CALLAHAN INDUSTRIAL DEVELOPMENT

KNOXVILLE, TENNESSEE

TRAFFIC IMPACT AND SITE ACCESS STUDY

CALLAHAN DRIVE
KNOXVILLE, TENNESSEE

CCI PROJECT NO. 01555-0000

REV 4

PREPARED FOR:

Phillips Infrastructure Holdings
10142 Parkside Drive, Suite 500
Knoxville, TN 37922

SUBMITTED BY:

Cannon & Cannon, Inc.
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Knoxville, TN 37919
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CONSULTING ENGINEERS
FIELD SURVEYORS

REVISED
April 25
2022

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TIS Version 2
4/25/2022

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REVISION 4 (04/25/22)
This report replaces the previous version of the traffic impact study dated 03/28/2022 prepared for this project in its entirety. The associated changes are related to comments received from the Knoxville-Knox County Planning, which are located in Appendix F.

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EXECUTIVE SUMMARY

This report provides a summary of a traffic impact and site access study that was performed for a proposed industrial development to be located along Callahan Drive in the City of Knoxville, Tennessee. The project site is located approximately one-half mile west of I-75 and south of Callahan Drive behind the existing UPS hub.

The purpose of this study was the evaluation of the traffic operational and safety impacts of the proposed development upon roadways in the vicinity of the project site. Discussion with City of Knoxville, Knox County, and Tennessee Department of Transportation officials resulted in six intersections being identified for detailed study. These are the Callahan Drive intersections with Old Callahan Drive, Yow Commercial Park Driveway, Viles Automotive Group Driveway, I-75 Southbound Ramps, I-75 Northbound Ramps, and Central Avenue Pike. Intersection evaluations such as capacity analyses and signal warrant analyses were conducted at the six study intersections for existing and future conditions, both with and without site generated traffic, in order to determine the anticipated impacts and to establish recommended mitigation measures. Additionally, the proposed site access location was reviewed and recommendations made related to its location and turn lane related needs.

The primary conclusion of this study is that the traffic generated from the proposed development will not have significant impacts at four of the six study intersections. While two of the study intersections indicated unacceptable levels-of-service at full project build-out without improvements, logical improvements are available to address these concerns.

The following is a listing of recommendations that were developed to address concerns that resulted primarily from traffic generated from the project site, or are offered to accommodate development of the site.

1. Construct the site access intersection as indicated on the project site plan, which includes relocation of the access driveways to Yow Commercial / Viles Auto to utilize this new intersection.

2. Install a three-phase traffic signal at this new site access intersection, which would include a left-turn phase into the project site and advance detector loops on the Callahan Drive approaches. This intersection is about one-half mile from the existing traffic signal at the I-75 southbound ramps. The City of Knoxville / Knox County should determine if such spacing justifies signal coordination between these signals, considering the dilemma zone advantages of the advance loops would be lost during hours when coordination is active. One possibility would be to run coordination during peak traffic hours and allow the site signal to run free during other hours.

3. At the proposed new site access intersection,
    a. Construct the following turn lanes on Callahan Drive:
        i. Eastbound right-turn lane with 100 feet of storage and a 180-foot bay taper
        ii. Eastbound left-turn lane with 150 feet of storage and a 180-foot bay taper
        iii. Westbound left-turn lane with 150 feet of storage and a 180-foot bay taper

   b. Proposed site access (northbound approach) cross-section:
      i. Northbound left / through lane (12') and right lane (12')
      ii. Provide one (1) receiving lane (18') into the proposed site access within the boulevard section to allow for heavy trucks. Additionally, this recommended width will allow enough room to by-pass a stalled vehicle within the boulevard.
      iii. Median width of 10'
4. Place any site related landscaping and signage at the site access intersection in such a fashion as to maintain the existing intersection sight distances.

The following is a listing of concerns / recommendations that were identified at project study intersections that are primarily existing issues that can expect relatively minor impact from site traffic.

1. The intersection of Callahan Drive and I-75 Northbound ramps is expected to exhibit unacceptable levels-of-service during the PM peak hour for 2025 background and combined traffic conditions. The addition of a second northbound right-turn lane would address this issue.

2. The intersection of Callahan Drive and Central Avenue Pike is expected to exhibit marginal, but acceptable, level-of-service conditions during the PM peak hour for 2025 background and combined traffic conditions. Therefore, we are calling the City of Knoxville's attention to this issue that may require addressing in the near future.

INTRODUCTION & PURPOSE OF STUDY

This report provides a summary of a traffic impact and site access study that was performed for a proposed industrial development to be located along Callahan Drive in the City of Knoxville, Tennessee. The project site is located approximately one-half mile west of I-75 and south of Callahan Drive behind the existing UPS hub. FIGURE 1 is a location map showing the major roadways in the project site vicinity.

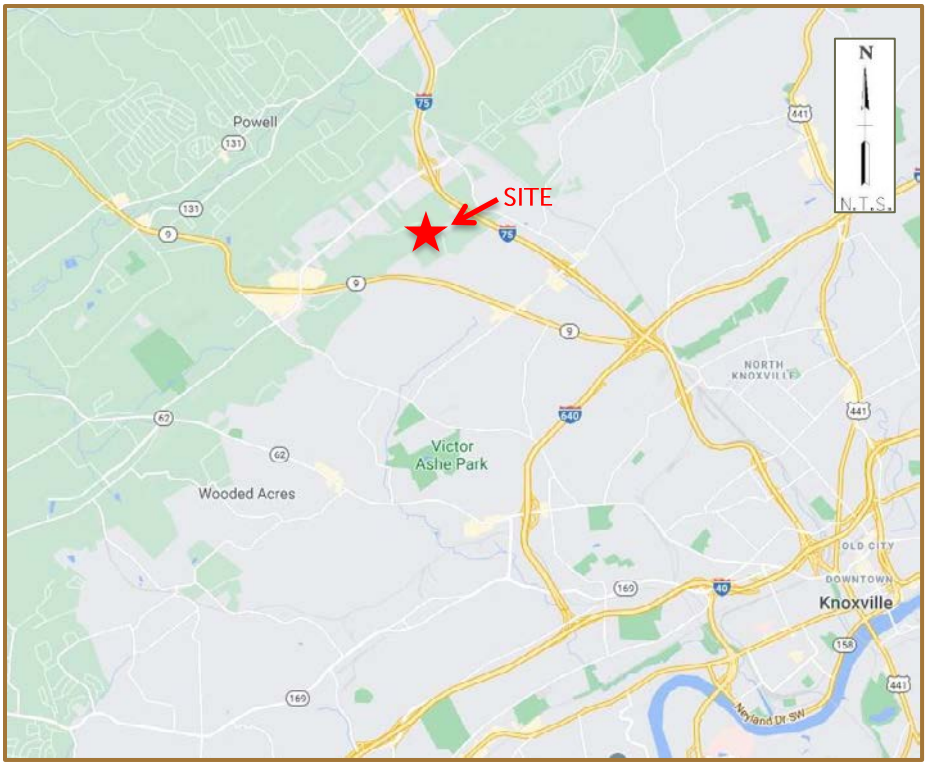

FIGURE 1
LOCATION MAP

The development plan for this project will consist of 575,000 square feet of warehousing and distribution development. The site proposes a single access point along Callahan Drive. FIGURE 2 is a Conceptual Site Plan detailing the proposed site. Lots 8, 9, & 10 are existing lots that are being brought into the overall development plan for this project. These specific lots will have access to Wilbanks Road and the newly proposed access point along Callahan Drive. Lots 1-7 & 11 will not have access to Wilbanks Road and only be able to access Callahan Drive through the newly proposed access road.

The purpose of this study was the evaluation of the traffic operational and safety impacts of the proposed development upon roadways in the vicinity of the project site. Discussion with City of Knoxville, Knox County, and Tennessee Department of Transportation officials resulted in six intersections being identified for detailed study. These are the Callahan Drive intersections with Old Callahan Drive, Yow Commercial Park Driveway, Viles Automotive Group Driveway, I-75 Southbound Ramps, I-75 Northbound Ramps, and Central Avenue Pike. Intersection evaluations such as capacity analyses and signal warrant analyses were conducted at the six study intersections for existing and future conditions, both with and without site generated traffic, in order to determine the anticipated impacts

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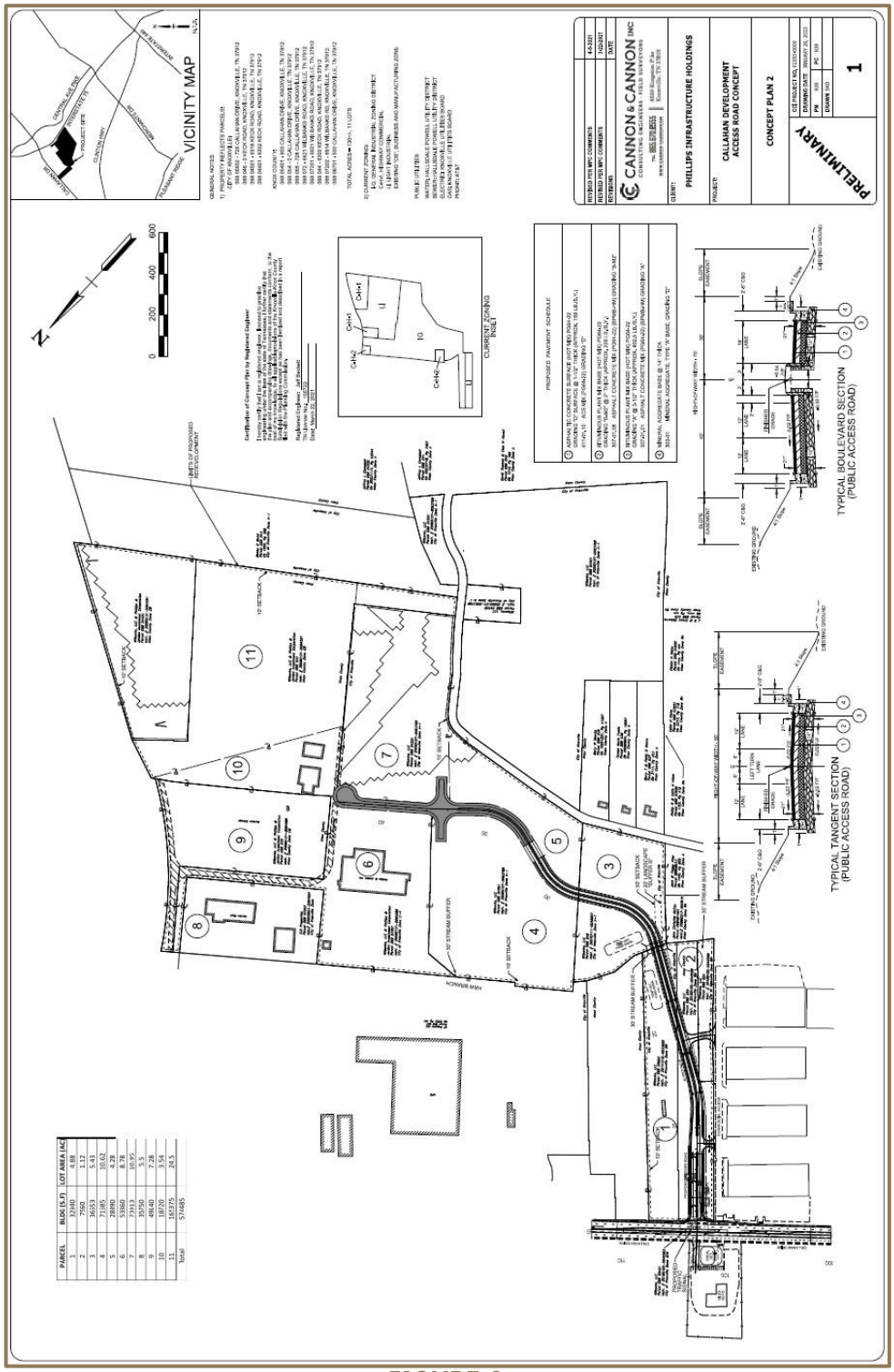


FIGURE 2
CONCEPTUAL SITE PLAN

EXISTING CONDITIONS

EXISTING ROADWAY CONDITIONS

Roadway conditions for the study roadways are summarized as follows:

- Callahan Drive is a multi-lane city maintained divided highway with two lanes in each direction. It is classified as a Minor Arterial by TDOT. Lane widths vary from 11 to 12 feet within the study area. Turn lanes are in place at major intersections and the posted speed limit is 45 mph.
- Old Callahan Drive is a two-lane local street that connects Callahan Drive to Clinton Highway and bypasses significant commercial development along Clinton Highway. Lane widths are 11-feet and the posted speed limit is 30 mph.
- Central Avenue Pike is a two-lane minor arterial that connects Callahan Drive to many residential areas along I-75. Lane widths vary from 11 to 12 feet and the posted speed limit is 40 mph.
- Wilbanks Road is a two-lane, unmarked local road. The roadway width varies from 24 to 26 feet and the posted speed limit is 25 mph.

Traffic control for the study intersections is as follows:

- Old Callahan Drive at Callahan Drive, I-75 Northbound & Southbound Ramps at Callahan Drive, and Central Avenue Pike at Callahan Drive are signalized intersections.
- Yow Commercial Right-In / Right-out Driveway at Callahan Drive and Viles Automotive / Yow Commercial Driveway at Callahan Drive are currently side-street STOP controlled.

EXISTING SITE CONDITIONS

The project site is located in the southwest quadrant of the interchange of I-75 and Callahan Drive behind the UPS hub. The site is somewhat rolling and slopes upward towards the southern end of the property boundary. FIGURE 3 provides an aerial view of the project site and the surrounding area.

FIGURE 3
EXISTING SITE CONDITIONS

EXISTING TRAFFIC DATA

Three types of existing traffic data were gathered for this study. The Tennessee Department of Transportation (TDOT) collects annual average daily traffic (AADT) data on roadways in the study area. Six count stations were found near the project site that were felt to have particular relevance for this study. The most currently available data from these stations are contained in Table 1.

TABLE 1: ANNUAL AVERAGE DAILY TRAFFIC COUNT SUMMARY

COUNT YEAR	TDOT COUNT STA. 47000393 CALLAHAN– WEST OF I-75	TDOT COUNT STA. 47000167R I-75 NB OFF-RAMP	TDOT COUNT STA. 47000170R I-75 NB ON-RAMP	TDOT COUNT STA. 47000169R I-75 SB OFF-RAMP	TDOT COUNT STA. 47000168R I-75 SB ON-RAMP	TDOT COUNT STA. 47000451 CALLAHAN – EAST OF I-75
2020	23,724	6,456	3,183	2,560	6,579	6,396
2019	28,448	9,994	3,474	3,253	9,277	7,560
2018	26,487	9,371	3,253	3,239	8,921	7,485
2017	26,644	10,339	3,774	3,243	8,318	6,614
2016	26,989	9,799	3,473	3,152	8,229	7,119
2015	26,071	11,759	3,863	3,291	8,355	6,627

In addition to the available AADT data, intersection turning movement traffic counts were conducted at the existing study intersections to determine the current peak hour operating volumes. The traffic counts were conducted during the first week of November 2020. During this time, regional traffic volumes and patterns were recovering from COVID-19 pandemic restrictions including business and school closures and widespread telecommuting or working from home practices. At the time of the counts, schools were conducting in-school instruction at a reduced student capacity. Due to concerns related to the validity of the intersection turning movement traffic counts, hourly volumes from the 2019 AADT data shown in TABLE 1 were obtained from TDOT in order to validate the results of the intersection turning movement counts conducted in November 2020.

After comparing the hourly volumes from the 2019 TDOT AADT's to the 2020 intersection turning movement counts, the 2020 volumes were found to be roughly 20% lower than the 2019 volumes in some movements. Adjustments were made to the 2020 raw traffic data to arrive at 2020 existing volumes to be utilized in this study.

An updated turning movement count was performed on March 8, 2022 at the intersection of Viles Automotive / Yow Commercial Driveways at Callahan Drive. The base traffic data is summarized on FIGURE 4, and the raw data traffic count summary sheets, TDOT 2019 hourly volume data, and the raw data traffic count summary sheets are contained in APPENDIX A.

EXISTING CAPACITY ANALYSES / LEVELS-OF-SERVICE

Capacity analyses employing the methods of the *Highway Capacity Manual* were conducted for the existing conditions at the study intersections. These analyses were performed with the 2020 existing traffic volumes and existing intersection traffic control and lane configurations. The EVALUATIONS section of this report may be referenced for tabular summaries of these analyses, while more detailed summaries are presented on the computer printouts contained in APPENDIX C. Also contained in APPENDIX C is a section entitled "Capacity and Level of Service Concepts", which provides a description of the utilized procedures.

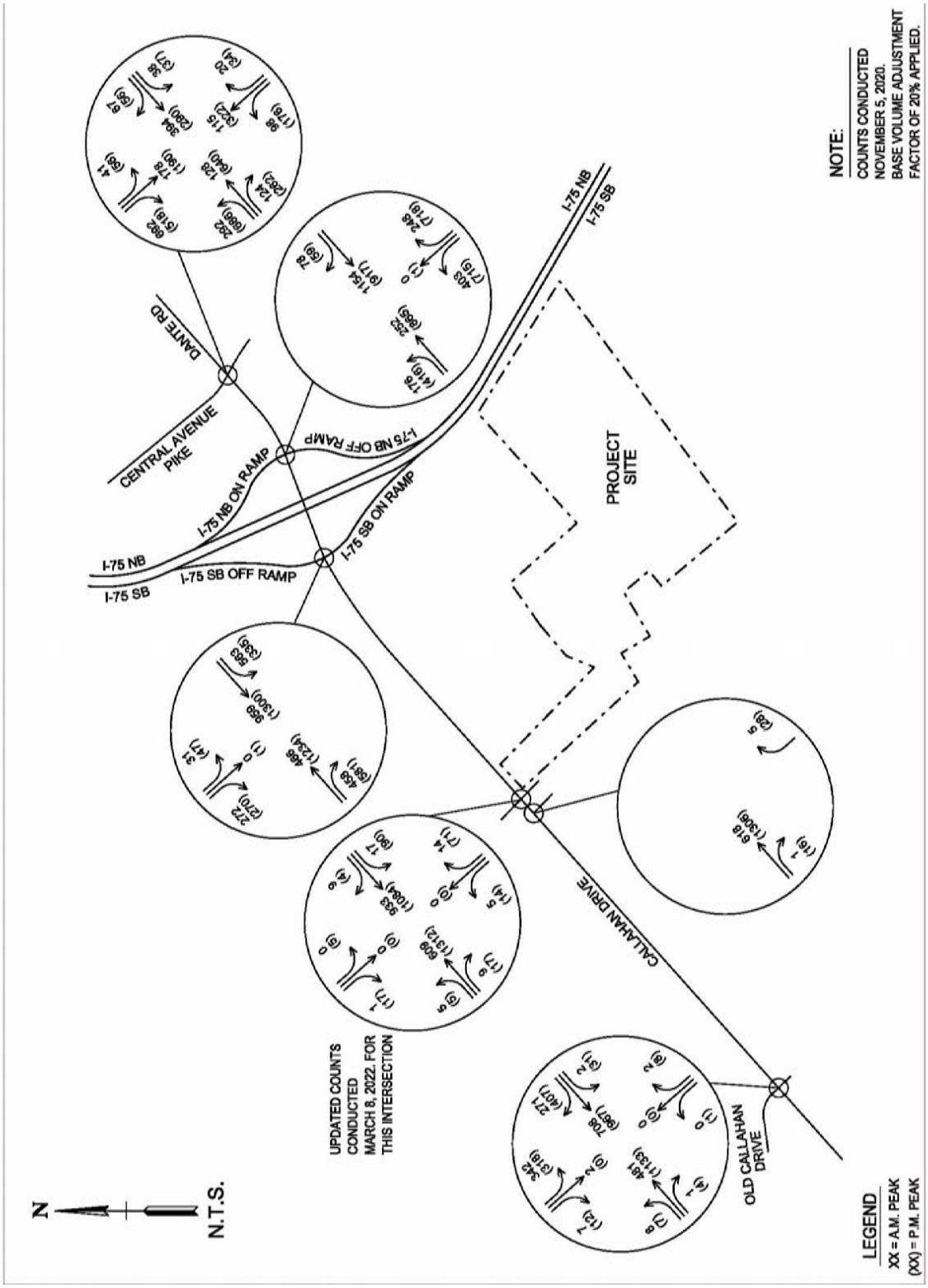


FIGURE 4
2020 EXISTING TRAFFIC VOLUMES

BACKGROUND CONDITIONS

BACKGROUND TRAFFIC GROWTH

The proposed development is anticipated to be constructed in one general phase with completion anticipated by 2025. Therefore, year 2025 was established as the appropriate design / analysis year for the study. In order to determine traffic volumes resulting solely from background traffic growth to year 2025, it was necessary to establish an annual growth rate for existing traffic. The TDOT ADT values previously discussed, as well as knowledge of the area, were used to determine an approximate annual growth rate. Based on the available data, a background annual growth rate of two percent was assumed. FIGURE 5 contains the background traffic volumes that would result from this annual growth rate from year 2020 to year 2025 for all intersections except for the intersection of Viles Automotive / Yow Commercial Driveways at Callahan Drive since it was re-counted in 2022. An annual growth rate from year 2022 to year 2025 was applied to this re-counted intersection.

BACKGROUND CAPACITY ANALYSES / LEVELS-OF-SERVICE

Capacity analyses as described in the Existing Conditions section of this report were conducted utilizing the Year 2025 background volumes shown in FIGURE 5 and existing intersection traffic control and lane configurations. The EVALUATIONS section of this report may be referenced for tabular summaries of these analyses, while more detailed summaries are presented on the computer printouts contained in the APPENDIX C.

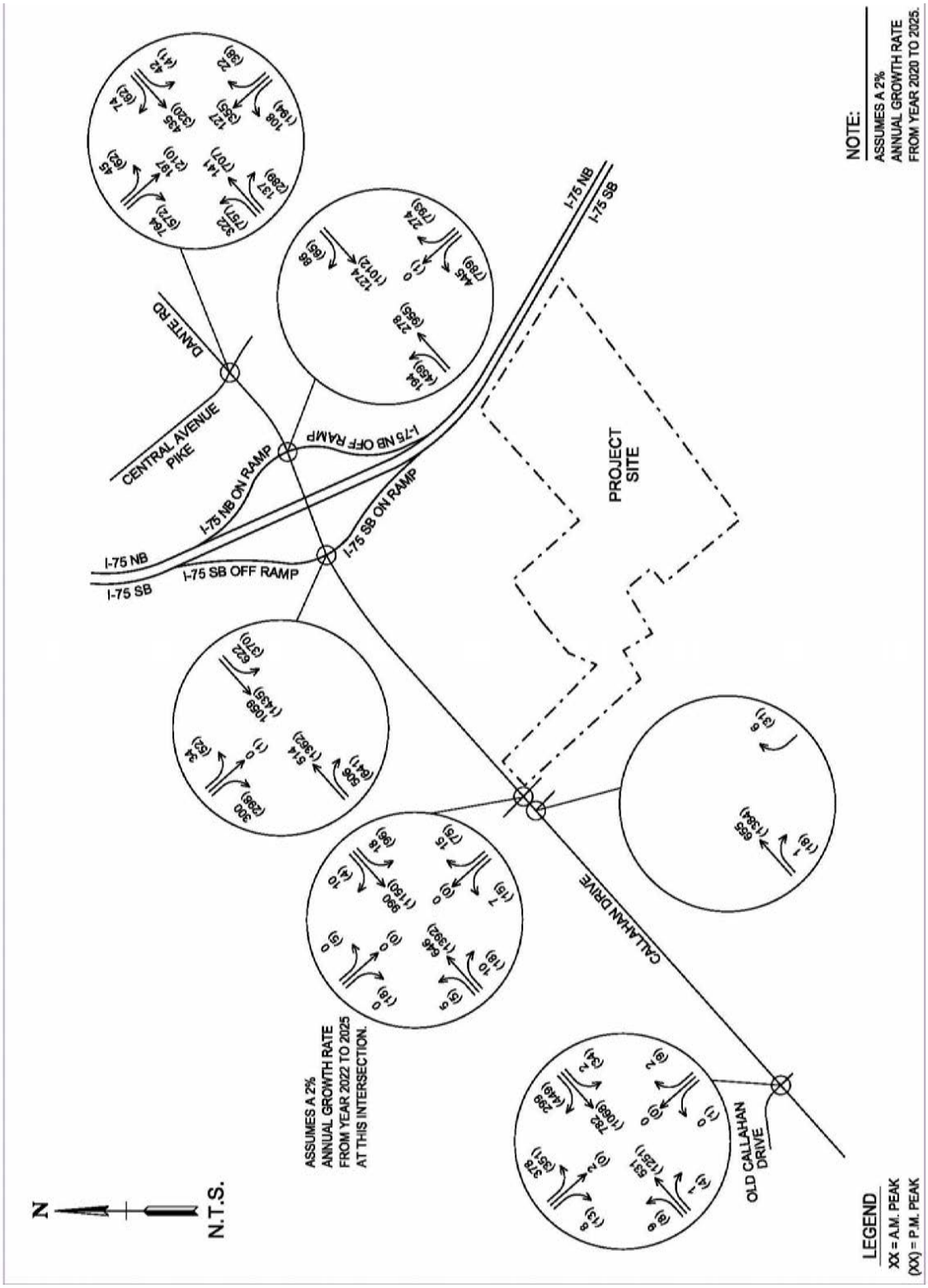


FIGURE 5
2025 BACKGROUND TRAFFIC VOLUMES

FUTURE CONDITIONS

TRIP GENERATION

In order to estimate the expected traffic volumes to be generated by the proposed development, the procedures recommended by the Institute of Transportation Engineers Trip Generation Manual (11th Edition) were utilized. The generated traffic volumes were determined based on the data for the peak hours of adjacent street traffic. See TABLE 2 for a summary of the traffic generated for this project. More detailed information is contained in APPENDIX B.

