



**Planning and Zoning Commission
Regular Meeting
212 Main Street
City of Lake Dallas, Texas 75065
Thursday, October 20, 2022, at 6:00 p.m.
Agenda**

1. Call to Order and Determination of Quorum

2. Pledges of Allegiance

3. Citizen Agenda & Public Comment

An opportunity for citizens to address the Planning & Zoning Commission on matters which are not scheduled for consideration by the Planning & Zoning Commission. Speakers will be limited to five (5) minutes each. The Texas Open Meeting Act prohibits deliberation by the Planning & Zoning Commission of any subject which is not on the posted agenda, therefore the Planning & Zoning Commission will not be able to discuss or take any action on items brought up during the citizen presentations that are not on the agenda.

4. Approval of the minutes of the August 18, 2022, regular meeting.

5. Hold a public hearing for a request to change the Zoning relating to the development and use of 7.63 acres out of the J.W. Simmons Survey, Abst. No. 1163, in the City of Lake Dallas, Denton County, Texas; generally located north-east of I-35E north bound access road on (FM 2181) at 250 East Swisher Road. (the "Property") from C-2 Commercial District to Planned Development District for R-3 Multi-Family Residence.

6. Announcements

7. Adjourn.

I certify that the above notice of this meeting was posted on the bulletin board at City Hall of the City of Lake Dallas, Texas on or before October 17, 2022, at 4:30 p.m.

Codi Delcambre, City Secretary If you plan to attend this public meeting and you have a disability that requires special arrangements at this meeting, please contact City Secretary's Office at (940) 497-2226 ext. 102 or fax (940) 497-4485 at least two (2) working days prior to the meeting so that appropriate arrangements can be made.

**State of Texas
County of Denton
City of Lake Dallas**

The Lake Dallas City Planning & Zoning Commission met in a regular meeting on August 18, 2022 in the Lake Dallas City Hall, 212 Main Street, with notice of the meeting given, as required by Title 5, Chapter 551.041 of the Texas Government Code. Chairperson Lester Raborn called the meeting to order at 6:01 p.m.

1. Call to Order and Determination of Quorum

Lester Raborn
Annette Fuller
Christian Cline
Melody Parlett
Rachel Fitzpatrick
Steve Dennis

Chairperson
Vice Chairperson
Member Place 2
Member Place 3
Member Place 1
Member Place 4

Absent: None

Staff Present: Codi Delcambre, City Secretary, and Marilyn Rojas, Permits Tech/Administrative Assistant.

2. Pledges of Allegiance

3. Citizen Agenda & Public Comment

An opportunity for citizens to address the Planning and Zoning Commission on matters which are not scheduled for consideration by the Planning and Zoning Commission. The Texas Open Meetings Act prohibits by the Planning and Zoning Commission of any subject which is not on the posted agenda.

No public input was received.

4. Approval of the minutes of the January 20, 2022, regular meeting, and July 21, 2022, regular meeting

Motion: Approval of the minutes.

Chairperson Lester Raborn motioned to approve of the minutes seconded by Member Place 3 Melody Parlett.

Ayes: Rachel Fitzpatrick, Melody Parlett, Christian Cline, Annette Fuller, Lester Raborn, and Steve Dennis.

Nays: None

Motion_Passed

6-0

5. **Conduct a public hearing and consider a Zoning Change for a Planned Development request for 24.4 acres of land being a part of the HH Swisher Survey, Abstract No. 1220 and Nathaniel French Survey, Abstract No. 424 being in the City of Lake Dallas, Denton County, Texas; generally located north-east of Shady Shores Road and East Swisher Drive for a mixed use with C-1 commercial and R-3 multi-family residential uses.**

Mr. Eric Wilhite with McAdams Associates, currently the City of Lake Dallas Planner presented details submitted by Mr. Mathias Haubert of Bohlerfor of the Planned Development to allow a mixed-use development to include multi-family and commercial/retail. The Planned Development Narrative outlines and establishes development standards and guidelines that will be followed at a formal side development plan. The development site circulation proposes to maintain shared access and have screening as needed, but maintain continuity and connective as possible, to maintain a mixed use feel.

Chairperson Lester Raborn opened the public hearing at 6:14 pm

Vice Chairperson, Annette Fuller chose to recluse herself, due to partial motion to her personal residence being part of the inclusion.

Cody Telfer, 510 Meadowbrook St and Nathan Forsbach, 510 Meadowbrook Sr spoke to oppose to request of the zoning change.

John Kendell, spoke on behalf of the applicant to motion the petition

Chairperson Lester Raborn closed the public hearing at 6:45 pm

Motion: To recommend City Council APPROVE/DENY the Planned Development Narrative for zoning of approximately 22- acre project located on HH Swisher Survey. Abstract No. 1220 and Nathaniel French Survey with the following conditions:

- **Base Zoning district**
- **Screening/Fencing**
- **Landscaping and Buffers**
- **Lot Use Regulations**

Member Place 4 Steve Dennis motioned to approve seconded by Member Place 3 Melody Parlett.

Ayes: Rachel Fitzpatrick, Melody Parlett, Christian Cline, Lester Raborn, and Steve Dennis

Nays: None

Motion Passed

5-0

6. Announcements

Ms. Delcambre updated of status pending projects, received by staff including more zoning request and other plans for the Planning and Zoning Committee review the following months.

7. Adjournment 6:48pm

Passed and approved on the _____ day of _____, 2022

Lester Raborn, Chairperson

Marilyn Rojas, Permits Tech/Administrative Assistant



**PLANNING AND ZONING COMMISSION
AGENDA MEMO**

AGENDA ITEM 5

Prepared By: Eric Wilhite, AICP, Consulting Planner

October 20, 2022

Planned Development – Portion of J.W. Simmons Survey, Abst. No. 1163,

DESCRIPTION

Hold a public hearing for a request to change the Zoning relating to the development and use of 7.63 acres out of the J.W. Simmons Survey, Abst. No. 1163, in the City of Lake Dallas, Denton County, Texas; generally located north-east of I-35E north bound access road on (FM 2181) at 250 East Swisher Road. (the "Property") from C-2 Commercial District to Planned Development District for R-3 Multi-Family Residence.

EXISTING CONDITIONS

The property is currently zoned C-2 commercial and is currently vacant but has been used for open storage and other commercial use in past. Property is generally flat and is not located within the 100-year floodplain.

ADJACENT LAND USES

North: C-1 Retail

East: C-2 Commercial

South: M-1 Light Industrial

West: C-2 Commercial

BACKGROUND INFORMATION

The applicant OHT Partners is requesting the Planned Development to allow a multi-family development. The property is currently owned by QT South LLC.

The development proposes two primary drive access points from Swisher Road. One on the west will be a shared road with the property contiguous to the west of the subject property and a right turn deceleration lane constructed. A secondary emergency access only will be created at the south-west corner of the development.

Because of the u-shape of the building footprints amenities and recreation elements are being proposed in the central courtyard areas of the complexes. An approximate 2,500 square foot area for a dog park is proposed on the south-east portion of the development surrounded by parking areas.

The total building square footage is 330,100 square feet and will be a total of 282 Units, with a density of 36.9du/ac. Parking is proposed to be 262 total spaces, with a breakdown of 80 having carports, 63 tuck under garages, and 16 tandem parking spaces (areas in front of apartment garage).

The following is provided for reference to the primary deviations from R-3 multi-family zoning standards. This information is also included on the PD Site Plan exhibit in a land use chart.

- 4 Story/60ft Building Height
- Parking in required setback
- Reduced Perimeter landscape area, 3ft wide
- Minimum Dwelling Unit Size 600 SF
- Increased Dwelling Unit per acre, 40du/ac
- Off-street parking- 1.5 spaces per du

The proposed dwelling unit mix of square footage are:

Studio- 26

1 Bedroom-168

2 Bedroom-76

3 Bedroom- 12

Total of 282 Units.

PLANNING ANALYSIS

A traffic impact assessment was done to determine needed deceleration lanes or intersection signalization.

The TIA summary is included in staff attachments.

While the applicant is requesting a PD for deviations from city code, none are seen as significant. Multi-family acts as a transition land use to the surrounding commercial and retail.

The usable open space being proposed is in excess of what base city code requires, 38,214SF (11.5%) to 33,237SF (10%) required.

RECOMMENDATION

After conducting the public hearing, City staff recommends the following motion:

Move to recommend City Council **APPROVE/DENY** the Planned Development for zoning of approximately 6.7-acre project located on Swisher Road.

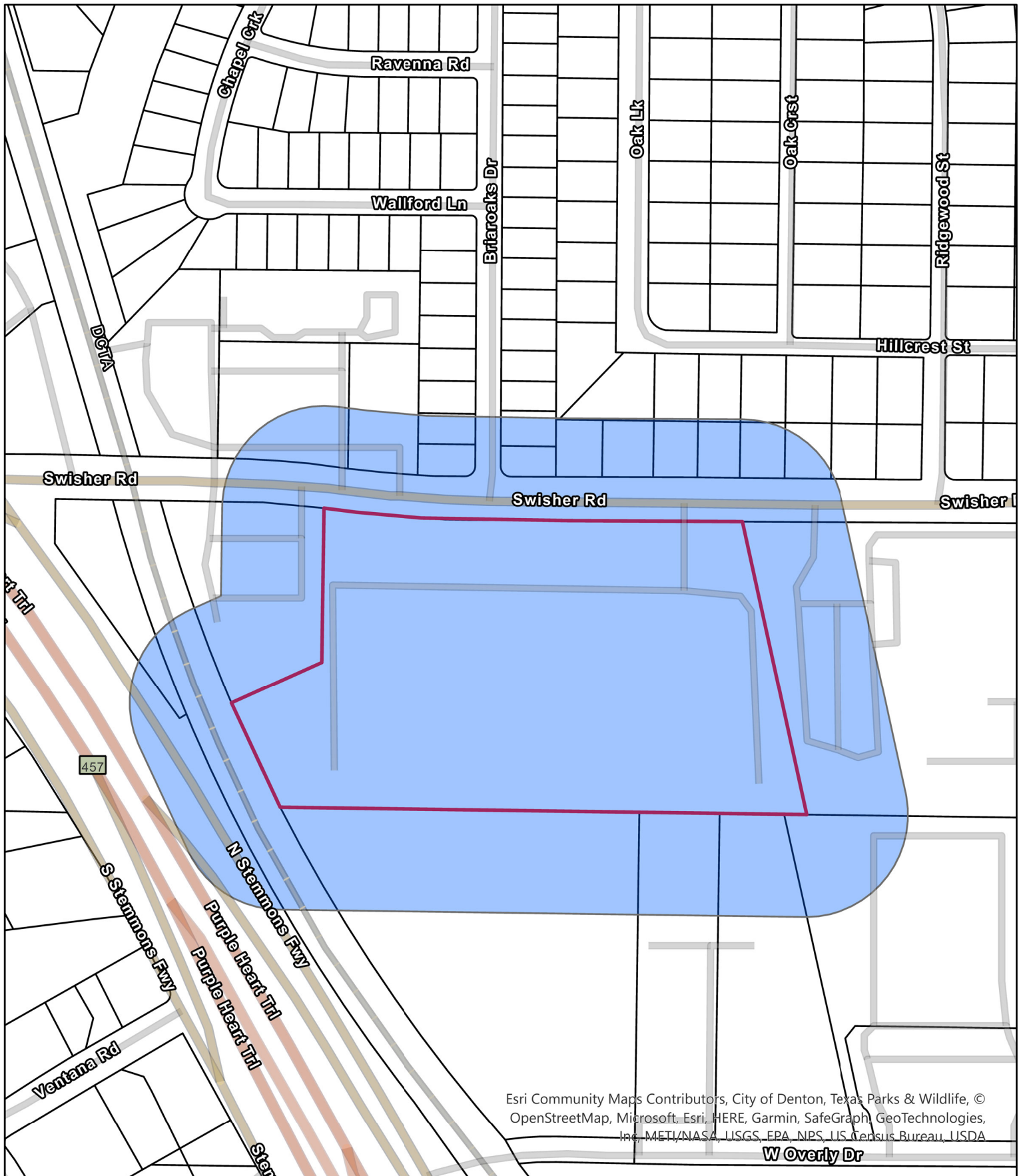
ATTACHMENTS:

1. Tract Exhibit
2. Property Owner Notification Map
3. PD Site Plan Exhibits
4. TIA summary

Zoning Change Request

OHT Partners

C-2 Planned Development MF



METES AND BOUNDS DESCRIPTION

BEING a tract of land situated in the J. Simmons Survey, Abstract No. 1163, City of Lake Dallas, Denton County, Texas, being part of a tract conveyed to QT South, LLC, by deed recorded in Document No. 2020-63696 of the Official Public Records of Denton County, Texas, with the subject tract being more particularly described as follows:

BEGINNING at 1/2 inch capped iron rod found lying in the south right-of-way line of Swisher Road (variable width right-of-way) and the northwest corner of Camina Holdings, LLC, by deed recorded in Document No. 2018-109181 of the Official Public Records of Denton County, Texas;

THENCE, S 13°14'03" E, passing at a distance of 585.72 feet the southwest corner of said Camina Holdings tract and the northwest corner of Lot 1, Block A of I.C.C. Addition, an addition to the City of Lake Dallas, Denton County, Texas, according to the plat thereof recorded in Cabinet M, Page 125 of the Plat Records of Denton County, Texas and continuing a total distance of 619.28 feet to a 5/8 inch capped iron rod found at the northeast corner of Lot 2, Block A of Comco Systems Addition, an addition to the City of Lake Dallas, Denton County, Texas, according to the plat thereof recorded in Cabinet R, Page 155 of the Plat Records of Denton County, Texas;

THENCE, S 89°42'20" W, passing at a distance of 169.77 feet the northwest corner of said Lot 2, Block A and the northeast corner of Lot 1, Block A of said Comco Systems Addition, continuing a along said north line of Lot 1, Block A, passing at a distance of 344.44 feet the northwest corner of said Lot 1, Block A and the northeast corner of Lot 1, Block 1 of Ahern Rentals at Stemmons Lake Dallas, an addition to the City of Lake Dallas, Denton County, Texas, according to the plat thereof recorded in Document No. 2019-251 of the Plat Records of Denton County, Texas, and continuing a total distance of 615.06 feet, from which a 1/2 inch capped iron rod found at the southwest corner of the remainder of said QT South tract bears S 89°42'20" W, 406.44 feet;

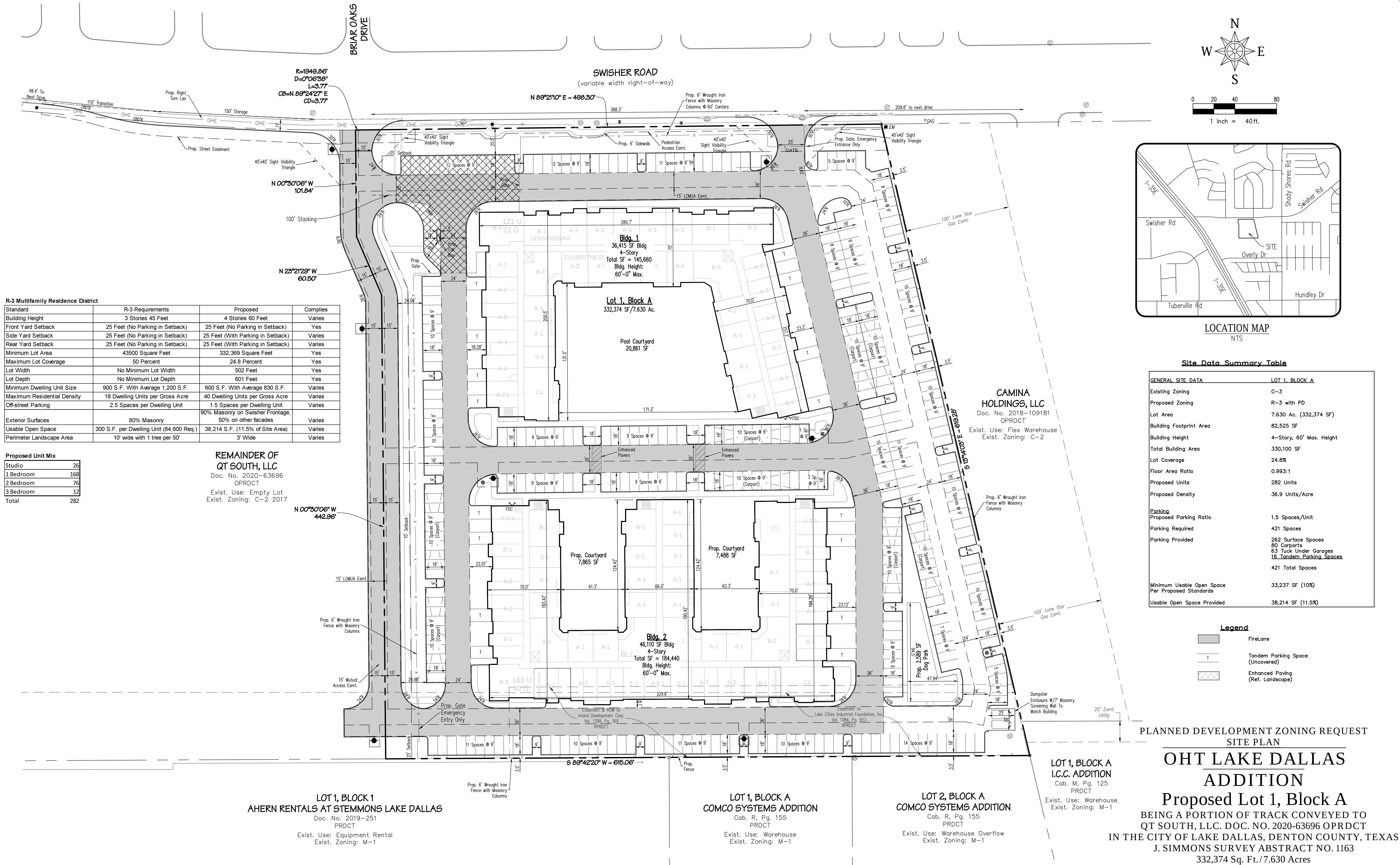
THENCE, N 00°30'06" W, 442.96 feet;

