

September 15, 2022

PK# 5431-22.460

# TRAFFIC IMPACT ANALYSIS

Project:

**1715 Market Center**

*In Dallas, Texas*

Prepared for:

**City of Dallas**

On behalf of:

**Market Center Boulevard JV LP**

Prepared by:

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## EXECUTIVE SUMMARY

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The services of **Pacheco Koch** were retained by **Market Center Boulevard JV LP** to prepare a Traffic Impact Analysis (TIA) for the proposed office development with ground-floor commercial located at 1715 Market Center Boulevard in Dallas, Texas. The Project is a redevelopment of the existing site. Buildout of the Project is estimated to occur by 2025. A TIA is required by the City of Dallas for review as part of the Owner's request to create a new PD Subdistrict for the subject property.

The purpose of this report is to estimate the incremental impact on the background traffic operational conditions caused by the proposed development within a specific study area as determined by standardized engineering analyses. The study parameters used in this TIA are based upon the requirements of City and are consistent with the standard industry practices used in similar studies.

Based upon the analyses performed herein, Pacheco Koch developed the following findings and recommendations.

**FINDING:** The proposed site redevelopment will include mid-rise office buildings with ground-floor retail and structured parking. The planned uses are anticipated to generate about 9,000 trip ends per day, including approximately 700 trip ends during the AM Peak Hour and 1,000 trip ends during the PM Peak Hour.

**FINDING:** The subject site is short distance from the Trinity Strand Trail. A small percent of site-generated trips may utilize the trail for access.

- ❖ **RECOMMENDATION:** Reinstall the pavement markings for the crosswalk on the south leg of Turtle Creek Boulevard at the Market Center Boulevard intersection to facilitate crossings of trail users from the Trinity Strand Trail who are destined for the subject site.

**FINDING:** The proposed development will effectively utilize existing access points located on Market Center Boulevard and E Irving Boulevard. The northern driveway on Market Center Boulevard provides a hooded left turn into the existing driveway; both driveways on E Irving Boulevard have access to full median openings—one at the intersection with Riveredge Drive, and the other serving private driveways. The proposed development will remove two existing driveways on Market Center Boulevard. The number of driveways on Irving Boulevard will remain the same.

**FINDING:** Traffic-signal-controlled intersections in the vicinity of the site exist near the four corners—at the intersections with Oak Lawn Avenue and with Turtle Creek Boulevard. Generally, all signal-controlled-intersections currently operate at very good Levels of Service during peak hour periods. The greatest traffic impact is anticipated to occur at the intersection of Market Center Boulevard and Oak Lawn Avenue, which is anticipated to operate at Level of Service C with the addition of background growth and

site-generated traffic. If background traffic growth continues for several years, the intersection may degrade to Level of Service D (generally “acceptable” for urban conditions) several years after site buildout. Automated traffic signal timing optimizations may negate or reduce the projected increases in delays.

FINDING: With the addition of projected background traffic growth, which includes projected traffic from future off-site developments in the vicinity, left turns from the minor-street approaches at the unsignalized intersection of E Irving Boulevard and Riveredge Drive/Site Driveway 1, are projected to experience high delays during peak hour periods. The intersection is not considered to be a candidate for installation of a traffic signal due to proximity of existing traffic signals. However, if the volume projections are accurate, motorists on both sides of the street have other route alternatives that would allow them to avoid unprotected left-turn maneuvers if desired. In the case of the subject site, motorists can instead use the driveways on Market Center Boulevard to make right-turns in lieu of left turns onto E Irving Boulevard. For Riveredge Drive, motorists can choose to travel east or west on E Levee Street to access nearby traffic signals to perform protected turning maneuvers.

- ❖ RECOMMENDATION: To reduce delay for right-turning motorists at the intersection of E Irving Boulevard and Riveredge Drive/Site Driveway 1, it is recommended that (in the case of Riveredge Drive) the existing roadway be re-stripped within existing pavement to provide a separate left- and right-approach lanes. It is recommended that Driveway 1 be reconstructed to a width sufficient to provide separate left- and right-turning approach lanes. During the engineering design phase, efforts should be made to align Site Driveway 1 with Riveredge Drive to eliminate the existing offset of opposing left-turn maneuvers.

NOTE: The City of Dallas Thoroughfare Plan calls for Market Center Boulevard to have a “Special” four-lane, median-divided cross-section in the future (currently, the cross-section has six lanes with a raised center median). Though no timetable for modifications to this roadway are known, this analysis indicates that the roadway link capacity will continue to be sufficient after the lane reduction to support traffic from the proposed development.

END



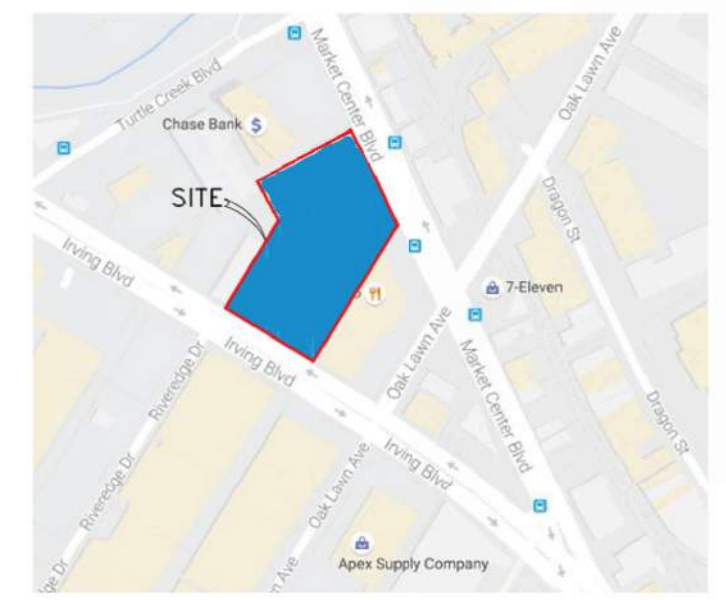
- Project Location
- Study Area Intersection (Signalized)
- Traffic Signal
- Study Area Intersection (Unsignalized)

# Site Location Map

1715 Market Center, Dallas, Texas

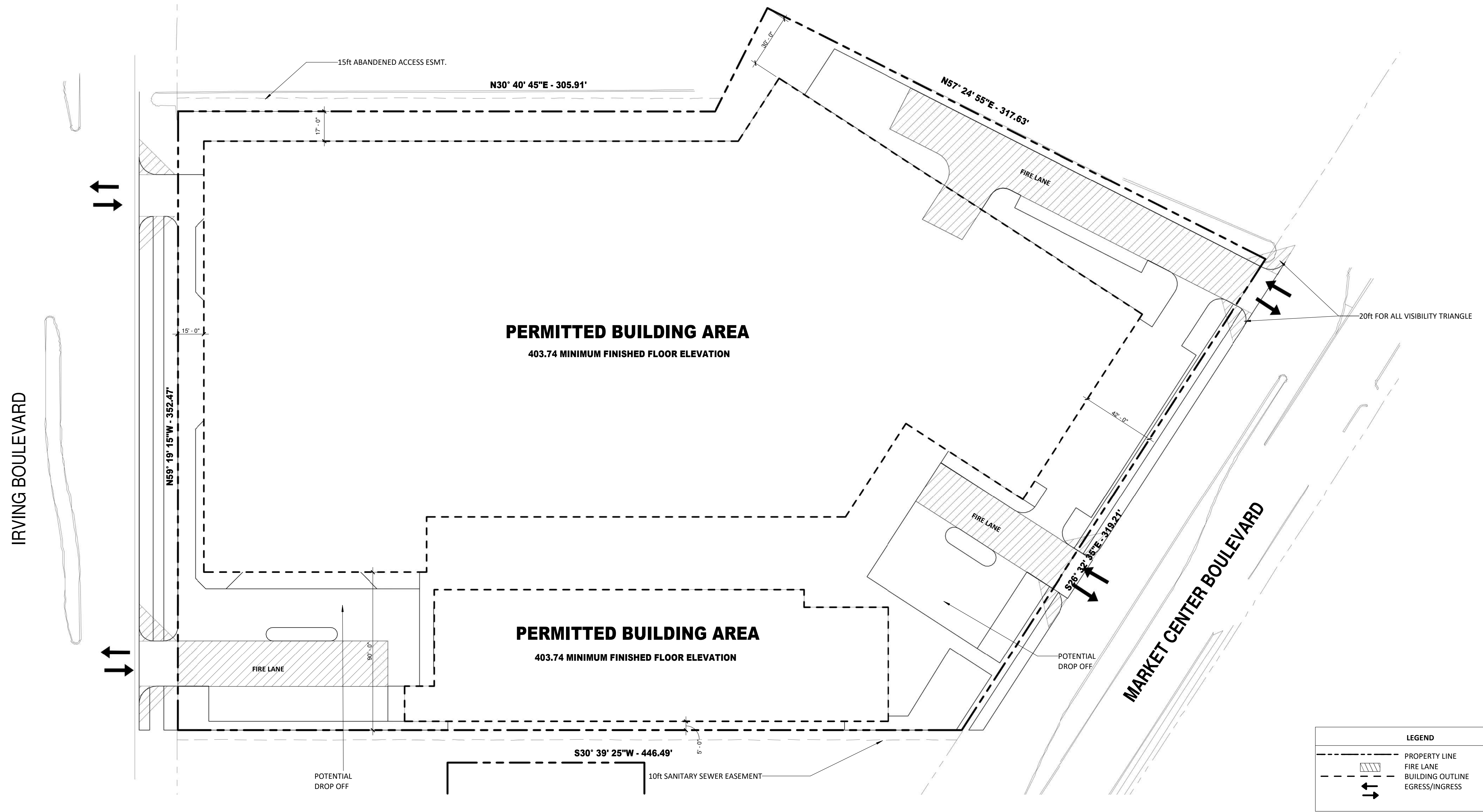
PK #5431-22.460 (SMN: 09/15/22)

OVERALL SITE DATA TABLE	
Allowable Uses Per PD 621, Subdistrict 1K	
Site Area	4.416 acres (192,365 SF)
Building Height	185' Mechanical equipment, elevator overrides, penthouses, parapet walls, and related equipment and structures may extend an additional 20 feet in height above the maximum structure height.
FAR	4.0



VICINITY MAP

NOT TO SCALE



**TRAFFIC IMPACT ANALYSIS**  
**1715 Market Center**  
Dallas, Texas

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## INTRODUCTION

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The services of **Pacheco Koch** (PK) were retained by **Market Center Boulevard JV LP** to prepare a Traffic Impact Analysis for a proposed office development with ground-floor commercial located at 1715 Market Center Boulevard in Dallas, Texas. A conceptual site plan for the Project, prepared by **HKS**, and a site location map (**Exhibit 1**) are provided following the EXECUTIVE SUMMARY section of this report.

In order to facilitate development of the Project, Market Center Boulevard JV LP (the “Applicant”) has made a request to the **City of Dallas** (the “Approving Agency”) to create a new PD Subdistrict for the subject property. As part of application process for this request, submittal of a TIA commissioned by the Applicant must be submitted to the Approving Agency for review.

This TIA was prepared by traffic engineers at Pacheco Koch (the “Engineer”) in accordance with industry and local standards. Pacheco Koch is a licensed engineering firm, based in Texas, that provides professional engineering and related services.

### **Purpose**

A Traffic Impact Analysis (TIA) is an engineering study used to provide information on the projected off-site impacts produced by a specific Project on the traffic operations of public traffic facilities. In some instances, those Project impacts can be sufficiently accommodated by the existing roadway network; while in other cases, Project impacts may require mitigation. Determination of mitigation requirements is subject to the standards and expectations of the Approving Agency.

Commissioning a TIA may be required by an Approving Agency when an Applicant is seeking approvals or entitlements for the Project. Using standardized analysis methodologies, the findings of the TIA are used to gage the direct impacts on the transportation system that are attributable to the Project. Under certain circumstances and within legal parameters, the Approving Agency may require the Applicant to fund the improvement(s) needed to mitigate the impacts.

A TIA should be prepared by a licensed Engineer skilled in the principles of traffic and transportation engineering and planning. The general methodologies, processes, and guidelines used in a TIA are established by industry standards—which are maintained by organizations such as the Institute of Transportation Engineers (ITE) and others—although, the project-specific parameters of the study (e.g., study locations, analysis scenarios, analytical assumptions, etc.) may be established by local ordinances or technical staff of the Approving Agency.

Generally, existing and background conditions of the transportation system are assumed to be the responsibility of the respective governing agency(-ies). Although the explicit purpose of a TIA is not to evaluate those conditions and identify deficiencies, this information may be evident from the study’s findings. The



Engineer may suggest or recommend modifications to the transportation system that, in the Engineer's opinion, could improve overall traffic operations, safety, site access, circulation, etc. However, such proposals may be unrelated to the traffic impacts of the Project and are not considered to be the responsibility of the Developer. Implementation of such modifications are subject to the discretion and approval of the respective agency. In general all proposals from the Engineer should not be considered mandatory and are not intended to assign or imply funding responsibility.

A TIA is not a detailed site plan review nor a substitute for local or regional transportation planning.

## **Project Description**

The Project will consist of high-rise office with ground-floor commercial use in multiple buildings. Buildout of the Project is estimated to occur by 2025. A summary of the proposed development program, by phase, is provided in **Table 1**.

Table 1. Development Program Summary

USE	FUTURE AMOUNT
Office	462,100 SF
Commercial	60,000 SF

*NOTE: The development program provided above is based upon the most current and complete information available at the time of this study publication.*

The subject site will have four points of vehicular access—two on Market Center Boulevard, including one at an existing “hooded” median opening and two on E Irving Boulevard (both at existing median openings).

Existing uses on the site include office/showroom warehouse, which will be replaced by the proposed development.

The 4.4-acre subject site is currently zoned Old Trinity and Design District Special Purpose District (PD No. 621), Subdistrict 1.

## **Study Parameters**

The study parameters used in this TIA are based upon industry standard practices and requirements of the City of Dallas. Project-specific study parameters were reviewed with City staff at the outset of the study.

This TIA analyzed the day-to-day traffic operations on the public roadway system at time periods that have the greatest combined volume of the background traffic and site-related traffic. Due to the predominant influence of background traffic, the weekday AM and PM peak hours of adjacent street traffic are typically analyzed.

The analysis scenarios addressed in this study include the following:

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- at existing conditions ("Existing" scenario)
- at site buildout year without site-generated traffic ("Background" scenario)
- at site buildout year with site-generated traffic ("Buildout" scenario)
- at five years after site buildout without site-generated traffic
- at five years after site buildout with site-generated traffic ("Horizon" scenario)

*NOTE: Analyses of all future conditions scenarios utilize projected traffic volumes derived by Pacheco Koch using reasonable and customary assumptions that are based upon existing conditions where possible. ITE appropriately points out that, due to natural changes in traffic patterns that occur over time, the margin of error for projected traffic volumes increases as the length of time of the projection increases; and, any projection of hourly turning movement volumes beyond five years inherently contain significant assumptions.*

The following technical assumptions were also made in this analysis.

- Background traffic includes projected traffic volumes from a nearby development currently under construction:
  - 161 Riveredge Drive (same Developer) - the Riveredge development is expected to contain approximately 123,000 SF of office and a 10,000-SF restaurant to be constructed during a similar timeframe as the Market Center redevelopment. Detailed trip data are provided in APPENDIX C.

## **Study Area**

The study area for a TIA is typically defined to allow an assessment of the most relevant traffic impacts to the local area. The extent of the study area is discretionary but is generally commensurate with the scale of the proposed development. Special localized factors may also be considered. The specific locations included in the study area of this TIA are listed below and depicted in **Exhibit 1**.

Traffic-Signal-Controlled Intersections:

- (a) Oak Lawn Avenue and Irving Boulevard
- (b) Oak Lawn Avenue and Market Center Boulevard
- (c) Market Center Boulevard and Turtle Creek Boulevard

STOP-Sign-Controlled Intersections:

- (d) Irving Boulevard and Riveredge Drive/Site Driveway 1
- (e) Irving Boulevard and Site Driveway 2
- (f) Market Center Boulevard and Site Driveway 3
- (g) Market Center Boulevard and Site Driveway 4

## Roadway Links:

- (A) Market Center Boulevard north of Oak Lawn Avenue
  - ❑ Existing operation and cross-section: *six lanes, two-way operation, median-divided*
  - ❑ City of Dallas Thoroughfare Plan Designation: *Principal Arterial/Special 4D*
  - ❑ Current Daily Traffic Volume: *8,644 (Tuesday, July 21, 2022)*
  - ❑ Posted Speed Limit: *35 MPH (per Sec. 28-44)*
  
- (B) Irving Boulevard west of Oak Lawn Avenue
  - ❑ Existing operation and cross-section: *six lanes, two-way operation, median-divided*
  - ❑ City of Dallas Thoroughfare Plan Designation: *Principal Arterial/M-6-D(A)*
  - ❑ Current Daily Traffic Volume: *16,426 (Tuesday, July 21, 2022)*
  - ❑ Posted Speed Limit: *35 MPH (per Sec. 28-44)*

## TRAFFIC IMPACT ANALYSIS

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The following is a description of the analyses performed as part of this Traffic Impact Analysis.

### **Approach**

The TIA presented in this report analyzed the operational conditions of the study area intersections for the relevant peak hours using standardized analytical methodologies, where applicable. Actual traffic volumes (with adjustments described previously) represent background traffic conditions with no site-related traffic included. Then, traffic generated by the proposed development was calculated using the industry-standard four-step approach of trip generation, mode split, trip distribution, and traffic assignment. By adding the site-generated traffic to the background traffic, the resulting site-plus-background operational conditions were re-analyzed in order to measure the "impact" created by the Project. For any scenario, where appropriate, the Engineer considered and may recommend measures to mitigate undue operational conditions. Recommendations may be unrelated to impact of the Project. However, any recommendations provided by the Engineer are for the consideration of the Approving Agency who may or may not accept the recommendations. Recommendations provided by the Engineer are not intended to assign or imply a mandate nor financial responsibility as such decisions are for the Approving Agency and Applicant to resolve.

## Background Traffic Volume Data

### Existing Volumes

Current traffic volumes were collected during the analysis periods at the study area intersections on Tuesday, July 12, 2022. Traffic volumes are graphically summarized in APPENDIX A; detailed data sheets are provided in APPENDIX B.

### Projected Background Traffic Volumes

Background traffic growth is defined as the normal growth of traffic that is not directly related to the subject development of this study. A review of historical traffic volume data can provide an indication of the local traffic growth patterns.

**Table 2** provides a comparison of prior traffic volumes from institutional sources in the vicinity of the subject site, from which PK calculated an annual growth rate.

Table 2. Historical Daily Traffic Volume Data

ROADWAY SEGMENT	HISTORICAL DAILY VOLUME (DATE)	ANNUAL GROWTH RATE
Oak Lawn Avenue, between Irving Boulevard and Market Center Boulevard	6,016 ('19) <sup>A</sup> 5,550 ('14) <sup>A</sup>	1.63%

Data Source: A = (TxDOT)

According to these historical data, traffic volumes in the vicinity of the subject site are generally increasing. For purposes of this study, Pacheco Koch assumed a growth rate of two percent (2.0%) per year to estimate future background traffic volumes.

By applying the assumed growth rate(s) described previously, future background traffic volumes at the Project buildout year were calculated for the study area intersections. These volumes are graphically summarized in APPENDIX A.

## Site-Related Traffic

### Trip Generation and Mode Split

Trip generation is calculated in terms of "trip ends" – a trip end is a one-way vehicular trip entering or exiting a site driveway (i.e., a single vehicle entering and exiting a site represents two trip ends). Trip generation for this Project was calculated using the Institute of Transportation Engineers (ITE) *Trip Generation* manual (11<sup>th</sup> Edition). ITE *Trip Generation* is a compilation of actual, vehicular traffic volume generation data and statistics by land use as collected over several decades by creditable sources across the country. Using the ITE equations and rates is an accepted methodology to calculate the projected site-generated traffic volumes for many land uses (though engineering judgment is strongly advised).

The base trip generation data from ITE generally reflect average conditions for a standalone use on a typical day. However, in some cases, the Engineer may judge that other factors may be of sufficient significance to warrant adjusting the base

ITE calculations in order to more accurately reflect Project-specific conditions. For this analysis “internal trip capture” was considered to be of sufficient significance to justify adjustment of the base ITE data.

“Internal trip capture” refers to the phenomenon that some portion of the trips generated by a given use originates from within the same site and, therefore, do not impact the external roadway network. The methodology used to calculate internal trip capture is recognized by ITE. The most current research and data collection is presented in the Transportation Research Board’s *NCHRP Report 684* (2011).

“Mode split” refers to the consideration of all modes of transportation. Typically, the majority of trips occur by passenger vehicles such as personal autos and ridesharing services. But, some alternative modes—such as travel by public transit, bicycle, and walking—do not generate additional vehicle trips. The default trip generation data from ITE is summarized in vehicular trip ends and incorporate “typical” mode split characteristics. However, when travel by alternative mode has the potential to be greater than normal, a reduction in the number of vehicular trip volume may be warranted. As described previously, for this analysis, an additional five percent (5.0%) reduction was applied to the base ITE data to account for bicycle mode split due to the close proximity of and convenient access to Trinity Strand Trail from the subject site.

**Table 3** provides a summary of the calculated trip ends generated by the project. Supplemental information used in the trip generation calculations is provided in APPENDIX C.

Table 3. Projected Trip Generation Summary

USE	DAILY TRIP ENDS (WEEKDAY)	AM PEAK HOUR TRIP ENDS (ADJACENT STREET PEAK)	PM PEAK HOUR TRIP ENDS (ADJACENT STREET PEAK)
		Total (In/Out)	Total (In/Out)
General Office	5,009	<b>702</b> (618/84)	<b>665</b> (113/552)
Retail (est: 12 kSF)	810	<b>21</b> (13/8)	<b>62</b> (30/32)
Restaurant (est.: 48 kSF)	4,024	<b>35</b> (18/17)	<b>374</b> (251/123)
GROSS TOTAL	9,843	<b>758</b> (649/109)	<b>1,101</b> (394/707)
SUBTOTAL AFTER REDUCTIONS*	9,351**	<b>687*</b> (600/87)*	<b>978*</b> (340/638)*

\* Reductions include alternate travel mode and internal trip capture reductions.

\*\* Alternative travel mode reductions only (equations for daily internal trip capture calculations are not available).

### Trip Distribution and Assignment

The distribution and assignment of site-generated trip ends to the surrounding roadway system is determined by proportionally estimating the orientation of travel

via various travel routes. This is a subjective exercise based upon professional judgment considering such factors as directional characteristics of existing local traffic, trip attributes (e.g., trip purpose, trip length, travel time, etc.), roadway features (e.g., capacity, operational conditions, character of environment), regional demographics, etc.

Traffic for the proposed redevelopment was distributed and assigned to the study area roadway network based upon consideration of the factors listed above. Detailed trip distribution and traffic assignment calculations and results are summarized in APPENDIX C.

### Site-Generated Traffic Volumes

Site-generated traffic is calculated by multiplying the trip generation value (from **Table 3**) by the corresponding traffic assignments (from APPENDIX C). The resulting cumulative (for all uses) peak period site-generated traffic volumes at buildout of the Project are graphically summarized in APPENDIX A.

## **Traffic Operational Analysis — Roadway Links**

### Description

A roadway link is a segment of roadway between two intersections. Roadway link capacity analysis is a comparison of actual or forecasted traffic volumes to the theoretically optimum roadway capacity. The capacity of the roadway link is predominantly a function of the roadway's cross-section (i.e., number of lanes, lane widths, type of center divider, etc.). However, other more theoretical factors also apply, such as the character of environment and the functional classification of the roadway. Generally, roadway link capacity is less critical than intersection capacity; however, it can provide a gage of the utilization of given roadway.

A specific industry standard for roadway link capacity does not exist, but the typical concept is derived from a base saturation flow rate (i.e., the maximum theoretical rate of continuous flow under ideal, unobstructed conditions -- in the traffic engineering industry, this value is generally considered to range between 1,900-2,100 vehicles per lane per hour). A series of adjustment factors are then applied to the saturation flow rate to reflect the characteristics of a given location.

The North Central Texas Council of Governments (NCTCOG) – the metropolitan planning agency for the Dallas-Fort Worth region – has derived internal “hourly service volume” guidelines used for transportation modelling purposes. The NCTCOG values were based upon the principals presented in the *Highway Capacity Manual* with “regional calibration” factors applied. Though these per-lane capacities, or “Service Volumes” (summarized in the table below), are intended for modelling purposes, they do provide a reasonable gage of theoretical capacity.

**Hourly Service Volumes By Roadway Function**

Area Type	Activity Density Range (per acre)	Principal Arterial		Minor Arterial & Frontage Road		Collector & Local Street	
		Median-Divided or One-Way	Undivided Two-Way	Median-Divided or One-Way	Undivided Two-Way	Median-Divided or One-Way	Undivided Two-Way
CBD	>125	725	650	725	650	475	425
Outer Business	30-125	775	725	775	725	500	450
Urban Residential	7.5-30	850	775	825	750	525	475
Suburban Residential	1.8-7.5	900	875	900	825	575	525
Rural	<1.8	1,025	925	975	875	600	550

To determine the utilization of a roadway, the volume:capacity ratio can be calculated – a v/c ratio of less than 1.0 indicates that the roadway is operating under capacity. NCTCOG’s Level of Service denominations are as follows:

- Volume:Capacity Ratio  $\leq$  65% is LOS A/B/C,
- Volume:Capacity Ratio  $>$  65% and  $\leq$  100% is LOS D/E,
- Volume:Capacity Ratio  $\geq$  100% is LOS F

**Summary of Results**

For roadways adjacent to or in the vicinity of the subject site, the volume/capacity ratio was calculated for existing and site buildout conditions. A summary of the link capacity analysis is provided in **Table 4**. See specific recommendations in the *Recommendations* section of this report.

**Table 4. Roadway Link Capacity Analysis Results Summary**

ROADWAY/ SCENARIO	PEAK HOUR VOLUME	THEORETICAL HOURLY CAPACITY	V:C RATIO— LEVEL OF SERVICE
<i>Market Center Boulevard</i>			
<i>(AM Peak Hour)</i>			
Existing Conditions	831	5,100/3,400*	0.16-A / 0.24-A*
Buildout Year-Background	882	5,100/3,400*	0.17-A / 0.26-B*
Buildout Year-Buildout	1,148	5,100/3,400*	0.23-A / 0.34-B*
<i>Irving Boulevard</i>			
<i>(PM Peak Hour)</i>			
Existing Conditions	1,731	5,100	0.34-B
Buildout Year-Background	1,837	5,100	0.36-B
Buildout Year-Buildout	2,232	5,100	0.44-B

\* Hypothetical results as a four-lane, median-divided cross-section (per City of Dallas Thoroughfare Plan).

## **Traffic Operational Analysis — Roadway Intersections**

### Description

The level of performance of civil infrastructure can often be measured through an analysis of volume and capacity that considers various physical and operational characteristics of the system. For vehicular traffic an operational analysis of roadway intersection capacity over a 60-minute period is the most detailed type of analysis. An industry-standardized methodology for this type of analysis was developed by the Transportation Research Board and is presented in the Highway Capacity Manual (HCM). HCM uses the term “Level of Service” (or, LOS) to qualitatively describe the efficiency using a letter grade of A through F. Generally, LOS can be described as follows:

LOS A = free, unobstructed flow

LOS B = reasonably free flow

LOS C = stable flow

LOS D = approaching unstable flow

LOS E = unstable flow, operating at design capacity

LOS F = operating over design capacity

Traffic operational analysis is typically measured in one-hour periods during day-to-day peak conditions. In most urban settings, LOS C, or better, is desirable, although LOS D is considered to be acceptable in urban conditions; LOS E indicates a facility or maneuver is approaching capacity, while LOS F is theoretically an over-capacity condition. On highly-utilized transportation facilities, brief periods of LOS E or F conditions are not uncommon for during peak periods. In some cases measures to increase capacity, either through operational changes and/or physical improvements, can be identified to improve efficiency and sometimes raise Level of Service.

For traffic-signal-controlled (“signalized”) intersections and STOP-controlled (“unsignalized”) intersections, LOS is determined based upon the calculated average seconds of delay per vehicle. For signalized intersections the average delay per vehicle can be effectively calculated for the entire intersection; however, for unsignalized intersections the average delay per vehicle is calculated only by approach or by individual traffic maneuvers that must stop or yield right-of-way.

*NOTE: The HCM unsignalized intersection analysis methodology was developed and calibrated for low-to-moderate volume intersections. When applied to intersections with one or more high-volume or high-capacity approaches, the analyses often reflect poor results (i.e., low Level of Service). However, the actual delay/operational conditions are typical of similar locations and do not necessarily represent unique conditions. Low-performing, high-volume, unsignalized intersections cannot be analytically mitigated unless a traffic signal is installed. (Traffic signal installation is subject to a detailed analysis of established criteria AND approval of the responsible agency. Neither Level of Service nor vehicle delay is a warrant for traffic signal installation.)*



The following table summarizes the LOS criteria for signalized and unsignalized intersections as defined in the latest edition of the *Highway Capacity Manual*.

	<b>Signalized Intersection (Average Delay per Vehicle)</b>	<b>Unsignalized Intersection (Average Delay per Vehicle)</b>
LOS A	$\leq 10$	$\leq 10$
LOS B	$> 10 - \leq 20$	$> 10 - \leq 15$
LOS C	$> 20 - \leq 35$	$> 15 - \leq 25$
LOS D	$> 35 - \leq 55$	$> 25 - \leq 35$
LOS E	$> 55 - \leq 80$	$> 35 - \leq 50$
LOS F	$> 80$	$> 50$

### Analysis Traffic Volumes

Determination of the traffic impact associated with the Project is measured by comparing the incremental change in operational conditions during peak periods with and without site-related traffic. APPENDIX A provides exhibits summarizing the following:

- Existing traffic volumes during study peak hours
- Projected Background traffic volumes at the Site Buildout Year during study peak hours
- Projected Site-Generated traffic volumes during study peak hours
- Projected Background-plus-Site-Generated traffic volumes at the Site Buildout Year during study peak hours
- Projected five years after site buildout traffic volumes, including Site-Generated traffic during study peak hours

A summary of the existing intersection/roadway geometry and traffic control devices is also graphically summarized in APPENDIX A.

### Summary of Results

Intersection capacity analyses presented in this study were performed using the *Synchro* software package. **Table 5** and **Table 6** provide a summary of the peak period intersection operational conditions under the analysis conditions presented previously. Detailed software output is provided in APPENDIX D.

## **SITE ACCESS EVALUATION**

The City of Dallas *Street Design Manual* suggests various site access items should be evaluated for each project, where applicable. **Table 7** summarizes the findings and recommendations of these evaluations. Applicable supplemental information is provided in APPENDIX E.

Table 5. Peak Hour Intersection Capacity Analysis Results Summary  
(Signalized Intersections)

INTERSECTION		EXISTING CONDITIONS						NO BUILD CONDITIONS						BUILD CONDITIONS						HORIZON CONDITIONS								
		AM			PM			AM			PM			AM			PM			AM			PM					
		LOS	delay	queue	LOS	delay	queue	LOS	delay	queue	LOS	delay	queue	LOS	delay	queue	LOS	delay	queue	LOS	delay	queue	LOS	delay	queue	LOS	delay	queue
Oak Lawn Avenue @ E Irving Boulevard	<b>Overall</b>	<b>D</b>	<b>(36.0)</b>		<b>B</b>	<b>(15.3)</b>		<b>D</b>	<b>(36.2)</b>		<b>B</b>	<b>(15.5)</b>		<b>D</b>	<b>(35.3)</b>		<b>B</b>	<b>(16.8)</b>		<b>D</b>	<b>(37.7)</b>		<b>B</b>	<b>(16.7)</b>				
	EB	D	(43.6)	126 ft	B	(17.7)	156 ft	D	(51.5)	153 ft	B	(17.9)	167 ft	D	(55.0)	168 ft	C	(20.2)	190 ft	E	(63.5)	200 ft	B	(19.8)	215 ft			
	WB	D	(44.6)	198 ft	B	(17.6)	43 ft	D	(43.0)	218 ft	B	(16.4)	45 ft	D	(41.3)	230 ft	B	(15.1)	50 ft	D	(39.5)	242 ft	B	(14.0)	54 ft			
	NB	A	(9.9)	25 ft	B	(14.4)	60 ft	B	(11.0)	28 ft	B	(15.9)	66 ft	B	(12.1)	29 ft	B	(17.2)	66 ft	B	(13.4)	34 ft	B	(18.6)	72 ft			
	SB	A	(4.9)	33 ft	A	(4.1)	117 ft	A	(4.9)	37 ft	A	(4.7)	160 ft	A	(7.1)	96 ft	A	(8.6)	167 ft	A	(9.1)	135 ft	A	(6.6)	182 ft			
Oak Lawn Avenue @ Market Center Boulevard	<b>Overall</b>	<b>C</b>	<b>(20.5)</b>		<b>B</b>	<b>(17.0)</b>		<b>C</b>	<b>(23.1)</b>		<b>B</b>	<b>(19.1)</b>		<b>C</b>	<b>(26.1)</b>		<b>C</b>	<b>(22.1)</b>		<b>C</b>	<b>(27.2)</b>		<b>C</b>	<b>(25.6)</b>				
	EB	A	(5.9)	30 ft	A	(5.4)	15 ft	A	(6.4)	34 ft	A	(5.2)	16 ft	A	(8.2)	44 ft	B	(11.1)	97 ft	A	(8.6)	47 ft	B	(12.6)	115 ft			
	WB	A	(7.5)	105 ft	A	(9.5)	50 ft	A	(8.5)	118 ft	A	(9.9)	53 ft	B	(12.1)	150 ft	B	(12.7)	67 ft	B	(12.6)	168 ft	B	(13.2)	74 ft			
	NB	D	(52.5)	103 ft	C	(24.0)	72 ft	D	(51.8)	113 ft	C	(25.2)	96 ft	D	(44.4)	117 ft	C	(26.2)	104 ft	D	(46.4)	127 ft	C	(27.3)	110 ft			
	SB	D	(44.3)	126 ft	C	(27.9)	117 ft	D	(47.4)	179 ft	C	(31.7)	153 ft	D	(47.0)	398 ft	D	(36.1)	180 ft	D	(49.5)	424 ft	C	(44.8)	203 ft			
Turtle Creek Boulevard @ Market Center Boulevard	<b>Overall</b>	<b>B</b>	<b>(11.3)</b>		<b>B</b>	<b>(13.9)</b>		<b>B</b>	<b>(11.4)</b>		<b>B</b>	<b>(14.5)</b>		<b>B</b>	<b>(11.7)</b>		<b>B</b>	<b>(16.2)</b>		<b>B</b>	<b>(11.8)</b>		<b>B</b>	<b>(16.6)</b>				
	EB	A	(2.5)	25 ft	B	(10.2)	58 ft	A	(2.5)	28 ft	B	(10.8)	65 ft	A	(3.3)	46 ft	B	(13.2)	78 ft	A	(3.5)	50 ft	B	(13.3)	84 ft			
	WB	A	(3.7)	55 ft	B	(16.8)	72 ft	A	(4.0)	61 ft	B	(18.2)	82 ft	A	(4.7)	69 ft	B	(19.2)	78 ft	A	(5.0)	78 ft	B	(19.8)	87 ft			
	NB	D	(42.6)	52 ft	B	(16.7)	55 ft	D	(44.0)	59 ft	B	(16.5)	66 ft	D	(47.1)	77 ft	B	(18.6)	130 ft	D	(47.5)	80 ft	B	(19.3)	136 ft			
	SB	C	(34.1)	76 ft	B	(13.2)	41 ft	C	(33.2)	79 ft	B	(13.2)	43 ft	C	(29.9)	76 ft	B	(13.0)	43 ft	C	(29.8)	83 ft	B	(13.2)	46 ft			
Turtle Creek Boulevard @ E Irving Boulevard	<b>Overall</b>	<b>A</b>	<b>(6.6)</b>		<b>B</b>	<b>(16.4)</b>		<b>A</b>	<b>(8.4)</b>		<b>B</b>	<b>(17.4)</b>		<b>A</b>	<b>(8.2)</b>		<b>B</b>	<b>(17.2)</b>		<b>A</b>	<b>(8.7)</b>		<b>B</b>	<b>(17.8)</b>				
	EB	A	(3.5)	45 ft	B	(16.6)	275 ft	A	(4.3)	57 ft	B	(17.0)	299 ft	A	(4.3)	64 ft	B	(17.3)	309 ft	A	(5.3)	71 ft	B	(18.0)	352 ft			
	WB	A	(3.8)	67 ft	B	(14.0)	105 ft	A	(4.7)	84 ft	B	(14.4)	112 ft	A	(4.7)	87 ft	B	(13.8)	144 ft	A	(5.0)	98 ft	B	(14.6)	160 ft			
	NB	C	(28.1)	44 ft	C	(22.9)	77 ft	C	(29.0)	51 ft	C	(29.7)	128 ft	C	(29.0)	51 ft	C	(29.7)	128 ft	C	(29.4)	55 ft	C	(30.0)	133 ft			
	SB	C	(27.3)	56 ft	B	(19.7)	59 ft	C	(33.8)	87 ft	C	(21.5)	73 ft	C	(33.8)	87 ft	C	(21.5)	73 ft	C	(33.8)	90 ft	C	(21.2)	78 ft			

NOTE: Traffic signal operational parameters used in this analysis were based upon actual traffic signal operational characteristics observed in the field at the time of data collection.

