Volume 1 – Traffic Impact Analysis

CityPlace PD 375 1B
Dallas, Texas

May 29, 2018

Kimley-Horn and Associates, Inc.
Dallas, Texas

Project #063000036
Registered Firm F-928

Kimley»Horn

Traffic Impact Analysis

Cityplace PD 375 1B
Dallas, Texas

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May 29, 2018

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EXECUTIVE SUMMARY

Tract 1 of PD 375 (Subdistrict B) is located at the northeast corner of the intersection of Lemmon Avenue East and Oak Grove Avenue in Dallas, Texas. The development as proposed changes the maximum FAR from 5.0 for all uses to 4.0 for multifamily uses on the site and to 8.0 for all other uses. The maximum FAR for the site would be 8.0 for all uses. This most conservatively translates to 906,222 SF of office uses. This study is intended to identify traffic generation characteristics, identify potential traffic related impacts on the local street system, and to develop mitigation measures required for identified impacts.

The following existing intersections were selected to be part of this study:

- Lemmon Avenue at McKinney Avenue;
- Lemmon Avenue East at McKinney Avenue;
- Lemmon Avenue at US 75 Northbound Frontage Road (NBFR);
- Lemmon Avenue at US 75 Southbound Frontage Road (SBFR);
- Blackburn Street/Haskell Avenue at US 75 NBFR;
- Blackburn Street at US 75 SBFR;
- Blackburn Street at Oak Grove Avenue;
- Cityplace West Boulevard at Oak Grove Avenue;
- Lemmon Avenue at Oak Grove Avenue; and
- Lemmon Avenue East at Oak Grove Avenue.

The site can have driveways on any adjacent street, such as Lemmon Avenue East. For a conservative only the following assumed driveways were included:

- Drive 1, which is a full-access driveway to Oak Grove Avenue; and
- Drive 2, which is a full-access driveway to Howell Street.

Additional driveways will spread out the site's traffic and improve operations at each driveways.

Traffic operations were analyzed at the study intersections for existing volumes, 2021 and 2026 background traffic volumes, and 2021 and 2026 background plus site-generated traffic volumes. The future years correspond to the expected buildout year of the site and a key future study year. Conditions were analyzed for the weekday AM and PM peak hours. The two-way conversion of McKinney Avenue was assumed to have taken place between 2021 and 2026, so the roadway network for the 2026 background and 2026 background plus site scenarios included McKinney in two-way operation.

The background traffic conditions included existing traffic with compound growth rates, plus explicit modelling of the following development in the vicinity:

- NEC Haskell site, a development consisting of 1,400,000 SF of office uses; 1,200 multifamily residences; and a variety of retail and entertainment uses, located on the northeast corner of Haskell Avenue and US 75.

For a conservative analysis, the existing traffic from the current bar and associated dog park was not removed from the background traffic.

After a 10% transit/trail mode share, the PD 375 1B redevelopment is expected to generate approximately 790 new weekday AM peak hour one-way vehicle trips and 832 new weekday PM peak hour one-way vehicle trips at buildout. The distribution of the site-generated traffic volumes onto the street system was based on the surrounding roadway network, existing traffic patterns, and the project's proposed access locations.

Based on the analysis presented in this report, the FAR revision of PD 375 1B can be successfully incorporated into the surrounding roadway network. The proposed site driveways provide the appropriate level of access for the development. The site-generated traffic does not significantly affect the existing vehicle traffic operations. No improvements to the external roadway network are recommended for the site.

I. INTRODUCTION

A. Purpose

Kimley-Horn was retained to conduct a Traffic Impact Analysis (TIA) of future traffic conditions associated with the changing of allowable FAR for PD 375 1B, which is located at the northeast corner of the intersection of Lemmon Avenue East and Oak Grove Avenue in Dallas, Texas. A site vicinity map is provided as **Exhibit 1**. **Exhibit 2** shows the proposed conceptual site plan. This study is intended to identify traffic generation characteristics, identify potential traffic related impacts on the local street system, and to develop mitigation measures required for identified impacts.

B. Methodology

Traffic operations were analyzed at the study intersections for AM and PM peak hours for the following scenarios:

- 2018 existing traffic
- 2021 background traffic
- 2021 background plus site traffic
- 2026 background traffic
- 2026 background plus site traffic

The capacity analyses were conducted using the *Synchro*™ software package and its associated *Intersection* reports for signalized intersections and *Highway Capacity Manual* reports for unsignalized intersections.

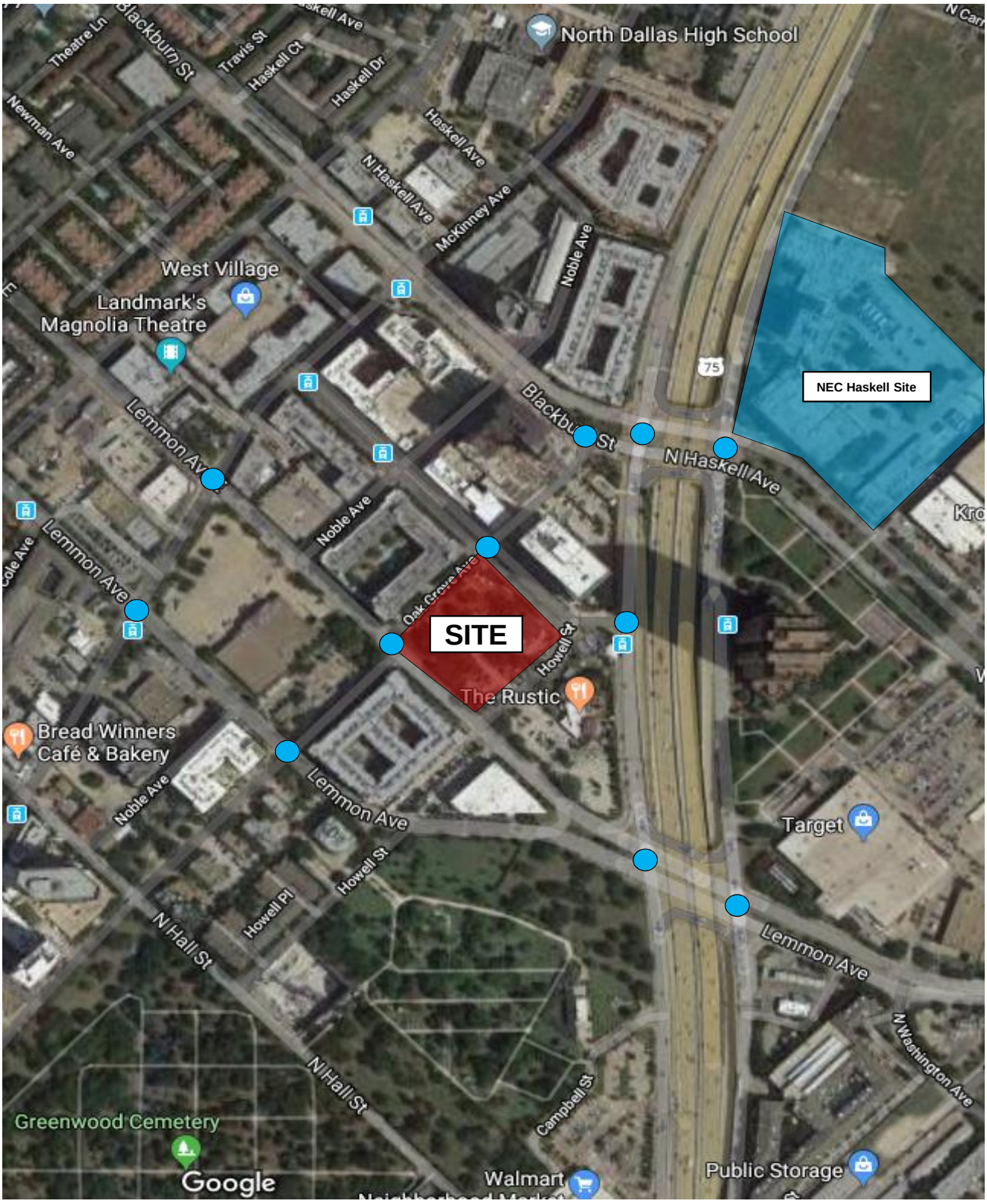


EXHIBIT 1

Vicinity Map

Cityplace PD 375 1B - Dallas, Texas

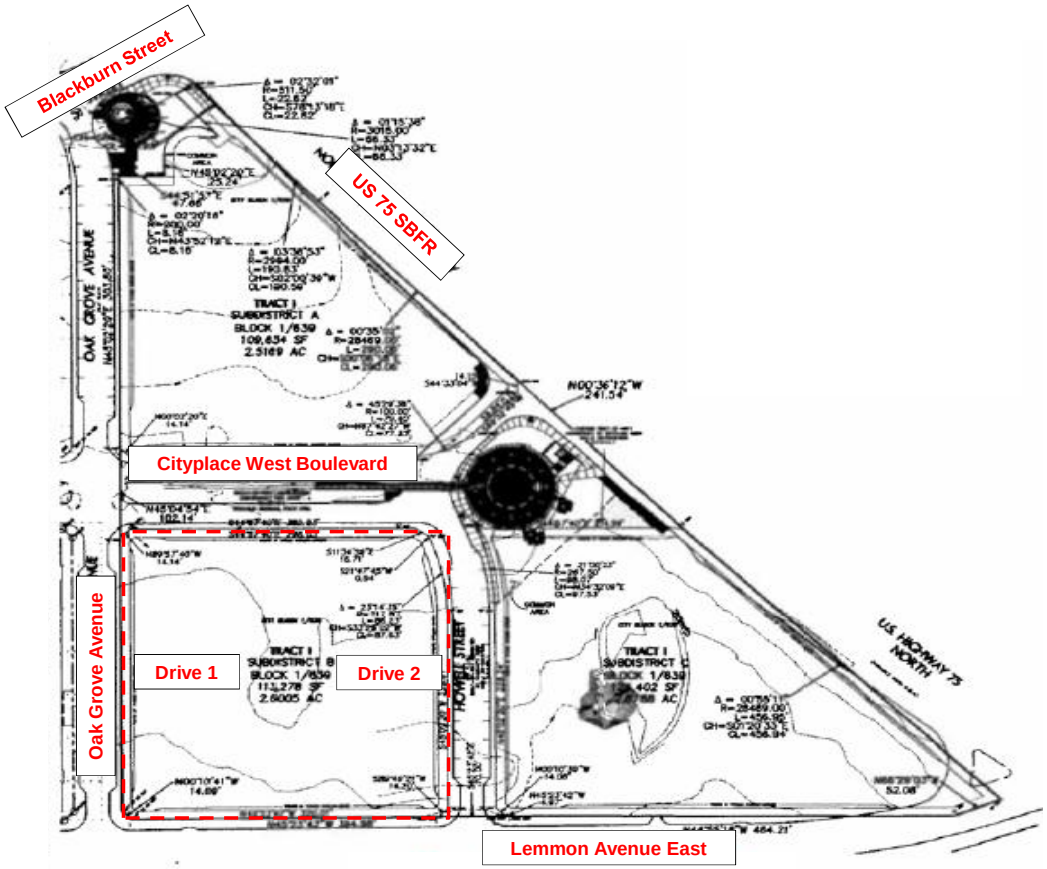
Kimley»Horn

LEGEND:

= Study Intersection

North

Not To Scale



CITYPLACE: PD375, Tract I

Subdistrict	Max Stories	Max Height	Max FAR	Land Area	Max Lot Coverage
A	20	270	5.00	109,636 SF(2.517 AC)	90%
B	43	546	5.00	113,278 SF(2.601 AC)	90%
C	43	546	5.00	125,402 SF(2.879 AC)	90%

CITYPLACE: PD375, Tract II

	Max Stories	Max Height	Square Footage	Land Area	Max Lot Coverage
Tract II	3	36'	23,305 SF	36,871 SF(0.8464 AC)	34%

Multifamily FAR 4.0*
All Other Uses FAR 8.0*
Combined FAR not to exceed 8.0

Note: Driveway locations have not been established by a stie plan.
Any driveway location shown here is merely for analysis purposes.
Driveways are allowed to all adjacent streets.

EXHIBIT 2

Conceptual Site Plan
Cityplace PD 375 1B - Dallas, Texas

Kimley»Horn

North
Not To Scale

II. EXISTING AND FUTURE AREA CONDITIONS

A. Roadway Characteristics

The following signalized intersections were evaluated as part of this study.

