Updated Traffic Impact Study for North Lawrence Riverfront Addition

NWC of N. 2nd Street (US 40/59) and Elm Street
City of Lawrence, Kansas

Prepared
for
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Prepared
By

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Introduction

Proposed Redevelopment

The proposed *"North Lawrence Riverfront Addition"* is an infill, mixed-use redevelopment located along the Kaw River in North Lawrence, Kansas within KDOT's District 1, Area 4. The site is bounded by N. 2nd Street (US 40/59) and Union Pacific railroad to the east and by the river levee on all other sides (See Location Map, Figure 1 of Appendix I). Currently the site is occupied by a few businesses, a couple of residential homes and a small mobile home park. Under the proposed redevelopment plan, the existing businesses and residential dwelling units will be replaced with number of mixed uses as shown in the Concept Plan, Appendix I and described below:

- 30,000 gross square feet of *General Office Buildings (ITE Land Use Code 710)*;
- 74,300 gross square feet of retail/service consisting of:
    - Two *High-Turnover (Sit-Down) Restaurants (ITE Land Use Code 932)* – each with gross floor area of approximately 6,000 sq. ft. including outdoor patios;
    - A *Quality Restaurant (ITE Land Use Code 931)* with gross floor area of approximately 6,500 square feet including an outdoor patio;
    - A *Coffee Shop Without Drive Thru Lane (ITE Land Use Code 936)* with gross floor area of approximately 1,200 sq. ft.;
    - Three *Drinking Places (ITE Land Use Code 925)* – two with gross floor area of approximately 2,600 sq. ft.; and one with gross floor area of approximately 900 sq. ft.;
    - 48,500 gross square feet of general retail space. At the time this study was prepared, specific uses for the individual retail spaces were unknown; therefore, ITE Land Use Code 820 (Shopping Center) is selected with gross leasable area (GLA) as the independent variable. For this analysis, gross leasable area is assumed to be the same as gross floor area.
- 390 dwelling units of *Multifamily (Mid-Rise) residential (ITE Land Use Code 221)* including 330 apartments and 60 condominiums; and
- A 150-room hotel (ITE Land Use 310).

Existing Developments and Zoning

The area in the vicinity of the project site is currently fully developed consisting of downtown Lawrence just south of the bridge over the Kaw River, residential neighborhood east of N. 2nd Street (US 40/59), and commercial and industrial uses along N. 2nd Street (US 40/59) farther to the north.

According to the City's Interactive Map, the site is currently zoned *IG (General Industrial)* with a small area on the southeast corner zoned as *CS (Commercial Strip District)*. The approved zoning for the entire site is *CD (Commercial District)* subject to the recording of the final plat.

Access

Currently, access to the site is provided at one point onto N. 2nd Street (US 40/59) at its intersection with Locust Street. Under the proposed redevelopment, a second access drive will be added onto N. 2nd Street (US 40/59), near the southernmost property line. This access drive will be restricted to "right-out" only and will also be used by fire/medical vehicles to enter the site in case of an emergency (See Concept Plan, Figure 2 of Appendix I).

Purpose

The purpose of this study is to:

1. Evaluate the existing operating conditions of traffic at the intersections of N. 2nd Street (US 40/59) with Locust, Lincoln and Lyon Streets.
2. Identify existing operational and/or safety deficiency(s), if any, at the above-mentioned intersections and recommend mitigation measures as needed.
3. Assess impact of trips generated by the proposed redevelopment on the subject intersections.
4. Recommend off-site improvements needed as the result of this redevelopment.
5. Evaluate the future operating conditions of traffic on the street network surrounding the site for target year 2040.

Data Collection and Summary

The following paragraphs summarize the results of data collection tasks and field observations for this project.

Roadway Characteristics

In the vicinity of the development sites (See Figure 3 of Appendix I for details):

- N. 2nd Street runs north/south along east side of the project site and is designated as a *"Principal Arterial"* on the *City's T2040 Thoroughfare Map*. It is a four-lane undivided concrete roadway with curb/gutter sections and posted speed limit of 40 mph. North of Lincoln Street, the posted speed limit changes to 45 mph.
- Elm Street runs between N. 2nd Street (US 40/59) and N. 9th Street approximately 50 ft. north of the south property line and is designated as a *"Local Street"* with one-way operation in the eastbound direction, except for a 250 ft. segment just west of N. 3rd Street that operates as a two-way street to provide access to local businesses on the north side of Elm Street. The only posted speed limit sign on Elm Street is a "20 mph when flashing" sign in the Woodlawn school zone. The statutory speed limit is 30 mph during all other times.
- Locust Street runs east/west at the entrance to the project site approximately 400 ft. north of the south property line and is designated as a *"Collector"* on the *City's T2040 Thoroughfare Map*. It has one through lane in each direction and a two-way left-turn lane between N. 2nd Street (US 40/59) and N. 3rd Street for a distance of approximately 560 ft. The posted speed limit is 30 mph.
- Lincoln Street runs east/west to the east of N. 2nd Street (US 40/59) approximately 1,000 ft. north of Locust Street and is designated as a *"Local Street"* on the *City's T2040 Thoroughfare Map*. It is a two-way two-lane roadway with posted speed limit of 25 mph.
- Lyon Street runs east/west to the east of N. 2nd Street (US 40/59) and is located near the northern edge of the project site approximately 1,650 ft. north of Locust Street. It is designated as a *"Collector"* on the *City's T2040 Thoroughfare Map*. It is a two-way two-lane roadway with posted speed limit of 30 mph.

- The intersection of N. 2nd Street (US 40/59) and Locust Street is controlled by a fully-actuated signal with camera detection, *"protected/permissive"* left-turn phase for north/south approaches and *"permissive only"* for east/west approaches. The lane configuration consists of:
    - North and south approach, each has one dedicated left-turn lane with approximate storage lengths of 255 ft. and 145 ft., respectively; and two through lanes with the outside lane shared by right-turn movement.
    - East approach has a dedicated left-turn lane with storage lengths of 225 ft. and one shared through- and right-turn lane.
    - West approach has one shared lane and no dedicated turn lane.
- The intersection of N. 2nd Street (US 40/59) and Lyon Street is controlled by a fully actuated signal with *"permissive only"* left-turn phase for all approaches. The lane configuration consists of:
    - North and south approach, each has two through lanes with the outside lane shared by right-turn movement and the inside lane shared by left-turn movement.
    - East and west approach, each has one shared lane and no dedicated turn lane.
    - The west leg of the intersection is a private commercial drive.
- The intersection of N. 2nd (US 40/59) and Lincoln Street is a "T" intersection controlled by a stop sign on Lincoln Street. The lane configuration consists of:
    - North and south approach, each has two through lanes with the outside lane (in the northbound direction) shared by right-turn movement and the inside lane (in the southbound direction) shared by left-turn movement.
    - East approach has a de-facto left-turn lane and a very short dedicated right-turn lane with storage for one vehicle only.

Manual Traffic Counts

Most recent peak-hour vehicular turning movement counts for the signalized intersections in the study area were obtained from the city files. These counts were taken during morning and afternoon peak-hours of typical weekdays in April 2015 and

January 2016. In addition, existing vehicular turning movement counts (dated July 2013) at the intersections of N. 2nd Street (US 40/59) with Elm Street and Lincoln Street were used for this analysis. Results, as summarized in Appendix IV and illustrated in Figure 4 of Appendix I, indicate that peak characteristics of traffic in the study area are as follows:

- On a typical weekday, morning peak occurs sometime between 7:15 and 8:30 with
    - N. 2nd Street (US 40/59), south of Locust Street, carrying peak-hour volumes of approximately 1,975 vph with directional distribution of approximately 60% - 40% (southbound - northbound). North of Locust Street, peak-hour volumes for the same time period are approximately 1,750 vph with directional distribution of approximately 55% - 45% (southbound – northbound).
    - Elm Street, east of N. 2nd Street (US 40/59), carrying peak-hour volumes of approximately 200 vph in the eastbound direction.
    - Locust Street, east of N. 2nd Street (US 40/59), carrying peak-hour volumes of approximately 320 vph with directional distribution of approximately 85% - 15% (westbound – eastbound).
    - Lyon Street, east of N. 2nd Street (US 40/59), carrying peak-hour volumes of approximately 180 vph with directional distribution of approximately 75% - 25% (westbound – eastbound).
- On a typical weekday, afternoon peak occurs sometime between 4:15 and 6:00 with
    - N. 2nd Street (US 24/40), south of Locust Street, carrying peak-hour volumes of approximately 2,250 vph with directional distribution of approximately 52% - 48% (southbound - northbound). North of Locust Street, peak-hour volumes for the same time period are approximately 2,050 vph with directional distribution of approximately 50% - 50% (southbound – northbound).
    - Elm Street, east of N. 2nd Street (US 24/40), carrying peak-hour volumes of approximately 300 vph in the eastbound direction.

  - Locust Street, east of N. 2nd Street (US 24/40), carrying peak-hour volumes of approximately 350 vph with directional distribution of approximately 70% - 30% (westbound – eastbound).
  - Lyon Street, east of N. 2nd Street (US 24/40), carrying peak-hour volumes of approximately 245 vph with directional distribution of approximately 50% - 50% (westbound – eastbound).
- The intersection of N. 2nd Street (US 24/40) and Locust Street carries approximately 2,015 vph and 2,325 vph during morning and afternoon peak-hours, respectively.
- The intersection of N. 2nd Street (US 24/40) and Lyon Street carries approximately 1,590 vph and 1,940 vph during morning and afternoon peak-hours, respectively.

Transit Services

N. Lawrence is currently served by the City's transit system (Line #4) with a number of stops along Locust Street, N. 7th Street, Lyon Street and N. 2nd Street (US 40/59). As shown in Appendix V, the closest stop to the proposed redevelopment site is at N. 2nd Street (US 24/40) and Locust (across the street from the site) with services every hour from 6:30 a.m. to 8:00 p.m. Monday - Saturday. Under the proposed redevelopment plan, on-site bus stop(s) will be provided to promote active transportation in the vicinity of the project site.

Existing and Planned Bikeways

According to the City's T2040 Bicycle System Map (See Appendix VI for details):

- The levee on the north side of the Kaw River that runs adjacent to the project site has a recreational trail that is designated as *existing shared use path*.
- The bridge over the Kaw River, connecting downtown to North Lawrence, is designated as *existing bike route*.
- Elm Street and N. 3rd Street are both designated as *planned (future) bike route*.
- Lyon Street, between N. 3rd Street and N. 5th Street is designated as *existing bike route*. East of N. 5th Street, it is designated as *planned (future) bike route*.

Under the proposed redevelopment plan, on-site pedestrian and bicycle amenities with connections to the existing adjacent bikeways and sidewalks will be provided to promote active transportation.

Evaluation of the Existing Operating Conditions

Volume/Capacity Analysis

A volume/capacity analysis (using Synchro 10 Software and methodologies outlined in the *6th Edition of the Highway Capacity Manual (HCM) published by TRB*) was conducted to determine level-of-service (LOS) for all movements at the intersections under study during both morning and afternoon peak-hours of a typical weekday.

Level-of-service, as defined in the HCM, describes the quality of traffic operating condition and ranges from "A" to "F", with LOS "A" representing the best (most desirable with minimum delay) conditions and LOS "F" the worst (severely congested with excessive delays). The following chart outlines level-of-service criteria for unsignalized and signalized intersections.

Level-Of-Service	Control Delay for Unsignalized Intersections (seconds/vehicle)	Control Delay for Signalized Intersections (seconds/vehicle)
A	0 – 10	0 – 10
B	> 10 – 15	> 10 – 20
C	> 15 – 25	> 20 – 35
D	> 25 – 35	> 35 – 55
E	> 35 – 50	> 55 – 80
F	> 50	> 80

Results of the analysis, as summarized in Appendix II and illustrated in Figure 5 of Appendix I, indicate that during the peak-hours of a typical weekday, under the existing lane geometry and phasing scheme with optimum signal timing:

- The intersection of N. 2nd and Locust operates at LOS "B" during both peak-hours with individual movements operating at LOS "B" and higher, except for the westbound left-turn movement that operates at LOS "C".
- The intersection of N. 2nd and Lyon operates at LOS "A" during both peak-hours with individual movements operating at LOS "B" and higher.
- At the intersection of N. 2nd and Lincoln, westbound left-turn movement operates at LOS "E" and "F" during morning and afternoon peak-hours, respectively with v/c < 0.18 and 95th percentile stacking of one (1) vehicle. However, it is to be noted that it is not uncommon for minor stop-controlled streets along arterials to experience above average delays with low LOS.

Sight Distance

A sight distance analysis and field investigations indicate that intersection sight distance (ISD) for westbound movement on Lincoln Street at its intersection with N. 2nd Street (US 24/40) is restricted to the south by the east retaining wall of the railroad overpass.

Reasoning (Using KDOT Access Management Policy, January 2013, Tables 4-12 and 4-14)

Posted speed limit on N. 2nd Street (US 24/40) = 40 mph

Grade on N. 2nd Street (US-40/59) = +3% (NB approaching Lincoln); -3% (SB Approaching Lincoln)

Req. ISD for westbound left-turn (from Lincoln onto N. 2nd) = 475 ft. vs. 90 ft. (measured) **RESTRICTED**

Req. ISD for westbound right-turn (from Lincoln onto N. 2nd) = 385 ft. vs. 90 ft. (measured) **RESTRICTED**

Req. SSD for Northbound movement on N. 2nd Street (US-40/59) = 289 ft. vs. >1000 ft. (measured) **OK**

Req. SSD for Southbound movement on N. 2nd Street (US-40/59) = 315 ft. vs. > 1000 ft. (measured) **OK**

Dedicated Turn Lane Analysis

Using the guidelines presented in the *KDOT's Access Management Policy (dated January 2013)*, under the existing conditions, the requirements for provision of a dedicated southbound left-turn lane and northbound right-turn lane on N. 2nd Street (US-40/59) at the intersection of Lincoln Street are met.

Reasoning:

Southbound Left-Turn Lane at Lincoln Street (Table 4-28)

Operating Speed = 45 mph (assume 5 mph over the posted speed limit of 40 mph)

Existing Advance Peak-Hour Volumes = 902 vph (AM) > 400 vph; 918 vph (PM) > 400 vph

Existing Opposing Peak-Hour Volumes = 770 vph (AM); 1022 vph (PM)

Existing Left-Turn Volumes = 3 vph (AM) < 7 vph (Req. Min.)

=15 vph (PM) > 5 vph (Req. Min.)

LT Lane Requirement Met

Northbound Right-Turn Lane at Lincoln Street (Table 4-26)

Operating Speed = 45 mph (assume 5 mph over the posted speed limit of 40 mph)

Existing Advance Peak-Hour Volumes = 770 vph (AM); 1022 vph (PM)

Existing Right-Turn Volumes = 22 vph (AM) < 41 (Req. Min.);

= 76 vph (PM) > 28 vph (Req. Min.

RT Lane Requirement Met

Trip Generation Analysis

Trip generation of a proposed land development project is typically estimated using trip generation rates suggested by the *Institute of Transportation Engineers (ITE), Trip Generation Manual (currently the 10th Edition)*. As mentioned earlier, for this analysis, the ITE land use codes 221, 310, 710, 820, 925, 931, 932, and 936 with their respective independent variables were selected. Results, as shown in Table 1 and Appendix III, are described in the following paragraphs.

Total Unadjusted Trips (External + Internal + Pass-By + New)

- On average, 677 trip-ends (364 inbound and 313 outbound) during morning peak-hour of a typical weekday;
- On average, 887 trip-ends (480 inbound and 407 outbound) during afternoon peak-hour of a typical weekday; and
- On average, 9,977 (+/-) trip-ends (two-way volumes) during 24-hour period of a typical weekday.

Internal Capture Trips

The above-mentioned trip numbers represent sum of the trips for single-use, free-standing sites for each proposed land use in a suburb setting. At mixed-use development sites, with two or more complementary land uses, however, there is potential for interaction among the uses that are referred to as "internal capture trips". As a result, the total external trip numbers may be less than the simple sum of the trips generated by each use separately.

The proposed redevelopment under study is a mixed-use redevelopment consisting of "office", "residential", "retail" and "lodging" components with significant potential for internal capture trips. Using the guidelines suggested in the *ITE Trip Generation Handbook, 3rd Edition* in conjunction with the *NCHRP Report 684 "Internal Capture Trip Estimation Tool*", the internal capture rate for the proposed redevelopment is 20% during the morning peak-hour and 47% during the afternoon peak-hour. For this analysis, a 20% value is assumed for both peak periods. Results, as summarized in Table 1 and shown in Appendix IV, indicate that the internal capture trips for this redevelopment are:

- On average, 135 trip-ends (69 inbound and 69 outbound) during morning peak-hour of a typical weekday; and
- On average, 177 trip-ends (96 inbound and 81 outbound) during afternoon peak-hour of a typical weekday.

External Trips

The estimated external trips for the proposed redevelopment, as summarized in Table 1, are:

- On average, 542 trip-ends (295 inbound and 244 outbound) during morning peak-hour of a typical weekday;
- On average, 710 trip-ends (384 inbound and 326 outbound) during afternoon peak-hour of a typical weekday; and
- On average, 7,982 (+/-) trip-ends (two-way volumes) during 24-hour period of a typical weekday.

Pass-By Trips

The resulting number of trips after adjustment for "internal capture trips" represents total vehicles entering and exiting the site at its proposed driveway(s). Because one of the components of the proposed uses for this site is retail-oriented, it attracts a portion of its trips from traffic passing the site on the way from origin to an ultimate destination. These retail trips are called "pass-by" trips and do not add new traffic to the adjacent street network. These trips are typically estimated using values suggested by the *ITE Trip Generation Handbook, 3rd Edition*. Table 1 shows a summary of applicable "pass-by" trips for this redevelopment; however, for this analysis a zero value is assumed.

Multimodal Concept

As mentioned earlier, this redevelopment site is located in a developed urbanized area about a block north of downtown Lawrence where walking, bicycling, and transit are viable modes of transportation. Trip generation numbers presented in the previous paragraphs do not reflect those for urban infill sites such as this site. These types of redevelopment sites often result in fewer vehicle trips due to modal shifts:

- More walking because of close proximity of complementary uses;
- More transit ridership because of convenient, frequent transit services; and
- More bicycling because of bicycle facilities and amenities available in and adjacent to the site.

Therefore, it is reasonable to imply that the trips used in this analysis may be subject to additional discounts due to the multimodal nature of this redevelopment.

Table 1

Summary of Trip Generation Calculations[1, 2] for North Lawrence Riverfront Development (Peak-Hours of Adjacent Street Network)

Land Use (ITE CODE)	Setting/ Location	Size	Typical Weekday						
			24-hr, 2-Way	AM Peak-Hour[3] (vph)			PM Peak-Hour[3] (vph)		
			Volume (vpd)	Enter	Exit	Total	Enter	Exit	Total
Mid-Rise Multifamily Housing (221)*	Gen. Urban/Suburban	390 units	2,124	34	96	130	100	64	164
Hotel (310)*	Gen. Urban/Suburban	150 rooms	1,254	41	29	70	44	42	86
General Office (710)*	Gen. Urban/Suburban	30,000 sq. ft.	330	47	8	55	6	30	36
Shopping Center (820)*	Gen. Urban/Suburban	48,500 GFA[4] 48,500 GLA[5]	3,676	109	67	176	153	165	318
Drinking Place (925)	Gen. Urban/Suburban	2,600 sq. ft.					20	10	30
Drinking Place (925)	Gen. Urban/Suburban	2,600 sq. ft.					20	10	30
Drinking Place (925)	Gen. Urban/Suburban	900 sq. ft.					7	3	10
Quality Restaurant (931)	Gen. Urban/Suburban	6,500 sq. ft.	545	5	0	5	34	17	51
High-Turnover Restaurant (932)	Gen. Urban/Suburban	6,000 sq. ft.	673	33	27	60	37	22	59
High-Turnover Restaurant (932)	Gen. Urban/Suburban	6,000 sq. ft.	673	33	27	60	37	22	59
Coffee Shop without D.T. Lane (936)	Gen. Urban/Suburban	1,200 sq. ft.	702	62	59	121	22	22	44
TOTAL UNADJUSTED TRIPS (Buildings I thru VII and Hotel)			**9,977**	**364**	**313**	**677**	**480**	**407**	**887**
Internal Capture Trips [AM Peak = 20%; PM Peak = 47% (Assume 20%)][6]			-1995	-69	-69	-135	-96	-81	-177
UNADJUSTED EXTERNAL TRIPS (Buildings I thru VII and Hotel)			**7982**	**295**	**244**	**542**	**384**	**326**	**710**
Other Applicable Adjustments :									
- Multi-Modal Use for Retail Component (Assume 0%)				0	0	0	0	0	0
- Pass-By Trips for Shopping Center (AM = 0%; PM = 34%)[7]							-42	-45	-86
- Pass-By Trips for Restaurants (AM = 0%; PM = 43%)[7]							-37	-21	-58
ADJUSTED EXTERNAL TRIPS ADDED TO NETWORK (Building I thru VII and Hotel)			**7,982**	**295**	**244**	**542**	**305**	**260**	**565**

NOTES:

1) Trip generation numbers in this table are calculated using the rates suggested in the *ITE Trip Generation Manual, 10th Edition.*

2) Number of trips are determined by both Weighted Average Rate Method and the Regression Equation Method and the method that meets the criteria suggested in the *ITE Trip Generation Handbook, 3rd Edition* with statistical significance is selected for analysis (* denotes use of Reg. Eq.)

3) Peak-hour of adjacent street network.

4) GFA = Gross Floor Area

5) GLA = Gross Leasable Area (for this study, GLA is assumed to be equal to GFA)

6) Calculated using the *NCHRP 684, Internal Trip Capture Estimation Tool.* However, for this study, a 20% rate is assumed for both AM and PM peak hours.

7) Calcualted using suggested values in the *ITE Trip Generation Handbook, 3rd Edition.*

Trip Distribution and Assignment Analysis

For the purpose of this study, it is assumed that individual components of the proposed redevelopment site have their own unique trip distribution patterns based on a combination of several factors such as:

- The existing traffic distribution patterns;
- Most direct and short route vs. a desirable alternative route that is either less congested (path of least resistance) or is more convenient;
- Employment-based trips;
- Home-based trips; and
- Retail-based trips.

"Hotel" Component (Figure 6 of Appendix I)

- 95% to/from north using N. 2nd Street; and
- 5% to/from south using the bridge over the Kaw River.

"Residential" and "Office" Components (Figure 7 of Appendix I)

- 40% to/from north using N. 2nd Street; and
- 60% to/from south using the bridge over the Kaw River.

"Retail" Component (Figure 8 of Appendix I)

- 41% to/from north using N. 2nd Street. Of which 2% to/from Lincoln Street and 10% to/from Lyon Street;
- 11% to/from east using Locust Street; and
- 48% to/from south using the bridge over the Kaw River.

Using these trip distribution patterns, site-generated trips are assigned to individual movements in the study area as illustrated in Figure 9 of Appendix I.

Analysis Time Period

An overview of the existing traffic volumes in the study area and their peak characteristics, in conjunction with estimated trips generated by the proposed redevelopment, indicate that the most critical peak period will likely occur during the *afternoon peak-hour* of a typical weekday. For this study, however, both peak-hours are analyzed.

Impact Assessment

Volume/Capacity Analysis

For the purpose of this analysis, the *unadjusted external* trip generation numbers were used to assess traffic impact of this redevelopment under the "worst case scenario" with no consideration for "pass-by" trips and multimodal characteristics of the project site. Results of a volume/capacity analysis indicate that during the peak-hours of a typical weekday, with certain site access improvements (i.e. a dedicated left-turn lane and a shared through/right turn lane for eastbound approach on Locust Street at its intersection with N. 2nd Street (US 40/59); and a new restricted "right/out" access drive near the south property line):

- The intersection of N. 2nd Street (US 40/59) and Locust Street will likely operate at LOS "B" and "C" during morning and afternoon peak-hours, respectively with individual movements likely operating at LOS "C" and higher, except for the westbound left-turn movement that will likely operate at LOS "D" during morning peak-hour. Moreover, the 95th percentile stacking length for the northbound left-turn movement (higher of the morning and afternoon peak-hour) will be 156', which utilizes the entire available storage length of this lane. The extent of which this lane can be lengthened is limited with some design constraints due to proximity of the bridge over the Kaw River.
- The intersection of N. 2nd Street (US 40/59) and Lyon Street will likely operate at LOS "A" during both peak-hours with individual movements likely operating at

LOS “B” and higher.

- At the intersection of N. 2nd Street (US 40/59) and Lincoln, westbound left-turn movement will still operate at LOS “E” and “F” during morning and afternoon peak-hours, respectively. As mentioned earlier, this movement carries very little traffic with v/c of < 0.27 with 95th percentile stacking of one (1) vehicle.

Target Year 2040

According to the *City’s T2040 Plan*, the most recent Travel Demand Model (TDM) projects the following LOS for the street network surrounding this development site for Target Year 2040 (Refer to T2040, Figure 7.6, LOS Map, TDM, scenario #13).

- N. 2nd Street, north of Lyon Street will likely operate at uncongested level with LOS “C” or higher. Between Lyon Street and Locust Street, it will likely experience some congestion with LOD “D”. South of Locust Street (the bridge on Kaw River extending onto downtown) will likely operate at congested level (at or above capacity).
- Lyon Street, Locust Street and Elm Street all will likely operate at uncongested level with LOS “C” or higher.

Summary and Recommendations

This study evaluates the existing operating conditions of traffic at selected intersections within the study area (See Location Map, Figure 1 of Appendix I). It also assesses the impact of traffic generated by the proposed North Lawrence Riverfront Addition on the adjacent street network. In addition, a cursory evaluation of traffic for target year 2040 is presented as well.

Existing Conditions (See Figures 3, 4 & 5 of Appendix I)

1) Under the existing geometric and operating conditions, the signalized intersections in the study area operate at LOS "B" and higher with *ample* reserve capacity. The only movement that operates at LOS "C" is the westbound left-turn movement on Locust Street at its intersection with N. 2nd Street (US40/59) with some reserve capacity. Results of the analysis also indicate that the 95th percentile stacking (queue length) for dedicated turn lanes at the intersection of N. 2nd Street (US 40/59) and Locust Street are as follows:
    - 150' for westbound left-turn lane (available length = 225', OK);
    - <25' for southbound left-turn lane (available length = 255', OK); and
    - <25' for northbound left-turn lane (available length = 145', OK).

2) At the intersection of N. 2nd Street (US 40/59) and Lincoln Street, westbound left-turn movement experiences above the average delays during both, morning and afternoon peak-hours. As mentioned earlier, this movement carries very little traffic with v/c < 0.18 and 95th percentile stacking of one (1) vehicle. It should be noted that it is not uncommon for minor stop-controlled streets along arterials to experience excessive delays.

    Furthermore, field observation indicates that the existing railroad overpass retaining wall (south of this intersection) restricts sight distance for traffic exiting Lincoln Street. Given the availability of several other east/west alternative routes, motorist will likely avoid using this intersection.

Following *KDOT's Access Management Policy* guidelines (using traffic volumes as the criteria), requirements for provision of a dedicated southbound left-turn lane and northbound right-turn lane on N. 2nd Street (US 40/59) at its intersection with Lincoln Street are met. However, because there is very little traffic (about 15 vph) negotiating this maneuver during the peak-hour, a southbound left lane should be considered if crash history indicates that there is a safety concern at this location.

Existing + Proposed Redevelopment (See Figures 10 & 11 of Appendix I)

As mentioned earlier, for this analysis, the scenario representing the *unadjusted external* trip generation numbers prior to any discounts for "pass-by" trips and multimodal characteristics was selected.

Results of the analysis indicate that with certain site access improvements including:

- A dedicated left-turn lane and a shared through/right turn lane for eastbound approach on Locust Street at its intersection with N. 2nd Street (US 40/59); and
- A new restricted "right-out" access drive near the south property line

the signalized intersections in the study area will likely operate at LOS "C" and higher with some reserve capacity. The only movement that will likely operate at LOS "D" is the westbound left-turn movement on Locust Street at its intersection with N. 2nd Street (US 40/59).

Results of the analysis also indicate that the 95th percentile stacking for the dedicated turn lanes at the intersection of N. 2nd Street (US 40/59) and Locust Street are as follows:

- 201' for westbound left-turn lane (available length = 225', OK);
- 29' for southbound left-turn lane (available length = 255', OK); and
- 156' for northbound left-turn lane (available length = 145', Marginal). The extent of which this lane can be lengthened is limited with some design constraints due to proximity of the bridge over the Kaw River.

Recommended Improvements

1. At the intersection of N. 2nd Street (US-40/59) and Locust Street:
    a) Provide a dedicated eastbound left-turn lane on Locust Street with minimum storage length of 100 ft.
    b) Provide a shared through/right turn lane on Locust Street.
    c) Increase the storage length of the existing northbound left-turn lane as far as possible.
    d) Consider modifying signal timing and phasing scheme as needed.
2. Provide a restricted “right-out” access drive near the south property line across from Elm Street.
3. Provide additional access drives onto N. 2nd Street (US 40/59) with the future phases of the redevelopment and/or when access at Locust Street cannot meet the demand.