Table 6. Peak Hour Intersection Capacity Analysis Results Summary  
(Unsignalized Intersections)

INTERSECTION	TRAFFIC MANEUVER	EXISTING CONDITIONS						NO BUILD CONDITIONS						BUILD CONDITIONS					
		AM			PM			AM			PM			AM			PM		
		LOS	delay	queue	LOS	delay	queue	LOS	delay	queue	LOS	delay	queue	LOS	delay	queue	LOS	delay	queue
Riveredge Drive/Site Driveway 1 @ E Irving Boulevard	<b>NB</b>	<b>B</b>	<b>(12.0)</b>	<b>5 ft</b>	<b>C</b>	<b>(18.8)</b>	<b>12 ft</b>	<b>B</b>	<b>(14.8)</b>	<b>12 ft</b>	<b>C</b>	<b>(21.6)</b>	<b>78 ft</b>	<b>C</b>	<b>(20.3)</b>	<b>19 ft</b>	<b>D</b>	<b>(33.5)</b>	<b>118 ft</b>
	SB	A	(9.8)	0 ft	C	(20.5)	2 ft	A	(9.8)	0 ft	E	(39.9)	5 ft	F	(69.0)	68 ft	F	(>100)	1626 ft
	<b>EBL</b>	<b>A</b>	<b>(8.8)</b>	<b>0 ft</b>	<b>A</b>	<b>(0.0)</b>	<b>0 ft</b>	<b>A</b>	<b>(8.8)</b>	<b>0 ft</b>	<b>A</b>	<b>(0.0)</b>	<b>0 ft</b>	<b>B</b>	<b>(11.2)</b>	<b>7 ft</b>	<b>A</b>	<b>(9.2)</b>	<b>2 ft</b>
	<b>WBL</b>	<b>A</b>	<b>(8.9)</b>	<b>5 ft</b>	<b>B</b>	<b>(10.7)</b>	<b>5 ft</b>	<b>B</b>	<b>(10.3)</b>	<b>31 ft</b>	<b>B</b>	<b>(12.1)</b>	<b>14 ft</b>	<b>B</b>	<b>(10.6)</b>	<b>33 ft</b>	<b>B</b>	<b>(11.5)</b>	<b>14 ft</b>
w/ Improvement <sup>1,2</sup>	<b>NBL</b>													<b>F</b>	<b>(53.6)</b>	<b>5 ft</b>	<b>F</b>	<b>(&gt;100)</b>	<b>21 ft</b>
	<b>NBR</b>													<b>C</b>	<b>(16.6)</b>	<b>14 ft</b>	<b>C</b>	<b>(15.1)</b>	<b>47 ft</b>
	SBL													-	-	-	-	-	
	SBR													F	(69.0)	68 ft	F	(>100)	1640 ft
	<b>EBL</b>													<b>B</b>	<b>(11.2)</b>	<b>7 ft</b>	<b>A</b>	<b>(9.2)</b>	<b>2 ft</b>
	<b>WBL</b>													<b>B</b>	<b>(10.6)</b>	<b>33 ft</b>	<b>B</b>	<b>(11.5)</b>	<b>14 ft</b>
E Irving Boulevard @ Site Driveway 2	<b>EBL</b>	-			-			-			-			<b>A</b>	<b>(9.5)</b>	<b>2 ft</b>	<b>A</b>	<b>(9.5)</b>	<b>2 ft</b>
	SB													<b>C</b>	<b>(18.8)</b>	<b>2 ft</b>	<b>C</b>	<b>(21.8)</b>	<b>21 ft</b>
Market Center Boulevard @ Site Driveway 3	NB	-			-			-			-			A	(9.2)	0 ft	A	(10.0)	7 ft
Market Center Boulevard @ Site Driveway 4	NB	-			-			-			-			A	(9.3)	2 ft	B	(10.8)	24 ft
	<b>WBL</b>	-			-			-			-			<b>B</b>	<b>(10.3)</b>	<b>26 ft</b>	<b>A</b>	<b>(9.5)</b>	<b>14 ft</b>

NOTE: Traffic maneuvers in bold font reflect maneuvers in the public right-of-way. (Other maneuvers listed only affect traffic maneuvers on private property.)

KEY:

A, B, C, D, E, F = Level-of-Service  
NB, SB, EB, WB = Intersection approach  
AM = AM Peak Hour of Adjacent Street

(##.#) = Average Seconds of Delay Per Vehicle  
-L, -T, -R = Left, Through, Right Turning movement  
PM = PM Peak Hour of Adjacent Street

IMPROVEMENTS (PROPOSED):

- 1 - Re-stripe and add NB left-turn lane.
- 2 - Re-stripe and add SB left-turn lane.

Table 7. Site Access Evaluation

EVALUATION	FINDING																								
<u>Auxiliary (Deceleration) Lanes</u>	Construction of deceleration lanes not recommended in urban conditions due to low speeds, driveway spacing, and pedestrian impact.																								
<u>Signage and Pavement Markings on Public Rights-of-Way</u>	Pavement markings along Irving Boulevard are in good condition; pavement markings along Market Center Boulevard are in poor condition. Existing signage around the perimeter of the site is in good condition.																								
<u>Historical Accident Analysis</u>	<p>According to the TxDOT Crash Records Information System (CRIS) database, a total of 30 reported crashes occurred around the perimeter of the site between 2019-2021. The following summarizes the number of severe crashes involving fatality (Type K) or serious injury (Type A). (See detailed summary data in Appendix E.)</p> <table border="1"> <thead> <tr> <th>Location</th> <th>Total</th> <th>Type K</th> <th>Type A</th> </tr> </thead> <tbody> <tr> <td>Intersection of Market Center Blvd &amp; Oak Lawn Ave</td> <td>16</td> <td>0</td> <td>1</td> </tr> <tr> <td>Intersection of Irving Blvd &amp; Oak Lawn Ave</td> <td>11</td> <td>0</td> <td>0</td> </tr> <tr> <td>Midblock on Market Center Blvd</td> <td>2</td> <td>0</td> <td>0</td> </tr> <tr> <td>Midblock on Irving Blvd</td> <td>1</td> <td>0</td> <td>0</td> </tr> <tr> <td><b>TOTAL</b></td> <td><b>30</b></td> <td><b>0</b></td> <td><b>1</b></td> </tr> </tbody> </table>	Location	Total	Type K	Type A	Intersection of Market Center Blvd & Oak Lawn Ave	16	0	1	Intersection of Irving Blvd & Oak Lawn Ave	11	0	0	Midblock on Market Center Blvd	2	0	0	Midblock on Irving Blvd	1	0	0	<b>TOTAL</b>	<b>30</b>	<b>0</b>	<b>1</b>
Location	Total	Type K	Type A																						
Intersection of Market Center Blvd & Oak Lawn Ave	16	0	1																						
Intersection of Irving Blvd & Oak Lawn Ave	11	0	0																						
Midblock on Market Center Blvd	2	0	0																						
Midblock on Irving Blvd	1	0	0																						
<b>TOTAL</b>	<b>30</b>	<b>0</b>	<b>1</b>																						
<u>Pedestrian Safety at Unsignalized Crossing(s)</u>	N/A - No unsignalized crossings around the perimeter of the site.																								
<u>Driveway Sight Distances</u>	All site driveways must comply with applicable sight distance requirements. No permanent obstructions were apparent.																								
<u>Number of Access Points and Driveway Spacing</u>	<p>The subject site currently has six points of vehicular access on the perimeter roadways (4 on Market Center, 2 on Irving). The proposed site plan will reduce the total number of driveways on Market Center Boulevard by two.</p> <table border="1"> <thead> <tr> <th>Frontage</th> <th>Existing</th> <th>Proposed</th> <th>Change</th> </tr> </thead> <tbody> <tr> <td>Market Center Blvd</td> <td>4</td> <td>2</td> <td>-2</td> </tr> <tr> <td>Irving Blvd</td> <td>2</td> <td>2</td> <td>0</td> </tr> </tbody> </table>	Frontage	Existing	Proposed	Change	Market Center Blvd	4	2	-2	Irving Blvd	2	2	0												
Frontage	Existing	Proposed	Change																						
Market Center Blvd	4	2	-2																						
Irving Blvd	2	2	0																						
<u>Corner Clearances</u>	All corner clearances are anticipated to comply with applicable standards. See Engineering Plans for detailed design.																								
<u>Median Openings</u>	<p>Market Center Blvd - The northernmost site driveway on Market Center Boulevard is served by an existing hooded left-turn entering the site. All other site driveways are right-in/right-out only. No changes to the existing median are anticipated.</p> <p>Irving Blvd - Both proposed site driveways on Irving Blvd are served by existing full median openings. Prior conversations with the City have included reducing the existing median opening with at the western driveway (Riveredge Drive intersection); it is recommended that the proposed driveway better align with Riveredge Drive to the extent possible. It is also recommended that the alignment of the eastern driveway also center with the median opening to the extent possible.</p>																								
<u>Shared Access</u>	N/A																								
<u>Stopping Sight Distance</u>	N/A																								
<u>Traffic Signal or STOP Control Warrant Analysis</u>	N/A																								
<u>Driveway Improvements</u>	All proposed driveways will be new or reconstructed and are anticipated to comply with applicable standards. See Engineering Plans for detailed design.																								
<u>Curb Return Radius</u>	All proposed driveways will be new or reconstructed and are anticipated to comply with applicable standards. See Engineering Plans for detailed design.																								

## SUMMARY OF FINDINGS AND RECOMMENDATIONS

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*NOTE: Recommendations presented in this report reflect the opinion of Pacheco Koch based solely upon technical analysis and professional judgment but are not intended to infer mandates or funding responsibility. Any proposed improvements in the public right-of-way are subject to approval of the responsible agency(-ies). Should the approving agency determine that any off-site improvements are required for approval of the Project, legal precedents apply with regard to jurisdiction and funding allocation.*

The following findings and, if applicable, recommendations were based upon an analysis of the anticipated traffic impact generated by the proposed development scenario outlined in the Project Description section of this report.

**FINDING:** The proposed site redevelopment will include mid-rise office buildings with ground-floor retail and structured parking. The planned uses are anticipated to generate about 9,000 trip ends per day, including approximately 700 trip ends during the AM Peak Hour and 1,000 trip ends during the PM Peak Hour.

**FINDING:** The subject site is short distance from the Trinity Strand Trail. A small percent of site-generated trips may utilize the trail for access.

- ❖ **RECOMMENDATION:** Reinstall the pavement markings for the crosswalk on the south leg of Turtle Creek Boulevard at the Market Center Boulevard intersection to facilitate crossings of trail users from the Trinity Strand Trail who are destined for the subject site.

**FINDING:** The proposed development will effectively utilize existing access points located on Market Center Boulevard and E Irving Boulevard. The northern driveway on Market Center Boulevard provides a hooded left turn into the existing driveway; both driveways on E Irving Boulevard have access to full median openings—one at the intersection with Riveredge Drive, and the other serving private driveways. The proposed development will remove two existing driveways on Market Center Boulevard. The number of driveways on Irving Boulevard will remain the same.

**FINDING:** Traffic-signal-controlled intersections in the vicinity of the site exist near the four corners—at the intersections with Oak Lawn Avenue and with Turtle Creek Boulevard. Generally, all signal-controlled-intersections currently operate at very good Levels of Service during peak hour periods. The greatest traffic impact is anticipated to occur at the intersection of Market Center Boulevard and Oak Lawn Avenue, which is anticipated to operate at Level of Service C with the addition of background growth and site-generated traffic. If background traffic growth continues for several years, the intersection may degrade to Level of Service D (generally “acceptable” for urban conditions) several years after site buildout. Automated traffic signal timing optimizations may negate or reduce the projected increases in delays.

**FINDING:** With the addition of projected background traffic growth, which includes projected traffic from future off-site developments in the vicinity,

left turns from the minor-street approaches at the unsignalized intersection of E Irving Boulevard and Riveredge Drive/Site Driveway 1, are projected to experience high delays during peak hour periods. The intersection is not considered to be a candidate for installation of a traffic signal due to proximity of existing traffic signals. However, if the volume projections are accurate, motorists on both sides of the street have other route alternatives that would allow them to avoid unprotected left-turn maneuvers if desired. In the case of the subject site, motorists can instead use the driveways on Market Center Boulevard to make right-turns in lieu of left turns onto E Irving Boulevard. For Riveredge Drive, motorists can choose to travel east or west on E Levee Street to access nearby traffic signals to perform protected turning maneuvers.

- ❖ **RECOMMENDATION:** To reduce delay for right-turning motorists at the intersection of E Irving Boulevard and Riveredge Drive/Site Driveway 1, it is recommended that (in the case of Riveredge Drive) the existing roadway be re-stripped within existing pavement to provide a separate left- and right-approach lanes. It is recommended that Driveway 1 be reconstructed to a width sufficient to provide separate left- and right-turning approach lanes. During the engineering design phase, efforts should be made to align Site Driveway 1 with Riveredge Drive to eliminate the existing offset of opposing left-turn maneuvers.

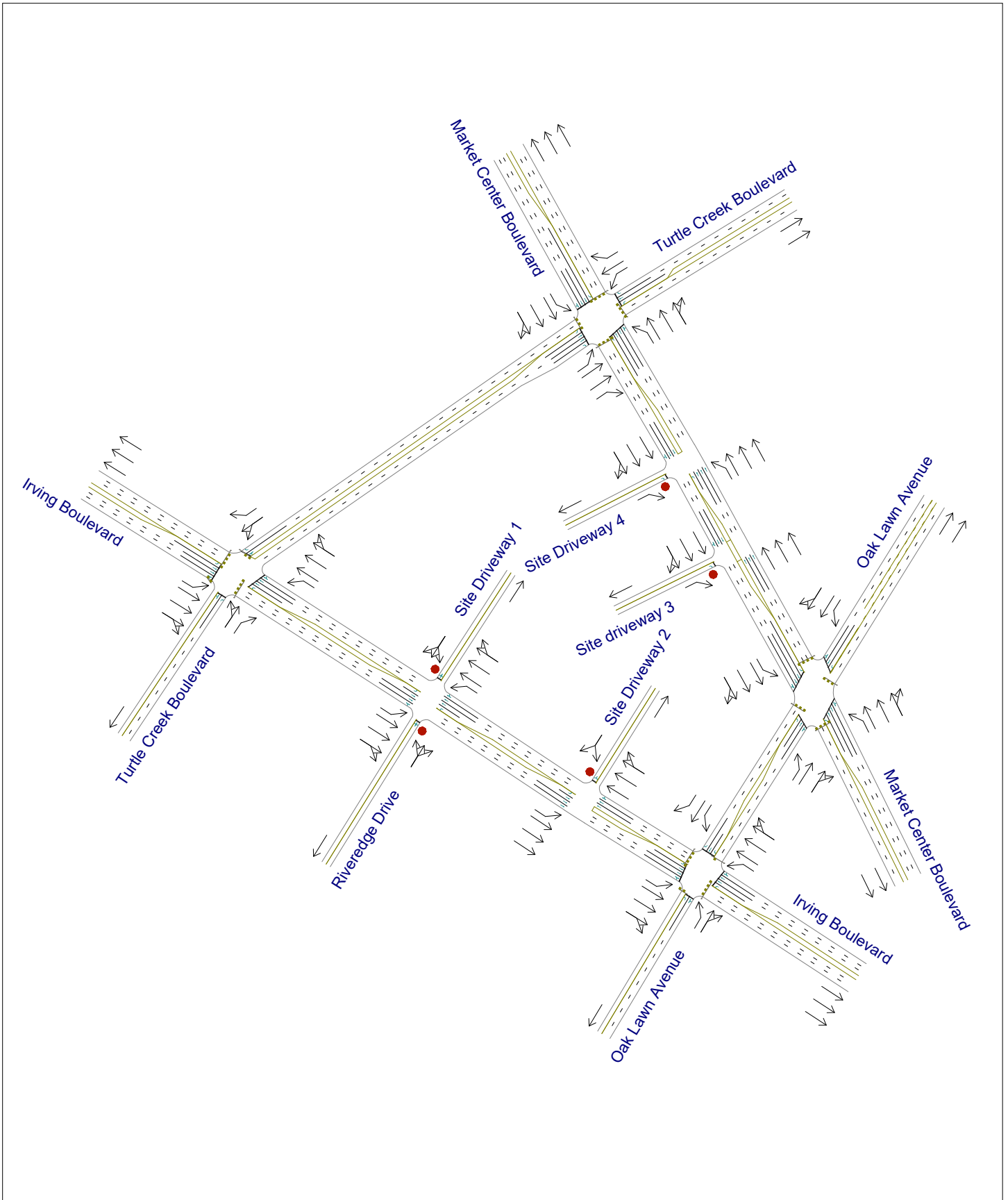
**NOTE:** The City of Dallas Thoroughfare Plan calls for Market Center Boulevard to have a "Special" four-lane, median-divided cross-section in the future (currently, the cross-section has six lanes with a raised center median). Though no timetable for modifications to this roadway are known, this analysis indicates that the roadway link capacity will continue to be sufficient after the lane reduction to support traffic from the proposed development.

END OF MEMO

APPENDIX A. Traffic Volumes Exhibits

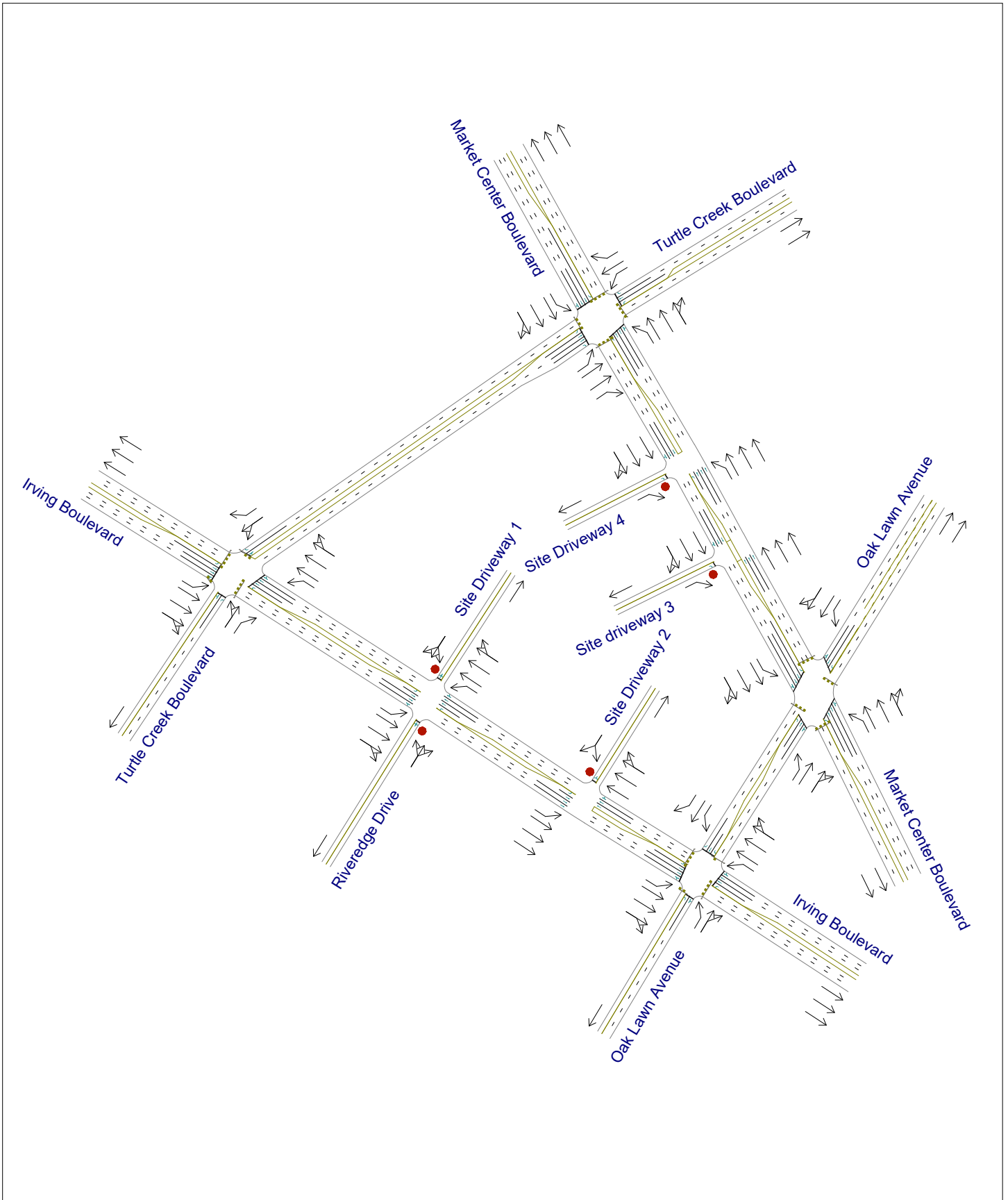
Appendix A1- Existing Roadway Geometry

North ^  
Not to Scale



Appendix A1a - Proposed Roadway Geometry

North ^  
Not to Scale

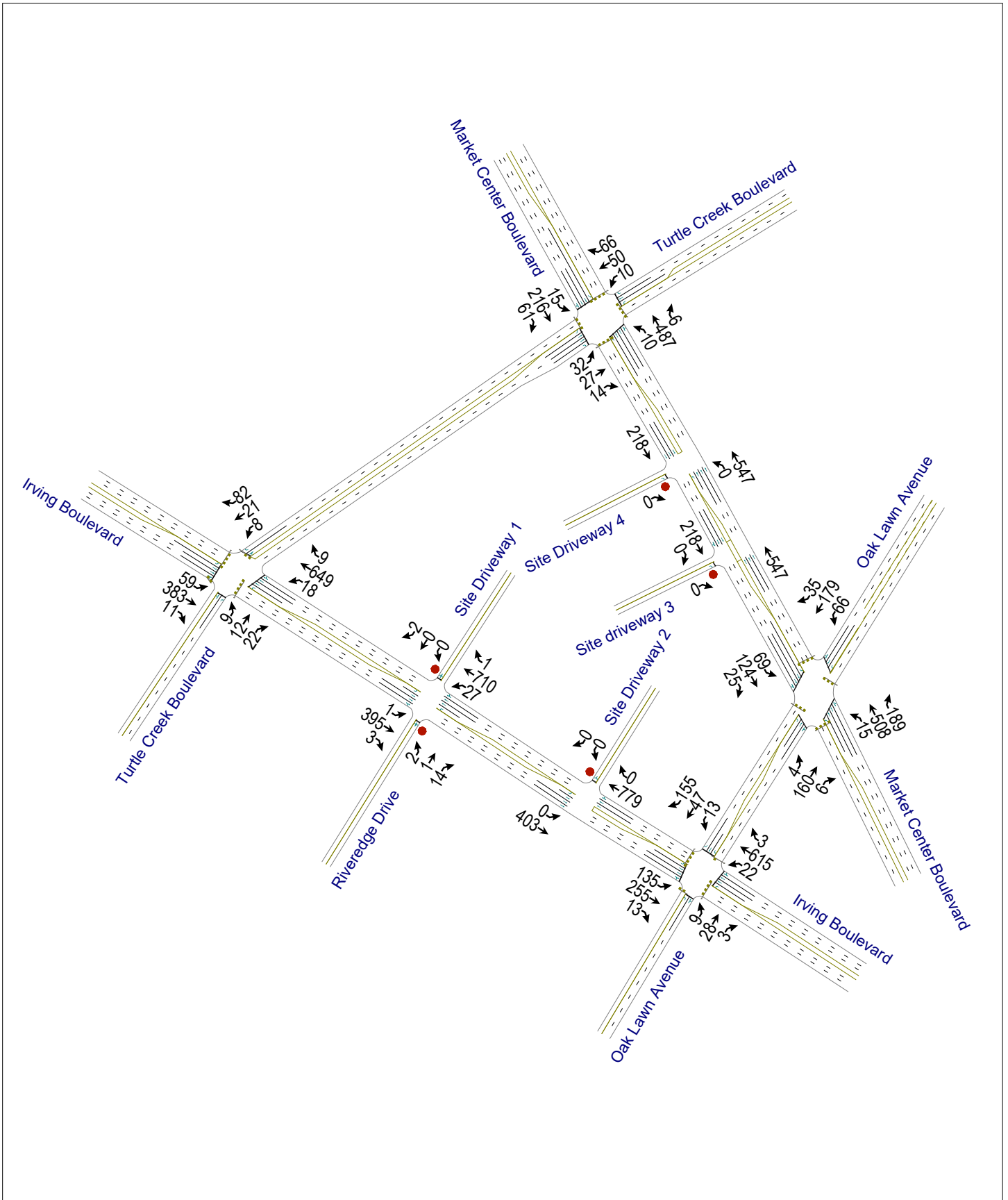


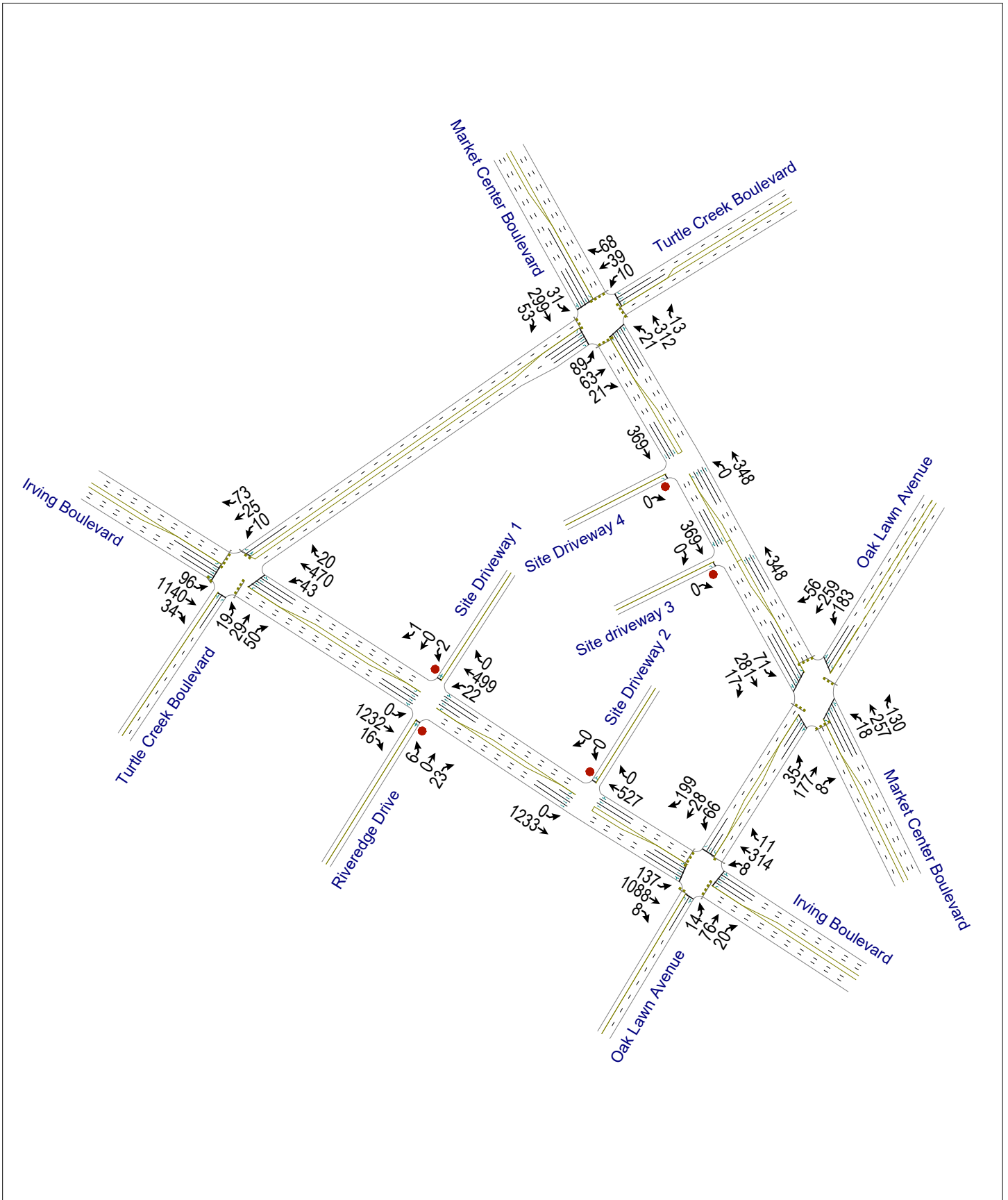


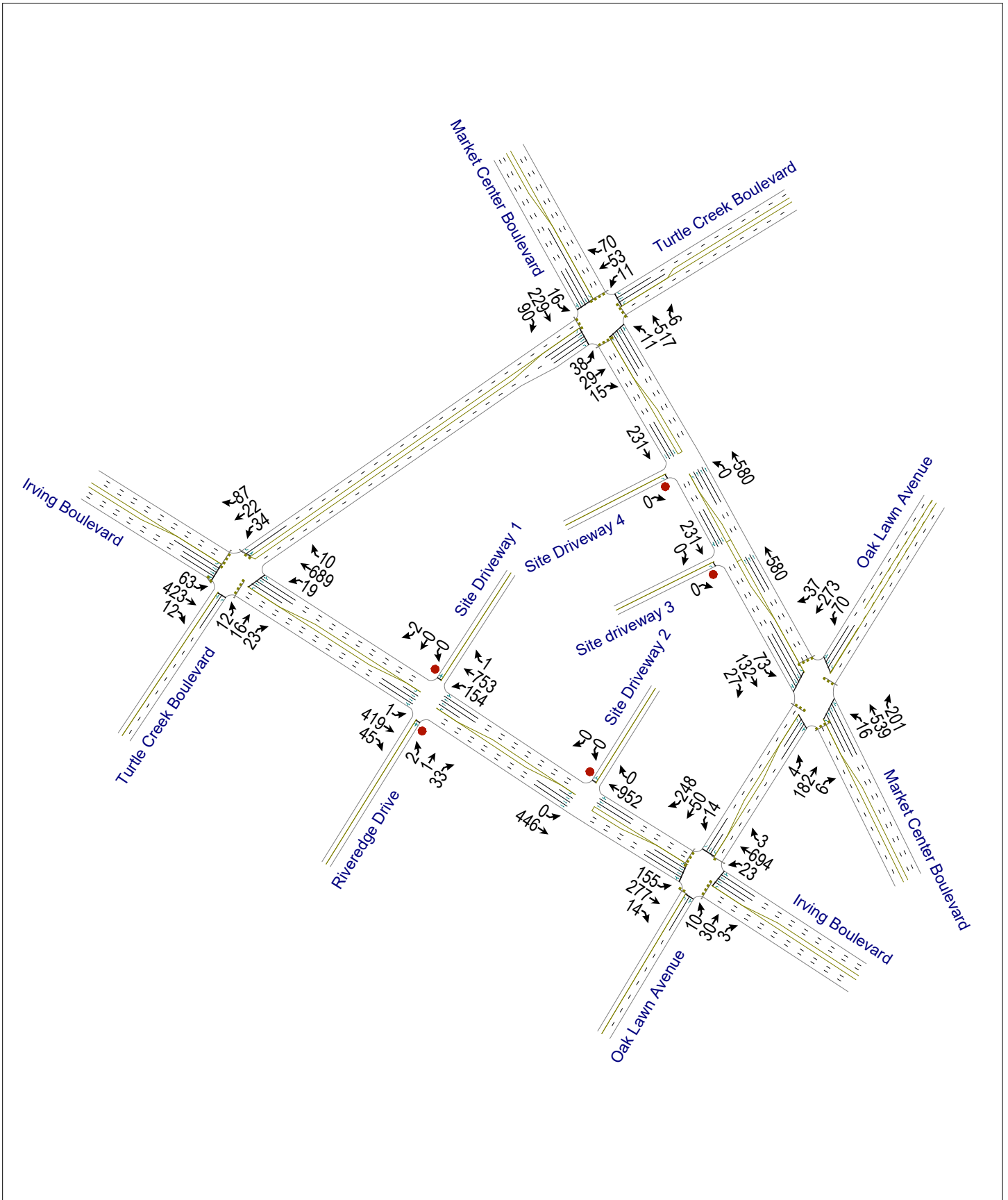
Appendix A1b - Improved Proposed Roadway Geometry