TABLE 2: TRIP GENERATION SUMMARY

LAND USE	ITE CODE	SIZE	WEEKDAY (TRIPS/DAY)	AM PEAK HOUR (TRIPS/HOUR)			PM PEAKHOUR (TRIPS/HOUR)		
				IN	OUT	TOTAL	IN	OUT	TOTAL
Industrial Park	130	575,000 SF	1,938	159	37	196	43	153	196

A.M. Peak Hour trip generation is based on Peak Hour of Adjacent Street Traffic, One Hour Between 7 & 9 a.m.
P.M. Peak Hour trip generation is based on Peak Hour of Adjacent Street Traffic, One Hour Between 4 & 6 p.m.

Below is a breakdown of each parcel's expected lot area and building size.

TABLE 3: PARCEL SUMMARY

PARCEL	BUILDING SIZE (SF)	LOT AREA (AC)
1	32,940	4.88
2	7,560	1.12
3	36,653	5.43
4	72,200	10.62
5	28,890	4.28
6 (Existing)	53,860	8.78
7	73,913	10.95
8 (Existing)	35,750	5.5
9	49,140	7.28
10 (Existing)	18,720	3.54
11	165,375	24.5
TOTAL	575,000	86.88

TRIP DISTRIBUTION AND ASSIGNMENT

The proposed trip distribution for this development was determined through a review of existing travel patterns, local knowledge of the study area, proposed site location in relation to surrounding roadway network, and engineering judgement. FIGURE 6 provides a summary of how the above site generated trips would be assigned to the study intersection. FIGURE 7 provides the proposed trip assignment volumes to the studied intersections.

FUTURE TRAFFIC VOLUMES

Future projected traffic volumes for the study intersection were developed by adding the generated and assigned trips shown in FIGURE 7 to the 2025 background traffic volumes developed in the previous section and shown in FIGURE 5. These combined 2025 volumes reflect the existing traffic, the background traffic growth, and the generated traffic from the proposed subdivision. These future volumes are shown on FIGURE 8 and are the combined volumes used in the analyses of future conditions with the proposed development.

FUTURE CAPACITY ANALYSES / LEVELS-OF-SERVICE

Capacity analyses, as described in the Existing Conditions section of this report, were conducted for all future conditions utilizing the traffic volumes shown in build-out scenarios above. These analyses employed appropriate modifications to the existing lane configurations and traffic control, as discussed in the EVALUATIONS section of this report. Tabular summaries of the analysis results and associated discussion are also contained in the EVALUATIONS section. In addition, detailed computer printout summaries of the analyses are contained in APPENDIX C.

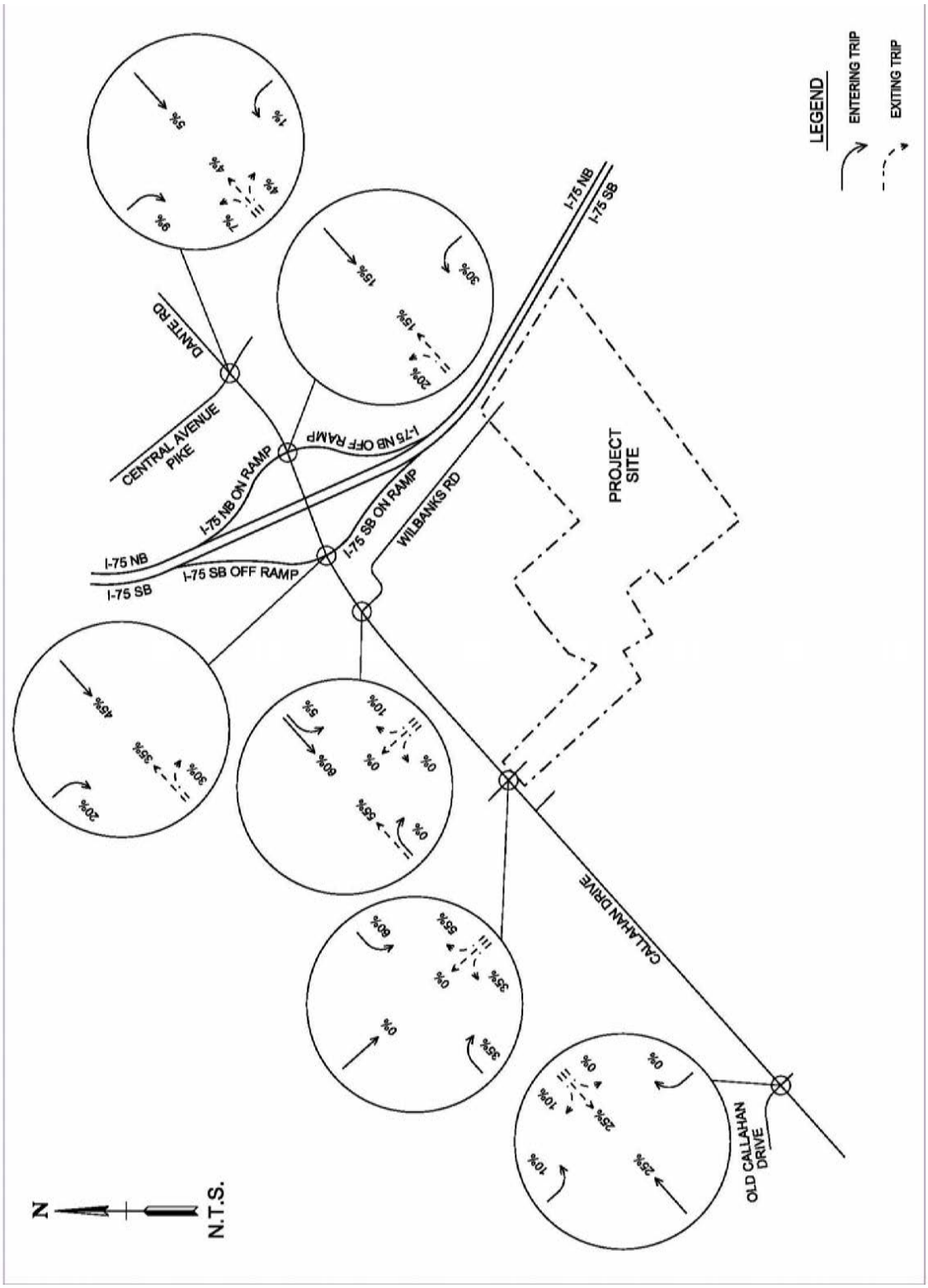


FIGURE 6
TRIP DISTRIBUTION

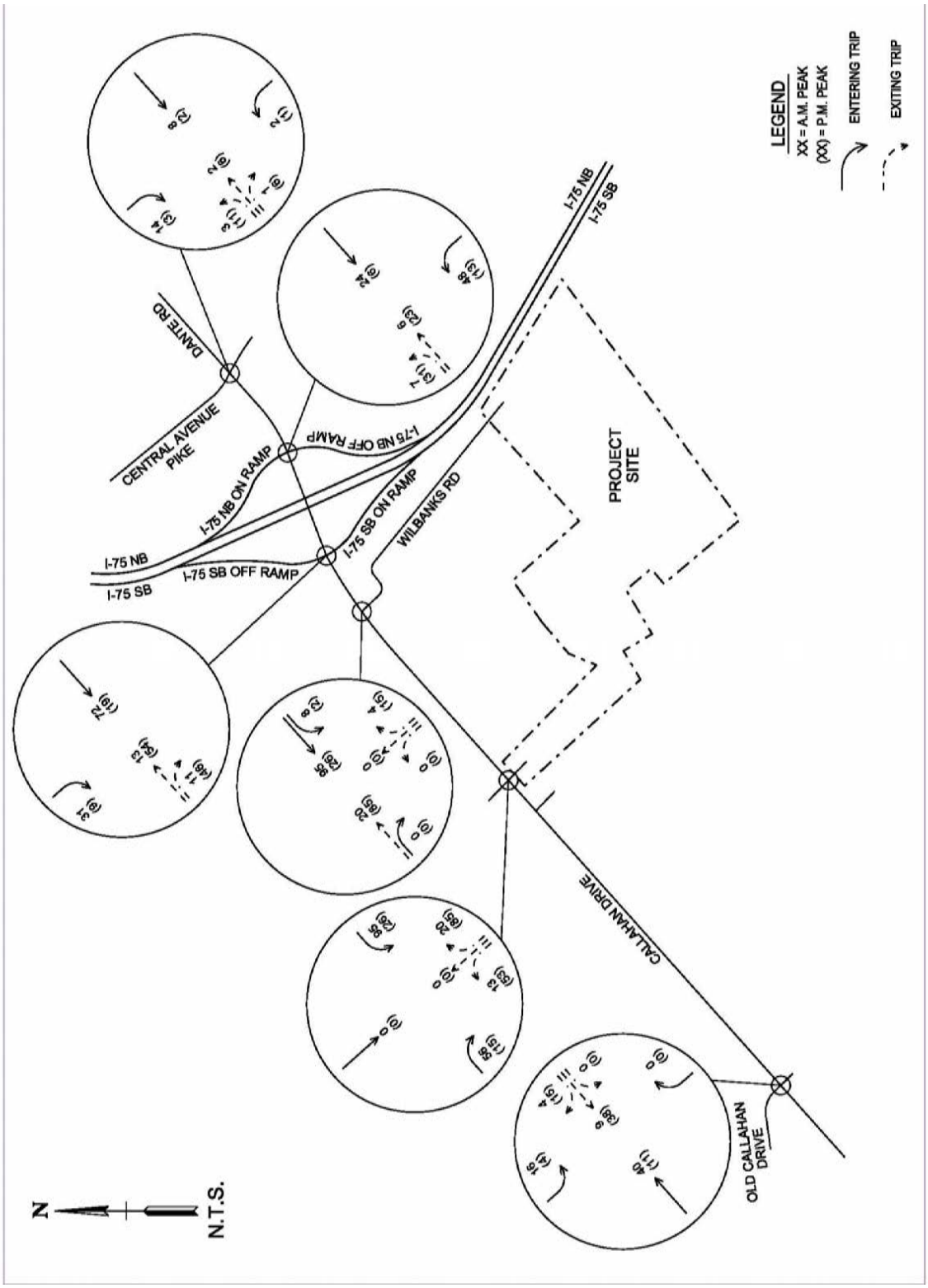


FIGURE 7
TRIP ASSIGNMENT

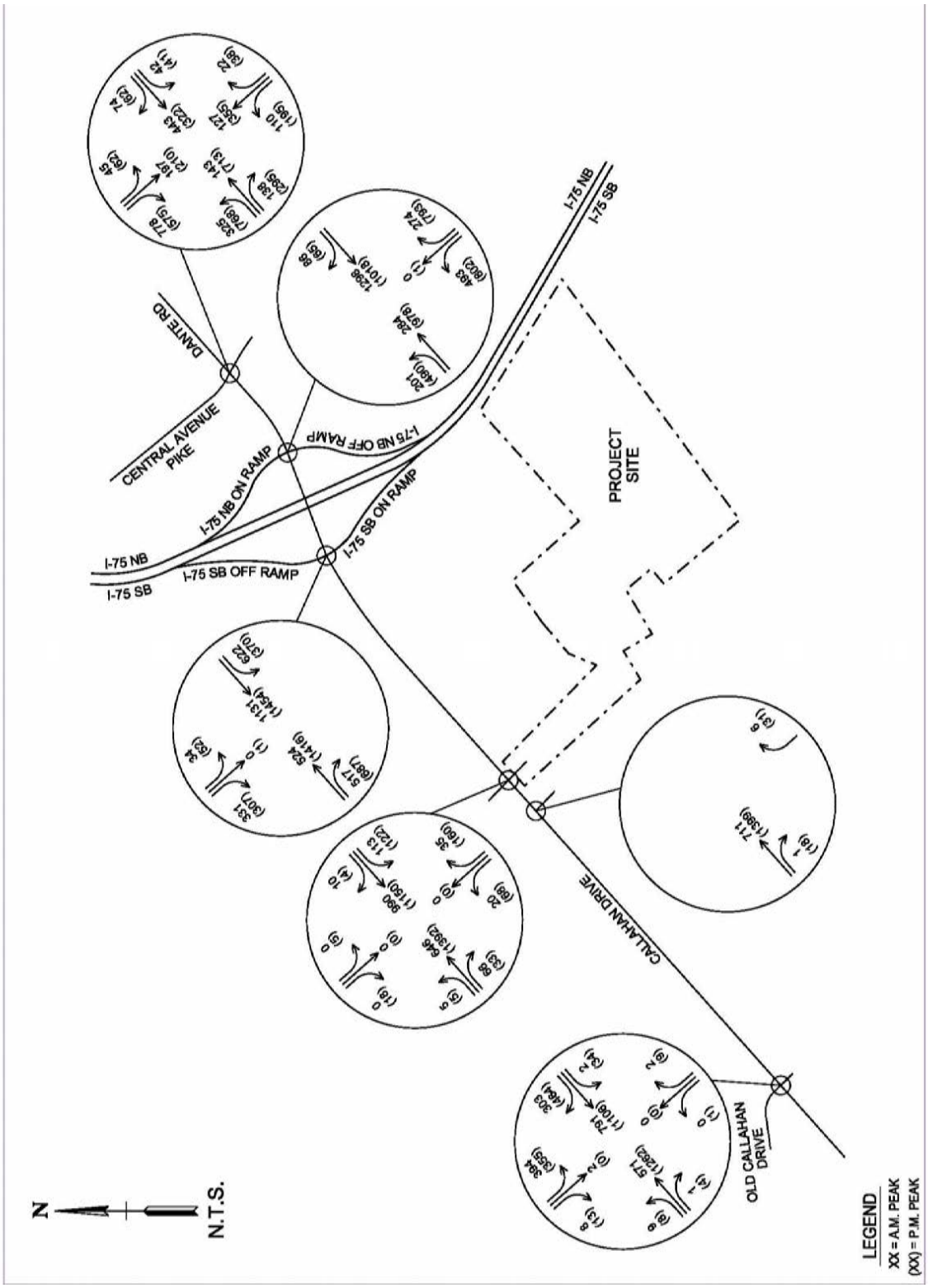


FIGURE 8
COMBINED TRAFFIC VOLUMES (2025)

EVALUATIONS

INTERSECTION CAPACITY ANALYSES

As discussed in the preceding sections of this report, capacity analyses employing the methods of the Highway Capacity Manual (HCM2010) were conducted for the study intersections, including the proposed project site access intersection. These analyses were performed for the previously discussed development scenarios. A summary of the capacity analyses results is shown in TABLE 3, while the resulting conclusions and recommendations are covered in the CONCLUSIONS and RECOMMENDATIONS section of this report.

TABLE 4: CAPACITY ANALYSES SUMMARY – EXISTING (2020), BACKGROUND (2025), & COMBINED (2025)

INTERSECTION	TIME PERIOD	YEAR 2020 EXISTING (LOS/DELAY)	YEAR 2025 BACKGROUND (LOS/DELAY)	YEAR 2025 COMBINED (LOS/DELAY)
Old Callahan Dr. at Callahan Dr. [2]TRAFFIC SIGNAL CONTROL	A.M. P.M.	B 19.3 C 20.2	C 21.1 C 23.6	C 21.6 C 24.3
Yow Commercial at Callahan Dr. [1]SIDE STREET STOP CONTROL	A.M. P.M.	B 10.5 C 15.6	B 10.7 C 16.9	B 11.0 C 16.7
Yow Commercial / Viles Auto at Callahan Drive (Existing Driveways) [1]SIDE STREET STOP CONTROL	NB A.M. NB P.M.	B 12.3 D 25.4	B 13.1 D 29.4	C 15.1 F 53.1
	SB A.M. SB P.M.	B 12.2 C 21.2	F N/A[3] C 23.4	F N/A[3] E 38.8
Site / Yow Commercial / Viles Auto at Callahan Drive (Proposed Site Access)[4] [2]TRAFFIC SIGNAL CONTROL	A.M. P.M.	-	-	A 5.5 B 10.9
I-75 Southbound Ramps at Callahan Drive [2]TRAFFIC SIGNAL CONTROL	A.M. P.M.	B 12.0 B 18.2	B 14.1 C 20.4	B 14.8 C 21.7
I-75 Northbound Ramps at Callahan Drive [2]TRAFFIC SIGNAL CONTROL	A.M. P.M.	C 21.9 D 53.8	C 25.7 E 77.4	C 27.5 F 81.7
I-75 Northbound Ramps at Callahan Drive w/ Dual NB RTL [2]TRAFFIC SIGNAL CONTROL	A.M. P.M.	-	-	C 27.4 D 35.8
Central Avenue Pike at Callahan Drive [2]TRAFFIC SIGNAL CONTROL	A.M. P.M.	B 18.7 D 37.6	C 22.2 D 52.6	C 22.5 D 53.0

[1]SIDE STREET STOP CONTROL – Data shown are Level-of-Service and Average Vehicular Delay (seconds) for the critical side street approach utilizing HCM methodology.
[2]TRAFFIC SIGNAL CONTROL – Data shown are Level-of-Service and Average Vehicular Delay (seconds) for the complete intersection utilizing HCM methodology.
[3]Delay exceeds HCS calculation thresholds and is indeterminable.
[4]Proposed site access location includes relocation of east drive to Yow Commercial and drive to Viles Auto.

CAPACITY RESULTS SUMMARY

As provided in TABLE 3 above, capacity analyses of anticipated future conditions indicate all but two of the study intersections exhibit operational conditions that are acceptable (LOS of "D" or better). These two problem locations are the intersections on Callahan Drive with Yow Commercial / Viles Auto Drives and the I-75 Northbound ramps. Alternatives were evaluated for each of these which addressed the associated concerns. Specifics are discussed in later sections.

TRAFFIC SIGNAL WARRANT EVALUATION

As mentioned previously, the site access intersection is proposed to be located to the east of the existing Callahan Drive with Yow Commercial / Viles Auto drives intersection, with the associated existing driveways relocated to the site access intersection. In order to address the poor levels-of-service associated with the existing conditions, the installation of a traffic signal is proposed. A signal warrant evaluation was conducted for this location, utilizing the official traffic signal warrants from the *Manual on Uniform Traffic Control Devices.* This evaluation indicated that Peak Hour and Four-Hour traffic signal warrants are expected to be satisfied at full build-out of the project site.

The 8-Hour traffic signal warrant is almost met, with seven (7) hours meeting the warrant under build-out conditions. The one hour that did not meet the signal warrant threshold is seven (7) vehicles away from meeting the warrant for that hour. Less than 10 vehicles in an hour is within normal daily intersection volume fluctuations and should be taken into consideration when analyzing the traffic signal warrants for this intersection. Since project combined conditions indicate such poor intersection operation without a traffic signal, it is recommended to install a traffic signal at the proposed site access. A spreadsheet summarizing this evaluation is contained in APPENDIX D.

TURN LANE EVALUATION

A turn lane evaluation was conducted for a potential eastbound right-turn lane to enter the project site at the proposed site access intersection. This evaluation, which utilized Knox County turn lane warrants, found that the right-turn lane is warranted. A spreadsheet summarizing this evaluation is contained in APPENDIX E.

Regarding a possible westbound left-turn lane at the project site intersection, such a lane is necessary for both intersection operations and safety. Additionally, since an eastbound left-turn lane of 150 feet is present at the existing Yow commercial access location, it is recommended to keep the same 150 feet of storage at the new proposed site access intersection for the eastbound left movement.

SIGHT DISTANCE REVIEW

Callahan Drive is a relatively straight and flat roadway in the study area, which was constructed to very high geometric standards. Accordingly, sight distance to and from the proposed site access intersection is excellent and well in excess of minimum standards.

RELOCATED MEDIAN OPENING REVIEW

Since an existing median opening along Callahan Drive is proposed to be relocated to the proposed site access location, the TDOT Driveway Manual was reviewed to ensure the new median opening spacing along Callahan Drive still met TDOT design guidelines. The TDOT Driveway Manual recommends a median opening spacing of 660 feet (with a range of 440 feet – 880 feet being acceptable) between median openings along a roadway in an urban area such as Callahan Drive. The existing median opening spacing is roughly 700 feet between the existing Yow Commercial and the adjacent opening to the east. The proposed relocated median opening is anticipated to reduce the median opening spacing to 600 feet. This spacing falls within the acceptable spacing range referenced above.

CONCLUSIONS & RECOMMENDATIONS

The primary conclusion of this study is that the traffic generated from the proposed development will not have significant impacts at four of the six study intersections. While two of the study intersections indicated unacceptable levels-of-service at full project build-out without improvements, logical improvements are available to address these concerns.

The following is a listing of recommendations that were developed to address concerns that resulted primarily from traffic generated from the project site, or are offered to accommodate development of the site.

1. Construct the site access intersection as indicated on the project site plan, which includes relocation of the access driveways to Yow Commercial / Viles Auto to utilize this new intersection.
2. Install a three-phase traffic signal at this new site access intersection, which would include a left-turn phase into the project site and advance detector loops on the Callahan Drive approaches. This intersection is about one-half mile from the existing traffic signal at the I-75 southbound ramps. The City of Knoxville / Knox County should determine if such spacing justifies signal coordination between these signals, considering the dilemma zone advantages of the advance loops would be lost during hours when coordination is active. One possibility would be to run coordination during peak traffic hours and allow the site signal to run free during other hours.
3. At the proposed new site access intersection,
    a. Construct the following turn lanes on Callahan Drive:
        i. Eastbound right-turn lane with 100 feet of storage and a 180-foot bay taper
        ii. Eastbound left-turn lane with 150 feet of storage and a 180-foot bay taper
        iii. Westbound left-turn lane with 150 feet of storage and a 180-foot bay taper
    b. Proposed site access (northbound approach) cross-section:
        i. Northbound left / through lane (12') and right lane (12')
        ii. Provide one (1) receiving lane (18') into the proposed site access within the boulevard section to allow for heavy trucks. Additionally, this recommended width will allow enough room to by-pass a stalled vehicle within the boulevard.
        iii. Median width of 10'
4. Place any site related landscaping and signage at the site access intersection in such a fashion as to maintain the existing intersection sight distances.

The following is a listing of concerns / recommendations that were identified at project study intersections that are primarily existing issues that can expect relatively minor impact from site traffic.

1. The intersection of Callahan Drive and I-75 Northbound ramps is expected to exhibit unacceptable levels-of-service during the PM peak hour for 2025 background and combined traffic conditions. The addition of a second northbound right-turn lane would address this issue.

2. The intersection of Callahan Drive and Central Avenue Pike is expected to exhibit marginal, but acceptable, level-of-service conditions during the PM peak hour for 2025 background and combined traffic conditions. Therefore, we are calling the City of Knoxville's attention to this issue that may require addressing in the near future.