APPENDIX I

Figures

Figure 1
Location Map

SITE PLAN

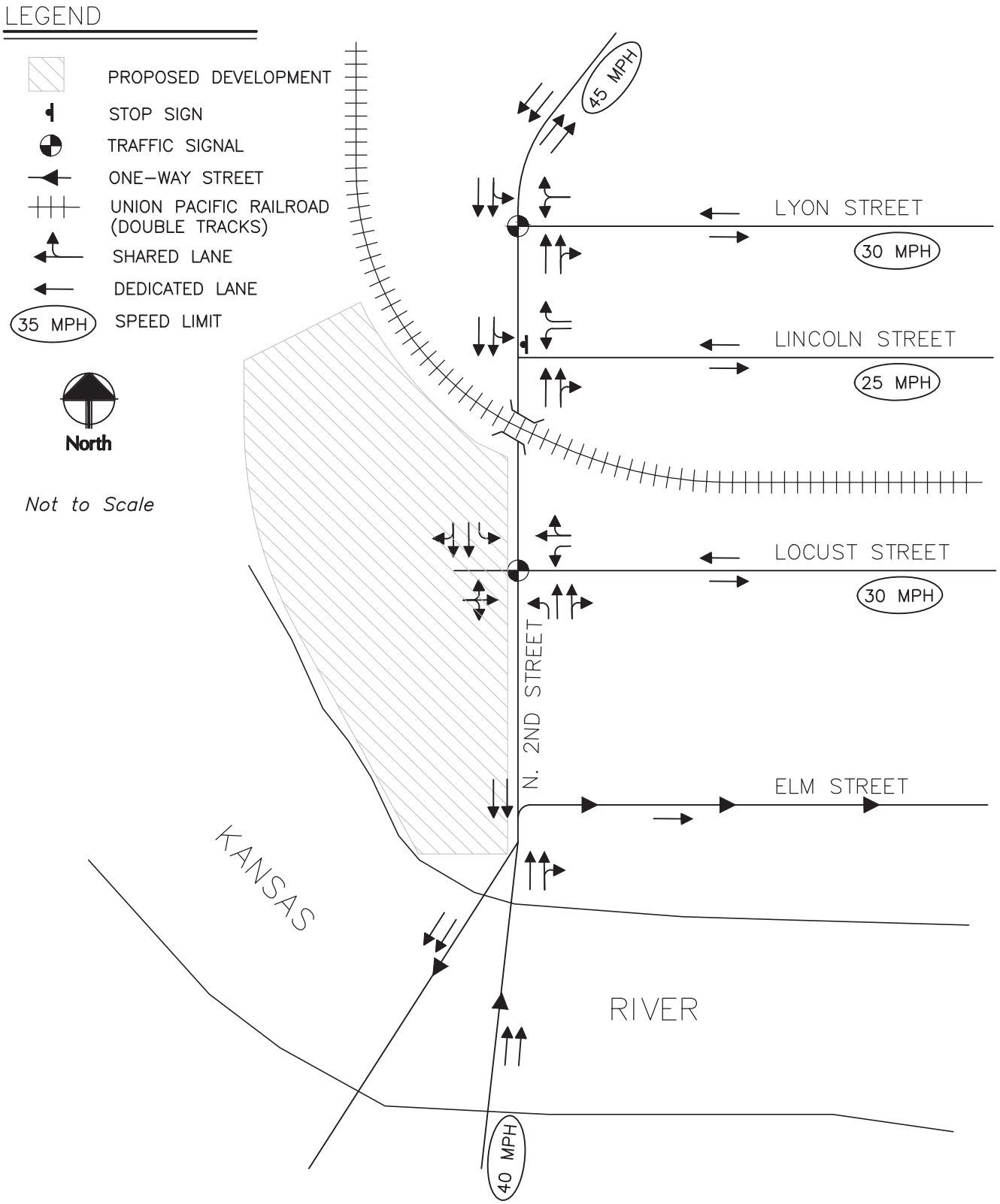


FIGURE 3
EXISTING LANE CONFIGURATIONS,
TRAFFIC CONTROL DEVICES, AND POSTED SPEED LIMITS
(2018)

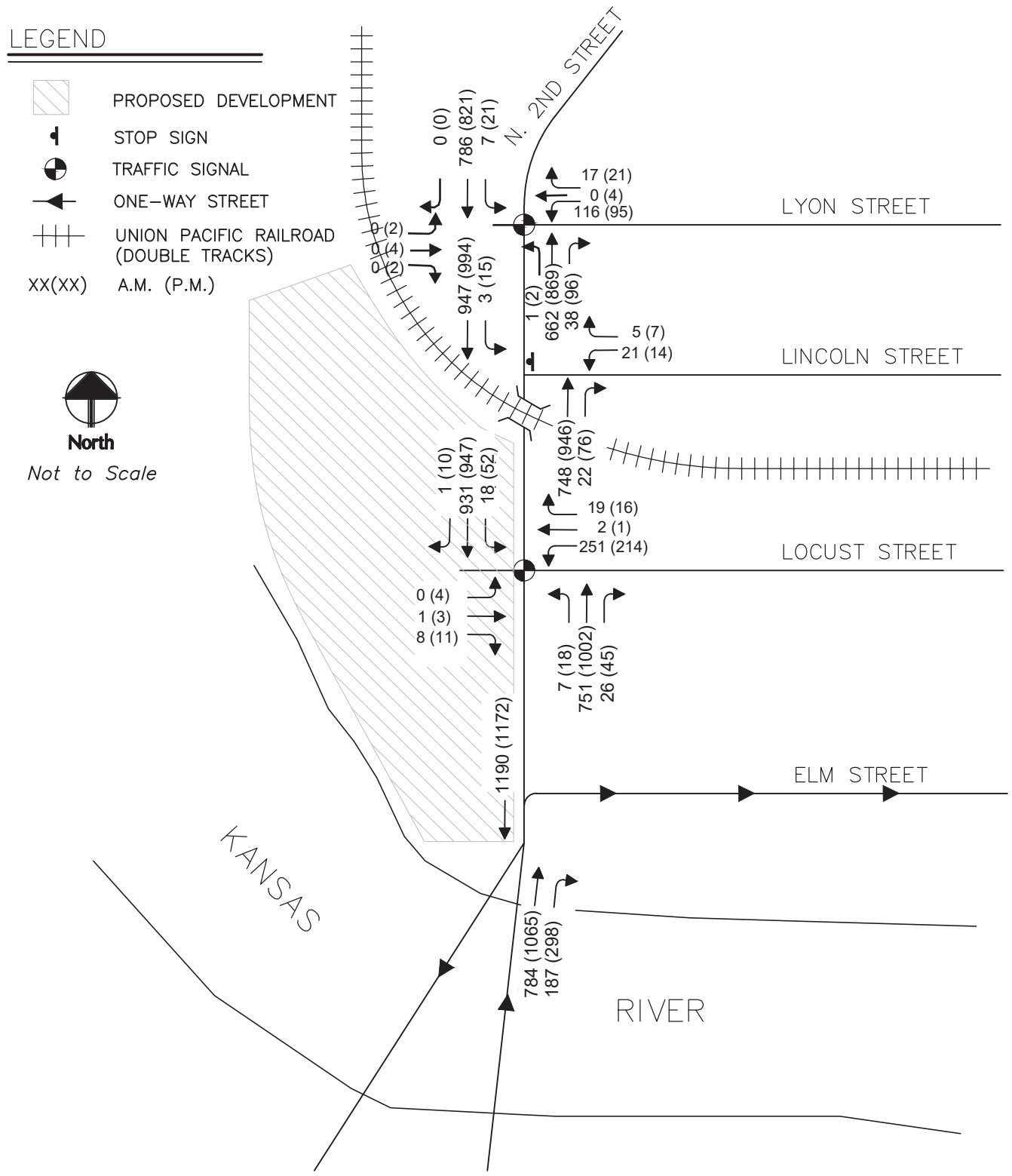


FIGURE 4
EXISTING PEAK-HOUR TRAFFIC VOLUMES
(TYPICAL WEEKDAY, 2015-2016)

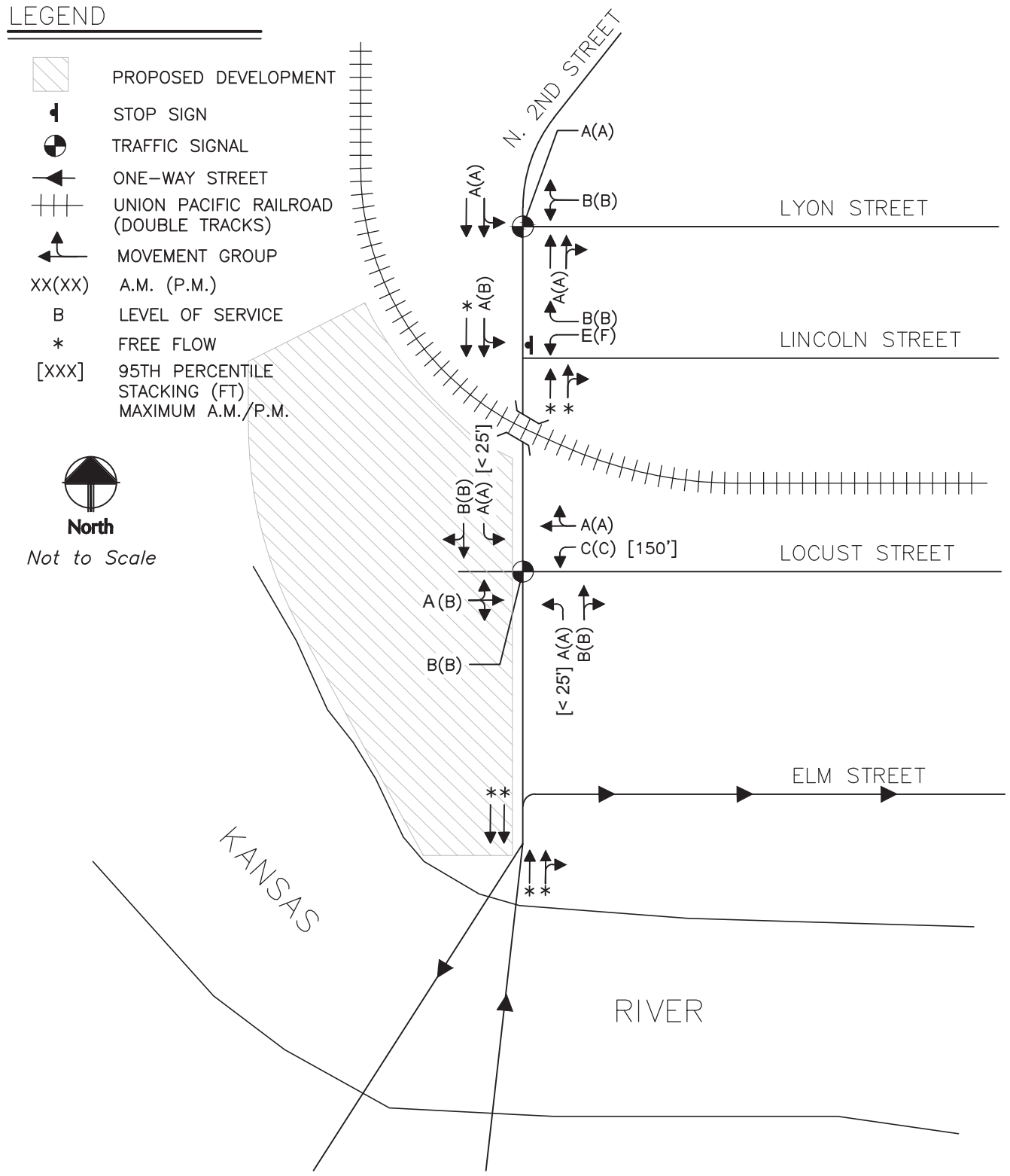


FIGURE 5
SUMMARY OF LEVEL OF SERVICE
FOR EXISTING TRAFFIC CONDITIONS
(PEAK-HOURS OF A TYPICAL WEEKDAY, 2015-2016)

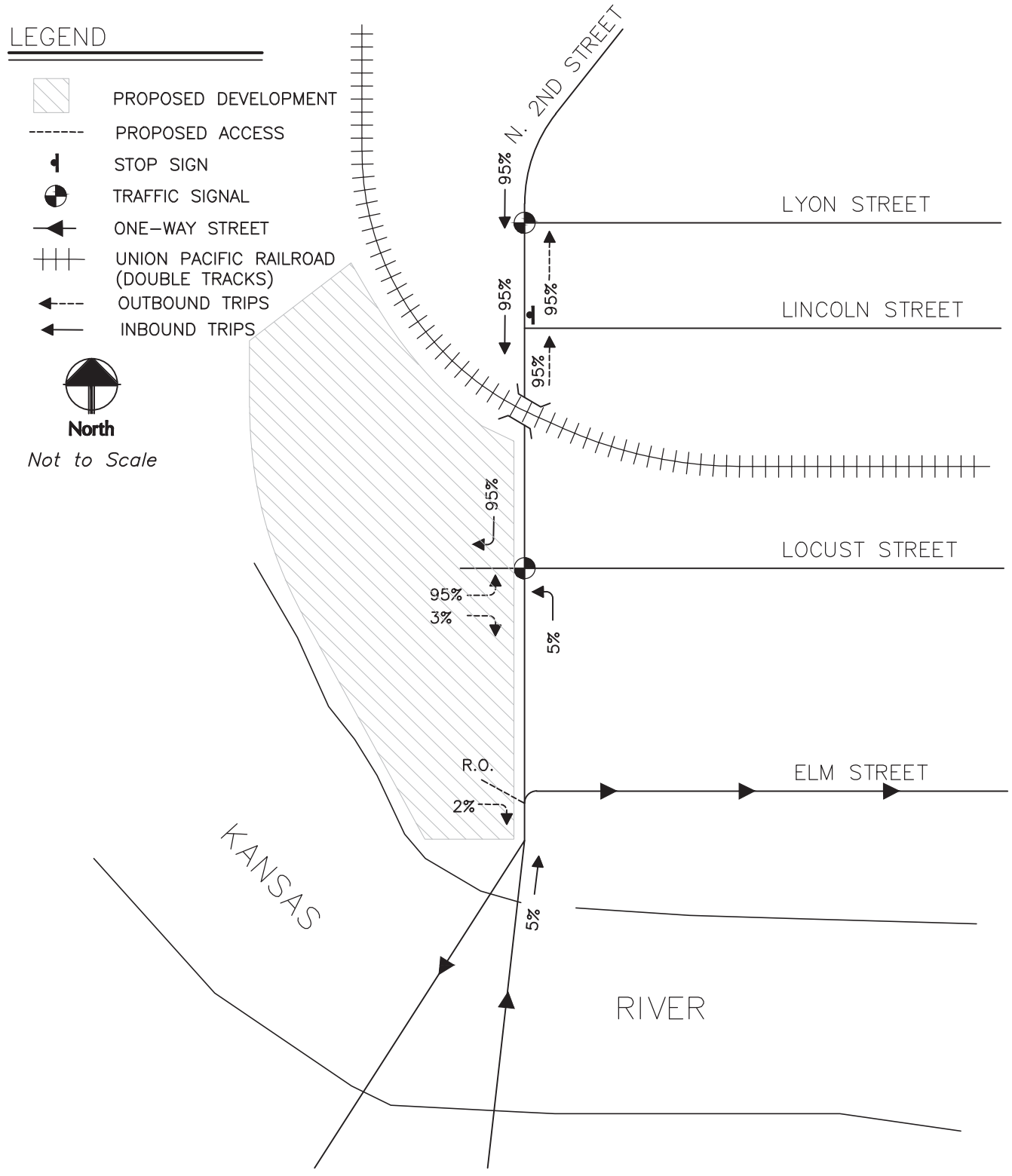


FIGURE 6
TRIP DISTRIBUTION PATTERNS FOR
"HOTEL" COMPONENT OF NORTH LAWRENCE
RIVERFRONT ADDITION
(PEAK-HOUR OF A TYPICAL WEEKDAY)

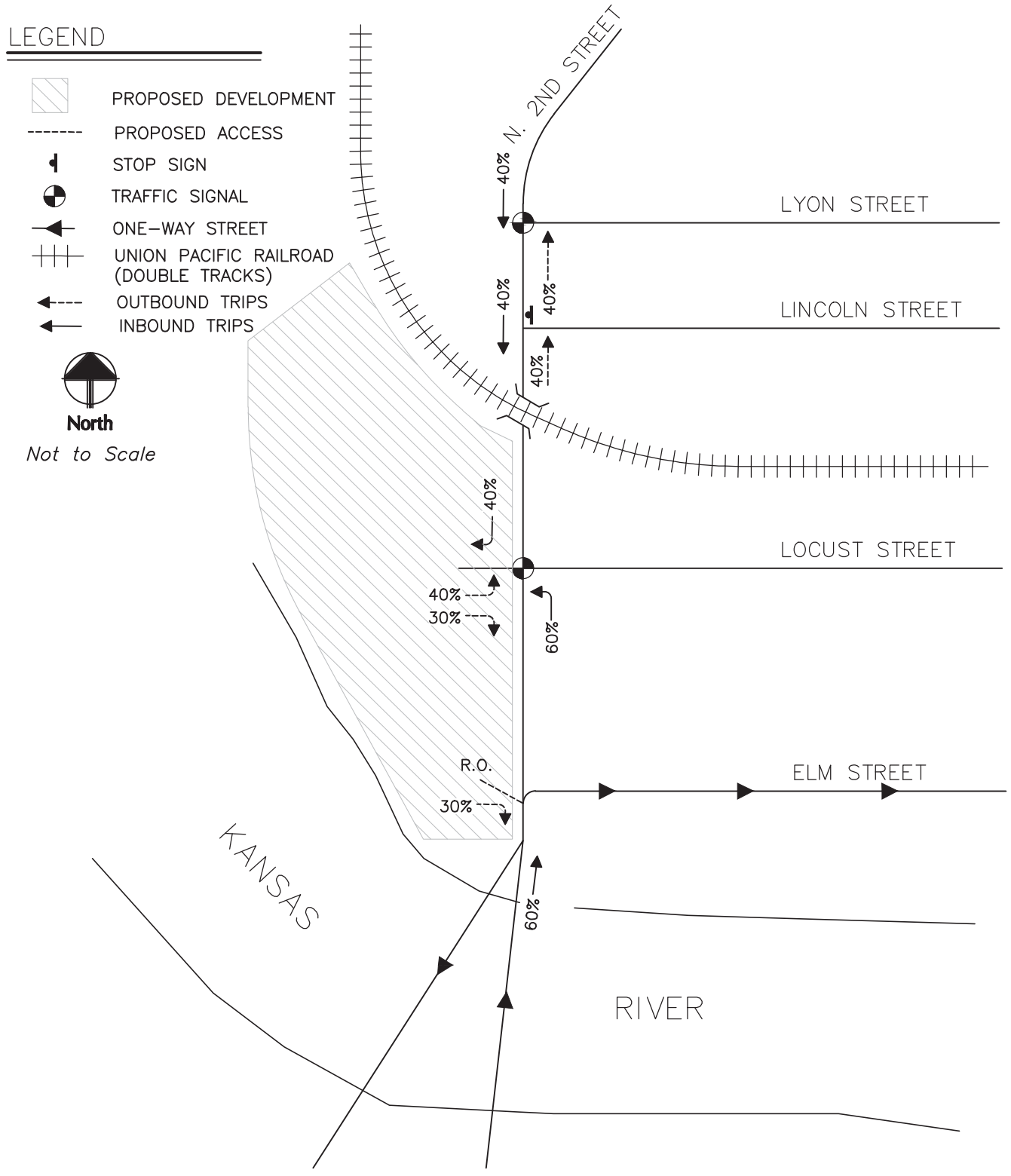


FIGURE 7
TRIP DISTRIBUTION PATTERNS FOR
"RESIDENTIAL"AND "OFFICE" COMPONENTS OF NORTH
LAWRENCE RIVERFRONT ADDITION
(PEAK-HOUR OF A TYPICAL WEEKDAY)

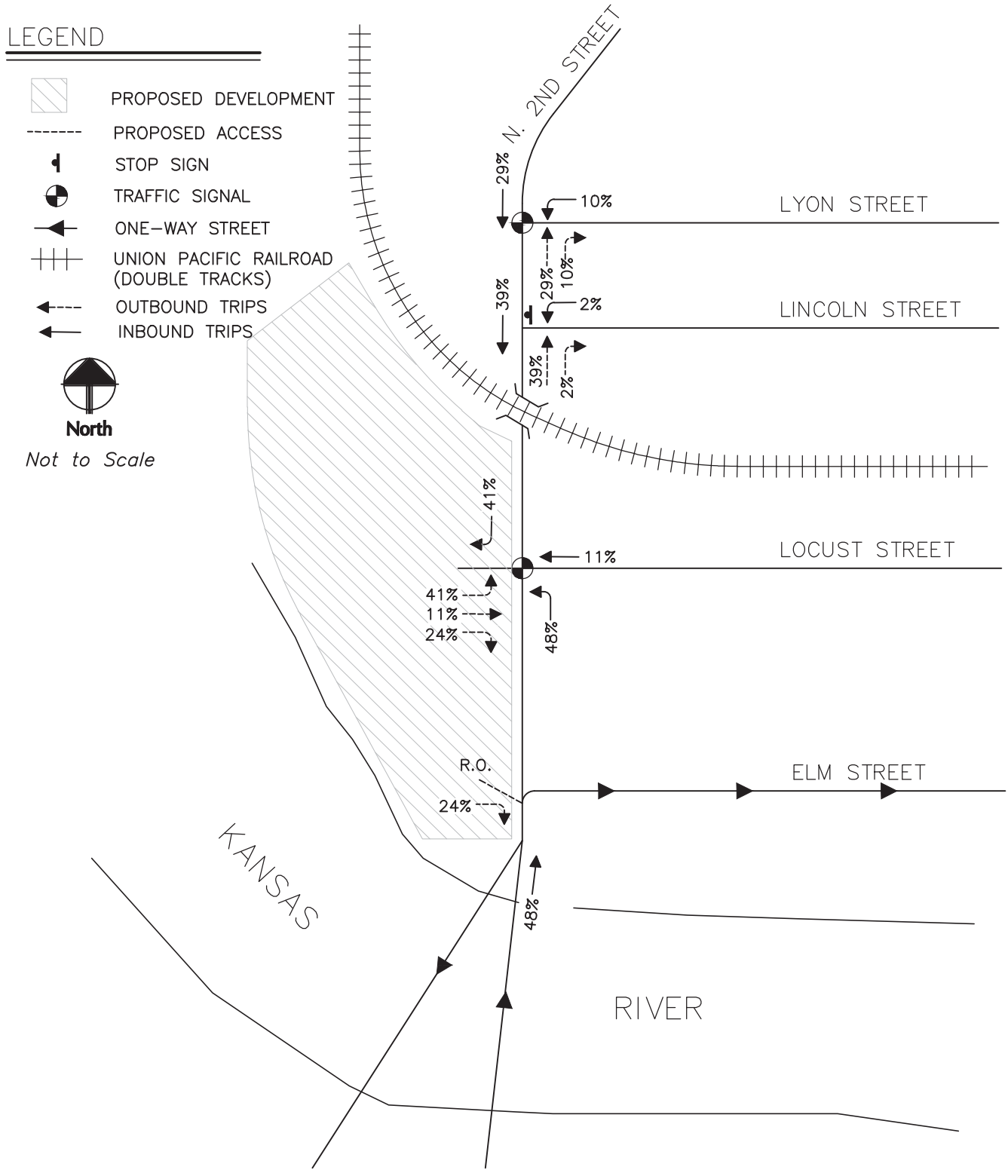
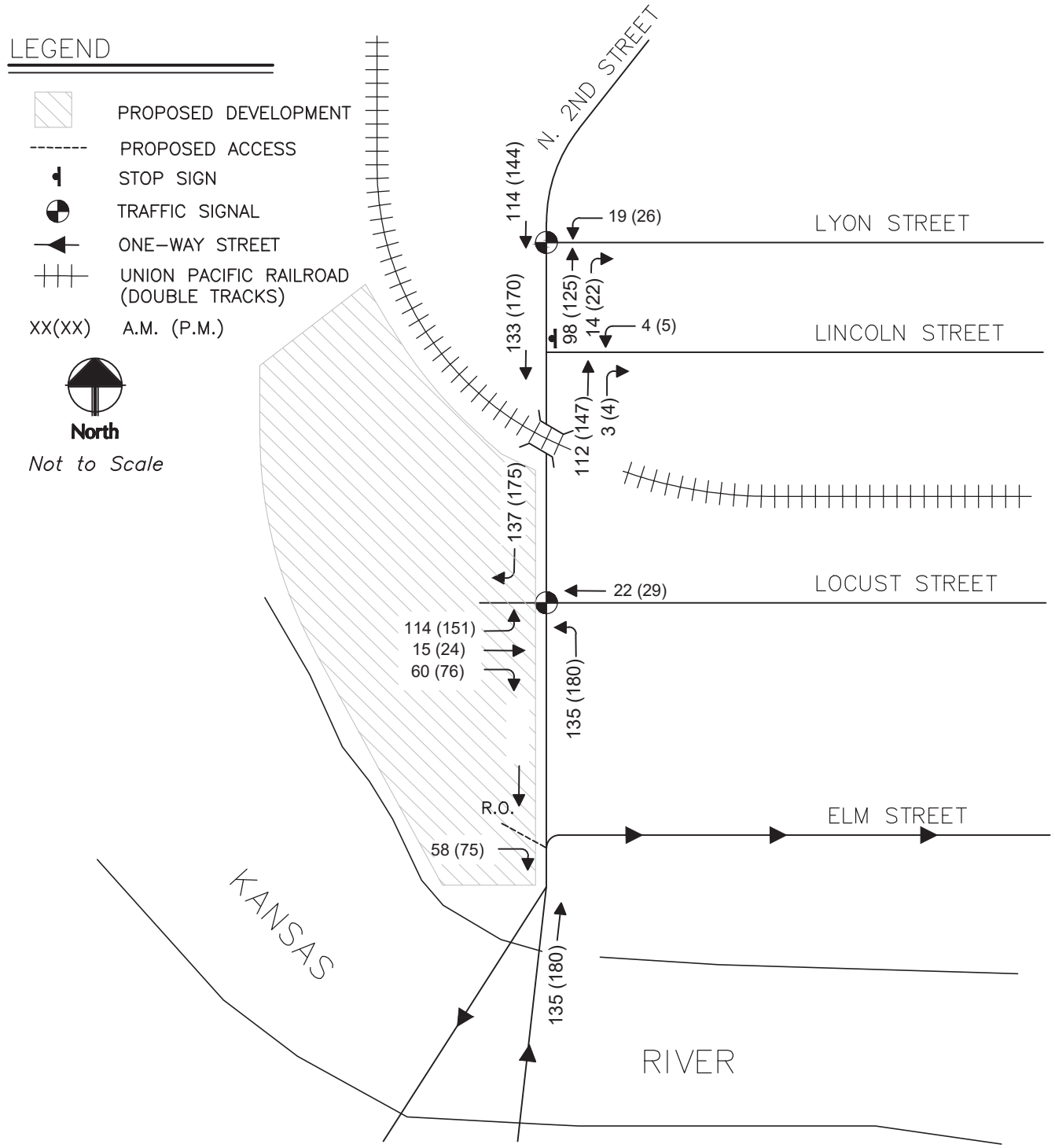


FIGURE 8
TRIP DISTRIBUTION PATTERNS FOR
"RETAIL" COMPONENT OF NORTH LAWRENCE
RIVERFRONT ADDITION
(PEAK-HOUR OF A TYPICAL WEEKDAY)



TRIPS (VPH)	UNADJUSTED		INTERNAL CAPTURE		DRIVEWAY	
	AM	PM	AM	PM	AM	PM
INBOUND	364	480	-69	-96	295	384
OUTBOUND	313	407	-69	-81	244	326
TOTAL 2–WAY	677	887	-135	-177	542	710

FIGURE 9
SITE-GENERATED EXTERNAL TRIPS
NORTH LAWRENCE RIVERFRONT ADDITION BUILDINGS I - VII AND HOTEL
(PEAK-HOURS OF A TYPICAL WEEKDAY)

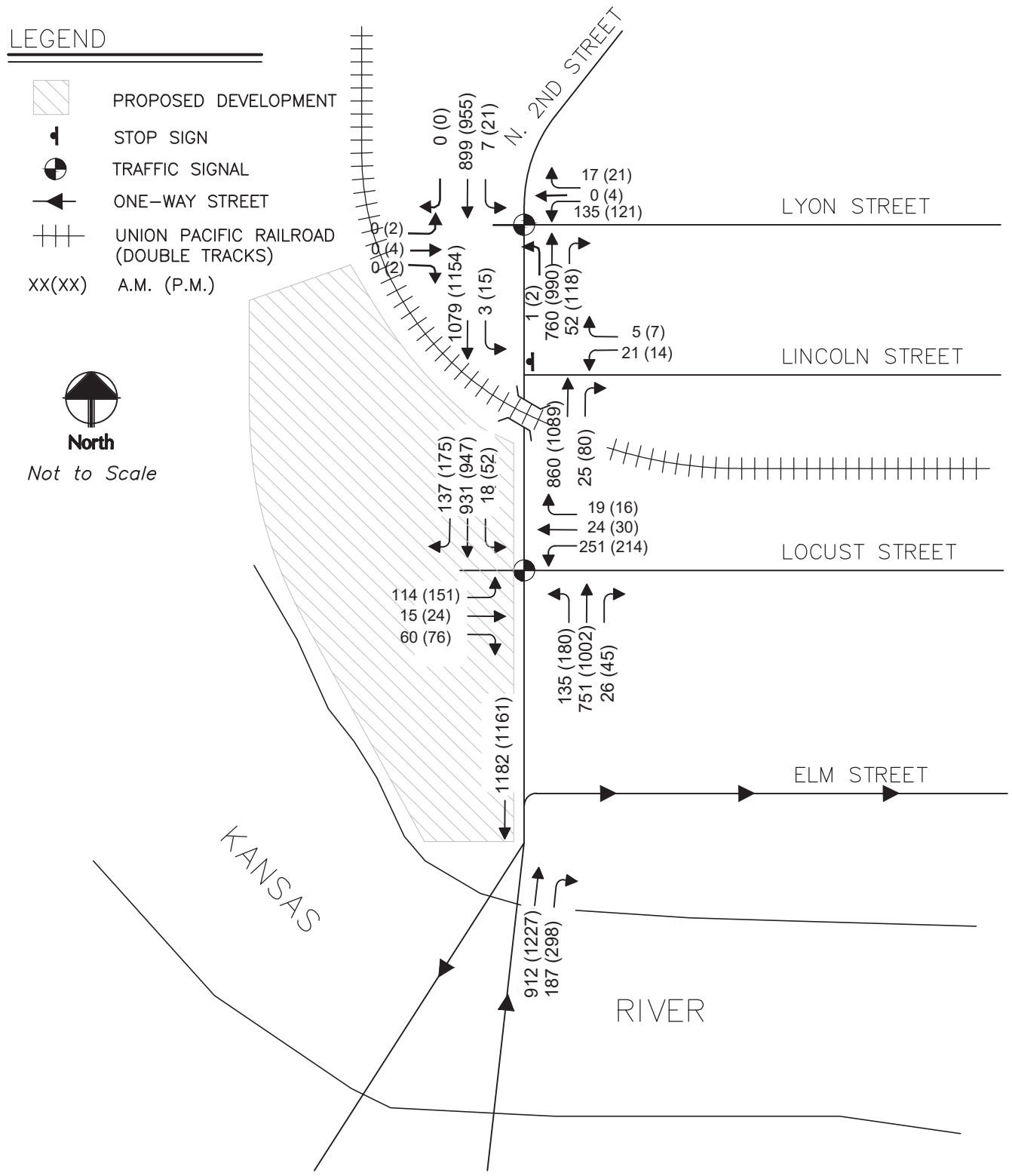


FIGURE 10
"ADJUSTED EXISTING + NORTH LAWRENCE RIVERFRONT ADDITION (BUILDINGS I -VII AND HOTEL)"
TRAFFIC VOLUMES (PEAK-HOURS OF A TYPICAL WEEKDAY)

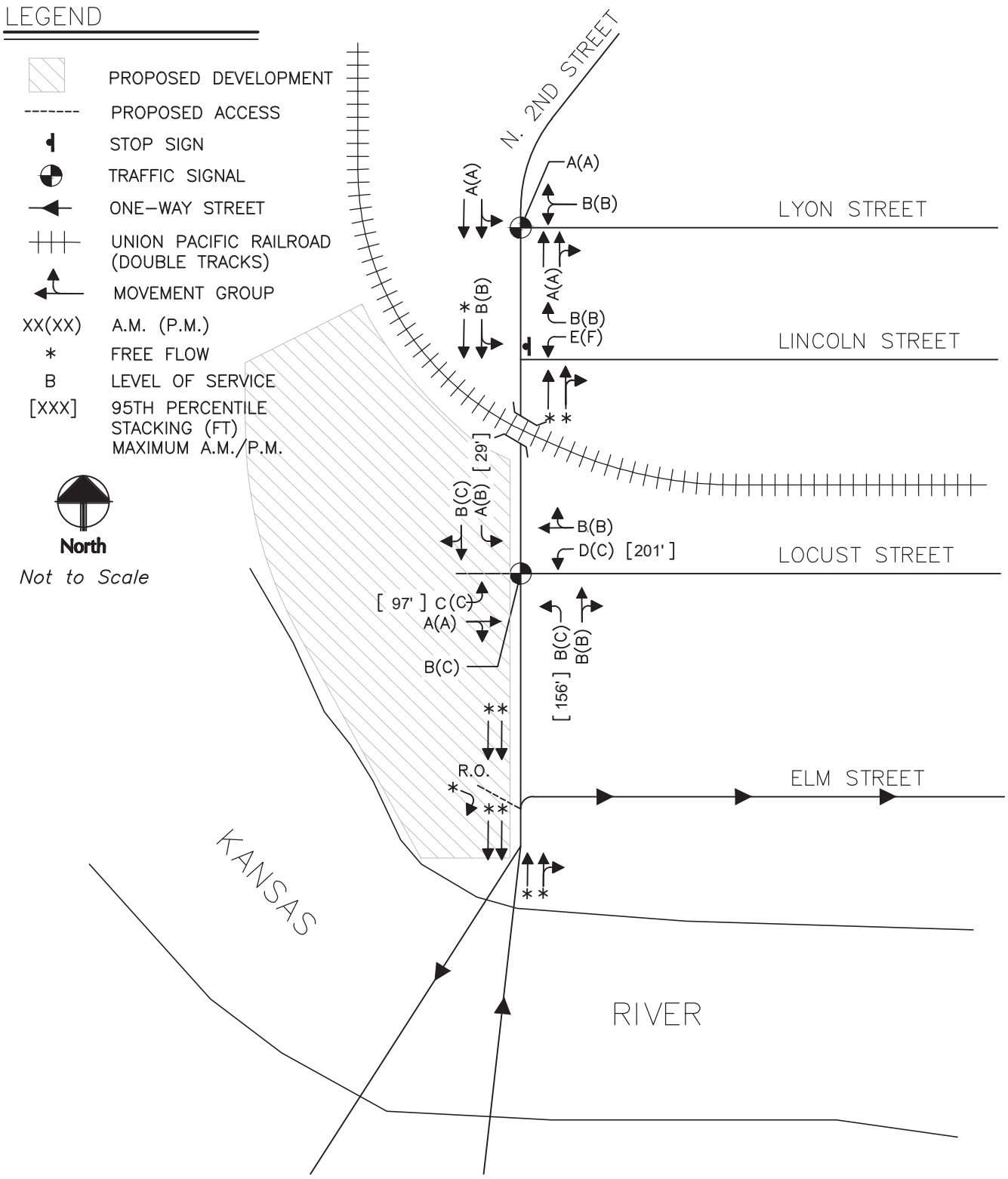


FIGURE 11
SUMMARY OF LEVEL OF SERVICE FOR
"ADJUSTED EXISTING + NORTH LAWRENCE RIVERFRONT ADDITION (BUILDINGS I -VII AND HOTEL)"
TRAFFIC VOLUMES (PEAK-HOURS OF A TYPICAL WEEKDAY)

