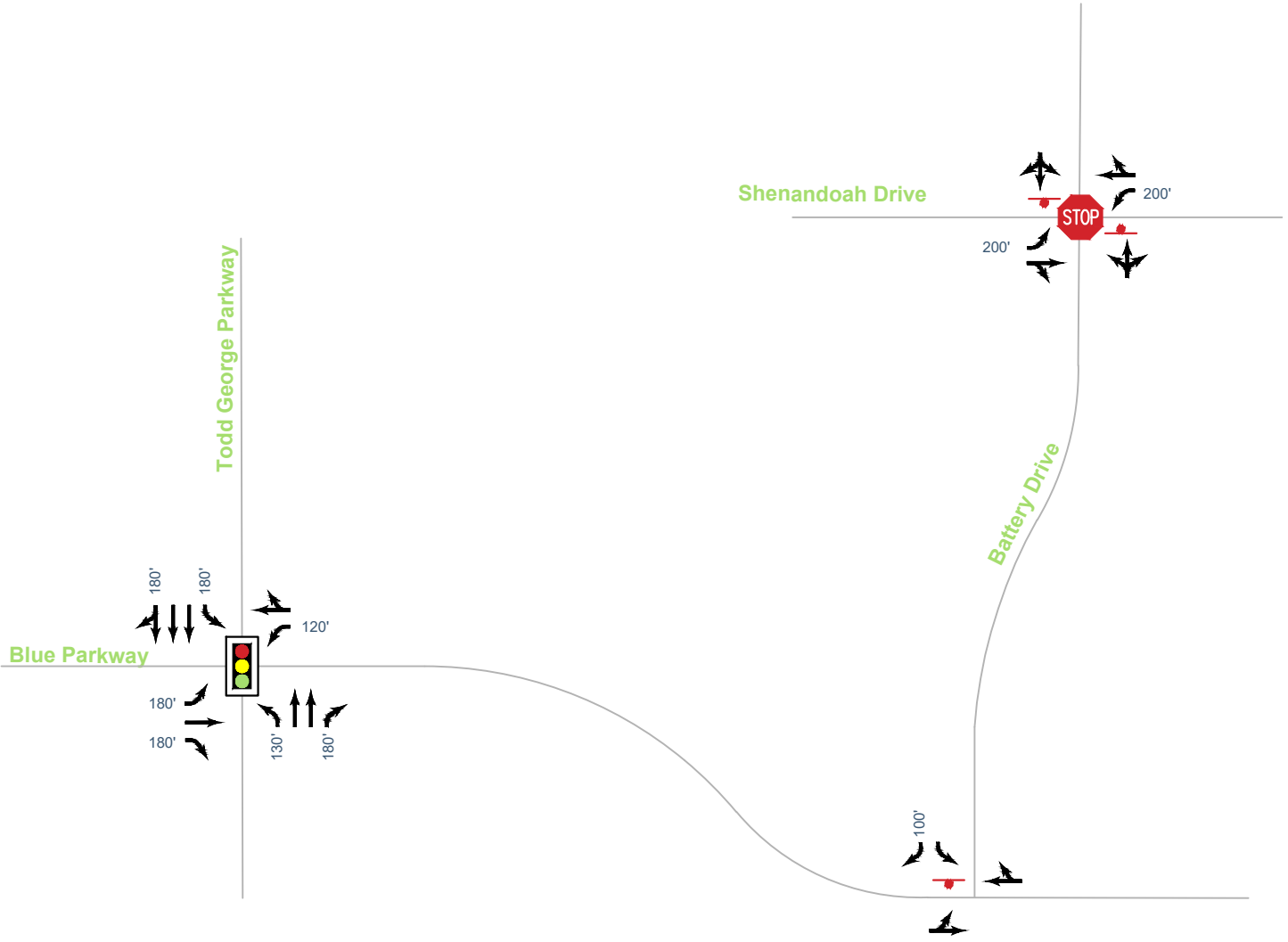
Unsignalized capacity analysis was conducted for the stop-controlled study intersections. Based on capacity analysis, all movements at the unsignalized study intersections are expected to operate at a LOS B or better during both peak hour periods.

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**.

