

**TRAFFIC IMPACT ANALYSIS FOR
CONCORDIA RESIDENTIAL DEVELOPMENT
KELLER, TEXAS**

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EXECUTIVE SUMMARY

This traffic study was conducted to analyze the potential traffic impacts of the proposed Concordia residential development, which will be located on 23.3 acres on the north side of North Tarrant Parkway between Willis Lane and Rufe Snow Drive in Keller, Texas. The Concordia residential development is planned to be completed in 2020 and will include 66 single-family homes. This proposed residential development is predicted to generate 710 trips on a daily basis with 52 trips during the AM peak hour and 69 trips during the PM peak hour. Access to the residential development will be provided by the main access location on North Tarrant Parkway at an existing median opening between Willis Lane and Rufe Snow Drive and by a connection to Vasey Oak Drive, located in the Chase Oaks residential subdivision immediately north of the proposed development.

As a result of the proposed residential development, the zoning would need to be changed from the existing “Retail” zoning to “SF-8.4” (single family residential – 8,400 square foot lots). If this land were developed under “Retail” zoning, it is estimated that retail land uses would generate a total of 7,474 new daily trips. This is significantly more than the 710 daily trips estimated to be generated by the proposed residential development.

Based on discussions with City staff, the following existing intersections were identified to be included as part of this study effort:

- Willis Lane at North Tarrant Parkway
- Median Opening (serving new development) at North Tarrant Parkway
- Rufe Snow Drive at North Tarrant Parkway
- Chase Oaks Drive at Rufe Snow Drive

Additionally, capacity analysis was identified to be performed for the study area roadway links and intersections during the weekday AM and PM peak hours under Existing (2018) and Buildout Year (2020) conditions.

Capacity Analysis

The roadway section of North Tarrant Parkway on both sides of the median opening currently operate at acceptable levels of service and are predicted to continue to operate at acceptable levels of service with the addition of site generated traffic. For each section, the levels of service remain the same under the same peak hour across all scenarios.

The signalized intersections on North Tarrant Parkway at Willis Lane and at Rufe Snow Drive currently operate and are predicted to continue operating at the same, acceptable levels of service under Buildout Year (2020) Background and Total conditions.

At the Chase Oaks Drive and Rufe Snow Drive unsignalized intersection, the approaches and movements currently operate at levels of service C or better. All approaches and movements

are predicted to continue operating at these same levels of service under Buildout Year (2020) Background and Total conditions, except the westbound approach, which is predicted to operate at LOS D during the PM peak hour under future (Background and Total) conditions.

At the North Tarrant Parkway and Concordia Roadway unsignalized intersection, the northbound approach, serving the existing apartment complex, currently operates at LOS D during the AM and PM peak hours. This approach is predicted to degrade to levels below LOS D under Buildout Year (2020) Background conditions and is predicted to remain at these same levels of service with traffic generated by the proposed development under Buildout Year (2020) Total conditions. The new southbound approach at this intersection, serving the proposed Concordia residential development, is predicted to operate at levels of service below D (AM peak hour) and E (PM peak hour) under Buildout Year (2020) Total conditions. However, at this location:

- The approaches typically have low volume-to-capacity ratios of approximately 0.25
- The traffic volumes on these approaches during the peak hours are typically approximately 30 vehicles or less, with only half of these being left turn movements.
- If motorists used the median as part of performing a two-stage left turn maneuver, which was not assumed in this analysis, delays for the northbound and southbound approaches are predicted to be reduced by approximately 20-35%.

A potential mitigation measure would be to signalize this intersection. However, the traffic volumes on the side streets are not close to meeting traffic signal warrants. Therefore, signalizing this intersection is not a viable alternative.

A mitigating measure for the southbound approach that is being provided as part of the residential development is having separate lanes for southbound left turns and right turns exiting the site on the Concordia Roadway. By providing separate lanes, this reduces the overall delay for the southbound approach. As a single lane, the southbound approach would experience higher delays than shown in the report.

An additional potential mitigating measure for the Concordia Roadway intersection would be to implement coordinated signal timings on North Tarrant Parkway at the Willis Lane and Rufe Snow Drive intersections. This would provide a consistent arrival pattern of east-west North Tarrant Parkway traffic at the Concordia Road intersection and is predicted to result in the side street approaches at this intersection operating at acceptable levels of service. Since signal timing coordination is typically regional in nature, any coordinated timings would be implemented by the City.

All intersections and existing approaches at the study intersections are predicted to operate at the same level of service under Buildout Year (2020) Total conditions, with site traffic included, as they are predicted to operate under Buildout Year (2020) Background conditions, without site traffic included. That is, if an approach is predicted to operate at

LOS D under Buildout Year (2020) Background conditions, it will remain operating at the same LOS D under Buildout Year (2020) Total conditions. The additional traffic generated by the Concordia Residential Development is not predicted to decrease the level of service at Buildout.

Access Management Analysis

An eastbound left turn lane will be provided on North Tarrant Parkway to serve the Concordia Residential Development at the existing median opening, as required by the City of Keller.

The right turn volumes at the proposed access roadway on North Tarrant Parkway into the Concordia Residential Development are not predicted to exceed the threshold for a right turn deceleration lane during either the weekday AM or PM peak hours. A westbound right turn deceleration lane on North Tarrant Parkway is not recommended at the proposed roadway.

The proposed residential roadway is predicted to meet the City's minimum spacing guidelines between adjacent driveways and adjacent streets.

Adequate sight distance is predicted to be provided for the proposed residential roadway on North Tarrant Parkway.

I. INTRODUCTION

A. Purpose

This traffic study was conducted to analyze the potential traffic impacts of the proposed Concordia residential development which will be located on the north side of North Tarrant Parkway between Willis Lane and Rufe Snow Drive in Keller, Texas.

B. Methodology

The following elements were included in this study:

Data Collection

- Collected weekday AM and PM peak period turning movement volumes at the study intersections on Tuesday, January 16th, 2018.
- Obtained the proposed site plan, information related to planned roadway improvements, and other relevant information.

Traffic Analysis

- Assessed the general accessibility of the site.
- Estimated the number of trips that will be generated by the proposed development.
- Estimated the directional distribution of traffic approaching/departing the proposed development.
- Assigned the estimated traffic to the street network.
- Performed capacity analyses for the critical intersections and roadway segments within the study area. Analyses assumed the following year assignments:
 - Existing Year (2018)
 - Buildout Year (2020)

Recommendations

- Determined if any roadway improvements are needed to accommodate projected traffic generated by the proposed development.

Documentation

- Prepared a report documenting the study procedures and results.

II. EXISTING AND PROPOSED LAND USE

A. *Site Location/Study Area*

The proposed Concordia residential development will be located on the north side of North Tarrant Parkway between Willis Lane and Rufe Snow Drive in Keller, Texas. A vicinity map of the study area is shown in **Figure 1** and a site plan for this facility is shown in **Figure 2**.

Single-family houses are located west of the proposed property and the Chase Oaks residential subdivision is located to the north. The Northwood Church complex is located east of the proposed property.

B. *Existing Zoning*

The City of Keller Zoning Map (last updated September 2015) identifies the subject site as “Retail.”

C. *Existing Development*

The subject site is currently undeveloped.

D. *Proposed Zoning*

The proposed zoning is “SF-8.4” (single family residential - 8,400 square foot lots). The proposed development will consist of 66 single-family homes with an average lot size of 65 feet by 130 feet (8,450 square feet).

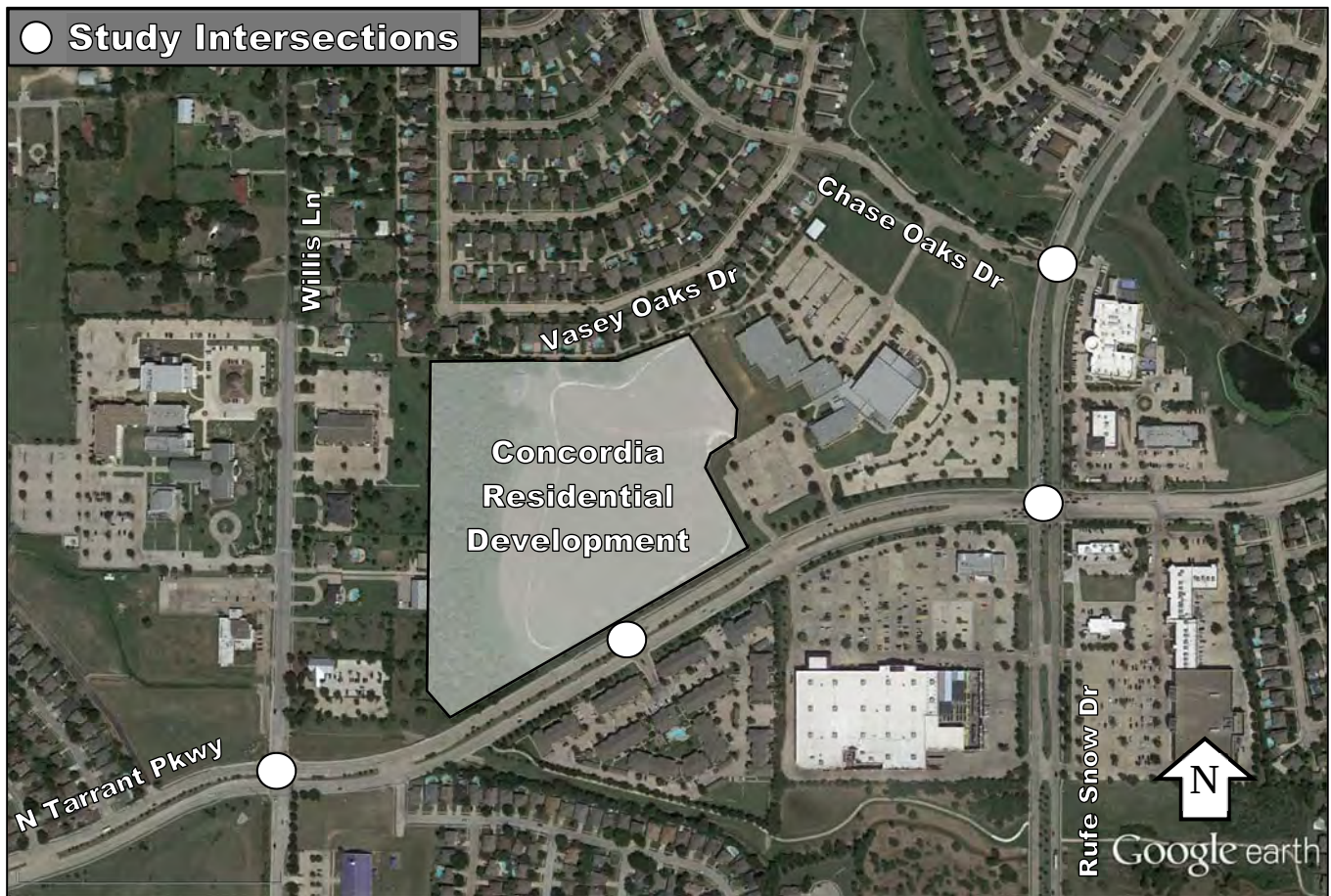


Figure 1: Vicinity Map of the Study Area

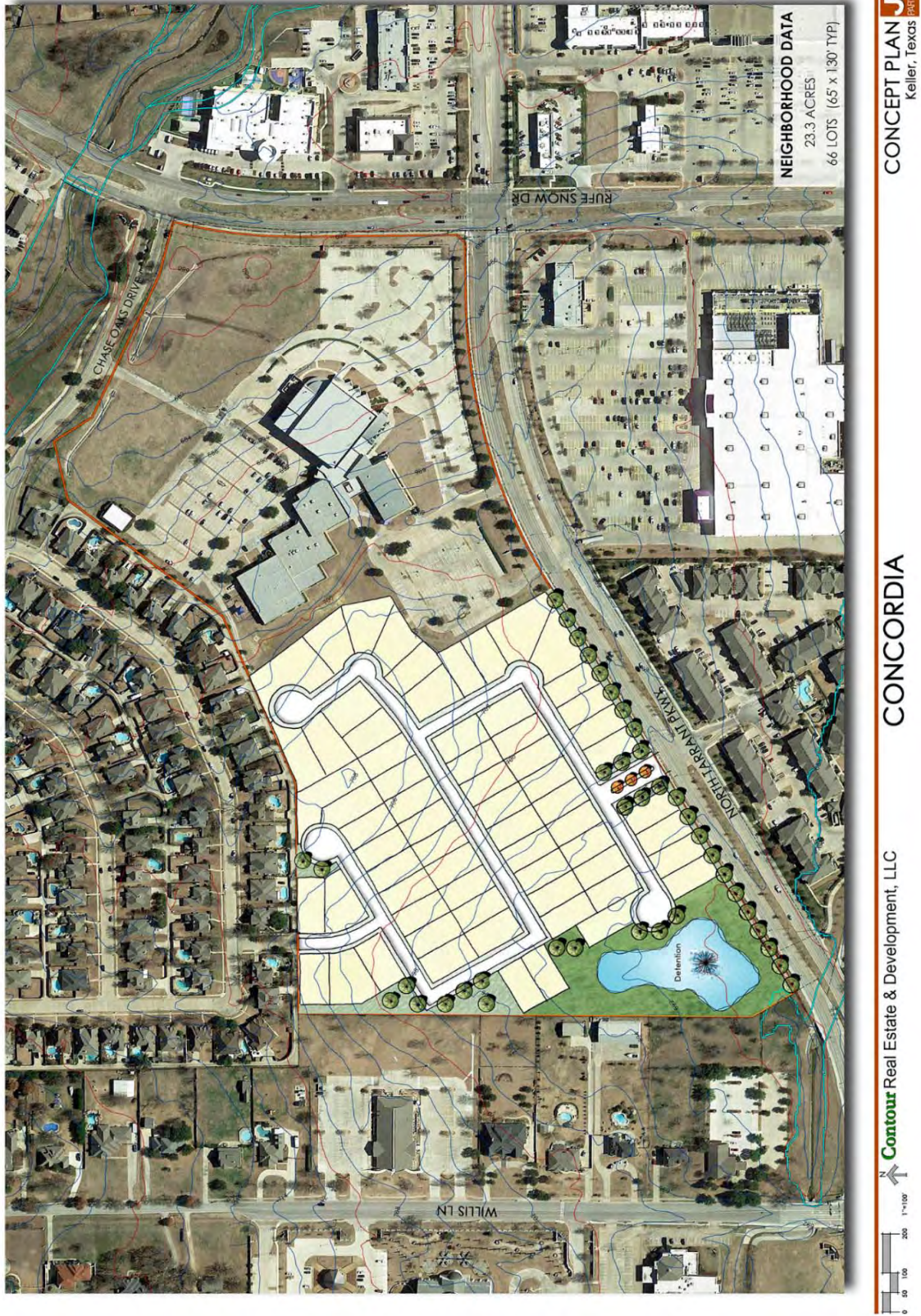


Figure 2: Proposed Site Plan

III. EXISTING AND PROPOSED TRANSPORTATION SYSTEM

A. *Thoroughfare System*

Access to the Concordia residential development will be provided by:

- One full access location at an existing median opening on North Tarrant Parkway.
- A connection to Rufe Snow Drive via existing residential streets, White Oak Trail and Vasey Oak Drive.

A description of the study area roadways includes:

North Tarrant Parkway – North Tarrant Parkway is south of the proposed development and is a six-lane divided roadway through the study area. The posted speed limit is 40 mph (miles per hour) to the west of Rufe Snow Drive and 35 mph to the east. North Tarrant Parkway is designated as a six-lane divided arterial (A6D) in the 2012 City of Keller Comprehensive Thoroughfare Plan. North Tarrant Parkway is at its ultimate configuration.

Rufe Snow Drive – Rufe Snow Drive is east of the proposed development and is a four-lane divided roadway through the study area. The posted speed limit is 40 mph. Rufe Snow Drive is designated as a six-lane divided arterial (A6D) in the City of Keller Comprehensive Thoroughfare Plan.

Willis Lane – Willis Lane is west of the proposed development and is a two-lane undivided roadway through the study area approximately 1,500 feet north of North Tarrant Parkway. From North Tarrant Parkway to approximately 1,500 feet north of North Tarrant Parkway, Willis Lane has two southbound lanes, a center two-way left turn lane and one northbound lane. The posted speed limit is 30 mph. Willis Lane is designated as a two-lane collector (C2U) in the City of Keller Comprehensive Thoroughfare Plan. Willis Lane is at its ultimate configuration.

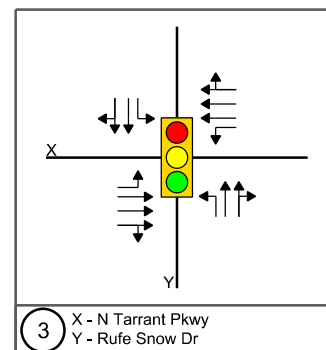
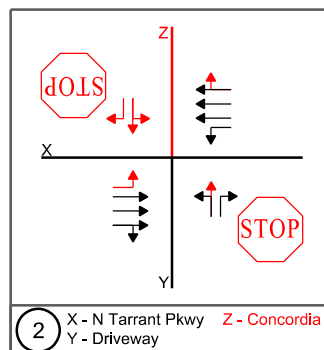
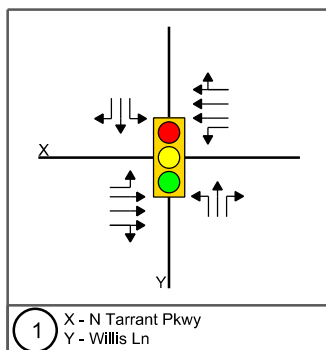
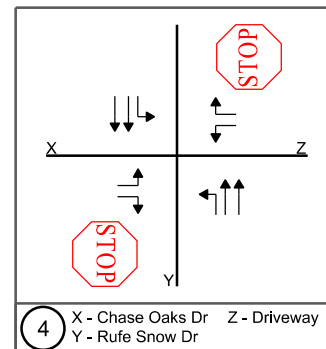
No other roadways in the study area are designated in the City of Keller Comprehensive Thoroughfare Plan.

The existing and proposed lane configurations and traffic control for the roadways and the study area intersections are provided in **Figure 3**.



Legend

- # - Study Intersection
- SPEED LIMIT
- Speed Limit on Road
- Turning Movements



Proposed approach and movements shown in red.



B. Existing Traffic Volumes

AM and PM peak hour turning movement volumes were collected at the existing study intersections from 6:30-8:30 AM and 4:30-6:30 PM on Tuesday, January 16, 2018. **Figure 4** shows the existing AM and PM peak hour intersection turning movement volumes. The raw traffic count data is provided in the Appendix.

C. Projected Traffic Volumes

Historical 24-hour traffic volumes near the proposed development were obtained from City of Keller traffic count maps and are presented in **Table 1**. Note that because there were no counts performed during 2015, it was assumed that 2015 volumes were equal to the average of the respective volumes for 2014 and 2016. This assumption enabled the estimation of annual linear growth rates for each period.

Table 1: City of Keller Historical Daily Traffic Counts – Intersection Approaches

Year	46 RUFE SNOW DR NORTH OF N TARRANT PKWY	47 N TARRANT PKWY EAST OF RUFE SNOW DR	48 RUFE SNOW DR SOUTH OF N TARRANT PKWY	49 N TARRANT PKWY WEST OF RUFE SNOW DR
2012	8,915	8,814	10,462	9,925
2013	8,259	11,271	8,911	11,787
2014	10,234	12,205	10,935	11,844
2015	9,676	13,185	10,130	11,394
2016	9,118	14,165	9,325	10,944
Average Growth	1%	13%	-2%	3%

The traffic volumes in Table 1 show that traffic near the study area has fluctuated over the previous five-year period with an average linear growth rate of 4%. These growth rates were determined using counts of exiting traffic at the four intersection legs of Rufe Snow Drive at North Tarrant Parkway. Because the highest average growth rate occurs on the east leg of the intersection, which leads away from the rest of the study area intersections, it is possible that the high average growth (13%) is skewing the overall average.

To represent a conservative analysis, an annual growth rate of four percent (4%) was used for determining traffic conditions in the Buildout Year (2020). To develop background traffic volumes under Buildout Year (2020) conditions, the existing traffic volumes were grown using this average annual rate (4%). The Buildout Year (2020) Background traffic volumes at the study intersections are provided in **Figure 5**.

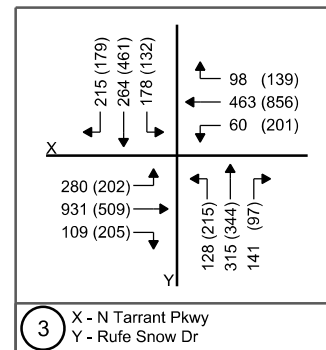
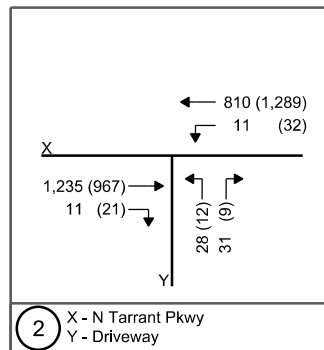
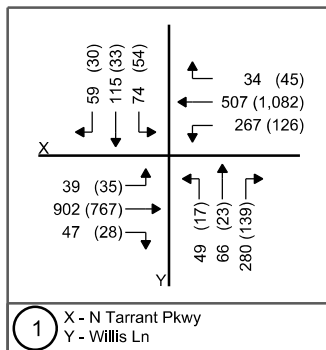
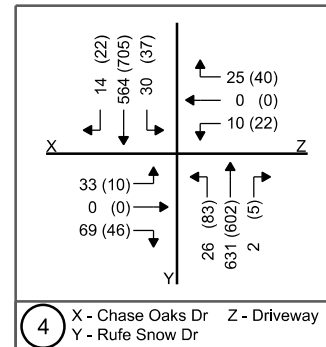


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- Study Intersection

(##) - AM (PM) Peak Hour Volumes



Traffic volume data was collected on Tuesday, January 16, 2018.



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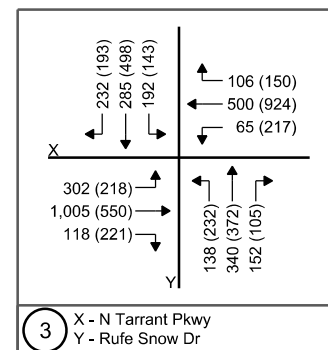
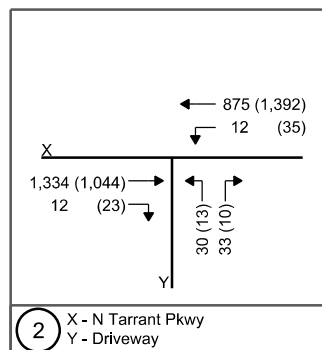
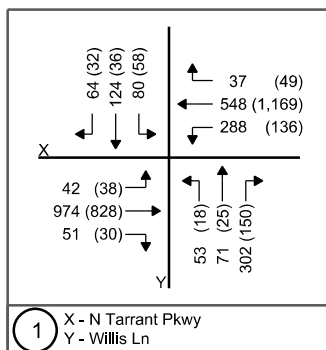
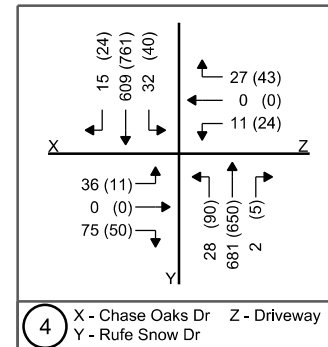


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- Study Intersection

(##) - AM (PM) Peak Hour Volumes



Not to scale

IV. SITE TRAFFIC CHARACTERISTICS

The estimate of the number of trips generated by the proposed residential development is a function of the type and quantity of land use for the development. The number of vehicle trips generated by the proposed development was estimated based on the trip generation rates and equations provided in the publication entitled *Trip Generation Manual, 10th Edition*, by the Institute of Transportation Engineers (ITE).

A. Existing Site Trip Generation

Because the site is currently undeveloped, there is no existing site trip generation. However, trip generation estimates have been made assuming full development and occupancy based on existing zoning (Retail) using a floor to area ratio (FAR) of 0.25 for the 23.3 acre site. Estimates of the number of trips generated by the site made for the AM and PM peak hours, as well as on a daily basis, are shown in **Table 2**.

Table 2: Trip Generation Characteristics for Assumed Commercial Development of Site

Land Use		Rates ¹								
Description	ITE Code	Average Weekday			AM Peak Hour			PM Peak Hour		
Shopping Center	820	Ln(T) = 0.68*Ln(X) + 5.57			T = 0.50(X) + 151.78			Ln(T) = 0.74*Ln(X) + 2.89		
Land Use		Directional Split ²								
Description	ITE Code	Average Weekday			AM Peak Hour			PM Peak Hour		
Shopping Center	820	50 / 50			62 / 38			48 / 52		
Land Use		Number of Trips								
Description	Variable ³	Average Weekday			AM Peak Hour			PM Peak Hour		
		Total	In	Out	Total	In	Out	Total	In	Out
Shopping Center	253.737	11,325	5,663	5,662	279	173	106	1,083	520	563
Pass-by reduction of 34%:		(3,851)	(1,926)	(1,925)	(96)	(59)	(37)	(369)	(177)	(192)
New generated trips:		7,474	3,737	3,737	183	114	69	714	343	371

¹ T = Trips Ends; X = 1,000 square feet gross leasable area

² XX / YY = % entering vehicles / % exiting vehicles

³ 1,000 square feet gross leasable area

B. Proposed Site Trip Generation

The proposed Concordia residential development is planned to consist of 66 single-family homes. Based on discussions with the developer, the Buildout Year of the proposed development will occur in two years (2020). The trip generation characteristics for the proposed development at Buildout are shown in **Table 3**.

Table 3: Trip Generation Characteristics for Proposed Concordia Residential Development

Land Use		Rates ¹								
Description	ITE Code	Average Weekday			AM Peak Hour			PM Peak Hour		
Single-Family Detached Housing	210	Ln(T) = 0.92*Ln(X) + 2.71			T = 0.71(X) + 4.80			Ln(T) = 0.96*Ln(X) + 0.20		
Land Use		Directional Split ²								
Description	ITE Code	Average Weekday			AM Peak Hour			PM Peak Hour		
Single-Family Detached Housing	210	50 / 50			25 / 75			63 / 37		
Land Use		Number of Trips								
Description	Variable ³	Average Weekday			AM Peak Hour			PM Peak Hour		
		Total	In	Out	Total	In	Out	Total	In	Out
Single-Family Detached Housing	66	710	355	355	52	13	39	69	43	26

¹ T = Trips Ends; X = Dwelling Units

² XX / YY = % entering vehicles / % exiting vehicles

³ Dwelling Units

C. Net Change in Trip Generation

Because the site is currently undeveloped, it does not generate trips. Therefore, any development of the site will result in new trips. However, the trips generated by the proposed Concordia residential development are expected to be significantly less than the trips generated by full development and occupancy of the site under Retail zoning.

Table 4: Net Change in Trip Generation

Land Use		Number of Trips								
Description	Variable ³	Average Weekday			AM Peak Hour			PM Peak Hour		
		Total	In	Out	Total	In	Out	Total	In	Out
Single-Family Detached Housing	66	710	355	355	52	13	39	69	43	26
Shopping Center	253.737	7,474	3,737	3,737	183	114	69	714	343	371
Difference:		-6,764	-3,382	-3,382	-131	-101	-30	-645	-300	-345

D. Trip Distribution and Traffic Assignment

The existing traffic volumes and roadways in the area, along with the proposed site layout, were used to estimate the directions from which new site generated trips would approach and depart the proposed residential development. The assumed directional distributions for the AM and PM peak hours are provided in **Figure 6** and **Figure 7**, respectively.

Estimated trips generated by the proposed residential development were assigned to the area roadways and site access points based on the assumed directional distributions. The estimated site generated traffic volumes during the AM and PM peak hours are shown in **Figure 8**.

Total (background + site) peak hour traffic conditions at Buildout Year (2020) were obtained by adding the Buildout Year (2020) Background traffic volumes (Figure 5) to the site generated traffic volumes (Figure 8). These total volumes are shown in **Figure 9**.



Notes

These percentages are based on the existing volume distribution at study area intersections.

Legend

-  - Percentage of New Trips in AM peak hour
-  - Study Intersection



Not to scale



Notes

These percentages are based on the existing volume distribution at study area intersections.

