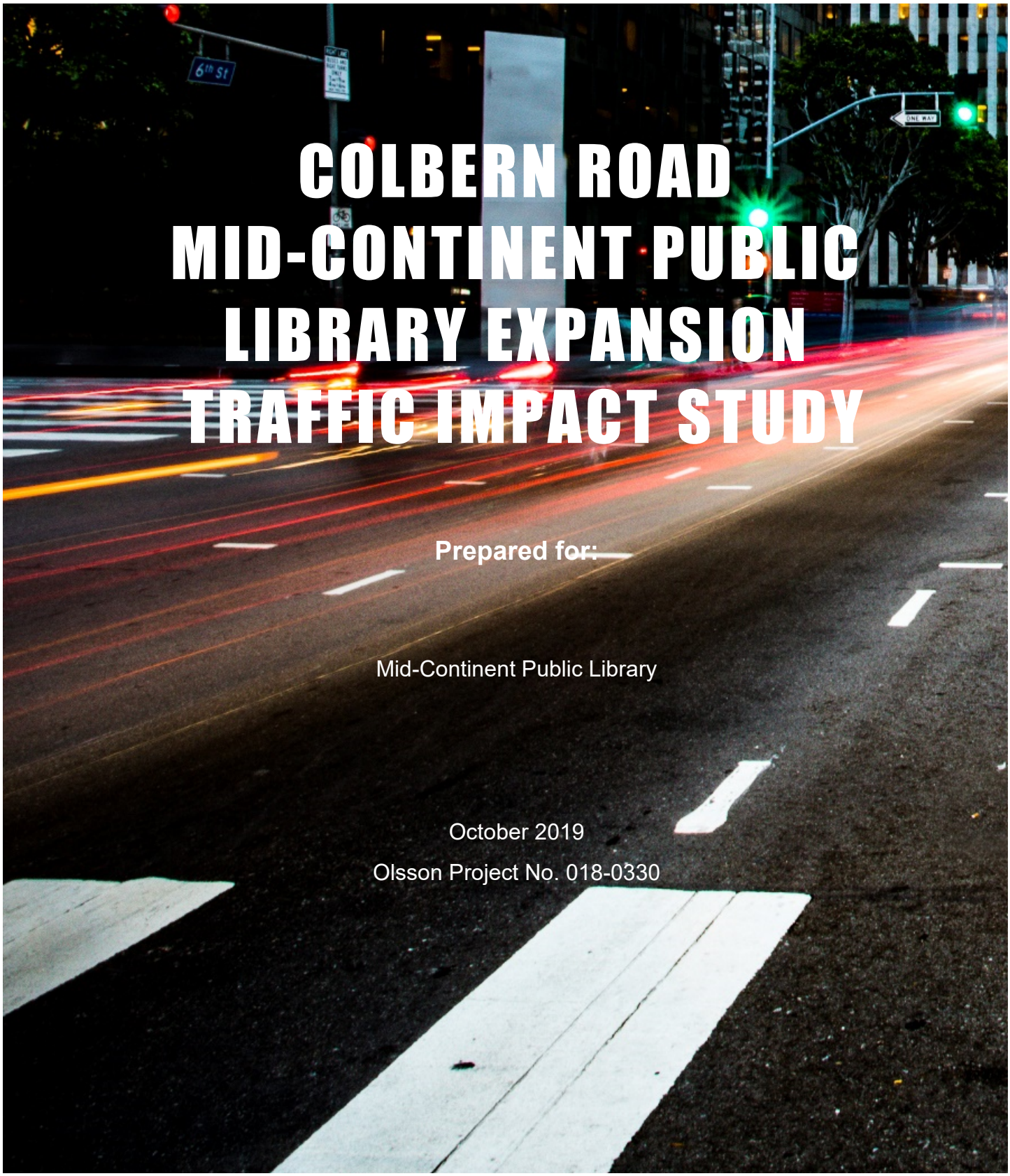


# COLBERN ROAD MID-CONTINENT PUBLIC LIBRARY EXPANSION TRAFFIC IMPACT STUDY

**Prepared for:**

Mid-Continent Public Library

October 2019

Olsson Project No. 018-0330

olsson

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10.03.2019

# TABLE OF CONTENTS

# LIST OF FIGURES



# LIST OF TABLES



# APPENDICES

# 1. INTRODUCTION

This report studies traffic impacts associated with the Colbern Road Mid-Continent Public Library (MCPL) proposed expansion to the existing facility located north of Colbern Road between Rice Road and Ball Drive in Lee's Summit, Missouri.

This report will review the impacts of the proposed expansion development on the existing roadway network and will recommend additional turn lanes, storage bays, and intersection control methods per the City of Lee's Summit *Access Management Code* and Missouri Department of Transportation's (MoDOT's) Engineering Policy Guide (EPG), as appropriate, for the following study intersections:

- Colbern Road and Northbound 291 Off-Ramp
- Colbern Road and Rice Road
- Colbern Road and Existing West Church Access (aligns with proposed MCPL access)
- Colbern Road and Existing Library/East Church Access
- Colbern Road and Ball Drive

For this study, the following scenarios were analyzed:

- Existing Conditions
- Existing Plus Proposed Development Conditions

In addition to the scenarios analyzed, a discussion of future access for the development will be provided considering public roadway plans adjacent to the site.

The approximate location of the proposed development is shown on **Figure 1**.

# FIGURE 1

Vicinity Map

Colbern Road MCPL
Lee's Summit, MO


*LEGEND*

Proposed Site Expansion

Source: Google Maps

# 2. DATA COLLECTION

The data collection effort included acquiring AM and PM peak hour turning movement counts and documentation of current roadway geometrics. Traffic counts were collected on Tuesday, July 23rd, 2019 at the study intersections listed in **Section 1.0**.

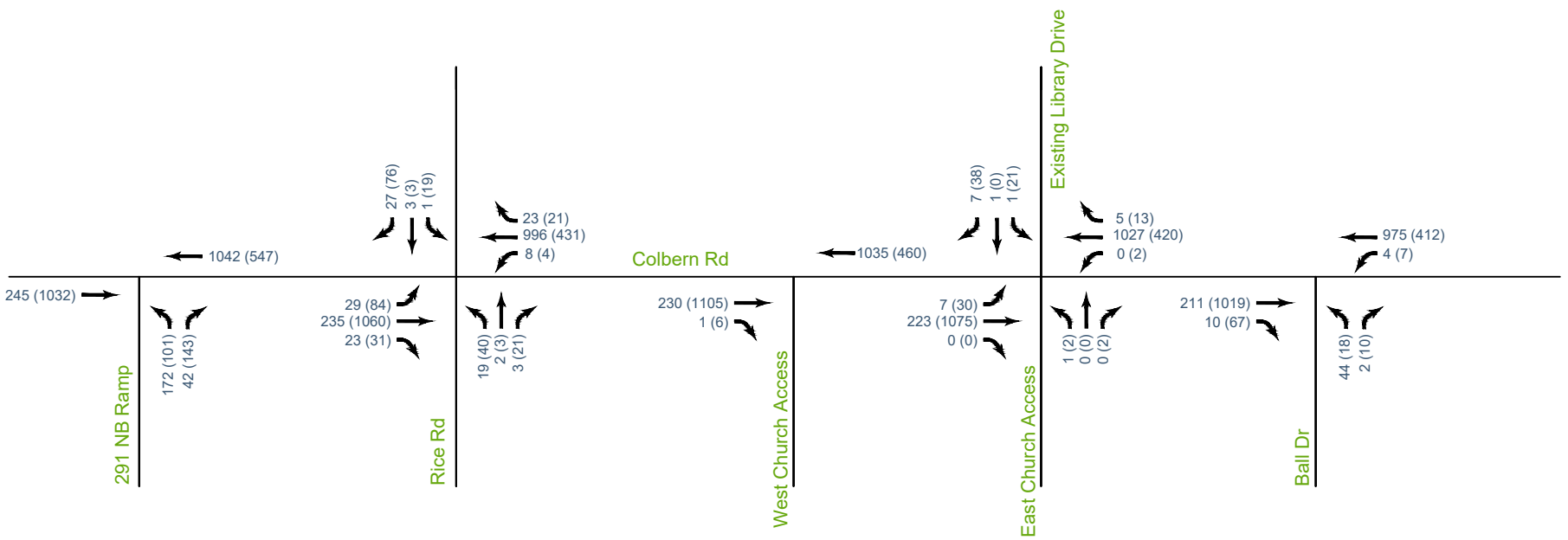
The counts were conducted during the typical weekday AM and PM peak periods from 7:00-9:00 AM and 4:00-6:00 PM. The AM peak hour period for the study intersections was determined to be from 7:00-8:00 AM. The PM peak hour period for the study intersections was determined to be from 4:45-5:45 PM. The existing peak hour volumes are illustrated in **Figure 1**. Count data for this study can be found in **Appendix A**.

The existing library is approximately 15,000 square feet. A comparison of actual trips to the site based on AM and PM peak hour data collection was compared to trip generation results for a 15,000 square foot library. Trip generation was conducted as discussed in **Section 4.1**. For reference, documentation of this comparison is provided in **Appendix A**. Reviewing actual traffic to expected traffic, the existing library site generates more actual trips during the AM peak hour period than expected through trip generation. The site generates fewer actual trips during the PM peak hour period than expected through trip generation.

# FIGURE 2

Existing
Peak Hour Volumes

Colbern Road MCPL
Lee's Summit, MO

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AM (PM) Peak Hour Volume

Proposed Site Location

# 3. EXISTING CONDITIONS

Existing traffic conditions were evaluated to identify any existing deficiencies and to provide a baseline for comparative purposes.

## 3.1. Network Characteristics

Four roadways within the study area were considered during analysis: Colbern Road, Northbound 291 Off-Ramp, Rice Road, and Ball Drive. Referencing the City's *2019 Comprehensive Plan Land Use Map,* current network characteristics are summarized in **Table 1**.

**Table 1. Existing Network Summary.**

| Roadway | Functional Classification | Typical Section | Median Type | Posted Speed |
|---|---|---|---|---|
| Colbern Road | Major Arterial | 4-Lane | Raised | 40 mph |
| Northbound 291 Off-Ramp | Freeway | 1-Lane Approach | Not Applicable | 35 mph |
| Rice Road | Commercial Collector | 2-Lane | None | 45 mph north of Colbern Road/25 mph south of Colbern Road |
| Ball Drive | Residential Collector | 2-Lane | None | 25 mph |

The intersection of Colbern Road and the Northbound 291 Off-Ramp is a signalized intersection. Pedestrian accommodations including marked crosswalks and pedestrian pushbuttons and signal heads are provided at the intersection.

The intersection of Colbern Road and Rice Road is unsignalized with stop-control provided for the minor street approaches (Rice Road). Marked crosswalks are provided along the north and south legs of the intersection for east/west pedestrian travel.

The intersection of Colbern Road and Ball Drive is a signalized intersection. Pedestrian accommodations including marked crosswalks and pedestrian pushbuttons and signal heads are provided at the intersection.

Sidewalk is provided along Colbern Road along both the north and south sides of the roadway. The existing sidewalk network along the north side of Colbern Road ends at the Northbound 291 Off-Ramp. The south sidewalk network is continuous throughout the project area.

## 3.2. Existing Warrant Analysis

*Signal Warrants*

A traffic signal may be justified if traffic conditions meet any of the applicable nine signal warrants described in the 2009 Manual on Uniform Traffic Control Devices (MUTCD). The MUTCD provides criteria for conducting an engineering study to determine whether a traffic signal is appropriate at any intersection.

For this study, based on the data available, the Four-Hour Vehicular Volume Warrant (Warrant 2) and the Peak Hour Signal Warrant (Warrant 3) were reviewed under existing conditions to determine if alternative control measures are warranted for the currently unsignalized intersections of Colbern Road with Rice Road and the Existing Library/Church Access. Based on available data, the intersections do not meet the necessary criteria to warrant a traffic signal.

Signal warrant analysis sheets can be found in **Appendix B**.

*Turn Lane Warrants*

City of Lee's Summit Access Management Code (AMC) guidelines were reviewed for turn lanes along study area roadways.

Left-turn Lanes: Based on the Lee's Summit AMC, left-turn lanes shall be provided on all approaches to intersections controlled by a signal. Turn lanes are provided as recommended at signalized intersections with the exception of the northbound approach of Ball Drive at Colbern Road. This is a T-intersection, serving northbound traffic approaching Colbern Road (left and right-turn movements). A dedicated left-turn lane is not provided; however, the approach does not service a through movement thus a turn lane may not be required for this situation. Capacity analysis and queuing will be reviewed to determine if a dedicated turn lane is recommended.

Based on the Lee's Summit AMC, left-turn lanes shall be provided on all arterial streets at the intersection with another arterial or collector street. On major arterial streets, left-turn lanes shall be provided at the intersection with all connectors (an exception may be granted for a singular, existing, residential lot). Turn lanes are provided as recommended along Colbern Road at the study intersections.

Per the AMC, left-turn lanes shall be provided on non-residential connectors intersecting with major arterial streets (where left-turn egress is permitted). Left-turn lanes should be provided on any connector at any location as recommended by a traffic study or where the left-turn lane provides design efficiencies desired by the owner/developer with exception of access associated with residential property. Dedicated left-turn lanes are not provided for northbound and southbound approaches at the intersection of Colbern Road and Rice Road. Capacity analysis and queuing will be reviewed to determine if a dedicated turn lane is recommended.

The existing library access has a single exit approach. Capacity analysis and queuing will be reviewed to determine if a dedicated turn lane is recommended.

Per the AMC, the minimum length of a left-turn lane should be 200 feet plus taper on an arterial street at non-arterial intersecting locations. The minimum length of a left-turn lane on collectors should be 150 feet plus taper. The minimum length of a left-turn lane on connectors should meet the driveway throat length requirements.

The eastbound left-turn lane at Colbern Road and Rice Road (60-feet), does not meet the recommended turn bay length for an arterial intersecting a collector. The ability to increase the eastbound left-turn lane is limited by the presence of the adjacent intersection of Colbern Road and the Northbound 291 Off-Ramp. Capacity analysis and queuing for the movement will be reviewed.

The existing eastbound left-turn lane at the library access (90-feet) does not meet the recommended minimum turn bay length. The ability to increase the turn bay length is limited by the presence of turn bays for adjacent access drives. Capacity analysis and queuing for the movement will be reviewed.

Right-turn Lanes: Based on the Lee's Summit AMC, right-turn lanes shall be provided on arterial streets for any movement with a volume of 30 vehicles in any hour at each intersecting street or driveway. Based on this criteria, the eastbound right-turn movement at the intersection of Colbern Road and Rice Road exceeds the criteria for a right-turn lane by one vehicle during the PM peak hour period (31 right-turning vehicles) based on existing volumes. Due to the proximity of the intersection to the signalized intersection of Colbern Road and the Northbound 291 Off-Ramp, the opportunity to construct an eastbound right-turn lane is limited. Capacity analysis and queuing for this movement will be reviewed.

The eastbound right-turn movement at the intersection of Colbern Road and Ball Drive exceeds the criteria for a right-turn lane (67 right-turning vehicles) during the PM peak hour period based on existing volumes. Capacity analysis and queuing for this movement will be reviewed to determine if a dedicated right turn lane is recommended at this location.

Existing locations that do not meet left or right-turn lane standards include:

- Dedicated left-turn lanes in northbound and southbound directions at Colbern Road and Rice Road are not provided
- Eastbound left-turn lane with reduced storage at Colbern Road and Rice Road
- Eastbound left-turn lane with reduced storage at Colbern Road and Existing Library/East Church Drive
- Dedicated eastbound right-turn lane at Colbern Road and Rice Road is not provided
- Dedicated eastbound right-turn lane at Colbern Road and Ball Drive is not provided

Capacity analysis is provided in **Section 3.3** to determine if additional turn lanes and/or storage length is recommended based on existing operations. Existing conditions lane configurations and traffic control for the study intersections are illustrated in **Figure 2**.

## 3.3. Existing 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 2** shows the delays associated with each LOS grade for signalized and unsignalized intersections, respectively.

**Table 2. 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) | | |

Queuing analysis was conducted using the 95th-percentile queue length. This represents the queue length that has a 5 percent probability of being exceeded during the peak hour period.

Results of the analysis indicate that the existing signalized study intersections are operating at an overall LOS B or better with individual movements operating at a LOS C or better during the AM and PM peak hour periods. The following operations were noted for existing analysis:

AM Peak Hour

- Colbern Road and Northbound 291 Off-Ramp
    - The westbound through movement 95th percentile queue may extend past the intersection of Colbern Road and Rice Road during portions of the AM peak hour period.

All movements at the unsignalized study intersections are operating at LOS D or better with acceptable queues during both the AM and PM peak hour periods with the following exceptions:

- Colbern Road and Rice Road
    - The southbound through movement is operating at a LOS E with a 95$^{th}$ percentile queue length of 78 feet during the PM peak hour period.
    - The northbound through movement is operating at a LOS F with a 95$^{th}$ percentile queue of 215 feet during the PM peak hour period.
    - Operations of this movement were observed via data collection video. Actual queuing of the northbound and southbound movements were not observed to exceed 3 to 4 vehicles.
- Colbern Road and Existing Library/East Church Access
    - The northbound movement is operating at a LOS E with a 95$^{th}$ percentile queue length of less than one vehicle.

Referencing Section 20.7 of the HCM for Two-Way Stop-Controlled Intersections, minor street approaches with movements operating at a lower level of service during peak hour periods are not uncommon at an unsignalized intersection. This is more prevalent for stop-controlled left-turn movements in urban areas, as higher volumes on the main road are accommodated. The HCM suggests that performance measures in addition to delay, such as volume-to-capacity (v/c) ratios for individual movements and queue lengths, should also be considered when evaluating the overall performance at two-way stop-controlled intersections. At the unsignalized minor street approaches listed above, the v/c ratios and 95$^{th}$-percentile queues are acceptable during the peak hour periods with the exception of the northbound movement at the intersection of Colbern Road and Rice Road during the PM peak hour period. As stated above, the queue and delay represented in the capacity analysis was not noted during field observations. Capacity analysis will be reviewed for existing plus development conditions to determine if the proposed development has a substantial impact on existing operations.

Several existing turn lane deficiencies were noted. Capacity and queuing analysis were reviewed for each movement.

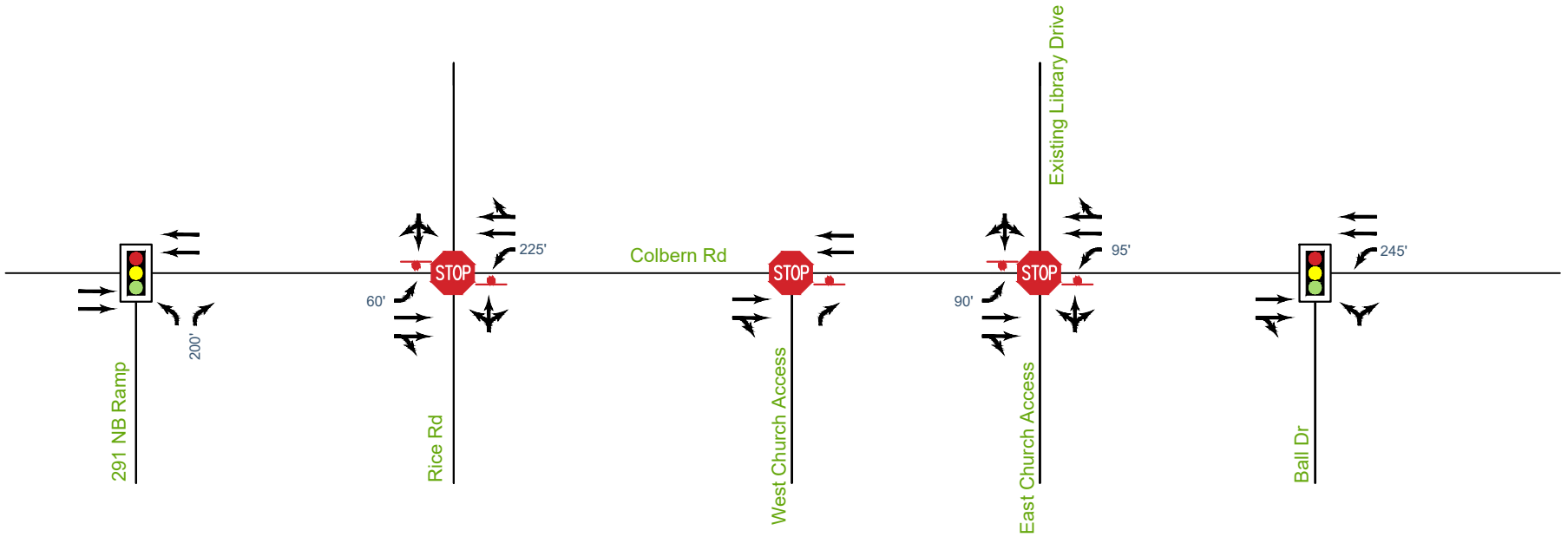
- *Dedicated left-turn lanes in northbound and southbound directions at Colbern Road and Rice Road are not provided.*
    - As mentioned under review of operations, data collection video was reviewed for the northbound and southbound approaches. Based on this review of operations, queuing of approximately 3 to 4 vehicles southbound and northbound was observed. This is consistent with reported southbound queuing but a decrease of expected northbound queuing.

  - Utilities in the area and existing access/development located in the southeast quadrant of the intersection may limit the opportunity for improvement. Additionally, the City has future plans for limitation of movements of this intersection and relocation of the full access intersection.
  - Capacity analysis will be reviewed for existing plus development conditions to determine if the proposed development has a substantial impact on existing operations.
- *Eastbound left-turn lane with reduced storage at Colbern Road and Rice Road*
  - Reviewing capacity analysis, the eastbound left-turn movement is operating at an acceptable level of service during both peak hour periods and 95$^{th}$ percentile queue lengths are not expected to exceed provided storage.
- *Eastbound left-turn lane with reduced storage at Colbern Road and Existing Library/East Church Drive*
  - Reviewing capacity analysis, the eastbound left-turn movement is operating at an acceptable level of service during both peak hour periods and 95$^{th}$ percentile queue lengths are not expected to exceed provided storage.
- *Dedicated eastbound right-turn lane at Colbern Road and Rice Road is not provided*
  - The limited intersection spacing between the Northbound 291 Off-Ramp and Rice Road limits the opportunity for an eastbound right-turn lane at this location. Volumes for the movement are low, and impact to the eastbound through movement is expected to be minimal.
- *Dedicated eastbound right-turn lane at Colbern Road and Ball Drive is not provided*
  - A longer through movement 95$^{th}$ percentile queue length (216') is noted during the PM peak hour period for the eastbound movement, although the queue is not indicated to extend to access for the business located west of the intersection. Capacity analysis will be reviewed for existing plus development conditions to determine if the proposed development has a substantial impact on existing operations.

# FIGURE 3

Existing
Lane Configuration and Traffic Control

Colbern Road MCPL
Lee's Summit, MO



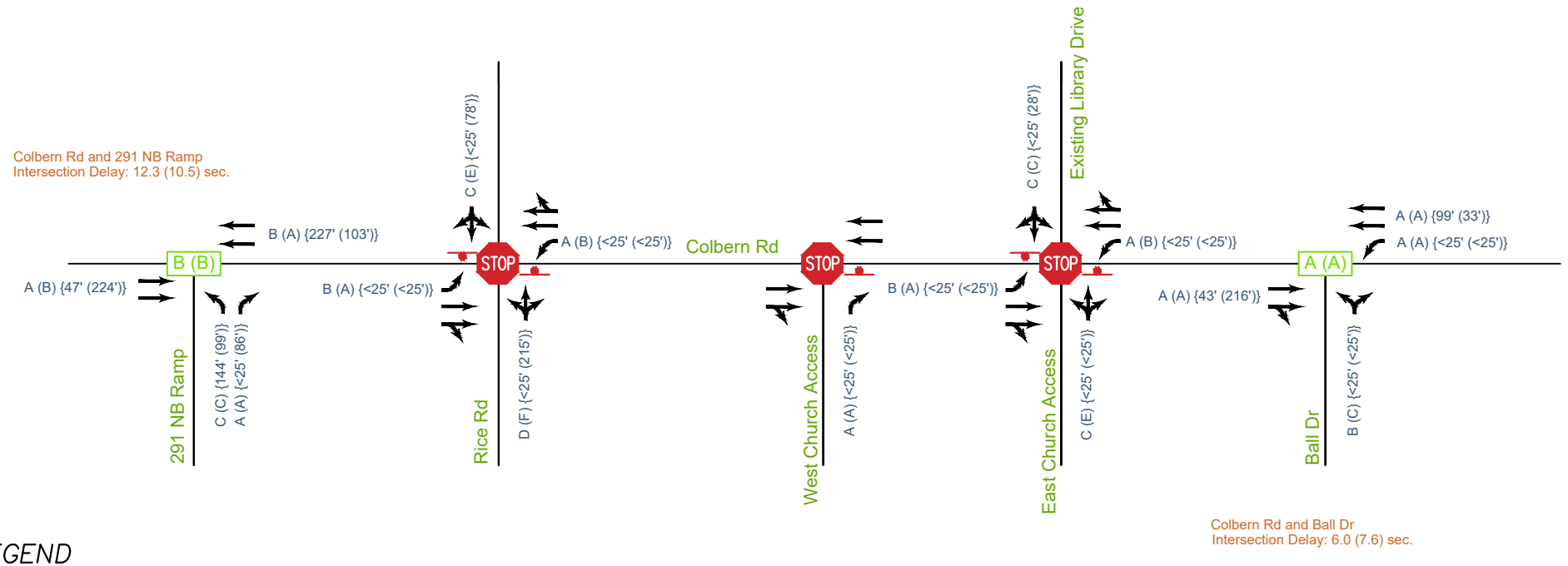

LEGEND

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

# FIGURE 4

Existing
Level of Service

Colbern Road MCPL
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 |

# 4. EXISTING PLUS PROPOSED DEVELOPMENT CONDITIONS

This scenario considers an expansion of the existing Mid-Continent Public Library located north of Colbern Road between Rice Road and Ball Drive. The proposed expansion consists of the addition of 20,000 square feet to the existing library (the current library square footage is approximately 15,000 square feet) for a total building square footage of 35,000 square feet. The site plan associated with the proposed development is illustrated in **Figure 5**.

The site plan illustrates proposed near-term access (considered during existing plus proposed development analysis) and a future access scenario. Proposed access dependent upon the existing and proposed roadway network will be discussed in detail in this section.

## 4.1. Proposed Development Trip Generation and Distribution

To determine the impact of potential site traffic on the roadway network, expected trips associated with the proposed expansion 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 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 3**. Detailed ITE trip generation information can be found in **Appendix C.**

**Table 3. Proposed Development Trip Generation.**

| Land Use | Size | Average Weekday | AM Peak Hour | | | PM Peak Hour | | |
|---|---|---|---|---|---|---|---|---|
| | | | Total | Enter | Exit | Total | Enter | Exit |
| Library | 20,000 SF | 1,403 | 21 | 15 | 6 | 170 | 82 | 88 |

Trips were distributed through the network based on the anticipated land use, the surrounding area, and the existing distribution of trips associated with the existing library. Directional trip distribution percentages expected for the site are illustrated in **Table 4.**

**Table 4. Proposed Development Trip Distribution.**

| Direction | Trip Distribution | |
|---|---|---|
| | TO | FROM |
| Colbern Road (West) | 60% | 45% |
| Colbern Road (East) | 30% | 30% |
| Ball Drive (South) | 10% | 10% |
| Northbound 291 Off-Ramp | 0% | 15% |
| **TOTAL** | **100%** | **100%** |

The City of Lee's Summit has indicated that a future roadway is planned west of the library site. At the writing of this report, conclusive plans regarding alignment, design, or funding for the future roadway were not available. However, access considerations for the library site considered this future roadway. For current development conditions, the existing full access library drive is proposed to remain. An additional right-in/right-out drive (Drive 1) is proposed approximately 200 feet west of the existing full access drive. The location of Drive 1 aligns with the anticipated location of the future roadway. A discussion of potential future access with construction of the roadway and how this may impact access to the library site is provided later in this report.

The expected trip distribution for the proposed development is shown in **Figure 5**. The resulting existing plus proposed development volumes are illustrated in **Figure 6**.

## 4.2. Access Characteristics

As discussed in **Section 4.1**, access is proposed to the site via the existing full access drive located along Colbern Road and via a proposed right-in/right-out (Drive 1) located west of the existing drive. The proposed right-in/right-out access aligns at the location of a proposed roadway extension. The use of the existing full access drive and Drive 1 are expected to be near-term solutions for access to the library. As the future roadway to the west of the site is constructed, alternative access considerations are proposed for the site and will be discussed later in the report.

*Access Spacing*

Drive 1 aligns with the location of a future roadway proposed to extend north from Colbern Road. As a right-in/right-out, Drive 1 does not meet spacing standards provided in the AMC as the drive is within the influence area of nearby drives serving adjacent development. However,

reviewing future plans for this roadway section and the drive location corresponding with a future roadway extension to the north, the location of Drive 1 incorporates future considerations. Discussion regarding access when the roadway is constructed north of Colbern Road is provided later in the report.

Drive 1 is located approximately 200 feet west of the existing library/east church drive (measured center to center). Drive 1 is located approximately 230 feet east of an existing full access drive located south of Colbern Road.

**Table 5. Access Characteristics**

| Proposed Access | Public Roadway Intersected | Access Type | Proposed Throat Length | Proposed Width | Median Divided |
|---|---|---|---|---|---|
| Existing Library Access | Colbern Road | Full Access | Existing (48 feet) | Existing (26 feet) | No |
| Drive 1 | Colbern Road | Right-In/ Right-Out | 81 feet | 28 feet | No |

Drive 1 access is expected to be constructed as an access to the library; the drive will not be constructed to standards associated with the planned roadway expansion. Driveway standards were reviewed for drive width and throat length.

Trip generation completed in **Section 4.1** of this report projects that Drive 1 will service 30 vehicles during the highest peak hour period. Drive 1 has a proposed driveway width of 28 feet. Referencing *Table 18-1* of the AMC, driveways servicing less than 150 vehicles per hour (vph) during the peak hour period should have a driveway width between 28 feet and 42 feet for two-way access. The proposed width of Drive 1 meets City standards.

Throat length standards for Drive 1 is based on projected peak hour volumes, per the City of Lee's Summit AMC. Drive 1 has a proposed driveway throat length of 81 feet. Referencing *Table 18-2* of the AMC, driveways servicing between 10 to 50 vph during the peak hour period should have a minimum throat length of 50 feet adjacent to an arterial roadway. The proposed throat length of Drive 1 meets City standards.

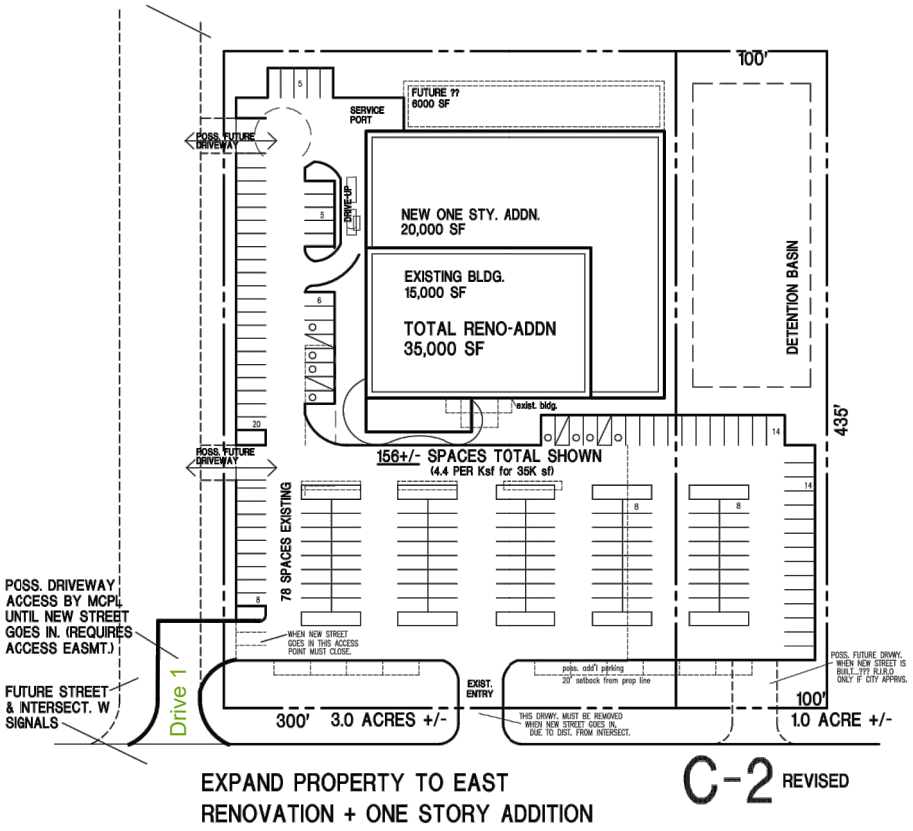
The driveway geometrics of the existing drive were reviewed considering additional traffic associated with the proposed expansion. The existing drive has an existing width of 26 feet. Based on the expected volume of 242 vehicles during the highest peak hour period, the AMC states a driveway width between 28 feet and 42 feet for two-way access. Based on acceptable current operations and acknowledgement that this access is expected to be modified in the future, the existing driveway width is expected to be acceptable.

The throat length of the existing drive is 45 feet. Based on the expected volume of 242 vehicles during the highest peak hour period, the AMC states the driveway throat should be a minimum of 125 feet. Acknowledging that this access is expected to be modified in the future, and that exiting vehicles can queue onto the site, the existing throat length is expected to be acceptable.

# FIGURE 5

Site Plan

Colbern Road MCPL
Lee's Summit, MO




PRELIMINARY

This dwg. is a prelim. sketch; actual conditions may vary.