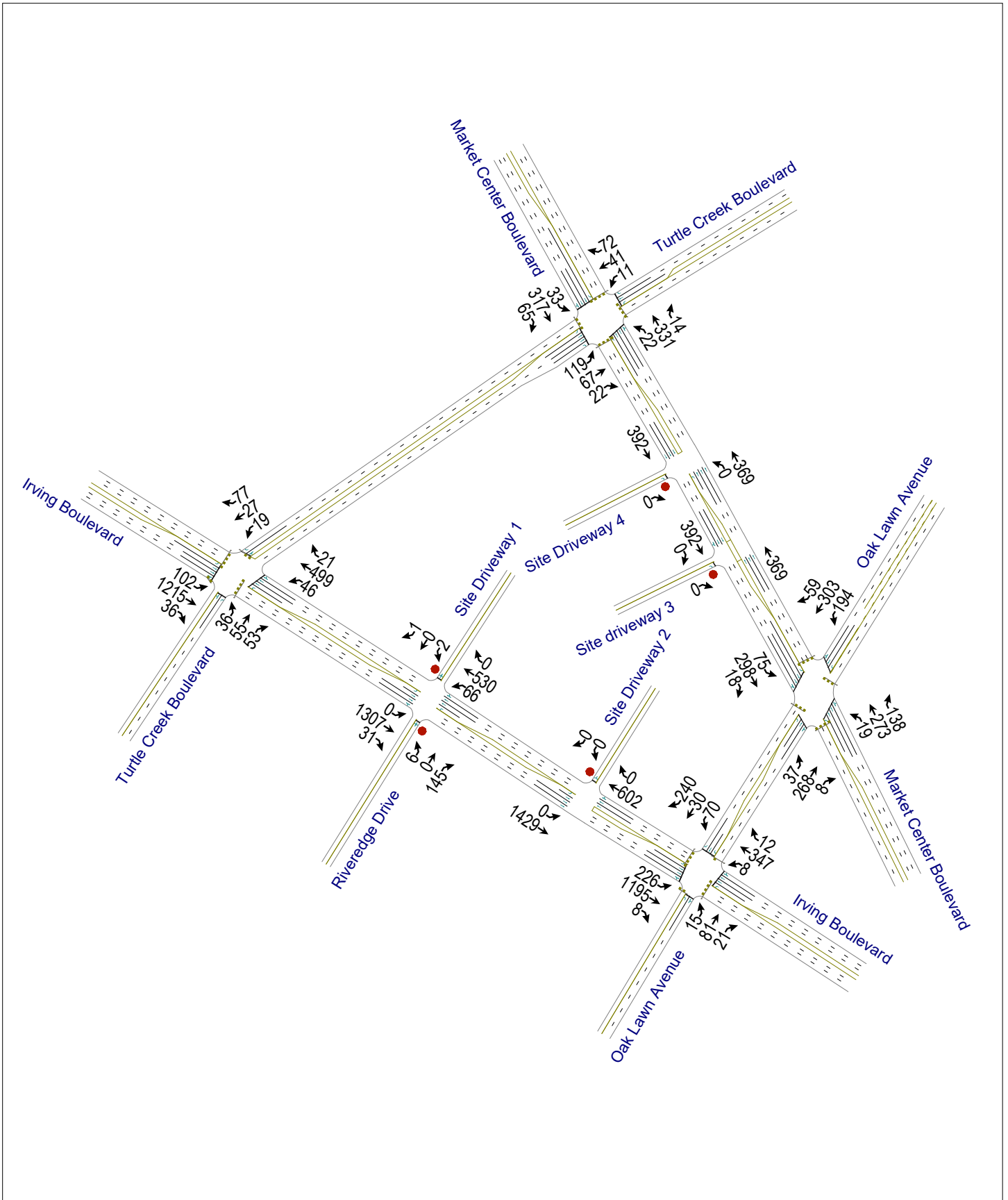
North ^  
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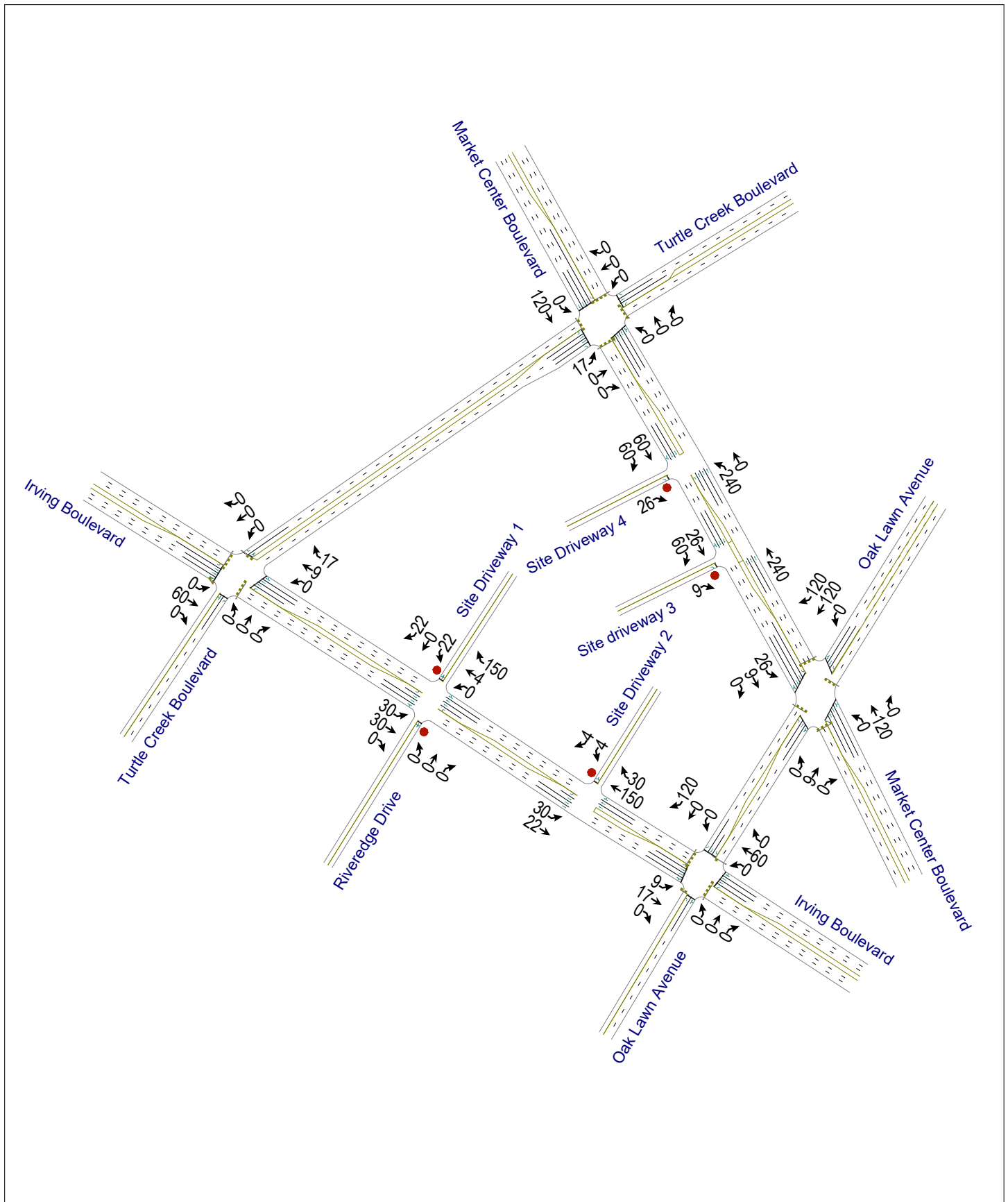


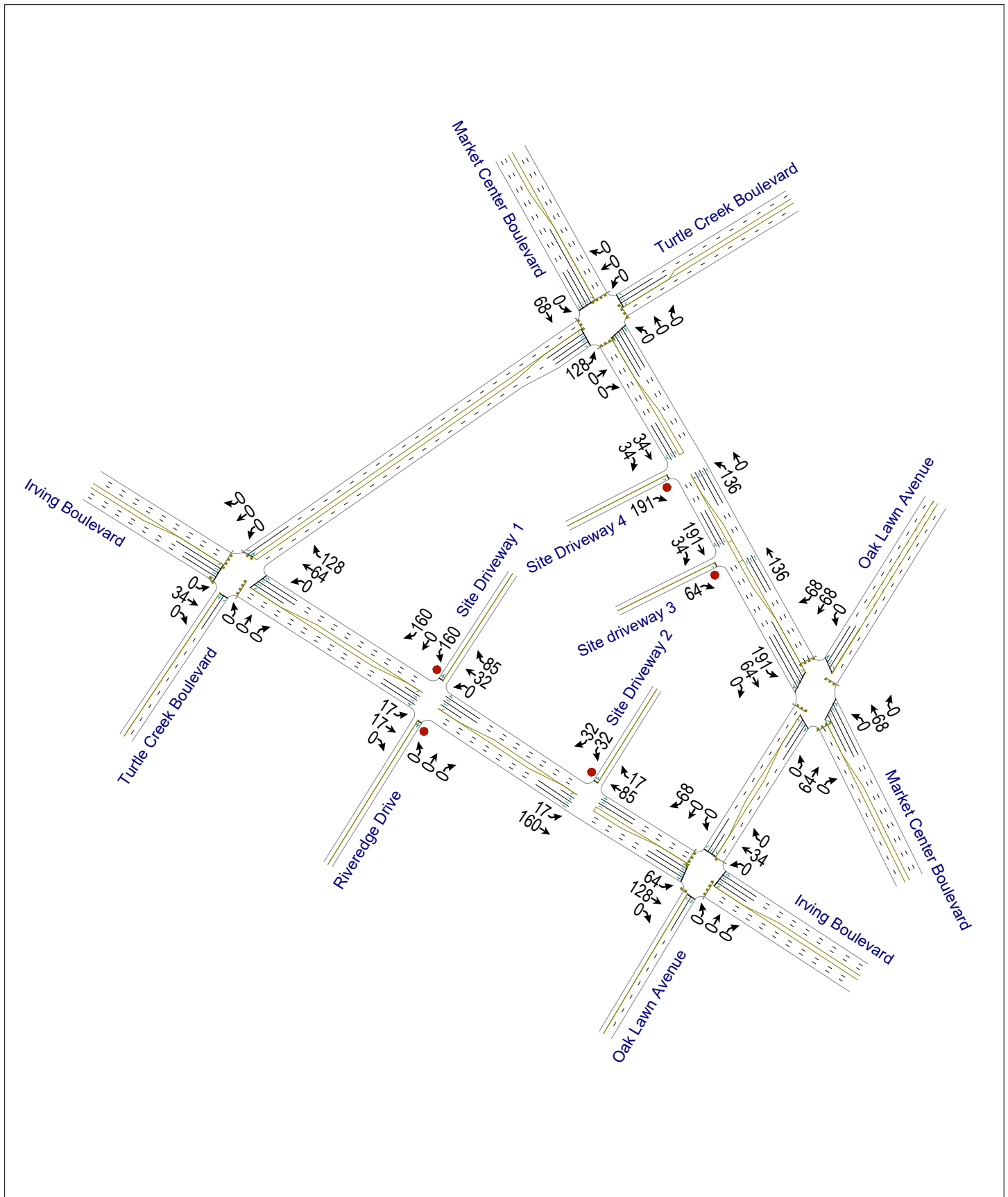


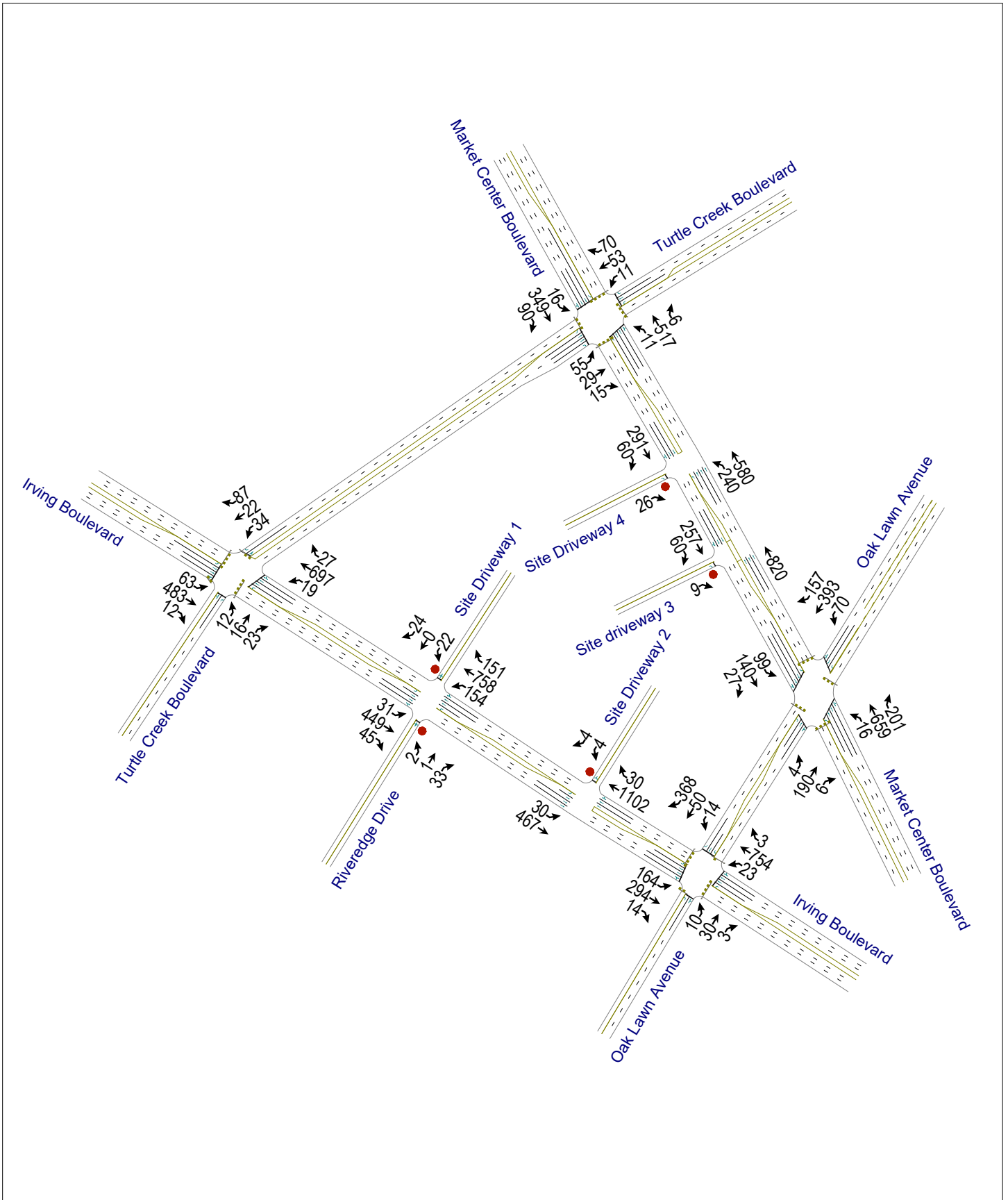




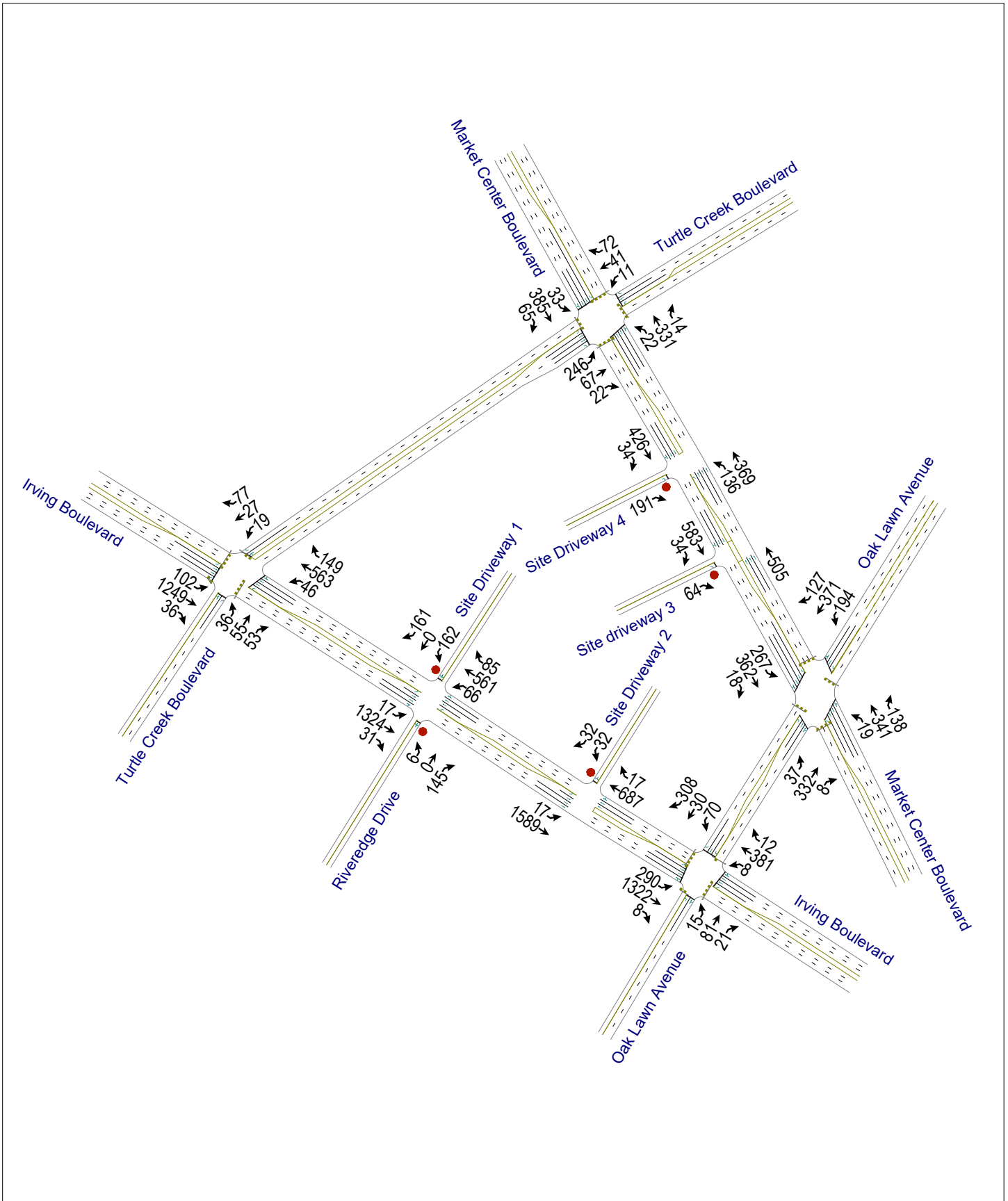


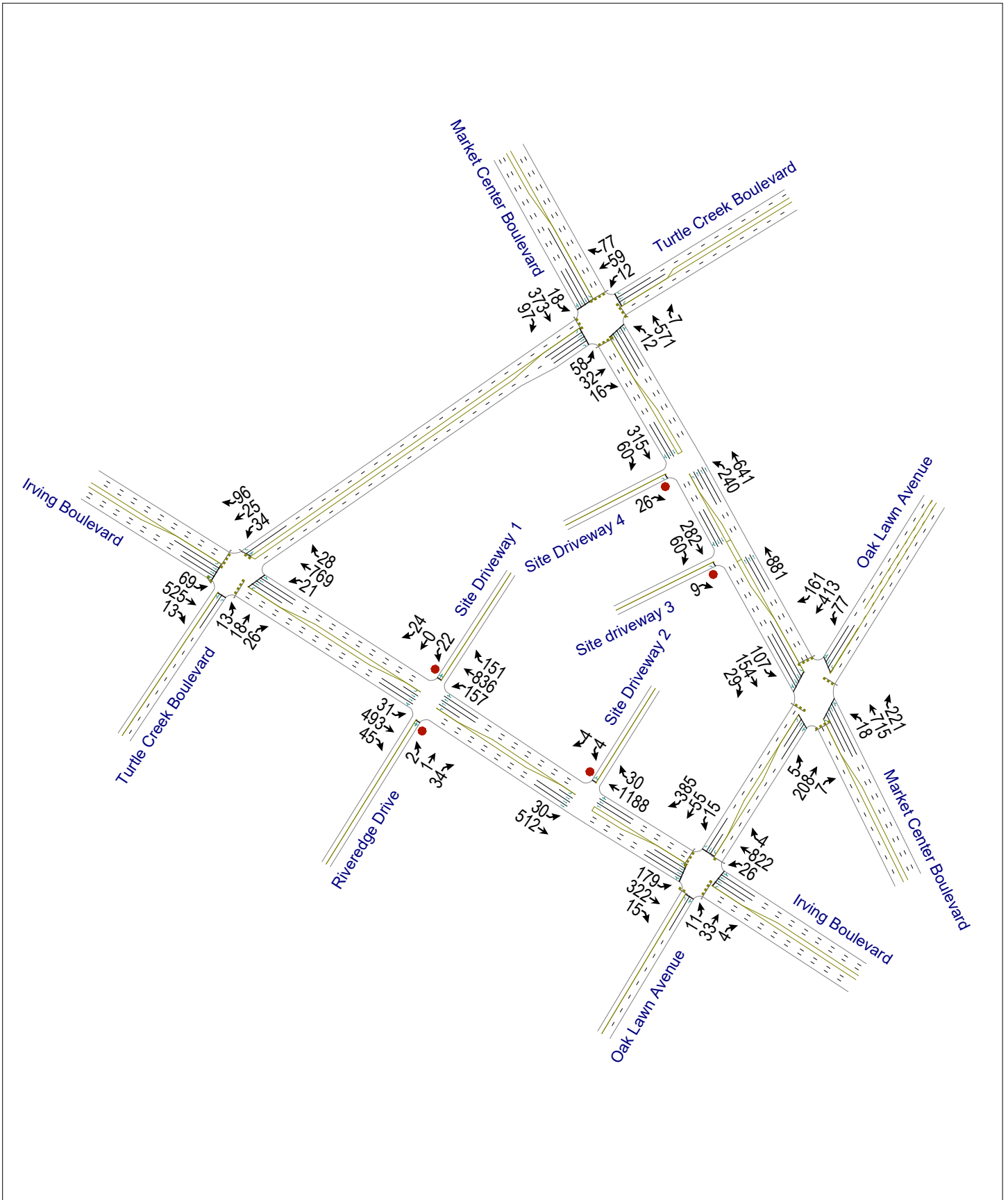


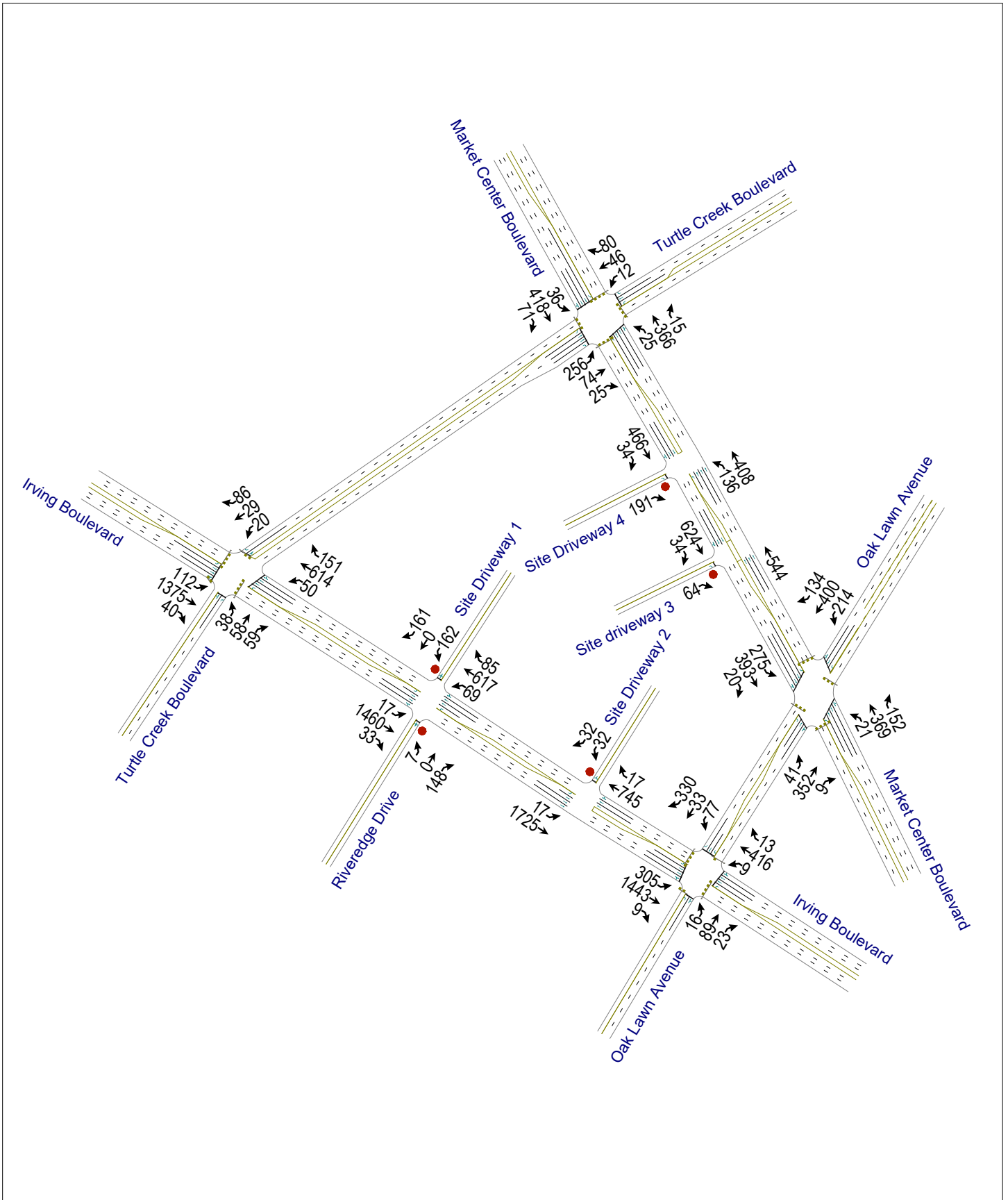












APPENDIX B. Detailed Traffic Volume Data

Intersection Turning Movement Counts

			NORTH LEG						EAST LEG						SOUTH LEG						WEST LEG					
			Southbound Approach on Turtle Creek Boulevard						Westbound Approach on Market Center Boulevard						Northbound Approach on Turtle Creek Boulevard						Eastbound Approach on Market Center Boulevard					
			Vehicles			Peds			Vehicles			Peds			Vehicles			Peds			Vehicles			Peds		
			U	L	T	R	CCW	CW	U	L	T	R	CCW	CW	U	L	T	R	CCW	CW	U	L	T	R	CCW	CW
START	END																									
City:	Dallas	7:00 AM	7:15 AM	1	5	8			3	109	0			5	6	2			1	25	8					
State:	Texas	7:15 AM	7:30 AM	1	9	9			1	131	4			1	2	1			6	23	13					
Day:	Tuesday	7:30 AM	7:45 AM	1	9	11			5	170	3			8	4	4			5	35	13					
Date:	12-Jul	7:45 AM	8:00 AM	0	10	14			3	130	3			6	8	6			2	54	7					
Year:	2022	8:00 AM	8:15 AM	1	16	9			3	138	1			7	7	1			8	52	18					
Data Collector:	Camera	8:15 AM	8:30 AM	3	10	18			4	122	2			9	7	7			0	53	16					
Data Source:	CJ Hensch & Associates, Inc.	8:30 AM	8:45 AM	4	10	24			0	120	1			4	7	3			1	55	9					
Traffic Control:	Traffic Signal	8:45 AM	9:00 AM	2	14	15			3	107	2			12	6	3			6	56	18					
Observations:		4:30 PM	4:45 PM	2	10	17			5	83	0			25	15	4			5	84	12					
		4:45 PM	5:00 PM	1	8	11			3	66	7			16	14	5			10	72	19					
		5:00 PM	5:15 PM	3	8	21			6	88	3			28	18	5			8	71	12					
		5:15 PM	5:30 PM	4	13	19			7	75	3			20	16	7			8	72	10					
		5:30 PM	5:45 PM	5	13	23			3	81	4			21	13	2			14	60	15					
		5:45 PM	6:00 PM	3	13	17			1	63	2			19	9	2			13	104	11					
		6:00 PM	6:15 PM	3	15	19			2	69	4			20	8	5			3	93	15					
		6:15 PM	6:30 PM	1	10	16			1	68	4			22	11	5			9	67	16					
AM Peak Hour	Intersection PHF:	0.95	Intersection PHV:	0	5	45	52		0	15	560	9		0	30	26	18		0	15	194	54				
	Peak Hour:	7:30 AM - 8:30 AM	PHF:	0.42	0.70	0.72			0.75	0.82	0.75			0.83	0.81	0.64			0.47	0.90	0.75					
	Study Area PHF:	0.95	Study Area PHV:	0	10	50	66		0	10	487	6		0	32	27	14		0	15	216	61				
	Peak Hour:	8:00 AM - 9:00 AM	PHF:	0.63	0.78	0.69			0.63	0.88	0.75			0.67	0.96	0.50			0.47	0.96	0.85					
PM Peak Hour	Intersection PHF:	0.96	Intersection PHV:	0	15	47	80		0	17	307	12		0	88	56	16		0	43	307	48				
	Peak Hour:	5:00 PM - 6:00 PM	PHF:	0.75	0.90	0.87			0.61	0.87	0.75			0.79	0.78	0.57			0.77	0.74	0.80					
	Study Area PHF:	0.94	Study Area PHV:	0	10	39	68		0	21	312	13		0	89	63	21		0	31	299	53				
	Peak Hour:	4:30 PM - 5:30 PM	PHF:	0.63	0.75	0.81			0.75	0.89	0.46			0.79	0.88	0.75			0.78	0.89	0.70					

Intersection Turning Movement Counts

			NORTH LEG						EAST LEG						SOUTH LEG						WEST LEG					
			Southbound Approach on Oak Lawn Avenue						Westbound Approach on market Center Boulevard						Northbound Approach on Oak Lawn Avenue						Eastbound Approach on market Center Boulevard					
			Vehicles			Peds			Vehicles			Peds			Vehicles			Peds			Vehicles			Peds		
			U	L	T	R	CCW	CW	U	L	T	R	CCW	CW	U	L	T	R	CCW	CW	U	L	T	R	CCW	CW
START	END																									
City:	Dallas	7:00 AM	7:15 AM	3	18	6			1	102	29			0	15	0			8	17	3					
State:	Texas	7:15 AM	7:30 AM	11	20	8			5	143	34			2	17	1			8	15	2					
Day:	Tuesday	7:30 AM	7:45 AM	7	18	11			3	158	35			3	27	1			11	22	5					
Date:	12-Jul	7:45 AM	8:00 AM	17	33	9			7	139	51			1	36	0			21	33	3					
Year:	2022	8:00 AM	8:15 AM	12	46	6			4	128	50			1	33	0			15	28	7					
Data Collector:	Camera	8:15 AM	8:30 AM	18	36	10			3	137	55			1	46	1			22	26	6					
Data Source:	CJ Hensch & Associates, Inc.	8:30 AM	8:45 AM	16	47	7			7	126	38			2	38	2			17	32	3					
Traffic Control:	Traffic Signal	8:45 AM	9:00 AM	20	50	12			1	117	46			0	43	3			15	38	9					
Observations:		4:30 PM	4:45 PM	44	57	13			5	71	34			6	33	2			21	75	7					
		4:45 PM	5:00 PM	48	58	8			1	59	31			10	42	1			14	61	5					
		5:00 PM	5:15 PM	37	66	16			8	74	38			12	56	3			18	80	3					
		5:15 PM	5:30 PM	54	78	19			4	53	27			7	46	2			18	65	2					
		5:30 PM	5:45 PM	44	59	16			2	61	26			6	32	5			20	63	3					
		5:45 PM	6:00 PM	54	60	12			4	47	30			7	31	6			12	85	7					
		6:00 PM	6:15 PM	37	54	12			5	61	28			5	46	4			21	91	6					
		6:15 PM	6:30 PM	33	49	4			3	50	32			11	47	3			18	47	7					
AM Peak Hour	Intersection PHF:	0.96		Intersection PHV:	0	66	179	35		0	15	508	189		0	4	160	6		0	69	124	25			
	Peak Hour:	8:00 AM - 9:00 AM		PHF:	0.83	0.90	0.73			0.54	0.93	0.86			0.50	0.87	0.50			0.78	0.82	0.69				
	Study Area PHF:	0.96		Study Area PHV:	0	66	179	35		0	15	508	189		0	4	160	6		0	69	124	25			
	Peak Hour:	8:00 AM - 9:00 AM		PHF:	0.83	0.90	0.73			0.54	0.93	0.86			0.50	0.87	0.50			0.78	0.82	0.69				
PM Peak Hour	Intersection PHF:	0.91		Intersection PHV:	0	183	259	56		0	18	257	130		0	35	177	8		0	71	281	17			
	Peak Hour:	4:30 PM - 5:30 PM		PHF:	0.85	0.83	0.74			0.56	0.87	0.86			0.73	0.79	0.67			0.85	0.88	0.61				
	Study Area PHF:	0.91		Study Area PHV:	0	183	259	56		0	18	257	130		0	35	177	8		0	71	281	17			
	Peak Hour:	4:30 PM - 5:30 PM		PHF:	0.85	0.83	0.74			0.56	0.87	0.86			0.73	0.79	0.67			0.85	0.88	0.61				

Intersection Turning Movement Counts

			NORTH LEG							EAST LEG							SOUTH LEG							WEST LEG								
			Southbound Approach on Turtle Creek Boulevard							Westbound Approach on Irving Boulevard							Northbound Approach on Turtle Creek Boulevard							Eastbound Approach on Irving Boulevard								
			Vehicles				Peds			Vehicles				Peds			Vehicles				Peds			Vehicles				Peds				
	START	END	U	L	T	R	CCW	CW	U	L	T	R	CCW	CW	U	L	T	R	CCW	CW	U	L	T	R	CCW	CW	U	L	T	R	CCW	CW
City:	<b>Dallas</b>		7:00 AM	7:15 AM	1	3	13			5	155	2			0	2	3				7	49	3									
State:	<b>Texas</b>		7:15 AM	7:30 AM	0	5	16			6	165	0			0	3	2				1	78	3									
Day:	<b>Tuesday</b>		7:30 AM	7:45 AM	2	4	21			4	174	1			2	2	5				10	82	4									
Date:	<b>12-Jul</b>		7:45 AM	8:00 AM	3	6	14			6	187	2			1	1	2				16	83	2									
Year:	<b>2022</b>		8:00 AM	8:15 AM	1	6	25			3	170	1			4	2	8				14	83	2									
Data Collector:	<b>Camera</b>		8:15 AM	8:30 AM	2	6	18			4	146	5			1	3	6				17	104	1									
Data Source:	<b>CJ Hensch &amp; Associates, Inc.</b>		8:30 AM	8:45 AM	1	5	13			5	172	0			2	5	6				11	93	3									
Traffic Control:			8:45 AM	9:00 AM	4	4	26			6	161	3			2	2	2				17	103	5									
Observations:			4:30 PM	4:45 PM	3	4	21			14	107	5			2	9	11				25	277	8									
			4:45 PM	5:00 PM	7	4	13			10	125	4			5	2	14				23	260	3									
			5:00 PM	5:15 PM	0	10	18			9	125	9			5	10	14				24	322	9									
			5:15 PM	5:30 PM	0	7	21			10	113	2			7	8	11				24	281	14									
			5:30 PM	5:45 PM	1	8	22			12	103	4			7	10	11				21	255	13									
			5:45 PM	6:00 PM	3	8	19			8	111	5			2	7	4				20	241	4									
			6:00 PM	6:15 PM	8	6	17			14	79	5			3	6	13				16	255	5									
			6:15 PM	6:30 PM	2	5	20			10	68	3			5	5	10				22	200	4									
AM Peak Hour	Intersection PHF:	0.96	Intersection PHV:		0	8	21	82		0	18	649	9		0	9	12	22		0	59	383	11									
	Peak Hour:	8:00 AM - 9:00 AM	PHF:		0.50	0.88	0.79			0.75	0.94	0.45			0.56	0.60	0.69				0.87	0.92	0.55									
PM Peak Hour	Study Area PHF:	0.96	Study Area PHV:		0	8	21	82		0	18	649	9		0	9	12	22		0	59	383	11									
	Peak Hour:	8:00 AM - 9:00 AM	PHF:		0.50	0.88	0.79			0.75	0.94	0.45			0.56	0.60	0.69				0.87	0.92	0.55									
PM Peak Hour	Intersection PHF:	0.90	Intersection PHV:		0	10	25	73		0	43	470	20		0	19	29	50		0	96	1,140	34									
	Peak Hour:	4:30 PM - 5:30 PM	PHF:		0.36	0.63	0.87			0.77	0.94	0.56			0.68	0.73	0.89				0.96	0.89	0.61									
PM Peak Hour	Study Area PHF:	0.90	Study Area PHV:		0	10	25	73		0	43	470	20		0	19	29	50		0	96	1,140	34									
	Peak Hour:	4:30 PM - 5:30 PM	PHF:		0.36	0.63	0.87			0.77	0.94	0.56			0.68	0.73	0.89				0.96	0.89	0.61									