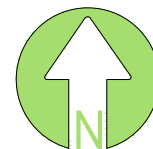
# FIGURE 4

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



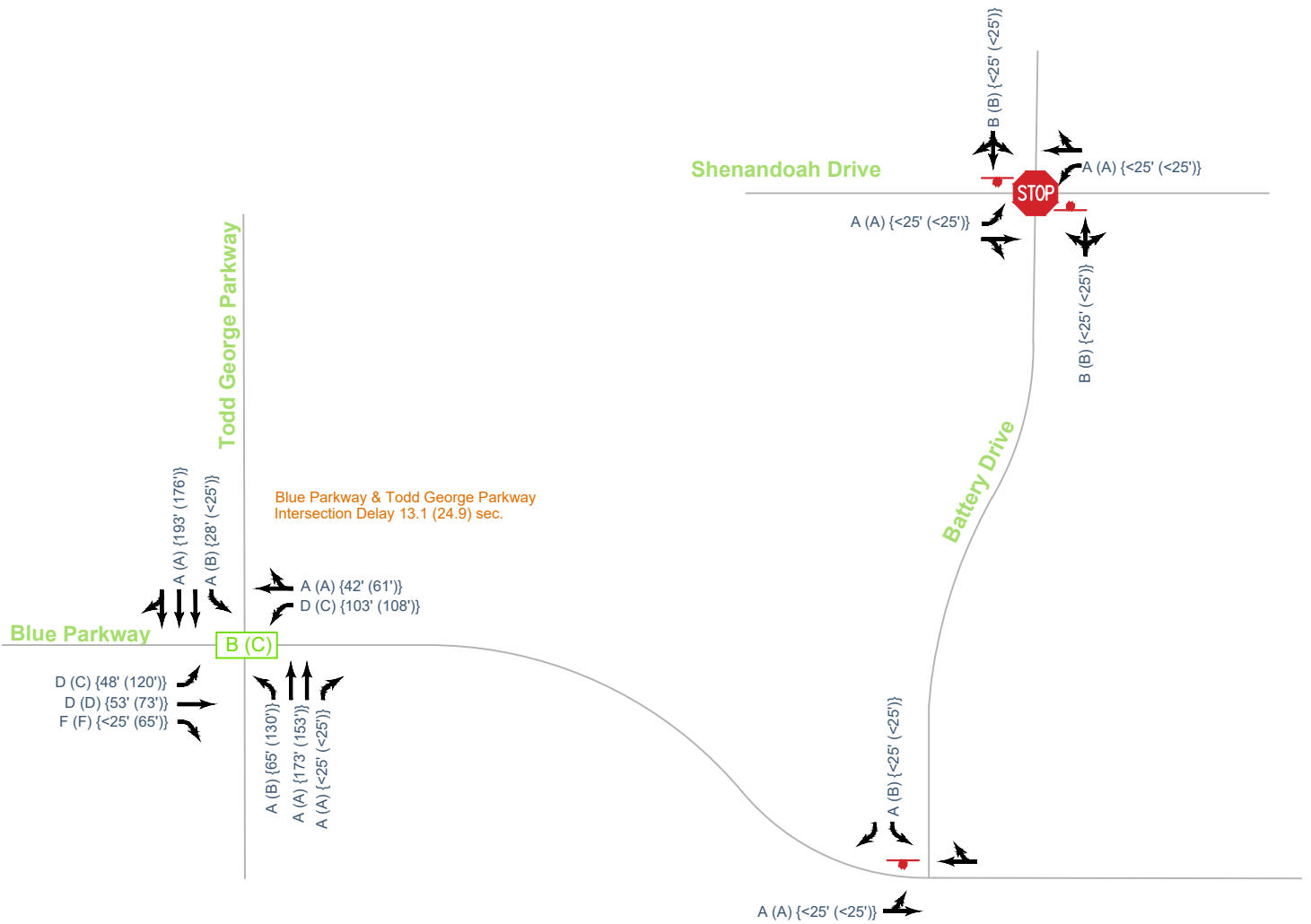
## LEGEND

- xx' → Lane Configuration & Storage Length
-  Stop Controlled Intersection
-  Stop Sign
-  Signalized Intersection



# 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 Controlled Intersection

Stop Sign

Lane Geometry



## 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**

<b>Proposed Access</b>	<b>Public Roadway Intersected</b>	<b>Access Type</b>	<b>Proposed Throat Length</b>	<b>Median Divided</b>
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 (10<sup>th</sup> 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**