0' 20' 40' 60'
1"=80' at 11x17;

MCPL
COLBERN ROAD BRANCH LEE'S SUMMIT MO

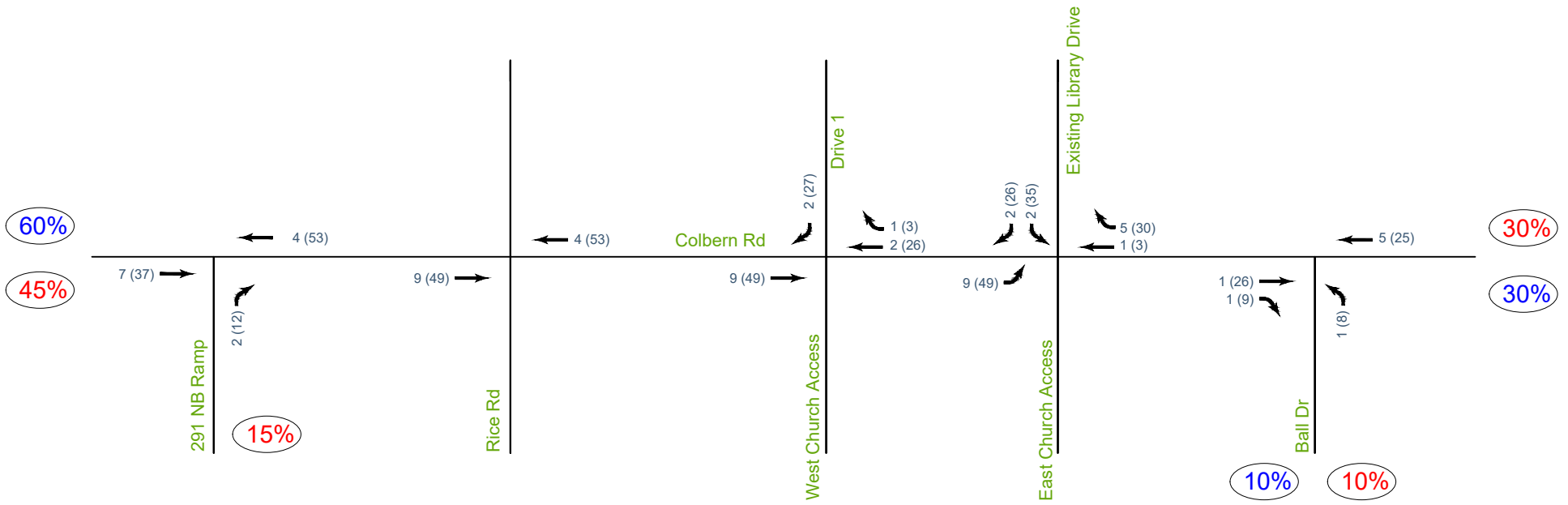
5-13-19
SITE STUDIES

SAPP DESIGN + helix ARCHITECTS

# FIGURE 6

Trip Distribution

Colbern Road MCPL
Lee's Summit, MO




*LEGEND*

AM (PM) *Primary Peak Hour Trips*

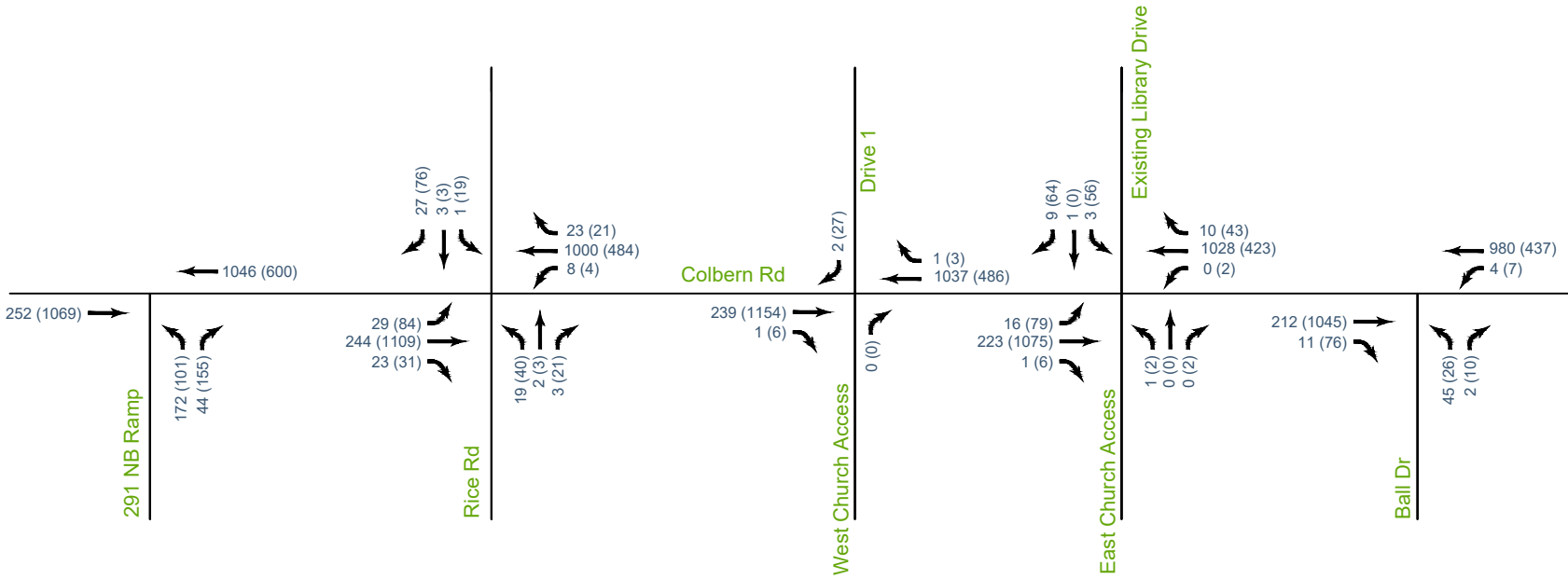
X% *Primary Entering Trip Distribution Percentage*

X% *Primary Exiting Trip Distribution Percentage*

# FIGURE 7

Existing plus Development
Peak Hour Volumes

Colbern Road MCPL
Lee's Summit, MO




*LEGEND*

AM (PM) *Peak Hour Volume*

## 4.3. Existing Plus Proposed Development Conditions

*Signal Warrants*

Considering existing plus proposed development volumes, the intersection of Colbern Road with Rice Road is not expected to meet the criteria for signalization during either peak hour period based on Warrant 3 (Peak Hour Warrant). The intersection of Colbern Road and the Existing Library/Church Drive is on the threshold for warranting a signal based on PM peak hour volumes. Due to only being warranted during the PM peak hour period, and future removal of this as a full access location, signalization is not recommended.

Signal warrant analysis sheets can be found in **Appendix C**.

*Turn Lane Warrants*

As discussed in **Section 3.2**, the following turn lane deficiencies were noted in existing conditions.

- Dedicated left-turn lanes in northbound and southbound directions at Colbern Road and Rice Road are not provided
- Eastbound left-turn lane with reduced storage at Colbern Road and Rice Road
- Eastbound left-turn lane with reduced storage at Colbern Road and Existing Library/East Church Drive
- Dedicated eastbound right-turn lane at Colbern Road and Rice Road is not provided
- Dedicated eastbound right-turn lane at Colbern Road and Ball Drive is not provided

Capacity analysis is provided in **Section 4.4** to determine if additional turn lanes and/or storage length is recommended based on existing operations.

Based on the Lee's Summit AMC, right-turn lanes shall be provided on arterial streets for any movement with a volume of 30 vehicles in any hour at each intersecting street or driveway. Based on this criteria, the westbound right-turn movement at the intersection of Colbern Road and Existing Library/East Church Drive exceeds the criteria for a right-turn lane during the PM peak hour period (43 right-turning vehicles) based on expected existing plus development volumes. Due to the planned relocation of this drive and exceeding the threshold for one peak hour period, it is not recommended to construct a right-turn lane. Capacity analysis and queuing for this movement will be reviewed.

Existing plus proposed development conditions lane configurations and traffic control for the study network are illustrated in **Figure 8**.

## 4.4. Existing Plus Proposed Development Capacity Analysis

Capacity analysis was performed under existing plus proposed development conditions using the methodologies described in **Section 3.3**. The peak hour factors observed under existing conditions were utilized for this scenario except for movements which are expected to experience an increase in traffic with the proposed development. At these locations, the peak hour factors were conservatively adjusted considering the Synchro suggested values and expected traffic conditions after development.

Results of the capacity analysis indicate similar operations to existing conditions. Results of the analysis indicate that the existing signalized study intersections are expected to operate at an overall LOS B or better with individual movements operating at a LOS C or better during the AM and PM peak hour periods.

All movements at the unsignalized study intersections are operating at LOS D or better with acceptable queues during both the AM and PM peak hour periods with the following exceptions:

- Colbern Road and Rice Road
    - Similar to the existing conditions, the northbound and southbound movements are expected to operate at a lower level of service. Significant increases to delay or 95$^{th}$ percentile queue lengths are not expected due to the proposed library expansion.
- Colbern Road and Existing Library/East Church Access
    - Similar to existing conditions, the northbound movement is expected to operate at a lower level of service. Significant increases to delay or 95$^{th}$ percentile queue lengths are not expected due to the proposed library expansion.
    - The southbound movement is expected to operate at a level of service F during the PM peak hour period with a 95$^{th}$ percentile queue length of 133 feet.
        - Existing throat length of this approach is not expected to accommodate the PM peak hour southbound 95$^{th}$ percentile queue. However, adequate storage for this queue length is provided on site. The main entrance for the library is expected to be located along the west side of the building, northwest of this proposed access. Thus, queuing associated with the movement would not be expected to significantly impact ingress to the main entrance.
        - Considering the future relocation and limitation of this access, the existing throat and acknowledgement of potential southbound queuing onto the site is expected to be acceptable.

As discussed in **Section 3.3**, v/c ratios were reviewed following guidance provided in the HCM. At the unsignalized minor street approaches listed above, the v/c ratios and 95$^{th}$-percentile queues are expected to be acceptable during the peak hour periods with the exception of the

northbound movement at the intersection of Colbern Road and Rice Road during the PM peak hour period. Comparing operations expected with development to existing conditions for this movement, the proposed development is expected to have a minimal impact on operations of this movement.

Several existing turn lane deficiencies were noted in **Section 3.2**. Capacity and queuing analysis were reviewed for each movement considering development conditions. After review of the analysis, it was determined that the proposed development is not expected to have a significant impact to existing operations. Operations specifically related to the existing library are further detailed below:

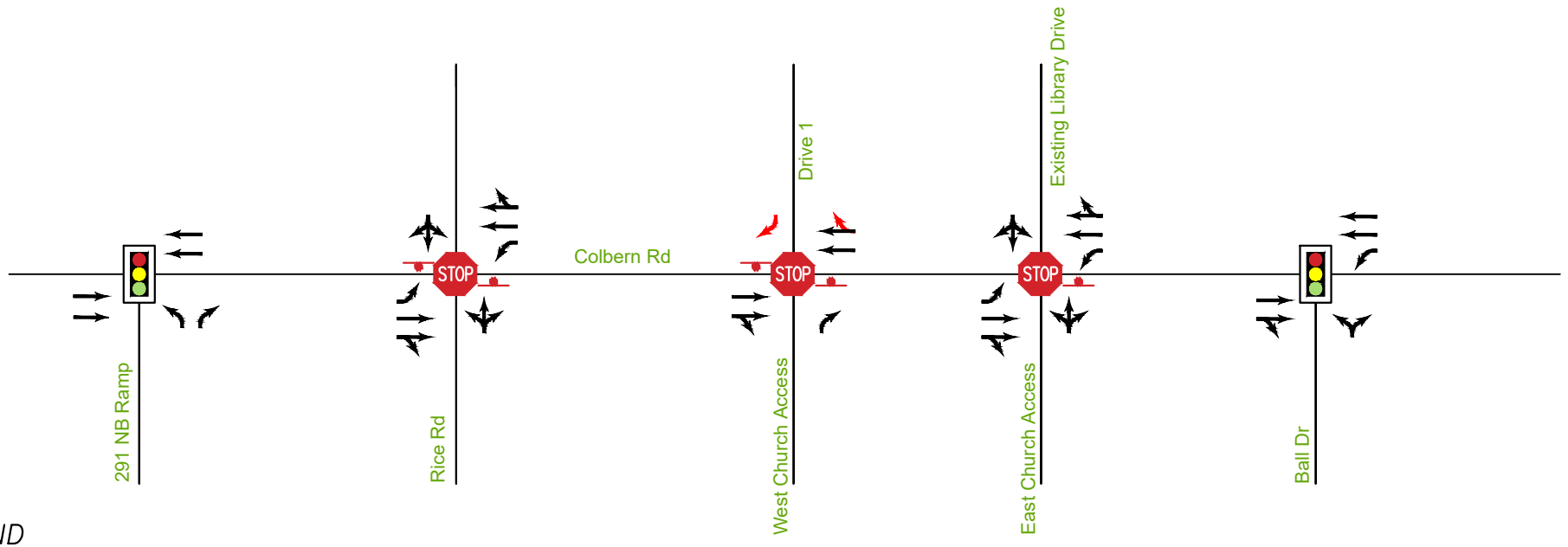
- *Eastbound left-turn lane with reduced storage at Colbern Road and Existing Library/East Church Drive*
    - Reviewing capacity analysis, the eastbound left-turn movement is operating at an acceptable level of service during both peak hour periods and 95$^{th}$ percentile queue lengths are not expected to exceed provided storage considering additional traffic associated with the proposed expansion.
- *Dedicated westbound right-turn lane at Colbern Road and Existing Library/Church*
    - Operations of the westbound movement are expected to be acceptable. Due to the full access location serving a near-term access need and the planned relocation of this drive in the future, construction of a westbound right-turn lane is not recommended.

The existing plus proposed development conditions capacity analysis summary is illustrated in **Figure 9**. Detailed results may be found in **Appendix C**.

# FIGURE 8

Existing plus Development
Lane Configuration and Traffic Control

Colbern Road MCPL
Lee's Summit, MO



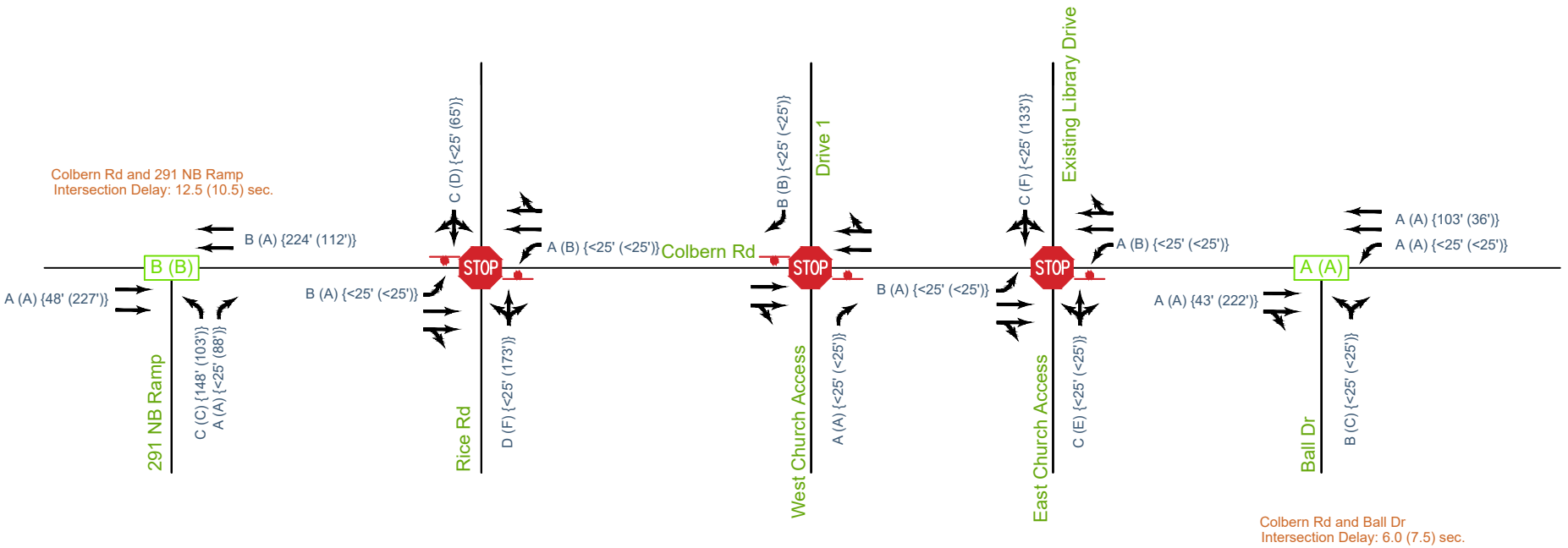

LEGEND

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

# FIGURE 9

Existing plus Development
Level of Service

Colbern Road MCPL
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

## 4.5. Future Access Considerations

As discussed at the beginning of this section, this study presents a review of a near-term solution for access for the proposed MCPL library expansion. Utilization of an existing full access location is recommended, as well as the addition of a right-in/right-out that aligns with a future proposed roadway extension.

When the roadway extension occurs at the west side of the project property, current access should be modified. The right-in/right-out will be removed and replaced with a full access intersection. It is assumed that this full access intersection will align with the existing west church access (currently limited to a right-in/right-out) located south of Colbern Road.

It should be noted that future analysis was not conducted. Consideration of future development that may occur along the proposed roadway or re-distribution of trips to the proposed roadway was outside the scope of this project review. However, a high-level review of future access considerations is provided. Prior to making access modification or design decisions, it is recommended to conduct analysis reviewing proposed use of the future roadway.

When the future roadway is constructed, a review of access along the south side of Colbern Road in the vicinity of the roadway extension should be reviewed. In order to provide turn lanes as recommended in the AMC, modifications to existing full access locations along the south side of Colbern Road may be required.

Specifically reviewing the library site, with the construction of the proposed roadway the right-in/right-out access will be eliminated.

To provide for adequate spacing from the new intersection of Colbern Road and the proposed roadway, the existing full access library drive located east of the proposed roadway should be located to the east edge of the property and limited to a right-in/right-out. Review of existing operations and changes to trip distribution due to revisions to the roadway network should be considered, but a westbound right-turn lane at this location may not be needed. Specific location of the proposed roadway is unknown at the writing of this report, however it is anticipated that the right-in/right-out for the library, located along Colbern Road, could be approximately 350 feet east of the proposed intersection (measured center to center).

It is anticipated that full access to the library site will be provided via the proposed roadway due to the limitation of access along Colbern Road. This supports improved access management along the Colbern Road corridor by limiting access along the major arterial roadway and providing access along a lower classification route (assuming the proposed roadway will operate as a collector or minor arterial roadway consistent with the current designation of Rice Road).

Access to the library from the proposed roadway should be located outside of any turn lanes associated with the southbound approach. It is anticipated that this will result in location of full access for the library towards the north edge of the library property line. As future development along the proposed roadway is considered, opportunities for shared full access with adjacent property to the north may be considered.

A right-in/right-out access is illustrated on the site plan along the new roadway between Colbern Road and the library full access. Potential for a right-in/right-out access should be considered when more definitive roadway plans are available.

# 5. SUMMARY

The purpose of this study was to summarize traffic impacts regarding a proposed library expansion to the existing Mid-Continent Public Library Colbern Road branch located north of Colbern Road between Rice Road and Ball Drive in Lee's Summit, Missouri.

## 5.1. Conclusions

The general findings of note for the traffic impact study include the following:

1. In general, traffic operations are not expected to be significantly impacted by the proposed development.
2. Several existing deficiencies of turn lanes at study intersections were noted, either turn lanes not provided or have reduced existing storage length. The operations of these existing movements are not expected to be significantly impacted by the proposed development.
3. An increase in southbound queuing at the existing library drive is expected with the library expansion. This queuing is expected to exceed available throat but can be contained internal to the site. Considering the future relocation and restriction of access at this drive location, the operations are expected to be acceptable.
4. As modifications are made to the roadway network in the vicinity of this project, evaluation of existing access and modifications to accommodate future roadway projects should be made.

## 5.2. Recommendations

There are no recommended improvements associated with the proposed development conditions analysis conducted for this study. As modifications to the roadway network in the vicinity of the library are made, a review of access should be conducted.

# APPENDIX A

Data Collection

Count Data

Olsson Associates : Overland Park
7301 West 133rd St

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

Count Name: Colbern Rd & Route 291 NB Off-Ramp
Site Code:
Start Date: 07/23/2019

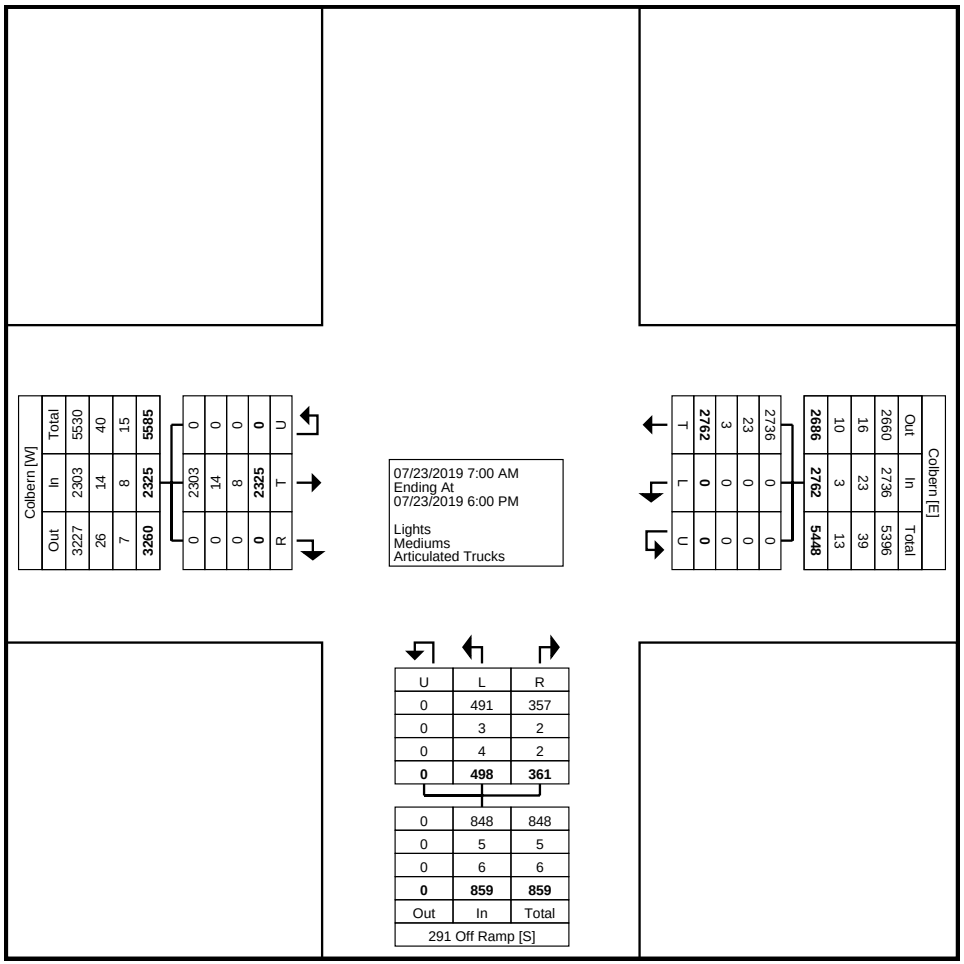

# Turning Movement Data

| Start Time | Colbern Westbound | | | | 291 Off Ramp Northbound | | | | Colbern Eastbound | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Thru | Left | U-Turn | App. Total | Right | Left | U-Turn | App. Total | Right | Thru | U-Turn | App. Total | Int. Total |
| 7:00 AM | 243 | 0 | 0 | 243 | 10 | 39 | 0 | 49 | 0 | 51 | 0 | 51 | 343 |
| 7:15 AM | 272 | 0 | 0 | 272 | 7 | 46 | 0 | 53 | 0 | 60 | 0 | 60 | 385 |
| 7:30 AM | 233 | 0 | 0 | 233 | 14 | 43 | 0 | 57 | 0 | 64 | 0 | 64 | 354 |
| 7:45 AM | 281 | 0 | 0 | 281 | 11 | 44 | 0 | 55 | 0 | 70 | 0 | 70 | 406 |
| Hourly Total | 1029 | 0 | 0 | 1029 | 42 | 172 | 0 | 214 | 0 | 245 | 0 | 245 | 1488 |
| 8:00 AM | 224 | 0 | 0 | 224 | 12 | 30 | 0 | 42 | 0 | 68 | 0 | 68 | 334 |
| 8:15 AM | 179 | 0 | 0 | 179 | 12 | 45 | 0 | 57 | 0 | 62 | 0 | 62 | 298 |
| 8:30 AM | 165 | 0 | 0 | 165 | 13 | 24 | 0 | 37 | 0 | 57 | 0 | 57 | 259 |
| 8:45 AM | 166 | 0 | 0 | 166 | 12 | 25 | 0 | 37 | 0 | 81 | 0 | 81 | 284 |
| Hourly Total | 734 | 0 | 0 | 734 | 49 | 124 | 0 | 173 | 0 | 268 | 0 | 268 | 1175 |
| *** BREAK *** | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 4:00 PM | 115 | 0 | 0 | 115 | 32 | 32 | 0 | 64 | 0 | 191 | 0 | 191 | 370 |
| 4:15 PM | 128 | 0 | 0 | 128 | 26 | 17 | 0 | 43 | 0 | 176 | 0 | 176 | 347 |
| 4:30 PM | 117 | 0 | 0 | 117 | 37 | 28 | 0 | 65 | 0 | 211 | 0 | 211 | 393 |
| 4:45 PM | 151 | 0 | 0 | 151 | 38 | 25 | 0 | 63 | 0 | 232 | 0 | 232 | 446 |
| Hourly Total | 511 | 0 | 0 | 511 | 133 | 102 | 0 | 235 | 0 | 810 | 0 | 810 | 1556 |
| 5:00 PM | 146 | 0 | 0 | 146 | 41 | 24 | 0 | 65 | 0 | 297 | 0 | 297 | 508 |
| 5:15 PM | 121 | 0 | 0 | 121 | 35 | 26 | 0 | 61 | 0 | 274 | 0 | 274 | 456 |
| 5:30 PM | 117 | 0 | 0 | 117 | 29 | 26 | 0 | 55 | 0 | 224 | 0 | 224 | 396 |
| 5:45 PM | 104 | 0 | 0 | 104 | 32 | 24 | 0 | 56 | 0 | 207 | 0 | 207 | 367 |
| Hourly Total | 488 | 0 | 0 | 488 | 137 | 100 | 0 | 237 | 0 | 1002 | 0 | 1002 | 1727 |
| Grand Total | 2762 | 0 | 0 | 2762 | 361 | 498 | 0 | 859 | 0 | 2325 | 0 | 2325 | 5946 |
| Approach % | 100.0 | 0.0 | 0.0 | - | 42.0 | 58.0 | 0.0 | - | 0.0 | 100.0 | 0.0 | - | - |
| Total % | 46.5 | 0.0 | 0.0 | 46.5 | 6.1 | 8.4 | 0.0 | 14.4 | 0.0 | 39.1 | 0.0 | 39.1 | - |
| Lights | 2736 | 0 | 0 | 2736 | 357 | 491 | 0 | 848 | 0 | 2303 | 0 | 2303 | 5887 |
| % Lights | 99.1 | - | - | 99.1 | 98.9 | 98.6 | - | 98.7 | - | 99.1 | - | 99.1 | 99.0 |
| Mediums | 23 | 0 | 0 | 23 | 2 | 3 | 0 | 5 | 0 | 14 | 0 | 14 | 42 |
| % Mediums | 0.8 | - | - | 0.8 | 0.6 | 0.6 | - | 0.6 | - | 0.6 | - | 0.6 | 0.7 |
| Articulated Trucks | 3 | 0 | 0 | 3 | 2 | 4 | 0 | 6 | 0 | 8 | 0 | 8 | 17 |
| % Articulated Trucks | 0.1 | - | - | 0.1 | 0.6 | 0.8 | - | 0.7 | - | 0.3 | - | 0.3 | 0.3 |

Olsson Associates : Overland Park
7301 West 133rd St

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

Count Name: Colbern Rd & Route 291 NB Off-Ramp
Site Code:
Start Date: 07/23/2019


Turning Movement Data Plot

Olsson Associates : Overland Park
7301 West 133rd St

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

Count Name: Colbern Rd & Route 291 NB Off-Ramp
Site Code:
Start Date: 07/23/2019


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

| Start Time | Colbern Westbound | | | | 291 Off Ramp Northbound | | | | Colbern Eastbound | | | | Int. Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Thru | Left | U-Turn | App. Total | Right | Left | U-Turn | App. Total | Right | Thru | U-Turn | App. Total | |
| 7:00 AM | 243 | 0 | 0 | 243 | 10 | 39 | 0 | 49 | 0 | 51 | 0 | 51 | 343 |
| 7:15 AM | 272 | 0 | 0 | 272 | 7 | 46 | 0 | 53 | 0 | 60 | 0 | 60 | 385 |
| 7:30 AM | 233 | 0 | 0 | 233 | 14 | 43 | 0 | 57 | 0 | 64 | 0 | 64 | 354 |
| 7:45 AM | 281 | 0 | 0 | 281 | 11 | 44 | 0 | 55 | 0 | 70 | 0 | 70 | 406 |
| Total | 1029 | 0 | 0 | 1029 | 42 | 172 | 0 | 214 | 0 | 245 | 0 | 245 | 1488 |
| Approach % | 100.0 | 0.0 | 0.0 | - | 19.6 | 80.4 | 0.0 | - | 0.0 | 100.0 | 0.0 | - | - |
| Total % | 69.2 | 0.0 | 0.0 | 69.2 | 2.8 | 11.6 | 0.0 | 14.4 | 0.0 | 16.5 | 0.0 | 16.5 | - |
| PHF | 0.915 | 0.000 | 0.000 | 0.915 | 0.750 | 0.935 | 0.000 | 0.939 | 0.000 | 0.875 | 0.000 | 0.875 | 0.916 |
| Lights | 1022 | 0 | 0 | 1022 | 40 | 171 | 0 | 211 | 0 | 237 | 0 | 237 | 1470 |
| % Lights | 99.3 | - | - | 99.3 | 95.2 | 99.4 | - | 98.6 | - | 96.7 | - | 96.7 | 98.8 |
| Mediums | 4 | 0 | 0 | 4 | 1 | 1 | 0 | 2 | 0 | 5 | 0 | 5 | 11 |
| % Mediums | 0.4 | - | - | 0.4 | 2.4 | 0.6 | - | 0.9 | - | 2.0 | - | 2.0 | 0.7 |
| Articulated Trucks | 3 | 0 | 0 | 3 | 1 | 0 | 0 | 1 | 0 | 3 | 0 | 3 | 7 |
| % Articulated Trucks | 0.3 | - | - | 0.3 | 2.4 | 0.0 | - | 0.5 | - | 1.2 | - | 1.2 | 0.5 |

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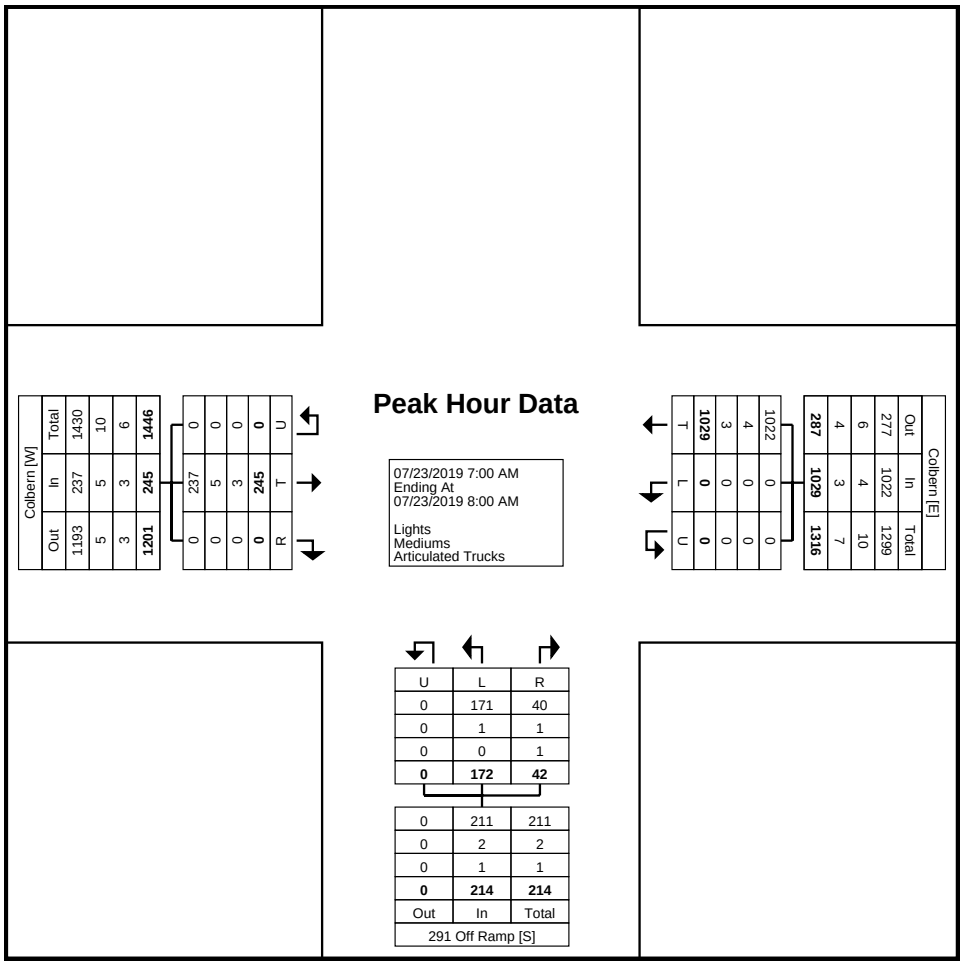
7301 West 133rd St