APPENDIX II

Results of Volume/Capacity Analysis
Using
Synchro 10 Software
(HCM 6th Edition Methodology)

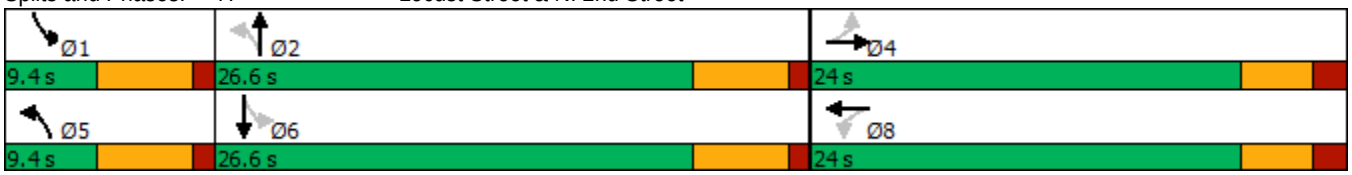
“EXISTING”
CASE SCENARIO

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	1	1	8	251	2	19	7	751	26	18	931	1
Future Volume (vph)	1	1	8	251	2	19	7	751	26	18	931	1
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		0	130		0	140		0	250		0
Storage Lanes	0		0	1		0	1		0	1		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	1.00	0.95	0.95
Frt		0.890			0.863			0.995				
Flt Protected		0.995		0.950			0.950			0.950		
Satd. Flow (prot)	0	1650	0	1770	1608	0	1770	3522	0	1770	3539	0
Flt Permitted		0.986		0.750			0.188			0.266		
Satd. Flow (perm)	0	1635	0	1397	1608	0	350	3522	0	495	3539	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		9			21			6				
Link Speed (mph)		30			30			30			45	
Link Distance (ft)		200			252			310			922	
Travel Time (s)		4.5			5.7			7.0			14.0	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	1	1	9	273	2	21	8	816	28	20	1012	1
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	11	0	273	23	0	8	844	0	20	1013	0
Turn Type	Perm	NA		Perm	NA		pm+pt	NA		pm+pt	NA	
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4			8			2			6		
Detector Phase	4	4		8	8		5	2		1	6	
Switch Phase												
Minimum Initial (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Minimum Split (s)	20.8	20.8		20.8	20.8		9.3	21.3		9.3	21.3	
Total Split (s)	24.0	24.0		24.0	24.0		9.4	26.6		9.4	26.6	
Total Split (%)	40.0%	40.0%		40.0%	40.0%		15.7%	44.3%		15.7%	44.3%	
Yellow Time (s)	3.2	3.2		3.2	3.2		4.3	4.3		4.3	4.3	
All-Red Time (s)	1.6	1.6		1.6	1.6		1.0	1.0		1.0	1.0	
Lost Time Adjust (s)		0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)		4.8		4.8	4.8		5.3	5.3		5.3	5.3	
Lead/Lag							Lead	Lag		Lead	Lag	
Lead-Lag Optimize?							Yes	Yes		Yes	Yes	
Recall Mode	None	None		None	None		None	Min		None	Min	
Act Effct Green (s)		13.9		13.9	13.9		22.5	21.8		22.5	21.8	
Actuated g/C Ratio		0.29		0.29	0.29		0.47	0.46		0.47	0.46	
v/c Ratio		0.02		0.67	0.05		0.03	0.52		0.06	0.62	
Control Delay		8.6		23.9	7.3		7.6	12.0		7.7	13.8	
Queue Delay		0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay		8.6		23.9	7.3		7.6	12.0		7.7	13.8	
LOS		A		C	A		A	B		A	B	
Approach Delay		8.6			22.6			12.0			13.7	
Approach LOS		A			C			B			B	
Queue Length 50th (ft)		0		58	0		1	71		3	92	
Queue Length 95th (ft)		10		153	14		7	188		12	#244	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Internal Link Dist (ft)		120			172			230			842	
Turn Bay Length (ft)				130			140			250		
Base Capacity (vph)		678		574	674		290	1678		345	1683	
Starvation Cap Reductn		0		0	0		0	0		0	0	
Spillback Cap Reductn		0		0	0		0	0		0	0	
Storage Cap Reductn		0		0	0		0	0		0	0	
Reduced v/c Ratio		0.02		0.48	0.03		0.03	0.50		0.06	0.60	

Intersection Summary			
Area Type:	Other		
Cycle Length: 60			
Actuated Cycle Length: 47.5			
Natural Cycle: 60			
Control Type: Actuated-Uncoordinated			
Maximum v/c Ratio: 0.67			
Intersection Signal Delay: 14.2		Intersection LOS: B	
Intersection Capacity Utilization 54.8%		ICU Level of Service A	
Analysis Period (min) 15			
# 95th percentile volume exceeds capacity, queue may be longer.			
Queue shown is maximum after two cycles.			

Splits and Phases: 7: Locust Street & N. 2nd Street

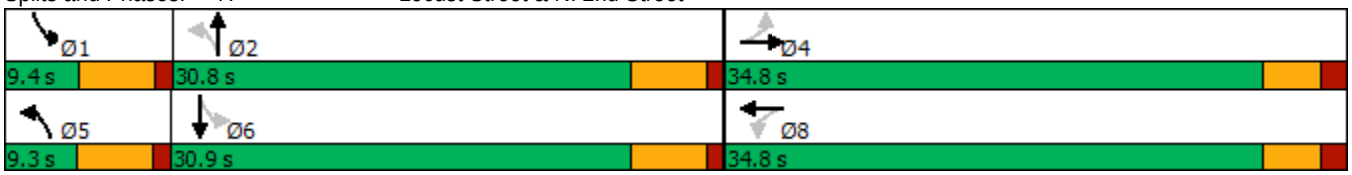


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	4	3	11	214	1	16	18	1002	45	52	947	10
Future Volume (vph)	4	3	11	214	1	16	18	1002	45	52	947	10
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		0	130		0	140		0	250		0
Storage Lanes	0		0	1		0	1		0	1		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	1.00	0.95	0.95
Frt		0.915			0.858			0.994			0.998	
Flt Protected		0.990		0.950			0.950			0.950		
Satd. Flow (prot)	0	1687	0	1770	1598	0	1770	3518	0	1770	3532	0
Flt Permitted		0.963		0.745			0.214			0.150		
Satd. Flow (perm)	0	1641	0	1388	1598	0	399	3518	0	279	3532	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		12			17			6			1	
Link Speed (mph)		30			30			30			45	
Link Distance (ft)		200			252			310			922	
Travel Time (s)		4.5			5.7			7.0			14.0	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	4	3	12	233	1	17	20	1089	49	57	1029	11
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	19	0	233	18	0	20	1138	0	57	1040	0
Turn Type	Perm	NA		Perm	NA		pm+pt	NA		pm+pt	NA	
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4			8			2			6		
Detector Phase	4	4		8	8		5	2		1	6	
Switch Phase												
Minimum Initial (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Minimum Split (s)	34.8	34.8		34.1	34.1		9.3	27.4		9.3	21.3	
Total Split (s)	34.8	34.8		34.8	34.8		9.3	30.8		9.4	30.9	
Total Split (%)	46.4%	46.4%		46.4%	46.4%		12.4%	41.1%		12.5%	41.2%	
Yellow Time (s)	3.2	3.2		3.2	3.2		4.3	4.3		4.3	4.3	
All-Red Time (s)	1.6	1.6		1.6	1.6		1.0	1.0		1.0	1.0	
Lost Time Adjust (s)		0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)		4.8		4.8	4.8		5.3	5.3		5.3	5.3	
Lead/Lag							Lead	Lag		Lead	Lag	
Lead-Lag Optimize?							Yes	Yes		Yes	Yes	
Recall Mode	None	None		None	None		None	Min		None	Min	
Act Effct Green (s)		15.0		15.0	15.0		30.2	28.0		32.3	31.6	
Actuated g/C Ratio		0.26		0.26	0.26		0.52	0.48		0.55	0.54	
v/c Ratio		0.04		0.65	0.04		0.07	0.67		0.22	0.54	
Control Delay		11.1		28.8	8.6		7.8	17.1		9.2	12.0	
Queue Delay		0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay		11.1		28.8	8.6		7.8	17.1		9.2	12.0	
LOS		B		C	A		A	B		A	B	
Approach Delay		11.1			27.3			16.9			11.8	
Approach LOS		B			C			B			B	
Queue Length 50th (ft)		2		76	0		3	174		8	102	
Queue Length 95th (ft)		15		139	13		13	#337		27	266	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Internal Link Dist (ft)		120			172			230			842	
Turn Bay Length (ft)				130			140			250		
Base Capacity (vph)		860		723	840		301	1687		260	1909	
Starvation Cap Reductn		0		0	0		0	0		0	0	
Spillback Cap Reductn		0		0	0		0	0		0	0	
Storage Cap Reductn		0		0	0		0	0		0	0	
Reduced v/c Ratio		0.02		0.32	0.02		0.07	0.67		0.22	0.54	

Intersection Summary			
Area Type:	Other		
Cycle Length: 75			
Actuated Cycle Length: 58.4			
Natural Cycle: 75			
Control Type: Actuated-Uncoordinated			
Maximum v/c Ratio: 0.67			
Intersection Signal Delay: 15.7		Intersection LOS: B	
Intersection Capacity Utilization 63.8%		ICU Level of Service B	
Analysis Period (min) 15			
# 95th percentile volume exceeds capacity, queue may be longer.			
Queue shown is maximum after two cycles.			

Splits and Phases: 7: Locust Street & N. 2nd Street



Intersection	
Int Delay, s/veh	0.5

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	21	5	748	22	3	947
Future Vol, veh/h	21	5	748	22	3	947
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	25	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	23	5	813	24	3	1029

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	1346	419	0	0	837	0
Stage 1	825	-	-	-	-	-
Stage 2	521	-	-	-	-	-
Critical Hdwy	6.84	6.94	-	-	4.14	-
Critical Hdwy Stg 1	5.84	-	-	-	-	-
Critical Hdwy Stg 2	5.84	-	-	-	-	-
Follow-up Hdwy	3.52	3.32	-	-	2.22	-
Pot Cap-1 Maneuver	143	583	-	-	793	-
Stage 1	391	-	-	-	-	-
Stage 2	561	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	142	583	-	-	793	-
Mov Cap-2 Maneuver	142	-	-	-	-	-
Stage 1	387	-	-	-	-	-
Stage 2	561	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	30.5	0	0
HCM LOS	D		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	WBLn2	SBL	SBT
Capacity (veh/h)	-	-	142	583	793	-
HCM Lane V/C Ratio	-	-	0.161	0.009	0.004	-
HCM Control Delay (s)	-	-	35.1	11.2	9.6	0
HCM Lane LOS	-	-	E	B	A	A
HCM 95th %tile Q(veh)	-	-	0.6	0	0	-

Intersection	
Int Delay, s/veh	0.7

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	14	7	946	76	15	994
Future Vol, veh/h	14	7	946	76	15	994
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	25	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	15	8	1028	83	16	1080

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	1642	556	0	0	1111	0
Stage 1	1070	-	-	-	-	-
Stage 2	572	-	-	-	-	-
Critical Hdwy	6.84	6.94	-	-	4.14	-
Critical Hdwy Stg 1	5.84	-	-	-	-	-
Critical Hdwy Stg 2	5.84	-	-	-	-	-
Follow-up Hdwy	3.52	3.32	-	-	2.22	-
Pot Cap-1 Maneuver	91	475	-	-	624	-
Stage 1	291	-	-	-	-	-
Stage 2	528	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	85	475	-	-	624	-
Mov Cap-2 Maneuver	85	-	-	-	-	-
Stage 1	272	-	-	-	-	-
Stage 2	528	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	41.8	0	0.5
HCM LOS	E		

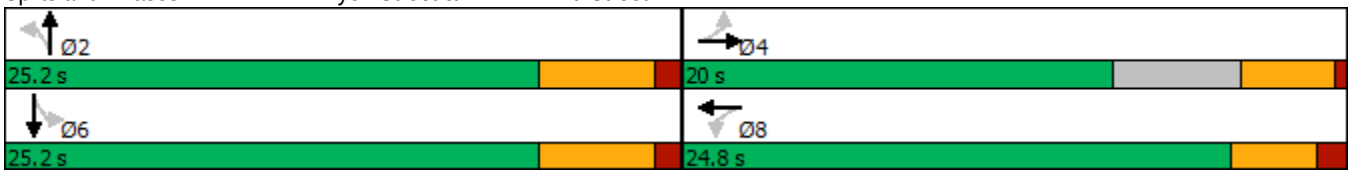
Minor Lane/Major Mvmt	NBT	NBR	WBLn1	WBLn2	SBL	SBT
Capacity (veh/h)	-	-	85	475	624	-
HCM Lane V/C Ratio	-	-	0.179	0.016	0.026	-
HCM Control Delay (s)	-	-	56.4	12.7	10.9	0.3
HCM Lane LOS	-	-	F	B	B	A
HCM 95th %tile Q(veh)	-	-	0.6	0	0.1	-

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	1	1	1	116	1	17	1	662	38	7	786	1
Future Volume (vph)	1	1	1	116	1	17	1	662	38	7	786	1
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	0.95	0.95	0.95	0.95
Frt		0.955			0.983			0.992				
Flt Protected		0.984			0.958							
Satd. Flow (prot)	0	1750	0	0	1754	0	0	3511	0	0	3539	0
Flt Permitted		0.907			0.752			0.954			0.948	
Satd. Flow (perm)	0	1613	0	0	1377	0	0	3349	0	0	3355	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		1			17			14				
Link Speed (mph)		30			30			30			45	
Link Distance (ft)		126			252			660			472	
Travel Time (s)		2.9			5.7			15.0			7.2	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	1	1	1	126	1	18	1	720	41	8	854	1
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	3	0	0	145	0	0	762	0	0	863	0
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Detector Phase	4	4		8	8		2	2		6	6	
Switch Phase												
Minimum Initial (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Minimum Split (s)	20.0	20.0		24.8	24.8		21.3	21.3		21.3	21.3	
Total Split (s)	20.0	20.0		24.8	24.8		25.2	25.2		25.2	25.2	
Total Split (%)	40.0%	40.0%		49.6%	49.6%		50.4%	50.4%		50.4%	50.4%	
Yellow Time (s)	3.5	3.5		3.2	3.2		4.3	4.3		4.3	4.3	
All-Red Time (s)	0.5	0.5		1.2	1.2		1.0	1.0		1.0	1.0	
Lost Time Adjust (s)		0.0			0.0			0.0			0.0	
Total Lost Time (s)		4.0			4.4			5.3			5.3	
Lead/Lag												
Lead-Lag Optimize?												
Recall Mode	None	None		None	None		Min	Min		Min	Min	
Act Effct Green (s)		9.4			9.1			23.8			23.8	
Actuated g/C Ratio		0.24			0.24			0.62			0.62	
v/c Ratio		0.01			0.43			0.37			0.42	
Control Delay		9.7			15.8			6.4			6.9	
Queue Delay		0.0			0.0			0.0			0.0	
Total Delay		9.7			15.8			6.4			6.9	
LOS		A			B			A			A	
Approach Delay		9.7			15.8			6.4			6.9	
Approach LOS		A			B			A			A	
Queue Length 50th (ft)		0			24			45			55	
Queue Length 95th (ft)		4			57			92			109	
Internal Link Dist (ft)		46			172			580			392	
Turn Bay Length (ft)												
Base Capacity (vph)		894			756			2086			2084	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
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		0.00			0.19			0.37			0.41	

Intersection Summary			
Area Type:	Other		
Cycle Length: 50			
Actuated Cycle Length: 38.6			
Natural Cycle: 50			
Control Type: Actuated-Uncoordinated			
Maximum v/c Ratio: 0.43			
Intersection Signal Delay: 7.4		Intersection LOS: A	
Intersection Capacity Utilization 48.9%		ICU Level of Service A	
Analysis Period (min) 15			

Splits and Phases: 1: Lyon Street & N. 2nd Street

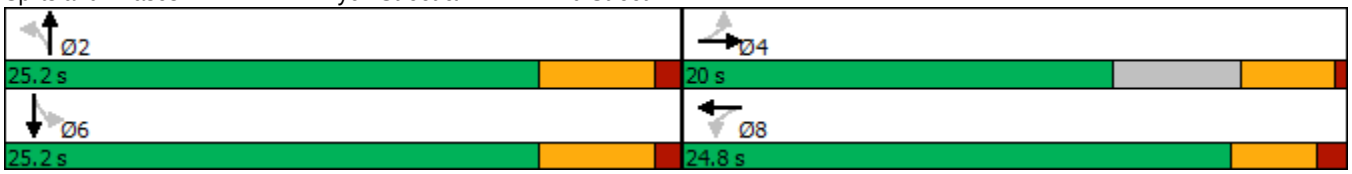


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	2	4	2	95	4	21	2	869	96	21	821	1
Future Volume (vph)	2	4	2	95	4	21	2	869	96	21	821	1
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	0.95	0.95	0.95	0.95
Frt		0.966			0.976			0.985				
Flt Protected		0.988			0.962						0.999	
Satd. Flow (prot)	0	1778	0	0	1749	0	0	3486	0	0	3536	0
Flt Permitted		0.923			0.765			0.954			0.917	
Satd. Flow (perm)	0	1661	0	0	1391	0	0	3326	0	0	3245	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		2			23			28				
Link Speed (mph)		30			30			30			45	
Link Distance (ft)		140			252			660			472	
Travel Time (s)		3.2			5.7			15.0			7.2	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	2	4	2	103	4	23	2	945	104	23	892	1
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	8	0	0	130	0	0	1051	0	0	916	0
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Detector Phase	4	4		8	8		2	2		6	6	
Switch Phase												
Minimum Initial (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Minimum Split (s)	20.0	20.0		24.8	24.8		21.3	21.3		21.3	21.3	
Total Split (s)	20.0	20.0		24.8	24.8		25.2	25.2		25.2	25.2	
Total Split (%)	40.0%	40.0%		49.6%	49.6%		50.4%	50.4%		50.4%	50.4%	
Yellow Time (s)	3.5	3.5		3.2	3.2		4.3	4.3		4.3	4.3	
All-Red Time (s)	0.5	0.5		1.2	1.2		1.0	1.0		1.0	1.0	
Lost Time Adjust (s)		0.0			0.0			0.0			0.0	
Total Lost Time (s)		4.0			4.4			5.3			5.3	
Lead/Lag												
Lead-Lag Optimize?												
Recall Mode	None	None		None	None		Min	Min		Min	Min	
Act Effct Green (s)		8.9			8.6			26.9			26.9	
Actuated g/C Ratio		0.21			0.21			0.65			0.65	
v/c Ratio		0.02			0.42			0.48			0.43	
Control Delay		10.4			16.4			6.7			6.5	
Queue Delay		0.0			0.0			0.0			0.0	
Total Delay		10.4			16.4			6.7			6.5	
LOS		B			B			A			A	
Approach Delay		10.4			16.4			6.7			6.5	
Approach LOS		B			B			A			A	
Queue Length 50th (ft)		1			25			67			57	
Queue Length 95th (ft)		7			51			131			113	
Internal Link Dist (ft)		60			172			580			392	
Turn Bay Length (ft)												
Base Capacity (vph)		858			715			2174			2111	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
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		0.01			0.18			0.48			0.43	

Intersection Summary			
Area Type:	Other		
Cycle Length: 50			
Actuated Cycle Length: 41.4			
Natural Cycle: 55			
Control Type: Actuated-Uncoordinated			
Maximum v/c Ratio: 0.48			
Intersection Signal Delay: 7.2		Intersection LOS: A	
Intersection Capacity Utilization 59.3%		ICU Level of Service B	
Analysis Period (min) 15			

Splits and Phases: 1: Lyon Street & N. 2nd Street



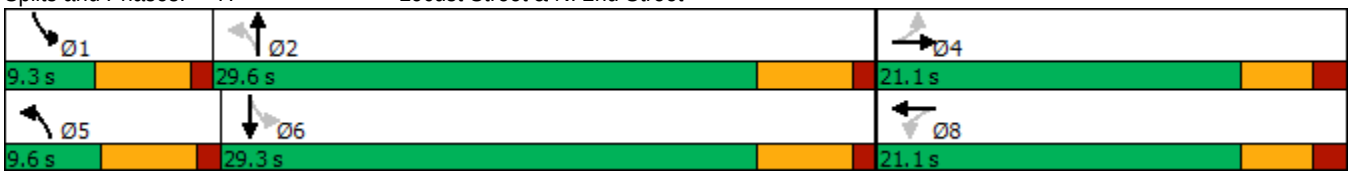
“Existing + Proposed Redevelopment (Building I-VII & Hotel)”
Traffic Conditions

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	114	15	60	251	24	19	135	751	26	18	931	137
Future Volume (vph)	114	15	60	251	24	19	135	751	26	18	931	137
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	125		0	130		0	140		0	250		0
Storage Lanes	1		0	1		0	1		0	1		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	1.00	0.95	0.95
Frt		0.880			0.933			0.995			0.981	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1770	1639	0	1770	1738	0	1770	3522	0	1770	3472	0
Flt Permitted	0.726			0.704			0.135			0.306		
Satd. Flow (perm)	1352	1639	0	1311	1738	0	251	3522	0	570	3472	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		65			21			7			32	
Link Speed (mph)		30			30			30			45	
Link Distance (ft)		200			252			310			922	
Travel Time (s)		4.5			5.7			7.0			14.0	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	124	16	65	273	26	21	147	816	28	20	1012	149
Shared Lane Traffic (%)												
Lane Group Flow (vph)	124	81	0	273	47	0	147	844	0	20	1161	0
Turn Type	Perm	NA		Perm	NA		pm+pt	NA		pm+pt	NA	
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4			8			2			6		
Detector Phase	4	4		8	8		5	2		1	6	
Switch Phase												
Minimum Initial (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Minimum Split (s)	20.8	20.8		20.8	20.8		9.3	21.3		9.3	21.3	
Total Split (s)	21.1	21.1		21.1	21.1		9.6	29.6		9.3	29.3	
Total Split (%)	35.2%	35.2%		35.2%	35.2%		16.0%	49.3%		15.5%	48.8%	
Yellow Time (s)	3.2	3.2		3.2	3.2		4.3	4.3		4.3	4.3	
All-Red Time (s)	1.6	1.6		1.6	1.6		1.0	1.0		1.0	1.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	4.8	4.8		4.8	4.8		5.3	5.3		5.3	5.3	
Lead/Lag							Lead	Lag		Lead	Lag	
Lead-Lag Optimize?							Yes	Yes		Yes	Yes	
Recall Mode	None	None		None	None		None	Min		None	Min	
Act Effct Green (s)	14.8	14.8		14.8	14.8		30.5	29.7		27.2	24.2	
Actuated g/C Ratio	0.26	0.26		0.26	0.26		0.54	0.53		0.48	0.43	
v/c Ratio	0.35	0.17		0.80	0.10		0.58	0.46		0.06	0.77	
Control Delay	21.1	7.8		40.1	11.7		19.7	10.2		6.5	19.4	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	21.1	7.8		40.1	11.7		19.7	10.2		6.5	19.4	
LOS	C	A		D	B		B	B		A	B	
Approach Delay		15.8			35.9			11.6			19.1	
Approach LOS		B			D			B			B	
Queue Length 50th (ft)	36	4		90	7		23	82		3	184	
Queue Length 95th (ft)	76	31		#201	28		#81	170		10	#272	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Internal Link Dist (ft)		120			172			230			842	
Turn Bay Length (ft)	125			130			140			250		
Base Capacity (vph)	396	526		384	524		253	1873		361	1518	
Starvation Cap Reductn	0	0		0	0		0	0		0	0	
Spillback Cap Reductn	0	0		0	0		0	0		0	0	
Storage Cap Reductn	0	0		0	0		0	0		0	0	
Reduced v/c Ratio	0.31	0.15		0.71	0.09		0.58	0.45		0.06	0.76	

Intersection Summary			
Area Type:	Other		
Cycle Length: 60			
Actuated Cycle Length: 56.5			
Natural Cycle: 60			
Control Type: Actuated-Uncoordinated			
Maximum v/c Ratio: 0.80			
Intersection Signal Delay: 18.1		Intersection LOS: B	
Intersection Capacity Utilization 71.0%		ICU Level of Service C	
Analysis Period (min) 15			
# 95th percentile volume exceeds capacity, queue may be longer.			
Queue shown is maximum after two cycles.			

Splits and Phases: 7: Locust Street & N. 2nd Street

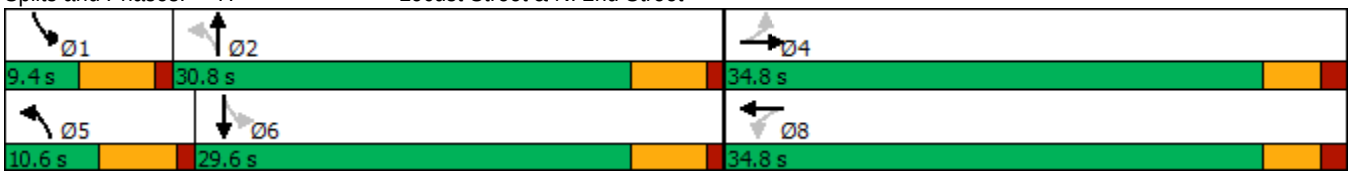


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	151	24	76	214	30	16	180	1002	45	52	947	175
Future Volume (vph)	151	24	76	214	30	16	180	1002	45	52	947	175
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	125		0	130		0	140		0	250		0
Storage Lanes	1		0	1		0	1		0	1		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	1.00	0.95	0.95
Frt		0.886			0.949			0.994			0.977	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1770	1650	0	1770	1768	0	1770	3518	0	1770	3458	0
Flt Permitted	0.724			0.687			0.134			0.169		
Satd. Flow (perm)	1349	1650	0	1280	1768	0	250	3518	0	315	3458	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		83			17			6			30	
Link Speed (mph)		30			30			30			45	
Link Distance (ft)		200			252			310			922	
Travel Time (s)		4.5			5.7			7.0			14.0	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	164	26	83	233	33	17	196	1089	49	57	1029	190
Shared Lane Traffic (%)												
Lane Group Flow (vph)	164	109	0	233	50	0	196	1138	0	57	1219	0
Turn Type	Perm	NA		Perm	NA		pm+pt	NA		pm+pt	NA	
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4			8			2			6		
Detector Phase	4	4		8	8		5	2		1	6	
Switch Phase												
Minimum Initial (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Minimum Split (s)	34.8	34.8		34.1	34.1		9.3	27.4		9.3	21.3	
Total Split (s)	34.8	34.8		34.8	34.8		10.6	30.8		9.4	29.6	
Total Split (%)	46.4%	46.4%		46.4%	46.4%		14.1%	41.1%		12.5%	39.5%	
Yellow Time (s)	3.2	3.2		3.2	3.2		4.3	4.3		4.3	4.3	
All-Red Time (s)	1.6	1.6		1.6	1.6		1.0	1.0		1.0	1.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	4.8	4.8		4.8	4.8		5.3	5.3		5.3	5.3	
Lead/Lag							Lead	Lag		Lead	Lag	
Lead-Lag Optimize?								Yes		Yes		
Recall Mode	None	None		None	None		None	Min		None	Min	
Act Effct Green (s)	16.3	16.3		16.3	16.3		32.9	29.8		28.6	24.5	
Actuated g/C Ratio	0.26	0.26		0.26	0.26		0.53	0.48		0.46	0.40	
v/c Ratio	0.46	0.22		0.69	0.10		0.74	0.67		0.23	0.88	
Control Delay	22.8	7.5		31.2	12.2		31.7	17.9		10.5	27.7	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	22.8	7.5		31.2	12.2		31.7	17.9		10.5	27.7	
LOS	C	A		C	B		C	B		B	C	
Approach Delay		16.7			27.8			20.0			26.9	
Approach LOS		B			C			B			C	
Queue Length 50th (ft)	51	7		77	9		31	180		8	205	
Queue Length 95th (ft)	97	37		142	30		#156	#363		29	#418	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Internal Link Dist (ft)		120			172			230			842	
Turn Bay Length (ft)	125			130			140			250		
Base Capacity (vph)	661	851		627	875		264	1704		243	1391	
Starvation Cap Reductn	0	0		0	0		0	0		0	0	
Spillback Cap Reductn	0	0		0	0		0	0		0	0	
Storage Cap Reductn	0	0		0	0		0	0		0	0	
Reduced v/c Ratio	0.25	0.13		0.37	0.06		0.74	0.67		0.23	0.88	

Intersection Summary			
Area Type:	Other		
Cycle Length: 75			
Actuated Cycle Length: 61.7			
Natural Cycle: 90			
Control Type: Actuated-Uncoordinated			
Maximum v/c Ratio: 0.88			
Intersection Signal Delay: 23.2		Intersection LOS: C	
Intersection Capacity Utilization 73.1%		ICU Level of Service D	
Analysis Period (min) 15			
# 95th percentile volume exceeds capacity, queue may be longer.			
Queue shown is maximum after two cycles.			