APPENDIX

APPENDIX ORDER:

A. TRAFFIC DATA

B. TRIP GENERATION INFORMATION

C. CAPACITY ANALYSES

D. SIGNAL WARRANT SPREADSHEETS

E. TURN LANE WARRANT SHEETS

APPENDIX A – TRAFFIC DATA

Prepared by National Data & Surveying Services

Old Callahan Dr/Discount Tire shop Dwy & Callahan Dr

Peak Hour Turning Movement Count

ID: 20-190015-001
City: Knoxville

Day: Thursday
Date: 11/05/2020

	PEAK HOURS	COUNT PERIODS
AM	07:30 AM - 08:30 AM	07:00 AM - 09:00 AM
NOON	NONE	NONE
PM	04:45 PM - 05:45 PM	04:00 PM - 06:00 PM

SOUTHBOUND – Old Callahan Dr/Discount Tire shop Dwy

	Right	Thru	Left	U-Turn	Out
AM	6	2	285	0	233
NOON	0	0	0	0	0
PM	10	0	265	0	345
Lanes	1	0	1	0	

EASTBOUND – Callahan Dr

	Lanes	AM	NOON	PM
Out		596	0	818
U-Turn	0	0	0	1
Left	1	7	0	6
Thru	2	401	0	944
Right	0	1	0	3

WESTBOUND – Callahan Dr

	Lanes	PM	NOON	AM
Right	0	339	0	226
Thru	2	806	0	590
Left	1	3	0	4
U-Turn	0	26	0	2
Out		1242	0	690

NORTHBOUND – Old Callahan Dr/Discount Tire shop Dwy

	Out	U-Turn	Left	Thru	Right
Lanes		0	0	1	0
PM	6	0	1	0	7
NOON	0	0	0	0	0
AM	7	0	0	0	2

CONTROL

Signalized

	AM	NOON	PM
TEV	1526	0	2411
PHF	0.93		0.96

Cars (AM)

Approach	Left	Thru	Right
Southbound	270	2	5
Eastbound	7	377	1
Westbound	4	556	223
Northbound	0	0	1

HT (AM)

Approach	Left	Thru	Right
Southbound	15	0	1
Eastbound	0	24	0
Westbound	0	34	3
Northbound	0	0	1

Cars (NOON)

Approach	Left	Thru	Right
Southbound	N/A	N/A	N/A
Eastbound	N/A	N/A	N/A
Westbound	N/A	N/A	N/A
Northbound	N/A	N/A	N/A

HT (NOON)

Approach	Left	Thru	Right
Southbound	N/A	N/A	N/A
Eastbound	N/A	N/A	N/A
Westbound	N/A	N/A	N/A
Northbound	N/A	N/A	N/A

Cars (PM)

Approach	Left	Thru	Right
Southbound	261	0	10
Eastbound	6	921	3
Westbound	3	787	328
Northbound	1	0	7

HT (PM)

Approach	Left	Thru	Right
Southbound	4	0	0
Eastbound	0	23	0
Westbound	0	19	11
Northbound	0	0	0

Pedestrians (Crosswalks)

Crosswalk	Half	AM	NOON	PM
North	West	0	0	0
North	East	0	0	0
West	North	0	0	0
West	South	0	0	0
East	North	0	0	0
East	South	0	0	0
South	West	0	0	3
South	East	0	0	0
Diagonal NW		0	0	0
Diagonal NE		0	0	0
Diagonal SW		0	0	0
Diagonal SE		0	0	0

Project ID: 20-190015-001
Location: Old Callahan Dr/Discount Tire shop Dwy & Callahan Dr
City: Knoxville

Day: Thursday
Date: 11/05/2020

Groups Printed - Cars, PU, Vans - Heavy Trucks

	Old Callahan Dr/Discount Tire shop Dwy Northbound						Old Callahan Dr/Discount Tire shop Dwy Southbound						Callahan Dr Eastbound						Callahan Dr Westbound						
Start Time	Left	Thru	Rgt	Uturn	Peds	App. Total	Left	Thru	Rgt	Uturn	Peds	App. Total	Left	Thru	Rgt	Uturn	Peds	App. Total	Left	Thru	Rgt	Uturn	Peds	App. Total	Int. Total
7:00 AM	0	0	0	0	0	0	54	0	2	0	0	56	0	62	0	0	0	62	1	103	40	0	0	144	262
7:15 AM	0	0	0	0	0	0	58	0	0	0	0	58	0	66	0	0	0	66	0	130	42	0	0	172	296
7:30 AM	0	0	0	0	0	0	72	0	2	0	0	74	2	85	0	0	0	87	0	146	65	0	0	211	372
7:45 AM	0	0	0	0	0	0	70	1	1	0	0	72	2	100	0	0	0	102	1	159	71	2	0	233	407
Total	0	0	0	0	0	0	254	1	5	0	0	260	4	313	0	0	0	317	2	538	218	2	0	760	1337
8:00 AM	0	0	2	0	0	2	80	0	1	0	0	81	2	112	0	0	0	114	1	160	53	0	0	214	411
8:15 AM	0	0	0	0	0	0	63	1	2	0	0	66	1	104	1	0	0	106	2	125	37	0	0	164	336
8:30 AM	0	0	1	0	0	1	51	0	2	0	1	53	0	101	1	0	0	102	2	129	40	0	0	171	327
8:45 AM	0	0	2	0	1	2	46	0	4	0	0	50	1	110	1	0	0	112	1	132	33	1	0	167	331
Total	0	0	5	0	1	5	240	1	9	0	1	250	4	427	3	0	0	434	6	546	163	1	0	716	1405
BREAK																									
4:00 PM	0	0	1	0	0	1	55	0	5	0	0	60	2	203	1	0	0	206	1	186	69	4	0	260	527
4:15 PM	0	0	1	0	0	1	55	0	5	0	1	60	0	226	0	0	0	226	0	181	68	2	0	251	538
4:30 PM	0	0	0	0	0	0	64	0	3	0	0	67	2	233	0	0	0	235	0	188	64	7	0	259	561
4:45 PM	0	0	0	0	0	0	62	0	2	0	0	64	1	228	0	0	0	229	0	226	91	3	0	320	613
Total	0	0	2	0	0	2	236	0	15	0	1	251	5	890	1	0	0	896	1	781	292	16	0	1090	2239
5:00 PM	0	0	1	0	0	1	72	0	1	0	0	73	3	241	1	1	0	246	0	193	104	9	0	306	626
5:15 PM	1	0	3	0	0	4	64	0	4	0	0	68	0	227	2	0	0	229	2	198	77	6	0	283	584
5:30 PM	0	0	3	0	3	3	67	0	3	0	0	70	2	248	0	0	0	250	1	189	67	8	0	265	588
5:45 PM	0	0	1	0	0	1	43	0	1	0	0	44	2	233	0	0	0	235	0	186	71	6	0	263	543
Total	1	0	8	0	3	9	246	0	9	0	0	255	7	949	3	1	0	960	3	766	319	29	0	1117	2341
Grand Total	1	0	15	0	4	16	976	2	38	0	2	1016	20	2579	7	1	0	2607	12	2631	992	48	0	3683	7322
Apprch %	6.3	0.0	93.8	0.0	25.0		96.1	0.2	3.7	0.0	0.2		0.8	98.9	0.3	0.0	0.0		0.3	71.4	26.9	1.3	0.0		
Total %	0.0	0.0	0.2	0.0	0.1	0.2	13.3	0.0	0.5	0.0	0.0	13.9	0.3	35.2	0.1	0.0	0.0	35.6	0.2	35.9	13.5	0.7	0.0	50.3	
Cars, PU, Vans	1	0	14	0		15	945	2	37	0		984	20	2486	7	1		2514	12	2535	967	48		3562	7075
% Cars, PU, Vans	100.0	0.0	93.3	0.0		93.8	96.8	100.0	97.4	0.0		96.9	100.0	96.4	100.0	100.0		96.4	100.0	96.4	97.5	100.0		96.7	96.6
Heavy Trucks	0	0	1	0		1	31	0	1	0		32	0	93	0	0		93	0	96	25	0		121	247
%Heavy Trucks	0.0	0.0	6.7	0.0		6.3	3.2	0.0	2.6	0.0		3.1	0.0	3.6	0.0	0.0		3.6	0.0	3.6	2.5	0.0		3.3	3.4

Project ID: 20-190015-001
Location: Old Callahan Dr/Discount Tire shop Dwy & Callaha
City: Knoxville

PEAK HOURS

Day: Thursday
Date: 11/05/2020

AM

	d Callahan Dr/Discount Tire shop D Northbound					d Callahan Dr/Discount Tire shop Dv Southbound					Callahan Dr Eastbound					Callahan Dr Westbound					
Start Time	Left	Thru	Rgt	Uturn	App. Total	Left	Thru	Rgt	Uturn	App. Total	Left	Thru	Rgt	Uturn	App. Total	Left	Thru	Rgt	Uturn	App. Total	Int. Total
Peak Hour Analysis from 07:00 AM to 09:00 AM																					
Peak Hour for Entire Intersection Begins at 07:30 AM																					
7:30 AM	0	0	0	0	0	72	0	2	0	74	2	85	0	0	87	0	146	65	0	211	372
7:45 AM	0	0	0	0	0	70	1	1	0	72	2	100	0	0	102	1	159	71	2	233	407
8:00 AM	0	0	2	0	2	80	0	1	0	81	2	112	0	0	114	1	160	53	0	214	411
8:15 AM	0	0	0	0	0	63	1	2	0	66	1	104	1	0	106	2	125	37	0	164	336
Total Volume	0	0	2	0	2	285	2	6	0	293	7	401	1	0	409	4	590	226	2	822	1526
% App. Total	0.0	0.0	100.0	0.0	100	97.3	0.7	2.0	0.0	100	1.7	98.0	0.2	0.0	100	0.5	71.8	27.5	0.2	100	
PHF					0.250					0.904					0.897					0.882	0.928
Cars, PU, Vans	0	0	1	0	1	270	2	5	0	277	7	377	1	0	385	4	556	223	2	785	1448
% Cars, PU, Vans	0.0	0.0	50.0	0.0	50.0	94.7	100.0	83.3	0.0	94.5	100.0	94.0	100.0	0.0	94.1	100.0	94.2	98.7	100.0	95.5	94.9
Heavy Trucks	0	0	1	0	1	15	0	1	0	16	0	24	0	0	24	0	34	3	0	37	78
%Heavy Trucks	0.0	0.0	50.0	0.0	50.0	5.3	0.0	16.7	0.0	5.5	0.0	6.0	0.0	0.0	5.9	0.0	5.8	1.3	0.0	4.5	5.1

PM

	d Callahan Dr/Discount Tire shop D Northbound					d Callahan Dr/Discount Tire shop Dv Southbound					Callahan Dr Eastbound					Callahan Dr Westbound					
Start Time	Left	Thru	Rgt	Uturn	App. Total	Left	Thru	Rgt	Uturn	App. Total	Left	Thru	Rgt	Uturn	App. Total	Left	Thru	Rgt	Uturn	App. Total	Int. Total
Peak Hour Analysis from 04:00 PM to 06:00 PM																					
Peak Hour for Entire Intersection Begins at 04:45 PM																					
4:45 PM	0	0	0	0	0	62	0	2	0	64	1	228	0	0	229	0	226	91	3	320	613
5:00 PM	0	0	1	0	1	72	0	1	0	73	3	241	1	1	246	0	193	104	9	306	626
5:15 PM	1	0	3	0	4	64	0	4	0	68	0	227	2	0	229	2	198	77	6	283	584
5:30 PM	0	0	3	0	3	67	0	3	0	70	2	248	0	0	250	1	189	67	8	265	588
Total Volume	1	0	7	0	8	265	0	10	0	275	6	944	3	1	954	3	806	339	26	1174	2411
% App. Total	12.5	0.0	87.5	0.0	100	96.4	0.0	3.6	0.0	100	0.6	99.0	0.3	0.1	100	0.3	68.7	28.9	2.2	100	
PHF					0.500					0.942					0.954					0.917	0.963
Cars, PU, Vans	1	0	7	0	8	261	0	10	0	271	6	921	3	1	931	3	787	328	26	1144	2354
% Cars, PU, Vans	100.0	0.0	100.0	0.0	100.0	98.5	0.0	100.0	0.0	98.5	100.0	97.6	100.0	100.0	97.6	100.0	97.6	96.8	100.0	97.4	97.6
Heavy Trucks	0	0	0	0	0	4	0	0	0	4	0	23	0	0	23	0	19	11	0	30	57
%Heavy Trucks	0.0	0.0	0.0	0.0	0.0	1.5	0.0	0.0	0.0	1.5	0.0	2.4	0.0	0.0	2.4	0.0	2.4	3.2	0.0	2.6	2.4

Prepared by National Data & Surveying Services

Yow Commercial Park Dwy & Callahan Dr

Peak Hour Turning Movement Count

ID: 20-190015-002
City: Knoxville

Day: Thursday
Date: 11/05/2020

	PEAK HOURS	COUNT PERIODS
AM	07:30 AM - 08:30 AM	07:00 AM - 09:00 AM
NOON	12:00 PM - 01:00 PM	11:00 AM - 01:00 PM
PM	04:45 PM - 05:45 PM	02:00 PM - 06:00 PM

Yow Commercial Park Dwy — SOUTHBOUND

	Right	Through	Left	U-Turn	Departing
AM	0	0	0	0	0
NOON	0	0	0	0	0
PM	0	0	0	0	0
(red)	0	0	0	0	

Callahan Dr — EASTBOUND

	AM	NOON	PM	(red)
Departing	0	0	0	
U-Turn	0	0	0	0
Left	0	0	0	0
Through	695	889	1266	3
Right	1	7	13	0

Callahan Dr — WESTBOUND

	(red)	PM	NOON	AM
Right	0	0	0	0
Through	0	0	0	0
Left	0	0	0	0
U-Turn	0	0	0	0
Departing		1289	900	699

Yow Commercial Park Dwy — NORTHBOUND

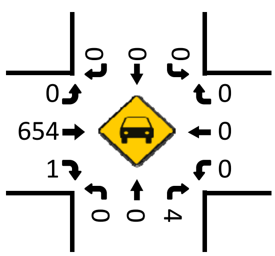
	Departing	U-Turn	Left	Through	Right
(red)		0	0	1	0
PM	13	0	0	0	23
NOON	7	0	0	0	11
AM	1	0	0	0	4

CONTROL

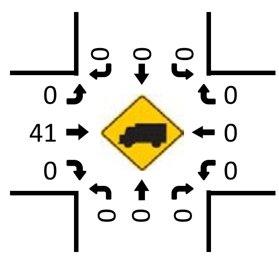
No Control

	AM	NOON	PM
TEV	700	907	1302
PHF	0.91	0.95	0.97

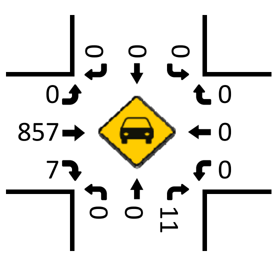
Cars (AM)



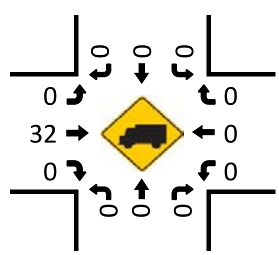
HT (AM)



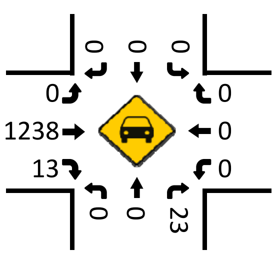
Cars (NOON)



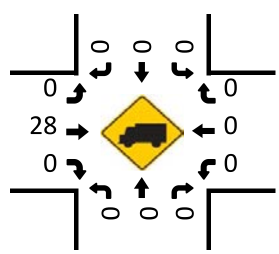
HT (NOON)



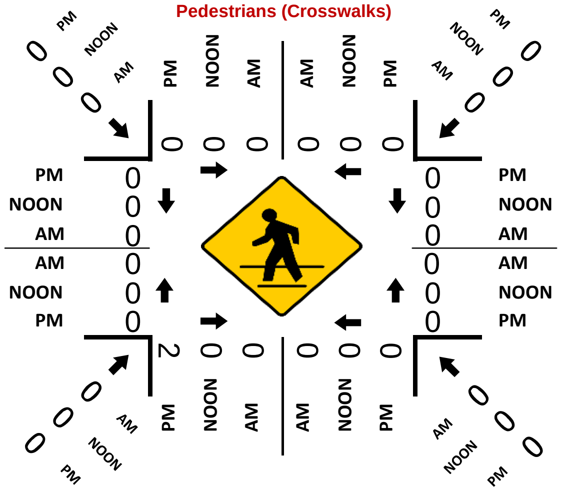
Cars (PM)



HT (PM)



Pedestrians (Crosswalks)



Project ID: 20-190015-002
Location: Yow Commercial Park Dwy & Callahan Dr
City: Knoxville

Day: Thursday
Date: 11/05/2020

Groups Printed - Cars, PU, Vans - Heavy Trucks

	Yow Commercial Park Dwy Northbound						Yow Commercial Park Dwy Southbound						Callahan Dr Eastbound						Callahan Dr Westbound						
Start Time	Left	Thru	Rgt	Uturn	Peds	App. Total	Left	Thru	Rgt	Uturn	Peds	App. Total	Left	Thru	Rgt	Uturn	Peds	App. Total	Left	Thru	Rgt	Uturn	Peds	App. Total	Int. Total
7:00 AM	0	0	3	0	0	3	0	0	0	0	0	0	0	110	0	0	0	110	0	0	0	0	0	0	113
7:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	128	0	0	0	128	0	0	0	0	0	0	128
7:30 AM	0	0	3	0	0	3	0	0	0	0	0	0	0	155	0	0	0	155	0	0	0	0	0	0	158
7:45 AM	0	0	1	0	0	1	0	0	0	0	0	0	0	168	0	0	0	168	0	0	0	0	0	0	169
Total	0	0	7	0	0	7	0	0	0	0	0	0	0	561	0	0	0	561	0	0	0	0	0	0	568
8:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	192	0	0	0	192	0	0	0	0	0	0	192
8:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	180	1	0	0	181	0	0	0	0	0	0	181
8:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	146	0	0	0	146	0	0	0	0	0	0	146
8:45 AM	0	0	1	0	0	1	0	0	0	0	0	0	0	151	0	0	0	151	0	0	0	0	0	0	152
Total	0	0	1	0	0	1	0	0	0	0	0	0	0	669	1	0	0	670	0	0	0	0	0	0	671
BREAK																									
11:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	180	0	0	0	180	0	0	0	0	0	0	180
11:15 AM	0	0	1	0	0	1	0	0	0	0	0	0	0	162	0	0	0	162	0	0	0	0	0	0	163
11:30 AM	0	0	2	0	0	2	0	0	0	0	0	0	0	191	0	0	0	191	0	0	0	0	0	0	193
11:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	199	1	0	0	200	0	0	0	0	0	0	200
Total	0	0	3	0	0	3	0	0	0	0	0	0	0	732	1	0	0	733	0	0	0	0	0	0	736
12:00 PM	0	0	3	0	0	3	0	0	0	0	0	0	0	211	1	0	0	212	0	0	0	0	0	0	215
12:15 PM	0	0	2	0	0	2	0	0	0	0	0	0	0	232	3	0	0	235	0	0	0	0	0	0	237
12:30 PM	0	0	4	0	0	4	0	0	0	0	0	0	0	233	1	0	0	234	0	0	0	0	0	0	238
12:45 PM	0	0	2	0	0	2	0	0	0	0	0	0	0	213	2	0	0	215	0	0	0	0	0	0	217
Total	0	0	11	0	0	11	0	0	0	0	0	0	0	889	7	0	0	896	0	0	0	0	0	0	907
BREAK																									
2:00 PM	0	0	2	0	2	2	0	0	0	0	0	0	0	218	1	0	0	219	0	0	0	0	0	0	221
2:15 PM	0	0	1	0	0	1	0	0	0	0	0	0	0	237	0	0	0	237	0	0	0	0	0	0	238
2:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	232	0	0	0	232	0	0	0	0	0	0	232
2:45 PM	0	0	1	0	0	1	0	0	0	0	0	0	0	224	0	0	0	224	0	0	0	0	0	0	225
Total	0	0	4	0	2	4	0	0	0	0	0	0	0	911	1	0	0	912	0	0	0	0	0	0	916
3:00 PM	0	0	1	0	0	1	0	0	0	0	0	0	0	232	5	0	0	237	0	0	0	0	0	0	238
3:15 PM	0	0	1	0	0	1	0	0	0	0	0	0	0	245	2	0	0	247	0	0	0	0	0	0	248
3:30 PM	0	0	1	0	0	1	0	0	0	0	0	0	0	259	1	0	0	260	0	0	0	0	0	0	261
3:45 PM	0	0	2	0	1	2	0	0	0	0	0	0	0	260	4	0	0	264	0	0	0	0	0	0	266
Total	0	0	5	0	1	5	0	0	0	0	0	0	0	996	12	0	0	1008	0	0	0	0	0	0	1013
4:00 PM	0	0	1	0	0	1	0	0	0	0	0	0	0	271	3	0	0	274	0	0	0	0	0	0	275
4:15 PM	0	0	5	0	0	5	0	0	0	0	0	0	0	295	4	0	0	299	0	0	0	0	0	0	304
4:30 PM	0	0	9	0	0	9	0	0	0	0	0	0	0	296	6	0	0	302	0	0	0	0	0	0	311
4:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	308	1	0	0	309	0	0	0	0	0	0	309
Total	0	0	15	0	0	15	0	0	0	0	0	0	0	1170	14	0	0	1184	0	0	0	0	0	0	1199
5:00 PM	0	0	11	0	0	11	0	0	0	0	0	0	0	321	3	0	0	324	0	0	0	0	0	0	335
5:15 PM	0	0	8	0	0	8	0	0	0	0	0	0	0	313	6	0	0	319	0	0	0	0	0	0	327
5:30 PM	0	0	4	0	2	4	0	0	0	0	0	0	0	324	3	0	0	327	0	0	0	0	0	0	331
5:45 PM	0	0	3	0	1	3	0	0	0	0	0	0	0	280	2	0	0	282	0	0	0	0	0	0	285
Total	0	0	26	0	3	26	0	0	0	0	0	0	0	1238	14	0	0	1252	0	0	0	0	0	0	1278
Grand Total	0	0	72	0	6	72	0	0	0	0	0	0	0	7166	50	0	0	7216	0	0	0	0	0	0	7288
Apprch %	0.0	0.0	100.0	0.0	8.3		0.0	0.0	0.0	0.0	0.0		0.0	99.3	0.7	0.0	0.0		0.0	0.0	0.0	0.0	0.0		
Total %	0.0	0.0	1.0	0.0	0.1	1.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	98.3	0.7	0.0	0.0	99.0	0.0	0.0	0.0	0.0	0.0	0.0	
Cars, PU, Vans	0	0	72	0		72	0	0	0	0		0	0	6912	50	0		6962	0	0	0	0		0	7034
% Cars, PU, Vans	0.0	0.0	100.0	0.0		100.0	0.0	0.0	0.0	0.0		0.0	0.0	96.5	100.0	0.0		96.5	0.0	0.0	0.0	0.0		0.0	96.5
Heavy Trucks	0	0	0	0		0	0	0	0	0		0	0	254	0	0		254	0	0	0	0		0	254
%Heavy Trucks	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	3.5	0.0	0.0		3.5	0.0	0.0	0.0	0.0		0.0	3.5

Project ID: 20-190015-002
Location: Yow Commercial Park Dwy & Callahan Dr
City: Knoxville

PEAK HOURS

Day: Thursday
Date: 11/05/2020

AM

	Yow Commercial Park Dwy Northbound					Yow Commercial Park Dwy Southbound					Callahan Dr Eastbound					Callahan Dr Westbound					
Start Time	Left	Thru	Rgt	Uturn	App. Total	Left	Thru	Rgt	Uturn	App. Total	Left	Thru	Rgt	Uturn	App. Total	Left	Thru	Rgt	Uturn	App. Total	Int. Total
Peak Hour Analysis from 07:00 AM to 09:00 AM																					
Peak Hour for Entire Intersection Begins at 07:30 AM																					
7:30 AM	0	0	3	0	3	0	0	0	0	0	0	155	0	0	155	0	0	0	0	0	158
7:45 AM	0	0	1	0	1	0	0	0	0	0	0	168	0	0	168	0	0	0	0	0	169
8:00 AM	0	0	0	0	0	0	0	0	0	0	0	192	0	0	192	0	0	0	0	0	192
8:15 AM	0	0	0	0	0	0	0	0	0	0	0	180	1	0	181	0	0	0	0	0	181
Total Volume	0	0	4	0	4	0	0	0	0	0	0	695	1	0	696	0	0	0	0	0	700
% App. Total	0.0	0.0	100.0	0.0	100	0.0	0.0	0.0	0.0	0	0.0	99.9	0.1	0.0	100	0.0	0.0	0.0	0.0	0	
PHF					0.333										0.906						0.911
Cars, PU, Vans	0	0	4	0	4	0	0	0	0	0	0	654	1	0	655	0	0	0	0	0	659
% Cars, PU, Vans	0.0	0.0	100.0	0.0	100.0	0.0	0.0	0.0	0.0	0.0	0.0	94.1	100.0	0.0	94.1	0.0	0.0	0.0	0.0	0.0	94.1
Heavy Trucks	0	0	0	0	0	0	0	0	0	0	0	41	0	0	41	0	0	0	0	0	41
%Heavy Trucks	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	5.9	0.0	0.0	5.9	0.0	0.0	0.0	0.0	0.0	5.9