Intersection Turning Movement Counts

				NORTH LEG						EAST LEG						SOUTH LEG						WEST LEG									
				Southbound Approach on Riverredge Drive						Westbound Approach on Irving Boulevard						Northbound Approach on Riverredge Drive						Eastbound Approach on Irving Boulevard									
				Vehicles			Peds			Vehicles			Peds			Vehicles			Peds			Vehicles			Peds						
		START	END	U	L	T	R	CCW	CW	U	L	T	R	CCW	CW	U	L	T	R	CCW	CW	U	L	T	R	CCW	CW				
City:	Dallas	7:00 AM	7:15 AM	0	0	0				4	152	0				1	0	2				0	53	1							
State:	Texas	7:15 AM	7:30 AM	0	0	0				1	181	0				0	0	0				0	71	1							
Day:	Tuesday	7:30 AM	7:45 AM	0	0	0				1	175	0				2	0	4				2	86	1							
Date:	12-Jul	7:45 AM	8:00 AM	0	0	0				2	209	0				0	0	3				0	86	3							
Year:	2022	8:00 AM	8:15 AM	0	0	0				11	175	0				2	0	3				0	83	1							
Data Collector:	Camera	8:15 AM	8:30 AM	0	0	0				3	162	0				0	0	2				0	109	1							
Data Source:	CJ Hensch & Associates, Inc.	8:30 AM	8:45 AM	0	0	0				0	185	0				0	1	3				1	95	0							
Traffic Control:	Minor Approach Stop	8:45 AM	9:00 AM	0	0	2				13	188	1				0	0	6				0	108	1							
Observations:		4:30 PM	4:45 PM	1	0	0				5	112	0				1	0	4				0	298	3							
		4:45 PM	5:00 PM	0	0	0				6	136	0				1	0	4				0	295	8							
		5:00 PM	5:15 PM	1	0	1				2	129	0				2	0	10				0	364	1							
		5:15 PM	5:30 PM	0	0	0				9	122	0				2	0	5				0	275	4							
		5:30 PM	5:45 PM	0	0	0				5	107	0				4	0	9				0	256	4							
		5:45 PM	6:00 PM	0	0	0				2	111	0				3	0	1				0	265	5							
		6:00 PM	6:15 PM	0	0	0				8	107	0				2	0	11				0	283	8							
		6:15 PM	6:30 PM	0	0	2				3	77	0				0	0	4				0	202	0							
AM Peak Hour	Intersection PHF:	0.91		Intersection PHV:						0	0	0	2			0	27	710	1			0	2	1	14			0	1	395	3
	Peak Hour:	8:00 AM - 9:00 AM		PHF:						0.00	0.00	0.25				0.52	0.94	0.25				0.25	0.25	0.58				0.25	0.91	0.75	
PM Peak Hour	Study Area PHF:	0.91		Study Area PHV:						0	0	0	2			0	27	710	1			0	2	1	14			0	1	395	3
	Peak Hour:	8:00 AM - 9:00 AM		PHF:						0.00	0.00	0.25				0.52	0.94	0.25				0.25	0.25	0.58				0.25	0.91	0.75	
AM Peak Hour	Intersection PHF:	0.88		Intersection PHV:						0	2	0	1			0	22	499	0			0	6	0	23			0	0	1,232	16
	Peak Hour:	4:30 PM - 5:30 PM		PHF:						0.50	0.00	0.25				0.61	0.92	0.00				0.75	0.00	0.58				0.00	0.85	0.50	
PM Peak Hour	Study Area PHF:	0.88		Study Area PHV:						0	2	0	1			0	22	499	0			0	6	0	23			0	0	1,232	16
	Peak Hour:	4:30 PM - 5:30 PM		PHF:						0.50	0.00	0.25				0.61	0.92	0.00				0.75	0.00	0.58				0.00	0.85	0.50	



Intersection Turning Movement Counts

			NORTH LEG						EAST LEG						SOUTH LEG						WEST LEG					
			Southbound Approach on Oak Lawn Avenue						Westbound Approach on Irving Boulevard						Northbound Approach on Oak Lawn Avenue						Eastbound Approach on Irving Boulevard					
			Vehicles			Peds			Vehicles			Peds			Vehicles			Peds			Vehicles			Peds		
			U	L	T	R	CCW	CW	U	L	T	R	CCW	CW	U	L	T	R	CCW	CW	U	L	T	R	CCW	CW
START	END																									
City:	Dallas	7:00 AM	7:15 AM	2	5	15			3	143	0			1	1	0			16	39	3					
State:	Texas	7:15 AM	7:30 AM	4	5	19			3	157	1			1	6	1			16	54	2					
Day:	Tuesday	7:30 AM	7:45 AM	2	6	16			1	149	1			1	6	0			32	63	1					
Date:	12-Jul	7:45 AM	8:00 AM	5	9	31			4	181	2			1	2	2			29	51	6					
Year:	2022	8:00 AM	8:15 AM	0	12	44			4	146	0			1	7	1			25	63	4					
Data Collector:	Camera	8:15 AM	8:30 AM	3	9	34			6	137	0			4	8	1			35	61	3					
Data Source:	CJ Hensch & Associates, Inc.	8:30 AM	8:45 AM	6	10	38			5	165	3			2	8	0			43	63	2					
Traffic Control:	Traffic Signal	8:45 AM	9:00 AM	4	16	39			7	167	0			2	5	1			32	68	4					
Observations:		4:30 PM	4:45 PM	15	5	42			1	81	1			2	12	9			33	286	1					
		4:45 PM	5:00 PM	16	6	45			0	88	2			5	15	4			33	243	3					
		5:00 PM	5:15 PM	19	11	48			4	77	4			4	33	5			47	308	2					
		5:15 PM	5:30 PM	16	6	64			3	68	4			3	16	2			24	251	2					
		5:30 PM	5:45 PM	13	6	42			2	77	4			1	13	3			35	258	2					
		5:45 PM	6:00 PM	24	10	37			1	72	4			2	9	1			23	224	1					
		6:00 PM	6:15 PM	14	5	44			1	63	6			1	20	2			36	261	0					
		6:15 PM	6:30 PM	14	7	34			3	42	4			1	14	2			28	179	2					
AM Peak Hour	Intersection PHF:	0.94	Intersection PHV:	0	13	47	155			0	22	615	3			0	9	28	3			0	135	255	13	
	Peak Hour:	8:00 AM - 9:00 AM	PHF:	0.54	0.73	0.88			0.79	0.92	0.25			0.56	0.88	0.75			0.78	0.94	0.81					
	Study Area PHF:	0.94	Study Area PHV:	0	13	47	155			0	22	615	3			0	9	28	3			0	135	255	13	
	Peak Hour:	8:00 AM - 9:00 AM	PHF:	0.54	0.73	0.88			0.79	0.92	0.25			0.56	0.88	0.75			0.78	0.94	0.81					
PM Peak Hour	Intersection PHF:	0.88	Intersection PHV:	0	66	28	199			0	8	314	11			0	14	76	20			0	137	1,088	8	
	Peak Hour:	4:30 PM - 5:30 PM	PHF:	0.87	0.64	0.78			0.50	0.89	0.69			0.70	0.58	0.56			0.73	0.88	0.67					
	Study Area PHF:	0.88	Study Area PHV:	0	66	28	199			0	8	314	11			0	14	76	20			0	137	1,088	8	
	Peak Hour:	4:30 PM - 5:30 PM	PHF:	0.87	0.64	0.78			0.50	0.89	0.69			0.70	0.58	0.56			0.73	0.88	0.67					

ROADWAY: Irving Boulevard  
 LOCATION: Between Riveredge Drive and Oak Lawn Avenue  
 DAY: Tuesday  
 DATE: 12-Jul  
 YEAR: 2022  
 SOURCE: CJ Hensch & Associates

24-HOUR, BI-DIRECTIONAL VOLUME  
**16,426**  
 (WEEKDAY)

Irving Boulevard

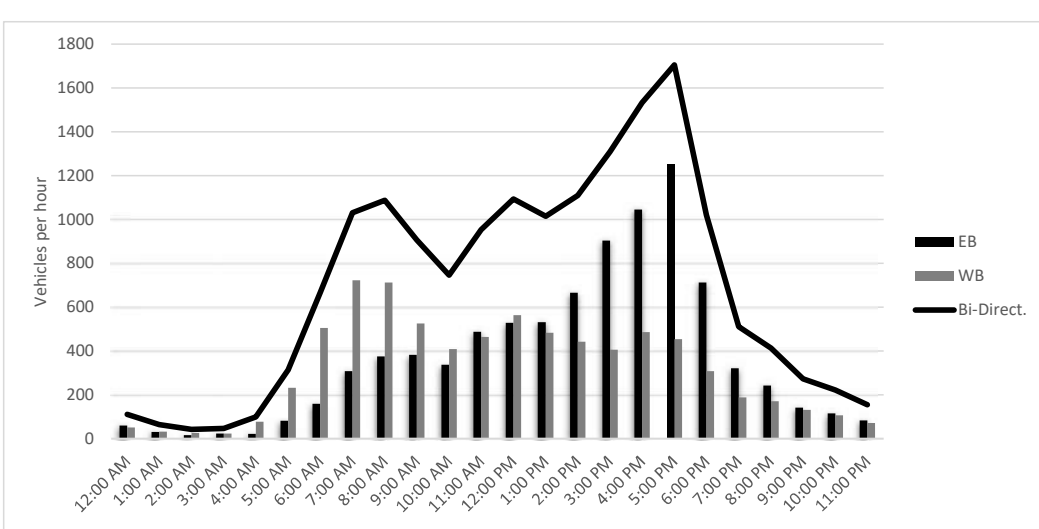
START TIME	Eastbound				Westbound				Totals		
	0:00	0:15	0:30	0:45	0:00	0:15	0:30	0:45	EB	WB	Bi-Direct.
12:00 AM	28	10	10	12	18	10	8	15	60	51	111
1:00 AM	7	8	10	6	12	9	10	2	31	33	64
2:00 AM	7	7	2	1	6	8	5	7	17	26	43
3:00 AM	9	5	6	3	2	8	6	8	23	24	47
4:00 AM	2	6	7	7	5	14	17	41	22	77	99
5:00 AM	12	14	20	36	26	42	68	96	82	232	314
6:00 AM	22	34	40	64	84	90	148	184	160	506	666
7:00 AM	68	77	99	64	151	186	186	200	308	723	1031
8:00 AM	102	85	97	92	185	158	181	188	376	712	1088
9:00 AM	118	84	98	82	156	143	126	100	382	525	907
10:00 AM	78	99	66	94	127	90	90	102	337	409	746
11:00 AM	112	98	140	138	104	111	113	137	488	465	953
12:00 PM	148	151	120	110	132	136	148	148	529	564	1093
1:00 PM	156	111	136	128	149	112	116	106	531	483	1014
2:00 PM	138	134	182	212	120	104	109	110	666	443	1109
3:00 PM	193	186	244	280	103	104	111	88	903	406	1309
4:00 PM	250	268	282	245	123	104	132	128	1045	487	1532
5:00 PM	378	323	312	238	115	120	110	109	1251	454	1705
6:00 PM	235	203	164	110	89	72	69	78	712	308	1020
7:00 PM	122	76	66	58	53	50	48	38	322	189	511
8:00 PM	88	65	42	48	30	41	62	38	243	171	414
9:00 PM	45	43	22	32	22	36	36	37	142	131	273
10:00 PM	27	33	30	25	34	28	29	16	115	107	222
11:00 PM	20	16	23	24	18	16	17	21	83	72	155

7:15 AM 8:15 AM  
 4:45 PM 5:45 PM  
 4:45 PM 5:45 PM  
 7:15 AM 8:15 AM

24-Hour Total: 16,426  
 (Bi-Direct.) AM Peak Hour Total: 1,099  
 (Bi-Direct.) PM Peak Hour Total: 1,731  
 Highest By Direction (EB): 1,258  
 Highest By Direction (WB): 757

	EB	WB	Bi-Direct.
24-Hour Total:	8,828	7,598	16,426
(Bi-Direct.) AM Peak Hour Total:	342	757	1,099
(Bi-Direct.) PM Peak Hour Total:	1,258	473	1,731
Highest By Direction (EB):	1,258		
Highest By Direction (WB):		757	

Graph



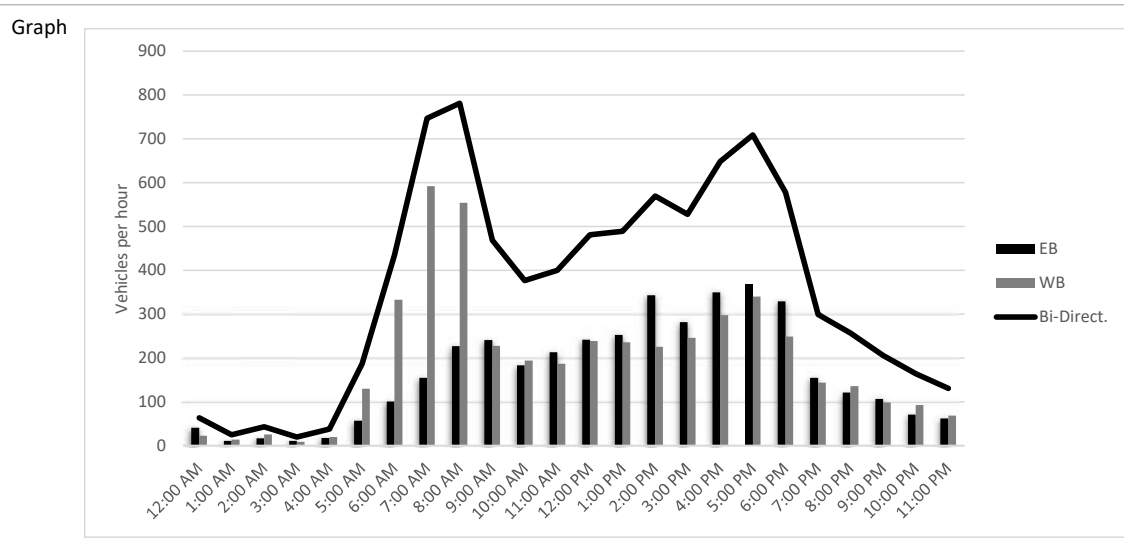
ROADWAY: Market Center Boulevard  
 LOCATION: Between Oak Lawn Avenue and Turtle Creek Boulevard  
 DAY: Tuesday  
 DATE: 12-Jul  
 YEAR: 2022  
 SOURCE: CJ Hensch & Associates

24-HOUR, BI-DIRECTIONAL VOLUME  
**8,644**  
 (WEEKDAY)

Market Center Boulevard

START TIME	Eastbound				Westbound				Totals		
	0:00	0:15	0:30	0:45	0:00	0:15	0:30	0:45	EB	WB	Bi-Direct.
12:00 AM	11	18	5	7	6	9	4	4	41	23	64
1:00 AM	2	3	1	5	0	2	4	8	11	14	25
2:00 AM	8	2	4	3	8	7	4	7	17	26	43
3:00 AM	1	1	3	6	0	4	2	3	11	9	20
4:00 AM	2	3	6	7	2	7	1	10	18	20	38
5:00 AM	8	7	22	20	14	24	44	48	57	130	187
6:00 AM	17	30	20	34	38	72	97	126	101	333	434
7:00 AM	28	27	44	56	108	158	166	160	155	592	747
8:00 AM	52	60	55	60	135	158	134	127	227	554	781
9:00 AM	69	61	62	49	69	63	56	40	241	228	469
10:00 AM	39	56	36	52	50	58	46	40	183	194	377
11:00 AM	46	51	54	62	40	50	53	44	213	187	400
12:00 PM	50	62	66	64	64	57	52	66	242	239	481
1:00 PM	66	62	71	54	64	49	68	55	253	236	489
2:00 PM	70	89	88	96	50	62	56	58	343	226	569
3:00 PM	60	72	70	80	64	68	57	57	282	246	528
4:00 PM	88	80	96	86	62	64	100	72	350	298	648
5:00 PM	98	88	77	106	108	81	82	69	369	340	709
6:00 PM	110	82	83	54	82	68	50	49	329	249	578
7:00 PM	46	42	38	29	36	39	32	37	155	144	299
8:00 PM	37	22	27	35	35	38	33	30	121	136	257
9:00 PM	26	37	26	18	25	28	20	26	107	99	206
10:00 PM	20	18	14	19	28	17	28	20	71	93	164
11:00 PM	22	16	14	10	16	18	19	16	62	69	131

7:30 AM	8:30 AM	24-Hour Total:	3,959	4,685	8,644
4:30 PM	5:30 PM	(Bi-Direct.) AM Peak Hour Total:	212	619	831
5:15 PM	6:15 PM	(Bi-Direct.) PM Peak Hour Total:	368	361	729
7:15 AM	8:15 AM	Highest By Direction (EB):	381		
		Highest By Direction (WB):		619	



APPENDIX C. Site-Generated Traffic Supplement

# Trip Generation Summary

## 1715 Market Center

Ped/Transit Reduction

5%

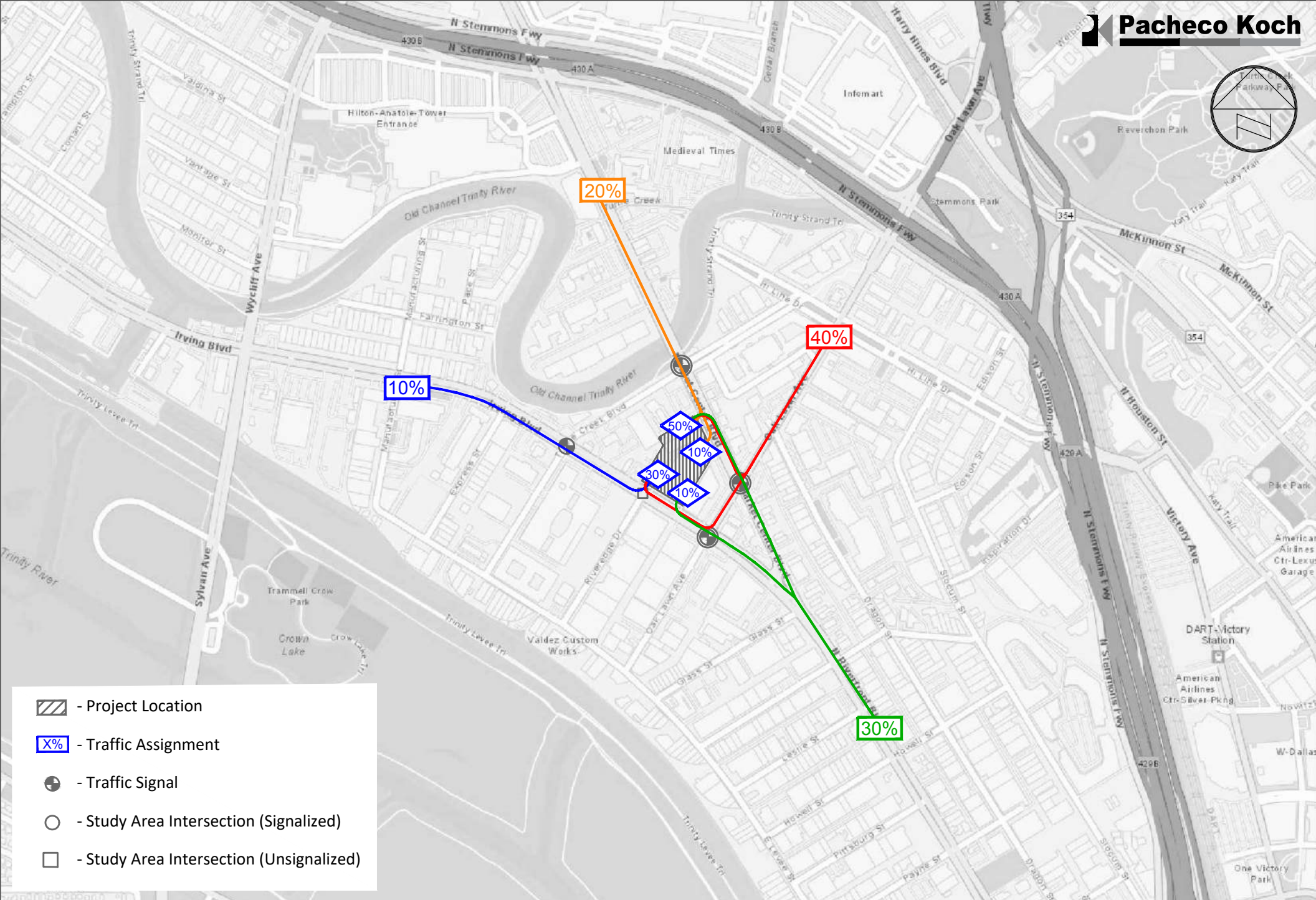
5%






5%

Development Program				Weekday Trip Ends						
ITE Landuse Code	Land Use	Quantity	Units	Weekday Daily	AM Peak - Adjacent Street			PM Peak - Adjacent Street		
					In	Out	Total	In	Out	Total
ITE LUC #710	General Office	462,100	SF	5009	618	84	702	113	552	665
	Internal trip capture				7	8		5	7	
	Ped/Bike/Transit Reduction			250	31	4		5	27	
ITE LUC #821	Shopping Plaza	12,000	SF	810	13	8	21	30	32	62
	Internal trip capture				5	3		17	10	
	Ped/Bike/Transit Reduction			41	0	0		1	1	
ITE LUC #931	Fine Dining Restaurant	48,000	SF	4024	18	17	35	251	123	374
	Internal trip capture				5	6		14	19	
	Ped/Bike/Transit Reduction			201	1	1		12	5	
<b>Subtotal (no adjustments)</b>				<b>9843</b>	<b>649</b>	<b>109</b>	<b>758</b>	<b>394</b>	<b>707</b>	<b>1101</b>
<b>Adjusted Subtotal</b>				<b>9351</b>	<b>600</b>	<b>87</b>	<b>687</b>	<b>340</b>	<b>638</b>	<b>978</b>
Pass-by (N/A)										
<b>Net Driveway Vols</b>				<b>9351</b>	<b>600</b>	<b>87</b>	<b>687</b>	<b>340</b>	<b>638</b>	<b>978</b>

## Off-Site Trip Generation: 5182-21.693 161 Riveredge

Development Program				Weekday Trip Ends						
ITE Landuse Code	Land Use	Quantity	Units	Weekday Daily	AM Peak - Adjacent Street			PM Peak - Adjacent Street		
					In	Out	Total	In	Out	Total
ITE LUC #710	General Office	123,065	SF	1334	165	22	187	30	147	177
ITE LUC #931	Restaurant	10,350	SF	868	4	4	8	54	27	81
<b>Subtotal (no adjustments)</b>				<b>2202</b>	<b>169</b>	<b>26</b>	<b>195</b>	<b>84</b>	<b>174</b>	<b>258</b>
Ped/Trans Reductions										
Internal Capture (Restaurant only)										
<b>Subtotal</b>				<b>434</b>	<b>2</b>	<b>2</b>	<b>4</b>	<b>27</b>	<b>14</b>	<b>41</b>
Pass-by				1768	167	24	191	57	161	218
<b>Net Driveway Vols</b>				<b>1768</b>	<b>167</b>	<b>24</b>	<b>191</b>	<b>57</b>	<b>161</b>	<b>218</b>

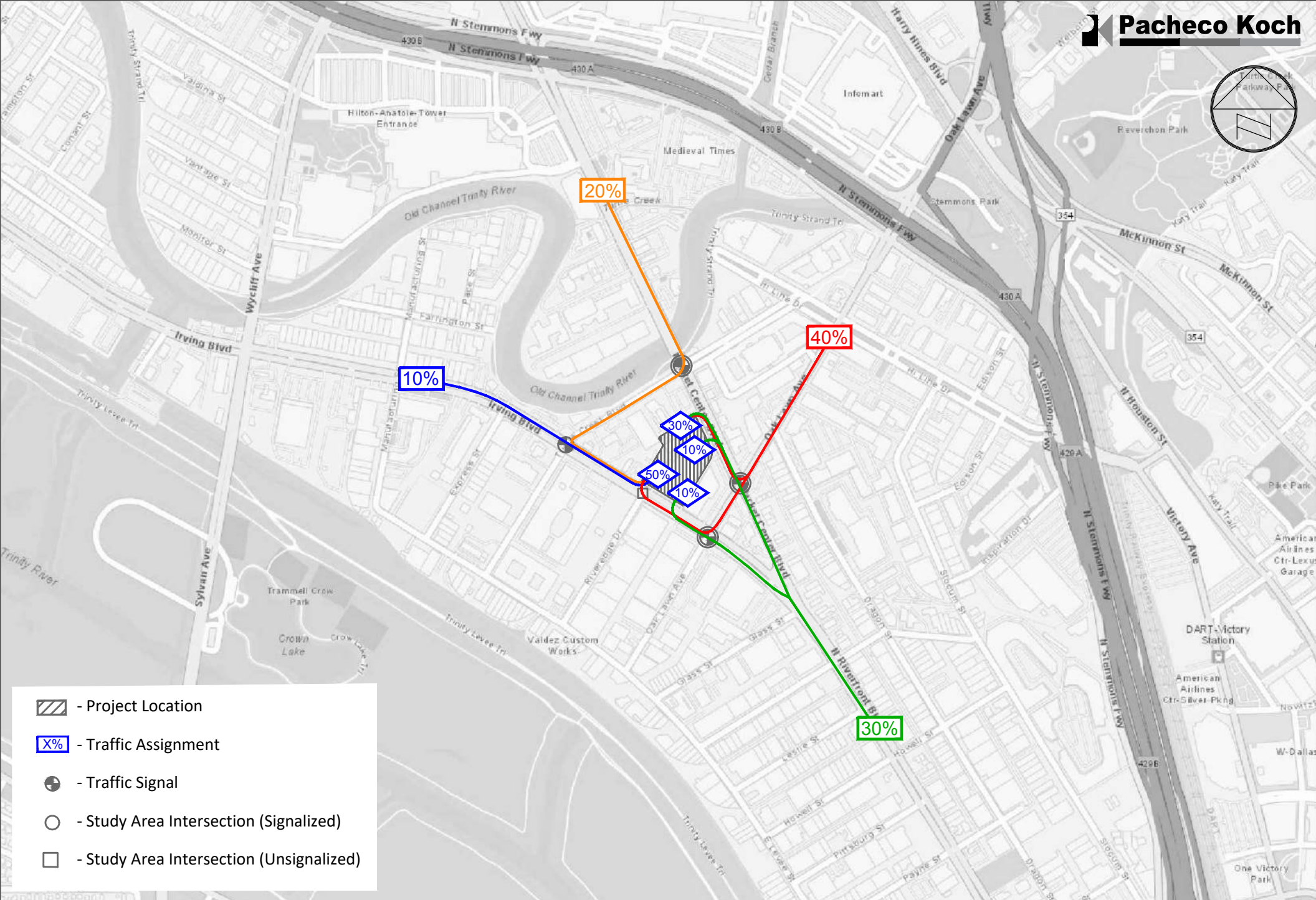


-  - Project Location
-  - Traffic Assignment
-  - Traffic Signal
-  - Study Area Intersection (Signalized)
-  - Study Area Intersection (Unsignalized)

# Site Generated Trip Distribution - Inbound

1715 Market Center, Dallas, Texas

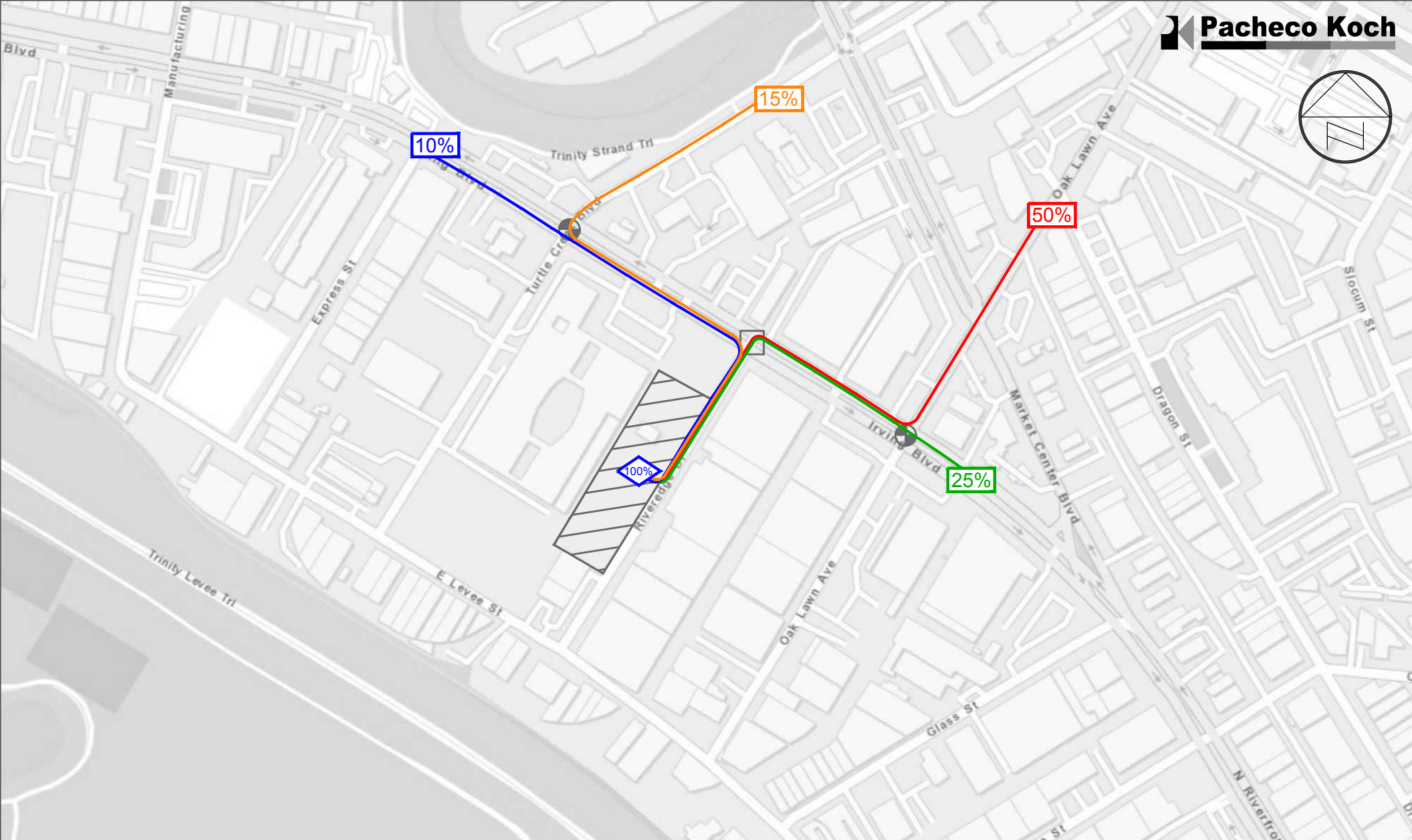
PK #5431-22.460 (SMN: 08/04/22)



# Site Generated Trip Distribution - Outbound

1715 Market Center, Dallas, Texas

PK #5431-22.460 (SMN: 08/04/22)



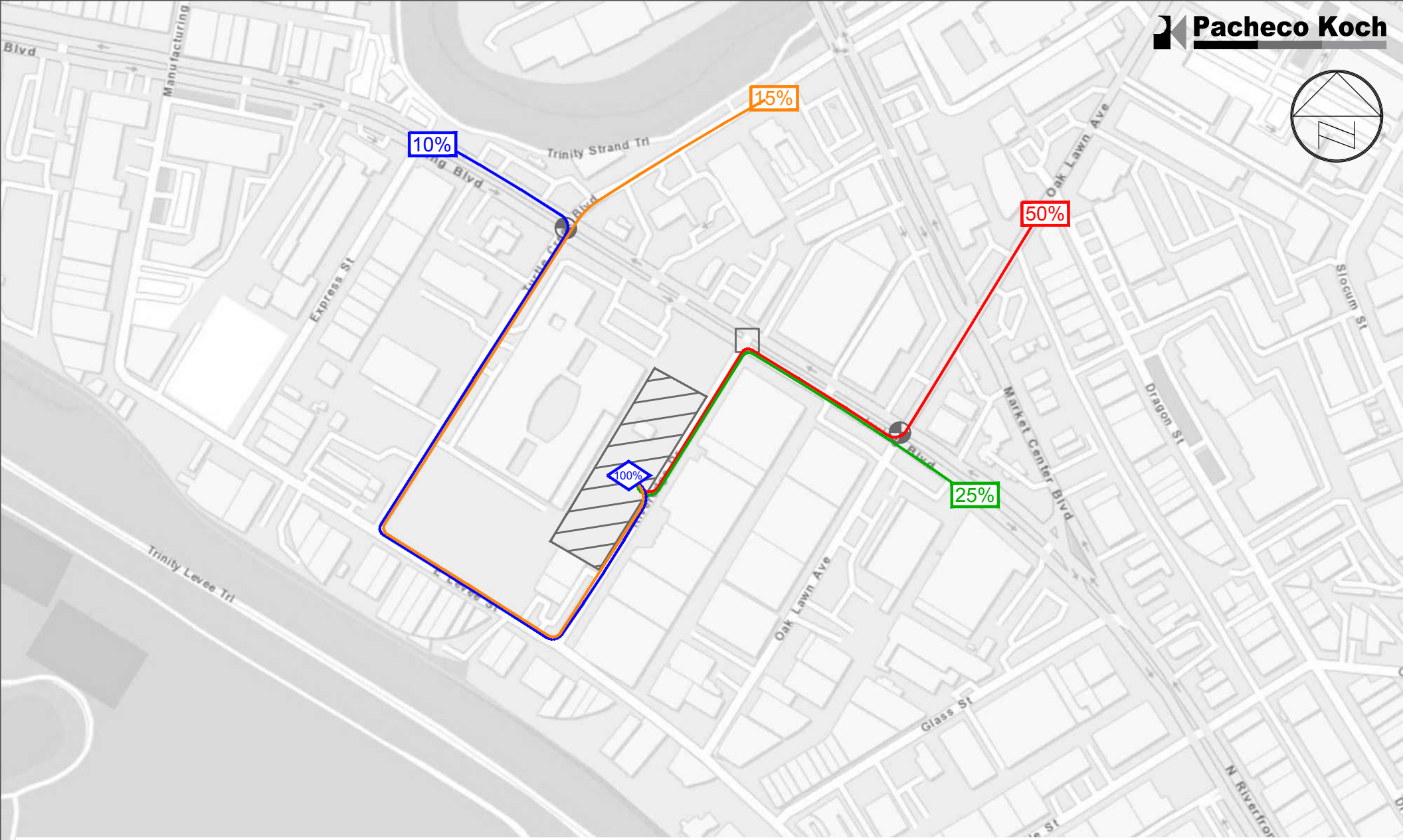
- Project Location
- Traffic Assignment

# Site Generated Trip Distribution - Inbound

161 Riveredge Drive, Dallas, Texas

PK 5182-21.693 (SMN: 09/14/22)





