Traffic and Transportation Commission

May 20, 2024

Traffic Signal
Ward 7

V-F. Applicant: David Miller, 6217 NE 105 Street, Oklahoma City, OK 73151
Municipal Code §32-69

Request: Traffic signals at the west and east side N Interstate Highway 35 Service Road and E Hefner Road intersections.

Traffic Data:	North/South	East/West
Street Name:	**N I-35 Service Road (west side)**	**E Hefner Road**
Street Typology:	Minor arterial	Minor arterial
bikewalkokc Designation:	No designation	No designation
Street Width:	54 feet, four lanes, two-way, curbed, divided (8 foot wide striped median) (south approach)	94 feet, five lanes, two-way, curbed, divided (30 foot wide raised median)
Existing Traffic Controls:	Stop control	Stop control
Parking Controls:	No parking anytime (both sides)	No parking anytime (both sides)
Traffic Entering Volumes:	4,237 vpd (2024)	5,257 vpd (2024)
Existing Speed Limits:	45 mph (north) 45 mph (south)	40 mph (west) 45 mph (east)
50th Percentile Speeds:	35 mph (north) 37 mph (south)	46 mph (west)
85th Percentile Speeds:	39 mph (north) 43 mph (south)	51 mph (west)
OCPD Collision Data: (January 2021 – December 2023)	0 collisions in 2021 1 collision in 2022 - 1 of type considered correctable 0 collisions in 2023	

Traffic Data:	North/South	East/West
Street Name:	**N I-35 Service Road (east side)**	**E Hefner Road**
Street Typology:	Minor arterial	Minor arterial
bikewalkokc Designation:	No designation (Signed as a sharrow facility)	No designation
Street Width:	54 feet, four lanes, two-way, curbed, divided (8 foot wide striped median) (south approach)	94 feet, five lanes, two-way, curbed, divided (30 foot wide raised median)
Existing Traffic Controls:	Stop control	Stop control
Parking Controls:	No parking anytime (both sides)	No parking anytime (both sides)
Traffic Entering Volumes:	4,993 vpd (2024)	5,010 vpd (2024)
Existing Speed Limits:	40 mph (north) 45 mph (south)	45 mph (west) 45 mph (east)

50th Percentile Speeds:	40 mph (north) 39 mph (south)	45 mph
85th Percentile Speeds:	46 mph (north) 48 mph (south)	51 mph
OCPD Collision Data: (January 2021 – December 2023)	1 collision in 2021 - 1 of type considered correctable 1 collision in 2022 - 1 of type considered correctable 1 collision in 2023 - 1 of type considered correctable	

Summary: This item was continued from the April 15 meeting at the request of the applicant.

David Miller has submitted a request for a traffic signals at the N Interstate Highway 35 (I-35) Service Road intersections with E Hefner Road.

At the N I-35 Service Roads, E Hefner Road is a 94 foot wide, five (5) lane, curbed, divided roadway with a raised 30 foot wide center median and is classified as a minor arterial in planokc. The speed limit on E Hefner Road to the west of the west side N I-35 Service Road is 40 miles per hour (mph) and 45 mph to the east of the west side I-35 Service Road. The Commission approved a request to change the speed limit on E Hefner Road from N Bryant Avenue to the west side N I-35 Service Road from 45 mph to 40 mph on June 16, 2008 (Item 5-C).

The N I-35 Service Road on the west side of N I-35 is a 54 foot wide four (4) lane, curbed divided roadway with an eight (8) foot wide striped center median. The speed limit on the west side service road is 45 mph to the north and south of E Hefner Road. The N I-35 Service Road on the east side of I-35 is a 54 foot wide four (4) lane, curbed divided roadway with an eight (8) foot wide striped center median. The speed limit on the east side service road is 40 mph to the north of E Hefner Road and 45 mph to the south. Both service roads are classified as minor arterials in planokc.

Bicycle route signs including MAY USE FULL LANE signs are present on both service roads to the north and south of E Hefner Road. The I-35 Service Roads were identified as existing bicycle facilities from NE 63 Street to NE 122 Street in bikewalkokc as adopted by the City Council on May 8, 2018. Currently neither service road appears on the Northeast OKC Sector Proposed Bicycle Facilities 2023 plan in the 2024 draft of bikewalkokc.

The closest traffic signals to both locations on the N I-35 Service Road system are at NE 122 Street, which is approximately 1.15 miles to the northeast. The N I-35 Service Road intersections at E Britton Road, about one mile to the south and at E Wilshire Boulevard, about two miles to the south, are all-way stop controlled. The closest adjacent intersections on E Hefner Road at N Bryant Avenue, which is about one mile to the west, and at N Sooner Road, about one mile to the east, are all-way stop controlled.

West I-35 Service Road Summary: The available decision sight distances on the north, east and south approaches to the west N I-35 Service Road intersection are greater than 1,000 feet, which exceeds the City's minimum prescribed requirements based on the 45 mph speed limit. The City's minimum prescribed decision

sight distance required for a roadway with a 45 mph speed limit is 620 feet. The available decision sight distance on the west approach is approximately 520 feet which is just 30 feet greater than the City's minimum prescribed 490 foot decision sight distance requirement for a roadway with a 40 mph speed limit. The minimum decision sight distance is prescribed in Table 1 of Section 4.3.2, Article IV of the Subdivision Regulations of the City of Oklahoma City. A copy of this table is included in this report for reference. The available decision sight distance measurement, however, cannot take into consideration the presence of seasonal foliage and its transitory impact on decision sight distance.

Oklahoma City Police Department records show there was one (1) collision reported at the west side N I-35 Service Road and E Hefner Road intersection in the three (3) year period from 2021 through 2023. No crashes were recorded in 2021; 1 crash was recorded in 2022, which was of a type considered correctable using signalized traffic control, and no crashes were recorded in 2023.

A spot speed study was conducted at the west side N I-35 Service Road and E Hefner Road intersection on March 25, 2024. The observed 50th and 85th percentile speeds on both roadways are provided in the Traffic Data section of the report. The highest speed on the west side I-35 Service Road, 64 mph, was observed on the south approach and the highest speed on E Hefner Road, 54 mph, was observed on the west approach. The 50th and 85th percentile speeds are the cumulative speeds at which 50 and 85 percent, respectively, of all drivers observed are traveling at or below.

East I-35 Service Road Summary:

The available decision sight distances on all approaches to the east N I-35 Service Road intersection are greater than 1,000 feet, which exceeds the City's minimum prescribed requirements based on the 45 mph speed limit on 3 of 4 approaches. The City's minimum prescribed decision sight distance required for a roadway with a 45 mph speed limit is 620 feet.

Oklahoma City Police Department records show there were 3 collisions reported at the east side N I-35 Service Road and E Hefner Road intersection in the 3 year period from 2021 through 2023. 1 crash was recorded each year and all were of a type considered correctable using signalized traffic control.

A spot speed study was conducted at the east side I-35 Service Road and E Hefner Road intersection on March 25, 2024. The observed 50th and 85th percentile speeds on both roadways are provided in the Traffic Data section of the report. The highest speed on the east side N I-35 Service Road, 55 mph, was observed on the north approach and the highest speed on E Hefner Road, 64 mph, was observed on the east approach.

Analysis:

The City uses the traffic signal warrants (consideration criteria) contained in the Manual on Uniform Traffic Control Devices for Streets and Highways (MUTCD), 11th Edition, published by the United States Department of Transportation, Federal Highway Administration, as the basis for analysis when considering the suitability of signalized control at an intersection. Within the MUTCD, there are nine (9) warrants to review when assessing

whether signalized traffic control is appropriate for use at an intersection. Section 4C.01 of the MUTCD, Studies and Factors for Justifying Traffic Control Signals, states as a matter of standard practice, “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 that location.” Section 4C.01 then provides a discrete list of consideration criteria or “warrants” that need to be reviewed in making the engineering study. The MUTCD states, “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”

Of the 9 MUTCD traffic signal warrants, three (3) warrants address traffic volumes. Each of these warrants stipulate certain traffic volume conditions that must be met for a certain number of hours on a typical day. The MUTCD allows for the use of reduced traffic volume warrants to compensate for various local conditions, such as a posted speed limit higher than 40 mph, the location lying in a community with a population less than 10,000 people or other conditions.

The third traffic volume-based warrant, the peak hour traffic volume warrant, is not applicable at this location. The MUTCD states that the peak hour “signal warrant should 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.” The adjacent land uses at and in the area surrounding the intersection do not meet the MUTCD’s conditions for application of the peak hour traffic volume warrant.

West I-35 Service Road Analysis Summary:

Based on the posted 45 mph speed limit on the west side N I-35 Service Road and the east approach of E Hefner Road, a signal warrant summary was prepared using the reduced “70%” traffic volume conditions and 80% volume conditions for combination of Conditions A and B: Warrant 1: the eight-hour vehicular volume warrant and Warrant 2: the four-hour vehicular volume warrant.

The analysis found the west side N I-35 Service Road and E Hefner Road intersection currently does not meet the Warrant 1 minimum full (100%) traffic volume conditions for considering the use of signalized traffic control.

As allowed in the MUTCD, when the Warrant 1 full, 100% vehicular volume criteria is not met, the intersection can be reviewed using the combined (Condition A and Condition B) eight-hour vehicular volume signal warrant at reduced 80% traffic conditions. The combination of conditions evaluates an intersection based on both the traffic entering volumes as well as the interruption of continuous traffic flow on the major roadway. When used, the MUTCD requires that both reduced Conditions A and B of the eight-hour vehicular volume signal warrant must be met. It is important to note that if the intersection had sufficient traffic volume at the full, 100% threshold level, all that would have been necessary to satisfy Warrant 1 would be meeting either Condition A or Condition B. 4C.02.08 states, “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.”

The west side N I-35 Service Road and E Hefner Road intersection does not satisfy the reduced criteria set forth for Conditions A and B of the combined warrant.

The analysis found the intersection did not meet the criteria to satisfy Warrant 1 under the reduced 70% traffic volume conditions.

The analysis found the intersection did not meet the criteria to satisfy Warrant 2 under the full, 100% vehicular volume criteria or the reduced 70% traffic volume conditions.

The intersection was not observed to have pedestrian crossing volumes sufficient to meet either of the MUTCD’s conditions in Warrant 4.

The intersection does not have a crash history sufficient to meet the 3 parts of the MUTCD’s crash experience warrant, Warrant 7.

To satisfy Warrant 7 criteria, 3 conditions must be met: a) adequate trial of alternatives to decrease crash frequency; b) the number of correctable crashes must equal or exceed the minimums prescribed in Tables 4C-2 through 4C-5 (as applicable); and c) traffic volumes must meet or exceed the 80 percent requirements for Conditions A and B of Warrant 1, the eight-hour volume warrant.

At this location, there has been no trial of alternatives as per part a) due to the low crash history and absence of mitigating factors. Per part c), the intersection does not have sufficient traffic entering volumes to meet the minimums prescribed in Conditions A and B of Warrant 1.

The intersection does not have a crash history sufficient to meet the requirements of part b). In the most recent 1 year period in 2023, no (0) crashes were recorded at the intersection. In the 3 year period from 2021 through 2023, 1 crash was recorded. This crash, which occurred in 2022, was of a type considered correctable using signalized traffic control.

For a roadway with a speed limit higher than 40 mph, the number of correctable and pedestrian-involved crashes in a 1 year period (for a major roadway with 2 or more lanes and a minor street with 2 or more lanes) stipulated in Table 4C-4 must equal or exceed ten (10) for an intersection with 4 legs or equal or exceed six (6) fatality and injury crashes including pedestrian-involved crashes. Similarly, in Table 4C-5, for a 3 year period, the number of correctable and pedestrian-involved crashes must equal or exceed sixteen (16) or equal or exceed nine (9) fatality and injury crashes including pedestrian-involved crashes.