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

Count Name: Colbern Rd & Route 291 NB Off-Ramp
Site Code:
Start Date: 07/23/2019


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

Olsson Associates : Overland Park
7301 West 133rd St

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

Count Name: Colbern Rd & Route 291 NB Off-Ramp
Site Code:
Start Date: 07/23/2019


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

| Start Time | Colbern Westbound | | | | 291 Off Ramp Northbound | | | | Colbern Eastbound | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Thru | Left | U-Turn | App. Total | Right | Left | U-Turn | App. Total | Right | Thru | U-Turn | App. Total | Int. Total |
| 4:45 PM | 151 | 0 | 0 | 151 | 38 | 25 | 0 | 63 | 0 | 232 | 0 | 232 | 446 |
| 5:00 PM | 146 | 0 | 0 | 146 | 41 | 24 | 0 | 65 | 0 | 297 | 0 | 297 | 508 |
| 5:15 PM | 121 | 0 | 0 | 121 | 35 | 26 | 0 | 61 | 0 | 274 | 0 | 274 | 456 |
| 5:30 PM | 117 | 0 | 0 | 117 | 29 | 26 | 0 | 55 | 0 | 224 | 0 | 224 | 396 |
| Total | 535 | 0 | 0 | 535 | 143 | 101 | 0 | 244 | 0 | 1027 | 0 | 1027 | 1806 |
| Approach % | 100.0 | 0.0 | 0.0 | - | 58.6 | 41.4 | 0.0 | - | 0.0 | 100.0 | 0.0 | - | - |
| Total % | 29.6 | 0.0 | 0.0 | 29.6 | 7.9 | 5.6 | 0.0 | 13.5 | 0.0 | 56.9 | 0.0 | 56.9 | - |
| PHF | 0.886 | 0.000 | 0.000 | 0.886 | 0.872 | 0.971 | 0.000 | 0.938 | 0.000 | 0.864 | 0.000 | 0.864 | 0.889 |
| Lights | 527 | 0 | 0 | 527 | 143 | 99 | 0 | 242 | 0 | 1022 | 0 | 1022 | 1791 |
| % Lights | 98.5 | - | - | 98.5 | 100.0 | 98.0 | - | 99.2 | - | 99.5 | - | 99.5 | 99.2 |
| Mediums | 8 | 0 | 0 | 8 | 0 | 1 | 0 | 1 | 0 | 2 | 0 | 2 | 11 |
| % Mediums | 1.5 | - | - | 1.5 | 0.0 | 1.0 | - | 0.4 | - | 0.2 | - | 0.2 | 0.6 |
| Articulated Trucks | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 1 | 0 | 3 | 0 | 3 | 4 |
| % Articulated Trucks | 0.0 | - | - | 0.0 | 0.0 | 1.0 | - | 0.4 | - | 0.3 | - | 0.3 | 0.2 |

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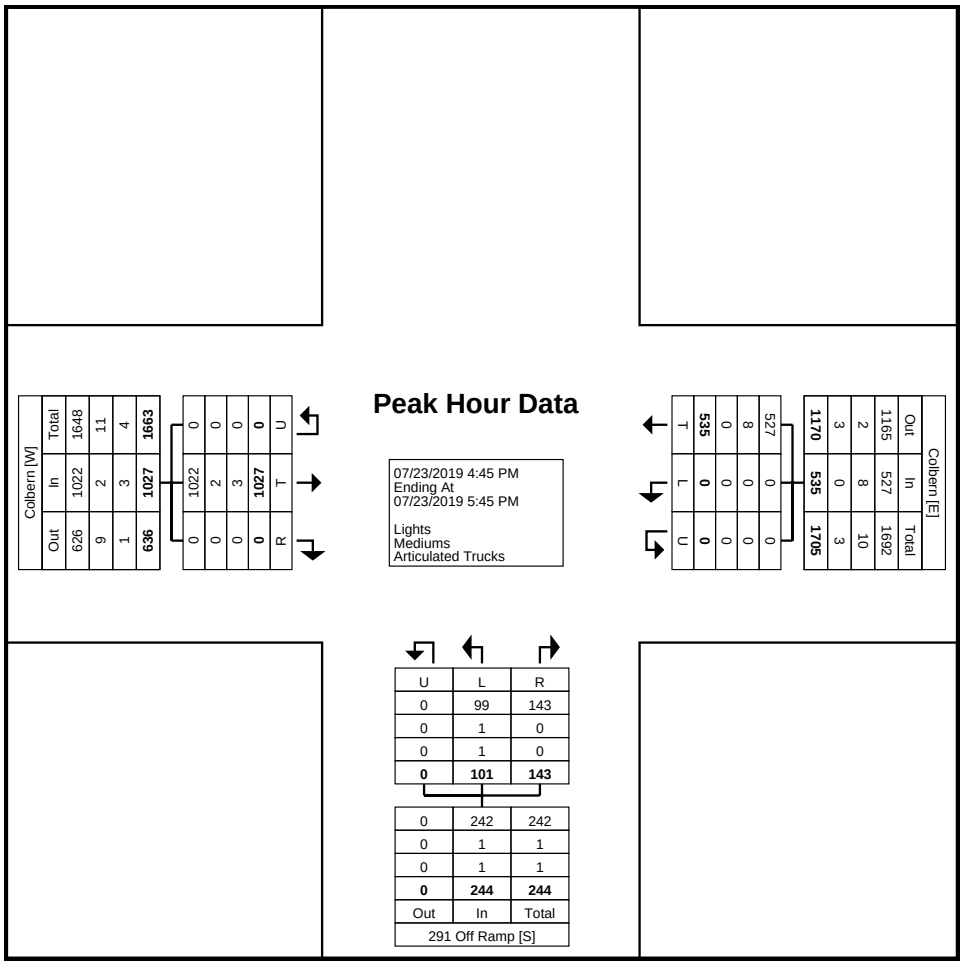
7301 West 133rd St

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

Count Name: Colbern Rd & Route 291 NB Off-Ramp
Site Code:
Start Date: 07/23/2019


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

Olsson Associates : Overland Park
7301 West 133rd St

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

Count Name: Colbern Rd & Ball Dr
Site Code:
Start Date: 07/23/2019

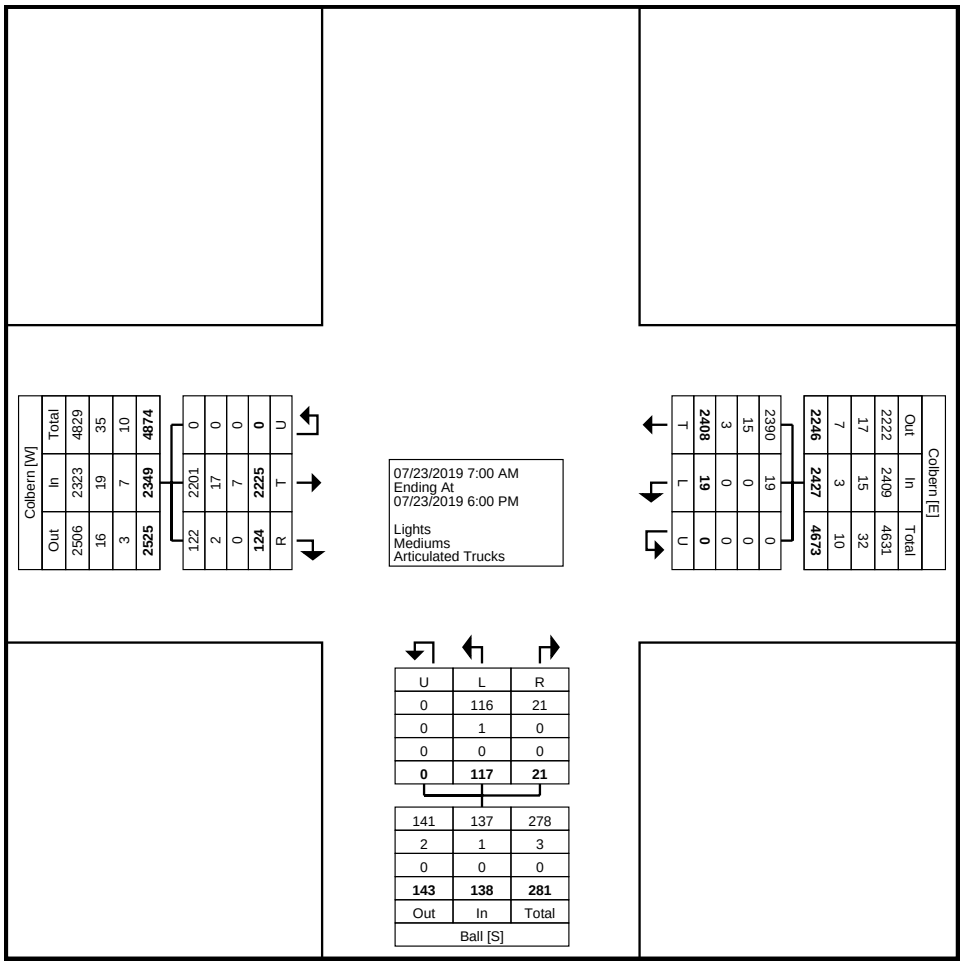

# Turning Movement Data

| Start Time | Colbern Westbound | | | | Ball Northbound | | | | Colbern Eastbound | | | | Int. Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Thru | Left | U-Turn | App. Total | Right | Left | U-Turn | App. Total | Right | Thru | U-Turn | App. Total | |
| 7:00 AM | 241 | 1 | 0 | 242 | 0 | 14 | 0 | 14 | 3 | 42 | 0 | 45 | 301 |
| 7:15 AM | 243 | 0 | 0 | 243 | 0 | 12 | 0 | 12 | 1 | 52 | 0 | 53 | 308 |
| 7:30 AM | 235 | 0 | 0 | 235 | 1 | 7 | 0 | 8 | 3 | 56 | 0 | 59 | 302 |
| 7:45 AM | 256 | 3 | 0 | 259 | 1 | 11 | 0 | 12 | 3 | 54 | 0 | 57 | 328 |
| Hourly Total | 975 | 4 | 0 | 979 | 2 | 44 | 0 | 46 | 10 | 204 | 0 | 214 | 1239 |
| 8:00 AM | 200 | 2 | 0 | 202 | 1 | 13 | 0 | 14 | 1 | 55 | 0 | 56 | 272 |
| 8:15 AM | 164 | 0 | 0 | 164 | 2 | 6 | 0 | 8 | 4 | 51 | 0 | 55 | 227 |
| 8:30 AM | 160 | 1 | 0 | 161 | 3 | 5 | 0 | 8 | 1 | 45 | 0 | 46 | 215 |
| 8:45 AM | 152 | 1 | 0 | 153 | 0 | 7 | 0 | 7 | 6 | 58 | 0 | 64 | 224 |
| Hourly Total | 676 | 4 | 0 | 680 | 6 | 31 | 0 | 37 | 12 | 209 | 0 | 221 | 938 |
| *** BREAK *** | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 4:00 PM | 93 | 0 | 0 | 93 | 0 | 9 | 0 | 9 | 7 | 167 | 0 | 174 | 276 |
| 4:15 PM | 84 | 0 | 0 | 84 | 1 | 6 | 0 | 7 | 6 | 190 | 0 | 196 | 287 |
| 4:30 PM | 85 | 0 | 0 | 85 | 0 | 2 | 0 | 2 | 7 | 232 | 0 | 239 | 326 |
| 4:45 PM | 122 | 1 | 0 | 123 | 2 | 4 | 0 | 6 | 15 | 238 | 0 | 253 | 382 |
| Hourly Total | 384 | 1 | 0 | 385 | 3 | 21 | 0 | 24 | 35 | 827 | 0 | 862 | 1271 |
| 5:00 PM | 94 | 1 | 0 | 95 | 3 | 2 | 0 | 5 | 14 | 292 | 0 | 306 | 406 |
| 5:15 PM | 92 | 2 | 0 | 94 | 2 | 3 | 0 | 5 | 20 | 274 | 0 | 294 | 393 |
| 5:30 PM | 94 | 3 | 0 | 97 | 3 | 9 | 0 | 12 | 18 | 215 | 0 | 233 | 342 |
| 5:45 PM | 93 | 4 | 0 | 97 | 2 | 7 | 0 | 9 | 15 | 204 | 0 | 219 | 325 |
| Hourly Total | 373 | 10 | 0 | 383 | 10 | 21 | 0 | 31 | 67 | 985 | 0 | 1052 | 1466 |
| Grand Total | 2408 | 19 | 0 | 2427 | 21 | 117 | 0 | 138 | 124 | 2225 | 0 | 2349 | 4914 |
| Approach % | 99.2 | 0.8 | 0.0 | - | 15.2 | 84.8 | 0.0 | - | 5.3 | 94.7 | 0.0 | - | - |
| Total % | 49.0 | 0.4 | 0.0 | 49.4 | 0.4 | 2.4 | 0.0 | 2.8 | 2.5 | 45.3 | 0.0 | 47.8 | - |
| Lights | 2390 | 19 | 0 | 2409 | 21 | 116 | 0 | 137 | 122 | 2201 | 0 | 2323 | 4869 |
| % Lights | 99.3 | 100.0 | - | 99.3 | 100.0 | 99.1 | - | 99.3 | 98.4 | 98.9 | - | 98.9 | 99.1 |
| Mediums | 15 | 0 | 0 | 15 | 0 | 1 | 0 | 1 | 2 | 17 | 0 | 19 | 35 |
| % Mediums | 0.6 | 0.0 | - | 0.6 | 0.0 | 0.9 | - | 0.7 | 1.6 | 0.8 | - | 0.8 | 0.7 |
| Articulated Trucks | 3 | 0 | 0 | 3 | 0 | 0 | 0 | 0 | 0 | 7 | 0 | 7 | 10 |
| % Articulated Trucks | 0.1 | 0.0 | - | 0.1 | 0.0 | 0.0 | - | 0.0 | 0.0 | 0.3 | - | 0.3 | 0.2 |

Olsson Associates : Overland Park
7301 West 133rd St

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

Count Name: Colbern Rd & Ball Dr
Site Code:
Start Date: 07/23/2019


Turning Movement Data Plot

Olsson Associates : Overland Park
7301 West 133rd St

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

Count Name: Colbern Rd & Ball Dr
Site Code:
Start Date: 07/23/2019

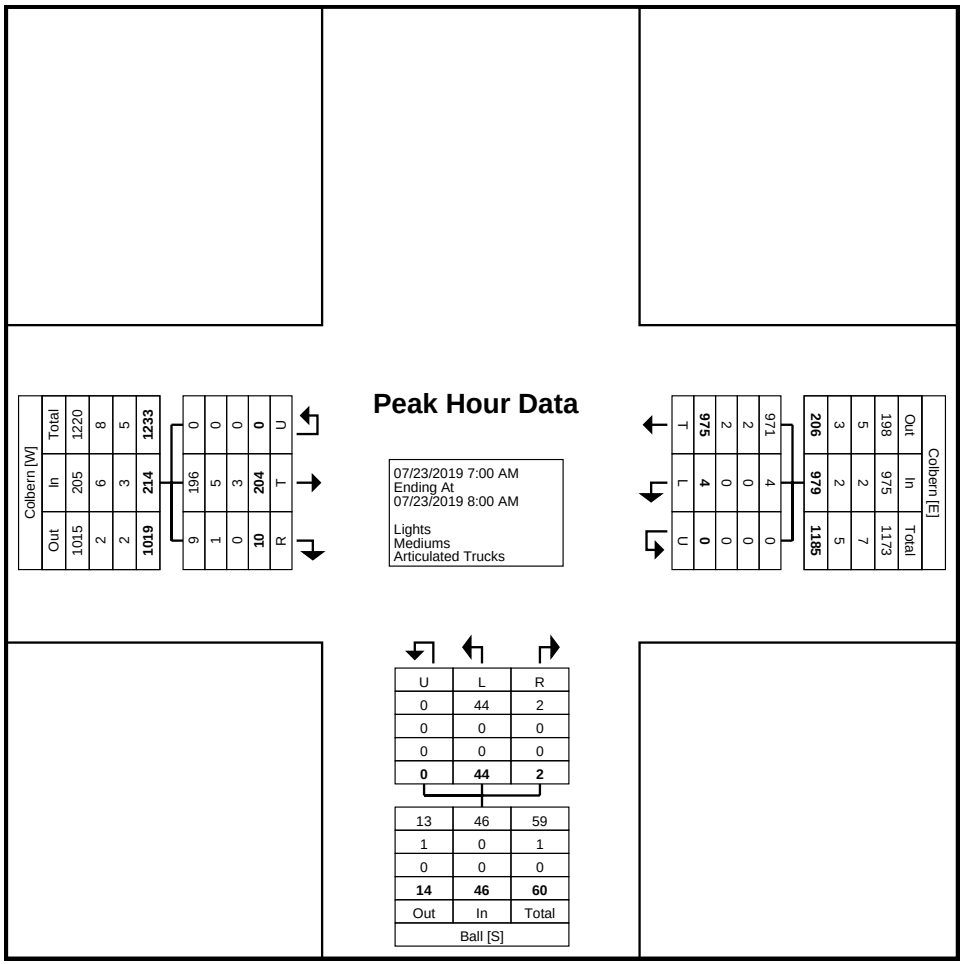

# Turning Movement Peak Hour Data (7:00 AM)

| Start Time | Colbern Westbound | | | | Ball Northbound | | | | Colbern Eastbound | | | | Int. Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Thru | Left | U-Turn | App. Total | Right | Left | U-Turn | App. Total | Right | Thru | U-Turn | App. Total | |
| 7:00 AM | 241 | 1 | 0 | 242 | 0 | 14 | 0 | 14 | 3 | 42 | 0 | 45 | 301 |
| 7:15 AM | 243 | 0 | 0 | 243 | 0 | 12 | 0 | 12 | 1 | 52 | 0 | 53 | 308 |
| 7:30 AM | 235 | 0 | 0 | 235 | 1 | 7 | 0 | 8 | 3 | 56 | 0 | 59 | 302 |
| 7:45 AM | 256 | 3 | 0 | 259 | 1 | 11 | 0 | 12 | 3 | 54 | 0 | 57 | 328 |
| Total | 975 | 4 | 0 | 979 | 2 | 44 | 0 | 46 | 10 | 204 | 0 | 214 | 1239 |
| Approach % | 99.6 | 0.4 | 0.0 | - | 4.3 | 95.7 | 0.0 | - | 4.7 | 95.3 | 0.0 | - | - |
| Total % | 78.7 | 0.3 | 0.0 | 79.0 | 0.2 | 3.6 | 0.0 | 3.7 | 0.8 | 16.5 | 0.0 | 17.3 | - |
| PHF | 0.952 | 0.333 | 0.000 | 0.945 | 0.500 | 0.786 | 0.000 | 0.821 | 0.833 | 0.911 | 0.000 | 0.907 | 0.944 |
| Lights | 971 | 4 | 0 | 975 | 2 | 44 | 0 | 46 | 9 | 196 | 0 | 205 | 1226 |
| % Lights | 99.6 | 100.0 | - | 99.6 | 100.0 | 100.0 | - | 100.0 | 90.0 | 96.1 | - | 95.8 | 99.0 |
| Mediums | 2 | 0 | 0 | 2 | 0 | 0 | 0 | 0 | 1 | 5 | 0 | 6 | 8 |
| % Mediums | 0.2 | 0.0 | - | 0.2 | 0.0 | 0.0 | - | 0.0 | 10.0 | 2.5 | - | 2.8 | 0.6 |
| Articulated Trucks | 2 | 0 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 3 | 0 | 3 | 5 |
| % Articulated Trucks | 0.2 | 0.0 | - | 0.2 | 0.0 | 0.0 | - | 0.0 | 0.0 | 1.5 | - | 1.4 | 0.4 |

Olsson Associates : Overland Park
7301 West 133rd St

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

Count Name: Colbern Rd & Ball Dr
Site Code:
Start Date: 07/23/2019


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

Olsson Associates : Overland Park
7301 West 133rd St

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

Count Name: Colbern Rd & Ball Dr
Site Code:
Start Date: 07/23/2019

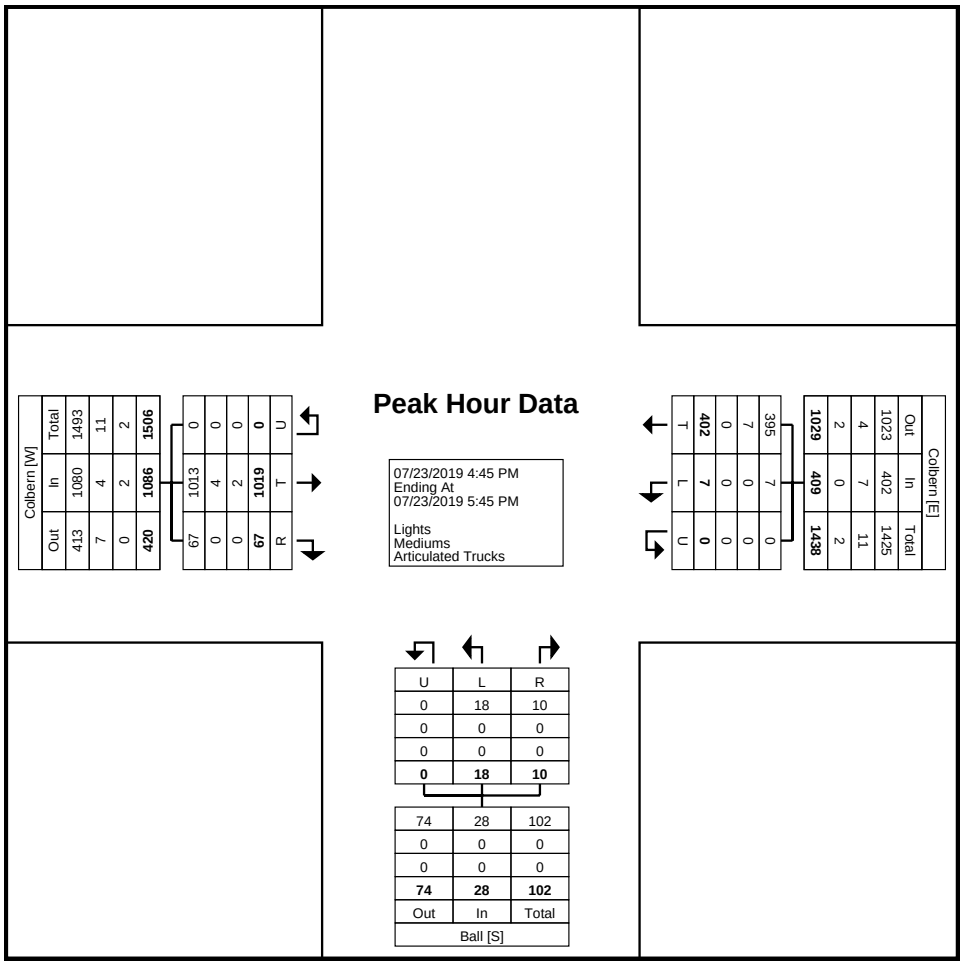

# Turning Movement Peak Hour Data (4:45 PM)

| Start Time | Colbern Westbound | | | | Ball Northbound | | | | Colbern Eastbound | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Thru | Left | U-Turn | App. Total | Right | Left | U-Turn | App. Total | Right | Thru | U-Turn | App. Total | Int. Total |
| 4:45 PM | 122 | 1 | 0 | 123 | 2 | 4 | 0 | 6 | 15 | 238 | 0 | 253 | 382 |
| 5:00 PM | 94 | 1 | 0 | 95 | 3 | 2 | 0 | 5 | 14 | 292 | 0 | 306 | 406 |
| 5:15 PM | 92 | 2 | 0 | 94 | 2 | 3 | 0 | 5 | 20 | 274 | 0 | 294 | 393 |
| 5:30 PM | 94 | 3 | 0 | 97 | 3 | 9 | 0 | 12 | 18 | 215 | 0 | 233 | 342 |
| Total | 402 | 7 | 0 | 409 | 10 | 18 | 0 | 28 | 67 | 1019 | 0 | 1086 | 1523 |
| Approach % | 98.3 | 1.7 | 0.0 | - | 35.7 | 64.3 | 0.0 | - | 6.2 | 93.8 | 0.0 | - | - |
| Total % | 26.4 | 0.5 | 0.0 | 26.9 | 0.7 | 1.2 | 0.0 | 1.8 | 4.4 | 66.9 | 0.0 | 71.3 | - |
| PHF | 0.824 | 0.583 | 0.000 | 0.831 | 0.833 | 0.500 | 0.000 | 0.583 | 0.838 | 0.872 | 0.000 | 0.887 | 0.938 |
| Lights | 395 | 7 | 0 | 402 | 10 | 18 | 0 | 28 | 67 | 1013 | 0 | 1080 | 1510 |
| % Lights | 98.3 | 100.0 | - | 98.3 | 100.0 | 100.0 | - | 100.0 | 100.0 | 99.4 | - | 99.4 | 99.1 |
| Mediums | 7 | 0 | 0 | 7 | 0 | 0 | 0 | 0 | 0 | 4 | 0 | 4 | 11 |
| % Mediums | 1.7 | 0.0 | - | 1.7 | 0.0 | 0.0 | - | 0.0 | 0.0 | 0.4 | - | 0.4 | 0.7 |
| Articulated Trucks | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 0 | 2 | 2 |
| % Articulated Trucks | 0.0 | 0.0 | - | 0.0 | 0.0 | 0.0 | - | 0.0 | 0.0 | 0.2 | - | 0.2 | 0.1 |

Olsson Associates : Overland Park
7301 West 133rd St

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

Count Name: Colbern Rd & Ball Dr
Site Code:
Start Date: 07/23/2019


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

Olsson Associates : Overland Park
7301 West 133rd St

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

Count Name: Colbern Rd & Existing Church Access
Site Code:
Start Date: 07/23/2019

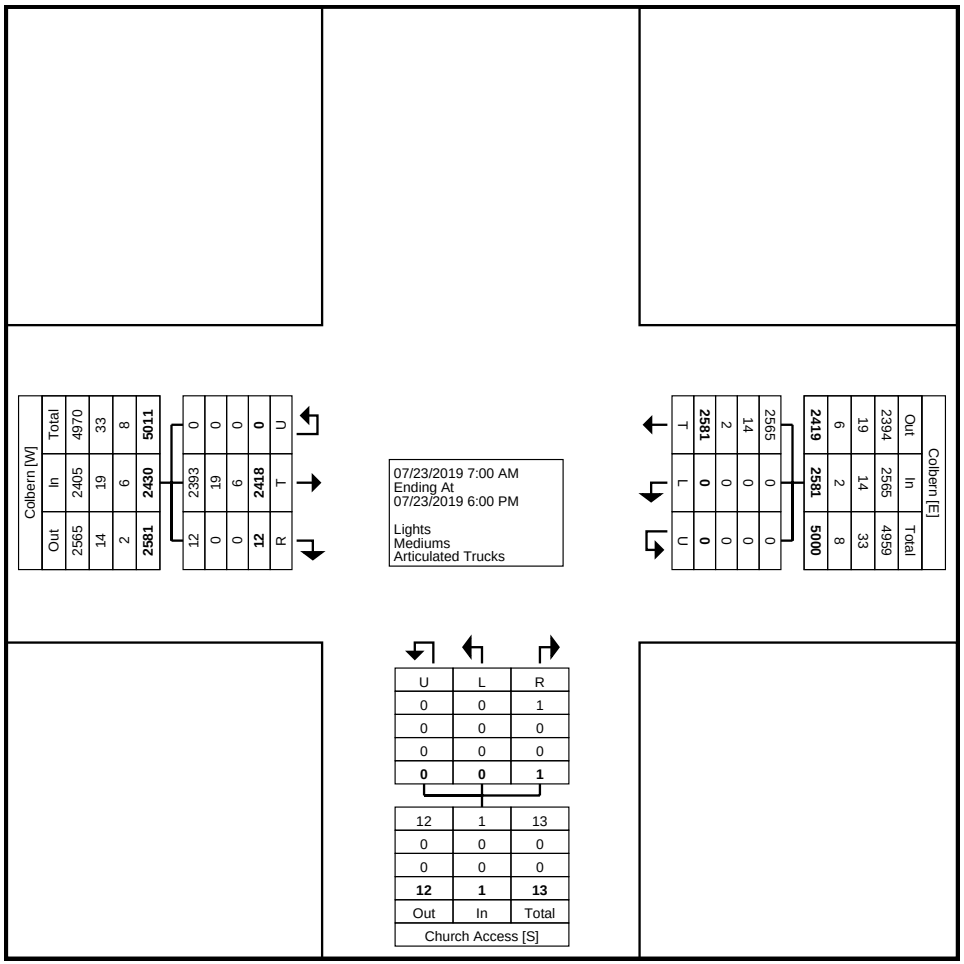

# Turning Movement Data

| Start Time | Colbern Westbound | | | | Church Access Northbound | | | | Colbern Eastbound | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Thru | Left | U-Turn | App. Total | Right | Left | U-Turn | App. Total | Right | Thru | U-Turn | App. Total | Int. Total |
| 7:00 AM | 248 | 0 | 0 | 248 | 0 | 0 | 0 | 0 | 0 | 47 | 0 | 47 | 295 |
| 7:15 AM | 266 | 0 | 0 | 266 | 0 | 0 | 0 | 0 | 0 | 52 | 0 | 52 | 318 |
| 7:30 AM | 238 | 0 | 0 | 238 | 0 | 0 | 0 | 0 | 1 | 61 | 0 | 62 | 300 |
| 7:45 AM | 275 | 0 | 0 | 275 | 0 | 0 | 0 | 0 | 0 | 66 | 0 | 66 | 341 |
| Hourly Total | 1027 | 0 | 0 | 1027 | 0 | 0 | 0 | 0 | 1 | 226 | 0 | 227 | 1254 |
| 8:00 AM | 210 | 0 | 0 | 210 | 0 | 0 | 0 | 0 | 0 | 58 | 0 | 58 | 268 |
| 8:15 AM | 169 | 0 | 0 | 169 | 0 | 0 | 0 | 0 | 0 | 56 | 0 | 56 | 225 |
| 8:30 AM | 160 | 0 | 0 | 160 | 0 | 0 | 0 | 0 | 0 | 51 | 0 | 51 | 211 |
| 8:45 AM | 151 | 0 | 0 | 151 | 0 | 0 | 0 | 0 | 0 | 73 | 0 | 73 | 224 |
| Hourly Total | 690 | 0 | 0 | 690 | 0 | 0 | 0 | 0 | 0 | 238 | 0 | 238 | 928 |
| *** BREAK *** | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 4:00 PM | 106 | 0 | 0 | 106 | 1 | 0 | 0 | 1 | 0 | 187 | 0 | 187 | 294 |
| 4:15 PM | 107 | 0 | 0 | 107 | 0 | 0 | 0 | 0 | 0 | 202 | 0 | 202 | 309 |
| 4:30 PM | 98 | 0 | 0 | 98 | 0 | 0 | 0 | 0 | 0 | 237 | 0 | 237 | 335 |
| 4:45 PM | 131 | 0 | 0 | 131 | 0 | 0 | 0 | 0 | 1 | 254 | 0 | 255 | 386 |
| Hourly Total | 442 | 0 | 0 | 442 | 1 | 0 | 0 | 1 | 1 | 880 | 0 | 881 | 1324 |
| 5:00 PM | 108 | 0 | 0 | 108 | 0 | 0 | 0 | 0 | 1 | 312 | 0 | 313 | 421 |
| 5:15 PM | 116 | 0 | 0 | 116 | 0 | 0 | 0 | 0 | 2 | 288 | 0 | 290 | 406 |
| 5:30 PM | 103 | 0 | 0 | 103 | 0 | 0 | 0 | 0 | 2 | 244 | 0 | 246 | 349 |
| 5:45 PM | 95 | 0 | 0 | 95 | 0 | 0 | 0 | 0 | 5 | 230 | 0 | 235 | 330 |
| Hourly Total | 422 | 0 | 0 | 422 | 0 | 0 | 0 | 0 | 10 | 1074 | 0 | 1084 | 1506 |
| Grand Total | 2581 | 0 | 0 | 2581 | 1 | 0 | 0 | 1 | 12 | 2418 | 0 | 2430 | 5012 |
| Approach % | 100.0 | 0.0 | 0.0 | - | 100.0 | 0.0 | 0.0 | - | 0.5 | 99.5 | 0.0 | - | - |
| Total % | 51.5 | 0.0 | 0.0 | 51.5 | 0.0 | 0.0 | 0.0 | 0.0 | 0.2 | 48.2 | 0.0 | 48.5 | - |
| Lights | 2565 | 0 | 0 | 2565 | 1 | 0 | 0 | 1 | 12 | 2393 | 0 | 2405 | 4971 |
| % Lights | 99.4 | - | - | 99.4 | 100.0 | - | - | 100.0 | 100.0 | 99.0 | - | 99.0 | 99.2 |
| Mediums | 14 | 0 | 0 | 14 | 0 | 0 | 0 | 0 | 0 | 19 | 0 | 19 | 33 |
| % Mediums | 0.5 | - | - | 0.5 | 0.0 | - | - | 0.0 | 0.0 | 0.8 | - | 0.8 | 0.7 |
| Articulated Trucks | 2 | 0 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 6 | 0 | 6 | 8 |
| % Articulated Trucks | 0.1 | - | - | 0.1 | 0.0 | - | - | 0.0 | 0.0 | 0.2 | - | 0.2 | 0.2 |

Olsson Associates : Overland Park
7301 West 133rd St

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

Count Name: Colbern Rd & Existing Church Access
Site Code:
Start Date: 07/23/2019


Turning Movement Data Plot

Olsson Associates : Overland Park
7301 West 133rd St

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

Count Name: Colbern Rd & Existing Church Access
Site Code:
Start Date: 07/23/2019