Legend

-  - Percentage of New Trips in PM peak hour
-  - Study Intersection



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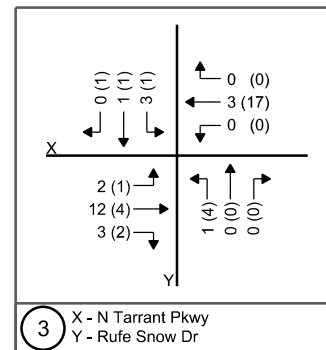
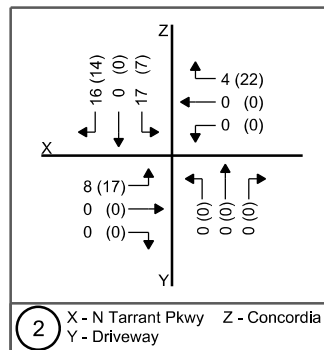
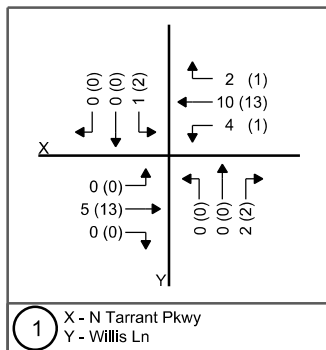
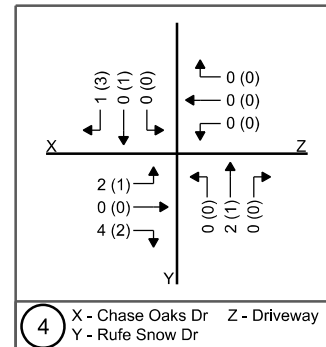


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- Study Intersection

(##) - AM (PM) Peak Hour Volumes



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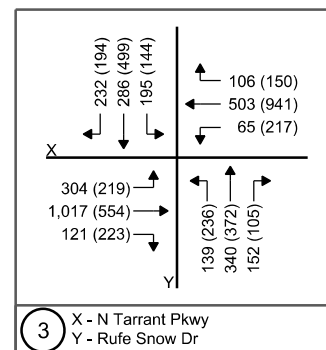
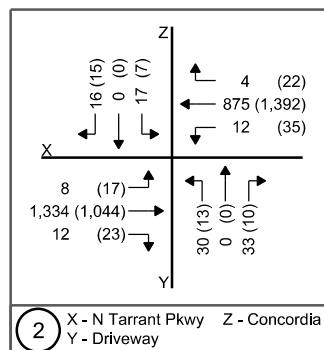
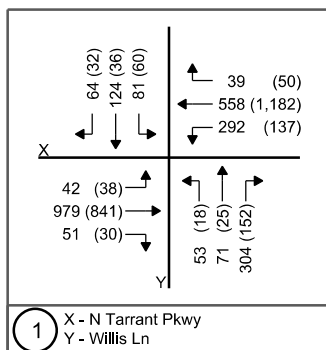
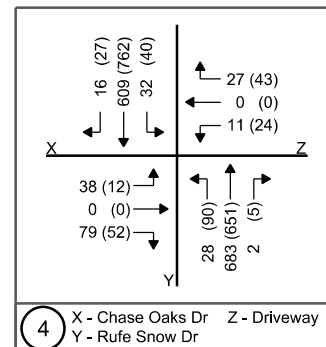


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- Study Intersection

(##) - AM (PM) Peak Hour Volumes



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V. TRAFFIC ANALYSIS

A. Level of Service Evaluations

Roadway Link Capacity Analyses

Roadway capacity is defined as the volume of traffic that a roadway can accommodate based on the road's width, traffic control, parking conditions, and several other factors. Capacity values for divided roadways by area type and functional class are presented in **Table 5**. These values were obtained from the North Central Texas Council of Governments' (NCTCOG) *Dallas-Fort Worth Regional Travel Model* and are used to determine planning level directional hourly capacities on roadway links within the model.

Table 5: NCTCOG Roadway Capacity and LOS Guidelines for Divided or One-way Roads

Area Type	Functional Class						
	Freeway	Principal Arterial	Minor Arterial	Collector	Ramp	Frontage Road	HOV
	Hourly Service Volume Per Lane*						
CBD	2,050	725	725	475	1,250	725	2,050
Fringe	2,125	775	775	500	1,375	775	2,125
Urban Residential	2,150	850	825	525	1,425	850	2,150
Suburban Residential	2,225	925	900	575	1,600	900	2,225
Rural	2,300	1,025	975	600	1,725	975	2,300

* Service volumes at Level of Service E (the model requires LOS E service volumes)

The roadway level of service (LOS) is determined by the volume on the roadway divided by the total roadway capacity. The LOS classifications used within the model are listed below:

- if Volume/Service Volume Ratio is ≤ 0.45 , then LOS = A or B
- if Volume/Service Volume Ratio is > 0.45 and ≤ 0.65 , then LOS = C
- if Volume/Service Volume Ratio is > 0.65 and ≤ 0.80 , then LOS = D
- if Volume/Service Volume Ratio is > 0.80 and ≤ 1.00 , then LOS = E
- if Volume/Service Volume Ratio is > 1.00 , then LOS = F

For this traffic impact study, using the information presented in Table 5, it was assumed that North Tarrant Parkway is a principal arterial in a suburban residential area. Based on that information, the appropriate capacity volumes from Table 5 for roadways in the study area are provided in **Table 6**. Directional Capacity is calculated by multiplying the hourly service volume per lane by the number of lanes in each direction.

Table 6: Roadway Link Capacity for Applicable Configurations

Analysis Period	Config	Area Type	Functional Class	Directional Capacity (C)	Dir	AM Peak Hour			PM Peak Hour		
						Volume (V)	V/C	LOS	Volume (V)	V/C	LOS
North Tarrant Parkway - East of Willis Lane											
Existing (2018)	6D	Suburban Residential	Principal Arterial	2,775	EB	1,257	0.45	C	960	0.35	A/B
					WB	809	0.29	A/B	1,253	0.45	C
Buildout (2020) Background	6D	Suburban Residential	Principal Arterial	2,775	EB	1,357	0.49	C	1,036	0.37	A/B
					WB	874	0.31	A/B	1,354	0.49	C
Buildout (2020) Total	6D	Suburban Residential	Principal Arterial	2,775	EB	1,365	0.49	C	1,053	0.38	A/B
					WB	890	0.32	A/B	1,369	0.49	C
North Tarrant Parkway - West of Rufe Snow Drive											
Existing (2018)	6D	Suburban Residential	Principal Arterial	2,775	EB	1,320	0.48	C	917	0.33	A/B
					WB	806	0.29	A/B	1,251	0.45	C
Buildout (2020) Background	6D	Suburban Residential	Principal Arterial	2,775	EB	1,425	0.51	C	990	0.36	A/B
					WB	870	0.31	A/B	1,350	0.49	C
Buildout (2020) Total	6D	Suburban Residential	Principal Arterial	2,775	EB	1,442	0.52	C	997	0.36	A/B
					WB	874	0.31	A/B	1,372	0.49	C

As shown by the results in Table 6, North Tarrant Parkway currently operates at acceptable levels of service and is predicted to continue to operate at acceptable levels of service with the addition of site generated traffic. For each segment, the levels of service remain the same under the same peak hour across all scenarios.

Intersection Capacity Analyses

The Level of Service (LOS) of an intersection is a qualitative measure of capacity and operating conditions that is directly related to vehicle delay. The LOS criteria for a signalized intersection are shown in **Table 7**. LOS is given a letter designation from A to F, with LOS A representing very short delays (less than 10 seconds of average control delay per vehicle) and LOS F representing very long delays (more than 80 seconds of average control delay per vehicle). Based on City of Keller guidelines, the minimum acceptable level of service is LOS C, ranging from 20.1 to 35 seconds of average control delay per vehicle.

Table 7: Level of Service Criteria for Signalized Intersections

Level-of-Service (LOS)	Average Control Delay (seconds/vehicle)	Description
A	≤ 10.0	Very low vehicle delays, free flow, signal progression extremely favorable, most vehicles arrive during given signal phase.
B	10.1 to 20.0	Good signal progression, more vehicles stop and experience higher delays than for LOS A.
C	20.1 to 35.0	Stable flow, fair signal progression, significant number of vehicles stop at signals.
D	35.1 to 55.0	Congestion noticeable, longer delays and unfavorable signal progression, many vehicles stop at signals.
E	55.1 to 80.0	Limit of acceptable delay, unstable flow, poor signal progression, traffic near roadway capacity, frequent cycle failures.
F	> 80.0	Unacceptable delays, extremely unstable flow and congestion, traffic exceeds roadway capacity, stop-and-go conditions.

SOURCE: *Highway Capacity Manual, HCM 2010*, Transportation Research Board, 2010.

The LOS criteria for an unsignalized intersection are shown in **Table 8**. LOS is given a letter designation from A to F, with LOS A representing very short delays (less than 10 seconds of average control delay per vehicle) and LOS F representing very long delays (more than 50 seconds of average control delay per vehicle). Based on City of Keller guidelines, the minimum acceptable level of service is LOS C, ranging from 15.1 to 25 seconds of average control delay per vehicle.

Table 8: Level of Service Criteria for Unsignalized Intersections

Level-of-Service (LOS)	Average Control Delay (seconds/vehicle)	Description
A	≤ 10.0	No delays at intersections with continuous flow of traffic. Uncongested operations; high frequency of long gaps available for all left and right turning traffic. No observable queues.
B	10.1 to 15.0	No delays at intersections with continuous flow of traffic. Uncongested operations; high frequency of long gaps available for all left and right turning traffic. No observable queues.
C	15.1 to 25.0	Moderate delays at intersections with satisfactory to good traffic flow. Light congestion; infrequent backups on critical approaches.
D	25.1 to 35.0	Increased probability of delays along every approach. Significant congestion on critical approaches, but intersection functional. No standing long lines formed.
E	35.1 to 50.0	Heavy traffic flow condition. Heavy delays probable. No available gaps for cross-street traffic or main street turning traffic. Limit of stable flow.
F	> 50.0	Unstable traffic flow. Heavy congestion. Traffic moves in forced flow condition. Average delays greater than one minute highly probable. Total breakdown.

SOURCE: *Highway Capacity Manual, HCM 2010*, Transportation Research Board, 2010.

Capacity analyses were conducted for the study area intersections under the following traffic condition scenarios:

- Existing Year (2018)
- Buildout Year (2020) Background
- Buildout Year (2020) Total

Additional performance measures such as volume to capacity (v/c) ratios and queue lengths also provide an indication of operations. For example, at two-way stop controlled intersections, main street traffic volumes may impose longer average delays for a small number of side-street vehicles, thus creating vehicle delays which correspond to a poor level of service.

Existing and Background Traffic Conditions

The existing lane configurations shown in Figure 3 and the traffic volumes shown in Figure 4 (Existing) and Figure 5 (Buildout Year Background) were used for the existing and background analyses.

Buildout Year (2020) Total Traffic Conditions

To evaluate the conditions of the study area under Buildout Year (2020) Total traffic conditions, the study area intersections were analyzed in Synchro using the proposed lane configurations shown in Figure 3 and the projected Buildout Year (2020) Total traffic volumes (Figure 9).

Table 9 presents the analysis results for the study intersections under Existing (2018), Buildout Year (2020) Background, and Buildout Year (2020) Total traffic conditions. The red values indicate approaches that currently operate or are predicted to operate at levels of service below City of Keller guidelines (LOS D, E or F).

The analysis results in Table 9 indicate that the signalized intersections on North Tarrant Parkway at Willis Lane and at Rufe Snow Drive currently operate and are predicted to continue operating at acceptable levels of service under Buildout Year (2020) Background and Total conditions. While the intersections operate at acceptable levels of service under all scenarios, the northbound approach during the AM and PM peak hours at the North Tarrant Parkway and Willis Lane intersection currently operates at LOS D and is predicted to continue operating at LOS D under Buildout Year (2020) Background and Total conditions. At the North Tarrant Parkway and Rufe Snow intersection, the southbound approach during the PM peak hour is predicted to operate at LOS D under both Buildout Year (2020) Background and Total conditions. Except for this southbound approach on Rufe Snow Drive at North Tarrant Parkway during the PM peak hour, the levels of service for the signalized intersections and approaches at the signalized intersections remain the same as Existing (2018) conditions under all scenarios evaluated.

At the North Tarrant Parkway and Concordia Roadway unsignalized intersection, the northbound approach, serving the existing apartment complex traffic, currently operates at LOS D during the AM and PM peak hours. This approach is predicted to degrade to LOS F (AM peak hour) and LOS E (PM peak hour) under Buildout Year (2020) Background conditions. These same levels of service are predicted for the northbound approach, serving the existing apartment complex traffic, under Buildout Year (2020) Total conditions.

The new southbound approach at the North Tarrant Parkway and Concordia Roadway unsignalized intersection, which will serve the proposed single family neighborhood, is predicted to operate at LOS D (AM peak hour) and LOS E (PM peak hour) under Buildout Year (2020) Total conditions.

Under Buildout Year (2020) Total conditions, the northbound and southbound approaches at this intersection are predicted to operate at volume-to-capacity levels of approximately 0.25 with only the northbound approach during the AM peak operating at a higher volume-to-capacity (0.52). With the low volumes on each of these approaches (approximately 30 vehicles or less during both peak hours, except the northbound approach during the AM peak hour – 63 vehicles) and volume-to-capacity ratios less than 0.80, the delays are a result of the high traffic volumes on North Tarrant Parkway creating longer average delays for the small number of side-street vehicles, corresponding to a LOS D, E or F. As a result, any new development on the subject property, regardless of use or density, will have the same or worse levels of service.

Table 9: Intersection Capacity Analysis Results

Scenario	AM Peak Hour Delay & LOS					PM Peak Hour Delay & LOS				
	Int.	EB	WB	NB	SB	Int.	EB	WB	NB	SB
1: North Tarrant Parkway & Willis Lane Signalized										
Existing (2018)	28.4 (C) ¹	26.9 (C)	20.7 (C)	46.5 (D)	30.5 (C)	20.3 (C)	18.4 (B)	17.4 (B)	42.8 (D)	31.1 (C)
Buildout (2020) Background	30.8 (C)	29.1 (C)	22.8 (C)	51.3 (D)	31.4 (C)	21.4 (C)	19.2 (B)	18.9 (B)	43.4 (D)	31.2 (C)
Buildout (2020) Total	31.1 (C)	29.3 (C)	23.1 (C)	51.9 (D)	31.4 (C)	21.6 (C)	19.4 (B)	19.1 (B)	43.5 (D)	31.1 (C)
2: North Tarrant Parkway & Concordia Roadway Unsignalized – TWSC										
Existing (2018)	- ²	-*	19.9* (C)	30.6 (D)	-	-	-*	15.6* (C)	25.8 (D)	-
Buildout (2020) Background	-	-*	22.1* (C)	55.5 (F)	-	-	-*	16.8* (C)	39.1 (E)	-
Buildout (2020) Total	-	14.2* (B)	22.1* (C)	62.4 (F)	34.6 (D)	-	22.3* (C)	16.8* (C)	45.5 (E)	39.6 (E)
3: North Tarrant Parkway & Rufe Snow Drive Signalized										
Existing (2018)	23.1 (C)	20.8 (C)	23.5 (C)	25.9 (C)	24.9 (C)	29.5 (C)	27.3 (C)	29.2 (C)	27.4 (C)	34.4 (C)
Buildout (2020) Background	24.8 (C)	22.3 (C)	25.5 (C)	28.2 (C)	26.4 (C)	34.0 (C)	30.6 (C)	33.6 (C)	30.9 (C)	41.0 (D)
Buildout (2020) Total	25.0 (C)	22.5 (C)	25.6 (C)	28.4 (C)	26.6 (C)	34.6 (C)	31.1 (C)	34.4 (C)	31.6 (C)	41.9 (D)
4: Chase Oaks Drive & Rufe Snow Drive Unsignalized – TWSC										
Existing (2018)	-	19.8 (C)	18.1 (C)	9.0* (A)	9.2* (A)	-	18.0 (C)	24.8 (C)	9.8* (A)	9.0* (A)
Buildout (2020) Background	-	23.1 (C)	20.4 (C)	9.2* (A)	9.5* (A)	-	20.6 (C)	30.9 (D)	10.2* (B)	9.2* (A)
Buildout (2020) Total	-	23.5 (C)	20.5 (C)	9.2* (A)	9.5* (A)	-	21.3 (C)	31.3 (D)	10.2* (B)	9.2* (A)

¹ Delay in seconds/vehicle (Level of Service)² HCM methodology does not provide intersection delay for two-way stop-controlled (TWSC) intersections.

*Indicates left turn delay for approach

The analysis at the North Tarrant Parkway and Concordia Roadway unsignalized intersection also did not assume that a northbound or southbound motorist could store in the median when making a left turn (i.e. two-stage gap acceptance), which is common at median openings similar to this. With the approximate 20-foot wide median, it can be assumed that the side-street left turning vehicles would store in the median on North Tarrant Parkway as part of their left turning movement. As seen by the results in **Table 10**, delays for the side-street approaches at this intersection are predicted to be reduced by approximately 20-35% and the level of service is predicted to improve.

Table 10: Intersection Capacity Analysis Results (With Median Storage)

Scenario	AM Peak Hour Delay & LOS					PM Peak Hour Delay & LOS				
	Int.	EB	WB	NB	SB	Int.	EB	WB	NB	SB
2: North Tarrant Parkway & Concordia Roadway						Unsignalized – TWSC				
Buildout (2020) Total	- ¹	14.2* (B) ²	22.1* (C)	49.4 (E)	23.1 (C)	-	22.3* (C)	16.8* (C)	29.1 (D)	32.6 (D)

¹ HCM methodology does not provide intersection delay for two-way stop-controlled (TWSC) intersections.

² Delay in seconds/vehicle (Level of Service)

*Indicates left turn delay for approach

A potential mitigation for the southbound approach at the North Tarrant Parkway and Concordia Roadway intersection would be to signalize this intersection. However, the traffic volumes on the side streets are not close to meeting traffic signal warrants (see the following section). Therefore, signalizing this intersection is not a viable alternative. At minor intersections with major arterials, side street approaches, even with low volumes similar to this scenario, typically have longer delays due to the high traffic volumes on the arterial.

A mitigating measure being provided as part of the residential development is providing separate lanes for southbound left turns and right turns exiting the site on the Concordia Roadway at North Tarrant Parkway. The results in Table 9 for this intersection incorporate this mitigating measure. If this were a single lane approach, the level of service for the southbound approach would degrade to LOS E during the AM peak hour and the delays during the PM peak hour would increase by approximately ten (10) percent, so providing two southbound approach lanes reduces the overall southbound delay when compared to if only a single lane southbound approach were provided.

Under existing conditions, the intersections on North Tarrant Parkway at Willis Lane and Rufe Snow Drive are currently running completely actuated. That is, the signalized intersections are not running at a consistent cycle length so traffic leaving those intersections would arrive randomly at the Concordia Roadway intersection. If coordinated signal timings were installed at the two signalized intersections to provide east-west progression on North Tarrant Parkway, a more consistent stream of east-west traffic would travel through the Concordia Roadway intersection. Therefore, analysis was performed to determine the impact on the Concordia Roadway intersection by providing coordinated signal timings on North Tarrant Parkway. These results are shown in **Table 11**, which indicate that with a uniform, consistent arrival of east-west North Tarrant Parkway traffic at the Concordia Road intersection, the side street approaches at this intersection are predicted to operate at acceptable levels of service.

Table 11: Intersection Capacity Analysis Results (Coordinated Signal System)

Scenario	AM Peak Hour Delay & LOS					PM Peak Hour Delay & LOS				
	Int.	EB	WB	NB	SB	Int.	EB	WB	NB	SB
2: North Tarrant Parkway & Concordia Roadway						Unsignalized – TWSC				
Buildout (2020) Total	- ¹	9.0* (A) ²	9.8* (A)	12.1 (B)	11.7 (B)	-	9.8* (A)	9.4* (A)	12.2 (B)	11.9 (B)

¹ HCM methodology does not provide intersection delay for two-way stop-controlled (TWSC) intersections.

² Delay in seconds/vehicle (Level of Service)

*Indicates left turn delay for approach

At the Chase Oaks Drive and Rufe Snow Drive unsignalized intersection, the approaches and movements currently operate at levels of service C or better. All approaches and movements are predicted to continue operating at these same levels of service under Buildout Year (2020) Background and Total conditions, except the westbound approach, which is predicted to operate at LOS D during the PM peak hour under future (Background and Total) conditions.

In summary, the following approaches are predicted to exceed LOS D (based on results in Table 9):

- Northbound at North Tarrant Parkway & Concordia Roadway under Buildout Year (2020) Background and Total conditions.
- Southbound at North Tarrant Parkway & Concordia Roadway under Buildout Year (2020) Total conditions (PM peak hour only)

All intersections and existing approaches at the study intersections are predicted to operate at the same level of service under Buildout Year (2020) Total conditions, with site traffic included, as they are predicted to operate under Buildout Year (2020) Background conditions, without site traffic included. That is, if an approach is predicted to operate at LOS D under Buildout Year (2020) Background conditions, it will remain operating at the same LOS D under Buildout Year (2020) Total conditions.

B. Traffic Signal Evaluations

A potential mitigation measure for the North Tarrant Parkway & Concordia Roadway intersection is the installation of a traffic signal. While installing a traffic signal would help mitigate the levels of service for the northbound and southbound approach, signal warrants are not predicted to be met, given the low volumes on the minor street (northbound and southbound) approaches.

The higher volume approach on the minor street during the AM peak hour at this intersection (66 northbound vehicles during the AM peak hour) under Buildout Year (2020) Total conditions (Figure 9) does not come close to meeting either Warrant 1 (where 100 vehicles would be required under the 8th-highest hour) or Warrant 2 (where 115 vehicles would be

required under the 4th-highest hour). Based on the peak hour side street volumes not meeting these warranting criteria, it is apparent a traffic signal would not meet warranting volumes.

C. Access Management

As part of this study, access management analyses were performed to consider the need for deceleration lanes and to determine if adequate spacing and intersection sight distance is provided for the proposed site roadway.

Left Turn Deceleration Lane Analysis

The City of Keller *Unified Development Code* (Section 5.08B) states that “Left-turn lanes shall be provided on all approaches to existing or proposed intersections when four or six-lane streets cross. Left-turn lanes shall also be provided for all divided streets where median openings provide access to streets, alleys or driveways, when required by the City.” An eastbound left turn lane on North Tarrant Parkway will be constructed at the Concordia Roadway when the Concordia Residential Development is developed.

Right Turn Deceleration Lane Analysis

The proposed site access roadway on North Tarrant Parkway was analyzed to determine the need for right turn deceleration lanes due to the new development. The City of Keller *Unified Development Code* (Section 5.08C) specifies that “Right-turn/deceleration lanes shall be provided on all approaches at intersections of arterial and collector streets (as shown on the Thoroughfare Plan). Right-turn/deceleration lanes shall also be provided at driveways to all commercial developments of five (5) acres or more (includes overall development with pad sites).” Since the proposed Concordia Roadway is not a collector on the Thoroughfare Plan and does not serve a commercial development, it was believed that the right turn deceleration lane requirement is not applicable at this intersection.

As an alternative, guidelines in TxDOT’s *Access Management Manual* were used, which state:

For roadways with a posted speed limit less than or equal to 45 mph, a right turn deceleration lane should be considered when peak right turn volumes are greater than 60 vehicles per hour.

Table 12 summarizes the projected right turn volumes under Buildout Year (2020) Total traffic conditions.

Table 12: Right Turn Deceleration Lane Analysis Results

Intersection	Approach	Speed Limit (mph)	Threshold (vph)	Volumes AM PM (vph)	Exceeds Threshold?
Concordia Roadway at North Tarrant Parkway	WB	40	60	6 25	No No

As shown in Table 12, the right turn volumes are not predicted to exceed 60 vehicles during the peak hours at the Concordia Roadway location on North Tarrant Parkway. Therefore, a westbound right turn deceleration lane is not recommended for this location.

Driveway Spacing

The City of Keller *Unified Development Code* indicates:

Driveways (either individual or the entry drive of a subdivision) shall be located a minimum of seventy-five feet (75') from any intersection of residential streets and a minimum of two hundred fifty feet (250') from any intersection of arterial or collector streets. (Section 5.07.A.1 – Driveways)

The *Unified Development Code* also indicates a minimum spacing between driveways on an arterial street of 200 feet.

The proposed access roadway at the existing median opening on North Tarrant Parkway will be located approximately 1,200 feet east of Willis Lane and approximately 1,400 feet west of Rufe Snow Drive. The proposed roadway will also be located approximately 550 feet west of the adjacent Church driveway. As currently proposed, the roadway location is predicted to meet the City's minimum spacing guidelines.

Intersection Sight Distance

As part of this traffic analysis, the available and recommended intersection sight distance was analyzed. The recommended sight distance was estimated using the procedures developed by the American Association of State Highway and Transportation Officials (AASHTO) and published in the 2011 edition of *A Policy on Geometric Design of Highways and Streets*. At this location, the motorist should be able to see if and when adequate gaps exist to perform their desired maneuver.

Table 13 presents the desired and available sight distance for vehicles exiting the proposed Concordia Roadway.

Table 13: Intersection Sight Distance Evaluation

Major Roadway	N Tarrant Pkwy
Posted Speed Limit	40 mph
Minor Roadway	Concordia Roadway
Design Vehicle	Passenger Car
Recommended Sight Distance	560'
Observed Sight Distance to the Left	~650'
Observed Sight Distance to the Right	~750'
Available > Recommended	
To the Left	YES
To the Right	YES

Based on field observations under existing conditions at the proposed Concordia Roadway location on North Tarrant Parkway, available sight distance fulfills the AASHTO recommendation.

VI. TRAFFIC MITIGATION

As a result of this traffic study, installing a traffic signal at the Concordia Roadway and North Tarrant Parkway was evaluated, but the low traffic volumes on the side streets do not come close to meeting traffic signal warrants. A traffic signal is not a viable alternative at this location.

Instead of a single southbound lane on the Concordia Roadway approach at the North Tarrant Parkway intersection, the developer is providing separate left turn and right turn lanes on this roadway. Providing two southbound lanes reduces the overall delay for the southbound approach when compared to an approach with a single lane.

If coordinated signal timings were implemented at the signalized intersections on North Tarrant Parkway at Willis Lane and Rufe Snow Drive, the northbound and southbound approaches at the Concordia Roadway and North Tarrant Parkway intersection are predicted to operate at acceptable levels of service.

VII. CONCLUSIONS

Based on the analysis of the proposed site plan and characteristics of the Concordia residential development, the following conclusions can be made:

- The development is planned to consist of 66 single-family homes.
- The proposed development is expected to generate 710 trips on a daily basis with 52 trips during the AM peak hour and 69 trips during the PM peak hour.

Traffic Analysis

- North Tarrant Parkway currently operates at acceptable levels of service and is predicted to continue to operate at acceptable levels of service with the addition of site generated traffic.
- The signalized intersections on North Tarrant Parkway at Willis Lane and at Rufe Snow Drive currently operate and are predicted to continue operating at acceptable levels of service under Buildout Year (2020) Background and Total conditions. While the intersections operate at acceptable levels of service, there are approaches at these intersections which operate at LOS D under Existing (2018) and Buildout Year (2020) conditions. However, the addition of site generated traffic under Buildout Year (2020) Total conditions does not result in a degradation in the level of service from the Buildout Year (2020) Background conditions at these approaches.
- At the Chase Oaks Drive and Rufe Snow Drive unsignalized intersection, the approaches and movements currently operate at levels of service C or better. All approaches and movements are predicted to continue operating at these same levels of service under Buildout Year (2020) Background and Total conditions, except the westbound approach, which is predicted to operate at LOS D during the PM peak hour under future (Background and Total) conditions.
- At the North Tarrant Parkway and Concordia Roadway unsignalized intersection, the northbound approach, serving the existing apartment complex, currently operates at LOS D during the AM and PM peak hours. This approach is predicted to degrade to LOS F (AM peak hour) and LOS E (PM peak hour) under Buildout Year (2020) Background conditions. The same levels of service predicted for the northbound approach under Buildout Year (2020) Background conditions are predicted for Buildout Year (2020) Total conditions.
- At the North Tarrant Parkway and Concordia Roadway unsignalized intersection, the new southbound approach at this intersection, serving the proposed Concordia residential development, is predicted to operate at LOS D (AM peak hour) and LOS E (PM peak hour) under Buildout Year (2020) Total conditions.

- A few notes regarding this operation at the North Tarrant Parkway and Concordia Roadway intersection:
 - The approaches typically have low volume-to-capacity ratios of approximately 0.25.
 - The traffic volumes on these approaches during the peak hours are typically approximately 30 vehicles or less, with only half of these being left turn movements.
 - The analysis did not assume vehicles would store in the median when making a left turn from the side street. If motorists used the median to perform a two-stage left turn maneuver, delays for the northbound and southbound approaches are predicted to be reduced by approximately 20-35%.
 - If coordinated signal timings were implemented at the signalized intersections on North Tarrant Parkway at Willis Lane and Rufe Snow Drive, the northbound and southbound approaches at the Concordia Roadway and North Tarrant Parkway intersection are predicted to operate at acceptable levels of service.
- All intersections and existing approaches at the study intersections are predicted to operate at the same level of service under Buildout Year (2020) Total conditions, with site traffic included, as they are predicted to operate under Buildout Year (2020) Background conditions, without site traffic included. That is, if an approach is predicted to operate at LOS D under Buildout Year (2020) Background conditions, it will remain operating at the same LOS D under Buildout Year (2020) Total conditions.

Access Management Analysis

- An eastbound left turn lane will be provided on North Tarrant Parkway to serve the Concordia Residential Development, as required by City of Keller.
- The right turn volumes at the proposed access roadway on North Tarrant Parkway are not predicted to exceed the threshold for a right turn deceleration lane during either the weekday AM or PM peak hours. A westbound right turn deceleration lane on North Tarrant Parkway is not recommended at the proposed access roadway.
- The proposed access roadway is predicted to meet the City's minimum spacing guidelines.
- Adequate sight distance is predicted to be provided for the proposed residential roadway on North Tarrant Parkway.

VIII. RECOMMENDATIONS

Based on the results of this traffic study, the following recommendations to the proposed development or roadway network are identified:

- Install an eastbound left turn lane on North Tarrant Parkway at the Concordia Roadway intersection.
- Provide two southbound lanes on the Concordia Roadway approach to North Tarrant Parkway.

IX. APPENDIX

GRAM Traffic NTX Inc.