- Lemmon Avenue at McKinney Avenue
- Lemmon Avenue East at McKinney Avenue
- Lemmon Avenue at US 75 Northbound Frontage Road (NBFR)
- Lemmon Avenue at US 75 Southbound Frontage Road (SBFR)
- Blackburn Street/Haskell Avenue at US 75 NBFR
- Blackburn Street at US 75 SBFR

The following unsignalized intersections were evaluated as part of this study:

- Blackburn Street at Oak Grove Avenue
- Cityplace West Boulevard at Oak Grove Avenue
- Lemmon Avenue at Oak Grove Avenue
- Lemmon Avenue East at Oak Grove Avenue

The major study area roadways are described in **Appendix A**.

Exhibit 3 illustrates the existing intersection geometry used for the traffic analysis. **Exhibit 9** shows the intersection geometry used for the traffic analysis after the McKinney two-way conversion has taken place.

B. Existing Study Area

The property occupies PD 375 1B, which currently allows for a maximum FAR of 5.0.

C. Proposed Site Improvements

The development as proposed changes the maximum FAR to 4.0 for multifamily uses on the site and to 8.0 for all other uses. The 8.0 FAR translates to 906,222 SF of office uses, which would be a worst-case scenario for traffic conditions.

While driveways are allowed to all four adjacent streets, for the TIA the site is assumed to have access via a total of two driveways. Additional driveways will spread out the site-generated traffic and result in more favorable operations at each driveway. The driveways to be modelled in this analysis are as follows:

Drive 1 – would be a full-access driveway to Oak Grove Avenue located midblock between Cityplace West Boulevard and Lemmon Avenue East. One lane will be constructed for the inbound movement, and one lane will be constructed for the outbound movement.

Drive 2 – would be a full-access driveway to Howell Street located midblock between Cityplace West Boulevard and Lemmon Avenue East. One lane will be constructed for the inbound movement, and one lane will be constructed for the outbound movement. Intersection sight distance at the proposed driveways is acceptable, with each on relatively flat and straight segments of their respective roadway.

D. Existing Traffic Volumes

24-hour machine counts were collected near the site on Lemmon Avenue, Lemmon Avenue East, and Oak Grove Avenue. **Exhibit 4** shows the existing weekday AM and PM peak hour traffic volumes. The raw count sheets, as well as a comparison between the 24-hour volumes collected and previous 24-hour counts, are provided in **Volume 2** of this report.

The 24-hour count showed the daily volume on the roadway link as follows:

- Lemmon Avenue: 24,131 vehicles per day (vpd)
- Lemmon Avenue East: 20,928 vpd
- Oak Grove Avenue: 1,289 vpd

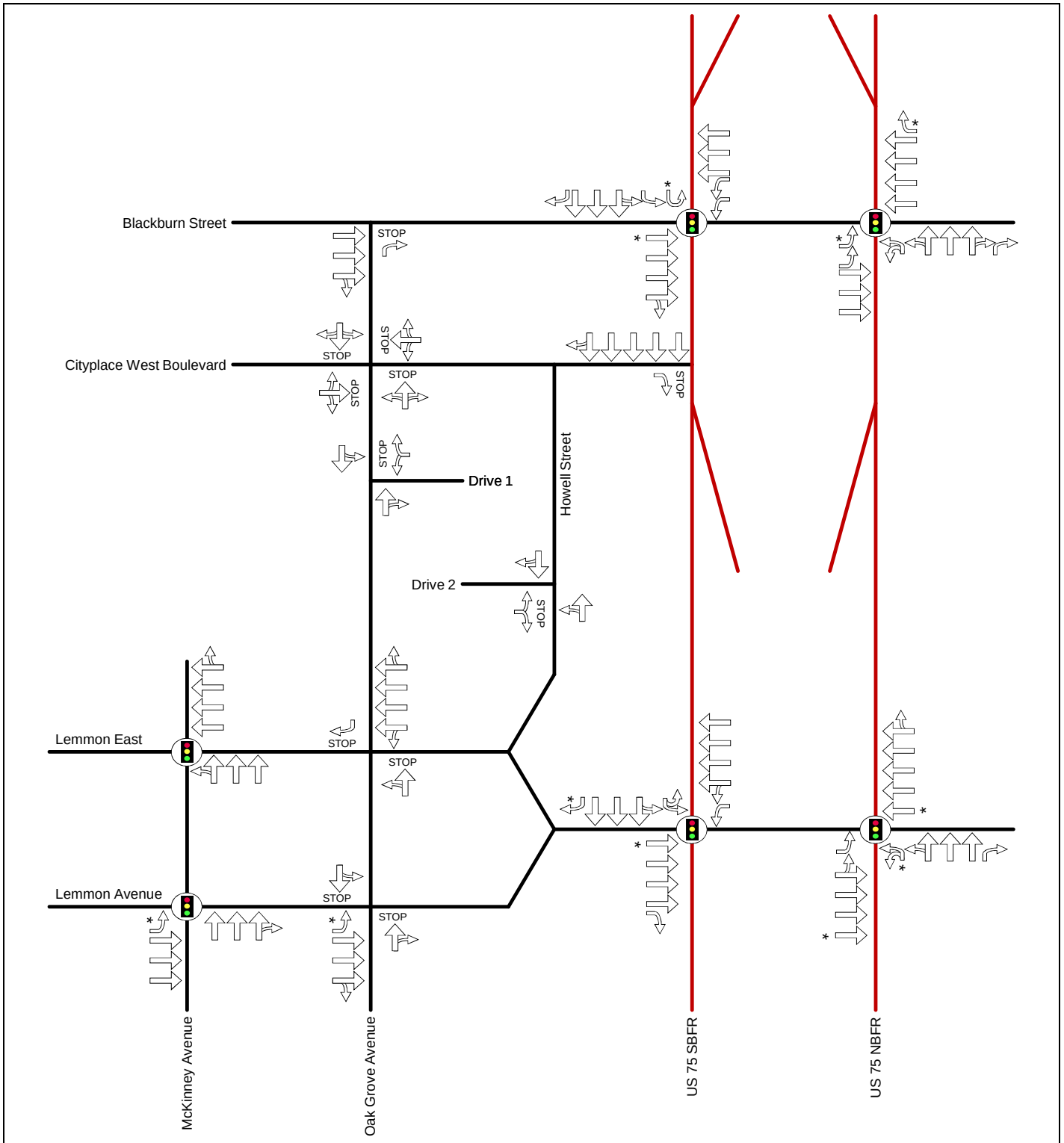


EXHIBIT 3

Lane Assignment and Intersection Control

Cityplace PD 375 1B - Dallas, Texas

Kimley»Horn

LEGEND:

= Signalized Intersection

STOP = Stop-Controlled Approach

= Travel Lane

* = Turn Bay

= Driveway Lanes or Off-Site Improvements

TWLTL = Two-Way Left Turn Lane

North

Not To Scale

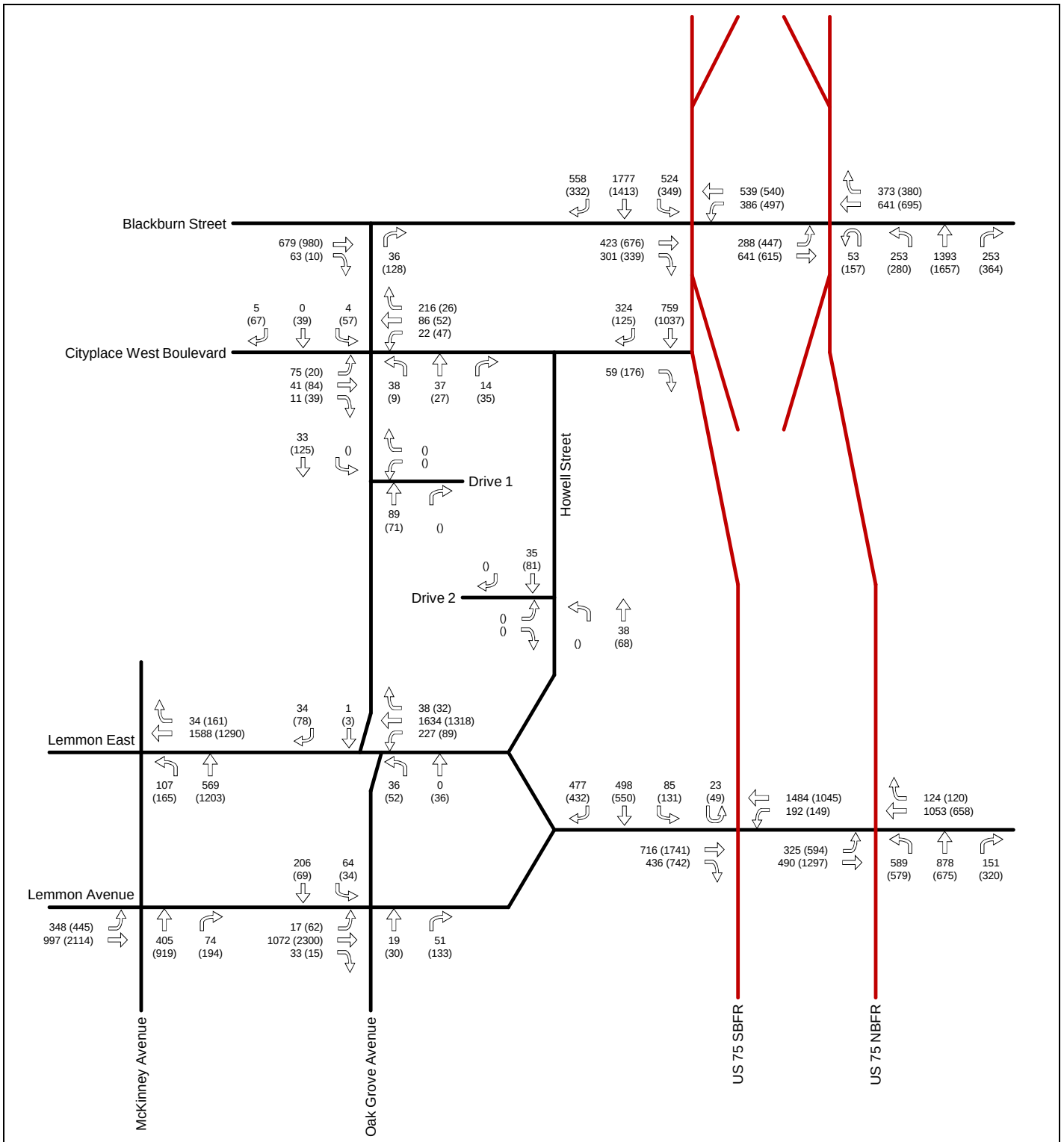


EXHIBIT 4

2018 Existing Traffic Volumes

Cityplace PD 375 1B - Dallas, Texas

Kimley»Horn

LEGEND:

X (Y)

X = Weekday AM Peak Hour Turning Movements

Y = Weekday PM Peak Hour Turning Movements

Volumes may not sum from point to point due to rounding and presence of smaller driveways not included in analysis.

North

Not To Scale

III. PROJECT TRAFFIC CHARACTERISTICS

A. Site-Generated Traffic

Site-generated traffic estimates are determined through a process known as trip generation. Rates and equations are applied to the proposed land use to estimate traffic generated by the development during a specific time interval. The acknowledged source for trip generation rates is the 10th edition of *Trip Generation Manual* published by the Institute of Transportation Engineers (ITE). ITE has established trip rates in nationwide studies of similar land uses. The trips indicated are actually one-way trips or *trip ends*, where one vehicle entering and exiting the site is counted as one inbound trip and one outbound trip.

Due to the site's proximity to both the Cityplace DART station for the Red, Blue, and Orange Rail lines and the Cityplace West Station for the McKinney Avenue Trolley, a 10% multimodal reduction was applied to the external trips.

No reductions were taken for pass-by trips or internal capture.

Table 1 shows the resulting daily and weekday AM and PM peak hour trip generation for the proposed development, showing new external trips.