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

| Start Time | Colbern Westbound | | | | Church Access Northbound | | | | Colbern Eastbound | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Thru | Left | U-Turn | App. Total | Right | Left | U-Turn | App. Total | Right | Thru | U-Turn | App. Total | Int. Total |
| 7:00 AM | 248 | 0 | 0 | 248 | 0 | 0 | 0 | 0 | 0 | 47 | 0 | 47 | 295 |
| 7:15 AM | 266 | 0 | 0 | 266 | 0 | 0 | 0 | 0 | 0 | 52 | 0 | 52 | 318 |
| 7:30 AM | 238 | 0 | 0 | 238 | 0 | 0 | 0 | 0 | 1 | 61 | 0 | 62 | 300 |
| 7:45 AM | 275 | 0 | 0 | 275 | 0 | 0 | 0 | 0 | 0 | 66 | 0 | 66 | 341 |
| Total | 1027 | 0 | 0 | 1027 | 0 | 0 | 0 | 0 | 1 | 226 | 0 | 227 | 1254 |
| Approach % | 100.0 | 0.0 | 0.0 | - | 0.0 | 0.0 | 0.0 | - | 0.4 | 99.6 | 0.0 | - | - |
| Total % | 81.9 | 0.0 | 0.0 | 81.9 | 0.0 | 0.0 | 0.0 | 0.0 | 0.1 | 18.0 | 0.0 | 18.1 | - |
| PHF | 0.934 | 0.000 | 0.000 | 0.934 | 0.000 | 0.000 | 0.000 | 0.000 | 0.250 | 0.856 | 0.000 | 0.860 | 0.919 |
| Lights | 1024 | 0 | 0 | 1024 | 0 | 0 | 0 | 0 | 1 | 216 | 0 | 217 | 1241 |
| % Lights | 99.7 | - | - | 99.7 | - | - | - | - | 100.0 | 95.6 | - | 95.6 | 99.0 |
| Mediums | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 8 | 0 | 8 | 9 |
| % Mediums | 0.1 | - | - | 0.1 | - | - | - | - | 0.0 | 3.5 | - | 3.5 | 0.7 |
| Articulated Trucks | 2 | 0 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 2 | 0 | 2 | 4 |
| % Articulated Trucks | 0.2 | - | - | 0.2 | - | - | - | - | 0.0 | 0.9 | - | 0.9 | 0.3 |

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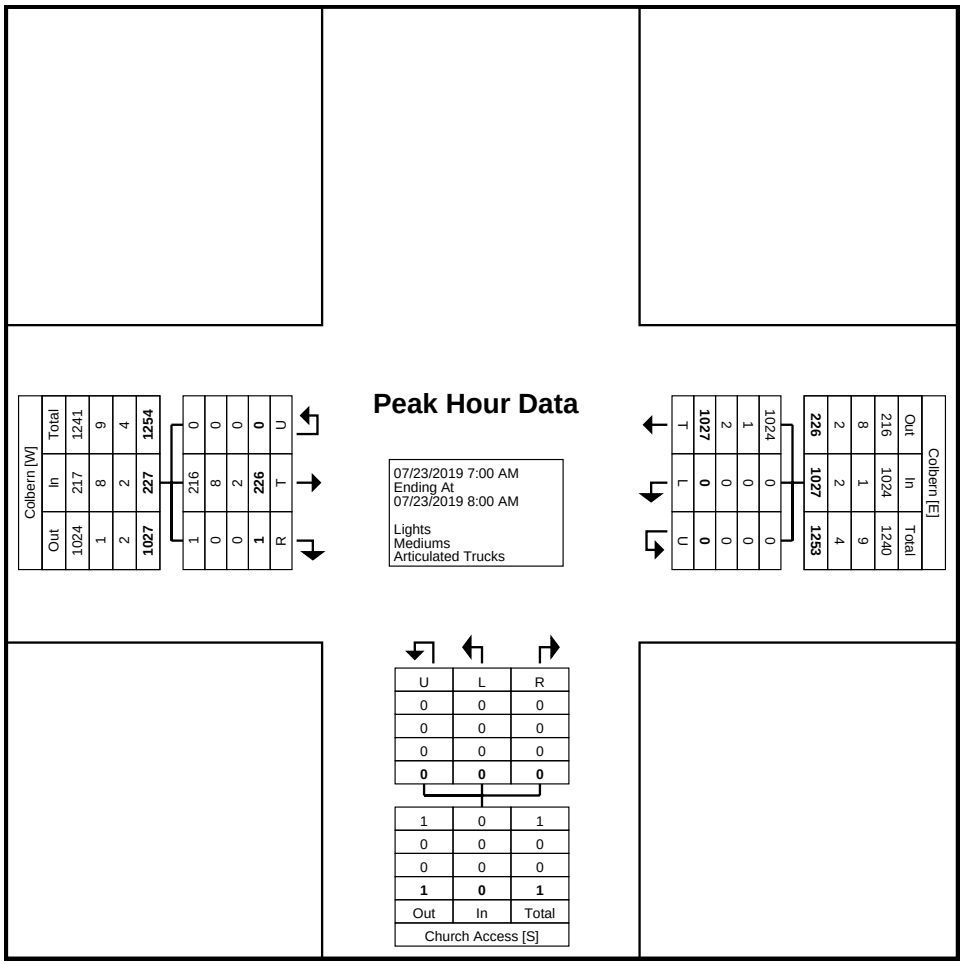
913.381.1170 tmchenry@olssonassociates.com

Count Name: Colbern Rd & Existing Church Access
Site Code:
Start Date: 07/23/2019


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

Olsson Associates : Overland Park
7301 West 133rd St

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

Count Name: Colbern Rd & Existing Church Access
Site Code:
Start Date: 07/23/2019


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

| Start Time | Colbern Westbound | | | | Church Access Northbound | | | | Colbern Eastbound | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Thru | Left | U-Turn | App. Total | Right | Left | U-Turn | App. Total | Right | Thru | U-Turn | App. Total | Int. Total |
| 4:45 PM | 131 | 0 | 0 | 131 | 0 | 0 | 0 | 0 | 1 | 254 | 0 | 255 | 386 |
| 5:00 PM | 108 | 0 | 0 | 108 | 0 | 0 | 0 | 0 | 1 | 312 | 0 | 313 | 421 |
| 5:15 PM | 116 | 0 | 0 | 116 | 0 | 0 | 0 | 0 | 2 | 288 | 0 | 290 | 406 |
| 5:30 PM | 103 | 0 | 0 | 103 | 0 | 0 | 0 | 0 | 2 | 244 | 0 | 246 | 349 |
| Total | 458 | 0 | 0 | 458 | 0 | 0 | 0 | 0 | 6 | 1098 | 0 | 1104 | 1562 |
| Approach % | 100.0 | 0.0 | 0.0 | - | 0.0 | 0.0 | 0.0 | - | 0.5 | 99.5 | 0.0 | - | - |
| Total % | 29.3 | 0.0 | 0.0 | 29.3 | 0.0 | 0.0 | 0.0 | 0.0 | 0.4 | 70.3 | 0.0 | 70.7 | - |
| PHF | 0.874 | 0.000 | 0.000 | 0.874 | 0.000 | 0.000 | 0.000 | 0.000 | 0.750 | 0.880 | 0.000 | 0.882 | 0.928 |
| Lights | 450 | 0 | 0 | 450 | 0 | 0 | 0 | 0 | 6 | 1092 | 0 | 1098 | 1548 |
| % Lights | 98.3 | - | - | 98.3 | - | - | - | - | 100.0 | 99.5 | - | 99.5 | 99.1 |
| Mediums | 8 | 0 | 0 | 8 | 0 | 0 | 0 | 0 | 0 | 4 | 0 | 4 | 12 |
| % Mediums | 1.7 | - | - | 1.7 | - | - | - | - | 0.0 | 0.4 | - | 0.4 | 0.8 |
| Articulated Trucks | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 0 | 2 | 2 |
| % Articulated Trucks | 0.0 | - | - | 0.0 | - | - | - | - | 0.0 | 0.2 | - | 0.2 | 0.1 |

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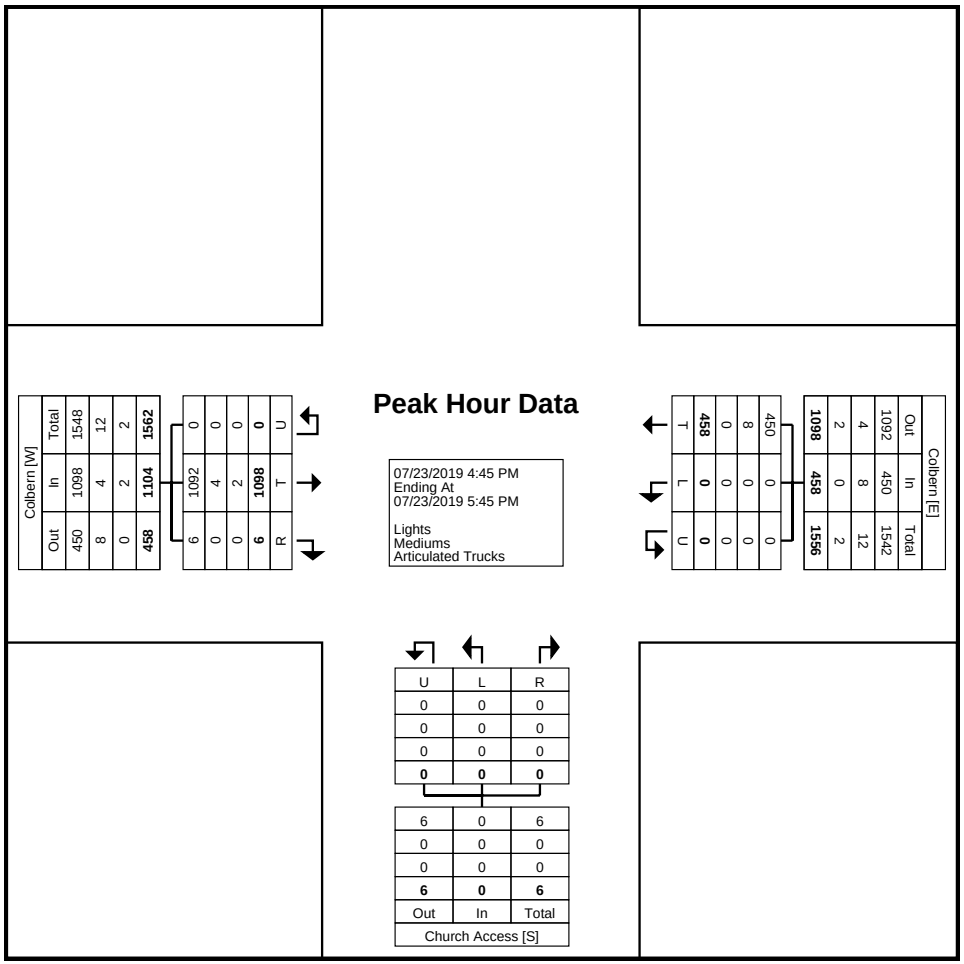
Count Name: Colbern Rd & Existing Church Access
Site Code:
Start Date: 07/23/2019


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

Olsson Associates : Overland Park
7301 West 133rd St

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

Count Name: Colbern Rd & Existing Library Drive
Site Code:
Start Date: 07/23/2019

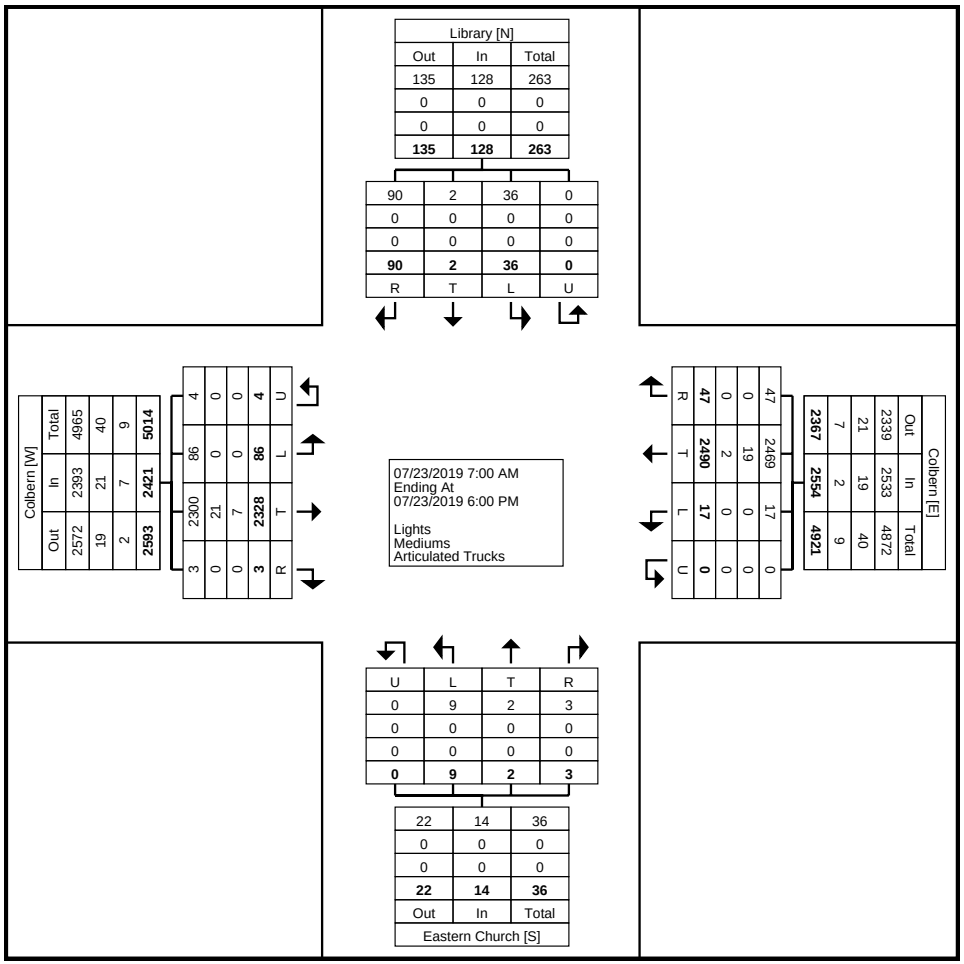

# Turning Movement Data

| Start Time | Library Southbound | | | | | Colbern Westbound | | | | | Eastern Church Northbound | | | | | Colbern Eastbound | | | | | Int. Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 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 | |
| 7:00 AM | 1 | 1 | 0 | 0 | 2 | 1 | 257 | 0 | 0 | 258 | 0 | 0 | 1 | 0 | 1 | 0 | 45 | 0 | 1 | 46 | 307 |
| 7:15 AM | 1 | 0 | 0 | 0 | 1 | 1 | 262 | 0 | 0 | 263 | 0 | 0 | 0 | 0 | 0 | 0 | 53 | 0 | 0 | 53 | 317 |
| 7:30 AM | 3 | 0 | 0 | 0 | 3 | 3 | 236 | 0 | 0 | 239 | 0 | 0 | 0 | 0 | 0 | 0 | 59 | 1 | 0 | 60 | 302 |
| 7:45 AM | 2 | 0 | 1 | 0 | 3 | 0 | 272 | 0 | 0 | 272 | 0 | 0 | 0 | 0 | 0 | 0 | 59 | 6 | 1 | 66 | 341 |
| Hourly Total | 7 | 1 | 1 | 0 | 9 | 5 | 1027 | 0 | 0 | 1032 | 0 | 0 | 1 | 0 | 1 | 0 | 216 | 7 | 2 | 225 | 1267 |
| 8:00 AM | 1 | 0 | 0 | 0 | 1 | 3 | 210 | 0 | 0 | 213 | 0 | 0 | 0 | 0 | 0 | 1 | 56 | 1 | 0 | 58 | 272 |
| 8:15 AM | 1 | 0 | 0 | 0 | 1 | 0 | 167 | 0 | 0 | 167 | 0 | 0 | 0 | 0 | 0 | 0 | 54 | 1 | 0 | 55 | 223 |
| 8:30 AM | 0 | 0 | 0 | 0 | 0 | 3 | 160 | 1 | 0 | 164 | 0 | 0 | 0 | 0 | 0 | 1 | 46 | 3 | 0 | 50 | 214 |
| 8:45 AM | 5 | 0 | 2 | 0 | 7 | 4 | 147 | 1 | 0 | 152 | 0 | 0 | 0 | 0 | 0 | 0 | 66 | 7 | 0 | 73 | 232 |
| Hourly Total | 7 | 0 | 2 | 0 | 9 | 10 | 684 | 2 | 0 | 696 | 0 | 0 | 0 | 0 | 0 | 2 | 222 | 12 | 0 | 236 | 941 |
| *** BREAK *** | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 4:00 PM | 6 | 0 | 2 | 0 | 8 | 7 | 100 | 0 | 0 | 107 | 0 | 0 | 0 | 0 | 0 | 0 | 180 | 9 | 1 | 190 | 305 |
| 4:15 PM | 17 | 0 | 5 | 0 | 22 | 7 | 88 | 1 | 0 | 96 | 0 | 1 | 1 | 0 | 2 | 0 | 192 | 10 | 0 | 202 | 322 |
| 4:30 PM | 13 | 0 | 6 | 0 | 19 | 4 | 86 | 0 | 0 | 90 | 0 | 0 | 0 | 0 | 0 | 0 | 241 | 7 | 0 | 248 | 357 |
| 4:45 PM | 5 | 0 | 2 | 0 | 7 | 5 | 122 | 2 | 0 | 129 | 1 | 0 | 1 | 0 | 2 | 0 | 254 | 5 | 0 | 259 | 397 |
| Hourly Total | 41 | 0 | 15 | 0 | 56 | 23 | 396 | 3 | 0 | 422 | 1 | 1 | 2 | 0 | 4 | 0 | 867 | 31 | 1 | 899 | 1381 |
| 5:00 PM | 9 | 0 | 6 | 0 | 15 | 2 | 98 | 0 | 0 | 100 | 0 | 0 | 1 | 0 | 1 | 0 | 301 | 10 | 1 | 312 | 428 |
| 5:15 PM | 11 | 0 | 7 | 0 | 18 | 2 | 104 | 0 | 0 | 106 | 1 | 0 | 0 | 0 | 1 | 0 | 279 | 7 | 0 | 286 | 411 |
| 5:30 PM | 6 | 0 | 4 | 0 | 10 | 3 | 95 | 4 | 0 | 102 | 1 | 0 | 3 | 0 | 4 | 0 | 229 | 10 | 0 | 239 | 355 |
| 5:45 PM | 9 | 1 | 1 | 0 | 11 | 2 | 86 | 8 | 0 | 96 | 0 | 1 | 2 | 0 | 3 | 1 | 214 | 9 | 0 | 224 | 334 |
| Hourly Total | 35 | 1 | 18 | 0 | 54 | 9 | 383 | 12 | 0 | 404 | 2 | 1 | 6 | 0 | 9 | 1 | 1023 | 36 | 1 | 1061 | 1528 |
| Grand Total | 90 | 2 | 36 | 0 | 128 | 47 | 2490 | 17 | 0 | 2554 | 3 | 2 | 9 | 0 | 14 | 3 | 2328 | 86 | 4 | 2421 | 5117 |
| Approach % | 70.3 | 1.6 | 28.1 | 0.0 | - | 1.8 | 97.5 | 0.7 | 0.0 | - | 21.4 | 14.3 | 64.3 | 0.0 | - | 0.1 | 96.2 | 3.6 | 0.2 | - | - |
| Total % | 1.8 | 0.0 | 0.7 | 0.0 | 2.5 | 0.9 | 48.7 | 0.3 | 0.0 | 49.9 | 0.1 | 0.0 | 0.2 | 0.0 | 0.3 | 0.1 | 45.5 | 1.7 | 0.1 | 47.3 | - |
| Lights | 90 | 2 | 36 | 0 | 128 | 47 | 2469 | 17 | 0 | 2533 | 3 | 2 | 9 | 0 | 14 | 3 | 2300 | 86 | 4 | 2393 | 5068 |
| % 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 | 98.8 | 100.0 | 100.0 | 98.8 | 99.0 |
| Mediums | 0 | 0 | 0 | 0 | 0 | 0 | 19 | 0 | 0 | 19 | 0 | 0 | 0 | 0 | 0 | 0 | 21 | 0 | 0 | 21 | 40 |
| % Mediums | 0.0 | 0.0 | 0.0 | - | 0.0 | 0.0 | 0.8 | 0.0 | - | 0.7 | 0.0 | 0.0 | 0.0 | - | 0.0 | 0.0 | 0.9 | 0.0 | 0.0 | 0.9 | 0.8 |
| Articulated Trucks | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 0 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 7 | 0 | 0 | 7 | 9 |
| % Articulated Trucks | 0.0 | 0.0 | 0.0 | - | 0.0 | 0.0 | 0.1 | 0.0 | - | 0.1 | 0.0 | 0.0 | 0.0 | - | 0.0 | 0.0 | 0.3 | 0.0 | 0.0 | 0.3 | 0.2 |

Olsson Associates : Overland Park
7301 West 133rd St

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

Count Name: Colbern Rd & Existing Library Drive
Site Code:
Start Date: 07/23/2019


Turning Movement Data Plot

Olsson Associates : Overland Park
7301 West 133rd St

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

Count Name: Colbern Rd & Existing Library Drive
Site Code:
Start Date: 07/23/2019


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

| Start Time | Library Southbound | | | | | Colbern Westbound | | | | | Eastern Church Northbound | | | | | Colbern 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 | 1 | 1 | 0 | 0 | 2 | 1 | 257 | 0 | 0 | 258 | 0 | 0 | 1 | 0 | 1 | 0 | 45 | 0 | 1 | 46 | 307 |
| 7:15 AM | 1 | 0 | 0 | 0 | 1 | 1 | 262 | 0 | 0 | 263 | 0 | 0 | 0 | 0 | 0 | 0 | 53 | 0 | 0 | 53 | 317 |
| 7:30 AM | 3 | 0 | 0 | 0 | 3 | 3 | 236 | 0 | 0 | 239 | 0 | 0 | 0 | 0 | 0 | 0 | 59 | 1 | 0 | 60 | 302 |
| 7:45 AM | 2 | 0 | 1 | 0 | 3 | 0 | 272 | 0 | 0 | 272 | 0 | 0 | 0 | 0 | 0 | 0 | 59 | 6 | 1 | 66 | 341 |
| Total | 7 | 1 | 1 | 0 | 9 | 5 | 1027 | 0 | 0 | 1032 | 0 | 0 | 1 | 0 | 1 | 0 | 216 | 7 | 2 | 225 | 1267 |
| Approach % | 77.8 | 11.1 | 11.1 | 0.0 | - | 0.5 | 99.5 | 0.0 | 0.0 | - | 0.0 | 0.0 | 100.0 | 0.0 | - | 0.0 | 96.0 | 3.1 | 0.9 | - | - |
| Total % | 0.6 | 0.1 | 0.1 | 0.0 | 0.7 | 0.4 | 81.1 | 0.0 | 0.0 | 81.5 | 0.0 | 0.0 | 0.1 | 0.0 | 0.1 | 0.0 | 17.0 | 0.6 | 0.2 | 17.8 | - |
| PHF | 0.583 | 0.250 | 0.250 | 0.000 | 0.750 | 0.417 | 0.944 | 0.000 | 0.000 | 0.949 | 0.000 | 0.000 | 0.250 | 0.000 | 0.250 | 0.000 | 0.915 | 0.292 | 0.500 | 0.852 | 0.929 |
| Lights | 7 | 1 | 1 | 0 | 9 | 5 | 1022 | 0 | 0 | 1027 | 0 | 0 | 1 | 0 | 1 | 0 | 207 | 7 | 2 | 216 | 1253 |
| % Lights | 100.0 | 100.0 | 100.0 | - | 100.0 | 100.0 | 99.5 | - | - | 99.5 | - | - | 100.0 | - | 100.0 | - | 95.8 | 100.0 | 100.0 | 96.0 | 98.9 |
| Mediums | 0 | 0 | 0 | 0 | 0 | 0 | 3 | 0 | 0 | 3 | 0 | 0 | 0 | 0 | 0 | 0 | 6 | 0 | 0 | 6 | 9 |
| % Mediums | 0.0 | 0.0 | 0.0 | - | 0.0 | 0.0 | 0.3 | - | - | 0.3 | - | - | 0.0 | - | 0.0 | - | 2.8 | 0.0 | 0.0 | 2.7 | 0.7 |
| Articulated Trucks | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 0 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 3 | 0 | 0 | 3 | 5 |
| % Articulated Trucks | 0.0 | 0.0 | 0.0 | - | 0.0 | 0.0 | 0.2 | - | - | 0.2 | - | - | 0.0 | - | 0.0 | - | 1.4 | 0.0 | 0.0 | 1.3 | 0.4 |

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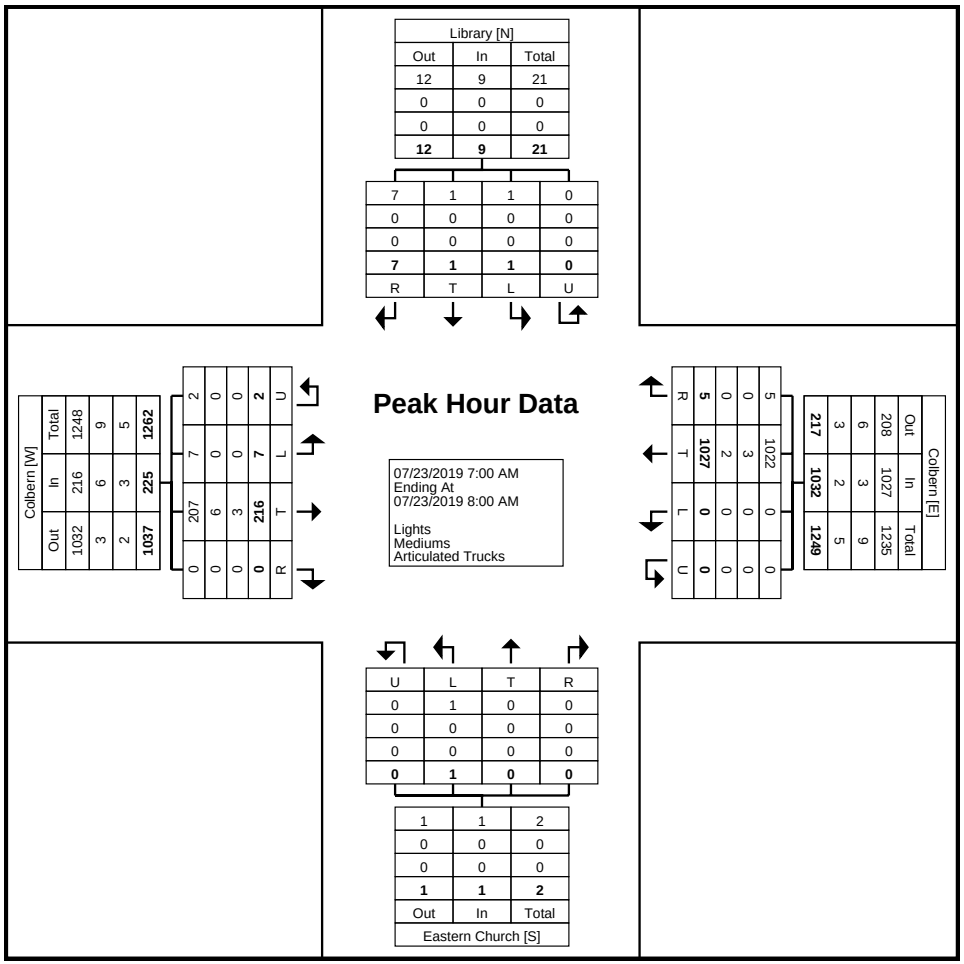
Site Code:
Start Date: 07/23/2019


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

Olsson Associates : Overland Park
7301 West 133rd St

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

Count Name: Colbern Rd & Existing Library Drive
Site Code:
Start Date: 07/23/2019

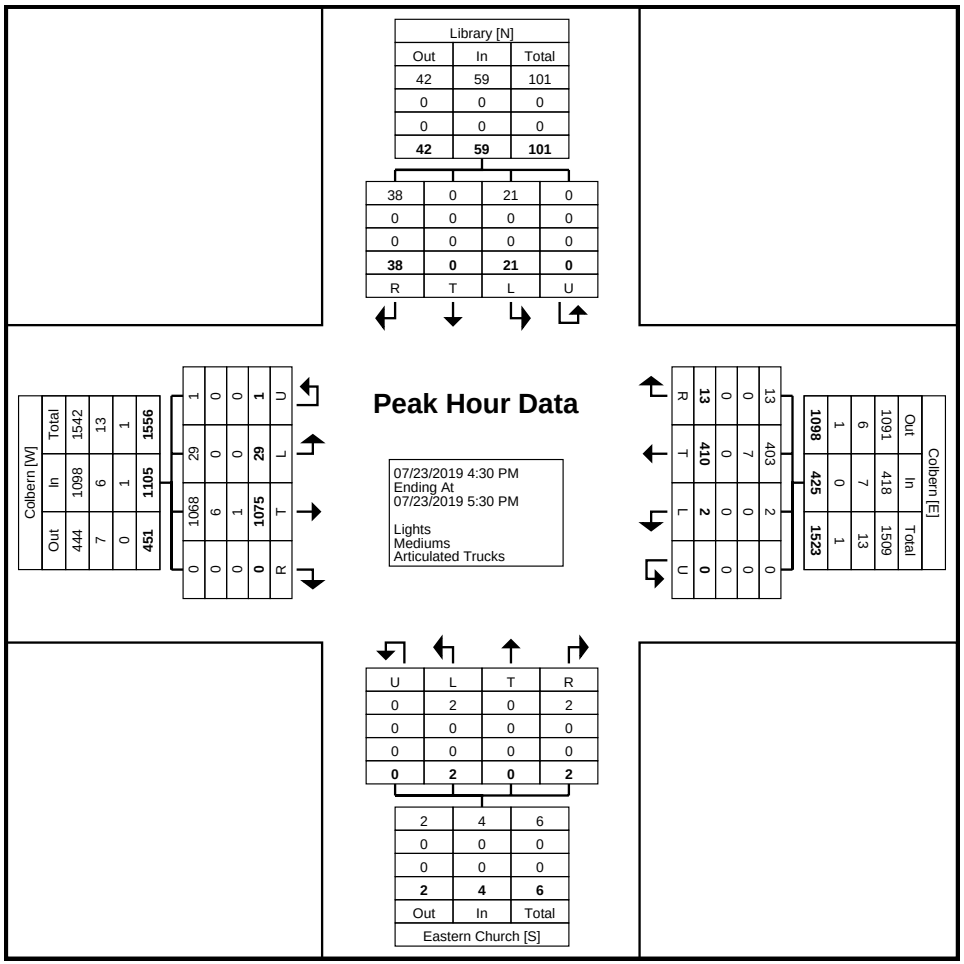

# Turning Movement Peak Hour Data (4:30 PM)

| Start Time | Library Southbound | | | | | Colbern Westbound | | | | | Eastern Church Northbound | | | | | Colbern 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 |
| 4:30 PM | 13 | 0 | 6 | 0 | 19 | 4 | 86 | 0 | 0 | 90 | 0 | 0 | 0 | 0 | 0 | 0 | 241 | 7 | 0 | 248 | 357 |
| 4:45 PM | 5 | 0 | 2 | 0 | 7 | 5 | 122 | 2 | 0 | 129 | 1 | 0 | 1 | 0 | 2 | 0 | 254 | 5 | 0 | 259 | 397 |
| 5:00 PM | 9 | 0 | 6 | 0 | 15 | 2 | 98 | 0 | 0 | 100 | 0 | 0 | 1 | 0 | 1 | 0 | 301 | 10 | 1 | 312 | 428 |
| 5:15 PM | 11 | 0 | 7 | 0 | 18 | 2 | 104 | 0 | 0 | 106 | 1 | 0 | 0 | 0 | 1 | 0 | 279 | 7 | 0 | 286 | 411 |
| Total | 38 | 0 | 21 | 0 | 59 | 13 | 410 | 2 | 0 | 425 | 2 | 0 | 2 | 0 | 4 | 0 | 1075 | 29 | 1 | 1105 | 1593 |
| Approach % | 64.4 | 0.0 | 35.6 | 0.0 | - | 3.1 | 96.5 | 0.5 | 0.0 | - | 50.0 | 0.0 | 50.0 | 0.0 | - | 0.0 | 97.3 | 2.6 | 0.1 | - | - |
| Total % | 2.4 | 0.0 | 1.3 | 0.0 | 3.7 | 0.8 | 25.7 | 0.1 | 0.0 | 26.7 | 0.1 | 0.0 | 0.1 | 0.0 | 0.3 | 0.0 | 67.5 | 1.8 | 0.1 | 69.4 | - |
| PHF | 0.731 | 0.000 | 0.750 | 0.000 | 0.776 | 0.650 | 0.840 | 0.250 | 0.000 | 0.824 | 0.500 | 0.000 | 0.500 | 0.000 | 0.500 | 0.000 | 0.893 | 0.725 | 0.250 | 0.885 | 0.930 |
| Lights | 38 | 0 | 21 | 0 | 59 | 13 | 403 | 2 | 0 | 418 | 2 | 0 | 2 | 0 | 4 | 0 | 1068 | 29 | 1 | 1098 | 1579 |
| % Lights | 100.0 | - | 100.0 | - | 100.0 | 100.0 | 98.3 | 100.0 | - | 98.4 | 100.0 | - | 100.0 | - | 100.0 | - | 99.3 | 100.0 | 100.0 | 99.4 | 99.1 |
| Mediums | 0 | 0 | 0 | 0 | 0 | 0 | 7 | 0 | 0 | 7 | 0 | 0 | 0 | 0 | 0 | 0 | 6 | 0 | 0 | 6 | 13 |
| % Mediums | 0.0 | - | 0.0 | - | 0.0 | 0.0 | 1.7 | 0.0 | - | 1.6 | 0.0 | - | 0.0 | - | 0.0 | - | 0.6 | 0.0 | 0.0 | 0.5 | 0.8 |
| Articulated Trucks | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 1 | 1 |
| % Articulated Trucks | 0.0 | - | 0.0 | - | 0.0 | 0.0 | 0.0 | 0.0 | - | 0.0 | 0.0 | - | 0.0 | - | 0.0 | - | 0.1 | 0.0 | 0.0 | 0.1 | 0.1 |