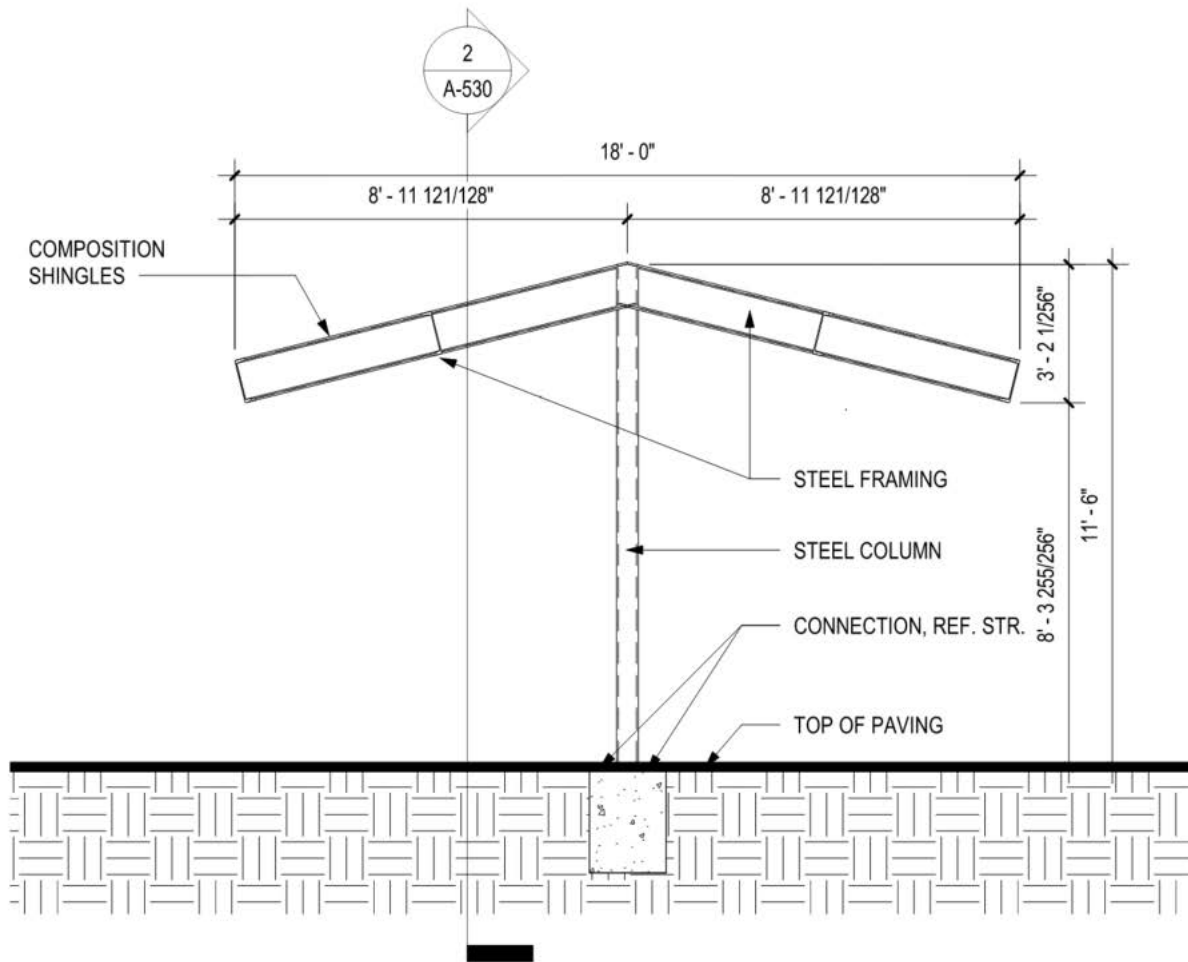
THENCE, N 23°21'29" W, 60.50 feet;

THENCE, N 00°30'06" W, 101.84 feet to a point lying in said south right-of-way line of Swisher Road;

THENCE around a non-tangent curve to the left having a central angle of 00°06'38", a radius of 1949.86 feet, a chord of N 89°24'27" E - 3.77 feet, an arc length of 3.77 feet;

THENCE, N 89°21'10" E, 498.30 feet to the POINT OF BEGINNING with the subject tract containing 332,374 square feet or 7.63 acres of land.



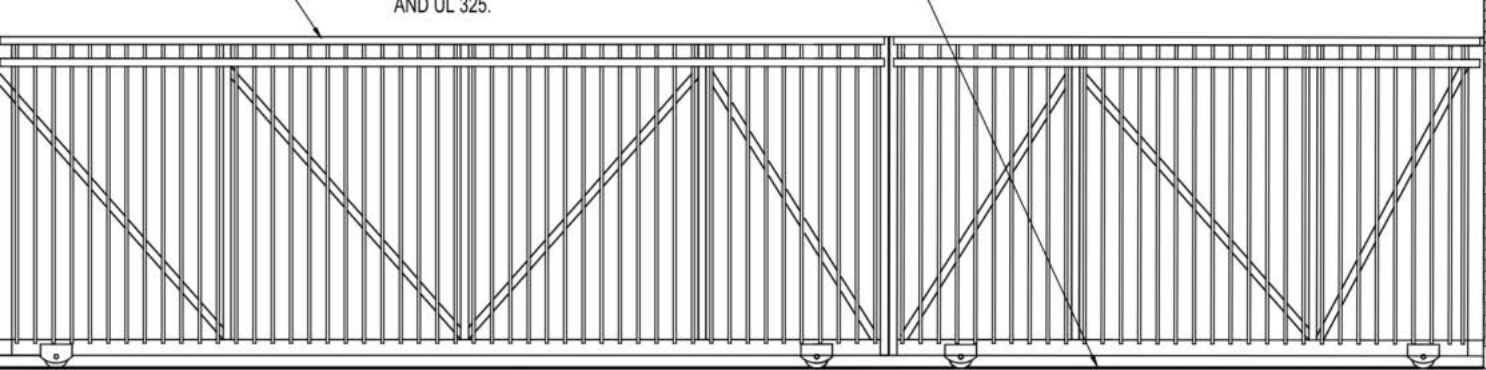


3 Carport - Short Section

Scale: 1/4" = 1'-0"



AND UL 325.



LANDSCAPE CALCULATIONS	
REQUIRED	PROVIDED
PERIMETER LANDSCAPE - 1 TREE / 50 LINEAL FEET OF PERIMETER AREA 2,299 L.F. (4 SIDES OF PERIMETER) = 46 TREES	51 TREES
1 TREE / 400 SF OF INTERIOR LANDSCAPE AREA APPROXIMATE 35,000 PLANTING AREA WITH- IN PARKING ISLANDS AND AMENITY COURT- YARDS = 87 TREES	89 TREES
10% OF GROSS PARKING AREA DEVOTED TO LANDSCAPE PARKING AREA =174,126 SF REQUIRED 17,412 SF	19,459 SF
15% OF THE LANDSCAP- ING SHALL BE LOCATED IN FRONT YARD	COMPLIES

LANDSCAPE LEGEND	
STREET TREE	ALLE ELM - ULMUS PARVIFOLIA
CANOPY TREE	LIVE OAK - QUERCUS VIRGINIANA
SIZE (4" CAL. MIN., 100 GAL., CONTAINER GROWN)	RED OAK - QUERCUS SHUMARDII BALD CYPRESS - TAXODIUM DISTICHUM
ORNAMENTAL TREE	RIVER BIRCH - BETULA NIGRA
SIZE (65 GALLON, CON- TAINER GROWN)	MEXICAN REDBUD - CERCIS CANADEN- SIS VAR. MEXICANA DESERT WILLOW - CHILOPSIS LINEARIS CRAPE MYRTLE - LAGERSTROEMIA INDICA
SHRUBS AND GROUND- COVER	PALETTE TO BE DEVELOPED IN CON- STRUCTION DOCUMENTS
SIZE (5 GAL. MIN.)	

NOTE: ALL LANDSCAPED AREAS TO BE IRRIGATED WITH FULLY AUTOMATIC IRRIGATION SYSTEM

PLANS TO BE PROVIDED AT CONSTRUCTION PERMIT PHASE.

OHT
Lake Dallas, TX

Garrison/Jones Landscape Architects
400 N Ervay St #132815
Dallas, TX 75201

0 30 60

This information is based on the most current information available and is intended for conceptual use only.



SUPPLEMENTAL MEMO

To: Mr. David Godvin
OHT Partners.
5440 Harvest Hill Road, Suite 101
Dallas, TX - 75230

From: DeShazo Group, Inc.

Date: October 3rd, 2022





10/03/2022

Re: **Right Turn Deceleration Lane Analysis for 250 Swisher Road Development in Lake Dallas, Texas**
(DeShazo Project No. 22126)

Mr. David,

Please accept this letter as a supplemental memorandum prepared by the DeShazo Group, Inc. (DeShazo) on October 3rd, 2022 for Professional Engineering Services. The services of **DeShazo** were retained by **OHT Partners** (Client) to perform an Addendum for the original Traffic Impact Analysis and Traffic Signal Warrant Analysis (TWSA): Warrant 3 (peak hour). In this Addendum, a right-turn analysis is performed.

The proposed 250 Swisher Road development is located in the southeast quadrant of IH-35E NBFR and Swisher Road intersection in the City of Lake Dallas, Texas. For this project, the client wants to determine the potential necessity of a right-turn lane at all proposed intersections using traffic volume-related two development options. The first will be multifamily housing and the second will be retail & restaurant on the empty lot. At this time the site plan is proposing either 286-dwelling units in a single phase (**Option A**) or 60,000 SF of Retail and 20,000 SF of restaurants (**Option B**). The estimated full buildout/ completion for this development will be approximately 2024. The preliminary site plan of the development is provided in **Exhibit 1**.

RIGHT-TURN DECELERATION LANE ANALYSIS: Based on Preliminary Site Plan the Driveway 1 at Swisher Road is proposed as a full median access road that is meeting a peak hour signal warrant. Whereas, Driveway 2 at Swisher Road will be operated as an exit only. Further, Driveway 1 will have a dedicated right-turn lane provided.

RECOMMENDATIONS: As the Driveway 2 is proposed as exit only there will not be any right-in movement at this future intersection. Therefore, DeShazo does not recommend providing a deceleration lane at Driveway 2 at Swisher Road.

END OF MEMO

R-3 Multifamily Residence District			
Standard	R-3 Requirements	Proposed	Complies
Building Height	3 Stories 45 Feet	4 Stories 60 Feet	Varies
Front Yard Setback	25 Feet (No Parking in Setback)	25 Feet (No Parking in Setback)	Yes
Side Yard Setback	25 Feet (No Parking in Setback)	25 Feet (With Parking in Setback)	Varies
Rear Yard Setback	25 Feet (No Parking in Setback)	25 Feet (With Parking in Setback)	Varies
Minimum Lot Area	43500 Square Feet	332,369 Square Feet	Yes
Maximum Lot Coverage	50 Percent	24.8 Percent	Yes
Lot Width	No Minimum Lot Width	502 Feet	Yes
Lot Depth	No Minimum Lot Depth	601 Feet	Yes
Minimum Dwelling Unit Size	900 S.F. With Average 1,200 S.F.	600 S.F. With Average 830 S.F.	Varies
Maximum Residential Density	18 Dwelling Units per Gross Acre	40 Dwelling Units per Gross Acre	Varies
Off-street Parking	2.5 Spaces per Dwelling Unit	1.5 Spaces per Dwelling Unit	Varies
Exterior Surfaces	80% Masonry	90% Masonry on Swisher Frontage, 50% on other facades	Varies
Usable Open Space	300 S.F. per Dwelling Unit (84,600 Req.)	38,214 S.F. (11.5% of Site Area)	Varies
Perimeter Landscape Area	10' wide with 1 tree per 50'	3' Wide	Varies

Proposed Unit Mix	
Studio	26
1 Bedroom	168
2 Bedroom	76
3 Bedroom	12
Total	282

REMAINDER OF
QT SOUTH, LLC
Doc. No. 2020-63696
OPRDC
Exist. Use: Empty Lot
Exist. Zoning: C-2 2017

LOT 1, BLOCK 1
AHERN RENTALS AT STEMMONS LAKE DALLAS
Doc. No. 2019-251
PRDCT
Exist. Use: Equipment Rental
Exist. Zoning: M-1

LOT 1, BLOCK A
COMCO SYSTEMS ADDITION
Cab. R, Pg. 155
PRDCT
Exist. Use: Warehouse
Exist. Zoning: M-1

LOT 2, BLOCK A
COMCO SYSTEMS ADDITION
Cab. R, Pg. 155
PRDCT
Exist. Use: Warehouse Overflow
Exist. Zoning: M-1

LOT 1, BLOCK A
I.C.C. ADDITION
Cab. M, Pg. 125
PRDCT
Exist. Use: Warehouse
Exist. Zoning: M-1

PLANNED DEVELOPMENT ZONING REQUEST
SITE PLAN
**OHT LAKE DALLAS
ADDITION**
Proposed Lot 1, Block A
BEING A PORTION OF TRACK CONVEYED TO
QT SOUTH, LLC. DOC. NO. 2020-63696 OPRDC
IN THE CITY OF LAKE DALLAS, DENTON COUNTY, TEXAS
J. SIMMONS SURVEY ABSTRACT NO. 1163
332,374 Sq. Ft./7.630 Acres

ENGINEER / SURVEYOR
Sparks Engineering, Inc.
501 President George Bush Turnpike, Suite 200
Richardson, TX 75075
Telephone: (972) 422-0077
TBPE No. F-2121
Contact: David Bond

APPLICANT/DEVELOPER
OHT Partners, LLC
5440 Harvest Hill, Suite 101
Dallas, TX 75230
Telephone: (469) 722-4653
Contact: David Godwin

OWNER
QT South, LLC
5725 Foxridge Drive
Mission, Kansas 66202
Telephone: (817) 786-3185
Contact: Jim Belman

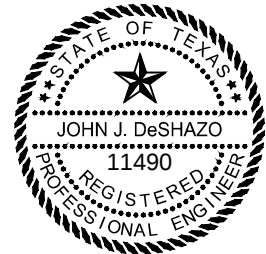
SUPPLEMENTAL MEMO

To: Mr. David Godvin
OHT Partners.
5440 Harvest Hill Road, Suite 101
Dallas, TX - 75230

From: DeShazo Group, Inc.

Date: September 30, 2022

Re: **Traffic Signal Warrant Analysis: Warrant 3 for the Intersection of Swisher Road and Briar Oaks Drive in Lake Dallas, Texas**
(DeShazo Project No. 22126)



09/30/2022

Mr. David,

Please accept this letter as a supplemental memorandum prepared by the DeShazo Group, Inc. (DeShazo) on September 30th, 2022 for Professional Engineering Services. The services of **DeShazo** were retained by **OHT Partners** (Client) to perform a Traffic Signal Warrant Analysis (TWSA): Warrant 3 (peak hour). The proposed 250 Swisher Road development is located in the southeast quadrant of IH-35E NBFR and Swisher Road intersection in the City of Lake Dallas, Texas. For this project, the client wants to determine the potential necessity of a traffic signal at this intersection using traffic volume-related warrants contrasting two development options. The first will be multifamily housing and the second will be retail & restaurant on the empty lot. At this time the site plan is proposing either 286-dwelling units in a single phase (**Option A**) or 60,000 SF of Retail and 20,000 SF of restaurants (**Option B**). The estimated full buildout/ completion for this development will be approximately 2024.

This report summarizes analyses based upon actual data collected for the adjacent roadways and trip generation data presented in the Traffic Impact Analysis (TIA) prepared by DeShazo Group, Inc., on September 12th, 2022, for the proposed development options A and B adjacent to the intersection of Swisher Road and Briar Oaks Drive. The TSWA was performed considering 2022 existing, 2024 buildout year, and 2029 horizon conditions with and without including the site traffic generated from the proposed development. The project vicinity map and preliminary site plan of the development is provided in **Exhibit 1**.

Analyses were prepared under the *Texas Manual on Uniform Traffic Control Devices (TMUTCD)* and were consistent with industry and local standards. This analysis specifically evaluated **Warrant 3**: Peak Hour. The results of this analysis are based upon projected trip generation data from the TIA which included off-peak hour estimates, traffic assignments, etc., and professional judgment.

The findings and recommendations presented in this memo are intended to provide information to the public and the governing agency (ies) regarding the need for traffic signals. This study is also intended to provide a credible basis upon which the governing agency (ies) may determine whether some actions may be required as a condition of the approval for (or delay in) installation of the traffic signals. This report is strictly based upon traffic volumes; however, the reviewing agency has the authority to dictate whether a signal is required for reasons other than the analysis presented herein.

TRAFFIC VOLUME

The existing turning movement traffic count was collected at the intersection of Swisher Road and Briar Oaks Drive, Texas on August 18TH, 2022. Turning movement counts were collected in 15-minute increments for a 5-hour period (7:00 AM to 9:00 AM and 3:00 PM to 6:00 PM). The detailed turning movement traffic count data for the intersection is provided in **Appendix A**.

PROJECTED BACKGROUND TRAFFIC VOLUMES

DeShazo used the same growth rate as considered in the TIA report i. e. an annual growth rate of **3%** from the collected (2022) for two years to the 2024 background condition. From 2024 and after, a constant annual growth rate of **1%** was used in this analysis.

SITE-GENERATED TRAFFIC VOLUMES

Traffic generated by the proposed development was calculated using updated trip generation and traffic assignment methodology derived from prior traffic impact analyses for the site. Off-peak hour trip generation was obtained from detailed data provided by the Institute of Transportation Engineers (ITE) *Trip Generation Manual (11th Edition)*, derived from field data and professional judgment where required. The increase in traffic at the subject intersection will be the additional turning movements due to the proposed site. It is to be noted that, the projected Trip generation for Option A and Option B developments will be updated on the TIA revision report. The updated projected trip generation tables for the proposed development options are provided in **Table 1A and 1B** below. It is to be noted that, internal capture and pass-by reductions are not considered for the TWSA analysis. Traffic assignment distribution is also modified for the previous TIA submittal based on recent changes in the Driveway type for Driveway 2. In the previous TIA submittal, both Driveway 1 and Driveway 2 were considered full access Driveways. However, based on the recent changes made by the client, Driveway 2 will be considered as an exit driveway only. Inbound and outbound traffic assignment at the intersection of Swisher Road and Briar Oaks Drive is shown in **Exhibit 2**.

Table 1A. Full Buildout Projected Trip Generation for Option A

ITE Code	ITE Land Use	Quantity		Weekday Trips	AM Peak Hour			PM Peak Hour		
					Total	In	Out	Total	In	Out
221	Mid-Rise Apartment	286	DU	1,318	114	26	88	112	68	44
		Subtotals		1,318	114	26	88	112	68	44
		Totals:		1,318	114	26	88	112	68	44

Table 1B. Full Buildout Projected Trip Generation for Option B

ITE Code	ITE Land Use	Quantity	Weekday Trips	AM Peak Hour			PM Peak Hour		
				Total	In	Out	Total	In	Out
821	Shopping Plaza(40k-150K)	60,000 SF	5,669	212	131	81	542	260	282
932	High-Turnover (Sit-Down) Restaurant	11,450 SF	1,227	110	60	50	104	63	41
934	Fast Food with Drive-Thru	8,550 SF	3,997	381	194	187	282	146	136
			Totals:	10,893	703	385	928	469	459

TRAFFIC SIGNAL WARRANT ANALYSIS

TRAFFIC SIGNAL WARRANT ANALYSIS STANDARDS

This memorandum summarizes the results of the traffic signal warrant analysis in accordance with the procedures outlined in the *Manual on Uniform Traffic Control Devices (MUTCD)*. The *MUTCD* is a national publication developed to ensure that a high degree of uniform standards are applied to the use of traffic control devices. Individual states also have the authority to develop a state version of the manual, though the state's premises must be consistent with national standards. The State of Texas is currently governed by the 2011 *Texas Manual on Uniform Traffic Control Devices (TMUTCD)*.