Splits and Phases: 7: Locust Street & N. 2nd Street



Intersection	
Int Delay, s/veh	0.6

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	21	5	860	25	3	1079
Future Vol, veh/h	21	5	860	25	3	1079
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	25	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	23	5	935	27	3	1173

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	1542	481	0	0	962	0
Stage 1	949	-	-	-	-	-
Stage 2	593	-	-	-	-	-
Critical Hdwy	6.84	6.94	-	-	4.14	-
Critical Hdwy Stg 1	5.84	-	-	-	-	-
Critical Hdwy Stg 2	5.84	-	-	-	-	-
Follow-up Hdwy	3.52	3.32	-	-	2.22	-
Pot Cap-1 Maneuver	106	531	-	-	711	-
Stage 1	337	-	-	-	-	-
Stage 2	515	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	105	531	-	-	711	-
Mov Cap-2 Maneuver	105	-	-	-	-	-
Stage 1	333	-	-	-	-	-
Stage 2	515	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	41.5	0	0.1
HCM LOS	E		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	WBLn2	SBL	SBT
Capacity (veh/h)	-	-	105	531	711	-
HCM Lane V/C Ratio	-	-	0.217	0.01	0.005	-
HCM Control Delay (s)	-	-	48.6	11.9	10.1	0.1
HCM Lane LOS	-	-	E	B	B	A
HCM 95th %tile Q(veh)	-	-	0.8	0	0	-

Intersection	
Int Delay, s/veh	0.9

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	14	7	1089	80	15	1154
Future Vol, veh/h	14	7	1089	80	15	1154
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	25	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	15	8	1184	87	16	1254

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	1887	636	0	0	1271	0
Stage 1	1228	-	-	-	-	-
Stage 2	659	-	-	-	-	-
Critical Hdwy	6.84	6.94	-	-	4.14	-
Critical Hdwy Stg 1	5.84	-	-	-	-	-
Critical Hdwy Stg 2	5.84	-	-	-	-	-
Follow-up Hdwy	3.52	3.32	-	-	2.22	-
Pot Cap-1 Maneuver	62	421	-	-	542	-
Stage 1	240	-	-	-	-	-
Stage 2	476	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	56	421	-	-	542	-
Mov Cap-2 Maneuver	56	-	-	-	-	-
Stage 1	217	-	-	-	-	-
Stage 2	476	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	65.7	0	0.7
HCM LOS	F		

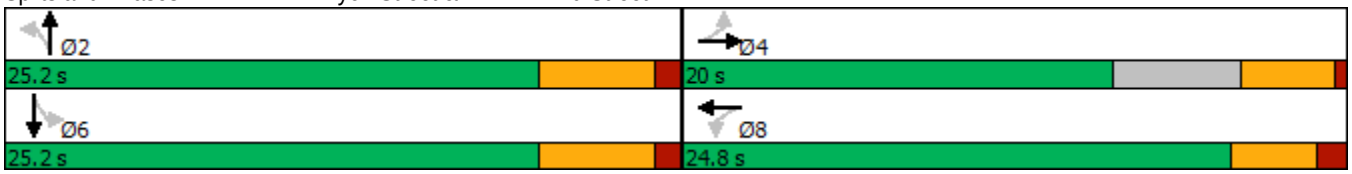
Minor Lane/Major Mvmt	NBT	NBR	WBLn1	WBLn2	SBL	SBT
Capacity (veh/h)	-	-	56	421	542	-
HCM Lane V/C Ratio	-	-	0.272	0.018	0.03	-
HCM Control Delay (s)	-	-	91.7	13.7	11.8	0.6
HCM Lane LOS	-	-	F	B	B	A
HCM 95th %tile Q(veh)	-	-	0.9	0.1	0.1	-

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	1	1	1	135	1	17	1	760	52	7	899	1
Future Volume (vph)	1	1	1	135	1	17	1	760	52	7	899	1
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	0.95	0.95	0.95	0.95
Frt		0.955			0.985			0.990				
Flt Protected		0.984			0.958							
Satd. Flow (prot)	0	1750	0	0	1758	0	0	3504	0	0	3539	0
Flt Permitted		0.910			0.748			0.954			0.947	
Satd. Flow (perm)	0	1619	0	0	1372	0	0	3343	0	0	3352	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		1			15			17				
Link Speed (mph)		30			30			30			45	
Link Distance (ft)		126			252			660			472	
Travel Time (s)		2.9			5.7			15.0			7.2	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	1	1	1	147	1	18	1	826	57	8	977	1
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	3	0	0	166	0	0	884	0	0	986	0
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Detector Phase	4	4		8	8		2	2		6	6	
Switch Phase												
Minimum Initial (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Minimum Split (s)	20.0	20.0		24.8	24.8		21.3	21.3		21.3	21.3	
Total Split (s)	20.0	20.0		24.8	24.8		25.2	25.2		25.2	25.2	
Total Split (%)	40.0%	40.0%		49.6%	49.6%		50.4%	50.4%		50.4%	50.4%	
Yellow Time (s)	3.5	3.5		3.2	3.2		4.3	4.3		4.3	4.3	
All-Red Time (s)	0.5	0.5		1.2	1.2		1.0	1.0		1.0	1.0	
Lost Time Adjust (s)		0.0			0.0			0.0			0.0	
Total Lost Time (s)		4.0			4.4			5.3			5.3	
Lead/Lag												
Lead-Lag Optimize?												
Recall Mode	None	None		None	None		Min	Min		Min	Min	
Act Effct Green (s)		10.0			9.8			24.3			24.3	
Actuated g/C Ratio		0.25			0.25			0.61			0.61	
v/c Ratio		0.01			0.48			0.43			0.48	
Control Delay		9.3			16.8			7.3			7.8	
Queue Delay		0.0			0.0			0.0			0.0	
Total Delay		9.3			16.8			7.3			7.8	
LOS		A			B			A			A	
Approach Delay		9.3			16.8			7.3			7.8	
Approach LOS		A			B			A			A	
Queue Length 50th (ft)		0			30			58			70	
Queue Length 95th (ft)		4			65			117			139	
Internal Link Dist (ft)		46			172			580			392	
Turn Bay Length (ft)												
Base Capacity (vph)		868			729			2050			2048	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
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		0.00			0.23			0.43			0.48	

Intersection Summary			
Area Type:	Other		
Cycle Length: 50			
Actuated Cycle Length: 39.8			
Natural Cycle: 50			
Control Type: Actuated-Uncoordinated			
Maximum v/c Ratio: 0.48			
Intersection Signal Delay: 8.3		Intersection LOS: A	
Intersection Capacity Utilization 53.1%		ICU Level of Service A	
Analysis Period (min) 15			

Splits and Phases: 1: Lyon Street & N. 2nd Street



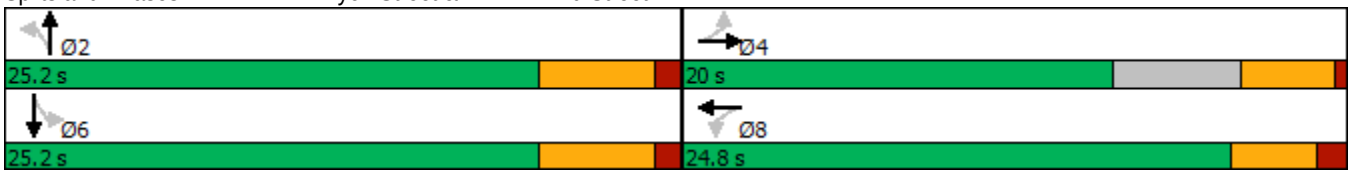
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	2	4	2	121	4	21	2	990	118	21	955	1
Future Volume (vph)	2	4	2	121	4	21	2	990	118	21	955	1
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	0.95	0.95	0.95	0.95
Frt		0.966			0.980			0.984				
Flt Protected		0.988			0.960						0.999	
Satd. Flow (prot)	0	1778	0	0	1752	0	0	3483	0	0	3536	0
Flt Permitted		0.925			0.757			0.954			0.915	
Satd. Flow (perm)	0	1664	0	0	1382	0	0	3322	0	0	3238	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		2			21			30				
Link Speed (mph)		30			30			30			45	
Link Distance (ft)		140			252			660			472	
Travel Time (s)		3.2			5.7			15.0			7.2	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	2	4	2	132	4	23	2	1076	128	23	1038	1
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	8	0	0	159	0	0	1206	0	0	1062	0
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Detector Phase	4	4		8	8		2	2		6	6	
Switch Phase												
Minimum Initial (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Minimum Split (s)	20.0	20.0		24.8	24.8		21.3	21.3		21.3	21.3	
Total Split (s)	20.0	20.0		24.8	24.8		25.2	25.2		25.2	25.2	
Total Split (%)	40.0%	40.0%		49.6%	49.6%		50.4%	50.4%		50.4%	50.4%	
Yellow Time (s)	3.5	3.5		3.2	3.2		4.3	4.3		4.3	4.3	
All-Red Time (s)	0.5	0.5		1.2	1.2		1.0	1.0		1.0	1.0	
Lost Time Adjust (s)		0.0			0.0			0.0			0.0	
Total Lost Time (s)		4.0			4.4			5.3			5.3	
Lead/Lag												
Lead-Lag Optimize?												
Recall Mode	None	None		None	None		Min	Min		Min	Min	
Act Effct Green (s)		9.8			9.5			26.7			26.7	
Actuated g/C Ratio		0.23			0.23			0.63			0.63	
v/c Ratio		0.02			0.49			0.57			0.52	
Control Delay		9.7			17.5			8.6			7.9	
Queue Delay		0.0			0.0			0.0			0.0	
Total Delay		9.7			17.5			8.6			7.9	
LOS		A			B			A			A	
Approach Delay		9.7			17.5			8.6			7.9	
Approach LOS		A			B			A			A	
Queue Length 50th (ft)		1			30			87			75	
Queue Length 95th (ft)		7			61			#179			154	
Internal Link Dist (ft)		60			172			580			392	
Turn Bay Length (ft)												
Base Capacity (vph)		837			691			2112			2048	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
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		0.01			0.23			0.57			0.52	

Intersection Summary			
Area Type:	Other		
Cycle Length: 50			
Actuated Cycle Length: 42.2			
Natural Cycle: 60			
Control Type: Actuated-Uncoordinated			
Maximum v/c Ratio: 0.57			
Intersection Signal Delay: 8.9		Intersection LOS: A	
Intersection Capacity Utilization 64.4%		ICU Level of Service C	
Analysis Period (min) 15			

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

Splits and Phases: 1: Lyon Street & N. 2nd Street



APPENDIX III

Results of Trip Generation Analysis
Using
ITE Trip Generation Manual, 10th Edition

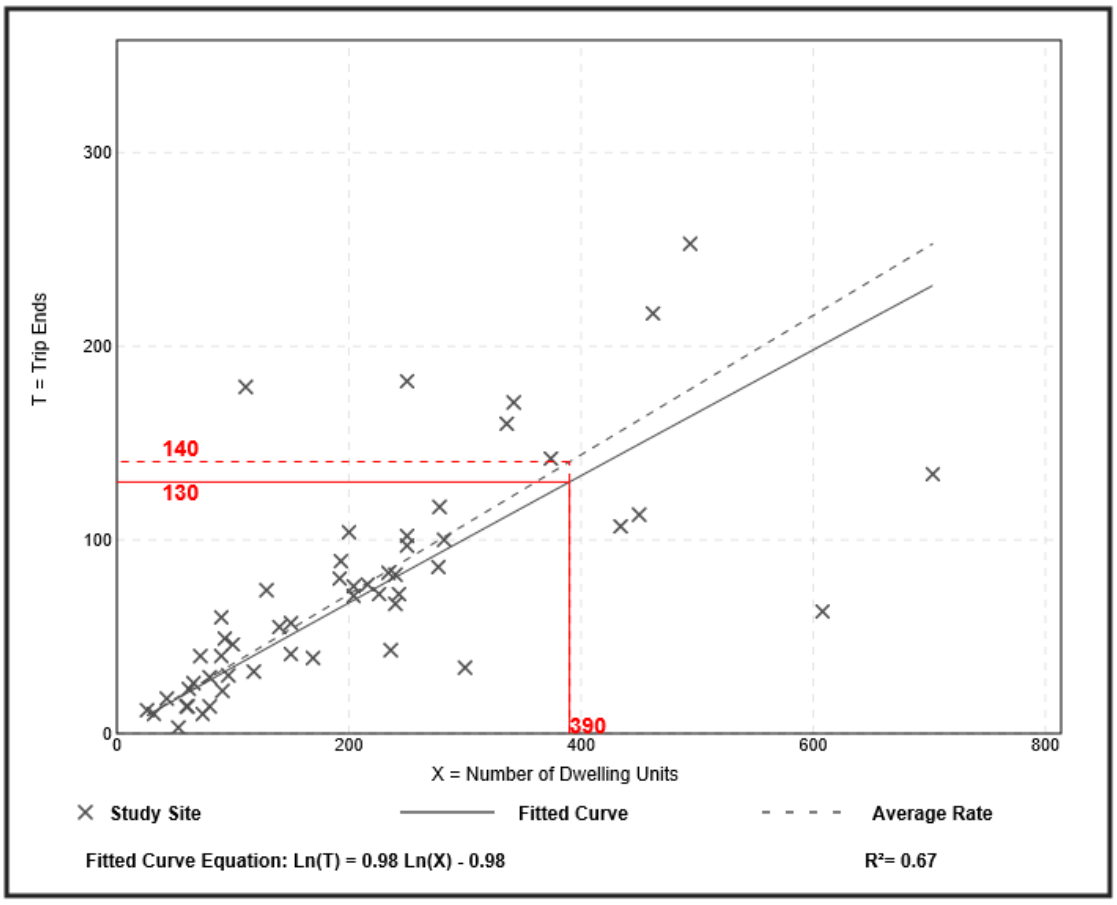
Multifamily Housing (Mid-Rise)
(221)

Vehicle Trip Ends vs: **Dwelling Units**
On a: **Weekday,**
Peak Hour of Adjacent Street Traffic,
One Hour Between 7 and 9 a.m.
Setting/Location: **General Urban/Suburban**
Number of Studies: 53
Avg. Num. of Dwelling Units: 207
Directional Distribution: 26% entering, 74% exiting

Vehicle Trip Generation per Dwelling Unit

Average Rate	Range of Rates	Standard Deviation
0.36	0.06 - 1.61	0.19

Data Plot and Equation



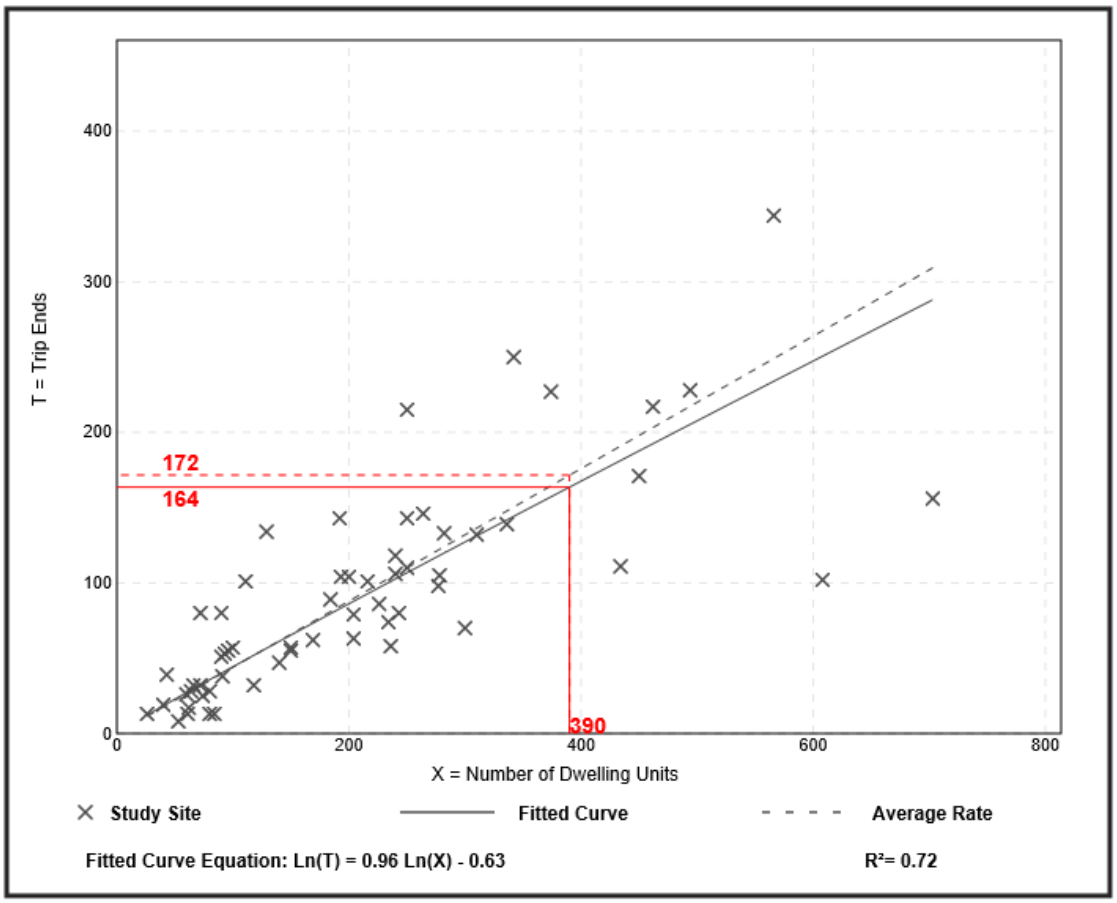
Multifamily Housing (Mid-Rise)
(221)

Vehicle Trip Ends vs: **Dwelling Units**
On a: **Weekday,**
Peak Hour of Adjacent Street Traffic,
One Hour Between 4 and 6 p.m.
Setting/Location: **General Urban/Suburban**
Number of Studies: 60
Avg. Num. of Dwelling Units: 208
Directional Distribution: 61% entering, 39% exiting

Vehicle Trip Generation per Dwelling Unit

Average Rate	Range of Rates	Standard Deviation
0.44	0.15 - 1.11	0.19

Data Plot and Equation



Multifamily Housing (Mid-Rise)
(221)

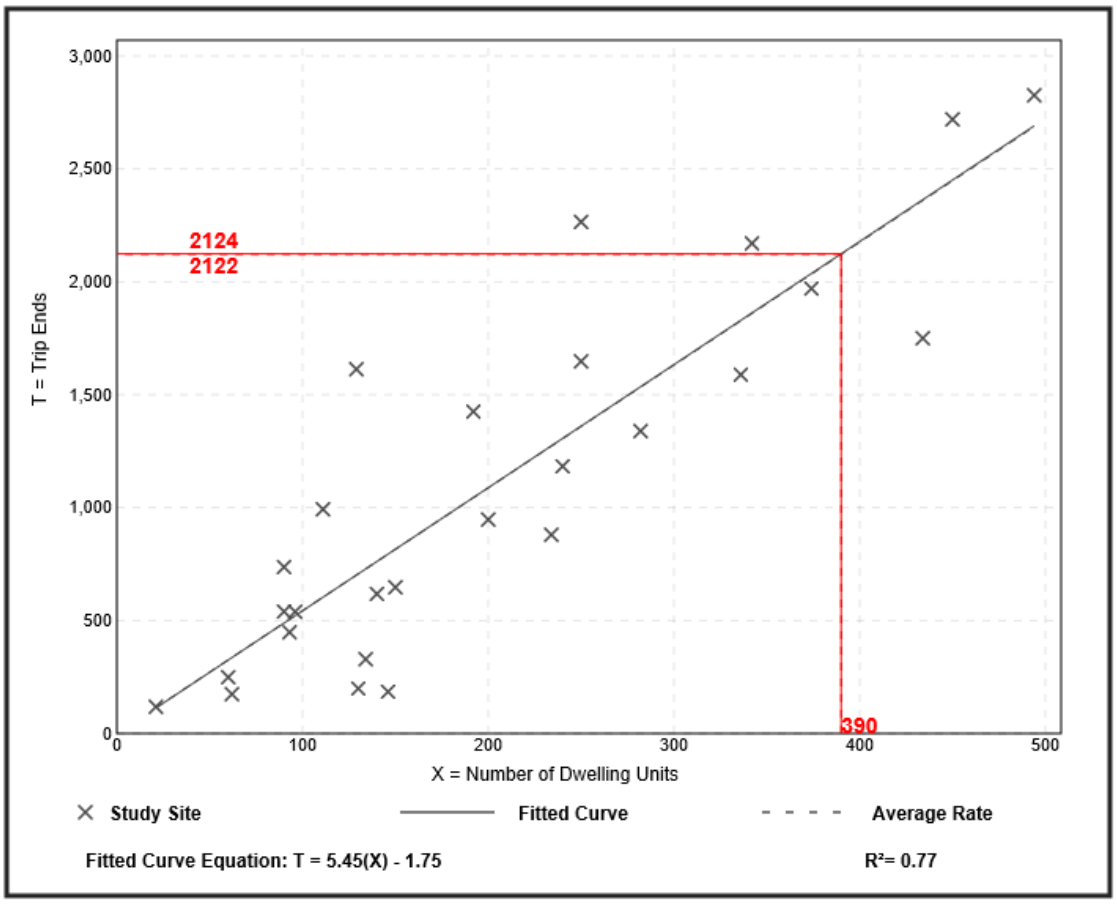
Vehicle Trip Ends vs: **Dwelling Units**
On a: **Weekday**

Setting/Location: **General Urban/Suburban**
Number of Studies: 27
Avg. Num. of Dwelling Units: 205
Directional Distribution: 50% entering, 50% exiting

Vehicle Trip Generation per Dwelling Unit

Average Rate	Range of Rates	Standard Deviation
5.44	1.27 - 12.50	2.03

Data Plot and Equation



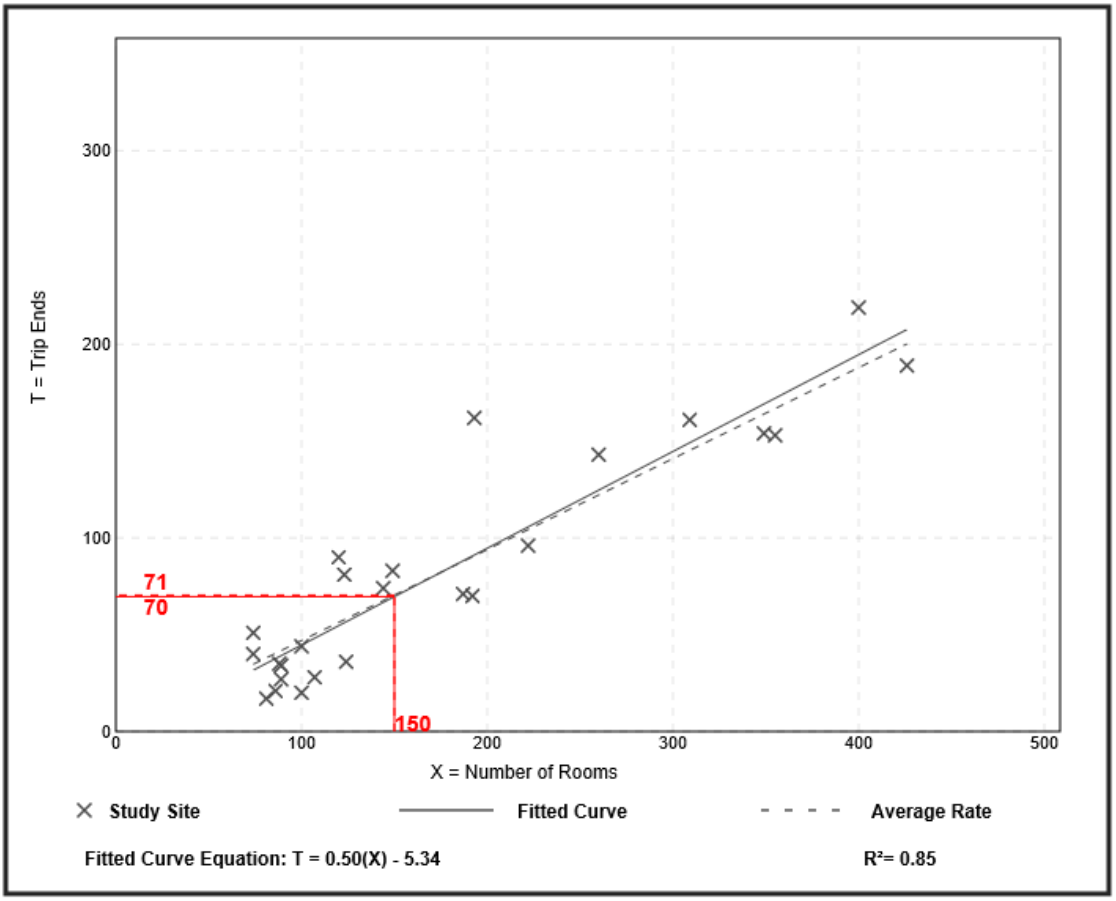
Hotel
(310)

Vehicle Trip Ends vs:	**Rooms**
On a:	**Weekday,**
	Peak Hour of Adjacent Street Traffic,
	One Hour Between 7 and 9 a.m.
Setting/Location:	**General Urban/Suburban**
Number of Studies:	25
Avg. Num. of Rooms:	178
Directional Distribution:	59% entering, 41% exiting

Vehicle Trip Generation per Room

Average Rate	Range of Rates	Standard Deviation
0.47	0.20 - 0.84	0.14

Data Plot and Equation



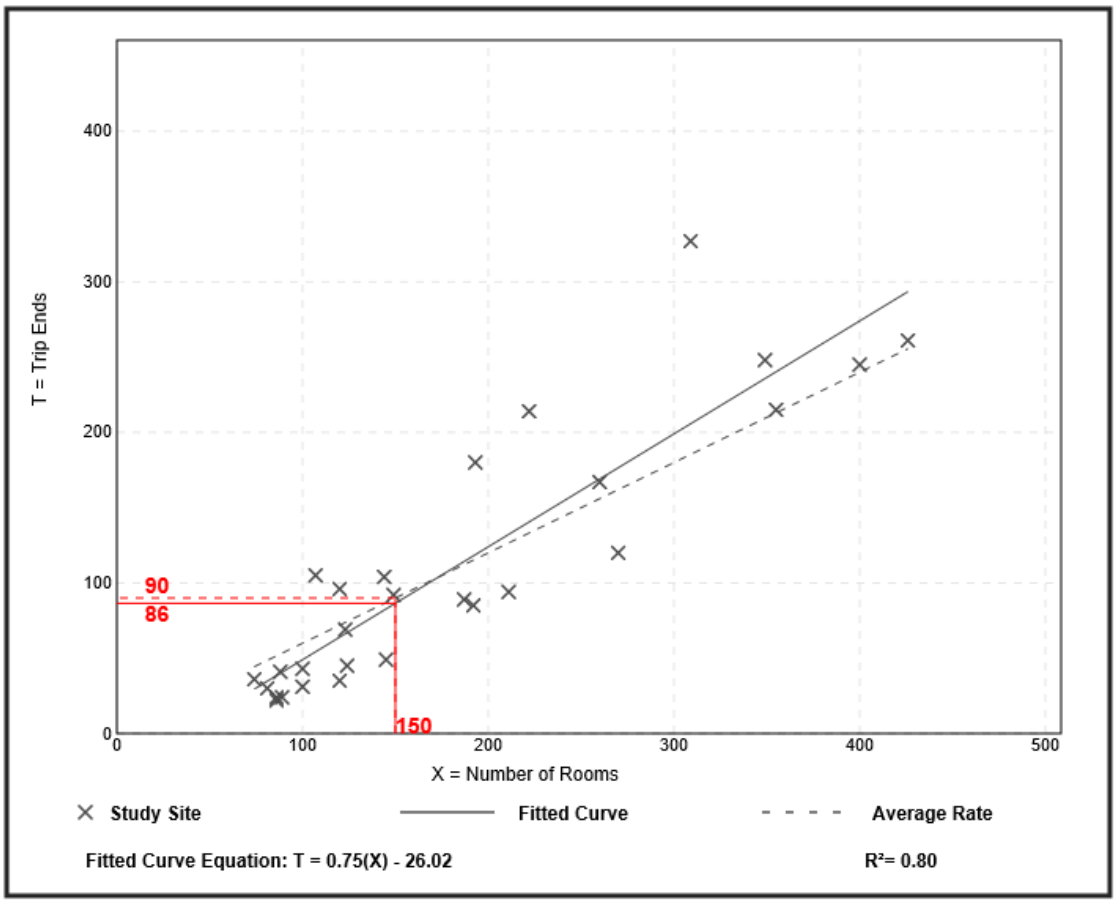
Hotel
(310)

Vehicle Trip Ends vs:	**Rooms**
On a:	**Weekday,**
	Peak Hour of Adjacent Street Traffic,
	One Hour Between 4 and 6 p.m.
Setting/Location:	**General Urban/Suburban**
Number of Studies:	28
Avg. Num. of Rooms:	183
Directional Distribution:	51% entering, 49% exiting

Vehicle Trip Generation per Room

Average Rate	Range of Rates	Standard Deviation
0.60	0.26 - 1.06	0.22

Data Plot and Equation



Hotel
(310)

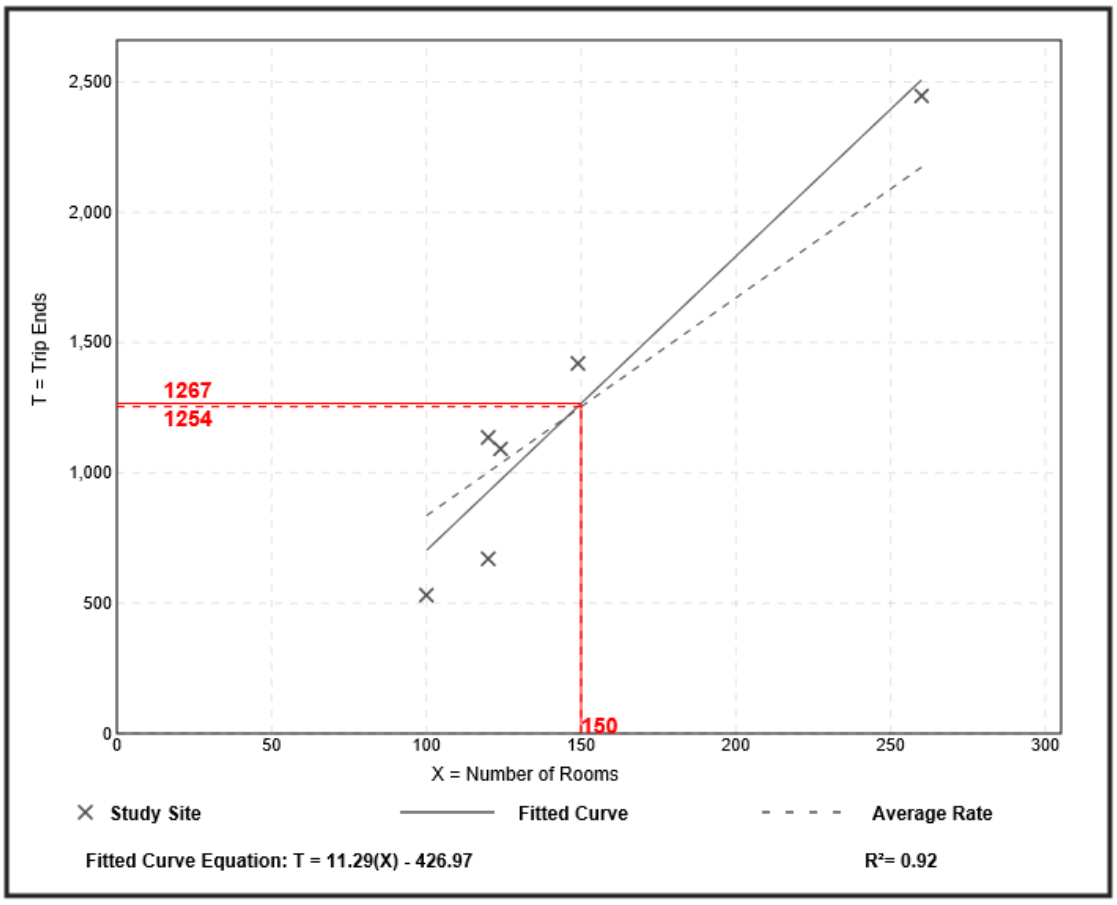
Vehicle Trip Ends vs: **Rooms**
On a: **Weekday**

Setting/Location: **General Urban/Suburban**
Number of Studies: 6
Avg. Num. of Rooms: 146
Directional Distribution: 50% entering, 50% exiting