1120 W. Lovers Lane

Arlington, Texas, United States 76013
817.265.8968

Count Name: 1 - N TARRANT
PKWY @ WILLIS LN
Site Code:
Start Date: 01/16/2018
Page No: 1

Turning Movement Data

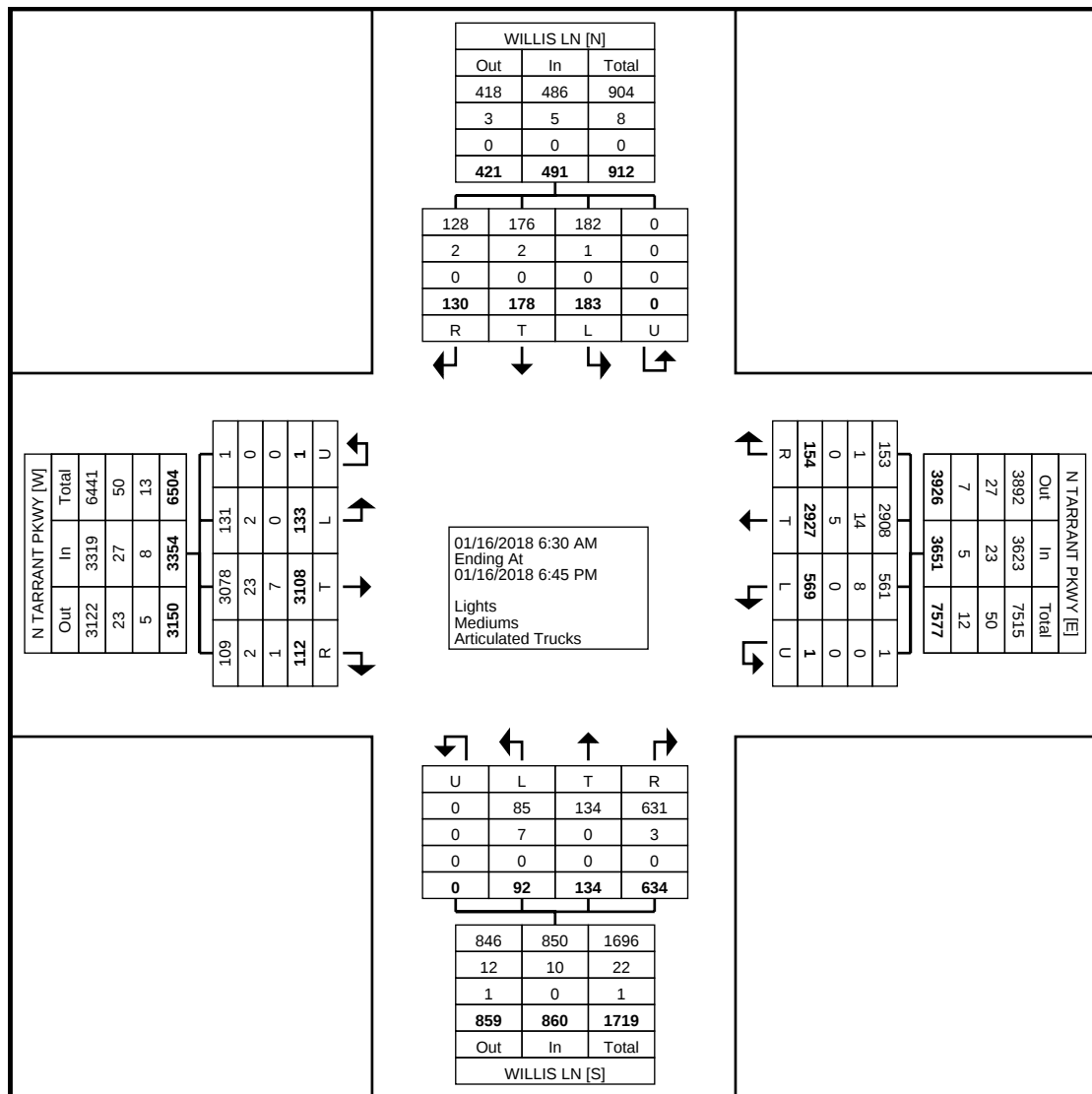
Start Time	WILLIS LN Southbound					N TARRANT PKWY Westbound					WILLIS LN Northbound					N TARRANT PKWY Eastbound					Int. Total
	Left	Thru	Right	U-Turn	App. Total	Left	Thru	Right	U-Turn	App. Total	Left	Thru	Right	U-Turn	App. Total	Left	Thru	Right	U-Turn	App. Total	
6:30 AM	0	1	5	0	6	4	49	1	0	54	1	3	13	0	17	1	154	2	0	157	234
6:45 AM	3	7	1	0	11	26	88	2	0	116	7	8	35	0	50	2	203	4	0	209	386
Hourly Total	3	8	6	0	17	30	137	3	0	170	8	11	48	0	67	3	357	6	0	366	620
7:00 AM	2	0	8	0	10	9	113	10	0	132	3	4	22	0	29	8	221	2	0	231	402
7:15 AM	14	3	7	0	24	14	105	13	0	132	2	5	22	0	29	13	212	5	0	230	415
7:30 AM	24	11	18	0	53	29	144	9	0	182	4	15	27	0	46	17	225	5	0	247	528
7:45 AM	37	43	25	0	105	70	136	11	1	218	9	14	37	0	60	16	228	15	0	259	642
Hourly Total	77	57	58	0	192	122	498	43	1	664	18	38	108	0	164	54	886	27	0	967	1987
8:00 AM	7	36	13	0	56	89	125	9	0	223	18	12	98	0	128	2	224	10	1	237	644
8:15 AM	6	25	3	0	34	79	102	5	0	186	18	25	118	0	161	4	225	17	0	246	627
*** BREAK ***	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Hourly Total	13	61	16	0	90	168	227	14	0	409	36	37	216	0	289	6	449	27	1	483	1271
4:30 PM	6	5	8	0	19	34	255	13	0	302	5	10	31	0	46	4	190	9	0	203	570
4:45 PM	17	8	8	0	33	42	226	11	0	279	3	5	30	0	38	10	151	6	0	167	517
Hourly Total	23	13	16	0	52	76	481	24	0	581	8	15	61	0	84	14	341	15	0	370	1087
5:00 PM	21	16	9	0	46	33	276	10	0	319	3	9	45	0	57	8	231	8	0	247	669
5:15 PM	16	8	7	0	31	36	281	9	0	326	5	6	32	0	43	12	192	7	0	211	611
5:30 PM	9	3	10	0	22	29	272	15	0	316	5	3	35	0	43	6	177	6	0	189	570
5:45 PM	8	6	4	0	18	28	253	11	0	292	4	5	27	0	36	9	167	7	0	183	529
Hourly Total	54	33	30	0	117	126	1082	45	0	1253	17	23	139	0	179	35	767	28	0	830	2379
6:00 PM	7	3	4	0	14	24	253	12	0	289	2	6	36	0	44	6	166	6	0	178	525
6:15 PM	6	3	0	0	9	23	243	13	0	279	3	4	26	0	33	15	142	3	0	160	481
6:30 PM	0	0	0	0	0	0	6	0	0	6	0	0	0	0	0	0	0	0	0	0	6
Grand Total	183	178	130	0	491	569	2927	154	1	3651	92	134	634	0	860	133	3108	112	1	3354	8356
Approach %	37.3	36.3	26.5	0.0	-	15.6	80.2	4.2	0.0	-	10.7	15.6	73.7	0.0	-	4.0	92.7	3.3	0.0	-	-
Total %	2.2	2.1	1.6	0.0	5.9	6.8	35.0	1.8	0.0	43.7	1.1	1.6	7.6	0.0	10.3	1.6	37.2	1.3	0.0	40.1	-
Lights	182	176	128	0	486	561	2908	153	1	3623	85	134	631	0	850	131	3078	109	1	3319	8278
% Lights	99.5	98.9	98.5	-	99.0	98.6	99.4	99.4	100.0	99.2	92.4	100.0	99.5	-	98.8	98.5	99.0	97.3	100.0	99.0	99.1
Mediums	1	2	2	0	5	8	14	1	0	23	7	0	3	0	10	2	23	2	0	27	65
% Mediums	0.5	1.1	1.5	-	1.0	1.4	0.5	0.6	0.0	0.6	7.6	0.0	0.5	-	1.2	1.5	0.7	1.8	0.0	0.8	0.8
Articulated Trucks	0	0	0	0	0	0	5	0	0	5	0	0	0	0	0	0	7	1	0	8	13
% Articulated Trucks	0.0	0.0	0.0	-	0.0	0.0	0.2	0.0	0.0	0.1	0.0	0.0	0.0	-	0.0	0.0	0.2	0.9	0.0	0.2	0.2

GRAM Traffic NTX Inc.

1120 W. Lovers Lane

Arlington, Texas, United States 76013
817.265.8968

Count Name: 1 - N TARRANT
PKWY @ WILLIS LN
Site Code:
Start Date: 01/16/2018
Page No: 2



Turning Movement Data Plot

GRAM Traffic NTX Inc.

1120 W. Lovers Lane

Arlington, Texas, United States 76013
817.265.8968

Count Name: 1 - N TARRANT
PKWY @ WILLIS LN
Site Code:
Start Date: 01/16/2018
Page No: 3

Turning Movement Peak Hour Data (7:30 AM)

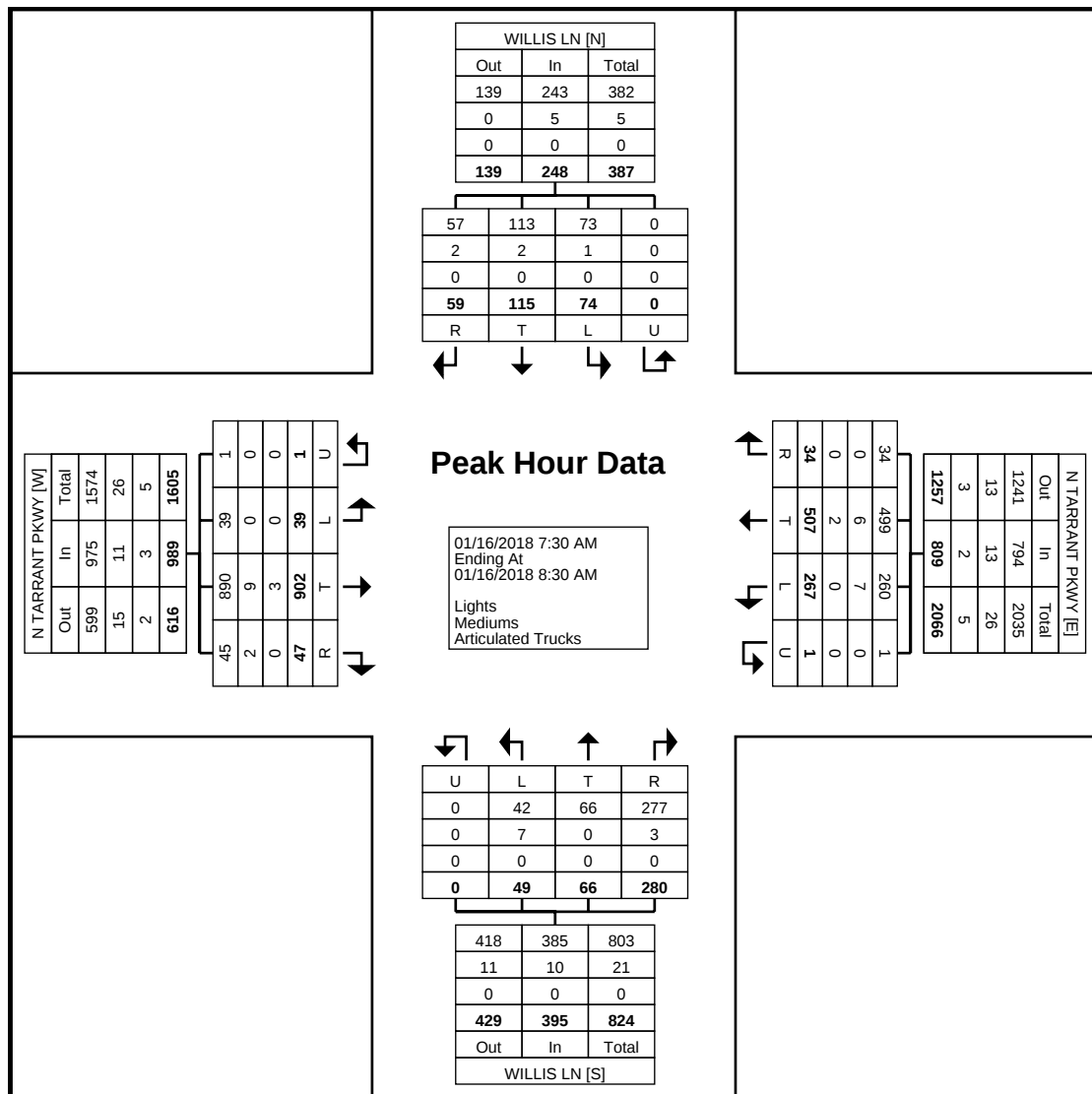
Start Time	WILLIS LN Southbound					N TARRANT PKWY Westbound					WILLIS LN Northbound					N TARRANT PKWY Eastbound					Int. Total
	Left	Thru	Right	U-Turn	App. Total	Left	Thru	Right	U-Turn	App. Total	Left	Thru	Right	U-Turn	App. Total	Left	Thru	Right	U-Turn	App. Total	
7:30 AM	24	11	18	0	53	29	144	9	0	182	4	15	27	0	46	17	225	5	0	247	528
7:45 AM	37	43	25	0	105	70	136	11	1	218	9	14	37	0	60	16	228	15	0	259	642
8:00 AM	7	36	13	0	56	89	125	9	0	223	18	12	98	0	128	2	224	10	1	237	644
8:15 AM	6	25	3	0	34	79	102	5	0	186	18	25	118	0	161	4	225	17	0	246	627
Total	74	115	59	0	248	267	507	34	1	809	49	66	280	0	395	39	902	47	1	989	2441
Approach %	29.8	46.4	23.8	0.0	-	33.0	62.7	4.2	0.1	-	12.4	16.7	70.9	0.0	-	3.9	91.2	4.8	0.1	-	-
Total %	3.0	4.7	2.4	0.0	10.2	10.9	20.8	1.4	0.0	33.1	2.0	2.7	11.5	0.0	16.2	1.6	37.0	1.9	0.0	40.5	-
PHF	0.500	0.669	0.590	0.000	0.590	0.750	0.880	0.773	0.250	0.907	0.681	0.660	0.593	0.000	0.613	0.574	0.989	0.691	0.250	0.955	0.948
Lights	73	113	57	0	243	260	499	34	1	794	42	66	277	0	385	39	890	45	1	975	2397
% Lights	98.6	98.3	96.6	-	98.0	97.4	98.4	100.0	100.0	98.1	85.7	100.0	98.9	-	97.5	100.0	98.7	95.7	100.0	98.6	98.2
Mediums	1	2	2	0	5	7	6	0	0	13	7	0	3	0	10	0	9	2	0	11	39
% Mediums	1.4	1.7	3.4	-	2.0	2.6	1.2	0.0	0.0	1.6	14.3	0.0	1.1	-	2.5	0.0	1.0	4.3	0.0	1.1	1.6
Articulated Trucks	0	0	0	0	0	0	2	0	0	2	0	0	0	0	0	0	3	0	0	3	5
% Articulated Trucks	0.0	0.0	0.0	-	0.0	0.0	0.4	0.0	0.0	0.2	0.0	0.0	0.0	-	0.0	0.0	0.3	0.0	0.0	0.3	0.2

GRAM Traffic NTX Inc.

1120 W. Lovers Lane

Arlington, Texas, United States 76013
817.265.8968

Count Name: 1 - N TARRANT
PKWY @ WILLIS LN
Site Code:
Start Date: 01/16/2018
Page No: 4



Turning Movement Peak Hour Data Plot (7:30 AM)

GRAM Traffic NTX Inc.

1120 W. Lovers Lane

Arlington, Texas, United States 76013
817.265.8968

Count Name: 1 - N TARRANT
PKWY @ WILLIS LN
Site Code:
Start Date: 01/16/2018
Page No: 5

Turning Movement Peak Hour Data (5:00 PM)

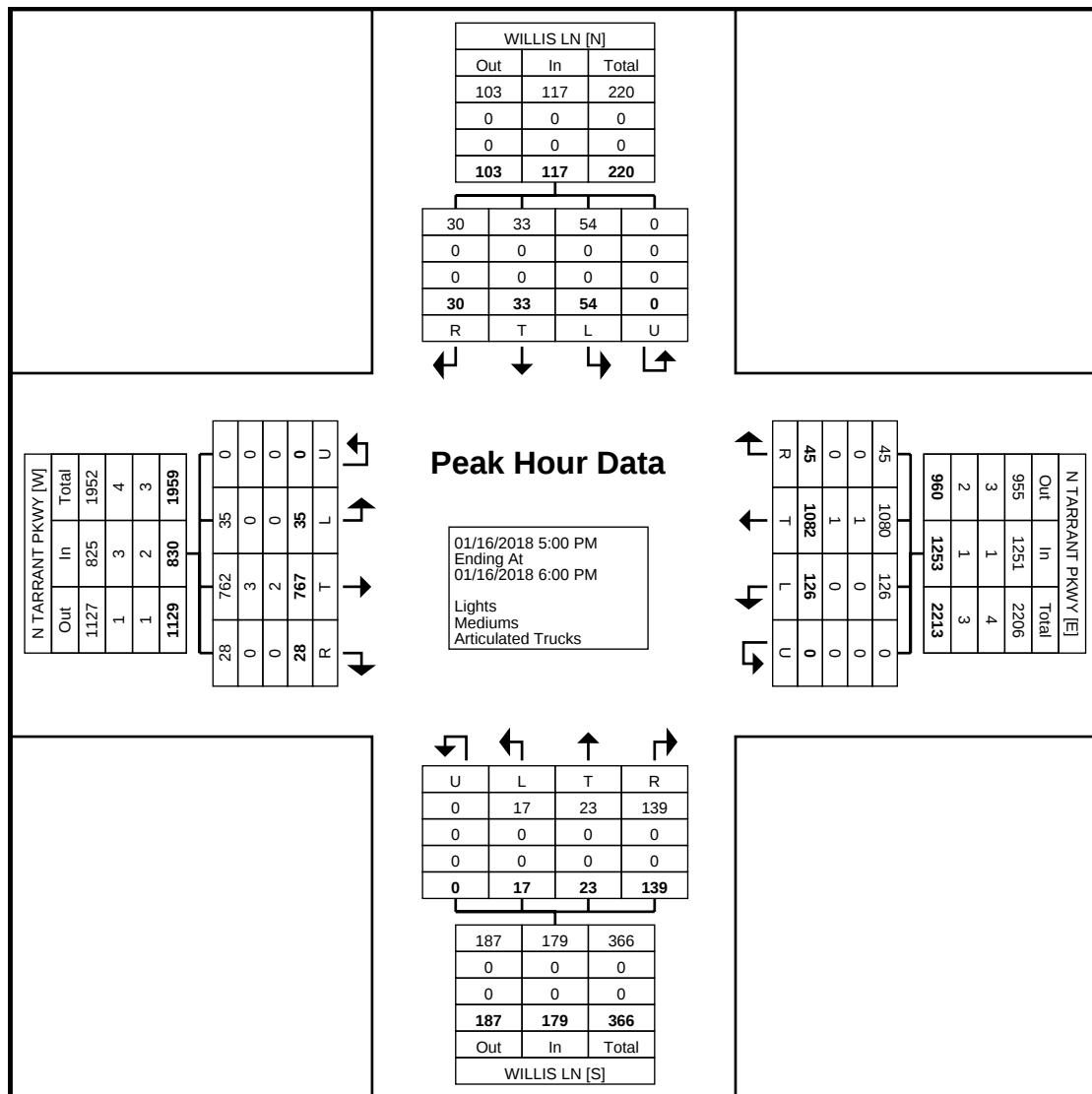
Start Time	WILLIS LN Southbound					N TARRANT PKWY Westbound					WILLIS LN Northbound					N TARRANT PKWY Eastbound					Int. Total
	Left	Thru	Right	U-Turn	App. Total	Left	Thru	Right	U-Turn	App. Total	Left	Thru	Right	U-Turn	App. Total	Left	Thru	Right	U-Turn	App. Total	
5:00 PM	21	16	9	0	46	33	276	10	0	319	3	9	45	0	57	8	231	8	0	247	669
5:15 PM	16	8	7	0	31	36	281	9	0	326	5	6	32	0	43	12	192	7	0	211	611
5:30 PM	9	3	10	0	22	29	272	15	0	316	5	3	35	0	43	6	177	6	0	189	570
5:45 PM	8	6	4	0	18	28	253	11	0	292	4	5	27	0	36	9	167	7	0	183	529
Total	54	33	30	0	117	126	1082	45	0	1253	17	23	139	0	179	35	767	28	0	830	2379
Approach %	46.2	28.2	25.6	0.0	-	10.1	86.4	3.6	0.0	-	9.5	12.8	77.7	0.0	-	4.2	92.4	3.4	0.0	-	-
Total %	2.3	1.4	1.3	0.0	4.9	5.3	45.5	1.9	0.0	52.7	0.7	1.0	5.8	0.0	7.5	1.5	32.2	1.2	0.0	34.9	-
PHF	0.643	0.516	0.750	0.000	0.636	0.875	0.963	0.750	0.000	0.961	0.850	0.639	0.772	0.000	0.785	0.729	0.830	0.875	0.000	0.840	0.889
Lights	54	33	30	0	117	126	1080	45	0	1251	17	23	139	0	179	35	762	28	0	825	2372
% Lights	100.0	100.0	100.0	-	100.0	100.0	99.8	100.0	-	99.8	100.0	100.0	100.0	-	100.0	100.0	99.3	100.0	-	99.4	99.7
Mediums	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0	0	3	0	0	3	4
% Mediums	0.0	0.0	0.0	-	0.0	0.0	0.1	0.0	-	0.1	0.0	0.0	0.0	-	0.0	0.0	0.4	0.0	-	0.4	0.2
Articulated Trucks	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0	0	2	0	0	2	3
% Articulated Trucks	0.0	0.0	0.0	-	0.0	0.0	0.1	0.0	-	0.1	0.0	0.0	0.0	-	0.0	0.0	0.3	0.0	-	0.2	0.1

GRAM Traffic NTX Inc.

1120 W. Lovers Lane

Arlington, Texas, United States 76013
817.265.8968

Count Name: 1 - N TARRANT
PKWY @ WILLIS LN
Site Code:
Start Date: 01/16/2018
Page No: 6



Turning Movement Peak Hour Data Plot (5:00 PM)

GRAM Traffic NTX Inc.

1120 W. Lovers Lane

Arlington, Texas, United States 76013
817.265.8968

Count Name: 2 - N TARRANT
PKWY @ EXISTING MEDIAN
OPENING
Site Code:
Start Date: 01/16/2018
Page No: 1

Turning Movement Data

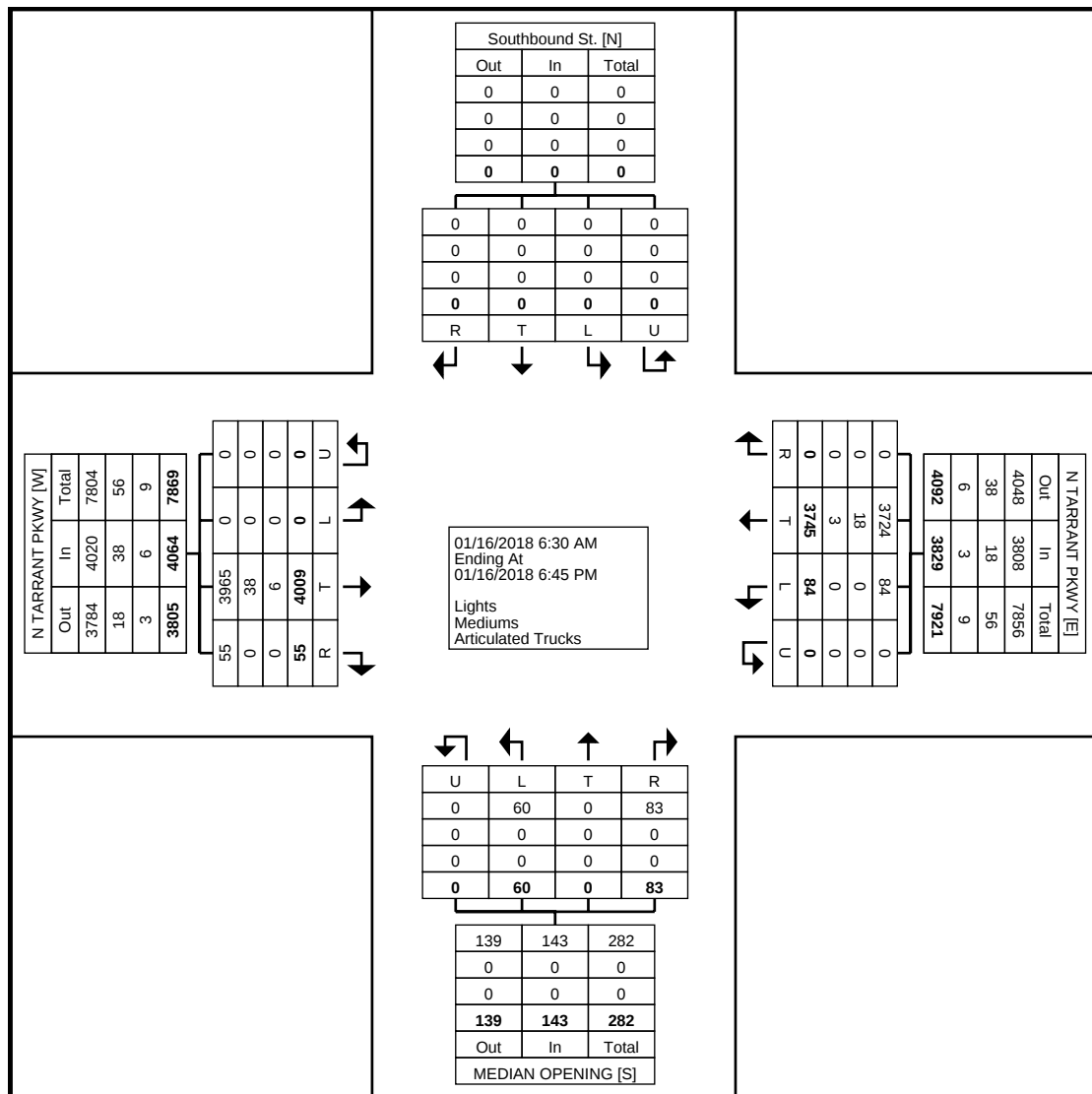
Start Time	Southbound St. Southbound					N TARRANT PKWY Westbound					MEDIAN OPENING Northbound					N TARRANT PKWY Eastbound					Int. Total
	Left	Thru	Right	U-Turn	App. Total	Left	Thru	Right	U-Turn	App. Total	Left	Thru	Right	U-Turn	App. Total	Left	Thru	Right	U-Turn	App. Total	
6:30 AM	0	0	0	0	0	1	62	0	0	63	2	0	7	0	9	0	177	0	0	177	249
6:45 AM	0	0	0	0	0	1	114	0	0	115	2	0	8	0	10	0	265	0	0	265	390
Hourly Total	0	0	0	0	0	2	176	0	0	178	4	0	15	0	19	0	442	0	0	442	639
7:00 AM	0	0	0	0	0	2	119	0	0	121	5	0	5	0	10	0	283	1	0	284	415
7:15 AM	0	0	0	0	0	0	129	0	0	129	5	0	8	0	13	0	253	0	0	253	395
7:30 AM	0	0	0	0	0	1	185	0	0	186	10	0	11	0	21	0	257	1	0	258	465
7:45 AM	0	0	0	0	0	3	222	0	0	225	6	0	8	0	14	0	280	4	0	284	523
Hourly Total	0	0	0	0	0	6	655	0	0	661	26	0	32	0	58	0	1073	6	0	1079	1798
8:00 AM	0	0	0	0	0	3	248	0	0	251	4	0	6	0	10	0	326	3	0	329	590
8:15 AM	0	0	0	0	0	4	155	0	0	159	8	0	6	0	14	0	372	3	0	375	548
8:30 AM	0	0	0	0	0	0	3	0	0	3	0	0	0	0	0	0	1	0	0	1	4
*** BREAK ***	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Hourly Total	0	0	0	0	0	7	406	0	0	413	12	0	12	0	24	0	699	6	0	705	1142
4:30 PM	0	0	0	0	0	11	293	0	0	304	1	0	5	0	6	0	246	6	0	252	562
4:45 PM	0	0	0	0	0	7	294	0	0	301	3	0	1	0	4	0	228	5	0	233	538
Hourly Total	0	0	0	0	0	18	587	0	0	605	4	0	6	0	10	0	474	11	0	485	1100
5:00 PM	0	0	0	0	0	8	315	0	0	323	3	0	1	0	4	0	261	3	0	264	591
5:15 PM	0	0	0	0	0	4	353	0	0	357	2	0	6	0	8	0	242	6	0	248	613
5:30 PM	0	0	0	0	0	13	327	0	0	340	4	0	1	0	5	0	236	7	0	243	588
5:45 PM	0	0	0	0	0	9	309	0	0	318	1	0	4	0	5	0	184	5	0	189	512
Hourly Total	0	0	0	0	0	34	1304	0	0	1338	10	0	12	0	22	0	923	21	0	944	2304
6:00 PM	0	0	0	0	0	6	304	0	0	310	2	0	3	0	5	0	211	5	0	216	531
6:15 PM	0	0	0	0	0	11	313	0	0	324	2	0	3	0	5	0	186	6	0	192	521
6:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	1
Grand Total	0	0	0	0	0	84	3745	0	0	3829	60	0	83	0	143	0	4009	55	0	4064	8036
Approach %	0.0	0.0	0.0	0.0	-	2.2	97.8	0.0	0.0	-	42.0	0.0	58.0	0.0	-	0.0	98.6	1.4	0.0	-	-
Total %	0.0	0.0	0.0	0.0	0.0	1.0	46.6	0.0	0.0	47.6	0.7	0.0	1.0	0.0	1.8	0.0	49.9	0.7	0.0	50.6	-
Lights	0	0	0	0	0	84	3724	0	0	3808	60	0	83	0	143	0	3965	55	0	4020	7971
% Lights	-	-	-	-	-	100.0	99.4	-	-	99.5	100.0	-	100.0	-	100.0	-	98.9	100.0	-	98.9	99.2
Mediums	0	0	0	0	0	0	18	0	0	18	0	0	0	0	0	0	38	0	0	38	56
% Mediums	-	-	-	-	-	0.0	0.5	-	-	0.5	0.0	-	0.0	-	0.0	-	0.9	0.0	-	0.9	0.7
Articulated Trucks	0	0	0	0	0	0	3	0	0	3	0	0	0	0	0	0	6	0	0	6	9
% Articulated Trucks	-	-	-	-	-	0.0	0.1	-	-	0.1	0.0	-	0.0	-	0.0	-	0.1	0.0	-	0.1	0.1

GRAM Traffic NTX Inc.