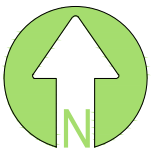
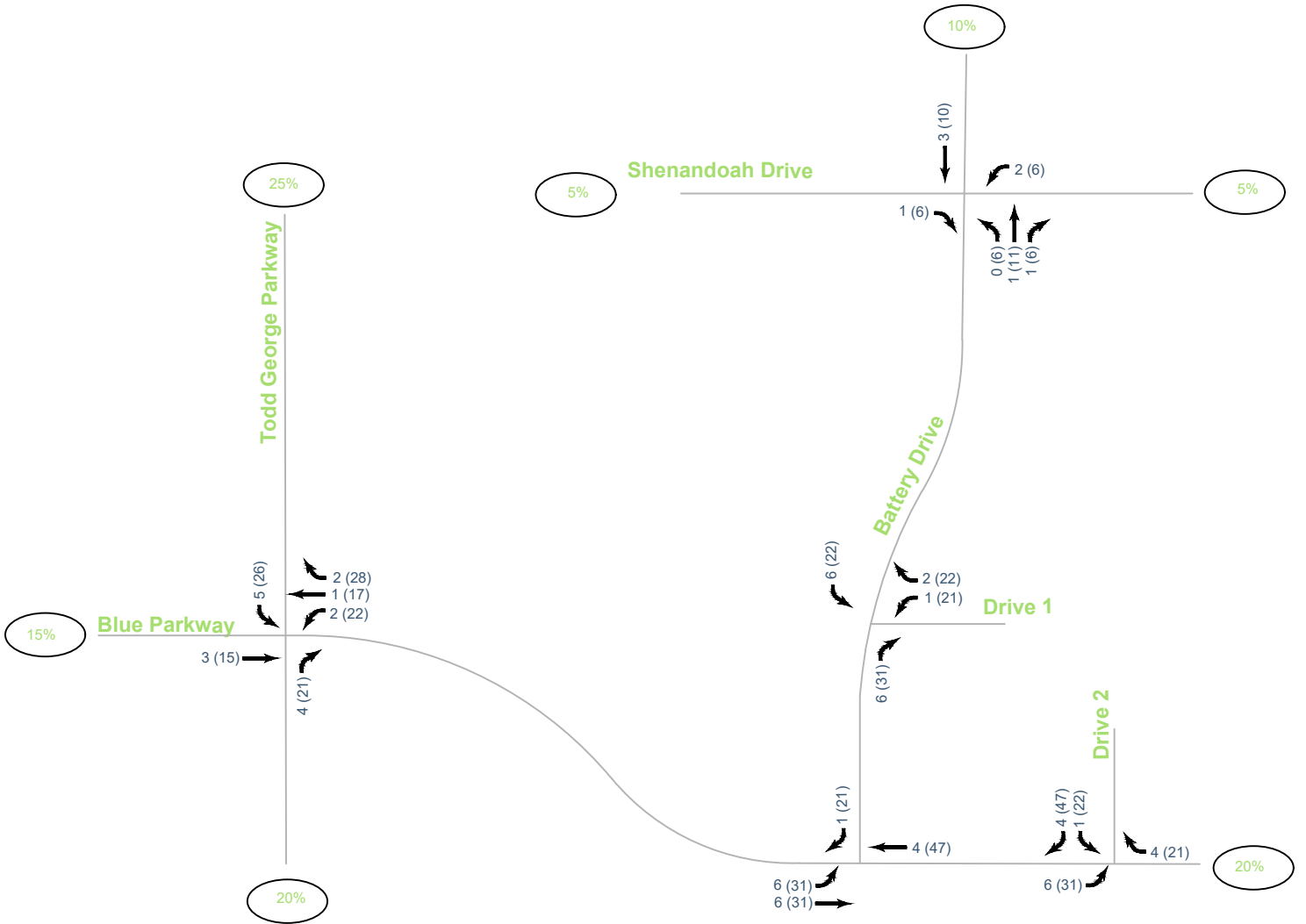
The trips generated by the proposed development were assigned to the roadway network based on the existing traffic gravity and characteristics of the surrounding area. City staff approved trip generation and distribution.

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



**OLSSON**  
 ASSOCIATES

## LEGEND

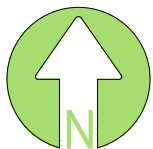
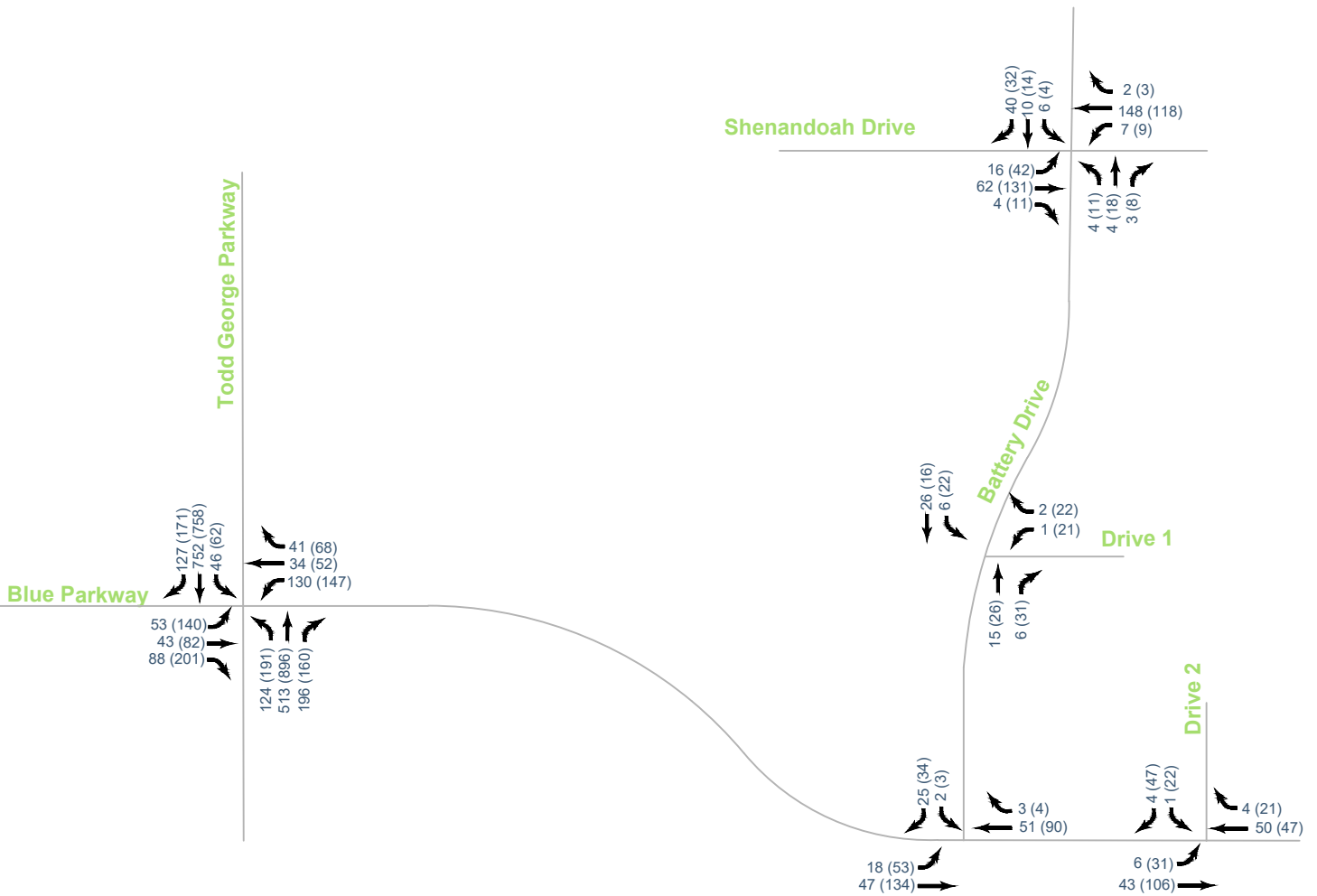
xx (xx) AM (PM) Peak Hour Trips