NOON

	Yow Commercial Park Dwy Northbound					Yow Commercial Park Dwy Southbound					Callahan Dr Eastbound					Callahan Dr Westbound					
Start Time	Left	Thru	Rgt	Uturn	App. Total	Left	Thru	Rgt	Uturn	App. Total	Left	Thru	Rgt	Uturn	App. Total	Left	Thru	Rgt	Uturn	App. Total	Int. Total
Peak Hour Analysis from 11:00 AM to 01:00 PM																					
Peak Hour for Entire Intersection Begins at 12:00 PM																					
12:00 PM	0	0	3	0	3	0	0	0	0	0	0	211	1	0	212	0	0	0	0	0	215
12:15 PM	0	0	2	0	2	0	0	0	0	0	0	232	3	0	235	0	0	0	0	0	237
12:30 PM	0	0	4	0	4	0	0	0	0	0	0	233	1	0	234	0	0	0	0	0	238
12:45 PM	0	0	2	0	2	0	0	0	0	0	0	213	2	0	215	0	0	0	0	0	217
Total Volume	0	0	11	0	11	0	0	0	0	0	0	889	7	0	896	0	0	0	0	0	907
% App. Total	0.0	0.0	100.0	0.0	100	0.0	0.0	0.0	0.0	0	0.0	99.2	0.8	0.0	100	0.0	0.0	0.0	0.0	0	
PHF					0.688										0.953						0.953
Cars, PU, Vans	0	0	11	0	11	0	0	0	0	0	0	857	7	0	864	0	0	0	0	0	875
% Cars, PU, Vans	0.0	0.0	100.0	0.0	100.0	0.0	0.0	0.0	0.0	0.0	0.0	96.4	100.0	0.0	96.4	0.0	0.0	0.0	0.0	0.0	96.5
Heavy Trucks	0	0	0	0	0	0	0	0	0	0	0	32	0	0	32	0	0	0	0	0	32
%Heavy Trucks	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.6	0.0	0.0	3.6	0.0	0.0	0.0	0.0	0.0	3.5

PM

	Yow Commercial Park Dwy Northbound					Yow Commercial Park Dwy Southbound					Callahan Dr Eastbound					Callahan Dr Westbound					
Start Time	Left	Thru	Rgt	Uturn	App. Total	Left	Thru	Rgt	Uturn	App. Total	Left	Thru	Rgt	Uturn	App. Total	Left	Thru	Rgt	Uturn	App. Total	Int. Total
Peak Hour Analysis from 02:00 PM to 06:00 PM																					
Peak Hour for Entire Intersection Begins at 04:45 PM																					
4:45 PM	0	0	0	0	0	0	0	0	0	0	0	308	1	0	309	0	0	0	0	0	309
5:00 PM	0	0	11	0	11	0	0	0	0	0	0	321	3	0	324	0	0	0	0	0	335
5:15 PM	0	0	8	0	8	0	0	0	0	0	0	313	6	0	319	0	0	0	0	0	327
5:30 PM	0	0	4	0	4	0	0	0	0	0	0	324	3	0	327	0	0	0	0	0	331
Total Volume	0	0	23	0	23	0	0	0	0	0	0	1266	13	0	1279	0	0	0	0	0	1302
% App. Total	0.0	0.0	100.0	0.0	100	0.0	0.0	0.0	0.0	0	0.0	99.0	1.0	0.0	100	0.0	0.0	0.0	0.0	0	
PHF					0.523										0.978						0.972
Cars, PU, Vans	0	0	23	0	23	0	0	0	0	0	0	1238	13	0	1251	0	0	0	0	0	1274
% Cars, PU, Vans	0.0	0.0	100.0	0.0	100.0	0.0	0.0	0.0	0.0	0.0	0.0	97.8	100.0	0.0	97.8	0.0	0.0	0.0	0.0	0.0	97.8
Heavy Trucks	0	0	0	0	0	0	0	0	0	0	0	28	0	0	28	0	0	0	0	0	28
%Heavy Trucks	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.2	0.0	0.0	2.2	0.0	0.0	0.0	0.0	0.0	2.2

Prepared by National Data & Surveying Services

Callahan Dr & Viles Automotive Group Dwy/Callahan Crossing Dwy

Peak Hour Turning Movement Count

ID: 22-190009-001
City: Knoxville

Day: Tuesday
Date: 3/8/2022

PEAK HOURS	
AM	07:15 AM - 08:15 AM
NOON	12:00 PM - 01:00 PM
PM	04:45 PM - 05:45 PM

COUNT PERIODS	
AM	7:00 AM - 09:00 AM
NOON	11:00 AM - 01:00 PM
PM	2:00 PM - 06:00 PM

Callahan Dr

SOUTHBOUND

AM	9	933	17	0	623	AM
NOON	5	822	18	1	888	NOON
PM	4	1084	90	4	1392	PM
	0	2	1	0		

EASTBOUND (Viles Automotive Group Dwy/Callahan Crossing Dwy)

AM	NOON	PM	
14	15	9	
0	0	0	0
0	8	5	0
0	0	0	1
1	12	17	0
AM	NOON	PM	

WESTBOUND (Viles Automotive Group Dwy/Callahan Crossing Dwy)

PM	NOON	AM	
71	22	14	0
0	0	0	1
14	14	5	0
0	0	0	0
107	32	26	
PM	NOON	AM	

CONTROL

2-Way Stop(EB/WB)

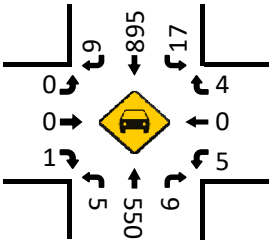
TEV	1607	1791	2643
	AM	NOON	PM
PHF	0.88	0.95	0.87

PM	1135	20	5	1312	17	PM
NOON	856	8	10	857	14	NOON
AM	944	5	5	609	9	AM
		0	1	2	0	

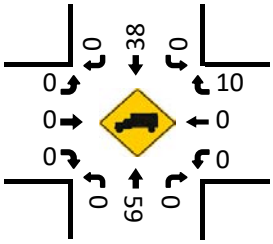
NORTHBOUND

Callahan Dr

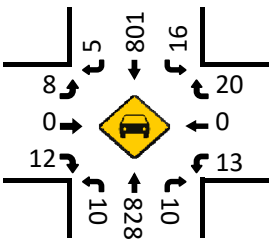
Cars (AM)



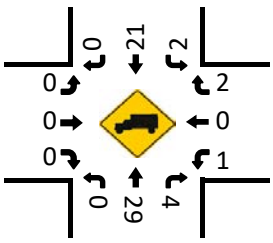
HT (AM)



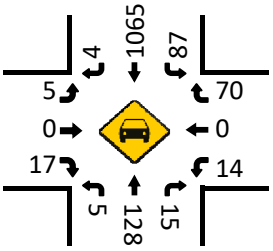
Cars (NOON)



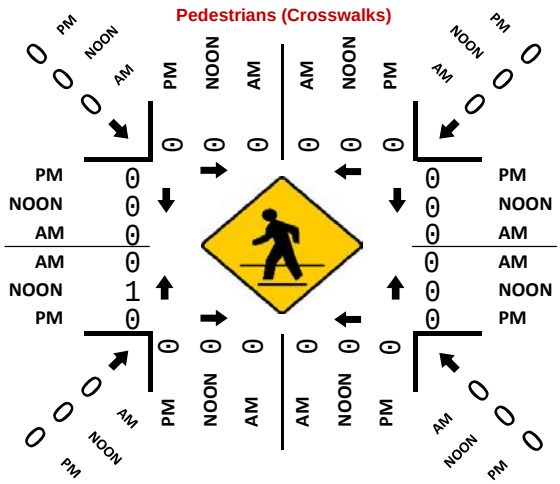
HT (NOON)



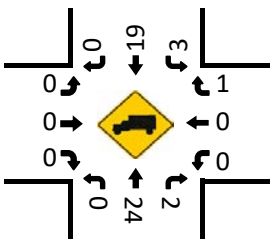
Cars (PM)



Pedestrians (Crosswalks)



HT (PM)



Project ID: 22-190009-001
Location: Callahan Dr & Viles Automotive Group Dwy/Callahan Crossing Dwy **Day: Tuesday**
City: Knoxville **Date: 3/8/2022**

Groups Printed - Cars, PU, Vans - Heavy Trucks

	Callahan Dr Northbound						Callahan Dr Southbound						Automotive Group Dwy/Callahan Crossings Eastbound						Automotive Group Dwy/Callahan Crossing I Westbound						
Start Time	Left	Thru	Rgt	Uturn	Peds	App. Total	Left	Thru	Rgt	Uturn	Peds	App. Total	Left	Thru	Rgt	Uturn	Peds	App. Total	Left	Thru	Rgt	Uturn	Peds	App. Total	Int. Total
7:00 AM	1	110	0	0	0	111	11	143	1	0	0	155	0	0	0	0	0	0	2	0	4	0	0	6	272
7:15 AM	0	153	3	0	0	156	4	206	0	0	0	210	0	0	1	0	0	1	2	0	10	0	0	12	379
7:30 AM	2	165	4	2	0	173	3	232	1	0	0	236	0	0	0	0	0	0	2	0	2	0	0	4	413
7:45 AM	1	153	1	3	0	158	5	286	5	0	0	296	0	0	0	0	0	0	0	0	1	0	0	1	455
Total	4	581	8	5	0	598	23	867	7	0	0	897	0	0	1	0	0	1	6	0	17	0	0	23	1519
8:00 AM	2	138	1	0	0	141	5	209	3	0	0	217	0	0	0	0	0	0	1	0	1	0	0	2	360
8:15 AM	2	160	2	1	0	165	4	189	0	0	0	193	0	0	2	0	0	2	0	0	2	0	0	2	362
8:30 AM	2	153	2	2	0	159	5	160	1	0	0	166	0	0	0	0	0	0	0	0	2	0	0	2	327
8:45 AM	0	147	3	3	0	153	15	207	2	0	0	224	0	0	0	0	0	0	0	0	5	0	0	5	382
Total	6	598	8	6	0	618	29	765	6	0	0	800	0	0	2	0	0	2	1	0	10	0	0	11	1431
BREAK																									
11:00 AM	1	179	4	2	0	186	4	213	2	1	0	220	2	0	2	0	0	4	1	0	6	0	0	7	417
11:15 AM	0	178	2	4	0	184	4	208	1	0	0	213	2	1	1	0	0	4	4	0	9	0	0	13	414
11:30 AM	1	177	3	0	0	181	3	210	1	0	0	214	1	0	0	0	0	1	2	0	3	0	0	5	401
11:45 AM	0	182	0	4	0	186	5	215	4	3	0	227	0	0	1	0	1	1	2	0	4	0	0	6	420
Total	2	716	9	10	0	737	16	846	8	4	0	874	5	1	4	0	1	10	9	0	22	0	0	31	1652
12:00 PM	1	206	4	0	0	211	5	226	1	0	0	232	1	0	3	0	1	4	7	0	5	0	0	12	459
12:15 PM	2	210	4	2	0	218	3	211	2	1	0	217	2	0	3	0	0	5	1	0	4	0	0	5	445
12:30 PM	5	206	2	3	0	216	2	183	0	0	0	185	3	0	5	0	0	8	4	0	4	0	0	8	417
12:45 PM	2	235	4	3	0	244	8	202	2	0	0	212	2	0	1	0	0	3	2	0	9	0	0	11	470
Total	10	857	14	8	0	889	18	822	5	1	0	846	8	0	12	0	1	20	14	0	22	0	0	36	1791
BREAK																									
2:00 PM	2	232	2	4	0	240	5	216	0	0	0	221	2	0	3	0	0	5	2	0	4	0	0	6	472
2:15 PM	0	226	1	0	0	227	5	189	2	0	0	196	1	0	1	0	0	2	2	0	7	0	0	9	434
2:30 PM	2	223	3	1	0	229	13	217	2	0	0	232	1	0	1	1	0	3	3	1	11	0	0	15	479
2:45 PM	0	211	5	2	0	218	7	219	3	0	0	229	2	0	4	0	0	6	2	0	5	0	0	7	460
Total	4	892	11	7	0	914	30	841	7	0	0	878	6	0	9	1	0	16	9	1	27	0	0	37	1845
3:00 PM	3	239	3	1	0	246	6	224	0	0	0	230	0	0	2	0	0	2	0	0	3	0	0	3	481
3:15 PM	0	258	1	1	0	260	11	213	3	0	0	227	2	0	2	0	0	4	4	0	7	0	0	11	502
3:30 PM	2	245	0	1	0	248	8	225	4	0	0	237	4	0	1	0	0	5	2	0	9	0	0	11	501
3:45 PM	0	253	3	3	0	259	24	258	1	0	0	283	0	0	1	0	0	1	2	0	13	0	1	15	558
Total	5	995	7	6	0	1013	49	920	8	0	0	977	6	0	6	0	0	12	8	0	32	0	1	40	2042
4:00 PM	0	283	6	3	0	292	31	269	2	0	0	302	1	0	1	0	0	2	3	0	6	0	0	9	605
4:15 PM	1	273	6	4	0	284	9	269	2	1	0	281	2	0	1	0	0	3	4	0	8	0	1	12	580
4:30 PM	0	307	2	0	0	309	12	263	1	2	0	278	1	0	2	0	0	3	1	0	15	0	0	16	606
4:45 PM	4	288	4	7	0	303	49	263	1	0	0	313	0	0	1	0	0	1	5	0	17	0	0	22	639
Total	5	1151	18	14	0	1188	101	1064	6	3	0	1174	4	0	5	0	0	9	13	0	46	0	1	59	2430
5:00 PM	1	378	4	6	0	389	14	301	0	1	0	316	3	0	15	0	0	18	4	0	32	0	0	36	759
5:15 PM	0	294	4	3	0	301	11	265	1	2	0	279	1	0	0	0	0	1	2	0	16	0	0	18	599
5:30 PM	0	352	5	4	0	361	16	255	2	1	0	274	1	0	1	0	0	2	3	0	6	0	0	9	646
5:45 PM	0	297	6	2	0	305	27	219	0	0	0	246	2	0	0	0	0	2	4	0	24	0	0	28	581
Total	1	1321	19	15	0	1356	68	1040	3	4	0	1115	7	0	16	0	0	23	13	0	78	0	0	91	2585
Grand Total	37	7111	94	71	0	7313	334	7165	50	12	0	7561	36	1	55	1	2	93	73	1	254	0	2	328	15295
Apprch %	0.5	97.2	1.3	1.0	0.0		4.4	94.8	0.7	0.2	0.0		38.7	1.1	59.1	1.1	2.2		22.3	0.3	77.4	0.0	0.6		
Total %	0.2	46.5	0.6	0.5	0.0	47.8	2.2	46.8	0.3	0.1	0.0	49.4	0.2	0.0	0.4	0.0	0.0	0.6	0.5	0.0	1.7	0.0	0.0	2.1	
Cars, PU, Vans	37	6842	81	70		7030	320	6953	50	12		7335	36	1	55	1		93	68	1	233	0		302	14760
% Cars, PU, Vans	100.0	96.2	86.2	98.6		96.1	95.8	97.0	100.0	100.0		97.0	100.0	100.0	100.0	100.0		100.0	93.2	100.0	91.7	0.0		92.1	96.5
Heavy trucks	0	269	13	1		283	14	212	0	0		226	0	0	0	0		0	5	0	21	0		26	535
%Heavy trucks	0.0	3.8	13.8	1.4		3.9	4.2	3.0	0.0	0.0		3.0	0.0	0.0	0.0	0.0		0.0	6.8	0.0	8.3	0.0		7.9	3.5

Project ID: 22-190009-001
Location: Callahan Dr & Viles Automotive Group Dwy/Callah
City: Knoxville

PEAK HOURS

Day: Tuesday
Date: 3/8/2022

AM

	Callahan Dr Northbound					Callahan Dr Southbound					tomotive Group Dwy/Callahan Cross Eastbound					tomotive Group Dwy/Callahan Cross Westbound					
Start Time	Left	Thru	Rgt	Uturn	App. Total	Left	Thru	Rgt	Uturn	App. Total	Left	Thru	Rgt	Uturn	App. Total	Left	Thru	Rgt	Uturn	App. Total	Int. Total
Peak Hour Analysis from 07:00 AM - 09:00 AM																					
Peak Hour for Entire Intersection Begins at 07:15 AM																					
7:15 AM	0	153	3	0	156	4	206	0	0	210	0	0	1	0	1	2	0	10	0	12	379
7:30 AM	2	165	4	2	173	3	232	1	0	236	0	0	0	0	0	2	0	2	0	4	413
7:45 AM	1	153	1	3	158	5	286	5	0	296	0	0	0	0	0	0	0	1	0	1	455
8:00 AM	2	138	1	0	141	5	209	3	0	217	0	0	0	0	0	1	0	1	0	2	360
Total Volume	5	609	9	5	628	17	933	9	0	959	0	0	1	0	1	5	0	14	0	19	1607
% App. Total	0.8	97.0	1.4	0.8	100	1.8	97.3	0.9	0.0	100	0.0	0.0	100.0	0.0	100	26.3	0.0	73.7	0.0	100	
PHF					0.908					0.810					0.250					0.396	0.883
Cars, PU, Vans	5	550	9	5	569	17	895	9	0	921	0	0	1	0	1	5	0	4	0	9	1500
% Cars, PU, Vans	100.0	90.3	100.0	100.0	90.6	100.0	95.9	100.0	0.0	96.0	0.0	0.0	100.0	0.0	100.0	100.0	0.0	28.6	0.0	47.4	93.3
Heavy trucks	0	59	0	0	59	0	38	0	0	38	0	0	0	0	0	0	0	10	0	10	107
%Heavy trucks	0.0	9.7	0.0	0.0	9.4	0.0	4.1	0.0	0.0	4.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	71.4	0.0	52.6	6.7

NOON

	Callahan Dr Northbound					Callahan Dr Southbound					tomotive Group Dwy/Callahan Cross Eastbound					tomotive Group Dwy/Callahan Cross Westbound					
Start Time	Left	Thru	Rgt	Uturn	App. Total	Left	Thru	Rgt	Uturn	App. Total	Left	Thru	Rgt	Uturn	App. Total	Left	Thru	Rgt	Uturn	App. Total	Int. Total
Peak Hour Analysis from 11:00 AM - 01:00 PM																					
Peak Hour for Entire Intersection Begins at 12:00 PM																					
12:00 PM	1	206	4	0	211	5	226	1	0	232	1	0	3	0	4	7	0	5	0	12	459
12:15 PM	2	210	4	2	218	3	211	2	1	217	2	0	3	0	5	1	0	4	0	5	445
12:30 PM	5	206	2	3	216	2	183	0	0	185	3	0	5	0	8	4	0	4	0	8	417
12:45 PM	2	235	4	3	244	8	202	2	0	212	2	0	1	0	3	2	0	9	0	11	470
Total Volume	10	857	14	8	889	18	822	5	1	846	8	0	12	0	20	14	0	22	0	36	1791
% App. Total	1.1	96.4	1.6	0.9	100	2.1	97.2	0.6	0.1	100	40.0	0.0	60.0	0.0	100	38.9	0.0	61.1	0.0	100	
PHF					0.911					0.912					0.625					0.750	0.953
Cars, PU, Vans	10	828	10	8	856	16	801	5	1	823	8	0	12	0	20	13	0	20	0	33	1732
% Cars, PU, Vans	100.0	96.6	71.4	100.0	96.3	88.9	97.4	100.0	100.0	97.3	100.0	0.0	100.0	0.0	100.0	92.9	0.0	90.9	0.0	91.7	96.7
Heavy trucks	0	29	4	0	33	2	21	0	0	23	0	0	0	0	0	1	0	2	0	3	59
%Heavy trucks	0.0	3.4	28.6	0.0	3.7	11.1	2.6	0.0	0.0	2.7	0.0	0.0	0.0	0.0	0.0	7.1	0.0	9.1	0.0	8.3	3.3

PM

	Callahan Dr Northbound					Callahan Dr Southbound					tomotive Group Dwy/Callahan Cross Eastbound					tomotive Group Dwy/Callahan Cross Westbound					
Start Time	Left	Thru	Rgt	Uturn	App. Total	Left	Thru	Rgt	Uturn	App. Total	Left	Thru	Rgt	Uturn	App. Total	Left	Thru	Rgt	Uturn	App. Total	Int. Total
Peak Hour Analysis from 02:00 PM - 06:00 PM																					
Peak Hour for Entire Intersection Begins at 04:45 PM																					
4:45 PM	4	288	4	7	303	49	263	1	0	313	0	0	1	0	1	5	0	17	0	22	639
5:00 PM	1	378	4	6	389	14	301	0	1	316	3	0	15	0	18	4	0	32	0	36	759
5:15 PM	0	294	4	3	301	11	265	1	2	279	1	0	0	0	1	2	0	16	0	18	599
5:30 PM	0	352	5	4	361	16	255	2	1	274	1	0	1	0	2	3	0	6	0	9	646
Total Volume	5	1312	17	20	1354	90	1084	4	4	1182	5	0	17	0	22	14	0	71	0	85	2643
% App. Total	0.4	96.9	1.3	1.5	100	7.6	91.7	0.3	0.3	100	22.7	0.0	77.3	0.0	100	16.5	0.0	83.5	0.0	100	
PHF					0.870					0.935					0.306					0.590	0.871
Cars, PU, Vans	5	1288	15	20	1328	87	1065	4	4	1160	5	0	17	0	22	14	0	70	0	84	2594
% Cars, PU, Vans	100.0	98.2	88.2	100.0	98.1	96.7	98.2	100.0	100.0	98.1	100.0	0.0	100.0	0.0	100.0	100.0	0.0	98.6	0.0	98.8	98.1
Heavy trucks	0	24	2	0	26	3	19	0	0	22	0	0	0	0	0	0	0	1	0	1	49
%Heavy trucks	0.0	1.8	11.8	0.0	1.9	3.3	1.8	0.0	0.0	1.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.4	0.0	1.2	1.9

Prepared by National Data & Surveying Services

I -75 SB Ramps & Callahan Dr

Peak Hour Turning Movement Count

ID: 20-190015-004
City: Knoxville

Day: Thursday
Date: 11/05/2020

PEAK HOURS	
AM	07:30 AM - 08:30 AM
NOON	NONE
PM	04:45 PM - 05:45 PM

COUNT PERIODS	
AM	07:00 AM - 09:00 AM
NOON	NONE
PM	04:00 PM - 06:00 PM

I -75 SB Ramps — SOUTHBOUND

AM	227	0	26	0	0	AM
NOON	0	0	0	0	0	NOON
PM	224	1	39	0	0	PM

Callahan Dr — EASTBOUND

AM	NOON	PM	
1026	0	1307	⇦
0	0	0	0
0	0	0	0
388	0	1028	2
382	0	484	1
AM	NOON	PM	

WESTBOUND — Callahan Dr

PM	NOON	AM	
0	0	0	0
1083	0	799	2
279	0	469	2
0	0	0	0
1067	0	414	⇨
PM	NOON	AM	

1	0	1	0	
0	0	0	0	

CONTROL

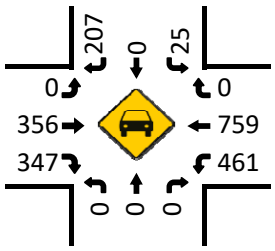
Signalized

TEV	2291 AM	0 NOON	3138 PM
PHF	0.95		0.93

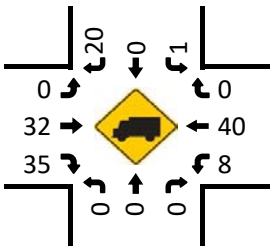
I -75 SB Ramps — NORTHBOUND

PM	764	0	0	0	0	PM
NOON	0	0	0	0	0	NOON
AM	851	0	0	0	0	AM

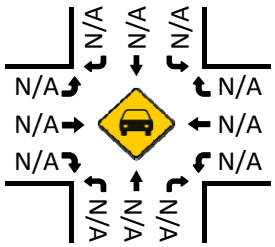
Cars (AM)