Vehicle Trip Generation per Room

Average Rate	Range of Rates	Standard Deviation
8.36	5.31 - 9.53	1.86

Data Plot and Equation



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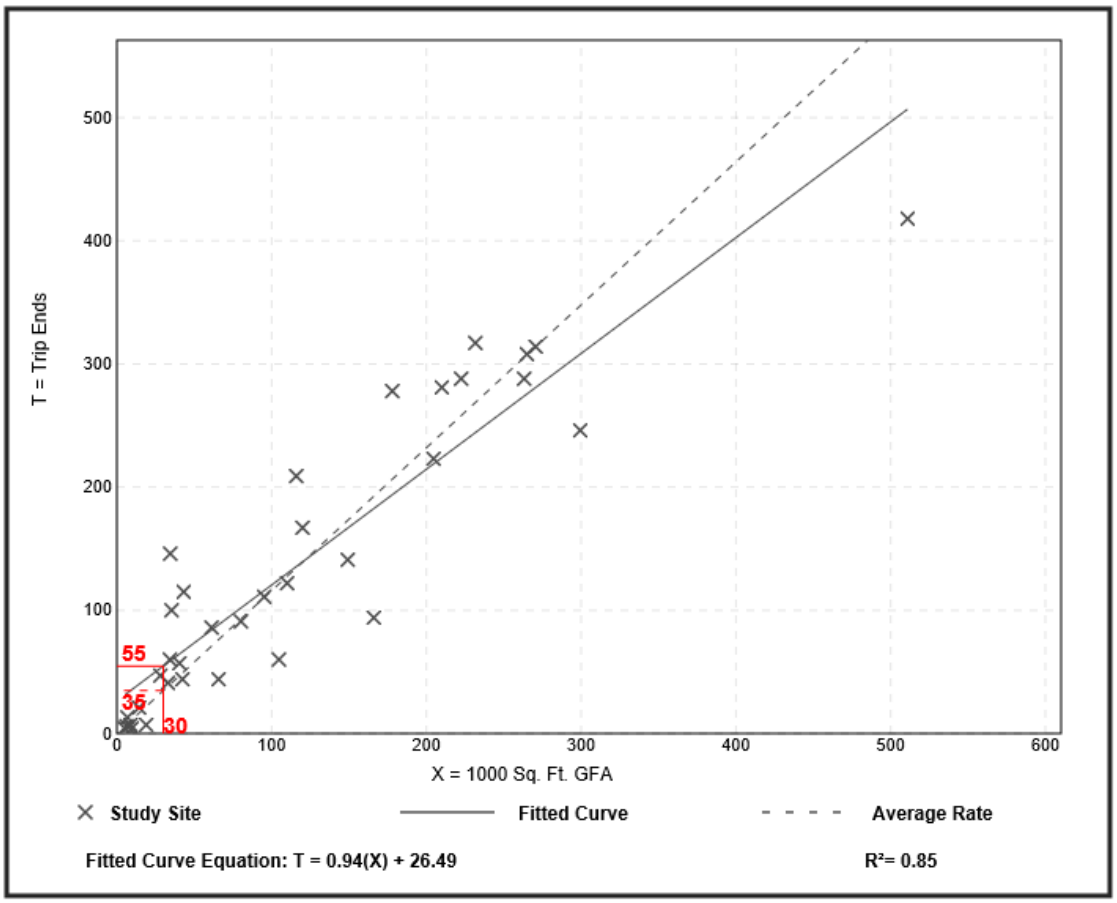
General Office Building
(710)

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

Vehicle Trip Generation per 1000 Sq. Ft. GFA

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

Data Plot and Equation



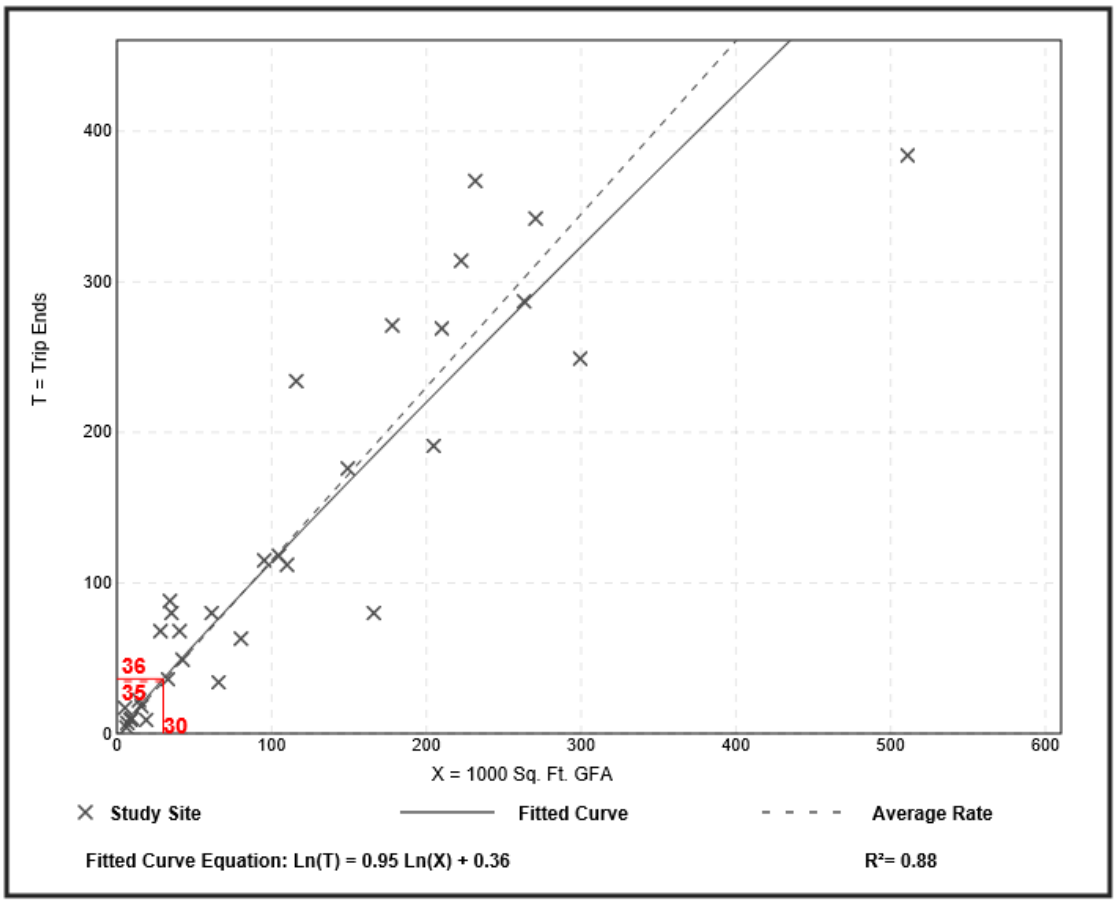
General Office Building
(710)

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

Vehicle Trip Generation per 1000 Sq. Ft. GFA

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

Data Plot and Equation



General Office Building
(710)

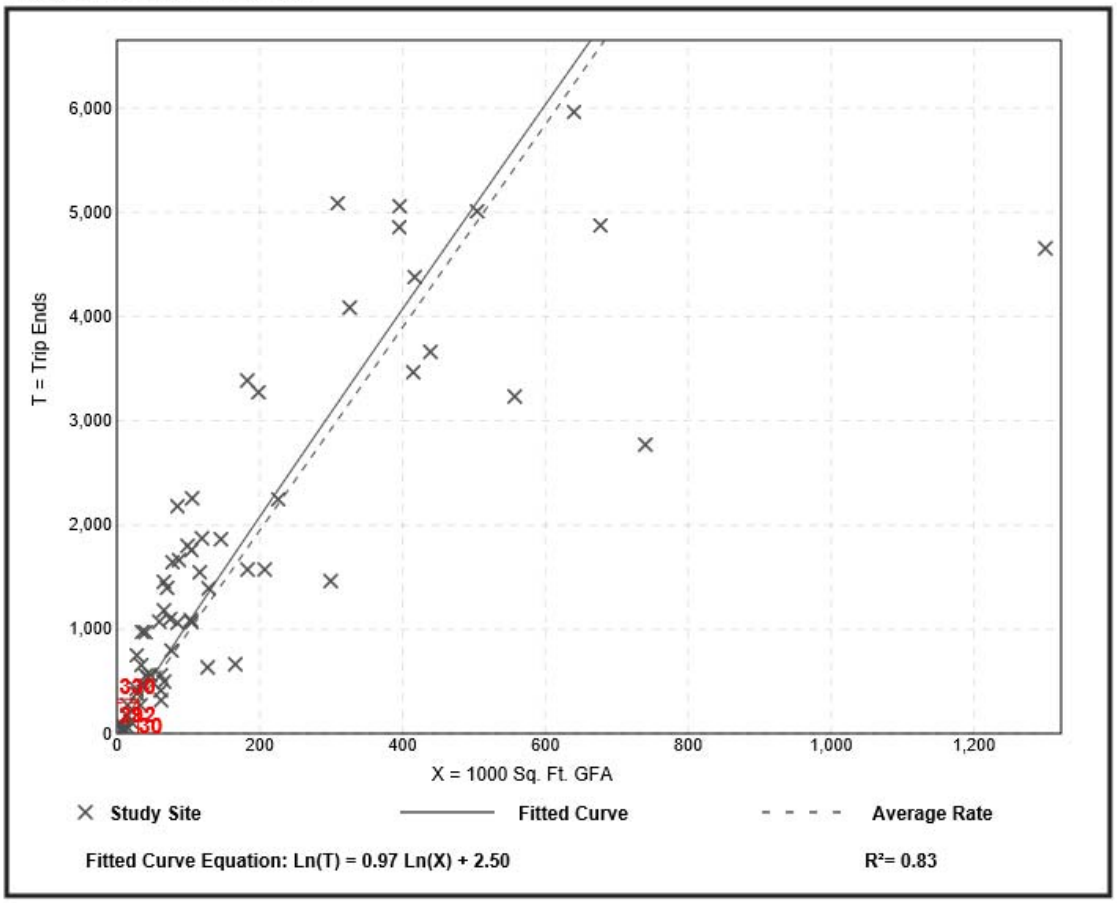
Vehicle Trip Ends vs: **1000 Sq. Ft. GFA**
On a: **Weekday**

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

Vehicle Trip Generation per 1000 Sq. Ft. GFA

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

Data Plot and Equation



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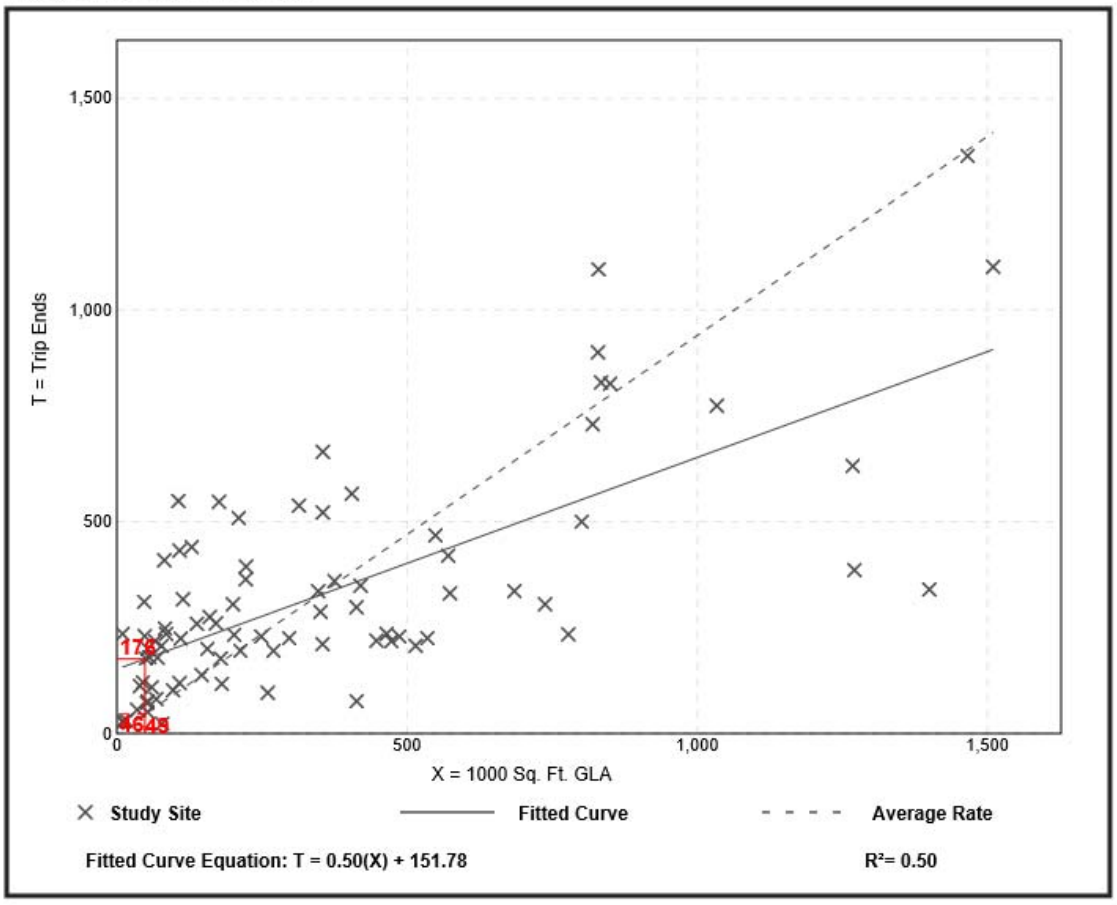
Shopping Center
(820)

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

Vehicle Trip Generation per 1000 Sq. Ft. GLA

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

Data Plot and Equation



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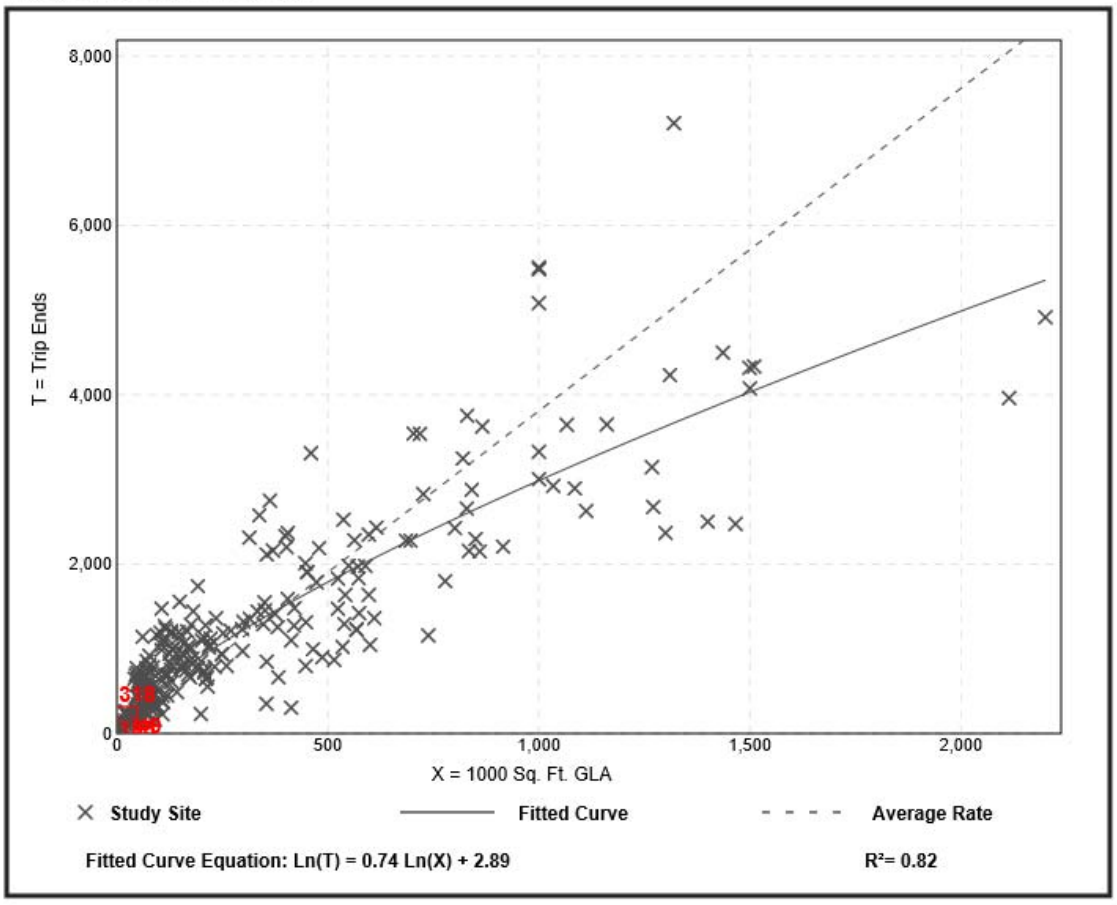
Shopping Center
(820)

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

Vehicle Trip Generation per 1000 Sq. Ft. GLA

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

Data Plot and Equation



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Shopping Center
(820)

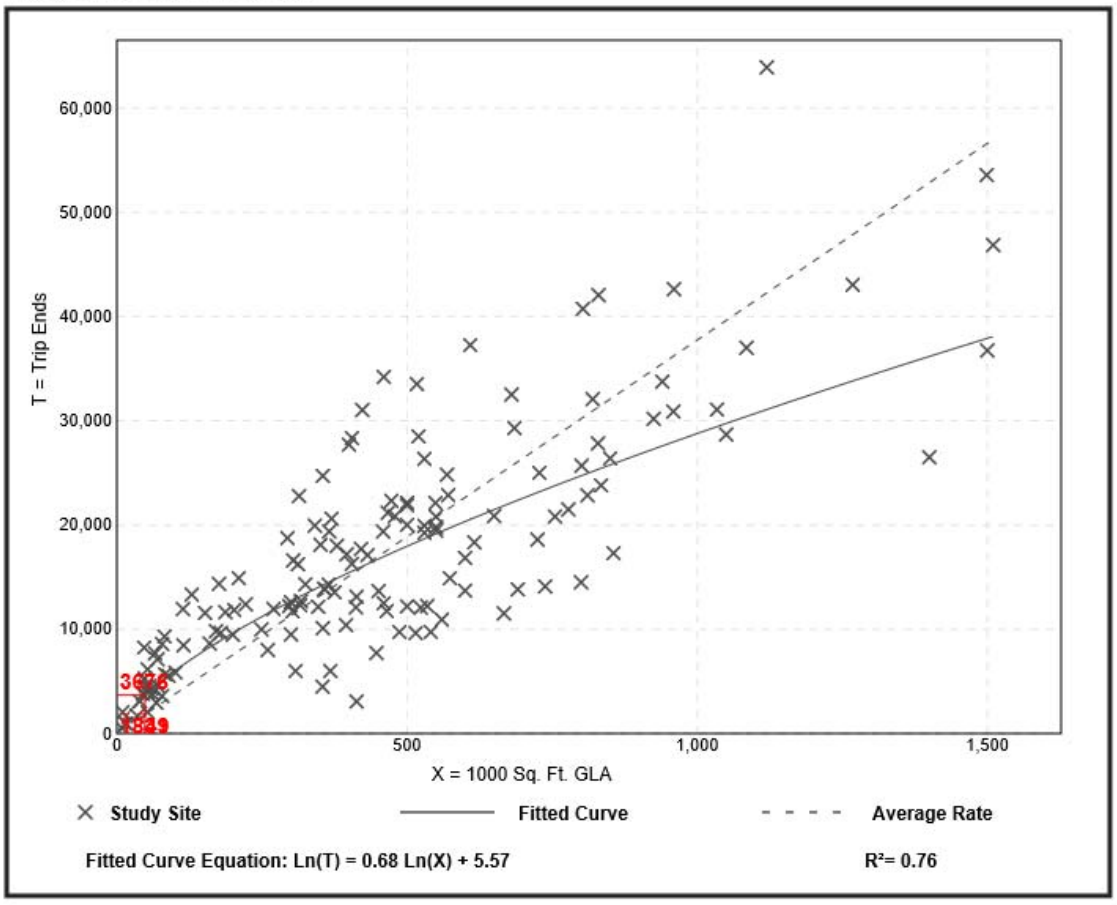
Vehicle Trip Ends vs: **1000 Sq. Ft. GLA**
On a: **Weekday**

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

Vehicle Trip Generation per 1000 Sq. Ft. GLA

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

Data Plot and Equation



Fitted Curve Equation: Ln(T) = 0.68 Ln(X) + 5.57 **R^2= 0.76**

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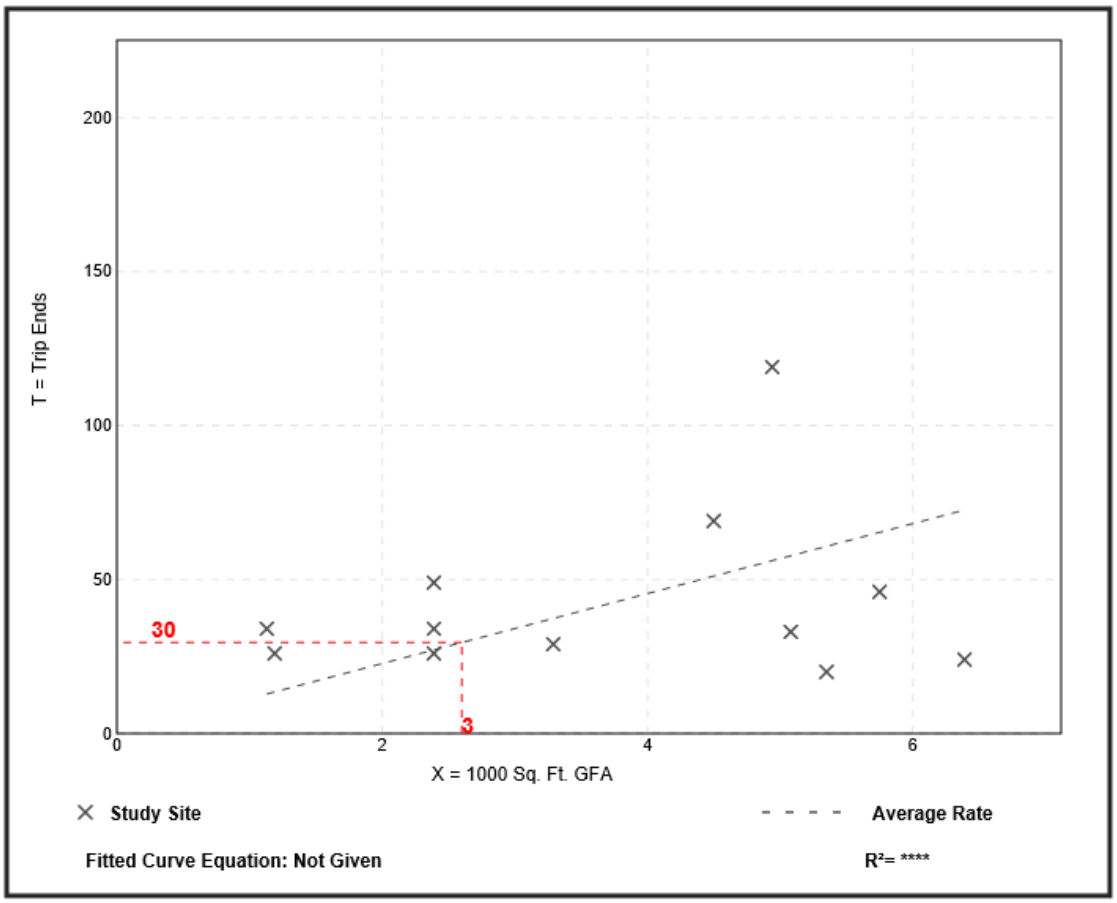
Drinking Place
(925)

Vehicle Trip Ends vs: **1000 Sq. Ft. GFA**
On a: **Weekday,**
Peak Hour of Adjacent Street Traffic,
One Hour Between 4 and 6 p.m.
Setting/Location: **General Urban/Suburban**
Number of Studies: 12
Avg. 1000 Sq. Ft. GFA: 4
Directional Distribution: 66% entering, 34% exiting

Vehicle Trip Generation per 1000 Sq. Ft. GFA

Average Rate	Range of Rates	Standard Deviation
11.36	3.74 - 30.09	7.81

Data Plot and Equation



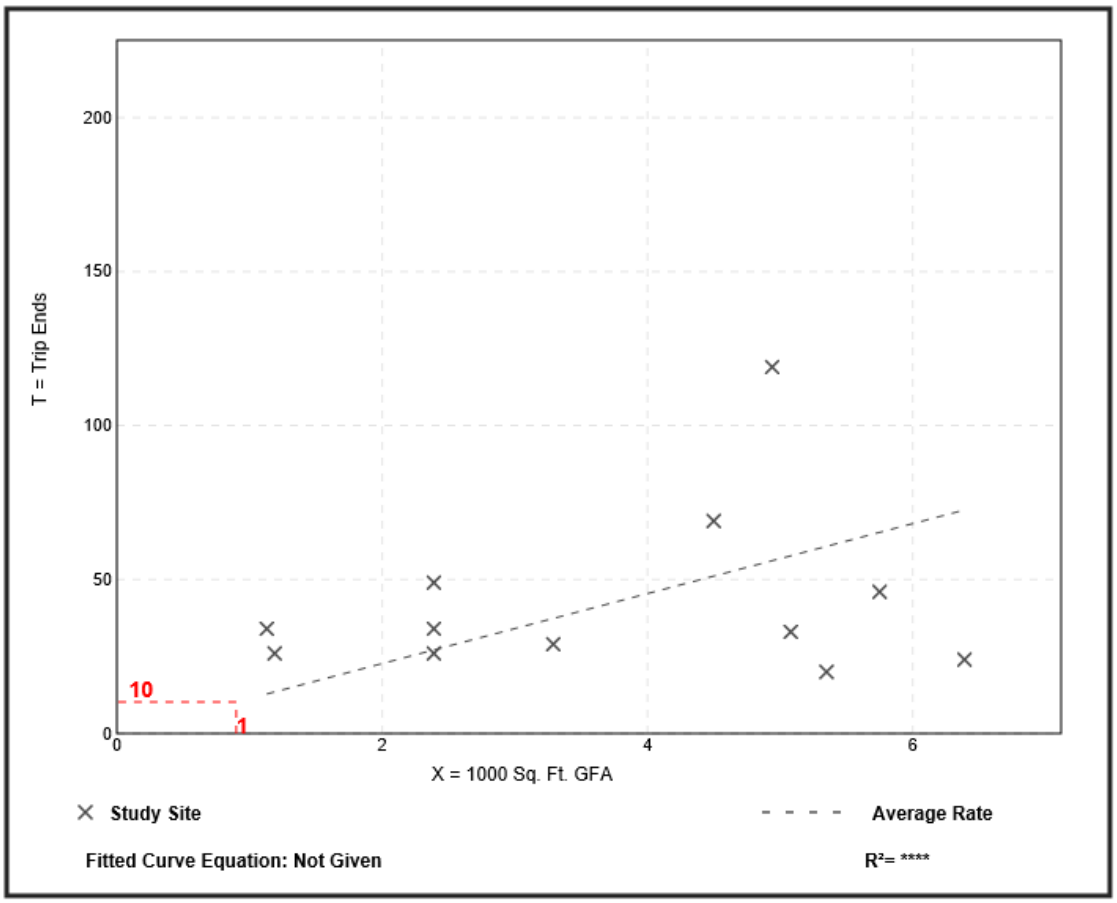
Drinking Place
(925)

Vehicle Trip Ends vs: **1000 Sq. Ft. GFA**
On a: **Weekday,**
Peak Hour of Adjacent Street Traffic,
One Hour Between 4 and 6 p.m.
Setting/Location: **General Urban/Suburban**
Number of Studies: 12
Avg. 1000 Sq. Ft. GFA: 4
Directional Distribution: 66% entering, 34% exiting

Vehicle Trip Generation per 1000 Sq. Ft. GFA

Average Rate	Range of Rates	Standard Deviation
11.36	3.74 - 30.09	7.81

Data Plot and Equation



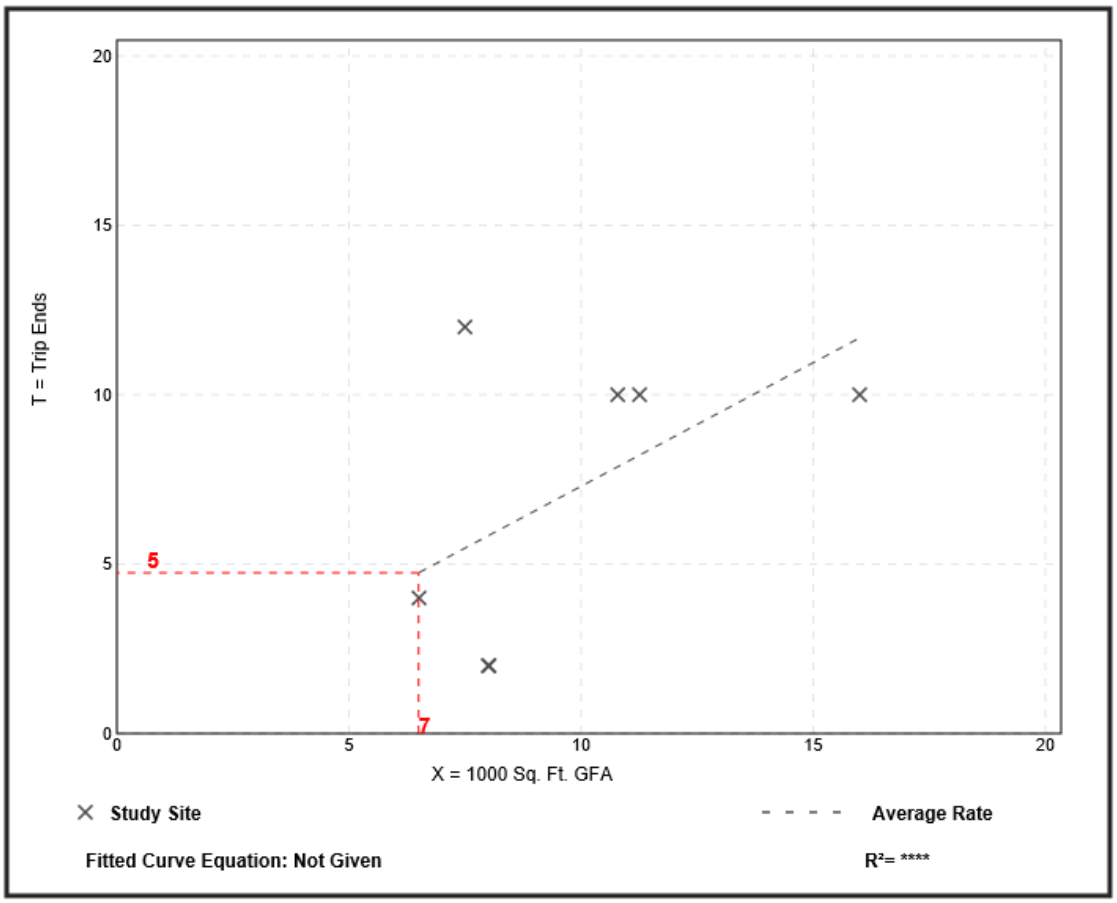
Quality Restaurant
(931)

Vehicle Trip Ends vs: **1000 Sq. Ft. GFA**
On a: **Weekday,**
Peak Hour of Adjacent Street Traffic,
One Hour Between 7 and 9 a.m.
Setting/Location: **General Urban/Suburban**
Number of Studies: 7
Avg. 1000 Sq. Ft. GFA: 10
Directional Distribution: Not Available