Table 1 – Trip Generation

Land Uses	Amount	Units	ITE Code	Daily One-Way Trips	AM Peak Hour One-Way Trips			PM Peak Hour One-Way Trips		
					IN	OUT	TOTAL	IN	OUT	TOTAL
General Office Building	906,222	SF	710	9,000	755	123	878	148	776	924
Development Totals										
Raw Trip Generation Total:				9,000	755	123	878	148	776	924
10% Multimodal Reduction				900	76	12	88	15	78	93
Total Net New External Vehicle Trips:				**8,100**	**679**	**111**	**790**	**133**	**698**	**831**

Trip Generation rates based on *ITE's Trip Generation Manual*, 10th Edition.

B. Trip Distribution and Assignment

The distribution of the site-generated traffic volumes into and out of the site driveways and onto the street system was based on the area street system characteristics, existing traffic patterns, relative land use density, and the locations of the proposed driveway access to/from the site.

The corresponding inbound and outbound traffic assignment, where the directional distribution is applied using the most probable paths to and from the site, can be found in **Exhibit 5**. **Exhibit 6** shows the resulting site-generated weekday AM and weekday PM peak hour turning movements after multiplying the new external trip generation for each phase by the respective traffic assignment percentages.

Exhibit 9 shows the intersection geometry used for the traffic analysis after the McKinney two-way conversion has taken place.

Exhibit 11 and **Exhibit 12** show the resulting site-generated weekday AM and weekday PM peak hour turning movements after multiplying the new external trip generation for each phase by the respective traffic assignment percentages after the McKinney two-way conversion has taken place.

C. Other Development Traffic Modelling

Using the same procedure as was used to develop PD 375 1B traffic and distribute that traffic on the roadway network, traffic was developed and distributed for the NEC Haskell site as well. The distribution and volumes for this development can be found in the **Volume 2** of this report. The NEC Haskell traffic was added into the 2021 and 2026 background traffic volumes.

D. Development of 2021 Background Traffic

In order to obtain 2021 background traffic, the existing traffic counts and historic counts near the site were compared to find expected growth trends within the study area. Based on the recent growth in the area, an annual growth rate of 1% was assumed for the background traffic through 2021. To calculate the 2021 background traffic, the existing 2018 traffic counts were grown by 1% annually for three years. The resulting 2021 background weekday AM and PM peak hour traffic volumes are shown in **Exhibit 7**.

E. Development of 2021 Total Traffic

Site traffic volumes were added to the background volumes to represent the estimated total (background plus site-generated) traffic conditions for the 2021 study year after completion of the proposed development. **Exhibit 8** shows the resulting 2021 weekday AM and PM peak hour total traffic volumes.

F. Development of 2026 Background and Total Traffic: McKinney Two-Way Conversion

The McKinney two-way conversion was assumed to be completed between 2021 and 2026, so both 2026 scenarios were analyzed with McKinney Avenue as a two-way street. The background and total traffic volumes in the 2026 study year were calculated in a similar manner to the 2021 traffic volumes by adding five years of 1% growth over the 2021 background volumes. The background development traffic was then added into the traffic volumes. **Exhibit 13** shows the resulting 2026 weekday AM and PM peak hour background traffic volumes, and **Exhibit 14** shows the resulting 2026 weekday AM and PM peak hour total traffic volumes after the addition of the site-generated traffic.

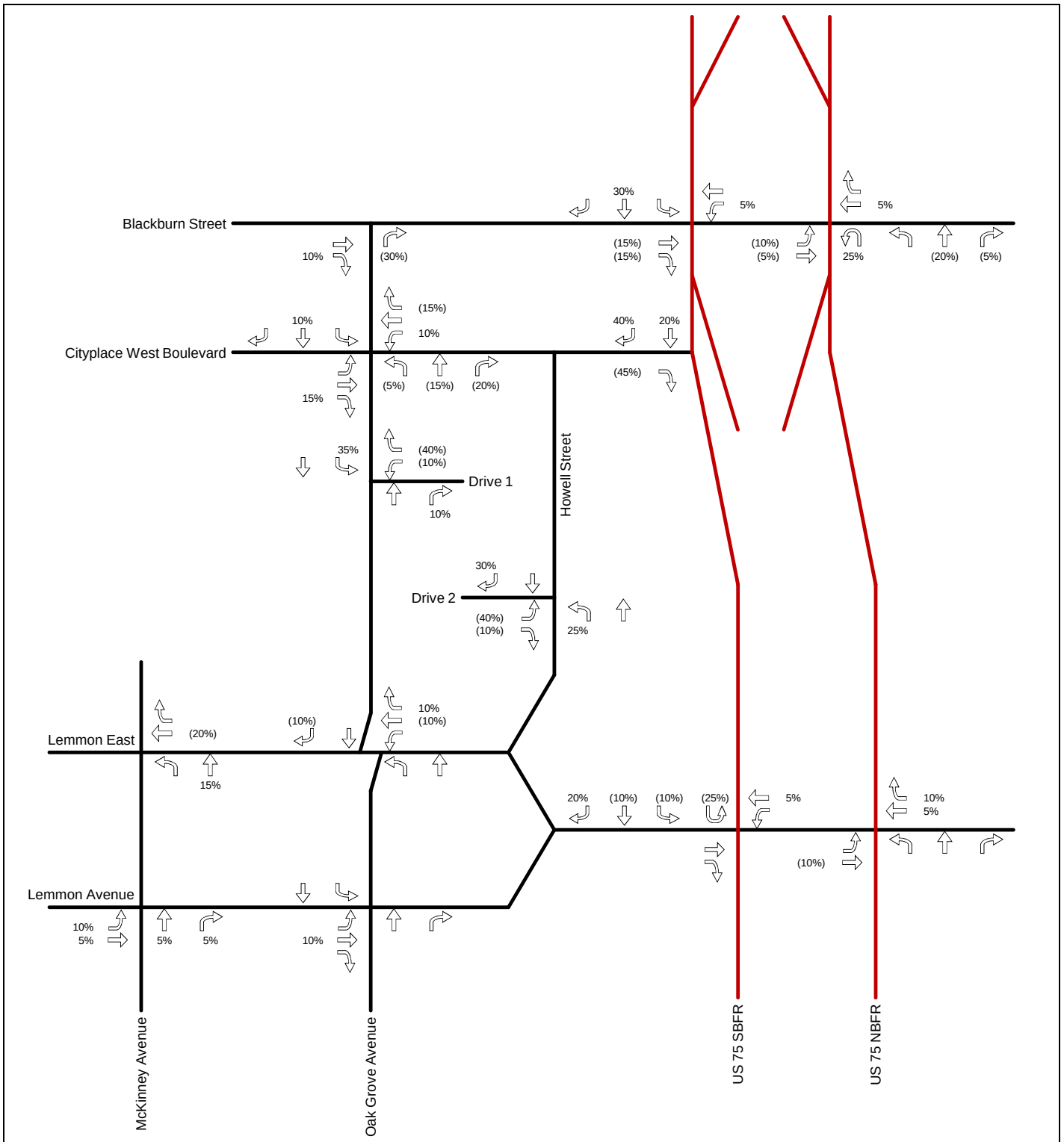


EXHIBIT 5

Trip Distribution and Traffic Assignment

Cityplace PD 375 1B - Dallas, Texas

Kimley»Horn

LEGEND:

X% (Y%)

X% = Percentage of Inbound Site-Generated Traffic

(Y%) = Percentage of Outbound Site-Generated Traffic

North

Not To Scale

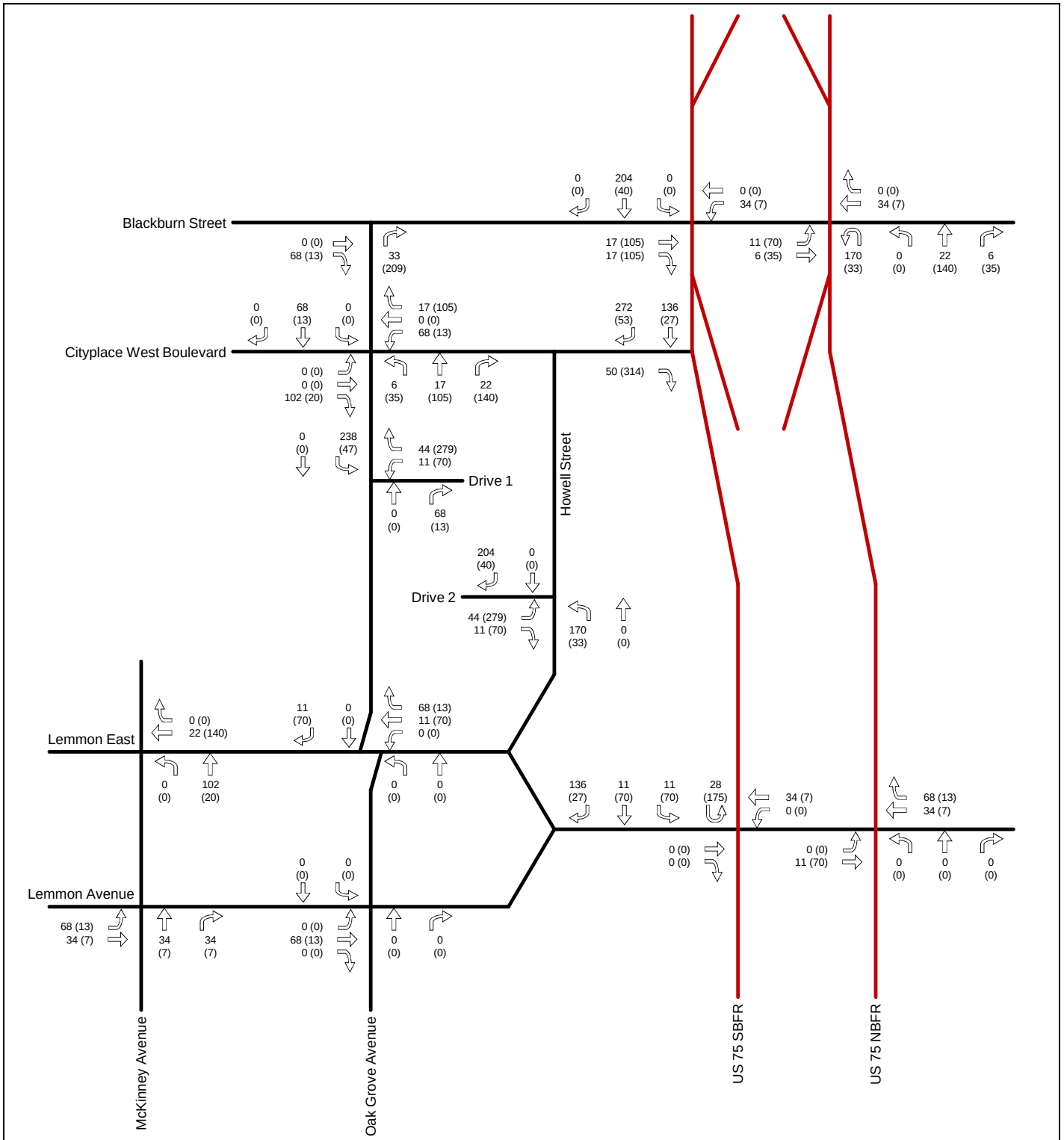


EXHIBIT 6

Site-Generated Traffic Volumes

Cityplace PD 375 1B - Dallas, Texas

Kimley»Horn

LEGEND:
X (Y)
X = Weekday AM Peak Hour Turning Movements
Y = Weekday PM Peak Hour Turning Movements
Volumes may not sum from point to point due to rounding and presence of smaller driveways not included in analysis.