- Project Location
- Traffic Assignment

# Site Generated Trip Distribution - Outbound

161 Riveredge Drive, Dallas, Texas  
PK 5182-21.693 (SMN: 09/14/22)

APPENDIX D. Detailed Intersection Capacity Analysis Results

1: Oak Lawn Avenue & Irving Boulevard  
5431-22.460

Existing  
Timing Plan: AM

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↕↕↕	↔	↔	↕↕↕	↔	↔	↕	↔	↔	↕	↕
Traffic Volume (vph)	135	255	13	22	615	3	9	28	3	13	47	155
Future Volume (vph)	135	255	13	22	615	3	9	28	3	13	47	155
Peak Hour Factor	0.78	0.94	0.81	0.79	0.92	0.50	0.56	0.88	0.75	0.54	0.73	0.88
Adj. Flow (vph)	173	271	16	28	668	6	16	32	4	24	64	176
Shared Lane Traffic (%)												
Lane Group Flow (vph)	173	287	0	28	674	0	16	36	0	24	64	176
Turn Type	pm+pt	NA	pm+pt	NA	Perm	NA	Perm	NA	Perm	NA	Perm	Perm
Protected Phases	7	4	3	8			2	2		6	6	
Permitted Phases	4		8				2			6		6
Detector Phase	7	4	3	8			2	2		6	6	6
Switch Phase												
Minimum Initial (s)	5.0	5.0	5.0	5.0			5.0	5.0		5.0	5.0	5.0
Minimum Split (s)	9.5	22.5		9.5	22.5		22.5	22.5		22.5	22.5	22.5
Total Split (s)	13.0	84.0		13.0	84.0		18.0	18.0		18.0	18.0	18.0
Total Split (%)	11.3%	73.0%		11.3%	73.0%		15.7%	15.7%		15.7%	15.7%	15.7%
Yellow Time (s)	3.5	3.5		3.5	3.5		3.5	3.5		3.5	3.5	3.5
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0	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	0.0
Total Lost Time (s)	4.5	4.5		4.5	4.5		4.5	4.5		4.5	4.5	4.5
Lead/Lag	Lead	Lag		Lead	Lag							
Lead-Lag Optimize?	Yes	Yes		Yes	Yes							
Recall Mode	None	None		None	None		C-Max	C-Max		C-Max	C-Max	C-Max
Act Effct Green (s)	33.6	28.5		29.8	22.8		70.2	70.2		70.2	70.2	70.2
Actuated g/C Ratio	0.29	0.25		0.26	0.20		0.61	0.61		0.61	0.61	0.61
v/c Ratio	0.82	0.23		0.09	0.67		0.02	0.03		0.03	0.06	0.17
Control Delay	60.7	33.3		26.5	45.3		10.6	9.5		10.5	10.4	2.1
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Total Delay	60.7	33.3		26.5	45.3		10.6	9.5		10.5	10.4	2.1
LOS	E	C		C	D		B	A		B	B	A
Approach Delay		43.6			44.6			9.9			4.9	
Approach LOS		D			D			A			A	
Queue Length 50th (ft)	98	61		15	170		4	9		7	18	0
Queue Length 95th (ft)	#126	84		29	198		10	25		12	33	28
Internal Link Dist (ft)		192			382			653			332	
Turn Bay Length (ft)	84			85						60		140
Base Capacity (vph)	211	3492		341	3512		812	1118		833	1136	1034
Starvation Cap Reductn	0	0		0	0		0	0		0	0	0
Spillback Cap Reductn	0	0		0	0		0	0		0	0	0
Storage Cap Reductn	0	0		0	0		0	0		0	0	0
Reduced v/c Ratio	0.82	0.08		0.08	0.19		0.02	0.03		0.03	0.06	0.17

Intersection Summary

Cycle Length: 115  
 Actuated Cycle Length: 115  
 Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green  
 Natural Cycle: 55  
 Control Type: Actuated-Coordinated  
 Maximum v/c Ratio: 0.82

1: Oak Lawn Avenue & Irving Boulevard  
5431-22.460

Existing  
Timing Plan: AM

Intersection Signal Delay: 36.0  
 Intersection LOS: D  
 Intersection Capacity Utilization 38.1%  
 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: 1: Oak Lawn Avenue & Irving Boulevard



2: Oak Lawn Avenue & Market Center Boulevard  
5431-22.460

Existing  
Timing Plan: AM

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↕	↔	↔	↕	↔	↔	↕	↔	↔	↕	↔
Traffic Volume (vph)	69	124	25	15	508	189	4	160	6	66	179	35
Future Volume (vph)	69	124	25	15	508	189	4	160	6	66	179	35
Confl. Peds. (#/hr)	130											
Peak Hour Factor	0.78	0.82	0.69	0.54	0.93	0.86	0.50	0.87	0.50	0.83	0.90	0.73
Adj. Flow (vph)	88	151	36	28	546	220	8	184	12	80	199	48
Shared Lane Traffic (%)												
Lane Group Flow (vph)	88	187	0	28	766	0	8	196	0	80	247	0
Turn Type	pm+pt	NA		pm+pt	NA		pm+pt	NA		pm+pt	NA	
Protected Phases	1	6		5	2		7	4		3	8	
Permitted Phases	6			2			4			8		
Detector Phase	1	6		5	2		7	4		3	8	
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Minimum Split (s)	9.5	22.5		9.5	22.5		9.5	22.5		9.5	22.5	
Total Split (s)	21.0	63.0		21.0	63.0		10.0	23.0		10.0	23.0	
Total Split (%)	17.9%	53.8%		17.9%	53.8%		8.5%	19.7%		8.5%	19.7%	
Yellow Time (s)	3.5	3.5		3.5	3.5		3.5	3.5		3.5	3.5	
All-Red Time (s)	1.0	1.0		1.0	1.0		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)	4.5	4.5		4.5	4.5		4.5	4.5		4.5	4.5	
Lead/Lag	Lead	Lag		Lead	Lag		Lead	Lag		Lead	Lag	
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes		Yes	Yes	
Recall Mode	None	C-Max		None	C-Max		None	None		None	None	
Act Effect Green (s)	86.0	81.3		83.0	78.1		16.6	12.2		19.3	18.2	
Actuated g/C Ratio	0.74	0.69		0.71	0.67		0.14	0.10		0.16	0.16	
v/c Ratio	0.18	0.05		0.03	0.23		0.04	0.53		0.44	0.45	
Control Delay	5.6	6.1		5.1	7.6		37.2	53.1		48.0	43.1	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	5.6	6.1		5.1	7.6		37.2	53.1		48.0	43.1	
LOS	A	A		A	A		D	D		D	D	
Approach Delay	5.9			7.5			52.5			44.3		
Approach LOS	A			A			D			D		
Queue Length 50th (ft)	16	13		5	68		5	73		52	78	
Queue Length 95th (ft)	30	24		9	105		10	103		85	126	
Internal Link Dist (ft)	164			443			332			494		
Turn Bay Length (ft)	130			80			70			109		
Base Capacity (vph)	591	3441		963	3291		189	558		183	617	
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	0.15	0.05		0.03	0.23		0.04	0.35		0.44	0.40	

Intersection Summary

Cycle Length: 117  
 Actuated Cycle Length: 117  
 Offset: 21 (18%), Referenced to phase 2:WBTL and 6:EBTL, Start of Green  
 Natural Cycle: 65  
 Control Type: Actuated-Coordinated

2: Oak Lawn Avenue & Market Center Boulevard  
5431-22.460

Existing  
Timing Plan: AM

Maximum v/c Ratio: 0.53	Intersection LOS: C
Intersection Signal Delay: 20.5	ICU Level of Service A
Intersection Capacity Utilization 43.4%	
Analysis Period (min) 15	

Splits and Phases: 2: Oak Lawn Avenue & Market Center Boulevard



3: Turtle Creek Boulevard & Market Center Boulevard  
5431-22.460

Existing  
Timing Plan: AM

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↗↘	↘	↔	↗↘	↘	↔	↗↘	↘	↔	↗↘	↘
Traffic Volume (vph)	15	216	61	10	487	6	32	27	14	10	50	66
Future Volume (vph)	15	216	61	10	487	6	32	27	14	10	50	66
Peak Hour Factor	0.50	0.96	0.85	0.63	0.88	0.75	0.67	0.96	0.50	0.63	0.78	0.69
Adj. Flow (vph)	30	225	72	16	553	8	48	28	28	16	64	96
Shared Lane Traffic (%)												
Lane Group Flow (vph)	30	297	0	16	561	0	48	28	28	16	64	96
Turn Type	pm+pt	NA	pm+pt	NA	Perm	NA	Perm	Perm	Perm	NA	Perm	Perm
Protected Phases	1	6	5	2	4	4	4	4	8	8	8	8
Permitted Phases	6		2		4		4		4		8	8
Detector Phase	1	6	5	2	4	4	4	4	8	8	8	8
Switch Phase												
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	9.5	22.5	9.5	22.5	36.0	22.5	22.5	22.5	22.5	22.5	22.5	22.5
Total Split (s)	15.0	65.0	15.0	65.0	36.0	36.0	36.0	36.0	36.0	36.0	36.0	36.0
Total Split (%)	12.9%	56.0%	12.9%	56.0%	31.0%	31.0%	31.0%	31.0%	31.0%	31.0%	31.0%	31.0%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	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	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Lead/Lag	Lead	Lag	Lead	Lag	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	C-Min	None	C-Min	None	None	None	None	None	None	None	None
Act Effct Green (s)	95.6	93.1	94.4	90.9	9.7	9.7	9.7	9.7	9.7	9.7	9.7	9.7
Actuated g/C Ratio	0.82	0.80	0.81	0.78	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08
v/c Ratio	0.04	0.08	0.02	0.14	0.43	0.09	0.15	0.14	0.41	0.44	0.44	0.44
Control Delay	2.1	2.5	2.1	3.8	61.4	48.1	4.8	50.2	57.3	16.0	16.0	16.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	2.1	2.5	2.1	3.8	61.4	48.1	4.8	50.2	57.3	16.0	16.0	16.0
LOS	A	A	A	A	E	D	A	D	E	B	B	B
Approach Delay	2.5		3.7		42.6		34.1					
Approach LOS	A		A		D		C					
Queue Length 50th (ft)	3	7	1	36	35	10	0	11	46	0	0	0
Queue Length 95th (ft)	5	25	4	55	52	24	0	23	76	22	22	22
Internal Link Dist (ft)		527		443		954		100	135		698	
Turn Bay Length (ft)	210		113		110		100	135				
Base Capacity (vph)	752	3949	944	3979	361	961	470	373	505	499	499	499
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.04	0.08	0.02	0.14	0.13	0.03	0.06	0.04	0.13	0.19	0.19	0.19

Intersection Summary

Cycle Length: 116  
 Actuated Cycle Length: 116  
 Offset: 15 (13%), Referenced to phase 2:WBTL and 6:EBTL, Start of Green  
 Natural Cycle: 55  
 Control Type: Actuated-Coordinated  
 Maximum v/c Ratio: 0.44

3: Turtle Creek Boulevard & Market Center Boulevard  
5431-22.460

Existing  
Timing Plan: AM

Intersection Signal Delay: 11.3  
 Intersection LOS: B  
 Intersection Capacity Utilization 29.1%  
 ICU Level of Service A  
 Analysis Period (min) 15

Splits and Phases: 3: Turtle Creek Boulevard & Market Center Boulevard



8: Turtle Creek Boulevard & Irving Boulevard  
5431-22.460

Existing  
Timing Plan: AM

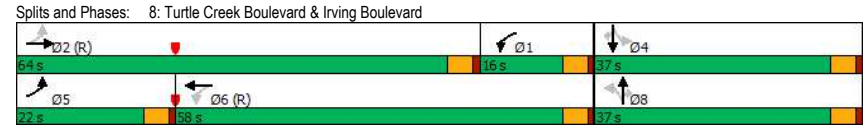
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↕↕↕	↔	↔	↕↕↕	↔	↔	↕	↕	↔	↕	↕
Traffic Volume (vph)	59	383	11	18	649	9	9	12	22	8	21	82
Future Volume (vph)	59	383	11	18	649	9	9	12	22	8	21	82
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	64	416	12	20	705	10	10	13	24	9	23	89
Shared Lane Traffic (%)												
Lane Group Flow (vph)	64	428	0	20	715	0	0	23	24	0	32	89
Turn Type	pm+pt	NA	pm+pt	NA	Perm	NA	Perm	Perm	Perm	NA	Perm	Perm
Protected Phases	5	2	1	6	8	8	8	8	8	4	4	4
Permitted Phases	2		6		8		8		8	4		4
Detector Phase	5	2	1	6	8	8	8	8	8	4	4	4
Switch Phase												
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	9.5	22.5	9.5	22.5	22.5	22.5	22.5	22.5	22.5	22.5	22.5	22.5
Total Split (s)	22.0	64.0	16.0	58.0	37.0	37.0	37.0	37.0	37.0	37.0	37.0	37.0
Total Split (%)	18.8%	54.7%	13.7%	49.6%	31.6%	31.6%	31.6%	31.6%	31.6%	31.6%	31.6%	31.6%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	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	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Lead/Lag	Lead	Lead	Lag	Lag	Yes	Yes						
Lead-Lag Optimize?	Yes	Yes	Yes	Yes								
Recall Mode	None	C-Max	None	C-Max	None	None	None	None	None	None	None	None
Act Effect Green (s)	94.0	94.0	91.3	91.3	7.6	7.6	7.6	7.6	7.6	7.6	7.6	7.6
Actuated g/C Ratio	0.80	0.80	0.78	0.78	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06
v/c Ratio	0.11	0.11	0.03	0.18	0.22	0.12	0.29	0.46				
Control Delay	4.3	3.4	4.0	3.8	56.1	1.3	58.2	16.2				
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	4.3	3.4	4.0	3.8	56.1	1.3	58.2	16.2				
LOS	A	A	A	A	E	A	E	B				
Approach Delay		3.5		3.8	28.1		27.3					
Approach LOS		A		A	C		C					
Queue Length 50th (ft)	5	12	3	44	17	0	23	0				
Queue Length 95th (ft)	27	45	10	67	44	0	56	44				
Internal Link Dist (ft)		330		590			366				954	
Turn Bay Length (ft)	133		75									
Base Capacity (vph)	689	4068	800	3962	441	510	468	510		468	510	
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.09	0.11	0.03	0.18	0.05	0.05	0.07	0.17				

**Intersection Summary**  
 Cycle Length: 117  
 Actuated Cycle Length: 117  
 Offset: 0 (0%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green  
 Natural Cycle: 55  
 Control Type: Actuated-Coordinated  
 Maximum v/c Ratio: 0.46

8: Turtle Creek Boulevard & Irving Boulevard  
5431-22.460

Existing  
Timing Plan: AM

Intersection Signal Delay: 6.6 Intersection LOS: A  
 Intersection Capacity Utilization 36.3% ICU Level of Service A  
 Analysis Period (min) 15



Intersection												
Int Delay, s/veh	0.7											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↵ ↑↑↑			↵ ↑↑↑			↕			↕		
Traffic Vol, veh/h	1	395	3	27	710	1	2	1	14	0	0	2
Future Vol, veh/h	1	395	3	27	710	1	2	1	14	0	0	2
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	43	-	-	60	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	50	91	75	52	94	50	50	50	58	92	92	50
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	2	434	4	52	755	2	4	2	24	0	0	4

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	757	0	0	438	0	0	846	1301	219	1039	1302	379
Stage 1	-	-	-	-	-	-	440	440	-	860	860	-
Stage 2	-	-	-	-	-	-	406	861	-	179	442	-
Critical Hdwy	5.34	-	-	5.34	-	-	6.44	6.54	7.14	6.44	6.54	7.14
Critical Hdwy Stg 1	-	-	-	-	-	-	7.34	5.54	-	7.34	5.54	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.74	5.54	-	6.74	5.54	-
Follow-up Hdwy	3.12	-	-	3.12	-	-	3.82	4.02	3.92	3.82	4.02	3.92
Pot Cap-1 Maneuver	*946	-	-	967	-	-	*314	160	*845	*242	160	*753
Stage 1	-	-	-	-	-	-	*755	753	-	*700	690	-
Stage 2	-	-	-	-	-	-	*772	689	-	*867	752	-
Platoon blocked, %	1	-	-	1	-	-	-	-	1	-	-	1
Mov Cap-1 Maneuver	*946	-	-	967	-	-	*299	151	*845	*223	151	*753
Mov Cap-2 Maneuver	-	-	-	-	-	-	*299	151	-	*223	151	-
Stage 1	-	-	-	-	-	-	*754	752	-	*699	652	-
Stage 2	-	-	-	-	-	-	*727	652	-	*838	750	-

Approach	EB			WB			NB			SB		
HCM Control Delay, s	0			0.6			12			9.8		
HCM LOS							B			A		

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	546	* 946	-	-	967	-	-	753
HCM Lane V/C Ratio	0.055	0.002	-	-	0.054	-	-	0.005
HCM Control Delay (s)	12	8.8	-	-	8.9	-	-	9.8
HCM Lane LOS	B	A	-	-	A	-	-	A
HCM 95th %tile Q(veh)	0.2	0	-	-	0.2	-	-	0

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

1: Oak Lawn Avenue & Irving Boulevard  
5431-22.460

Existing  
Timing Plan: PM

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↕	↔	↔	↕	↔	↔	↕	↔	↔	↕	↔
Traffic Volume (vph)	137	1088	8	8	314	11	14	76	20	66	28	199
Future Volume (vph)	137	1088	8	8	314	11	14	76	20	66	28	199
Peak Hour Factor	0.73	0.88	0.67	0.50	0.89	0.69	0.70	0.58	0.56	0.87	0.64	0.78
Adj. Flow (vph)	188	1236	12	16	353	16	20	131	36	76	44	255
Shared Lane Traffic (%)												
Lane Group Flow (vph)	188	1248	0	16	369	0	20	167	0	76	44	255
Turn Type	pm+pt	NA	pm+pt	NA	Perm	NA	Perm	NA	Perm	NA	Perm	Perm
Protected Phases	7	4	3	8	2	2						
Permitted Phases	4		8		2		6		6		6	
Detector Phase	7	4	3	8	2	2	6	6	6	6	6	6
Switch Phase												
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	9.5	22.5	9.5	22.5	22.5	22.5	22.5	22.5	22.5	22.5	22.5	22.5
Total Split (s)	10.0	40.0	10.0	40.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0
Total Split (%)	14.3%	57.1%	14.3%	57.1%	28.6%	28.6%	28.6%	28.6%	28.6%	28.6%	28.6%	28.6%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	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	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Lead/Lag	Lead	Lag	Lead	Lag								
Lead-Lag Optimize?	Yes	Yes	Yes	Yes								
Recall Mode	None	None	None	None	C-Max	C-Max	C-Max	C-Max	C-Max	C-Max	C-Max	C-Max
Act Effct Green (s)	28.6	27.5	25.0	19.5	31.5	31.5	31.5	31.5	31.5	31.5	31.5	31.5
Actuated g/C Ratio	0.41	0.39	0.36	0.28	0.45	0.45	0.45	0.45	0.45	0.45	0.45	0.45
v/c Ratio	0.46	0.62	0.07	0.26	0.03	0.20	0.14	0.05	0.30			
Control Delay	15.4	18.1	9.1	18.0	16.0	14.2	6.9	5.9	3.0			
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0			
Total Delay	15.4	18.1	9.1	18.0	16.0	14.2	6.9	5.9	3.0			
LOS	B	B	A	B	B	B	A	A	A	A	A	A
Approach Delay		17.7		17.6		14.4		4.1				
Approach LOS		B		B		B		A				
Queue Length 50th (ft)	53	153	4	45	4	34	4	2	2			
Queue Length 95th (ft)	41	156	5	43	17	60	m49	12	117			
Internal Link Dist (ft)		192		382		653		332				
Turn Bay Length (ft)	84		85				60		140			
Base Capacity (vph)	409	2577	228	2567	610	821	545	838	852			
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0			
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0			
Storage Cap Reductn	0	0	0	0	0	0	0	0	0			
Reduced v/c Ratio	0.46	0.48	0.07	0.14	0.03	0.20	0.14	0.05	0.30			

Intersection Summary

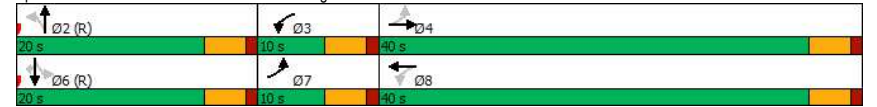
Cycle Length: 70  
 Actuated Cycle Length: 70  
 Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green  
 Natural Cycle: 55  
 Control Type: Actuated-Coordinated  
 Maximum v/c Ratio: 0.62

1: Oak Lawn Avenue & Irving Boulevard  
5431-22.460

Existing  
Timing Plan: PM

Intersection Signal Delay: 15.3  
 Intersection LOS: B  
 Intersection Capacity Utilization 46.9%  
 ICU Level of Service A  
 Analysis Period (min) 15  
 m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 1: Oak Lawn Avenue & Irving Boulevard





2: Oak Lawn Avenue & Market Center Boulevard  
5431-22.460

Existing  
Timing Plan: PM

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↔↔	↔	↔	↔↔	↔	↔	↔	↔	↔	↔	↔
Traffic Volume (vph)	71	281	17	18	257	130	35	177	8	183	259	56
Future Volume (vph)	71	281	17	18	257	130	35	177	8	183	259	56
Confl. Peds. (#/hr)	130											
Peak Hour Factor	0.85	0.88	0.61	0.56	0.87	0.86	0.73	0.79	0.67	0.85	0.83	0.74
Adj. Flow (vph)	84	319	28	32	295	151	48	224	12	215	312	76
Shared Lane Traffic (%)												
Lane Group Flow (vph)	84	347	0	32	446	0	48	236	0	215	388	0
Turn Type	pm+pt	NA		pm+pt	NA		pm+pt	NA		pm+pt	NA	
Protected Phases	1	6		5	2		7	4		3	8	
Permitted Phases	6			2			4			8		
Detector Phase	1	6		5	2		7	4		3	8	
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Minimum Split (s)	9.5	22.5		9.5	22.5		9.5	22.5		9.5	22.5	
Total Split (s)	15.0	27.0		15.0	27.0		10.0	18.0		10.0	18.0	
Total Split (%)	21.4%	38.6%		21.4%	38.6%		14.3%	25.7%		14.3%	25.7%	
Yellow Time (s)	3.5	3.5		3.5	3.5		3.5	3.5		3.5	3.5	
All-Red Time (s)	1.0	1.0		1.0	1.0		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)	4.5	4.5		4.5	4.5		4.5	4.5		4.5	4.5	
Lead/Lag	Lead	Lag		Lead	Lag		Lead	Lag		Lead	Lag	
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes		Yes	Yes	
Recall Mode	None	C-Max		None	C-Max		None	None		None	None	
Act Effect Green (s)	38.8	35.4		35.4	30.4		16.5	11.0		18.3	15.0	
Actuated g/C Ratio	0.55	0.51		0.51	0.43		0.24	0.16		0.26	0.21	
v/c Ratio	0.16	0.14		0.06	0.20		0.17	0.42		0.68	0.51	
Control Delay	4.5	5.7		8.1	9.7		16.9	25.4		33.1	25.0	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	4.5	5.7		8.1	9.7		16.9	25.4		33.1	25.0	
LOS	A	A		A	A		B	C		C	C	
Approach Delay	5.4			9.5			24.0			27.9		
Approach LOS	A			A			C			C		
Queue Length 50th (ft)	7	9		6	29		14	43		71	73	
Queue Length 95th (ft)	11	15		10	50		32	72		#117	102	
Internal Link Dist (ft)	164			443			332			494		
Turn Bay Length (ft)	130			80			70			109		
Base Capacity (vph)	575	2553		668	2179		288	682		315	779	
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	0.15	0.14		0.05	0.20		0.17	0.35		0.68	0.50	

Intersection Summary

Cycle Length: 70  
 Actuated Cycle Length: 70  
 Offset: 15 (21%), Referenced to phase 2:WBTL and 6:EBTL, Start of Green  
 Natural Cycle: 65  
 Control Type: Actuated-Coordinated

2: Oak Lawn Avenue & Market Center Boulevard  
5431-22.460

Existing  
Timing Plan: PM

Maximum v/c Ratio: 0.68  
 Intersection Signal Delay: 17.0  
 Intersection LOS: B  
 Intersection Capacity Utilization 42.3%  
 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: 2: Oak Lawn Avenue & Market Center Boulevard



3: Turtle Creek Boulevard & Market Center Boulevard  
5431-22.460

Existing  
Timing Plan: PM

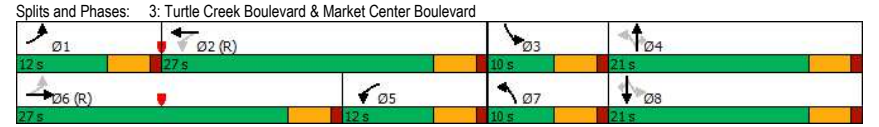
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↕	↔	↔	↕	↔	↔	↕	↔	↔	↕	↔
Traffic Volume (vph)	31	299	53	21	312	13	89	63	21	10	39	68
Future Volume (vph)	31	299	53	21	312	13	89	63	21	10	39	68
Peak Hour Factor	0.78	0.89	0.70	0.75	0.89	0.50	0.79	0.88	0.75	0.63	0.75	0.81
Adj. Flow (vph)	40	336	76	28	351	26	113	72	28	16	52	84
Shared Lane Traffic (%)												
Lane Group Flow (vph)	40	412	0	28	377	0	113	72	28	16	52	84
Turn Type	pm+pt	NA	pm+pt	NA	pm+pt	NA	Perm	pm+pt	NA	Perm	NA	Perm
Protected Phases	1	6	5	2	7	4	4	8	3	8		
Permitted Phases	6		2		4		4	8		8		8
Detector Phase	1	6	5	2	7	4	4	3	8	8		8
Switch Phase												
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	9.5	22.5	9.5	22.5	9.5	22.5	9.5	22.5	9.5	22.5	9.5	22.5
Total Split (s)	12.0	27.0	12.0	27.0	10.0	21.0	10.0	21.0	10.0	21.0	10.0	21.0
Total Split (%)	17.1%	38.6%	17.1%	38.6%	14.3%	30.0%	14.3%	30.0%	14.3%	30.0%	14.3%	30.0%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	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	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Lead/Lag	Lead	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	C-Min	None	C-Min	None	None	None	None	None	None	None	None
Act Effct Green (s)	38.8	39.7	37.5	37.5	19.5	17.1	17.1	12.4	7.4	7.4		7.4
Actuated g/C Ratio	0.55	0.57	0.54	0.54	0.28	0.24	0.24	0.18	0.11	0.11		0.11
v/c Ratio	0.07	0.15	0.05	0.14	0.31	0.08	0.05	0.06	0.26	0.22		0.22
Control Delay	14.0	9.8	21.0	16.4	19.1	19.2	0.2	15.9	31.5	1.4		1.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0
Total Delay	14.0	9.8	21.0	16.4	19.1	19.2	0.2	15.9	31.5	1.4		1.4
LOS	B	A	C	B	B	B	A	B	C	A		A
Approach Delay		10.2		16.8		16.7		13.2				
Approach LOS		B		B		B		B				
Queue Length 50th (ft)	7	22	8	38	36	11	0	5	21	0		0
Queue Length 95th (ft)	27	58	m24	72	55	28	0	11	41	0		0
Internal Link Dist (ft)		527		443		956		698				
Turn Bay Length (ft)	210		113		110		100	135				
Base Capacity (vph)	553	2839	578	2716	369	990	611	271	439	551		
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0		0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0		0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0		0
Reduced v/c Ratio	0.07	0.15	0.05	0.14	0.31	0.07	0.05	0.06	0.12	0.15		0.15

**Intersection Summary**  
 Cycle Length: 70  
 Actuated Cycle Length: 70  
 Offset: 12 (17%), Referenced to phase 2:WBTL and 6:EBTL, Start of Green  
 Natural Cycle: 65  
 Control Type: Actuated-Coordinated  
 Maximum v/c Ratio: 0.31

3: Turtle Creek Boulevard & Market Center Boulevard  
5431-22.460

Existing  
Timing Plan: PM

Intersection Signal Delay: 13.9 Intersection LOS: B  
 Intersection Capacity Utilization 34.0% ICU Level of Service A  
 Analysis Period (min) 15  
 m Volume for 95th percentile queue is metered by upstream signal.



8: Turtle Creek Boulevard & Irving Boulevard  
5431-22.460

Existing  
Timing Plan: PM

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↕↕↕	↔	↔	↕↕↕	↔	↔	↕	↕	↔	↕	↔
Traffic Volume (vph)	96	1140	34	43	470	20	19	29	50	10	25	73
Future Volume (vph)	96	1140	34	43	470	20	19	29	50	10	25	73
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)	104	1239	37	47	511	22	21	32	54	11	27	79
Shared Lane Traffic (%)												
Lane Group Flow (vph)	104	1276	0	47	533	0	0	53	54	0	38	79
Turn Type	pm+pt	NA	pm+pt	NA	Perm	NA	Perm	Perm	Perm	NA	Perm	Perm
Protected Phases	5	2	1	6			8	8	8	4	4	4
Permitted Phases	2		6		8		8	8	8	4	4	4
Detector Phase	5	2	1	6			8	8	8	4	4	4
Switch Phase												
Minimum Initial (s)	5.0	5.0	5.0	5.0			5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	9.5	22.5	22.5	22.5			22.5	22.5	22.5	22.5	22.5	22.5
Total Split (s)	22.0	87.0	16.0	81.0			41.0	41.0	41.0	41.0	41.0	41.0
Total Split (%)	15.3%	60.4%	11.1%	56.3%			28.5%	28.5%	28.5%	28.5%	28.5%	28.5%
Yellow Time (s)	3.5	3.5	3.5	3.5			3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.0	1.0	1.0	1.0			1.0	1.0	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	0.0	0.0
Total Lost Time (s)	4.5	4.5	4.5	4.5			4.5	4.5	4.5	4.5	4.5	4.5
Lead/Lag	Lead	Lead	Lag	Lag								
Lead-Lag Optimize?	Yes	Yes	Yes	Yes								
Recall Mode	None	C-Max	None	C-Max			Max	Max	Max	Max	Max	Max
Act Effct Green (s)	85.7	85.7	84.7	84.7			36.5	36.5	36.5	36.5	36.5	36.5
Actuated g/C Ratio	0.60	0.60	0.59	0.59			0.25	0.25	0.25	0.25	0.25	0.25
v/c Ratio	0.20	0.42	0.15	0.18			0.12	0.12	0.12	0.09	0.17	0.17
Control Delay	14.6	16.8	16.6	13.8			42.5	3.7	41.8	9.0	9.0	9.0
Queue Delay	0.0	0.0	0.0	0.0			0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	14.6	16.8	16.6	13.8			42.5	3.7	41.8	9.0	9.0	9.0
LOS	B	B	B	B			D	A	D	D	A	A
Approach Delay		16.6		14.0			22.9		19.7			
Approach LOS		B		B			C		B			
Queue Length 50th (ft)	43	239	18	79			39	0	27	0	0	0
Queue Length 95th (ft)	72	275	38	105			77	16	59	42	42	42
Internal Link Dist (ft)		339		581			352		956			
Turn Bay Length (ft)	133		75									
Base Capacity (vph)	569	3016	330	2977			426	460	443	460	460	460
Starvation Cap Reductn	0	0	0	0			0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0			0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0			0	0	0	0	0	0
Reduced v/c Ratio	0.18	0.42	0.14	0.18			0.12	0.12	0.09	0.17	0.17	0.17

Intersection Summary

Cycle Length: 144  
 Actuated Cycle Length: 144  
 Offset: 0 (0%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green  
 Natural Cycle: 70  
 Control Type: Actuated-Coordinated  
 Maximum v/c Ratio: 0.42

8: Turtle Creek Boulevard & Irving Boulevard  
5431-22.460

Existing  
Timing Plan: PM

Intersection Signal Delay: 16.4  
 Intersection LOS: B  
 Intersection Capacity Utilization 47.4%  
 ICU Level of Service A  
 Analysis Period (min) 15

Splits and Phases: 8: Turtle Creek Boulevard & Irving Boulevard



Intersection												
Int Delay, s/veh	0.7											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↵ ↑↑↑			↵ ↑↑↑			↕			↕		
Traffic Vol, veh/h	0	1232	16	22	499	0	6	0	23	2	0	1
Future Vol, veh/h	0	1232	16	22	499	0	6	0	23	2	0	1
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	43	-	-	60	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	85	50	61	92	92	75	92	58	50	50	50
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	1449	32	36	542	0	8	0	40	4	0	2

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	542	0	0	1481	0	0	1754	2079	741	1194	2095	271
Stage 1	-	-	-	-	-	-	1465	1465	-	614	614	-
Stage 2	-	-	-	-	-	-	289	614	-	580	1481	-
Critical Hdwy	5.34	-	-	5.34	-	-	6.44	6.54	7.14	6.44	6.54	7.14
Critical Hdwy Stg 1	-	-	-	-	-	-	7.34	5.54	-	7.34	5.54	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.74	5.54	-	6.74	5.54	-
Follow-up Hdwy	3.12	-	-	3.12	-	-	3.82	4.02	3.92	3.82	4.02	3.92
Pot Cap-1 Maneuver	900	-	-	666	-	-	*90	53	*641	*196	52	*833
Stage 1	-	-	-	-	-	-	*518	535	-	*610	652	-
Stage 2	-	-	-	-	-	-	*855	652	-	*658	523	-
Platoon blocked, %	1	-	-	1	-	-	-	-	1	-	-	1
Mov Cap-1 Maneuver	900	-	-	666	-	-	*86	50	*641	*176	49	*833
Mov Cap-2 Maneuver	-	-	-	-	-	-	*86	50	-	*176	49	-
Stage 1	-	-	-	-	-	-	*518	535	-	*610	617	-
Stage 2	-	-	-	-	-	-	*807	617	-	*617	523	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0	0.7	18.8	20.5
HCM LOS			C	C

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	308	900	-	-	666	-	-	239
HCM Lane V/C Ratio	0.155	-	-	-	0.054	-	-	0.025
HCM Control Delay (s)	18.8	0	-	-	10.7	-	-	20.5
HCM Lane LOS	C	A	-	-	B	-	-	C
HCM 95th %tile Q(veh)	0.5	0	-	-	0.2	-	-	0.1

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

1: Oak Lawn Avenue & Irving Boulevard  
5431-22.460

No Build  
Timing Plan: AM

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↕↕↕	↔	↔	↕↕↕	↔	↔	↕	↔	↔	↕	↕
Traffic Volume (vph)	155	277	14	23	694	3	10	30	3	14	50	248
Future Volume (vph)	155	277	14	23	694	3	10	30	3	14	50	248
Peak Hour Factor	0.78	0.94	0.81	0.79	0.92	0.50	0.56	0.88	0.75	0.54	0.73	0.88
Adj. Flow (vph)	199	295	17	29	754	6	18	34	4	26	68	282
Shared Lane Traffic (%)												
Lane Group Flow (vph)	199	312	0	29	760	0	18	38	0	26	68	282
Turn Type	pm+pt	NA	pm+pt	NA	Perm	NA	Perm	NA	Perm	NA	Perm	Perm
Protected Phases	7	4	3	8			2	2		6	6	
Permitted Phases	4		8				2			6		6
Detector Phase	7	4	3	8			2	2		6	6	6
Switch Phase												
Minimum Initial (s)	5.0	5.0	5.0	5.0			5.0	5.0		5.0	5.0	5.0
Minimum Split (s)	9.5	22.5	9.5	22.5			22.5	22.5		22.5	22.5	22.5
Total Split (s)	13.0	84.0	13.0	84.0			18.0	18.0		18.0	18.0	18.0
Total Split (%)	11.3%	73.0%	11.3%	73.0%			15.7%	15.7%		15.7%	15.7%	15.7%
Yellow Time (s)	3.5	3.5	3.5	3.5			3.5	3.5		3.5	3.5	3.5
All-Red Time (s)	1.0	1.0	1.0	1.0			1.0	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	0.0
Total Lost Time (s)	4.5	4.5	4.5	4.5			4.5	4.5		4.5	4.5	4.5
Lead/Lag	Lead	Lag	Lead	Lag								
Lead-Lag Optimize?	Yes	Yes	Yes	Yes								
Recall Mode	None	None	None	None			C-Max	C-Max		C-Max	C-Max	C-Max
Act Effct Green (s)	36.2	31.1	32.4	25.4			67.6	67.6		67.6	67.6	67.6
Actuated g/C Ratio	0.31	0.27	0.28	0.22			0.59	0.59		0.59	0.59	0.59
v/c Ratio	0.95	0.23	0.09	0.68			0.02	0.04		0.03	0.06	0.27
Control Delay	82.8	31.6	24.7	43.7			11.7	10.6		11.7	11.6	2.2
Queue Delay	0.0	0.0	0.0	0.0			0.0	0.0		0.0	0.0	0.4
Total Delay	82.8	31.6	24.7	43.7			11.7	10.6		11.7	11.6	2.6
LOS	F	C	C	D			B	B		B	B	A
Approach Delay		51.5		43.0				11.0			4.9	
Approach LOS		D		D				B			A	
Queue Length 50th (ft)	110	65	14	189			5	10		8	20	0
Queue Length 95th (ft)	#153	87	29	218			11	28		13	37	37
Internal Link Dist (ft)		192		382				653			332	
Turn Bay Length (ft)	84		85							60		140
Base Capacity (vph)	210	3492	359	3512			780	1078		801	1094	1046
Starvation Cap Reductn	0	0	0	0			0	0		0	0	394
Spillback Cap Reductn	0	0	0	0			0	0		0	0	0
Storage Cap Reductn	0	0	0	0			0	0		0	0	0
Reduced v/c Ratio	0.95	0.09	0.08	0.22			0.02	0.04		0.03	0.06	0.43