TRAFFIC SIGNAL WARRANTS

The 2011 *TMUTCD* defines a series of traffic signal warrants to be used in the investigation of a traffic signal installation. These warrants are listed as follows.

<u>Traffic-Volume Related Warrants:</u>	<u>Non-Traffic-Volume Related Warrants:*</u>
Warrant 1 – Eight-Hour Vehicular Volume	Warrant 4 – Pedestrian Volume
Warrant 2 – Four-Hour Vehicular Volume	Warrant 5 – School Crossing
Warrant 3 – Peak Hour	Warrant 6 – Coordinated Signal System
Warrant 7 – Crash Experience*	
Warrant 8 – Roadway Network*	
Warrant 9 – Intersections near Grade Crossing*	
* Not analyzed in this study.	

The *TMUTCD* maintains that engineering judgment based upon “an engineering study of traffic conditions, and pedestrian and physical characteristics of the location” should be used to determine whether the installation of a traffic signal is justified. It is important to note that the intersection level of service (LOS) is not a warrant for signal installation. The *TMUTCD* further states¹:

The satisfaction of a traffic signal warrant shall not in itself require the installation of a traffic signal.

However, a traffic control signal should not be installed unless one or more of the factors described in this [manual] are met.

Also, a traffic control signal should not be installed unless an engineering study indicates that its installation will improve the overall safety and/or operation of the intersection.

Finally, at a location that is under development... hourly volumes should be estimated as part of an engineering study for comparison with traffic signal warrants. A traffic control signal installed under projected conditions should

have an engineering study done within one year of putting the signal into stop-and-go operation to determine if the signal is justified.

¹ 2011 *TMUTCD* - Sect. 4C.01 page 458.

This analysis evaluates all vehicular-traffic-related warrants—specifically Warrants 1, 2, and 3. No operational integration of existing traffic signals was considered in this analysis. Furthermore, Warrant 9: Intersection near Grade Crossing is intended for use at locations where none of the conditions described in other signal warrants are met but its proximity to a grade crossing is the principal reason for considering a traffic control signal. An excerpt from the 2011 *TMUTCD* §4C-01 of these warrants is provided in **Appendix B**.

Table 2 provides a summary of the background information for the intersection required to conduct the traffic signal warrant analysis.

Table 2. Background Information for Traffic Signal Warrant Analysis

	MAJOR STREET (Swisher Road)	MINOR STREET (Briar Oaks Drive)
Number of Approaching Lanes	2 Lanes	1 Lane
Speed Limit (≤ 40 mph)	35	30
Community Population	>10,000	

Based on the data presented above, the “70% Factor” (as described in *TMUTCD*) is not applicable in this analysis.

TRAFFIC VOLUME ADJUSTMENTS

The traffic volumes used in signal warrant analyses include the sum of the approach volumes (i.e., traffic volumes entering the intersection) in both directions on the major street versus the highest minor street approach volume. It is not necessary to use the same minor street approach throughout the analysis if the higher volume approach varies during the analysis period.

The *TMUTCD* has provisions for different adjustments in the assessment of the traffic-volume-related warrants. For instance, right-turning vehicles may turn "right-on-red" at a traffic signal under the same conditions as turning right at an unsignalized, STOP-controlled intersection approach. At intersection approaches on a minor street where the ability to turn right is uninhibited due to the intersection geometry (e.g., exclusive right-turn lanes) or where a disproportionately high percentage of vehicles are turning right (i.e., there is not a significant queue of vehicles turning left or traveling straight), then...

*Engineering judgment should be used to determine what, if any, portion of the right-turn traffic is subtracted from the minor-street traffic count when evaluating the count against the traffic signal warrants.*²

In this analysis, all right-turning traffic on SB, NB, EB, and WB approaches are required to come to a complete stop upon approaching the intersection on red.

TRAFFIC SIGNAL WARRANT ANALYSIS RESULTS

SWISHER ROAD AND BRIAR OAKS DRIVE RESULTS

Tables 3 show the results of the signal warrant analysis for different scenarios analyzed. A detailed summary of the traffic volume calculations used in this analysis is provided in **Appendix C**.

**Table 3. TSWA Summary for Swisher Road and Briar Oaks Drive
(3A. Existing Conditions)**

Warrant	2022 Existing Conditions	
	Warrant Satisfaction	Traffic Signal Recommended
Warrant 3 - Peak-Hour	Not Met	No

(3B. Buildout Conditions)

Warrant	2024 Background		2024 Background Plus Site			
			Option A		Option B	
	Warrant Satisfaction	Traffic Signal Recommended	Warrant Satisfaction	Traffic Signal Recommended	Warrant Satisfaction	Traffic Signal Recommended
Warrant 3 - Peak-Hour	Not Met	No	Met	Yes	Met	Yes

(3C. Horizon Conditions)

Warrant	2029 Horizon		2029 Horizon Plus Site			
			Option A		Option B	
	Warrant Satisfaction	Traffic Signal Recommended	Warrant Satisfaction	Traffic Signal Recommended	Warrant Satisfaction	Traffic Signal Recommended
Warrant 3 - Peak-Hour	Not Met	No	Met	Yes	Met	Yes

WARRANT 3 - PEAK HOUR VEHICULAR VOLUMES

This warrant applies when the minor street has an excessive delay when entering or crossing the major street for at least one hour each day. The warrant is typically applied at locations that discharge a large number of vehicles over a short period of time. The total major street approach volumes, when plotted with the corresponding minor street volumes, must fall above the line for “1 lane and 1 lane” in Figure 4C-4 (see **Appendix B**) for at least one hour. Warrant 3, Peak Hour has been used as the posted speed limit on the major street is 35 mph (≤ 40 mph).

FINDING: The 2022 Existing Conditions do not satisfy Warrant 3, Peak Hour.

FINDING: The 2024 Background Conditions do not satisfy Warrant 3, Peak Hour.

FINDING: The 2024 Background Plus Site (Buildout) Conditions both Option A and B **satisfy** Warrant 3, Peak Hour.

FINDING: The 2029 Horizon Conditions do not **satisfy** Warrant 3, Peak Hour.

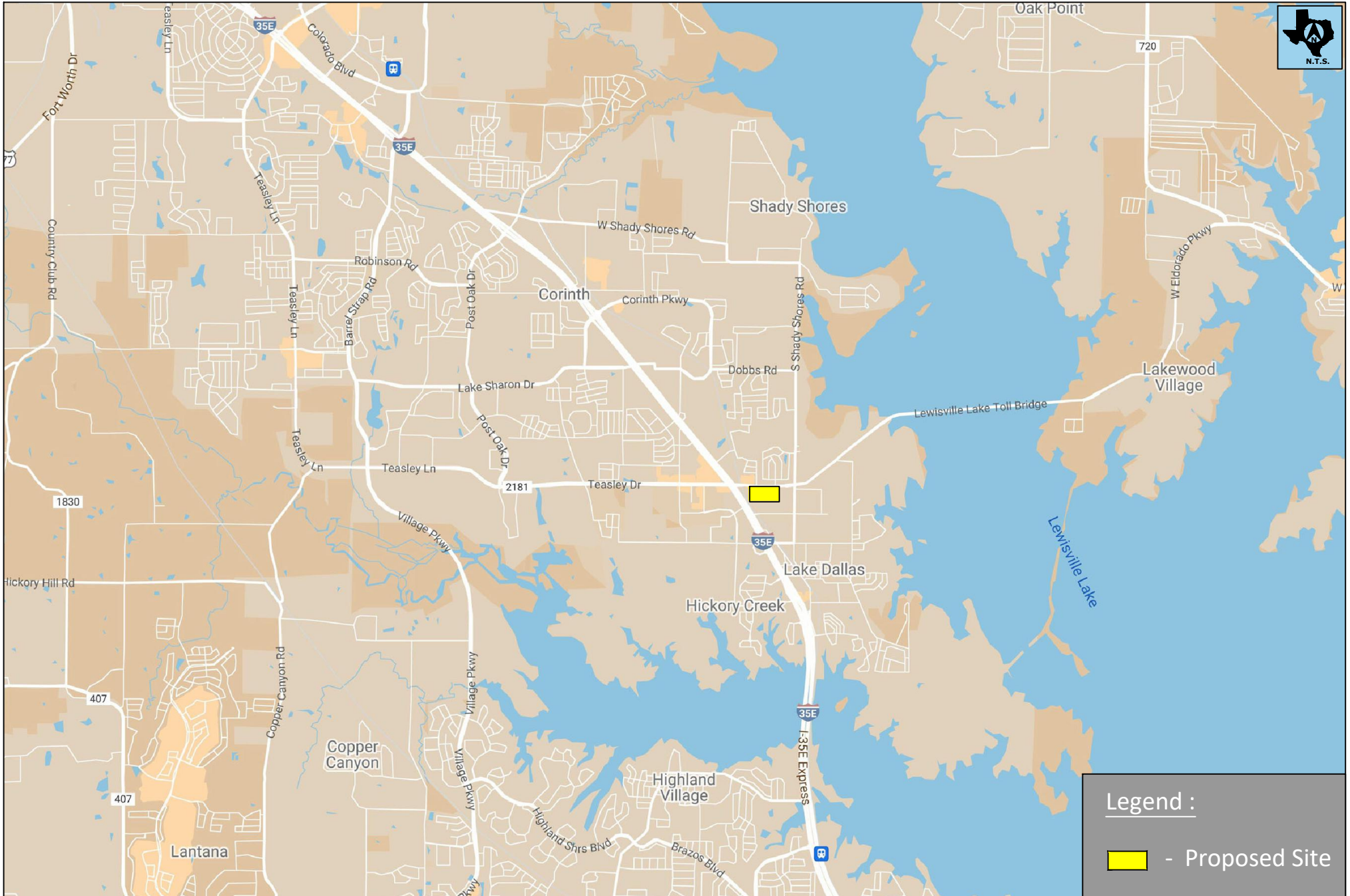
FINDING: The 2029 Horizon plus Site Conditions both Option A and B **satisfy** Warrant 3, Peak Hour.

RECOMMENDATIONS: The analysis is based upon the existing intersection volumes and the projected site-related volumes. Projected traffic conditions at the subject intersection satisfy the criteria for traffic-related warrants 3 with the completion of the proposed development Options A and B. It also needs to note

that the developer of this project is not completely responsible for warranting a signal at this intersection. DeShazo recommends a pro-rata cost-sharing needs be developed by the approving agency to identify developers' contribution percentage for mitigation, overall cost, and cost share.

END OF MEMO

Exhibit 1



PROJECT VICINITY MAP

TWSA for the intersection of Swisher Road and Briar Oaks Drive in Lake Dallas, Texas

DGI PROJECT #:22126

DATE : SepAUG. 2022

PREPARED BY: PA

EXHIBIT

1

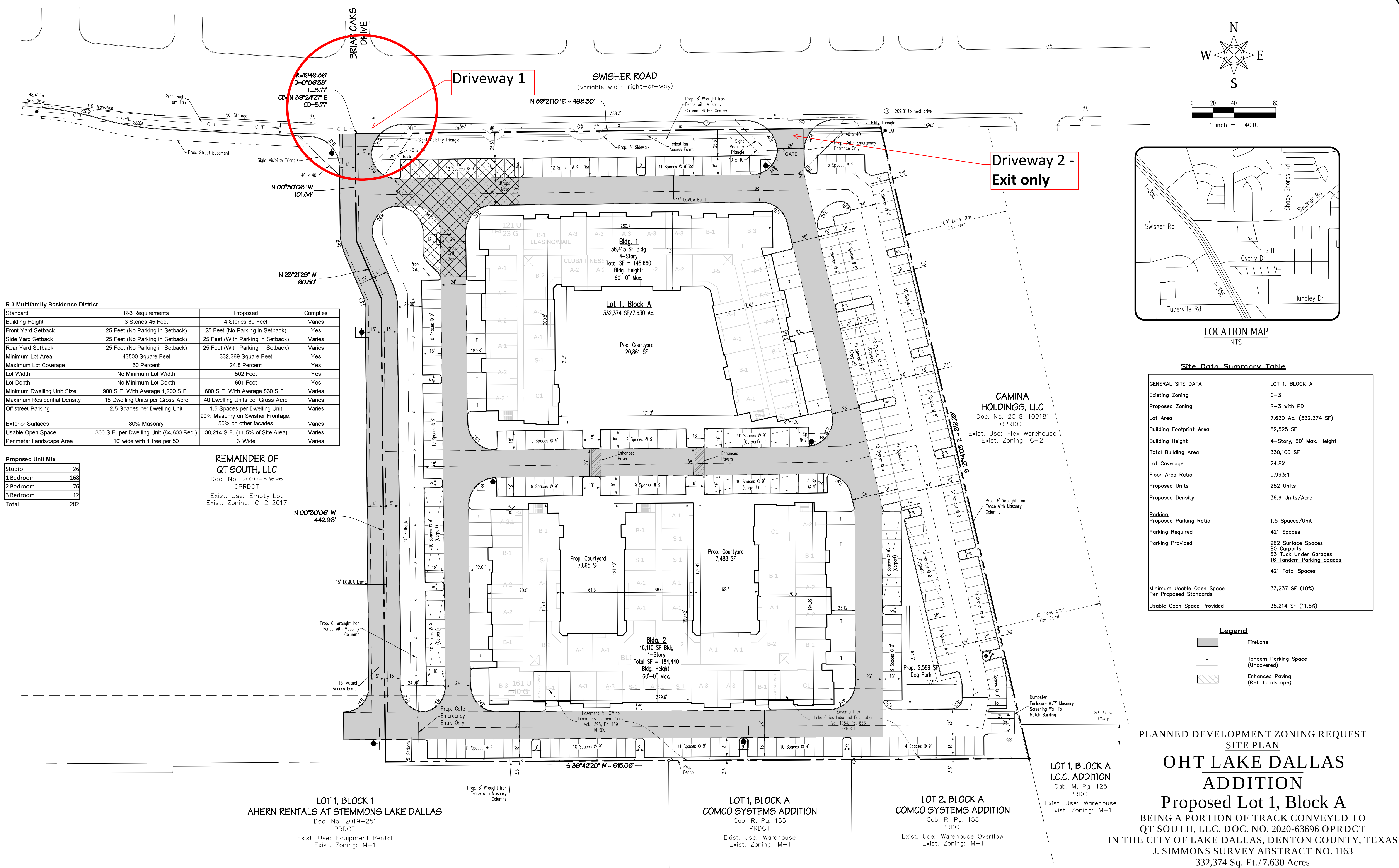
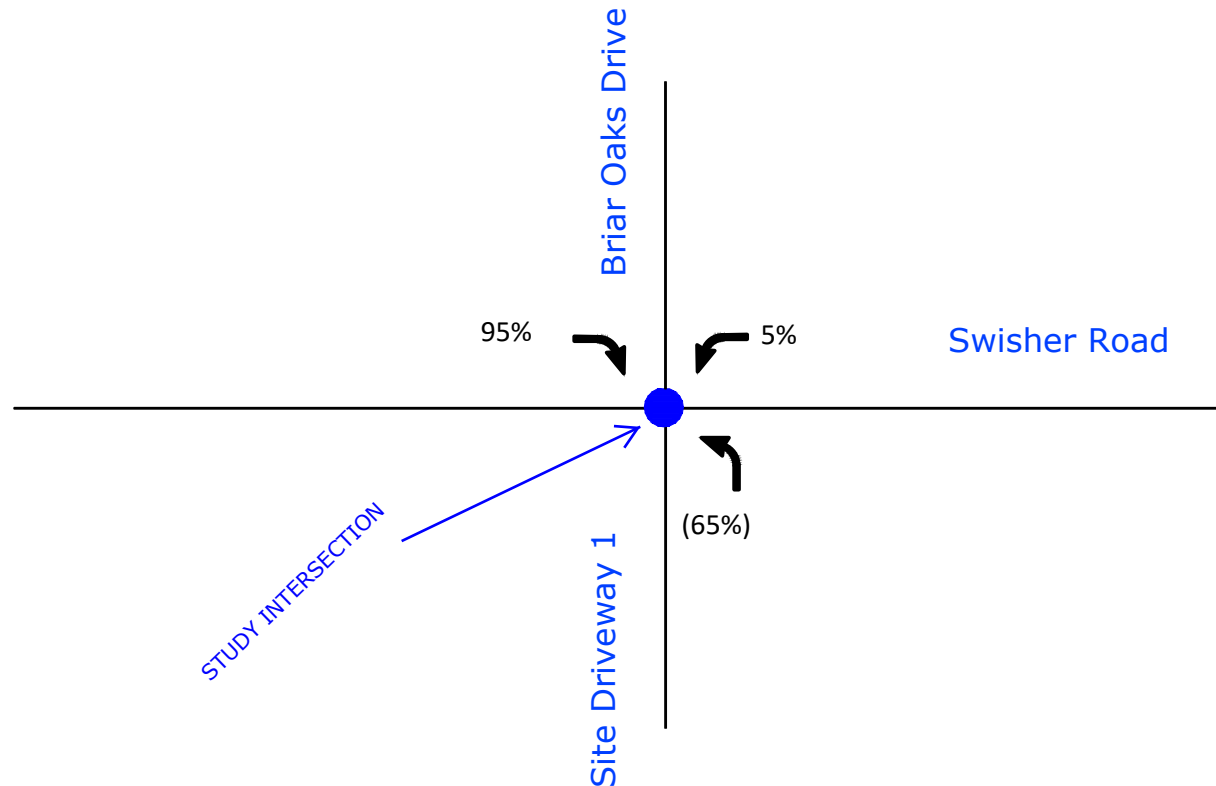


Exhibit 2



Option A



Legend :

*XX - Inbound Traffic Assignment
(XX) - Outbound Traffic Assignment*

INBOUND & OUTBOUND TRAFFIC-ASSIGNMENTS

Traffic Signal Warrant Analysis for the Intersection of Swisher Road and Briar Oaks Drive Drive in Lake Dallas, Texas