East I-35 Service Road Analysis Summary:

Based on the posted 45 mph speed limit on E Hefner Road and the south approach of the east side N I-35 Service Road, a signal warrant summary was prepared using the reduced “70%” traffic volume conditions and 80% volume conditions for combination of Conditions A and B: Warrant 1: the eight-hour vehicular volume warrant and Warrant 2: the four-hour vehicular volume warrant.

The analysis found the east side N I-35 Service Road and E Hefner Road intersection currently does not meet the Warrant 1 minimum full (100%) traffic volume conditions for considering the use of signalized traffic control.

As allowed in the MUTCD, when the Warrant 1 full, 100% vehicular volume criteria is not met, the intersection can be reviewed using the combined (Condition A and Condition B) eight-hour vehicular volume signal warrant at reduced 80% traffic conditions. The combination of conditions evaluates an intersection based on both the traffic entering volumes as well as the interruption of continuous traffic flow on the major roadway. When used, the MUTCD requires that both reduced Conditions A and B of the eight-hour vehicular volume signal warrant must be met. It is important to note that if the intersection had sufficient traffic volume at the full, 100% threshold level, all that would have been necessary to satisfy Warrant 1 would be meeting either Condition A or Condition B. 4C.02.08 states, “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.”

The east side N I-35 Service Road and E Hefner Road intersection does not satisfy the reduced criteria set forth for Conditions A and B of the combined warrant.

The analysis found the intersection did not meet the criteria to satisfy Warrant 1 under the reduced 70% traffic volume conditions.

The analysis found the intersection does satisfy Warrant 2 under reduced 70% traffic volume conditions but does not satisfy the warrant under any other conditions.

The intersection was not observed to have pedestrian crossing volumes sufficient to meet either of the MUTCD’s conditions in Warrant 4.

The intersection does not have a crash history sufficient to meet the 3 parts of the MUTCD's crash experience warrant, Warrant 7.

To satisfy Warrant 7 criteria, 3 conditions must be met: a) adequate trial of alternatives to decrease crash frequency; b) the number of correctable crashes must equal or exceed the minimums prescribed in Tables 4C-2 through 4C-5 (as applicable); and c) traffic volumes must meet or exceed the 80 percent requirements for Conditions A and B of Warrant 1, the eight-hour volume warrant.

At this location, there has been no trial of alternatives as per part a) due to the low crash history and absence of mitigating factors. Per part c), the intersection does not have sufficient traffic entering volumes to meet the minimums prescribed in Conditions A and B of Warrant 1.

The intersection does not have a crash history sufficient to meet the requirements of part b). In the most recent 1 year period in 2023, 1 crash was recorded and was of a type considered correctable using signalized traffic control. In the 3 year period from 2021 through 2023, 3 crashes were recorded and all 3 were of a type considered correctable.

Recommendation: Presently, the east N I-35 Service Road intersection with E Hefner Road meets Warrant 2 under reduced traffic volume conditions and the west N I-35 Service Road and E Hefner Road intersection does not meet any of the MUTCD's 9 signalized traffic control criteria.

Neither location has sufficient traffic entering volumes to meet the reduced traffic volume conditions in Warrant 1 or crash history sufficient to meet the 1 and 3 year correctable crash type totals to satisfy Warrant 7.

Should the Traffic and Transportation Commission approve the request, the approval needs to include roadway widening for dedicated left turn lanes on both approaches of the west and east side N I-35 Service Roads and extension of the existing east bound left turn lanes on E Hefner Road at both intersections. Approval of traffic signals without the inclusion of turn lane improvements will not afford left turning drivers the ability to do so with a protected left turn phase.

Action on this matter is at the discretion of the Commission.

Next Actions: Unless appealed, the decision of the Traffic and Transportation Commission is final.

No existing funding sources have been identified for new traffic signals approved by the Commission. Should the signalized traffic control be approved, the improvements will be added to an unfunded projects list. Projects on the unfunded list are typically considered during the planning of new general obligation bond projects by the City.

Traffic Services Division
SC:sc

§ 32-69. Traffic control device locations.

Whenever the Commission records the finding based upon a traffic engineering survey and investigation that normal movement of traffic within legal limitations is or has become impeded or dangerous at any intersection or crossing because of increased use of street or changed conditions and that the increased use or change in conditions requires the installation at the intersection of suitable traffic control devices reasonably found from the data reported in the survey to be necessary to restore normal movement of traffic within legal limitations, or to provide greater safety and efficiency in the use of streets entering and leaving the intersection, the Commission shall designate the intersection or location for installation of traffic control devices, and the Director shall initiate necessary steps to obtain and install the same.
(Code 1970, § 34-4; Code 1980, § 32-69)

RECEIVED BY
November 30, 2023
Traffic Services Division

David Miller

6217 NE 105th St.

Oklahoma City, OK 73151

November 11, 2023

Stuart Chai, P.E.

City Traffic Engineer

Oklahoma City Traffic Services Division

James D. Couch Municipal Building

420 W. Main Street, Suite 600

Oklahoma City, OK 73102

RE: Traffic and Transportation Commission request for Traffic Control Signals at the intersections of the I-35 Frontage Roads (east and west sides) and E. Hefner Road.

Dear Mr. Chai,

Quik Trip is building a new Auto/Truck Stop Store on 10 acres of the SW corner of E. Hefner Road and the west side of I-35 Frontage Road. As a former OKC Traffic Commissioner, I recognize the impact this business will have on the traffic flow in this area. A 200-300% increase in the OTR semi-truck AND auto traffic is possible. Construction has already started and is scheduled for completion in the Spring of 2024.

I request that the OKC TTC begin a study and evaluate the needs for a traffic signal system for this intersection(s), so that funding can be allocated by the City Council on a priority basis. If possible, we need to avoid a traffic nightmare like the one that existed at I-35 and Waterloo Road for many months.

Thanks for advancing this issue at the monthly Traffic and Transportation Commission meeting.

Respectfully,

Dave Miller

Dave Miller

(405) 204-8123... voice or text.

N
W E
S

Intersection Traffic Control Map

Existing traffic controls and speed limits (as depicted)

Requested traffic controls (as depicted)

N
W E
S

Regional Section Line Road Traffic Control Map

Existing traffic controls and speed limits (as depicted)

TRAFFIC SIGNAL WARRANT SUMMARY

City: Oklahoma City
County: Oklahoma
Engineer: Stuart Chai, P.E.
Date: March 21, 2024

Major Street: E Hefner Road — Lanes: 2 — Critical Approach Speed: 45
Minor Street: N I-35 Service Road (west side) — Lanes: 2

Volume Level Criteria

1. Is the critical speed of major street traffic > 70 km/h (40 mph) ? ☒ Yes ☐ No
2. Is the intersection in a built-up area of isolated community of <10,000 population? ☐ Yes ☒ No

If Question 1 or 2 above is answered "Yes", then use "70%" volume level ☒ 70% ☐ 100%

WARRANT 1 - EIGHT-HOUR VEHICULAR VOLUME

Applicable: ☒ Yes ☐ No
Satisfied: ☐ Yes ☒ No

Warrant 1 is satisfied if Condition A or Condition B is "100%" satisfied.
Warrant is also satisfied if both Condition A and Condition B are "80%" satisfied.

Condition A - Minimum Vehicular Volume

100% Satisfied: ☐ Yes ☒ No
80% Satisfied: ☐ Yes ☒ No

(volumes in veh/hr)	Minimum Requirements (80% Shown in Brackets)				Eight Highest Hours							
					9:00 AM - 10:00 AM	10:00 AM - 11:00 AM	1:00 PM - 2:00 PM	2:00 PM - 3:00 PM	4:00 PM - 5:00 PM	5:00 PM - 6:00 PM	6:00 PM - 7:00 PM	7:00 PM - 8:00 PM
Approach Lanes	1		2 or more									
Volume Level	100%	70%	100%	70%								
Both Approaches on Major Street	500 (400)	350	600 (480)	420	402	435	331	378	318	492	468	440
Highest Approach on Minor Street	150 (120)	105	200 (160)	140	216	175	220	125	210	248	270	191

Record 8 highest hours and the corresponding volumes in boxes provided. Condition is 100% satisfied if the minimum volumes are met for eight hours . Condition is 80% satisfied if parenthetical volumes are met for eight hours.

Condition B - Interruption of Continuous Traffic

Condition B is intended for application where the traffic volume is so heavy that traffic on the minor street suffers excessive delay.

Applicable: ☒ Yes ☐ No
Excessive Delay: ☐ Yes ☒ No
100% Satisfied: ☐ Yes ☒ No
80% Satisfied: ☐ Yes ☒ No

(volumes in veh/hr)	Minimum Requirements (80% Shown in Brackets)				Eight Highest Hours							
					9:00 AM - 10:00 AM	10:00 AM - 11:00 AM	1:00 PM - 2:00 PM	2:00 PM - 3:00 PM	4:00 PM - 5:00 PM	5:00 PM - 6:00 PM	6:00 PM - 7:00 PM	7:00 PM - 8:00 PM
Approach Lanes	1		2 or more									
Volume Level	100%	70%	100%	70%								
Both Approaches on Major Street	750 (600)	525	900 (720)	630	402	435	331	378	318	492	468	440
Highest Approach on Minor Street	75 (60)	53	100 (80)	70	216	175	220	125	210	248	270	191

Record 8 highest hours and the corresponding volumes in boxes provided. Condition is 100% satisfied if the minimum volumes are met for eight hours . Condition is 80% satisfied if parenthetical volumes are met for eight hours.

Traffic signal warrant analysis for west side N I-35 Service Road and E Hefner Road.

TRAFFIC SIGNAL WARRANT SUMMARY

City: Oklahoma City
County: Oklahoma
Engineer: Stuart Chai, P.E.
Date: March 21, 2024

Major Street: E Hefner Road — Lanes: 2 — Critical Approach Speed: 45
Minor Street: N I-35 Service Road (west side) — Lanes: 2

Volume Level Criteria

1. Is the critical speed of major street traffic > 70 km/h (40 mph) ? ☒ Yes ☐ No
2. Is the intersection in a built-up area of isolated community of <10,000 population? ☐ Yes ☒ No

If Question 1 or 2 above is answered "Yes", then use "70%" volume level ☒ 70% ☐ 100%

WARRANT 2 - FOUR-HOUR VEHICULAR VOLUME

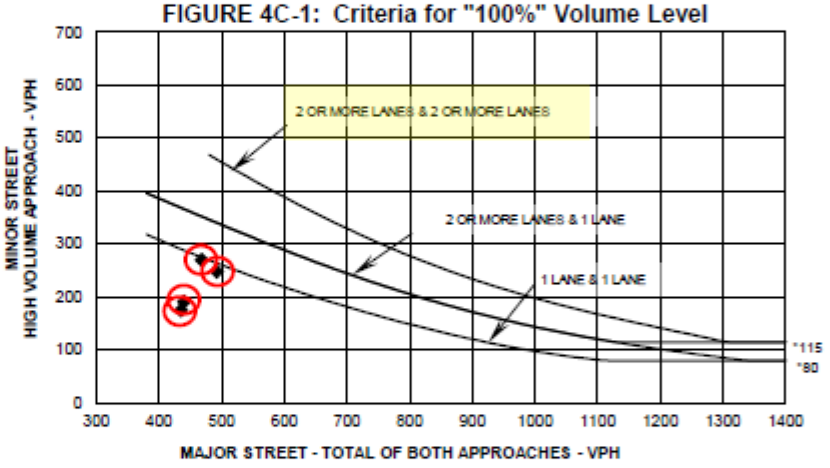
If all four points lie above the appropriate line, then the warrant is satisfied.

Applicable: ☒ Yes ☐ No
Satisfied: ☐ Yes ☒ No

Plot four volume combinations on the applicable figure below.