North

Not To Scale

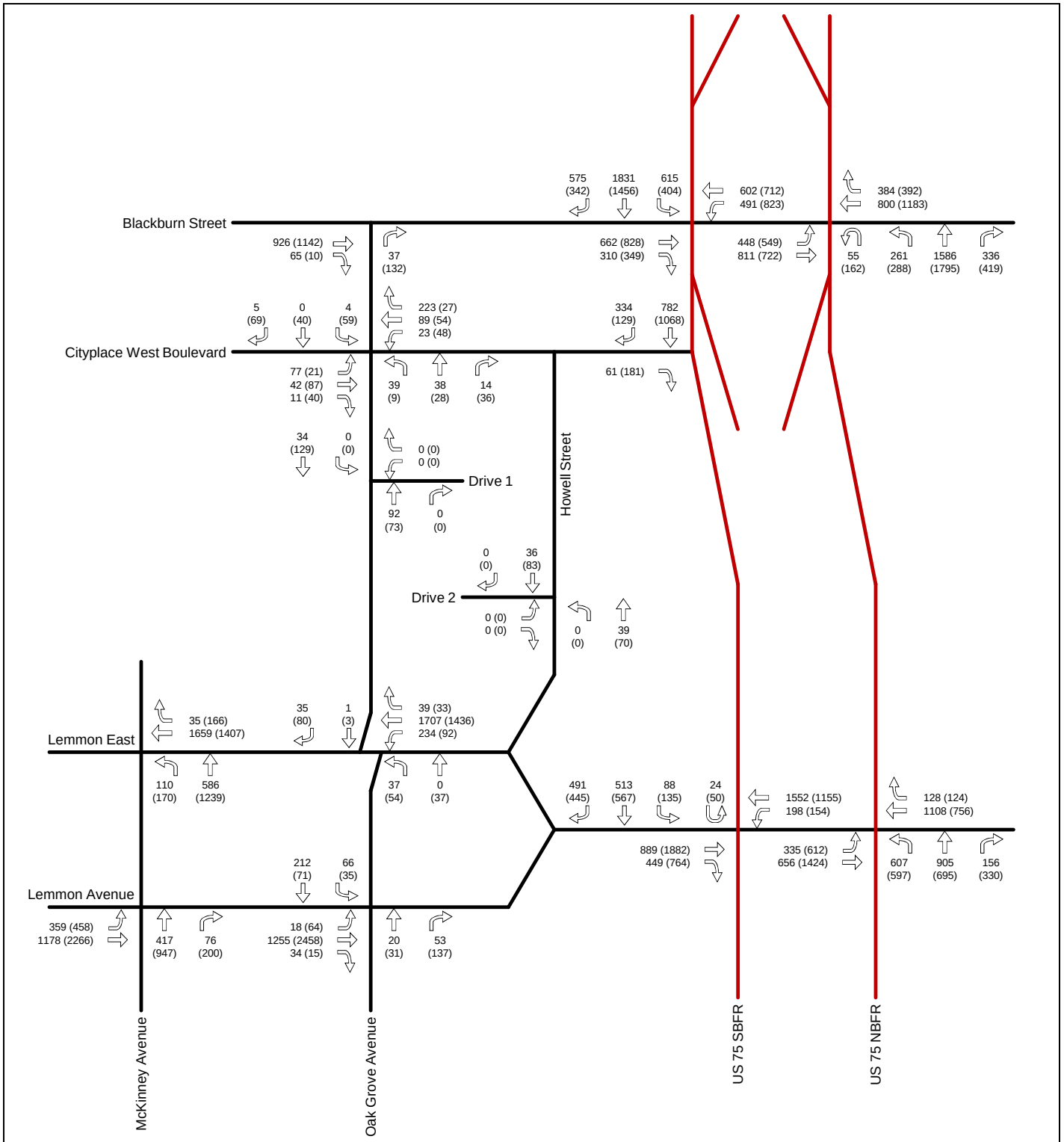


EXHIBIT 7

2021 Background Traffic Volumes

Cityplace PD 375 1B - Dallas, Texas

Kimley»Horn

LEGEND:

X (Y)

X = Weekday AM Peak Hour Turning Movements

Y = Weekday PM Peak Hour Turning Movements

Volumes may not sum from point to point due to rounding and presence of smaller driveways not included in analysis.

North

Not To Scale

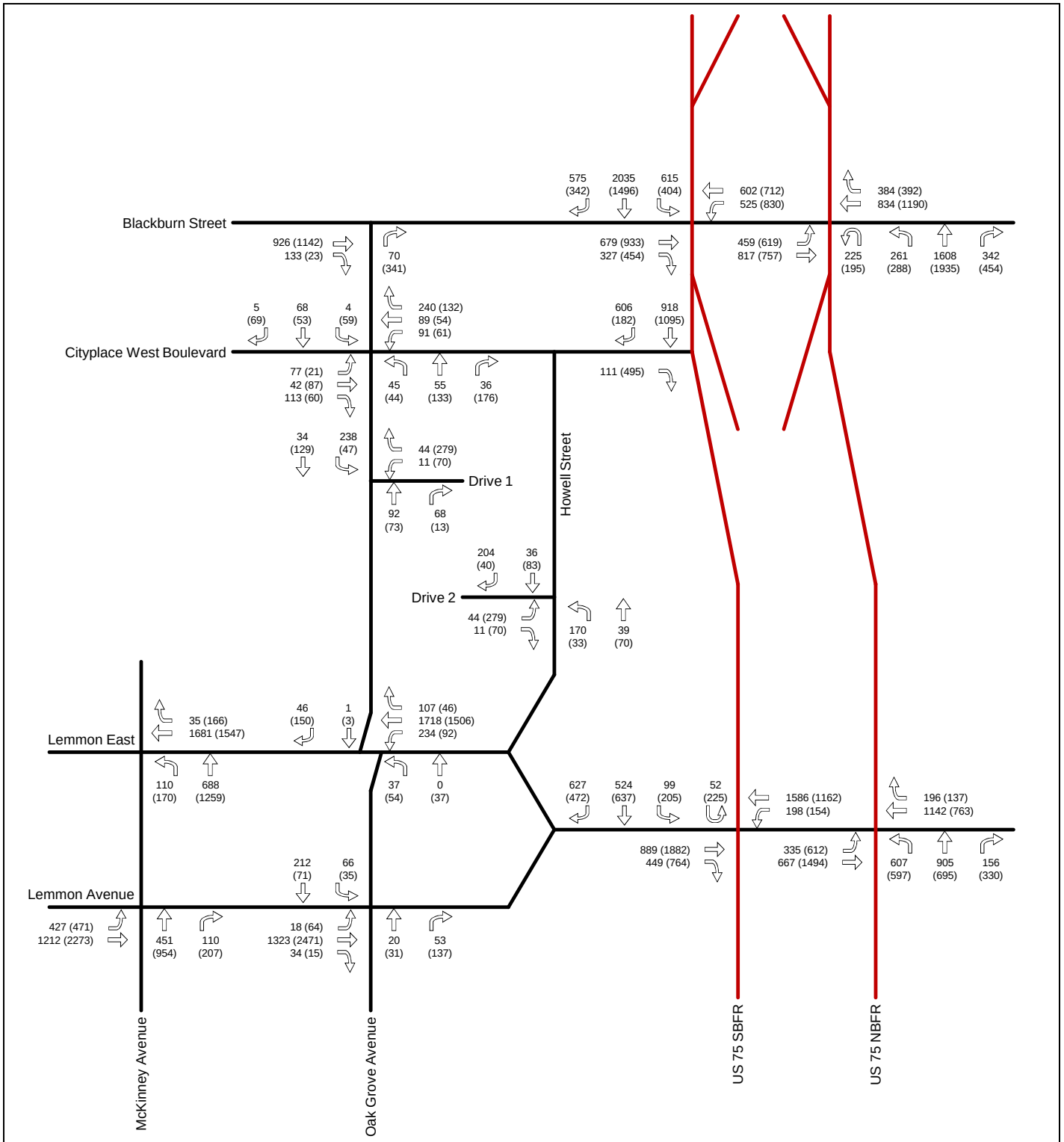


EXHIBIT 8

2021 Background Plus Site-Generated Traffic Volumes

Cityplace PD 375 1B - Dallas, Texas

Kimley»Horn

LEGEND:

X (Y)

X = Weekday AM Peak Hour Turning Movements

Y = Weekday PM Peak Hour Turning Movements

Volumes may not sum from point to point due to rounding and presence of smaller driveways not included in analysis.