xx% Distribution Percentages

# FIGURE 8

## Existing + Approved + Development Conditions Peak Hour Volumes

Mid-Continent Public Library  
Lee's Summit, MO



### 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.

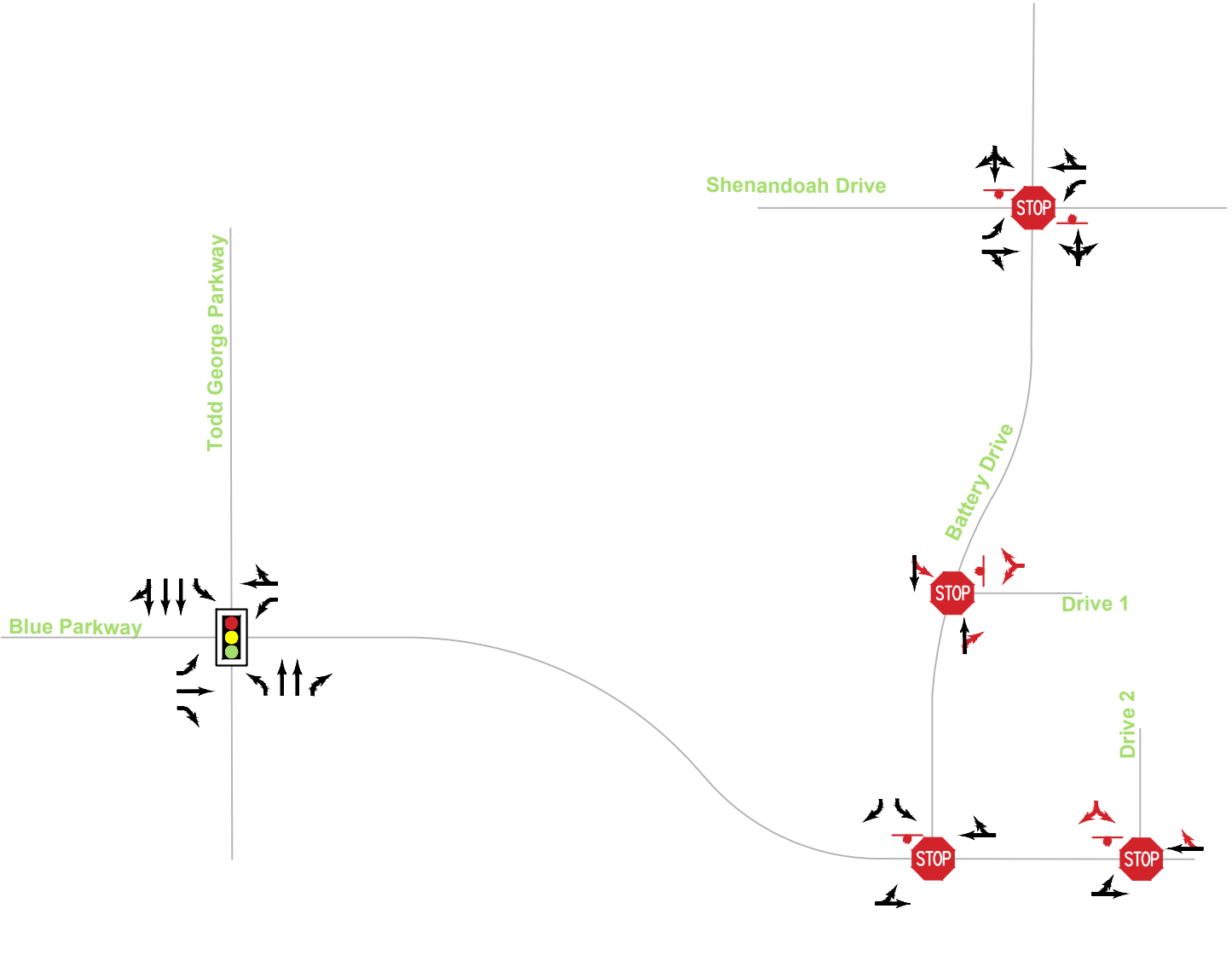
The City and MoDOT recently completed an interchange project along Blackwell Road at US-50, east of the proposed site. Trips generated by the proposed library development are expected to be minimal and have a negligible impact on operations at the new interchange. The interchange should have adequate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