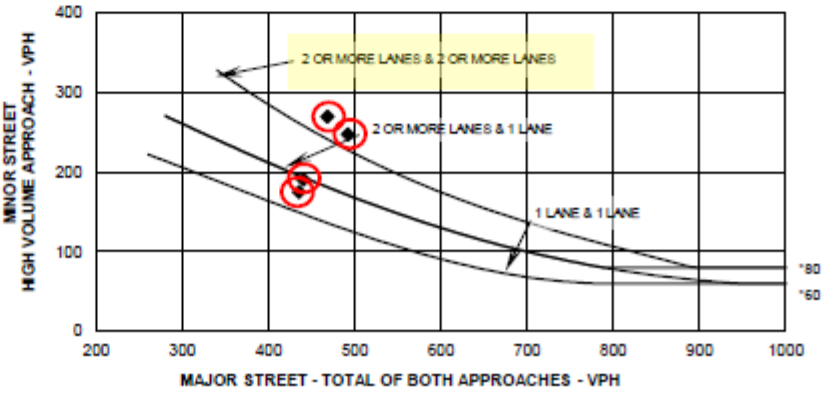
Four Highest Hours	Volumes	
	Major Street	Minor Street
10:00 AM - 11:00 AM	435	175
5:00 PM - 6:00 PM	492	248
6:00 PM - 7:00 PM	468	270
7:00 PM - 8:00 PM	440	191

FIGURE 4C-1: Criteria for "100%" Volume Level



** 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 threshold for a minor street approach with one lane.*

FIGURE 4C-2: Criteria for "70%" Volume Level
(Community Less than 10,000 population or above 70 km/hr (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 threshold for a minor street approach with one lane.*

TRAFFIC SIGNAL WARRANT SUMMARY

City: Oklahoma City
County: Oklahoma
Engineer: Stuart Chai, P.E.
Date: March 21, 2024

Major Street: E Hefner Road — Lanes: 2 — Critical Approach Speed: 45
Minor Street: N I-35 Service Road (west side) — Lanes: 2

Volume Level Criteria

1. Is the critical speed of major street traffic > 70 km/h (40 mph) ? ☒ Yes ☐ No
2. Is the intersection in a built-up area of isolated community of <10,000 population? ☐ Yes ☒ No

If Question 1 or 2 above is answered "Yes", then use "70%" volume level ☒ 70% ☐ 100%

WARRANT 3 - PEAK HOUR

Applicable: ☐ Yes ☒ No
Satisfied: ☐ Yes ☒ No

If all three criteria are fullfilled or the plotted point lies above the appropriate line, then the warrant is satisfied.

Plot volume combination on the applicable figure below.

Unusual condition justifying use of warrant:
NO UNUSUAL CONDITION

Record hour when criteria are fulfilled and the corresponding delay or volume in boxes provided.

Peak Hour		
17:00	492	248

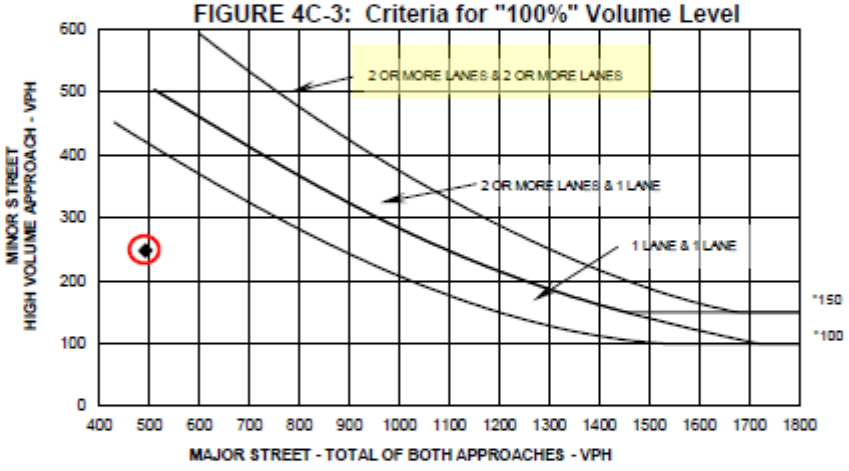
Criteria

1. Delay on Minor Approach *(vehicle-hours)		
Approach Lanes	1	2
Delay Criteria*	4.0	5.0
Delay*		
Fulfilled?: ☐ Yes ☐ No		

2. Volume on Minor Approach *(vehicles per hour)		
Approach Lanes	1	2
Volume Criteria*	100	150
Volume*	104	
Fulfilled?: ☒ Yes ☐ No		

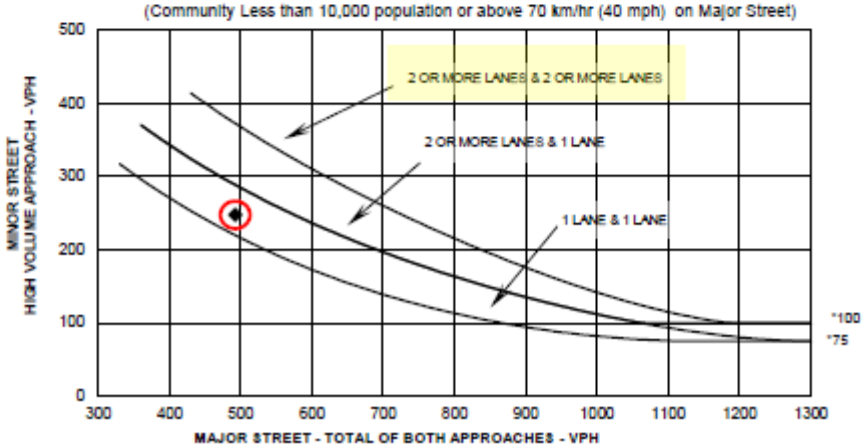
3. Total Entering Volume *(vehicles per hour)		
No. of Approaches	3	4
Volume Criteria*	650	800
Volume*		
Fulfilled?: ☒ Yes ☐ No		

FIGURE 4C-3: Criteria for "100%" Volume Level



* 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 threshold for a minor street approach with one lane.

FIGURE 4C-4: Criteria for "70%" Volume Level
(Community Less than 10,000 population or above 70 km/hr (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 threshold for a minor street approach with one lane.

TRAFFIC SIGNAL WARRANT SUMMARY

City: Oklahoma City
County: Oklahoma
Engineer: Stuart Chai, P.E.
Date: March 21, 2024

Major Street: E Hefner Road — Lanes: 2 — Critical Approach Speed: 45
Minor Street: N I-35 Service Road (west side) — Lanes: 2

WARRANT 4 - PEDESTRIAN VOLUME

Applicable: ☐ Yes ☒ No
Satisfied: ☐ Yes ☒ No

Record hours where criteria are fulfilled and the corresponding volume or gap frequency in the boxes provided. The warrant is satisfied if condition 1 or 2 is fulfilled and condition 3 is fulfilled.

Criteria	Hour	Pedestrian Volume	Pedestrian Gaps	Fulfilled? Yes	Fulfilled? No
1. Pedestrian volume crossing the major street is 100 ped/hr or more for each of any four hours and there are less than 60 gaps per hour in the major street traffic stream of adequate length.					X
2. Pedestrian volume crossing the major street is 190 ped/hr or more for any one hour and there are less than 60 gaps per hour in the major street traffic stream of adequate length.					X
3. The nearest traffic signal along the major street is located more than 90 m (300 ft) away, or the nearest signal is within 90 m (300 ft) but the proposed traffic signal will not restrict the progressive movement of traffic.				X	

WARRANT 5 - SCHOOL CROSSING

Applicable: ☐ Yes ☒ No
Satisfied: ☐ Yes ☒ No

Record hours where criteria are fulfilled and the corresponding volume or gap frequency in the boxes provided. The warrant is satisfied if all three of the criteria are fulfilled.

Criteria				Fulfilled? Yes	Fulfilled? No
1. There are a minimum of 20 students crossing the major street during the highest crossing hour.	Students:	Hour:			X
2. There are fewer adequate gaps in the major street traffic stream during the period when the children are using the crossing than the number of minutes in the same period.		Minutes:	Gaps:		X
3. The nearest traffic signal along the major street is located more than 90 m (300 ft) away, or the nearest signal is within 90 m (300 ft) but the proposed traffic signal will not restrict the progressive movement of traffic.				X	

WARRANT 6 - COORDINATED SIGNAL SYSTEM

Applicable: ☐ Yes ☒ No
Satisfied: ☐ Yes ☒ No

Indicate if the criteria are fulfilled in the boxes provided. The warrant is satisfied if either criterion is fulfilled. This warrant should not be applied when the resulting signal spacing would be less than 300 m (1,000 ft).

Criteria	Fulfilled? Yes	Fulfilled? No
1. On a one-way street or a street that has traffic predominately in one direction, the adjacent signals are so far apart that they do not provide the necessary degree of vehicle platooning.		X
2. On a two-way street, adjacent signals do not provide the necessary degree of platooning, and the proposed and adjacent signals will collectively provide a progressive operation.		X

TRAFFIC SIGNAL WARRANT SUMMARY

City: Oklahoma City
County: Oklahoma
Engineer: Stuart Chai, P.E.
Date: March 21, 2024

Major Street: E Hefner Road — Lanes: 2 — Critical Approach Speed: 45
Minor Street: N I-35 Service Road (west side) — Lanes: 2

WARRANT 7 - CRASH EXPERIENCE

Applicable: ☒ Yes ☐ No
Satisfied: ☐ Yes ☒ No

Record hours where criteria are fulfilled, the corresponding volume, and other information in the boxes provided. The warrant is satisfied when all three (3) of the criteria conditions are fulfilled.

Criteria - See MUTCD Section 4C.08		Met? Yes
A. Adequate trial of other remedial measures has failed to reduce crash frequency; *and*	Measure tried: Dual 48" stop signs (installed by ODOT)	☒
B. 1 Number of angle crashes and pedestrian crashes within 1 year period equals or exceeds threshold in Table 4C-2; *or*		☐
2 Number of fatal and injury angle crashes and pedestrian crashes within 1 year period equals or exceeds threshold in Table 4C-2; *or*		☐
3 Number of angle crashes and pedestrian crashes within 3 year period equals or exceeds threshold in Table 4C-3; *or*		☐
4 Number of fatal and injury angle crashes and pedestrian crashes within 3 year period equals or exceeds threshold in Table 4C-3; *and*		☐
C. For each of any 8 hours of an avg. day, vph in both 80% columns of Condition A in Table 4C-1 OR both 80% columns of Condition B in same table exist on the major street and the more critical minor street approach or the pedestrian volume is not less than 80% of required volume in Section 4C.05		☐

All criteria met?	Yes	No
All three required criteria satisfied to meet warrant?	☐	☒

WARRANT 8 - ROADWAY NETWORK

Applicable: ☐ Yes ☒ No
Satisfied: ☐ Yes ☐ No

Record hours where criteria are fulfilled, and the corresponding volume or other information in the boxes provided. The warrant is satisfied if at least one of the criteria is fulfilled and if all intersecting routes have one or more of the characteristics listed.

Criteria							Met? Yes	Met? No	Fulfilled? Yes	Fulfilled? No
1. Both of the criteria to the right are met.	a. Total entering volume of at least 1,000 veh/hr during a typical weekday peak hour.		Entering Volume:							
	b. Five-year projected volumes that satisfy one or more of Warrants 1, 2, or 3.		Warrant:	1	2	3				
			Satisfied?:							
2. Total entering volume at least 1,000 veh/hr for each of any 5 hrs of a non-normal business day (Sat. or Sun.)						← Hour				
						← Volume				

Characteristics of Major Routes		Met? Yes	Met? No	Fulfilled? Yes	Fulfilled? No
1. Part of the street or highway system that serves as the principal roadway network for through traffic flow.	Major Street:				
	Minor Street:				
2. Rural or suburban highway outside of, entering, or traversing a city.	Major Street:				
	Minor Street:				
3. Appears as a major route on an official plan.	Major Street:				
	Minor Street:				

TRAFFIC SIGNAL WARRANT SUMMARY

City: Oklahoma City
County: Oklahoma
Engineer: Stuart Chai, P.E.
Date: March 21, 2024

Major Street: E Hefner Road — Lanes: 2 — Critical Approach Speed: 45
Minor Street: N I-35 Service Road (west side) — Lanes: 2

WARRANT 9 - INTERSECTION NEAR A GRADE CROSSING

Applicable: ☐ Yes ☒ No
Satisfied: ☐ Yes ☐ No

This criteria is intended for use at a location where none of the conditions described in the other eight warrants are met.