DGI PROJECT #:22126

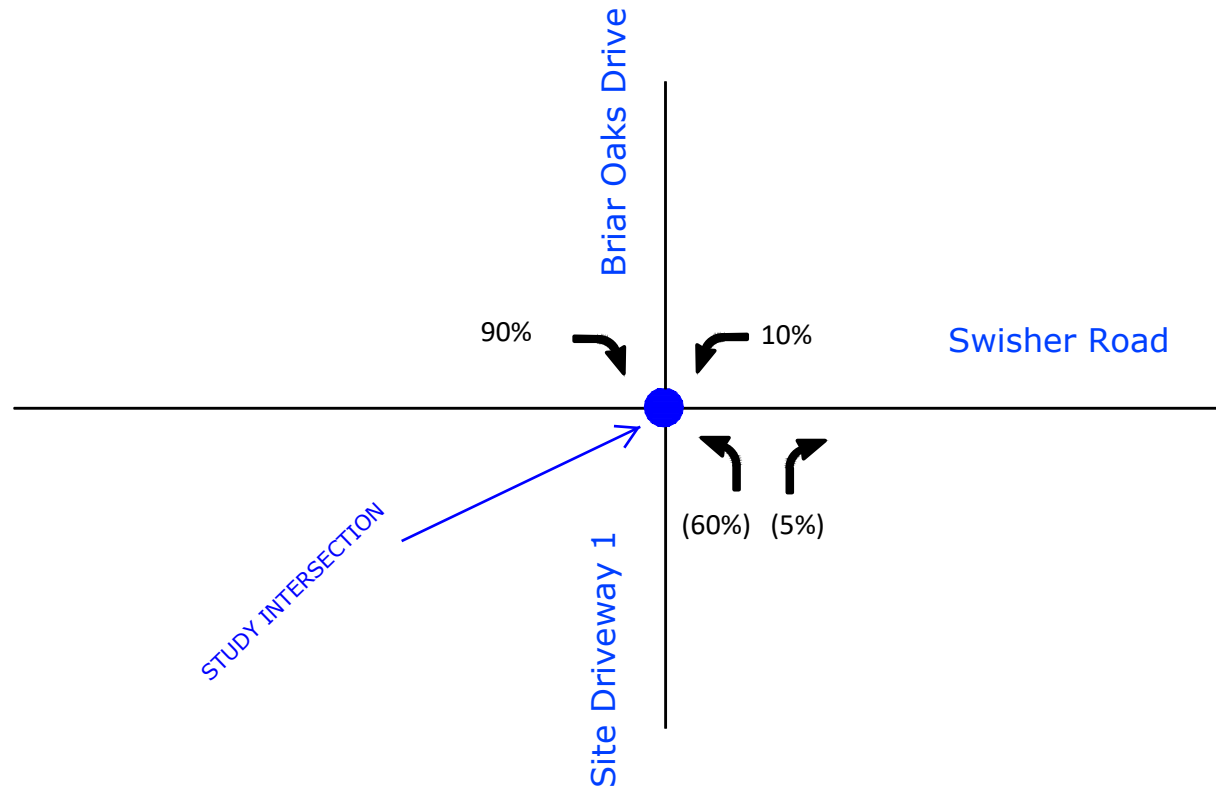
DATE : Sep 2022

EXHIBIT

2A



Option B



Legend :

*XX - Inbound Traffic Assignment
(XX) - Outbound Traffic Assignment*

INBOUND & OUTBOUND TRAFFIC-ASSIGNMENTS

Traffic Signal Warrant Analysis for the Intersection of Swisher Road and Briar Oaks Drive Drive in Lake Dallas, Texas

DGI PROJECT #:22126

DATE : Sep 2022

EXHIBIT

2B

Appendix A. Traffic Data Volumes Summary

DeShazo Group, Inc.

		WESTBOUND				EASTBOUND				NORTHBOUND				SOUTHBOUND				<i>Page 1 of 2 Pages</i>		
Time of Count		MAJOR				MAJOR				MINOR				MINOR				Fifteen Minute	Peak Hour Totals	Peak Hour Factor
		>><				>><				>><				>><						
		Uturn	Left	Thru	Right	Uturn	Left	Thru	Right	Uturn	Left	Thru	Right	Uturn	Left	Thru	Right	Subtotals		
07:00	07:15	0	0	252	7	0	2	193	0	0	0	0	0	0	4	0	8	466		
07:15	07:30	0	0	247	8	0	4	213	0	0	0	0	0	0	1	0	7	480		
07:30	07:45	0	0	257	6	0	2	198	0	0	0	0	0	0	2	0	6	471		
07:45	08:00	0	0	263	10	0	2	257	0	0	0	0	0	0	3	0	9	544	1,961	90.12%
08:00	08:15	0	0	258	7	0	5	214	0	0	0	0	0	0	2	0	3	489	1,984	101.43%
08:15	08:30	1	0	256	5	0	1	213	0	0	0	0	0	0	1	0	2	479	1,983	103.50%
08:30	08:45	0	0	226	1	0	3	190	0	0	0	0	0	1	3	0	3	427	1,939	113.52%
08:45	09:00	0	0	208	2	0	1	170	0	0	0	0	0	0	1	0	4	386	1,781	115.35%
09:00	09:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1,292	#DIV/0!
09:15	09:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	813	#DIV/0!
09:30	09:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	386	#DIV/0!
09:45	10:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	#DIV/0!
10:00	10:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	#DIV/0!
10:15	10:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	#DIV/0!
10:30	10:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	#DIV/0!
10:45	11:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	#DIV/0!
11:00	11:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	#DIV/0!
11:15	11:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	#DIV/0!
11:30	11:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	#DIV/0!
11:45	12:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	#DIV/0!
12:00	12:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	#DIV/0!
12:15	12:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	#DIV/0!
12:30	12:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	#DIV/0!
12:45	13:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	#DIV/0!
13:00	13:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	#DIV/0!
13:15	13:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	#DIV/0!
13:30	13:45	0																		

Appendix B. TMUTCD Guidelines

CHAPTER 4C. TRAFFIC CONTROL SIGNAL NEEDS STUDIES

Section 4C.01 Studies and Factors for Justifying Traffic Control Signals

Standard:

- 01 An engineering study of traffic conditions, pedestrian characteristics, and physical characteristics of the location shall be performed to determine whether installation of a traffic control signal is justified at a particular location.
- 02 The investigation of the need for a traffic control signal shall include an analysis of factors related to the existing operation and safety at the study location and the potential to improve these conditions, and the applicable factors contained in the following traffic signal warrants:
- Warrant 1, Eight-Hour Vehicular Volume
 - Warrant 2, Four-Hour Vehicular Volume
 - Warrant 3, Peak Hour
 - Warrant 4, Pedestrian Volume
 - Warrant 5, School Crossing
 - Warrant 6, Coordinated Signal System
 - Warrant 7, Crash Experience
 - Warrant 8, Roadway Network
 - Warrant 9, Intersection Near a Grade Crossing

- 03 The satisfaction of a traffic signal warrant or warrants shall not in itself require the installation of a traffic control signal.

Support:

- 04 Sections 8C.09 and 8C.10 contain information regarding the use of traffic control signals instead of gates and/or flashing-light signals at highway-rail grade crossings and highway-light rail transit grade crossings, respectively.

Guidance:

- 05 *A traffic control signal should not be installed unless one or more of the factors described in this Chapter are met.*
- 06 *A traffic control signal should not be installed unless an engineering study indicates that installing a traffic control signal will improve the overall safety and/or operation of the intersection.*
- 07 *A traffic control signal should not be installed if it will seriously disrupt progressive traffic flow.*
- 08 *The study should consider the effects of the right-turn vehicles from the minor-street approaches. Engineering judgment should be used to determine what, if any, portion of the right-turn traffic is subtracted from the minor-street traffic count when evaluating the count against the signal warrants listed in Paragraph 2.*
- 09 *Engineering judgment should also be used in applying various traffic signal warrants to cases where approaches consist of one lane plus one left-turn or right-turn lane. The site-specific traffic characteristics should dictate whether an approach is considered as one lane or two lanes. For example, for an approach with one lane for through and right-turning traffic plus a left-turn lane, if engineering judgment indicates that it should be considered a one-lane approach because the traffic using the left-turn lane is minor, the total traffic volume approaching the intersection should be applied against the signal warrants as a one-lane approach. The approach should be considered two lanes if approximately half of the traffic on the approach turns left and the left-turn lane is of sufficient length to accommodate all left-turn vehicles.*
- 10 *Similar engineering judgment and rationale should be applied to a street approach with one through/left-turn lane plus a right-turn lane. In this case, the degree of conflict of minor-street right-turn traffic with traffic on the major street should be considered. Thus, right-turn traffic should not be included in the minor-street volume if the movement enters the major street with minimal conflict. The approach should be evaluated as a one-lane approach with only the traffic volume in the through/left-turn lane considered.*
- 11 *At a location that is under development or construction and where it is not possible to obtain a traffic count that would represent future traffic conditions, hourly volumes should be estimated as part of an engineering study for comparison with traffic signal warrants. Except for locations where the engineering study uses the satisfaction of Warrant 8 to justify a signal, a traffic control signal installed under projected conditions should have an engineering study done within 1 year of putting the signal into stop-and-go operation to determine if the signal is justified. If not justified, the signal should be taken out of stop-and-go operation or removed.*
- 12 *For signal warrant analysis, a location with a wide median, even if the median width is greater than 30 feet, should be considered as one intersection.*

Option:

- 13 At an intersection with a high volume of left-turn traffic from the major street, the signal warrant analysis may be performed in a manner that considers the higher of the major-street left-turn volumes as the “minor-street” volume and the corresponding single direction of opposing traffic on the major street as the “major-street” volume.
- 14 For signal warrants requiring conditions to be present for a certain number of hours in order to be satisfied, any four sequential 15-minute periods may be considered as 1 hour if the separate 1-hour periods used in the warrant analysis do not overlap each other and both the major-street volume and the minor-street volume are for the same specific one-hour periods.
- 15 For signal warrant analysis, bicyclists may be counted as either vehicles or pedestrians.

Support:

- 16 When performing a signal warrant analysis, bicyclists riding in the street with other vehicular traffic are usually counted as vehicles and bicyclists who are clearly using pedestrian facilities are usually counted as pedestrians.

Option:

- 17 Engineering study data may include the following:
 - A. The number of vehicles entering the intersection in each hour from each approach during 12 hours of an average day. It is desirable that the hours selected contain the greatest percentage of the 24-hour traffic volume.
 - B. Vehicular volumes for each traffic movement from each approach, classified by vehicle type (heavy trucks, passenger cars and light trucks, public-transit vehicles, and, in some locations, bicycles), during each 15-minute period of the 2 hours in the morning and 2 hours in the afternoon during which total traffic entering the intersection is greatest.
 - C. Pedestrian volume counts on each crosswalk during the same periods as the vehicular counts in Item B and during hours of highest pedestrian volume. Where young, elderly, and/or persons with physical or visual disabilities need special consideration, the pedestrians and their crossing times may be classified by general observation.
 - D. Information about nearby facilities and activity centers that serve the young, elderly, and/or persons with disabilities, including requests from persons with disabilities for accessible crossing improvements at the location under study. These persons might not be adequately reflected in the pedestrian volume count if the absence of a signal restrains their mobility.
 - E. The posted or statutory speed limit or the 85th-percentile speed on the uncontrolled approaches to the location.
 - F. A condition diagram showing details of the physical layout, including such features as intersection geometrics, channelization, grades, sight-distance restrictions, transit stops and routes, parking conditions, pavement markings, roadway lighting, driveways, nearby railroad crossings, distance to nearest traffic control signals, utility poles and fixtures, and adjacent land use.
 - G. A collision diagram showing crash experience by type, location, direction of movement, severity, weather, time of day, date, and day of week for at least 1 year.
- 18 The following data, which are desirable for a more precise understanding of the operation of the intersection, may be obtained during the periods described in Item B of Paragraph 17:
 - A. Vehicle-hours of stopped time delay determined separately for each approach.
 - B. The number and distribution of acceptable gaps in vehicular traffic on the major street for entrance from the minor street.
 - C. The posted or statutory speed limit or the 85th-percentile speed on controlled approaches at a point near to the intersection but unaffected by the control.
 - D. Pedestrian delay time for at least two 30-minute peak pedestrian delay periods of an average weekday or like periods of a Saturday or Sunday.
 - E. Queue length on stop-controlled approaches.

Section 4C.02 Warrant 1, Eight-Hour Vehicular Volume

Support:

- 01 The Minimum Vehicular Volume, Condition A, is intended for application at locations where a large volume of intersecting traffic is the principal reason to consider installing a traffic control signal.
- 02 The Interruption of Continuous Traffic, Condition B, is intended for application at locations where Condition A is not satisfied and where the traffic volume on a major street is so heavy that traffic on a minor intersecting street suffers excessive delay or conflict in entering or crossing the major street.
- 03 It is intended that Warrant 1 be treated as a single warrant. If Condition A is satisfied, then Warrant 1 is satisfied and analyses of Condition B and the combination of Conditions A and B are not needed. Similarly, if Condition B is satisfied, then Warrant 1 is satisfied and an analysis of the combination of Conditions A and B is not needed.

Standard:

04 The need for a traffic control signal shall be considered if an engineering study finds that one of the following conditions exist for each of any 8 hours of an average day:

- A. The vehicles per hour given in both of the 100 percent columns of Condition A in Table 4C-1 exist on the major-street and the higher-volume minor-street approaches, respectively, to the intersection; or
- B. The vehicles per hour given in both of the 100 percent columns of Condition B in Table 4C-1 exist on the major-street and the higher-volume minor-street approaches, respectively, to the intersection.

In applying each condition the major-street and minor-street volumes shall be for the same 8 hours. On the minor street, the higher volume shall not be required to be on the same approach during each of these 8 hours.

Option:

05 If the posted or statutory speed limit or the 85th-percentile speed on the major street exceeds 40 mph, or if the intersection lies within the built-up area of an isolated community having a population of less than 10,000, the traffic volumes in the 70 percent columns in Table 4C-1 may be used in place of the 100 percent columns.

Guidance:

06 The combination of Conditions A and B is intended for application at locations where Condition A is not satisfied and Condition B is not satisfied and should be applied only after an adequate trial of other alternatives that could cause less delay and inconvenience to traffic has failed to solve the traffic problems.

Standard:

07 The need for a traffic control signal shall be considered if an engineering study finds that both of the following conditions exist for each of any 8 hours of an average day:

- A. The vehicles per hour given in both of the 80 percent columns of Condition A in Table 4C-1 exist on the major-street and the higher-volume minor-street approaches, respectively, to the intersection; and
- B. The vehicles per hour given in both of the 80 percent columns of Condition B in Table 4C-1 exist on the major-street and the higher-volume minor-street approaches, respectively, to the intersection.

These major-street and minor-street volumes shall be for the same 8 hours for each condition; however, the 8 hours satisfied in Condition A shall not be required to be the same 8 hours satisfied in Condition B. On the minor street, the higher volume shall not be required to be on the same approach during each of the 8 hours.

Table 4C-1. Warrant 1, Eight-Hour Vehicular Volume

Condition A—Minimum Vehicular Volume

Number of lanes for moving traffic on each approach		Vehicles per hour on major street (total of both approaches)				Vehicles per hour on higher-volume minor-street approach (one direction only)			
Major Street	Minor Street	100% ^a	80% ^b	70% ^c	56% ^d	100% ^a	80% ^b	70% ^c	56% ^d
1	1	500	400	350	280	150	120	105	84
2 or more	1	600	480	420	336	150	120	105	84
2 or more	2 or more	600	480	420	336	200	160	140	112
1	2 or more	500	400	350	280	200	160	140	112

Condition B—Interruption of Continuous Traffic

Number of lanes for moving traffic on each approach		Vehicles per hour on major street (total of both approaches)				Vehicles per hour on higher-volume minor-street approach (one direction only)			
Major Street	Minor Street	100% ^a	80% ^b	70% ^c	56% ^d	100% ^a	80% ^b	70% ^c	56% ^d
1	1	750	600	525	420	75	60	53	42
2 or more	1	900	720	630	504	75	60	53	42
2 or more	2 or more	900	720	630	504	100	80	70	56
1	2 or more	750	600	525	420	100	80	70	56

^a Basic minimum hourly volume

^b Used for combination of Conditions A and B after adequate trial of other remedial measures

^c May be used when the major-street speed exceeds 40 mph or in an isolated community with a population of less than 10,000

^d May be used for combination of Conditions A and B after adequate trial of other remedial measures when the major-street speed exceeds 40 mph or in an isolated community with a population of less than 10,000

Option:

- 08 If the posted or statutory speed limit or the 85th-percentile speed on the major street exceeds 40 mph, or if the intersection lies within the built-up area of an isolated community having a population of less than 10,000, the traffic volumes in the 56 percent columns in Table 4C-1 may be used in place of the 80 percent columns.

Section 4C.03 Warrant 2, Four-Hour Vehicular Volume

Support:

- 01 The Four-Hour Vehicular Volume signal warrant conditions are intended to be applied where the volume of intersecting traffic is the principal reason to consider installing a traffic control signal.

Standard:

- 02 **The need for a traffic control signal shall be considered if an engineering study finds that, for each of any 4 hours of an average day, the plotted points representing the vehicles per hour on the major street (total of both approaches) and the corresponding vehicles per hour on the higher-volume minor-street approach (one direction only) all fall above the applicable curve in Figure 4C-1 for the existing combination of approach lanes. On the minor street, the higher volume shall not be required to be on the same approach during each of these 4 hours.**

Option:

- 03 If the posted or statutory speed limit or the 85th-percentile speed on the major street exceeds 40 mph, or if the intersection lies within the built-up area of an isolated community having a population of less than 10,000, Figure 4C-2 may be used in place of Figure 4C-1.

Section 4C.04 Warrant 3, Peak Hour

Support:

- 01 The Peak Hour signal warrant is intended for use at a location where traffic conditions are such that for a minimum of 1 hour of an average day, the minor-street traffic suffers undue delay when entering or crossing the major street.