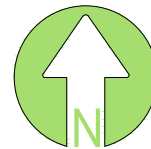
Existing + Approved + Development Conditions  
Lane Configuration & Traffic Control

Mid-Continent Public Library  
Lee's Summit, MO



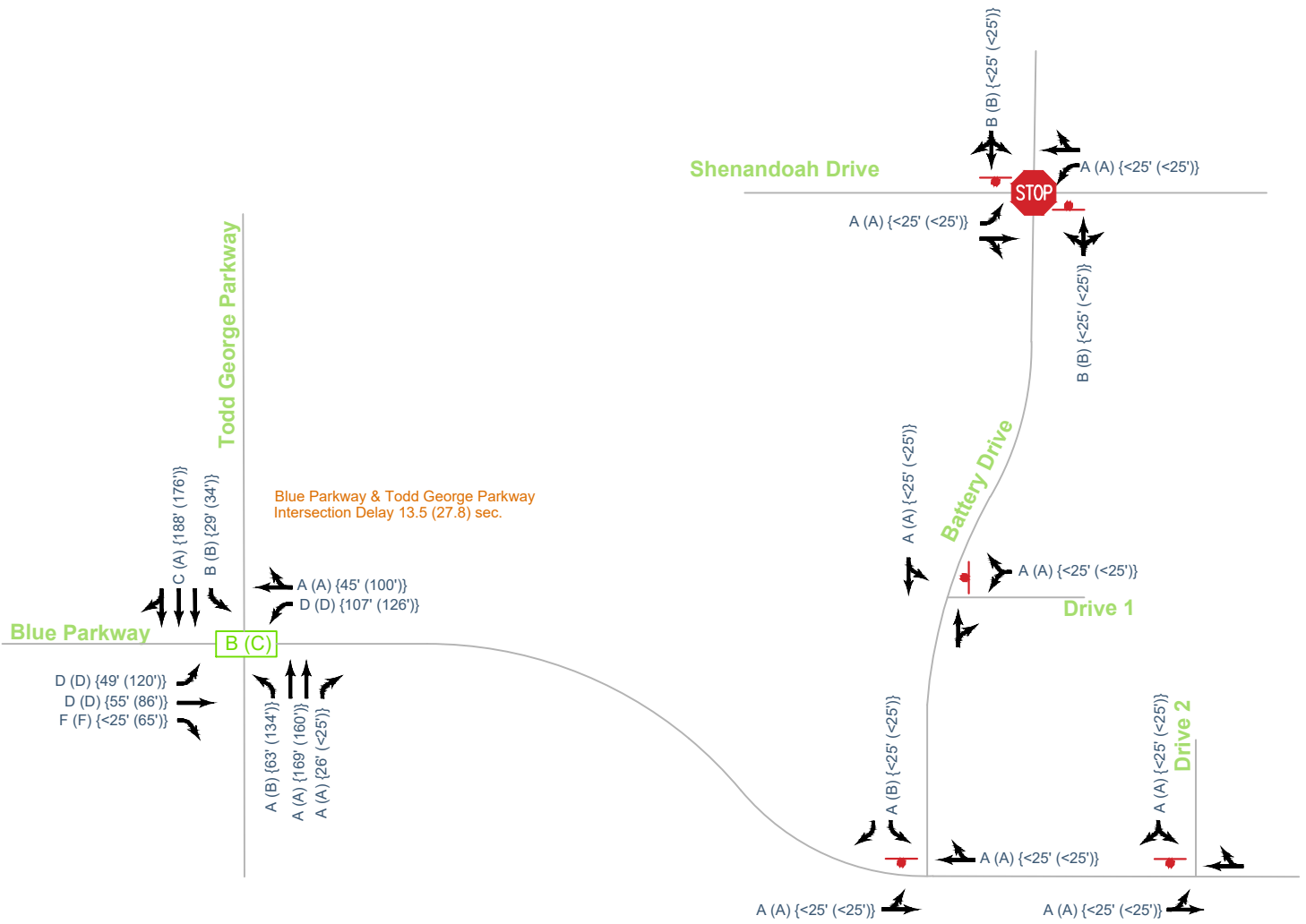
## LEGEND

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



# FIGURE 10

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



## LEGEND

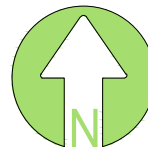
AM (PM) {AM (PM)} Movement LOS & {95th Percentile Queue}

**AM (PM)** Signalized Intersection LOS

Stop Controlled Intersection

Stop Sign

Lane Geometry



## 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 (10<sup>th</sup> 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
<b>Total</b>	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.