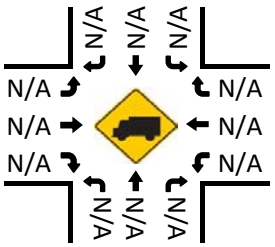
HT (AM)



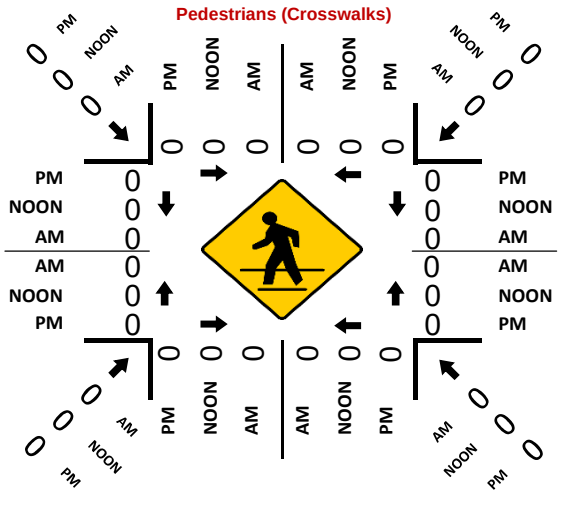
Cars (NOON)



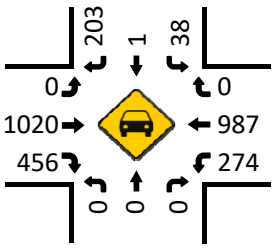
HT (NOON)



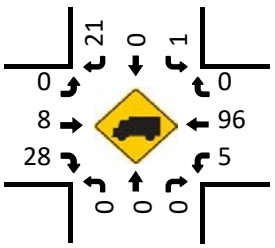
Pedestrians (Crosswalks)



Cars (PM)



HT (PM)



Project ID: 20-190015-004
Location: I -75 SB Ramps & Callahan Dr
City: Knoxville

Day: Thursday
Date: 11/05/2020

Groups Printed - Cars, PU, Vans - Heavy Trucks

	I -75 SB Ramps Northbound						I -75 SB Ramps Southbound						Callahan Dr Eastbound						Callahan Dr Westbound						
Start Time	Left	Thru	Rgt	Uturn	Peds	App. Total	Left	Thru	Rgt	Uturn	Peds	App. Total	Left	Thru	Rgt	Uturn	Peds	App. Total	Left	Thru	Rgt	Uturn	Peds	App. Total	Int. Total
7:00 AM	0	0	0	0	0	0	3	2	40	0	0	45	0	62	68	0	0	130	114	158	0	0	0	272	447
7:15 AM	0	0	0	0	0	0	7	0	49	0	0	56	0	61	58	0	0	119	144	166	0	0	0	310	485
7:30 AM	0	0	0	0	0	0	5	0	58	0	0	63	0	82	92	0	0	174	119	207	0	0	0	326	563
7:45 AM	0	0	0	0	0	0	4	0	57	0	0	61	0	89	96	0	0	185	128	231	0	0	0	359	605
Total	0	0	0	0	0	0	19	2	204	0	0	225	0	294	314	0	0	608	505	762	0	0	0	1267	2100
8:00 AM	0	0	0	0	0	0	4	0	69	0	0	73	0	113	93	0	0	206	109	191	0	0	0	300	579
8:15 AM	0	0	0	0	0	0	13	0	43	0	0	56	0	104	101	0	0	205	113	170	0	0	0	283	544
8:30 AM	0	0	0	0	0	0	8	0	48	0	0	56	0	93	85	0	0	178	85	174	0	0	0	259	493
8:45 AM	0	0	0	0	0	0	10	0	50	0	0	60	0	90	66	0	0	156	61	214	0	0	0	275	491
Total	0	0	0	0	0	0	35	0	210	0	0	245	0	400	345	0	0	745	368	749	0	0	0	1117	2107
BREAK																									
4:00 PM	0	0	0	0	0	0	12	0	61	0	0	73	0	207	87	0	0	294	58	247	0	0	0	305	672
4:15 PM	0	0	0	0	0	0	5	0	51	0	0	56	0	214	106	0	0	320	63	240	0	0	0	303	679
4:30 PM	0	0	0	0	0	0	7	0	61	0	0	68	0	220	125	0	0	345	71	222	0	0	0	293	706
4:45 PM	0	0	0	0	0	0	5	0	48	0	0	53	0	252	126	0	0	378	49	298	0	0	0	347	778
Total	0	0	0	0	0	0	29	0	221	0	0	250	0	893	444	0	0	1337	241	1007	0	0	0	1248	2835
5:00 PM	0	0	0	0	0	0	12	0	61	0	0	73	0	275	134	0	0	409	94	272	0	0	0	366	848
5:15 PM	0	0	0	0	0	0	13	1	49	0	0	63	0	260	104	0	0	364	66	254	0	0	0	320	747
5:30 PM	0	0	0	0	0	0	9	0	66	0	0	75	0	241	120	0	0	361	70	259	0	0	0	329	765
5:45 PM	0	0	0	0	2	0	6	0	75	0	0	81	0	224	94	0	0	318	75	226	0	0	0	301	700
Total	0	0	0	0	2	0	40	1	251	0	0	292	0	1000	452	0	0	1452	305	1011	0	0	0	1316	3060
Grand Total	0	0	0	0	2	0	123	3	886	0	0	1012	0	2587	1555	0	0	4142	1419	3529	0	0	0	4948	10102
Apprch %	0.0	0.0	0.0	0.0	0.0		12.2	0.3	87.5	0.0	0.0		0.0	62.5	37.5	0.0	0.0		28.7	71.3	0.0	0.0	0.0		
Total %	0.0	0.0	0.0	0.0	0.0	0.0	1.2	0.0	8.8	0.0	0.0	10.0	0.0	25.6	15.4	0.0	0.0	41.0	14.0	34.9	0.0	0.0	0.0	49.0	
Cars, PU, Vans	0	0	0	0		0	119	3	816	0		938	0	2509	1451	0		3960	1393	3289	0	0		4682	9580
% Cars, PU, Vans	0.0	0.0	0.0	0.0		0.0	96.7	100.0	92.1	0.0		92.7	0.0	97.0	93.3	0.0		95.6	98.2	93.2	0.0	0.0		94.6	94.8
Heavy Trucks	0	0	0	0		0	4	0	70	0		74	0	78	104	0		182	26	240	0	0		266	522
%Heavy Trucks	0.0	0.0	0.0	0.0		0.0	3.3	0.0	7.9	0.0		7.3	0.0	3.0	6.7	0.0		4.4	1.8	6.8	0.0	0.0		5.4	5.2

Project ID: 20-190015-004
Location: I -75 SB Ramps & Callahan Dr
City: Knoxville

PEAK HOURS

Day: Thursday
Date: 11/05/2020

AM

	I -75 SB Ramps Northbound					I -75 SB Ramps Southbound					Callahan Dr Eastbound					Callahan Dr Westbound					
Start Time	Left	Thru	Rgt	Uturn	App. Total	Left	Thru	Rgt	Uturn	App. Total	Left	Thru	Rgt	Uturn	App. Total	Left	Thru	Rgt	Uturn	App. Total	Int. Total
Peak Hour Analysis from 07:00 AM to 09:00 AM																					
Peak Hour for Entire Intersection Begins at 07:30 AM																					
7:30 AM	0	0	0	0	0	5	0	58	0	63	0	82	92	0	174	119	207	0	0	326	563
7:45 AM	0	0	0	0	0	4	0	57	0	61	0	89	96	0	185	128	231	0	0	359	605
8:00 AM	0	0	0	0	0	4	0	69	0	73	0	113	93	0	206	109	191	0	0	300	579
8:15 AM	0	0	0	0	0	13	0	43	0	56	0	104	101	0	205	113	170	0	0	283	544
Total Volume	0	0	0	0	0	26	0	227	0	253	0	388	382	0	770	469	799	0	0	1268	2291
% App. Total	0.0	0.0	0.0	0.0	0	10.3	0.0	89.7	0.0	100	0.0	50.4	49.6	0.0	100	37.0	63.0	0.0	0.0	100	
PHF										0.866					0.934					0.883	0.947
Cars, PU, Vans	0	0	0	0	0	25	0	207	0	232	0	356	347	0	703	461	759	0	0	1220	2155
% Cars, PU, Vans	0.0	0.0	0.0	0.0	0.0	96.2	0.0	91.2	0.0	91.7	0.0	91.8	90.8	0.0	91.3	98.3	95.0	0.0	0.0	96.2	94.1
Heavy Trucks	0	0	0	0	0	1	0	20	0	21	0	32	35	0	67	8	40	0	0	48	136
%Heavy Trucks	0.0	0.0	0.0	0.0	0.0	3.8	0.0	8.8	0.0	8.3	0.0	8.2	9.2	0.0	8.7	1.7	5.0	0.0	0.0	3.8	5.9

PM

	I -75 SB Ramps Northbound					I -75 SB Ramps Southbound					Callahan Dr Eastbound					Callahan Dr Westbound					
Start Time	Left	Thru	Rgt	Uturn	App. Total	Left	Thru	Rgt	Uturn	App. Total	Left	Thru	Rgt	Uturn	App. Total	Left	Thru	Rgt	Uturn	App. Total	Int. Total
Peak Hour Analysis from 04:00 PM to 06:00 PM																					
Peak Hour for Entire Intersection Begins at 04:45 PM																					
4:45 PM	0	0	0	0	0	5	0	48	0	53	0	252	126	0	378	49	298	0	0	347	778
5:00 PM	0	0	0	0	0	12	0	61	0	73	0	275	134	0	409	94	272	0	0	366	848
5:15 PM	0	0	0	0	0	13	1	49	0	63	0	260	104	0	364	66	254	0	0	320	747
5:30 PM	0	0	0	0	0	9	0	66	0	75	0	241	120	0	361	70	259	0	0	329	765
Total Volume	0	0	0	0	0	39	1	224	0	264	0	1028	484	0	1512	279	1083	0	0	1362	3138
% App. Total	0.0	0.0	0.0	0.0	0	14.8	0.4	84.8	0.0	100	0.0	68.0	32.0	0.0	100	20.5	79.5	0.0	0.0	100	
PHF										0.880					0.924					0.930	0.925
Cars, PU, Vans	0	0	0	0	0	38	1	203	0	242	0	1020	456	0	1476	274	987	0	0	1261	2979
% Cars, PU, Vans	0.0	0.0	0.0	0.0	0.0	97.4	100.0	90.6	0.0	91.7	0.0	99.2	94.2	0.0	97.6	98.2	91.1	0.0	0.0	92.6	94.9
Heavy Trucks	0	0	0	0	0	1	0	21	0	22	0	8	28	0	36	5	96	0	0	101	159
%Heavy Trucks	0.0	0.0	0.0	0.0	0.0	2.6	0.0	9.4	0.0	8.3	0.0	0.8	5.8	0.0	2.4	1.8	8.9	0.0	0.0	7.4	5.1

Prepared by National Data & Surveying Services

I -75 NB Ramps & Callahan Dr

Peak Hour Turning Movement Count

ID: 20-190015-005
City: Knoxville

Day: Thursday
Date: 11/05/2020

PEAK HOURS	COUNT PERIODS
07:15 AM - 08:15 AM	07:00 AM - 09:00 AM
NONE	NONE
04:45 PM - 05:45 PM	04:00 PM - 06:00 PM

I -75 NB Ramps — SOUTHBOUND

AM	0	0	0	0	212	AM
NOON	0	0	0	0	0	NOON
PM	0	0	0	0	397	PM

Callahan Dr — EASTBOUND

AM	NOON	PM	
1301	0	1362	⇦
0	0	2	0
147	0	347	1
210	0	721	2
0	0	0	0
AM	NOON	PM	

CONTROL

Signalized

TEV	1930 AM	0 NOON	3078 PM
PHF	0.95		0.98

WESTBOUND — Callahan Dr

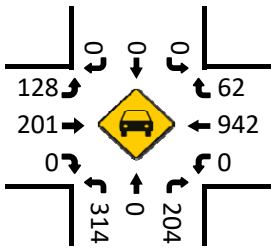
PM	NOON	AM	
49	0	65	0
764	0	962	2
0	0	0	0
0	0	0	0
1319	0	417	⇨
PM	NOON	AM	

I -75 NB Ramps — NORTHBOUND

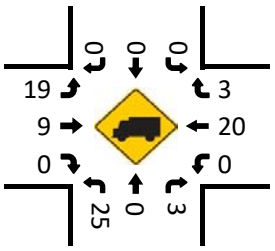
PM	0	0	596	1	598	PM
NOON	0	0	0	0	0	NOON
AM	0	0	339	0	207	AM

0 0 0 0 — 0 2 0 1

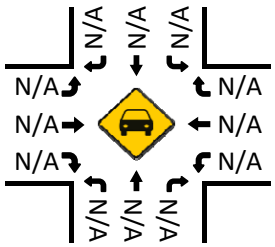
Cars (AM)



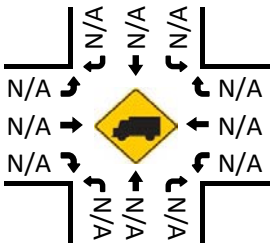
HT (AM)



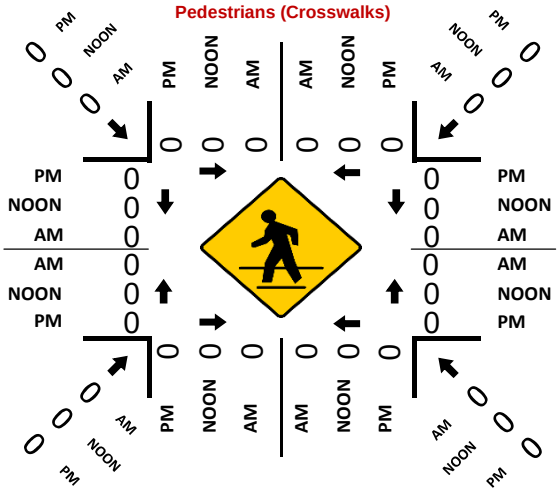
Cars (NOON)



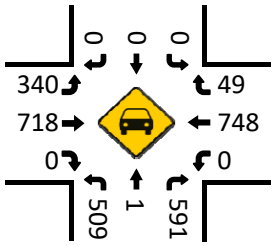
HT (NOON)



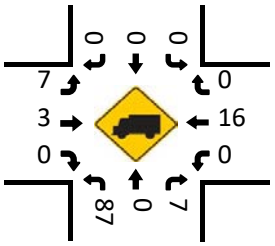
Pedestrians (Crosswalks)



Cars (PM)



HT (PM)



Project ID: 20-190015-005
Location: I -75 NB Ramps & Callahan Dr
City: Knoxville

Day: Thursday
Date: 11/05/2020

Groups Printed - Cars, PU, Vans - Heavy Trucks

	I -75 NB Ramps Northbound						I -75 NB Ramps Southbound						Callahan Dr Eastbound						Callahan Dr Westbound						
Start Time	Left	Thru	Rgt	Uturn	Peds	App. Total	Left	Thru	Rgt	Uturn	Peds	App. Total	Left	Thru	Rgt	Uturn	Peds	App. Total	Left	Thru	Rgt	Uturn	Peds	App. Total	Int. Total
7:00 AM	65	0	30	0	0	95	0	0	0	0	0	0	25	42	0	0	0	67	0	203	10	0	0	213	375
7:15 AM	79	0	42	0	0	121	0	0	0	0	0	0	32	35	0	0	0	67	0	235	21	0	0	256	444
7:30 AM	75	0	55	0	0	130	0	0	0	0	0	0	35	47	0	0	0	82	0	257	17	0	0	274	486
7:45 AM	107	0	58	0	0	165	0	0	0	0	0	0	38	52	0	0	0	90	0	245	10	0	0	255	510
Total	326	0	185	0	0	511	0	0	0	0	0	0	130	176	0	0	0	306	0	940	58	0	0	998	1815
8:00 AM	78	0	52	0	0	130	0	0	0	0	0	0	42	76	0	0	0	118	0	225	17	0	0	242	490
8:15 AM	72	0	37	0	0	109	0	0	0	0	0	0	39	77	0	1	0	117	0	204	9	0	0	213	439
8:30 AM	92	0	51	0	0	143	0	0	0	0	0	0	42	65	0	0	0	107	0	172	9	0	0	181	431
8:45 AM	91	0	54	0	0	145	0	0	0	0	0	0	30	66	0	0	0	96	0	180	8	0	0	188	429
Total	333	0	194	0	0	527	0	0	0	0	0	0	153	284	0	1	0	438	0	781	43	0	0	824	1789
BREAK																									
4:00 PM	128	1	139	0	0	268	0	0	0	0	0	0	73	149	0	1	0	223	0	168	14	0	0	182	673
4:15 PM	136	0	132	0	0	268	0	0	0	0	0	0	70	142	0	0	0	212	0	174	16	0	0	190	670
4:30 PM	135	0	135	0	0	270	0	0	0	0	0	0	73	158	0	1	0	232	0	166	15	0	0	181	683
4:45 PM	158	0	166	0	0	324	0	0	0	0	0	0	93	163	0	0	0	256	0	183	17	0	0	200	780
Total	557	1	572	0	0	1130	0	0	0	0	0	0	309	612	0	2	0	923	0	691	62	0	0	753	2806
5:00 PM	154	1	130	0	0	285	0	0	0	0	0	0	81	196	0	1	0	278	0	213	12	0	0	225	788
5:15 PM	147	0	169	0	0	316	0	0	0	0	0	0	85	192	0	1	0	278	0	169	8	0	0	177	771
5:30 PM	137	0	133	0	0	270	0	0	0	0	0	0	88	170	0	0	0	258	0	199	12	0	0	211	739
5:45 PM	116	0	110	0	2	226	0	0	0	0	0	0	70	158	0	0	0	228	0	174	6	0	0	180	634
Total	554	1	542	0	2	1097	0	0	0	0	0	0	324	716	0	2	0	1042	0	755	38	0	0	793	2932
Grand Total	1770	2	1493	0	2	3265	0	0	0	0	0	0	916	1788	0	5	0	2709	0	3167	201	0	0	3368	9342
Apprch %	54.2	0.1	45.7	0.0	0.1		0.0	0.0	0.0	0.0	0.0		33.8	66.0	0.0	0.2	0.0		0.0	94.0	6.0	0.0	0.0		
Total %	18.9	0.0	16.0	0.0	0.0	34.9	0.0	0.0	0.0	0.0	0.0	0.0	9.8	19.1	0.0	0.1	0.0	29.0	0.0	33.9	2.2	0.0	0.0	36.1	
Cars, PU, Vans	1574	1	1469	0		3044	0	0	0	0		0	865	1757	0	5		2627	0	3097	197	0		3294	8965
% Cars, PU, Vans	88.9	50.0	98.4	0.0		93.2	0.0	0.0	0.0	0.0		0.0	94.4	98.3	0.0	100.0		97.0	0.0	97.8	98.0	0.0		97.8	96.0
Heavy Trucks	196	1	24	0		221	0	0	0	0		0	51	31	0	0		82	0	70	4	0		74	377
%Heavy Trucks	11.1	50.0	1.6	0.0		6.8	0.0	0.0	0.0	0.0		0.0	5.6	1.7	0.0	0.0		3.0	0.0	2.2	2.0	0.0		2.2	4.0

Project ID: 20-190015-005
Location: I -75 NB Ramps & Callahan Dr
City: Knoxville

PEAK HOURS

Day: Thursday
Date: 11/05/2020

AM

	I-75 NB Ramps Northbound					I-75 NB Ramps Southbound					Callahan Dr Eastbound					Callahan Dr Westbound					
Start Time	Left	Thru	Rgt	Uturn	App. Total	Left	Thru	Rgt	Uturn	App. Total	Left	Thru	Rgt	Uturn	App. Total	Left	Thru	Rgt	Uturn	App. Total	Int. Total
Peak Hour Analysis from 07:00 AM to 09:00 AM																					
Peak Hour for Entire Intersection Begins at 07:15 AM																					
7:15 AM	79	0	42	0	121	0	0	0	0	0	32	35	0	0	67	0	235	21	0	256	444
7:30 AM	75	0	55	0	130	0	0	0	0	0	35	47	0	0	82	0	257	17	0	274	486
7:45 AM	107	0	58	0	165	0	0	0	0	0	38	52	0	0	90	0	245	10	0	255	510
8:00 AM	78	0	52	0	130	0	0	0	0	0	42	76	0	0	118	0	225	17	0	242	490
Total Volume	339	0	207	0	546	0	0	0	0	0	147	210	0	0	357	0	962	65	0	1027	1930
% App. Total	62.1	0.0	37.9	0.0	100	0.0	0.0	0.0	0.0	0	41.2	58.8	0.0	0.0	100	0.0	93.7	6.3	0.0	100	
PHF					0.827										0.756					0.937	0.946
Cars, PU, Vans	314	0	204	0	518	0	0	0	0	0	128	201	0	0	329	0	942	62	0	1004	1851
% Cars, PU, Vans	92.6	0.0	98.6	0.0	94.9	0.0	0.0	0.0	0.0	0.0	87.1	95.7	0.0	0.0	92.2	0.0	97.9	95.4	0.0	97.8	95.9
Heavy Trucks	25	0	3	0	28	0	0	0	0	0	19	9	0	0	28	0	20	3	0	23	79
%Heavy Trucks	7.4	0.0	1.4	0.0	5.1	0.0	0.0	0.0	0.0	0.0	12.9	4.3	0.0	0.0	7.8	0.0	2.1	4.6	0.0	2.2	4.1

PM

	I-75 NB Ramps Northbound					I-75 NB Ramps Southbound					Callahan Dr Eastbound					Callahan Dr Westbound					
Start Time	Left	Thru	Rgt	Uturn	App. Total	Left	Thru	Rgt	Uturn	App. Total	Left	Thru	Rgt	Uturn	App. Total	Left	Thru	Rgt	Uturn	App. Total	Int. Total
Peak Hour Analysis from 04:00 PM to 06:00 PM																					
Peak Hour for Entire Intersection Begins at 04:45 PM																					
4:45 PM	158	0	166	0	324	0	0	0	0	0	93	163	0	0	256	0	183	17	0	200	780
5:00 PM	154	1	130	0	285	0	0	0	0	0	81	196	0	1	278	0	213	12	0	225	788
5:15 PM	147	0	169	0	316	0	0	0	0	0	85	192	0	1	278	0	169	8	0	177	771
5:30 PM	137	0	133	0	270	0	0	0	0	0	88	170	0	0	258	0	199	12	0	211	739
Total Volume	596	1	598	0	1195	0	0	0	0	0	347	721	0	2	1070	0	764	49	0	813	3078
% App. Total	49.9	0.1	50.0	0.0	100	0.0	0.0	0.0	0.0	0	32.4	67.4	0.0	0.2	100	0.0	94.0	6.0	0.0	100	
PHF					0.922										0.962					0.903	0.977
Cars, PU, Vans	509	1	591	0	1101	0	0	0	0	0	340	718	0	2	1060	0	748	49	0	797	2958
% Cars, PU, Vans	85.4	100.0	98.8	0.0	92.1	0.0	0.0	0.0	0.0	0.0	98.0	99.6	0.0	100.0	99.1	0.0	97.9	100.0	0.0	98.0	96.1
Heavy Trucks	87	0	7	0	94	0	0	0	0	0	7	3	0	0	10	0	16	0	0	16	120
%Heavy Trucks	14.6	0.0	1.2	0.0	7.9	0.0	0.0	0.0	0.0	0.0	2.0	0.4	0.0	0.0	0.9	0.0	2.1	0.0	0.0	2.0	3.9