Standard:

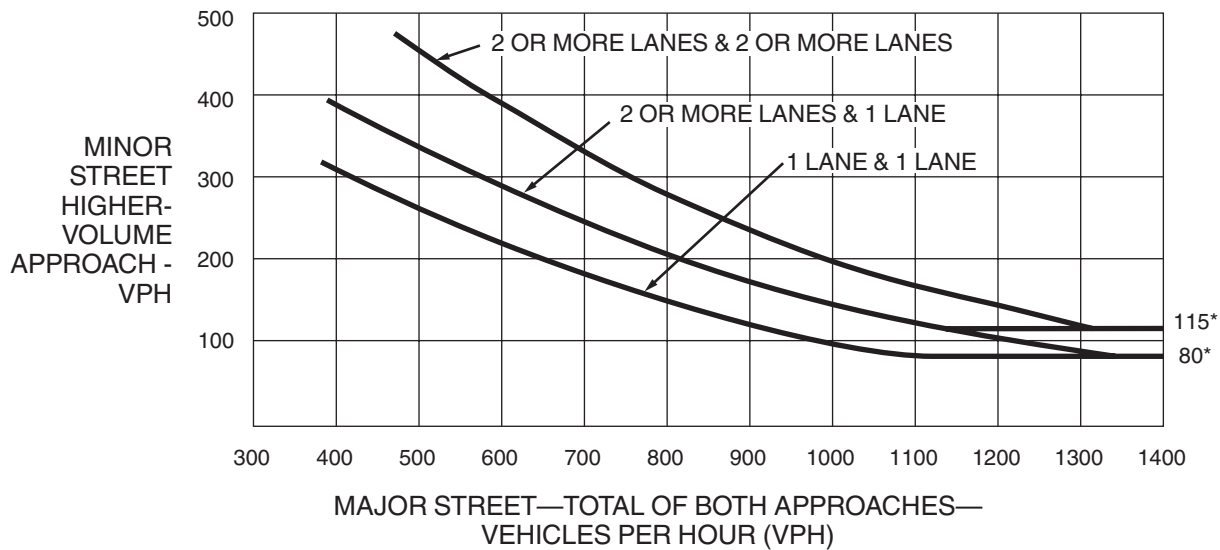
- 02 **This signal warrant shall be applied only in unusual cases, such as office complexes, manufacturing plants, industrial complexes, or high-occupancy vehicle facilities that attract or discharge large numbers of vehicles over a short time.**
- 03 **The need for a traffic control signal shall be considered if an engineering study finds that the criteria in either of the following two categories are met:**
- A. If all three of the following conditions exist for the same 1 hour (any four consecutive 15-minute periods) of an average day:**
 - 1. The total stopped time delay experienced by the traffic on one minor-street approach (one direction only) controlled by a STOP sign equals or exceeds: 4 vehicle-hours for a one-lane approach or 5 vehicle-hours for a two-lane approach; and**
 - 2. The volume on the same minor-street approach (one direction only) equals or exceeds 100 vehicles per hour for one moving lane of traffic or 150 vehicles per hour for two moving lanes; and**
 - 3. The total entering volume serviced during the hour equals or exceeds 650 vehicles per hour for intersections with three approaches or 800 vehicles per hour for intersections with four or more approaches.**
 - B. The plotted point representing the vehicles per hour on the major street (total of both approaches) and the corresponding vehicles per hour on the higher-volume minor-street approach (one direction only) for 1 hour (any four consecutive 15-minute periods) of an average day falls above the applicable curve in Figure 4C-3 for the existing combination of approach lanes.**

Option:

- 04 If the posted or statutory speed limit or the 85th-percentile speed on the major street exceeds 40 mph, or if the intersection lies within the built-up area of an isolated community having a population of less than 10,000, Figure 4C-4 may be used in place of Figure 4C-3 to evaluate the criteria in the second category of the Standard.
- 05 If this warrant is the only warrant met and a traffic control signal is justified by an engineering study, the traffic control signal may be operated in the flashing mode during the hours that the volume criteria of this warrant are not met.

Guidance:

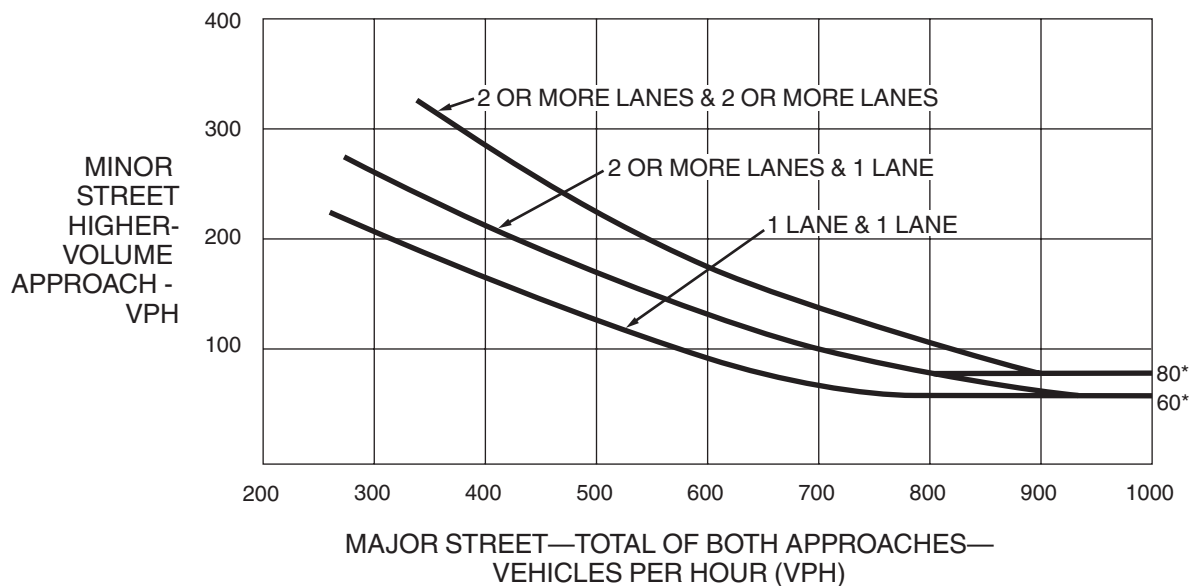
- 06 *If this warrant is the only warrant met and a traffic control signal is justified by an engineering study, the traffic control signal should be traffic-actuated.*

Figure 4C-1. Warrant 2, Four-Hour Vehicular Volume

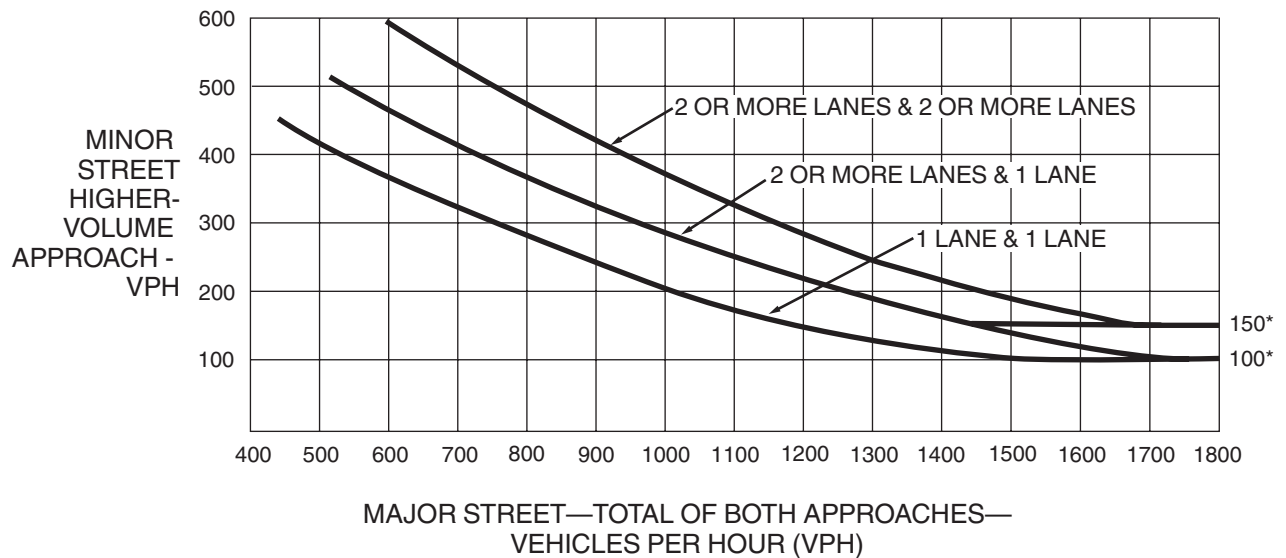
*Note: 115 vph applies as the lower threshold volume for a minor-street approach with two or more lanes and 80 vph applies as the lower threshold volume for a minor-street approach with one lane.

Figure 4C-2. Warrant 2, Four-Hour Vehicular Volume (70% Factor)

(COMMUNITY LESS THAN 10,000 POPULATION OR ABOVE 40 MPH ON MAJOR STREET)

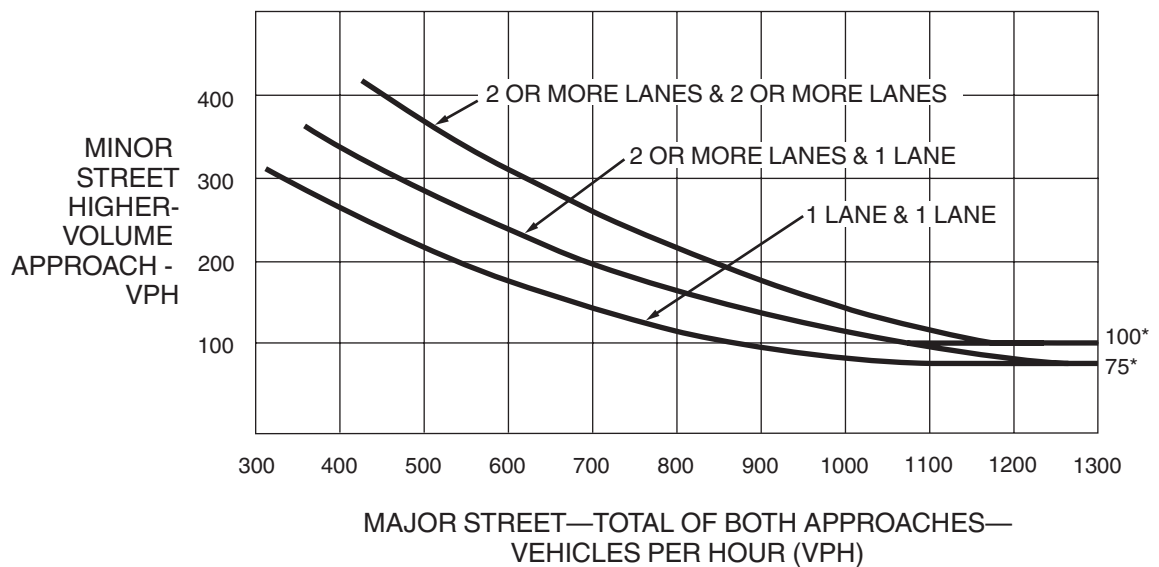


*Note: 80 vph applies as the lower threshold volume for a minor-street approach with two or more lanes and 60 vph applies as the lower threshold volume for a minor-street approach with one lane.

Figure 4C-3. Warrant 3, Peak Hour

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

Figure 4C-4. Warrant 3, Peak Hour (70% Factor)
 (COMMUNITY LESS THAN 10,000 POPULATION OR ABOVE 40 MPH ON MAJOR STREET)



*Note: 100 vph applies as the lower threshold volume for a minor-street approach with two or more lanes and 75 vph applies as the lower threshold volume for a minor-street approach with one lane.

Appendix C. Detailed Summary of The Traffic Volume Calculations

Cursory Traffic Signal Warrant Study

Intersection: Swisher Road at Briar Oaks Drive

Date: 9/30/2022

Description: Existing Traffic Counts

Adjustment Factors

- | | | | | | |
|------------------------------|------------------|---------|---------------------------------|-------------|-------|
| 1. Major Street Approach | <u>2 or more</u> | lane(s) | 5. Horizon Years (Projection) | <u>0</u> | years |
| 2. Minor Street Approach | <u>1</u> | lane(s) | 6. Average Annual Growth Factor | | |
| 3. Community Population | <u>></u> | 10,000 | Major Street Approach | <u>0.0%</u> | |
| 4. Major Street Posted Speed | <u>≤</u> | 40 mph | Minor Street Approaches | <u>0.0%</u> | |

Traffic Volume

TIME	MAJOR STREET APPROACHES			MINOR STREET APPROACH		
	WB	EB	Σ	NB	SB	Φ
7:00 AM	1,050	871	1,921	0	40	40
8:00 AM	964	797	1,761	0	20	20
9:00 AM	0	0	0	0	0	0
10:00 AM	0	0	0	0	0	0
11:00 AM	0	0	0	0	0	0
12:00 PM	0	0	0	0	0	0
1:00 PM	0	0	0	0	0	0
2:00 PM	0	0	0	0	0	0
3:00 PM	765	1,120	1,885	0	29	29
4:00 PM	795	1,358	2,153	0	35	35
5:00 PM	832	1,390	2,222	0	33	33
6:00 PM	0	0	0	0	0	0
7:00 PM	0	0	0	0	0	0
8:00 PM	0	0	0	0	0	0
9:00 PM	0	0	0	0	0	0
10:00 PM	0	0	0	0	0	0

Source: DeShazo road tube counts on DATE

Texas Manual On Uniform Traffic Control Devices

MUTCD Warrant	Conditional Parameters	No. Hrs Satisfied	No. Hrs Required	Warrant
3 - Peak-Hour Vehicular Volume (see attached Figure 2)		0	1	Not Met
4 - Pedestrian Volume.....	Not Analyzed in this study			
5 - School Crossing.....	Not Analyzed in this study			
6 - Coordinated Signal System.....	Not Analyzed in this study			
7 - Crash Experience.....	Not Analyzed in this study			
8 - Roadway Network.....	Not Analyzed in this study			
9 - Intersection near Grade Crossing	Not Analyzed in this study			

Results

Existing approach volumes do not satisfy **Warrant Three** -- Peak-Hour Vehicular Volume at this intersection. The MUTCD stipulates that a traffic signal control may be installed provided that these warrants are met at the discretion of the authorized agency representative responsible for traffic control installation and maintenance. As needed, further analysis or assessments are required prior to final determination.

Cursory Traffic Signal Warrant Study

Intersection: Swisher Road at Briar Oaks Drive

Date: 9/30/2022

Description: Existing Traffic Counts

Figures/Results:

Figure 1. Warrant 2, Four-Hour Vehicular Volume

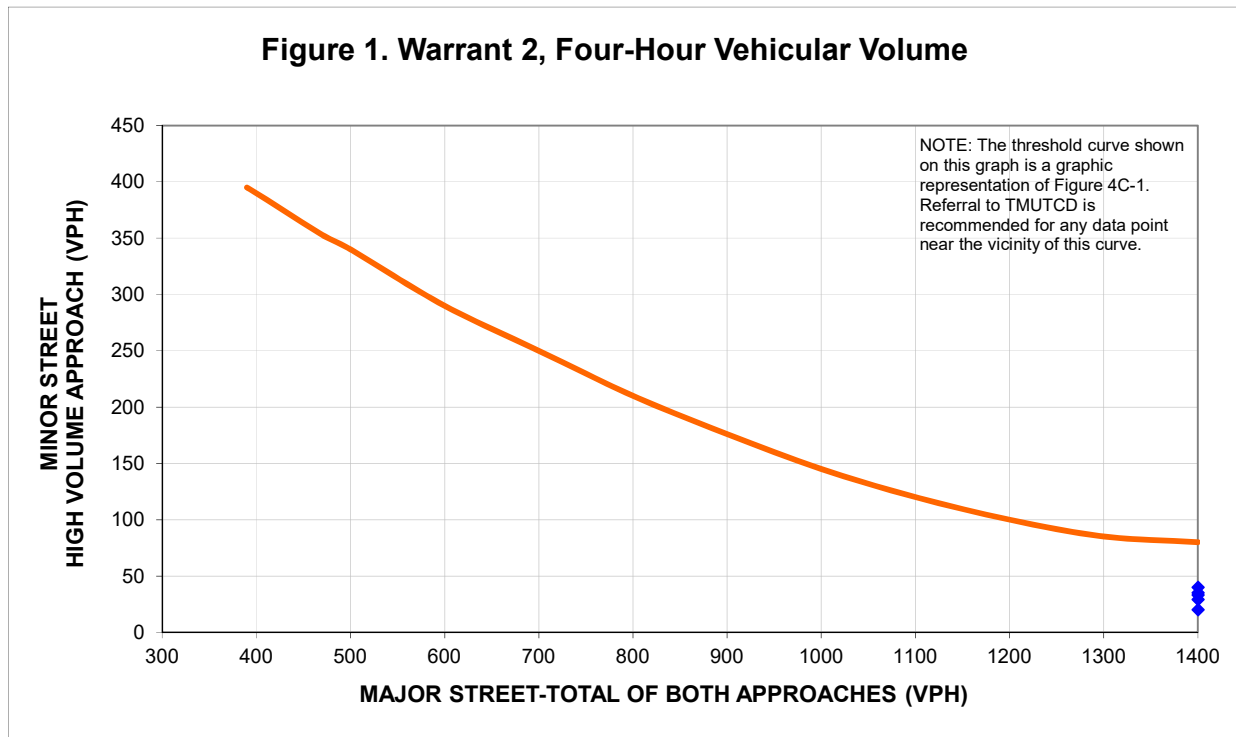
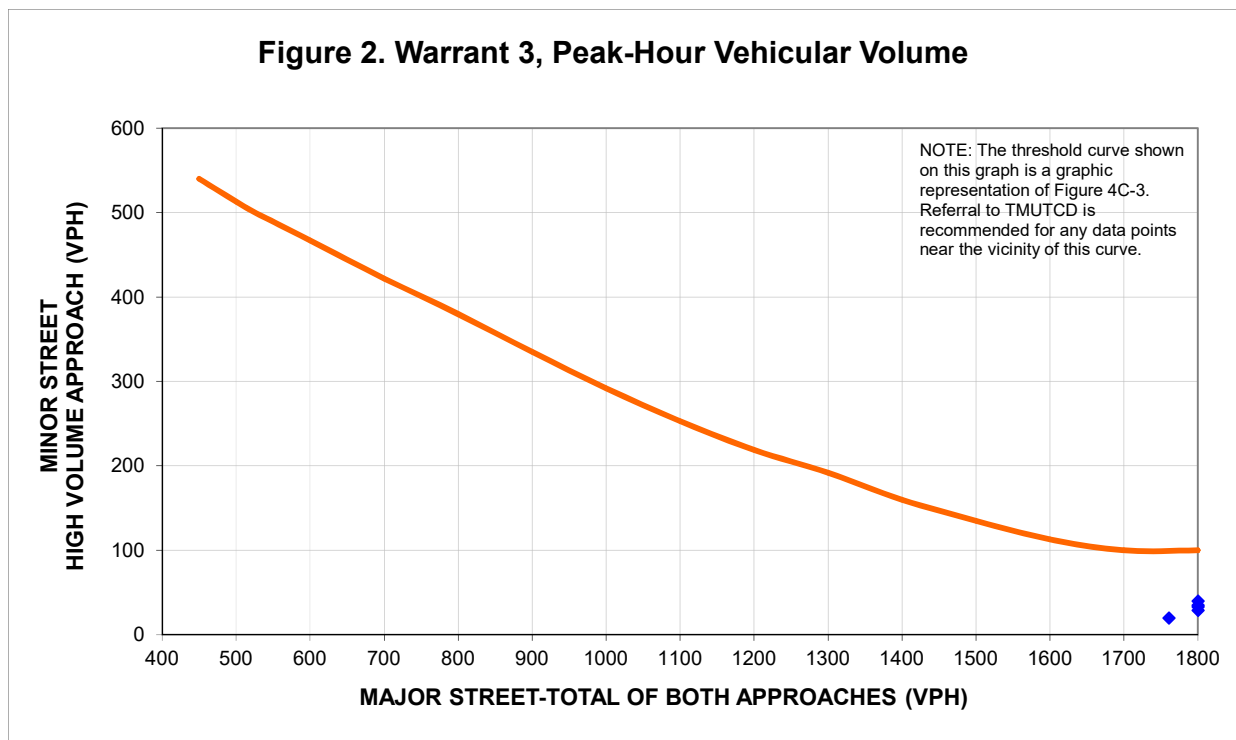