North

Not To Scale

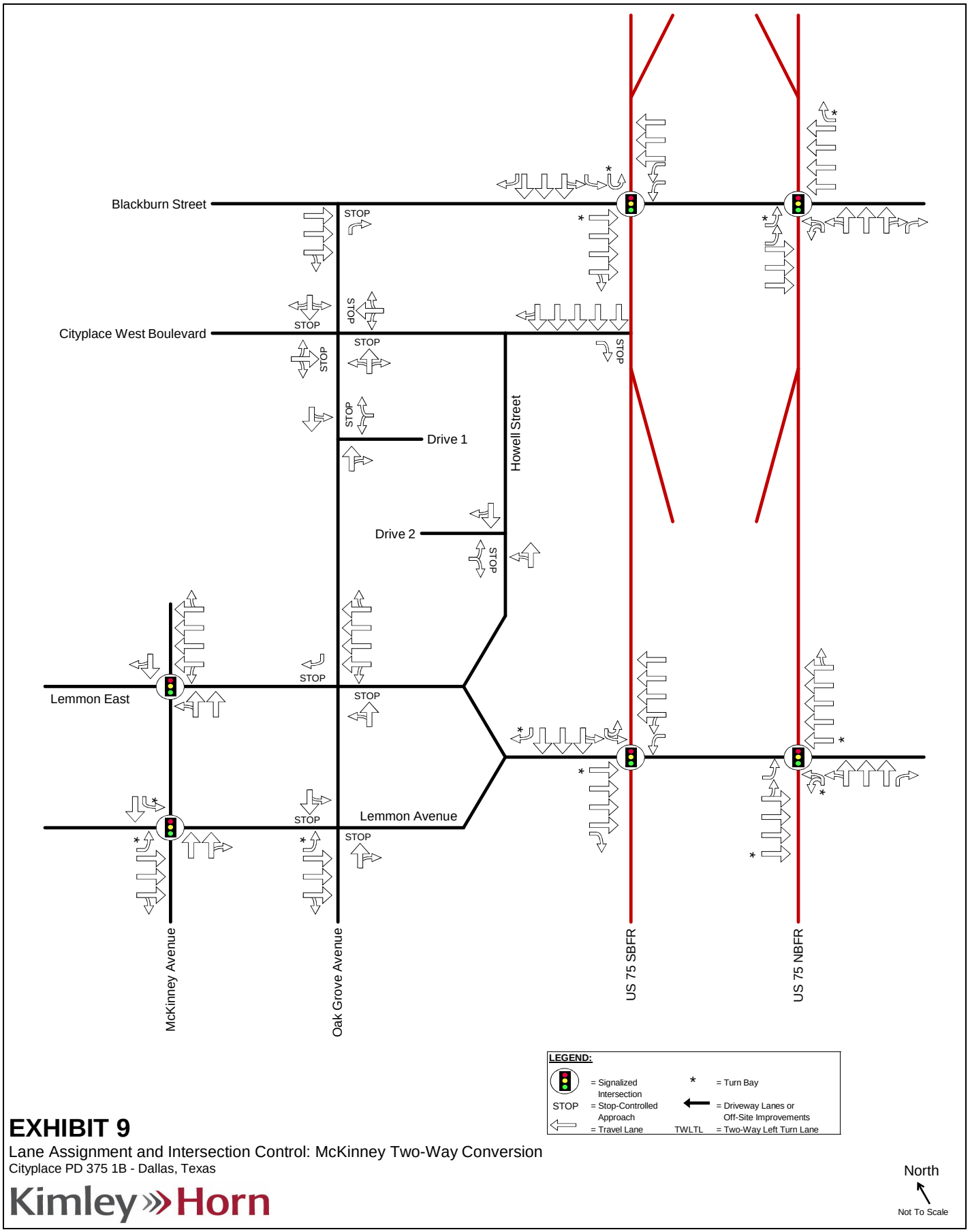


EXHIBIT 9

Lane Assignment and Intersection Control: McKinney Two-Way Conversion

Cityplace PD 375 1B - Dallas, Texas

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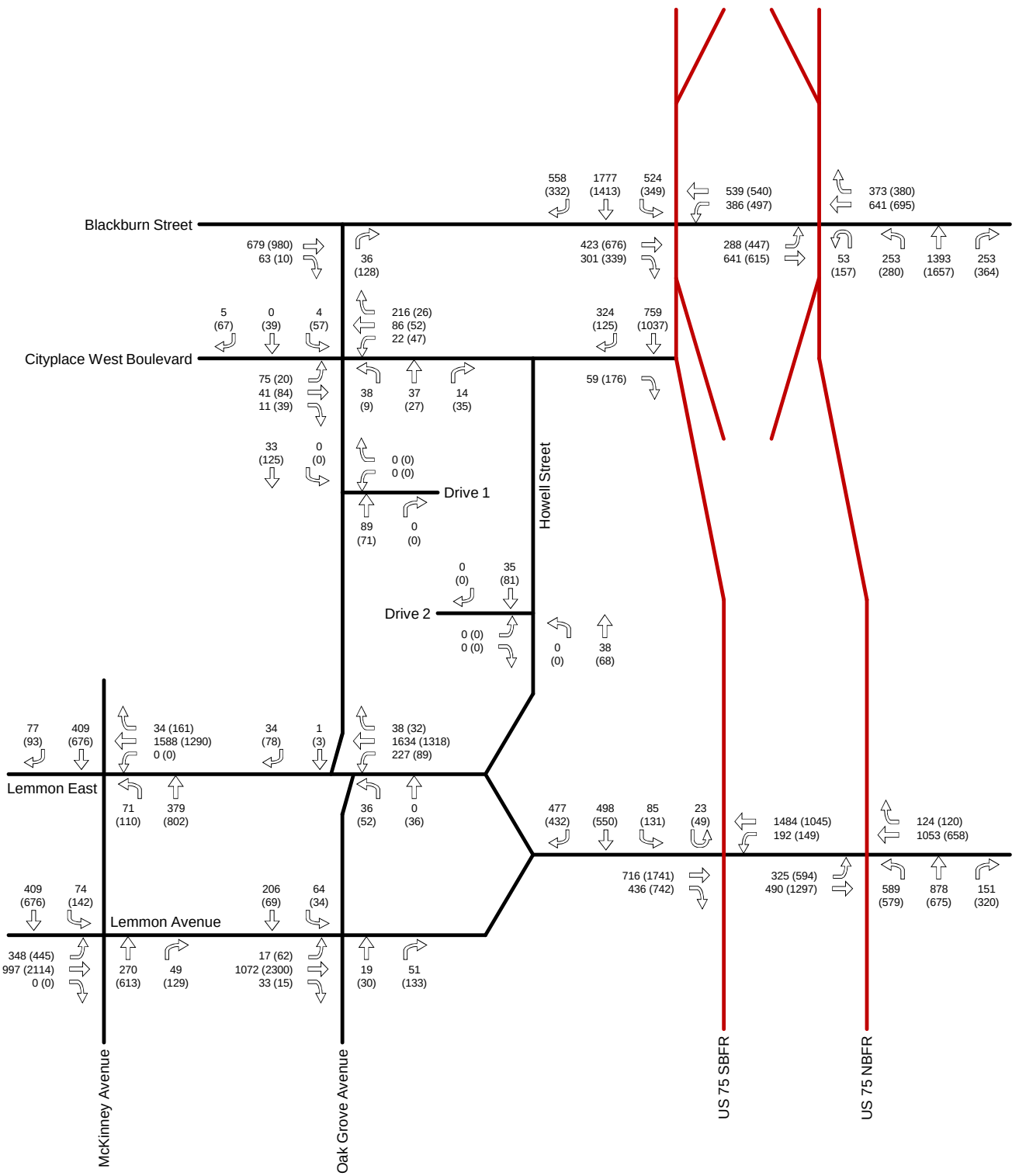


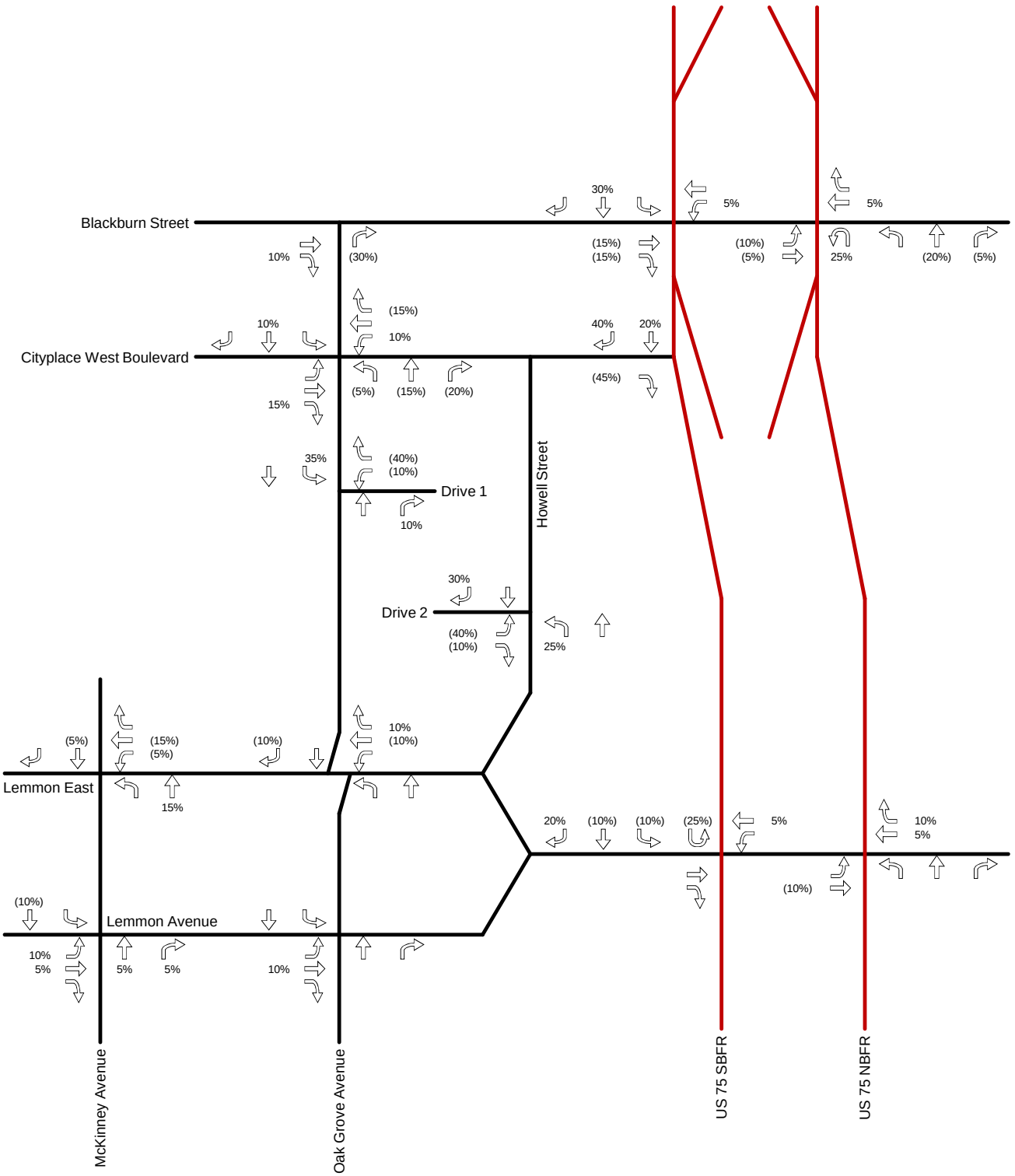
LEGEND:
X (Y)
X = Weekday AM Peak Hour Turning Movements
Y = Weekday PM Peak Hour Turning Movements
Volumes may not sum from point to point due to rounding
and presence of smaller driveways not included in analysis.

EXHIBIT 10

2018 Existing Traffic Volumes: McKinney Two-Way Conversion
Cityplace PD 375 1B - Dallas, Texas

Kimley»Horn

North
Not To Scale



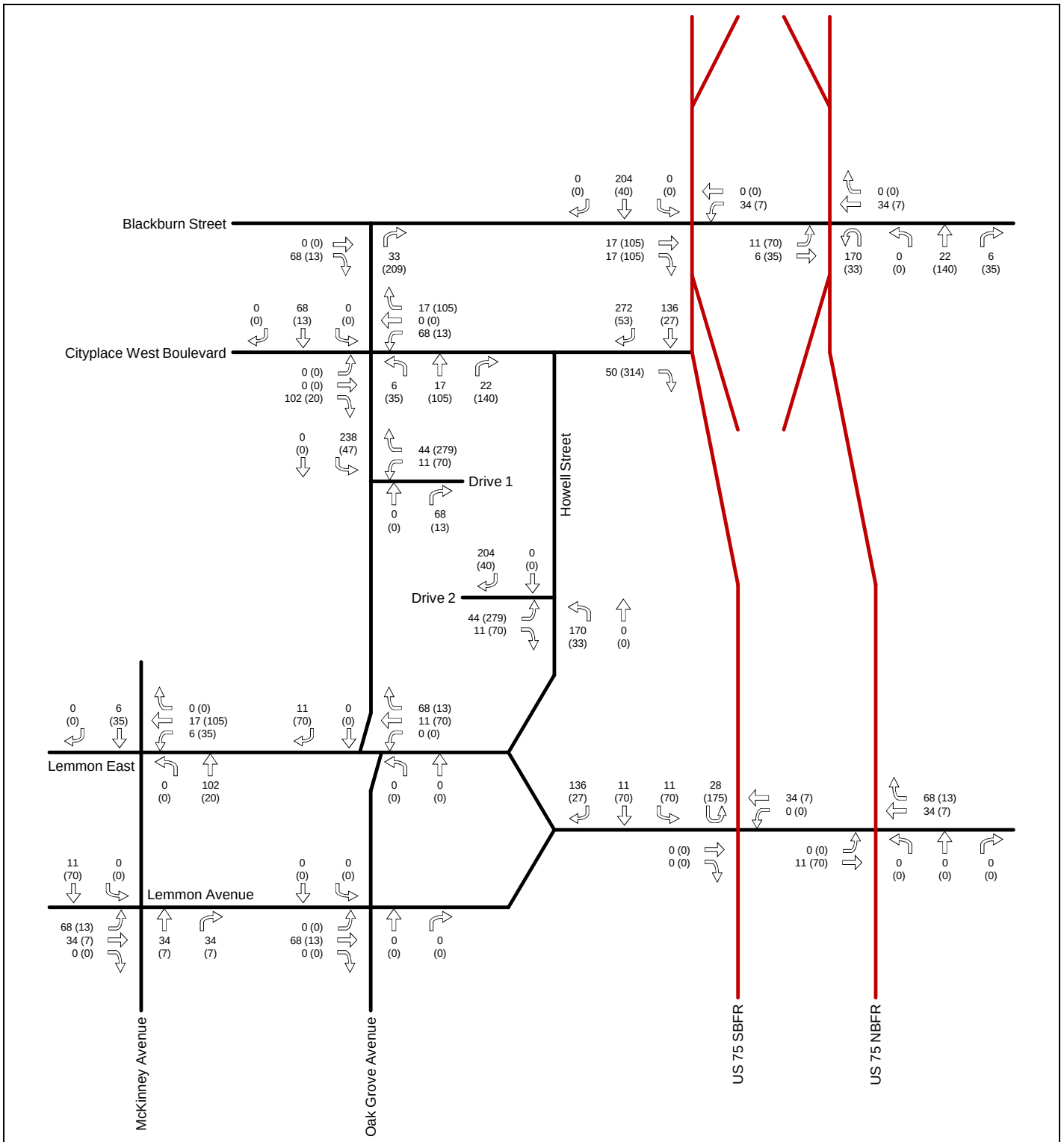
LEGEND:
X% (Y%)
X% = Percentage of Inbound Site-Generated Traffic
(Y%) = Percentage of Outbound Site-Generated Traffic

EXHIBIT 11

Trip Distribution and Traffic Assignment: McKinney Two-Way Conversion
Cityplace PD 375 1B - Dallas, Texas