Criteria - See MUTCD Section 4C.10	Yes	No
A. Stop or yield line on approach of intersection nearest to center of the track is within 140 feet; *and*	☐	☐
B. During highest traffic volume hour during which rail traffic uses the crossing the poltted points for traffic volume on the major and minor streets fall above the applicable curve in Figure 4C-9 or 4C-10.	☐	☐
	Criteria met?	
	Yes	No
Both required criteria satisfied to meet warrant?	☐	☐

CONCLUSIONS

Warrants Satisfied: ☐☐☐☐☐☐☐☐☐

Remarks: No signal warrants are satisfied

City of Oklahoma City Public Works Department

Traffic Services Division

SIGNAL WARRANTS ANALYSIS

Warrant 1 - 8 Hour Vehicular Volume

LOCATION: **WEST I-35 Service Road and E Hefner Road** DATE: **1/26/2024**

Posted Speed	Approach Description		Lanes
40	Major App1:	E Hefner Road (EB)	2
45	Major App2:	E Hefner Road (WB)	2
45	Minor App3:	N I-35 Service Road (NB)	2
45	Minor App4:	N I-35 Service Road (SB)	2

Warrant 1 - 8 Hour Vehicular Volume - Condition A

				Qualifying Criteria					Condition A & B must be met					
				(a)	(a)				(b)	(b)	(c)	(c)	(d)	(d)
				100%	100%				80%	80%	70%	70%	56%	56%
	EB	WB		Req'd Vol. 600	Req'd Vol. 200	NB	SB	Greater Volume	Req'd Vol. 480	Req'd Vol. 160	Req'd Vol. 420	Req'd Vol. 140	Req'd Vol. 336	Req'd Vol. 112
HOUR	MAJOR APP. 1	MAJOR APP. 2	TOTAL 1+2	VOLUME MET	VOLUME MET	MINOR APP. 3	MINOR APP. 4	of Minor APP. 3 or 4	VOLUME MET	VOLUME MET	VOLUME MET	VOLUME MET	VOLUME MET	VOLUME MET
0:00 - 1:00	26	39	65	FALSE	FALSE	54	11	54	FALSE	FALSE	FALSE	FALSE	FALSE	FALSE
1:00 - 2:00	4	36	40	FALSE	FALSE	26	20	26	FALSE	FALSE	FALSE	FALSE	FALSE	FALSE
2:00 - 3:00	6	18	24	FALSE	FALSE	20	9	20	FALSE	FALSE	FALSE	FALSE	FALSE	FALSE
3:00 - 4:00	6	15	21	FALSE	FALSE	42	6	42	FALSE	FALSE	FALSE	FALSE	FALSE	FALSE
4:00 - 5:00	5	8	13	FALSE	FALSE	16	3	16	FALSE	FALSE	FALSE	FALSE	FALSE	FALSE
5:00 - 6:00	2	14	16	FALSE	FALSE	19	5	19	FALSE	FALSE	FALSE	FALSE	FALSE	FALSE
6:00 - 7:00	16	13	29	FALSE	FALSE	16	16	16	FALSE	FALSE	FALSE	FALSE	FALSE	FALSE
7:00 - 8:00	19	51	70	FALSE	FALSE	67	20	67	FALSE	FALSE	FALSE	FALSE	FALSE	FALSE
8:00 - 9:00	49	124	173	FALSE	FALSE	145	74	145	FALSE	FALSE	FALSE	TRUE	FALSE	TRUE
9:00 - 10:00	103	299	402	FALSE	TRUE	216	166	216	FALSE	TRUE	FALSE	TRUE	TRUE	TRUE
10:00 - 11:00	116	319	435	FALSE	FALSE	175	124	175	FALSE	TRUE	TRUE	TRUE	TRUE	TRUE
11:00 - 12:00	81	179	260	FALSE	FALSE	143	66	143	FALSE	FALSE	FALSE	TRUE	FALSE	TRUE
12:00 - 13:00	86	217	303	FALSE	FALSE	186	89	186	FALSE	TRUE	FALSE	TRUE	FALSE	TRUE
13:00 - 14:00	102	229	331	FALSE	TRUE	220	88	220	FALSE	TRUE	FALSE	TRUE	FALSE	TRUE
14:00 - 15:00	134	244	378	FALSE	FALSE	125	86	125	FALSE	FALSE	FALSE	FALSE	TRUE	TRUE
15:00 - 16:00	113	193	306	FALSE	FALSE	158	68	158	FALSE	FALSE	FALSE	TRUE	FALSE	TRUE
16:00 - 17:00	121	197	318	FALSE	TRUE	210	81	210	FALSE	TRUE	FALSE	TRUE	FALSE	TRUE
17:00 - 18:00	180	312	492	FALSE	TRUE	248	93	248	TRUE	TRUE	TRUE	TRUE	TRUE	TRUE
18:00 - 19:00	164	304	468	FALSE	TRUE	270	79	270	FALSE	TRUE	TRUE	TRUE	TRUE	TRUE
19:00 - 20:00	165	275	440	FALSE	FALSE	191	82	191	FALSE	TRUE	TRUE	TRUE	TRUE	TRUE
20:00 - 21:00	96	171	267	FALSE	FALSE	119	61	119	FALSE	FALSE	FALSE	FALSE	FALSE	TRUE
21:00 - 22:00	76	100	176	FALSE	FALSE	81	47	81	FALSE	FALSE	FALSE	FALSE	FALSE	FALSE
22:00 - 23:00	41	74	115	FALSE	FALSE	83	32	83	FALSE	FALSE	FALSE	FALSE	FALSE	FALSE
23:00 - 24:00	39	76	115	FALSE	FALSE	55	26	55	FALSE	FALSE	FALSE	FALSE	FALSE	FALSE
Total	1,750	3,507	5,257			2,885	1,352	2,885						
Grand Totals	33%	67%				100%	47%							
Number of hours criteria met				11	0				1	8	4	11		
Criteria applicablefor this analysis?					YES					YES		YES		
8 Hour Warrant Volume Condition					100%					80%		70%		
8 Hour Warrant Condition A satisfied?					NO					NO		NO		

8 hour warrant percentage volume adjustment criteria

100%	(a)	Basic minimum hourly volume
80%	(b)	Used for combination of Conditions A and B after adequate trial of other remedial measures.
70%	(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.
56%	(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.

Warrant 1 - 8 Hour Vehicular Volume - Condition B

				Qualifying Criteria					Condition A & B must be met					
				(a)	(a)				(b)	(b)	(c)	(c)	(d)	(d)
				100%	100%				80%	80%	70%	70%	56%	56%
				Req'd Vol.	Req'd Vol.			Greater	Req'd Vol.	Req'd Vol.	Req'd Vol.	Req'd Vol.	Req'd Vol.	Req'd Vol.
				750	75			Volume	600	60	525	53	420	42
HOUR	MAJOR APP. 1	MAJOR APP. 2	TOTAL 1+2	WARRANT MET	WARRANT MET	MINOR APP. 3	MINOR APP. 4	of Minor APP. 3 or 4	WARRANT MET	WARRANT MET	WARRANT MET	WARRANT MET	VOLUME MET	VOLUME MET
0:00 - 1:00	26	39	65	FALSE	FALSE	54	11	54	FALSE	FALSE	FALSE	TRUE	FALSE	TRUE
1:00 - 2:00	4	36	40	FALSE	FALSE	26	20	26	FALSE	FALSE	FALSE	FALSE	FALSE	FALSE
2:00 - 3:00	6	18	24	FALSE	FALSE	20	9	20	FALSE	FALSE	FALSE	FALSE	FALSE	FALSE
3:00 - 4:00	6	15	21	FALSE	FALSE	42	6	42	FALSE	FALSE	FALSE	FALSE	FALSE	TRUE
4:00 - 5:00	5	8	13	FALSE	FALSE	16	3	16	FALSE	FALSE	FALSE	FALSE	FALSE	FALSE
5:00 - 6:00	2	14	16	FALSE	FALSE	19	5	19	FALSE	FALSE	FALSE	FALSE	FALSE	FALSE
6:00 - 7:00	16	13	29	FALSE	FALSE	16	16	16	FALSE	FALSE	FALSE	FALSE	FALSE	FALSE
7:00 - 8:00	19	51	70	FALSE	FALSE	67	20	67	FALSE	TRUE	FALSE	TRUE	FALSE	TRUE
8:00 - 9:00	49	124	173	FALSE	TRUE	145	74	145	FALSE	TRUE	FALSE	TRUE	FALSE	TRUE
9:00 - 10:00	103	299	402	FALSE	TRUE	216	166	216	FALSE	TRUE	FALSE	TRUE	FALSE	TRUE
10:00 - 11:00	116	319	435	FALSE	TRUE	175	124	175	FALSE	TRUE	FALSE	TRUE	TRUE	TRUE
11:00 - 12:00	81	179	260	FALSE	TRUE	143	66	143	FALSE	TRUE	FALSE	TRUE	FALSE	TRUE
12:00 - 13:00	86	217	303	FALSE	TRUE	186	89	186	FALSE	TRUE	FALSE	TRUE	FALSE	TRUE
13:00 - 14:00	102	229	331	FALSE	TRUE	220	88	220	FALSE	TRUE	FALSE	TRUE	FALSE	TRUE
14:00 - 15:00	134	244	378	FALSE	TRUE	125	86	125	FALSE	TRUE	FALSE	TRUE	FALSE	TRUE
15:00 - 16:00	113	193	306	FALSE	TRUE	158	68	158	FALSE	TRUE	FALSE	TRUE	FALSE	TRUE
16:00 - 17:00	121	197	318	FALSE	TRUE	210	81	210	FALSE	TRUE	FALSE	TRUE	FALSE	TRUE
17:00 - 18:00	180	312	492	FALSE	TRUE	248	93	248	FALSE	TRUE	FALSE	TRUE	TRUE	TRUE
18:00 - 19:00	164	304	468	FALSE	TRUE	270	79	270	FALSE	TRUE	FALSE	TRUE	TRUE	TRUE
19:00 - 20:00	165	275	440	FALSE	TRUE	191	82	191	FALSE	TRUE	FALSE	TRUE	TRUE	TRUE
20:00 - 21:00	96	171	267	FALSE	TRUE	119	61	119	FALSE	TRUE	FALSE	TRUE	FALSE	TRUE
21:00 - 22:00	76	100	176	FALSE	TRUE	81	47	81	FALSE	TRUE	FALSE	TRUE	FALSE	TRUE
22:00 - 23:00	41	74	115	FALSE	TRUE	83	32	83	FALSE	TRUE	FALSE	TRUE	FALSE	TRUE
23:00 - 24:00	39	76	115	FALSE	FALSE	55	26	55	FALSE	FALSE	FALSE	TRUE	FALSE	TRUE
Total	1,750	3,507	5,257			2,885	1,352							
Number of hours criteria met				0	15				0	16	0	18		
Criteria applicablefor this analysis?					YES					YES		YES		
8 Hour Warrant Volume Condition					100%					80%		70%		
8 Hour Warrant Condition B satisfied?					NO					NO		YES		

Traffic Signal Warrant Review Summary

	Warrant Satisfied?		
Warrant 1	NO	8 hour vehicular volume	0 of 8 hours satisfied at the reduced 70% volumes
Warrant 2	NO	4 hour vehicular volume	2 of 4 hours satisfied at the reduced 70% volumes
Warrant 3	NO	Peak hour vehicular volume	Warrant not applicable
Warrant 4	NO	Pedestrian volume	Pedestrian volumes and delays not met
Warrant 5	NO	School crossing	School-age pedestrian volume met, delays not met
Warrant 6	NO	Coordinated signal operation	Warrant not applicable
Warrant 7	NO	Crash experience	Warrant not met
Warrant 8	NO	Roadway network	Warrant not applicable
Warrant 9	NO	Intersection near a grade crossing	No railroad grade crossing present

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TRAFFIC ENGINEERING - 07/99
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TRAFFIC SIGNAL WARRANT SUMMARY

City: Oklahoma City
County: Oklahoma
Engineer: Stuart Chai, P.E.
Date: March 21, 2024

Major Street: E Hefner Road — Lanes: 2 — Critical Approach Speed: 45
Minor Street: N I-35 Service Road (east side) — Lanes: 2

Volume Level Criteria

1. Is the critical speed of major street traffic > 70 km/h (40 mph) ? ☒ Yes ☐ No
2. Is the intersection in a built-up area of isolated community of <10,000 population? ☐ Yes ☒ No

If Question 1 or 2 above is answered "Yes", then use "70%" volume level ☒ 70% ☐ 100%

WARRANT 1 - EIGHT-HOUR VEHICULAR VOLUME

Applicable: ☒ Yes ☐ No
Satisfied: ☐ Yes ☒ No

Warrant 1 is satisfied if Condition A or Condition B is "100%" satisfied.
Warrant is also satisfied if both Condition A and Condition B are "80%" satisfied.