Figure 2. Warrant 3, Peak-Hour Vehicular Volume



Cursory Traffic Signal Warrant Study

Intersection: Swisher Road at Briar Oaks Drive

Date: 9/30/2022

Description: 2024 Background Traffic Counts

Adjustment Factors

- | | | | | | |
|------------------------------|------------------|---------|---------------------------------|-------------|-------|
| 1. Major Street Approach | <u>2 or more</u> | lane(s) | 5. Horizon Years (Projection) | <u>2</u> | years |
| 2. Minor Street Approach | <u>1</u> | lane(s) | 6. Average Annual Growth Factor | | |
| 3. Community Population | <u>></u> | 10,000 | Major Street Approach | <u>3.0%</u> | |
| 4. Major Street Posted Speed | <u>≤</u> | 40 mph | Minor Street Approaches | <u>3.0%</u> | |

Traffic Volume

TIME Begin	MAJOR STREET APPROACHES			MINOR STREET APPROACH		
	WB	EB	Σ	NB	SB	Φ
7:00 AM	1,114	924	2,038	0	42	42
8:00 AM	1,023	846	1,868	0	21	21
9:00 AM	0	0	0	0	0	0
10:00 AM	0	0	0	0	0	0
11:00 AM	0	0	0	0	0	0
12:00 PM	0	0	0	0	0	0
1:00 PM	0	0	0	0	0	0
2:00 PM	0	0	0	0	0	0
3:00 PM	812	1,188	2,000	0	31	31
4:00 PM	843	1,441	2,284	0	37	37
5:00 PM	883	1,475	2,357	0	35	35
6:00 PM	0	0	0	0	0	0
7:00 PM	0	0	0	0	0	0
8:00 PM	0	0	0	0	0	0
9:00 PM	0	0	0	0	0	0
10:00 PM	0	0	0	0	0	0

Source: DeShazo road tube counts on DATE

Texas Manual On Uniform Traffic Control Devices

MUTCD Warrant	Conditional Parameters	No. Hrs Satisfied	No. Hrs Required	Warrant
3 - Peak-Hour Vehicular Volume (<i>see attached Figure 2</i>)		0	1	Not Met
4 - Pedestrian Volume.....	Not Analyzed in this study			
5 - School Crossing.....	Not Analyzed in this study			
6 - Coordinated Signal System.....	Not Analyzed in this study			
7 - Crash Experience.....	Not Analyzed in this study			
8 - Roadway Network.....	Not Analyzed in this study			
9 - Intersection near Grade Crossing	Not Analyzed in this study			

Results

2024 Background approach volumes do not satisfy **Warrant Three** -- Peak-Hour Vehicular Volume at this intersection. The MUTCD stipulates that a traffic signal control may be installed provided that these warrants are met at the discretion of the authorized agency representative responsible for traffic control installation and maintenance. As needed, further analysis or assessments are required prior to final determination.

Cursory Traffic Signal Warrant Study

Intersection: Swisher Road at Briar Oaks Drive

Date: 9/30/2022

Description: 2024 Background Traffic Counts

Figures/Results:

Figure 1. Warrant 2, Four-Hour Vehicular Volume

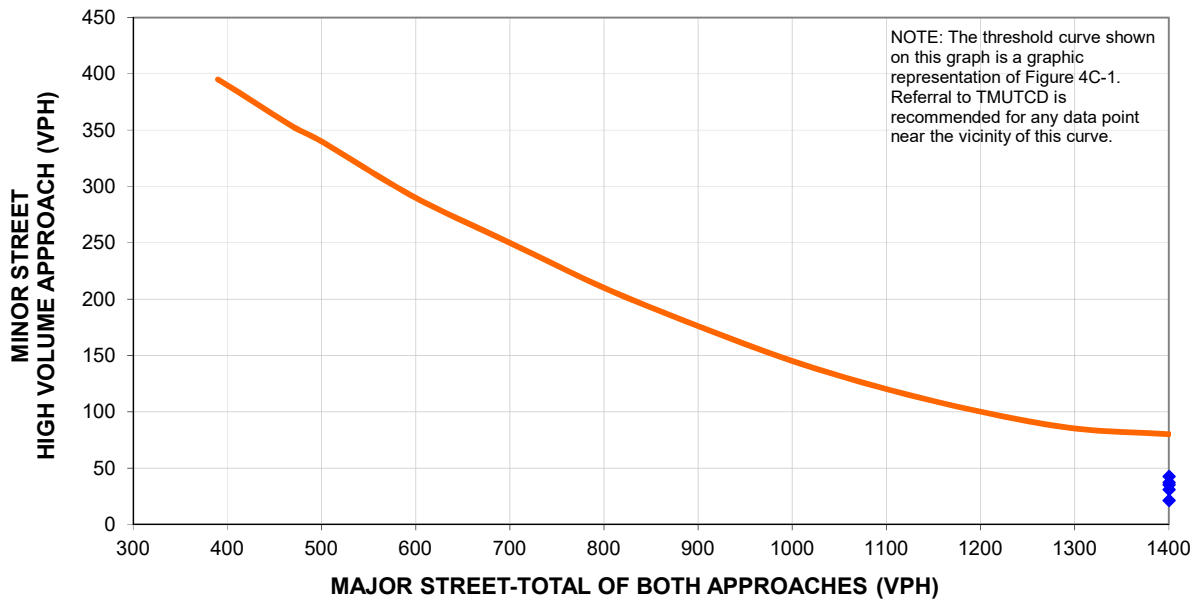
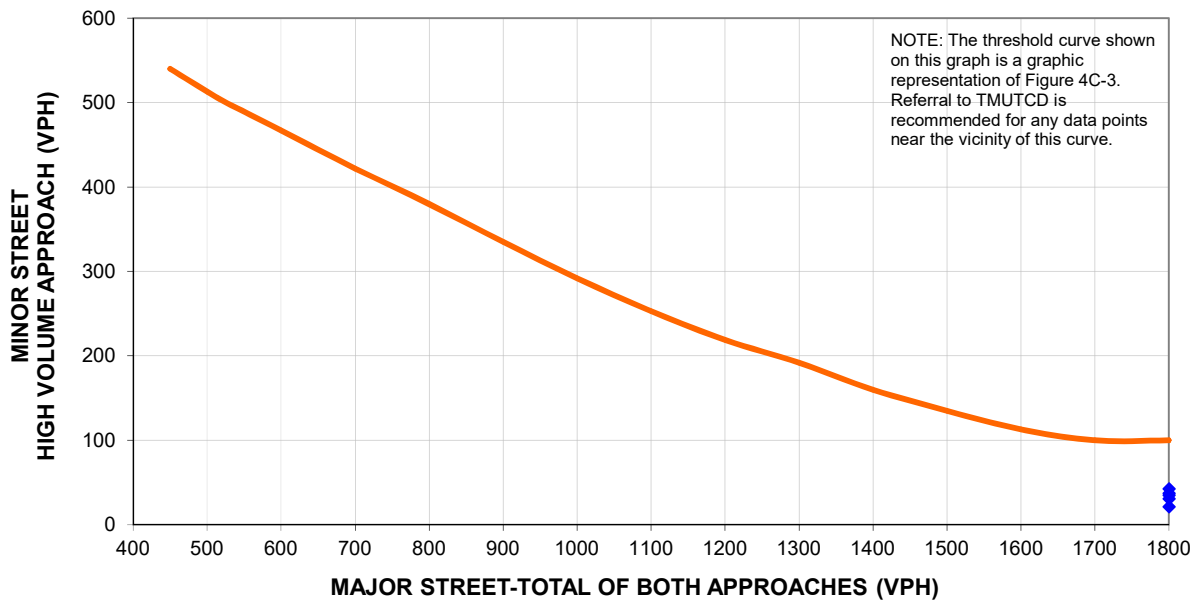


Figure 2. Warrant 3, Peak-Hour Vehicular Volume



Trip Generation Option A

ITE Code	ITE Land Use	Quantity	Weekday Trips	AM Peak Hour			PM Peak Hour		
				Total	In	Out	Total	In	Out
221	Mid-Rise Apartment	286 DU	1,318	114	26	88	112	68	44
	Subtotals:		1,318	114	26	88	112	68	44
	Totals:		1,318	114	26	88	112	68	44

GENERAL USE		Weekday Trips
MULTIFAMILY RESIDENTIAL		
Subtotal:		1,318
Total:		1,318

Option A

Table A. Weekday Trips as Calculated by ITE's Trip Generation handbook

	RESIDENTIAL (MULTIFAMILY)	TOTALS
24-hr Trips	1,318	1,318

Trip Generation Profile

Time	Inbound	Outbound
7:00 AM	2.5%	14.7%
8:00 AM	3.0%	12.5%
9:00 AM	2.2%	6.9%
10:00 AM	2.7%	4.6%
11:00 AM	3.4%	4.0%
12:00 PM	4.3%	4.8%
1:00 PM	4.4%	4.4%
2:00 PM	4.1%	3.7%
3:00 PM	5.9%	3.8%
4:00 PM	9.2%	5.1%
5:00 PM	13.1%	5.8%
6:00 PM	12.1%	6.0%
7:00 PM	9.4%	5.4%
8:00 PM	7.7%	3.1%
9:00 PM	6.5%	1.5%
10:00 PM	3.7%	1.6%
11:00 PM	2.1%	0.8%
12:00 AM		

SOURCE:

*ITE Trip Generation vehicle
time of the day distribution*

Trip Generation

Time	Inbound	Outbound	Totals
7:00 AM	33	193	226
8:00 AM	39	165	204
9:00 AM	29	91	119
10:00 AM	36	60	96
11:00 AM	45	52	97
12:00 PM	57	63	120
1:00 PM	58	58	115
2:00 PM	54	49	103
3:00 PM	78	50	128
4:00 PM	122	67	189
5:00 PM	172	76	248
6:00 PM	159	79	238
7:00 PM	124	71	196
8:00 PM	102	41	143
9:00 PM	86	20	106
10:00 PM	48	21	69
11:00 PM	28	10	38
12:00 AM	0	0	0

Cursory Traffic Signal Warrant Study

Intersection: Swisher Road at Briar Oaks Drive/Driveway 1

Date: 9/30/2022

Description: 2024 Buildout Traffic Counts (2 years) Option A

Adjustment Factors

- | | | | | | |
|------------------------------|------------------|---------|---------------------------------|-------------|-------|
| 1. Major Street Approach | <u>2 or more</u> | lane(s) | 5. Horizon Years (Projection) | <u>2</u> | years |
| 2. Minor Street Approach | <u>1</u> | lane(s) | 6. Average Annual Growth Factor | | |
| 3. Community Population | <u>></u> | 10,000 | Major Street Approach | <u>3.0%</u> | |
| 4. Major Street Posted Speed | <u>≤</u> | 40 mph | Minor Street Approaches | <u>3.0%</u> | |

Traffic Volume

TIME Begin	MAJOR STREET APPROACHES			MINOR STREET APPROACH		
	WB	EB	Σ	NB	SB	Φ
7:00 AM	1,116	955	2,071	126	42	126
8:00 AM	1,025	883	1,907	107	21	107
9:00 AM	0	0	0	0	0	0
10:00 AM	0	0	0	0	0	0
11:00 AM	0	0	0	0	0	0
12:00 PM	0	0	0	0	0	0
1:00 PM	0	0	0	0	0	0
2:00 PM	0	0	0	0	0	0
3:00 PM	815	1,262	2,078	33	31	33
4:00 PM	850	1,556	2,406	44	37	44
5:00 PM	891	1,638	2,529	50	35	50
6:00 PM	0	0	0	0	0	0
7:00 PM	0	0	0	0	0	0
8:00 PM	0	0	0	0	0	0
9:00 PM	0	0	0	0	0	0
10:00 PM	0	0	0	0	0	0

Source: DeShazo road tube counts on DATE

Texas Manual On Uniform Traffic Control Devices

MUTCD Warrant	Conditional Parameters	No. Hrs Satisfied	No. Hrs Required	Warrant
3 - Peak-Hour Vehicular Volume (see attached Figure 2)		2	1	Met
4 - Pedestrian Volume.....	Not Analyzed in this study			
5 - School Crossing.....	Not Analyzed in this study			
6 - Coordinated Signal System.....	Not Analyzed in this study			
7 - Crash Experience.....	Not Analyzed in this study			
8 - Roadway Network.....	Not Analyzed in this study			
9 - Intersection near Grade Crossing	Not Analyzed in this study			

Results

2024 Background Plus Site Option A approach volumes do satisfy **Warrant Three** -- Peak-Hour Vehicular Volume at this intersection. The MUTCD stipulates that a traffic signal control may be installed provided that these warrants are met at the discretion of the authorized agency representative responsible for traffic control installation and maintenance. As needed, further analysis or assessments are required prior to final determination.

Cursory Traffic Signal Warrant Study

Intersection: Swisher Road at Briar Oaks Drive/Driveway 1
Description: 2024 Buildout Traffic Counts (2 years) Option A

Date: 9/30/2022

Figures/Results:

Figure 1. Warrant 2, Four-Hour Vehicular Volume

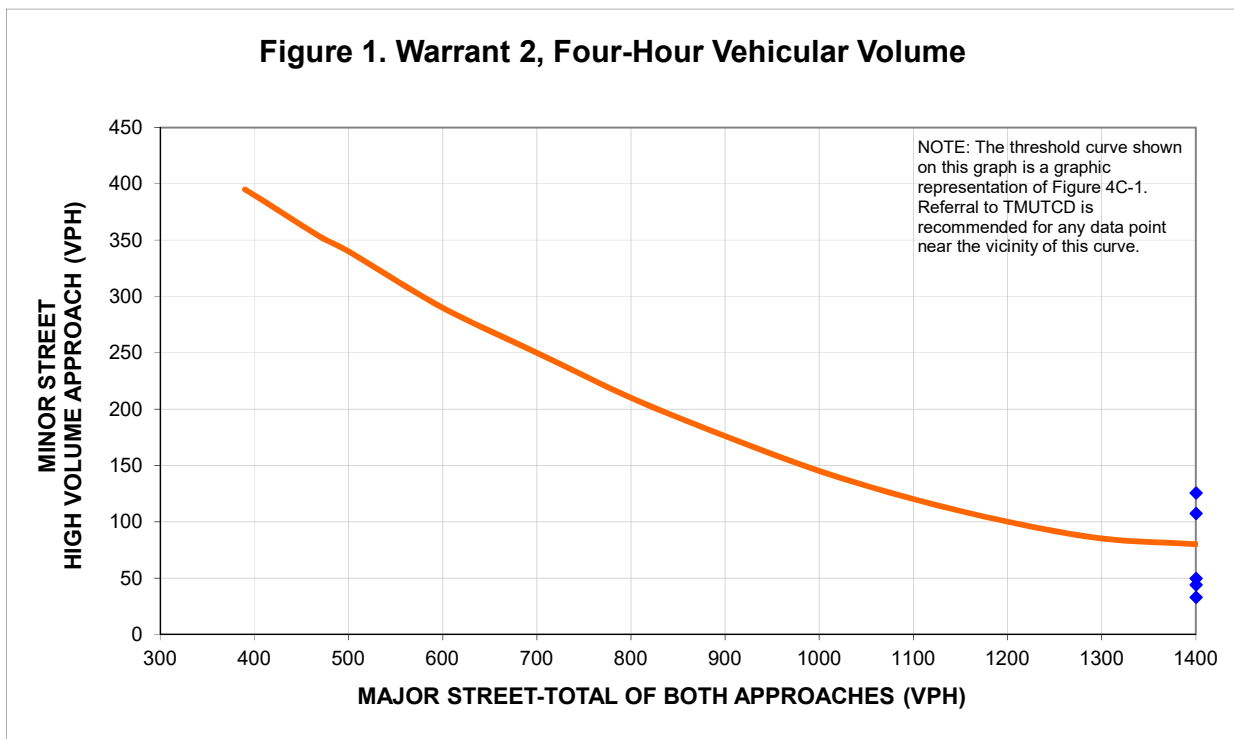
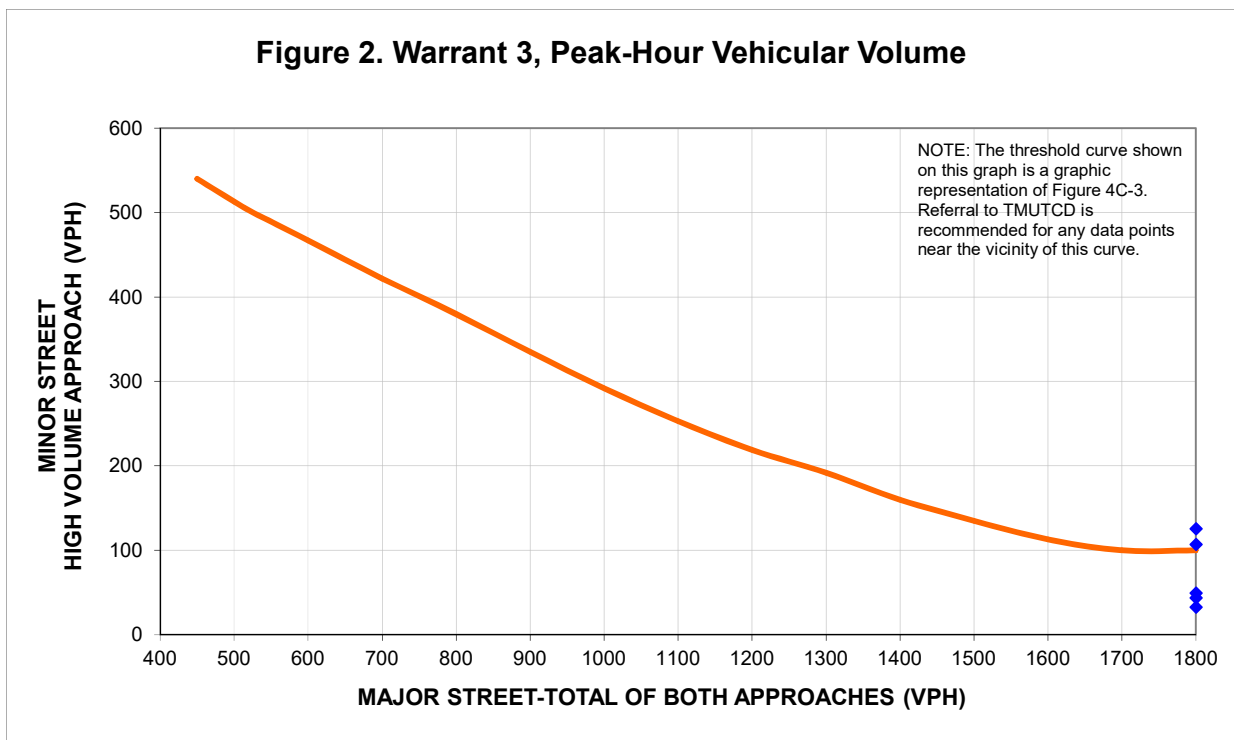