Kimley»Horn

North
Not To Scale



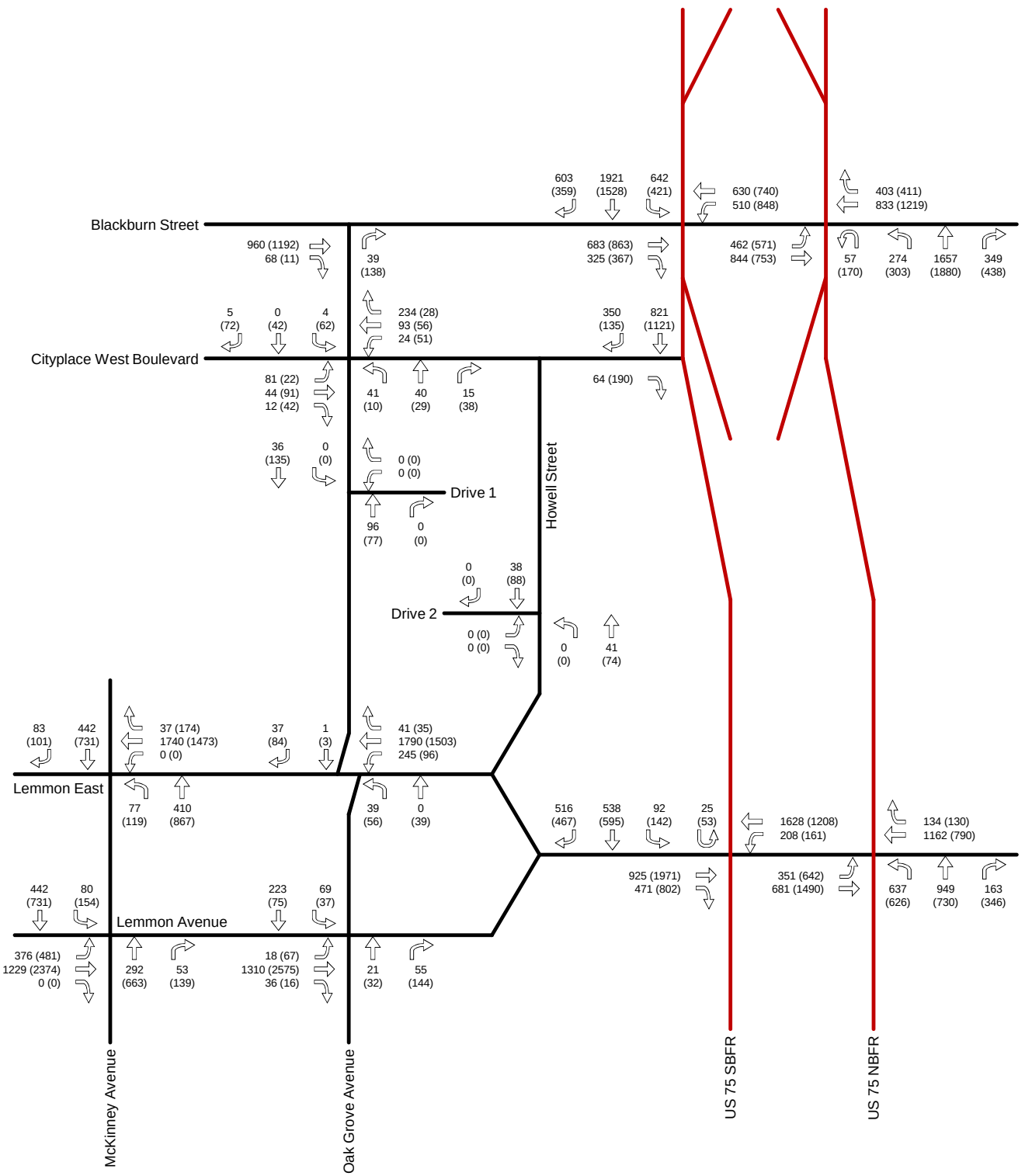
LEGEND:
X (Y)
X = Weekday AM Peak Hour Turning Movements
Y = Weekday PM Peak Hour Turning Movements
Volumes may not sum from point to point due to rounding and presence of smaller driveways not included in analysis.

EXHIBIT 12

Site-Generated Traffic Volumes: McKinney Two-Way Conversion
Cityplace PD 375 1B - Dallas, Texas

Kimley»Horn

North
Not To Scale



LEGEND:
X (Y)
X = Weekday AM Peak Hour Turning Movements
Y = Weekday PM Peak Hour Turning Movements
Volumes may not sum from point to point due to rounding
and presence of smaller driveways not included in analysis.

EXHIBIT 13

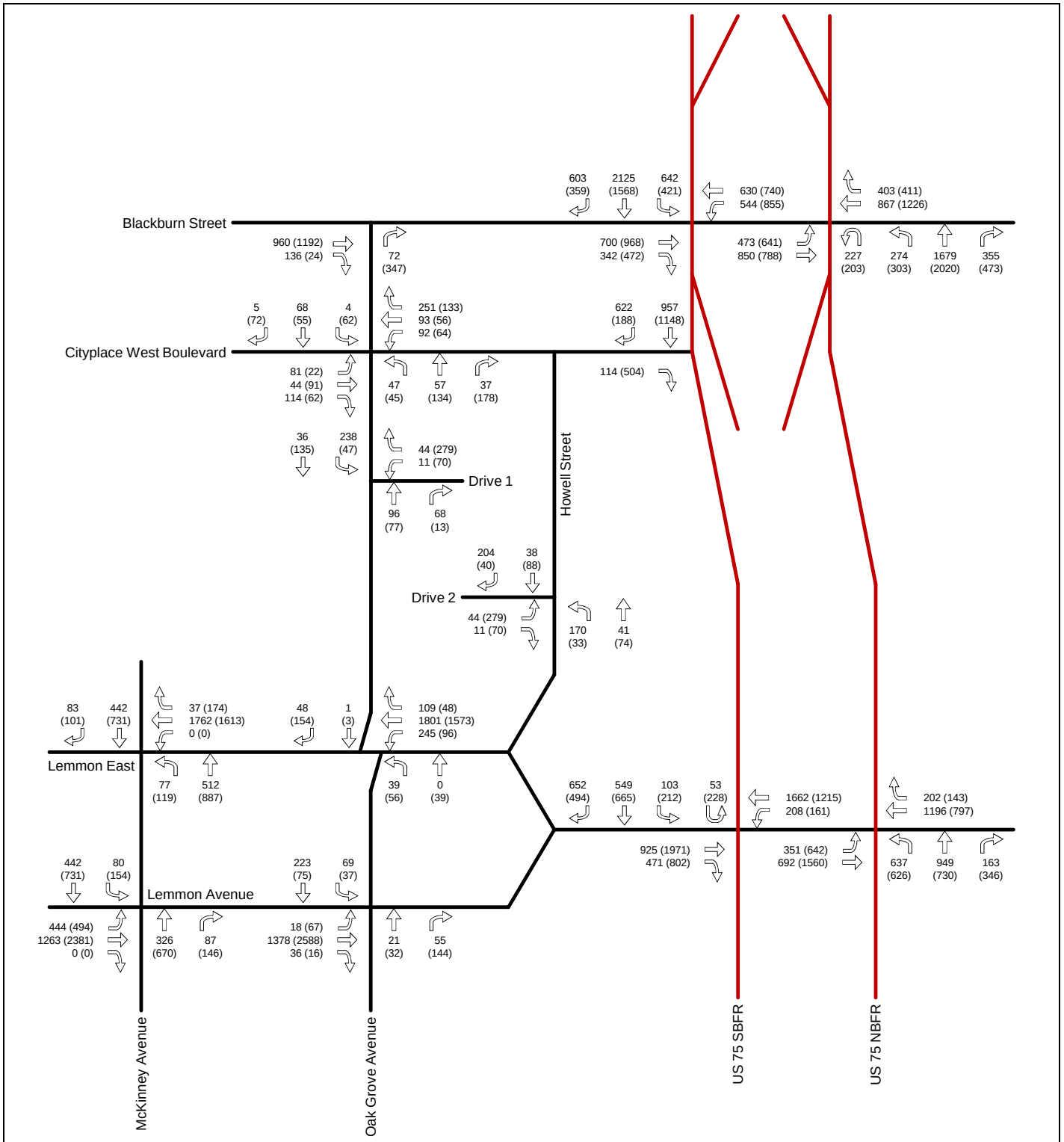
2026 Background Traffic Volumes: McKinney Two-Way Conversion

Cityplace PD 375 1B - Dallas, Texas

Kimley»Horn

North

Not To Scale



LEGEND:
X (Y)
X = Weekday AM Peak Hour Turning Movements
Y = Weekday PM Peak Hour Turning Movements
Volumes may not sum from point to point due to rounding and presence of smaller driveways not included in analysis.

EXHIBIT 14

2026 Background Plus Site-Generated Traffic Volumes: McKinney Two-Way Conversion

Cityplace PD 375 1B - Dallas, Texas

Kimley»Horn

North

Not To Scale

IV. TRAFFIC OPERATIONS ANALYSIS

Kimley-Horn conducted a traffic operations analysis to determine potential capacity deficiencies in the 2018, 2021 and 2026 study years at the study intersections. The acknowledged source for determining overall capacity is the current edition of the *Highway Capacity Manual.*

A. Analysis Methodology

Capacity analysis results are listed in terms of Level of Service (LOS). Level of service and the corresponding analysis methodology are explained in **Appendix B**.

Signal timings for the signalized intersections are based off of Dallas "As Fine-Tuned" Synchro files. Timing adjustments were made in the future scenarios to accommodate changes in traffic volumes due to background growth and site traffic, replicating how City staff will periodically review signal operations in the future.

Calculations for the level of service at the key intersections identified for study are provided in **Volume 2** of this report. The existing and 2021 analyses assumed the lane geometry and intersection control shown in **Exhibit 3**. The 2026 analyses, which are analyzed with the McKinney two-way conversion in place, assumed the lane geometry and intersection control illustrated in **Exhibit 9**.

B. Analysis Results

Table 2 and **Table 3** show the intersection operational results for the weekday AM and PM peak hours, respectively.

Table 2 – Traffic Operational Results – Weekday AM Peak Hour

INTERSECTION	APPROACH	2018 Background Traffic AM Peak Hour		2021 Background Traffic AM Peak Hour		2021 Background plus Site Traffic AM Peak Hour		2026 Background Traffic AM Peak Hour		2026 Background plus Site Traffic AM Peak Hour	
		DELAY (SEC/VEH)	LOS	DELAY (SEC/VEH)	LOS	DELAY (SEC/VEH)	LOS	DELAY (SEC/VEH)	LOS	DELAY (SEC/VEH)	LOS
McKinney Avenue @ Lemmon Avenue East	WB	5.2	A	5.6	A	6.8	A	16.7	B	16.8	B
	NB	23.5	C	24.0	C	24.7	C	35.7	D	45.5	D
	SB	&	&	&	&	&	&	46.4	D	46.4	D
	Overall	**10.8**	**B**	**11.1**	**B**	**12.6**	**B**	**25.5**	**C**	**28.0**	**C**
McKinney Avenue @ Lemmon Avenue	EB	0.6	A	0.8	A	1.1	A	2.9	A	3.4	A
	NB	43.4	D	43.8	D	45.2	D	31.6	C	33.7	C
	SB	&	&	&	&	&	&	50.6	D	51.0	D
	Overall	**11.7**	**B**	**11.2**	**B**	**12.3**	**B**	**16.5**	**B**	**17.1**	**B**
US 75 SBFR @ Lemmon Avenue	EB	31.1	C	35.8	D	35.8	D	34.4	C	34.4	C
	WB	3.9	A	3.9	A	3.7	A	8.9	A	9.0	A
	SB	39.1	D	44.2	D	71.4	E	43.4	D	64.8	E
	Overall	**22.0**	**C**	**25.1**	**C**	**33.5**	**C**	**26.5**	**C**	**33.2**	**C**
US 75 NBFR @ Lemmon Avenue	EB	6.0	A	5.1	A	5.0	A	5.3	A	5.2	A
	WB	115.6	F	41.9	D	50.2	D	40.2	D	52.1	D
	NB	21.3	C	33.0	C	33.0	C	37.0	D	37.0	D
	Overall	**48.7**	**D**	**28.6**	**C**	**31.7**	**C**	**29.9**	**C**	**34.0**	**C**
US 75 SBFR @ Blackburn Street	EB	31.3	C	99.4	F	99.6	F	101.0	F	100.0	F
	WB	6.6	A	57.5	E	59.7	E	75.0	E	78.0	E
	SB	83.4	F	31.9	C	37.0	D	27.1	C	30.4	C
	Overall	**58.2**	**E**	**50.9**	**D**	**54.0**	**D**	**52.3**	**D**	**54.3**	**D**
US 75 NBFR @ Blackburn Street / Haskell Avenue	EB	6.0	A	58.4	E	64.4	E	66.5	E	66.5	E
	WB	74.6	E	50.9	D	56.9	E	57.9	E	69.8	E
	NB	45.2	D	47.8	D	47.8	D	63.3	E	66.2	E
	Overall	**42.7**	**D**	**51.5**	**D**	**54.7**	**D**	**62.9**	**E**	**67.1**	**E**
Oak Grove Avenue @ Blackburn Street	NBR*	12.7	B	12.9	B	14.2	B	13.2	B	14.5	B
Oak Grove Avenue @ Cityplace West Boulevard	NB*	8.8	A	8.8	A	10.5	B	9.0	A	10.7	B
	EB*	8.6	A	8.7	A	10.7	B	8.8	A	11.0	B
	WB*	9.5	A	9.7	A	14.3	B	10.0	A	15.2	C
	SB*	8.0	A	8.0	A	9.9	A	8.1	A	10.0	A
	Overall	**9.2**	**A**	**9.3**	**A**	**12.3**	**B**	**9.5**	**A**	**12.9**	**B**
Oak Grove Avenue @ Lemmon Avenue East	NB*	18.7	C	19.5	C	19.6	C	20.7	C	20.8	C
	SB*	17.2	C	23.5	C	19.4	C	18.7	C	20.6	C
Oak Grove Avenue @ Lemmon Avenue	NB*	11.2	B	11.4	B	11.5	B	11.5	B	11.7	B
	EBL	8.2	A	8.2	A	8.0	A	8.2	A	8.2	A
	SB*	16.5	C	18.1	C	17.9	C	18.2	C	17.9	C
Oak Grove Avenue @ Drive 1	WB*	-	-	-	-	11.3	B	-	-	11.4	B
	SBL	-	-	-	-	8.3	A	-	-	0.3	A
Howell Street @ Drive 2	NBL	-	-	-	-	13.8	B	-	-	13.9	B
	WB*	-	-	-	-	8.2	A	-	-	8.2	A
US 75 SBFR @ Cityplace West Boulevard	EBR*	13.4	B	13.6	B	19.7	C	14.0	B	20.6	C