Vehicle Trip Generation per 1000 Sq. Ft. GFA

Average Rate	Range of Rates	Standard Deviation
0.73	0.25 - 1.60	0.42

Data Plot and Equation



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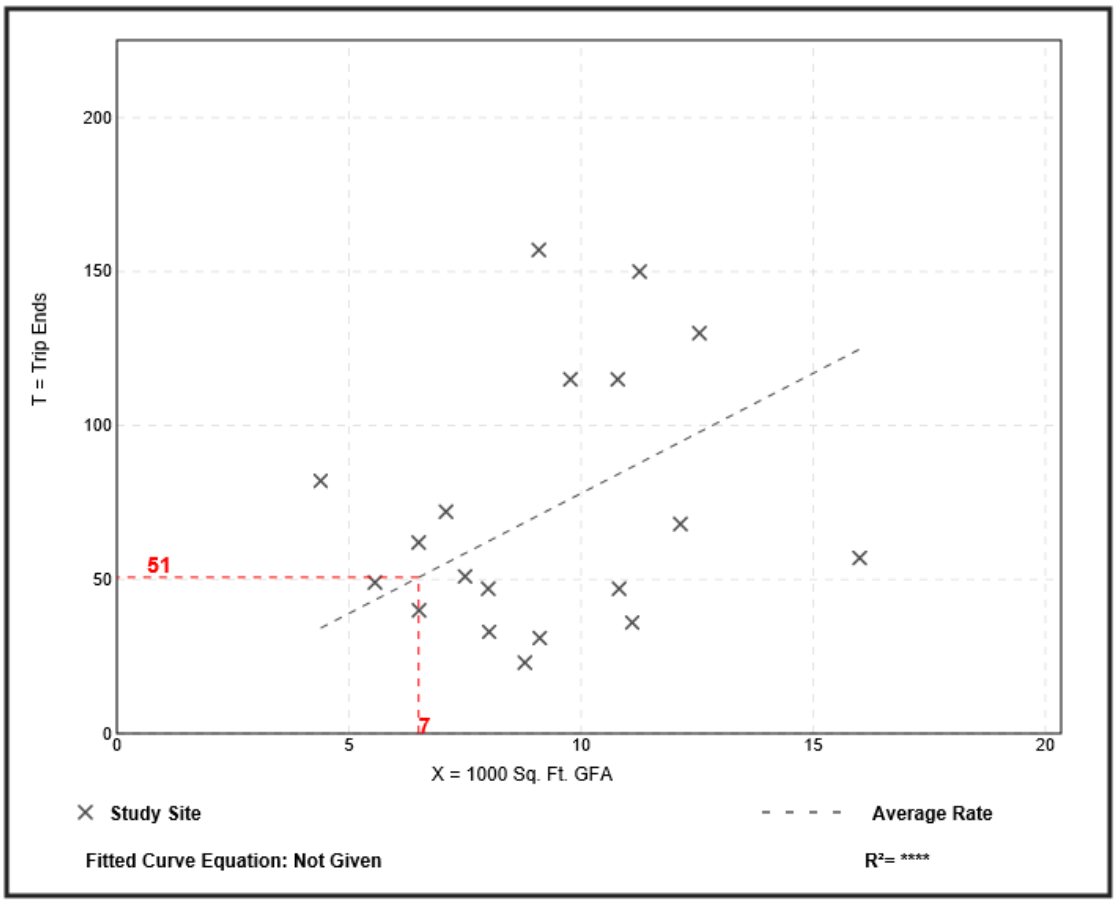
Quality Restaurant
(931)

Vehicle Trip Ends vs: **1000 Sq. Ft. GFA**
On a: **Weekday,**
Peak Hour of Adjacent Street Traffic,
One Hour Between 4 and 6 p.m.
Setting/Location: **General Urban/Suburban**
Number of Studies: 19
Avg. 1000 Sq. Ft. GFA: 9
Directional Distribution: 67% entering, 33% exiting

Vehicle Trip Generation per 1000 Sq. Ft. GFA

Average Rate	Range of Rates	Standard Deviation
7.80	2.62 - 18.68	4.49

Data Plot and Equation



Quality Restaurant
(931)

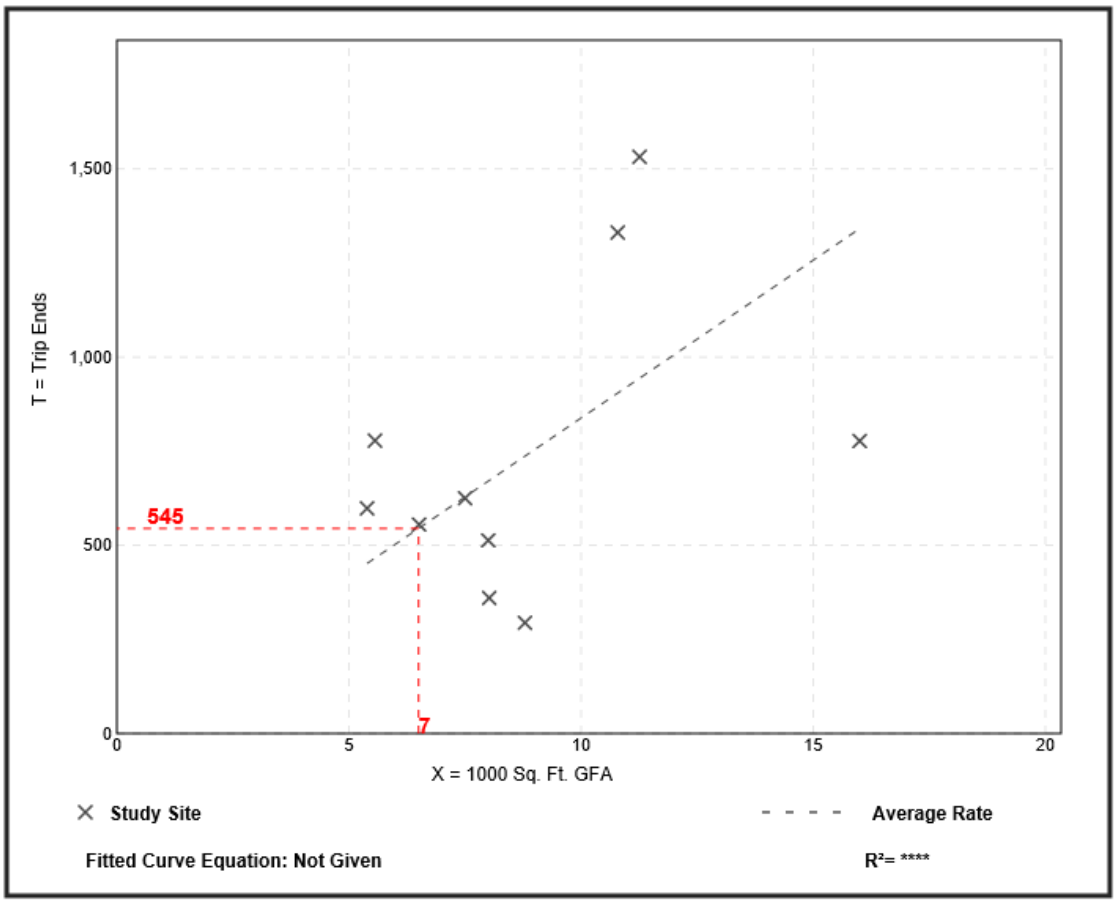
Vehicle Trip Ends vs: **1000 Sq. Ft. GFA**
On a: **Weekday**

Setting/Location: **General Urban/Suburban**
Number of Studies: 10
Avg. 1000 Sq. Ft. GFA: 9
Directional Distribution: 50% entering, 50% exiting

Vehicle Trip Generation per 1000 Sq. Ft. GFA

Average Rate	Range of Rates	Standard Deviation
83.84	33.45 - 139.93	40.01

Data Plot and Equation



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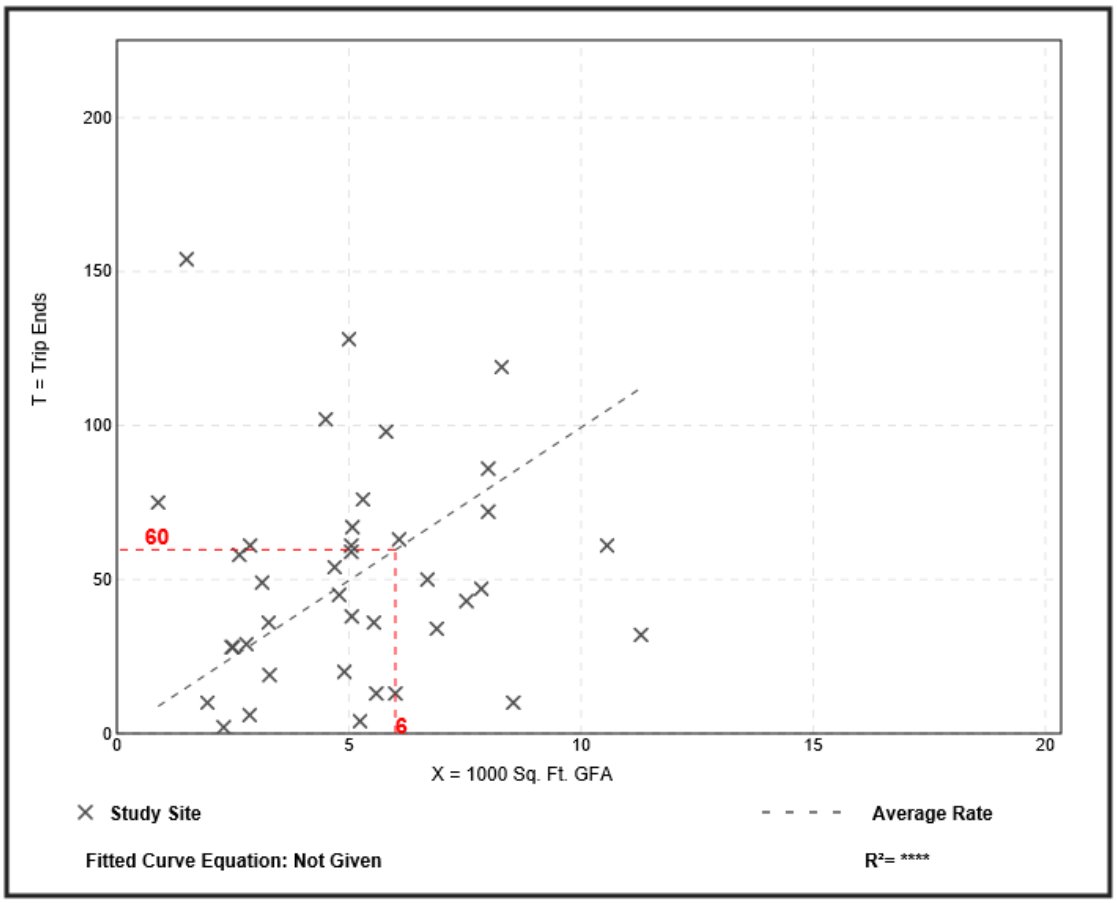
High-Turnover (Sit-Down) Restaurant
(932)

Vehicle Trip Ends vs: **1000 Sq. Ft. GFA**
On a: **Weekday,**
Peak Hour of Adjacent Street Traffic,
One Hour Between 7 and 9 a.m.
Setting/Location: **General Urban/Suburban**
Number of Studies: 39
Avg. 1000 Sq. Ft. GFA: 5
Directional Distribution: 55% entering, 45% exiting

Vehicle Trip Generation per 1000 Sq. Ft. GFA

Average Rate	Range of Rates	Standard Deviation
9.94	0.76 - 102.39	11.33

Data Plot and Equation



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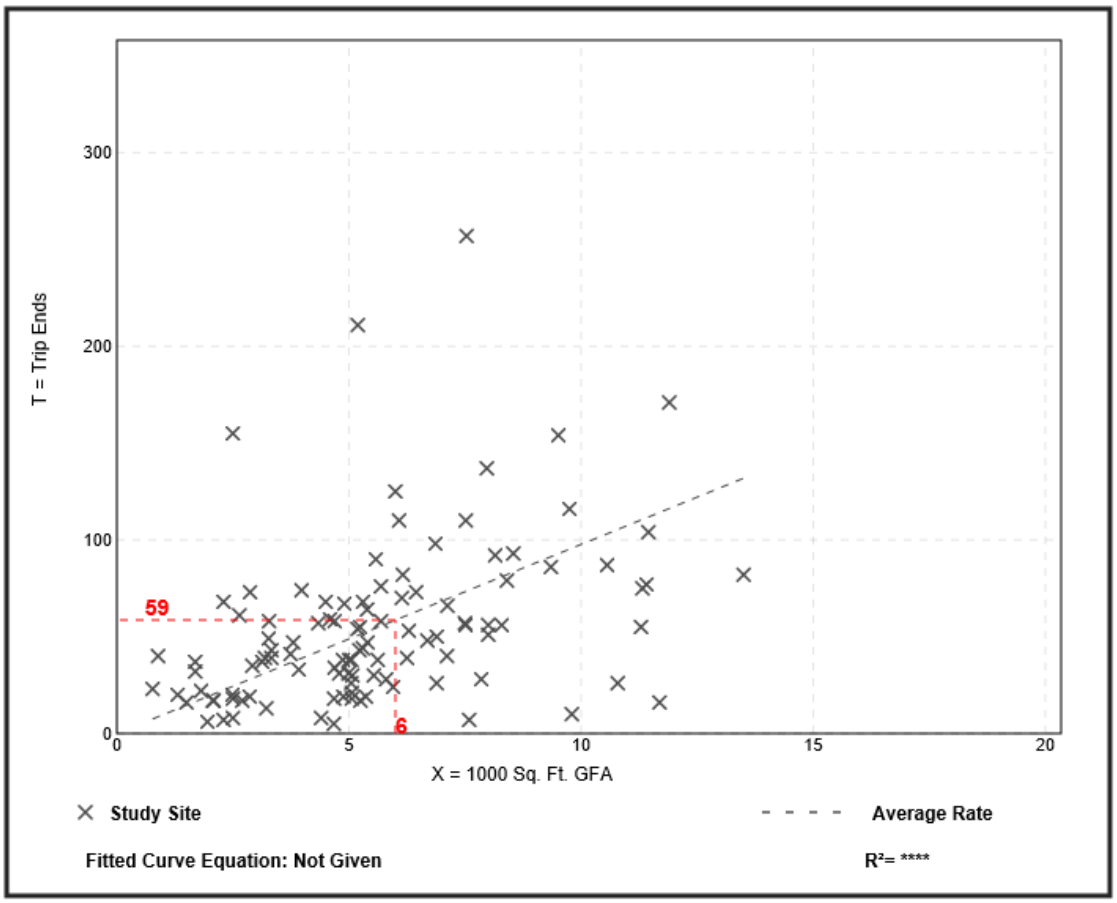
High-Turnover (Sit-Down) Restaurant
(932)

Vehicle Trip Ends vs: **1000 Sq. Ft. GFA**
On a: **Weekday,**
Peak Hour of Adjacent Street Traffic,
One Hour Between 4 and 6 p.m.
Setting/Location: **General Urban/Suburban**
Number of Studies: 107
Avg. 1000 Sq. Ft. GFA: 6
Directional Distribution: 62% entering, 38% exiting

Vehicle Trip Generation per 1000 Sq. Ft. GFA

Average Rate	Range of Rates	Standard Deviation
9.77	0.92 - 62.00	7.37

Data Plot and Equation



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High-Turnover (Sit-Down) Restaurant
(932)

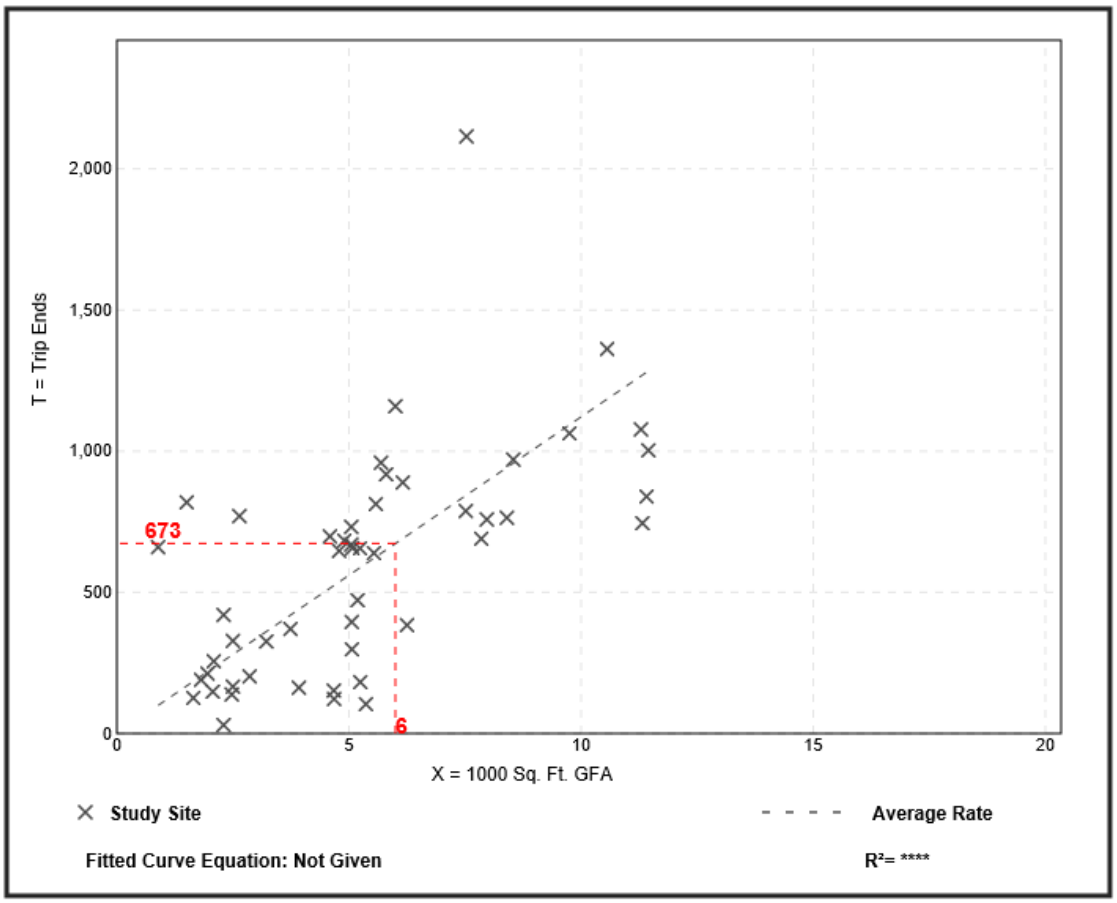
Vehicle Trip Ends vs: **1000 Sq. Ft. GFA**
On a: **Weekday**

Setting/Location: **General Urban/Suburban**
Number of Studies: 50
Avg. 1000 Sq. Ft. GFA: 5
Directional Distribution: 50% entering, 50% exiting

Vehicle Trip Generation per 1000 Sq. Ft. GFA

Average Rate	Range of Rates	Standard Deviation
112.18	13.04 - 742.41	72.51

Data Plot and Equation



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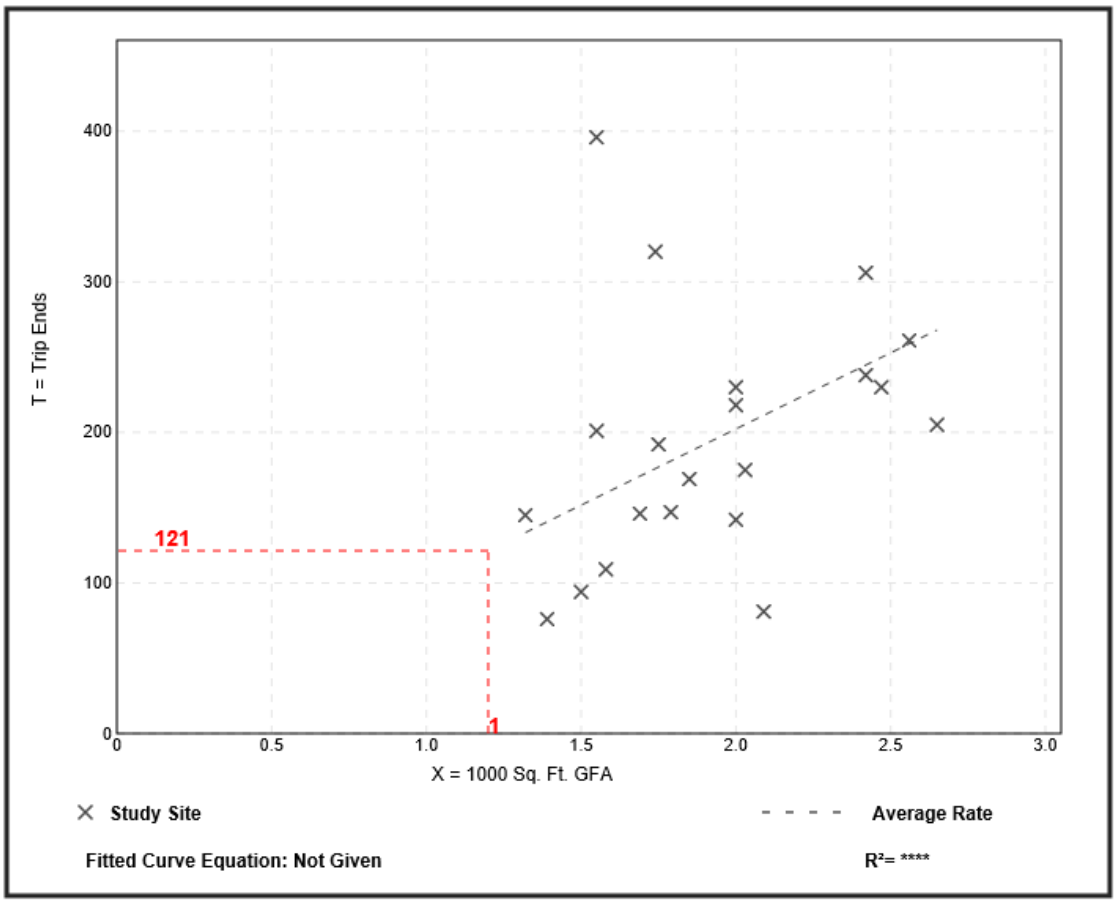
Coffee/Donut Shop without Drive-Through Window
(936)

Vehicle Trip Ends vs:	**1000 Sq. Ft. GFA**
On a:	**Weekday,**
	Peak Hour of Adjacent Street Traffic,
	One Hour Between 7 and 9 a.m.
Setting/Location:	**General Urban/Suburban**
Number of Studies:	21
Avg. 1000 Sq. Ft. GFA:	2
Directional Distribution:	51% entering, 49% exiting

Vehicle Trip Generation per 1000 Sq. Ft. GFA

Average Rate	Range of Rates	Standard Deviation
101.14	38.76 - 255.48	43.44

Data Plot and Equation



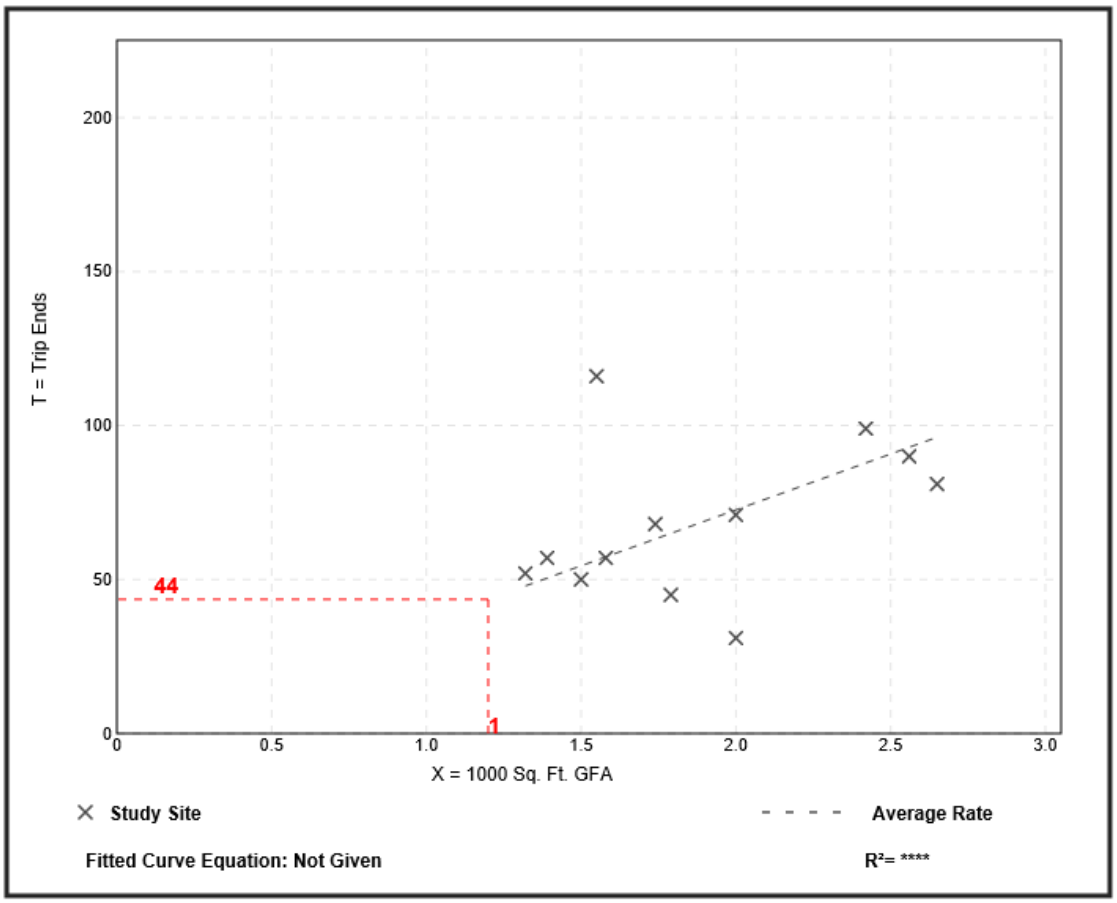
Coffee/Donut Shop without Drive-Through Window
(936)

Vehicle Trip Ends vs:	**1000 Sq. Ft. GFA**
On a:	**Weekday,**
	Peak Hour of Adjacent Street Traffic,
	One Hour Between 4 and 6 p.m.
Setting/Location:	**General Urban/Suburban**
Number of Studies:	12
Avg. 1000 Sq. Ft. GFA:	2
Directional Distribution:	50% entering, 50% exiting

Vehicle Trip Generation per 1000 Sq. Ft. GFA

Average Rate	Range of Rates	Standard Deviation
36.31	15.50 - 74.84	13.22

Data Plot and Equation



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Coffee/Donut Shop without Drive-Through Window
(936)

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

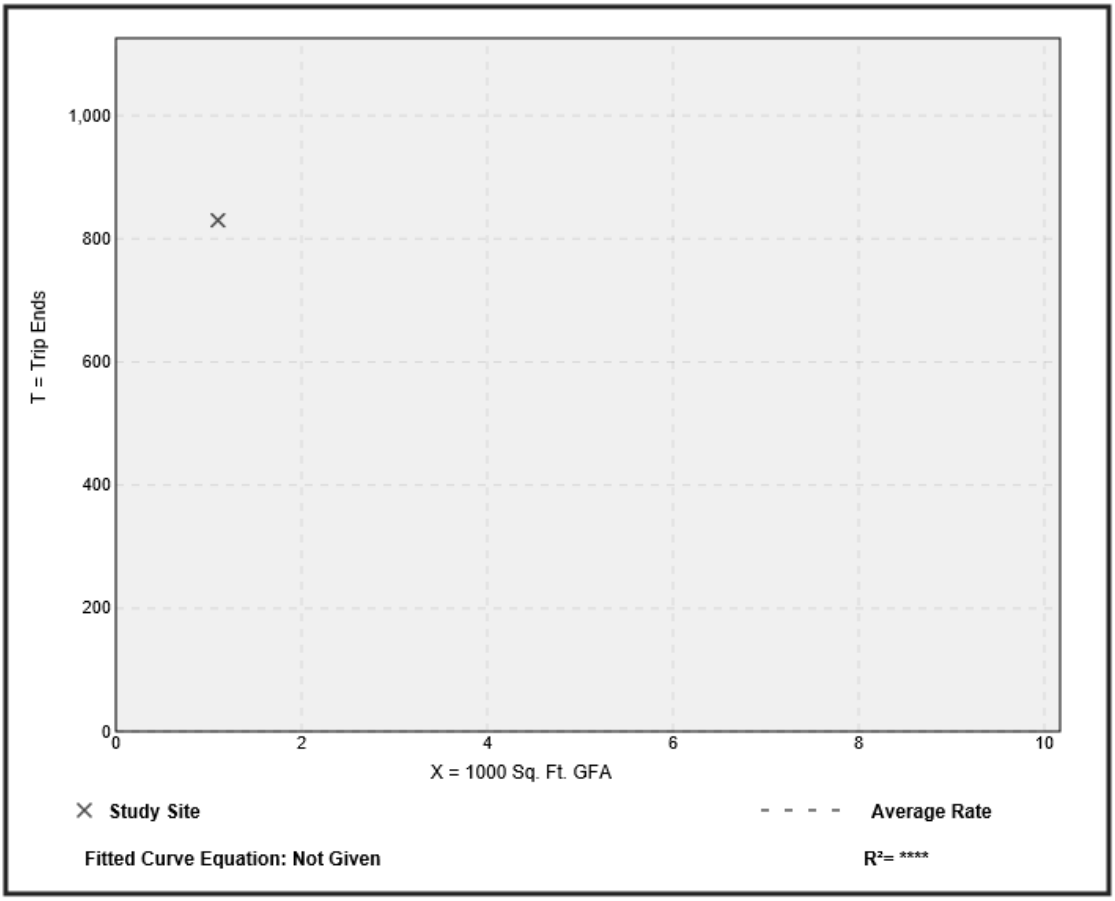
Setting/Location: **Dense Multi-Use Urban**
Number of Studies: 1
Avg. 1000 Sq. Ft. GFA: 1
Directional Distribution: 50% entering, 50% exiting

Person Trip Generation per 1000 Sq. Ft. GFA

Average Rate	Range of Rates	Standard Deviation
754.55	754.55 - 754.55	*

Data Plot and Equation

Caution – Small Sample Size



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APPENDIX IV

Results of Internal Trip Capture Calculations
Using
NCHRP Report 684 Estimator
(ITE Trip Generation Handbook, 3rd Edition Methodology)

NCHRP 8-51 Internal Trip Capture Estimation Tool			
Project Name:	North Lawrence Riverfront Development	**Organization:**	MGS
Project Location:	NWC of N. 2nd St (US 24-40) and Elm St.	**Performed By:**	MG
Scenario Description:	Buildings I thru VII and Hotel	**Date:**	10/9/2018
Analysis Year:	2018	**Checked By:**	
Analysis Period:	**AM Street Peak Hour**	**Date:**	

Table 1-A: Base Vehicle-Trip Generation Estimates (Single-Use Site Estimate)

Land Use	Development Data (*For Information Only*)			Estimated Vehicle-Trips		
	ITE LUCs[1]	Quantity	Units	Total	Entering	Exiting
Office	710	30,000	GFA sq. ft.	55	47	8
Retail	820	48,500	GFA sq. ft.	176	109	67
Restaurant	931 /932/936	19,700	GFA sq. ft.	246	133	113
Cinema/Entertainment	925	6,100	GFA sq. ft.	0	0	0
Residential	221	390	dwelling units	130	34	96
Hotel	310	150	rooms	70	41	29
All Other Land Uses[2]				0		
Total				677	364	313

Table 2-A: Mode Split and Vehicle Occupancy Estimates

Land Use	Entering Trips			Exiting Trips		
	Veh. Occ.	% Transit	% Non-Motorized	Veh. Occ.	% Transit	% Non-Motorized
Office	1.00	0%	0%	1.00	0%	0%
Retail	1.00	0%	0%	1.00	0%	0%
Restaurant	1.00	0%	0%	1.00	0%	0%
Cinema/Entertainment	1.00	0%	0%	1.00	0%	0%
Residential	1.00	0%	0%	1.00	0%	0%
Hotel	1.00	0%	0%	1.00	0%	0%
All Other Land Uses[2]						

Table 3-A: Average Land Use Interchange Distances (Feet Walking Distance)

Origin (From)	Destination (To)					
	Office	Retail	Restaurant	Cinema/Entertainment	Residential	Hotel
Office						
Retail						
Restaurant						
Cinema/Entertainment						
Residential						
Hotel						

Table 4-A: Internal Person-Trip Origin-Destination Matrix*

Origin (From)	Destination (To)					
	Office	Retail	Restaurant	Cinema/Entertainment	Residential	Hotel
Office		2	5	0	0	0
Retail	2		9	0	1	0
Restaurant	7	9		0	2	2
Cinema/Entertainment	0	0	0		0	0
Residential	1	1	19	0		0
Hotel	1	4	3	0	0	

Table 5-A: Computations Summary

	Total	Entering	Exiting
All Person-Trips	677	364	313
Internal Capture Percentage	20%	19%	22%
External Vehicle-Trips[3]	541	296	245
External Transit-Trips[4]	0	0	0
External Non-Motorized Trips[4]	0	0	0

Table 6-A: Internal Trip Capture Percentages by Land Use

Land Use	Entering Trips	Exiting Trips
Office	23%	88%
Retail	15%	18%
Restaurant	27%	18%
Cinema/Entertainment	N/A	N/A
Residential	9%	22%
Hotel	5%	28%

[1]Land Use Codes (LUCs) from *Trip Generation Informational Report*, published by the Institute of Transportation Engineers.