1120 W. Lovers Lane

Arlington, Texas, United States 76013
817.265.8968

Count Name: 2 - N TARRANT
PKWY @ EXISTING MEDIAN
OPENING
Site Code:
Start Date: 01/16/2018
Page No: 2



Turning Movement Data Plot

GRAM Traffic NTX Inc.

1120 W. Lovers Lane

Arlington, Texas, United States 76013
817.265.8968

Count Name: 2 - N TARRANT
PKWY @ EXISTING MEDIAN
OPENING
Site Code:
Start Date: 01/16/2018
Page No: 3

Turning Movement Peak Hour Data (7:30 AM)

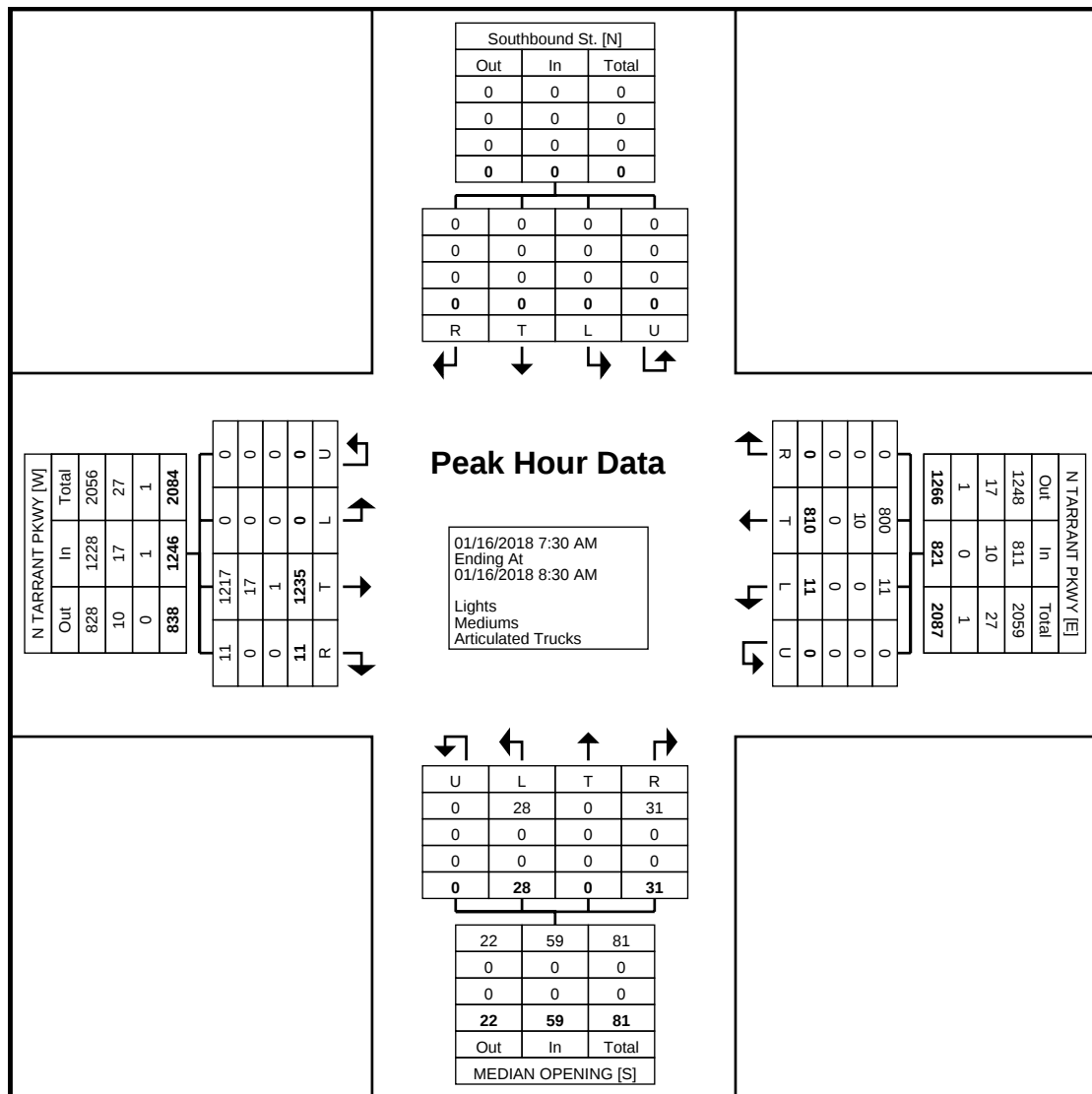
Start Time	Southbound St. Southbound					N TARRANT PKWY Westbound					MEDIAN OPENING Northbound					N TARRANT PKWY Eastbound					Int. Total
	Left	Thru	Right	U-Turn	App. Total	Left	Thru	Right	U-Turn	App. Total	Left	Thru	Right	U-Turn	App. Total	Left	Thru	Right	U-Turn	App. Total	
7:30 AM	0	0	0	0	0	1	185	0	0	186	10	0	11	0	21	0	257	1	0	258	465
7:45 AM	0	0	0	0	0	3	222	0	0	225	6	0	8	0	14	0	280	4	0	284	523
8:00 AM	0	0	0	0	0	3	248	0	0	251	4	0	6	0	10	0	326	3	0	329	590
8:15 AM	0	0	0	0	0	4	155	0	0	159	8	0	6	0	14	0	372	3	0	375	548
Total	0	0	0	0	0	11	810	0	0	821	28	0	31	0	59	0	1235	11	0	1246	2126
Approach %	0.0	0.0	0.0	0.0	-	1.3	98.7	0.0	0.0	-	47.5	0.0	52.5	0.0	-	0.0	99.1	0.9	0.0	-	-
Total %	0.0	0.0	0.0	0.0	0.0	0.5	38.1	0.0	0.0	38.6	1.3	0.0	1.5	0.0	2.8	0.0	58.1	0.5	0.0	58.6	-
PHF	0.000	0.000	0.000	0.000	0.000	0.688	0.817	0.000	0.000	0.818	0.700	0.000	0.705	0.000	0.702	0.000	0.830	0.688	0.000	0.831	0.901
Lights	0	0	0	0	0	11	800	0	0	811	28	0	31	0	59	0	1217	11	0	1228	2098
% Lights	-	-	-	-	-	100.0	98.8	-	-	98.8	100.0	-	100.0	-	100.0	-	98.5	100.0	-	98.6	98.7
Mediums	0	0	0	0	0	0	10	0	0	10	0	0	0	0	0	0	17	0	0	17	27
% Mediums	-	-	-	-	-	0.0	1.2	-	-	1.2	0.0	-	0.0	-	0.0	-	1.4	0.0	-	1.4	1.3
Articulated Trucks	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	1
% Articulated Trucks	-	-	-	-	-	0.0	0.0	-	-	0.0	0.0	-	0.0	-	0.0	-	0.1	0.0	-	0.1	0.0

GRAM Traffic NTX Inc.

1120 W. Lovers Lane

Arlington, Texas, United States 76013
817.265.8968

Count Name: 2 - N TARRANT
PKWY @ EXISTING MEDIAN
OPENING
Site Code:
Start Date: 01/16/2018
Page No: 4



Turning Movement Peak Hour Data Plot (7:30 AM)

GRAM Traffic NTX Inc.

1120 W. Lovers Lane

Arlington, Texas, United States 76013
817.265.8968

Count Name: 2 - N TARRANT
PKWY @ EXISTING MEDIAN
OPENING
Site Code:
Start Date: 01/16/2018
Page No: 5

Turning Movement Peak Hour Data (4:45 PM)

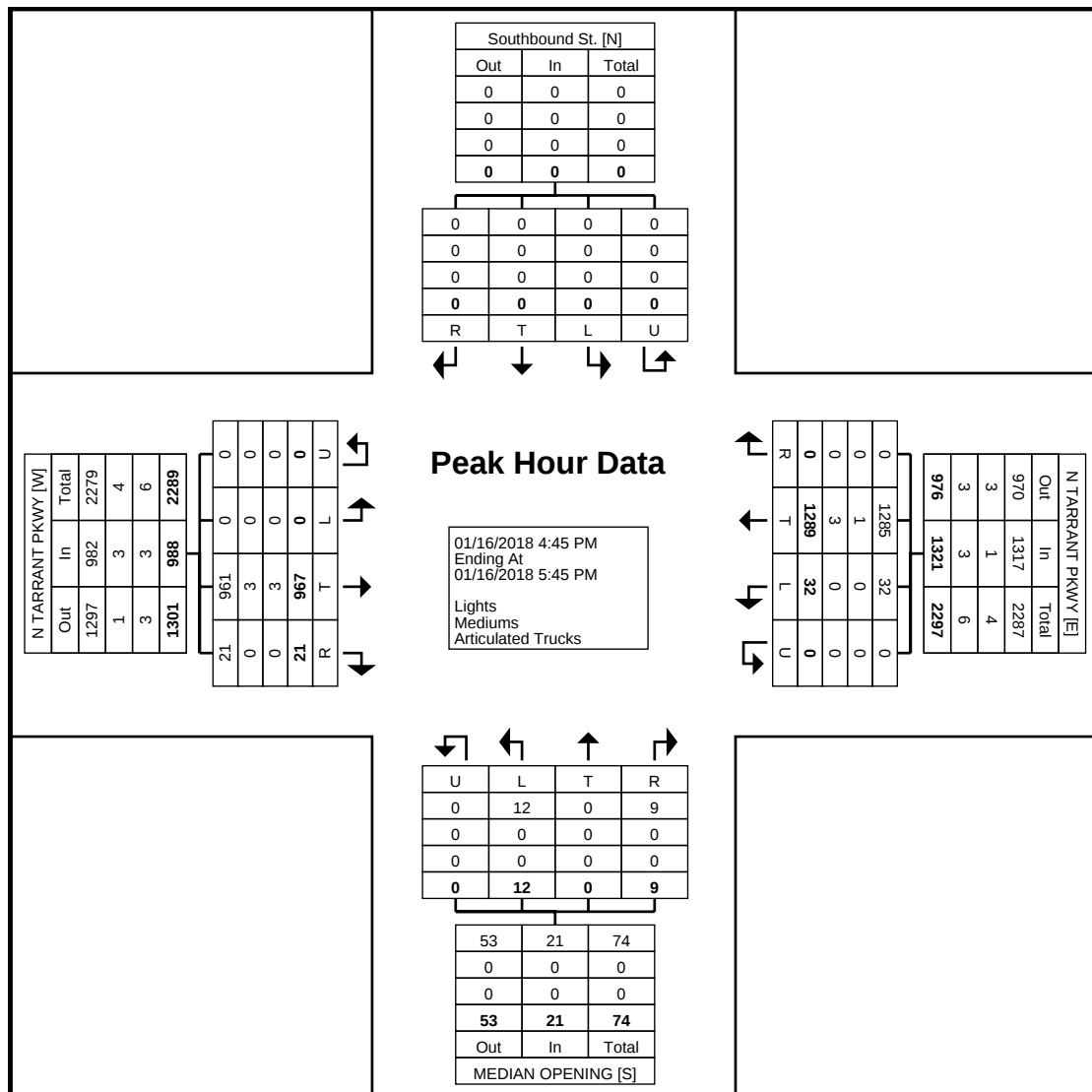
Start Time	Southbound St. Southbound					N TARRANT PKWY Westbound					MEDIAN OPENING Northbound					N TARRANT PKWY Eastbound					Int. Total
	Left	Thru	Right	U-Turn	App. Total	Left	Thru	Right	U-Turn	App. Total	Left	Thru	Right	U-Turn	App. Total	Left	Thru	Right	U-Turn	App. Total	
4:45 PM	0	0	0	0	0	7	294	0	0	301	3	0	1	0	4	0	228	5	0	233	538
5:00 PM	0	0	0	0	0	8	315	0	0	323	3	0	1	0	4	0	261	3	0	264	591
5:15 PM	0	0	0	0	0	4	353	0	0	357	2	0	6	0	8	0	242	6	0	248	613
5:30 PM	0	0	0	0	0	13	327	0	0	340	4	0	1	0	5	0	236	7	0	243	588
Total	0	0	0	0	0	32	1289	0	0	1321	12	0	9	0	21	0	967	21	0	988	2330
Approach %	0.0	0.0	0.0	0.0	-	2.4	97.6	0.0	0.0	-	57.1	0.0	42.9	0.0	-	0.0	97.9	2.1	0.0	-	-
Total %	0.0	0.0	0.0	0.0	0.0	1.4	55.3	0.0	0.0	56.7	0.5	0.0	0.4	0.0	0.9	0.0	41.5	0.9	0.0	42.4	-
PHF	0.000	0.000	0.000	0.000	0.000	0.615	0.913	0.000	0.000	0.925	0.750	0.000	0.375	0.000	0.656	0.000	0.926	0.750	0.000	0.936	0.950
Lights	0	0	0	0	0	32	1285	0	0	1317	12	0	9	0	21	0	961	21	0	982	2320
% Lights	-	-	-	-	-	100.0	99.7	-	-	99.7	100.0	-	100.0	-	100.0	-	99.4	100.0	-	99.4	99.6
Mediums	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0	0	3	0	0	3	4
% Mediums	-	-	-	-	-	0.0	0.1	-	-	0.1	0.0	-	0.0	-	0.0	-	0.3	0.0	-	0.3	0.2
Articulated Trucks	0	0	0	0	0	0	3	0	0	3	0	0	0	0	0	0	3	0	0	3	6
% Articulated Trucks	-	-	-	-	-	0.0	0.2	-	-	0.2	0.0	-	0.0	-	0.0	-	0.3	0.0	-	0.3	0.3

GRAM Traffic NTX Inc.

1120 W. Lovers Lane

Arlington, Texas, United States 76013
817.265.8968

Count Name: 2 - N TARRANT
PKWY @ EXISTING MEDIAN
OPENING
Site Code:
Start Date: 01/16/2018
Page No: 6



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

GRAM Traffic NTX Inc.

1120 W. Lovers Lane

Arlington, Texas, United States 76013
817.265.8968

Count Name: 3 - N TARRANT
PKWY @ RUFE SNOW DR
Site Code:
Start Date: 01/16/2018
Page No: 1

Turning Movement Data

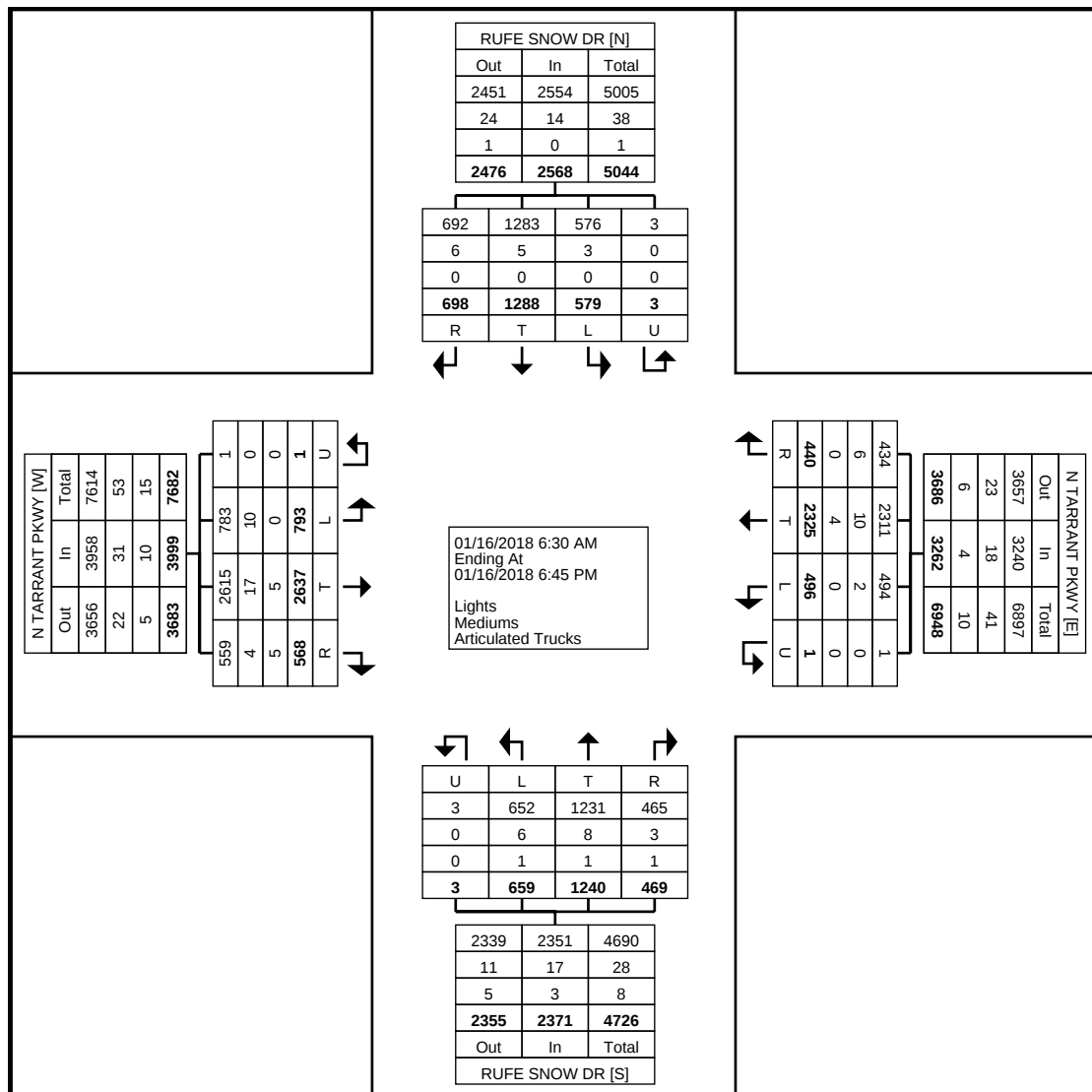
Start Time	RUFE SNOW DR Southbound					N TARRANT PKWY Westbound					RUFE SNOW DR Northbound					N TARRANT PKWY Eastbound					Int. Total
	Left	Thru	Right	U-Turn	App. Total	Left	Thru	Right	U-Turn	App. Total	Left	Thru	Right	U-Turn	App. Total	Left	Thru	Right	U-Turn	App. Total	
6:30 AM	28	31	4	0	63	9	33	8	0	50	14	38	32	0	84	29	147	10	0	186	383
6:45 AM	27	55	33	0	115	14	61	12	0	87	26	66	43	0	135	33	201	21	0	255	592
Hourly Total	55	86	37	0	178	23	94	20	0	137	40	104	75	0	219	62	348	31	0	441	975
7:00 AM	40	52	21	0	113	14	67	21	0	102	31	61	27	0	119	42	210	13	0	265	599
7:15 AM	37	53	38	0	128	19	66	24	1	110	28	74	42	0	144	30	207	23	0	260	642
7:30 AM	48	70	44	0	162	19	104	13	0	136	27	76	51	0	154	41	233	28	0	302	754
7:45 AM	43	62	63	0	168	20	127	39	0	186	38	95	32	0	165	59	194	29	0	282	801
Hourly Total	168	237	166	0	571	72	364	97	1	534	124	306	152	0	582	172	844	93	0	1109	2796
8:00 AM	43	64	73	0	180	9	143	27	0	179	34	74	24	0	132	76	233	26	0	335	826
8:15 AM	44	68	35	0	147	12	89	19	0	120	29	70	34	0	133	104	271	26	0	401	801
8:30 AM	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0	0	2	0	0	2	3
*** BREAK ***	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Hourly Total	87	132	108	0	327	21	233	46	0	300	63	144	58	0	265	180	506	52	0	738	1630
4:30 PM	36	106	48	0	190	48	222	36	0	306	48	86	34	0	168	53	130	48	0	231	895
4:45 PM	31	110	38	0	179	48	199	38	0	285	48	86	19	1	154	46	94	58	1	199	817
Hourly Total	67	216	86	0	369	96	421	74	0	591	96	172	53	1	322	99	224	106	1	430	1712
5:00 PM	26	111	48	0	185	54	198	38	0	290	59	70	18	1	148	54	148	47	0	249	872
5:15 PM	39	134	45	3	221	51	237	27	0	315	60	102	26	0	188	49	137	52	0	238	962
5:30 PM	50	94	44	0	188	38	213	35	0	286	59	105	23	1	188	49	121	51	0	221	883
5:45 PM	32	109	57	0	198	49	180	31	0	260	51	92	22	0	165	31	97	46	0	174	797
Hourly Total	147	448	194	3	792	192	828	131	0	1151	229	369	89	2	689	183	503	196	0	882	3514
6:00 PM	29	96	46	0	171	47	202	42	0	291	47	78	15	0	140	51	114	49	0	214	816
6:15 PM	26	73	60	0	159	45	183	30	0	258	60	67	26	0	153	46	98	41	0	185	755
6:30 PM	0	0	1	0	1	0	0	0	0	0	0	0	1	0	1	0	0	0	0	0	2
Grand Total	579	1288	698	3	2568	496	2325	440	1	3262	659	1240	469	3	2371	793	2637	568	1	3999	12200
Approach %	22.5	50.2	27.2	0.1	-	15.2	71.3	13.5	0.0	-	27.8	52.3	19.8	0.1	-	19.8	65.9	14.2	0.0	-	-
Total %	4.7	10.6	5.7	0.0	21.0	4.1	19.1	3.6	0.0	26.7	5.4	10.2	3.8	0.0	19.4	6.5	21.6	4.7	0.0	32.8	-
Lights	576	1283	692	3	2554	494	2311	434	1	3240	652	1231	465	3	2351	783	2615	559	1	3958	12103
% Lights	99.5	99.6	99.1	100.0	99.5	99.6	99.4	98.6	100.0	99.3	98.9	99.3	99.1	100.0	99.2	98.7	99.2	98.4	100.0	99.0	99.2
Mediums	3	5	6	0	14	2	10	6	0	18	6	8	3	0	17	10	17	4	0	31	80
% Mediums	0.5	0.4	0.9	0.0	0.5	0.4	0.4	1.4	0.0	0.6	0.9	0.6	0.6	0.0	0.7	1.3	0.6	0.7	0.0	0.8	0.7
Articulated Trucks	0	0	0	0	0	0	4	0	0	4	1	1	1	0	3	0	5	5	0	10	17
% Articulated Trucks	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.0	0.0	0.1	0.2	0.1	0.2	0.0	0.1	0.0	0.2	0.9	0.0	0.3	0.1

GRAM Traffic NTX Inc.

1120 W. Lovers Lane

Arlington, Texas, United States 76013
817.265.8968

Count Name: 3 - N TARRANT
PKWY @ RUFE SNOW DR
Site Code:
Start Date: 01/16/2018
Page No: 2



Turning Movement Data Plot

GRAM Traffic NTX Inc.

1120 W. Lovers Lane

Arlington, Texas, United States 76013
817.265.8968

Count Name: 3 - N TARRANT
PKWY @ RUFE SNOW DR
Site Code:
Start Date: 01/16/2018
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Turning Movement Peak Hour Data (7:30 AM)

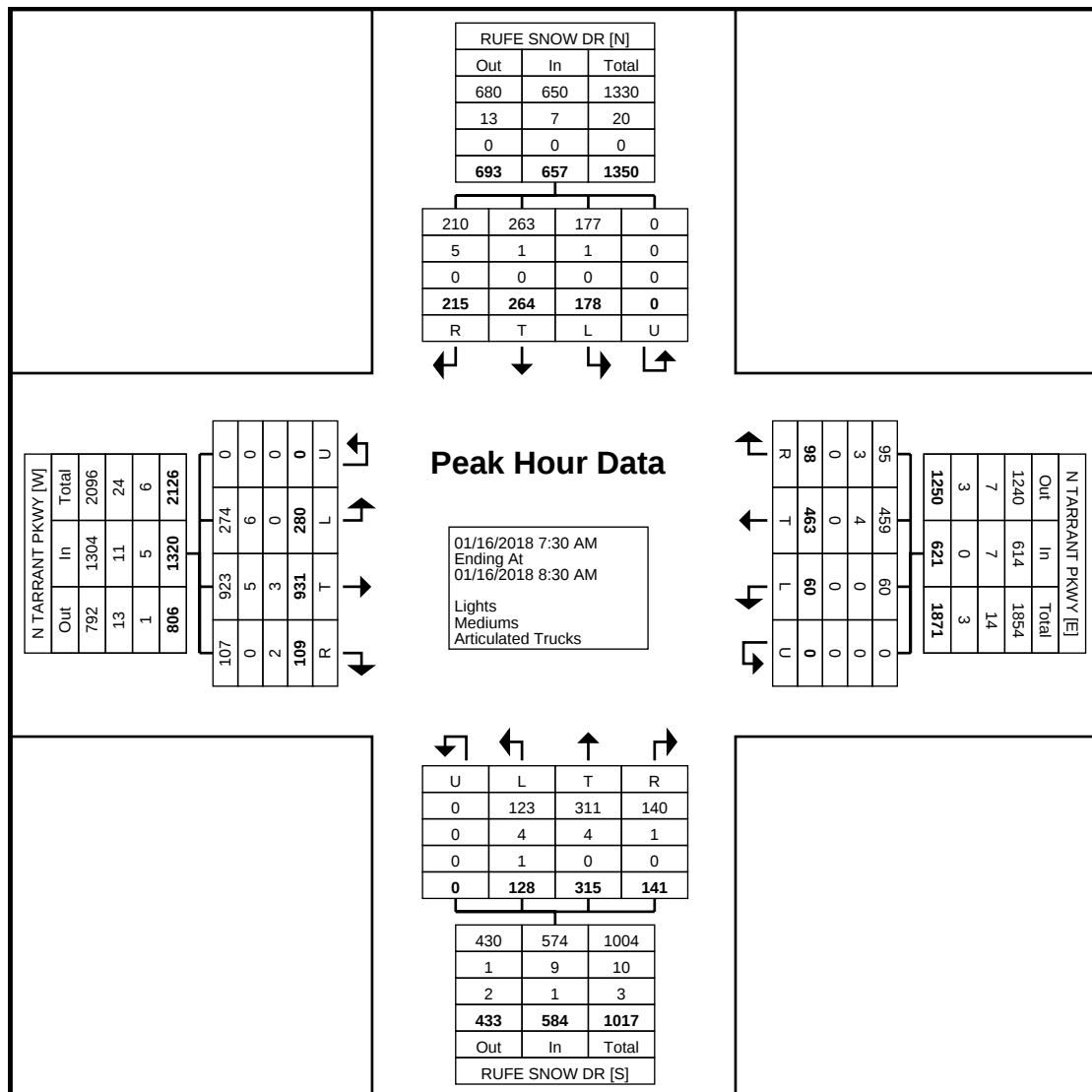
Start Time	RUFE SNOW DR Southbound					N TARRANT PKWY Westbound					RUFE SNOW DR Northbound					N TARRANT PKWY Eastbound					Int. Total
	Left	Thru	Right	U-Turn	App. Total	Left	Thru	Right	U-Turn	App. Total	Left	Thru	Right	U-Turn	App. Total	Left	Thru	Right	U-Turn	App. Total	
7:30 AM	48	70	44	0	162	19	104	13	0	136	27	76	51	0	154	41	233	28	0	302	754
7:45 AM	43	62	63	0	168	20	127	39	0	186	38	95	32	0	165	59	194	29	0	282	801
8:00 AM	43	64	73	0	180	9	143	27	0	179	34	74	24	0	132	76	233	26	0	335	826
8:15 AM	44	68	35	0	147	12	89	19	0	120	29	70	34	0	133	104	271	26	0	401	801
Total	178	264	215	0	657	60	463	98	0	621	128	315	141	0	584	280	931	109	0	1320	3182
Approach %	27.1	40.2	32.7	0.0	-	9.7	74.6	15.8	0.0	-	21.9	53.9	24.1	0.0	-	21.2	70.5	8.3	0.0	-	-
Total %	5.6	8.3	6.8	0.0	20.6	1.9	14.6	3.1	0.0	19.5	4.0	9.9	4.4	0.0	18.4	8.8	29.3	3.4	0.0	41.5	-
PHF	0.927	0.943	0.736	0.000	0.913	0.750	0.809	0.628	0.000	0.835	0.842	0.829	0.691	0.000	0.885	0.673	0.859	0.940	0.000	0.823	0.963
Lights	177	263	210	0	650	60	459	95	0	614	123	311	140	0	574	274	923	107	0	1304	3142
% Lights	99.4	99.6	97.7	-	98.9	100.0	99.1	96.9	-	98.9	96.1	98.7	99.3	-	98.3	97.9	99.1	98.2	-	98.8	98.7
Mediums	1	1	5	0	7	0	4	3	0	7	4	4	1	0	9	6	5	0	0	11	34
% Mediums	0.6	0.4	2.3	-	1.1	0.0	0.9	3.1	-	1.1	3.1	1.3	0.7	-	1.5	2.1	0.5	0.0	-	0.8	1.1
Articulated Trucks	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1	0	3	2	0	5	6
% Articulated Trucks	0.0	0.0	0.0	-	0.0	0.0	0.0	0.0	-	0.0	0.8	0.0	0.0	-	0.2	0.0	0.3	1.8	-	0.4	0.2

GRAM Traffic NTX Inc.