Signalized | Unsignalized

* Stop-Controlled Approach

\- No movements in Time Period

& Movement only present in 2-Way McKinney Avenue Operation

Table 3 – Traffic Operational Results – Weekday PM Peak Hour

INTERSECTION	APPROACH	2018 Background Traffic PM Peak Hour		2021 Background Traffic PM Peak Hour		2021 Background plus Site Traffic PM Peak Hour		2026 Background Traffic PM Peak Hour		2026 Background plus Site Traffic PM Peak Hour	
		DELAY (SEC/VEH)	LOS	DELAY (SEC/VEH)	LOS	DELAY (SEC/VEH)	LOS	DELAY (SEC/VEH)	LOS	DELAY (SEC/VEH)	LOS
McKinney Avenue @ Lemmon Avenue East	WB	12.1	B	11.0	B	11.9	B	32.5	C	41.1	D
	NB	18.7	B	18.8	B	19.0	B	41.0	D	44.1	D
	SB	&	&	&	&	&	&	73.9	E	73.5	E
	Overall	**15.2**	**B**	**14.6**	**B**	**15.0**	**B**	**44.0**	**D**	**48.7**	**D**
McKinney Avenue @ Lemmon Avenue	EB	7.8	A	8.8	A	9.0	A	22.3	C	23.1	C
	NB	37.4	D	37.8	D	38.0	D	32.9	C	42.4	D
	SB	&	&	&	&	&	&	70.7	E	71.5	E
	Overall	**16.9**	**B**	**17.5**	**B**	**17.6**	**B**	**33.2**	**C**	**35.6**	**D**
US 75 SBFR @ Lemmon Avenue	EB	68.4	E	71.2	E	71.0	E	79.4	E	79.2	E
	WB	3.0	A	5.6	A	5.6	A	5.6	A	5.5	A
	SB	50.6	D	43.2	D	53.2	D	41.6	D	49.2	D
	Overall	**47.8**	**D**	**47.7**	**D**	**50.1**	**D**	**51.4**	**D**	**53.0**	**D**
US 75 NBFR @ Lemmon Avenue	EB	3.6	A	3.9	A	3.7	A	4.3	A	4.1	A
	WB	68.3	E	54.1	D	55.0	D	55.0	D	56.4	E
	NB	26.7	C	27.0	C	27.0	C	30.7	C	30.6	C
	Overall	**24.7**	**C**	**22.3**	**C**	**22.3**	**C**	**24.0**	**C**	**24.0**	**C**
US 75 SBFR @ Blackburn Street	EB	37.0	D	88.1	F	91.3	F	33.8	C	73.2	E
	WB	8.8	A	77.5	E	77.7	E	85.5	F	87.6	F
	SB	80.3	F	41.8	D	45.1	D	49.0	D	53.6	D
	Overall	**51.6**	**D**	**64.1**	**E**	**67.2**	**E**	**57.1**	**E**	**69.1**	**E**
US 75 NBFR @ Blackburn Street / Haskell Avenue	EB	5.8	A	54.3	D	66.6	E	47.7	D	58.2	E
	WB	127.7	F	93.2	F	93.4	F	90.5	F	90.3	F
	NB	38.0	D	31.1	C	49.2	D	58.9	E	66.4	E
	Overall	**52.6**	**D**	**54.8**	**D**	**65.8**	**E**	**65.6**	**E**	**71.3**	**E**
Oak Grove Avenue @ Blackburn Street	NBR*	17.9	C	18.6	C	59.3	F	19.9	C	73.4	F
Oak Grove Avenue @ Cityplace West Boulevard	NB*	8.1	A	8.2	A	15.1	C	8.3	A	15.7	C
	EB*	8.7	A	8.8	A	11.4	B	8.9	A	11.7	B
	WB*	8.7	A	8.8	A	12.7	B	8.9	A	13.1	B
	SB*	8.9	A	9.0	A	11.4	B	9.1	A	11.8	B
	Overall	**8.7**	**A**	**8.8**	**A**	**13.1**	**B**	**8.9**	**A**	**13.5**	**B**
Oak Grove Avenue @ Lemmon Avenue East	NB*	16.7	C	15.2	C	15.5	C	15.7	C	16.1	C
	SB*	14.4	B	17.9	C	25.1	D	19.0	C	26.6	D
Oak Grove Avenue @ Lemmon Avenue	NB*	25.3	D	25.9	D	26.2	D	34.3	D	34.3	D
	EBL	8.3	A	8.4	A	8.4	A	8.4	A	8.4	A
	SB*	28.2	D	29.7	D	31.0	D	43.0	E	43.0	E
Oak Grove Avenue @ Drive 1	WB*	-	-	-	-	12.9	B	-	-	13.0	B
	SBL	-	-	-	-	7.5	A	-	-	7.5	A
Howell Street @ Drive 2	NBL	-	-	-	-	14.7	B	-	-	7.6	A
	WB*	-	-	-	-	7.5	A	-	-	14.9	B
US 75 SBFR @ Cityplace West Boulevard	EBR*	16.3	C	16.8	C	114.1	F	17.9	C	136.6	F

Signalized | Unsignalized

* Stop-Controlled Approach

\- No movements in Time Period

& Movement only present in 2-Way McKinney Avenue Operation

C. 2018 Existing Traffic Operations

The analysis of the 2018 existing traffic operations shows that the signalized study intersections operate with moderate delay in both peak hours. Both the intersections of McKinney Avenue with the Lemmon Avenues (Lemmon Avenue and Lemmon Avenue East) operate at LOS B during both peak hours. From a vehicular perspective, these intersections function optimally. The imminent conversion of McKinney Avenue from one-way northbound traffic to two-way traffic is not primarily intended to improve vehicular traffic performance. The two-way conversion is intended to improve pedestrian and bicyclist conditions. The 2026 scenarios are analyzed with the two-way conversion already in place.

The intersection of the US 75 frontage roads with Lemmon Avenue operates with a moderate amount of delay. The southbound frontage road intersection operates at LOS C and D during the AM peak and PM peak, respectively, and its northbound counterpart operates at LOS D and C during the same hours. The intersections of the frontage roads with Blackburn Street (also known as Haskell Avenue east of US 75) also operate with a moderate amount of delay. The intersection of Blackburn Street and the southbound frontage road operates at LOS E during the AM peak and at LOS D during the PM peak. The northbound intersection operates at LOS D during both peak hours.

These levels of service are very typical for the magnitude of density surrounding the study area. In the given urban setting, there are not always other routes to take to avoid frontage road interchanges, and the high delays that are sometimes experienced at these intersections are a function of the described lack of alternate routes and the sheer volume of traffic that an urban setting generates. It is generally understood that a healthy, thriving city will need to have traffic to support its business and retail activities, and this area of Dallas is a good example of such a situation.

Of the unsignalized study intersections, all but two approaches operate at LOS C or better during both peak hours. At the intersection of Oak Grove Avenue and Lemmon Avenue, both the north- and southbound approaches operate at LOS D during the PM peak hour. Given the arterial-level volumes present on Lemmon Avenue, LOS D is in the expected range of service.

Every other unsignalized approach or movement at the study intersections operates at LOS C or better, which, in the urban setting of the project, is very favorable.

D. 2021 Background Traffic Operations

The signalized study intersections generally experience more delay with three years of background growth added to the network, but with the retiming of the intersections of the US 75 frontage roads with Blackburn Street and Lemmon Avenue there are some delay reductions. There is one increase in level of service. During the PM peak hour, the intersection of the US 75 southbound frontage road and Blackburn Street changes from

LOS D to E, which is expected for the intersection of a principal City arterial and a major frontage road. Each of the other signalized intersections operates at LOS D or better.

The unsignalized intersections experience additional delays at the study approaches, but every approach continues to operate at LOS C or better after the addition of background traffic growth.

E. 2021 Background Plus Site-Generated Traffic Operations

The addition of the site-generated traffic to the 2021 background traffic results in some additional delay at the existing signalized intersections, and there is one change in level of service. The intersection of the US 75 northbound frontage road and Blackburn Street/Haskell Avenue changes from LOS D to E during the AM peak. All of the signalized intersections operate at LOS E or better, which is appropriate for an urban setting close to a major state highway.

The unsignalized intersections also experience some additional delay after the site-generated traffic is dispersed about the roadway network. During the AM peak hour, all unsignalized approaches to the study intersections operate at LOS C or better.

The northbound right-turning movement from Oak Grove Avenue to Blackburn Street changes from LOS C to F during the PM peak hour. The average delay per northbound vehicle is calculated to be 59.3 seconds, which is half the traffic cycle length of the adjacent intersection of Blackburn Street and the US 75 southbound frontage road. Therefore, the level of service of F experienced for this movement indicates that the turning vehicles must wait for the adjacent signal to open up space for them to turn rather than implying that the movement lacks the ability to successfully provide access leaving the site. However, if users find the delay at this approach is unacceptable, they can reroute themselves to use a less straightforward path and access Blackburn Street by McKinney Avenue.

During the PM peak hour, the southbound approach to the intersection of Oak Grove Avenue and Lemmon Avenue East changes from LOS C to D, which is typical for an unsignalized approach to a City arterial as both start to reach their intended volumes.

The eastbound approach to the intersection of Cityplace West Boulevard and the US 75 southbound frontage road changes from LOS C to F during the same peak hour. Cityplace West Boulevard provides a very convenient access point to the US 75 southbound frontage road. Users can avoid driving through the Blackburn Street interchange, can access the Lemmon Avenue Texas U-Turn, and can avoid making an unsignalized left onto Lemmon Avenue. Therefore, it is likely that even though the predicted delays are relatively high for the eastbound right-turning movement, drivers will still be strongly attracted to it. If users do not wish to experience the delay for the

Cityplace West Boulevard approach, they may choose a less straightforward path and use the lower-delay approaches at Oak Grove and Lemmon Avenue East.

All approaches to the site driveways all operate at LOS B or better during both peak hours, providing appropriate access to and from the site.

F. 2026 Background Traffic Operations: Two-Way McKinney Avenue Operation

The analysis of the 2026 Background Traffic operations shows that, when compared to the 2021 background traffic operations, the signalized study intersections experience a few changes in level of service with the addition of five more years of background traffic growth. After McKinney Avenue is converted to two-way operation, the McKinney Avenue intersection with Lemmon Avenue East operates at LOS C during the AM peak and at LOS D during the PM peak. The intersection of McKinney Avenue with Lemmon Avenue operates at LOS B and LOS C during the AM and PM peaks, respectively, after the conversion has taken place. The intersection of the US 75 northbound frontage road and Blackburn Street/Haskell Avenue changes from LOS D to E during both peak hours. All of the signalized intersections continue to operate at LOS E or better during both peak hours.