Olsson Associates : Overland Park
7301 West 133rd St

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

Count Name: Colbern Rd & Existing Library Drive
Site Code:
Start Date: 07/23/2019


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

Olsson Associates : Overland Park
7301 West 133rd St

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

Count Name: Colbern Rd & Rice Rd
Site Code:
Start Date: 07/23/2019

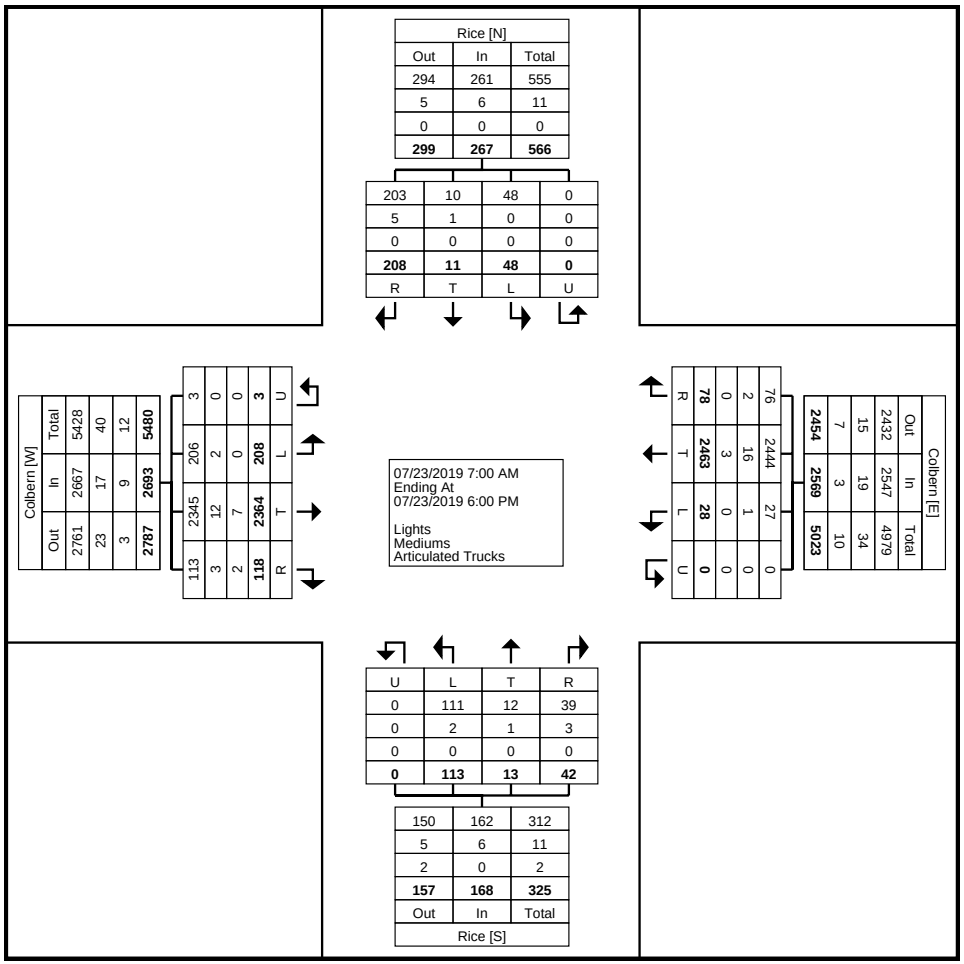

# Turning Movement Data

| Start Time | Rice Southbound | | | | | Colbern Westbound | | | | | Rice Northbound | | | | | Colbern 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 | 8 | 0 | 0 | 0 | 8 | 4 | 238 | 2 | 0 | 244 | 2 | 1 | 4 | 0 | 7 | 2 | 49 | 10 | 0 | 61 | 320 |
| 7:15 AM | 6 | 0 | 1 | 0 | 7 | 8 | 257 | 2 | 0 | 267 | 0 | 1 | 6 | 0 | 7 | 6 | 53 | 8 | 0 | 67 | 348 |
| 7:30 AM | 5 | 2 | 0 | 0 | 7 | 5 | 224 | 0 | 0 | 229 | 0 | 0 | 3 | 0 | 3 | 5 | 65 | 6 | 1 | 77 | 316 |
| 7:45 AM | 8 | 1 | 0 | 0 | 9 | 6 | 269 | 4 | 0 | 279 | 1 | 0 | 6 | 0 | 7 | 10 | 64 | 5 | 0 | 79 | 374 |
| Hourly Total | 27 | 3 | 1 | 0 | 31 | 23 | 988 | 8 | 0 | 1019 | 3 | 2 | 19 | 0 | 24 | 23 | 231 | 29 | 1 | 284 | 1358 |
| 8:00 AM | 14 | 1 | 1 | 0 | 16 | 2 | 205 | 4 | 0 | 211 | 1 | 0 | 5 | 0 | 6 | 11 | 59 | 9 | 0 | 79 | 312 |
| 8:15 AM | 6 | 1 | 0 | 0 | 7 | 3 | 166 | 2 | 0 | 171 | 2 | 1 | 5 | 0 | 8 | 10 | 58 | 6 | 1 | 75 | 261 |
| 8:30 AM | 14 | 0 | 3 | 0 | 17 | 1 | 149 | 6 | 0 | 156 | 0 | 1 | 4 | 0 | 5 | 9 | 52 | 9 | 0 | 70 | 248 |
| 8:45 AM | 16 | 1 | 2 | 0 | 19 | 7 | 142 | 3 | 0 | 152 | 1 | 0 | 8 | 0 | 9 | 11 | 73 | 11 | 0 | 95 | 275 |
| Hourly Total | 50 | 3 | 6 | 0 | 59 | 13 | 662 | 15 | 0 | 690 | 4 | 2 | 22 | 0 | 28 | 41 | 242 | 35 | 1 | 319 | 1096 |
| *** BREAK *** | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 4:00 PM | 20 | 1 | 6 | 0 | 27 | 14 | 89 | 1 | 0 | 104 | 4 | 1 | 8 | 0 | 13 | 9 | 189 | 20 | 0 | 218 | 362 |
| 4:15 PM | 20 | 1 | 9 | 0 | 30 | 4 | 103 | 0 | 0 | 107 | 5 | 3 | 8 | 0 | 16 | 4 | 187 | 21 | 0 | 212 | 365 |
| 4:30 PM | 16 | 0 | 5 | 0 | 21 | 5 | 94 | 0 | 0 | 99 | 6 | 0 | 8 | 0 | 14 | 7 | 221 | 15 | 1 | 244 | 378 |
| 4:45 PM | 22 | 1 | 7 | 0 | 30 | 7 | 120 | 1 | 0 | 128 | 4 | 0 | 14 | 0 | 18 | 6 | 248 | 28 | 0 | 282 | 458 |
| Hourly Total | 78 | 3 | 27 | 0 | 108 | 30 | 406 | 2 | 0 | 438 | 19 | 4 | 38 | 0 | 61 | 26 | 845 | 84 | 1 | 956 | 1563 |
| 5:00 PM | 25 | 1 | 4 | 0 | 30 | 2 | 109 | 2 | 0 | 113 | 9 | 2 | 12 | 0 | 23 | 9 | 296 | 29 | 0 | 334 | 500 |
| 5:15 PM | 13 | 1 | 3 | 0 | 17 | 7 | 106 | 1 | 0 | 114 | 2 | 1 | 6 | 0 | 9 | 9 | 288 | 12 | 0 | 309 | 449 |
| 5:30 PM | 10 | 0 | 4 | 0 | 14 | 1 | 101 | 0 | 0 | 102 | 2 | 1 | 8 | 0 | 11 | 6 | 233 | 11 | 0 | 250 | 377 |
| 5:45 PM | 5 | 0 | 3 | 0 | 8 | 2 | 91 | 0 | 0 | 93 | 3 | 1 | 8 | 0 | 12 | 4 | 229 | 8 | 0 | 241 | 354 |
| Hourly Total | 53 | 2 | 14 | 0 | 69 | 12 | 407 | 3 | 0 | 422 | 16 | 5 | 34 | 0 | 55 | 28 | 1046 | 60 | 0 | 1134 | 1680 |
| Grand Total | 208 | 11 | 48 | 0 | 267 | 78 | 2463 | 28 | 0 | 2569 | 42 | 13 | 113 | 0 | 168 | 118 | 2364 | 208 | 3 | 2693 | 5697 |
| Approach % | 77.9 | 4.1 | 18.0 | 0.0 | - | 3.0 | 95.9 | 1.1 | 0.0 | - | 25.0 | 7.7 | 67.3 | 0.0 | - | 4.4 | 87.8 | 7.7 | 0.1 | - | - |
| Total % | 3.7 | 0.2 | 0.8 | 0.0 | 4.7 | 1.4 | 43.2 | 0.5 | 0.0 | 45.1 | 0.7 | 0.2 | 2.0 | 0.0 | 2.9 | 2.1 | 41.5 | 3.7 | 0.1 | 47.3 | - |
| Lights | 203 | 10 | 48 | 0 | 261 | 76 | 2444 | 27 | 0 | 2547 | 39 | 12 | 111 | 0 | 162 | 113 | 2345 | 206 | 3 | 2667 | 5637 |
| % Lights | 97.6 | 90.9 | 100.0 | - | 97.8 | 97.4 | 99.2 | 96.4 | - | 99.1 | 92.9 | 92.3 | 98.2 | - | 96.4 | 95.8 | 99.2 | 99.0 | 100.0 | 99.0 | 98.9 |
| Mediums | 5 | 1 | 0 | 0 | 6 | 2 | 16 | 1 | 0 | 19 | 3 | 1 | 2 | 0 | 6 | 3 | 12 | 2 | 0 | 17 | 48 |
| % Mediums | 2.4 | 9.1 | 0.0 | - | 2.2 | 2.6 | 0.6 | 3.6 | - | 0.7 | 7.1 | 7.7 | 1.8 | - | 3.6 | 2.5 | 0.5 | 1.0 | 0.0 | 0.6 | 0.8 |
| Articulated Trucks | 0 | 0 | 0 | 0 | 0 | 0 | 3 | 0 | 0 | 3 | 0 | 0 | 0 | 0 | 0 | 2 | 7 | 0 | 0 | 9 | 12 |
| % Articulated Trucks | 0.0 | 0.0 | 0.0 | - | 0.0 | 0.0 | 0.1 | 0.0 | - | 0.1 | 0.0 | 0.0 | 0.0 | - | 0.0 | 1.7 | 0.3 | 0.0 | 0.0 | 0.3 | 0.2 |

Olsson Associates : Overland Park
7301 West 133rd St

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

Count Name: Colbern Rd & Rice Rd
Site Code:
Start Date: 07/23/2019


Turning Movement Data Plot

Olsson Associates : Overland Park
7301 West 133rd St

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

Count Name: Colbern Rd & Rice Rd
Site Code:
Start Date: 07/23/2019


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

| Start Time | Rice Southbound | | | | | Colbern Westbound | | | | | Rice Northbound | | | | | Colbern 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 | 8 | 0 | 0 | 0 | 8 | 4 | 238 | 2 | 0 | 244 | 2 | 1 | 4 | 0 | 7 | 2 | 49 | 10 | 0 | 61 | 320 |
| 7:15 AM | 6 | 0 | 1 | 0 | 7 | 8 | 257 | 2 | 0 | 267 | 0 | 1 | 6 | 0 | 7 | 6 | 53 | 8 | 0 | 67 | 348 |
| 7:30 AM | 5 | 2 | 0 | 0 | 7 | 5 | 224 | 0 | 0 | 229 | 0 | 0 | 3 | 0 | 3 | 5 | 65 | 6 | 1 | 77 | 316 |
| 7:45 AM | 8 | 1 | 0 | 0 | 9 | 6 | 269 | 4 | 0 | 279 | 1 | 0 | 6 | 0 | 7 | 10 | 64 | 5 | 0 | 79 | 374 |
| Total | 27 | 3 | 1 | 0 | 31 | 23 | 988 | 8 | 0 | 1019 | 3 | 2 | 19 | 0 | 24 | 23 | 231 | 29 | 1 | 284 | 1358 |
| Approach % | 87.1 | 9.7 | 3.2 | 0.0 | - | 2.3 | 97.0 | 0.8 | 0.0 | - | 12.5 | 8.3 | 79.2 | 0.0 | - | 8.1 | 81.3 | 10.2 | 0.4 | - | - |
| Total % | 2.0 | 0.2 | 0.1 | 0.0 | 2.3 | 1.7 | 72.8 | 0.6 | 0.0 | 75.0 | 0.2 | 0.1 | 1.4 | 0.0 | 1.8 | 1.7 | 17.0 | 2.1 | 0.1 | 20.9 | - |
| PHF | 0.844 | 0.375 | 0.250 | 0.000 | 0.861 | 0.719 | 0.918 | 0.500 | 0.000 | 0.913 | 0.375 | 0.500 | 0.792 | 0.000 | 0.857 | 0.575 | 0.888 | 0.725 | 0.250 | 0.899 | 0.908 |
| Lights | 27 | 3 | 1 | 0 | 31 | 22 | 982 | 8 | 0 | 1012 | 2 | 1 | 17 | 0 | 20 | 22 | 224 | 28 | 1 | 275 | 1338 |
| % Lights | 100.0 | 100.0 | 100.0 | - | 100.0 | 95.7 | 99.4 | 100.0 | - | 99.3 | 66.7 | 50.0 | 89.5 | - | 83.3 | 95.7 | 97.0 | 96.6 | 100.0 | 96.8 | 98.5 |
| Mediums | 0 | 0 | 0 | 0 | 0 | 1 | 3 | 0 | 0 | 4 | 1 | 1 | 2 | 0 | 4 | 1 | 4 | 1 | 0 | 6 | 14 |
| % Mediums | 0.0 | 0.0 | 0.0 | - | 0.0 | 4.3 | 0.3 | 0.0 | - | 0.4 | 33.3 | 50.0 | 10.5 | - | 16.7 | 4.3 | 1.7 | 3.4 | 0.0 | 2.1 | 1.0 |
| Articulated Trucks | 0 | 0 | 0 | 0 | 0 | 0 | 3 | 0 | 0 | 3 | 0 | 0 | 0 | 0 | 0 | 0 | 3 | 0 | 0 | 3 | 6 |
| % Articulated Trucks | 0.0 | 0.0 | 0.0 | - | 0.0 | 0.0 | 0.3 | 0.0 | - | 0.3 | 0.0 | 0.0 | 0.0 | - | 0.0 | 0.0 | 1.3 | 0.0 | 0.0 | 1.1 | 0.4 |

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7301 West 133rd St

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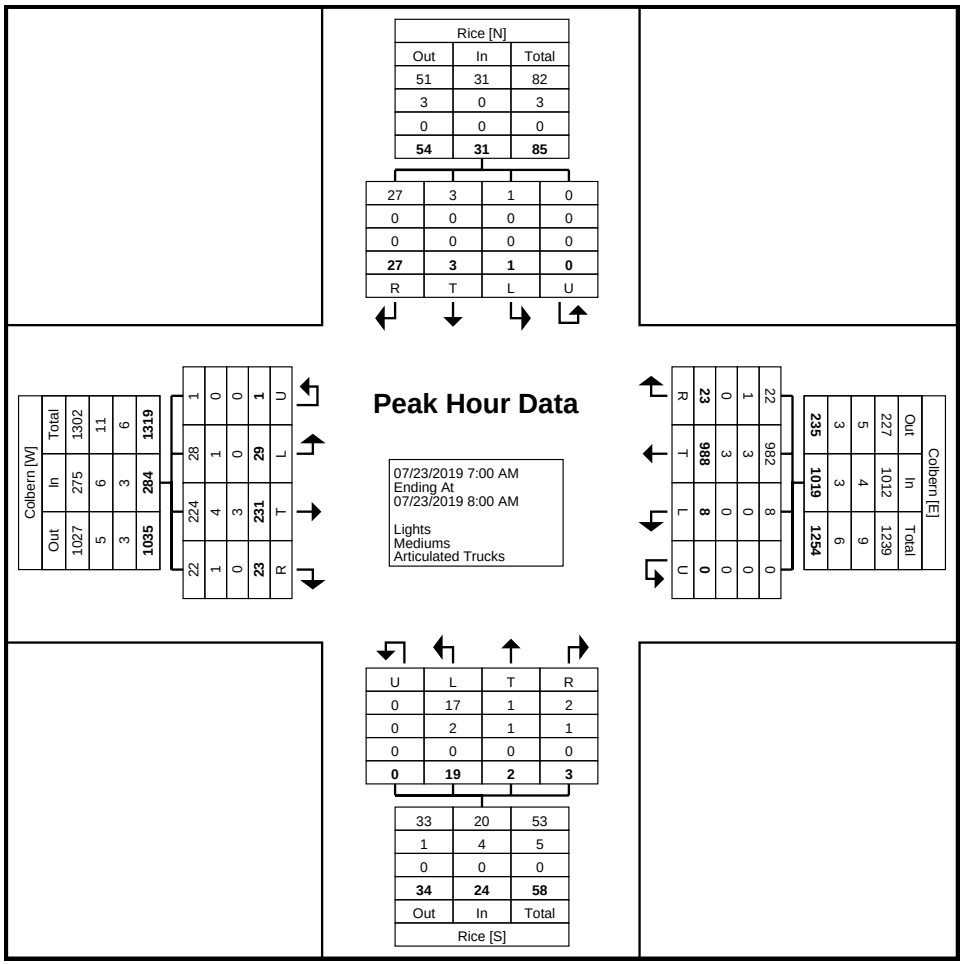
913.381.1170 tmchenry@olssonassociates.com

Count Name: Colbern Rd & Rice Rd
Site Code:
Start Date: 07/23/2019


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

Olsson Associates : Overland Park
7301 West 133rd St

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

Count Name: Colbern Rd & Rice Rd
Site Code:
Start Date: 07/23/2019


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

| Start Time | Rice Southbound | | | | | Colbern Westbound | | | | | Rice Northbound | | | | | Colbern 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 |
| 4:30 PM | 16 | 0 | 5 | 0 | 21 | 5 | 94 | 0 | 0 | 99 | 6 | 0 | 8 | 0 | 14 | 7 | 221 | 15 | 1 | 244 | 378 |
| 4:45 PM | 22 | 1 | 7 | 0 | 30 | 7 | 120 | 1 | 0 | 128 | 4 | 0 | 14 | 0 | 18 | 6 | 248 | 28 | 0 | 282 | 458 |
| 5:00 PM | 25 | 1 | 4 | 0 | 30 | 2 | 109 | 2 | 0 | 113 | 9 | 2 | 12 | 0 | 23 | 9 | 296 | 29 | 0 | 334 | 500 |
| 5:15 PM | 13 | 1 | 3 | 0 | 17 | 7 | 106 | 1 | 0 | 114 | 2 | 1 | 6 | 0 | 9 | 9 | 288 | 12 | 0 | 309 | 449 |
| Total | 76 | 3 | 19 | 0 | 98 | 21 | 429 | 4 | 0 | 454 | 21 | 3 | 40 | 0 | 64 | 31 | 1053 | 84 | 1 | 1169 | 1785 |
| Approach % | 77.6 | 3.1 | 19.4 | 0.0 | - | 4.6 | 94.5 | 0.9 | 0.0 | - | 32.8 | 4.7 | 62.5 | 0.0 | - | 2.7 | 90.1 | 7.2 | 0.1 | - | - |
| Total % | 4.3 | 0.2 | 1.1 | 0.0 | 5.5 | 1.2 | 24.0 | 0.2 | 0.0 | 25.4 | 1.2 | 0.2 | 2.2 | 0.0 | 3.6 | 1.7 | 59.0 | 4.7 | 0.1 | 65.5 | - |
| PHF | 0.760 | 0.750 | 0.679 | 0.000 | 0.817 | 0.750 | 0.894 | 0.500 | 0.000 | 0.887 | 0.583 | 0.375 | 0.714 | 0.000 | 0.696 | 0.861 | 0.889 | 0.724 | 0.250 | 0.875 | 0.893 |
| Lights | 75 | 3 | 19 | 0 | 97 | 21 | 423 | 3 | 0 | 447 | 20 | 3 | 40 | 0 | 63 | 29 | 1048 | 84 | 1 | 1162 | 1769 |
| % Lights | 98.7 | 100.0 | 100.0 | - | 99.0 | 100.0 | 98.6 | 75.0 | - | 98.5 | 95.2 | 100.0 | 100.0 | - | 98.4 | 93.5 | 99.5 | 100.0 | 100.0 | 99.4 | 99.1 |
| Mediums | 1 | 0 | 0 | 0 | 1 | 0 | 6 | 1 | 0 | 7 | 1 | 0 | 0 | 0 | 1 | 1 | 4 | 0 | 0 | 5 | 14 |
| % Mediums | 1.3 | 0.0 | 0.0 | - | 1.0 | 0.0 | 1.4 | 25.0 | - | 1.5 | 4.8 | 0.0 | 0.0 | - | 1.6 | 3.2 | 0.4 | 0.0 | 0.0 | 0.4 | 0.8 |
| Articulated Trucks | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 0 | 0 | 2 | 2 |
| % 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 | 3.2 | 0.1 | 0.0 | 0.0 | 0.2 | 0.1 |

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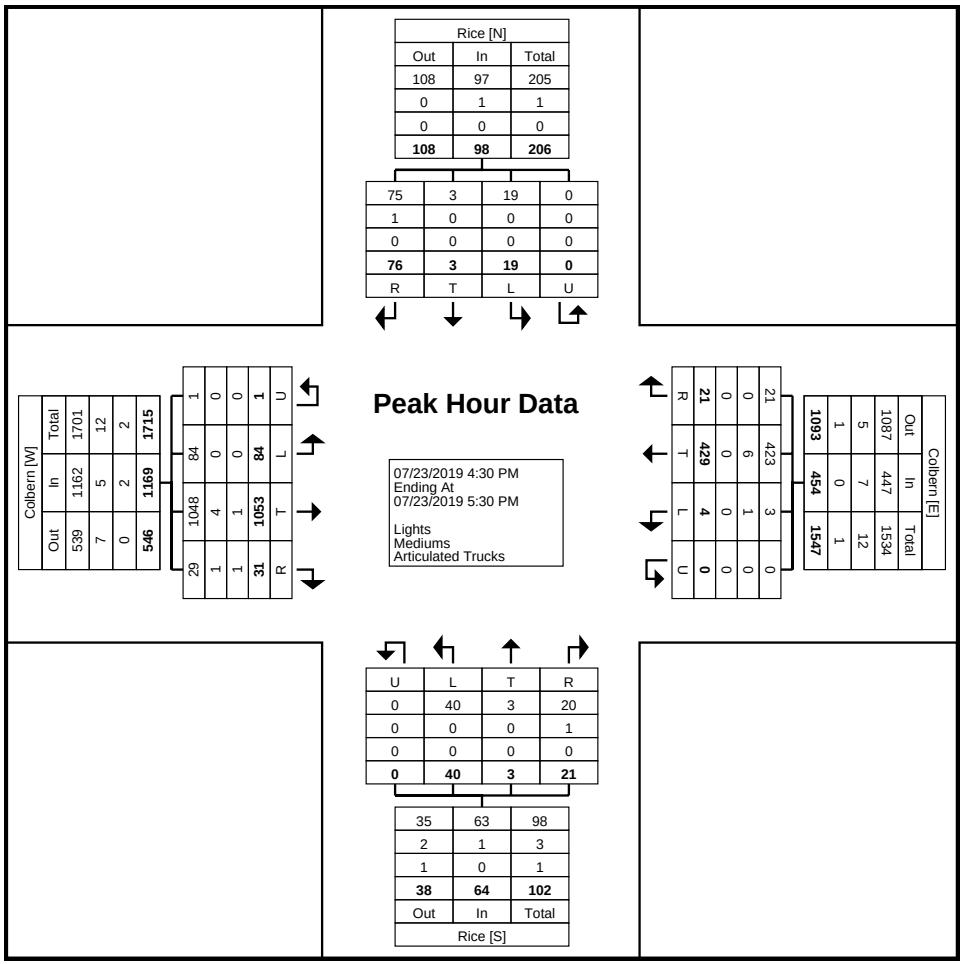
913.381.1170 tmchenry@olssonassociates.com

Count Name: Colbern Rd & Rice Rd
Site Code:
Start Date: 07/23/2019


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

Trip Generation Comparison

**Daily Trip Generation**

| ITE Code/Page | Land Use | Size | | Trip Gen. Avg. Rate/Eq. | Daily Trips | Trip Distribution Enter | Trip Distribution Exit | Daily Trips Enter | Daily Trips Exit |
|---|---|---|---|---|---|---|---|---|---|
| 590 | Library | 15,000 | SF | Equation | 1055 | 50% | 50% | 528 | 527 |
| **Total** | | | | | **1,055** | | | **528** | **527** |

**AM Peak Hour Trip Generation (Adjacent Street)**

| ITE Code/Page | Land Use | Size | | Trip Gen. Avg. Rate/Eq. | AM Peak Hour Trips | Trip Distribution Enter | Trip Distribution Exit | AM Peak Hour Trips Enter | AM Peak Hour Trips Exit |
|---|---|---|---|---|---|---|---|---|---|
| 590 | Library | 15,000 | SF | Equation | 12 | 71% | 29% | 9 | 3 |
| **Total** | | | | | **12** | | | **9** | **3** |

**PM Peak Hour Trip Generation (Adjacent Street)**

| ITE Code/Page | Land Use | Size | | Trip Gen. Avg. Rate/Eq. | PM Peak Hour Trips | Trip Distribution Enter | Trip Distribution Exit | PM Peak Hour Trips Enter | PM Peak Hour Trips Exit |
|---|---|---|---|---|---|---|---|---|---|
| 590 | Library | 15,000 | SF | Equation | 123 | 48% | 52% | 60 | 63 |
| **Total** | | | | | **123** | | | **60** | **63** |

Comparison of Existing Actual Trips to Expected Trips

| | AM | | | PM | | |
|---|---|---|---|---|---|---|
| | Total | Enter | Exit | Total | Enter | Exit |
| Existing Actual Trips | 21 | 12 | 9 | 102 | 43 | 59 |
| Existing Expected Trips | 12 | 9 | 3 | 123 | 60 | 63 |
| **Difference** | **9** | **3** | **6** | **-21** | **-17** | **-4** |

# APPENDIX B

Existing Development Conditions

Signal Warrants

Major Street : Colbern Rd
Minor Street : Rice Rd
City : Lee's Summit, MO
County :

Time Count Began : 6:00am
Date : July 23rd, 2019
Day of Week of Count: Tuesday

Is the intersection in a community with a population less than 10,000 or are speeds greater than 40 mph? No

| | Major Street | Minor Street |
|---|---|---|
| Adjustment factor for day of week and month of year of count | 1 | 1 |
| Number of Lanes | 4 | 2 |

| Time Beginning | Major Street Approach Volumes EAST | WEST | Total ≅ | Minor Street Approach Volumes NORTH | SOUTH | * |
|---|---|---|---|---|---|---|
| 12:00 m | 0 | 0 | 0 | 0 | 0 | 0 |
| 1:00 | 0 | 0 | 0 | 0 | 0 | 0 |
| 2:00 | 0 | 0 | 0 | 0 | 0 | 0 |
| 3:00 am | 0 | 0 | 0 | 0 | 0 | 0 |
| 4:00 | 0 | 0 | 0 | 0 | 0 | 0 |
| 5:00 | 0 | 0 | 0 | 0 | 0 | 0 |
| 6:00 am | 0 | 0 | 0 | 0 | 0 | 0 |
| 7:00 | 284 | 1019 | 1303 | 24 | 31 | 31 |
| 8:00 | 319 | 690 | 1009 | 28 | 59 | 59 |
| 9:00 am | 0 | 0 | 0 | 0 | 0 | 0 |
| 10:00 | 0 | 0 | 0 | 0 | 0 | 0 |
| 11:00 | 0 | 0 | 0 | 0 | 0 | 0 |
| 12:00 n | 0 | 0 | 0 | 0 | 0 | 0 |
| 1:00 | 0 | 0 | 0 | 0 | 0 | 0 |
| 2:00 | 0 | 0 | 0 | 0 | 0 | 0 |
| 3:00 pm | 0 | 0 | 0 | 0 | 0 | 0 |
| 4:00 | 956 | 438 | 1394 | 61 | 108 | 108 |
| 5:00 | 1134 | 422 | 1556 | 55 | 69 | 69 |
| 6:00 pm | 0 | 0 | 0 | 0 | 0 | 0 |
| 7:00 | 0 | 0 | 0 | 0 | 0 | 0 |
| 8:00 | 0 | 0 | 0 | 0 | 0 | 0 |
| 9:00 pm | 0 | 0 | 0 | 0 | 0 | 0 |
| 10:00 | 0 | 0 | 0 | 0 | 0 | 0 |
| 11:00 | 0 | 0 | 0 | 0 | 0 | 0 |
| 24HR Total | 2693 | 2569 | | 168 | 267 | |

**Note:** ≅ Total of both approaches.
* The HIGHEST approach only.

NOTE:
Basic minimum hourly volumes (unreduced)

NOTE: No adjust ment made

**Warrant #2 - Four-Hour Vehicular Volume**

| Warrant Volume | Percent of Warrant |
|---|---|
| 0 | ***** |
| 0 | ***** |
| 0 | ***** |
| 0 | ***** |
| 0 | ***** |
| 0 | ***** |
| 0 | ***** |
| 120 | 26 |
| 190 | 31 |
| 0 | ***** |
| 0 | ***** |
| 0 | ***** |
| 0 | ***** |
| 0 | ***** |
| 0 | ***** |
| 0 | ***** |
| 120 | 90 |
| 120 | 58 |
| 0 | ***** |
| 0 | ***** |
| 0 | ***** |
| 0 | ***** |
| 0 | ***** |
| 0 | ***** |

Warranting Volumes From MUTCD Fig. 4C-1

Hours Met 0
Warrant Met No

**Warrant #3 - Peak Hour**

| Warrant Volume | Percent of Warrant |
|---|---|
| 0 | ***** |
| 0 | ***** |
| 0 | ***** |
| 0 | ***** |
| 0 | ***** |
| 0 | ***** |
| 0 | ***** |
| 250 | 12 |
| 360 | 16 |
| 0 | ***** |
| 0 | ***** |
| 0 | ***** |
| 0 | ***** |
| 0 | ***** |
| 0 | ***** |
| 0 | ***** |
| 230 | 47 |
| 180 | 38 |
| 0 | ***** |
| 0 | ***** |
| 0 | ***** |
| 0 | ***** |
| 0 | ***** |
| 0 | ***** |

Warranting Volumes From MUTCD Fig. 4C-3

Hours Met 0
Warrant Met No

***** Major Street volume is so low that no Minor Street warrant exists

Major Street : Colbern Rd
Minor Street : Ex. Library Access
City : Lee's Summit, MO
County :

Time Count Began : 6:00am
Date : July 23rd, 2019
Day of Week of Count: Tuesday

Is the intersection in a community with a population less than 10,000 or are speeds greater than 40 mph? No

| | Major Street | Minor Street |
|---|---|---|
| Adjustment factor for day of week and month of year of count | 1 | 1 |
| Number of Lanes | 4 | 2 |

| Time Beginning | Major Street Approach Volumes EAST | WEST | Total | ≅ | Minor Street Approach Volumes NORTH | SOUTH | * |
|---|---|---|---|---|---|---|---|
| 12:00 m | 0 | 0 | 0 | | 0 | 0 | 0 |
| 1:00 | 0 | 0 | 0 | | 0 | 0 | 0 |
| 2:00 | 0 | 0 | 0 | | 0 | 0 | 0 |
| 3:00 am | 0 | 0 | 0 | | 0 | 0 | 0 |
| 4:00 | 0 | 0 | 0 | | 0 | 0 | 0 |
| 5:00 | 0 | 0 | 0 | | 0 | 0 | 0 |
| 6:00 am | 0 | 0 | 0 | | 0 | 0 | 0 |
| 7:00 | 225 | 1032 | 1257 | | 1 | 9 | 9 |
| 8:00 | 236 | 696 | 932 | | 0 | 9 | 9 |
| 9:00 am | 0 | 0 | 0 | | 0 | 0 | 0 |
| 10:00 | 0 | 0 | 0 | | 0 | 0 | 0 |
| 11:00 | 0 | 0 | 0 | | 0 | 0 | 0 |
| 12:00 n | 0 | 0 | 0 | | 0 | 0 | 0 |
| 1:00 | 0 | 0 | 0 | | 0 | 0 | 0 |
| 2:00 | 0 | 0 | 0 | | 0 | 0 | 0 |
| 3:00 pm | 0 | 0 | 0 | | 0 | 0 | 0 |
| 4:00 | 899 | 422 | 1321 | | 4 | 56 | 56 |
| 5:00 | 1061 | 404 | 1465 | | 9 | 54 | 54 |
| 6:00 pm | 0 | 0 | 0 | | 0 | 0 | 0 |
| 7:00 | 0 | 0 | 0 | | 0 | 0 | 0 |
| 8:00 | 0 | 0 | 0 | | 0 | 0 | 0 |
| 9:00 pm | 0 | 0 | 0 | | 0 | 0 | 0 |
| 10:00 | 0 | 0 | 0 | | 0 | 0 | 0 |
| 11:00 | 0 | 0 | 0 | | 0 | 0 | 0 |
| 24HR Total | 2421 | 2554 | | | 14 | 128 | |