Figure 2. Warrant 3, Peak-Hour Vehicular Volume



Trip Generation Option B

Option B

ITE Code	ITE Land Use	Quantity		Weekday Trips	AM Peak Hour			PM Peak Hour		
					Total	In	Out	Total	In	Out
821	Shopping Plaza(40k-150K)	60,000	SF	5,669	212	131	81	542	260	282
932	High-Turnover (Sit-Down) Restaurant	11,450	SF	1,227	110	60	50	104	63	41
934	Fast Food with Drive-Thru	8,550	SF	3,997	381	194	187	282	146	136
	<i>Subtotals:</i>			10,893	703	385	318	928	469	459
	<i>Totals:</i>			10,893	703	385	318	928	469	459

GENERAL USE	Weekday Trips
RETAIL	
<i>Subtotal:</i>	5,669
932 HIGH TURNOVER RESTAURANT	
<i>Subtotal:</i>	1,227
934 FAST FOOD WITH DRIVE THROUGH	
<i>Subtotal:</i>	3,997
<i>Total:</i>	10,893

Trip Distribution Option B

24-hr Trips	<i>RETAIL</i>	<i>932 HIGH TURNOVER RESTAURANT</i>	<i>934 FAST FOOD WITH DRIVE THROUGH</i>	<i>TOTALS</i>
	5,669	1,227	3,997	10,893

Trip Generation Profile

Time	Inbound	Outbound	Inbound	Outbound	Inbound	Outbound
7:00 AM	1.9%	1.2%	2.7%	1.8%	3.4%	3.1%
8:00 AM	2.9%	1.8%	3.4%	3.1%	3.5%	3.4%
9:00 AM	4.9%	3.2%	4.0%	3.4%	3.4%	3.3%
10:00 AM	7.0%	5.3%	5.5%	4.4%	4.0%	3.7%
11:00 AM	8.5%	7.3%	12.1%	6.9%	9.1%	7.7%
12:00 PM	9.6%	8.9%	12.4%	12.3%	11.9%	12.0%
1:00 PM	8.7%	9.0%	6.5%	11.2%	7.9%	8.7%
2:00 PM	7.8%	8.6%	4.0%	5.1%	5.9%	6.5%
3:00 PM	8.1%	8.5%	3.3%	4.0%	5.7%	5.7%
4:00 PM	8.6%	8.7%	6.2%	3.9%	5.9%	5.6%
5:00 PM	8.7%	8.9%	10.2%	6.8%	6.9%	6.5%
6:00 PM	7.7%	7.8%	10.1%	8.7%	7.4%	7.4%
7:00 PM	6.5%	7.0%	7.2%	9.2%	6.3%	6.6%
8:00 PM	4.3%	6.3%	4.3%	7.1%	5.6%	5.8%
9:00 PM	1.9%	4.6%	2.6%	4.8%	4.1%	4.6%
10:00 PM	0.8%	1.2%	1.4%	2.9%	2.5%	2.9%
11:00 PM	0.3%	0.7%	0.5%	1.4%	1.4%	1.8%
12:00 AM	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%

SOURCE:

ITE Trip Generation vehicle of the Day distribution

Trip Generation

Time	Inbound	Outbound	Inbound	Outbound	Inbound	Outbound	Totals
7:00 AM	110	71	34	22	136	124	497
8:00 AM	167	104	41	38	139	137	627
9:00 AM	280	179	49	42	136	130	817
10:00 AM	397	299	67	54	160	148	1,124
11:00 AM	480	413	149	85	365	306	1,799
12:00 PM	546	502	152	151	475	479	2,306
1:00 PM	493	509	79	137	315	349	1,882
2:00 PM	444	489	49	62	234	258	1,536
3:00 PM	457	479	40	49	227	228	1,481
4:00 PM	486	495	76	48	235	222	1,562
5:00 PM	496	504	125	84	278	261	1,747
6:00 PM	436	443	124	106	296	296	1,701
7:00 PM	371	394	88	113	253	265	1,484
8:00 PM	242	360	52	88	225	234	1,200
9:00 PM	106	262	32	59	164	184	807
10:00 PM	43	71	17	36	99	116	381
11:00 PM	19	39	6	17	57	72	210
12:00 AM	0	0	0	0	0	0	0

Cursory Traffic Signal Warrant Study

Intersection: Swisher Road at Briar Oaks Drive/Driveway 1

Date: 9/30/2022

Description: 2024 Buildout Option B Traffic Counts (2 years)

Adjustment Factors

- | | | | | | |
|------------------------------|------------------|---------|---------------------------------|-------------|-------|
| 1. Major Street Approach | <u>2 or more</u> | lane(s) | 5. Horizon Years (Projection) | <u>2</u> | years |
| 2. Minor Street Approach | <u>1</u> | lane(s) | 6. Average Annual Growth Factor | | |
| 3. Community Population | <u>></u> | 10,000 | Major Street Approach | <u>3.0%</u> | |
| 4. Major Street Posted Speed | <u>≤</u> | 40 mph | Minor Street Approaches | <u>3.0%</u> | |

Traffic Volume

TIME	MAJOR STREET APPROACHES			MINOR STREET APPROACH		
	WB	EB	Σ	NB	SB	Φ
7:00 AM	1,142	1,176	2,318	141	42	141
8:00 AM	1,057	1,159	2,216	181	21	181
9:00 AM	0	0	0	0	0	0
10:00 AM	0	0	0	0	0	0
11:00 AM	0	0	0	0	0	0
12:00 PM	0	0	0	0	0	0
1:00 PM	0	0	0	0	0	0
2:00 PM	0	0	0	0	0	0
3:00 PM	884	1,840	2,724	492	31	492
4:00 PM	923	2,158	3,081	497	37	497
5:00 PM	972	2,283	3,255	552	35	552
6:00 PM	0	0	0	0	0	0
7:00 PM	0	0	0	0	0	0
8:00 PM	0	0	0	0	0	0
9:00 PM	0	0	0	0	0	0
10:00 PM	0	0	0	0	0	0

Source: DeShazo road tube counts on DATE

Texas Manual On Uniform Traffic Control Devices

MUTCD Warrant	Conditional Parameters	No. Hrs Satisfied	No. Hrs Required	Warrant
3 - Peak-Hour Vehicular Volume (see attached Figure 2)		5	1	Met
4 - Pedestrian Volume.....	Not Analyzed in this study			
5 - School Crossing.....	Not Analyzed in this study			
6 - Coordinated Signal System.....	Not Analyzed in this study			
7 - Crash Experience.....	Not Analyzed in this study			
8 - Roadway Network.....	Not Analyzed in this study			
9 - Intersection near Grade Crossing	Not Analyzed in this study			

Results

2024 Background Plus Site Option B approach volumes do satisfy **Warrant Three** -- Peak-Hour Vehicular Volume at this intersection. The MUTCD stipulates that a traffic signal control may be installed provided that these warrants are met at the discretion of the authorized agency representative responsible for traffic control installation and maintenance. As needed, further analysis or assessments are required prior to final determination.

Cursory Traffic Signal Warrant Study

Intersection: Swisher Road at Briar Oaks Drive/Driveway 1
Description: 2024 Buildout Option B Traffic Counts (2 years)

Date: 9/30/2022

Figures/Results:

Figure 1. Warrant 2, Four-Hour Vehicular Volume

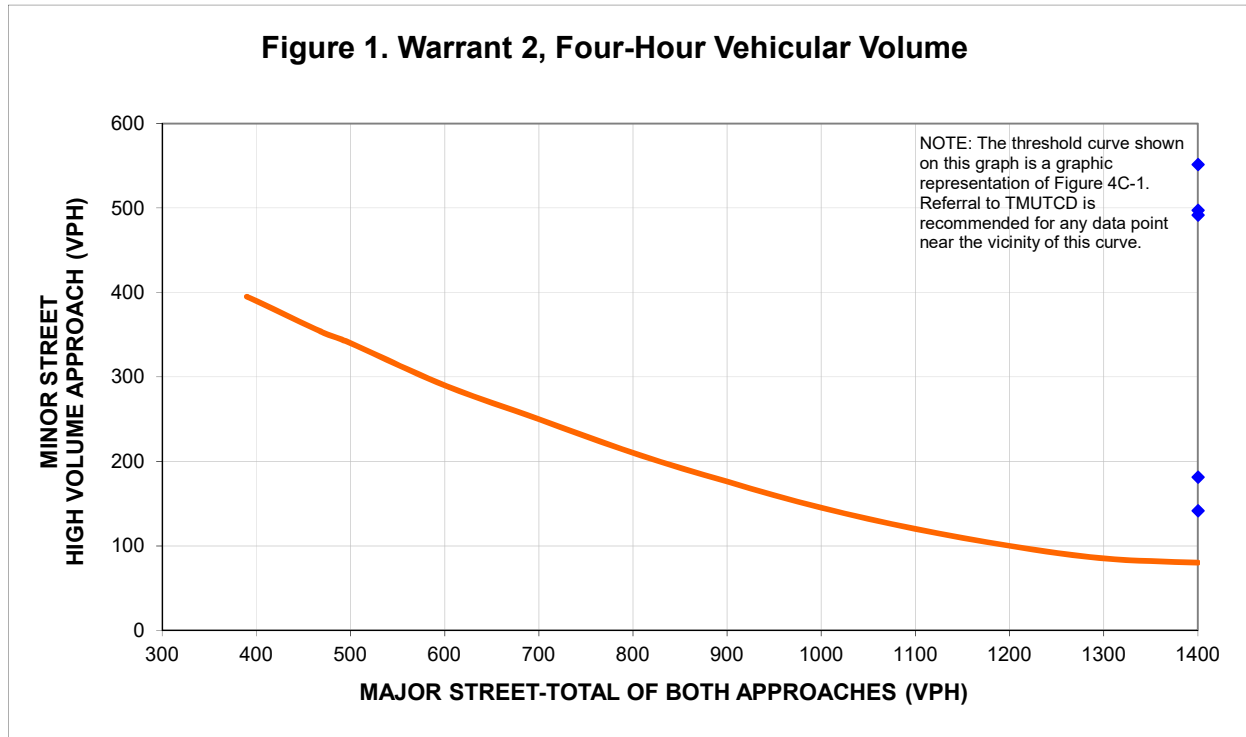
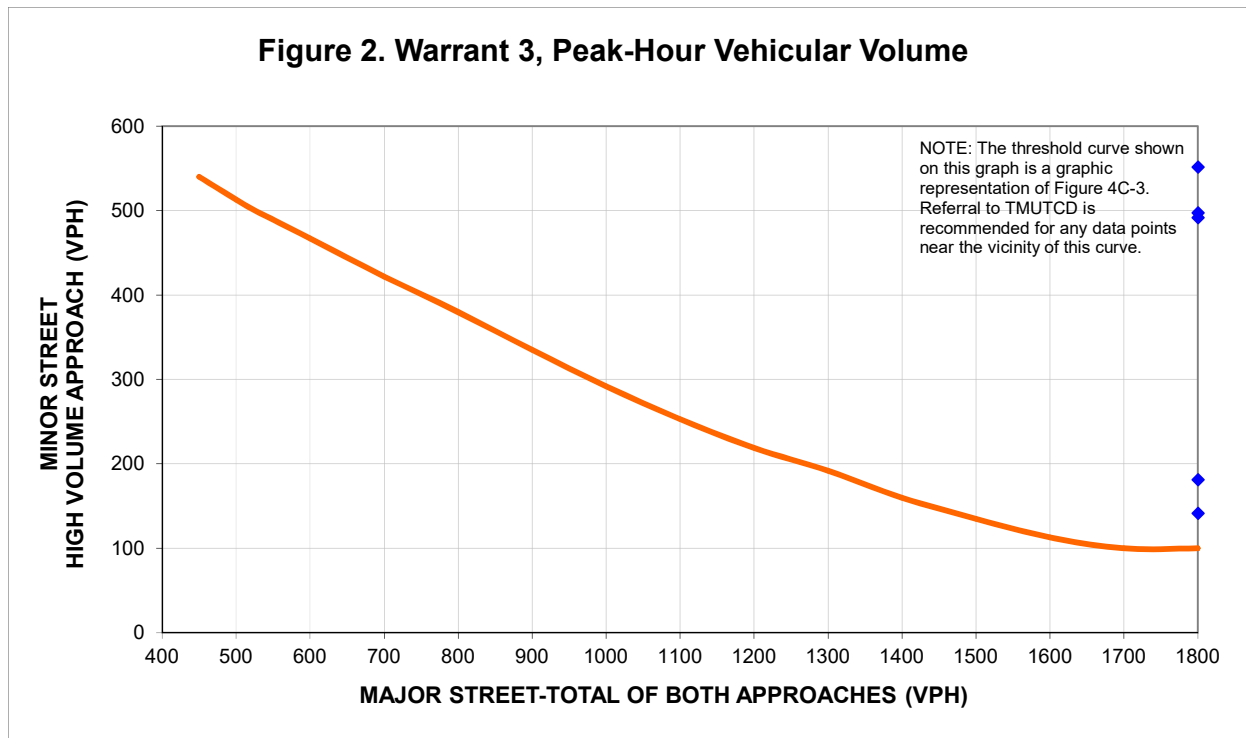


Figure 2. Warrant 3, Peak-Hour Vehicular Volume



Cursory Traffic Signal Warrant Study

Intersection: Swisher Road at Briar Oaks Drive

Date: 9/30/2022

Description: 2029 Horizon Traffic Counts

Adjustment Factors

- | | | | | | |
|------------------------------|------------------|---------|---------------------------------|-------------|-------|
| 1. Major Street Approach | <u>2 or more</u> | lane(s) | 5. Horizon Years (Projection) | <u>5</u> | years |
| 2. Minor Street Approach | <u>1</u> | lane(s) | 6. Average Annual Growth Factor | | |
| 3. Community Population | <u>></u> | 10,000 | Major Street Approach | <u>1.0%</u> | |
| 4. Major Street Posted Speed | <u>≤</u> | 40 mph | Minor Street Approaches | <u>1.0%</u> | |

Traffic Volume

TIME	MAJOR STREET APPROACHES			MINOR STREET APPROACH		
	WB	EB	Σ	NB	SB	Φ
7:00 AM	1,170	971	2,141	0	43	43
8:00 AM	1,075	888	1,963	0	21	21
9:00 AM	0	0	0	0	0	0
10:00 AM	0	0	0	0	0	0
11:00 AM	0	0	0	0	0	0
12:00 PM	0	0	0	0	0	0
1:00 PM	0	0	0	0	0	0
2:00 PM	0	0	0	0	0	0
3:00 PM	851	1,248	2,099	0	30	30
4:00 PM	886	1,512	2,398	0	37	37
5:00 PM	927	1,550	2,477	0	35	35
6:00 PM	0	0	0	0	0	0
7:00 PM	0	0	0	0	0	0
8:00 PM	0	0	0	0	0	0
9:00 PM	0	0	0	0	0	0
10:00 PM	0	0	0	0	0	0

Source: DeShazo road tube counts on DATE

Texas Manual On Uniform Traffic Control Devices

MUTCD Warrant	Conditional Parameters	No. Hrs Satisfied	No. Hrs Required	Warrant
3 - Peak-Hour Vehicular Volume (<i>see attached Figure 2</i>)		0	1	Not Met
4 - Pedestrian Volume.....	Not Analyzed in this study			
5 - School Crossing.....	Not Analyzed in this study			
6 - Coordinated Signal System.....	Not Analyzed in this study			
7 - Crash Experience.....	Not Analyzed in this study			
8 - Roadway Network.....	Not Analyzed in this study			
9 - Intersection near Grade Crossing	Not Analyzed in this study			

Results

2029 Horizon approach volumes do not satisfy **Warrant Three** -- Peak-Hour Vehicular Volume at this intersection. The MUTCD stipulates that a traffic signal control may be installed provided that these warrants are met at the discretion of the authorized agency representative responsible for traffic control installation and maintenance. As needed, further analysis or assessments are required prior to final determination.