[2]Total estimate for all other land uses at mixed-use development site-not subject to internal trip capture computations in this estimator

[3]Vehicle-trips computed using the mode split and vehicle occupancy values provided in Table 2-A

[4]Person-Trips

*Indicates computation that has been rounded to the nearest whole number.

Estimation Tool Developed by the Texas Transportation Institute

Project Name:	North Lawrence Riverfront Development
Analysis Period:	**AM Street Peak Hour**

Table 7-A: Conversion of Vehicle-Trip Ends to Person-Trip Ends

Land Use	Table 7-A (D): Entering Trips			Table 7-A (O): Exiting Trips		
	Veh. Occ.	Vehicle-Trips	Person-Trips*	Veh. Occ.	Vehicle-Trips	Person-Trips*
Office	1.00	47	47	1.00	8	8
Retail	1.00	109	109	1.00	67	67
Restaurant	1.00	133	133	1.00	113	113
Cinema/Entertainment	1.00	0	0	1.00	0	0
Residential	1.00	34	34	1.00	96	96
Hotel	1.00	41	41	1.00	29	29

Table 8-A (O): Internal Person-Trip Origin-Destination Matrix (Computed at Origin)

Origin (From)	Destination (To)					
	Office	Retail	Restaurant	Cinema/Entertainment	Residential	Hotel
Office		2	5	0	0	0
Retail	19		9	0	9	0
Restaurant	35	16		0	5	3
Cinema/Entertainment	0	0	0		0	0
Residential	2	1	19	0		0
Hotel	22	4	3	0	0	

Table 8-A (D): Internal Person-Trip Origin-Destination Matrix (Computed at Destination)

Origin (From)	Destination (To)					
	Office	Retail	Restaurant	Cinema/Entertainment	Residential	Hotel
Office		35	31	0	0	0
Retail	2		67	0	1	0
Restaurant	7	9		0	2	2
Cinema/Entertainment	0	0	0		0	0
Residential	1	19	27	0		0
Hotel	1	4	8	0	0	

Table 9-A (D): Internal and External Trips Summary (Entering Trips)

Destination Land Use	Person-Trip Estimates			External Trips by Mode*		
	Internal	External	Total	Vehicles[1]	Transit[2]	Non-Motorized[2]
Office	11	36	47	36	0	0
Retail	16	93	109	93	0	0
Restaurant	36	97	133	97	0	0
Cinema/Entertainment	0	0	0	0	0	0
Residential	3	31	34	31	0	0
Hotel	2	39	41	39	0	0
All Other Land Uses[3]	0	0	0	0	0	0

Table 9-A (O): Internal and External Trips Summary (Exiting Trips)

Origin Land Use	Person-Trip Estimates			External Trips by Mode*		
	Internal	External	Total	Vehicles[1]	Transit[2]	Non-Motorized[2]
Office	7	1	8	1	0	0
Retail	12	55	67	55	0	0
Restaurant	20	93	113	93	0	0
Cinema/Entertainment	0	0	0	0	0	0
Residential	21	75	96	75	0	0
Hotel	8	21	29	21	0	0
All Other Land Uses[3]	0	0	0	0	0	0

[1]Vehicle-trips computed using the mode split and vehicle occupancy values provided in Table 2-A

[2]Person-Trips

[3]Total estimate for all other land uses at mixed-use development site-not subject to internal trip capture computations in this estimator

*Indicates computation that has been rounded to the nearest whole number.

NCHRP 8-51 Internal Trip Capture Estimation Tool			
Project Name:	North Lawrence Riverfront Development	**Organization:**	MGS
Project Location:	NWC of N. 2nd St (US 24-40) and Elm St.	**Performed By:**	MG
Scenario Description:	Buildings I thru VII and Hotel	**Date:**	10/9/2018
Analysis Year:	2018	**Checked By:**	
Analysis Period:	**PM Street Peak Hour**	**Date:**	

Table 1-P: Base Vehicle-Trip Generation Estimates (Single-Use Site Estimate)

Land Use	Development Data (*For Information Only*)			Estimated Vehicle-Trips		
	ITE LUCs[1]	Quantity	Units	Total	Entering	Exiting
Office	710	30,000	GFA sq. ft.	36	6	30
Retail	820	48,500	GFA sq. ft.	318	153	165
Restaurant	931 /932/936	19,700	GFA sq. ft.	213	130	83
Cinema/Entertainment	925	6,100	GFA sq. ft.	70	47	23
Residential	221	390	dwelling units	164	100	64
Hotel	310	150	rooms	86	44	42
All Other Land Uses[2]				0		
Total				887	480	407

Table 2-P: Mode Split and Vehicle Occupancy Estimates

Land Use	Entering Trips			Exiting Trips		
	Veh. Occ.	% Transit	% Non-Motorized	Veh. Occ.	% Transit	% Non-Motorized
Office	1.00	0%	0%	1.00	0%	0%
Retail	1.00	0%	0%	1.00	0%	0%
Restaurant	1.00	0%	0%	1.00	0%	0%
Cinema/Entertainment	1.00	0%	0%	1.00	0%	0%
Residential	1.00	0%	0%	1.00	0%	0%
Hotel	1.00	0%	0%	1.00	0%	0%
All Other Land Uses[2]						

Table 3-P: Average Land Use Interchange Distances (Feet Walking Distance)

Origin (From)	Destination (To)					
	Office	Retail	Restaurant	Cinema/Entertainment	Residential	Hotel
Office		1000	1000		1000	
Retail					1000	
Restaurant					1000	
Cinema/Entertainment					1000	
Residential		1000	1000			
Hotel					1650	

Table 4-P: Internal Person-Trip Origin-Destination Matrix*

Origin (From)	Destination (To)					
	Office	Retail	Restaurant	Cinema/Entertainment	Residential	Hotel
Office		5	1	0	1	0
Retail	1		38	7	40	7
Restaurant	1	34		7	14	6
Cinema/Entertainment	0	5	4		2	0
Residential	2	12	10	0		2
Hotel	0	3	7	0	0	

Table 5-P: Computations Summary

	Total	Entering	Exiting
All Person-Trips	887	480	407
Internal Capture Percentage	47%	44%	51%
External Vehicle-Trips[3]	469	271	198
External Transit-Trips[4]	0	0	0
External Non-Motorized Trips[4]	0	0	0

Table 6-P: Internal Trip Capture Percentages by Land Use

Land Use	Entering Trips	Exiting Trips
Office	67%	23%
Retail	39%	56%
Restaurant	46%	75%
Cinema/Entertainment	30%	48%
Residential	57%	41%
Hotel	34%	24%

[1]Land Use Codes (LUCs) from *Trip Generation Informational Report*, published by the Institute of Transportation Engineers.

[2]Total estimate for all other land uses at mixed-use development site-not subject to internal trip capture computations in this estimator

[3]Vehicle-trips computed using the mode split and vehicle occupancy values provided in Table 2-P

[4]Person-Trips

*Indicates computation that has been rounded to the nearest whole number.

Estimation Tool Developed by the Texas Transportation Institute

Project Name:	North Lawrence Riverfront Development
Analysis Period:	**PM Street Peak Hour**

Table 7-P: Conversion of Vehicle-Trip Ends to Person-Trip Ends

Land Use	Table 7-P (D): Entering Trips			Table 7-P (O): Exiting Trips		
	Veh. Occ.	Vehicle-Trips	Person-Trips*	Veh. Occ.	Vehicle-Trips	Person-Trips*
Office	1.00	6	6	1.00	30	30
Retail	1.00	153	153	1.00	165	165
Restaurant	1.00	130	130	1.00	83	83
Cinema/Entertainment	1.00	47	47	1.00	23	23
Residential	1.00	100	100	1.00	64	64
Hotel	1.00	44	44	1.00	42	42

Table 8-P (O): Internal Person-Trip Origin-Destination Matrix (Computed at Origin)

Origin (From)	Destination (To)					
	Office	Retail	Restaurant	Cinema/Entertainment	Residential	Hotel
Office		5	1	0	1	0
Retail	3		48	7	40	8
Restaurant	2	34		7	14	6
Cinema/Entertainment	0	5	7		2	0
Residential	3	20	10	0		2
Hotel	0	7	29	0	1	

Table 8-P (D): Internal Person-Trip Origin-Destination Matrix (Computed at Destination)

Origin (From)	Destination (To)					
	Office	Retail	Restaurant	Cinema/Entertainment	Residential	Hotel
Office		9	2	0	4	0
Retail	2		38	12	46	7
Restaurant	2	77		15	16	31
Cinema/Entertainment	0	6	4		4	0
Residential	3	12	14	0		5
Hotel	0	3	7	0	0	

Table 9-P (D): Internal and External Trips Summary (Entering Trips)

Destination Land Use	Person-Trip Estimates			External Trips by Mode*		
	Internal	External	Total	Vehicles[1]	Transit[2]	Non-Motorized[2]
Office	4	2	6	2	0	0
Retail	59	94	153	94	0	0
Restaurant	60	70	130	70	0	0
Cinema/Entertainment	14	33	47	33	0	0
Residential	57	43	100	43	0	0
Hotel	15	29	44	29	0	0
All Other Land Uses[3]	0	0	0	0	0	0

Table 9-P (O): Internal and External Trips Summary (Exiting Trips)

Origin Land Use	Person-Trip Estimates			External Trips by Mode*		
	Internal	External	Total	Vehicles[1]	Transit[2]	Non-Motorized[2]
Office	7	23	30	23	0	0
Retail	93	72	165	72	0	0
Restaurant	62	21	83	21	0	0
Cinema/Entertainment	11	12	23	12	0	0
Residential	26	38	64	38	0	0
Hotel	10	32	42	32	0	0
All Other Land Uses[3]	0	0	0	0	0	0

[1]Vehicle-trips computed using the mode split and vehicle occupancy values provided in Table 2-P

[2]Person-Trips

[3]Total estimate for all other land uses at mixed-use development site-not subject to internal trip capture computations in this estimator

*Indicates computation that has been rounded to the nearest whole number.

Table 7.1a Adjusted Internal Trip Capture Rates for Trip Origins within a Multi-Use Development			
Land Use Pairs		Weekday	
		AM Peak Hour	PM Peak Hour
From OFFICE	To Office	0.0%	0.0%
	To Retail	28.0%	15.2%
	To Restaurant	63.0%	3.0%
	To Cinema/Entertainment	0.0%	0.0%
	To Residential	1.0%	1.9%
	To Hotel	0.0%	0.0%
From RETAIL	To Office	29.0%	2.0%
	To Retail	0.0%	0.0%
	To Restaurant	13.0%	29.0%
	To Cinema/Entertainment	0.0%	4.0%
	To Residential	14.0%	24.2%
	To Hotel	0.0%	5.0%
From RESTAURANT	To Office	31.0%	3.0%
	To Retail	14.0%	41.0%
	To Restaurant	0.0%	0.0%
	To Cinema/Entertainment	0.0%	8.0%
	To Residential	4.0%	16.7%
	To Hotel	3.0%	7.0%
From CINEMA/ENTERTAINMENT	To Office	0.0%	2.0%
	To Retail	0.0%	21.0%
	To Restaurant	0.0%	31.0%
	To Cinema/Entertainment	0.0%	0.0%
	To Residential	0.0%	7.4%
	To Hotel	0.0%	2.0%
From RESIDENTIAL	To Office	2.0%	4.0%
	To Retail	1.0%	31.9%
	To Restaurant	20.0%	16.0%
	To Cinema/Entertainment	0.0%	0.0%
	To Residential	0.0%	0.0%
	To Hotel	0.0%	3.0%
From HOTEL	To Office	75.0%	0.0%
	To Retail	14.0%	16.0%
	To Restaurant	9.0%	68.0%
	To Cinema/Entertainment	0.0%	0.0%
	To Residential	0.0%	1.5%
	To Hotel	0.0%	0.0%

Table 7.2a Adjusted Internal Trip Capture Rates for Trip Destinations within a Multi-Use Development			
Land Use Pairs		Weekday	
		AM Peak Hour	PM Peak Hour
To OFFICE	From Office	0.0%	0.0%
	From Retail	4.0%	31.0%
	From Restaurant	14.0%	30.0%
	From Cinema/Entertainment	0.0%	6.0%
	From Residential	3.0%	57.0%
	From Hotel	3.0%	0.0%
To RETAIL	From Office	32.0%	6.1%
	From Retail	0.0%	0.0%
	From Restaurant	8.0%	50.0%
	From Cinema/Entertainment	0.0%	4.0%
	From Residential	17.0%	7.6%
	From Hotel	4.0%	2.0%
To RESTAURANT	From Office	23.0%	1.5%
	From Retail	50.0%	29.0%
	From Restaurant	0.0%	0.0%
	From Cinema/Entertainment	0.0%	3.0%
	From Residential	20.0%	10.6%
	From Hotel	6.0%	5.0%
To CINEMA/ENTERTAINMENT	From Office	0.0%	1.0%
	From Retail	0.0%	26.0%
	From Restaurant	0.0%	32.0%
	From Cinema/Entertainment	0.0%	0.0%
	From Residential	0.0%	0.0%
	From Hotel	0.0%	0.0%
To RESIDENTIAL	From Office	0.0%	4.0%
	From Retail	2.0%	46.0%
	From Restaurant	5.0%	16.0%
	From Cinema/Entertainment	0.0%	4.0%
	From Residential	0.0%	0.0%
	From Hotel	0.0%	0.0%
To HOTEL	From Office	0.0%	0.0%
	From Retail	0.0%	17.0%
	From Restaurant	4.0%	71.0%
	From Cinema/Entertainment	0.0%	1.0%
	From Residential	0.0%	12.0%
	From Hotel	0.0%	0.0%

NCHRP 8-51 Internal Trip Capture Estimation Tool			
Project Name:	North Lawrence Riverfront Development	**Organization:**	MGS
Project Location:	NWC of N. 2nd St (US 24-40) and Elm St.	**Performed By:**	MG
Scenario Description:	Buildings I thru VII and Hotel	**Date:**	10/9/2018
Analysis Year:	2018	**Checked By:**	
Analysis Period:	**AM Street Peak Hour**	**Date:**	

Table 1-A: Base Vehicle-Trip Generation Estimates (Single-Use Site Estimate)

Land Use	Development Data (*For Information Only*)			Estimated Vehicle-Trips		
	ITE LUCs[1]	Quantity	Units	Total	Entering	Exiting
Office	710	30,000	GFA sq. ft.	55	47	8
Retail	820	74,300	GFA sq. ft.	189	117	72
Restaurant				0		
Cinema/Entertainment				0		
Residential	221	390	dwelling units	130	34	96
Hotel	310	150	rooms	70	41	29
All Other Land Uses[2]				0		
Total				444	239	205

Table 2-A: Mode Split and Vehicle Occupancy Estimates

Land Use	Entering Trips			Exiting Trips		
	Veh. Occ.	% Transit	% Non-Motorized	Veh. Occ.	% Transit	% Non-Motorized
Office	1.00	0%	0%	1.00	0%	0%
Retail	1.00	0%	0%	1.00	0%	0%
Restaurant	1.00	0%	0%	1.00	0%	0%
Cinema/Entertainment	1.00	0%	0%	1.00	0%	0%
Residential	1.00	0%	0%	1.00	0%	0%
Hotel	1.00	0%	0%	1.00	0%	0%
All Other Land Uses[2]						

Table 3-A: Average Land Use Interchange Distances (Feet Walking Distance)

Origin (From)	Destination (To)					
	Office	Retail	Restaurant	Cinema/Entertainment	Residential	Hotel
Office						
Retail						
Restaurant						
Cinema/Entertainment						
Residential						
Hotel						

Table 4-A: Internal Person-Trip Origin-Destination Matrix*

Origin (From)	Destination (To)					
	Office	Retail	Restaurant	Cinema/Entertainment	Residential	Hotel
Office		2	0	0	0	0
Retail	2		0	0	1	0
Restaurant	0	0		0	0	0
Cinema/Entertainment	0	0	0		0	0
Residential	1	1	0	0		0
Hotel	1	4	0	0	0	

Table 5-A: Computations Summary

	Total	Entering	Exiting
All Person-Trips	444	239	205
Internal Capture Percentage	5%	5%	6%
External Vehicle-Trips[3]	420	227	193
External Transit-Trips[4]	0	0	0
External Non-Motorized Trips[4]	0	0	0

Table 6-A: Internal Trip Capture Percentages by Land Use

Land Use	Entering Trips	Exiting Trips
Office	9%	25%
Retail	6%	4%
Restaurant	N/A	N/A
Cinema/Entertainment	N/A	N/A
Residential	3%	2%
Hotel	0%	17%

[1]Land Use Codes (LUCs) from *Trip Generation Informational Report*, published by the Institute of Transportation Engineers.

[2]Total estimate for all other land uses at mixed-use development site-not subject to internal trip capture computations in this estimator

[3]Vehicle-trips computed using the mode split and vehicle occupancy values provided in Table 2-A

[4]Person-Trips

*Indicates computation that has been rounded to the nearest whole number.

Estimation Tool Developed by the Texas Transportation Institute

Project Name:	North Lawrence Riverfront Development
Analysis Period:	**AM Street Peak Hour**

Table 7-A: Conversion of Vehicle-Trip Ends to Person-Trip Ends

Land Use	Table 7-A (D): Entering Trips			Table 7-A (O): Exiting Trips		
	Veh. Occ.	Vehicle-Trips	Person-Trips*	Veh. Occ.	Vehicle-Trips	Person-Trips*
Office	1.00	47	47	1.00	8	8
Retail	1.00	117	117	1.00	72	72
Restaurant	1.00	0	0	1.00	0	0
Cinema/Entertainment	1.00	0	0	1.00	0	0
Residential	1.00	34	34	1.00	96	96
Hotel	1.00	41	41	1.00	29	29

Table 8-A (O): Internal Person-Trip Origin-Destination Matrix (Computed at Origin)

Origin (From)	Destination (To)					
	Office	Retail	Restaurant	Cinema/Entertainment	Residential	Hotel
Office		2	5	0	0	0
Retail	21		9	0	10	0
Restaurant	0	0		0	0	0
Cinema/Entertainment	0	0	0		0	0
Residential	2	1	19	0		0
Hotel	22	4	3	0	0	

Table 8-A (D): Internal Person-Trip Origin-Destination Matrix (Computed at Destination)

Origin (From)	Destination (To)					
	Office	Retail	Restaurant	Cinema/Entertainment	Residential	Hotel
Office		37	0	0	0	0
Retail	2		0	0	1	0
Restaurant	7	9		0	2	2
Cinema/Entertainment	0	0	0		0	0
Residential	1	20	0	0		0
Hotel	1	5	0	0	0	

Table 9-A (D): Internal and External Trips Summary (Entering Trips)

Destination Land Use	Person-Trip Estimates			External Trips by Mode*		
	Internal	External	Total	Vehicles[1]	Transit[2]	Non-Motorized[2]
Office	4	43	47	43	0	0
Retail	7	110	117	110	0	0
Restaurant	0	0	0	0	0	0
Cinema/Entertainment	0	0	0	0	0	0
Residential	1	33	34	33	0	0
Hotel	0	41	41	41	0	0
All Other Land Uses[3]	0	0	0	0	0	0

Table 9-A (O): Internal and External Trips Summary (Exiting Trips)

Origin Land Use	Person-Trip Estimates			External Trips by Mode*		
	Internal	External	Total	Vehicles[1]	Transit[2]	Non-Motorized[2]
Office	2	6	8	6	0	0
Retail	3	69	72	69	0	0
Restaurant	0	0	0	0	0	0
Cinema/Entertainment	0	0	0	0	0	0
Residential	2	94	96	94	0	0
Hotel	5	24	29	24	0	0
All Other Land Uses[3]	0	0	0	0	0	0

[1]Vehicle-trips computed using the mode split and vehicle occupancy values provided in Table 2-A

[2]Person-Trips

[3]Total estimate for all other land uses at mixed-use development site-not subject to internal trip capture computations in this estimator

*Indicates computation that has been rounded to the nearest whole number.

NCHRP 8-51 Internal Trip Capture Estimation Tool			
Project Name:	North Lawrence Riverfront Development	**Organization:**	MGS
Project Location:	NWC of N. 2nd St (US 24-40) and Elm St.	**Performed By:**	MG
Scenario Description:	Buildings I thru VII and Hotel	**Date:**	10/9/2018
Analysis Year:	2018	**Checked By:**	
Analysis Period:	**PM Street Peak Hour**	**Date:**	

Table 1-P: Base Vehicle-Trip Generation Estimates (Single-Use Site Estimate)

Land Use	Development Data (*For Information Only*)			Estimated Vehicle-Trips		
	ITE LUCs[1]	Quantity	Units	Total	Entering	Exiting
Office	710	30,000	GFA sq. ft.	36	6	30
Retail	820	74,300	GFA sq. ft.	436	209	227
Restaurant				0		
Cinema/Entertainment				0		
Residential	221	390	dwelling units	164	100	64
Hotel	310	150	rooms	86	44	42
All Other Land Uses[2]				0		
Total				722	359	363

Table 2-P: Mode Split and Vehicle Occupancy Estimates

Land Use	Entering Trips			Exiting Trips		
	Veh. Occ.	% Transit	% Non-Motorized	Veh. Occ.	% Transit	% Non-Motorized
Office	1.00	0%	0%	1.00	0%	0%
Retail	1.00	0%	0%	1.00	0%	0%
Restaurant	1.00	0%	0%	1.00	0%	0%
Cinema/Entertainment	1.00	0%	0%	1.00	0%	0%
Residential	1.00	0%	0%	1.00	0%	0%
Hotel	1.00	0%	0%	1.00	0%	0%
All Other Land Uses[2]						

Table 3-P: Average Land Use Interchange Distances (Feet Walking Distance)

Origin (From)	Destination (To)					
	Office	Retail	Restaurant	Cinema/Entertainment	Residential	Hotel
Office		1000	1000		1000	
Retail					1000	
Restaurant					1000	
Cinema/Entertainment					1000	
Residential		1000	1000			
Hotel					1650	

Table 4-P: Internal Person-Trip Origin-Destination Matrix*

Origin (From)	Destination (To)					
	Office	Retail	Restaurant	Cinema/Entertainment	Residential	Hotel
Office		5	0	0	1	0
Retail	2		0	0	46	7
Restaurant	0	0		0	0	0
Cinema/Entertainment	0	0	0		0	0
Residential	3	16	0	0		2
Hotel	0	4	0	0	0	

Table 5-P: Computations Summary

	Total	Entering	Exiting
All Person-Trips	722	359	363
Internal Capture Percentage	24%	24%	24%
External Vehicle-Trips[3]	550	273	277
External Transit-Trips[4]	0	0	0
External Non-Motorized Trips[4]	0	0	0

Table 6-P: Internal Trip Capture Percentages by Land Use

Land Use	Entering Trips	Exiting Trips
Office	83%	20%
Retail	12%	24%
Restaurant	N/A	N/A
Cinema/Entertainment	N/A	N/A
Residential	47%	33%
Hotel	20%	10%

[1]Land Use Codes (LUCs) from *Trip Generation Informational Report*, published by the Institute of Transportation Engineers.

[2]Total estimate for all other land uses at mixed-use development site-not subject to internal trip capture computations in this estimator

[3]Vehicle-trips computed using the mode split and vehicle occupancy values provided in Table 2-P

[4]Person-Trips

*Indicates computation that has been rounded to the nearest whole number.

Estimation Tool Developed by the Texas Transportation Institute

Project Name:	North Lawrence Riverfront Development
Analysis Period:	**PM Street Peak Hour**

Table 7-P: Conversion of Vehicle-Trip Ends to Person-Trip Ends

Land Use	Table 7-P (D): Entering Trips			Table 7-P (O): Exiting Trips		
	Veh. Occ.	Vehicle-Trips	Person-Trips*	Veh. Occ.	Vehicle-Trips	Person-Trips*
Office	1.00	6	6	1.00	30	30
Retail	1.00	209	209	1.00	227	227
Restaurant	1.00	0	0	1.00	0	0
Cinema/Entertainment	1.00	0	0	1.00	0	0
Residential	1.00	100	100	1.00	64	64
Hotel	1.00	44	44	1.00	42	42

Table 8-P (O): Internal Person-Trip Origin-Destination Matrix (Computed at Origin)

Origin (From)	Destination (To)					
	Office	Retail	Restaurant	Cinema/Entertainment	Residential	Hotel
Office		5	1	0	1	0
Retail	5		66	9	55	11
Restaurant	0	0		0	0	0
Cinema/Entertainment	0	0	0		0	0
Residential	3	20	10	0		2
Hotel	0	7	29	0	1	

Table 8-P (D): Internal Person-Trip Origin-Destination Matrix (Computed at Destination)

Origin (From)	Destination (To)					
	Office	Retail	Restaurant	Cinema/Entertainment	Residential	Hotel
Office		13	0	0	4	0
Retail	2		0	0	46	7
Restaurant	2	105		0	16	31
Cinema/Entertainment	0	8	0		4	0
Residential	3	16	0	0		5
Hotel	0	4	0	0	0	

Table 9-P (D): Internal and External Trips Summary (Entering Trips)

Destination Land Use	Person-Trip Estimates			External Trips by Mode*		
	Internal	External	Total	Vehicles[1]	Transit[2]	Non-Motorized[2]
Office	5	1	6	1	0	0
Retail	25	184	209	184	0	0
Restaurant	0	0	0	0	0	0
Cinema/Entertainment	0	0	0	0	0	0
Residential	47	53	100	53	0	0
Hotel	9	35	44	35	0	0
All Other Land Uses[3]	0	0	0	0	0	0

Table 9-P (O): Internal and External Trips Summary (Exiting Trips)

Origin Land Use	Person-Trip Estimates			External Trips by Mode*		
	Internal	External	Total	Vehicles[1]	Transit[2]	Non-Motorized[2]
Office	6	24	30	24	0	0
Retail	55	172	227	172	0	0
Restaurant	0	0	0	0	0	0
Cinema/Entertainment	0	0	0	0	0	0
Residential	21	43	64	43	0	0
Hotel	4	38	42	38	0	0
All Other Land Uses[3]	0	0	0	0	0	0

[1]Vehicle-trips computed using the mode split and vehicle occupancy values provided in Table 2-P

[2]Person-Trips

[3]Total estimate for all other land uses at mixed-use development site-not subject to internal trip capture computations in this estimator

*Indicates computation that has been rounded to the nearest whole number.

Table 7.1a Adjusted Internal Trip Capture Rates for Trip Origins within a Multi-Use Development			
Land Use Pairs		Weekday	
		AM Peak Hour	PM Peak Hour
From OFFICE	To Office	0.0%	0.0%
	To Retail	28.0%	15.2%
	To Restaurant	63.0%	3.0%
	To Cinema/Entertainment	0.0%	0.0%
	To Residential	1.0%	1.9%
	To Hotel	0.0%	0.0%
From RETAIL	To Office	29.0%	2.0%
	To Retail	0.0%	0.0%
	To Restaurant	13.0%	29.0%
	To Cinema/Entertainment	0.0%	4.0%
	To Residential	14.0%	24.2%
	To Hotel	0.0%	5.0%
From RESTAURANT	To Office	31.0%	3.0%
	To Retail	14.0%	41.0%
	To Restaurant	0.0%	0.0%
	To Cinema/Entertainment	0.0%	8.0%
	To Residential	4.0%	16.7%
	To Hotel	3.0%	7.0%
From CINEMA/ENTERTAINMENT	To Office	0.0%	2.0%
	To Retail	0.0%	21.0%
	To Restaurant	0.0%	31.0%
	To Cinema/Entertainment	0.0%	0.0%
	To Residential	0.0%	7.4%
	To Hotel	0.0%	2.0%
From RESIDENTIAL	To Office	2.0%	4.0%
	To Retail	1.0%	31.9%
	To Restaurant	20.0%	16.0%
	To Cinema/Entertainment	0.0%	0.0%
	To Residential	0.0%	0.0%
	To Hotel	0.0%	3.0%
From HOTEL	To Office	75.0%	0.0%
	To Retail	14.0%	16.0%
	To Restaurant	9.0%	68.0%
	To Cinema/Entertainment	0.0%	0.0%
	To Residential	0.0%	1.5%
	To Hotel	0.0%	0.0%

Table 7.2a Adjusted Internal Trip Capture Rates for Trip Destinations within a Multi-Use Development			
Land Use Pairs		Weekday	
		AM Peak Hour	PM Peak Hour
To OFFICE	From Office	0.0%	0.0%
	From Retail	4.0%	31.0%
	From Restaurant	14.0%	30.0%
	From Cinema/Entertainment	0.0%	6.0%
	From Residential	3.0%	57.0%
	From Hotel	3.0%	0.0%
To RETAIL	From Office	32.0%	6.1%
	From Retail	0.0%	0.0%
	From Restaurant	8.0%	50.0%
	From Cinema/Entertainment	0.0%	4.0%
	From Residential	17.0%	7.6%
	From Hotel	4.0%	2.0%
To RESTAURANT	From Office	23.0%	1.5%
	From Retail	50.0%	29.0%
	From Restaurant	0.0%	0.0%
	From Cinema/Entertainment	0.0%	3.0%
	From Residential	20.0%	10.6%
	From Hotel	6.0%	5.0%
To CINEMA/ENTERTAINMENT	From Office	0.0%	1.0%
	From Retail	0.0%	26.0%
	From Restaurant	0.0%	32.0%
	From Cinema/Entertainment	0.0%	0.0%
	From Residential	0.0%	0.0%
	From Hotel	0.0%	0.0%
To RESIDENTIAL	From Office	0.0%	4.0%
	From Retail	2.0%	46.0%
	From Restaurant	5.0%	16.0%
	From Cinema/Entertainment	0.0%	4.0%
	From Residential	0.0%	0.0%
	From Hotel	0.0%	0.0%
To HOTEL	From Office	0.0%	0.0%
	From Retail	0.0%	17.0%
	From Restaurant	4.0%	71.0%
	From Cinema/Entertainment	0.0%	1.0%
	From Residential	0.0%	12.0%
	From Hotel	0.0%	0.0%