**Note:** ≅ Total of both approaches.
* The HIGHEST approach only.

NOTE: Basic minimum hourly volumes (unreduced)

NOTE: No adjust ment made

| Warrant #2 - Four-Hour Vehicular Volume | | Warrant #3 - Peak Hour | |
|---|---|---|---|
| Warrant Volume | Percent of Warrant | Warrant Volume | Percent of Warrant |
| 0 | ***** | 0 | ***** |
| 0 | ***** | 0 | ***** |
| 0 | ***** | 0 | ***** |
| 0 | ***** | 0 | ***** |
| 0 | ***** | 0 | ***** |
| 0 | ***** | 0 | ***** |
| 0 | ***** | 0 | ***** |
| 120 | 8 | 270 | 3 |
| 220 | 4 | 400 | 2 |
| 0 | ***** | 0 | ***** |
| 0 | ***** | 0 | ***** |
| 0 | ***** | 0 | ***** |
| 0 | ***** | 0 | ***** |
| 0 | ***** | 0 | ***** |
| 0 | ***** | 0 | ***** |
| 0 | ***** | 0 | ***** |
| 120 | 47 | 250 | 22 |
| 120 | 45 | 210 | 26 |
| 0 | ***** | 0 | ***** |
| 0 | ***** | 0 | ***** |
| 0 | ***** | 0 | ***** |
| 0 | ***** | 0 | ***** |
| 0 | ***** | 0 | ***** |
| 0 | ***** | 0 | ***** |
| Warranting Volumes From MUTCD Fig. 4C-1 | | Warranting Volumes From MUTCD Fig. 4C-3 | |
| Hours Met | 0 | Hours Met | 0 |
| Warrant Met | No | Warrant Met | No |

***** Major Street volume is so low that no Minor Street warrant exists

Capacity Analysis

| Intersection | |
|---|---|
| Int Delay, s/veh | 1.6 |

| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Vol, veh/h | 29 | 235 | 23 | 8 | 996 | 23 | 19 | 2 | 3 | 1 | 3 | 27 |
| Future Vol, veh/h | 29 | 235 | 23 | 8 | 996 | 23 | 19 | 2 | 3 | 1 | 3 | 27 |
| 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 | 60 | - | - | 225 | - | - | - | - | - | - | - | - |
| Veh in Median Storage, # | - | 0 | - | - | 0 | - | - | 0 | - | - | 0 | - |
| Grade, % | - | 0 | - | - | 0 | - | - | 0 | - | - | 0 | - |
| Peak Hour Factor | 73 | 89 | 58 | 50 | 92 | 72 | 79 | 50 | 38 | 25 | 38 | 84 |
| Heavy Vehicles, % | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 |
| Mvmt Flow | 40 | 264 | 40 | 16 | 1083 | 32 | 24 | 4 | 8 | 4 | 8 | 32 |

| Major/Minor | Major1 | | | Major2 | | | Minor1 | | | Minor2 | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Conflicting Flow All | 1115 | 0 | 0 | 304 | 0 | 0 | 942 | 1511 | 152 | 1345 | 1515 | 558 |
| Stage 1 | - | - | - | - | - | - | 364 | 364 | - | 1131 | 1131 | - |
| Stage 2 | - | - | - | - | - | - | 578 | 1147 | - | 214 | 384 | - |
| Critical Hdwy | 4.14 | - | - | 4.14 | - | - | 7.54 | 6.54 | 6.94 | 7.54 | 6.54 | 6.94 |
| Critical Hdwy Stg 1 | - | - | - | - | - | - | 6.54 | 5.54 | - | 6.54 | 5.54 | - |
| Critical Hdwy Stg 2 | - | - | - | - | - | - | 6.54 | 5.54 | - | 6.54 | 5.54 | - |
| Follow-up Hdwy | 2.22 | - | - | 2.22 | - | - | 3.52 | 4.02 | 3.32 | 3.52 | 4.02 | 3.32 |
| Pot Cap-1 Maneuver | 622 | - | - | 1254 | - | - | 218 | 119 | 867 | 110 | 118 | 473 |
| Stage 1 | - | - | - | - | - | - | 627 | 622 | - | 217 | 277 | - |
| Stage 2 | - | - | - | - | - | - | 468 | 272 | - | 768 | 610 | - |
| Platoon blocked, % | | - | - | | - | - | | | | | | |
| Mov Cap-1 Maneuver | 622 | - | - | 1254 | - | - | 181 | 110 | 867 | 100 | 109 | 473 |
| Mov Cap-2 Maneuver | - | - | - | - | - | - | 181 | 110 | - | 100 | 109 | - |
| Stage 1 | - | - | - | - | - | - | 587 | 582 | - | 203 | 273 | - |
| Stage 2 | - | - | - | - | - | - | 418 | 268 | - | 707 | 571 | - |

| Approach | EB | WB | NB | SB |
|---|---|---|---|---|
| HCM Control Delay, s | 1.3 | 0.1 | 26.6 | 23 |
| HCM LOS | | | D | C |

| Minor Lane/Major Mvmt | NBLn1 | EBL | EBT | EBR | WBL | WBT | WBR | SBLn1 |
|---|---|---|---|---|---|---|---|---|
| Capacity (veh/h) | 202 | 622 | - | - | 1254 | - | - | 244 |
| HCM Lane V/C Ratio | 0.178 | 0.064 | - | - | 0.013 | - | - | 0.18 |
| HCM Control Delay (s) | 26.6 | 11.2 | - | - | 7.9 | - | - | 23 |
| HCM Lane LOS | D | B | - | - | A | - | - | C |
| HCM 95th %tile Q(veh) | 0.6 | 0.2 | - | - | 0 | - | - | 0.6 |

| Intersection | |
|---|---|
| Int Delay, s/veh | 0.6 |

| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Vol, veh/h | 7 | 223 | 0 | 0 | 1027 | 5 | 1 | 0 | 0 | 1 | 1 | 7 |
| Future Vol, veh/h | 7 | 223 | 0 | 0 | 1027 | 5 | 1 | 0 | 0 | 1 | 1 | 7 |
| 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 | 90 | - | - | 95 | - | - | - | - | - | - | - | - |
| Veh in Median Storage, # | - | 0 | - | - | 0 | - | - | 0 | - | - | 0 | - |
| Grade, % | - | 0 | - | - | 0 | - | - | 0 | - | - | 0 | - |
| Peak Hour Factor | 29 | 92 | 100 | 100 | 94 | 42 | 25 | 100 | 100 | 25 | 25 | 58 |
| Heavy Vehicles, % | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 |
| Mvmt Flow | 24 | 242 | 0 | 0 | 1093 | 12 | 4 | 0 | 0 | 4 | 4 | 12 |

| Major/Minor | Major1 | | | Major2 | | | Minor1 | | | Minor2 | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Conflicting Flow All | 1105 | 0 | 0 | 242 | 0 | 0 | 839 | 1395 | 121 | 1268 | 1389 | 553 |
| Stage 1 | - | - | - | - | - | - | 290 | 290 | - | 1099 | 1099 | - |
| Stage 2 | - | - | - | - | - | - | 549 | 1105 | - | 169 | 290 | - |
| Critical Hdwy | 4.14 | - | - | 4.14 | - | - | 7.54 | 6.54 | 6.94 | 7.54 | 6.54 | 6.94 |
| Critical Hdwy Stg 1 | - | - | - | - | - | - | 6.54 | 5.54 | - | 6.54 | 5.54 | - |
| Critical Hdwy Stg 2 | - | - | - | - | - | - | 6.54 | 5.54 | - | 6.54 | 5.54 | - |
| Follow-up Hdwy | 2.22 | - | - | 2.22 | - | - | 3.52 | 4.02 | 3.32 | 3.52 | 4.02 | 3.32 |
| Pot Cap-1 Maneuver | 628 | - | - | 1322 | - | - | 259 | 140 | 908 | 125 | 141 | 477 |
| Stage 1 | - | - | - | - | - | - | 694 | 671 | - | 227 | 287 | - |
| Stage 2 | - | - | - | - | - | - | 488 | 285 | - | 816 | 671 | - |
| Platoon blocked, % | | - | - | | - | - | | | | | | |
| Mov Cap-1 Maneuver | 628 | - | - | 1322 | - | - | 240 | 135 | 908 | 121 | 136 | 477 |
| Mov Cap-2 Maneuver | - | - | - | - | - | - | 240 | 135 | - | 121 | 136 | - |
| Stage 1 | - | - | - | - | - | - | 668 | 646 | - | 218 | 287 | - |
| Stage 2 | - | - | - | - | - | - | 469 | 285 | - | 785 | 646 | - |

| Approach | EB | WB | NB | SB |
|---|---|---|---|---|
| HCM Control Delay, s | 1 | 0 | 20.3 | 22.2 |
| HCM LOS | | | C | C |

| Minor Lane/Major Mvmt | NBLn1 | EBL | EBT | EBR | WBL | WBT | WBR | SBLn1 |
|---|---|---|---|---|---|---|---|---|
| Capacity (veh/h) | 240 | 628 | - | - | 1322 | - | - | 229 |
| HCM Lane V/C Ratio | 0.017 | 0.038 | - | - | - | - | - | 0.088 |
| HCM Control Delay (s) | 20.3 | 11 | - | - | 0 | - | - | 22.2 |
| HCM Lane LOS | C | B | - | - | A | - | - | C |
| HCM 95th %tile Q(veh) | 0.1 | 0.1 | - | - | 0 | - | - | 0.3 |

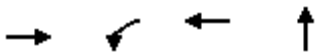
| Intersection | |
|---|---|
| Int Delay, s/veh | 0 |

| Movement | EBT | EBR | WBL | WBT | NBL | NBR |
|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | |
| Traffic Vol, veh/h | 230 | 1 | 0 | 1035 | 0 | 0 |
| Future Vol, veh/h | 230 | 1 | 0 | 1035 | 0 | 0 |
| 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 | 86 | 25 | 100 | 93 | 100 | 100 |
| Heavy Vehicles, % | 2 | 2 | 2 | 2 | 2 | 2 |
| Mvmt Flow | 267 | 4 | 0 | 1113 | 0 | 0 |

| Major/Minor | Major1 | | Major2 | | Minor1 | |
|---|---|---|---|---|---|---|
| Conflicting Flow All | 0 | 0 | - | - | - | 136 |
| Stage 1 | - | - | - | - | - | - |
| Stage 2 | - | - | - | - | - | - |
| Critical Hdwy | - | - | - | - | - | 6.94 |
| Critical Hdwy Stg 1 | - | - | - | - | - | - |
| Critical Hdwy Stg 2 | - | - | - | - | - | - |
| Follow-up Hdwy | - | - | - | - | - | 3.32 |
| Pot Cap-1 Maneuver | - | - | 0 | - | 0 | 888 |
| Stage 1 | - | - | 0 | - | 0 | - |
| Stage 2 | - | - | 0 | - | 0 | - |
| Platoon blocked, % | - | - | | - | | |
| Mov Cap-1 Maneuver | - | - | - | - | - | 888 |
| Mov Cap-2 Maneuver | - | - | - | - | - | - |
| Stage 1 | - | - | - | - | - | - |
| Stage 2 | - | - | - | - | - | - |

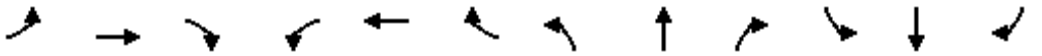
| Approach | EB | WB | NB |
|---|---|---|---|
| HCM Control Delay, s | 0 | 0 | 0 |
| HCM LOS | | | A |

| Minor Lane/Major Mvmt | NBLn1 | EBT | EBR | WBT |
|---|---|---|---|---|
| Capacity (veh/h) | - | - | - | - |
| HCM Lane V/C Ratio | - | - | - | - |
| HCM Control Delay (s) | 0 | - | - | - |
| HCM Lane LOS | A | - | - | - |
| HCM 95th %tile Q(veh) | - | - | - | - |



| Lane Group | EBT | WBL | WBT | NBT |
|---|---|---|---|---|
| Lane Group Flow (vph) | 244 | 12 | 1026 | 60 |
| v/c Ratio | 0.11 | 0.02 | 0.41 | 0.13 |
| Control Delay | 6.6 | 4.2 | 5.1 | 3.2 |
| Queue Delay | 0.0 | 0.0 | 0.0 | 0.0 |
| Total Delay | 6.6 | 4.2 | 5.1 | 3.2 |
| Queue Length 50th (ft) | 11 | 1 | 63 | 0 |
| Queue Length 95th (ft) | 43 | 2 | 99 | 13 |
| Internal Link Dist (ft) | 295 | | 547 | 737 |
| Turn Bay Length (ft) | | 245 | | |
| Base Capacity (vph) | 3473 | 1212 | 3539 | 1396 |
| Starvation Cap Reductn | 0 | 0 | 0 | 0 |
| Spillback Cap Reductn | 0 | 0 | 0 | 0 |
| Storage Cap Reductn | 0 | 0 | 0 | 0 |
| Reduced v/c Ratio | 0.07 | 0.01 | 0.29 | 0.04 |

Intersection Summary



| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Volume (veh/h) | 0 | 211 | 10 | 4 | 975 | 0 | 44 | 0 | 2 | 0 | 0 | 0 |
| Future Volume (veh/h) | 0 | 211 | 10 | 4 | 975 | 0 | 44 | 0 | 2 | 0 | 0 | 0 |
| Initial Q (Qb), veh | 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 | | | |
| Parking Bus, Adj | 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 | | | | |
| Adj Sat Flow, veh/h/ln | 0 | 1870 | 1870 | 1870 | 1870 | 0 | 1900 | 1870 | 1900 | | | |
| Adj Flow Rate, veh/h | 0 | 232 | 12 | 12 | 1026 | 0 | 56 | 0 | 4 | | | |
| Peak Hour Factor | 0.92 | 0.91 | 0.83 | 0.33 | 0.95 | 0.92 | 0.79 | 0.92 | 0.50 | | | |
| Percent Heavy Veh, % | 0 | 2 | 2 | 2 | 2 | 0 | 0 | 2 | 0 | | | |
| Cap, veh/h | 0 | 1073 | 55 | 563 | 1868 | 0 | 129 | 0 | 9 | | | |
| Arrive On Green | 0.00 | 0.31 | 0.31 | 0.02 | 0.53 | 0.00 | 0.08 | 0.00 | 0.08 | | | |
| Sat Flow, veh/h | 0 | 3532 | 177 | 1781 | 3647 | 0 | 1649 | 0 | 118 | | | |
| Grp Volume(v), veh/h | 0 | 119 | 125 | 12 | 1026 | 0 | 60 | 0 | 0 | | | |
| Grp Sat Flow(s),veh/h/ln | 0 | 1777 | 1839 | 1781 | 1777 | 0 | 1767 | 0 | 0 | | | |
| Q Serve(g_s), s | 0.0 | 1.5 | 1.5 | 0.1 | 5.8 | 0.0 | 1.0 | 0.0 | 0.0 | | | |
| Cycle Q Clear(g_c), s | 0.0 | 1.5 | 1.5 | 0.1 | 5.8 | 0.0 | 1.0 | 0.0 | 0.0 | | | |
| Prop In Lane | 0.00 | | 0.10 | 1.00 | | 0.00 | 0.93 | | 0.07 | | | |
| Lane Grp Cap(c), veh/h | 0 | 554 | 574 | 563 | 1868 | 0 | 139 | 0 | 0 | | | |
| V/C Ratio(X) | 0.00 | 0.22 | 0.22 | 0.02 | 0.55 | 0.00 | 0.43 | 0.00 | 0.00 | | | |
| Avail Cap(c_a), veh/h | 0 | 2285 | 2364 | 1651 | 4570 | 0 | 1398 | 0 | 0 | | | |
| HCM Platoon Ratio | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | | | |
| Upstream Filter(I) | 0.00 | 1.00 | 1.00 | 1.00 | 1.00 | 0.00 | 1.00 | 0.00 | 0.00 | | | |
| Uniform Delay (d), s/veh | 0.0 | 7.7 | 7.7 | 5.8 | 4.8 | 0.0 | 13.3 | 0.0 | 0.0 | | | |
| Incr Delay (d2), s/veh | 0.0 | 0.2 | 0.2 | 0.0 | 0.3 | 0.0 | 2.1 | 0.0 | 0.0 | | | |
| Initial Q Delay(d3),s/veh | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | | | |
| %ile BackOfQ(50%),veh/ln | 0.0 | 0.3 | 0.4 | 0.0 | 0.5 | 0.0 | 0.4 | 0.0 | 0.0 | | | |
| Unsig. Movement Delay, s/veh | | | | | | | | | | | | |
| LnGrp Delay(d),s/veh | 0.0 | 7.9 | 7.9 | 5.8 | 5.0 | 0.0 | 15.4 | 0.0 | 0.0 | | | |
| LnGrp LOS | A | A | A | A | A | A | B | A | A | | | |
| Approach Vol, veh/h | | 244 | | | 1038 | | | 60 | | | | |
| Approach Delay, s/veh | | 7.9 | | | 5.1 | | | 15.4 | | | | |
| Approach LOS | | A | | | A | | | B | | | | |
| Timer - Assigned Phs | | 2 | 3 | 4 | | | | 8 | | | | |
| Phs Duration (G+Y+Rc), s | | 8.4 | 6.5 | 15.5 | | | | 21.9 | | | | |
| Change Period (Y+Rc), s | | 6.0 | 6.0 | 6.0 | | | | 6.0 | | | | |
| Max Green Setting (Gmax), s | | 24.0 | 19.0 | 39.0 | | | | 39.0 | | | | |
| Max Q Clear Time (g_c+I1), s | | 3.0 | 2.1 | 3.5 | | | | 7.8 | | | | |
| Green Ext Time (p_c), s | | 0.2 | 0.0 | 1.3 | | | | 8.1 | | | | |
| Intersection Summary | | | | | | | | | | | | |
| HCM 6th Ctrl Delay | | | 6.0 | | | | | | | | | |
| HCM 6th LOS | | | A | | | | | | | | | |

| Lane Group | EBT | WBT | NBL | NBR |
|---|---|---|---|---|
| Lane Group Flow (vph) | 278 | 1133 | 185 | 56 |
| v/c Ratio | 0.13 | 0.52 | 0.38 | 0.12 |
| Control Delay | 7.6 | 11.1 | 29.0 | 7.8 |
| Queue Delay | 0.0 | 0.0 | 0.0 | 0.0 |
| Total Delay | 7.6 | 11.1 | 29.0 | 7.8 |
| Queue Length 50th (ft) | 32 | 176 | 85 | 0 |
| Queue Length 95th (ft) | 47 | 227 | 144 | 19 |
| Internal Link Dist (ft) | 516 | 112 | 754 | |
| Turn Bay Length (ft) | | | | 250 |
| Base Capacity (vph) | 2162 | 2162 | 491 | 480 |
| Starvation Cap Reductn | 0 | 0 | 0 | 0 |
| Spillback Cap Reductn | 0 | 0 | 0 | 0 |
| Storage Cap Reductn | 0 | 0 | 0 | 0 |
| Reduced v/c Ratio | 0.13 | 0.52 | 0.38 | 0.12 |

Intersection Summary

| Movement | EBT | EBR | WBL | WBT | NBL | NBR |
|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | |
| Traffic Volume (veh/h) | 245 | 0 | 0 | 1042 | 172 | 42 |
| Future Volume (veh/h) | 245 | 0 | 0 | 1042 | 172 | 42 |
| Initial Q (Qb), veh | 0 | 0 | 0 | 0 | 0 | 0 |
| Ped-Bike Adj(A_pbT) | | 1.00 | 1.00 | | 1.00 | 1.00 |
| Parking Bus, Adj | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Work Zone On Approach | No | | | No | No | |
| Adj Sat Flow, veh/h/ln | 1870 | 0 | 0 | 1870 | 1870 | 1870 |
| Adj Flow Rate, veh/h | 278 | 0 | 0 | 1133 | 185 | 0 |
| Peak Hour Factor | 0.88 | 1.00 | 1.00 | 0.92 | 0.93 | 0.75 |
| Percent Heavy Veh, % | 2 | 0 | 0 | 2 | 2 | 2 |
| Cap, veh/h | 2172 | 0 | 0 | 2172 | 495 | |
| Arrive On Green | 0.61 | 0.00 | 0.00 | 0.61 | 0.28 | 0.00 |
| Sat Flow, veh/h | 3741 | 0 | 0 | 3741 | 1781 | 1585 |
| Grp Volume(v), veh/h | 278 | 0 | 0 | 1133 | 185 | 0 |
| Grp Sat Flow(s),veh/h/ln | 1777 | 0 | 0 | 1777 | 1781 | 1585 |
| Q Serve(g_s), s | 3.0 | 0.0 | 0.0 | 16.4 | 7.5 | 0.0 |
| Cycle Q Clear(g_c), s | 3.0 | 0.0 | 0.0 | 16.4 | 7.5 | 0.0 |
| Prop In Lane | | 0.00 | 0.00 | | 1.00 | 1.00 |
| Lane Grp Cap(c), veh/h | 2172 | 0 | 0 | 2172 | 495 | |
| V/C Ratio(X) | 0.13 | 0.00 | 0.00 | 0.52 | 0.37 | |
| Avail Cap(c_a), veh/h | 2172 | 0 | 0 | 2172 | 495 | |
| HCM Platoon Ratio | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Upstream Filter(I) | 1.00 | 0.00 | 0.00 | 1.00 | 1.00 | 0.00 |
| Uniform Delay (d), s/veh | 7.4 | 0.0 | 0.0 | 10.0 | 26.2 | 0.0 |
| Incr Delay (d2), s/veh | 0.1 | 0.0 | 0.0 | 0.9 | 2.2 | 0.0 |
| Initial Q Delay(d3),s/veh | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| %ile BackOfQ(50%),veh/ln | 1.0 | 0.0 | 0.0 | 5.6 | 3.4 | 0.0 |
| Unsig. Movement Delay, s/veh | | | | | | |
| LnGrp Delay(d),s/veh | 7.5 | 0.0 | 0.0 | 10.9 | 28.3 | 0.0 |
| LnGrp LOS | A | A | A | B | C | |
| Approach Vol, veh/h | 278 | | | 1133 | 185 | A |
| Approach Delay, s/veh | 7.5 | | | 10.9 | 28.3 | |
| Approach LOS | A | | | B | C | |

| Timer - Assigned Phs | 2 | | | | 6 | 8 |
|---|---|---|---|---|---|---|
| Phs Duration (G+Y+Rc), s | 60.0 | | | | 60.0 | 30.0 |
| Change Period (Y+Rc), s | 5.0 | | | | 5.0 | 5.0 |
| Max Green Setting (Gmax), s | 55.0 | | | | 55.0 | 25.0 |
| Max Q Clear Time (g_c+I1), s | 18.4 | | | | 5.0 | 9.5 |
| Green Ext Time (p_c), s | 9.7 | | | | 1.8 | 0.4 |

| Intersection Summary | |
|---|---|
| HCM 6th Ctrl Delay | 12.3 |
| HCM 6th LOS | B |

**Notes**

Unsignalized Delay for [NBR] is excluded from calculations of the approach delay and intersection delay.

| Intersection | |
|---|---|
| Int Delay, s/veh | 21.7 |

| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Vol, veh/h | 84 | 1060 | 31 | 4 | 431 | 21 | 40 | 3 | 21 | 19 | 3 | 76 |
| Future Vol, veh/h | 84 | 1060 | 31 | 4 | 431 | 21 | 40 | 3 | 21 | 19 | 3 | 76 |
| 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 | 60 | - | - | 225 | - | - | - | - | - | - | - | - |
| Veh in Median Storage, # | - | 0 | - | - | 0 | - | - | 0 | - | - | 0 | - |
| Grade, % | - | 0 | - | - | 0 | - | - | 0 | - | - | 0 | - |
| Peak Hour Factor | 72 | 89 | 86 | 50 | 89 | 75 | 71 | 38 | 58 | 68 | 75 | 76 |
| Heavy Vehicles, % | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 |
| Mvmt Flow | 117 | 1191 | 36 | 8 | 484 | 28 | 56 | 8 | 36 | 28 | 4 | 100 |

| Major/Minor | Major1 | | | Major2 | | | Minor1 | | | Minor2 | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Conflicting Flow All | 512 | 0 | 0 | 1227 | 0 | 0 | 1703 | 1971 | 614 | 1348 | 1975 | 256 |
| Stage 1 | - | - | - | - | - | - | 1443 | 1443 | - | 514 | 514 | - |
| Stage 2 | - | - | - | - | - | - | 260 | 528 | - | 834 | 1461 | - |
| Critical Hdwy | 4.14 | - | - | 4.14 | - | - | 7.54 | 6.54 | 6.94 | 7.54 | 6.54 | 6.94 |
| Critical Hdwy Stg 1 | - | - | - | - | - | - | 6.54 | 5.54 | - | 6.54 | 5.54 | - |
| Critical Hdwy Stg 2 | - | - | - | - | - | - | 6.54 | 5.54 | - | 6.54 | 5.54 | - |
| Follow-up Hdwy | 2.22 | - | - | 2.22 | - | - | 3.52 | 4.02 | 3.32 | 3.52 | 4.02 | 3.32 |
| Pot Cap-1 Maneuver | 1050 | - | - | 564 | - | - | 59 | 62 | 435 | 109 | 61 | 743 |
| Stage 1 | - | - | - | - | - | - | 139 | 196 | - | 511 | 534 | - |
| Stage 2 | - | - | - | - | - | - | 722 | 526 | - | 329 | 192 | - |
| Platoon blocked, % | | - | - | | - | - | | | | | | |
| Mov Cap-1 Maneuver | 1050 | - | - | 564 | - | - | ~ 44 | 54 | 435 | 80 | 53 | 743 |
| Mov Cap-2 Maneuver | - | - | - | - | - | - | ~ 44 | 54 | - | 80 | 53 | - |
| Stage 1 | - | - | - | - | - | - | 124 | 174 | - | 454 | 527 | - |
| Stage 2 | - | - | - | - | - | - | 611 | 519 | - | 256 | 171 | - |

| Approach | EB | WB | NB | SB |
|---|---|---|---|---|
| HCM Control Delay, s | 0.8 | 0.2 | $ 392.1 | 38 |
| HCM LOS | | | F | E |

| Minor Lane/Major Mvmt | NBLn1 | EBL | EBT | EBR | WBL | WBT | WBR | SBLn1 |
|---|---|---|---|---|---|---|---|---|
| Capacity (veh/h) | 67 | 1050 | - | - | 564 | - | - | 236 |
| HCM Lane V/C Ratio | 1.499 | 0.111 | - | - | 0.014 | - | - | 0.559 |
| HCM Control Delay (s) | $ 392.1 | 8.9 | - | - | 11.5 | - | - | 38 |
| HCM Lane LOS | F | A | - | - | B | - | - | E |
| HCM 95th %tile Q(veh) | 8.6 | 0.4 | - | - | 0 | - | - | 3.1 |

| Notes | | | |
|---|---|---|---|
| ~: Volume exceeds capacity | $: Delay exceeds 300s | +: Computation Not Defined | *: All major volume in platoon |

| Intersection | |
|---|---|
| Int Delay, s/veh | 1.4 |

| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Vol, veh/h | 30 | 1075 | 0 | 2 | 420 | 13 | 2 | 0 | 2 | 21 | 0 | 38 |
| Future Vol, veh/h | 30 | 1075 | 0 | 2 | 420 | 13 | 2 | 0 | 2 | 21 | 0 | 38 |
| 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 | 90 | - | - | 95 | - | - | - | - | - | - | - | - |
| Veh in Median Storage, # | - | 0 | - | - | 0 | - | - | 0 | - | - | 0 | - |
| Grade, % | - | 0 | - | - | 0 | - | - | 0 | - | - | 0 | - |
| Peak Hour Factor | 73 | 89 | 100 | 25 | 84 | 65 | 50 | 100 | 50 | 75 | 100 | 73 |
| Heavy Vehicles, % | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 |
| Mvmt Flow | 41 | 1208 | 0 | 8 | 500 | 20 | 4 | 0 | 4 | 28 | 0 | 52 |

| Major/Minor | Major1 | | | Major2 | | | Minor1 | | | Minor2 | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Conflicting Flow All | 520 | 0 | 0 | 1208 | 0 | 0 | 1556 | 1826 | 604 | 1212 | 1816 | 260 |
| Stage 1 | - | - | - | - | - | - | 1290 | 1290 | - | 526 | 526 | - |
| Stage 2 | - | - | - | - | - | - | 266 | 536 | - | 686 | 1290 | - |
| Critical Hdwy | 4.14 | - | - | 4.14 | - | - | 7.54 | 6.54 | 6.94 | 7.54 | 6.54 | 6.94 |
| Critical Hdwy Stg 1 | - | - | - | - | - | - | 6.54 | 5.54 | - | 6.54 | 5.54 | - |
| Critical Hdwy Stg 2 | - | - | - | - | - | - | 6.54 | 5.54 | - | 6.54 | 5.54 | - |
| Follow-up Hdwy | 2.22 | - | - | 2.22 | - | - | 3.52 | 4.02 | 3.32 | 3.52 | 4.02 | 3.32 |
| Pot Cap-1 Maneuver | 1042 | - | - | 573 | - | - | 77 | 76 | 441 | 138 | 77 | 739 |
| Stage 1 | - | - | - | - | - | - | 173 | 232 | - | 503 | 527 | - |
| Stage 2 | - | - | - | - | - | - | 716 | 522 | - | 404 | 232 | - |
| Platoon blocked, % | | - | - | | - | - | | | | | | |
| Mov Cap-1 Maneuver | 1042 | - | - | 573 | - | - | 69 | 72 | 441 | 131 | 73 | 739 |
| Mov Cap-2 Maneuver | - | - | - | - | - | - | 69 | 72 | - | 131 | 73 | - |
| Stage 1 | - | - | - | - | - | - | 166 | 223 | - | 483 | 520 | - |
| Stage 2 | - | - | - | - | - | - | 656 | 515 | - | 385 | 223 | - |

| Approach | EB | WB | NB | SB |
|---|---|---|---|---|
| HCM Control Delay, s | 0.3 | 0.2 | 37.4 | 22.8 |
| HCM LOS | | | E | C |

| Minor Lane/Major Mvmt | NBLn1 | EBL | EBT | EBR | WBL | WBT | WBR | SBLn1 |
|---|---|---|---|---|---|---|---|---|
| Capacity (veh/h) | 119 | 1042 | - | - | 573 | - | - | 282 |
| HCM Lane V/C Ratio | 0.067 | 0.039 | - | - | 0.014 | - | - | 0.284 |
| HCM Control Delay (s) | 37.4 | 8.6 | - | - | 11.4 | - | - | 22.8 |
| HCM Lane LOS | E | A | - | - | B | - | - | C |
| HCM 95th %tile Q(veh) | 0.2 | 0.1 | - | - | 0 | - | - | 1.1 |

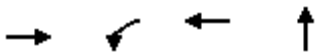
| Intersection | |
|---|---|
| Int Delay, s/veh | 0 |

| Movement | EBT | EBR | WBL | WBT | NBL | NBR |
|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | |
| Traffic Vol, veh/h | 1105 | 6 | 0 | 460 | 0 | 0 |
| Future Vol, veh/h | 1105 | 6 | 0 | 460 | 0 | 0 |
| 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 | 88 | 75 | 100 | 87 | 100 | 100 |
| Heavy Vehicles, % | 2 | 2 | 2 | 2 | 2 | 2 |
| Mvmt Flow | 1256 | 8 | 0 | 529 | 0 | 0 |

| Major/Minor | Major1 | | Major2 | | Minor1 | |
|---|---|---|---|---|---|---|
| Conflicting Flow All | 0 | 0 | - | - | - | 632 |
| Stage 1 | - | - | - | - | - | - |
| Stage 2 | - | - | - | - | - | - |
| Critical Hdwy | - | - | - | - | - | 6.94 |
| Critical Hdwy Stg 1 | - | - | - | - | - | - |
| Critical Hdwy Stg 2 | - | - | - | - | - | - |
| Follow-up Hdwy | - | - | - | - | - | 3.32 |
| Pot Cap-1 Maneuver | - | - | 0 | - | 0 | 423 |
| Stage 1 | - | - | 0 | - | 0 | - |
| Stage 2 | - | - | 0 | - | 0 | - |
| Platoon blocked, % | - | - | | - | | |
| Mov Cap-1 Maneuver | - | - | - | - | - | 423 |
| Mov Cap-2 Maneuver | - | - | - | - | - | - |
| Stage 1 | - | - | - | - | - | - |
| Stage 2 | - | - | - | - | - | - |

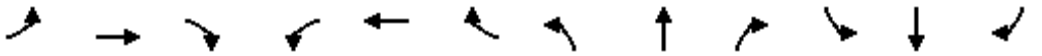
| Approach | EB | WB | NB |
|---|---|---|---|
| HCM Control Delay, s | 0 | 0 | 0 |
| HCM LOS | | | A |

| Minor Lane/Major Mvmt | NBLn1 | EBT | EBR | WBT |
|---|---|---|---|---|
| Capacity (veh/h) | - | - | - | - |
| HCM Lane V/C Ratio | - | - | - | - |
| HCM Control Delay (s) | 0 | - | - | - |
| HCM Lane LOS | A | - | - | - |
| HCM 95th %tile Q(veh) | - | - | - | - |



| Lane Group | EBT | WBL | WBT | NBT |
|---|---|---|---|---|
| Lane Group Flow (vph) | 1251 | 12 | 502 | 48 |
| v/c Ratio | 0.48 | 0.03 | 0.18 | 0.12 |
| Control Delay | 6.2 | 3.1 | 3.0 | 2.2 |
| Queue Delay | 0.0 | 0.0 | 0.0 | 0.0 |
| Total Delay | 6.2 | 3.1 | 3.0 | 2.2 |
| Queue Length 50th (ft) | 84 | 1 | 25 | 0 |
| Queue Length 95th (ft) | 216 | 3 | 33 | 8 |
| Internal Link Dist (ft) | 295 | | 547 | 737 |
| Turn Bay Length (ft) | | 245 | | |
| Base Capacity (vph) | 3040 | 1071 | 3488 | 1223 |
| Starvation Cap Reductn | 0 | 0 | 0 | 0 |
| Spillback Cap Reductn | 0 | 0 | 0 | 0 |
| Storage Cap Reductn | 0 | 0 | 0 | 0 |
| Reduced v/c Ratio | 0.41 | 0.01 | 0.14 | 0.04 |