1120 W. Lovers Lane

Arlington, Texas, United States 76013
817.265.8968

Count Name: 3 - N TARRANT
PKWY @ RUFE SNOW DR
Site Code:
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Turning Movement Peak Hour Data Plot (7:30 AM)

GRAM Traffic NTX Inc.

1120 W. Lovers Lane

Arlington, Texas, United States 76013
817.265.8968

Count Name: 3 - N TARRANT
PKWY @ RUFE SNOW DR
Site Code:
Start Date: 01/16/2018
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Turning Movement Peak Hour Data (4:30 PM)

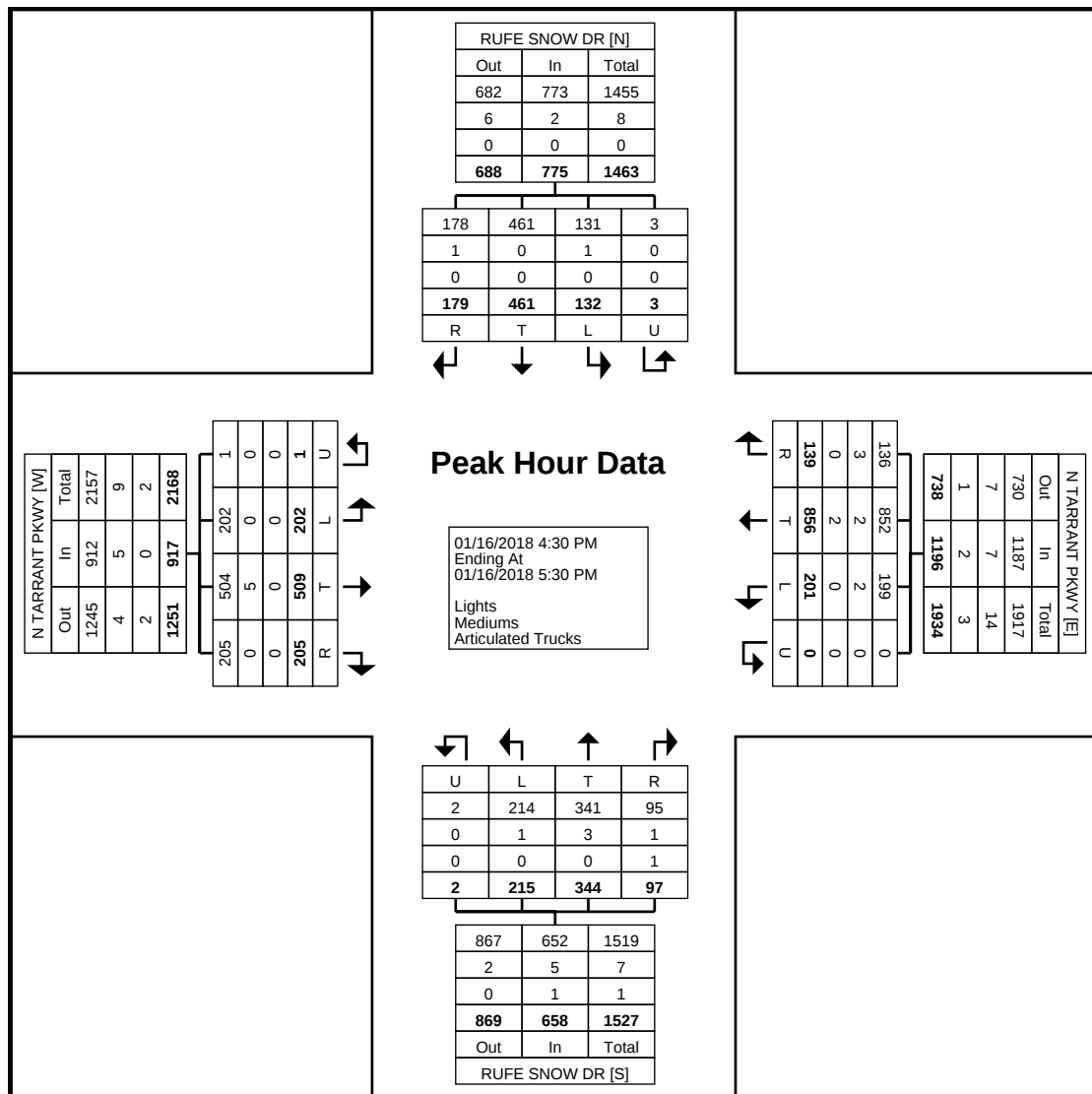
Start Time	RUFE SNOW DR Southbound					N TARRANT PKWY Westbound					RUFE SNOW DR Northbound					N TARRANT PKWY Eastbound					Int. Total
	Left	Thru	Right	U-Turn	App. Total	Left	Thru	Right	U-Turn	App. Total	Left	Thru	Right	U-Turn	App. Total	Left	Thru	Right	U-Turn	App. Total	
4:30 PM	36	106	48	0	190	48	222	36	0	306	48	86	34	0	168	53	130	48	0	231	895
4:45 PM	31	110	38	0	179	48	199	38	0	285	48	86	19	1	154	46	94	58	1	199	817
5:00 PM	26	111	48	0	185	54	198	38	0	290	59	70	18	1	148	54	148	47	0	249	872
5:15 PM	39	134	45	3	221	51	237	27	0	315	60	102	26	0	188	49	137	52	0	238	962
Total	132	461	179	3	775	201	856	139	0	1196	215	344	97	2	658	202	509	205	1	917	3546
Approach %	17.0	59.5	23.1	0.4	-	16.8	71.6	11.6	0.0	-	32.7	52.3	14.7	0.3	-	22.0	55.5	22.4	0.1	-	-
Total %	3.7	13.0	5.0	0.1	21.9	5.7	24.1	3.9	0.0	33.7	6.1	9.7	2.7	0.1	18.6	5.7	14.4	5.8	0.0	25.9	-
PHF	0.846	0.860	0.932	0.250	0.877	0.931	0.903	0.914	0.000	0.949	0.896	0.843	0.713	0.500	0.875	0.935	0.860	0.884	0.250	0.921	0.922
Lights	131	461	178	3	773	199	852	136	0	1187	214	341	95	2	652	202	504	205	1	912	3524
% Lights	99.2	100.0	99.4	100.0	99.7	99.0	99.5	97.8	-	99.2	99.5	99.1	97.9	100.0	99.1	100.0	99.0	100.0	100.0	99.5	99.4
Mediums	1	0	1	0	2	2	2	3	0	7	1	3	1	0	5	0	5	0	0	5	19
% Mediums	0.8	0.0	0.6	0.0	0.3	1.0	0.2	2.2	-	0.6	0.5	0.9	1.0	0.0	0.8	0.0	1.0	0.0	0.0	0.5	0.5
Articulated Trucks	0	0	0	0	0	0	2	0	0	2	0	0	1	0	1	0	0	0	0	0	3
% Articulated Trucks	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.0	-	0.2	0.0	0.0	1.0	0.0	0.2	0.0	0.0	0.0	0.0	0.0	0.1

GRAM Traffic NTX Inc.

1120 W. Lovers Lane

Arlington, Texas, United States 76013
817.265.8968

Count Name: 3 - N TARRANT
PKWY @ RUFE SNOW DR
Site Code:
Start Date: 01/16/2018
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GRAM Traffic NTX Inc.

1120 W. Lovers Lane

Arlington, Texas, United States 76013
817.265.8968

Count Name: 4 - CHASE OAKS
DR @ RUFE SNOW DR
Site Code:
Start Date: 01/16/2018
Page No: 1

Turning Movement Data

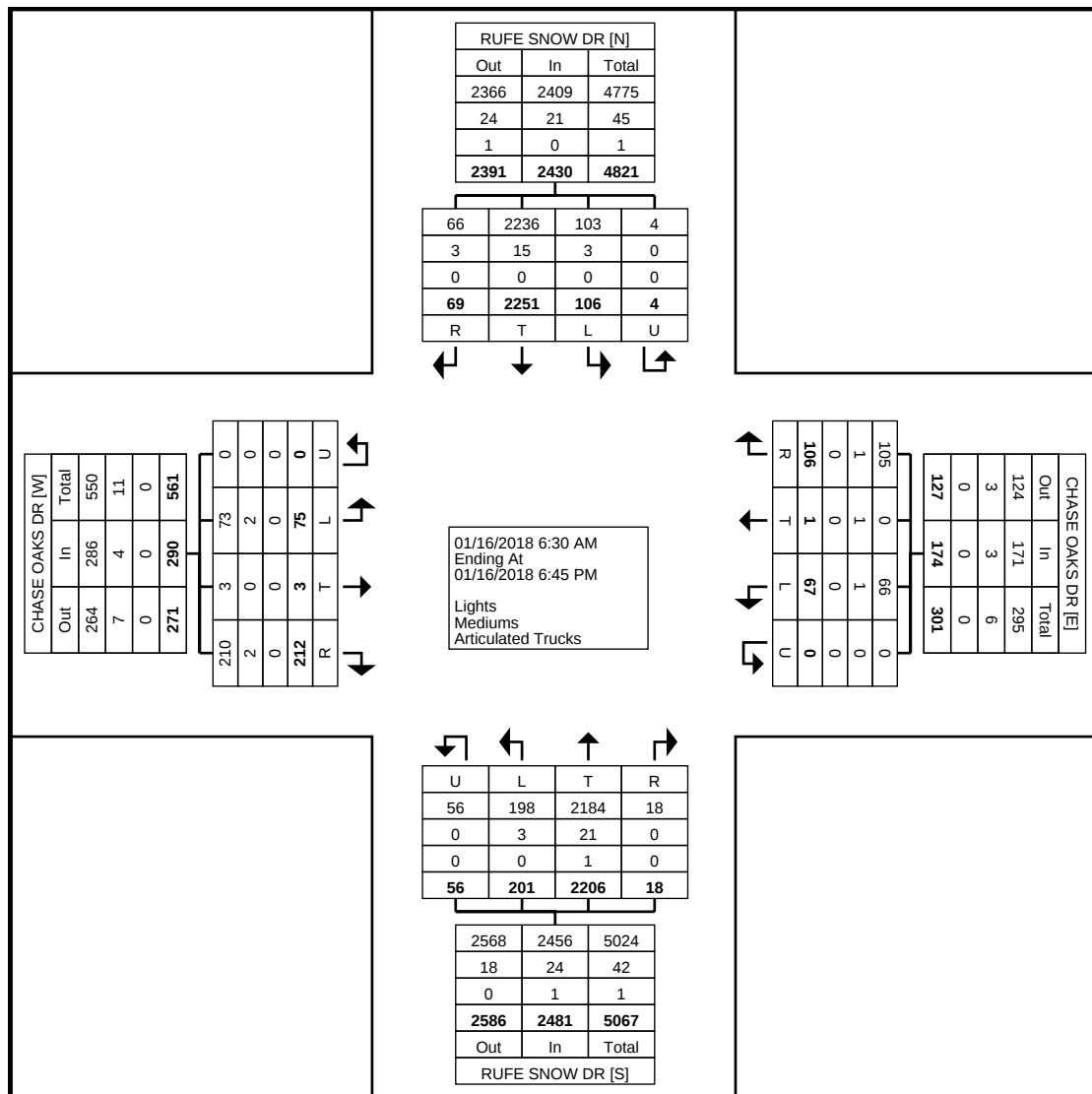
Start Time	RUFE SNOW DR Southbound					CHASE OAKS DR Westbound					RUFE SNOW DR Northbound					CHASE OAKS DR Eastbound					Int. Total
	Left	Thru	Right	U-Turn	App. Total	Left	Thru	Right	U-Turn	App. Total	Left	Thru	Right	U-Turn	App. Total	Left	Thru	Right	U-Turn	App. Total	
6:30 AM	3	66	1	0	70	2	0	1	0	3	1	75	1	0	77	2	0	10	0	12	162
6:45 AM	3	93	0	0	96	2	0	2	0	4	4	103	2	0	109	6	0	17	0	23	232
Hourly Total	6	159	1	0	166	4	0	3	0	7	5	178	3	0	186	8	0	27	0	35	394
7:00 AM	5	103	3	0	111	5	1	2	0	8	4	114	0	0	118	7	1	11	0	19	256
7:15 AM	5	121	0	0	126	1	0	5	0	6	2	119	0	0	121	7	0	19	0	26	279
7:30 AM	6	151	2	0	159	0	0	5	0	5	7	122	0	0	129	5	0	13	0	18	311
7:45 AM	9	128	4	0	141	3	0	5	0	8	6	173	2	2	183	7	0	18	0	25	357
Hourly Total	25	503	9	0	537	9	1	17	0	27	19	528	2	2	551	26	1	61	0	88	1203
8:00 AM	10	156	2	0	168	4	0	10	0	14	8	164	0	4	176	15	0	25	0	40	398
8:15 AM	5	129	6	0	140	3	0	5	0	8	5	172	0	6	183	6	0	13	0	19	350
8:30 AM	0	1	1	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2
*** BREAK ***	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Hourly Total	15	286	9	0	310	7	0	15	0	22	13	336	0	10	359	21	0	38	0	59	750
4:30 PM	2	165	6	0	173	4	0	3	0	7	24	144	2	4	174	4	0	9	0	13	367
4:45 PM	11	166	7	2	186	7	0	7	0	14	17	142	2	11	172	1	0	7	0	8	380
Hourly Total	13	331	13	2	359	11	0	10	0	21	41	286	4	15	346	5	0	16	0	21	747
5:00 PM	8	173	6	0	187	4	0	7	0	11	32	137	1	4	174	2	0	7	0	9	381
5:15 PM	4	206	5	0	215	7	0	9	0	16	14	159	3	3	179	2	0	10	0	12	422
5:30 PM	12	153	6	1	172	6	0	8	0	14	23	168	1	8	200	1	0	18	0	19	405
5:45 PM	13	173	5	1	192	5	0	16	0	21	14	138	0	4	156	5	0	11	0	16	385
Hourly Total	37	705	22	2	766	22	0	40	0	62	83	602	5	19	709	10	0	46	0	56	1593
6:00 PM	5	141	12	0	158	9	0	11	0	20	19	152	3	8	182	3	2	11	0	16	376
6:15 PM	5	125	3	0	133	5	0	10	0	15	21	124	1	2	148	2	0	13	0	15	311
6:30 PM	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
Grand Total	106	2251	69	4	2430	67	1	106	0	174	201	2206	18	56	2481	75	3	212	0	290	5375
Approach %	4.4	92.6	2.8	0.2	-	38.5	0.6	60.9	0.0	-	8.1	88.9	0.7	2.3	-	25.9	1.0	73.1	0.0	-	-
Total %	2.0	41.9	1.3	0.1	45.2	1.2	0.0	2.0	0.0	3.2	3.7	41.0	0.3	1.0	46.2	1.4	0.1	3.9	0.0	5.4	-
Lights	103	2236	66	4	2409	66	0	105	0	171	198	2184	18	56	2456	73	3	210	0	286	5322
% Lights	97.2	99.3	95.7	100.0	99.1	98.5	0.0	99.1	-	98.3	98.5	99.0	100.0	100.0	99.0	97.3	100.0	99.1	-	98.6	99.0
Mediums	3	15	3	0	21	1	1	1	0	3	3	21	0	0	24	2	0	2	0	4	52
% Mediums	2.8	0.7	4.3	0.0	0.9	1.5	100.0	0.9	-	1.7	1.5	1.0	0.0	0.0	1.0	2.7	0.0	0.9	-	1.4	1.0
Articulated Trucks	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0	1
% Articulated Trucks	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	-	0.0	0.0

GRAM Traffic NTX Inc.

1120 W. Lovers Lane

Arlington, Texas, United States 76013
817.265.8968

Count Name: 4 - CHASE OAKS
DR @ RUFE SNOW DR
Site Code:
Start Date: 01/16/2018
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Turning Movement Data Plot

GRAM Traffic NTX Inc.

1120 W. Lovers Lane

Arlington, Texas, United States 76013
817.265.8968

Count Name: 4 - CHASE OAKS
DR @ RUFÉ SNOW DR
Site Code:
Start Date: 01/16/2018
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Turning Movement Peak Hour Data (7:30 AM)

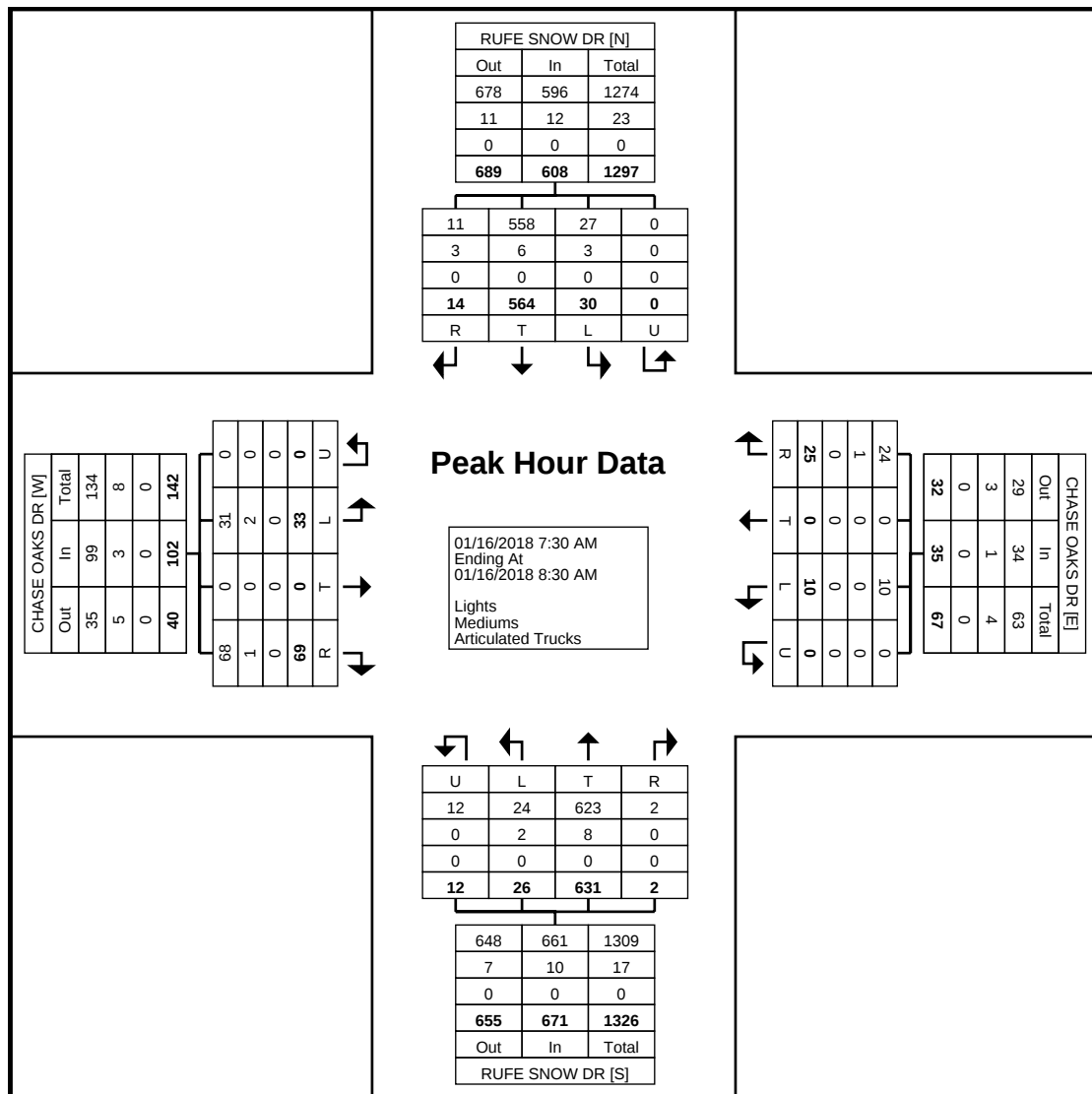
Start Time	RUFÉ SNOW DR Southbound					CHASE OAKS DR Westbound					RUFÉ SNOW DR Northbound					CHASE OAKS DR Eastbound					Int. Total
	Left	Thru	Right	U-Turn	App. Total	Left	Thru	Right	U-Turn	App. Total	Left	Thru	Right	U-Turn	App. Total	Left	Thru	Right	U-Turn	App. Total	
7:30 AM	6	151	2	0	159	0	0	5	0	5	7	122	0	0	129	5	0	13	0	18	311
7:45 AM	9	128	4	0	141	3	0	5	0	8	6	173	2	2	183	7	0	18	0	25	357
8:00 AM	10	156	2	0	168	4	0	10	0	14	8	164	0	4	176	15	0	25	0	40	398
8:15 AM	5	129	6	0	140	3	0	5	0	8	5	172	0	6	183	6	0	13	0	19	350
Total	30	564	14	0	608	10	0	25	0	35	26	631	2	12	671	33	0	69	0	102	1416
Approach %	4.9	92.8	2.3	0.0	-	28.6	0.0	71.4	0.0	-	3.9	94.0	0.3	1.8	-	32.4	0.0	67.6	0.0	-	-
Total %	2.1	39.8	1.0	0.0	42.9	0.7	0.0	1.8	0.0	2.5	1.8	44.6	0.1	0.8	47.4	2.3	0.0	4.9	0.0	7.2	-
PHF	0.750	0.904	0.583	0.000	0.905	0.625	0.000	0.625	0.000	0.625	0.813	0.912	0.250	0.500	0.917	0.550	0.000	0.690	0.000	0.638	0.889
Lights	27	558	11	0	596	10	0	24	0	34	24	623	2	12	661	31	0	68	0	99	1390
% Lights	90.0	98.9	78.6	-	98.0	100.0	-	96.0	-	97.1	92.3	98.7	100.0	100.0	98.5	93.9	-	98.6	-	97.1	98.2
Mediums	3	6	3	0	12	0	0	1	0	1	2	8	0	0	10	2	0	1	0	3	26
% Mediums	10.0	1.1	21.4	-	2.0	0.0	-	4.0	-	2.9	7.7	1.3	0.0	0.0	1.5	6.1	-	1.4	-	2.9	1.8
Articulated Trucks	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
% Articulated Trucks	0.0	0.0	0.0	-	0.0	0.0	-	0.0	-	0.0	0.0	0.0	0.0	0.0	0.0	0.0	-	0.0	-	0.0	0.0

GRAM Traffic NTX Inc.

1120 W. Lovers Lane

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Count Name: 4 - CHASE OAKS
DR @ RUFÉ SNOW DR
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Turning Movement Peak Hour Data Plot (7:30 AM)

GRAM Traffic NTX Inc.

1120 W. Lovers Lane

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Count Name: 4 - CHASE OAKS
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Turning Movement Peak Hour Data (5:00 PM)

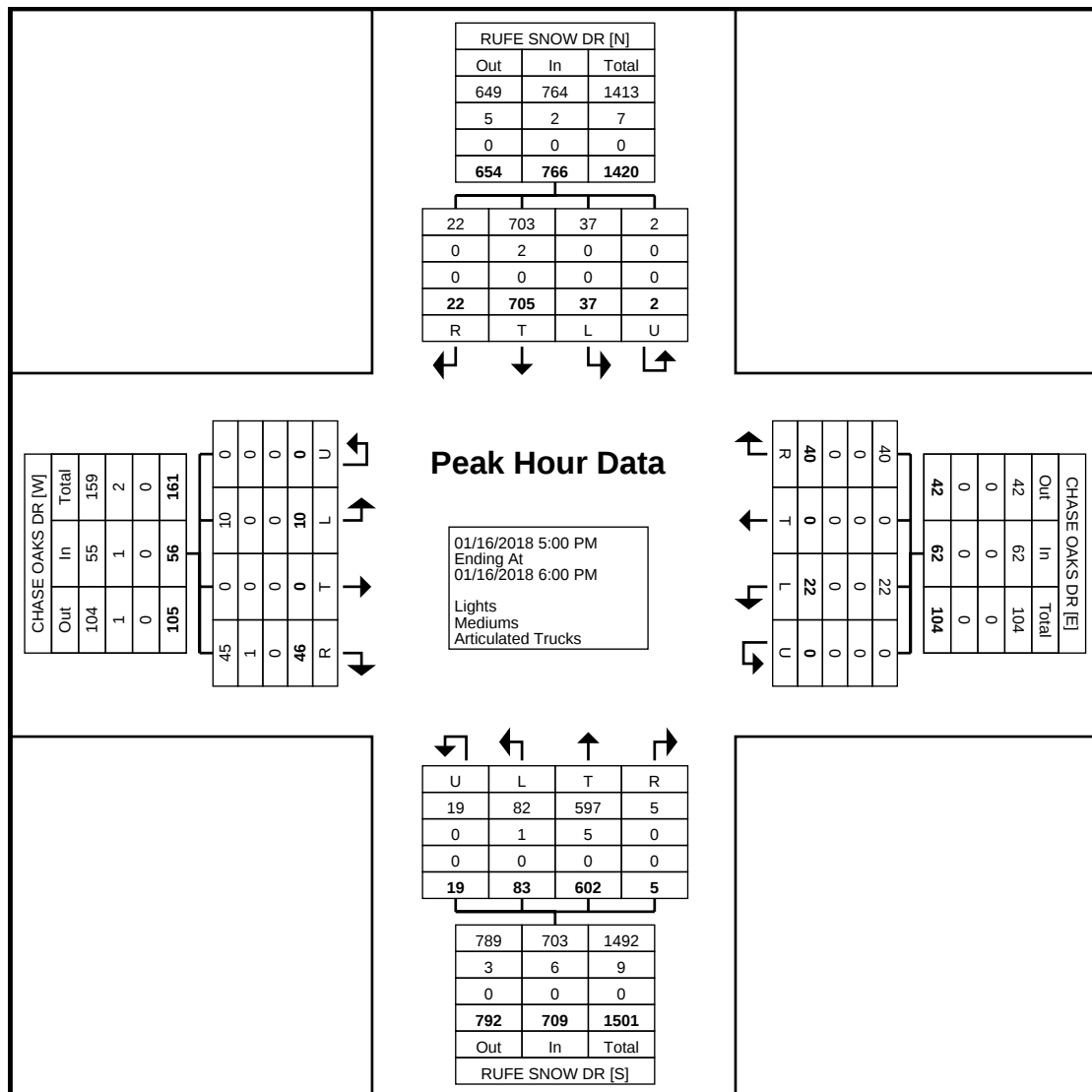
Start Time	RUFÉ SNOW DR Southbound					CHASE OAKS DR Westbound					RUFÉ SNOW DR Northbound					CHASE OAKS DR Eastbound					Int. Total
	Left	Thru	Right	U-Turn	App. Total	Left	Thru	Right	U-Turn	App. Total	Left	Thru	Right	U-Turn	App. Total	Left	Thru	Right	U-Turn	App. Total	
5:00 PM	8	173	6	0	187	4	0	7	0	11	32	137	1	4	174	2	0	7	0	9	381
5:15 PM	4	206	5	0	215	7	0	9	0	16	14	159	3	3	179	2	0	10	0	12	422
5:30 PM	12	153	6	1	172	6	0	8	0	14	23	168	1	8	200	1	0	18	0	19	405
5:45 PM	13	173	5	1	192	5	0	16	0	21	14	138	0	4	156	5	0	11	0	16	385
Total	37	705	22	2	766	22	0	40	0	62	83	602	5	19	709	10	0	46	0	56	1593
Approach %	4.8	92.0	2.9	0.3	-	35.5	0.0	64.5	0.0	-	11.7	84.9	0.7	2.7	-	17.9	0.0	82.1	0.0	-	-
Total %	2.3	44.3	1.4	0.1	48.1	1.4	0.0	2.5	0.0	3.9	5.2	37.8	0.3	1.2	44.5	0.6	0.0	2.9	0.0	3.5	-
PHF	0.712	0.856	0.917	0.500	0.891	0.786	0.000	0.625	0.000	0.738	0.648	0.896	0.417	0.594	0.886	0.500	0.000	0.639	0.000	0.737	0.944
Lights	37	703	22	2	764	22	0	40	0	62	82	597	5	19	703	10	0	45	0	55	1584
% Lights	100.0	99.7	100.0	100.0	99.7	100.0	-	100.0	-	100.0	98.8	99.2	100.0	100.0	99.2	100.0	-	97.8	-	98.2	99.4
Mediums	0	2	0	0	2	0	0	0	0	0	1	5	0	0	6	0	0	1	0	1	9
% Mediums	0.0	0.3	0.0	0.0	0.3	0.0	-	0.0	-	0.0	1.2	0.8	0.0	0.0	0.8	0.0	-	2.2	-	1.8	0.6
Articulated Trucks	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
% Articulated Trucks	0.0	0.0	0.0	0.0	0.0	0.0	-	0.0	-	0.0	0.0	0.0	0.0	0.0	0.0	0.0	-	0.0	-	0.0	0.0

GRAM Traffic NTX Inc.