The unsignalized intersections experience additional delays at the study approaches, and every approach operates at LOS C or better after the addition of background traffic growth with two exceptions. The north- and southbound approaches to the intersection of Oak Grove Avenue and Lemmon Avenue change to LOS D and LOS E, respectively, during the PM peak hour, which is within the range of acceptable conditions for the urbanized setting of the development.

G. 2026 Background Plus Site-Generated Traffic Operations: Two-Way McKinney Avenue Operation

The addition of the site-generated traffic to the 2026 background traffic results in some additional delay at the signalized study intersections, and there is only one change in level of service. The intersection of McKinney Avenue and Lemmon Avenue changes from LOS C to D during the PM peak hour.

Each signalized intersection operates at LOS E or better after the addition of site-generated traffic at buildout.

With site traffic, the unsignalized intersections experience additional delays at the study approaches. There are three changes in level of service. The southbound approach to the intersection of Oak Grove Avenue and Lemmon Avenue East changes from LOS C to D during the PM peak hour. The northbound right-turning movement of Oak Grove Avenue at Blackburn Street changes from LOS C to F during the PM peak hour. As previously mentioned, if the queue from the intersection of Blackburn Street and the

US 75 southbound frontage road blocks this turning movement, users can choose to reroute themselves to access Blackburn Street via McKinney Avenue.

The westbound right-turning movement of Cityplace West Boulevard and the US 75 southbound frontage roads also changes from LOS C to F during the PM peak hour. Due to the prime placement of Cityplace West Boulevard, as mentioned before, it is unlikely that the relatively high delays will deter users from trying to access the US 75 southbound frontage road via this movement. However, if they do choose to alter their route, they have multiple paths they can choose with low associated delays that are less straightforward.

All approaches to the site driveways operate favorably at LOS B or better during both peak hours at buildout.

H. Link Volume Analysis

The link capacity analysis examines the operating conditions of roadway links rather than intersections, using the daily volumes passing a fixed point. The operating condition is defined by the ratio of link volume to link capacity, or V/C. The V/C of the different roadway links that would be impacted by the proposed development's traffic was calculated for the 2018 existing traffic, 2021 background and background plus site traffic, and 2026 background and background plus site traffic scenarios. The daily link capacity for each roadway is taken from the NCTCOG model capacity volumes assuming the urban residential area type. Lemmon Avenue and Lemmon Avenue East, as a one-way principal arterial couplet, have a capacity of 85 vehicles per lane per hour (vphpl). Oak Grove Avenue, as an undivided collector street, has a capacity of 475 vehicles per lane per hour (vphpl).

The link analyses, displayed below in **Table 4**, show that Lemmon Avenue currently operates at LOS D. Lemmon Avenue was modelled with four travel lanes, which it has for most of the stretch between McKinney Avenue and US 75. The only exception to the lane count is at the intersection of Lemmon Avenue and Oak Grove where the number of lanes temporarily drops to three before returning to four at the intersection of Lemmon Avenue and the US 75 southbound frontage road. During the 2021 background, 2021 background plus site, and 2026 background scenarios, the roadway continues to operate at LOS D. With the addition of site generated traffic to the 2026 background traffic, the roadway volume increases by 1% and changes the level of service to LOS E. These levels of service generally correspond to the conditions experienced by road users today. Lemmon Avenue has not been identified by the City as needing immediate capacity increases and is not projected to need any with the proposed site traffic.

Lemmon Avenue East, which has four full travel lanes running the whole way between the US 75 southbound frontage road and McKinney Avenue, currently operates at LOS C and continues to do so through the 2021 background scenario. When site traffic is

added to the 2021 volumes, the level of service changes to D. Through both the 2026 background and 2026 background plus site scenarios, the roadway continues to operate at LOS D, with more than a quarter of its potential capacity remaining through the 2026 background plus site scenario.

Oak Grove Avenue operates at LOS A/B with current traffic, and continues to do so during both the 2021 and 2026 background scenarios. Once site traffic is applied to the network, the roadway link changes from LOS A/B to C in both the 2021 and 2026 background plus site scenarios. At site buildout, the roadway link is left with more than half of its total capacity unused.

The site as proposed does not have a significant negative impact on the link capacities of the study roadways.

Table 4 – Link Operational Results

Roadway Link		2018 Existing			2021 Background					2021 Site-Generated		2021 Background+Site		
From	To	Volume	V/C Ratio	LOS	Volume	Daily Volume	Volume	V/C Ratio	LOS	Assignment	Daily Volume	Volume	V/C Ratio	LOS
Lemmon Avenue														
McKinney Avenue	**US 75 SBFR**	24,131	0.71	D	NEC Haskell Site 5.0%	809	25,671	0.76	D	5.0%	405	26,076	0.77	D
Volume Limit 4 Lanes = 34,000							1% growth for 3 years							
Lemmon Avenue East														
US 75 SBFR	**McKinney Avenue**	20,928	0.62	C	NEC Haskell Site 2.5%	404	21,966	0.65	C	17.5%	1,418	23,384	0.69	D
Volume Limit 4 Lanes = 34,000							1% growth for 3 years							
Oak Grove Avenue														
Lemmon Avenue	**Lemmon Avenue East**	1,289	0.14	A/B	NEC Haskell Site 0.0%	0	1,328	0.14	A/B	37.5%	3,038	4,366	0.46	C
Volume Limit 2 Lanes = 9,500							1% growth for 3 years							

Roadway Link			2026 Background					2026 Site-Generated		2026 Background+Site		
From	To		Volume	Daily Volume	Volume	V/C Ratio	LOS	Assignment	Daily Volume	Volume	V/C Ratio	LOS
Lemmon Avenue												
McKinney Avenue	**US 75 SBFR**		NEC Haskell Site 5.0%	809	26,902	0.79	D	5.0%	405	27,307	0.80	E
Volume Limit 4 Lanes = 34,000					1% growth for 5 additional years							
Lemmon Avenue East												
US 75 SBFR	**McKinney Avenue**		NEC Haskell Site 2.5%	404	23,034	0.68	D	17.5%	1,418	24,452	0.72	D
Volume Limit 4 Lanes = 34,000					1% growth for 5 additional years							
Oak Grove Avenue												
Lemmon Avenue	**Lemmon Avenue East**		NEC Haskell Site 0.0%	0	1,394	0.15	A/B	37.5%	3,038	4,432	0.47	C
Volume Limit 2 Lanes = 9,500					1% growth for 5 additional years							

Volume Limit Based on NCTCOG DFWRTM Hourly Capacity Per Lane

V. CONCLUSIONS AND RECOMMENDATIONS

Based on the analysis presented in this report, the changing of allowable FAR for PD 375 1B, which is located at the northeast corner of the intersection of Lemmon Avenue East and Oak Grove Avenue in Dallas, Texas, can be successfully incorporated into the surrounding roadway network. The proposed site driveways provide the appropriate level of access for the development. The site-generated traffic does not significantly affect the existing vehicle traffic operations. No improvements to the external roadway network are recommended for the site.

Kimley»Horn

APPENDIX A

A. Roadway Characteristics

The following signalized intersections were evaluated as part of this study.

- Lemmon Avenue at McKinney Avenue
- Lemmon Avenue East at McKinney Avenue
- Lemmon Avenue at US 75 Northbound Frontage Road (NBFR)
- Lemmon Avenue at US 75 Southbound Frontage Road (SBFR)
- Blackburn Street at US 75 NBFR
- Blackburn Street at US 75 SBFR

The following unsignalized intersections were evaluated as part of this study:

- Blackburn Street at Oak Grove Avenue
- Cityplace West Boulevard at Oak Grove Avenue
- Lemmon Avenue at Oak Grove Avenue
- Lemmon Avenue East at Oak Grove Avenue

Lemmon Avenue (and Lemmon Avenue East) – is a six-lane divided road that runs southeast-northwest throughout north and east Dallas. Approximately 250 feet from the intersection of Lemmon Avenue and the US 75 SBFR, Lemmon Avenue splits into a one-way couplet. The northeastern road becomes Lemmon Avenue East and runs northwestbound. The southwestern portion of the road continues to be called Lemmon Avenue and runs southeastbound. As a couplet, the street is still considered a six-lane divided roadway (albeit widely divided). In the project vicinity, both Lemmon Avenue and Lemmon Avenue East have intersections with the US 75 frontage roads, Oak Grove Avenue, McKinney Avenue, other local streets, and various commercial driveways. On the City of Dallas Thoroughfare Plan, Lemmon Avenue is classified as a Principal Arterial (EXST CPLT). The speed limit near the site is posted at 35 mph.

Oak Grove Avenue – is a two-lane undivided road that runs northeast-southwest in the project area. In the project vicinity, Oak Grove Avenue has intersections with Blackburn Street, Cityplace West Boulevard, Lemmon Avenue East, Lemmon Avenue, other local streets, and various residential and commercial driveways. On the City of Dallas Thoroughfare Plan, Oak Grove Avenue is not classified. The speed limit near the site is not posted, so by default it is 30 mph.

Blackburn Street – is a four-lane divided road that runs southeast-northwest throughout north and east Dallas. In the project vicinity, Blackburn Street has intersections with the US 75 frontage roads, Oak Grove Avenue, McKinney Avenue, other local streets, and various commercial driveways. On the City of Dallas Thoroughfare Plan, Lemmon Avenue is classified as a Community Collector (S-4-D). The speed limit near the site is posted at 30 mph.

Cityplace West Boulevard – is a two-lane undivided road that runs southeast-northwest in the project area. In the project vicinity, Cityplace West Boulevard has intersections with the US 75 frontage roads, Howell Street, Oak Grove Avenue, McKinney Avenue, and various residential and commercial driveways. The McKinney Avenue Trolley runs along Cityplace Boulevard before turning onto McKinney Avenue. On the City of Dallas Thoroughfare Plan, Cityplace West Boulevard is not classified. The speed limit near the site is not posted, so by default it is 30 mph.

Howell Street – is a two-lane undivided road that runs northeast-southwest in the project area. In the project vicinity, Howell Street has intersections with Cityplace West Boulevard, Lemmon Avenue East, and various commercial driveways. On the City of Dallas Thoroughfare Plan, Howell Street is not classified. The speed limit near the site is not posted, so by default it is 30 mph.

US 75 Frontage Roads – are variable-lane frontage roads that service US 75 throughout Dallas. In the project vicinity, the US 75 frontage roads have intersections with Blackburn Street, Lemmon Avenue, and Cityplace West Boulevard. There is an exit ramp from US 75 to the US 75 SBFR north of Blackburn Street and an entrance ramp just south of Blackburn Street. From the US 75 NBFR to US 75, there is an exit ramp just south of Blackburn Street and an entrance ramp just north of Blackburn Street. The speed limit near the site is 35 mph.

Exhibit 3 illustrates the existing intersection geometry used for the traffic analysis.

APPENDIX B

A. Analysis Methodology

Capacity analysis results are listed in terms of Level of Service (LOS). LOS is a qualitative term describing operating conditions a driver will experience while traveling on a particular street or highway during a specific time interval. It ranges from A (very little delay) to F (long delays and congestion). **Table 5** shows the definition of level of service for signalized and unsignalized intersections.

Table 5 – Level of Service Definitions

Level of Service	Signalized Intersection Average Total Delay (sec/veh)	Unsignalized Intersection Average Total Delay (sec/veh)
A	≤10	≤10
B	>10 and ≤20	>10 and ≤15
C	>20 and ≤35	>15 and ≤25
D	>35 and ≤55	>25 and ≤35
E	>55 and ≤80	>35 and ≤50
F	>80	>50

Definitions provided from the Highway Capacity Manual, Special Report 209, Transportation Research Board, 2010.

Study area intersections were analyzed based on average total delay analysis for signalized and unsignalized intersections. For the unsignalized analysis, the level of service (LOS) for a two-way stop-controlled intersection is defined for each movement. Unlike signalized intersections which define LOS for each approach and for the intersection as a whole, LOS for two-way stop-controlled intersections is not defined as a whole.

Signal timings for the signalized intersections are based off of Dallas "As Fine-Tuned" Synchro files. Timing adjustments were made in the future scenarios to accommodate changes in traffic volumes due to background growth and site traffic, replicating how City staff will periodically review signal operations in the future.

Calculations for the level of service at the key intersections identified for study are provided in the **Volume 2** of this report. The analyses assumed the lane geometry and intersection control shown in **Exhibit 3**.