Intersection Summary



| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Volume (veh/h) | 0 | 1019 | 67 | 7 | 412 | 0 | 18 | 0 | 10 | 0 | 0 | 0 |
| Future Volume (veh/h) | 0 | 1019 | 67 | 7 | 412 | 0 | 18 | 0 | 10 | 0 | 0 | 0 |
| Initial Q (Qb), veh | 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 | | | |
| Parking Bus, Adj | 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 | | | | |
| Adj Sat Flow, veh/h/ln | 0 | 1870 | 1870 | 1870 | 1870 | 0 | 1900 | 1870 | 1900 | | | |
| Adj Flow Rate, veh/h | 0 | 1171 | 80 | 12 | 502 | 0 | 36 | 0 | 12 | | | |
| Peak Hour Factor | 0.92 | 0.87 | 0.84 | 0.58 | 0.82 | 0.92 | 0.50 | 0.92 | 0.83 | | | |
| Percent Heavy Veh, % | 0 | 2 | 2 | 2 | 2 | 0 | 0 | 2 | 0 | | | |
| Cap, veh/h | 0 | 1726 | 118 | 309 | 2368 | 0 | 78 | 0 | 26 | | | |
| Arrive On Green | 0.00 | 0.51 | 0.51 | 0.02 | 0.67 | 0.00 | 0.06 | 0.00 | 0.06 | | | |
| Sat Flow, veh/h | 0 | 3469 | 230 | 1781 | 3647 | 0 | 1296 | 0 | 432 | | | |
| Grp Volume(v), veh/h | 0 | 616 | 635 | 12 | 502 | 0 | 48 | 0 | 0 | | | |
| Grp Sat Flow(s),veh/h/ln | 0 | 1777 | 1829 | 1781 | 1777 | 0 | 1728 | 0 | 0 | | | |
| Q Serve(g_s), s | 0.0 | 11.4 | 11.4 | 0.1 | 2.4 | 0.0 | 1.2 | 0.0 | 0.0 | | | |
| Cycle Q Clear(g_c), s | 0.0 | 11.4 | 11.4 | 0.1 | 2.4 | 0.0 | 1.2 | 0.0 | 0.0 | | | |
| Prop In Lane | 0.00 | | 0.13 | 1.00 | | 0.00 | 0.75 | | 0.25 | | | |
| Lane Grp Cap(c), veh/h | 0 | 908 | 935 | 309 | 2368 | 0 | 105 | 0 | 0 | | | |
| V/C Ratio(X) | 0.00 | 0.68 | 0.68 | 0.04 | 0.21 | 0.00 | 0.46 | 0.00 | 0.00 | | | |
| Avail Cap(c_a), veh/h | 0 | 1577 | 1623 | 1046 | 3153 | 0 | 944 | 0 | 0 | | | |
| HCM Platoon Ratio | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | | | |
| Upstream Filter(I) | 0.00 | 1.00 | 1.00 | 1.00 | 1.00 | 0.00 | 1.00 | 0.00 | 0.00 | | | |
| Uniform Delay (d), s/veh | 0.0 | 8.0 | 8.0 | 6.1 | 2.8 | 0.0 | 19.9 | 0.0 | 0.0 | | | |
| Incr Delay (d2), s/veh | 0.0 | 0.9 | 0.9 | 0.1 | 0.0 | 0.0 | 3.1 | 0.0 | 0.0 | | | |
| Initial Q Delay(d3),s/veh | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | | | |
| %ile BackOfQ(50%),veh/ln | 0.0 | 2.7 | 2.8 | 0.0 | 0.2 | 0.0 | 0.5 | 0.0 | 0.0 | | | |
| Unsig. Movement Delay, s/veh | | | | | | | | | | | | |
| LnGrp Delay(d),s/veh | 0.0 | 8.9 | 8.9 | 6.1 | 2.9 | 0.0 | 23.1 | 0.0 | 0.0 | | | |
| LnGrp LOS | A | A | A | A | A | A | C | A | A | | | |
| Approach Vol, veh/h | | 1251 | | | 514 | | | 48 | | | | |
| Approach Delay, s/veh | | 8.9 | | | 3.0 | | | 23.1 | | | | |
| Approach LOS | | A | | | A | | | C | | | | |
| Timer - Assigned Phs | | 2 | 3 | 4 | | | | 8 | | | | |
| Phs Duration (G+Y+Rc), s | | 8.7 | 6.8 | 28.5 | | | | 35.3 | | | | |
| Change Period (Y+Rc), s | | 6.0 | 6.0 | 6.0 | | | | 6.0 | | | | |
| Max Green Setting (Gmax), s | | 24.0 | 19.0 | 39.0 | | | | 39.0 | | | | |
| Max Q Clear Time (g_c+I1), s | | 3.2 | 2.1 | 13.4 | | | | 4.4 | | | | |
| Green Ext Time (p_c), s | | 0.2 | 0.0 | 9.0 | | | | 3.4 | | | | |
| Intersection Summary | | | | | | | | | | | | |
| HCM 6th Ctrl Delay | | | 7.6 | | | | | | | | | |
| HCM 6th LOS | | | A | | | | | | | | | |

| Lane Group | EBT | WBT | NBL | NBR |
|---|---|---|---|---|
| Lane Group Flow (vph) | 1200 | 615 | 104 | 164 |
| v/c Ratio | 0.52 | 0.27 | 0.24 | 0.35 |
| Control Delay | 10.3 | 7.8 | 31.6 | 16.3 |
| Queue Delay | 0.0 | 0.0 | 0.0 | 0.0 |
| Total Delay | 10.3 | 7.8 | 31.6 | 16.3 |
| Queue Length 50th (ft) | 192 | 78 | 53 | 35 |
| Queue Length 95th (ft) | 224 | 103 | 99 | 86 |
| Internal Link Dist (ft) | 516 | 112 | 754 | |
| Turn Bay Length (ft) | | | | 250 |
| Base Capacity (vph) | 2300 | 2300 | 442 | 466 |
| Starvation Cap Reductn | 0 | 0 | 0 | 0 |
| Spillback Cap Reductn | 0 | 0 | 0 | 0 |
| Storage Cap Reductn | 0 | 0 | 0 | 0 |
| Reduced v/c Ratio | 0.52 | 0.27 | 0.24 | 0.35 |

Intersection Summary

| Movement | EBT | EBR | WBL | WBT | NBL | NBR |
|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | |
| Traffic Volume (veh/h) | 1032 | 0 | 0 | 547 | 101 | 143 |
| Future Volume (veh/h) | 1032 | 0 | 0 | 547 | 101 | 143 |
| Initial Q (Qb), veh | 0 | 0 | 0 | 0 | 0 | 0 |
| Ped-Bike Adj(A_pbT) | | 1.00 | 1.00 | | 1.00 | 1.00 |
| Parking Bus, Adj | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Work Zone On Approach | No | | | No | No | |
| Adj Sat Flow, veh/h/ln | 1870 | 0 | 0 | 1870 | 1870 | 1870 |
| Adj Flow Rate, veh/h | 1200 | 0 | 0 | 615 | 104 | 0 |
| Peak Hour Factor | 0.86 | 1.00 | 1.00 | 0.89 | 0.97 | 0.87 |
| Percent Heavy Veh, % | 2 | 0 | 0 | 2 | 2 | 2 |
| Cap, veh/h | 2310 | 0 | 0 | 2310 | 445 | |
| Arrive On Green | 0.65 | 0.00 | 0.00 | 0.65 | 0.25 | 0.00 |
| Sat Flow, veh/h | 3741 | 0 | 0 | 3741 | 1781 | 1585 |
| Grp Volume(v), veh/h | 1200 | 0 | 0 | 615 | 104 | 0 |
| Grp Sat Flow(s),veh/h/ln | 1777 | 0 | 0 | 1777 | 1781 | 1585 |
| Q Serve(g_s), s | 17.8 | 0.0 | 0.0 | 7.3 | 4.7 | 0.0 |
| Cycle Q Clear(g_c), s | 17.8 | 0.0 | 0.0 | 7.3 | 4.7 | 0.0 |
| Prop In Lane | | 0.00 | 0.00 | | 1.00 | 1.00 |
| Lane Grp Cap(c), veh/h | 2310 | 0 | 0 | 2310 | 445 | |
| V/C Ratio(X) | 0.52 | 0.00 | 0.00 | 0.27 | 0.23 | |
| Avail Cap(c_a), veh/h | 2310 | 0 | 0 | 2310 | 445 | |
| HCM Platoon Ratio | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Upstream Filter(I) | 1.00 | 0.00 | 0.00 | 1.00 | 1.00 | 0.00 |
| Uniform Delay (d), s/veh | 9.2 | 0.0 | 0.0 | 7.4 | 29.9 | 0.0 |
| Incr Delay (d2), s/veh | 0.8 | 0.0 | 0.0 | 0.3 | 1.2 | 0.0 |
| Initial Q Delay(d3),s/veh | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| %ile BackOfQ(50%),veh/ln | 6.0 | 0.0 | 0.0 | 2.5 | 2.1 | 0.0 |
| Unsig. Movement Delay, s/veh | | | | | | |
| LnGrp Delay(d),s/veh | 10.1 | 0.0 | 0.0 | 7.7 | 31.1 | 0.0 |
| LnGrp LOS | B | A | A | A | C | |
| Approach Vol, veh/h | 1200 | | | 615 | 104 | A |
| Approach Delay, s/veh | 10.1 | | | 7.7 | 31.1 | |
| Approach LOS | B | | | A | C | |

| Timer - Assigned Phs | 2 | | | | 6 | 8 |
|---|---|---|---|---|---|---|
| Phs Duration (G+Y+Rc), s | 70.0 | | | | 70.0 | 30.0 |
| Change Period (Y+Rc), s | 5.0 | | | | 5.0 | 5.0 |
| Max Green Setting (Gmax), s | 65.0 | | | | 65.0 | 25.0 |
| Max Q Clear Time (g_c+I1), s | 9.3 | | | | 19.8 | 6.7 |
| Green Ext Time (p_c), s | 4.5 | | | | 11.0 | 0.2 |

| Intersection Summary | |
|---|---|
| HCM 6th Ctrl Delay | 10.5 |
| HCM 6th LOS | B |

**Notes**

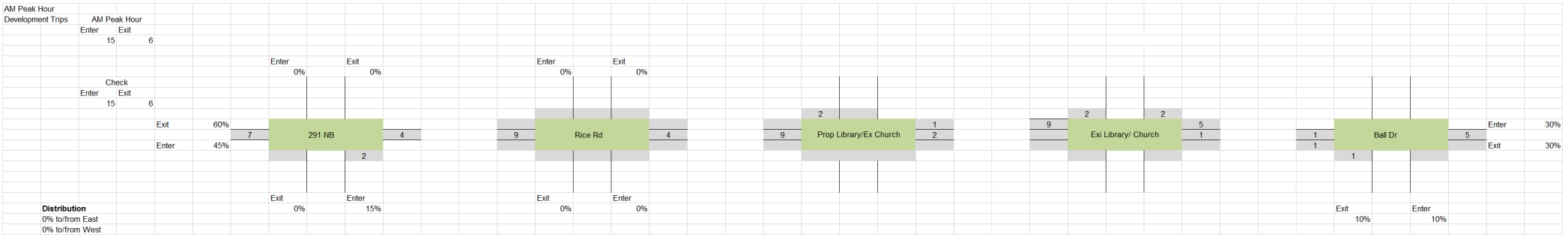
Unsignalized Delay for [NBR] is excluded from calculations of the approach delay and intersection delay.

# APPENDIX C

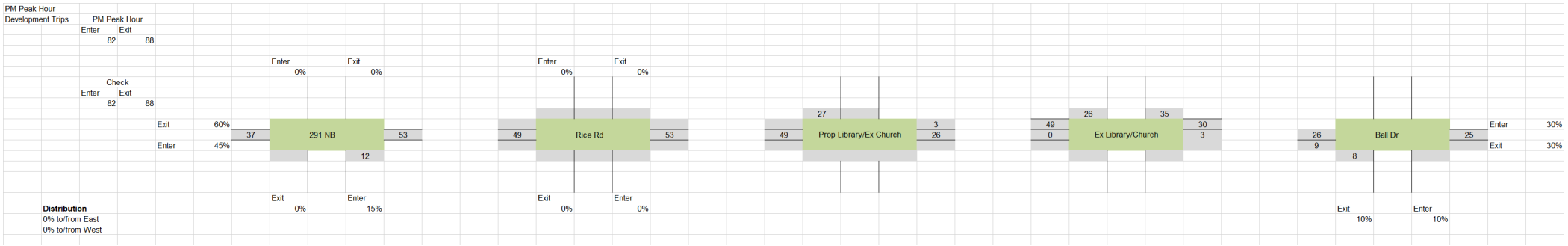
Existing plus Proposed Development Conditions

# Trip Distribution

# AM

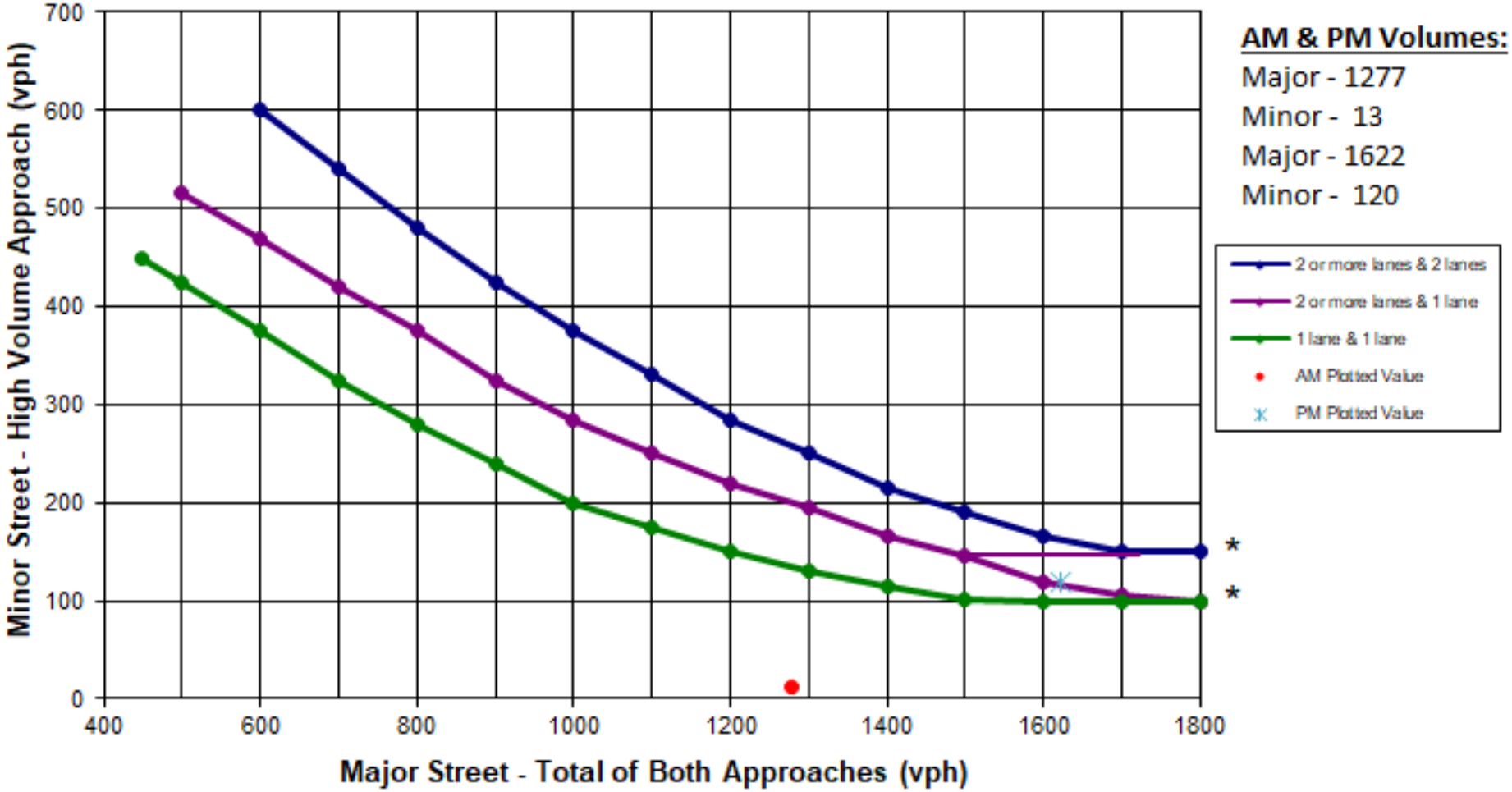

AM Peak Hour
Development Trips
AM Peak Hour
Enter Exit
15 6
Check
Enter Exit
15 6
Exit 60%
Enter 45%
Enter Exit
0% 0%
7 291 NB 4
2
Exit Enter
0% 15%
Enter Exit
0% 0%
9 Rice Rd 4
Exit Enter
0% 0%
2
9 Prop Library/Ex Church 1
2
Exi Library/ Church 5
1
2 2
9
1 Ball Dr 5
1
1
Enter 30%
Exit 30%
Exit Enter
10% 10%
Distribution
0% to/from East
0% to/from West

# PM


PM Peak Hour
Development Trips
PM Peak Hour
Enter Exit
82 88
Check
Enter Exit
82 88
Exit 60%
Enter 45%
Enter Exit
0% 0%
37 291 NB 53
12
Exit Enter
0% 15%
Enter Exit
0% 0%
49 Rice Rd 53
Exit Enter
0% 0%
27
49 Prop Library/Ex Church 3
26
49 Ex Library/Church 30
0 3
26 35
26 Ball Dr 25
9
8
Enter 30%
Exit 30%
Exit Enter
10% 10%
Distribution
0% to/from East
0% to/from West

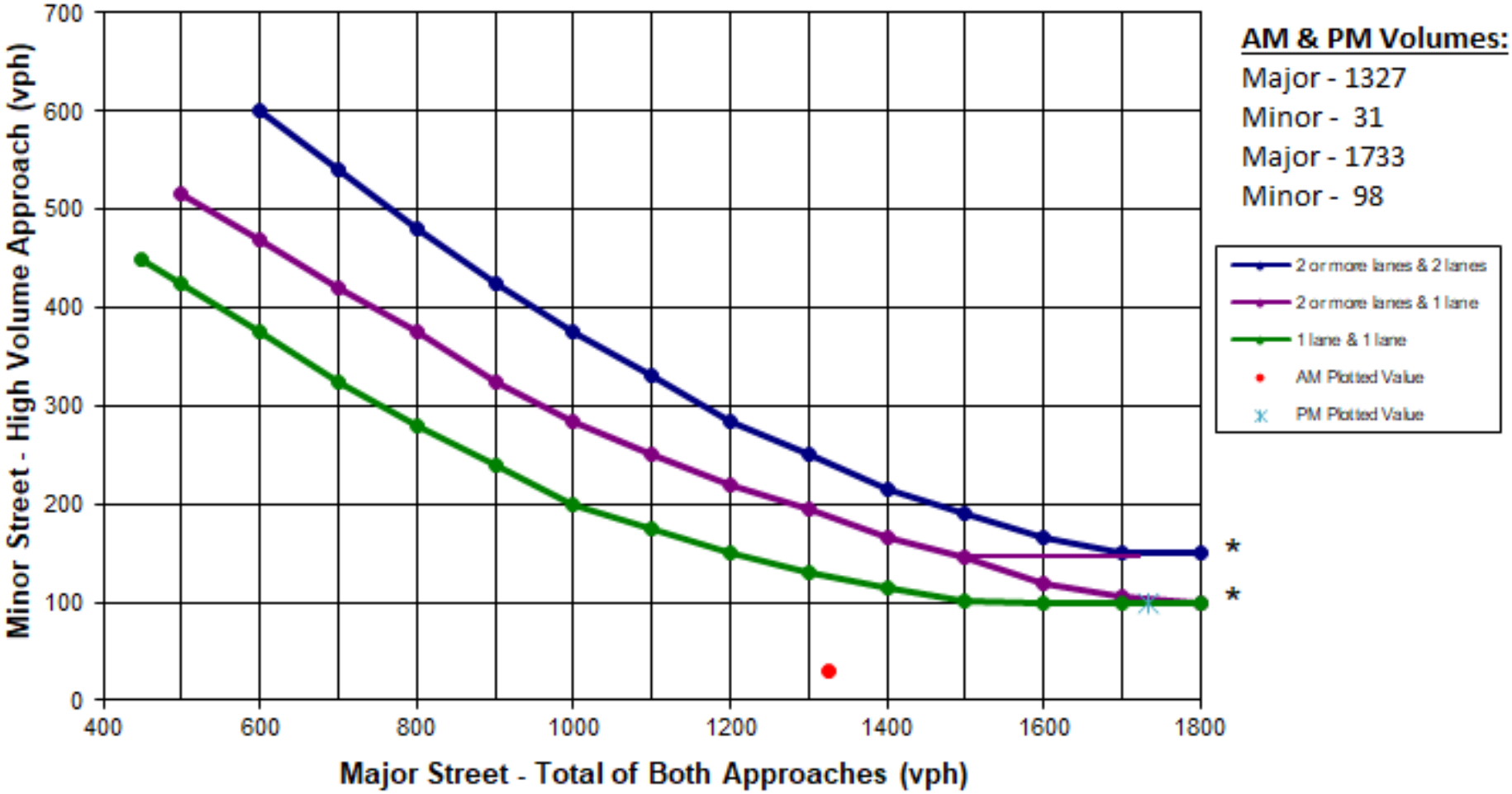
Signal Warrants

# Peak Hour Volume Warrant (Existing + Development)
## Colbern Rd & Proposed Library Access




*Note: 150 vph applies as the lower threshold volume for a minor street approach with two or more lanes and 100 vph applies as the lower threshold volume for a minor street approach with one lane.

# Peak Hour Volume Warrant (Existing+Dev)
## Colbern Rd & Rice Rd




*Note: 150 vph applies as the lower threshold volume for a minor street approach with two or more lanes and 100 vph applies as the lower threshold volume for a minor street approach with one lane.

Capacity Analysis

| Intersection | |
|---|---|
| Int Delay, s/veh | 1.3 |

| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Vol, veh/h | 29 | 244 | 23 | 8 | 1000 | 23 | 19 | 2 | 3 | 1 | 3 | 27 |
| Future Vol, veh/h | 29 | 244 | 23 | 8 | 1000 | 23 | 19 | 2 | 3 | 1 | 3 | 27 |
| 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 | 60 | - | - | 225 | - | - | - | - | - | - | - | - |
| Veh in Median Storage, # | - | 0 | - | - | 0 | - | - | 0 | - | - | 0 | - |
| Grade, % | - | 0 | - | - | 0 | - | - | 0 | - | - | 0 | - |
| Peak Hour Factor | 78 | 87 | 78 | 78 | 93 | 78 | 78 | 78 | 78 | 78 | 78 | 78 |
| Heavy Vehicles, % | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 |
| Mvmt Flow | 37 | 280 | 29 | 10 | 1075 | 29 | 24 | 3 | 4 | 1 | 4 | 35 |

| Major/Minor | Major1 | | | Major2 | | | Minor1 | | | Minor2 | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Conflicting Flow All | 1104 | 0 | 0 | 309 | 0 | 0 | 929 | 1493 | 155 | 1326 | 1493 | 552 |
| Stage 1 | - | - | - | - | - | - | 369 | 369 | - | 1110 | 1110 | - |
| Stage 2 | - | - | - | - | - | - | 560 | 1124 | - | 216 | 383 | - |
| Critical Hdwy | 4.14 | - | - | 4.14 | - | - | 7.54 | 6.54 | 6.94 | 7.54 | 6.54 | 6.94 |
| Critical Hdwy Stg 1 | - | - | - | - | - | - | 6.54 | 5.54 | - | 6.54 | 5.54 | - |
| Critical Hdwy Stg 2 | - | - | - | - | - | - | 6.54 | 5.54 | - | 6.54 | 5.54 | - |
| Follow-up Hdwy | 2.22 | - | - | 2.22 | - | - | 3.52 | 4.02 | 3.32 | 3.52 | 4.02 | 3.32 |
| Pot Cap-1 Maneuver | 628 | - | - | 1248 | - | - | 222 | 122 | 863 | 114 | 122 | 477 |
| Stage 1 | - | - | - | - | - | - | 623 | 619 | - | 223 | 283 | - |
| Stage 2 | - | - | - | - | - | - | 480 | 279 | - | 766 | 610 | - |
| Platoon blocked, % | | - | - | | - | - | | | | | | |
| Mov Cap-1 Maneuver | 628 | - | - | 1248 | - | - | 190 | 114 | 863 | 106 | 114 | 477 |
| Mov Cap-2 Maneuver | - | - | - | - | - | - | 190 | 114 | - | 106 | 114 | - |
| Stage 1 | - | - | - | - | - | - | 586 | 582 | - | 210 | 281 | - |
| Stage 2 | - | - | - | - | - | - | 436 | 277 | - | 714 | 574 | - |

| Approach | EB | WB | NB | SB |
|---|---|---|---|---|
| HCM Control Delay, s | 1.2 | 0.1 | 26.5 | 17.1 |
| HCM LOS | | | D | C |

| Minor Lane/Major Mvmt | NBLn1 | EBL | EBT | EBR | WBL | WBT | WBR | SBLn1 |
|---|---|---|---|---|---|---|---|---|
| Capacity (veh/h) | 198 | 628 | - | - | 1248 | - | - | 336 |
| HCM Lane V/C Ratio | 0.155 | 0.059 | - | - | 0.008 | - | - | 0.118 |
| HCM Control Delay (s) | 26.5 | 11.1 | - | - | 7.9 | - | - | 17.1 |
| HCM Lane LOS | D | B | - | - | A | - | - | C |
| HCM 95th %tile Q(veh) | 0.5 | 0.2 | - | - | 0 | - | - | 0.4 |

| Intersection | |
|---|---|
| Int Delay, s/veh | 0.4 |

| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Vol, veh/h | 16 | 223 | 0 | 0 | 1028 | 10 | 1 | 0 | 0 | 3 | 1 | 9 |
| Future Vol, veh/h | 16 | 223 | 0 | 0 | 1028 | 10 | 1 | 0 | 0 | 3 | 1 | 9 |
| 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 | 90 | - | - | 95 | - | - | - | - | - | - | - | - |
| Veh in Median Storage, # | - | 0 | - | - | 0 | - | - | 0 | - | - | 0 | - |
| Grade, % | - | 0 | - | - | 0 | - | - | 0 | - | - | 0 | - |
| Peak Hour Factor | 78 | 87 | 78 | 100 | 93 | 78 | 78 | 100 | 100 | 78 | 78 | 78 |
| Heavy Vehicles, % | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 |
| Mvmt Flow | 21 | 256 | 0 | 0 | 1105 | 13 | 1 | 0 | 0 | 4 | 1 | 12 |

| Major/Minor | Major1 | | | Major2 | | | Minor1 | | | Minor2 | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Conflicting Flow All | 1118 | 0 | 0 | 256 | 0 | 0 | 851 | 1416 | 128 | 1282 | 1410 | 559 |
| Stage 1 | - | - | - | - | - | - | 298 | 298 | - | 1112 | 1112 | - |
| Stage 2 | - | - | - | - | - | - | 553 | 1118 | - | 170 | 298 | - |
| Critical Hdwy | 4.14 | - | - | 4.14 | - | - | 7.54 | 6.54 | 6.94 | 7.54 | 6.54 | 6.94 |
| Critical Hdwy Stg 1 | - | - | - | - | - | - | 6.54 | 5.54 | - | 6.54 | 5.54 | - |
| Critical Hdwy Stg 2 | - | - | - | - | - | - | 6.54 | 5.54 | - | 6.54 | 5.54 | - |
| Follow-up Hdwy | 2.22 | - | - | 2.22 | - | - | 3.52 | 4.02 | 3.32 | 3.52 | 4.02 | 3.32 |
| Pot Cap-1 Maneuver | 620 | - | - | 1306 | - | - | 253 | 136 | 898 | 122 | 137 | 472 |
| Stage 1 | - | - | - | - | - | - | 686 | 666 | - | 223 | 282 | - |
| Stage 2 | - | - | - | - | - | - | 485 | 281 | - | 815 | 666 | - |
| Platoon blocked, % | | - | - | | - | - | | | | | | |
| Mov Cap-1 Maneuver | 620 | - | - | 1306 | - | - | 239 | 131 | 898 | 119 | 132 | 472 |
| Mov Cap-2 Maneuver | - | - | - | - | - | - | 239 | 131 | - | 119 | 132 | - |
| Stage 1 | - | - | - | - | - | - | 663 | 643 | - | 215 | 282 | - |
| Stage 2 | - | - | - | - | - | - | 471 | 281 | - | 787 | 643 | - |

| Approach | EB | WB | NB | SB |
|---|---|---|---|---|
| HCM Control Delay, s | 0.8 | 0 | 20.1 | 20.4 |
| HCM LOS | | | C | C |

| Minor Lane/Major Mvmt | NBLn1 | EBL | EBT | EBR | WBL | WBT | WBR | SBLn1 |
|---|---|---|---|---|---|---|---|---|
| Capacity (veh/h) | 239 | 620 | - | - | 1306 | - | - | 251 |
| HCM Lane V/C Ratio | 0.005 | 0.033 | - | - | - | - | - | 0.066 |
| HCM Control Delay (s) | 20.1 | 11 | - | - | 0 | - | - | 20.4 |
| HCM Lane LOS | C | B | - | - | A | - | - | C |
| HCM 95th %tile Q(veh) | 0 | 0.1 | - | - | 0 | - | - | 0.2 |

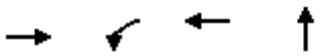
| Intersection | |
|---|---|
| Int Delay, s/veh | 0 |

| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | ↑↑↳ | | | ↑↑↳ | | | | ↱ | | | ↱ |
| Traffic Vol, veh/h | 0 | 239 | 1 | 0 | 1037 | 1 | 0 | 0 | 0 | 0 | 0 | 2 |
| Future Vol, veh/h | 0 | 239 | 1 | 0 | 1037 | 1 | 0 | 0 | 0 | 0 | 0 | 2 |
| 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 | - | - | - | - | - | - | - | - | 0 | - | - | 0 |
| Veh in Median Storage, # | - | 0 | - | - | 0 | - | - | 0 | - | - | 0 | - |
| Grade, % | - | 0 | - | - | 0 | - | - | 0 | - | - | 0 | - |
| Peak Hour Factor | 78 | 87 | 78 | 78 | 93 | 92 | 100 | 92 | 100 | 92 | 92 | 78 |
| Heavy Vehicles, % | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 |
| Mvmt Flow | 0 | 275 | 1 | 0 | 1115 | 1 | 0 | 0 | 0 | 0 | 0 | 3 |

| Major/Minor | Major1 | | | Major2 | | | Minor1 | | | Minor2 | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Conflicting Flow All | - | 0 | 0 | - | - | 0 | - | - | 138 | - | - | 558 |
| Stage 1 | - | - | - | - | - | - | - | - | - | - | - | - |
| Stage 2 | - | - | - | - | - | - | - | - | - | - | - | - |
| Critical Hdwy | - | - | - | - | - | - | - | - | 6.94 | - | - | 6.94 |
| Critical Hdwy Stg 1 | - | - | - | - | - | - | - | - | - | - | - | - |
| Critical Hdwy Stg 2 | - | - | - | - | - | - | - | - | - | - | - | - |
| Follow-up Hdwy | - | - | - | - | - | - | - | - | 3.32 | - | - | 3.32 |
| Pot Cap-1 Maneuver | 0 | - | - | 0 | - | - | 0 | 0 | 885 | 0 | 0 | 473 |
| Stage 1 | 0 | - | - | 0 | - | - | 0 | 0 | - | 0 | 0 | - |
| Stage 2 | 0 | - | - | 0 | - | - | 0 | 0 | - | 0 | 0 | - |
| Platoon blocked, % | | - | - | | - | - | | | | | | |
| Mov Cap-1 Maneuver | - | - | - | - | - | - | - | - | 885 | - | - | 473 |
| Mov Cap-2 Maneuver | - | - | - | - | - | - | - | - | - | - | - | - |
| Stage 1 | - | - | - | - | - | - | - | - | - | - | - | - |
| Stage 2 | - | - | - | - | - | - | - | - | - | - | - | - |

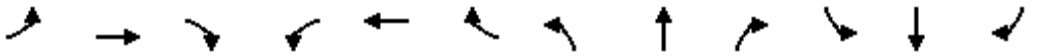
| Approach | EB | WB | NB | SB |
|---|---|---|---|---|
| HCM Control Delay, s | 0 | 0 | 0 | 12.7 |
| HCM LOS | | | A | B |

| Minor Lane/Major Mvmt | NBLn1 | EBT | EBR | WBT | WBR | SBLn1 |
|---|---|---|---|---|---|---|
| Capacity (veh/h) | - | - | - | - | - | 473 |
| HCM Lane V/C Ratio | - | - | - | - | - | 0.005 |
| HCM Control Delay (s) | 0 | - | - | - | - | 12.7 |
| HCM Lane LOS | A | - | - | - | - | B |
| HCM 95th %tile Q(veh) | - | - | - | - | - | 0 |