**Intersection Summary**  
 Cycle Length: 115  
 Actuated Cycle Length: 115  
 Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green  
 Natural Cycle: 55  
 Control Type: Actuated-Coordinated  
 Maximum v/c Ratio: 0.95

1: Oak Lawn Avenue & Irving Boulevard  
5431-22.460

No Build  
Timing Plan: AM

Intersection Signal Delay: 36.2 Intersection LOS: D  
 Intersection Capacity Utilization 44.2% 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: 1: Oak Lawn Avenue & Irving Boulevard



2: Oak Lawn Avenue & Market Center Boulevard  
5431-22.460

No Build  
Timing Plan: AM

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↔↔	↔	↔	↔↔	↔	↔	↔↔	↔	↔	↔↔	↔
Traffic Volume (vph)	73	132	27	16	539	201	4	182	6	70	273	37
Future Volume (vph)	73	132	27	16	539	201	4	182	6	70	273	37
Confl. Peds. (#/hr)	130											
Peak Hour Factor	0.78	0.82	0.69	0.54	0.93	0.86	0.50	0.87	0.50	0.83	0.90	0.73
Adj. Flow (vph)	94	161	39	30	580	234	8	209	12	84	303	51
Shared Lane Traffic (%)												
Lane Group Flow (vph)	94	200	0	30	814	0	8	221	0	84	354	0
Turn Type	pm+pt	NA		pm+pt	NA		pm+pt	NA		pm+pt	NA	
Protected Phases	1	6		5	2		7	4		3	8	
Permitted Phases	6			2			4			8		
Detector Phase	1	6		5	2		7	4		3	8	
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Minimum Split (s)	9.5	22.5		9.5	22.5		9.5	22.5		9.5	22.5	
Total Split (s)	21.0	63.0		21.0	63.0		10.0	23.0		10.0	23.0	
Total Split (%)	17.9%	53.8%		17.9%	53.8%		8.5%	19.7%		8.5%	19.7%	
Yellow Time (s)	3.5	3.5		3.5	3.5		3.5	3.5		3.5	3.5	
All-Red Time (s)	1.0	1.0		1.0	1.0		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)	4.5	4.5		4.5	4.5		4.5	4.5		4.5	4.5	
Lead/Lag	Lead	Lag		Lead	Lag		Lead	Lag		Lead	Lag	
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes		Yes	Yes	
Recall Mode	None	C-Max		None	C-Max		None	None		None	None	
Act Effect Green (s)	84.7	79.8		80.6	74.5		18.1	13.7		20.8	19.7	
Actuated g/C Ratio	0.72	0.68		0.69	0.64		0.15	0.12		0.18	0.17	
v/c Ratio	0.21	0.06		0.04	0.26		0.05	0.54		0.45	0.60	
Control Delay	6.2	6.4		5.5	8.6		36.2	52.3		47.2	47.4	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	6.2	6.4		5.5	8.6		36.2	52.3		47.2	47.4	
LOS	A	A		A	A		D	D		D	D	
Approach Delay	6.4			8.5			51.8			47.4		
Approach LOS	A			A			D			D		
Queue Length 50th (ft)	18	15		5	76		5	83		54	122	
Queue Length 95th (ft)	34	26		10	118		10	113		86	179	
Internal Link Dist (ft)	164			443			332			494		
Turn Bay Length (ft)	130			80			70			109		
Base Capacity (vph)	561	3379		940	3143		168	558		188	629	
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	0.17	0.06		0.03	0.26		0.05	0.40		0.45	0.56	

Intersection Summary

Cycle Length: 117  
 Actuated Cycle Length: 117  
 Offset: 21 (18%), Referenced to phase 2:WBTL and 6:EBTL, Start of Green  
 Natural Cycle: 65  
 Control Type: Actuated-Coordinated

2: Oak Lawn Avenue & Market Center Boulevard  
5431-22.460

No Build  
Timing Plan: AM

Maximum v/c Ratio: 0.60	Intersection LOS: C
Intersection Signal Delay: 23.1	ICU Level of Service A
Intersection Capacity Utilization 47.0%	
Analysis Period (min) 15	

Splits and Phases: 2: Oak Lawn Avenue & Market Center Boulevard



3: Turtle Creek Boulevard & Market Center Boulevard  
5431-22.460

No Build  
Timing Plan: AM

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↕	↔	↔	↕	↔	↔	↕	↔	↔	↕	↔
Traffic Volume (vph)	16	229	90	11	517	6	38	29	15	11	53	70
Future Volume (vph)	16	229	90	11	517	6	38	29	15	11	53	70
Peak Hour Factor	0.50	0.96	0.85	0.63	0.88	0.75	0.67	0.96	0.50	0.63	0.78	0.69
Adj. Flow (vph)	32	239	106	17	588	8	57	30	30	17	68	101
Shared Lane Traffic (%)												
Lane Group Flow (vph)	32	345	0	17	596	0	57	30	30	17	68	101
Turn Type	pm+pt	NA	pm+pt	NA	Perm	NA	Perm	Perm	Perm	NA	Perm	Perm
Protected Phases	1	6	5	2	4	4	4	4	8	8	8	8
Permitted Phases	6		2		4		4		4	8		8
Detector Phase	1	6	5	2	4	4	4	4	8	8	8	8
Switch Phase												
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	9.5	22.5	9.5	22.5	36.0	22.5	22.5	22.5	22.5	22.5	22.5	22.5
Total Split (s)	15.0	65.0	15.0	65.0	36.0	36.0	36.0	36.0	36.0	36.0	36.0	36.0
Total Split (%)	12.9%	56.0%	12.9%	56.0%	31.0%	31.0%	31.0%	31.0%	31.0%	31.0%	31.0%	31.0%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	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	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Lead/Lag	Lead	Lag	Lead	Lag	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	C-Min	None	C-Min	None	None	None	None	None	None	None	None
Act Effct Green (s)	95.0	92.4	93.7	90.2	10.4	10.4	10.4	10.4	10.4	10.4	10.4	10.4
Actuated g/C Ratio	0.82	0.80	0.81	0.78	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09
v/c Ratio	0.05	0.09	0.02	0.15	0.48	0.09	0.16	0.14	0.41	0.43	0.43	0.43
Control Delay	2.3	2.5	2.3	4.1	62.7	47.2	5.3	49.3	56.2	15.1	15.1	15.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	2.3	2.5	2.3	4.1	62.7	47.2	5.3	49.3	56.2	15.1	15.1	15.1
LOS	A	A	A	A	E	D	A	D	E	B	B	B
Approach Delay		2.5		4.0		44.0		33.2				
Approach LOS		A		A		D		C				
Queue Length 50th (ft)	3	8	2	40	41	11	0	12	49	0	0	0
Queue Length 95th (ft)	5	28	4	61	59	25	0	24	79	22	22	22
Internal Link Dist (ft)		527		443		954		698				
Turn Bay Length (ft)	210		113		110		100	135				
Base Capacity (vph)	727	3887	901	3948	360	961	470	372	505	503	503	503
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.04	0.09	0.02	0.15	0.16	0.03	0.06	0.05	0.13	0.20	0.20	0.20

Intersection Summary

Cycle Length: 116  
 Actuated Cycle Length: 116  
 Offset: 15 (13%), Referenced to phase 2:WBTL and 6:EBTL, Start of Green  
 Natural Cycle: 55  
 Control Type: Actuated-Coordinated  
 Maximum v/c Ratio: 0.48

3: Turtle Creek Boulevard & Market Center Boulevard  
5431-22.460

No Build  
Timing Plan: AM

Intersection Signal Delay: 11.4  
 Intersection LOS: B  
 Intersection Capacity Utilization 29.9%  
 ICU Level of Service A  
 Analysis Period (min) 15

Splits and Phases: 3: Turtle Creek Boulevard & Market Center Boulevard



8: Turtle Creek Boulevard & Irving Boulevard  
5431-22.460

No Build  
Timing Plan: AM

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↔↔↔	↔	↔	↔↔↔	↔	↔	↔	↔	↔	↔	↔
Traffic Volume (vph)	63	423	12	19	689	10	12	16	23	34	22	87
Future Volume (vph)	63	423	12	19	689	10	12	16	23	34	22	87
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)	68	460	13	21	749	11	13	17	25	37	24	95
Shared Lane Traffic (%)												
Lane Group Flow (vph)	68	473	0	21	760	0	0	30	25	0	61	95
Turn Type	pm+pt	NA	pm+pt	NA	Perm	NA	Perm	Perm	Perm	NA	Perm	Perm
Protected Phases	5	2	1	6	8	8	8	8	8	4	4	4
Permitted Phases	2		6		8		8		8	4		4
Detector Phase	5	2	1	6	8	8	8	8	8	4	4	4
Switch Phase												
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	9.5	22.5	9.5	22.5	22.5	22.5	22.5	22.5	22.5	22.5	22.5	22.5
Total Split (s)	22.0	64.0	16.0	58.0	37.0	37.0	37.0	37.0	37.0	37.0	37.0	37.0
Total Split (%)	18.8%	54.7%	13.7%	49.6%	31.6%	31.6%	31.6%	31.6%	31.6%	31.6%	31.6%	31.6%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	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	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Lead/Lag	Lead	Lead	Lag	Lag	Yes	Yes						
Lead-Lag Optimize?	Yes	Yes	Yes	Yes								
Recall Mode	None	C-Max	None	C-Max	None	None	None	None	None	None	None	None
Act Effct Green (s)	91.7	91.7	88.9	88.9	9.9	9.9	9.9	9.9	9.9	9.9	9.9	9.9
Actuated g/C Ratio	0.78	0.78	0.76	0.76	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08
v/c Ratio	0.12	0.12	0.03	0.20	0.22	0.11	0.49	0.43				
Control Delay	5.2	4.1	5.1	4.7	52.4	1.0	63.2	15.0				
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0				
Total Delay	5.2	4.1	5.1	4.7	52.4	1.0	63.2	15.0				
LOS	A	A	A	A	D	A	E	B				
Approach Delay		4.3		4.7	29.0		33.8					
Approach LOS		A		A	C		C					
Queue Length 50th (ft)	6	16	4	53	21	0	45	0				
Queue Length 95th (ft)	32	57	12	84	51	0	87	48				
Internal Link Dist (ft)		330		590	366		954					
Turn Bay Length (ft)	133		75									
Base Capacity (vph)	653	3970	753	3855	443	510	412	510				
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	0.10	0.12	0.03	0.20	0.07	0.05	0.15	0.19				

**Intersection Summary**  
 Cycle Length: 117  
 Actuated Cycle Length: 117  
 Offset: 0 (0%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green  
 Natural Cycle: 55  
 Control Type: Actuated-Coordinated  
 Maximum v/c Ratio: 0.49

8: Turtle Creek Boulevard & Irving Boulevard  
5431-22.460

No Build  
Timing Plan: AM

Intersection Signal Delay: 8.4  
 Intersection Capacity Utilization 38.7%  
 Analysis Period (min) 15  
 Intersection LOS: A  
 ICU Level of Service A

Splits and Phases: 8: Turtle Creek Boulevard & Irving Boulevard





Intersection												
Int Delay, s/veh	2.4											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↵ ↑↑↑			↵ ↑↑↑			↕			↕		
Traffic Vol, veh/h	1	419	45	154	753	1	2	1	33	0	0	2
Future Vol, veh/h	1	419	45	154	753	1	2	1	33	0	0	2
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	43	-	-	60	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	50	91	75	52	94	50	50	50	58	92	92	50
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	2	460	60	296	801	2	4	2	57	0	0	4

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	803	0	0	520	0	0	1406	1889	260	1583	1918	402
Stage 1	-	-	-	-	-	-	494	494	-	1394	1394	-
Stage 2	-	-	-	-	-	-	912	1395	-	189	524	-
Critical Hdwy	5.34	-	-	5.34	-	-	6.44	6.54	7.14	6.44	6.54	7.14
Critical Hdwy Stg 1	-	-	-	-	-	-	7.34	5.54	-	7.34	5.54	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.74	5.54	-	6.74	5.54	-
Follow-up Hdwy	3.12	-	-	3.12	-	-	3.82	4.02	3.92	3.82	4.02	3.92
Pot Cap-1 Maneuver	*946	-	-	969	-	-	147	70	*822	*115	67	*753
Stage 1	-	-	-	-	-	-	804	777	-	*256	355	-
Stage 2	-	-	-	-	-	-	650	355	-	*844	752	-
Platoon blocked, %	1	-	-	1	-	-	-	-	1	-	-	1
Mov Cap-1 Maneuver	*946	-	-	969	-	-	111	49	*822	*79	46	*753
Mov Cap-2 Maneuver	-	-	-	-	-	-	111	49	-	*79	46	-
Stage 1	-	-	-	-	-	-	803	776	-	*256	246	-
Stage 2	-	-	-	-	-	-	449	246	-	*782	751	-

Approach	EB			WB			NB			SB		
HCM Control Delay, s	0			2.8			14.8			9.8		
HCM LOS							B			A		

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	431	* 946	-	-	969	-	-	753
HCM Lane V/C Ratio	0.146	0.002	-	-	0.306	-	-	0.005
HCM Control Delay (s)	14.8	8.8	-	-	10.3	-	-	9.8
HCM Lane LOS	B	A	-	-	B	-	-	A
HCM 95th %tile Q(veh)	0.5	0	-	-	1.3	-	-	0

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

1: Oak Lawn Avenue & Irving Boulevard  
5431-22.460

No Build  
Timing Plan: PM

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↕	↔	↔	↕	↔	↔	↕	↔	↔	↕	↔
Traffic Volume (vph)	226	1195	8	8	347	12	15	81	21	70	30	240
Future Volume (vph)	226	1195	8	8	347	12	15	81	21	70	30	240
Peak Hour Factor	0.73	0.88	0.67	0.50	0.89	0.69	0.70	0.58	0.56	0.87	0.64	0.78
Adj. Flow (vph)	310	1358	12	16	390	17	21	140	38	80	47	308
Shared Lane Traffic (%)												
Lane Group Flow (vph)	310	1370	0	16	407	0	21	178	0	80	47	308
Turn Type	pm+pt	NA	pm+pt	NA	Perm	NA	Perm	NA	Perm	NA	Perm	Perm
Protected Phases	7	4	3	8	2	2						
Permitted Phases	4		8		2				6		6	
Detector Phase	7	4	3	8	2	2			6	6	6	
Switch Phase												
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	9.5	22.5	9.5	22.5	22.5	22.5	22.5	22.5	22.5	22.5	22.5	22.5
Total Split (s)	10.0	40.0	10.0	40.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0
Total Split (%)	14.3%	57.1%	14.3%	57.1%	28.6%	28.6%	28.6%	28.6%	28.6%	28.6%	28.6%	28.6%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	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	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Lead/Lag	Lead	Lag	Lead	Lag								
Lead-Lag Optimize?	Yes	Yes	Yes	Yes								
Recall Mode	None	None	None	None	C-Max	C-Max	C-Max	C-Max	C-Max	C-Max	C-Max	C-Max
Act Effct Green (s)	30.9	29.8	27.3	21.8	29.2	29.2	29.2	29.2	29.2	29.2	29.2	29.2
Actuated g/C Ratio	0.44	0.43	0.39	0.31	0.42	0.42	0.42	0.42	0.42	0.42	0.42	0.42
v/c Ratio	0.72	0.63	0.07	0.26	0.04	0.23	0.16	0.06	0.37			
Control Delay	22.9	16.8	8.1	16.7	17.3	15.8	7.2	6.0	3.9			
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0			
Total Delay	22.9	16.8	8.1	16.7	17.3	15.8	7.2	6.0	3.9			
LOS	C	B	A	B	B	B	A	A	A			
Approach Delay		17.9		16.4		15.9		4.7				
Approach LOS		B		B		B		A				
Queue Length 50th (ft)	88	160	4	47	5	41	4	2	7			
Queue Length 95th (ft)	62	167	4	45	19	66	m52	16	140			
Internal Link Dist (ft)		192		382		653		332				
Turn Bay Length (ft)	84		85				60		140			
Base Capacity (vph)	429	2577	229	2570	564	763	494	778	840			
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0			
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0			
Storage Cap Reductn	0	0	0	0	0	0	0	0	0			
Reduced v/c Ratio	0.72	0.53	0.07	0.16	0.04	0.23	0.16	0.06	0.37			

Intersection Summary

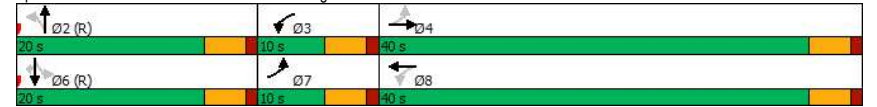
Cycle Length: 70  
 Actuated Cycle Length: 70  
 Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green  
 Natural Cycle: 60  
 Control Type: Actuated-Coordinated  
 Maximum v/c Ratio: 0.72

1: Oak Lawn Avenue & Irving Boulevard  
5431-22.460

No Build  
Timing Plan: PM

Intersection Signal Delay: 15.5  
 Intersection Capacity Utilization 49.2%  
 Intersection LOS: B  
 ICU Level of Service A  
 Analysis Period (min) 15  
 m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 1: Oak Lawn Avenue & Irving Boulevard



2: Oak Lawn Avenue & Market Center Boulevard  
5431-22.460

No Build  
Timing Plan: PM



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↕	↔	↔	↕	↔	↔	↕	↔	↔	↕	↔
Traffic Volume (vph)	75	298	18	19	273	138	37	268	8	194	303	59
Future Volume (vph)	75	298	18	19	273	138	37	268	8	194	303	59
Confl. Peds. (#/hr)	130											
Peak Hour Factor	0.85	0.88	0.61	0.56	0.87	0.86	0.73	0.79	0.67	0.85	0.83	0.74
Adj. Flow (vph)	88	339	30	34	314	160	51	339	12	228	365	80
Shared Lane Traffic (%)												
Lane Group Flow (vph)	88	369	0	34	474	0	51	351	0	228	445	0
Turn Type	pm+pt	NA		pm+pt	NA		pm+pt	NA		pm+pt	NA	
Protected Phases	1	6		5	2		7	4		3	8	
Permitted Phases	6			2			4			8		
Detector Phase	1	6		5	2		7	4		3	8	
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Minimum Split (s)	9.5	22.5		9.5	22.5		9.5	22.5		9.5	22.5	
Total Split (s)	15.0	27.0		15.0	27.0		10.0	18.0		10.0	18.0	
Total Split (%)	21.4%	38.6%		21.4%	38.6%		14.3%	25.7%		14.3%	25.7%	
Yellow Time (s)	3.5	3.5		3.5	3.5		3.5	3.5		3.5	3.5	
All-Red Time (s)	1.0	1.0		1.0	1.0		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)	4.5	4.5		4.5	4.5		4.5	4.5		4.5	4.5	
Lead/Lag	Lead	Lag		Lead	Lag		Lead	Lag		Lead	Lag	
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes		Yes	Yes	
Recall Mode	None	C-Max		None	C-Max		None	None		None	None	
Act Effect Green (s)	37.8	34.5		34.4	29.3		17.5	12.0		19.3	16.0	
Actuated g/C Ratio	0.54	0.49		0.49	0.42		0.25	0.17		0.28	0.23	
v/c Ratio	0.18	0.15		0.06	0.22		0.18	0.58		0.80	0.55	
Control Delay	4.9	5.3		8.2	10.0		15.4	26.7		43.5	25.7	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	4.9	5.3		8.2	10.0		15.4	26.7		43.5	25.7	
LOS	A	A		A	B		B	C		D	C	
Approach Delay	5.2			9.9			25.2			31.7		
Approach LOS	A			A			C			C		
Queue Length 50th (ft)	8	10		6	32		14	76		74	86	
Queue Length 95th (ft)	12	16		11	53		m23	96		#153	119	
Internal Link Dist (ft)	164			443			332			494		
Turn Bay Length (ft)	130			80			70			109		
Base Capacity (vph)	556	2484		644	2112		280	682		286	812	
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	0.16	0.15		0.05	0.22		0.18	0.51		0.80	0.55	

Intersection Summary

Cycle Length: 70  
Actuated Cycle Length: 70  
Offset: 15 (21%), Referenced to phase 2:WBTL and 6:EBTL, Start of Green  
Natural Cycle: 65  
Control Type: Actuated-Coordinated

2: Oak Lawn Avenue & Market Center Boulevard  
5431-22.460

No Build  
Timing Plan: PM

Maximum v/c Ratio: 0.80

Intersection Signal Delay: 19.1

Intersection LOS: B

Intersection Capacity Utilization 45.9%

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.

m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 2: Oak Lawn Avenue & Market Center Boulevard



3: Turtle Creek Boulevard & Market Center Boulevard  
5431-22.460

No Build  
Timing Plan: PM

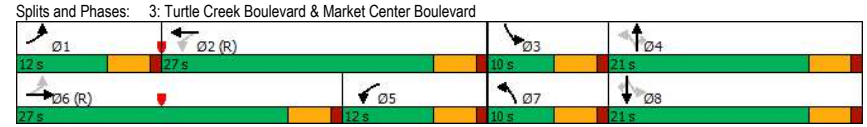
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↕↕↕	↔	↔	↕↕↕	↔	↔	↕↕↕	↔	↔	↕	↕
Traffic Volume (vph)	33	317	65	22	331	14	119	67	22	11	41	72
Future Volume (vph)	33	317	65	22	331	14	119	67	22	11	41	72
Peak Hour Factor	0.78	0.89	0.70	0.75	0.89	0.50	0.79	0.88	0.75	0.63	0.75	0.81
Adj. Flow (vph)	42	356	93	29	372	28	151	76	29	17	55	89
Shared Lane Traffic (%)												
Lane Group Flow (vph)	42	449	0	29	400	0	151	76	29	17	55	89
Turn Type	pm+pt	NA	pm+pt	NA	pm+pt	NA	Perm	pm+pt	NA	NA	Perm	Perm
Protected Phases	1	6	5	2	7	4	7	4	3	8	8	8
Permitted Phases	6		2		4		4		8		8	8
Detector Phase	1	6	5	2	7	4	4	3	8	8	8	8
Switch Phase												
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	9.5	22.5	9.5	22.5	9.5	22.5	22.5	9.5	22.5	9.5	22.5	22.5
Total Split (s)	12.0	27.0	12.0	27.0	10.0	21.0	21.0	10.0	21.0	10.0	21.0	21.0
Total Split (%)	17.1%	38.6%	17.1%	38.6%	14.3%	30.0%	30.0%	14.3%	30.0%	30.0%	30.0%	30.0%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	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	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Lead/Lag	Lead	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	C-Min	None	C-Min	None	None	None	None	None	None	None	None
Act Effct Green (s)	37.6	38.5	36.0	36.0	21.1	18.6	18.6	12.5	7.5	7.5	7.5	7.5
Actuated g/C Ratio	0.54	0.55	0.51	0.51	0.30	0.27	0.27	0.18	0.11	0.11	0.11	0.11
v/c Ratio	0.08	0.16	0.05	0.15	0.37	0.08	0.05	0.06	0.28	0.23	0.23	0.23
Control Delay	15.2	10.3	22.9	17.9	19.0	17.7	0.1	14.9	31.6	1.5	1.5	1.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	15.2	10.3	22.9	17.9	19.0	17.7	0.1	14.9	31.6	1.5	1.5	1.5
LOS	B	B	C	B	B	B	A	B	C	A	A	A
Approach Delay		10.8		18.2		16.5		13.2				
Approach LOS		B		B		B		B				
Queue Length 50th (ft)	8	25	8	46	47	11	0	5	22	0	0	0
Queue Length 95th (ft)	30	65	m25	82	66	28	0	11	43	0	0	0
Internal Link Dist (ft)		527		443		956		698				
Turn Bay Length (ft)	210		113		110	100	135					
Base Capacity (vph)	527	2779	558	2639	409	1049	634	273	439	551		
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.08	0.16	0.05	0.15	0.37	0.07	0.05	0.06	0.13	0.16		

**Intersection Summary**  
 Cycle Length: 70  
 Actuated Cycle Length: 70  
 Offset: 12 (17%), Referenced to phase 2:WBTL and 6:EBTL, Start of Green  
 Natural Cycle: 65  
 Control Type: Actuated-Coordinated  
 Maximum v/c Ratio: 0.37

3: Turtle Creek Boulevard & Market Center Boulevard  
5431-22.460

No Build  
Timing Plan: PM

Intersection Signal Delay: 14.5 Intersection LOS: B  
 Intersection Capacity Utilization 36.3% ICU Level of Service A  
 Analysis Period (min) 15  
 m Volume for 95th percentile queue is metered by upstream signal.



8: Turtle Creek Boulevard & Irving Boulevard  
5431-22.460

No Build  
Timing Plan: PM

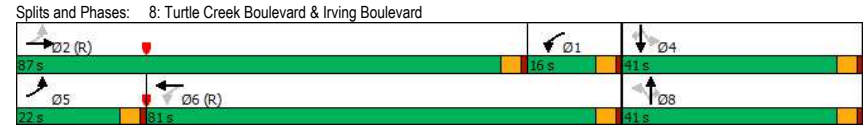
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↔↔↔	↔	↔	↔↔↔	↔	↔	↔	↔	↔	↔	↔
Traffic Volume (vph)	102	1215	36	46	499	21	36	55	53	19	27	77
Future Volume (vph)	102	1215	36	46	499	21	36	55	53	19	27	77
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	111	1321	39	50	542	23	39	60	58	21	29	84
Shared Lane Traffic (%)												
Lane Group Flow (vph)	111	1360	0	50	565	0	0	99	58	0	50	84
Turn Type	pm+pt	NA	pm+pt	NA	Perm	NA	Perm	Perm	Perm	NA	Perm	Perm
Protected Phases	5	2	1	6	8	8	8	8	8	4	4	4
Permitted Phases	2		6		8		8		8	4		4
Detector Phase	5	2	1	6	8	8	8	8	8	4	4	4
Switch Phase												
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	9.5	22.5	22.5	22.5	22.5	22.5	22.5	22.5	22.5	22.5	22.5	22.5
Total Split (s)	22.0	87.0	16.0	81.0	41.0	41.0	41.0	41.0	41.0	41.0	41.0	41.0
Total Split (%)	15.3%	60.4%	11.1%	56.3%	28.5%	28.5%	28.5%	28.5%	28.5%	28.5%	28.5%	28.5%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	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	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Lead/Lag	Lead	Lead	Lag	Lag	Yes	Yes						
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes						
Recall Mode	None	C-Max	None	C-Max	Max	Max	Max	Max	Max	Max	Max	Max
Act Effct Green (s)	85.7	85.7	84.4	84.4	36.5	36.5	36.5	36.5	36.5	36.5	36.5	36.5
Actuated g/C Ratio	0.60	0.60	0.59	0.59	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25
v/c Ratio	0.22	0.45	0.17	0.19	0.24	0.13	0.12	0.18	0.12	0.18	0.18	0.18
Control Delay	14.8	17.2	17.6	14.1	44.6	4.4	42.5	9.1	42.5	9.1	42.5	9.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	14.8	17.2	17.6	14.1	44.6	4.4	42.5	9.1	42.5	9.1	42.5	9.1
LOS	B	B	B	B	D	A	D	A	D	A	D	A
Approach Delay		17.0		14.4	29.7		21.5		21.5		17.0	
Approach LOS		B		B	C		C		C		B	
Queue Length 50th (ft)	46	261	19	85	74	0	36	0	36	0	261	0
Queue Length 95th (ft)	76	299	40	112	128	21	73	43	73	43	299	43
Internal Link Dist (ft)		339		581	352		956		956		339	
Turn Bay Length (ft)	133		75									
Base Capacity (vph)	554	3016	309	2967	414	460	415	463	415	463	309	2967
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.20	0.45	0.16	0.19	0.24	0.13	0.12	0.18	0.12	0.18	0.16	0.19

**Intersection Summary**  
 Cycle Length: 144  
 Actuated Cycle Length: 144  
 Offset: 0 (0%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green  
 Natural Cycle: 70  
 Control Type: Actuated-Coordinated  
 Maximum v/c Ratio: 0.45

8: Turtle Creek Boulevard & Irving Boulevard  
5431-22.460

No Build  
Timing Plan: PM

Intersection Signal Delay: 17.4 Intersection LOS: B  
 Intersection Capacity Utilization 51.2% ICU Level of Service A  
 Analysis Period (min) 15



Intersection												
Int Delay, s/veh	2.8											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖ ↑↑↑			↖ ↑↑↑			↔			↔		
Traffic Vol, veh/h	0	1307	31	66	530	0	6	0	145	2	0	1
Future Vol, veh/h	0	1307	31	66	530	0	6	0	145	2	0	1
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	43	-	-	60	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	85	50	61	92	92	75	92	58	50	50	50
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	1538	62	108	576	0	8	0	250	4	0	2

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	576	0	0	1600	0	0	2015	2361	800	1407	2392	288
Stage 1	-	-	-	-	-	-	1569	1569	-	792	792	-
Stage 2	-	-	-	-	-	-	446	792	-	615	1600	-
Critical Hdwy	5.34	-	-	5.34	-	-	6.44	6.54	7.14	6.44	6.54	7.14
Critical Hdwy Stg 1	-	-	-	-	-	-	7.34	5.54	-	7.34	5.54	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.74	5.54	-	6.74	5.54	-
Follow-up Hdwy	3.12	-	-	3.12	-	-	3.82	4.02	3.92	3.82	4.02	3.92
Pot Cap-1 Maneuver	866	-	-	613	-	-	62	35	*623	*146	33	*833
Stage 1	-	-	-	-	-	-	483	506	-	*452	534	-
Stage 2	-	-	-	-	-	-	813	534	-	*639	484	-
Platoon blocked, %	1	-	-	1	-	-	-	-	1	-	-	1
Mov Cap-1 Maneuver	866	-	-	613	-	-	54	29	*623	*76	27	*833
Mov Cap-2 Maneuver	-	-	-	-	-	-	54	29	-	*76	27	-
Stage 1	-	-	-	-	-	-	483	506	-	*452	440	-
Stage 2	-	-	-	-	-	-	668	440	-	*383	484	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0	1.9	21.6	39.9
HCM LOS			C	E

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	470	866	-	-	613	-	-	109
HCM Lane V/C Ratio	0.549	-	-	-	0.177	-	-	0.055
HCM Control Delay (s)	21.6	0	-	-	12.1	-	-	39.9
HCM Lane LOS	C	A	-	-	B	-	-	E
HCM 95th %tile Q(veh)	3.3	0	-	-	0.6	-	-	0.2

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

1: Oak Lawn Avenue & Irving Boulevard  
5431-22.460

Build  
Timing Plan: AM

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↕↕↕	↔	↔	↕↕↕	↔	↔	↕	↔	↔	↕	↕
Traffic Volume (vph)	164	294	14	23	754	3	10	30	3	14	50	368
Future Volume (vph)	164	294	14	23	754	3	10	30	3	14	50	368
Peak Hour Factor	0.78	0.94	0.81	0.79	0.92	0.50	0.56	0.88	0.75	0.54	0.73	0.88
Adj. Flow (vph)	210	313	17	29	820	6	18	34	4	26	68	418
Shared Lane Traffic (%)												
Lane Group Flow (vph)	210	330	0	29	826	0	18	38	0	26	68	418
Turn Type	pm+pt	NA		pm+pt	NA		Perm	NA		Perm	NA	Perm
Protected Phases	7	4		3	8			2			6	
Permitted Phases	4			8			2			6		6
Detector Phase	7	4		3	8		2	2		6	6	6
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	5.0
Minimum Split (s)	9.5	22.5		9.5	22.5		22.5	22.5		22.5	22.5	22.5
Total Split (s)	13.0	84.0		13.0	84.0		18.0	18.0		18.0	18.0	18.0
Total Split (%)	11.3%	73.0%		11.3%	73.0%		15.7%	15.7%		15.7%	15.7%	15.7%
Yellow Time (s)	3.5	3.5		3.5	3.5		3.5	3.5		3.5	3.5	3.5
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0	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	0.0
Total Lost Time (s)	4.5	4.5		4.5	4.5		4.5	4.5		4.5	4.5	4.5
Lead/Lag	Lead	Lag		Lead	Lag							
Lead-Lag Optimize?	Yes	Yes		Yes	Yes							
Recall Mode	None	None		None	None		C-Max	C-Max		C-Max	C-Max	C-Max
Act Effct Green (s)	38.5	33.4		34.6	27.7		65.3	65.3		65.3	65.3	65.3
Actuated g/C Ratio	0.33	0.29		0.30	0.24		0.57	0.57		0.57	0.57	0.57
v/c Ratio	1.00	0.22		0.08	0.67		0.02	0.04		0.03	0.06	0.40
Control Delay	94.2	30.0		23.0	42.0		12.9	11.8		12.9	12.8	5.1
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.7
Total Delay	94.2	30.0		23.0	42.0		12.9	11.8		12.9	12.8	5.8
LOS	F	C		C	D		B	B		B	B	A
Approach Delay		55.0			41.3			12.1			7.1	
Approach LOS		D			D			B			A	
Queue Length 50th (ft)	-116	68		14	204		6	10		8	21	33
Queue Length 95th (ft)	#168	89		27	230		12	29		14	39	96
Internal Link Dist (ft)		192			382			653			332	
Turn Bay Length (ft)	84			85						60		140
Base Capacity (vph)	210	3492		375	3512		754	1042		774	1058	1035
Starvation Cap Reductn	0	0		0	0		0	0		0	0	328
Spillback Cap Reductn	0	0		0	0		0	0		0	0	0
Storage Cap Reductn	0	0		0	0		0	0		0	0	0
Reduced v/c Ratio	1.00	0.09		0.08	0.24		0.02	0.04		0.03	0.06	0.59

Intersection Summary

Cycle Length: 115  
 Actuated Cycle Length: 115  
 Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green  
 Natural Cycle: 55  
 Control Type: Actuated-Coordinated  
 Maximum v/c Ratio: 1.00

1: Oak Lawn Avenue & Irving Boulevard  
5431-22.460

Build  
Timing Plan: AM

Intersection Signal Delay: 35.3  
 Intersection LOS: D  
 Intersection Capacity Utilization 52.8%  
 ICU Level of Service A  
 Analysis Period (min) 15  
 ~ Volume exceeds capacity, queue is theoretically infinite.  
 Queue shown is maximum after two cycles.  
 # 95th percentile volume exceeds capacity, queue may be longer.  
 Queue shown is maximum after two cycles.