Prepared by National Data & Surveying Services

Central Ave Pike & Callahan Dr/Dante Rd

Peak Hour Turning Movement Count

ID: 20-190015-006
City: Knoxville

Day: Thursday
Date: 11/05/2020

PEAK HOURS

AM	07:30 AM - 08:30 AM
NOON	NONE
PM	04:45 PM - 05:45 PM

COUNT PERIODS

AM	07:00 AM - 09:00 AM
NOON	NONE
PM	04:00 PM - 06:00 PM

Central Ave Pike — SOUTHBOUND

AM	577	148	34	0	395	AM
NOON	0	0	0	0	0	NOON
PM	432	158	47	0	887	PM
	1	1	1	0		

Callahan Dr/Dante Rd — EASTBOUND

AM	NOON	PM	
987	0	821	
0	0	0	0
243	0	572	1
107	0	533	1
103	0	218	1

CONTROL

Signalized

	AM	NOON	PM
TEV	1823	0	2723
PHF	0.95		0.96

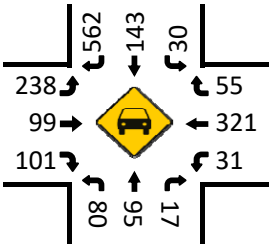
Callahan Dr/Dante Rd — WESTBOUND

PM	NOON	AM	
47	0	56	0
242	0	328	1
31	0	32	1
0	0	0	0
608	0	158	

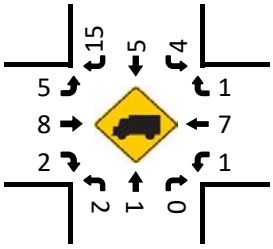
	0	1	1	0		
PM	407	0	147	268	28	PM
NOON	0	0	0	0	0	NOON
AM	283	0	82	96	17	AM

Central Ave Pike — NORTHBOUND

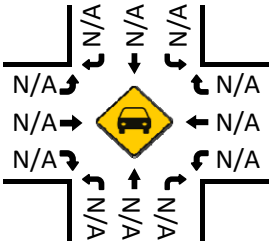
Cars (AM)



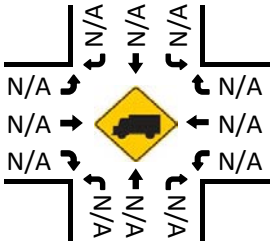
HT (AM)



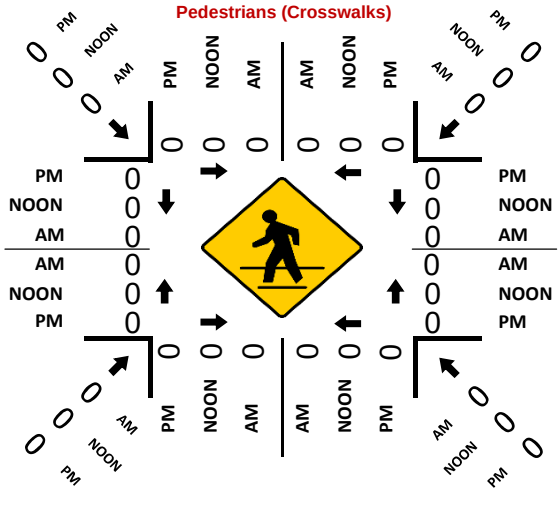
Cars (NOON)



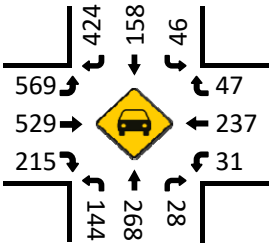
HT (NOON)



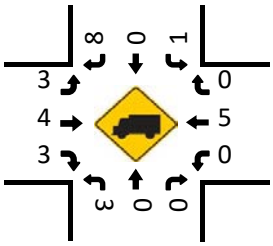
Pedestrians (Crosswalks)



Cars (PM)



HT (PM)



Project ID: 20-190015-006
Location: Central Ave Pike & Callahan Dr/Dante Rd
City: Knoxville

Day: Thursday
Date: 11/05/2020

Groups Printed - Cars, PU, Vans - Heavy Trucks

	Central Ave Pike Northbound						Central Ave Pike Southbound						Callahan Dr/Dante Rd Eastbound						Callahan Dr/Dante Rd Westbound						
Start Time	Left	Thru	Rgt	Uturn	Peds	App. Total	Left	Thru	Rgt	Uturn	Peds	App. Total	Left	Thru	Rgt	Uturn	Peds	App. Total	Left	Thru	Rgt	Uturn	Peds	App. Total	Int. Total
7:00 AM	33	13	3	0	0	49	4	20	122	0	0	146	40	21	13	0	0	74	6	65	9	0	0	80	349
7:15 AM	13	14	4	0	0	31	2	29	126	0	0	157	40	18	19	0	0	77	5	108	7	0	0	120	385
7:30 AM	20	27	3	0	0	50	2	37	165	0	0	204	63	13	24	0	0	100	11	96	19	0	0	126	480
7:45 AM	23	25	6	0	0	54	13	40	151	0	0	204	56	31	24	0	0	111	6	79	19	0	0	104	473
Total	89	79	16	0	0	184	21	126	564	0	0	711	199	83	80	0	0	362	28	348	54	0	0	430	1687
8:00 AM	21	27	5	0	0	53	7	32	135	0	0	174	59	40	27	0	0	126	6	90	6	0	0	102	455
8:15 AM	18	17	3	0	0	38	12	39	126	0	0	177	65	23	28	0	0	116	9	63	12	0	0	84	415
8:30 AM	25	18	1	0	0	44	1	28	103	0	0	132	55	34	30	0	0	119	7	57	3	0	0	67	362
8:45 AM	17	16	7	0	0	40	5	35	121	0	0	161	72	18	28	0	0	118	4	48	11	0	0	63	382
Total	81	78	16	0	0	175	25	134	485	0	0	644	251	115	113	0	0	479	26	258	32	0	0	316	1614
BREAK																									
4:00 PM	42	52	10	0	0	104	9	32	85	0	0	126	149	100	33	0	0	282	9	47	8	0	0	64	576
4:15 PM	39	47	5	0	0	91	18	42	109	0	0	169	146	95	38	0	0	279	7	44	11	0	0	62	601
4:30 PM	39	55	6	0	0	100	12	43	99	0	0	154	142	107	46	0	0	295	9	41	8	0	0	58	607
4:45 PM	36	65	9	0	0	110	9	42	117	0	0	168	147	129	44	0	0	320	8	59	11	0	0	78	676
Total	156	219	30	0	0	405	48	159	410	0	0	617	584	431	161	0	0	1176	33	191	38	0	0	262	2460
5:00 PM	41	68	5	0	0	114	15	35	110	0	0	160	139	131	49	0	0	319	5	57	12	0	0	74	667
5:15 PM	31	66	10	0	0	107	10	41	101	0	0	152	148	149	70	0	0	367	10	63	11	0	0	84	710
5:30 PM	39	69	4	0	0	112	13	40	104	0	0	157	138	124	55	0	0	317	8	63	13	0	0	84	670
5:45 PM	37	45	8	0	0	90	8	48	99	0	0	155	136	92	36	0	0	264	9	35	9	0	0	53	562
Total	148	248	27	0	0	423	46	164	414	0	0	624	561	496	210	0	0	1267	32	218	45	0	0	295	2609
Grand Total	474	624	89	0	0	1187	140	583	1873	0	0	2596	1595	1125	564	0	0	3284	119	1015	169	0	0	1303	8370
Apprch %	39.9	52.6	7.5	0.0	0.0		5.4	22.5	72.1	0.0	0.0		48.6	34.3	17.2	0.0	0.0		9.1	77.9	13.0	0.0	0.0		
Total %	5.7	7.5	1.1	0.0	0.0	14.2	1.7	7.0	22.4	0.0	0.0	31.0	19.1	13.4	6.7	0.0	0.0	39.2	1.4	12.1	2.0	0.0	0.0	15.6	
Cars, PU, Vans	464	622	85	0		1171	132	577	1829	0		2538	1576	1102	551	0		3229	117	995	167	0		1279	8217
% Cars, PU, Vans	97.9	99.7	95.5	0.0		98.7	94.3	99.0	97.7	0.0		97.8	98.8	98.0	97.7	0.0		98.3	98.3	98.0	98.8	0.0		98.2	98.2
Heavy Trucks	10	2	4	0		16	8	6	44	0		58	19	23	13	0		55	2	20	2	0		24	153
%Heavy Trucks	2.1	0.3	4.5	0.0		1.3	5.7	1.0	2.3	0.0		2.2	1.2	2.0	2.3	0.0		1.7	1.7	2.0	1.2	0.0		1.8	1.8

Project ID: 20-190015-006
Location: Central Ave Pike & Callahan Dr/Dante Rd
City: Knoxville

PEAK HOURS

Day: Thursday
Date: 11/05/2020

AM

	Central Ave Pike Northbound					Central Ave Pike Southbound					Callahan Dr/Dante Rd Eastbound					Callahan Dr/Dante Rd Westbound					
Start Time	Left	Thru	Rgt	Uturn	App. Total	Left	Thru	Rgt	Uturn	App. Total	Left	Thru	Rgt	Uturn	App. Total	Left	Thru	Rgt	Uturn	App. Total	Int. Total
Peak Hour Analysis from 07:00 AM to 09:00 AM																					
Peak Hour for Entire Intersection Begins at 07:30 AM																					
7:30 AM	20	27	3	0	50	2	37	165	0	204	63	13	24	0	100	11	96	19	0	126	480
7:45 AM	23	25	6	0	54	13	40	151	0	204	56	31	24	0	111	6	79	19	0	104	473
8:00 AM	21	27	5	0	53	7	32	135	0	174	59	40	27	0	126	6	90	6	0	102	455
8:15 AM	18	17	3	0	38	12	39	126	0	177	65	23	28	0	116	9	63	12	0	84	415
Total Volume	82	96	17	0	195	34	148	577	0	759	243	107	103	0	453	32	328	56	0	416	1823
% App. Total	42.1	49.2	8.7	0.0	100	4.5	19.5	76.0	0.0	100	53.6	23.6	22.7	0.0	100	7.7	78.8	13.5	0.0	100	
PHF					0.903					0.930					0.899					0.825	0.949
Cars, PU, Vans	80	95	17	0	192	30	143	562	0	735	238	99	101	0	438	31	321	55	0	407	1772
% Cars, PU, Vans	97.6	99.0	100.0	0.0	98.5	88.2	96.6	97.4	0.0	96.8	97.9	92.5	98.1	0.0	96.7	96.9	97.9	98.2	0.0	97.8	97.2
Heavy Trucks	2	1	0	0	3	4	5	15	0	24	5	8	2	0	15	1	7	1	0	9	51
%Heavy Trucks	2.4	1.0	0.0	0.0	1.5	11.8	3.4	2.6	0.0	3.2	2.1	7.5	1.9	0.0	3.3	3.1	2.1	1.8	0.0	2.2	2.8

PM

	Central Ave Pike Northbound					Central Ave Pike Southbound					Callahan Dr/Dante Rd Eastbound					Callahan Dr/Dante Rd Westbound					
Start Time	Left	Thru	Rgt	Uturn	App. Total	Left	Thru	Rgt	Uturn	App. Total	Left	Thru	Rgt	Uturn	App. Total	Left	Thru	Rgt	Uturn	App. Total	Int. Total
Peak Hour Analysis from 04:00 PM to 06:00 PM																					
Peak Hour for Entire Intersection Begins at 04:45 PM																					
4:45 PM	36	65	9	0	110	9	42	117	0	168	147	129	44	0	320	8	59	11	0	78	676
5:00 PM	41	68	5	0	114	15	35	110	0	160	139	131	49	0	319	5	57	12	0	74	667
5:15 PM	31	66	10	0	107	10	41	101	0	152	148	149	70	0	367	10	63	11	0	84	710
5:30 PM	39	69	4	0	112	13	40	104	0	157	138	124	55	0	317	8	63	13	0	84	670
Total Volume	147	268	28	0	443	47	158	432	0	637	572	533	218	0	1323	31	242	47	0	320	2723
% App. Total	33.2	60.5	6.3	0.0	100	7.4	24.8	67.8	0.0	100	43.2	40.3	16.5	0.0	100	9.7	75.6	14.7	0.0	100	
PHF					0.971					0.948					0.901					0.952	0.959
Cars, PU, Vans	144	268	28	0	440	46	158	424	0	628	569	529	215	0	1313	31	237	47	0	315	2696
% Cars, PU, Vans	98.0	100.0	100.0	0.0	99.3	97.9	100.0	98.1	0.0	98.6	99.5	99.2	98.6	0.0	99.2	100.0	97.9	100.0	0.0	98.4	99.0
Heavy Trucks	3	0	0	0	3	1	0	8	0	9	3	4	3	0	10	0	5	0	0	5	27
%Heavy Trucks	2.0	0.0	0.0	0.0	0.7	2.1	0.0	1.9	0.0	1.4	0.5	0.8	1.4	0.0	0.8	0.0	2.1	0.0	0.0	1.6	1.0

APPENDIX B – TRIP GENERATION

Land Use: 130
Industrial Park

Description

An industrial park contains several individual industrial or related facilities. It is characterized by a mix of manufacturing, service, and warehouse facilities with a wide variation in the proportion of each type of use from one location to another. Many industrial parks contain highly diversified facilities. Some parks in the database have a large number of small businesses and others have one or two dominant industries. General light industrial (Land Use 110) and manufacturing (Land Use 140) are related uses.

Additional Data

The sites were surveyed in the 1980s, the 2000s, 2010s, and the 2020s in California, Georgia, New Jersey, Massachusetts, New York, Ontario (CAN), and Pennsylvania.

Source Numbers

106, 162, 184, 251, 277, 422, 706, 747, 753, 937, 1032, 1070

Industrial Park
(130)

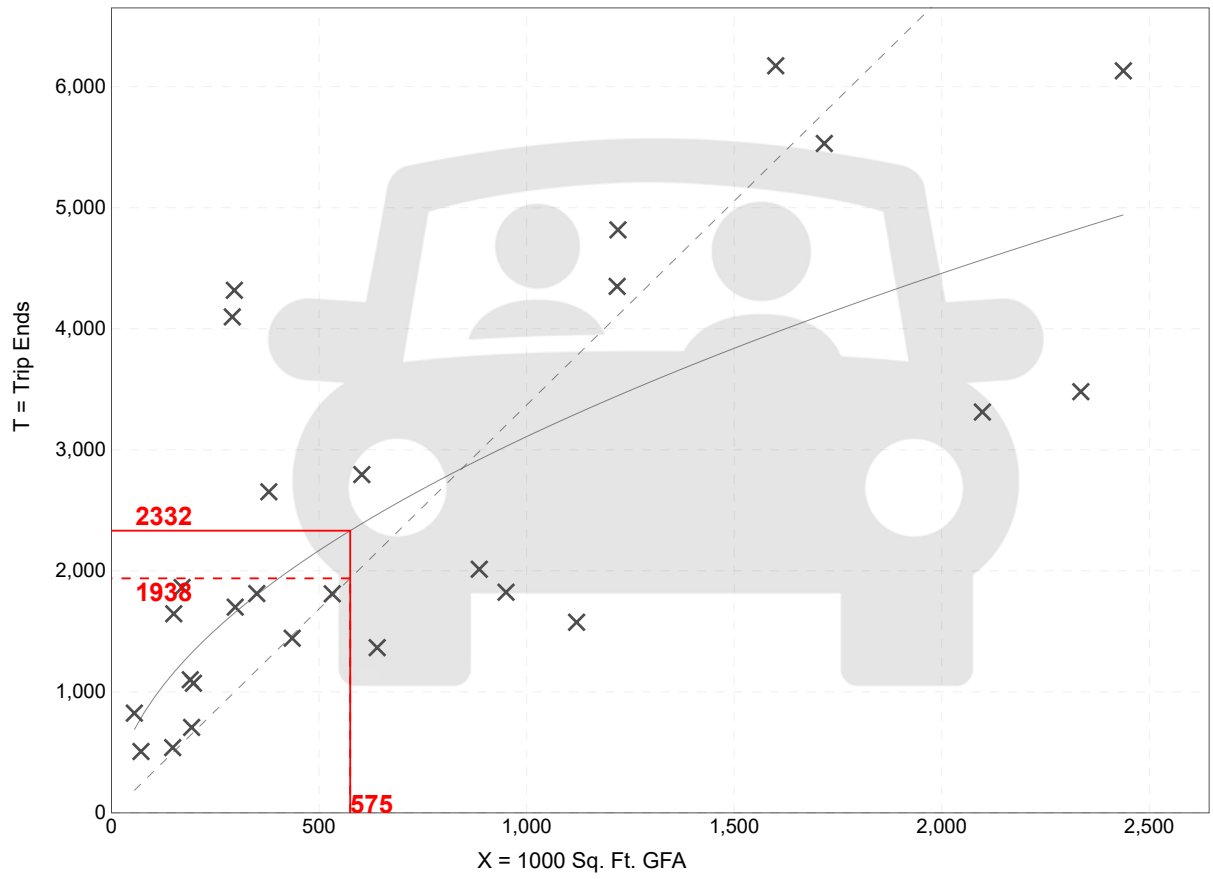
Vehicle Trip Ends vs: **1000 Sq. Ft. GFA**
On a: **Weekday**

Setting/Location: **General Urban/Suburban**
Number of Studies: 27
Avg. 1000 Sq. Ft. GFA: 762
Directional Distribution: 50% entering, 50% exiting

Vehicle Trip Generation per 1000 Sq. Ft. GFA

Average Rate	Range of Rates	Standard Deviation
3.37	1.41 - 14.98	2.60

Data Plot and Equation



Fitted Curve Equation: Ln(T) = 0.52 Ln(X) + 4.45 **R^2= 0.58**

Trip Gen Manual, 11th Edition ● Institute of Transportation Engineers

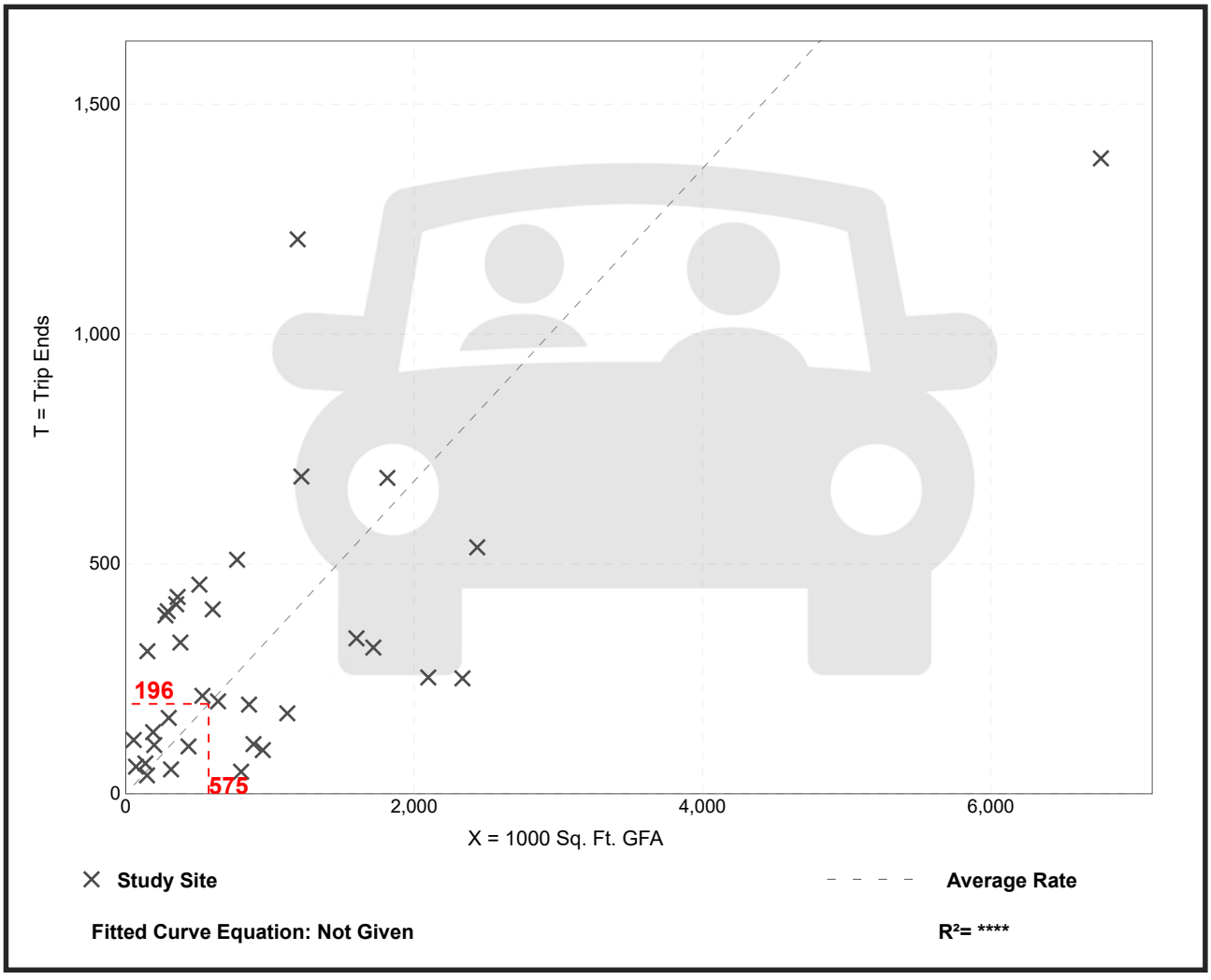
Industrial Park
(130)

Vehicle Trip Ends vs: **1000 Sq. Ft. GFA**
On a: **Weekday,**
Peak Hour of Adjacent Street Traffic,
One Hour Between 7 and 9 a.m.
Setting/Location: **General Urban/Suburban**
Number of Studies: 34
Avg. 1000 Sq. Ft. GFA: 956
Directional Distribution: 81% entering, 19% exiting

Vehicle Trip Generation per 1000 Sq. Ft. GFA

Average Rate	Range of Rates	Standard Deviation
0.34	0.06 - 2.13	0.33

Data Plot and Equation



Trip Gen Manual, 11th Edition ● Institute of Transportation Engineers

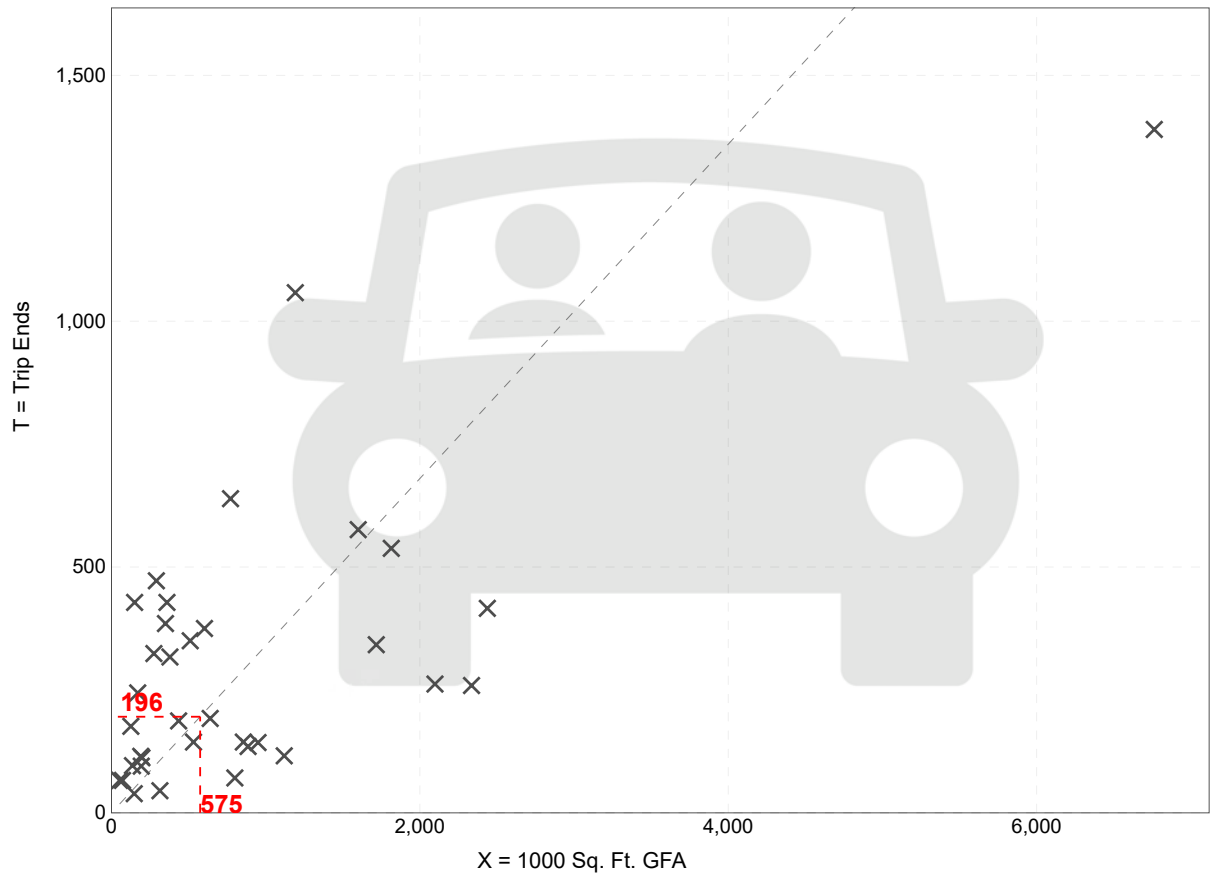
Industrial Park
(130)

Vehicle Trip Ends vs:	**1000 Sq. Ft. GFA**
On a:	**Weekday,**
	Peak Hour of Adjacent Street Traffic,
	One Hour Between 4 and 6 p.m.
Setting/Location:	**General Urban/Suburban**
Number of Studies:	35
Avg. 1000 Sq. Ft. GFA:	899
Directional Distribution:	22% entering, 78% exiting

Vehicle Trip Generation per 1000 Sq. Ft. GFA

Average Rate	Range of Rates	Standard Deviation
0.34	0.09 - 2.85	0.36

Data Plot and Equation



Fitted Curve Equation: Not Given

R^2= **

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APPENDIX C – CAPACITY ANALYSIS

CAPACITY AND LEVEL-OF-SERVICE CONCEPTS

In a general sense, a roadway is similar to a pipeline or other material carrying conduit in that it has a certain capacity for the amount of material (vehicles) that it can efficiently carry. As the number of vehicles in a given time period gradually increases, the quality of traffic flow gradually decreases. On roadway sections this results in increasing turbulence in the traffic stream, and at intersections it results in increasing stops and delay. As the volumes begin to approach the capacity of the facility, these problems rapidly magnify, with resulting serious levels of congestion, stops, delay, excess fuel consumption, pollutant emissions, etc.