APPENDIX V

Summary of Traffic Counts

PEAK AM Count

Signal Location	Last updated 2/23/17	Count AM Date	Begin Peak	Peak Volume	South Bound			West Bound			North Bound			East Bound			
					Right	Thru	Left	Right	Thru	Left	Right	Thru	Left	Right	Thru	Left	
STREET1	STREET2	COUNTDATE		PEAKTOT/	SBRT	SBTHRU	SBLT	WBRT	WBTHRU	WBLT	NBRT	NBTHRU	NBLT	EBRT	EBTHRU	EBLT	Site_ID
2 nd St.	Locust St.	29-Jan-16	7:30	2015	1	931	18	19	2	251	26	751	7	8	1	0	168
2 nd St.	Lyon St.	15-Apr-15	7:30	1627	0	786	7	17	0	116	38	662	1	0	0	0	2
2 nd St.	McDonald St	22-Apr-15	7:30	1525	33	525	14	18	18	14	21	804	15	12	15	36	3
3 rd St.	KTA	15-Sep-15	7:15	1742	23	610	120	67	35	166	256	289	151	17	5	3	4
6 th St.	Congressional	30-Mar-16	8:00	1295	24	13	87	25	432	29	24	47	39	15	486	74	72
6 th St.	Folks Road	08-Feb-17	7:00	2266	112	41	133	202	671	71	66	70	40	44	738	78	6
6 th St.	Iowa St.	06-May-15	7:30	2427	0	0	0	0	601	292	241	0	138	206	949	0	7
6 th St.	Kasold Dr.	14-Apr-16	7:30	2963	39	250	145	33	717	107	193	128	175	174	974	28	8
6 th St.	Kentucky St.	04-May-16	7:30	2434	0	0	0	0	975	0	177	0	486	0	796	0	9
6 th St.	Lawrence Ave.	19-Apr-16	7:30	2638	71	88	197	94	726	25	51	76	49	44	1147	70	10
6 th St.	Maine St.	03-May-16	7:30	2785	49	28	158	297	931	13	8	47	33	29	1088	104	11
6 th St.	Massachusetts St.	05-May-16	7:30	1919	0	0	0	312	221	0	7	141	69	153	498	518	12
6 th St.	Michigan St.	26-Apr-16	7:30	2415	57	32	196	54	852	2	18	21	40	13	1100	30	13
6 th St.	MontereyWay	14-Feb-17	7:30	2603	56	180	119	45	803	71	135	75	166	82	816	55	14
6 th St.	Rockledge Rd.	10-Apr-14	7:30	2285	119	17	15	19	690	16	21	29	37	45	1094	183	15
6 th St.	Schwarz Rd.	22-Feb-17	7:30	2288	3	1	17	0	871	9	20	0	24	16	1327	0	16
6 th St.	Stoneridge	07-Apr-16	7:30	1259	44	4	43	23	525	37	67	0	48	9	443	16	73
6 th St.	Vermont St.	25-Feb-16	7:30	2356	683	169	350	0	261	6	0	0	0	69	818	0	17
6 th St.	Wakarusa Dr.	05-May-15	7:30	2268	77	200	179	65	325	242	206	205	140	146	449	34	18
7 th St.	Kentucky St.	07-Oct-14	7:30	809	0	0	0	55	45	0	41	612	17	0	30	9	186
7 th St.	Massachusetts St.	30-Apr-14	8:00	504	17	94	19	17	42	14	23	164	23	19	37	35	19
7 th St.	New Hampshire St.	01-Oct-14	7:30	1039	5	151	306	394	41	4	5	43	4	17	47	22	20
7 th St.	Vermont St.	27-Aug-14	7:45	496	37	197	54	0	58	8	46	0	30	19	47	0	21
8 th St.	Kentucky St.	02-Oct-14	7:30	703	0	0	0	22	24	0	24	583	4	0	33	13	22
8 th St.	Massachusetts St.	29-Oct-14	7:30	447	10	139	5	5	18	8	17	179	9	6	38	13	23
8 th St.	Vermont St.	08-Oct-14	8:00	400	16	160	8	11	31	11	30	79	4	9	33	8	24
9 th St.	Emery Rd.	17-Nov-15	7:30	1118	0	0	0	0	341	44	47	0	22	30	634	0	25
9 th St.	Iowa St.	06-May-14	7:30	2672	39	860	227	126	135	163	14	677	32	54	248	97	26
9 th St.	Kentucky St.	29-Apr-14	7:30	1360	0	0	0	21	171	0	27	568	172	0	333	68	27
9 th St.	Maine St.	12-Nov-15	7:45	1130	12	45	39	16	295	8	6	13	8	28	644	16	28
9 th St.	Massachusetts St.	08-May-14	7:45	806	13	113	12	11	111	12	38	203	30	56	182	25	29
9 th St.	Mississippi St.	04-Nov-15	7:45	1379	16	64	41	22	367	62	26	14	23	76	660	8	30
9 th St.	Tennessee St.	29-Apr-14	7:45	1617	58	524	33	0	333	21	0	0	0	264	384	0	31
9 th St.	Vermont St.	14-May-14	7:45	790	29	116	22	14	129	5	12	65	28	79	239	52	32
10 th St.	Massachusetts St.	15-May-14	8:00	550	12	130	20	19	35	5	15	220	24	15	43	12	33
11 th St.	Kentucky St.	23-Oct-14	7:30	1022	0	0	0	147	117	0	48	487	54	0	158	11	34
11 th St.	Massachusetts St.	21-Aug-14	7:45	1167	13	170	14	27	147	33	68	218	182	141	131	23	1
11 th St.	Tennessee St.	28-Oct-14	7:30	1128	20	714	148	0	130	46	0	0	0	31	39	0	36
14 th St.	Kentucky St.	20-Jan-15	7:30	947	0	0	0	69	84	0	7	599	65	0	99	24	37
14 th St.	Massachusetts St.	22-Jan-15	7:30	1094	3	248	31	24	57	25	62	461	92	42	45	4	38
14 th St.	Tennessee St.	21-Jan-15	7:30	823	9	579	80	0	66	54	0	0	0	19	16	0	39
Bob Billings	Crestline Dr.	09-Apr-15	7:30	1874	94	83	73	16	298	15	10	21	73	252	855	84	40
15 th St.	Iowa St.	26-Jan-17	7:30	3094	154	748	130	38	63	36	134	801	122	229	347	292	41
Bob Billings	Kasold Dr.	28-Apr-15	7:30	2533	59	335	129	29	273	108	269	296	102	136	719	80	42
Bob Billings	Monterey Way	25-Mar-15	7:30	1553	167	0	220	78	361	0	0	0	0	0	620	107	80
17 th St.	Massachusetts St.	03-Feb-15	7:30	831	14	245	3	5	32	13	11	446	14	23	10	15	43
19 th St.	Haskell Rd.	12-Feb-15	7:30	1622	35	204	61	69	281	29	37	322	200	150	195	39	44
19 th St.	Iowa St.	29-Apr-15	7:45	2673	57	698	226	216	106	130	256	835	26	22	92	9	45
19 th St.	Kentucky St.	25-Feb-15	7:15	1498	0	0	0	187	441	0	11	66	4	7	516	266	46
19 th St.	Louisiana St.	07-Apr-15	7:30	1625	22	24	9	17	565	156	170	44	152	90	368	8	47

PEAK PM Count

Signal Location	Last Updated 2/23/17	Count PM Date	Begin Peak	Peak Volume	South Bound			West Bound			North Bound			East Bound			
					Right	Thru	Left	Right	Thru	Left	Right	Thru	Left	Right	Thru	Left	
STREET1	STREET2	COUNTDATE		PEAKTOTA	SBRT	SBTHRU	SBLT	WBRT	WBTHRU	WBLT	NBRT	NBTHRU	NBLT	EBRT	EBTHRU	EBLT	Site_ID
2 nd St.	Locust St.	29-Jan-16	16:45	2323	10	947	52	16	1	214	45	1002	18	11	3	4	168
2 nd St.	Lyon St.	15-Apr-15	16:30	1935	0	821	21	21	4	95	96	867	2	2	4	2	2
2 nd St.	McDonald St	22-Apr-15	16:45	2265	182	442	69	66	190	115	93	362	324	200	118	104	3
3 rd St.	KTA	15-Sep-15	17:00	1826	7	400	48	105	8	321	228	589	34	39	33	14	4
6 th St.	Congressional	30-Mar-16	17:00	1745	46	31	84	116	568	82	28	27	42	19	628	74	72
6 th St.	Folks Road	08-Feb-17	17:00	2639	124	38	108	94	1037	55	44	35	23	63	894	124	6
6 th St.	Iowa St.	06-May-15	16:45	3035	0	0	0	0	1156	339	219	0	337	213	771	0	7
6 th St.	Kasold Dr.	14-Apr-16	16:45	3499	48	164	83	63	1127	225	192	267	271	209	769	81	8
6 th St.	Kentucky St.	04-May-16	16:45	2969	0	0	0	0	1082	0	287	0	621	0	979	0	9
6 th St.	Lawrence Ave.	19-Apr-16	16:45	3162	82	102	170	167	1287	62	39	117	66	55	928	87	10
6 th St.	Maine St.	03-May-16	4:30PM	3112	126	57	265	197	1231	13	31	54	72	27	991	48	11
6 th St.	Massachusetts St.	05-May-16	16:45	2524	0	0	0	394	330	0	14	181	101	205	511	788	12
6 th St.	Michigan St.	26-Apr-16	16:15	2813	97	33	178	73	1357	9	17	23	59	28	927	12	13
6 th St.	MontereyWay	14-Feb-17	17:00	3413	58	159	135	141	1163	159	91	164	177	157	920	89	14
6 th St.	Rockledge Rd.	10-Apr-14	16:45	2884	228	23	29	19	1306	19	20	32	49	68	920	171	15
6 th St.	Schwarz Rd.	22-Feb-17	16:45	2884	1	0	2	0	1584	23	9	0	21	20	1224	0	16
6 th St.	Stoneridge	07-Apr-16	17:00	1570	18	2	34	70	547	69	37	0	11	58	674	50	73
6 th St.	Vermont St.	25-Feb-16	16:30	2859	675	212	354	0	393	22	0	0	0	121	1082	0	17
6 th St.	Wakarusa Dr.	05-May-15	17:00	2938	50	167	175	118	546	360	307	215	235	134	571	60	18
7 th St.	Massachusetts St.	30-Apr-14	17:00	916	23	178	17	31	94	27	73	264	44	64	41	60	19
7 th St.	New Hampshire St.	02-Oct-14	17:00	1348	30	176	277	403	95	18	17	124	32	102	55	19	20
7 th St.	Vermont St.	27-Aug-14	16:45	827	73	256	65	0	121	21	97	0	88	33	73	0	21
7th St.	Kentucky St.	07-Oct-14	16:45	1246	0	0	0	159	136	0	79	792	33	0	34	13	186
8 th St.	Kentucky St.	02-Oct-14	16:30	1068	0	0	0	92	98	0	36	770	13	0	46	13	22
8 th St.	Massachusetts St.	29-Oct-14	16:15	857	36	193	11	20	75	36	43	286	34	19	65	39	23
8 th St.	Vermont St.	08-Oct-14	16:45	797	44	259	16	38	85	30	65	175	26	12	35	12	24
9 th St.	Emery Rd.	17-Nov-15	17:00	1579	0	0	0	0	771	68	72	0	52	36	579	0	25
9 th St.	Iowa St.	06-May-14	16:45	3260	65	813	173	203	378	279	17	796	69	62	270	135	26
9 th St.	Kentucky St.	29-Apr-14	16:45	1999	0	0	0	43	410	0	56	627	330	0	454	79	27
9 th St.	Maine St.	12-Nov-15	17:00	1764	21	35	50	40	785	14	22	55	28	10	688	16	28
9 th St.	Massachusetts St.	08-May-14	16:45	1363	58	200	14	32	229	19	45	304	74	109	206	73	29
9 th St.	Mississippi St.	04-Nov-15	17:00	1978	23	44	40	50	713	74	98	52	142	55	665	22	30
9 th St.	Tennessee St.	29-Apr-13	17:00	2229	147	579	37	0	659	37	0	0	0	265	505	0	31
9 th St.	Vermont St.	14-May-14	16:45	1330	101	185	27	29	287	11	20	121	89	80	273	107	32
10 th St.	Massachusetts St.	15-May-14	17:00	1157	80	244	24	74	128	23	41	378	46	48	54	17	33
11 th St.	Kentucky St.	23-Oct-14	17:00	1462	0	0	0	199	205	0	107	680	48	0	204	19	34
11 th St.	Massachusetts St.	21-Aug-14	16:45	1712	23	251	21	51	230	114	81	334	163	200	172	72	1
11 th St.	Tennessee St.	28-Oct-14	16:30	1453	20	872	113	0	106	129	0	0	0	91	122	0	36
14 th St.	Kentucky St.	20-Jan-15	16:45	1140	0	0	0	100	89	0	27	654	76	0	160	34	37
14 th St.	Massachusetts St.	22-Jan-15	16:30	1439	17	534	16	8	37	17	28	540	109	81	38	14	38
14 th St.	Tennessee St.	21-Jan-15	16:30	1417	32	947	110	0	112	67	0	0	0	67	82	0	39
Bob Billings	Crestline Dr.	09-Apr-15	16:45	2149	98	48	63	67	752	24	20	98	284	96	521	78	40
15 th St.	Iowa St.	26-Jan-17	17:00	3963	225	1000	81	136	359	155	143	993	250	209	242	170	41
Bob Billings	Kasold Dr.	28-Apr-15	16:45	3077	78	464	76	113	634	259	149	426	161	169	426	122	42
Bob Billings	Monterey Way	25-Mar-15	16:30	1776	126	0	189	268	613	0	0	0	0	0	435	145	80
17 th St.	Massachusetts St.	03-Feb-15	16:45	1555	11	617	9	9	15	10	65	651	37	64	28	39	43
19 th St.	Haskell Rd.	12-Feb-15	16:45	1799	55	312	88	89	208	23	58	268	139	246	270	43	44

Summary of Vehicular Turning Movement Counts

N. 2nd Street & Lincoln Street
Morning Peak-Hours
Sunny, Warm

File Name : N2nd&lincoln-eam
Site Code : 1
Start Date : 7/16/2013
Page No : 1

Groups Printed- Unshifted

	N. 2nd Street From North					Lincoln Street From East					N. 2nd Street From South					From West					
Start Time	Right	Thru	Left		App. Total	Right	Thru	Left		App. Total	Right	Thru	Left		App. Total	Right	Thru	Left		App. Total	Int. Total
Factor	1.0	1.0	1.0	1.0		1.0	1.0	1.0	1.0		1.0	1.0	1.0	1.0		1.0	1.0	1.0	1.0		
07:00 AM	0	0	0	0	0	0	0	2	0	2	1	0	0	0	1	0	0	0	0	0	3
07:15 AM	0	0	1	0	1	1	0	5	0	6	3	0	0	0	3	0	0	0	0	0	10
07:30 AM	0	0	0	0	0	1	0	4	0	5	3	0	0	0	3	0	0	0	0	0	8
07:45 AM	0	0	2	0	2	2	0	5	0	7	6	0	0	0	6	0	0	0	0	0	15
Total	0	0	3	0	3	4	0	16	0	20	13	0	0	0	13	0	0	0	0	0	36
08:00 AM	0	0	0	0	0	1	0	7	0	8	10	0	0	0	10	0	0	0	0	0	18
08:15 AM	0	0	0	0	0	1	0	5	0	6	2	0	0	0	2	0	0	0	0	0	8
08:30 AM	0	0	5	0	5	1	0	0	0	1	3	0	0	0	3	0	0	0	0	0	9
08:45 AM	0	0	2	0	2	0	0	3	0	3	2	0	0	0	2	0	0	0	0	0	7
Total	0	0	7	0	7	3	0	15	0	18	17	0	0	0	17	0	0	0	0	0	42
Grand Total	0	0	10	0	10	7	0	31	0	38	30	0	0	0	30	0	0	0	0	0	78
Apprch %	0	0	100	0		18.4	0	81.6	0		100	0	0	0		0	0	0	0		
Total %	0	0	12.8	0	12.8	9	0	39.7	0	48.7	38.5	0	0	0	38.5	0	0	0	0	0	

Summary of Vehicular Turning Movement Counts

N. 2nd Street & Lincoln Street
Morning Peak-Hours
Sunny, Warm

File Name : N2nd&lincoln-eam
Site Code : 1
Start Date : 7/16/2013
Page No : 2

	N. 2nd Street From North					Lincoln Street From East					N. 2nd Street From South					From West					
Start Time	Right	Thru	Left		App. Total	Right	Thru	Left		App. Total	Right	Thru	Left		App. Total	Right	Thru	Left		App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 07:15 AM																					
07:15 AM	0	0	1	0	1	1	0	5	0	6	3	0	0	0	3	0	0	0	0	0	10
07:30 AM	0	0	0	0	0	1	0	4	0	5	3	0	0	0	3	0	0	0	0	0	8
07:45 AM	0	0	**2**	**0**	**2**	**2**	**0**	**5**	**0**	**7**	**6**	**0**	**0**	**0**	**6**	**0**	**0**	**0**	**0**	**0**	**15**
08:00 AM	**0**	**0**	**0**	**0**	**0**	**1**	**0**	**7**	0	**8**	**10**	**0**	**0**	**0**	**10**	0	0	0	0	0	**18**
Total Volume	0	0	3	0	3	5	0	21	0	26	22	0	0	0	22	0	0	0	0	0	51
% App. Total	0	0	100	0		19.2	0	80.8	0		100	0	0	0		0	0	0	0		
PHF	.000	.000	.375	.000	.375	.625	.000	.750	.000	.813	.550	.000	.000	.000	.550	.000	.000	.000	.000	.000	.708

Summary of Vehicular Turning Movement Counts

N. 2nd Street & Lincoln Street
Afternoon Peak-Hours
Sunny, warm

File Name : N2nd&lincoln-epm
Site Code : 1
Start Date : 7/16/2013
Page No : 1

Groups Printed- Unshifted

	N. 2nd Street From North					Lincoln Street From East					N. 2nd Street From South					From West					
Start Time	Right	Thru	Left		App. Total	Right	Thru	Left		App. Total	Right	Thru	Left		App. Total	Right	Thru	Left		App. Total	Int. Total
Factor	1.0	1.0	1.0	1.0		1.0	1.0	1.0	1.0		1.0	1.0	1.0	1.0		1.0	1.0	1.0	1.0		
04:00 PM	0	0	1	0	1	0	0	2	0	2	9	0	0	0	9	0	0	0	0	0	12
04:15 PM	0	0	1	0	1	1	0	2	0	3	39	0	0	0	39	0	0	0	0	0	43
04:30 PM	0	0	12	0	12	3	0	3	0	6	12	0	0	0	12	0	0	0	0	0	30
04:45 PM	0	0	1	0	1	0	0	5	0	5	9	0	0	0	9	0	0	0	0	0	15
Total	0	0	15	0	15	4	0	12	0	16	69	0	0	0	69	0	0	0	0	0	100
05:00 PM	0	0	1	0	1	3	0	4	0	7	16	0	0	0	16	0	0	0	0	0	24
05:15 PM	0	0	1	0	1	0	0	5	0	5	16	0	0	0	16	0	0	0	0	0	22
05:30 PM	0	0	2	0	2	3	0	8	0	11	12	0	0	0	12	0	0	0	0	0	25
05:45 PM	0	0	0	0	0	2	0	2	0	4	7	0	0	0	7	0	0	0	0	0	11
Total	0	0	4	0	4	8	0	19	0	27	51	0	0	0	51	0	0	0	0	0	82
Grand Total	0	0	19	0	19	12	0	31	0	43	120	0	0	0	120	0	0	0	0	0	182
Apprch %	0	0	100	0		27.9	0	72.1	0		100	0	0	0		0	0	0	0		
Total %	0	0	10.4	0	10.4	6.6	0	17	0	23.6	65.9	0	0	0	65.9	0	0	0	0	0	

Summary of Vehicular Turning Movement Counts

N. 2nd Street & Lincoln Street
Afternoon Peak-Hours
Sunny, warm

File Name : N2nd&lincoln-epm
Site Code : 1
Start Date : 7/16/2013
Page No : 2

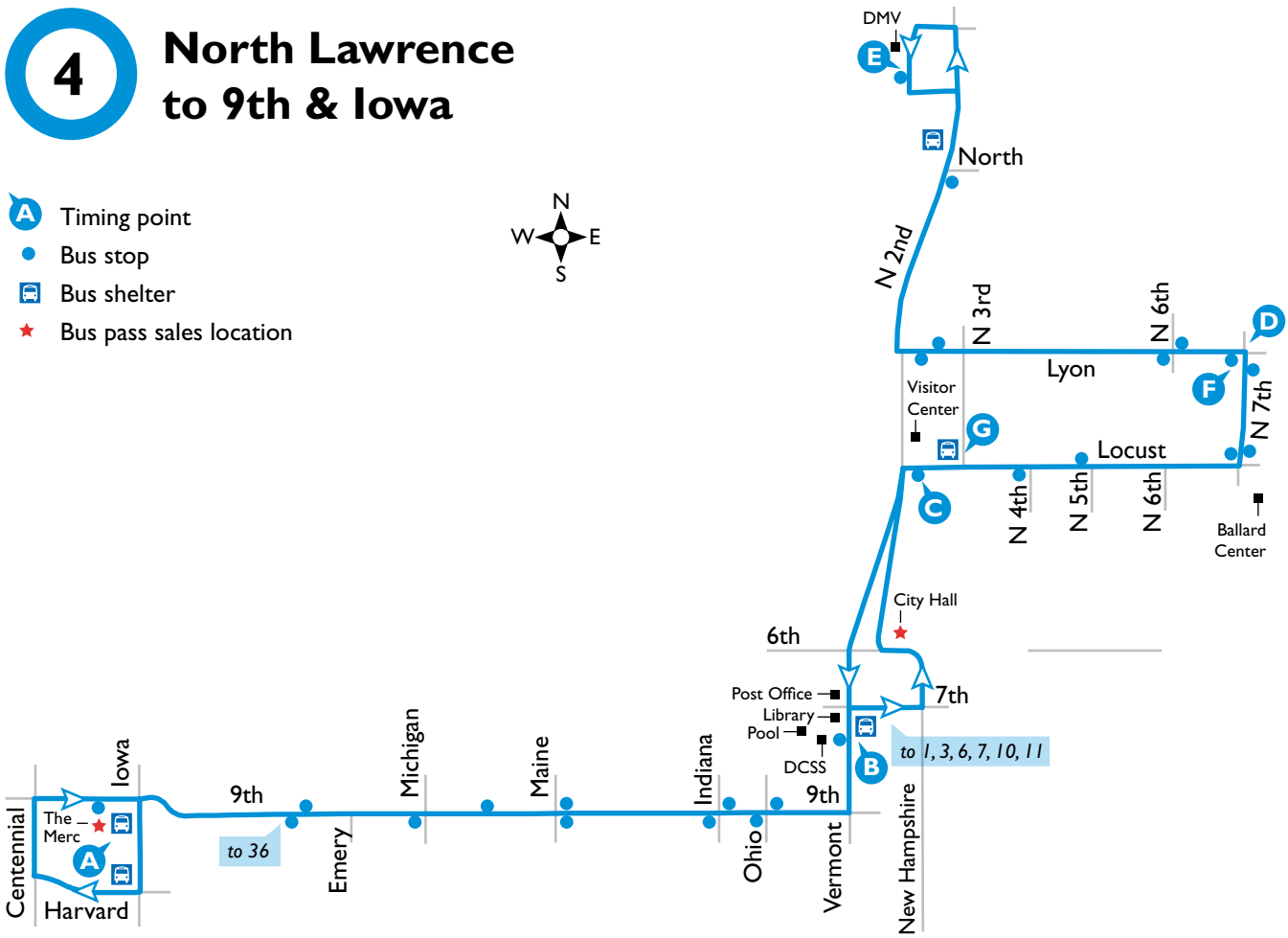
	N. 2nd Street From North					Lincoln Street From East					N. 2nd Street From South					From West					
Start Time	Right	Thru	Left		App. Total	Right	Thru	Left		App. Total	Right	Thru	Left		App. Total	Right	Thru	Left		App. Total	Int. Total
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 04:15 PM																					
04:15 PM	0	0	1	0	1	1	0	2	0	3	**39**	**0**	**0**	**0**	**39**	0	0	0	0	0	**43**
04:30 PM	0	0	**12**	**0**	**12**	**3**	**0**	**3**	**0**	**6**	**12**	**0**	**0**	**0**	**12**	**0**	**0**	**0**	**0**	**0**	**30**
04:45 PM	**0**	**0**	**1**	**0**	**1**	**0**	**0**	**5**	0	5	9	0	0	0	9	0	0	0	0	0	15
05:00 PM	0	0	1	0	1	3	0	4	0	**7**	**16**	**0**	**0**	**0**	**16**	**0**	**0**	**0**	**0**	**0**	**24**
Total Volume	**0**	**0**	**15**	**0**	**15**	**7**	**0**	**14**	**0**	**21**	**76**	**0**	**0**	**0**	**76**	**0**	**0**	**0**	**0**	**0**	**112**
% App. Total	**0**	**0**	**100**	**0**		**33.3**	**0**	**66.7**	**0**		**100**	**0**	**0**	**0**		**0**	**0**	**0**	**0**		
PHF	**.000**	**.000**	**.313**	**.000**	**.313**	**.583**	**.000**	**.700**	**.000**	**.750**	**.487**	**.000**	**.000**	**.000**	**.487**	**.000**	**.000**	**.000**	**.000**	**.000**	**.651**

APPENDIX VI

Current Transit Route and Schedule
(Line 4, North Lawrence)

4 North Lawrence to 9th & Iowa

- A Timing point
- Bus stop
- Bus shelter
- Bus pass sales location



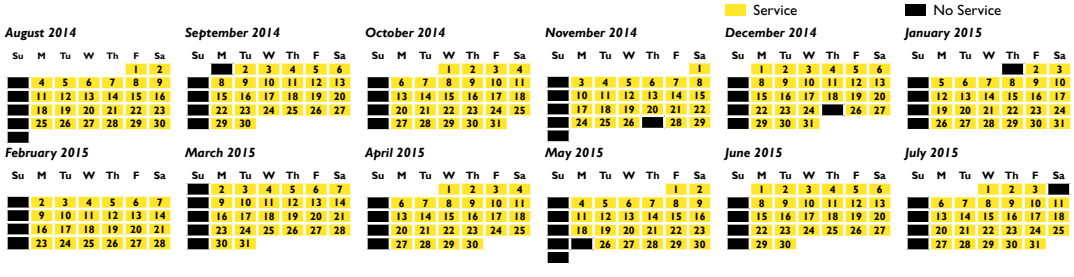
NORTHBOUND

	A 9th & Iowa	B 7th & Vermont	C 2nd & Locust	D 7th & Lyon	E DMV
AM					
	6:10	6:25	6:31	6:35	6:42
	7:10	7:25	7:31	7:35	7:42
	8:10	8:25	8:31	8:35	8:42
	9:10	9:25	9:31	9:35	9:42
	10:10	10:25	10:31	10:35	10:42
	11:10	11:25	11:31	11:35	11:42
PM	**12:10**	**12:25**	**12:31**	**12:35**	**12:42**
	1:10	**1:25**	**1:31**	**1:35**	**1:42**
	2:10	**2:25**	**2:31**	**2:35**	**2:42**
	3:10	**3:25**	**3:31**	**3:35**	**3:42**
	4:10	**4:25**	**4:31**	**4:35**	**4:42**
	5:10	**5:25**	**5:31**	**5:35**	**5:42**
	6:10	**6:25**	**6:31**	**6:35**	**6:42**
	7:10	**7:25**	**7:31**	**7:35**	**7:42**

SOUTHBOUND

	E DMV	F 7th & Lyon	G 2nd & Locust	B 7th & Vermont	A 9th & Iowa
AM				6:02	6:10
	6:47	6:52	6:54	7:02	7:10
	7:47	7:52	7:54	8:02	8:10
	8:47	8:52	8:54	9:02	9:10
	9:47	9:52	9:54	10:02	10:10
	10:47	10:52	10:54	11:02	11:10
	11:47	11:52	11:54	**12:02**	**12:10**
PM	**12:47**	**12:52**	**12:54**	**1:02**	**1:10**
	1:47	**1:52**	**1:54**	**2:02**	**2:10**
	2:47	**2:52**	**2:54**	**3:02**	**3:10**
	3:47	**3:52**	**3:54**	**4:02**	**4:10**
	4:47	**4:52**	**4:54**	**5:02**	**5:10**
	5:47	**5:52**	**5:54**	**6:02**	**6:10**
	6:47	**6:52**	**6:54**	**7:02**	**7:10**
	7:47	**7:52**	**7:54**	**8:00**	

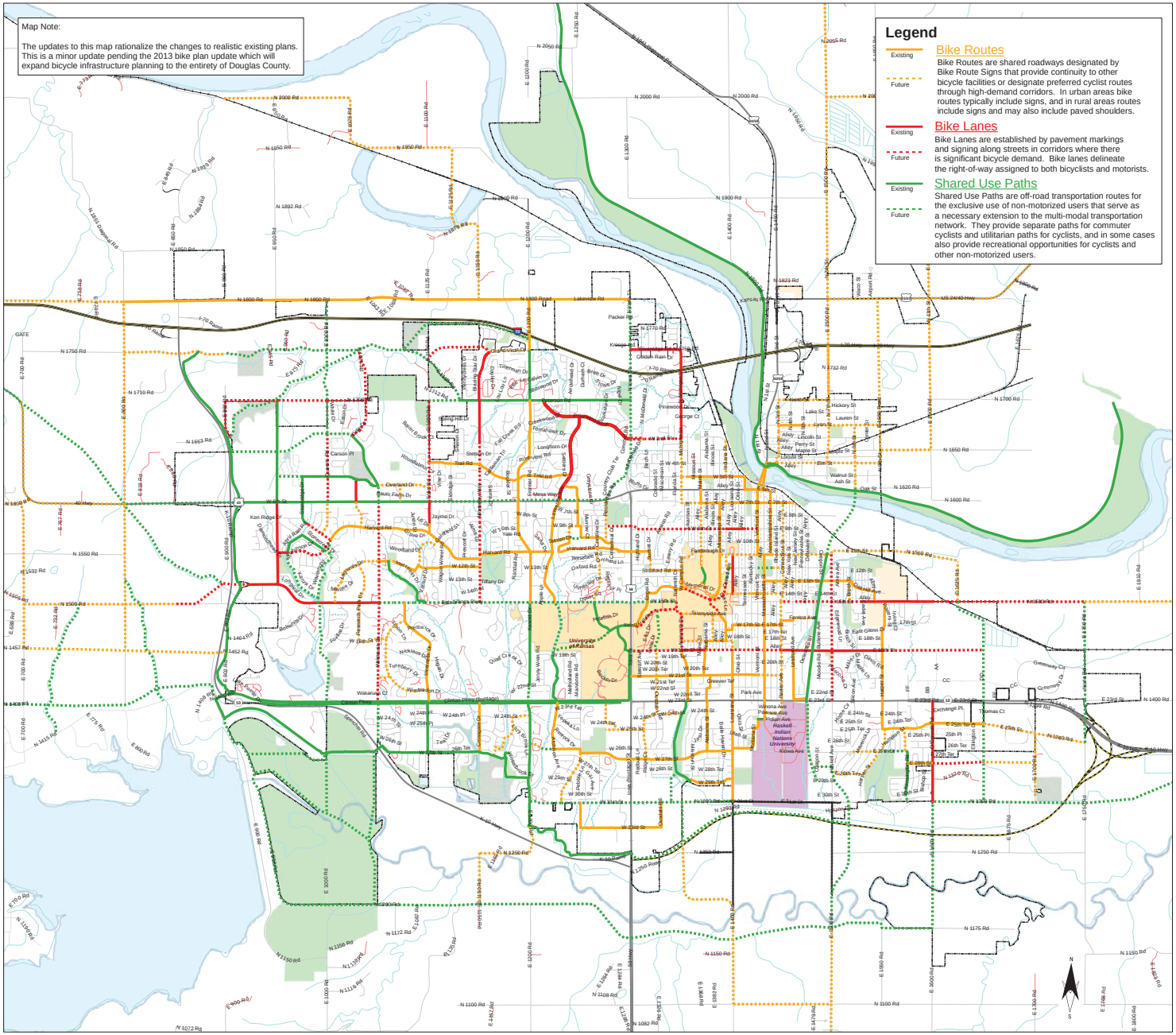
This route operates Monday–Saturday, except holidays: New Year's Day, Memorial Day, Independence Day, Labor Day, Thanksgiving Day, and Christmas Day.



APPENDIX VII

Current and Future Bikeways
(Source: City's T2040 Bicycle System Map)

T2040 Bikeway System Map



Lawrence-Douglas County Metropolitan Planning Organization

Drafted by David R. Guntert

Map Notes:

It is understood that future roadways are projections only. Development plans that extend roads designated to have bicycle facilities should also continue those bicycle facilities. All developments that seek changes in the designated bicycle facilities shown on this map are subject to review by the Bicycle Advisory Committee, which shall make its recommendations to the Lawrence City Commission, Douglas County Commission, and the Lawrence-Douglas County MPO. The MPO by approval of this map is establishing a regional plan for bikeway development that is made a part of the Metropolitan Transportation Plan.

Approved by the Lawrence-Douglas County Metropolitan Planning Organization on April 16, 2009. Minor network updates last made on March 21, 2013.
T2040 Metropolitan Transportation Plan Approved on March 21, 2013.