Splits and Phases: 1: Oak Lawn Avenue & Irving Boulevard



2: Oak Lawn Avenue & Market Center Boulevard  
5431-22.460

Build  
Timing Plan: AM



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↕↕	↔	↔	↕↕	↔	↔	↕↕	↔	↔	↕↕	↔
Traffic Volume (vph)	99	140	27	16	659	201	4	190	6	70	393	157
Future Volume (vph)	99	140	27	16	659	201	4	190	6	70	393	157
Confl. Peds. (#/hr)	130											
Peak Hour Factor	0.78	0.82	0.69	0.54	0.93	0.86	0.50	0.87	0.50	0.83	0.90	0.73
Adj. Flow (vph)	127	171	39	30	709	234	8	218	12	84	437	215
Shared Lane Traffic (%)												
Lane Group Flow (vph)	127	210	0	30	943	0	8	230	0	84	652	0
Turn Type	pm+pt	NA		pm+pt	NA		pm+pt	NA		pm+pt	NA	
Protected Phases	1	6		5	2		7	4		3	8	
Permitted Phases	6			2			4			8		
Detector Phase	1	6		5	2		7	4		3	8	
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Minimum Split (s)	9.5	22.5		9.5	22.5		9.5	22.5		9.5	22.5	
Total Split (s)	21.0	63.0		21.0	63.0		10.0	23.0		10.0	23.0	
Total Split (%)	17.9%	53.8%		17.9%	53.8%		8.5%	19.7%		8.5%	19.7%	
Yellow Time (s)	3.5	3.5		3.5	3.5		3.5	3.5		3.5	3.5	
All-Red Time (s)	1.0	1.0		1.0	1.0		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)	4.5	4.5		4.5	4.5		4.5	4.5		4.5	4.5	
Lead/Lag	Lead	Lag		Lead	Lag		Lead	Lag		Lead	Lag	
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes		Yes	Yes	
Recall Mode	None	C-Max		None	C-Max		None	None		None	None	
Act Effect Green (s)	78.5	72.9		72.8	66.6		24.9	20.5		27.6	26.5	
Actuated g/C Ratio	0.67	0.62		0.62	0.57		0.21	0.18		0.24	0.23	
v/c Ratio	0.34	0.07		0.04	0.33		0.06	0.37		0.33	0.81	
Control Delay	9.0	7.8		6.5	12.3		34.8	44.7		39.8	47.9	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	9.0	7.8		6.5	12.3		34.8	44.7		39.8	47.9	
LOS	A	A		A	B		C	D		D	D	
Approach Delay	8.2			12.1			44.4			47.0		
Approach LOS	A			B			D			D		
Queue Length 50th (ft)	30	19		7	115		5	81		51	219	
Queue Length 95th (ft)	44	27		10	150		10	117		86	#398	
Internal Link Dist (ft)	164			443			332			494		
Turn Bay Length (ft)	130			80			70			109		
Base Capacity (vph)	476	3093		866	2831		136	618		252	809	
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	0.27	0.07		0.03	0.33		0.06	0.37		0.33	0.81	

Intersection Summary

Cycle Length: 117  
 Actuated Cycle Length: 117  
 Offset: 21 (18%), Referenced to phase 2:WBTL and 6:EBTL, Start of Green  
 Natural Cycle: 65  
 Control Type: Actuated-Coordinated

2: Oak Lawn Avenue & Market Center Boulevard  
5431-22.460

Build  
Timing Plan: AM

Maximum v/c Ratio: 0.81	Intersection LOS: C
Intersection Signal Delay: 26.1	ICU Level of Service B
Intersection Capacity Utilization 57.8%	
Analysis Period (min) 15	
# 95th percentile volume exceeds capacity, queue may be longer.	
Queue shown is maximum after two cycles.	

Splits and Phases: 2: Oak Lawn Avenue & Market Center Boulevard





3: Turtle Creek Boulevard & Market Center Boulevard  
5431-22.460

Build  
Timing Plan: AM

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↕	↔	↔	↕	↔	↔	↕	↔	↔	↕	↔
Traffic Volume (vph)	16	349	90	11	517	6	55	29	15	11	53	70
Future Volume (vph)	16	349	90	11	517	6	55	29	15	11	53	70
Peak Hour Factor	0.50	0.96	0.85	0.63	0.88	0.75	0.67	0.96	0.50	0.63	0.78	0.69
Adj. Flow (vph)	32	364	106	17	588	8	82	30	30	17	68	101
Shared Lane Traffic (%)												
Lane Group Flow (vph)	32	470	0	17	596	0	82	30	30	17	68	101
Turn Type	pm+pt	NA	pm+pt	NA	Perm	NA	Perm	Perm	Perm	NA	Perm	Perm
Protected Phases	1	6	5	2	4	4	4	4	8	8	8	8
Permitted Phases	6		2		4		4		4	8		8
Detector Phase	1	6	5	2	4	4	4	4	8	8	8	8
Switch Phase												
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	9.5	22.5	9.5	22.5	9.5	22.5	22.5	22.5	22.5	22.5	22.5	22.5
Total Split (s)	15.0	65.0	15.0	65.0	36.0	36.0	36.0	36.0	36.0	36.0	36.0	36.0
Total Split (%)	12.9%	56.0%	12.9%	56.0%	31.0%	31.0%	31.0%	31.0%	31.0%	31.0%	31.0%	31.0%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	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	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Lead/Lag	Lead	Lag	Lead	Lag	Lead	Lag	Lead	Lag	Lead	Lag	Lead	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	C-Min	None	C-Min	None	C-Min	None	C-Min	None	C-Min	None	C-Min
Act Effct Green (s)	92.8	90.2	91.6	88.0	12.6	12.6	12.6	12.6	12.6	12.6	12.6	12.6
Actuated g/C Ratio	0.80	0.78	0.79	0.76	0.11	0.11	0.11	0.11	0.11	0.11	0.11	0.11
v/c Ratio	0.05	0.12	0.02	0.15	0.57	0.08	0.14	0.11	0.11	0.34	0.39	0.39
Control Delay	2.9	3.3	2.9	4.8	63.6	44.6	4.7	45.9	50.8	13.0	13.0	13.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	2.9	3.3	2.9	4.8	63.6	44.6	4.7	45.9	50.8	13.0	13.0	13.0
LOS	A	A	A	A	E	D	A	D	D	D	B	B
Approach Delay		3.3		4.7		47.1		29.9				
Approach LOS		A		A		D		C				
Queue Length 50th (ft)	4	16	2	44	59	11	0	12	48	0	0	0
Queue Length 95th (ft)	6	46	5	69	77	24	0	23	76	21	21	21
Internal Link Dist (ft)		527		443		954		698				
Turn Bay Length (ft)	210		113		110		100	135				
Base Capacity (vph)	712	3841	796	3851	360	961	470	372	505	503	503	503
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.04	0.12	0.02	0.15	0.23	0.03	0.06	0.05	0.13	0.20	0.20	0.20

Intersection Summary

Cycle Length: 116  
 Actuated Cycle Length: 116  
 Offset: 15 (13%), Referenced to phase 2:WBTL and 6:EBTL, Start of Green  
 Natural Cycle: 55  
 Control Type: Actuated-Coordinated  
 Maximum v/c Ratio: 0.57

3: Turtle Creek Boulevard & Market Center Boulevard  
5431-22.460

Build  
Timing Plan: AM

Intersection Signal Delay: 11.7  
 Intersection LOS: B  
 Intersection Capacity Utilization 30.5%  
 ICU Level of Service A  
 Analysis Period (min) 15

Splits and Phases: 3: Turtle Creek Boulevard & Market Center Boulevard



8: Turtle Creek Boulevard & Irving Boulevard  
5431-22.460

Build  
Timing Plan: AM

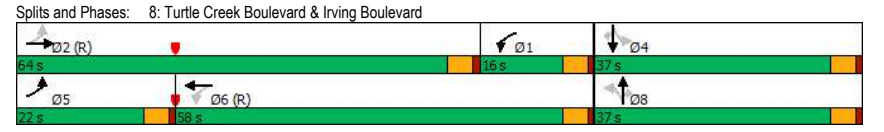
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↕↕↕	↔	↔	↕↕↕	↔	↔	↕	↕	↔	↕	↕
Traffic Volume (vph)	63	483	12	19	697	27	12	16	23	34	22	87
Future Volume (vph)	63	483	12	19	697	27	12	16	23	34	22	87
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	68	525	13	21	758	29	13	17	25	37	24	95
Shared Lane Traffic (%)												
Lane Group Flow (vph)	68	538	0	21	787	0	0	30	25	0	61	95
Turn Type	pm+pt	NA	pm+pt	NA	Perm	NA	Perm	Perm	Perm	NA	Perm	Perm
Protected Phases	5	2	1	6	8	8	8	8	4	4	4	4
Permitted Phases	2		6		8		8		8	4		4
Detector Phase	5	2	1	6	8	8	8	8	4	4	4	4
Switch Phase												
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	9.5	22.5	9.5	22.5	22.5	22.5	22.5	22.5	22.5	22.5	22.5	22.5
Total Split (s)	22.0	64.0	16.0	58.0	37.0	37.0	37.0	37.0	37.0	37.0	37.0	37.0
Total Split (%)	18.8%	54.7%	13.7%	49.6%	31.6%	31.6%	31.6%	31.6%	31.6%	31.6%	31.6%	31.6%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	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	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Lead/Lag	Lead	Lead	Lag	Lag	Yes	Yes						
Lead-Lag Optimize?	Yes	Yes	Yes	Yes								
Recall Mode	None	C-Max	None	C-Max	None	None	None	None	None	None	None	None
Act Effct Green (s)	91.7	91.7	88.9	88.9	9.9	9.9	9.9	9.9	9.9	9.9	9.9	9.9
Actuated g/C Ratio	0.78	0.78	0.76	0.76	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08
v/c Ratio	0.13	0.14	0.03	0.20	0.22	0.11	0.49	0.43				
Control Delay	5.3	4.2	5.1	4.7	52.4	1.0	63.2	15.0				
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0				
Total Delay	5.3	4.2	5.1	4.7	52.4	1.0	63.2	15.0				
LOS	A	A	A	A	D	A	E	B				
Approach Delay		4.3		4.7	29.0		33.8					
Approach LOS		A		A	C		C					
Queue Length 50th (ft)	6	19	4	55	21	0	45	0				
Queue Length 95th (ft)	32	64	12	87	51	0	87	48				
Internal Link Dist (ft)		330		590	366		954					
Turn Bay Length (ft)	133		75									
Base Capacity (vph)	641	3970	716	3841	443	510	412	510				
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	0.11	0.14	0.03	0.20	0.07	0.05	0.15	0.19				

**Intersection Summary**  
 Cycle Length: 117  
 Actuated Cycle Length: 117  
 Offset: 0 (0%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green  
 Natural Cycle: 55  
 Control Type: Actuated-Coordinated  
 Maximum v/c Ratio: 0.49

8: Turtle Creek Boulevard & Irving Boulevard  
5431-22.460

Build  
Timing Plan: AM

Intersection Signal Delay: 8.2 Intersection LOS: A  
 Intersection Capacity Utilization 39.2% ICU Level of Service A  
 Analysis Period (min) 15



4: Riveredge Drive/Site Driveway 1 & Irving Boulevard  
5431-22.460

Build  
Timing Plan: AM

Intersection												
Int Delay, s/veh	4.6											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↕ ↑↑↑			↕ ↑↑↑			↕			↕		
Traffic Vol, veh/h	31	449	45	154	758	151	2	1	33	22	0	24
Future Vol, veh/h	31	449	45	154	758	151	2	1	33	22	0	24
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	43	-	-	60	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	0	-	0	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	50	91	75	52	94	50	50	50	58	92	92	50
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	62	493	60	296	806	302	4	2	57	24	0	48

Major/Minor	Major1	Major2	Minor1	Minor2
Conflicting Flow All	1108	0	0	553
Stage 1	-	-	-	-
Stage 2	-	-	-	-
Critical Hdwy	5.34	-	-	5.34
Critical Hdwy Stg 1	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-
Follow-up Hdwy	3.12	-	-	3.12
Pot Cap-1 Maneuver	641	-	-	933
Stage 1	-	-	-	-
Stage 2	-	-	-	-
Platoon blocked, %	1	-	-	1
Mov Cap-1 Maneuver	641	-	-	933
Mov Cap-2 Maneuver	-	-	-	-
Stage 1	-	-	-	-
Stage 2	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	1.1	2.2	20.3	69
HCM LOS			C	F

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	298	641	-	-	933	-	-	123
HCM Lane V/C Ratio	0.211	0.097	-	-	0.317	-	-	0.585
HCM Control Delay (s)	20.3	11.2	-	-	10.6	-	-	69
HCM Lane LOS	C	B	-	-	B	-	-	F
HCM 95th %tile Q(veh)	0.8	0.3	-	-	1.4	-	-	2.9

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

5: Irving Boulevard & Site Driveway 2  
5431-22.460

Build  
Timing Plan: AM

Intersection						
Int Delay, s/veh	0.3					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↕ ↑↑↑ ↑↑↑			↕		↕
Traffic Vol, veh/h	30	467	1102	30	4	4
Future Vol, veh/h	30	467	1102	30	4	4
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	40	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	33	508	1198	33	4	4

Major/Minor	Major1	Major2	Minor2
Conflicting Flow All	1231	0	-
Stage 1	-	-	-
Stage 2	-	-	-
Critical Hdwy	5.34	-	-
Critical Hdwy Stg 1	-	-	-
Critical Hdwy Stg 2	-	-	-
Follow-up Hdwy	3.12	-	-
Pot Cap-1 Maneuver	*833	-	-
Stage 1	-	-	-
Stage 2	-	-	-
Platoon blocked, %	1	-	-
Mov Cap-1 Maneuver	*833	-	-
Mov Cap-2 Maneuver	-	-	-
Stage 1	-	-	-
Stage 2	-	-	-

Approach	EB	WB	SB
HCM Control Delay, s	0.6	0	18.8
HCM LOS			C

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	*833	-	-	-	269
HCM Lane V/C Ratio	0.039	-	-	-	0.032
HCM Control Delay (s)	9.5	-	-	-	18.8
HCM Lane LOS	A	-	-	-	C
HCM 95th %tile Q(veh)	0.1	-	-	-	0.1

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

6: Site driveway 3 & Market Center Boulevard  
5431-22.460

Build  
Timing Plan: AM

Intersection						
Int Delay, s/veh	0.1					
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑↑			↑↑↑		↑
Traffic Vol, veh/h	257	60	0	820	0	9
Future Vol, veh/h	257	60	0	820	0	9
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	-	0
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	279	65	0	891	0	10

Major/Minor	Major1	Major2	Minor1
Conflicting Flow All	0	0	- 172
Stage 1	-	-	-
Stage 2	-	-	-
Critical Hdwy	-	-	- 7.14
Critical Hdwy Stg 1	-	-	-
Critical Hdwy Stg 2	-	-	-
Follow-up Hdwy	-	-	- 3.92
Pot Cap-1 Maneuver	-	- 0	- 0 *866
Stage 1	-	- 0	- 0
Stage 2	-	- 0	- 0
Platoon blocked, %	-	-	- 1
Mov Cap-1 Maneuver	-	-	- *866
Mov Cap-2 Maneuver	-	-	-
Stage 1	-	-	-
Stage 2	-	-	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0	9.2
HCM LOS			A

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBT
Capacity (veh/h)	866	-	-	-
HCM Lane V/C Ratio	0.011	-	-	-
HCM Control Delay (s)	9.2	-	-	-
HCM Lane LOS	A	-	-	-
HCM 95th %tile Q(veh)	0	-	-	-

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

7: Site Driveway 4 & Market Center Boulevard  
5431-22.460

Build  
Timing Plan: AM

Intersection						
Int Delay, s/veh	2.3					
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑↑			↑↑↑		↑
Traffic Vol, veh/h	291	60	240	580	0	26
Future Vol, veh/h	291	60	240	580	0	26
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	50	-	-	0
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	316	65	261	630	0	28

Major/Minor	Major1	Major2	Minor1
Conflicting Flow All	0	0	381 - 191
Stage 1	-	-	-
Stage 2	-	-	-
Critical Hdwy	-	- 5.34	- 7.14
Critical Hdwy Stg 1	-	-	-
Critical Hdwy Stg 2	-	-	-
Follow-up Hdwy	-	- 3.12	- 3.92
Pot Cap-1 Maneuver	-	- 940	- 0 *866
Stage 1	-	-	- 0
Stage 2	-	-	- 0
Platoon blocked, %	-	- 1	- 1
Mov Cap-1 Maneuver	-	- 940	- *866
Mov Cap-2 Maneuver	-	-	-
Stage 1	-	-	-
Stage 2	-	-	-

Approach	EB	WB	NB
HCM Control Delay, s	0	3	9.3
HCM LOS			A

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	866	-	-	940	-
HCM Lane V/C Ratio	0.033	-	-	0.278	-
HCM Control Delay (s)	9.3	-	-	10.3	-
HCM Lane LOS	A	-	-	B	-
HCM 95th %tile Q(veh)	0.1	-	-	1.1	-

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

1: Oak Lawn Avenue & Irving Boulevard  
5431-22.460

Build  
Timing Plan: PM

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↕	↔	↔	↕	↔	↔	↕	↔	↔	↕	↔
Traffic Volume (vph)	290	1322	8	8	381	12	15	81	21	70	30	308
Future Volume (vph)	290	1322	8	8	381	12	15	81	21	70	30	308
Peak Hour Factor	0.73	0.88	0.67	0.50	0.89	0.69	0.70	0.58	0.56	0.87	0.64	0.78
Adj. Flow (vph)	397	1502	12	16	428	17	21	140	38	80	47	395
Shared Lane Traffic (%)												
Lane Group Flow (vph)	397	1514	0	16	445	0	21	178	0	80	47	395
Turn Type	pm+pt	NA	pm+pt	NA	Perm	NA	Perm	NA	Perm	NA	Perm	Perm
Protected Phases	7	4	3	8			2	2			6	
Permitted Phases	4			8			2			6		6
Detector Phase	7	4		3	8		2	2		6	6	6
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	5.0
Minimum Split (s)	9.5	22.5		9.5	22.5		22.5	22.5		22.5	22.5	22.5
Total Split (s)	10.0	40.0		10.0	40.0		20.0	20.0		20.0	20.0	20.0
Total Split (%)	14.3%	57.1%		14.3%	57.1%		28.6%	28.6%		28.6%	28.6%	28.6%
Yellow Time (s)	3.5	3.5		3.5	3.5		3.5	3.5		3.5	3.5	3.5
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0	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	0.0
Total Lost Time (s)	4.5	4.5		4.5	4.5		4.5	4.5		4.5	4.5	4.5
Lead/Lag	Lead	Lag		Lead	Lag							
Lead-Lag Optimize?	Yes	Yes		Yes	Yes							
Recall Mode	None	None		None	None		C-Max	C-Max		C-Max	C-Max	C-Max
Act Effct Green (s)	33.1	32.0		29.5	24.0		27.0	27.0		27.0	27.0	27.0
Actuated g/C Ratio	0.47	0.46		0.42	0.34		0.39	0.39		0.39	0.39	0.39
v/c Ratio	0.89	0.65		0.07	0.26		0.04	0.25		0.18	0.07	0.46
Control Delay	37.1	15.8		7.2	15.4		18.2	17.0		7.7	6.2	5.1
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Total Delay	37.1	15.8		7.2	15.4		18.2	17.0		7.7	6.2	5.1
LOS	D	B		A	B		B	B		A	A	A
Approach Delay		20.2			15.1			17.2			5.6	
Approach LOS		C			B			B			A	
Queue Length 50th (ft)	110	169		4	49		5	44		5	3	13
Queue Length 95th (ft)	80	190		4	50		19	66		m30	m12	167
Internal Link Dist (ft)		192			382			653			332	
Turn Bay Length (ft)	84			85						60		140
Base Capacity (vph)	446	2584		231	2569		520	705		450	717	852
Starvation Cap Reductn	0	0		0	0		0	0		0	0	0
Spillback Cap Reductn	0	0		0	0		0	0		0	0	0
Storage Cap Reductn	0	0		0	0		0	0		0	0	0
Reduced v/c Ratio	0.89	0.59		0.07	0.17		0.04	0.25		0.18	0.07	0.46

Intersection Summary

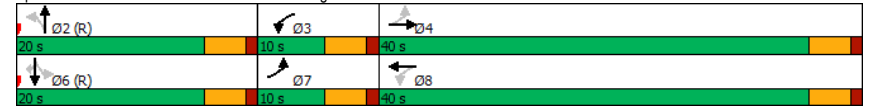
Cycle Length: 70  
 Actuated Cycle Length: 70  
 Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green  
 Natural Cycle: 60  
 Control Type: Actuated-Coordinated  
 Maximum v/c Ratio: 0.89

1: Oak Lawn Avenue & Irving Boulevard  
5431-22.460

Build  
Timing Plan: PM

Intersection Signal Delay: 16.8  
 Intersection LOS: B  
 Intersection Capacity Utilization 51.7%  
 ICU Level of Service A  
 Analysis Period (min) 15  
 m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 1: Oak Lawn Avenue & Irving Boulevard



2: Oak Lawn Avenue & Market Center Boulevard  
5431-22.460

Build  
Timing Plan: PM

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↔↔	↔	↔	↔↔	↔	↔	↔↔	↔	↔	↔↔	↔
Traffic Volume (vph)	267	362	18	19	341	138	37	332	8	194	371	127
Future Volume (vph)	267	362	18	19	341	138	37	332	8	194	371	127
Confl. Peds. (#/hr)	130											
Peak Hour Factor	0.85	0.88	0.61	0.56	0.87	0.86	0.73	0.79	0.67	0.85	0.83	0.74
Adj. Flow (vph)	314	411	30	34	392	160	51	420	12	228	447	172
Shared Lane Traffic (%)												
Lane Group Flow (vph)	314	441	0	34	552	0	51	432	0	228	619	0
Turn Type	pm+pt	NA		pm+pt	NA		pm+pt	NA		pm+pt	NA	
Protected Phases	1	6		5	2		7	4		3	8	
Permitted Phases	6			2			4			8		
Detector Phase	1	6		5	2		7	4		3	8	
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Minimum Split (s)	9.5	22.5		9.5	22.5		9.5	22.5		9.5	22.5	
Total Split (s)	15.0	27.0		15.0	27.0		10.0	18.0		10.0	18.0	
Total Split (%)	21.4%	38.6%		21.4%	38.6%		14.3%	25.7%		14.3%	25.7%	
Yellow Time (s)	3.5	3.5		3.5	3.5		3.5	3.5		3.5	3.5	
All-Red Time (s)	1.0	1.0		1.0	1.0		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)	4.5	4.5		4.5	4.5		4.5	4.5		4.5	4.5	
Lead/Lag	Lead	Lag		Lead	Lag		Lead	Lag		Lead	Lag	
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes		Yes	Yes	
Recall Mode	None	C-Max		None	C-Max		None	None		None	None	
Act Effect Green (s)	38.1	33.9		30.1	23.9		18.0	12.5		19.8	16.5	
Actuated g/C Ratio	0.54	0.48		0.43	0.34		0.26	0.18		0.28	0.24	
v/c Ratio	0.64	0.18		0.07	0.31		0.22	0.68		0.87	0.72	
Control Delay	17.3	6.7		8.6	12.9		15.4	27.5		54.4	29.3	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	17.3	6.7		8.6	12.9		15.4	27.5		54.4	29.3	
LOS	B	A		A	B		B	C		D	C	
Approach Delay	11.1			12.7			26.2			36.1		
Approach LOS	B			B			C			D		
Queue Length 50th (ft)	40	17		6	45		13	98		74	122	
Queue Length 95th (ft)	97	33		11	67		m19	m104		#142	#180	
Internal Link Dist (ft)	164		443		332		494					
Turn Bay Length (ft)	130			80			70			109		
Base Capacity (vph)	498	2449		576	1766		232	683		263	854	
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	0.63	0.18		0.06	0.31		0.22	0.63		0.87	0.72	

Intersection Summary

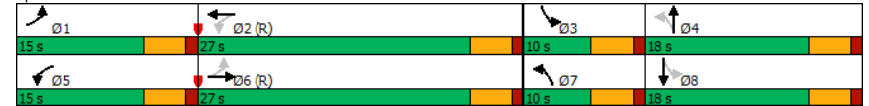
Cycle Length: 70  
 Actuated Cycle Length: 70  
 Offset: 15 (21%), Referenced to phase 2:WBTL and 6:EBTL, Start of Green  
 Natural Cycle: 70  
 Control Type: Actuated-Coordinated

2: Oak Lawn Avenue & Market Center Boulevard  
5431-22.460

Build  
Timing Plan: PM

Maximum v/c Ratio: 0.87  
 Intersection Signal Delay: 22.1  
 Intersection LOS: C  
 Intersection Capacity Utilization 59.6%  
 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.  
 m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 2: Oak Lawn Avenue & Market Center Boulevard



3: Turtle Creek Boulevard & Market Center Boulevard  
5431-22.460

Build  
Timing Plan: PM

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↕	↔	↔	↕	↔	↔	↕	↔	↔	↕	↔
Traffic Volume (vph)	33	385	65	22	331	14	246	67	22	11	41	72
Future Volume (vph)	33	385	65	22	331	14	246	67	22	11	41	72
Peak Hour Factor	0.78	0.89	0.70	0.75	0.89	0.50	0.79	0.88	0.75	0.63	0.75	0.81
Adj. Flow (vph)	42	433	93	29	372	28	311	76	29	17	55	89
Shared Lane Traffic (%)												
Lane Group Flow (vph)	42	526	0	29	400	0	311	76	29	17	55	89
Turn Type	pm+pt	NA	pm+pt	NA	pm+pt	NA	Perm	pm+pt	NA	Perm	NA	Perm
Protected Phases	1	6	5	2	7	4	3	8	8	8	8	8
Permitted Phases	6		2		4		4	8		8		8
Detector Phase	1	6	5	2	7	4	4	3	8	8	8	8
Switch Phase												
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	9.5	22.5	9.5	22.5	9.5	22.5	22.5	9.5	22.5	9.5	22.5	22.5
Total Split (s)	12.0	27.0	12.0	27.0	10.0	21.0	21.0	10.0	21.0	10.0	21.0	21.0
Total Split (%)	17.1%	38.6%	17.1%	38.6%	14.3%	30.0%	30.0%	14.3%	30.0%	30.0%	30.0%	30.0%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	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	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Lead/Lag	Lead	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	C-Min	None	C-Min	None	None	None	None	None	None	None	None
Act Effct Green (s)	31.4	31.4	28.3	28.3	25.6	23.3	23.3	12.4	7.5	7.5	7.5	7.5
Actuated g/C Ratio	0.45	0.45	0.40	0.40	0.37	0.33	0.33	0.18	0.11	0.11	0.11	0.11
v/c Ratio	0.10	0.23	0.07	0.20	0.60	0.06	0.04	0.06	0.28	0.23	0.23	0.23
Control Delay	16.3	12.9	23.0	18.9	21.1	15.5	0.1	13.8	31.6	1.5	1.5	1.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	16.3	12.9	23.0	18.9	21.1	15.5	0.1	13.8	31.6	1.5	1.5	1.5
LOS	B	B	C	B	C	B	A	B	C	A	A	A
Approach Delay		13.2		19.2		18.6		13.0				
Approach LOS		B		B		B		B				
Queue Length 50th (ft)	10	42	9	45	88	9	4	22	0	0	0	0
Queue Length 95th (ft)	28	78	m21	m78	130	27	0	43	0	0	0	0
Internal Link Dist (ft)		527		443		956		698				
Turn Bay Length (ft)	210		113		110	100	135					
Base Capacity (vph)	445	2292	449	2185	522	1229	702	272	439	551		
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.09	0.23	0.06	0.18	0.60	0.06	0.04	0.06	0.13	0.16		

Intersection Summary

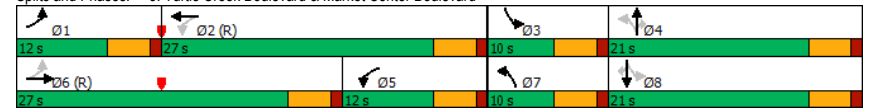
Cycle Length: 70  
 Actuated Cycle Length: 70  
 Offset: 12 (17%), Referenced to phase 2:WBTL and 6:EBTL, Start of Green  
 Natural Cycle: 65  
 Control Type: Actuated-Coordinated  
 Maximum v/c Ratio: 0.60

3: Turtle Creek Boulevard & Market Center Boulevard  
5431-22.460

Build  
Timing Plan: PM

Intersection Signal Delay: 16.2  
 Intersection LOS: B  
 Intersection Capacity Utilization 44.6%  
 ICU Level of Service A  
 Analysis Period (min) 15  
 m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 3: Turtle Creek Boulevard & Market Center Boulevard



8: Turtle Creek Boulevard & Irving Boulevard  
5431-22.460

Build  
Timing Plan: PM

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↔↔	↔	↔	↔↔	↔	↔	↔	↔	↔	↔	↔
Traffic Volume (vph)	102	1249	36	46	563	149	36	55	53	19	27	77
Future Volume (vph)	102	1249	36	46	563	149	36	55	53	19	27	77
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)	111	1358	39	50	612	162	39	60	58	21	29	84
Shared Lane Traffic (%)												
Lane Group Flow (vph)	111	1397	0	50	774	0	0	99	58	0	50	84
Turn Type	pm+pt	NA	pm+pt	NA	Perm	NA	Perm	Perm	Perm	NA	Perm	Perm
Protected Phases	5	2	1	6				8		4		
Permitted Phases	2		6		8		8	8	4		4	
Detector Phase	5	2	1	6			8	8	4	4	4	
Switch Phase												
Minimum Initial (s)	5.0	5.0	5.0	5.0			5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	9.5	22.5	22.5	22.5			22.5	22.5	22.5	22.5	22.5	22.5
Total Split (s)	22.0	87.0	16.0	81.0			41.0	41.0	41.0	41.0	41.0	41.0
Total Split (%)	15.3%	60.4%	11.1%	56.3%			28.5%	28.5%	28.5%	28.5%	28.5%	28.5%
Yellow Time (s)	3.5	3.5	3.5	3.5			3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.0	1.0	1.0	1.0			1.0	1.0	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	0.0	0.0
Total Lost Time (s)	4.5	4.5	4.5	4.5			4.5	4.5	4.5	4.5	4.5	4.5
Lead/Lag	Lead	Lead	Lag	Lag								
Lead-Lag Optimize?	Yes	Yes	Yes	Yes								
Recall Mode	None	C-Max	None	C-Max			Max	Max	Max	Max	Max	Max
Act Effct Green (s)	85.7	85.7	84.4	84.4			36.5	36.5	36.5	36.5	36.5	36.5
Actuated g/C Ratio	0.60	0.60	0.59	0.59			0.25	0.25	0.25	0.25	0.25	0.25
v/c Ratio	0.27	0.46	0.17	0.27			0.24	0.13	0.12	0.18	0.18	0.18
Control Delay	15.4	17.4	18.0	13.6			44.6	4.4	42.5	9.1	9.1	9.1
Queue Delay	0.0	0.0	0.0	0.0			0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	15.4	17.4	18.0	13.6			44.6	4.4	42.5	9.1	9.1	9.1
LOS	B	B	B	B			D	A	D	A	A	A
Approach Delay		17.3		13.8			29.7		21.5			
Approach LOS		B		B			C		C			
Queue Length 50th (ft)	46	271	19	112			74	0	36	0	0	0
Queue Length 95th (ft)	76	309	40	144			128	21	73	43	43	43
Internal Link Dist (ft)		339		581			352		956			
Turn Bay Length (ft)	133		75									
Base Capacity (vph)	475	3016	300	2918			414	460	415	463	463	463
Starvation Cap Reductn	0	0	0	0			0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0			0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0			0	0	0	0	0	0
Reduced v/c Ratio	0.23	0.46	0.17	0.27			0.24	0.13	0.12	0.18	0.18	0.18

**Intersection Summary**  
 Cycle Length: 144  
 Actuated Cycle Length: 144  
 Offset: 0 (0%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green  
 Natural Cycle: 70  
 Control Type: Actuated-Coordinated  
 Maximum v/c Ratio: 0.46

8: Turtle Creek Boulevard & Irving Boulevard  
5431-22.460

Build  
Timing Plan: PM

Intersection Signal Delay: 17.2  
 Intersection Capacity Utilization 51.9%  
 Intersection LOS: B  
 ICU Level of Service A  
 Analysis Period (min) 15

Splits and Phases: 8: Turtle Creek Boulevard & Irving Boulevard





4: Riveredge Drive/Site Driveway 1 & Irving Boulevard  
5431-22.460

Build  
Timing Plan: PM

Intersection												
Int Delay, s/veh	417.6											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↕ ↑↑↑			↕ ↑↑↑			↕			↕		
Traffic Vol, veh/h	17	1324	31	66	561	85	6	0	145	162	0	161
Future Vol, veh/h	17	1324	31	66	561	85	6	0	145	162	0	161
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	43	-	-	60	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	0	-	0	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	85	50	61	92	92	75	92	58	50	50	50
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	18	1558	62	108	610	92	8	0	250	324	0	322

Major/Minor	Major1	Major2	Minor1	Minor2
Conflicting Flow All	702	0	0	1620
Stage 1	-	-	-	-
Stage 2	-	-	-	-
Critical Hdwy	5.34	-	-	5.34
Critical Hdwy Stg 1	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-
Follow-up Hdwy	3.12	-	-	3.12
Pot Cap-1 Maneuver	878	-	-	661
Stage 1	-	-	-	-
Stage 2	-	-	-	-
Platoon blocked, %	1	-	-	1
Mov Cap-1 Maneuver	878	-	-	661
Mov Cap-2 Maneuver	-	-	-	-
Stage 1	-	-	-	-
Stage 2	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.1	1.5	33.5	\$ 2151.5
HCM LOS			D	F

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	374	878	-	-	661	-	-	115
HCM Lane V/C Ratio	0.69	0.021	-	-	0.164	-	-	5.617
HCM Control Delay (s)	33.5	9.2	-	-	11.5	-	-	\$ 2151.5
HCM Lane LOS	D	A	-	-	B	-	-	F
HCM 95th %tile Q(veh)	5	0.1	-	-	0.6	-	-	69.8

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

5: Irving Boulevard & Site Driveway 2  
5431-22.460

Build  
Timing Plan: PM

Intersection						
Int Delay, s/veh	0.7					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↕ ↑↑↑ ↑↑↑			↕		↕
Traffic Vol, veh/h	17	1589	687	17	32	32
Future Vol, veh/h	17	1589	687	17	32	32
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	40	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	18	1727	747	18	35	35

Major/Minor	Major1	Major2	Minor2
Conflicting Flow All	765	0	0
Stage 1	-	-	-
Stage 2	-	-	-
Critical Hdwy	5.34	-	-
Critical Hdwy Stg 1	-	-	-
Critical Hdwy Stg 2	-	-	-
Follow-up Hdwy	3.12	-	-
Pot Cap-1 Maneuver	813	-	-
Stage 1	-	-	-
Stage 2	-	-	-
Platoon blocked, %	1	-	-
Mov Cap-1 Maneuver	813	-	-
Mov Cap-2 Maneuver	-	-	-
Stage 1	-	-	-
Stage 2	-	-	-

Approach	EB	WB	SB
HCM Control Delay, s	0.1	0	21.8
HCM LOS			C

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	813	-	-	-	283
HCM Lane V/C Ratio	0.023	-	-	-	0.246
HCM Control Delay (s)	9.5	-	-	-	21.8
HCM Lane LOS	A	-	-	-	C
HCM 95th %tile Q(veh)	0.1	-	-	-	0.9

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

6: Site driveway 3 & Market Center Boulevard  
5431-22.460

Build  
Timing Plan: PM

Intersection						
Int Delay, s/veh	0.5					
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑↑		↑↑↑		↑	
Traffic Vol, veh/h	583	34	0	505	0	64
Future Vol, veh/h	583	34	0	505	0	64
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	-	0
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	634	37	0	549	0	70

Major/Minor	Major1	Major2	Minor1
Conflicting Flow All	0	0	- 336
Stage 1	-	-	-
Stage 2	-	-	-
Critical Hdwy	-	-	- 7.14
Critical Hdwy Stg 1	-	-	-
Critical Hdwy Stg 2	-	-	-
Follow-up Hdwy	-	-	- 3.92
Pot Cap-1 Maneuver	-	- 0	- 0 *796
Stage 1	-	- 0	- 0
Stage 2	-	- 0	- 0
Platoon blocked, %	-	-	- 1
Mov Cap-1 Maneuver	-	-	- *796
Mov Cap-2 Maneuver	-	-	-
Stage 1	-	-	-
Stage 2	-	-	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0	10
HCM LOS	B		

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBT
Capacity (veh/h)	796	-	-	-
HCM Lane V/C Ratio	0.087	-	-	-
HCM Control Delay (s)	10	-	-	-
HCM Lane LOS	B	-	-	-
HCM 95th %tile Q(veh)	0.3	-	-	-

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

7: Site Driveway 4 & Market Center Boulevard  
5431-22.460

Build  
Timing Plan: PM

Intersection						
Int Delay, s/veh	2.9					
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑↑		↑↑↑		↑	
Traffic Vol, veh/h	426	34	136	369	0	191
Future Vol, veh/h	426	34	136	369	0	191
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	50	-	-	0
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	463	37	148	401	0	208

Major/Minor	Major1	Major2	Minor1
Conflicting Flow All	0	0	500 - 250
Stage 1	-	-	-
Stage 2	-	-	-
Critical Hdwy	-	- 5.34	- - 7.14
Critical Hdwy Stg 1	-	-	-
Critical Hdwy Stg 2	-	-	-
Follow-up Hdwy	-	- 3.12	- - 3.92
Pot Cap-1 Maneuver	-	- 946	- 0 *833
Stage 1	-	-	- 0
Stage 2	-	-	- 0
Platoon blocked, %	-	- 1	- - 1
Mov Cap-1 Maneuver	-	- 946	- - *833
Mov Cap-2 Maneuver	-	-	-
Stage 1	-	-	-
Stage 2	-	-	-

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

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	833	-	-	946	-
HCM Lane V/C Ratio	0.249	-	-	0.156	-
HCM Control Delay (s)	10.8	-	-	9.5	-
HCM Lane LOS	B	-	-	A	-
HCM 95th %tile Q(veh)	1	-	-	0.6	-

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

1: Oak Lawn Avenue & Irving Boulevard  
5431-22.460

Horizon  
Timing Plan: AM

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↕↕	↔	↔	↕↕	↔	↔	↕	↔	↔	↕	↕
Traffic Volume (vph)	179	322	15	26	822	4	11	33	4	15	55	385
Future Volume (vph)	179	322	15	26	822	4	11	33	4	15	55	385
Peak Hour Factor	0.78	0.94	0.81	0.79	0.92	0.50	0.56	0.88	0.75	0.54	0.73	0.88
Adj. Flow (vph)	229	343	19	33	893	8	20	38	5	28	75	438
Shared Lane Traffic (%)												
Lane Group Flow (vph)	229	362	0	33	901	0	20	43	0	28	75	438
Turn Type	pm+pt	NA		pm+pt	NA		Perm	NA		Perm	NA	Perm
Protected Phases	7	4		3	8			2			6	
Permitted Phases	4			8			2			6		6
Detector Phase	7	4		3	8		2	2		6	6	6
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	5.0
Minimum Split (s)	9.5	22.5		9.5	22.5		22.5	22.5		22.5	22.5	22.5
Total Split (s)	13.0	84.0		13.0	84.0		18.0	18.0		18.0	18.0	18.0
Total Split (%)	11.3%	73.0%		11.3%	73.0%		15.7%	15.7%		15.7%	15.7%	15.7%
Yellow Time (s)	3.5	3.5		3.5	3.5		3.5	3.5		3.5	3.5	3.5
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0	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	0.0
Total Lost Time (s)	4.5	4.5		4.5	4.5		4.5	4.5		4.5	4.5	4.5
Lead/Lag	Lead	Lag		Lead	Lag							
Lead-Lag Optimize?	Yes	Yes		Yes	Yes							
Recall Mode	None	None		None	None		C-Max	C-Max		C-Max	C-Max	C-Max
Act Effct Green (s)	40.8	35.7		37.2	30.1		62.9	62.9		62.9	62.9	62.9
Actuated g/C Ratio	0.35	0.31		0.32	0.26		0.55	0.55		0.55	0.55	0.55
v/c Ratio	1.10	0.23		0.09	0.68		0.03	0.04		0.04	0.07	0.44
Control Delay	118.8	28.5		21.4	40.2		14.4	12.9		14.3	14.1	7.1
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.9
Total Delay	118.8	28.5		21.4	40.2		14.4	12.9		14.3	14.1	8.0
LOS	F	C		C	D		B	B		B	B	A
Approach Delay		63.5			39.5			13.4				9.1
Approach LOS		E			D			B				A
Queue Length 50th (ft)	-132	72		15	219		7	12		9	25	53
Queue Length 95th (ft)	#200	93		29	242		13	34		16	45	135
Internal Link Dist (ft)		192			382			653			332	
Turn Bay Length (ft)	84			85						60		140
Base Capacity (vph)	209	3492		388	3512		720	1002		742	1018	995
Starvation Cap Reductn	0	0		0	0		0	0		0	0	296
Spillback Cap Reductn	0	0		0	0		0	0		0	0	0
Storage Cap Reductn	0	0		0	0		0	0		0	0	0
Reduced v/c Ratio	1.10	0.10		0.09	0.26		0.03	0.04		0.04	0.07	0.63

Intersection Summary

Cycle Length: 115  
 Actuated Cycle Length: 115  
 Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green  
 Natural Cycle: 55  
 Control Type: Actuated-Coordinated  
 Maximum v/c Ratio: 1.10

1: Oak Lawn Avenue & Irving Boulevard  
5431-22.460

Horizon  
Timing Plan: AM

Intersection Signal Delay: 37.7  
 Intersection Capacity Utilization 55.2%  
 Intersection LOS: D  
 ICU Level of Service B  
 Analysis Period (min) 15  
 ~ Volume exceeds capacity, queue is theoretically infinite.  
 Queue shown is maximum after two cycles.  
 # 95th percentile volume exceeds capacity, queue may be longer.  
 Queue shown is maximum after two cycles.