Condition A - Minimum Vehicular Volume

100% Satisfied: ☐ Yes ☒ No
80% Satisfied: ☐ Yes ☒ No

(volumes in veh/hr)	Minimum Requirements (80% Shown in Brackets)				Eight Highest Hours							
Approach Lanes	1		2 or more		9:00 AM - 10:00 AM	10:00 AM - 11:00 AM	1:00 PM - 2:00 PM	2:00 PM - 3:00 PM	4:00 PM - 5:00 PM	5:00 PM - 6:00 PM	6:00 PM - 7:00 PM	7:00 PM - 8:00 PM
Volume Level	100%	70%	100%	70%								
Both Approaches on Major Street	500 (400)	350	600 (480)	420	418	440	305	325	308	458	455	406
Highest Approach on Minor Street	150 (120)	105	200 (160)	140	309	293	261	310	260	338	302	315

Record 8 highest hours and the corresponding volumes in boxes provided. Condition is 100% satisfied if the minimum volumes are met for eight hours. Condition is 80% satisfied if parenthetical volumes are met for eight hours.

Condition B - Interruption of Continuous Traffic

Condition B is intended for application where the traffic volume is so heavy that traffic on the minor street suffers excessive delay.

Applicable: ☒ Yes ☐ No
Excessive Delay: ☐ Yes ☒ No
100% Satisfied: ☐ Yes ☒ No
80% Satisfied: ☐ Yes ☒ No

(volumes in veh/hr)	Minimum Requirements (80% Shown in Brackets)				Eight Highest Hours							
Approach Lanes	1		2 or more		9:00 AM - 10:00 AM	10:00 AM - 11:00 AM	1:00 PM - 2:00 PM	2:00 PM - 3:00 PM	4:00 PM - 5:00 PM	5:00 PM - 6:00 PM	6:00 PM - 7:00 PM	7:00 PM - 8:00 PM
Volume Level	100%	70%	100%	70%								
Both Approaches on Major Street	750 (600)	525	900 (720)	630	418	440	305	325	308	458	455	406
Highest Approach on Minor Street	75 (60)	53	100 (80)	70	309	293	261	310	260	338	302	315

Record 8 highest hours and the corresponding volumes in boxes provided. Condition is 100% satisfied if the minimum volumes are met for eight hours. Condition is 80% satisfied if parenthetical volumes are met for eight hours.

Traffic signal warrant analysis for east side N I-35 Service Road and E Hefner Road.

TRAFFIC SIGNAL WARRANT SUMMARY

City: Oklahoma City
County: Oklahoma
Engineer: Stuart Chai, P.E.
Date: March 21, 2024

Major Street: E Hefner Road — Lanes: 2 — Critical Approach Speed: 45
Minor Street: N I-35 Service Road (east side) — Lanes: 2

Volume Level Criteria

1. Is the critical speed of major street traffic > 70 km/h (40 mph) ? ☒ Yes ☐ No
2. Is the intersection in a built-up area of isolated community of <10,000 population? ☐ Yes ☒ No

If Question 1 or 2 above is answered "Yes", then use "70%" volume level ☒ 70% ☐ 100%

WARRANT 2 - FOUR-HOUR VEHICULAR VOLUME

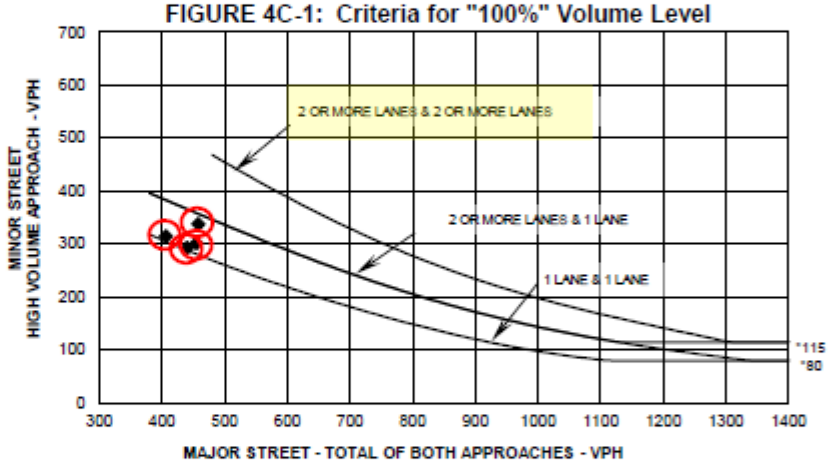
If all four points lie above the appropriate line, then the warrant is satisfied.

Applicable: ☒ Yes ☐ No
Satisfied: ☐ Yes ☒ No

Four Highest Hours	Volumes	
	Major Street	Minor Street
10:00 AM - 11:00 AM	440	293
5:00 PM - 6:00 PM	458	338
6:00 PM - 7:00 PM	455	302
7:00 PM - 8:00 PM	406	315

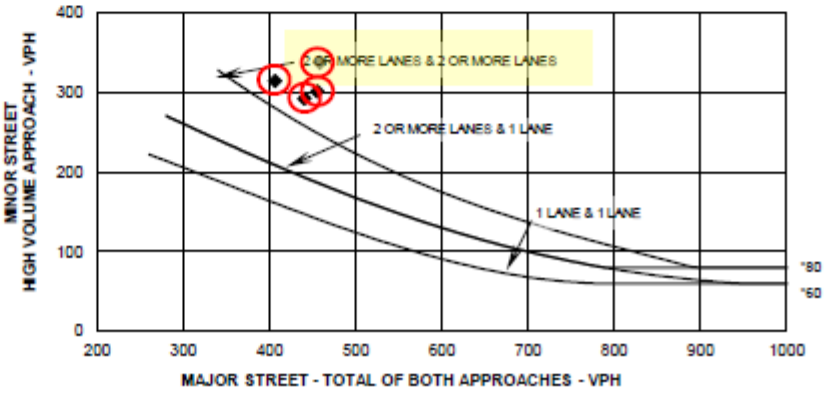
Plot four volume combinations on the applicable figure below.

FIGURE 4C-1: Criteria for "100%" Volume Level



* 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 threshold for a minor street approach with one lane.*

FIGURE 4C-2: Criteria for "70%" Volume Level
(Community Less than 10,000 population or above 70 km/hr (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 threshold for a minor street approach with one lane.*

Warrant 2 criteria met under 70% reduced traffic volume conditions (based on the speed limit being greater than 40 mph on the major street, E Hefner Road)

TRAFFIC SIGNAL WARRANT SUMMARY

City: Oklahoma City
County: Oklahoma
Engineer: Stuart Chai, P.E.
Date: March 21, 2024

Major Street: E Hefner Road — Lanes: 2 — Critical Approach Speed: 45
Minor Street: N I-35 Service Road (east side) — Lanes: 2

Volume Level Criteria

1. Is the critical speed of major street traffic > 70 km/h (40 mph) ? ☒ Yes ☐ No
2. Is the intersection in a built-up area of isolated community of <10,000 population? ☐ Yes ☒ No

If Question 1 or 2 above is answered "Yes", then use "70%" volume level ☒ 70% ☐ 100%

WARRANT 3 - PEAK HOUR

Applicable: ☐ Yes ☒ No
Satisfied: ☐ Yes ☒ No

If all three criteria are fullfilled or the plotted point lies above the appropriate line, then the warrant is satisfied.

Unusual condition justifying use of warrant: NO UNUSUAL CONDITION

Record hour when criteria are fulfilled and the corresponding delay or volume in boxes provided.

Peak Hour		
17:00	458	338

Criteria

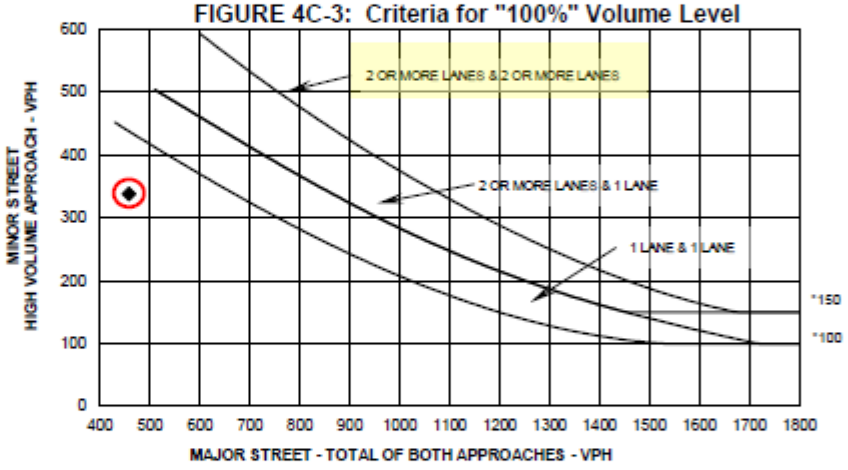
1. Delay on Minor Approach *(vehicle-hours)		
Approach Lanes	1	2
Delay Criteria*	4.0	5.0
Delay*		
Fulfilled?: ☐ Yes ☐ No		

2. Volume on Minor Approach *(vehicles per hour)		
Approach Lanes	1	2
Volume Criteria*	100	150
Volume*	104	
Fulfilled?: ☒ Yes ☐ No		

3. Total Entering Volume *(vehicles per hour)		
No. of Approaches	3	4
Volume Criteria*	650	800
Volume*		
Fulfilled?: ☒ Yes ☐ No		

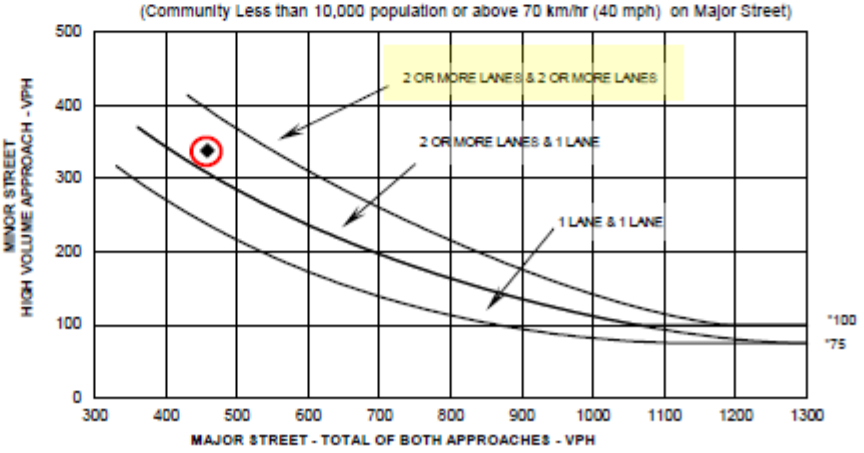
Plot volume combination on the applicable figure below.