1120 W. Lovers Lane

Arlington, Texas, United States 76013
817.265.8968

Count Name: 4 - CHASE OAKS
DR @ RUFE SNOW DR
Site Code:
Start Date: 01/16/2018
Page No: 6



Turning Movement Peak Hour Data Plot (5:00 PM)

HCM 2010 Signalized Intersection Summary
1: Willis Ln & N Tarrant Pkwy

Existing AM.syn
02/12/2018

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	39	902	47	267	507	34	49	66	280	74	115	59
Traffic Volume (veh/h)	39	902	47	267	507	34	49	66	280	74	115	59
Future Volume (veh/h)	5	2	12	1	6	16	3	8	18	7	4	14
Number	0	0	0	0	0	0	0	0	0	0	0	0
Initial Q (Qb) veh	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A, pbT)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/hln	1863	1863	1900	1863	1863	1900	1863	1863	1863	1863	1863	1863
Adj Sat Flow, veh/hln	41	949	49	281	534	36	52	69	295	78	121	62
Adj Flow Rate, veh/h	1	3	0	1	3	0	1	1	1	1	1	1
Adj No. of Lanes	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Peak Hour Factor	2	2	2	2	2	2	2	2	2	2	2	2
Percent Heavy Veh, %	471	1709	88	405	1966	131	363	409	348	361	423	360
Cap. veh/h	0.07	0.35	0.35	0.13	0.40	0.40	0.05	0.22	0.22	0.05	0.23	0.23
Arrive On Green	1774	4953	255	1774	4870	326	1774	1863	1583	1774	1863	1583
Sat Flow, veh/h	41	649	349	281	370	200	52	69	295	78	121	62
Grp Volume(V), veh/h	1774	1695	1818	1774	1695	1805	1774	1863	1583	1774	1863	1583
Grp Sat Flow(s), veh/hln	1.4	15.3	15.3	9.5	7.2	7.3	2.2	3.0	17.6	3.3	5.3	3.1
Q Serve(g, s)	1.4	15.3	15.3	9.5	7.2	7.3	2.2	3.0	17.6	3.3	5.3	3.1
Cycle Q Clear(g, c), s	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Prop In Lane	471	1170	627	405	1369	729	363	409	348	361	423	360
Lane Grp Cap(c), veh/h	0.09	0.55	0.56	0.69	0.27	0.27	0.14	0.17	0.85	0.22	0.29	0.17
V/C Ratio(X)	620	1379	739	540	1379	734	461	474	402	446	474	402
Avail Cap(c, a), veh/h	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	17.3	26.1	26.1	18.3	19.6	19.7	27.4	31.1	36.8	27.2	31.4	30.6
Uniform Delay (d), s/veh	0.1	0.9	1.7	3.9	0.2	0.4	0.3	0.4	16.5	0.4	0.8	0.5
Incr Delay (d2), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Initial Q Delay(d3), s/veh	0.7	7.3	7.9	5.0	3.4	3.7	1.1	1.6	9.3	1.6	2.8	1.4
%ile BackOfQ(50%) veh/h	17.5	27.0	27.8	22.1	19.9	20.1	27.7	31.5	53.3	27.6	32.2	31.0
LnGrp Delay(d), s/veh	B	C	C	C	B	C	C	C	D	C	C	C
LnGrp LOS	1039	851	851	416	261	261	261	261	261	261	261	261
Approach Vol, veh/h	26.9	20.7	20.7	46.5	30.5	30.5	30.5	30.5	30.5	30.5	30.5	30.5
Approach Delay, s/veh	C	C	C	D	C	C	C	C	C	C	C	C
Approach LOS	1	2	3	4	5	6	7	8	8	8	8	8
Timer	1	2	3	4	5	6	7	8	8	8	8	8
Assigned Phs	19.0	39.4	11.1	28.9	13.2	45.2	11.8	28.1	28.1	28.1	28.1	28.1
Phs Duration (G+Y+Rc), s	6.5	5.5	6.5	6.5	6.5	6.5	6.5	6.5	6.5	6.5	6.5	6.5
Change Period (Y+Rc), s	20.0	40.0	10.0	25.0	15.0	40.0	10.0	25.0	25.0	25.0	25.0	25.0
Max Green Setting (Gmax), s	11.5	17.3	4.2	7.3	3.4	9.3	5.3	19.6	19.6	19.6	19.6	19.6
Max Q Clear Time (g_c+I1), s	1.0	16.6	0.1	4.4	0.1	20.8	0.1	2.0	2.0	2.0	2.0	2.0
Green Ext Time (g_c), s												
Intersection Summary												
HCM 2010 Ctrl Delay	28.4											
HCM 2010 LOS	C											

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Synchro 9 Report
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HCM 2010 TWSC
2: N Tarrant Pkwy

Existing AM.syn
02/12/2018

Intersection	EBT	EBT	EBR	WBL	WBT	NBL	NBR
Int Delay, s/veh	1	1	1	1	1	1	1
Movement	EBT	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	1235	1235	11	11	810	28	31
Traffic Vol, veh/h	1235	1235	11	11	810	28	31
Future Vol, veh/h	1235	1235	11	11	810	28	31
Conflicting Peds, #/hr	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	-	-	-	-	-	-
Storage Length	-	-	-	-	-	-	-
Veh in Median Storage, #	0	0	0	0	0	0	0
Grade, %	0	0	0	0	0	0	0
Peak Hour Factor	90	90	90	90	90	90	90
Heavy Vehicles, %	2	2	2	2	2	2	2
Mvmt Flow	1372	12	12	900	31	34	34
Major/Minor	Major1	Major2	Minor1				
Conflicting Flow All	0	0	1384	0	1762	692	
Stage 1	-	-	-	-	1378	-	
Stage 2	-	-	-	-	384	-	
Critical Hwy	-	-	5.34	-	5.74	7.14	
Critical Hwy Sg 1	-	-	-	-	6.64	-	
Critical Hwy Sg 2	-	-	-	-	3.82	3.92	
Follow-up Hwy	-	-	254	-	125	331	
Pot Cap-1 Maneuver	-	-	-	-	141	-	
Stage 1	-	-	-	-	602	-	
Stage 2	-	-	-	-	-	-	
Platoon blocked, %	-	-	-	-	-	-	
Mov Cap-1 Maneuver	-	-	254	-	119	331	
Mov Cap-2 Maneuver	-	-	-	-	119	-	
Stage 1	-	-	-	-	141	-	
Stage 2	-	-	-	-	574	-	
Approach	EB	WB	NB				
HCM Control Delay, s	0	0.3	30.6				
HCM LOS	D						
Minor Lane/Major Mvmt	NBLn1	NBLn2	EBT	EBR	WBL	WBT	
Capacity (veh/h)	119	331	-	-	254	-	
HCM Lane V/C Ratio	0.261	0.104	-	-	0.048	-	
HCM Control Delay (s)	45.6	17.1	-	-	19.9	-	
HCM Lane LOS	E	C	-	-	C	-	
HCM 95th %ile Q(veh)	1	0.3	-	-	0.2	-	

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Synchro 9 Report
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HCM 2010 Signalized Intersection Summary

Existing AM.syn
02/12/2018

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Traffic Volume (veh/h)	280	931	109	60	463	98	128	315	141	178	264	215
Future Volume (veh/h)	280	931	109	60	463	98	128	315	141	178	264	215
Number	7	4	14	3	8	18	1	6	16	5	2	12
Initial Q (Qb) veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A, pbt)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/hln	1863	1863	1900	1863	1863	1900	1863	1863	1900	1863	1863	1900
Adj Flow Rate, veh/h	292	970	114	62	482	102	133	328	147	185	275	224
Adj No. of Lanes	1	3	0	1	3	0	1	2	0	1	2	0
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap. veh/h	472	1462	171	290	1015	210	334	406	218	359	422	333
Arrive On Green	0.15	0.32	0.32	0.07	0.24	0.24	0.09	0.21	0.21	0.11	0.22	0.22
Sat Flow, veh/h	1774	4616	541	1774	4226	873	1774	2394	1052	1774	1884	1486
Grp Volume(V), veh/h	292	712	372	62	394	200	133	241	234	185	258	241
Grp Sat Flow(S), veh/hln	1774	1695	1767	1774	1695	1709	1774	1770	1677	1774	1770	1600
Q Serve(g, s)	8.4	13.3	13.3	1.8	7.1	7.3	4.2	9.1	9.4	5.8	9.7	10.1
Cycle Q Clear(g, c), s	8.4	13.3	13.3	1.8	7.1	7.3	4.2	9.1	9.4	5.8	9.7	10.1
Prop In Lane	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lane Grp Cap(c), veh/h	472	1074	560	290	814	410	334	366	347	359	396	358
V/C Ratio(X)	0.62	0.66	0.66	0.21	0.47	0.49	0.40	0.66	0.67	0.52	0.65	0.67
Avail Cap(c, a), veh/h	700	1857	968	654	1857	936	662	848	804	656	848	767
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	16.0	21.6	21.6	18.5	23.8	23.9	20.2	26.6	26.7	20.0	25.7	25.9
Incr Delay (d2), s/veh	0.5	0.3	0.5	0.1	0.2	0.3	0.3	0.8	0.9	0.4	0.7	0.8
Initial Q Delay(Q3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%), s/vehln	4.1	6.2	6.5	0.9	3.3	3.5	2.0	4.5	4.4	2.9	4.8	4.5
LnGrp Delay(d), s/veh	16.5	21.8	22.1	18.7	23.9	24.2	20.4	27.3	27.5	20.4	26.4	26.7
LnGrp LOS	B	C	C	B	C	C	C	C	C	C	C	C
Approach Vol, veh/h	1376			646			608				684	
Approach Delay, s/veh	20.8			23.5			25.9				24.9	
Approach LOS	C			C			C				C	
Timer	1	2	3	4	5	6	7	8				
Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	12.0	21.9	10.5	28.6	13.3	20.6	16.1	23.0				
Change Period (Y+Rc), s	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5				
Max Green Setting (Cmax), s	20.0	35.0	20.0	40.0	20.0	35.0	20.0	40.0				
Max Q Clear Time (g_c+I1), s	6.2	12.1	3.8	15.3	7.8	11.4	10.4	9.3				
Green Ext Time (p_c), s	0.1	3.7	0.0	7.8	0.1	3.7	0.2	8.2				
Intersection Summary												
HCM 2010 Ctrl Delay				23.1								
HCM 2010 LOS				C								

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HCM 2010 TWSC

Existing AM.syn
02/12/2018

4: Rufe Snow Dr & Chase Oaks Dr

Intersection	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
In Delay, s/veh	2.3											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Traffic Vol, veh/h	33	0	69	10	0	25	26	631	2	30	564	14
Future Vol, veh/h	33	0	69	10	0	25	26	631	2	30	564	14
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	0	-	-	0	115	-	-	125	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	89	89	89	89	89	89	89	89	89	89	89	89
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	37	0	78	11	0	28	29	709	2	34	634	16
Major/Minor	Minor2	Minor1	Minor1	Major1	Major1	Major2						
Conflicting Flow All	1122	1479	325	1153	1486	356	649	0	0	711	0	0
Stage 1	709	709	-	769	769	-	-	-	-	-	-	-
Stage 2	413	770	-	384	717	-	-	-	-	-	-	-
Critical Hwy	7.54	6.54	6.94	7.54	6.54	6.94	4.14	-	-	4.14	-	-
Critical Hwy Sig 1	6.54	5.54	-	6.54	5.54	-	-	-	-	-	-	-
Critical Hwy Sig 2	6.54	5.54	-	6.54	5.54	-	-	-	-	-	-	-
Follow-up Hwy	3.52	4.02	3.32	3.52	4.02	3.32	2.22	-	-	2.22	-	-
Pot Cap-1 Maneuver	161	125	671	152	123	640	933	-	-	884	-	-
Stage 1	391	435	-	360	409	-	-	-	-	-	-	-
Stage 2	587	408	-	611	432	-	-	-	-	-	-	-
Platoon blocked, %												
Mov Cap-1 Maneuver	146	116	671	127	115	640	933	-	-	884	-	-
Mov Cap-2 Maneuver	146	116	-	127	115	-	-	-	-	-	-	-
Stage 1	379	418	-	349	396	-	-	-	-	-	-	-
Stage 2	544	395	-	520	415	-	-	-	-	-	-	-
Approach	EB	WB	NB	NB	SB	SB						
HCM Control Delay, s	19.8		18.1		0.4	0.5						
HCM LOS	C		C									
Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	EBLn2	WBLn1	WBLn2	SBL	SBT	SBR		
Capacity (veh/h)	933	-	-	146	671	127	640	884	-	-	-	-
HCM Lane V/C Ratio	0.031	-	-	0.254	0.116	0.088	0.044	0.038	-	-	-	-
HCM Control Delay (s)	9	-	-	37.9	11.1	36.1	10.9	9.2	-	-	-	-
HCM Lane LOS	A	-	-	E	B	E	B	A	-	-	-	-
HCM 95th %ile Q(veh)	0.1	-	-	1	0.4	0.3	0.1	0.1	-	-	-	-

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Synchro 9 Report
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HCM 2010 Signalized Intersection Summary
 1: Willis Ln & N Tarrant Pkwy

Existing PM.syn
 02/12/2018

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	35	767	28	126	1082	45	17	23	139	54	33	30
Traffic Volume (veh/h)	35	767	28	126	1082	45	17	23	139	54	33	30
Future Volume (veh/h)	5	2	12	1	6	16	3	8	18	7	4	14
Number	0	0	0	0	0	0	0	0	0	0	0	0
Initial Q (Qb) veh	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A, pbt)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/hln	1863	1863	1900	1863	1863	1900	1863	1863	1863	1863	1863	1863
Adj Flow Rate, veh/h	39	862	31	142	1216	51	19	26	156	61	37	34
Adj No. of Lanes	1	3	0	1	3	0	1	1	1	1	1	1
Peak Hour Factor	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap. veh/h	329	2094	75	461	2283	96	307	253	215	324	304	259
Arrive On Green	0.07	0.42	0.42	0.11	0.46	0.46	0.03	0.14	0.14	0.05	0.16	0.16
Sat Flow, veh/h	1774	5040	181	1774	5006	210	1774	1863	1583	1774	1863	1583
Grp Volume(V), veh/h	39	579	314	142	823	444	19	26	156	61	37	34
Grp Sat Flow(S), veh/hln	1774	1895	1831	1774	1695	1826	1774	1863	1583	1774	1863	1583
Q Serve(g, s)	1.0	10.6	10.6	3.6	15.3	15.3	0.8	1.1	8.3	2.5	1.5	1.6
Cycle Q Clear(g, c), s	1.0	10.6	10.6	3.6	15.3	15.3	0.8	1.1	8.3	2.5	1.5	1.6
Prop In Lane	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lane Grp Cap(c), veh/h	329	1409	761	461	1546	833	307	253	215	324	304	259
V/C Ratio(X)	0.12	0.41	0.41	0.31	0.53	0.53	0.06	0.10	0.73	0.19	0.12	0.13
Avail Cap(c, a), veh/h	508	1547	836	670	1547	833	464	531	452	433	531	452
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	12.7	18.1	18.1	11.5	17.1	17.1	31.2	33.2	36.3	29.9	31.3	31.3
Incr Delay (d2), s/veh	0.3	0.4	0.8	0.6	0.7	1.2	0.1	0.4	9.5	0.4	0.4	0.5
Initial Q Delay(Q3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%), s/vehln	0.5	5.0	5.5	1.8	7.2	7.9	0.4	0.6	4.2	1.3	0.8	0.7
LnGrp Delay(d), s/veh	13.0	18.5	18.8	12.2	17.8	18.3	31.3	33.6	45.8	30.3	31.7	31.8
LnGrp LOS	B	B	B	B	B	B	C	C	D	C	C	C
Approach Vol, veh/h	932			1409			201				132	
Approach Delay, s/veh	18.4			17.4			42.8				31.1	
Approach LOS	B			B			D				C	
Timer	1	2	3	4	5	6	7	8				
Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	16.2	41.9	8.7	20.8	12.6	45.5	11.1	18.4				
Change Period (Y+Rc), s	6.5	5.5	6.5	6.5	6.5	5.5	6.5	6.5				
Max Green Setting (Gmax), s	20.0	40.0	10.0	25.0	15.0	40.0	10.0	25.0				
Max Q Clear Time (g_c+H), s	5.6	12.6	2.8	3.6	3.0	17.3	4.5	10.3				
Green Ext Time (g_c), s	0.6	23.8	0.0	2.0	0.1	20.1	0.1	1.6				
Intersection Summary												
HCM 2010 Ctrl Delay				20.3								
HCM 2010 LOS				C								

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HCM 2010 TWSC
 2: N Tarrant Pkwy

Existing PM.syn
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Intersection	EBT	EBR	WBT	WBR	NBT	NBR	SBT	SBR
Int Delay, s/veh	0.5							
Movement	EBT	EBR	WBT	WBR	NBT	NBR	SBT	SBR
Lane Configurations	444	444	444	444	444	444	444	444
Traffic Vol, veh/h	967	21	32	1289	12	9		
Future Vol, veh/h	967	21	32	1289	12	9		
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None	-	None
Storage Length	-	-	120	-	0	0	-	-
Veh in Median Storage, #	0	-	-	0	0	0	-	-
Grade, %	0	-	-	0	0	0	-	-
Peak Hour Factor	95	95	95	95	95	95	95	95
Heavy Vehicles, %	2	2	2	2	2	2	2	2
Mvmt Flow	1018	22	34	1357	13	9		
Major/Minor	Major1	Major2	Minor1					
Conflicting Flow All	0	0	1040	0	1639	520		
Stage 1	-	-	-	-	1029	-		
Stage 2	-	-	-	-	610	-		
Critical Hwy	-	-	5.34	-	5.74	7.14		
Critical Hwy Sg 1	-	-	-	-	6.64	-		
Critical Hwy Sg 2	-	-	-	-	3.82	3.92		
Follow-up Hwy	-	-	3.12	-	342	429		
Pot Cap-1 Maneuver	-	-	374	-	146	429		
Stage 1	-	-	-	-	232	-		
Stage 2	-	-	-	-	460	-		
Platoon blocked, %	-	-	-	-	-	-		
Mov Cap-1 Maneuver	-	-	374	-	133	429		
Mov Cap-2 Maneuver	-	-	-	-	133	-		
Stage 1	-	-	-	-	232	-		
Stage 2	-	-	-	-	418	-		
Approach	EB	WB	NB					
HCM Control Delay, s	0	0.4	25.8					
HCM LOS		D						
Minor Lane/Major Mvmt	NBLn1	NBLn2	EBT	EBR	WBL	WBT		
Capacity (veh/h)	133	429	-	-	374	-		
HCM Lane V/C Ratio	0.095	0.022	-	-	0.09	-		
HCM Control Delay (s)	34.9	13.6	-	-	15.6	-		
HCM Lane LOS	D	B	-	-	C	-		
HCM 95th %ile Q(veh)	0.3	0.1	-	-	0.3	-		

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HCM 2010 Signalized Intersection Summary

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Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	202	509	205	201	856	139	215	344	97	132	461	179
Traffic Volume (veh/h)	202	509	205	201	856	139	215	344	97	132	461	179
Future Volume (veh/h)	7	4	14	3	8	18	1	6	16	5	2	12
Number	0	0	0	0	0	0	0	0	0	0	0	0
Initial Q (Q ₀) veh	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A _{pbt})	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/hln	1863	1863	1900	1863	1863	1900	1863	1863	1900	1863	1863	1900
Adj Sat Flow, veh/hln	220	553	223	218	930	151	234	374	105	143	501	195
Adj Flow Rate, veh/h	1	3	0	1	3	0	1	2	0	1	2	0
Adj No. of Lanes	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Peak Hour Factor	2	2	2	2	2	2	2	2	2	2	2	2
Percent Heavy Veh, %	319	1066	418	376	1305	211	330	796	221	375	629	243
Cap. veh/h	0.11	0.30	0.30	0.11	0.30	0.30	0.12	0.29	0.29	0.08	0.25	0.25
Arrive On Green	1774	3595	1410	1774	4413	714	1774	2739	760	1774	2496	966
Sat Flow, veh/h	220	521	255	218	714	367	234	240	239	143	354	342
Grp Volume(V), veh/h	1774	1895	1614	1774	1695	1737	1774	1770	1729	1774	1770	1692
Grp Sat Flow(S), veh/hln	8.1	12.3	12.7	8.1	18.1	18.2	9.2	10.7	11.0	5.7	18.0	18.2
Q Served(g.s), s	8.1	12.3	12.7	8.1	18.1	18.2	9.2	10.7	11.0	5.7	18.0	18.2
Cycle Q Clear(g_c), s	1.00	0.87	1.00	1.00	1.00	1.00	0.41	1.00	0.44	1.00	0.57	1.00
Prop In Lane	319	1005	479	376	1003	514	330	514	502	375	446	426
Lane Grp Cap(c), veh/h	0.69	0.52	0.53	0.58	0.71	0.72	0.71	0.47	0.48	0.38	0.80	0.80
V/C Ratio(X)	499	1409	671	557	1409	722	490	643	629	605	643	615
Avail Cap(c.a), veh/h	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	22.5	28.1	28.3	20.9	30.2	30.3	24.4	28.0	28.1	23.8	33.7	33.7
Uniform Delay (d), s/veh	1.0	0.2	0.3	0.5	0.4	0.8	1.1	0.2	0.3	0.2	2.7	3.0
Incr Delay (d2), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Initial Q Delay(Q3), s/veh	4.1	5.7	5.7	4.0	8.5	8.8	4.6	5.2	5.3	2.8	9.1	8.9
%ile BackOfQ(50%) veh/hln	23.5	28.3	28.6	21.4	30.6	31.1	25.5	28.3	28.4	24.0	36.3	36.7
LnGrp Delay(d), s/veh	C	C	C	C	C	C	C	C	C	C	C	D
LnGrp LOS	C	C	C	C	C	C	C	C	C	C	C	D
Approach Vol, veh/h	996			1299			713				839	
Approach Delay, s/veh	27.3			29.2			27.4				34.4	
Approach LOS	C			C			C				C	
Timer	1	2	3	4	5	6	7	8				
Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	16.8	29.7	15.7	34.0	13.1	33.5	15.7	34.0				
Change Period (Y+Rc), s	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5				
Max Green Setting (G _{max}), s	20.0	35.0	20.0	40.0	20.0	35.0	20.0	40.0				
Max Q Clear Time (g_c+H), s	11.2	20.2	10.1	14.7	7.7	13.0	10.1	20.2				
Green Ext Time (g_c), s	0.1	4.0	0.1	9.1	0.1	4.5	0.1	8.3				
Intersection Summary												
HCM 2010 Ctrl Delay				29.5								
HCM 2010 LOS				C								

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4: Rufe Snow Dr & Chase Oaks Dr

Intersection	2.3											
In Delay, s/veh	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	4	4	4	4	4	4	4	4	4	4	4	4
Traffic Vol, veh/h	10	0	46	22	0	40	83	602	5	37	705	22
Future Vol, veh/h	10	0	46	22	0	40	83	602	5	37	705	22
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	0	-	-	0	115	-	-	125	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	94	94	94	94	94	94	94	94	94	94	94	94
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	11	0	49	23	0	43	88	640	5	39	750	23
Major/Minor	Minor2	Minor2	Minor1	Minor1	Major1	Major1	Major2	Major2	Major2	Major2	Major2	Major2
Conflicting Flow All	1337	1662	387	1274	1672	323	773	0	0	646	0	0
Stage 1	840	840	-	820	820	-	-	-	-	-	-	-
Stage 2	497	822	-	454	852	-	-	-	-	-	-	-
Critical Hwy	7.54	6.54	6.94	7.54	6.54	6.94	4.14	-	-	4.14	-	-
Critical Hwy Sig 1	6.54	5.54	-	6.54	5.54	-	-	-	-	-	-	-
Critical Hwy Sig 2	6.54	5.54	-	6.54	5.54	-	-	-	-	-	-	-
Follow-up Hwy	3.52	4.02	3.32	3.52	4.02	3.32	2.22	-	-	2.22	-	-
Pot Cap-1 Maneuver	111	96	611	124	95	673	838	-	-	935	-	-
Stage 1	326	379	-	335	387	-	-	-	-	-	-	-
Stage 2	523	386	-	555	374	-	-	-	-	-	-	-
Platoon blocked, %	-	-	-	-	-	-	-	-	-	-	-	-
Mov Cap-1 Maneuver	93	82	611	102	81	673	838	-	-	935	-	-
Mov Cap-2 Maneuver	93	82	-	102	81	-	-	-	-	-	-	-
Stage 1	292	363	-	300	346	-	-	-	-	-	-	-
Stage 2	438	345	-	489	358	-	-	-	-	-	-	-
Approach	EB	WB	WB	WB	NB	NB	SB	SB	SB	SB	SB	SB
HCM Control Delay, s	18	24.8	24.8	24.8	1.2	1.2	0.4	0.4	0.4	0.4	0.4	0.4
HCM LOS	C	C	C	C	C	C	C	C	C	C	C	C
Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	EBLn2	WBLn1	WBLn2	SBL	SBT	SBR	SBR	SBR
Capacity (veh/h)	838	-	-	93	611	102	673	935	-	-	-	-
HCM Lane V/C Ratio	0.105	-	-	0.114	0.08	0.229	0.063	0.042	-	-	-	-
HCM Control Delay (s)	9.8	-	-	48.6	11.4	50.5	10.7	9	-	-	-	-
HCM Lane LOS	A	-	-	E	B	F	B	A	-	-	-	-
HCM 95th %ile Q(veh)	0.4	-	-	0.4	0.3	0.8	0.2	0.1	-	-	-	-

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HCM 2010 Signalized Intersection Summary
1: Willis Ln & N Tarrant Pkwy

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Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	42	974	51	288	548	37	53	71	302	80	124	64
Traffic Volume (veh/h)	42	974	51	288	548	37	53	71	302	80	124	64
Future Vol. veh/h	5	2	12	1	6	16	3	8	18	7	4	14
Number	0	0	0	0	0	0	0	0	0	0	0	0
Initial Q (Q ₀) veh	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A _{pbt})	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/hln	1863	1863	1900	1863	1863	1900	1863	1863	1863	1863	1863	1863
Adj Flow Rate, veh/h	44	1025	54	303	577	39	56	75	318	84	131	67
Adj No. of Lanes	1	3	0	1	3	0	1	1	1	1	1	1
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh. %	2	2	2	2	2	2	2	2	2	2	2	2
Cap. veh/h	455	1690	89	395	1973	132	361	423	360	357	436	370
Arrive On Green	0.07	0.34	0.34	0.13	0.41	0.41	0.05	0.23	0.23	0.05	0.23	0.23
Sat Flow, veh/h	1774	4947	260	1774	4869	327	1774	1863	1583	1774	1863	1583
Grp Volume(V), veh/h	44	702	377	303	401	215	56	75	318	84	131	67
Grp Sat Flow(S), veh/hln	1774	1695	1817	1774	1695	1805	1774	1863	1583	1774	1863	1583
Q Served(g.s), s	1.5	17.6	17.6	10.6	8.1	8.2	2.4	3.3	19.9	3.7	5.9	3.5
Cycle Q Clear(g_c), s	1.5	17.6	17.6	10.6	8.1	8.2	2.4	3.3	19.9	3.7	5.9	3.5
Prop In Lane	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lane Grp Cap(c), veh/h	455	1158	621	395	1374	731	361	423	360	357	436	370
V/C Ratio(X)	0.10	0.61	0.61	0.77	0.29	0.29	0.16	0.18	0.88	0.24	0.30	0.18
Avail Cap(c.a), veh/h	591	1326	711	506	1374	731	451	455	387	436	455	387
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	18.2	28.0	28.0	19.9	20.5	20.5	28.0	31.8	38.2	27.8	32.3	31.3
Incr Delay (d2), s/veh	0.2	1.2	2.2	7.0	0.2	0.5	0.3	0.4	21.7	0.5	0.8	0.5
Initial Q Delay(Q3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%) veh/h	0.8	8.4	9.2	5.9	3.8	4.2	1.2	1.8	10.8	1.8	3.2	1.6
LnGrp Delay(d), s/veh	18.3	29.1	30.2	26.9	20.8	21.0	28.2	32.2	59.9	28.3	33.1	31.8
LnGrp LOS	B	C	C	C	C	C	C	C	E	C	C	C
Approach Vol, veh/h	1123			919			449				282	
Approach Delay, s/veh	29.1			22.8			51.3				31.4	
Approach LOS	C			C			D				C	
Timer	1	2	3	4	5	6	7	8				
Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	20.1	40.4	11.3	30.4	13.6	46.9	11.9	29.7				
Change Period (Y+Rc), s	6.5	5.5	6.5	6.5	6.5	5.5	6.5	6.5				
Max Green Setting (Cmax), s	20.0	40.0	10.0	25.0	15.0	40.0	10.0	25.0				
Max Q Clear Time (g_c+H), s	12.6	19.6	4.4	7.9	3.5	10.2	5.7	21.9				
Green Ext Time (g_c), s	1.0	15.3	0.1	4.8	0.1	21.7	0.1	1.4				
Intersection Summary												
HCM 2010 Ctrl Delay					30.8							
HCM 2010 LOS					C							