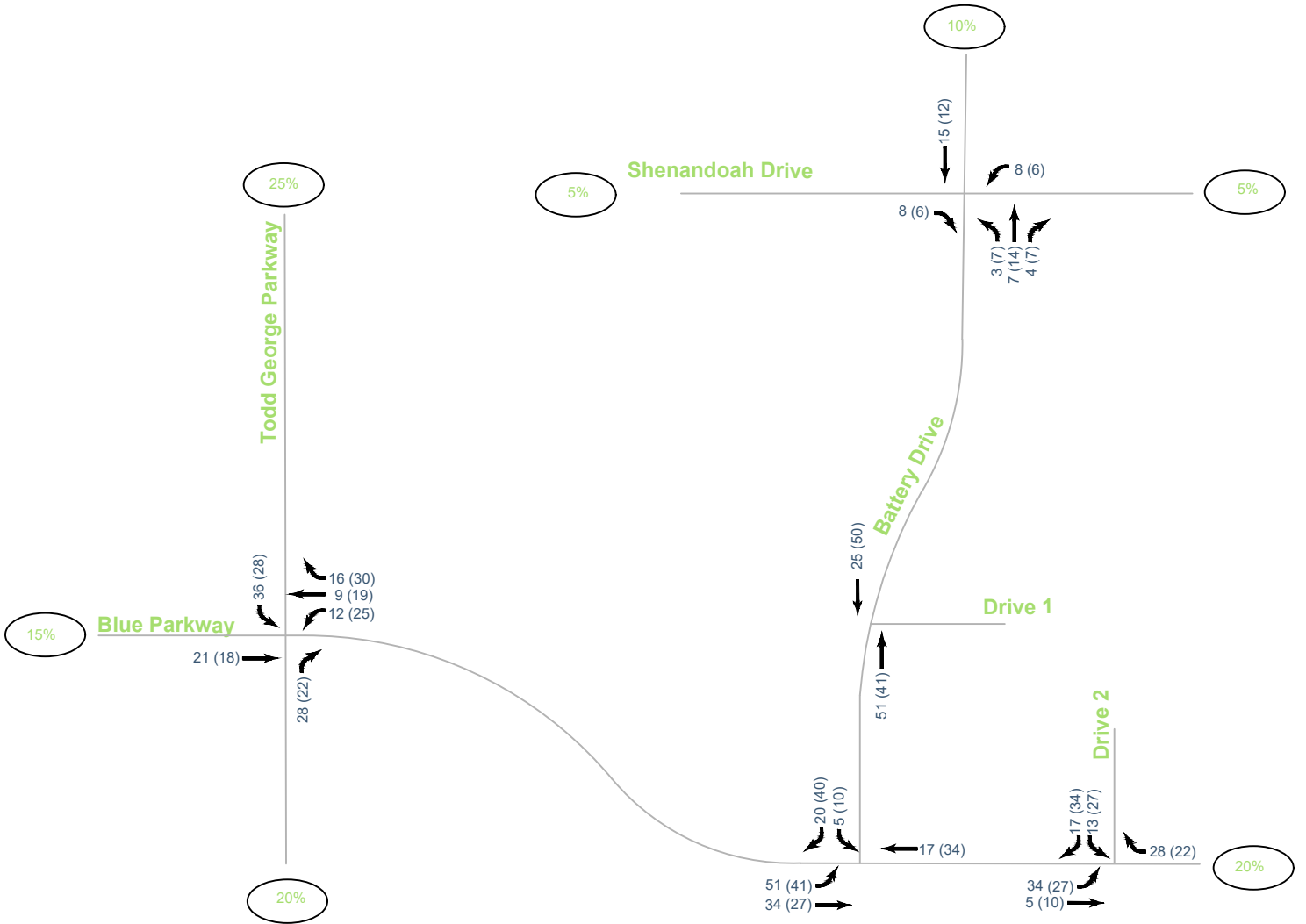
The individual movements at the unsignalized intersections are expected to operate at a LOS C or better during the AM and PM peak hour periods. Traffic operations are expected to be acceptable under this scenario thus additional turn lanes are not recommended.