The Transportation Research Board has published the Year 2010 Highway Capacity Manual (HCM2010), which establishes theoretical techniques to quantify the capacity conditions on all types of roadways, intersections, ramps, pedestrian facilities, etc. A basic concept that is applicable to most of these techniques is the idea of level of service (LOS). This concept establishes a rating system that quantifies the quality of traffic flow, as perceived by motorists and/or passengers. The general system is similar to a school grade scale, and is outlined as follows:

Level of Service (LOS)	General Quality of Traffic Flow	Description of Corresponding Conditions
A	Excellent	Roadways – Free flow, high maneuverability Intersections – Very few stops, very low delay
B	Very Good	Roadways – Free flow, slightly lower maneuverability Intersections – Minor stops, low delay
C	Good	Roadways – Stable flow, restricted maneuverability Intersections – Significant stops, significant delay
D	Fair	Roadways – Marginally stable flow, congestion seriously restricts maneuverability Intersections – High stops, long but tolerable delay
E	Poor	Roadways – Unstable flow*, lower operating speeds, congestion severely restricts maneuverability Intersections – All vehicles stop, very long queues and very long intolerable delay
F	Very Poor	Roadways – Forced flow, stoppages may be lengthy, congestion severely restricts maneuverability Intersections – All vehicles stop, extensive queues and extremely long intolerable delay

*Unstable flow is such that minor fluctuations or disruptions can result in rapid degradation to LOS F.

LOS CRITERIA: SIGNALIZED & UNSIGNALIZED INTERSECTIONS

LOS	CONTROL DELAY (S/VEH)		
	SIGNALIZED	UNSIGNALIZED	ROUNDABOUT
A	≤10	≤10	≤10
B	>10-20	>10-15	>10-15
C	>20-35	>15-25	>15-25
D	>35-55	>25-35	>25-35
E	>55-80	>35-50	>35-50
F	>80	>50	>50

Another measure of intersection capacity that is often used in the evaluation of intersection operations is the volume to capacity (V/C) ratio. This ratio is defined as "the ratio of flow rate to capacity", and is a good measure of how much of an intersection's available capacity has been used up by the analysis volumes. Conversely, it also provides an indication of the reserve capacity available for future growth in traffic volumes.

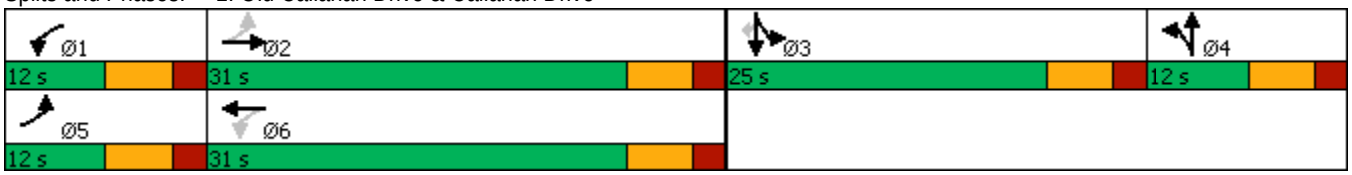
The Intersection Capacity Utilization (ICU) is another measure that expresses a value similar to the V/C ratio. Specifically, the ICU method "sums the amount of the time required to serve all movements at saturation for a given cycle length and divides by that reference cycle length." The ICU is considered a more accurate measure of volume to capacity conditions for a signalized intersection, primarily because it accounts for the effects of the signal timing on intersection capacity.

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	8	481	1	2	708	271	0	0	2	342	2	7
Future Volume (vph)	8	481	1	2	708	271	0	0	2	342	2	7
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00
Frt					0.959			0.865				0.850
Flt Protected	0.950			0.950							0.953	
Satd. Flow (prot)	1770	3539	0	1770	3394	0	0	1611	0	0	1775	1583
Flt Permitted	0.166			0.428							0.953	
Satd. Flow (perm)	309	3539	0	797	3394	0	0	1611	0	0	1775	1583
Satd. Flow (RTOR)					72			246				205
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Shared Lane Traffic (%)												
Lane Group Flow (vph)	9	518	0	2	1052	0	0	2	0	0	370	8
Turn Type	pm+pt	NA		pm+pt	NA			NA		Split	NA	Perm
Protected Phases	5	2		1	6		4	4		3	3	
Permitted Phases	2			6								3
Detector Phase	5	2		1	6		4	4		3	3	3
Switch Phase												
Minimum Initial (s)	6.0	15.0		6.0	15.0		6.0	6.0		6.0	6.0	6.0
Minimum Split (s)	12.0	21.0		12.0	21.0		12.0	12.0		12.0	12.0	12.0
Total Split (s)	12.0	31.0		12.0	31.0		12.0	12.0		25.0	25.0	25.0
Total Split (%)	15.0%	38.8%		15.0%	38.8%		15.0%	15.0%		31.3%	31.3%	31.3%
Maximum Green (s)	6.0	25.0		6.0	25.0		6.0	6.0		19.0	19.0	19.0
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	4.0
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0		0.0	0.0			0.0			0.0	0.0
Total Lost Time (s)	6.0	6.0		6.0	6.0			6.0			6.0	6.0
Lead/Lag	Lead	Lag		Lead	Lag		Lag	Lag		Lead	Lead	Lead
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes		Yes	Yes	Yes
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	3.0
Recall Mode	None	Min		None	Min		None	None		None	None	None
Act Effct Green (s)	25.0	24.1		25.0	24.1			6.2			17.3	17.3
Actuated g/C Ratio	0.44	0.42		0.44	0.42			0.11			0.30	0.30
v/c Ratio	0.03	0.35		0.00	0.72			0.01			0.69	0.01
Control Delay	10.6	14.1		10.5	18.8			0.0			28.9	0.0
Queue Delay	0.0	0.0		0.0	0.0			0.0			0.0	0.0
Total Delay	10.6	14.1		10.5	18.8			0.0			28.9	0.0
LOS	B	B		B	B			A			C	A
Approach Delay		14.0			18.8						28.3	
Approach LOS		B			B						C	
Queue Length 50th (ft)	2	53		0	124			0			101	0
Queue Length 95th (ft)	10	154		4	#384			0			#331	0
Internal Link Dist (ft)		1332			2747			179			1202	
Turn Bay Length (ft)	125			110								45
Base Capacity (vph)	293	1604		453	1578			394			611	679
Starvation Cap Reductn	0	0		0	0			0			0	0
Spillback Cap Reductn	0	0		0	0			0			0	0
Storage Cap Reductn	0	0		0	0			0			0	0
Reduced v/c Ratio	0.03	0.32		0.00	0.67			0.01			0.61	0.01

Intersection Summary	
Cycle Length: 80	
Actuated Cycle Length: 57.3	
Natural Cycle: 80	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.72	
Intersection Signal Delay: 19.3	Intersection LOS: B
Intersection Capacity Utilization 64.0%	ICU Level of Service B
Analysis Period (min) 15	

\# 95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 1: Old Callahan Drive & Callahan Drive



HCS7 Two-Way Stop-Control Report

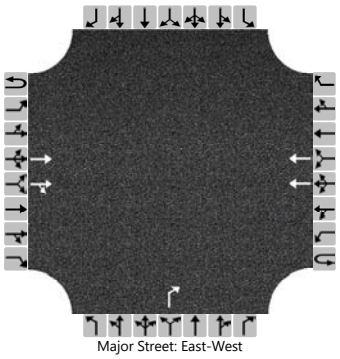
General Information

Analyst	WAS
Agency/Co.	Cannon & Cannon, Inc.
Date Performed	11/30/2020
Analysis Year	2022
Time Analyzed	AM Peak
Intersection Orientation	East-West
Project Description	2022 Existing AM

Site Information

Intersection	Yow West at Callahan Dr
Jurisdiction	Knoxville / Knox Co.
East/West Street	Callahan Drive
North/South Street	Yow Commercial West
Peak Hour Factor	0.92
Analysis Time Period (hrs)	0.25

Lanes


Major Street: East-West

Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority	1U	1	2	3	4U	4	5	6		7	8	9		10	11	12
Number of Lanes	0	0	2	0	0	0	2	0		0	0	1		0	0	0
Configuration			T	TR			T					R				
Volume (veh/h)			618	1			939					5				
Percent Heavy Vehicles (%)												3				
Proportion Time Blocked																
Percent Grade (%)										0						
Right Turn Channelized										No						
Median Type | Storage	Left + Thru								1							

Critical and Follow-up Headways

Base Critical Headway (sec)												6.9				
Critical Headway (sec)												6.96				
Base Follow-Up Headway (sec)												3.3				
Follow-Up Headway (sec)												3.33				

Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)												5				
Capacity, c (veh/h)												656				
v/c Ratio												0.01				
95% Queue Length, Q_{95} (veh)												0.0				
Control Delay (s/veh)												10.5				
Level of Service (LOS)												B				
Approach Delay (s/veh)										10.5						
Approach LOS										B						

HCS7 Two-Way Stop-Control Report

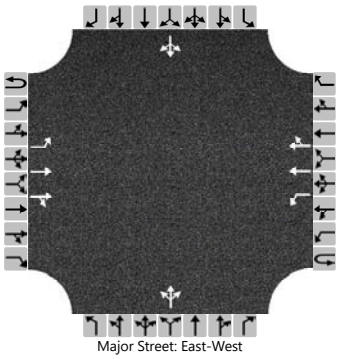
General Information

Analyst	WAS
Agency/Co.	Cannon & Cannon, Inc.
Date Performed	11/30/2020
Analysis Year	2022
Time Analyzed	AM Peak
Intersection Orientation	East-West
Project Description	2022 Existing AM

Site Information

Intersection	Yow East at Callahan Dr
Jurisdiction	Knoxville / Knox Co.
East/West Street	Callahan Drive
North/South Street	Yow Comm. East / Viles
Peak Hour Factor	0.92
Analysis Time Period (hrs)	0.25

Lanes


Major Street: East-West

Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority	1U	1	2	3	4U	4	5	6		7	8	9		10	11	12
Number of Lanes	0	1	2	0	0	1	2	0		0	1	0		0	1	0
Configuration		L	T	TR		L	T	TR			LTR				LTR	
Volume (veh/h)	0	5	609	9	0	17	933	9		5	0	14		0	0	1
Percent Heavy Vehicles (%)	3	3			3	3				3	3	3		3	3	3
Proportion Time Blocked																
Percent Grade (%)										0				0		
Right Turn Channelized																
Median Type | Storage		Left + Thru								2						

Critical and Follow-up Headways

Base Critical Headway (sec)		4.1				4.1				7.5	6.5	6.9		7.5	6.5	6.9
Critical Headway (sec)		4.16				4.16				7.56	6.56	6.96		7.56	6.56	6.96
Base Follow-Up Headway (sec)		2.2				2.2				3.5	4.0	3.3		3.5	4.0	3.3
Follow-Up Headway (sec)		2.23				2.23				3.53	4.03	3.33		3.53	4.03	3.33

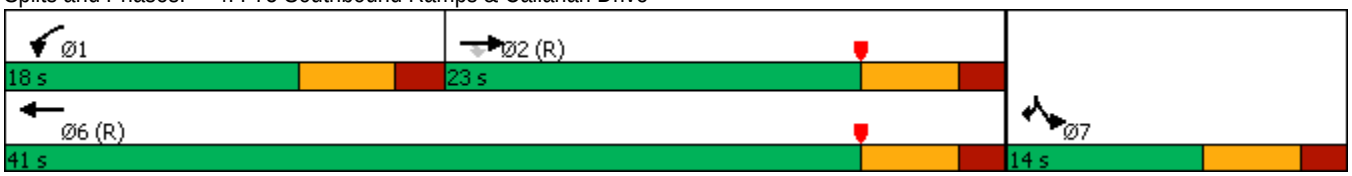
Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)		5				18					21				1	
Capacity, c (veh/h)		668				908					511				504	
v/c Ratio		0.01				0.02					0.04				0.00	
95% Queue Length, Q_{95} (veh)		0.0				0.1					0.1				0.0	
Control Delay (s/veh)		10.4				9.0					12.3				12.2	
Level of Service (LOS)		B				A					B				B	
Approach Delay (s/veh)	0.1				0.2				12.3				12.2			
Approach LOS									B				B			

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	466	458	563	959	0	0	0	0	31	0	272
Future Volume (vph)	0	466	458	563	959	0	0	0	0	31	0	272
Lane Util. Factor	1.00	0.95	1.00	0.97	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt			0.850									0.850
Flt Protected				0.950						0.950		
Satd. Flow (prot)	0	3539	1583	3433	3539	0	0	0	0	1770	0	1583
Flt Permitted				0.950						0.950		
Satd. Flow (perm)	0	3539	1583	3433	3539	0	0	0	0	1770	0	1583
Satd. Flow (RTOR)			453									179
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	491	482	593	1009	0	0	0	0	33	0	286
Turn Type		NA	Perm	Prot	NA					Prot		Prot
Protected Phases		2		1	6					7		7
Permitted Phases			2									
Detector Phase		2	2	1	6					7		7
Switch Phase												
Minimum Initial (s)		15.0	15.0	6.0	15.0					8.0		8.0
Minimum Split (s)		21.0	21.0	12.0	21.0					14.0		14.0
Total Split (s)		23.0	23.0	18.0	41.0					14.0		14.0
Total Split (%)		41.8%	41.8%	32.7%	74.5%					25.5%		25.5%
Maximum Green (s)		17.0	17.0	12.0	35.0					8.0		8.0
Yellow Time (s)		4.0	4.0	4.0	4.0					4.0		4.0
All-Red Time (s)		2.0	2.0	2.0	2.0					2.0		2.0
Lost Time Adjust (s)		0.0	0.0	0.0	0.0					0.0		0.0
Total Lost Time (s)		6.0	6.0	6.0	6.0					6.0		6.0
Lead/Lag		Lag	Lag	Lead								
Lead-Lag Optimize?		Yes	Yes	Yes								
Vehicle Extension (s)		3.0	3.0	3.0	3.0					3.0		3.0
Recall Mode		C-Max	C-Max	None	C-Max					None		None
Act Effct Green (s)		17.2	17.2	11.8	35.0					8.0		8.0
Actuated g/C Ratio		0.31	0.31	0.21	0.64					0.15		0.15
v/c Ratio		0.44	0.60	0.81	0.45					0.13		0.75
Control Delay		16.7	6.0	23.4	2.2					21.9		24.1
Queue Delay		0.0	0.0	0.0	0.0					0.0		0.0
Total Delay		16.7	6.0	23.4	2.2					21.9		24.1
LOS		B	A	C	A					C		C
Approach Delay		11.4			10.0						23.9	
Approach LOS		B			B						C	
Queue Length 50th (ft)		66	7	79	0					10		33
Queue Length 95th (ft)		103	64	m97	0					30		#134
Internal Link Dist (ft)		2461			901			890			1125	
Turn Bay Length (ft)			165	130								390
Base Capacity (vph)		1106	806	749	2252					257		383
Starvation Cap Reductn		0	0	0	0					0		0
Spillback Cap Reductn		0	0	0	0					0		0
Storage Cap Reductn		0	0	0	0					0		0
Reduced v/c Ratio		0.44	0.60	0.79	0.45					0.13		0.75

Intersection Summary	
Cycle Length: 55	
Actuated Cycle Length: 55	
Offset: 36 (65%), Referenced to phase 2:EBT and 6:WBT, Start of Yellow	
Natural Cycle: 55	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 0.81	
Intersection Signal Delay: 12.0	Intersection LOS: B
Intersection Capacity Utilization 70.6%	ICU Level of Service C
Analysis Period (min) 15	
# 95th percentile volume exceeds capacity, queue may be longer.	
Queue shown is maximum after two cycles.	
m Volume for 95th percentile queue is metered by upstream signal.	

Splits and Phases: 4: I-75 Southbound Ramps & Callahan Drive

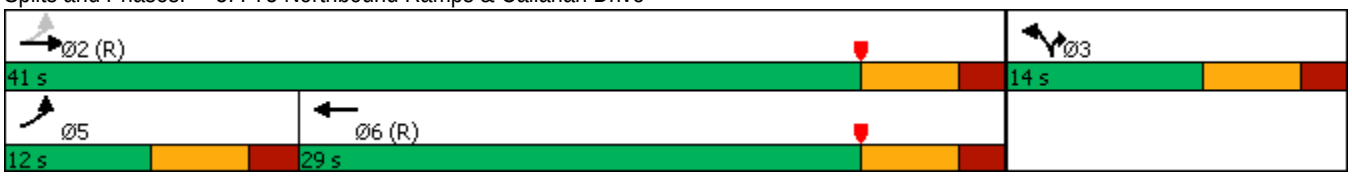


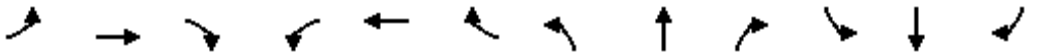
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	176	252	0	0	1154	78	403	0	248	0	0	0
Future Volume (vph)	176	252	0	0	1154	78	403	0	248	0	0	0
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	0.95	0.97	1.00	1.00	1.00	1.00	1.00
Frt					0.991				0.850			
Flt Protected	0.950						0.950					
Satd. Flow (prot)	1770	3539	0	0	3507	0	3433	0	1583	0	0	0
Flt Permitted	0.132						0.950					
Satd. Flow (perm)	246	3539	0	0	3507	0	3433	0	1583	0	0	0
Satd. Flow (RTOR)					15				261			
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Shared Lane Traffic (%)												
Lane Group Flow (vph)	185	265	0	0	1297	0	424	0	261	0	0	0
Turn Type	pm+pt	NA			NA		Prot		Prot			
Protected Phases	5	2			6		3		3			
Permitted Phases	2											
Detector Phase	5	2			6		3		3			
Switch Phase												
Minimum Initial (s)	6.0	15.0			15.0		8.0		8.0			
Minimum Split (s)	12.0	21.0			21.0		14.0		14.0			
Total Split (s)	12.0	41.0			29.0		14.0		14.0			
Total Split (%)	21.8%	74.5%			52.7%		25.5%		25.5%			
Maximum Green (s)	6.0	35.0			23.0		8.0		8.0			
Yellow Time (s)	4.0	4.0			4.0		4.0		4.0			
All-Red Time (s)	2.0	2.0			2.0		2.0		2.0			
Lost Time Adjust (s)	0.0	0.0			0.0		0.0		0.0			
Total Lost Time (s)	6.0	6.0			6.0		6.0		6.0			
Lead/Lag	Lead				Lag							
Lead-Lag Optimize?	Yes				Yes							
Vehicle Extension (s)	3.0	3.0			3.0		3.0		3.0			
Recall Mode	None	C-Max			C-Max		None		None			
Act Effct Green (s)	35.0	35.0			25.4		8.0		8.0			
Actuated g/C Ratio	0.64	0.64			0.46		0.15		0.15			
v/c Ratio	0.57	0.12			0.80		0.85		0.58			
Control Delay	29.1	0.2			21.2		42.0		9.3			
Queue Delay	0.0	0.0			0.0		0.0		0.0			
Total Delay	29.1	0.2			21.2		42.0		9.3			
LOS	C	A			C		D		A			
Approach Delay		12.1			21.2			29.5				
Approach LOS		B			C			C				
Queue Length 50th (ft)	26	0			280		71		0			
Queue Length 95th (ft)	#91	0			325		#138		53			
Internal Link Dist (ft)		901			779			1037			999	
Turn Bay Length (ft)	155						800		1000			
Base Capacity (vph)	322	2252			1627		499		453			
Starvation Cap Reductn	0	0			0		0		0			
Spillback Cap Reductn	0	0			0		0		0			
Storage Cap Reductn	0	0			0		0		0			
Reduced v/c Ratio	0.57	0.12			0.80		0.85		0.58			

Intersection Summary	
Cycle Length: 55	
Actuated Cycle Length: 55	
Offset: 5 (9%), Referenced to phase 2:EBTL and 6:WBT, Start of Yellow	
Natural Cycle: 60	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 0.85	
Intersection Signal Delay: 21.9	Intersection LOS: C
Intersection Capacity Utilization 70.6%	ICU Level of Service C
Analysis Period (min) 15	

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 5: I-75 Northbound Ramps & Callahan Drive

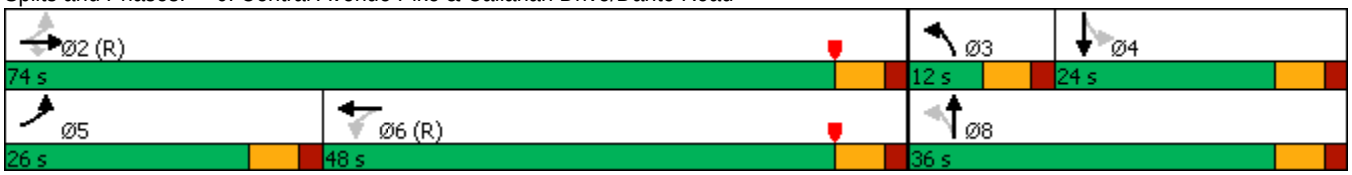




Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	292	128	124	38	394	67	98	115	20	41	178	692
Future Volume (vph)	292	128	124	38	394	67	98	115	20	41	178	692
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt			0.850		0.978			0.978				0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1770	1863	1583	1770	1822	0	1770	1822	0	1770	1863	1583
Flt Permitted	0.298			0.671			0.310			0.666		
Satd. Flow (perm)	555	1863	1583	1250	1822	0	577	1822	0	1241	1863	1583
Satd. Flow (RTOR)			131		9			8				572
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Shared Lane Traffic (%)												
Lane Group Flow (vph)	307	135	131	40	486	0	103	142	0	43	187	728
Turn Type	pm+pt	NA	Perm	Perm	NA		pm+pt	NA		Perm	NA	Free
Protected Phases	5	2			6		3	8			4	
Permitted Phases	2		2	6			8			4		Free
Detector Phase	5	2	2	6	6		3	8		4	4	
Switch Phase												
Minimum Initial (s)	6.0	15.0	15.0	15.0	15.0		6.0	8.0		8.0	8.0	
Minimum Split (s)	12.0	21.0	21.0	21.0	21.0		12.0	14.0		14.0	14.0	
Total Split (s)	26.0	74.0	74.0	48.0	48.0		12.0	36.0		24.0	24.0	
Total Split (%)	23.6%	67.3%	67.3%	43.6%	43.6%		10.9%	32.7%		21.8%	21.8%	
Maximum Green (s)	20.0	68.0	68.0	42.0	42.0		6.0	30.0		18.0	18.0	
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0		4.0	4.0	
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0		2.0	2.0		2.0	2.0	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	6.0	6.0	6.0	6.0	6.0		6.0	6.0		6.0	6.0	
Lead/Lag	Lead			Lag	Lag		Lead			Lag	Lag	
Lead-Lag Optimize?	Yes			Yes	Yes		Yes			Yes	Yes	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	None	C-Max	C-Max	C-Max	C-Max		None	None		None	None	
Act Effct Green (s)	70.7	70.7	70.7	50.6	50.6		27.3	27.3		15.3	15.3	110.0
Actuated g/C Ratio	0.64	0.64	0.64	0.46	0.46		0.25	0.25		0.14	0.14	1.00
v/c Ratio	0.60	0.11	0.12	0.07	0.58		0.50	0.31		0.25	0.72	0.46
Control Delay	16.8	7.4	1.6	19.8	26.4		41.0	33.0		44.8	61.1	1.0
Queue Delay	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	0.0
Total Delay	16.8	7.4	1.6	19.8	26.4		41.0	33.0		44.8	61.1	1.0
LOS	B	A	A	B	C		D	C		D	E	A
Approach Delay		11.1			25.9			36.4			14.7	
Approach LOS		B			C			D			B	
Queue Length 50th (ft)	85	24	1	16	244		58	76		27	127	0
Queue Length 95th (ft)	137	56	11	41	398		102	130		61	200	0
Internal Link Dist (ft)		779			937			888			996	
Turn Bay Length (ft)	570			90			110			155		155
Base Capacity (vph)	577	1197	1063	575	842		208	502		203	304	1583
Starvation Cap Reductn	0	0	0	0	0		0	0		0	0	0
Spillback Cap Reductn	0	0	0	0	0		0	0		0	0	0
Storage Cap Reductn	0	0	0	0	0		0	0		0	0	0
Reduced v/c Ratio	0.53	0.11	0.12	0.07	0.58		0.50	0.28		0.21	0.62	0.46