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Intersection	16											
In Delay, s/veh												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	4+T+T	4+T+T		4+T+T	4+T+T		4+T+T	4+T+T		4+T+T	4+T+T	
Traffic Vol. veh/h	0	1334	12	12	875	0	30	0	33	0	0	0
Future Vol. veh/h	0	1334	12	12	875	0	30	0	33	0	0	0
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	-	-	-	120	-	-	-	-	0	-	-	0
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	90	90	90	90	90	90	90	90	90	90	90	90
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	1482	13	13	972	0	33	0	37	0	0	0
Major/Minor	Major1	Major2	Minor1	Minor2								
Conflicting Flow All	972	0	0	1496	0	0	1905	2488	748	1592	2495	486
Stage 1	-	-	-	-	-	-	-	1489	1489	-	999	999
Stage 2	-	-	-	-	-	-	-	416	999	-	593	1496
Critical Hwy Sig 1	5.34	-	-	5.34	-	-	-	6.44	6.54	7.14	6.44	6.54
Critical Hwy Sig 2	-	-	-	-	-	-	-	7.34	5.54	-	7.34	5.54
Follow-up Hwy	3.12	-	-	3.12	-	-	-	3.82	4.02	3.92	4.02	3.92
Pot Cap-1 Maneuver	404	-	-	224	-	0	73	29	305	113	29	451
Stage 1	-	-	-	-	-	0	90	186	-	199	319	-
Stage 2	-	-	-	-	-	0	535	319	-	418	184	-
Platoon blocked, %	-	-	-	-	-	-	-	-	-	-	-	-
Mov Cap-1 Maneuver	404	-	-	224	-	-	70	27	305	95	27	451
Mov Cap-2 Maneuver	-	-	-	-	-	-	70	27	-	95	27	-
Stage 1	-	-	-	-	-	-	90	186	-	199	300	-
Stage 2	-	-	-	-	-	-	504	300	-	368	184	-
Approach	EB	WB	NB	SB								
HCM Control Delay, s	0	0.3	55.5	0								
HCM LOS		F	A									
Minor Lane/Major Mvmt	NBLn1	NBLn2	EBL	EBT	EBR	WBL	WBL	WBLn1	SBLn2			
Capacity (veh/h)	70	305	404	-	224	-	-	-	-	-	-	-
HCM Lane V/C Ratio	0.476	0.12	-	-	-	0.06	-	-	-	-	-	-
HCM Control Delay (s)	96.4	18.4	0	-	-	22.1	-	0	0			
HCM Lane LOS	F	C	A	-	C	-	A	-	A			
HCM 95th %ile Q(veh)	1.9	0.4	0	-	0.2	-	-	-	-			

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HCM 2010 Signalized Intersection Summary
3: Rufe Snow Dr & N Tarrant Pkwy

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Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations													
Future Volume (veh/h)	302	1005	118	65	500	106	138	340	152	192	285	232	
Future Volume (veh/h)	302	1005	118	65	500	106	138	340	152	192	285	232	
Number	7	4	14	3	8	18	1	6	16	5	2	12	
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0	
Ped-Bike Adj(A, pbt)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Adj Sat Flow, veh/hln	1863	1863	1900	1863	1863	1900	1863	1863	1900	1863	1863	1900	
Adj Flow Rate, veh/h	315	1047	123	68	521	110	144	354	158	200	297	242	
Adj No. of Lanes	1	3	0	1	3	0	1	2	0	1	2	0	
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2	
Cap. veh/h	469	1525	179	275	1044	216	321	514	225	354	453	359	
Arrive On Green	0.15	0.33	0.33	0.07	0.25	0.25	0.08	0.21	0.21	0.11	0.24	0.24	
Sat Flow, veh/h	1774	4616	541	1774	4226	873	1774	2395	1051	1774	1879	1490	
Grp Volume(v), veh/h	315	769	401	68	416	215	144	260	252	200	279	260	
Grp Sat Flow(S), veh/hln	1774	1695	1767	1774	1695	1709	1774	1770	1677	1774	1770	1600	
Q Serve(g, s), s	9.9	15.7	15.7	2.2	8.4	8.7	4.9	10.8	11.1	6.8	11.3	11.7	
Cycle Q Clear(g_c), s	9.9	15.7	15.7	2.2	8.4	8.7	4.9	10.8	11.1	6.8	11.3	11.7	
Prop In Lane	1.00	0.31	1.00	1.00	0.51	1.00	0.63	1.00	0.63	1.00	0.93	0.93	
Lane Grp Cap(c), veh/h	469	1120	584	275	838	422	321	379	360	354	426	385	
v/c Ratio(X)	0.67	0.69	0.69	0.25	0.50	0.51	0.45	0.69	0.70	0.57	0.65	0.67	
Avail Cap(c, a), veh/h	645	1700	886	599	1700	857	616	777	736	602	777	702	
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Uniform Delay (d), s/veh	17.3	23.1	23.1	20.0	25.8	25.9	22.0	28.8	29.0	21.4	27.3	27.4	
Incr Delay (d2), s/veh	0.6	0.3	0.5	0.2	0.2	0.4	0.4	0.8	0.9	0.5	0.6	0.8	
Initial Q Delay(Q3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
%ile BackOfQ(50%), veh/h	4.9	7.3	7.7	1.1	3.9	4.1	2.4	5.4	5.2	3.3	5.6	5.3	
LnGrp Delay(d), s/veh	17.9	23.4	23.7	20.2	25.9	26.2	22.4	29.7	29.9	22.0	27.9	28.2	
LnGrp LOS	B	C	C	C	C	C	C	C	C	C	C	C	
Approach Vol, veh/h	1485												
Approach Delay, s/veh	22.3												
Approach LOS	C												
Timer	1	2	3	4	5	6	7	8					
Assigned Phs	1	2	3	4	5	6	7	8					
Phs Duration (G+Y+Rc), s	12.2	24.7	10.9	31.9	14.3	22.6	17.6	25.2					
Change Period (Y+Rc), s	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5					
Max Green Setting (Gmax), s	20.0	35.0	20.0	40.0	20.0	35.0	20.0	40.0					
Max Q Clear Time (g_c+I), s	6.9	13.7	4.2	17.7	8.8	13.1	11.9	10.7					
Green Ext Time (p_c), s	0.1	4.0	0.0	8.3	0.1	4.0	0.2	9.1					
Intersection Summary													
HCM 2010 Ctrl Delay	24.8												
HCM 2010 LOS	C												

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HCM 2010 TWSC

4: Rufe Snow Dr & Chase Oaks Dr

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Intersection	2.6											
	Int Delay, s/veh											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔	↔	↔	↔	↔		↔	↔	↔	↔	↔
Traffic Vol, veh/h	36	0	75	11	0	27	28	681	2	32	609	15
Future Vol, veh/h	36	0	75	11	0	27	28	681	2	32	609	15
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Stop Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	0	-	-	0	115	-	-	125	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	89	89	89	89	89	89	89	89	89	89	89	89
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	40	0	84	12	0	30	31	765	2	36	684	17
Major/Minor	Minor2	Minor2	Minor1	Minor1	Minor1	Major1	Major1	Major2				
Conflicting Flow All	1211	1595	351	1243	1602	384	701	0	0	767	0	0
Stage 1	765	765	-	829	829	-	-	-	-	-	-	-
Stage 2	446	830	-	414	773	-	-	-	-	-	-	-
Critical Hdwy	7.54	6.54	6.94	7.54	6.54	6.94	4.14	-	-	4.14	-	-
Critical Hdwy Sig 1	6.54	5.54	-	6.54	5.54	-	-	-	-	-	-	-
Critical Hdwy Sig 2	6.54	5.54	-	6.54	5.54	-	-	-	-	-	-	-
Follow-up Hdwy	3.52	4.02	3.32	3.52	4.02	3.32	2.22	-	-	2.22	-	-
Pot Cap-1 Maneuver	138	106	645	131	105	614	892	-	-	842	-	-
Stage 1	362	410	-	331	383	-	-	-	-	-	-	-
Stage 2	561	383	-	586	407	-	-	-	-	-	-	-
Platoon blocked, %	-	-	-	-	-	-	-	-	-	-	-	-
Mov Cap-1 Maneuver	124	98	645	107	97	614	892	-	-	842	-	-
Mov Cap-2 Maneuver	124	98	-	107	97	-	-	-	-	-	-	-
Stage 1	349	392	-	319	370	-	-	-	-	-	-	-
Stage 2	515	370	-	488	390	-	-	-	-	-	-	-
Approach	EB	WB	NB	NB	SB	SB						
HCM Control Delay, s	23.1	20.4	0.4	0.4	0.5	0.5						
HCM LOS	C	C										
Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	EBLn2	WBLn1	WBLn2	SBL	SBT	SBR		
Capacity (veh/h)	892	-	-	124	645	107	614	842	-	-		
HCM Lane V/C Ratio	0.035	-	-	0.326	0.131	0.116	0.049	0.043	-	-		
HCM Control Delay (s)	9.2	-	-	47.5	11.4	43	11.2	9.5	-	-		
HCM Lane LOS	A	-	-	E	B	E	B	A	-	-		
HCM 95th %ile Q(veh)	0.1	-	-	1.3	0.4	0.4	0.2	0.1	-	-		

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HCM 2010 TWSC
2: N Tarrant Pkwy

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Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	38	828	30	136	1169	49	18	25	150	58	36	32
Traffic Volume (veh/h)	38	828	30	136	1169	49	18	25	150	58	36	32
Future Volume (veh/h)	5	2	12	1	6	16	3	8	18	7	4	14
Number	0	0	0	0	0	0	0	0	0	0	0	0
Initial Q (Q ₀) veh	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A _{pbt})	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/hln	1863	1863	1900	1863	1863	1900	1863	1863	1863	1863	1863	1863
Adj Flow Rate, veh/h	43	930	34	153	1313	55	20	28	169	65	40	36
Adj No. of Lanes	1	3	0	1	3	0	1	1	1	1	1	1
Peak Hour Factor	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap. veh/h	311	2085	76	437	2252	94	317	268	228	330	319	271
Arrive On Green	0.07	0.41	0.41	0.11	0.45	0.45	0.03	0.14	0.14	0.05	0.17	0.17
Sat Flow, veh/h	1774	5037	184	1774	5006	210	1774	1863	1583	1774	1863	1583
Grp Volume(V), veh/h	43	626	338	153	899	479	20	28	169	65	40	36
Grp Sat Flow(S), veh/hln	1774	1695	1830	1774	1695	1826	1774	1863	1583	1774	1863	1583
Q Served(g, s)	1.1	11.9	11.9	4.0	17.5	17.5	0.8	1.2	9.2	2.7	1.6	1.7
Cycle Q Clear(g, c), s	1.1	11.9	11.9	4.0	17.5	17.5	0.8	1.2	9.2	2.7	1.6	1.7
Prop In Lane	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lane Grp Cap(c), veh/h	311	1404	758	437	1525	821	317	268	228	330	319	271
V/C Ratio(X)	0.14	0.45	0.45	0.35	0.58	0.58	0.06	0.10	0.74	0.20	0.13	0.13
Avail Cap(c, a), veh/h	478	1514	817	640	1525	821	468	520	442	433	520	442
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	13.3	18.9	18.9	12.2	18.4	18.4	31.2	33.3	36.7	29.9	31.4	31.5
Incr Delay (d2), s/veh	0.3	0.5	0.9	0.8	0.9	1.7	0.1	0.4	9.7	0.4	0.4	0.5
Initial Q Delay(Q3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackQ(Q50%), veh/ln	0.6	5.7	6.2	2.0	8.3	9.2	0.4	0.6	4.6	1.4	0.9	0.8
LnGrp Delay(d), s/veh	13.7	19.3	19.7	13.0	19.3	20.0	31.3	33.7	46.4	30.3	31.8	31.9
LnGrp LOS	B	B	B	B	B	C	C	C	D	C	C	C
Approach Vol, veh/h	1007			1521			217				141	
Approach Delay, s/veh	19.2			18.9			43.4				31.2	
Approach LOS	B			B			D				C	
Timer	1	2	3	4	5	6	7	8				
Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	16.3	42.6	8.9	21.8	13.1	45.8	11.3	19.4				
Change Period (Y+Rc), s	6.5	5.5	6.5	6.5	6.5	5.5	6.5	6.5				
Max Green Setting (G _{max}), s	20.0	40.0	10.0	25.0	15.0	40.0	10.0	25.0				
Max Q Clear Time (g_c+H), s	6.0	13.9	2.8	3.7	3.1	19.5	4.7	11.2				
Green Ext Time (g_c), s	0.6	23.2	0.0	2.1	0.1	18.9	0.1	1.7				
Intersection Summary												
HCM 2010 Ctrl Delay					21.4							
HCM 2010 LOS					C							

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Intersection	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
In Delay, s/veh	0.6											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	4+4+4	4+4+4	4+4+4	4+4+4	4+4+4	4+4+4	4+4+4	4+4+4	4+4+4	4+4+4	4+4+4	4+4+4
Traffic Vol, veh/h	0	1044	23	35	1392	0	13	0	10	0	0	0
Future Vol, veh/h	0	1044	23	35	1392	0	13	0	10	0	0	0
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	-	-	-	-	-	-	-	-	-	-
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	-	-	-	-	-	-	-	-	-	-	-
Grade, %	-	-	-	-	-	-	-	-	-	-	-	-
Peak Hour Factor	95	95	95	95	95	95	95	95	95	95	95	95
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	1099	24	37	1465	0	14	0	11	0	0	0
Major/Minor	Major1	Major2	Major2	Major2	Major2	Major2	Minor1	Minor1	Minor2	Minor2	Minor2	Minor2
Conflicting Flow All	1465	0	0	1123	0	0	1771	2650	562	1979	2662	733
Stage 1	-	-	-	-	-	-	-	1111	-	1539	1539	-
Stage 2	-	-	-	-	-	-	-	660	1539	-	440	1123
Critical Hwy Sg 1	5.34	-	-	5.34	-	-	-	6.44	6.54	7.14	6.44	6.54
Critical Hwy Sg 2	-	-	-	-	-	-	-	7.34	5.54	-	7.34	5.54
Follow-up Hwy	3.12	-	-	3.12	-	-	-	6.74	5.54	-	6.74	5.54
Pot Cap-1 Maneuver	232	-	-	341	-	-	0	88	23	403	65	22
Stage 1	-	-	-	-	-	-	0	167	283	-	83	176
Stage 2	-	-	-	-	-	-	0	381	176	-	518	279
Platoon blocked, %	-	-	-	-	-	-	-	-	-	-	-	-
Mov Cap-1 Maneuver	232	-	-	341	-	-	-	81	21	403	58	20
Mov Cap-2 Maneuver	-	-	-	-	-	-	-	81	21	-	58	20
Stage 1	-	-	-	-	-	-	-	167	283	-	83	157
Stage 2	-	-	-	-	-	-	-	340	157	-	504	279
Approach	EB	WB	NB	SB								
HCM Control Delay, s	0	0.4					39.1		0			
HCM LOS		E					A					
Minor Lane/Major Mvmt	NBLn1	NBLn2	EBL	EBT	EBR	WBL	WBT	SBLn1	SBLn2			
Capacity (veh/h)	81	403	232	-	-	341	-	-	-	-	-	-
HCM Lane V/C Ratio	0.169	0.026	-	-	-	0.108	-	-	-	-	-	-
HCM Control Delay (s)	58.3	14.2	0	-	-	16.8	-	0	0			
HCM Lane LOS	F	B	A	-	-	C	-	A	A			
HCM 95th %ile Q(veh)	0.6	0.1	0	-	-	0.4	-	-	-	-	-	-

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Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	218	550	221	217	924	150	232	372	105	143	498	193
Traffic Volume (veh/h)	218	550	221	217	924	150	232	372	105	143	498	193
Future Volume (veh/h)	7	4	14	3	8	18	1	6	16	5	2	12
Number	0	0	0	0	0	0	0	0	0	0	0	0
Initial Q (Qb) veh	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A, pct)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/hln	1863	1863	1900	1863	1863	1900	1863	1863	1900	1863	1863	1900
Adj Flow Rate, veh/h	237	598	240	236	1004	163	252	404	114	155	541	210
Adj No. of Lanes	1	3	0	1	3	0	1	2	0	1	2	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap. veh/h	309	1085	425	367	1330	215	322	820	229	368	651	252
Arrive On Green	0.11	0.30	0.30	0.11	0.30	0.30	0.12	0.30	0.30	0.08	0.26	0.26
Sat Flow, veh/h	1774	3595	1410	1774	4412	715	1774	2734	764	1774	2496	966
Grp Volume(V), veh/h	237	563	275	236	771	396	252	260	258	155	383	368
Grp Sat Flow(S), veh/hln	1774	1695	1614	1774	1695	1737	1774	1770	1728	1774	1770	1692
Q Served(g, s)	9.7	14.8	15.3	9.6	21.9	22.0	10.8	12.9	13.1	6.7	21.8	21.9
Cycle Q Clear(g_c), s	9.7	14.8	15.3	9.6	21.9	22.0	10.8	12.9	13.1	6.7	21.8	21.9
Prop In Lane	1.00	1.00	0.87	1.00	1.00	0.41	1.00	1.00	0.44	1.00	1.00	0.57
Lane Grp Cap(c), veh/h	309	1023	487	367	1022	523	322	531	519	368	461	441
V/C Ratio(X)	0.77	0.55	0.56	0.64	0.75	0.76	0.78	0.49	0.50	0.42	0.83	0.83
Avail Cap(c, a), veh/h	446	1271	605	504	1271	651	439	581	567	556	581	555
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	25.2	31.2	31.3	23.0	33.7	33.7	26.6	30.6	30.7	25.7	37.2	37.3
Incr Delay (d2), s/veh	2.6	0.2	0.4	0.7	1.5	2.9	4.2	0.3	0.3	0.3	6.6	7.1
Initial Q Delay(Q3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%), veh/h	4.9	7.0	6.8	4.7	10.5	11.0	5.6	6.3	6.3	3.3	11.5	11.1
LnGrp Delay(d), s/veh	27.7	31.3	31.7	23.7	35.2	36.6	30.8	30.9	31.0	26.0	43.8	44.4
LnGrp LOS	C	C	C	C	D	D	C	C	C	C	D	D
Approach Vol, veh/h	1075			1403			770				906	
Approach Delay, s/veh	30.6			33.6			30.9				41.0	
Approach LOS	C			C			C				D	
Timer	1	2	3	4	5	6	7	8				
Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	18.4	33.3	17.2	37.7	14.2	37.5	17.3	37.7				
Change Period (Y+Rc), s	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5				
Max Green Setting (Gmax), s	20.0	35.0	20.0	40.0	20.0	35.0	20.0	40.0				
Max Q Clear Time (g_c+I1), s	12.8	23.9	11.6	17.3	8.7	15.1	11.7	24.0				
Green Ext Time (g_c), s	0.1	3.9	0.1	9.7	0.1	4.9	0.1	8.1				
Intersection Summary												
HCM 2010 Ctrl Delay				34.0								
HCM 2010 LOS				C								

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Intersection	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
In Delay, s/veh	2.7											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	11	0	50	24	0	43	90	650	5	40	761	24
Traffic Vol, veh/h	11	0	50	24	0	43	90	650	5	40	761	24
Future Vol, veh/h	11	0	50	24	0	43	90	650	5	40	761	24
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Signal Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	0	-	-	0	115	-	-	125	-	-
Veh in Median Storage, #	-	-	0	-	-	0	-	-	0	-	-	0
Grade, %	-	-	0	-	-	0	-	-	0	-	-	0
Peak Hour Factor	94	94	94	94	94	94	94	94	94	94	94	94
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	12	0	53	26	0	46	96	691	5	43	810	26
Major/Minor	Minor2	Minor1	Minor1	Major1	Major1	Major2						
Conflicting Flow All	1444	1795	418	1376	1806	348	835	0	0	697	0	0
Stage 1	907	907	-	886	886	-	-	-	-	-	-	-
Stage 2	537	888	-	490	920	-	-	-	-	-	-	-
Critical Hwy	7.54	6.54	6.94	7.54	6.54	6.94	4.14	-	-	4.14	-	-
Critical Hwy Sig 1	6.54	5.54	-	6.54	5.54	-	-	-	-	-	-	-
Critical Hwy Sig 2	6.54	5.54	-	6.54	5.54	-	-	-	-	-	-	-
Follow-up Hwy	3.52	4.02	3.32	3.52	4.02	3.32	2.22	-	-	2.22	-	-
Pot Cap-1 Maneuver	93	80	584	104	78	648	794	-	-	895	-	-
Stage 1	297	353	-	306	361	-	-	-	-	-	-	-
Stage 2	496	360	-	529	348	-	-	-	-	-	-	-
Platoon blocked, %	-	-	-	-	-	-	-	-	-	-	-	-
Mov Cap-1 Maneuver	76	67	584	83	65	648	794	-	-	895	-	-
Mov Cap-2 Maneuver	76	67	-	83	65	-	-	-	-	-	-	-
Stage 1	261	336	-	269	317	-	-	-	-	-	-	-
Stage 2	405	316	-	458	331	-	-	-	-	-	-	-
Approach	EB	WB	WB	NB	NB	SB						
HCM Control Delay, s	20.6		30.9		1.2	0.4						
HCM LOS	C		D									
Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	EBLn2	WBLn1	WBLn2	SBL	SBT	SBR		
Capacity (veh/h)	794	-	-	76	584	83	648	895	-	-	-	-
HCM Lane V/C Ratio	0.121	-	-	0.154	0.091	0.308	0.071	0.048	-	-	-	-
HCM Control Delay (s)	10.2	-	-	60.8	11.8	66.6	11	9.2	-	-	-	-
HCM Lane LOS	B	-	-	F	B	F	B	A	-	-	-	-
HCM 95th %ile Q(veh)	0.4	-	-	0.5	0.3	1.1	0.2	0.1	-	-	-	-

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HCM 2010 Signalized Intersection Summary
1: Willis Ln & N Tarrant Pkwy

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Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Lane Traffic Volume (veh/h)	42	979	51	292	558	39	53	71	304	81	124	64
Future Volume (veh/h)	42	979	51	292	558	39	53	71	304	81	124	64
Number	5	2	12	1	6	16	3	8	18	7	4	14
Initial Q (Q ₀), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A _{pbt})	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/hln	1863	1863	1900	1863	1863	1900	1863	1863	1863	1863	1863	1863
Adj Flow Rate, veh/h	44	1031	54	307	587	41	56	75	320	85	131	67
Adj No. of Lanes	1	3	0	1	3	0	1	1	1	1	1	1
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap. veh/h	451	1686	88	396	1971	137	361	424	361	357	437	371
Arrive On Green	0.07	0.34	0.34	0.13	0.41	0.41	0.05	0.23	0.23	0.05	0.23	0.23
Sat Flow, veh/h	1774	4948	259	1774	4857	337	1774	1863	1583	1774	1863	1583
Grp Volume(V), veh/h	44	706	379	307	408	220	56	75	320	85	131	67
Grp Sat Flow(S), veh/hln	1774	1695	1817	1774	1695	1803	1774	1863	1583	1774	1863	1583
Q Served(g, s)	1.5	17.8	17.8	10.9	8.4	8.5	2.4	3.3	20.1	3.7	5.9	3.5
Cycle Q Clear(g, c), s	1.5	17.8	17.8	10.9	8.4	8.5	2.4	3.3	20.1	3.7	5.9	3.5
Prop In Lane	1.00	1.00	0.14	1.00	1.00	0.19	1.00	1.00	1.00	1.00	1.00	1.00
Lane Grp Cap(c), veh/h	451	1155	619	396	1376	732	361	424	361	357	437	371
V/C Ratio(X)	0.10	0.61	0.61	0.78	0.30	0.30	0.16	0.18	0.89	0.24	0.30	0.18
Avail Cap(c, a), veh/h	586	1321	708	502	1376	732	451	454	386	435	454	386
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	18.3	28.2	28.2	20.1	20.6	20.6	28.0	31.9	38.4	27.9	32.4	31.4
Incr Delay (d2), s/veh	0.2	1.2	2.3	7.5	0.3	0.5	0.3	0.4	22.3	0.5	0.8	0.5
Initial Q Delay(Q3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%) veh/h	0.8	8.5	9.3	6.0	4.0	4.3	1.2	1.8	11.0	1.8	3.2	1.6
LnGrp Delay(d), s/veh	18.5	29.4	30.5	27.6	20.9	21.1	28.3	32.3	60.7	28.4	33.2	31.9
LnGrp LOS	B	C	C	C	C	C	C	C	E	C	C	C
Approach Vol, veh/h	1129											
Approach Delay, s/veh	29.3											
Approach LOS	C											
Timer	1	2	3	4	5	6	7	8				
Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	20.3	40.5	11.3	30.6	13.6	47.2	12.0	29.9				
Change Period (Y+Rc), s	6.5	5.5	6.5	6.5	6.5	5.5	6.5	6.5				
Max Green Setting (Gmax), s	20.0	40.0	10.0	25.0	15.0	40.0	10.0	25.0				
Max Q Clear Time (g_c+I1), s	12.9	19.8	4.4	7.9	3.5	10.5	5.7	22.1				
Green Ext Time (p_c), s	1.0	15.1	0.1	4.8	0.1	21.8	0.1	1.3				
Intersection Summary												
HCM 2010 Ctrl Delay	31.1											
HCM 2010 LOS	C											

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2: N Tarrant Pkwy

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Intersection	2.3											
	Int Delay, s/veh											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	5	4	4	5	4	4	4	4	4	4	4	4
Traffic Vol, veh/h	8	1334	12	12	875	4	30	0	33	17	0	16
Future Vol, veh/h	8	1334	12	12	875	4	30	0	33	17	0	16
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	0	-	120	-	-	-	-	-	0	-	-	0
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	90	90	90	90	90	90	90	90	90	90	90	90
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	9	1482	13	13	972	4	33	0	37	19	0	18
Major/Minor	Major1	Major2	Minor1	Minor2								
Conflicting Flow All	977	0	0	1496	0	0	1923	2510	748	1612	2514	488
Stage 1	-	-	-	-	-	-	-	1507	1507	-	1001	1001
Stage 2	-	-	-	-	-	-	-	416	1003	-	611	1513
Critical Hdwy	5.34	-	-	5.34	-	-	-	6.44	6.54	7.14	6.44	6.54
Critical Hdwy Sig 1	-	-	-	-	-	-	-	7.34	5.54	-	7.34	5.54
Critical Hdwy Sig 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
Pot Cap-1 Maneuver	402	-	-	224	-	-	-	71	28	305	110	28
Stage 1	-	-	-	-	-	-	-	87	182	-	199	319
Stage 2	-	-	-	-	-	-	-	535	318	-	408	181
Platoon blocked, %	-	-	-	-	-	-	-	64	26	305	91	26
Mov Cap-1 Maneuver	402	-	-	224	-	-	-	64	26	-	91	26
Mov Cap-2 Maneuver	-	-	-	-	-	-	-	85	178	-	195	300
Stage 1	-	-	-	-	-	-	-	85	178	-	195	300
Stage 2	-	-	-	-	-	-	-	484	300	-	351	177
Approach	EB	WB	NB	SB								
HCM Control Delay, s	0.1	0.3	62.4	34.6								
HCM LOS	F	D	F	D								
Minor Lane/Major Mvmt	NBLn1	NBLn2	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1	SBLn2		
Capacity (veh/h)	64	305	402	-	224	-	-	-	-	91	450	
HCM Lane V/C Ratio	0.521	0.12	0.022	-	0.06	-	-	-	-	0.208	0.04	
HCM Control Delay (s)	110.9	18.4	14.2	-	22.1	-	-	-	-	54.6	13.3	
HCM Lane LOS	F	C	B	-	C	-	-	-	-	F	B	
HCM 95th %ile Q(veh)	2.1	0.4	0.1	-	0.2	-	-	-	-	0.7	0.1	

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HCM 2010 Signalized Intersection Summary
 3: Rufe Snow Dr & N Tarrant Pkwy