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



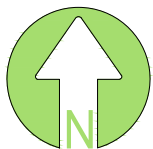
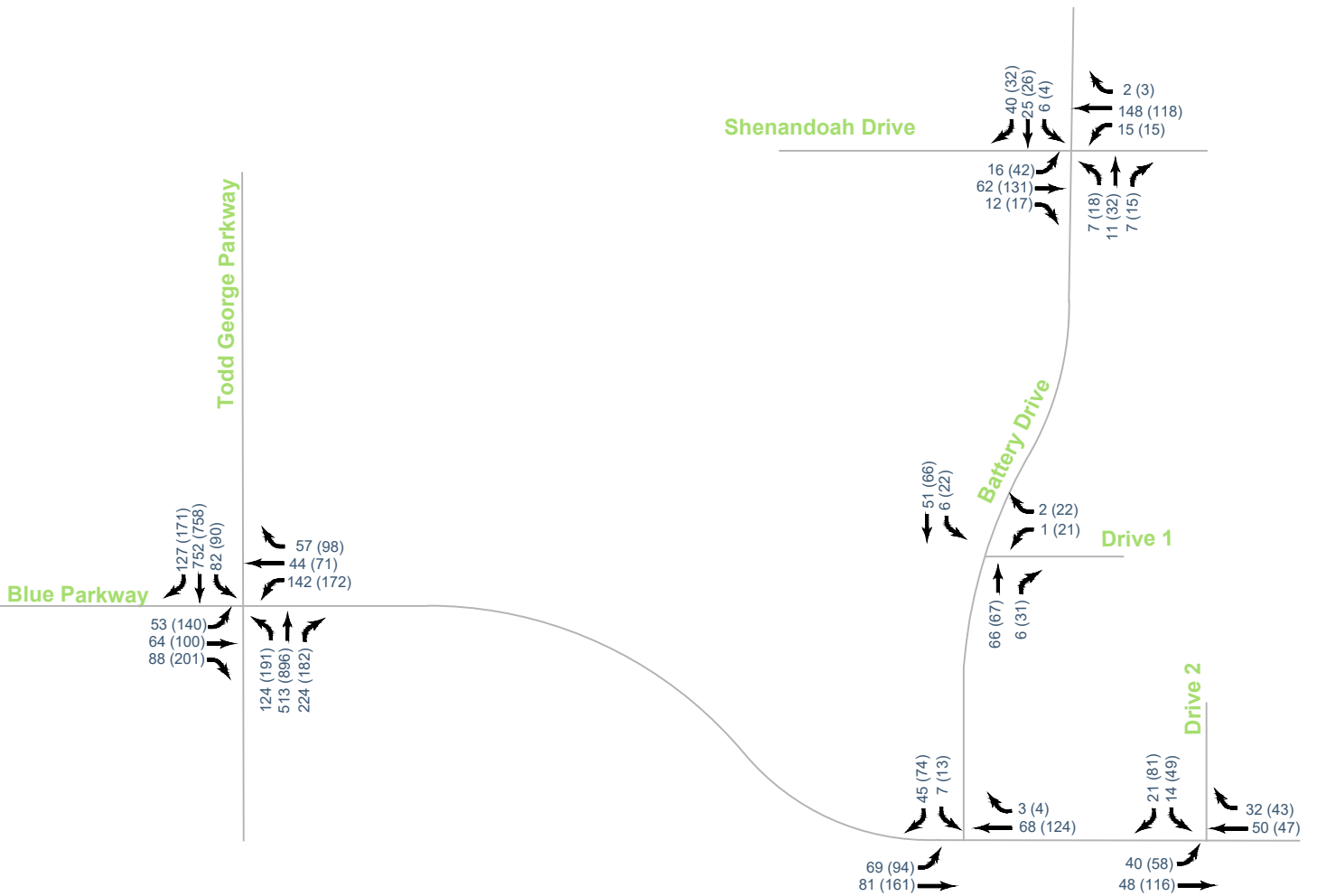
### LEGEND