FIGURE 4C-3: Criteria for "100%" Volume Level



* 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 threshold for a minor street approach with one lane.*

FIGURE 4C-4: Criteria for "70%" Volume Level
(Community Less than 10,000 population or above 70 km/hr (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 threshold for a minor street approach with one lane.*

TRAFFIC SIGNAL WARRANT SUMMARY

City: Oklahoma City
County: Oklahoma
Engineer: Stuart Chai, P.E.
Date: March 21, 2024

Major Street: E Hefner Road — Lanes: 2 — Critical Approach Speed: 45
Minor Street: N I-35 Service Road (east side) — Lanes: 2

WARRANT 4 - PEDESTRIAN VOLUME

Applicable: ☐ Yes ☒ No
Satisfied: ☐ Yes ☒ No

Record hours where criteria are fulfilled and the corresponding volume or gap frequency in the boxes provided. The warrant is satisfied if condition 1 or 2 is fulfilled and condition 3 is fulfilled.

Criteria	Hour	Pedestrian Volume	Pedestrian Gaps	Fulfilled? Yes	Fulfilled? No
1. Pedestrian volume crossing the major street is 100 ped/hr or more for each of any four hours and there are less than 60 gaps per hour in the major street traffic stream of adequate length.					X
2. Pedestrian volume crossing the major street is 190 ped/hr or more for any one hour and there are less than 60 gaps per hour in the major street traffic stream of adequate length.					X
3. The nearest traffic signal along the major street is located more than 90 m (300 ft) away, or the nearest signal is within 90 m (300 ft) but the proposed traffic signal will not restrict the progressive movement of traffic.				X	

WARRANT 5 - SCHOOL CROSSING

Applicable: ☐ Yes ☒ No
Satisfied: ☐ Yes ☒ No

Record hours where criteria are fulfilled and the corresponding volume or gap frequency in the boxes provided. The warrant is satisfied if all three of the criteria are fulfilled.

Criteria				Fulfilled? Yes	Fulfilled? No
1. There are a minimum of 20 students crossing the major street during the highest crossing hour.	Students:	Hour:			X
2. There are fewer adequate gaps in the major street traffic stream during the period when the children are using the crossing than the number of minutes in the same period.		Minutes:	Gaps:		X
3. The nearest traffic signal along the major street is located more than 90 m (300 ft) away, or the nearest signal is within 90 m (300 ft) but the proposed traffic signal will not restrict the progressive movement of traffic.				X	

WARRANT 6 - COORDINATED SIGNAL SYSTEM

Applicable: ☐ Yes ☒ No
Satisfied: ☐ Yes ☒ No

Indicate if the criteria are fulfilled in the boxes provided. The warrant is satisfied if either criterion is fulfilled. This warrant should not be applied when the resulting signal spacing would be less than 300 m (1,000 ft).

Criteria	Fulfilled? Yes	Fulfilled? No
1. On a one-way street or a street that has traffic predominately in one direction, the adjacent signals are so far apart that they do not provide the necessary degree of vehicle platooning.		X
2. On a two-way street, adjacent signals do not provide the necessary degree of platooning, and the proposed and adjacent signals will collectively provide a progressive operation.		X

TRAFFIC SIGNAL WARRANT SUMMARY

City: Oklahoma City
County: Oklahoma
Engineer: Stuart Chai, P.E.
Date: March 21, 2024

Major Street: E Hefner Road
Lanes: 2
Critical Approach Speed: 45
Minor Street: N I-35 Service Road (east side)
Lanes: 2

WARRANT 7 - CRASH EXPERIENCE

Applicable: ☒ Yes ☐ No
Satisfied: ☐ Yes ☒ No

Record hours where criteria are fulfilled, the corresponding volume, and other information in the boxes provided. The warrant is satisfied when all three (3) of the criteria conditions are fulfilled.

Criteria - See MUTCD Section 4C.08		Met? Yes
A. Adequate trial of other remedial measures has failed to reduce crash frequency; *and*	Measure tried: Dual 48" stop signs (installed by ODOT)	☒
B. 1 Number of angle crashes and pedestrian crashes within 1 year period equals or exceeds threshold in Table 4C-2; *or*		☐
2 Number of fatal and injury angle crashes and pedestrian crashes within 1 year period equals or exceeds threshold in Table 4C-2; *or*		☐
3 Number of angle crashes and pedestrian crashes within 3 year period equals or exceeds threshold in Table 4C-3; *or*		☐
4 Number of fatal and injury angle crashes and pedestrian crashes within 3 year period equals or exceeds threshold in Table 4C-3; *and*		☐
C. For each of any 8 hours of an avg. day, vph in both 80% columns of Condition A in Table 4C-1 OR both 80% columns of Condition B in same table exist on the major street and the more critical minor street approach or the pedestrian volume is not less than 80% of required volume in Section 4C.05		☐

All criteria met?	
Yes	No
☐	☒

All three required criteria satisfied to meet warrant?

WARRANT 8 - ROADWAY NETWORK

Applicable: ☐ Yes ☒ No
Satisfied: ☐ Yes ☐ No

Record hours where criteria are fulfilled, and the corresponding volume or other information in the boxes provided. The warrant is satisfied if at least one of the criteria is fulfilled and if all intersecting routes have one or more of the characteristics listed.

Criteria								Met? Yes	Met? No	Fulfilled? Yes	Fulfilled? No
1. Both of the criteria to the right are met.	a. Total entering volume of at least 1,000 veh/hr during a typical weekday peak hour.			Entering Volume:							
	b. Five-year projected volumes that satisfy one or more of Warrants 1, 2, or 3.		Warrant:	1	2	3					
			Satisfied?:								
2. Total entering volume at least 1,000 veh/hr for each of any 5 hrs of a non-normal business day (Sat. or Sun.)							← Hour				
							← Volume				

Characteristics of Major Routes		Met? Yes	Met? No	Fulfilled? Yes	Fulfilled? No
1. Part of the street or highway system that serves as the principal roadway network for through traffic flow.	Major Street:				
	Minor Street:				
2. Rural or suburban highway outside of, entering, or traversing a city.	Major Street:				
	Minor Street:				
3. Appears as a major route on an official plan.	Major Street:				
	Minor Street:				

TRAFFIC SIGNAL WARRANT SUMMARY

City: Oklahoma City
County: Oklahoma

Engineer: Stuart Chai, P.E.
Date: March 21, 2024

Major Street: E Hefner Road — Lanes: 2 — Critical Approach Speed: 45
Minor Street: N I-35 Service Road (east side) — Lanes: 2

WARRANT 9 - INTERSECTION NEAR A GRADE CROSSING

This criteria is intended for use at a location where none of the conditions described in the other eight warrants are met.

Applicable: ☐ Yes ☒ No
Satisfied: ☐ Yes ☐ No

Criteria - See MUTCD Section 4C.10	Yes	No
A. Stop or yield line on approach of intersection nearest to center of the track is within 140 feet; *and*	☐	☐
B. During highest traffic volume hour during which rail traffic uses the crossing the poltted points for traffic volume on the major and minor streets fall above the applicable curve in Figure 4C-9 or 4C-10.	☐	☐
	Criteria met?	
	Yes	No
Both required criteria satisfied to meet warrant?	☐	☐

CONCLUSIONS

Warrants Satisfied: 2

Remarks: 70% reduced 4-hour vehicular volume criteria met to satisfy Warrant 2

City of Oklahoma City Public Works Department

Traffic Services Division

SIGNAL WARRANTS ANALYSIS

Warrant 1 - 8 Hour Vehicular Volume

LOCATION: **EAST I-35 Service Road and E Hefner Road** DATE: **1/26/2024**

Posted Speed	Approach Description	Lanes
45	Major App1: E Hefner Road (EB)	2
45	Major App2: E Hefner Road (WB)	2
45	Minor App3: N I-35 Service Road (NB)	2
40	Minor App4: N I-35 Service Road (SB)	2

Warrant 1 - 8 Hour Vehicular Volume - Condition A

				Qualifying Criteria					Condition A & B must be met					
				(a)	(a)				(b)	(b)	(c)	(c)	(d)	(d)
				100%	100%				80%	80%	70%	70%	56%	56%
				Req'd Vol.	Req'd Vol.			Greater	Req'd Vol.	Req'd Vol.	Req'd Vol.	Req'd Vol.	Req'd Vol.	Req'd Vol.
	EB	WB		600	200	NB	SB	Volume	480	160	420	140	336	112
HOUR	MAJOR APP. 1	MAJOR APP. 2	TOTAL 1+2	VOLUME MET	VOLUME MET	MINOR APP. 3	MINOR APP. 4	of Minor APP. 3 or 4	VOLUME MET	VOLUME MET	VOLUME MET	VOLUME MET	VOLUME MET	VOLUME MET
0:00 - 1:00	39	18	57	FALSE	FALSE	69	8	69	FALSE	FALSE	FALSE	FALSE	FALSE	FALSE
1:00 - 2:00	12	11	23	FALSE	FALSE	64	5	64	FALSE	FALSE	FALSE	FALSE	FALSE	FALSE
2:00 - 3:00	17	10	27	FALSE	FALSE	28	8	28	FALSE	FALSE	FALSE	FALSE	FALSE	FALSE
3:00 - 4:00	25	5	30	FALSE	FALSE	21	4	21	FALSE	FALSE	FALSE	FALSE	FALSE	FALSE
4:00 - 5:00	10	1	11	FALSE	FALSE	15	1	15	FALSE	FALSE	FALSE	FALSE	FALSE	FALSE
5:00 - 6:00	8	8	16	FALSE	FALSE	36	3	36	FALSE	FALSE	FALSE	FALSE	FALSE	FALSE
6:00 - 7:00	21	11	32	FALSE	FALSE	54	6	54	FALSE	FALSE	FALSE	FALSE	FALSE	FALSE
7:00 - 8:00	26	37	63	FALSE	FALSE	68	16	68	FALSE	FALSE	FALSE	FALSE	FALSE	FALSE
8:00 - 9:00	82	112	194	FALSE	FALSE	184	35	184	FALSE	TRUE	FALSE	TRUE	FALSE	TRUE
9:00 - 10:00	155	263	418	FALSE	TRUE	309	34	309	FALSE	TRUE	FALSE	TRUE	TRUE	TRUE
10:00 - 11:00	164	276	440	FALSE	TRUE	293	41	293	FALSE	TRUE	TRUE	TRUE	TRUE	TRUE
11:00 - 12:00	102	143	245	FALSE	TRUE	258	32	258	FALSE	TRUE	FALSE	TRUE	FALSE	TRUE
12:00 - 13:00	134	165	299	FALSE	TRUE	212	46	212	FALSE	TRUE	FALSE	TRUE	FALSE	TRUE
13:00 - 14:00	146	159	305	FALSE	TRUE	261	62	261	FALSE	TRUE	FALSE	TRUE	FALSE	TRUE
14:00 - 15:00	153	172	325	FALSE	TRUE	310	65	310	FALSE	TRUE	FALSE	TRUE	FALSE	TRUE
15:00 - 16:00	153	137	290	FALSE	TRUE	236	48	236	FALSE	TRUE	FALSE	TRUE	FALSE	TRUE
16:00 - 17:00	171	137	308	FALSE	TRUE	260	59	260	FALSE	TRUE	FALSE	TRUE	FALSE	TRUE
17:00 - 18:00	232	226	458	FALSE	TRUE	338	73	338	FALSE	TRUE	TRUE	TRUE	TRUE	TRUE
18:00 - 19:00	221	234	455	FALSE	TRUE	302	69	302	FALSE	TRUE	TRUE	TRUE	TRUE	TRUE
19:00 - 20:00	200	206	406	FALSE	TRUE	315	64	315	FALSE	TRUE	FALSE	TRUE	TRUE	TRUE
20:00 - 21:00	134	134	268	FALSE	TRUE	221	33	221	FALSE	TRUE	FALSE	TRUE	FALSE	TRUE
21:00 - 22:00	77	61	138	FALSE	FALSE	140	27	140	FALSE	FALSE	FALSE	TRUE	FALSE	TRUE
22:00 - 23:00	66	39	105	FALSE	FALSE	88	17	88	FALSE	FALSE	FALSE	FALSE	FALSE	FALSE
23:00 - 24:00	53	44	97	FALSE	FALSE	150	5	150	FALSE	FALSE	FALSE	TRUE	FALSE	TRUE
Total	2,401	2,609	5,010			4,232	761	4,232						
Grand Totals	48%	52%				100%	18%							
Number of hours criteria met				0	12			12	0	13	3	15		
Criteria applicablefor this analysis?					YES					YES		YES		
8 Hour Warrant Volume Condition					100%					80%		70%		
8 Hour Warrant Condition A satisfied?					NO					NO		NO		

8 hour warrant percentage volume adjustment criteria

100%	(a)	Basic minimum hourly volume
80%	(b)	Used for combination of Conditions A and B after adequate trial of other remedial measures.
70%	(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.
56%	(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.