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Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↰↰	↰	↰↰	↰↰	↰	↰	↰↰	↰	↰	↰	↰
Lane Traffic Volume (veh/h)	304	1017	121	65	503	106	139	340	152	195	286	232
Future Volume (veh/h)	304	1017	121	65	503	106	139	340	152	195	286	232
Number	7	4	14	3	8	18	1	6	16	5	2	12
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A, pbt)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/hln	1863	1863	1900	1863	1863	1900	1863	1863	1900	1863	1863	1900
Adj Flow Rate, veh/h	317	1059	126	68	524	110	145	354	158	203	298	242
Adj No. of Lanes	1	3	0	1	3	0	1	2	0	1	2	0
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap. veh/h	469	1531	182	273	1049	216	321	512	225	355	454	359
Arrive On Green	0.15	0.33	0.33	0.07	0.25	0.25	0.08	0.21	0.21	0.11	0.24	0.24
Sat Flow, veh/h	1774	4609	548	1774	4230	869	1774	2395	1051	1774	1882	1488
Grp Volume(v), veh/h	317	779	406	68	418	216	145	260	252	203	280	260
Grp Sat Flow(S), veh/hln	1774	1695	1766	1774	1695	1709	1774	1770	1677	1774	1770	1600
Q Serve(g, s)	10.1	16.0	16.0	2.2	8.5	8.8	5.0	10.9	11.2	7.0	11.5	11.8
Cycle Q Clear(g, c), s	10.1	16.0	16.0	2.2	8.5	8.8	5.0	10.9	11.2	7.0	11.5	11.8
Prop In Lane	1.00	0.31	1.00	1.00	0.51	1.00	0.63	1.00	0.63	1.00	0.93	0.93
Lane Grp Cap(c), veh/h	469	1126	587	273	841	424	321	379	359	355	427	386
V/C Ratio(X)	0.68	0.69	0.69	0.25	0.50	0.51	0.45	0.69	0.70	0.57	0.66	0.67
Avail Cap(c, a), veh/h	641	1687	879	593	1687	851	612	771	730	597	771	697
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	17.4	23.3	23.3	20.2	25.9	26.0	22.2	29.1	29.2	21.6	27.5	27.6
Incr Delay (d2), s/veh	0.6	0.3	0.6	0.2	0.2	0.4	0.4	0.8	0.9	0.5	0.6	0.8
Initial Q Delay(Q3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%), veh/ln	4.9	7.5	7.9	1.1	4.0	4.2	2.4	5.4	5.3	3.4	5.7	5.3
LnGrp Delay(d), s/veh	18.0	23.6	23.8	20.4	26.1	26.4	22.6	29.9	30.2	22.2	28.1	28.4
LnGrp LOS	B	C	C	C	C	C	C	C	C	C	C	C
Approach Vol, veh/h	1502											
Approach Delay, s/veh	22.5											
Approach LOS	C											
Timer	1	2	3	4	5	6	7	8				
Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	12.3	24.9	11.0	32.2	14.5	22.7	17.7	25.4				
Change Period (Y+Rc), s	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5				
Max Green Setting (Gmax), s	20.0	35.0	20.0	40.0	20.0	35.0	20.0	40.0				
Max Q Clear Time (g_c+I1), s	7.0	13.8	4.2	18.0	9.0	13.2	12.1	10.8				
Green Ext Time (p_c), s	0.1	4.0	0.0	8.4	0.1	4.0	0.2	9.2				
Intersection Summary												
HCM 2010 Ctrl Delay	25.0											
HCM 2010 LOS	C											

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HCM 2010 TWSC
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Intersection	2.7											
In Delay, s/veh	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	4	4	4	4	4	4	4	4	4	4	4	4
Traffic Vol, veh/h	38	0	79	11	0	27	28	683	2	32	609	16
Future Vol, veh/h	38	0	79	11	0	27	28	683	2	32	609	16
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Signal Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	0	-	-	0	115	-	-	125	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	89	89	89	89	89	89	89	89	89	89	89	89
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	43	0	89	12	0	30	31	767	2	36	684	18
Major/Minor	Minor2	Minor2	Minor1	Minor1	Major1	Major1	Major2	Major2	Major2	Major2	Major2	Major2
Conflicting Flow All	1212	1598	351	1245	1605	385	702	0	0	770	0	0
Stage 1	765	765	-	831	831	-	-	-	-	-	-	-
Stage 2	447	833	-	414	774	-	-	-	-	-	-	-
Critical Hwy	7.54	6.54	6.94	7.54	6.54	6.94	4.14	-	-	4.14	-	-
Critical Hwy Sig 1	6.54	5.54	-	6.54	5.54	-	-	-	-	-	-	-
Critical Hwy Sig 2	6.54	5.54	-	6.54	5.54	-	-	-	-	-	-	-
Follow-up Hwy	3.52	4.02	3.32	3.52	4.02	3.32	2.22	-	-	2.22	-	-
Pot Cap-1 Maneuver	138	105	645	130	104	613	891	-	-	840	-	-
Stage 1	362	410	-	330	383	-	-	-	-	-	-	-
Stage 2	560	382	-	586	406	-	-	-	-	-	-	-
Platoon blocked, %	-	-	-	-	-	-	-	-	-	-	-	-
Mov Cap-1 Maneuver	124	97	645	106	96	613	891	-	-	840	-	-
Mov Cap-2 Maneuver	124	97	-	106	96	-	-	-	-	-	-	-
Stage 1	349	392	-	319	370	-	-	-	-	-	-	-
Stage 2	514	369	-	484	389	-	-	-	-	-	-	-
Approach	EB	EB	WB	WB	NB	NB	SB	SB	SB	SB	SB	SB
HCM Control Delay, s	23.5	23.5	20.5	20.5	0.4	0.4	0.5	0.5	0.5	0.5	0.5	0.5
HCM LOS	C	C	C	C	C	C	C	C	C	C	C	C
Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	EBLn2	WBLn1	WBLn2	SBL	SBT	SBR	SBR	SBR
Capacity (veh/h)	891	-	-	124	645	106	613	840	-	-	-	-
HCM Lane V/C Ratio	0.035	-	-	0.344	0.138	0.117	0.049	0.043	-	-	-	-
HCM Control Delay (s)	9.2	-	-	48.6	11.5	43.4	11.2	9.5	-	-	-	-
HCM Lane LOS	A	-	-	E	B	E	B	A	-	-	-	-
HCM 95th %ile Q(veh)	0.1	-	-	1.4	0.5	0.4	0.2	0.1	-	-	-	-

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HCM 2010 Signalized Intersection Summary
1: Willis Ln & N Tarrant Pkwy

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Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	38	841	30	137	1182	50	18	25	152	60	36	32
Traffic Volume (veh/h)	38	841	30	137	1182	50	18	25	152	60	36	32
Future Volume (veh/h)	5	2	12	1	6	16	3	8	18	7	4	14
Number	0	0	0	0	0	0	0	0	0	0	0	0
Initial Q (Q ₀) veh	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A _{pbt})	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/hln	1863	1863	1900	1863	1863	1900	1863	1863	1863	1863	1863	1863
Adj Sat Flow, veh/hln	43	945	34	154	1328	56	20	28	171	67	40	36
Adj Flow Rate, veh/h	1	3	0	1	3	0	1	1	1	1	1	1
Adj No. of Lanes	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89
Peak Hour Factor	2	2	2	2	2	2	2	2	2	2	2	2
Percent Heavy Veh, %	308	2084	75	432	2248	95	318	270	230	322	322	274
Cap. veh/h	0.07	0.41	0.41	0.11	0.45	0.45	0.03	0.15	0.15	0.05	0.17	0.17
Arrive On Green	1774	5040	181	1774	5005	211	1774	1863	1583	1774	1863	1583
Sat Flow, veh/h	43	635	344	154	900	484	20	28	171	67	40	36
Grp Volume(V), veh/h	1774	1695	1831	1774	1695	1826	1774	1863	1583	1774	1863	1583
Grp Sat Flow(S), veh/hln	1.1	12.2	12.2	4.1	17.9	0.8	1.2	9.3	2.8	1.6	1.7	1.7
Q Served(g.s), s	1.1	12.2	12.2	4.1	17.9	0.8	1.2	9.3	2.8	1.6	1.7	1.7
Cycle Q Clear(g_c), s	1.00	0.10	1.00	1.00	0.12	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Prop In Lane	308	1402	757	432	1523	820	318	270	230	322	322	274
Lane Grp Cap(c), veh/h	0.14	0.45	0.45	0.36	0.59	0.59	0.06	0.10	0.10	0.12	0.12	0.13
V/C Ratio(X)	474	1509	815	634	1523	820	469	518	441	433	518	441
Avail Cap(c.a), veh/h	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	13.5	19.0	19.0	12.3	18.6	18.6	31.2	33.3	36.8	29.9	31.4	31.4
Uniform Delay (d), s/veh	0.4	0.5	0.9	0.9	1.0	1.8	0.1	0.4	9.7	0.4	0.4	0.5
Incr Delay (d2), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Initial Q Delay(Q3), s/veh	0.6	5.7	6.3	2.1	8.6	9.4	0.4	0.6	4.7	1.4	0.9	0.8
%ile BackQ(Q50%), veh/hln	13.8	19.5	19.9	13.2	19.5	20.3	31.3	33.7	46.5	30.4	31.8	31.9
LnGrp Delay(d), s/veh	B	B	B	B	B	C	C	C	D	C	C	C
LnGrp LOS	1022	1538	1538	1538	1538	1538	219	219	143	143	143	143
Approach Vol, veh/h	194	194	194	194	194	194	194	194	194	194	194	194
Approach Delay, s/veh	B	B	B	B	B	B	D	D	D	D	D	D
Approach LOS	1	2	3	4	5	6	7	8	8	8	8	8
Timer	1	2	3	4	5	6	7	8	8	8	8	8
Assigned Phs	16.3	42.7	8.9	22.0	13.1	45.9	11.4	19.5	19.5	19.5	19.5	19.5
Phs Duration (G+Y+Rc), s	6.5	5.5	6.5	6.5	6.5	6.5	6.5	6.5	6.5	6.5	6.5	6.5
Change Period (Y+Rc), s	20.0	40.0	10.0	25.0	15.0	40.0	10.0	25.0	25.0	25.0	25.0	25.0
Max Green Setting (Gmax), s	6.1	14.2	2.8	3.7	3.1	19.9	4.8	11.3	11.3	11.3	11.3	11.3
Max Q Clear Time (g_c+H), s	0.6	23.0	0.0	2.1	0.1	18.6	0.1	1.7	1.7	1.7	1.7	1.7
Green Ext Time (g_c), s												
Intersection Summary												
HCM 2010 Ctrl Delay												
HCM 2010 LOS												

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Intersection	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
In Delay, s/veh	11	11	11	11	11	11	11	11	11	11	11	11
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	17	1044	23	35	1392	22	13	0	10	7	0	15
Traffic Vol, veh/h	17	1044	23	35	1392	22	13	0	10	7	0	15
Future Vol, veh/h	0	0	0	0	0	0	0	0	0	0	0	0
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	-	-	-	-	-	-	-	-	-	-
Storage Length	0	0	0	120	0	0	0	0	0	0	0	0
Veh in Median Storage, #	0	0	0	0	0	0	0	0	0	0	0	0
Grade, %	95	95	95	95	95	95	95	95	95	95	95	95
Peak Hour Factor	2	2	2	2	2	2	2	2	2	2	2	2
Heavy Vehicles, %	18	1099	24	37	1465	23	14	0	11	7	0	16
Mvmt Flow												
Major/Minor	Major1	Major2	Minor1	Minor2	Minor1	Minor2	Minor1	Minor2	Minor1	Minor2	Minor1	Minor2
Conflicting Flow All	1488	0	0	1123	0	0	1807	2709	562	2026	2710	744
Stage 1	-	-	-	-	-	-	-	1147	-	1551	-	-
Stage 2	-	-	-	-	-	-	-	660	1562	-	475	1159
Critical Hwy	5.34	-	-	5.34	-	-	-	6.44	6.54	7.14	6.44	6.54
Critical Hwy Sg 1	-	-	-	-	-	-	-	7.34	5.54	-	7.34	5.54
Critical Hwy Sg 2	-	-	-	-	-	-	-	6.74	5.54	-	6.74	5.54
Follow-up Hwy	3.12	-	-	3.12	-	-	-	3.82	4.02	3.92	3.82	4.02
Pot Cap-1 Maneuver	226	-	-	341	-	-	-	84	21	403	61	21
Stage 1	-	-	-	-	-	-	-	157	272	-	81	173
Stage 2	-	-	-	-	-	-	-	381	171	-	493	268
Platoon blocked, %	-	-	-	-	-	-	-	-	-	-	-	-
Mov Cap-1 Maneuver	226	-	-	341	-	-	-	69	17	403	51	17
Mov Cap-2 Maneuver	-	-	-	-	-	-	-	69	17	-	51	17
Stage 1	-	-	-	-	-	-	-	144	250	-	75	154
Stage 2	-	-	-	-	-	-	-	322	152	-	442	247
Approach	EB	WB	NB	SB	EB	WB	NB	SB	EB	WB	NB	SB
HCM Control Delay, s	0.3	0.4	45.5	39.6	0.3	0.4	45.5	39.6	0.3	0.4	45.5	39.6
HCM LOS	E	E	E	E	E	E	E	E	E	E	E	E
Minor Lane/Major Mvmt	NBLn1	NBLn2	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1	SBLn2	SBLn1	SBLn2
Capacity (veh/h)	69	403	226	-	-	341	-	-	51	306	-	-
HCM Lane V/C Ratio	0.198	0.026	0.079	-	-	0.108	-	-	0.144	0.052	-	-
HCM Control Delay (s)	69.6	14.2	22.3	-	-	16.8	-	-	87.2	17.4	-	-
HCM Lane LOS	F	B	C	-	-	C	-	-	F	C	-	-
HCM 95th %ile Q(veh)	0.7	0.1	0.3	-	-	0.4	-	-	0.5	0.2	-	-

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Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Traffic Volume (veh/h)	219	554	223	217	941	150	236	372	105	144	499	194
Future Volume (veh/h)	219	554	223	217	941	150	236	372	105	144	499	194
Number	7	4	14	3	8	18	1	6	16	5	2	12
Initial Q (Qb) veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A, pct)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/hln	1863	1863	1900	1863	1863	1900	1863	1863	1900	1863	1863	1900
Adj Flow Rate, veh/h	238	602	242	236	1023	163	257	404	114	157	542	211
Adj No. of Lanes	1	3	0	1	3	0	1	2	0	1	2	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap. veh/h	306	1091	429	365	1341	213	323	822	230	369	649	252
Arrive On Green	0.11	0.30	0.30	0.11	0.30	0.11	0.30	0.12	0.30	0.08	0.26	0.26
Sat Flow, veh/h	1774	3592	1412	1774	4425	704	1774	2734	764	1774	2494	968
Grp Volume(V), veh/h	238	567	277	236	783	403	257	260	258	157	384	369
Grp Sat Flow(S), veh/hln	1774	1895	1614	1774	1695	1739	1774	1770	1728	1774	1770	1692
Q Served(g, s), s	9.8	15.1	15.6	9.7	22.6	22.7	11.2	13.0	13.3	6.9	22.2	22.3
Cycle Q Clear(g, c), s	9.8	15.1	15.6	9.7	22.6	22.7	11.2	13.0	13.3	6.9	22.2	22.3
Prop In Lane	1.00	0.87	1.00	1.00	0.40	1.00	0.44	1.00	0.44	1.00	0.57	0.57
Lane Grp Cap(c), veh/h	306	1030	490	365	1027	527	323	532	519	369	460	440
V/C Ratio(X)	0.78	0.55	0.56	0.65	0.76	0.76	0.80	0.49	0.50	0.43	0.83	0.84
Avail Cap(c, a), veh/h	439	1255	597	499	1255	643	433	573	560	551	573	548
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	25.5	31.5	31.6	23.2	34.1	34.2	26.9	31.0	31.1	26.1	37.8	37.8
Incr Delay (d2), s/veh	3.1	0.2	0.4	0.7	1.7	3.3	5.2	0.3	0.3	0.3	7.1	7.7
Initial Q Delay(Q3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%), veh/h	5.0	7.1	7.0	4.8	10.8	11.3	5.8	6.4	6.3	3.3	11.7	11.4
LnGrp Delay(d), s/veh	28.7	31.6	32.0	24.0	35.9	37.5	32.1	31.3	31.4	26.4	44.9	45.5
LnGrp LOS	C	C	C	C	D	D	C	C	C	C	C	D
Approach Vol, veh/h	1082			1422			775				910	
Approach Delay, s/veh	31.1			34.4			31.6				41.9	
Approach LOS	C			C			C				D	
Timer	1	2	3	4	5	6	7	8				
Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	18.8	33.6	17.4	38.3	14.4	38.0	17.4	38.3				
Change Period (Y+Rc), s	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5				
Max Green Setting (Gmax), s	20.0	35.0	20.0	40.0	20.0	35.0	20.0	40.0				
Max Q Clear Time (g_c+I1), s	13.2	24.3	11.7	17.6	8.9	15.3	11.8	24.7				
Green Ext Time (g_c), s	0.1	3.8	0.1	9.8	0.1	4.9	0.1	8.0				
Intersection Summary												
HCM 2010 Ctrl Delay				34.6								
HCM 2010 LOS				C								

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Intersection	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
In Delay, s/veh	2.7											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Traffic Vol, veh/h	12	0	52	24	0	43	90	651	5	40	762	27
Future Vol, veh/h	12	0	52	24	0	43	90	651	5	40	762	27
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	0	-	-	0	115	-	-	125	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	94	94	94	94	94	94	94	94	94	94	94	94
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	13	0	55	26	0	46	96	693	5	43	811	29
Major/Minor	Minor2	Minor1	Minor1	Major1	Major1	Major2						
Conflicting Flow All	1448	1799	420	1377	1811	349	839	0	0	698	0	0
Stage 1	910	910	-	887	887	-	-	-	-	-	-	-
Stage 2	538	889	-	490	924	-	-	-	-	-	-	-
Critical Hwy	7.54	6.54	6.94	7.54	6.54	6.94	4.14	-	-	4.14	-	-
Critical Hwy Sig 1	6.54	5.54	-	6.54	5.54	-	-	-	-	-	-	-
Critical Hwy Sig 2	6.54	5.54	-	6.54	5.54	-	-	-	-	-	-	-
Follow-up Hwy	3.52	4.02	3.32	3.52	4.02	3.32	2.22	-	-	2.22	-	-
Pot Cap-1 Maneuver	92	79	582	104	78	647	791	-	-	894	-	-
Stage 1	296	352	-	305	360	-	-	-	-	-	-	-
Stage 2	495	360	-	529	346	-	-	-	-	-	-	-
Platoon blocked, %												
Mov Cap-1 Maneuver	75	66	582	82	65	647	791	-	-	894	-	-
Mov Cap-2 Maneuver	75	66	-	82	65	-	-	-	-	-	-	-
Stage 1	260	335	-	268	316	-	-	-	-	-	-	-
Stage 2	404	316	-	456	329	-	-	-	-	-	-	-
Approach	EB	WB	WB	NB	NB	SB						
HCM Control Delay, s	21.3		31.3		1.2					0.4		
HCM LOS	C		D									
Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	EBLn2	WBLn1	WBLn2	SBL	SBT	SBR		
Capacity (veh/h)	791	-	-	75	582	82	647	894	-	-	-	-
HCM Lane V/C Ratio	0.121	-	-	0.17	0.095	0.311	0.071	0.048	-	-	-	-
HCM Control Delay (s)	10.2	-	-	62.6	11.8	67.6	11	9.2	-	-	-	-
HCM Lane LOS	B	-	-	F	B	F	B	A	-	-	-	-
HCM 95th %ile Q(veh)	0.4	-	-	0.6	0.3	1.2	0.2	0.1	-	-	-	-

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Intersection		1.8															
Int Delay, s/veh		0.9															
Movement	EBL	EBT	EBL	EBT	EBL	EBT	WBL	WBT	WBL	WBT	NBL	NBT	NBL	NBT	SBL	SBT	SBR
Lane Configurations	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5
Traffic Vol, veh/h	8	1334	12	12	875	4	30	0	33	17	0	16					
Future Vol, veh/h	8	1334	12	12	875	4	30	0	33	17	0	16					
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Free	Free	Free	Free	Free	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Storage Length	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Grade, %	-	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Peak Hour Factor	90	90	90	90	90	90	90	90	90	90	90	90	90	90	90	90	90
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	9	1482	13	13	972	4	33	0	37	19	0	18					
Major/Minor		Major1				Major2				Minor1				Minor2			
Conflicting Flow All	977	0	0	1496	0	0	1496	0	0	1923	2510	748	1612	2514	488		
Stage 1	-	-	-	-	-	-	-	-	-	-	1507	1507	-	1001	1001	-	-
Stage 2	-	-	-	-	-	-	-	-	-	-	416	1003	-	611	1513	-	-
Critical Hdwy	5.34	-	-	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	-	-	3.12	-	-	3.82	4.02	3.92	3.82	4.02	3.92		
Pot Cap-1 Maneuver	402	-	-	224	-	-	224	-	-	71	28	305	110	28	450		
Stage 1	-	-	-	-	-	-	-	-	-	87	182	-	199	319	-		
Stage 2	-	-	-	-	-	-	-	-	-	535	318	-	408	181	-		
Platoon blocked, %	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
Mov Cap-1 Maneuver	402	-	-	224	-	-	224	-	-	64	26	305	91	26	450		
Mov Cap-2 Maneuver	-	-	-	-	-	-	-	-	-	77	112	-	150	108	-		
Stage 1	-	-	-	-	-	-	-	-	-	85	178	-	195	300	-		
Stage 2	-	-	-	-	-	-	-	-	-	484	300	-	351	177	-		
Approach		EB		WB		NB		SB									
HCM Control Delay, s	0.1	0.1		0.3		49.4		23.1									
HCM LOS						E		C									
Minor Lane/Major Mvmt		NBLn1NBLn2		EBL		EBT		WBL		WBT		NBL		WBL		WBT	
Capacity (veh/h)	77	305		402		-		224		-		-		150		450	
HCM Lane V/C Ratio	0.433	0.12		0.022		-		0.06		-		-		0.126		0.04	
HCM Control Delay (s)	83.5	18.4		14.2		-		22.1		-		-		32.4		13.3	
HCM Lane LOS	F	C		B		-		C		-		-		D		B	
HCM 95th %tile Q(veh)	1.7	0.4		0.1		-		0.2		-		-		0.4		0.1	

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Intersection		0.9															
Int Delay, s/veh		0.9															
Movement	EBL	EBT	EBL	EBT	EBL	EBT	WBL	WBT	WBL	WBT	NBL	NBT	NBL	NBT	SBL	SBT	SBR
Lane Configurations	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5
Traffic Vol, veh/h	17	1044	23	35	1392	22	13	0	10	7	0	15					
Future Vol, veh/h	17	1044	23	35	1392	22	13	0	10	7	0	15					
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Free	Free	Free	Free	Free	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Storage Length	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Grade, %	-	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Peak Hour Factor	95	95	95	95	95	95	95	95	95	95	95	95	95	95	95	95	95
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	18	1099	24	37	1465	23	14	0	11	7	0	16					
Major/Minor		Major1				Major2				Minor1				Minor2			
Conflicting Flow All	1488	0	0	1123	0	0	1123	0	0	1807	2709	562	2026	2710	744		
Stage 1	-	-	-	-	-	-	-	-	-	-	1147	1147	-	1551	1551	-	-
Stage 2	-	-	-	-	-	-	-	-	-	-	660	1562	-	475	1159	-	-
Critical Hdwy	5.34	-	-	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	-	-	3.12	-	-	3.82	4.02	3.92	3.82	4.02	3.92		
Pot Cap-1 Maneuver	226	-	-	341	-	-	341	-	-	84	21	403	61	21	306		
Stage 1	-	-	-	-	-	-	-	-	-	157	272	-	81	173	-		
Stage 2	-	-	-	-	-	-	-	-	-	381	171	-	493	268	-		
Platoon blocked, %	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
Mov Cap-1 Maneuver	226	-	-	341	-	-	341	-	-	69	17	403	51	17	306		
Mov Cap-2 Maneuver	-	-	-	-	-	-	-	-	-	115	87	-	67	89	-		
Stage 1	-	-	-	-	-	-	-	-	-	144	250	-	75	154	-		
Stage 2	-	-	-	-	-	-	-	-	-	322	152	-	442	247	-		
Approach		EB		WB		NB		SB									
HCM Control Delay, s	0.3	0.3		0.4		29.1		32.6									
HCM LOS						D		D									
Minor Lane/Major Mvmt		NBLn1NBLn2		EBL		EBT		WBL		WBT		NBL		WBL		WBT	
Capacity (veh/h)	115	403		226		-		341		-		-		67		306	
HCM Lane V/C Ratio	0.119	0.026		0.079		-		0.108		-		-		0.11		0.052	
HCM Control Delay (s)	40.5	14.2		22.3		-		16.8		-		-		65.3		17.4	
HCM Lane LOS	E	B		C		-		C		-		-		F		C	
HCM 95th %tile Q(veh)	0.4	0.1		0.3		-		0.4		-		-		0.4		0.2	

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Intersection		0.6															
Int Delay, s/veh		0.6															
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR					
Lane Configurations	5	5	5	5	5	5	5	5	5	5	5	5					
Traffic Vol, veh/h	8	1334	12	12	875	4	30	0	33	17	0	16					
Future Vol, veh/h	8	1334	12	12	875	4	30	0	33	17	0	16					
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0					
Sign Control	Free	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop					
RT Channelized	-	-	-	-	-	-	-	-	-	-	-	-					
Storage Length	150	-	-	120	-	-	-	-	-	0	-	-					
Veh in Median Storage, #	-	0	-	-	0	-	-	-	1	-	-	1					
Grade, %	-	0	-	-	0	-	-	-	0	-	-	0					
Peak Hour Factor	90	90	90	90	90	90	90	90	90	90	90	90					
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2					
Mvmt Flow	9	1482	13	13	972	4	33	0	37	19	0	18					
Major/Minor	Major1	Major2	Minor1	Minor2													
Conflicting Flow All	977	0	1496	0	0	1923	2510	748	1612	2514	488						
Stage 1	-	-	-	-	-	1507	1507	-	1001	1001	-						
Stage 2	-	-	-	-	-	416	1003	-	611	1513	-						
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	903	-	*767	-	-	*422	372	*610	*422	368	*718						
Stage 1	-	-	-	-	-	*626	595	-	*705	680	-						
Stage 2	-	-	-	-	-	*737	679	-	*626	590	-						
Platoon blocked, %	1	-	1	-	-	1	1	1	1	1	1						
Mov Cap-1 Maneuver	903	-	*767	-	-	*403	362	*610	*388	359	*718						
Mov Cap-2 Maneuver	-	-	-	-	-	*482	448	-	*458	443	-						
Stage 1	-	-	-	-	-	*620	589	-	*698	669	-						
Stage 2	-	-	-	-	-	*706	667	-	*582	584	-						
Approach	EB	WB	NB	SB													
HCM Control Delay, s	0.1	0.1		12.1		11.7											
HCM LOS		B		B													
Minor Lane/Major Mvmt	NBLn1	NBLn2	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1	SBLn2							
Capacity (veh/h)	482	610	903	-	-	*767	-	-	458	718							
HCM Lane V/C Ratio	0.069	0.06	0.01	-	-	0.017	-	-	0.041	0.025							
HCM Control Delay (s)	13	11.3	9	-	-	9.8	-	-	13.2	10.1							
HCM Lane LOS	B	B	A	-	-	A	-	-	B	B							
HCM 95th %ile Q(veh)	0.2	0.2	0	-	-	0.1	-	-	0.1	0.1							
Notes																	
Volume exceeds capacity	\$		Delay exceeds 300s		+		Computation Not Defined		+		All major volume in platoon						

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Intersection		0.4															
Int Delay, s/veh		0.4															
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR					
Lane Configurations	5	5	5	5	5	5	5	5	5	5	5	5					
Traffic Vol, veh/h	17	1044	23	35	1392	22	13	0	10	7	0	15					
Future Vol, veh/h	17	1044	23	35	1392	22	13	0	10	7	0	15					
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	-	-	-	-	-	-	-	-	-	-	-	-					
Storage Length	150	-	-	120	-	-	-	-	-	-	-	-					
Veh in Median Storage, #	-	0	-	-	0	-	-	-	1	-	-	1					
Grade, %	-	0	-	-	0	-	-	-	0	-	-	0					
Peak Hour Factor	95	95	95	95	95	95	95	95	95	95	95	95					
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2					
Mvmt Flow	18	1099	24	37	1465	23	14	0	11	7	0	16					
Major/Minor	Major1	Major2		Minor1		Minor2											
Conflicting Flow All	1488	0	0	1123	0	0	1807	2709	562	2026	2710	744					
Stage 1	-	-	-	-	-	-	1147	1147	-	1551	1551	-					
Stage 2	-	-	-	-	-	-	660	1562	-	475	1159	-					
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	*767	-	-	*848	-	-	*377	*344	*675	*377	*343	*610					
Stage 1	-	-	-	-	-	-	*692	*659	-	*567	*558	-					
Stage 2	-	-	-	-	-	-	*626	*549	-	*692	*659	-					
Platoon blocked, %	1	-	-	1	-	-	1	1	1	1	1	1					
Mov Cap-1 Maneuver	*767	-	-	*848	-	-	*349	*321	*675	*353	*320	*610					
Mov Cap-2 Maneuver	-	-	-	-	-	-	*437	*401	-	*428	*404	-					
Stage 1	-	-	-	-	-	-	*676	*643	-	*553	*534	-					
Stage 2	-	-	-	-	-	-	*583	*525	-	*666	*643	-					
Approach	EB	WB		NB		SB											
HCM Control Delay, s	0.2	0.2		12.2		11.9											
HCM LOS		B		B		B											
Minor Lane/Major Mvmt	NBLn1NBLn2	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1	SBLn2								
Capacity (veh/h)	437	675	*767	-	*848	-	*428	610									
HCM Lane V/C Ratio	0.031	0.016	0.023	-	0.043	-	0.017	0.026									
HCM Control Delay (s)	13.5	10.4	9.8	-	9.4	-	13.6	11.1									
HCM Lane LOS	B	B	A	-	A	-	B	B									
HCM 95th %ile Q(veh)	0.1	0	0.1	-	0.1	-	0.1	0.1									
Notes																	
Volume exceeds capacity													\$. Delay exceeds 300s				
* Computation Not Defined													*. All major volume in platoon				