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

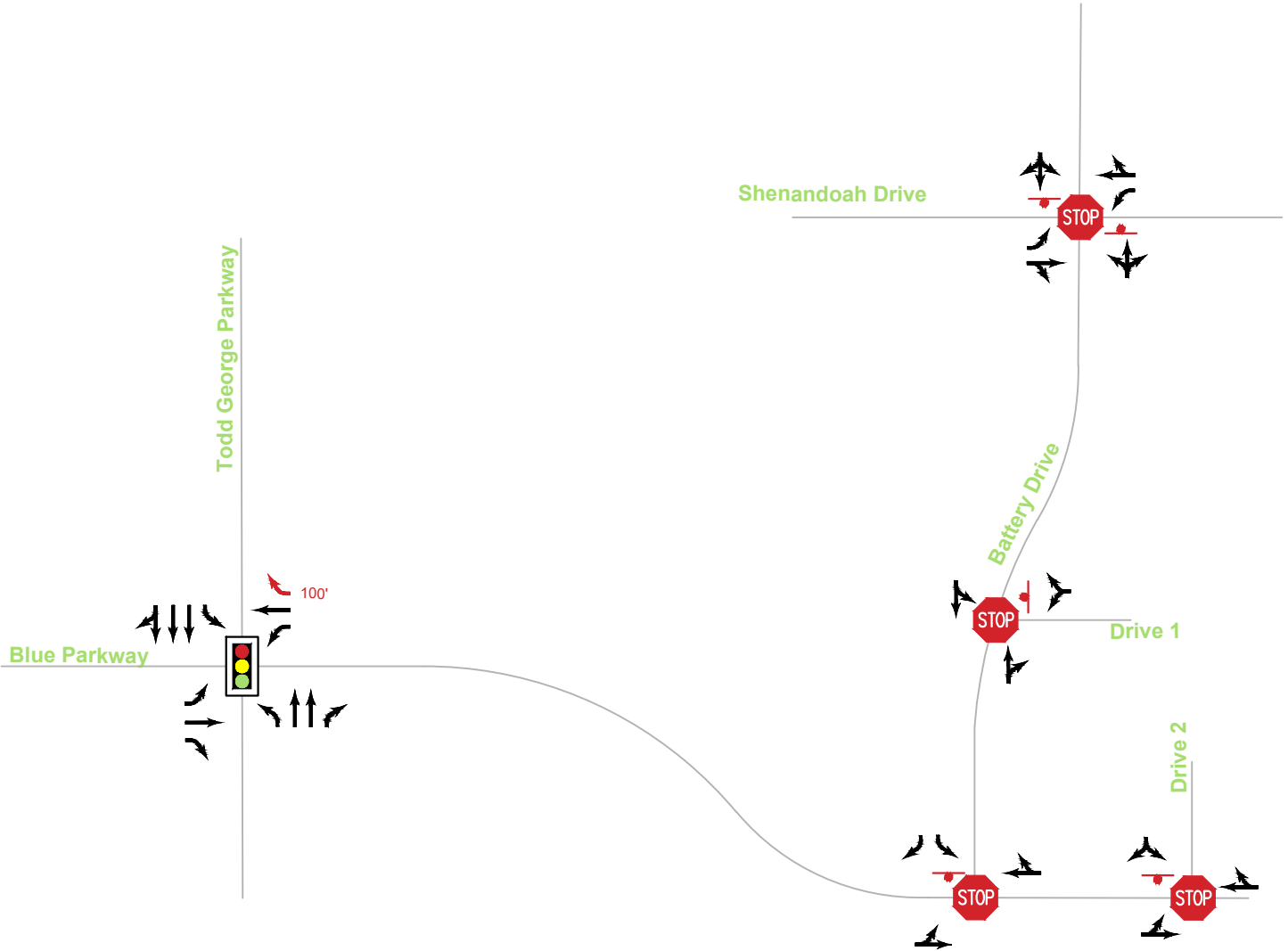


## LEGEND

xx (xx) AM (PM) Peak Hour Volumes

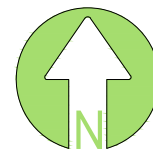
# FIGURE 13

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



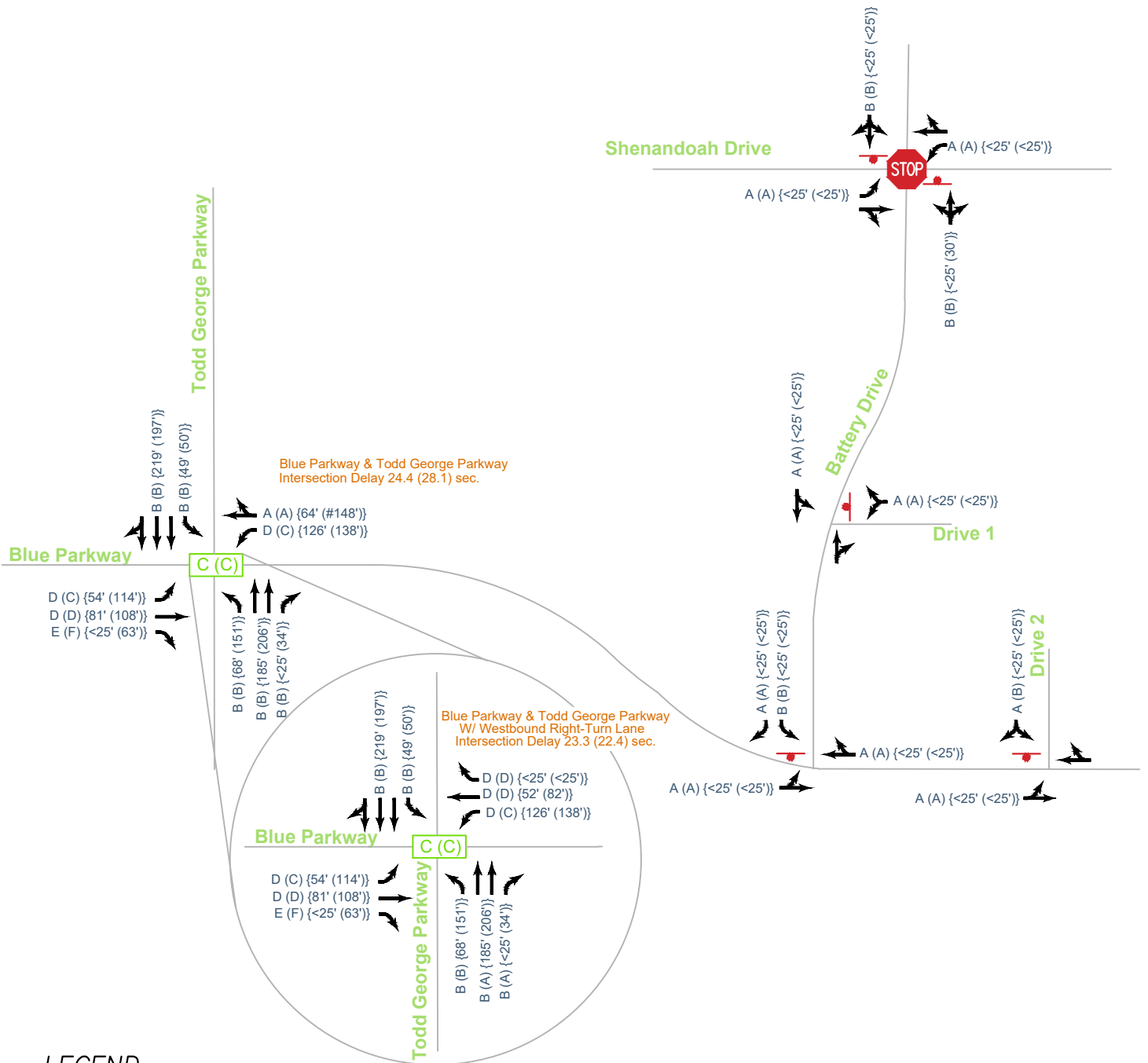
## LEGEND

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



# 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}

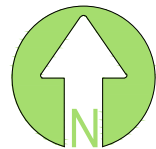
AM (PM) Signalized Intersection LOS

STOP Stop Controlled Intersection

Stop Sign

Lane Geometry

# 95th Percentile Queue Exceeds Capacity



## 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.