Warrant 1 - 8 Hour Vehicular Volume - Condition B

				Qualifying Criteria					Condition A & B must be met					
				(a)	(a)				(b)	(b)	(c)	(c)	(d)	(d)
				100%	100%				80%	80%	70%	70%	56%	56%
				Req'd Vol.	Req'd Vol.			Greater	Req'd Vol.	Req'd Vol.	Req'd Vol.	Req'd Vol.	Req'd Vol.	Req'd Vol.
				750	75			Volume	600	60	525	53	420	42
	MAJOR	MAJOR	TOTAL	WARRANT	WARRANT	MINOR	MINOR	of Minor	WARRANT	WARRANT	WARRANT	WARRANT	VOLUME	VOLUME
HOUR	APP. 1	APP. 2	1+2	MET	MET	APP. 3	APP. 4	APP. 3 or 4	MET	MET	MET	MET	MET	MET
0:00 - 1:00	39	18	57	FALSE	FALSE	69	8	69	FALSE	TRUE	FALSE	TRUE	FALSE	TRUE
1:00 - 2:00	12	11	23	FALSE	FALSE	64	5	64	FALSE	TRUE	FALSE	TRUE	FALSE	TRUE
2:00 - 3:00	17	10	27	FALSE	FALSE	28	8	28	FALSE	FALSE	FALSE	FALSE	FALSE	FALSE
3:00 - 4:00	25	5	30	FALSE	FALSE	21	4	21	FALSE	FALSE	FALSE	FALSE	FALSE	FALSE
4:00 - 5:00	10	1	11	FALSE	FALSE	15	1	15	FALSE	FALSE	FALSE	FALSE	FALSE	FALSE
5:00 - 6:00	8	8	16	FALSE	FALSE	36	3	36	FALSE	FALSE	FALSE	FALSE	FALSE	FALSE
6:00 - 7:00	21	11	32	FALSE	FALSE	54	6	54	FALSE	FALSE	FALSE	TRUE	FALSE	TRUE
7:00 - 8:00	26	37	63	FALSE	FALSE	68	16	68	FALSE	TRUE	FALSE	TRUE	FALSE	TRUE
8:00 - 9:00	82	112	194	FALSE	TRUE	184	35	184	FALSE	TRUE	FALSE	TRUE	FALSE	TRUE
9:00 - 10:00	155	263	418	FALSE	TRUE	309	34	309	FALSE	TRUE	FALSE	TRUE	FALSE	TRUE
10:00 - 11:00	164	276	440	FALSE	TRUE	293	41	293	FALSE	TRUE	FALSE	TRUE	TRUE	TRUE
11:00 - 12:00	102	143	245	FALSE	TRUE	258	32	258	FALSE	TRUE	FALSE	TRUE	FALSE	TRUE
12:00 - 13:00	134	165	299	FALSE	TRUE	212	46	212	FALSE	TRUE	FALSE	TRUE	FALSE	TRUE
13:00 - 14:00	146	159	305	FALSE	TRUE	261	62	261	FALSE	TRUE	FALSE	TRUE	FALSE	TRUE
14:00 - 15:00	153	172	325	FALSE	TRUE	310	65	310	FALSE	TRUE	FALSE	TRUE	FALSE	TRUE
15:00 - 16:00	153	137	290	FALSE	TRUE	236	48	236	FALSE	TRUE	FALSE	TRUE	FALSE	TRUE
16:00 - 17:00	171	137	308	FALSE	TRUE	260	59	260	FALSE	TRUE	FALSE	TRUE	FALSE	TRUE
17:00 - 18:00	232	226	458	FALSE	TRUE	338	73	338	FALSE	TRUE	FALSE	TRUE	TRUE	TRUE
18:00 - 19:00	221	234	455	FALSE	TRUE	302	69	302	FALSE	TRUE	FALSE	TRUE	TRUE	TRUE
19:00 - 20:00	200	206	406	FALSE	TRUE	315	64	315	FALSE	TRUE	FALSE	TRUE	FALSE	TRUE
20:00 - 21:00	134	134	268	FALSE	TRUE	221	33	221	FALSE	TRUE	FALSE	TRUE	FALSE	TRUE
21:00 - 22:00	77	61	138	FALSE	TRUE	140	27	140	FALSE	TRUE	FALSE	TRUE	FALSE	TRUE
22:00 - 23:00	66	39	105	FALSE	TRUE	88	17	88	FALSE	TRUE	FALSE	TRUE	FALSE	TRUE
23:00 - 24:00	53	44	97	FALSE	TRUE	150	5	150	FALSE	TRUE	FALSE	TRUE	FALSE	TRUE
Total	2,401	2,609	5,010			4,232	761							

Number of hours criteria met	0	16		0	19	0	20
Criteria applicablefor this analysis?		YES			YES		YES
8 Hour Warrant Volume Condition		100%			80%		70%
8 Hour Warrant Condition B satisfied?		NO			NO		NO

Traffic Signal Warrant Review Summary

	Warrant Satisfied?		
Warrant 1	NO	8 hour vehicular volume	0 of 8 hours satisfied at the reduced 70% volumes
Warrant 2	YES	4 hour vehicular volume	4 of 4 hours satisfied at the reduced 70% volumes
Warrant 3	NO	Peak hour vehicular volume	Warrant not applicable
Warrant 4	NO	Pedestrian volume	Pedestrian volumes and delays not met
Warrant 5	NO	School crossing	School-age pedestrian volume met, delays not met
Warrant 6	NO	Coordinated signal operation	Warrant not applicable
Warrant 7	NO	Crash experience	Warrant not met
Warrant 8	NO	Roadway network	Warrant not applicable
Warrant 9	NO	Intersection near a grade crossing	No railroad grade crossing present

Spot Speed Study on E Hefner Road west of I-35
Speed limit: 40 MPH
Date: 3/25/24 9:10 AM to 3/25/24 9:41 AM

Total vehicles recorded in file = 106
Lowest recorded speed = 34
Average speed = 46
Highest recorded speed = 57

10 Mph pace speed = 41 - 50
Percent under pace speed = 11
Percent in pace speed = 72
Percent over pace speed = 16

15th percentile = 41
50th percentile = 46
85th percentile = 51
95th percentile = 54

Speed (mph)	Vehicles Counted	Percent of Total	Cumulative Percentage
34	1	0.9	0.9
35	0	0	0.9
36	0	0	0.9
37	2	1.9	2.8
38	1	0.9	3.8
39	4	3.8	7.5
40	4	3.8	11.3
41	4	3.8	15.1
42	8	7.5	22.6
43	4	3.8	26.4
44	10	9.4	35.8
45	9	8.5	44.3
46	13	12.3	56.6
47	6	5.7	62.3
48	10	9.4	71.7
49	6	5.7	77.4
50	7	6.6	84
51	5	4.7	88.7
52	3	2.8	91.5
53	3	2.8	94.3
54	3	2.8	97.2
55	1	0.9	98.1
56	0	0	98.1
57	2	1.9	100

11% of drivers observed travelled at or below the 40 mph speed limit.

46 mph observed 50th percentile speed.

51 mph observed 85th percentile speed.

57mph highest observed speed.

Spot Speed Study on E Hefner Road east of I-35
Speed limit: 45 MPH
Date: 3/25/24 8:45 AM to 3/25/24 9:05 AM

Total vehicles recorded in file = 109
Lowest recorded speed = 21
Average speed = 44
Highest recorded speed = 64

10 Mph pace speed = 40 - 49
Percent under pace speed = 16
Percent in pace speed = 62
Percent over pace speed = 21

15th percentile = 39
50th percentile = 45
85th percentile = 51
95th percentile = 55

Speed (mph)	Vehicles Counted	Percent of Total	Cumulative Percentage
21	2	1.8	1.8
22	0	0	1.8
23	0	0	1.8
24	0	0	1.8
25	0	0	1.8
26	0	0	1.8
27	0	0	1.8
28	1	0.9	2.8
29	0	0	2.8
30	1	0.9	3.7
31	0	0	3.7
32	0	0	3.7
33	0	0	3.7
34	3	2.8	6.4
35	1	0.9	7.3
36	5	4.6	11.9
37	2	1.8	13.8
38	0	0	13.8
39	3	2.8	16.5
40	7	6.4	22.9
41	6	5.5	28.4
42	6	5.5	33.9
43	8	7.3	41.3
44	5	4.6	45.9
45	7	6.4	52.3
46	8	7.3	59.6
47	6	5.5	65.1
48	7	6.4	71.6
49	8	7.3	78.9
50	4	3.7	82.6
51	3	2.8	85.3
52	3	2.8	88.1
53	3	2.8	90.8
54	4	3.7	94.5
55	1	0.9	95.4
56	1	0.9	96.3
57	0	0	96.3
58	1	0.9	97.2
59	2	1.8	99.1
60	0	0	99.1
61	0	0	99.1
62	0	0	99.1
63	0	0	99.1
64	1	0.9	100

45 mph observed 50th percentile speed.

51 mph observed 85th percentile speed.

64 mph highest observed speed.

Spot Speed Study on I-35 Service Road west of I-35 and north of Hefner
Speed limit: 45 MPH
Date: 3/25/24 12:58 PM to 3/25/24 2:12 PM

Total vehicles recorded in file = 107
Lowest recorded speed = 9
Average speed = 34
Highest recorded speed = 48

10 Mph pace speed = 29 - 38
Percent under pace speed = 15
Percent in pace speed = 61
Percent over pace speed = 23

15th percentile = 29
50th percentile = 35
85th percentile = 39
95th percentile = 41

Speed (mph)	Vehicles Counted	Percent of Total	Cumulative Percentage
9	1	0.9	0.9
10	0	0	0.9
11	0	0	0.9
12	0	0	0.9
13	0	0	0.9
14	0	0	0.9
15	0	0	0.9
16	0	0	0.9
17	0	0	0.9
18	2	1.9	2.8
19	0	0	2.8
20	0	0	2.8
21	0	0	2.8
22	0	0	2.8
23	1	0.9	3.7
24	1	0.9	4.7
25	4	3.7	8.4
26	2	1.9	10.3
27	3	2.8	13.1
28	2	1.9	15
29	5	4.7	19.6
30	4	3.7	23.4
31	3	2.8	26.2
32	9	8.4	34.6
33	7	6.5	41.1
34	3	2.8	43.9
35	10	9.3	53.3
36	7	6.5	59.8
37	8	7.5	67.3
38	10	9.3	76.6
39	9	8.4	85
40	8	7.5	92.5
41	3	2.8	95.3
42	2	1.9	97.2
43	1	0.9	98.1
44	0	0	98.1
45	0	0	98.1
46	0	0	98.1
47	0	0	98.1
48	2	1.9	100

35 mph observed 50th percentile speed.