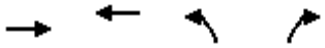


| Lane Group | EBT | WBL | WBT | NBT |
|---|---|---|---|---|
| Lane Group Flow (vph) | 258 | 5 | 1054 | 61 |
| v/c Ratio | 0.11 | 0.01 | 0.41 | 0.13 |
| Control Delay | 6.4 | 4.2 | 5.1 | 3.3 |
| Queue Delay | 0.0 | 0.0 | 0.0 | 0.0 |
| Total Delay | 6.4 | 4.2 | 5.1 | 3.3 |
| Queue Length 50th (ft) | 12 | 1 | 66 | 0 |
| Queue Length 95th (ft) | 43 | 3 | 103 | 14 |
| Internal Link Dist (ft) | 295 | | 547 | 737 |
| Turn Bay Length (ft) | | 245 | | |
| Base Capacity (vph) | 3462 | 1205 | 3539 | 1386 |
| Starvation Cap Reductn | 0 | 0 | 0 | 0 |
| Spillback Cap Reductn | 0 | 0 | 0 | 0 |
| Storage Cap Reductn | 0 | 0 | 0 | 0 |
| Reduced v/c Ratio | 0.07 | 0.00 | 0.30 | 0.04 |

Intersection Summary



| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Volume (veh/h) | 0 | 212 | 11 | 4 | 980 | 0 | 45 | 0 | 2 | 0 | 0 | 0 |
| Future Volume (veh/h) | 0 | 212 | 11 | 4 | 980 | 0 | 45 | 0 | 2 | 0 | 0 | 0 |
| Initial Q (Qb), veh | 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 | | | |
| Parking Bus, Adj | 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 | | | | |
| Adj Sat Flow, veh/h/ln | 0 | 1870 | 1870 | 1870 | 1870 | 0 | 1900 | 1870 | 1900 | | | |
| Adj Flow Rate, veh/h | 0 | 244 | 14 | 5 | 1054 | 0 | 58 | 0 | 3 | | | |
| Peak Hour Factor | 0.92 | 0.87 | 0.78 | 0.78 | 0.93 | 0.78 | 0.78 | 1.00 | 0.78 | | | |
| Percent Heavy Veh, % | 0 | 2 | 2 | 2 | 2 | 0 | 0 | 2 | 0 | | | |
| Cap, veh/h | 0 | 1135 | 65 | 559 | 1894 | 0 | 133 | 0 | 7 | | | |
| Arrive On Green | 0.00 | 0.33 | 0.33 | 0.01 | 0.53 | 0.00 | 0.08 | 0.00 | 0.08 | | | |
| Sat Flow, veh/h | 0 | 3511 | 195 | 1781 | 3647 | 0 | 1683 | 0 | 87 | | | |
| Grp Volume(v), veh/h | 0 | 126 | 132 | 5 | 1054 | 0 | 61 | 0 | 0 | | | |
| Grp Sat Flow(s),veh/h/ln | 0 | 1777 | 1835 | 1781 | 1777 | 0 | 1771 | 0 | 0 | | | |
| Q Serve(g_s), s | 0.0 | 1.6 | 1.6 | 0.1 | 6.1 | 0.0 | 1.0 | 0.0 | 0.0 | | | |
| Cycle Q Clear(g_c), s | 0.0 | 1.6 | 1.6 | 0.1 | 6.1 | 0.0 | 1.0 | 0.0 | 0.0 | | | |
| Prop In Lane | 0.00 | | 0.11 | 1.00 | | 0.00 | 0.95 | | 0.05 | | | |
| Lane Grp Cap(c), veh/h | 0 | 590 | 610 | 559 | 1894 | 0 | 140 | 0 | 0 | | | |
| V/C Ratio(X) | 0.00 | 0.21 | 0.22 | 0.01 | 0.56 | 0.00 | 0.44 | 0.00 | 0.00 | | | |
| Avail Cap(c_a), veh/h | 0 | 2240 | 2314 | 1642 | 4481 | 0 | 1374 | 0 | 0 | | | |
| HCM Platoon Ratio | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | | | |
| Upstream Filter(I) | 0.00 | 1.00 | 1.00 | 1.00 | 1.00 | 0.00 | 1.00 | 0.00 | 0.00 | | | |
| Uniform Delay (d), s/veh | 0.0 | 7.4 | 7.4 | 5.7 | 4.8 | 0.0 | 13.6 | 0.0 | 0.0 | | | |
| Incr Delay (d2), s/veh | 0.0 | 0.2 | 0.2 | 0.0 | 0.3 | 0.0 | 2.1 | 0.0 | 0.0 | | | |
| Initial Q Delay(d3),s/veh | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | | | |
| %ile BackOfQ(50%),veh/ln | 0.0 | 0.4 | 0.4 | 0.0 | 0.6 | 0.0 | 0.4 | 0.0 | 0.0 | | | |
| Unsig. Movement Delay, s/veh | | | | | | | | | | | | |
| LnGrp Delay(d),s/veh | 0.0 | 7.6 | 7.6 | 5.7 | 5.1 | 0.0 | 15.7 | 0.0 | 0.0 | | | |
| LnGrp LOS | A | A | A | A | A | A | B | A | A | | | |
| Approach Vol, veh/h | | 258 | | | 1059 | | | 61 | | | | |
| Approach Delay, s/veh | | 7.6 | | | 5.1 | | | 15.7 | | | | |
| Approach LOS | | A | | | A | | | B | | | | |
| Timer - Assigned Phs | | 2 | 3 | 4 | | | | 8 | | | | |
| Phs Duration (G+Y+Rc), s | | 8.4 | 6.2 | 16.3 | | | | 22.5 | | | | |
| Change Period (Y+Rc), s | | 6.0 | 6.0 | 6.0 | | | | 6.0 | | | | |
| Max Green Setting (Gmax), s | | 24.0 | 19.0 | 39.0 | | | | 39.0 | | | | |
| Max Q Clear Time (g_c+I1), s | | 3.0 | 2.1 | 3.6 | | | | 8.1 | | | | |
| Green Ext Time (p_c), s | | 0.2 | 0.0 | 1.4 | | | | 8.4 | | | | |
| Intersection Summary | | | | | | | | | | | | |
| HCM 6th Ctrl Delay | | | 6.0 | | | | | | | | | |
| HCM 6th LOS | | | A | | | | | | | | | |



| Lane Group | EBT | WBT | NBL | NBR |
|---|---|---|---|---|
| Lane Group Flow (vph) | 290 | 1125 | 198 | 56 |
| v/c Ratio | 0.13 | 0.52 | 0.40 | 0.12 |
| Control Delay | 7.6 | 11.1 | 29.5 | 7.8 |
| Queue Delay | 0.0 | 0.0 | 0.0 | 0.0 |
| Total Delay | 7.6 | 11.1 | 29.5 | 7.8 |
| Queue Length 50th (ft) | 33 | 174 | 91 | 0 |
| Queue Length 95th (ft) | 48 | 224 | 148 | 21 |
| Internal Link Dist (ft) | 516 | 112 | 754 | |
| Turn Bay Length (ft) | | | | 250 |
| Base Capacity (vph) | 2162 | 2162 | 491 | 480 |
| Starvation Cap Reductn | 0 | 0 | 0 | 0 |
| Spillback Cap Reductn | 0 | 0 | 0 | 0 |
| Storage Cap Reductn | 0 | 0 | 0 | 0 |
| Reduced v/c Ratio | 0.13 | 0.52 | 0.40 | 0.12 |

Intersection Summary

| Movement | EBT | EBR | WBL | WBT | NBL | NBR |
|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | |
| Traffic Volume (veh/h) | 252 | 0 | 0 | 1046 | 172 | 44 |
| Future Volume (veh/h) | 252 | 0 | 0 | 1046 | 172 | 44 |
| Initial Q (Qb), veh | 0 | 0 | 0 | 0 | 0 | 0 |
| Ped-Bike Adj(A_pbT) | | 1.00 | 1.00 | | 1.00 | 1.00 |
| Parking Bus, Adj | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Work Zone On Approach | No | | | No | No | |
| Adj Sat Flow, veh/h/ln | 1870 | 0 | 0 | 1870 | 1870 | 1870 |
| Adj Flow Rate, veh/h | 290 | 0 | 0 | 1125 | 198 | 0 |
| Peak Hour Factor | 0.87 | 1.00 | 1.00 | 0.93 | 0.87 | 0.78 |
| Percent Heavy Veh, % | 2 | 0 | 0 | 2 | 2 | 2 |
| Cap, veh/h | 2172 | 0 | 0 | 2172 | 495 | |
| Arrive On Green | 0.61 | 0.00 | 0.00 | 0.61 | 0.28 | 0.00 |
| Sat Flow, veh/h | 3741 | 0 | 0 | 3741 | 1781 | 1585 |
| Grp Volume(v), veh/h | 290 | 0 | 0 | 1125 | 198 | 0 |
| Grp Sat Flow(s),veh/h/ln | 1777 | 0 | 0 | 1777 | 1781 | 1585 |
| Q Serve(g_s), s | 3.1 | 0.0 | 0.0 | 16.2 | 8.1 | 0.0 |
| Cycle Q Clear(g_c), s | 3.1 | 0.0 | 0.0 | 16.2 | 8.1 | 0.0 |
| Prop In Lane | | 0.00 | 0.00 | | 1.00 | 1.00 |
| Lane Grp Cap(c), veh/h | 2172 | 0 | 0 | 2172 | 495 | |
| V/C Ratio(X) | 0.13 | 0.00 | 0.00 | 0.52 | 0.40 | |
| Avail Cap(c_a), veh/h | 2172 | 0 | 0 | 2172 | 495 | |
| HCM Platoon Ratio | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Upstream Filter(I) | 1.00 | 0.00 | 0.00 | 1.00 | 1.00 | 0.00 |
| Uniform Delay (d), s/veh | 7.4 | 0.0 | 0.0 | 10.0 | 26.4 | 0.0 |
| Incr Delay (d2), s/veh | 0.1 | 0.0 | 0.0 | 0.9 | 2.4 | 0.0 |
| Initial Q Delay(d3),s/veh | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| %ile BackOfQ(50%),veh/ln | 1.0 | 0.0 | 0.0 | 5.5 | 3.7 | 0.0 |
| Unsig. Movement Delay, s/veh | | | | | | |
| LnGrp Delay(d),s/veh | 7.5 | 0.0 | 0.0 | 10.8 | 28.8 | 0.0 |
| LnGrp LOS | A | A | A | B | C | |
| Approach Vol, veh/h | 290 | | | 1125 | 198 | A |
| Approach Delay, s/veh | 7.5 | | | 10.8 | 28.8 | |
| Approach LOS | A | | | B | C | |

| Timer - Assigned Phs | 2 | | | | 6 | 8 |
|---|---|---|---|---|---|---|
| Phs Duration (G+Y+Rc), s | 60.0 | | | | 60.0 | 30.0 |
| Change Period (Y+Rc), s | 5.0 | | | | 5.0 | 5.0 |
| Max Green Setting (Gmax), s | 55.0 | | | | 55.0 | 25.0 |
| Max Q Clear Time (g_c+I1), s | 18.2 | | | | 5.1 | 10.1 |
| Green Ext Time (p_c), s | 9.6 | | | | 1.9 | 0.5 |

| Intersection Summary | |
|---|---|
| HCM 6th Ctrl Delay | 12.5 |
| HCM 6th LOS | B |

**Notes**

Unsignalized Delay for [NBR] is excluded from calculations of the approach delay and intersection delay.

| Intersection | |
|---|---|
| Int Delay, s/veh | 15.1 |

| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Vol, veh/h | 84 | 1109 | 31 | 4 | 484 | 21 | 40 | 3 | 21 | 19 | 3 | 76 |
| Future Vol, veh/h | 84 | 1109 | 31 | 4 | 484 | 21 | 40 | 3 | 21 | 19 | 3 | 76 |
| 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 | 60 | - | - | 225 | - | - | - | - | - | - | - | - |
| Veh in Median Storage, # | - | 0 | - | - | 0 | - | - | 0 | - | - | 0 | - |
| Grade, % | - | 0 | - | - | 0 | - | - | 0 | - | - | 0 | - |
| Peak Hour Factor | 78 | 93 | 78 | 78 | 92 | 78 | 78 | 78 | 78 | 78 | 78 | 78 |
| Heavy Vehicles, % | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 |
| Mvmt Flow | 108 | 1192 | 40 | 5 | 526 | 27 | 51 | 4 | 27 | 24 | 4 | 97 |

| Major/Minor | Major1 | | | Major2 | | | Minor1 | | | Minor2 | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Conflicting Flow All | 553 | 0 | 0 | 1232 | 0 | 0 | 1703 | 1991 | 616 | 1364 | 1998 | 277 |
| Stage 1 | - | - | - | - | - | - | 1428 | 1428 | - | 550 | 550 | - |
| Stage 2 | - | - | - | - | - | - | 275 | 563 | - | 814 | 1448 | - |
| Critical Hdwy | 4.14 | - | - | 4.14 | - | - | 7.54 | 6.54 | 6.94 | 7.54 | 6.54 | 6.94 |
| Critical Hdwy Stg 1 | - | - | - | - | - | - | 6.54 | 5.54 | - | 6.54 | 5.54 | - |
| Critical Hdwy Stg 2 | - | - | - | - | - | - | 6.54 | 5.54 | - | 6.54 | 5.54 | - |
| Follow-up Hdwy | 2.22 | - | - | 2.22 | - | - | 3.52 | 4.02 | 3.32 | 3.52 | 4.02 | 3.32 |
| Pot Cap-1 Maneuver | 1013 | - | - | 561 | - | - | 59 | 60 | 433 | 106 | 59 | 720 |
| Stage 1 | - | - | - | - | - | - | 142 | 199 | - | 487 | 514 | - |
| Stage 2 | - | - | - | - | - | - | 708 | 507 | - | 338 | 195 | - |
| Platoon blocked, % | | - | - | | - | - | | | | | | |
| Mov Cap-1 Maneuver | 1013 | - | - | 561 | - | - | ~ 44 | 53 | 433 | 86 | 52 | 720 |
| Mov Cap-2 Maneuver | - | - | - | - | - | - | ~ 44 | 53 | - | 86 | 52 | - |
| Stage 1 | - | - | - | - | - | - | 127 | 178 | - | 435 | 509 | - |
| Stage 2 | - | - | - | - | - | - | 602 | 502 | - | 277 | 174 | - |

| Approach | EB | WB | NB | SB |
|---|---|---|---|---|
| HCM Control Delay, s | 0.7 | 0.1 | $ 325.4 | 32.1 |
| HCM LOS | | | F | D |

| Minor Lane/Major Mvmt | NBLn1 | EBL | EBT | EBR | WBL | WBT | WBR | SBLn1 |
|---|---|---|---|---|---|---|---|---|
| Capacity (veh/h) | 63 | 1013 | - | - | 561 | - | - | 255 |
| HCM Lane V/C Ratio | 1.302 | 0.106 | - | - | 0.009 | - | - | 0.493 |
| HCM Control Delay (s) | $ 325.4 | 9 | - | - | 11.5 | - | - | 32.1 |
| HCM Lane LOS | F | A | - | - | B | - | - | D |
| HCM 95th %tile Q(veh) | 6.9 | 0.4 | - | - | 0 | - | - | 2.5 |

| Notes | | | |
|---|---|---|---|
| ~: Volume exceeds capacity | $: Delay exceeds 300s | +: Computation Not Defined | *: All major volume in platoon |

| Intersection | |
|---|---|
| Int Delay, s/veh | 5.8 |

| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Vol, veh/h | 79 | 1075 | 0 | 2 | 423 | 43 | 2 | 0 | 2 | 56 | 0 | 64 |
| Future Vol, veh/h | 79 | 1075 | 0 | 2 | 423 | 43 | 2 | 0 | 2 | 56 | 0 | 64 |
| 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 | 90 | - | - | 95 | - | - | - | - | - | - | - | - |
| Veh in Median Storage, # | - | 0 | - | - | 0 | - | - | 0 | - | - | 0 | - |
| Grade, % | - | 0 | - | - | 0 | - | - | 0 | - | - | 0 | - |
| Peak Hour Factor | 78 | 93 | 100 | 78 | 87 | 78 | 78 | 100 | 78 | 78 | 100 | 78 |
| Heavy Vehicles, % | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 |
| Mvmt Flow | 101 | 1156 | 0 | 3 | 486 | 55 | 3 | 0 | 3 | 72 | 0 | 82 |

| Major/Minor | Major1 | | | Major2 | | | Minor1 | | | Minor2 | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Conflicting Flow All | 541 | 0 | 0 | 1156 | 0 | 0 | 1607 | 1905 | 578 | 1300 | 1878 | 271 |
| Stage 1 | - | - | - | - | - | - | 1358 | 1358 | - | 520 | 520 | - |
| Stage 2 | - | - | - | - | - | - | 249 | 547 | - | 780 | 1358 | - |
| Critical Hdwy | 4.14 | - | - | 4.14 | - | - | 7.54 | 6.54 | 6.94 | 7.54 | 6.54 | 6.94 |
| Critical Hdwy Stg 1 | - | - | - | - | - | - | 6.54 | 5.54 | - | 6.54 | 5.54 | - |
| Critical Hdwy Stg 2 | - | - | - | - | - | - | 6.54 | 5.54 | - | 6.54 | 5.54 | - |
| Follow-up Hdwy | 2.22 | - | - | 2.22 | - | - | 3.52 | 4.02 | 3.32 | 3.52 | 4.02 | 3.32 |
| Pot Cap-1 Maneuver | 1024 | - | - | 600 | - | - | 70 | 68 | 459 | 119 | 71 | 727 |
| Stage 1 | - | - | - | - | - | - | 157 | 215 | - | 507 | 530 | - |
| Stage 2 | - | - | - | - | - | - | 733 | 516 | - | 354 | 215 | - |
| Platoon blocked, % | | - | - | | - | - | | | | | | |
| Mov Cap-1 Maneuver | 1024 | - | - | 600 | - | - | 57 | 61 | 459 | 109 | 64 | 727 |
| Mov Cap-2 Maneuver | - | - | - | - | - | - | 57 | 61 | - | 109 | 64 | - |
| Stage 1 | - | - | - | - | - | - | 141 | 194 | - | 457 | 527 | - |
| Stage 2 | - | - | - | - | - | - | 647 | 513 | - | 317 | 194 | - |

| Approach | EB | WB | NB | SB |
|---|---|---|---|---|
| HCM Control Delay, s | 0.7 | 0.1 | 42.5 | 66.4 |
| HCM LOS | | | E | F |

| Minor Lane/Major Mvmt | NBLn1 | EBL | EBT | EBR | WBL | WBT | WBR | SBLn1 |
|---|---|---|---|---|---|---|---|---|
| Capacity (veh/h) | 101 | 1024 | - | - | 600 | - | - | 199 |
| HCM Lane V/C Ratio | 0.051 | 0.099 | - | - | 0.004 | - | - | 0.773 |
| HCM Control Delay (s) | 42.5 | 8.9 | - | - | 11 | - | - | 66.4 |
| HCM Lane LOS | E | A | - | - | B | - | - | F |
| HCM 95th %tile Q(veh) | 0.2 | 0.3 | - | - | 0 | - | - | 5.3 |

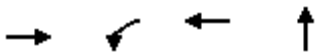
| Intersection | |
|---|---|
| Int Delay, s/veh | 0.2 |

| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | ↑↑↱ | | | ↑↑↱ | | | | ↱ | | | ↱ |
| Traffic Vol, veh/h | 0 | 1154 | 6 | 0 | 486 | 3 | 0 | 0 | 0 | 0 | 0 | 27 |
| Future Vol, veh/h | 0 | 1154 | 6 | 0 | 486 | 3 | 0 | 0 | 0 | 0 | 0 | 27 |
| 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 | - | - | - | - | - | - | - | - | 0 | - | - | 0 |
| Veh in Median Storage, # | - | 0 | - | - | 0 | - | - | 0 | - | - | 0 | - |
| Grade, % | - | 0 | - | - | 0 | - | - | 0 | - | - | 0 | - |
| Peak Hour Factor | 92 | 93 | 78 | 100 | 92 | 78 | 100 | 92 | 100 | 92 | 92 | 78 |
| Heavy Vehicles, % | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 |
| Mvmt Flow | 0 | 1241 | 8 | 0 | 528 | 4 | 0 | 0 | 0 | 0 | 0 | 35 |

| Major/Minor | Major1 | | | Major2 | | | Minor1 | | | Minor2 | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Conflicting Flow All | - | 0 | 0 | - | - | 0 | - | - | 625 | - | - | 266 |
| Stage 1 | - | - | - | - | - | - | - | - | - | - | - | - |
| Stage 2 | - | - | - | - | - | - | - | - | - | - | - | - |
| Critical Hdwy | - | - | - | - | - | - | - | - | 6.94 | - | - | 6.94 |
| Critical Hdwy Stg 1 | - | - | - | - | - | - | - | - | - | - | - | - |
| Critical Hdwy Stg 2 | - | - | - | - | - | - | - | - | - | - | - | - |
| Follow-up Hdwy | - | - | - | - | - | - | - | - | 3.32 | - | - | 3.32 |
| Pot Cap-1 Maneuver | 0 | - | - | 0 | - | - | 0 | 0 | 428 | 0 | 0 | 732 |
| Stage 1 | 0 | - | - | 0 | - | - | 0 | 0 | - | 0 | 0 | - |
| Stage 2 | 0 | - | - | 0 | - | - | 0 | 0 | - | 0 | 0 | - |
| Platoon blocked, % | | - | - | | - | - | | | | | | |
| Mov Cap-1 Maneuver | - | - | - | - | - | - | - | - | 428 | - | - | 732 |
| Mov Cap-2 Maneuver | - | - | - | - | - | - | - | - | - | - | - | - |
| Stage 1 | - | - | - | - | - | - | - | - | - | - | - | - |
| Stage 2 | - | - | - | - | - | - | - | - | - | - | - | - |

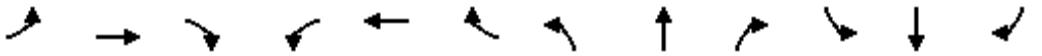
| Approach | EB | WB | NB | SB |
|---|---|---|---|---|
| HCM Control Delay, s | 0 | 0 | 0 | 10.2 |
| HCM LOS | | | A | B |

| Minor Lane/Major Mvmt | NBLn1 | EBT | EBR | WBT | WBR | SBLn1 |
|---|---|---|---|---|---|---|
| Capacity (veh/h) | - | - | - | - | - | 732 |
| HCM Lane V/C Ratio | - | - | - | - | - | 0.047 |
| HCM Control Delay (s) | 0 | - | - | - | - | 10.2 |
| HCM Lane LOS | A | - | - | - | - | B |
| HCM 95th %tile Q(veh) | - | - | - | - | - | 0.1 |



| Lane Group | EBT | WBL | WBT | NBT |
|---|---|---|---|---|
| Lane Group Flow (vph) | 1221 | 9 | 502 | 46 |
| v/c Ratio | 0.42 | 0.02 | 0.16 | 0.11 |
| Control Delay | 4.9 | 2.7 | 2.1 | 1.8 |
| Queue Delay | 0.0 | 0.0 | 0.0 | 0.0 |
| Total Delay | 4.9 | 2.7 | 2.1 | 1.8 |
| Queue Length 50th (ft) | 0 | 0 | 0 | 0 |
| Queue Length 95th (ft) | 222 | 3 | 36 | 0 |
| Internal Link Dist (ft) | 295 | | 547 | 737 |
| Turn Bay Length (ft) | | 245 | | |
| Base Capacity (vph) | 3128 | 1196 | 3493 | 1318 |
| Starvation Cap Reductn | 0 | 0 | 0 | 0 |
| Spillback Cap Reductn | 0 | 0 | 0 | 0 |
| Storage Cap Reductn | 0 | 0 | 0 | 0 |
| Reduced v/c Ratio | 0.39 | 0.01 | 0.14 | 0.03 |

Intersection Summary



| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Volume (veh/h) | 0 | 1045 | 76 | 7 | 437 | 0 | 26 | 0 | 10 | 0 | 0 | 0 |
| Future Volume (veh/h) | 0 | 1045 | 76 | 7 | 437 | 0 | 26 | 0 | 10 | 0 | 0 | 0 |
| Initial Q (Qb), veh | 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 | | | |
| Parking Bus, Adj | 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 | | | | |
| Adj Sat Flow, veh/h/ln | 0 | 1870 | 1870 | 1870 | 1870 | 0 | 1900 | 1870 | 1900 | | | |
| Adj Flow Rate, veh/h | 0 | 1124 | 97 | 9 | 502 | 0 | 33 | 0 | 13 | | | |
| Peak Hour Factor | 0.92 | 0.93 | 0.78 | 0.78 | 0.87 | 0.78 | 0.78 | 0.78 | 0.78 | | | |
| Percent Heavy Veh, % | 0 | 2 | 2 | 2 | 2 | 0 | 0 | 2 | 0 | | | |
| Cap, veh/h | 0 | 1677 | 145 | 309 | 2349 | 0 | 73 | 0 | 29 | | | |
| Arrive On Green | 0.00 | 0.51 | 0.51 | 0.01 | 0.66 | 0.00 | 0.06 | 0.00 | 0.06 | | | |
| Sat Flow, veh/h | 0 | 3404 | 285 | 1781 | 3647 | 0 | 1235 | 0 | 486 | | | |
| Grp Volume(v), veh/h | 0 | 603 | 618 | 9 | 502 | 0 | 46 | 0 | 0 | | | |
| Grp Sat Flow(s),veh/h/ln | 0 | 1777 | 1819 | 1781 | 1777 | 0 | 1721 | 0 | 0 | | | |
| Q Serve(g_s), s | 0.0 | 10.9 | 10.9 | 0.1 | 2.4 | 0.0 | 1.1 | 0.0 | 0.0 | | | |
| Cycle Q Clear(g_c), s | 0.0 | 10.9 | 10.9 | 0.1 | 2.4 | 0.0 | 1.1 | 0.0 | 0.0 | | | |
| Prop In Lane | 0.00 | | 0.16 | 1.00 | | 0.00 | 0.72 | | 0.28 | | | |
| Lane Grp Cap(c), veh/h | 0 | 900 | 922 | 309 | 2349 | 0 | 102 | 0 | 0 | | | |
| V/C Ratio(X) | 0.00 | 0.67 | 0.67 | 0.03 | 0.21 | 0.00 | 0.45 | 0.00 | 0.00 | | | |
| Avail Cap(c_a), veh/h | 0 | 1617 | 1656 | 1073 | 3235 | 0 | 964 | 0 | 0 | | | |
| HCM Platoon Ratio | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | | | |
| Upstream Filter(I) | 0.00 | 1.00 | 1.00 | 1.00 | 1.00 | 0.00 | 1.00 | 0.00 | 0.00 | | | |
| Uniform Delay (d), s/veh | 0.0 | 7.9 | 7.9 | 6.0 | 2.9 | 0.0 | 19.5 | 0.0 | 0.0 | | | |
| Incr Delay (d2), s/veh | 0.0 | 0.9 | 0.9 | 0.0 | 0.0 | 0.0 | 3.1 | 0.0 | 0.0 | | | |
| Initial Q Delay(d3),s/veh | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | | | |
| %ile BackOfQ(50%),veh/ln | 0.0 | 2.5 | 2.6 | 0.0 | 0.2 | 0.0 | 0.5 | 0.0 | 0.0 | | | |
| Unsig. Movement Delay, s/veh | | | | | | | | | | | | |
| LnGrp Delay(d),s/veh | 0.0 | 8.8 | 8.8 | 6.0 | 2.9 | 0.0 | 22.6 | 0.0 | 0.0 | | | |
| LnGrp LOS | A | A | A | A | A | A | C | A | A | | | |
| Approach Vol, veh/h | | 1221 | | | 511 | | | 46 | | | | |
| Approach Delay, s/veh | | 8.8 | | | 3.0 | | | 22.6 | | | | |
| Approach LOS | | A | | | A | | | C | | | | |
| Timer - Assigned Phs | | 2 | 3 | 4 | | | | 8 | | | | |
| Phs Duration (G+Y+Rc), s | | 8.5 | 6.6 | 27.7 | | | | 34.3 | | | | |
| Change Period (Y+Rc), s | | 6.0 | 6.0 | 6.0 | | | | 6.0 | | | | |
| Max Green Setting (Gmax), s | | 24.0 | 19.0 | 39.0 | | | | 39.0 | | | | |
| Max Q Clear Time (g_c+I1), s | | 3.1 | 2.1 | 12.9 | | | | 4.4 | | | | |
| Green Ext Time (p_c), s | | 0.2 | 0.0 | 8.8 | | | | 3.4 | | | | |
| Intersection Summary | | | | | | | | | | | | |
| HCM 6th Ctrl Delay | | | 7.5 | | | | | | | | | |
| HCM 6th LOS | | | A | | | | | | | | | |

| Lane Group | EBT | WBT | NBL | NBR |
|---|---|---|---|---|
| Lane Group Flow (vph) | 1149 | 652 | 122 | 187 |
| v/c Ratio | 0.50 | 0.28 | 0.28 | 0.39 |
| Control Delay | 10.0 | 7.9 | 32.3 | 16.8 |
| Queue Delay | 0.0 | 0.0 | 0.0 | 0.0 |
| Total Delay | 10.0 | 7.9 | 32.3 | 16.8 |
| Queue Length 50th (ft) | 180 | 84 | 63 | 42 |
| Queue Length 95th (ft) | 227 | 112 | 103 | 88 |
| Internal Link Dist (ft) | 516 | 112 | 754 | |
| Turn Bay Length (ft) | | | | 250 |
| Base Capacity (vph) | 2300 | 2300 | 442 | 474 |
| Starvation Cap Reductn | 0 | 0 | 0 | 0 |
| Spillback Cap Reductn | 0 | 0 | 0 | 0 |
| Storage Cap Reductn | 0 | 0 | 0 | 0 |
| Reduced v/c Ratio | 0.50 | 0.28 | 0.28 | 0.39 |

Intersection Summary

| Movement | EBT | EBR | WBL | WBT | NBL | NBR |
|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | |
| Traffic Volume (veh/h) | 1069 | 0 | 0 | 600 | 101 | 155 |
| Future Volume (veh/h) | 1069 | 0 | 0 | 600 | 101 | 155 |
| Initial Q (Qb), veh | 0 | 0 | 0 | 0 | 0 | 0 |
| Ped-Bike Adj(A_pbT) | | 1.00 | 1.00 | | 1.00 | 1.00 |
| Parking Bus, Adj | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Work Zone On Approach | No | | | No | No | |
| Adj Sat Flow, veh/h/ln | 1870 | 0 | 0 | 1870 | 1870 | 1870 |
| Adj Flow Rate, veh/h | 1149 | 0 | 0 | 652 | 122 | 0 |
| Peak Hour Factor | 0.93 | 1.00 | 1.00 | 0.92 | 0.83 | 0.83 |
| Percent Heavy Veh, % | 2 | 0 | 0 | 2 | 2 | 2 |
| Cap, veh/h | 2310 | 0 | 0 | 2310 | 445 | |
| Arrive On Green | 0.65 | 0.00 | 0.00 | 0.65 | 0.25 | 0.00 |
| Sat Flow, veh/h | 3741 | 0 | 0 | 3741 | 1781 | 1585 |
| Grp Volume(v), veh/h | 1149 | 0 | 0 | 652 | 122 | 0 |
| Grp Sat Flow(s),veh/h/ln | 1777 | 0 | 0 | 1777 | 1781 | 1585 |
| Q Serve(g_s), s | 16.7 | 0.0 | 0.0 | 7.9 | 5.5 | 0.0 |
| Cycle Q Clear(g_c), s | 16.7 | 0.0 | 0.0 | 7.9 | 5.5 | 0.0 |
| Prop In Lane | | 0.00 | 0.00 | | 1.00 | 1.00 |
| Lane Grp Cap(c), veh/h | 2310 | 0 | 0 | 2310 | 445 | |
| V/C Ratio(X) | 0.50 | 0.00 | 0.00 | 0.28 | 0.27 | |
| Avail Cap(c_a), veh/h | 2310 | 0 | 0 | 2310 | 445 | |
| HCM Platoon Ratio | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Upstream Filter(I) | 1.00 | 0.00 | 0.00 | 1.00 | 1.00 | 0.00 |
| Uniform Delay (d), s/veh | 9.1 | 0.0 | 0.0 | 7.5 | 30.2 | 0.0 |
| Incr Delay (d2), s/veh | 0.8 | 0.0 | 0.0 | 0.3 | 1.5 | 0.0 |
| Initial Q Delay(d3),s/veh | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| %ile BackOfQ(50%),veh/ln | 5.7 | 0.0 | 0.0 | 2.6 | 2.5 | 0.0 |
| Unsig. Movement Delay, s/veh | | | | | | |
| LnGrp Delay(d),s/veh | 9.8 | 0.0 | 0.0 | 7.8 | 31.7 | 0.0 |
| LnGrp LOS | A | A | A | A | C | |
| Approach Vol, veh/h | 1149 | | | 652 | 122 | A |
| Approach Delay, s/veh | 9.8 | | | 7.8 | 31.7 | |
| Approach LOS | A | | | A | C | |

| Timer - Assigned Phs | 2 | | | | 6 | 8 |
|---|---|---|---|---|---|---|
| Phs Duration (G+Y+Rc), s | 70.0 | | | | 70.0 | 30.0 |
| Change Period (Y+Rc), s | 5.0 | | | | 5.0 | 5.0 |
| Max Green Setting (Gmax), s | 65.0 | | | | 65.0 | 25.0 |
| Max Q Clear Time (g_c+I1), s | 9.9 | | | | 18.7 | 7.5 |
| Green Ext Time (p_c), s | 4.8 | | | | 10.3 | 0.3 |

| Intersection Summary | |
|---|---|
| HCM 6th Ctrl Delay | 10.5 |
| HCM 6th LOS | B |

**Notes**

Unsignalized Delay for [NBR] is excluded from calculations of the approach delay and intersection delay.