Cursory Traffic Signal Warrant Study

Intersection: Swisher Road at Briar Oaks Drive

Date: 9/30/2022

Description: 2029 Horizon Traffic Counts

Figures/Results:

Figure 1. Warrant 2, Four-Hour Vehicular Volume

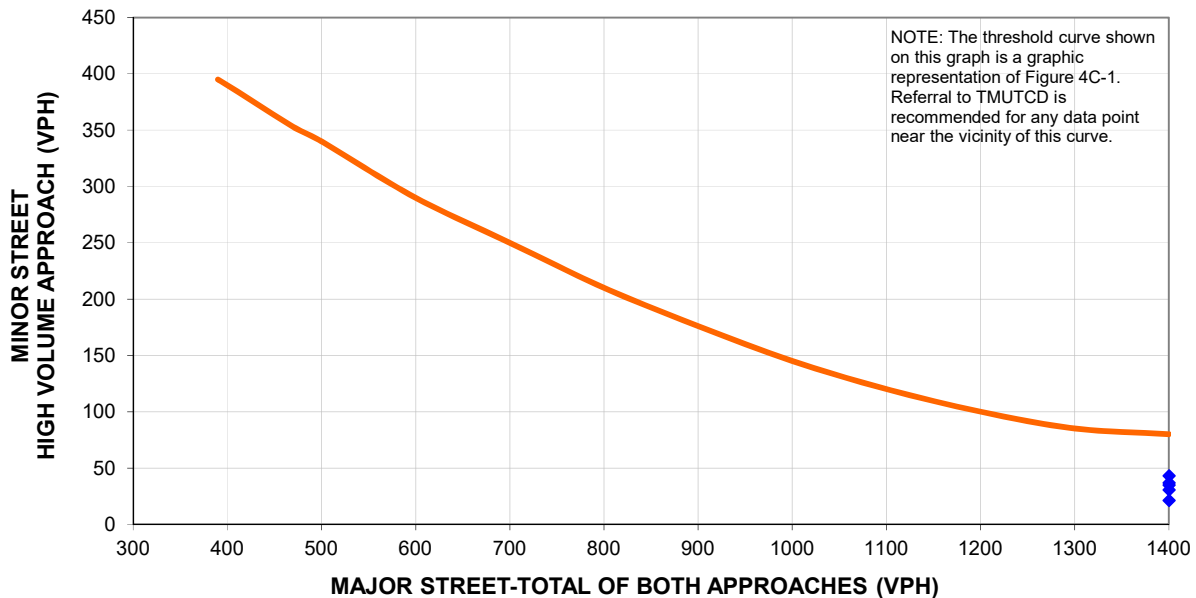
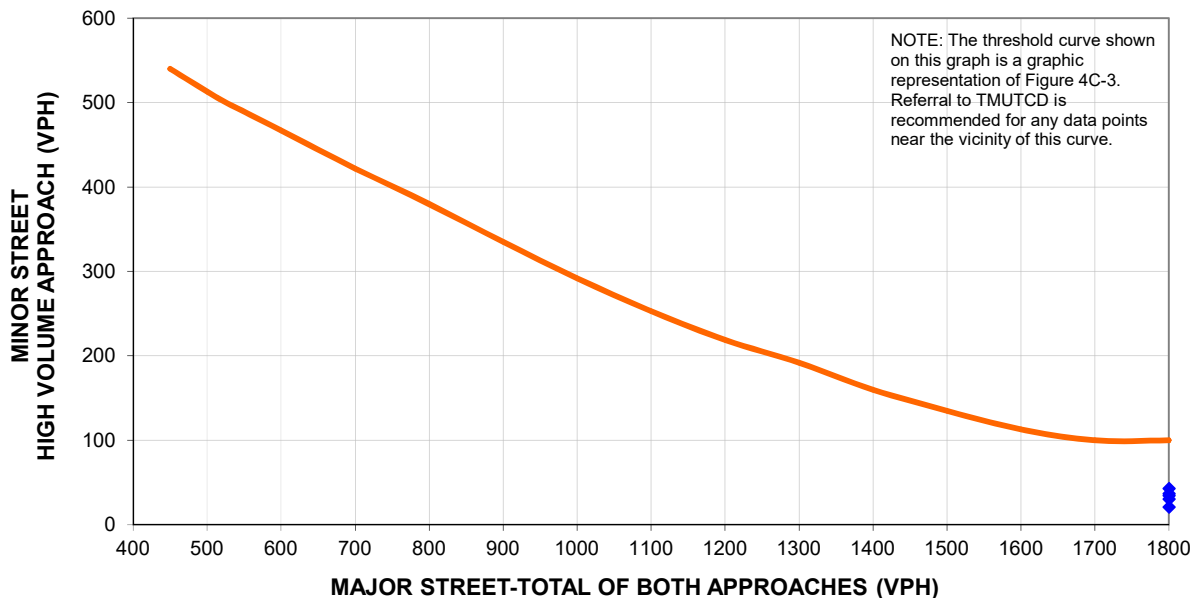


Figure 2. Warrant 3, Peak-Hour Vehicular Volume



Cursory Traffic Signal Warrant Study

Intersection: Swisher Road at Briar Oaks Drive/Driveway 1

Date: 9/30/2022

Description: 2029 Horizon Plus Site Traffic Counts (5 years) Option A

Adjustment Factors

- | | | | | | |
|------------------------------|------------------|---------|---------------------------------|-------------|-------|
| 1. Major Street Approach | <u>2 or more</u> | lane(s) | 5. Horizon Years (Projection) | <u>5</u> | years |
| 2. Minor Street Approach | <u>1</u> | lane(s) | 6. Average Annual Growth Factor | | |
| 3. Community Population | <u>></u> | 10,000 | Major Street Approach | <u>1.0%</u> | |
| 4. Major Street Posted Speed | <u>≤</u> | 40 mph | Minor Street Approaches | <u>1.0%</u> | |

Traffic Volume

TIME Begin	MAJOR STREET APPROACHES			MINOR STREET APPROACH		
	WB	EB	Σ	NB	SB	Φ
7:00 AM	1,171	1,002	2,174	126	43	126
8:00 AM	1,077	925	2,002	107	21	107
9:00 AM	0	0	0	0	0	0
10:00 AM	0	0	0	0	0	0
11:00 AM	0	0	0	0	0	0
12:00 PM	0	0	0	0	0	0
1:00 PM	0	0	0	0	0	0
2:00 PM	0	0	0	0	0	0
3:00 PM	855	1,322	2,177	33	30	33
4:00 PM	892	1,628	2,520	44	37	44
5:00 PM	936	1,714	2,649	50	35	50
6:00 PM	0	0	0	0	0	0
7:00 PM	0	0	0	0	0	0
8:00 PM	0	0	0	0	0	0
9:00 PM	0	0	0	0	0	0
10:00 PM	0	0	0	0	0	0

Source: DeShazo road tube counts on DATE

Texas Manual On Uniform Traffic Control Devices

MUTCD Warrant	Conditional Parameters	No. Hrs Satisfied	No. Hrs Required	Warrant
3 - Peak-Hour Vehicular Volume (<i>see attached Figure 2</i>)		<u>2</u>	1	Met
4 - Pedestrian Volume.....	<i>Not Analyzed in this study</i>			
5 - School Crossing.....	<i>Not Analyzed in this study</i>			
6 - Coordinated Signal System.....	<i>Not Analyzed in this study</i>			
7 - Crash Experience.....	<i>Not Analyzed in this study</i>			
8 - Roadway Network.....	<i>Not Analyzed in this study</i>			
9 - Intersection near Grade Crossing	<i>Not Analyzed in this study</i>			

Results

2029 Horizon Plus Site approach volumes do satisfy **Warrant Three** -- Peak-Hour Vehicular Volume at this intersection. The MUTCD stipulates that a traffic signal control may be installed provided that these warrants are met at the discretion of the authorized agency representative responsible for traffic control installation and maintenance. As needed, further analysis or assessments are required prior to final determination.

Cursory Traffic Signal Warrant Study

Intersection: Swisher Road at Briar Oaks Drive/Driveway 1

Date: 9/30/2022

Description: 2029 Horizon Plus Site Traffic Counts (5 years) Option A

Figures/Results:

Figure 1. Warrant 2, Four-Hour Vehicular Volume

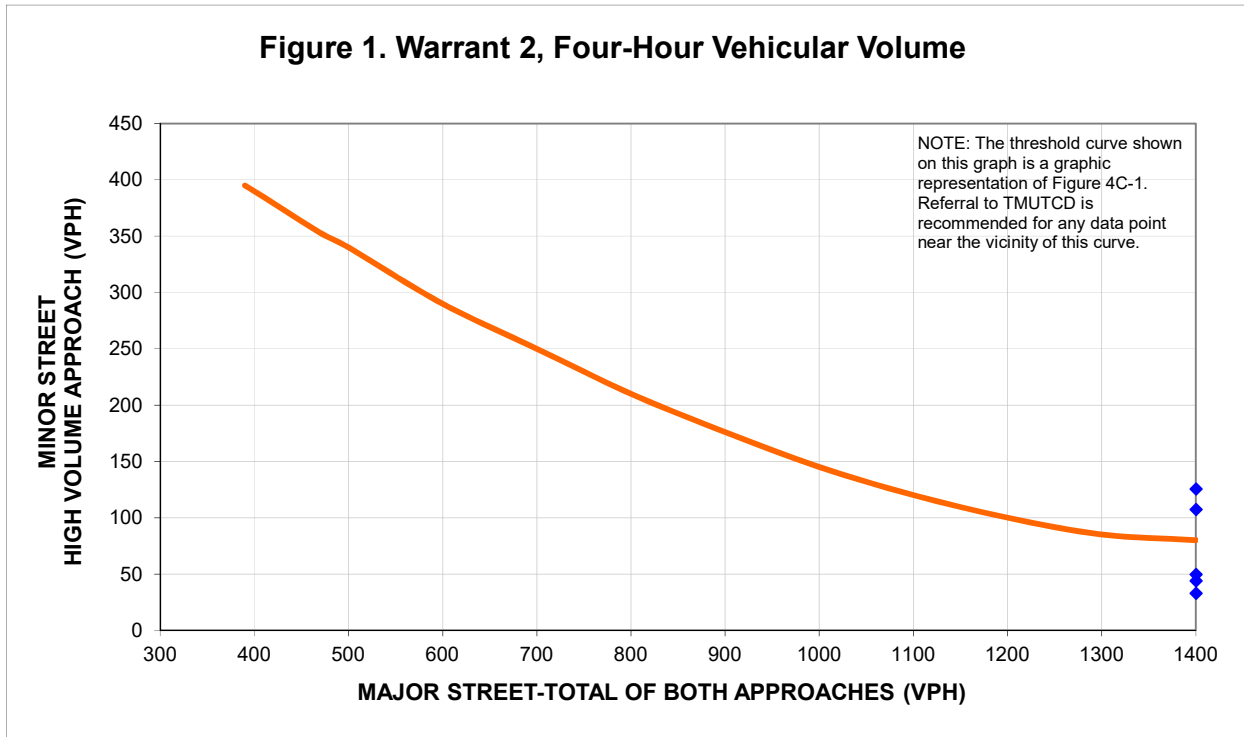
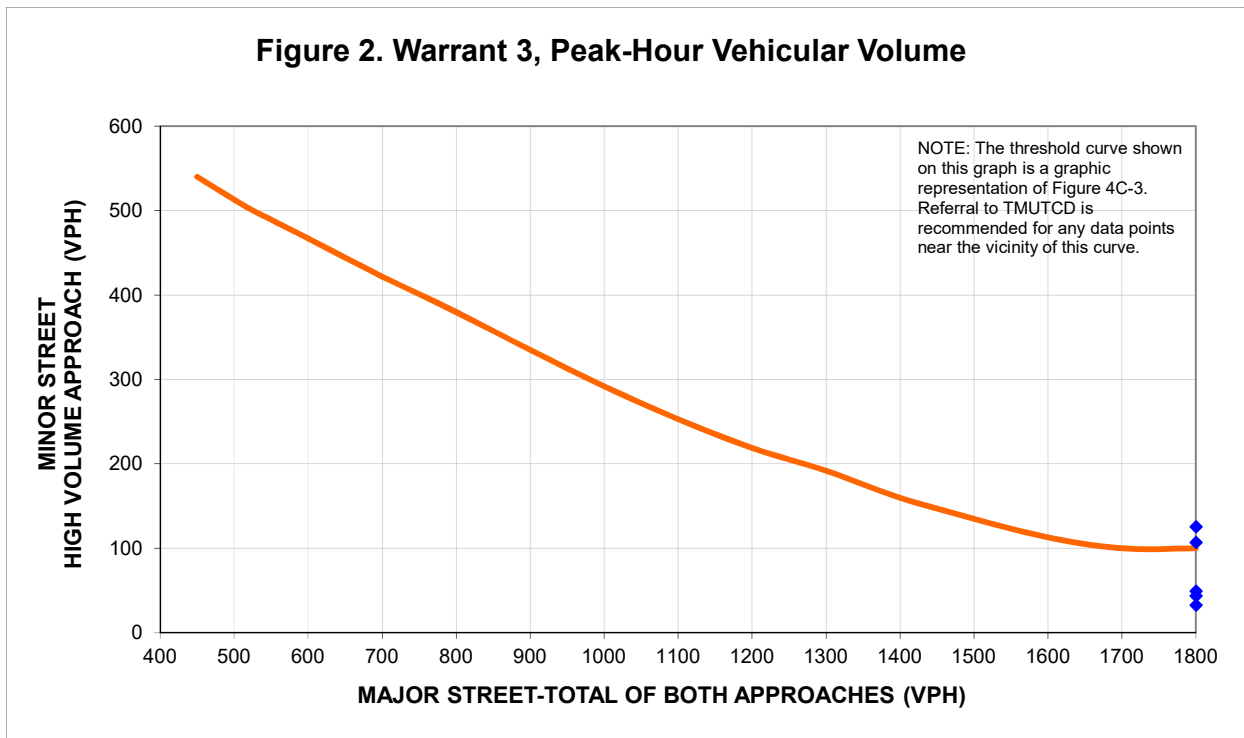


Figure 2. Warrant 3, Peak-Hour Vehicular Volume



Cursory Traffic Signal Warrant Study

Intersection: Swisher Road at Briar Oaks Drive/Driveway 1

Date: 9/30/2022

Description: 2029 Horizon Plus Site Option B Traffic Counts (5 years)

Adjustment Factors

- | | | | | | |
|------------------------------|------------------|---------|---------------------------------|-------------|-------|
| 1. Major Street Approach | <u>2 or more</u> | lane(s) | 5. Horizon Years (Projection) | <u>5</u> | years |
| 2. Minor Street Approach | <u>1</u> | lane(s) | 6. Average Annual Growth Factor | | |
| 3. Community Population | <u>></u> | 10,000 | Major Street Approach | <u>1.0%</u> | |
| 4. Major Street Posted Speed | <u>≤</u> | 40 mph | Minor Street Approaches | <u>1.0%</u> | |

Traffic Volume

TIME Begin	MAJOR STREET APPROACHES			MINOR STREET APPROACH		
	WB	EB	Σ	NB	SB	Φ
7:00 AM	1,198	1,223	2,421	141	43	141
8:00 AM	1,110	1,201	2,311	181	21	181
9:00 AM	0	0	0	0	0	0
10:00 AM	0	0	0	0	0	0
11:00 AM	0	0	0	0	0	0
12:00 PM	0	0	0	0	0	0
1:00 PM	0	0	0	0	0	0
2:00 PM	0	0	0	0	0	0
3:00 PM	924	1,900	2,823	492	30	492
4:00 PM	966	2,229	3,195	497	37	497
5:00 PM	1,017	2,359	3,375	552	35	552
6:00 PM	0	0	0	0	0	0
7:00 PM	0	0	0	0	0	0
8:00 PM	0	0	0	0	0	0
9:00 PM	0	0	0	0	0	0
10:00 PM	0	0	0	0	0	0

Source: DeShazo road tube counts on DATE

Texas Manual On Uniform Traffic Control Devices

MUTCD Warrant	Conditional Parameters	No. Hrs Satisfied	No. Hrs Required	Warrant
3 - Peak-Hour Vehicular Volume (see attached Figure 2)		5	1	Met
4 - Pedestrian Volume.....	Not Analyzed in this study			
5 - School Crossing.....	Not Analyzed in this study			
6 - Coordinated Signal System.....	Not Analyzed in this study			
7 - Crash Experience.....	Not Analyzed in this study			
8 - Roadway Network.....	Not Analyzed in this study			
9 - Intersection near Grade Crossing	Not Analyzed in this study			

Results

2029 Horizon Plus Site Option B approach volumes do satisfy **Warrant Three** -- Peak-Hour Vehicular Volume at this intersection. The MUTCD stipulates that a traffic signal control may be installed provided that these warrants are met at the discretion of the authorized agency representative responsible for traffic control installation and maintenance. As needed, further analysis or assessments are required prior to final determination.

Cursory Traffic Signal Warrant Study

Intersection: Swisher Road at Briar Oaks Drive/Driveway 1

Date: 9/30/2022

Description: 2029 Horizon Plus Site Option B Traffic Counts (5 years)

Figures/Results:

Figure 1. Warrant 2, Four-Hour Vehicular Volume

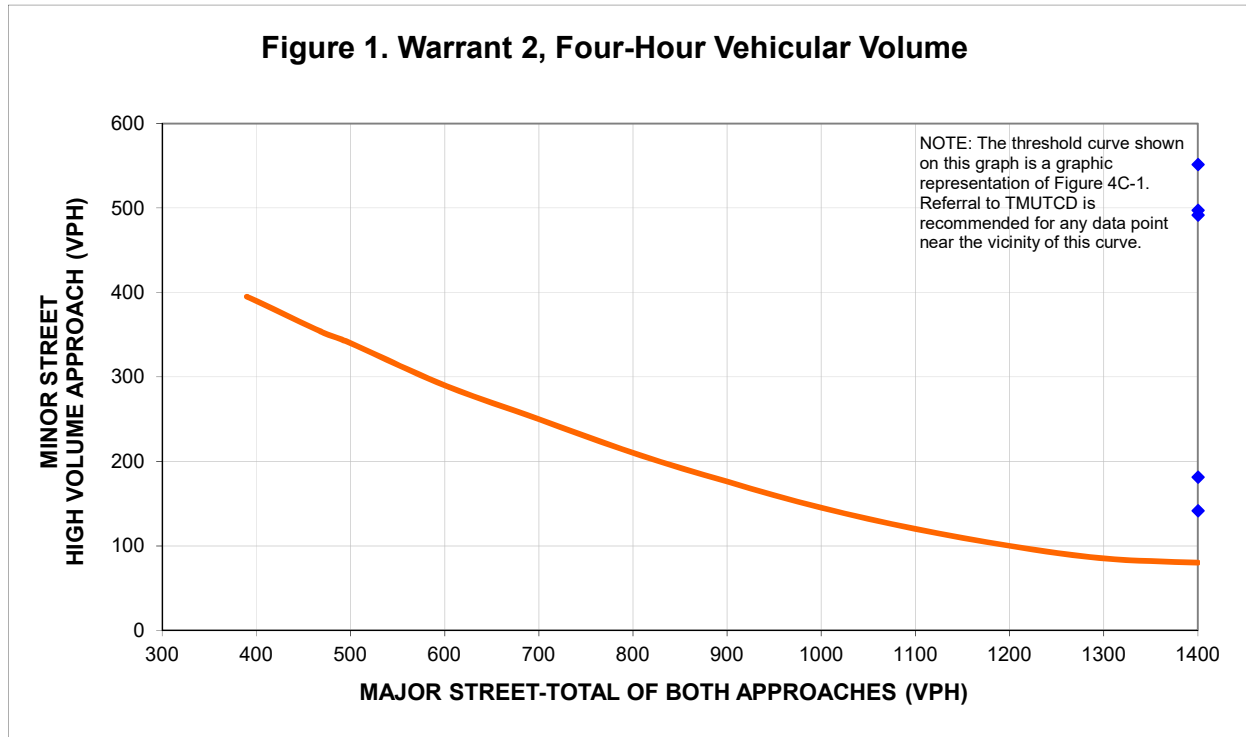


Figure 2. Warrant 3, Peak-Hour Vehicular Volume