39 mph observed 85th percentile speed.

48 mph highest observed speed.

Spot Speed Study on I-35 Service Road west of I-35 and south of Hefner
Speed limit: 45 MPH
Date: 3/25/24 9:47 AM to 3/25/24 10:39 AM

Total vehicles recorded in file = 101
Lowest recorded speed = 2
Average speed = 36
Highest recorded speed = 64

10 Mph pace speed = 32 - 41
Percent under pace speed = 18
Percent in pace speed = 59
Percent over pace speed = 21

15th percentile = 29
50th percentile = 37
85th percentile = 43
95th percentile = 48

Speed (mph)	Vehicles Counted	Percent of Total	Cumulative Percentage
2	1	1	1
3	0	0	1
4	0	0	1
5	0	0	1
6	0	0	1
7	0	0	1
8	0	0	1
9	0	0	1
10	0	0	1
11	0	0	1
12	0	0	1
13	0	0	1
14	0	0	1
15	0	0	1
16	0	0	1
17	0	0	1
18	0	0	1
19	0	0	1
20	0	0	1
21	1	1	2
22	1	1	3
23	2	2	5
24	0	0	5
25	0	0	5
26	3	3	7.9
27	4	4	11.9
28	3	3	14.9
29	1	1	15.8
30	1	1	16.8
31	2	2	18.8
32	6	5.9	24.8
33	2	2	26.7
34	5	5	31.7
35	11	10.9	42.6
36	6	5.9	48.5
37	6	5.9	54.5
38	7	6.9	61.4
39	5	5	66.3
40	7	6.9	73.3
41	5	5	78.2
42	4	4	82.2
43	3	3	85.1
44	3	3	88.1
45	3	3	91.1
46	3	3	94.1
47	0	0	94.1
48	3	3	97
49	0	0	97
50	0	0	97
51	1	1	98
52	0	0	98
53	0	0	98
54	0	0	98
55	0	0	98
56	0	0	98
57	0	0	98
58	0	0	98
59	0	0	98
60	1	1	99
61	0	0	99
62	0	0	99
63	0	0	99
64	1	1	100

37 mph observed 50th percentile speed.

43 mph observed 85th percentile speed.

64 mph highest observed speed.

Spot Speed Study on I-35 Service Road east of I-35 and north of Hefner
Speed limit: 40 MPH
Date: 3/25/24 2:19 PM to 3/25/24 3:11 PM

Total vehicles recorded in file = 101
Lowest recorded speed = 22
Average speed = 39
Highest recorded speed = 55

10 Mph pace speed = 35 - 44
Percent under pace speed = 20
Percent in pace speed = 56
Percent over pace speed = 22

15th percentile = 33
50th percentile = 40
85th percentile = 46
95th percentile = 50

Speed (mph)	Vehicles Counted	Percent of Total	Cumulative Percentage
22	1	1	1
23	0	0	1
24	0	0	1
25	2	2	3
26	0	0	3
27	0	0	3
28	0	0	3
29	1	1	4
30	1	1	5
31	2	2	6.9
32	6	5.9	12.9
33	3	3	15.8
34	5	5	20.8
35	4	4	24.8
36	5	5	29.7
37	4	4	33.7
38	6	5.9	39.6
39	9	8.9	48.5
40	5	5	53.5
41	6	5.9	59.4
42	6	5.9	65.3
43	6	5.9	71.3
44	6	5.9	77.2
45	6	5.9	83.2
46	6	5.9	89.1
47	1	1	90.1
48	2	2	92.1
49	0	0	92.1
50	3	3	95
51	1	1	96
52	0	0	96
53	2	2	98
54	0	0	98
55	2	2	100

40 mph observed 50th percentile speed.

46 mph observed 85th percentile speed.

55 mph highest observed speed.

Spot Speed Study on I-35 Service Road east of I-35 and south of E Hefner Road
Speed limit: 45 MPH
Date: 3/25/24 10:42 AM to 3/25/24 11:42 AM

Total vehicles recorded in file = 54
Lowest recorded speed = 1
Average speed = 38
Highest recorded speed = 53

10 Mph pace speed = 34 - 43
Percent under pace speed = 18
Percent in pace speed = 48
Percent over pace speed = 33

15th percentile = 32
50th percentile = 39
85th percentile = 48
95th percentile = 51

Speed (mph)	Vehicles Counted	Percent of Total	Cumulative Percentage
1	1	1.9	1.9
2	0	0	1.9
3	0	0	1.9
4	0	0	1.9
5	0	0	1.9
6	0	0	1.9
7	0	0	1.9
8	0	0	1.9
9	0	0	1.9
10	0	0	1.9
11	0	0	1.9
12	0	0	1.9
13	0	0	1.9
14	0	0	1.9
15	0	0	1.9
16	0	0	1.9
17	0	0	1.9
18	0	0	1.9
19	0	0	1.9
20	0	0	1.9
21	0	0	1.9
22	1	1.9	3.7
23	0	0	3.7
24	0	0	3.7
25	0	0	3.7
26	0	0	3.7
27	1	1.9	5.6
28	1	1.9	7.4
29	1	1.9	9.3
30	0	0	9.3
31	1	1.9	11.1
32	3	5.6	16.7
33	1	1.9	18.5
34	5	9.3	27.8
35	4	7.4	35.2
36	3	5.6	40.7
37	2	3.7	44.4
38	1	1.9	46.3
39	3	5.6	51.9
40	1	1.9	53.7
41	4	7.4	61.1
42	2	3.7	64.8
43	1	1.9	66.7
44	2	3.7	70.4
45	3	5.6	75.9
46	2	3.7	79.6
47	1	1.9	81.5
48	4	7.4	88.9
49	2	3.7	92.6
50	1	1.9	94.4
51	1	1.9	96.3
52	1	1.9	98.1
53	1	1.9	100

39 mph observed 50th percentile speed.

48 mph observed 85th percentile speed.

53 mph highest observed speed.

City of Oklahoma City Intersection Sight Distance Criteria

Intersection sight distance is the *unobstructed and continuous* visual distance required for a driver to detect an unexpected or otherwise difficult-to-perceive information source or hazard in a roadway environment that may be visually cluttered, recognize the hazard or its threat potential, select an appropriate speed and path and initiate and complete the required safety maneuver safely and efficiently. The sight distance required is based on the posted speed limit. Required sight distances are provided in Table 1 of Section 4.3.2, Article IV of the Subdivision Regulations of the City of Oklahoma City. The definition used is that for decision sight distance as included in "A Policy on Geometric Design of Highways and Streets 2001" as published by the American Association of State and Highway Transportation Officials.

The basic parameters used to field evaluate sight distance are as follows:

Three foot six inch (3'-6") driver eye height. The standard location for measuring driver decision sight distance is at a point ten feet (10') back from the curb line and/or edge of pavement.

Four foot three inch (4'-3") roadway object target height.

Minimum Intersection Sight Distance

Posted Speed (MPH)	Minimum Required (feet/**yards**)	Desirable (feet/**yards**)
20	220 / **73**	315 / **105**
25	235 / **78**	315 / **105**
30	315 / **105**	425 / **142**
35	385 / **128**	515 / **172**
40	490 / **163**	660 / **220**
45	620 / **207**	840 / **280**
50	750 / **250**	1025 / **342**
55	890 / **297**	1230 / **410**

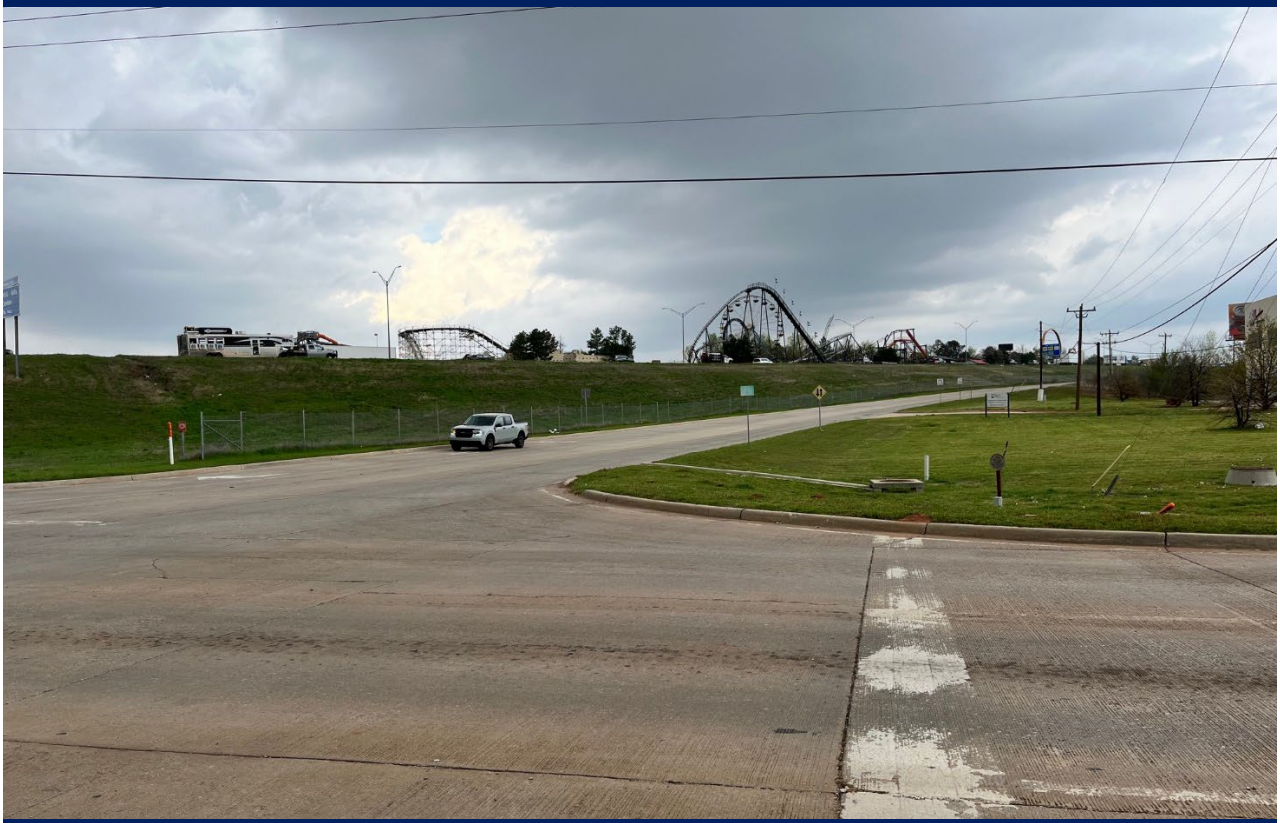
Looking east on E Hefner Road from the west side of the west N I-35 Service Road toward the I-35 bridge.

Looking west on E Hefner Road from the east side of the west N I-35 Service Road. The Quik Trip truck stop (under construction) addressed in the applicant's letter is visible on the left side of this image. The available decision sight distance looking to the west is approximately 520 feet. The City's minimum prescribed decision sight distance based on the 40 mph speed limit on E Hefner Road west of I-35 is 490 feet.

Looking east on E Hefner Road from the north approach of the west N I-35 Service Road toward the I-35 bridge.

Looking north on the west N I-35 Service Road from E Hefner Road. Ride structures in the Six Flags Frontier City amusement park are visible in the distance.

Looking west on E Hefner Road from the east side of the east N I-35 Service Road toward the I-35 bridge.



Looking north on the east N I-35 Service Road from E Hefner Road. Ride structures in the Six Flags Frontier City amusement park are visible in the distance.

Looking south on the east N I-35 Service Road from E Hefner Road.

Looking east on E Hefner Road from the west side of the east N I-35 Service Road.