Splits and Phases: 1: Oak Lawn Avenue & Irving Boulevard



2: Oak Lawn Avenue & Market Center Boulevard  
5431-22.460

Horizon  
Timing Plan: AM

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↕↕↕	↔	↔	↕↕↕	↔	↔	↕↕↕	↔	↔	↕↕↕	↔
Traffic Volume (vph)	107	154	29	18	715	221	5	208	7	77	413	161
Future Volume (vph)	107	154	29	18	715	221	5	208	7	77	413	161
Confl. Peds. (#/hr)	130											
Peak Hour Factor	0.78	0.82	0.69	0.54	0.93	0.86	0.50	0.87	0.50	0.83	0.90	0.73
Adj. Flow (vph)	137	188	42	33	769	257	10	239	14	93	459	221
Shared Lane Traffic (%)												
Lane Group Flow (vph)	137	230	0	33	1026	0	10	253	0	93	680	0
Turn Type	pm+pt	NA		pm+pt	NA		pm+pt	NA		pm+pt	NA	
Protected Phases	1	6		5	2		7	4		3	8	
Permitted Phases	6			2			4			8		
Detector Phase	1	6		5	2		7	4		3	8	
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Minimum Split (s)	9.5	22.5		9.5	22.5		9.5	22.5		9.5	22.5	
Total Split (s)	21.0	63.0		21.0	63.0		10.0	23.0		10.0	23.0	
Total Split (%)	17.9%	53.8%		17.9%	53.8%		8.5%	19.7%		8.5%	19.7%	
Yellow Time (s)	3.5	3.5		3.5	3.5		3.5	3.5		3.5	3.5	
All-Red Time (s)	1.0	1.0		1.0	1.0		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)	4.5	4.5		4.5	4.5		4.5	4.5		4.5	4.5	
Lead/Lag	Lead	Lag		Lead	Lag		Lead	Lag		Lead	Lag	
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes		Yes	Yes	
Recall Mode	None	C-Max		None	C-Max		None	None		None	None	
Act Effect Green (s)	78.6	72.8		72.6	66.3		24.0	18.5		27.6	26.5	
Actuated g/C Ratio	0.67	0.62		0.62	0.57		0.21	0.16		0.24	0.23	
v/c Ratio	0.39	0.07		0.05	0.36		0.07	0.45		0.40	0.84	
Control Delay	9.8	7.9		6.6	12.8		35.0	46.9		41.8	50.5	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	9.8	7.9		6.6	12.8		35.0	46.9		41.8	50.5	
LOS	A	A		A	B		C	D		D	D	
Approach Delay	8.6			12.6			46.4			49.5		
Approach LOS	A			B			D			D		
Queue Length 50th (ft)	33	20		7	130		6	90		56	233	
Queue Length 95th (ft)	47	30		10	168		12	127		94	#424	
Internal Link Dist (ft)	164			443			332			494		
Turn Bay Length (ft)	130			80			70			109		
Base Capacity (vph)	451	3096		853	2818		136	558		233	807	
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	0.30	0.07		0.04	0.36		0.07	0.45		0.40	0.84	

Intersection Summary

Cycle Length: 117  
 Actuated Cycle Length: 117  
 Offset: 21 (18%), Referenced to phase 2:WBTL and 6:EBTL, Start of Green  
 Natural Cycle: 65  
 Control Type: Actuated-Coordinated

2: Oak Lawn Avenue & Market Center Boulevard  
5431-22.460

Horizon  
Timing Plan: AM

Maximum v/c Ratio: 0.84  
 Intersection Signal Delay: 27.2  
 Intersection LOS: C  
 Intersection Capacity Utilization 60.4%  
 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: 2: Oak Lawn Avenue & Market Center Boulevard



3: Turtle Creek Boulevard & Market Center Boulevard  
5431-22.460

Horizon  
Timing Plan: AM

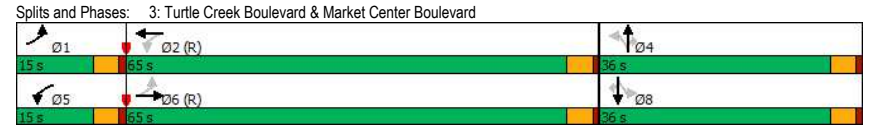
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↕↕	↔	↔	↕↕	↔	↔	↕↕	↔	↔	↕	↔
Traffic Volume (vph)	18	373	97	12	571	7	58	32	16	12	59	77
Future Volume (vph)	18	373	97	12	571	7	58	32	16	12	59	77
Peak Hour Factor	0.50	0.96	0.85	0.63	0.88	0.75	0.67	0.96	0.50	0.63	0.78	0.69
Adj. Flow (vph)	36	389	114	19	649	9	87	33	32	19	76	112
Shared Lane Traffic (%)												
Lane Group Flow (vph)	36	503	0	19	658	0	87	33	32	19	76	112
Turn Type	pm+pt	NA	pm+pt	NA	Perm	NA	Perm	Perm	Perm	NA	Perm	Perm
Protected Phases	1	6	5	2	4	4	4	4	8	8	8	8
Permitted Phases	6		2		4	4	4	4	8	8	8	8
Detector Phase	1	6	5	2	4	4	4	4	8	8	8	8
Switch Phase												
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	9.5	22.5	9.5	22.5	9.5	22.5	22.5	22.5	22.5	22.5	22.5	22.5
Total Split (s)	15.0	65.0	15.0	65.0	36.0	36.0	36.0	36.0	36.0	36.0	36.0	36.0
Total Split (%)	12.9%	56.0%	12.9%	56.0%	31.0%	31.0%	31.0%	31.0%	31.0%	31.0%	31.0%	31.0%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	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	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Lead/Lag	Lead	Lag	Lead	Lag	Lead	Lag	Lead	Lag	Lead	Lag	Lead	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	C-Min	None	C-Min	None	C-Min	None	C-Min	None	C-Min	None	C-Min
Act Effct Green (s)	92.3	89.7	91.1	87.5	13.0	13.0	13.0	13.0	13.0	13.0	13.0	13.0
Actuated g/C Ratio	0.80	0.77	0.79	0.75	0.11	0.11	0.11	0.11	0.11	0.11	0.11	0.11
v/c Ratio	0.06	0.13	0.03	0.17	0.59	0.08	0.14	0.12	0.36	0.40	0.40	0.40
Control Delay	3.1	3.5	3.0	5.0	64.3	44.2	5.2	45.7	51.1	12.6	12.6	12.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	3.1	3.5	3.0	5.0	64.3	44.2	5.2	45.7	51.1	12.6	12.6	12.6
LOS	A	A	A	A	E	D	A	D	D	D	B	B
Approach Delay		3.5		5.0		47.5		29.8				
Approach LOS		A		A		D		C				
Queue Length 50th (ft)	4	17	2	50	63	11	0	13	53	0	0	0
Queue Length 95th (ft)	7	50	6	78	80	26	0	24	83	21	21	21
Internal Link Dist (ft)		527		443		954		698				
Turn Bay Length (ft)	210		113		110	100	135					
Base Capacity (vph)	673	3821	771	3829	356	961	470	371	505	511	511	511
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.05	0.13	0.02	0.17	0.24	0.03	0.07	0.05	0.15	0.22	0.22	0.22

**Intersection Summary**  
 Cycle Length: 116  
 Actuated Cycle Length: 116  
 Offset: 15 (13%), Referenced to phase 2:WBTL and 6:EBTL, Start of Green  
 Natural Cycle: 55  
 Control Type: Actuated-Coordinated  
 Maximum v/c Ratio: 0.59

3: Turtle Creek Boulevard & Market Center Boulevard  
5431-22.460

Horizon  
Timing Plan: AM

Intersection Signal Delay: 11.8 Intersection LOS: B  
 Intersection Capacity Utilization 32.3% ICU Level of Service A  
 Analysis Period (min) 15



8: Turtle Creek Boulevard & Irving Boulevard  
5431-22.460

Horizon  
Timing Plan: AM

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↕↕↕	↔	↔	↕↕↕	↔	↔	↕	↕	↔	↕	↕
Traffic Volume (vph)	69	525	13	21	769	28	13	18	26	34	25	96
Future Volume (vph)	69	525	13	21	769	28	13	18	26	34	25	96
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)	75	571	14	23	836	30	14	20	28	37	27	104
Shared Lane Traffic (%)												
Lane Group Flow (vph)	75	585	0	23	866	0	0	34	28	0	64	104
Turn Type	pm+pt	NA	pm+pt	NA	Perm	NA	Perm	Perm	Perm	NA	Perm	Perm
Protected Phases	5	2		1	6			8			4	
Permitted Phases	2			6			8		8	4		4
Detector Phase	5	2		1	6		8	8	8	4	4	4
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0		5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	9.5	22.5		9.5	22.5		22.5	22.5	22.5	22.5	22.5	22.5
Total Split (s)	22.0	64.0		16.0	58.0		37.0	37.0	37.0	37.0	37.0	37.0
Total Split (%)	18.8%	54.7%		13.7%	49.6%		31.6%	31.6%	31.6%	31.6%	31.6%	31.6%
Yellow Time (s)	3.5	3.5		3.5	3.5		3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0	1.0	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	0.0	0.0
Total Lost Time (s)	4.5	4.5		4.5	4.5		4.5	4.5	4.5	4.5	4.5	4.5
Lead/Lag	Lead	Lead		Lag	Lag							
Lead-Lag Optimize?	Yes	Yes		Yes	Yes							
Recall Mode	None	C-Max		None	C-Max		None	None	None	None	None	None
Act Effct Green (s)	88.3	88.3		88.4	88.4		10.1	10.1		10.1	10.1	
Actuated g/C Ratio	0.75	0.75		0.76	0.76		0.09	0.09		0.09	0.09	
v/c Ratio	0.16	0.15		0.03	0.23		0.25	0.12		0.50	0.45	
Control Delay	6.2	5.1		5.3	5.0		52.7	1.1		63.3	15.6	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	6.2	5.1		5.3	5.0		52.7	1.1		63.3	15.6	
LOS	A	A		A	A		D	A		E	B	
Approach Delay		5.3			5.0		29.4			33.8		
Approach LOS		A			A		C			C		
Queue Length 50th (ft)	16	48		4	64		24	0		47	0	
Queue Length 95th (ft)	35	71		13	98		55	0		90	51	
Internal Link Dist (ft)		330			590		366			954		
Turn Bay Length (ft)	133			75								
Base Capacity (vph)	592	3822		689	3824		445	510		415	514	
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	0.13	0.15		0.03	0.23		0.08	0.05		0.15	0.20	

Intersection Summary

Cycle Length: 117  
 Actuated Cycle Length: 117  
 Offset: 0 (0%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green  
 Natural Cycle: 55  
 Control Type: Actuated-Coordinated  
 Maximum v/c Ratio: 0.50

8: Turtle Creek Boulevard & Irving Boulevard  
5431-22.460

Horizon  
Timing Plan: AM

Intersection Signal Delay: 8.7  
 Intersection Capacity Utilization 40.8%  
 Analysis Period (min) 15  
 Intersection LOS: A  
 ICU Level of Service A

Splits and Phases: 8: Turtle Creek Boulevard & Irving Boulevard



1: Oak Lawn Avenue & Irving Boulevard  
5431-22.460

Horizon  
Timing Plan: PM

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↕	↔	↔	↕	↔	↔	↕	↔	↔	↕	↔
Traffic Volume (vph)	305	1443	9	9	416	13	16	89	23	77	33	330
Future Volume (vph)	305	1443	9	9	416	13	16	89	23	77	33	330
Peak Hour Factor	0.73	0.88	0.67	0.50	0.89	0.69	0.70	0.58	0.56	0.87	0.64	0.78
Adj. Flow (vph)	418	1640	13	18	467	19	23	153	41	89	52	423
Shared Lane Traffic (%)												
Lane Group Flow (vph)	418	1653	0	18	486	0	23	194	0	89	52	423
Turn Type	pm+pt	NA	pm+pt	NA	Perm	NA	Perm	NA	Perm	NA	Perm	Perm
Protected Phases	7	4	3	8			2	2		6	6	6
Permitted Phases	4		8				2			6		6
Detector Phase	7	4	3	8			2	2		6	6	6
Switch Phase												
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	9.5	22.5	9.5	22.5	22.5	22.5	22.5	22.5	22.5	22.5	22.5	22.5
Total Split (s)	10.0	40.0	10.0	40.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0
Total Split (%)	14.3%	57.1%	14.3%	57.1%	28.6%	28.6%	28.6%	28.6%	28.6%	28.6%	28.6%	28.6%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	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	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Lead/Lag	Lead	Lag	Lead	Lag								
Lead-Lag Optimize?	Yes	Yes	Yes	Yes								
Recall Mode	None	None	None	None	C-Max	C-Max	C-Max	C-Max	C-Max	C-Max	C-Max	C-Max
Act Effct Green (s)	35.2	34.1	31.6	26.1	24.9	24.9	24.9	24.9	24.9	24.9	24.9	24.9
Actuated g/C Ratio	0.50	0.49	0.45	0.37	0.36	0.36	0.36	0.36	0.36	0.36	0.36	0.36
v/c Ratio	0.91	0.67	0.08	0.26	0.05	0.30	0.23	0.08	0.51			
Control Delay	39.3	14.9	6.9	14.3	19.1	18.6	8.7	6.8	6.2			
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0			
Total Delay	39.3	14.9	6.9	14.3	19.1	18.6	8.7	6.8	6.2			
LOS	D	B	A	B	B	B	A	A	A			
Approach Delay		19.8		14.0		18.6		6.6				
Approach LOS		B		B		B		A				
Queue Length 50th (ft)	109	178	4	51	6	52	6	3	15			
Queue Length 95th (ft)	85	215	4	54	20	72	m35	m13	182			
Internal Link Dist (ft)		192		382		653		332				
Turn Bay Length (ft)	84		85				60		140			
Base Capacity (vph)	459	2619	232	2569	478	652	393	662	835			
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0			
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0			
Storage Cap Reductn	0	0	0	0	0	0	0	0	0			
Reduced v/c Ratio	0.91	0.63	0.08	0.19	0.05	0.30	0.23	0.08	0.51			

Intersection Summary

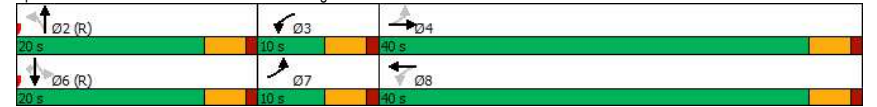
Cycle Length: 70  
 Actuated Cycle Length: 70  
 Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green  
 Natural Cycle: 60  
 Control Type: Actuated-Coordinated  
 Maximum v/c Ratio: 0.91

1: Oak Lawn Avenue & Irving Boulevard  
5431-22.460

Horizon  
Timing Plan: PM

Intersection Signal Delay: 16.7  
 Intersection LOS: B  
 Intersection Capacity Utilization 54.4%  
 ICU Level of Service A  
 Analysis Period (min) 15  
 m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 1: Oak Lawn Avenue & Irving Boulevard



2: Oak Lawn Avenue & Market Center Boulevard  
5431-22.460

Horizon  
Timing Plan: PM

	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↔↔	↔	↔	↔↔	↔	↔	↔↔	↔	↔	↔↔	↔
Traffic Volume (vph)	275	393	20	21	369	152	41	352	9	214	400	134
Future Volume (vph)	275	393	20	21	369	152	41	352	9	214	400	134
Confl. Peds. (#/hr)	130											
Peak Hour Factor	0.85	0.88	0.61	0.56	0.87	0.86	0.73	0.79	0.67	0.85	0.83	0.74
Adj. Flow (vph)	324	447	33	38	424	177	56	446	13	252	482	181
Shared Lane Traffic (%)												
Lane Group Flow (vph)	324	480	0	38	601	0	56	459	0	252	663	0
Turn Type	pm+pt	NA		pm+pt	NA		pm+pt	NA		pm+pt	NA	
Protected Phases	1	6		5	2		7	4		3	8	
Permitted Phases	6			2			4			8		
Detector Phase	1	6		5	2		7	4		3	8	
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Minimum Split (s)	9.5	22.5		9.5	22.5		9.5	22.5		9.5	22.5	
Total Split (s)	15.0	27.0		15.0	27.0		10.0	18.0		10.0	18.0	
Total Split (%)	21.4%	38.6%		21.4%	38.6%		14.3%	25.7%		14.3%	25.7%	
Yellow Time (s)	3.5	3.5		3.5	3.5		3.5	3.5		3.5	3.5	
All-Red Time (s)	1.0	1.0		1.0	1.0		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)	4.5	4.5		4.5	4.5		4.5	4.5		4.5	4.5	
Lead/Lag	Lead	Lag		Lead	Lag		Lead	Lag		Lead	Lag	
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes		Yes	Yes	
Recall Mode	None	C-Max		None	C-Max		None	None		None	None	
Act Effect Green (s)	37.9	33.7		29.9	23.6		18.2	12.7		20.0	16.7	
Actuated g/C Ratio	0.54	0.48		0.43	0.34		0.26	0.18		0.29	0.24	
v/c Ratio	0.69	0.20		0.08	0.34		0.24	0.71		0.98	0.77	
Control Delay	21.4	6.6		8.7	13.5		15.8	28.7		79.1	31.7	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	21.4	6.6		8.7	13.5		15.8	28.7		79.1	31.7	
LOS	C	A		A	B		B	C		E	C	
Approach Delay	12.6			13.2			27.3			44.8		
Approach LOS	B			B			C			D		
Queue Length 50th (ft)	41	19		7	51		14	101		-84	134	
Queue Length 95th (ft)	115	35		12	74		m21	m110		#175	#203	
Internal Link Dist (ft)	164		443		332		494					
Turn Bay Length (ft)	130			80			70			109		
Base Capacity (vph)	477	2433		559	1746		232	683		256	862	
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	0.68	0.20		0.07	0.34		0.24	0.67		0.98	0.77	

Intersection Summary

Cycle Length: 70  
Actuated Cycle Length: 70  
Offset: 15 (21%), Referenced to phase 2:WBTL and 6:EBTL, Start of Green  
Natural Cycle: 75  
Control Type: Actuated-Coordinated

2: Oak Lawn Avenue & Market Center Boulevard  
5431-22.460

Horizon  
Timing Plan: PM

Maximum v/c Ratio: 0.98  
Intersection Signal Delay: 25.6 Intersection LOS: C  
Intersection Capacity Utilization 62.6% ICU Level of Service B  
Analysis Period (min) 15  
~ Volume exceeds capacity, queue is theoretically infinite.  
Queue shown is maximum after two cycles.  
# 95th percentile volume exceeds capacity, queue may be longer.  
Queue shown is maximum after two cycles.  
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 2: Oak Lawn Avenue & Market Center Boulevard





3: Turtle Creek Boulevard & Market Center Boulevard  
5431-22.460

Horizon  
Timing Plan: PM

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↕	↔	↔	↕	↔	↔	↕	↔	↔	↕	↔
Traffic Volume (vph)	36	418	71	25	366	15	256	74	25	12	46	80
Future Volume (vph)	36	418	71	25	366	15	256	74	25	12	46	80
Peak Hour Factor	0.78	0.89	0.70	0.75	0.89	0.50	0.79	0.88	0.75	0.63	0.75	0.81
Adj. Flow (vph)	46	470	101	33	411	30	324	84	33	19	61	99
Shared Lane Traffic (%)												
Lane Group Flow (vph)	46	571	0	33	441	0	324	84	33	19	61	99
Turn Type	pm+pt	NA	pm+pt	NA	pm+pt	NA	Perm	pm+pt	NA	Perm	NA	Perm
Protected Phases	1	6	5	2	7	4	4	8	3	8	8	8
Permitted Phases	6		2		4		4	8		8		8
Detector Phase	1	6	5	2	7	4	4	3	8	8		8
Switch Phase												
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	9.5	22.5	9.5	22.5	9.5	22.5	22.5	9.5	22.5	9.5	22.5	22.5
Total Split (s)	12.0	27.0	12.0	27.0	10.0	21.0	21.0	10.0	21.0	10.0	21.0	21.0
Total Split (%)	17.1%	38.6%	17.1%	38.6%	14.3%	30.0%	30.0%	14.3%	30.0%	30.0%	30.0%	30.0%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	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	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Lead/Lag	Lead	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	C-Min	None	C-Min	None	None	None	None	None	None	None	None
Act Effct Green (s)	31.3	31.3	28.3	28.3	25.5	23.2	23.2	12.7	7.8	7.8		7.8
Actuated g/C Ratio	0.45	0.45	0.40	0.40	0.36	0.33	0.33	0.18	0.11	0.11		0.11
v/c Ratio	0.11	0.25	0.08	0.22	0.63	0.07	0.05	0.07	0.30	0.26		0.26
Control Delay	16.2	13.0	23.8	19.5	22.2	15.8	0.1	14.1	31.7	1.6		1.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0
Total Delay	16.2	13.0	23.8	19.5	22.2	15.8	0.1	14.1	31.7	1.6		1.6
LOS	B	B	C	B	C	B	A	B	C	A		A
Approach Delay		13.3		19.8		19.3		13.2				
Approach LOS		B		B		B		B				
Queue Length 50th (ft)	11	47	11	50	93	10	0	5	25	0		0
Queue Length 95th (ft)	30	84	m24	m87	136	30	0	11	46	0		0
Internal Link Dist (ft)		527		443		956		698				
Turn Bay Length (ft)	210		113		110	100	135					
Base Capacity (vph)	431	2273	436	2167	517	1219	698	276	439	551		
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0		0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0		0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0		0
Reduced v/c Ratio	0.11	0.25	0.08	0.20	0.63	0.07	0.05	0.07	0.14	0.18		0.18

Intersection Summary

Cycle Length: 70  
 Actuated Cycle Length: 70  
 Offset: 12 (17%), Referenced to phase 2:WBTL and 6:EBTL, Start of Green  
 Natural Cycle: 65  
 Control Type: Actuated-Coordinated  
 Maximum v/c Ratio: 0.63

3: Turtle Creek Boulevard & Market Center Boulevard  
5431-22.460

Horizon  
Timing Plan: PM

Intersection Signal Delay: 16.6  
 Intersection LOS: B  
 Intersection Capacity Utilization 45.9%  
 ICU Level of Service A  
 Analysis Period (min) 15  
 m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 3: Turtle Creek Boulevard & Market Center Boulevard



8: Turtle Creek Boulevard & Irving Boulevard  
5431-22.460

Horizon  
Timing Plan: PM

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↕↕↕	↔	↔	↕↕↕	↔	↔	↕	↕	↔	↕↕↕	↔
Traffic Volume (vph)	112	1375	40	50	614	151	38	58	59	20	29	86
Future Volume (vph)	112	1375	40	50	614	151	38	58	59	20	29	86
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)	122	1495	43	54	667	164	41	63	64	22	32	93
Shared Lane Traffic (%)												
Lane Group Flow (vph)	122	1538	0	54	831	0	0	104	64	0	54	93
Turn Type	pm+pt	NA	pm+pt	NA	Perm	NA	Perm	Perm	Perm	NA	Perm	Perm
Protected Phases	5	2	1	6	8	8	8	8	4	4	4	4
Permitted Phases	2		6		8		8		8	4		4
Detector Phase	5	2	1	6	8	8	8	8	4	4	4	4
Switch Phase												
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	9.5	22.5	22.5	22.5	22.5	22.5	22.5	22.5	22.5	22.5	22.5	22.5
Total Split (s)	22.0	87.0	16.0	81.0	41.0	41.0	41.0	41.0	41.0	41.0	41.0	41.0
Total Split (%)	15.3%	60.4%	11.1%	56.3%	28.5%	28.5%	28.5%	28.5%	28.5%	28.5%	28.5%	28.5%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	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	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Lead/Lag	Lead	Lead	Lag	Lag	Yes	Yes						
Lead-Lag Optimize?	Yes	Yes	Yes	Yes								
Recall Mode	None	C-Max	None	C-Max	Max	Max	Max	Max	Max	Max	Max	Max
Act Effct Green (s)	85.7	85.7	84.0	84.0	36.5	36.5	36.5	36.5	36.5	36.5	36.5	36.5
Actuated g/C Ratio	0.60	0.60	0.58	0.58	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25
v/c Ratio	0.31	0.51	0.21	0.29	0.25	0.14	0.13	0.20				
Control Delay	15.9	18.2	20.4	14.3	44.9	5.7	42.6	8.7				
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0				
Total Delay	15.9	18.2	20.4	14.3	44.9	5.7	42.6	8.7				
LOS	B	B	C	B	D	A	D	A				
Approach Delay		18.0		14.6		30.0		21.2				
Approach LOS		B		B		C		C				
Queue Length 50th (ft)	51	310	21	126	78	0	39	0				
Queue Length 95th (ft)	83	352	43	160	133	27	78	46				
Internal Link Dist (ft)		339		581		352		956				
Turn Bay Length (ft)	133		75									
Base Capacity (vph)	455	3016	271	2903	413	460	415	470				
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	0.27	0.51	0.20	0.29	0.25	0.14	0.13	0.20				

**Intersection Summary**  
 Cycle Length: 144  
 Actuated Cycle Length: 144  
 Offset: 0 (0%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green  
 Natural Cycle: 75  
 Control Type: Actuated-Coordinated  
 Maximum v/c Ratio: 0.51

8: Turtle Creek Boulevard & Irving Boulevard  
5431-22.460

Horizon  
Timing Plan: PM

Intersection Signal Delay: 17.8  
 Intersection LOS: B  
 Intersection Capacity Utilization 54.7%  
 ICU Level of Service A  
 Analysis Period (min) 15

Splits and Phases: 8: Turtle Creek Boulevard & Irving Boulevard



Intersection												
Int Delay, s/veh	4.6											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↵ ↑↑↑			↵ ↑↑↑			↵	↵		↕		
Traffic Vol, veh/h	31	449	45	154	758	151	2	1	33	22	0	24
Future Vol, veh/h	31	449	45	154	758	151	2	1	33	22	0	24
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	43	-	-	60	-	-	150	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	50	91	75	52	94	50	50	50	58	92	92	50
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	62	493	60	296	806	302	4	2	57	24	0	48

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	1108	0	0	553	0	0	1561	2347	277	1871	2226	554
Stage 1	-	-	-	-	-	-	647	647	-	1549	1549	-
Stage 2	-	-	-	-	-	-	914	1700	-	322	677	-
Critical Hdwy	5.34	-	-	5.34	-	-	6.44	6.54	7.14	6.44	6.54	7.14
Critical Hdwy Stg 1	-	-	-	-	-	-	7.34	5.54	-	7.34	5.54	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.74	5.54	-	6.74	5.54	-
Follow-up Hdwy	3.12	-	-	3.12	-	-	3.82	4.02	3.92	3.82	4.02	3.92
Pot Cap-1 Maneuver	641	-	-	933	-	-	118	36	*822	*76	43	*753
Stage 1	-	-	-	-	-	-	621	656	-	*190	290	-
Stage 2	-	-	-	-	-	-	648	238	-	*844	635	-
Platoon blocked, %	1	-	-	1	-	-			1			1
Mov Cap-1 Maneuver	641	-	-	933	-	-	78	22	*822	*46	27	*753
Mov Cap-2 Maneuver	-	-	-	-	-	-	78	22	-	*46	27	-
Stage 1	-	-	-	-	-	-	560	593	-	*172	198	-
Stage 2	-	-	-	-	-	-	414	163	-	*707	573	-

Approach	EB			WB			NB			SB		
HCM Control Delay, s	1.1			2.2			19			69		
HCM LOS							C			F		

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	78	368	641	-	-	933	-	-	123
HCM Lane V/C Ratio	0.051	0.16	0.097	-	-	0.317	-	-	0.585
HCM Control Delay (s)	53.6	16.6	11.2	-	-	10.6	-	-	69
HCM Lane LOS	F	C	B	-	-	B	-	-	F
HCM 95th %tile Q(veh)	0.2	0.6	0.3	-	-	1.4	-	-	2.9

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

Intersection												
Int Delay, s/veh	416.5											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖ ↑↑↑			↖ ↑↑↑			↖	↗		↕		
Traffic Vol, veh/h	17	1324	31	66	561	85	6	0	145	162	0	161
Future Vol, veh/h	17	1324	31	66	561	85	6	0	145	162	0	161
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	43	-	-	60	-	-	150	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	85	50	61	92	92	75	92	58	50	50	50
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	18	1558	62	108	610	92	8	0	250	324	0	322

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	702	0	0	1620	0	0	2085	2543	810	1531	2528	351
Stage 1	-	-	-	-	-	-	1625	1625	-	872	872	-
Stage 2	-	-	-	-	-	-	460	918	-	659	1656	-
Critical Hdwy	5.34	-	-	5.34	-	-	6.44	6.54	7.14	6.44	6.54	7.14
Critical Hdwy Stg 1	-	-	-	-	-	-	7.34	5.54	-	7.34	5.54	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.74	5.54	-	6.74	5.54	-
Follow-up Hdwy	3.12	-	-	3.12	-	-	3.82	4.02	3.92	3.82	4.02	3.92
Pot Cap-1 Maneuver	878	-	-	661	-	-	*56	27	*605	*~ 123	27	*796
Stage 1	-	-	-	-	-	-	*501	514	-	*502	565	-
Stage 2	-	-	-	-	-	-	*817	535	-	*621	490	-
Platoon blocked, %	1	-	-	1	-	-			1			1
Mov Cap-1 Maneuver	878	-	-	661	-	-	*29	22	*605	*~ 62	22	*796
Mov Cap-2 Maneuver	-	-	-	-	-	-	*29	22	-	*~ 62	22	-
Stage 1	-	-	-	-	-	-	*491	503	-	*491	473	-
Stage 2	-	-	-	-	-	-	*407	448	-	*357	480	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.1	1.5	19.9	\$ 2151.5
HCM LOS			C	F

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	29	605	878	-	-	661	-	-	115
HCM Lane V/C Ratio	0.276	0.413	0.021	-	-	0.164	-	-	5.617
HCM Control Delay (s)	171	15.1	9.2	-	-	11.5	-	-	\$2151.5
HCM Lane LOS	F	C	A	-	-	B	-	-	F
HCM 95th %tile Q(veh)	0.9	2	0.1	-	-	0.6	-	-	69.8

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

APPENDIX E. Site Access Evaluation Supplement

All crash data available using this tool represents reportable data collected from Texas Peace Officer's Crash Reports (CR-3) received and processed by the Texas Department of Transportation (Department) as of 08/01/2022. The Department makes no warranty, representation or guaranty as to the content, accuracy, timeliness or completeness of any of the information provided as a result of your query. Any opinions and conclusions resulting from analysis performed on the crash data must be represented as your own and not those of the State of Texas or the Department.