Intersection Summary	
Cycle Length: 110	
Actuated Cycle Length: 110	
Offset: 108 (98%), Referenced to phase 2:EBTL and 6:WBTL, Start of Yellow	
Natural Cycle: 70	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 0.72	
Intersection Signal Delay: 18.7	Intersection LOS: B
Intersection Capacity Utilization 75.8%	ICU Level of Service D
Analysis Period (min) 15	

Splits and Phases: 6: Central Avenue Pike & Callahan Drive/Dante Road



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	7	1133	4	31	967	407	1	0	8	318	0	12
Future Volume (vph)	7	1133	4	31	967	407	1	0	8	318	0	12
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.999			0.956			0.880				0.850
Flt Protected	0.950			0.950				0.994			0.950	
Satd. Flow (prot)	1770	3536	0	1770	3383	0	0	1629	0	0	1770	1583
Flt Permitted	0.105			0.125				0.994			0.950	
Satd. Flow (perm)	196	3536	0	233	3383	0	0	1629	0	0	1770	1583
Satd. Flow (RTOR)					88			182				182
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Shared Lane Traffic (%)												
Lane Group Flow (vph)	7	1184	0	32	1431	0	0	9	0	0	331	13
Turn Type	pm+pt	NA		pm+pt	NA		Split	NA		Split	NA	Perm
Protected Phases	5	2		1	6		4	4		3	3	
Permitted Phases	2			6								3
Detector Phase	5	2		1	6		4	4		3	3	3
Switch Phase												
Minimum Initial (s)	6.0	15.0		6.0	15.0		6.0	6.0		6.0	6.0	6.0
Minimum Split (s)	12.0	21.0		12.0	21.0		12.0	12.0		12.0	12.0	12.0
Total Split (s)	12.0	43.0		12.0	43.0		12.0	12.0		23.0	23.0	23.0
Total Split (%)	13.3%	47.8%		13.3%	47.8%		13.3%	13.3%		25.6%	25.6%	25.6%
Maximum Green (s)	6.0	37.0		6.0	37.0		6.0	6.0		17.0	17.0	17.0
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	4.0
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0		0.0	0.0			0.0			0.0	0.0
Total Lost Time (s)	6.0	6.0		6.0	6.0			6.0			6.0	6.0
Lead/Lag	Lead	Lag		Lead	Lag		Lag	Lag		Lead	Lead	Lead
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes		Yes	Yes	Yes
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	3.0
Recall Mode	None	Min		None	Min		None	None		None	None	None
Act Effct Green (s)	38.9	36.8		40.0	39.1			6.1			17.3	17.3
Actuated g/C Ratio	0.54	0.51		0.55	0.54			0.08			0.24	0.24
v/c Ratio	0.03	0.66		0.12	0.77			0.03			0.78	0.03
Control Delay	8.1	17.3		8.8	17.8			0.2			43.7	0.1
Queue Delay	0.0	0.0		0.0	0.0			0.0			0.0	0.0
Total Delay	8.1	17.3		8.8	17.8			0.2			43.7	0.1
LOS	A	B		A	B			A			D	A
Approach Delay		17.2			17.6			0.2			42.0	
Approach LOS		B			B			A			D	
Queue Length 50th (ft)	1	149		5	192			0			122	0
Queue Length 95th (ft)	8	393		21	#565			0			#360	0
Internal Link Dist (ft)		1332			2747			179			1202	
Turn Bay Length (ft)	125			110								45
Base Capacity (vph)	237	1837		258	1892			303			422	516
Starvation Cap Reductn	0	0		0	0			0			0	0
Spillback Cap Reductn	0	0		0	0			0			0	0
Storage Cap Reductn	0	0		0	0			0			0	0
Reduced v/c Ratio	0.03	0.64		0.12	0.76			0.03			0.78	0.03

Intersection Summary	
Cycle Length: 90	
Actuated Cycle Length: 72.4	
Natural Cycle: 90	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.78	
Intersection Signal Delay: 20.2	Intersection LOS: C
Intersection Capacity Utilization 74.0%	ICU Level of Service D
Analysis Period (min) 15	

\# 95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 1: Old Callahan Drive & Callahan Drive

HCS7 Two-Way Stop-Control Report

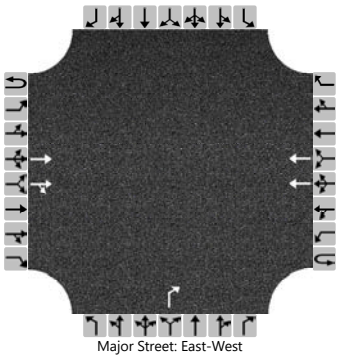
General Information

Analyst	WAS
Agency/Co.	Cannon & Cannon, Inc.
Date Performed	11/30/2020
Analysis Year	2022
Time Analyzed	PM Peak
Intersection Orientation	East-West
Project Description	2022 Existing PM

Site Information

Intersection	Yow West at Callahan Dr
Jurisdiction	Knoxville / Knox Co.
East/West Street	Callahan Drive
North/South Street	Yow Commercial West
Peak Hour Factor	0.92
Analysis Time Period (hrs)	0.25

Lanes


Major Street: East-West

Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority	1U	1	2	3	4U	4	5	6		7	8	9		10	11	12
Number of Lanes	0	0	2	0	0	0	2	0		0	0	1		0	0	0
Configuration			T	TR			T					R				
Volume (veh/h)			1306	16			1115					28				
Percent Heavy Vehicles (%)												3				
Proportion Time Blocked																
Percent Grade (%)										0						
Right Turn Channelized										No						
Median Type | Storage	Left + Thru								1							

Critical and Follow-up Headways

Base Critical Headway (sec)												6.9				
Critical Headway (sec)												6.96				
Base Follow-Up Headway (sec)												3.3				
Follow-Up Headway (sec)												3.33				

Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)												30				
Capacity, c (veh/h)												369				
v/c Ratio												0.08				
95% Queue Length, Q_{95} (veh)												0.3				
Control Delay (s/veh)												15.6				
Level of Service (LOS)												C				
Approach Delay (s/veh)										15.6						
Approach LOS										C						

HCS7 Two-Way Stop-Control Report

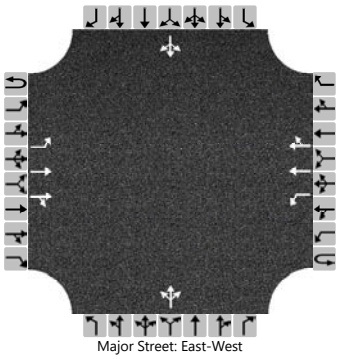
General Information

Analyst	WAS
Agency/Co.	Cannon & Cannon, Inc.
Date Performed	11/30/2020
Analysis Year	2022
Time Analyzed	PM Peak
Intersection Orientation	East-West
Project Description	2022 Existing PM

Site Information

Intersection	Yow East at Callahan Dr
Jurisdiction	Knoxville / Knox Co.
East/West Street	Callahan Drive
North/South Street	Yow Comm. East / Viles
Peak Hour Factor	0.92
Analysis Time Period (hrs)	0.25

Lanes


Major Street: East-West

Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority	1U	1	2	3	4U	4	5	6		7	8	9		10	11	12
Number of Lanes	0	1	2	0	0	1	2	0		0	1	0		0	1	0
Configuration		L	T	TR		L	T	TR			LTR				LTR	
Volume (veh/h)	0	5	1312	17	0	90	1084	4		14	0	71		5	0	17
Percent Heavy Vehicles (%)	3	3			3	3				3	3	3		3	3	3
Proportion Time Blocked																
Percent Grade (%)									0				0			
Right Turn Channelized																
Median Type | Storage	Left + Thru								2							

Critical and Follow-up Headways

Base Critical Headway (sec)		4.1				4.1				7.5	6.5	6.9		7.5	6.5	6.9
Critical Headway (sec)		4.16				4.16				7.56	6.56	6.96		7.56	6.56	6.96
Base Follow-Up Headway (sec)		2.2				2.2				3.5	4.0	3.3		3.5	4.0	3.3
Follow-Up Headway (sec)		2.23				2.23				3.53	4.03	3.33		3.53	4.03	3.33

Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)		5				98					92				24	
Capacity, c (veh/h)		581				460					268				246	
v/c Ratio		0.01				0.21					0.34				0.10	
95% Queue Length, Q_{95} (veh)		0.0				0.8					1.5				0.3	
Control Delay (s/veh)		11.3				14.9					25.4				21.2	
Level of Service (LOS)		B				B					D				C	
Approach Delay (s/veh)	0.0				1.1				25.4				21.2			
Approach LOS									D				C			

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	1234	581	335	1300	0	0	0	0	47	0	270
Future Volume (vph)	0	1234	581	335	1300	0	0	0	0	47	0	270
Lane Util. Factor	1.00	0.95	1.00	0.97	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt			0.850									0.850
Flt Protected				0.950						0.950		
Satd. Flow (prot)	0	3539	1583	3433	3539	0	0	0	0	1770	0	1583
Flt Permitted				0.950						0.950		
Satd. Flow (perm)	0	3539	1583	3433	3539	0	0	0	0	1770	0	1583
Satd. Flow (RTOR)			471									98
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	1327	625	360	1398	0	0	0	0	51	0	290
Turn Type		NA	Perm	Prot	NA					Prot		Prot
Protected Phases		2		1	6					7		7
Permitted Phases			2									
Detector Phase		2	2	1	6					7		7
Switch Phase												
Minimum Initial (s)		15.0	15.0	6.0	15.0					8.0		8.0
Minimum Split (s)		21.0	21.0	12.0	21.0					14.0		14.0
Total Split (s)		54.0	54.0	20.0	74.0					26.0		26.0
Total Split (%)		54.0%	54.0%	20.0%	74.0%					26.0%		26.0%
Maximum Green (s)		48.0	48.0	14.0	68.0					20.0		20.0
Yellow Time (s)		4.0	4.0	4.0	4.0					4.0		4.0
All-Red Time (s)		2.0	2.0	2.0	2.0					2.0		2.0
Lost Time Adjust (s)		0.0	0.0	0.0	0.0					0.0		0.0
Total Lost Time (s)		6.0	6.0	6.0	6.0					6.0		6.0
Lead/Lag		Lag	Lag	Lead								
Lead-Lag Optimize?		Yes	Yes	Yes								
Vehicle Extension (s)		3.0	3.0	3.0	3.0					3.0		3.0
Recall Mode		C-Max	C-Max	None	C-Max					None		None
Act Effct Green (s)		51.5	51.5	13.9	71.3					16.7		16.7
Actuated g/C Ratio		0.52	0.52	0.14	0.71					0.17		0.17
v/c Ratio		0.73	0.60	0.76	0.55					0.17		0.84
Control Delay		22.7	7.0	44.4	5.3					35.4		47.5
Queue Delay		0.0	0.0	0.0	0.0					0.0		0.0
Total Delay		22.7	7.0	44.4	5.3					35.4		47.5
LOS		C	A	D	A					D		D
Approach Delay		17.7			13.3						45.7	
Approach LOS		B			B						D	
Queue Length 50th (ft)		356	55	92	260					28		118
Queue Length 95th (ft)		446	161	m117	m295					60		#232
Internal Link Dist (ft)		2461			901			890			1125	
Turn Bay Length (ft)			165	130								390
Base Capacity (vph)		1821	1043	491	2523					354		395
Starvation Cap Reductn		0	0	0	0					0		0
Spillback Cap Reductn		0	0	0	0					0		0
Storage Cap Reductn		0	0	0	0					0		0
Reduced v/c Ratio		0.73	0.60	0.73	0.55					0.14		0.73

Intersection Summary	
Cycle Length: 100	
Actuated Cycle Length: 100	
Offset: 69 (69%), Referenced to phase 2:EBT and 6:WBT, Start of Yellow	
Natural Cycle: 60	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 0.84	
Intersection Signal Delay: 18.2	Intersection LOS: B
Intersection Capacity Utilization 85.7%	ICU Level of Service E
Analysis Period (min) 15	
# 95th percentile volume exceeds capacity, queue may be longer.	
Queue shown is maximum after two cycles.	
m Volume for 95th percentile queue is metered by upstream signal.	

Splits and Phases: 4: I-75 Southbound Ramps & Callahan Drive

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	416	865	0	0	917	59	715	0	718	0	0	0
Future Volume (vph)	416	865	0	0	917	59	715	0	718	0	0	0
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	0.95	0.97	1.00	1.00	1.00	1.00	1.00
Frt					0.991				0.850			
Flt Protected	0.950						0.950					
Satd. Flow (prot)	1770	3539	0	0	3507	0	3433	0	1583	0	0	0
Flt Permitted	0.121						0.950					
Satd. Flow (perm)	225	3539	0	0	3507	0	3433	0	1583	0	0	0
Satd. Flow (RTOR)					6				110			
Peak Hour Factor	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Shared Lane Traffic (%)												
Lane Group Flow (vph)	424	883	0	0	996	0	730	0	733	0	0	0
Turn Type	pm+pt	NA			NA		Prot		Prot			
Protected Phases	5	2			6		3		3			
Permitted Phases	2											
Detector Phase	5	2			6		3		3			
Switch Phase												
Minimum Initial (s)	6.0	15.0			15.0		8.0		8.0			
Minimum Split (s)	12.0	21.0			21.0		14.0		14.0			
Total Split (s)	24.0	57.0			33.0		43.0		43.0			
Total Split (%)	24.0%	57.0%			33.0%		43.0%		43.0%			
Maximum Green (s)	18.0	51.0			27.0		37.0		37.0			
Yellow Time (s)	4.0	4.0			4.0		4.0		4.0			
All-Red Time (s)	2.0	2.0			2.0		2.0		2.0			
Lost Time Adjust (s)	0.0	0.0			0.0		0.0		0.0			
Total Lost Time (s)	6.0	6.0			6.0		6.0		6.0			
Lead/Lag	Lead				Lag							
Lead-Lag Optimize?	Yes				Yes							
Vehicle Extension (s)	3.0	3.0			3.0		3.0		3.0			
Recall Mode	None	C-Max			C-Max		None		None			
Act Effct Green (s)	51.0	51.0			27.0		37.0		37.0			
Actuated g/C Ratio	0.51	0.51			0.27		0.37		0.37			
v/c Ratio	1.08	0.49			1.05		0.57		1.12			
Control Delay	79.5	9.5			67.6		27.4		99.8			
Queue Delay	0.0	0.0			0.0		0.0		0.0			
Total Delay	79.5	9.5			67.6		27.4		99.8			
LOS	E	A			E		C		F			
Approach Delay		32.2			67.6			63.7				
Approach LOS		C			E			E				
Queue Length 50th (ft)	~240	191			~346		189		~495			
Queue Length 95th (ft)	#427	186			m#462		247		#722			
Internal Link Dist (ft)		901			779			1037			999	
Turn Bay Length (ft)	155						800		1000			
Base Capacity (vph)	392	1804			951		1270		655			
Starvation Cap Reductn	0	0			0		0		0			
Spillback Cap Reductn	0	0			0		0		0			
Storage Cap Reductn	0	0			0		0		0			
Reduced v/c Ratio	1.08	0.49			1.05		0.57		1.12			

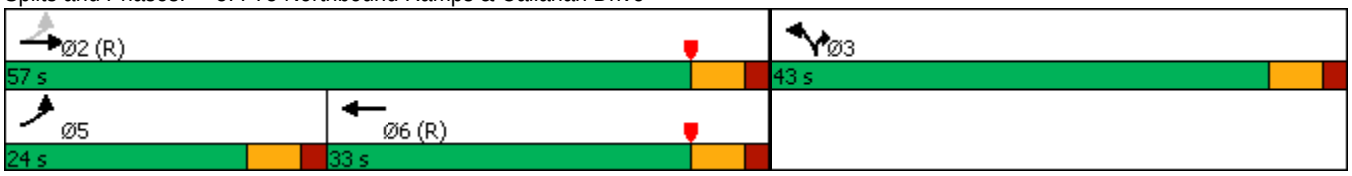
Intersection Summary	
Cycle Length: 100	
Actuated Cycle Length: 100	
Offset: 1 (1%), Referenced to phase 2:EBTL and 6:WBT, Start of Yellow	
Natural Cycle: 120	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 1.12	
Intersection Signal Delay: 53.8	Intersection LOS: D
Intersection Capacity Utilization 85.7%	ICU Level of Service E
Analysis Period (min) 15	

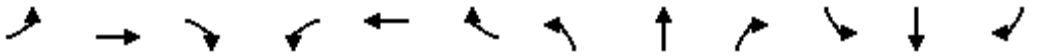
~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

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

Splits and Phases: 5: I-75 Northbound Ramps & Callahan Drive

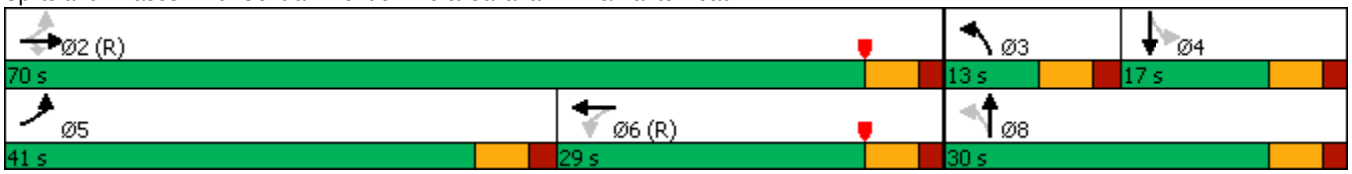




Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	686	640	262	37	290	56	176	322	34	56	190	518
Future Volume (vph)	686	640	262	37	290	56	176	322	34	56	190	518
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt			0.850		0.976			0.986				0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1770	1863	1583	1770	1818	0	1770	1837	0	1770	1863	1583
Flt Permitted	0.184			0.411			0.235			0.509		
Satd. Flow (perm)	343	1863	1583	766	1818	0	438	1837	0	948	1863	1583
Satd. Flow (RTOR)			273		9			5				540
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Shared Lane Traffic (%)												
Lane Group Flow (vph)	715	667	273	39	360	0	183	370	0	58	198	540
Turn Type	pm+pt	NA	Perm	Perm	NA		pm+pt	NA		Perm	NA	Free
Protected Phases	5	2			6		3	8			4	
Permitted Phases	2		2	6			8			4		Free
Detector Phase	5	2	2	6	6		3	8		4	4	
Switch Phase												
Minimum Initial (s)	6.0	15.0	15.0	15.0	15.0		6.0	8.0		8.0	8.0	
Minimum Split (s)	12.0	21.0	21.0	21.0	21.0		12.0	14.0		14.0	14.0	
Total Split (s)	41.0	70.0	70.0	29.0	29.0		13.0	30.0		17.0	17.0	
Total Split (%)	41.0%	70.0%	70.0%	29.0%	29.0%		13.0%	30.0%		17.0%	17.0%	
Maximum Green (s)	35.0	64.0	64.0	23.0	23.0		7.0	24.0		11.0	11.0	
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0		4.0	4.0	
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0		2.0	2.0		2.0	2.0	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	6.0	6.0	6.0	6.0	6.0		6.0	6.0		6.0	6.0	
Lead/Lag	Lead			Lag	Lag		Lead			Lag	Lag	
Lead-Lag Optimize?	Yes			Yes	Yes		Yes			Yes	Yes	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	None	C-Max	C-Max	C-Max	C-Max		None	None		None	None	
Act Effct Green (s)	64.0	64.0	64.0	23.0	23.0		24.0	24.0		11.0	11.0	100.0
Actuated g/C Ratio	0.64	0.64	0.64	0.23	0.23		0.24	0.24		0.11	0.11	1.00
v/c Ratio	1.00	0.56	0.25	0.22	0.85		0.92	0.83		0.56	0.97	0.34
Control Delay	55.0	10.9	2.7	35.2	55.5		83.1	53.3		63.8	102.0	0.6
Queue Delay	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	0.0
Total Delay	55.0	10.9	2.7	35.2	55.5		83.1	53.3		63.8	102.0	0.6
LOS	D	B	A	D	E		F	D		E	F	A
Approach Delay		28.6			53.5			63.2			30.4	
Approach LOS		C			D			E			C	
Queue Length 50th (ft)	368	137	6	20	215		99	222		36	128	0
Queue Length 95th (ft)	m#484	m180	m27	51	#370		#197	#375		#91	#268	0
Internal Link Dist (ft)		779			937			888			996	
Turn Bay Length (ft)	570			90			110			155		155
Base Capacity (vph)	718	1192	1111	176	425		198	444		104	204	1583
Starvation Cap Reductn	0	0	0	0	0		0	0		0	0	0
Spillback Cap Reductn	0	0	0	0	0		0	0		0	0	0
Storage Cap Reductn	0	0	0	0	0		0	0		0	0	0
Reduced v/c Ratio	1.00	0.56	0.25	0.22	0.85		0.92	0.83		0.56	0.97	0.34

Intersection Summary	
Cycle Length: 100	
Actuated Cycle Length: 100	
Offset: 76 (76%), Referenced to phase 2:EBTL and 6:WBTL, Start of Yellow	
Natural Cycle: 90	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 1.00	
Intersection Signal Delay: 37.6	Intersection LOS: D
Intersection Capacity Utilization 102.3%	ICU Level of Service G
Analysis Period (min) 15	
# 95th percentile volume exceeds capacity, queue may be longer.	
Queue shown is maximum after two cycles.	
m Volume for 95th percentile queue is metered by upstream signal.	

Splits and Phases: 6: Central Avenue Pike & Callahan Drive/Dante Road

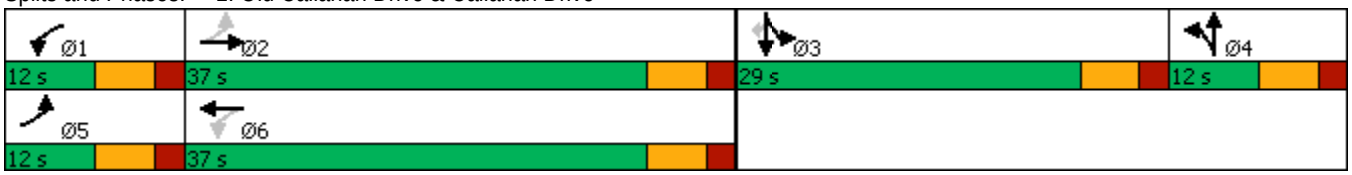


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	9	531	1	2	782	299	0	0	2	378	2	8
Future Volume (vph)	9	531	1	2	782	299	0	0	2	378	2	8
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00
Frt					0.958			0.865				0.850
Flt Protected	0.950			0.950							0.953	
Satd. Flow (prot)	1770	3539	0	1770	3391	0	0	1611	0	0	1775	1583
Flt Permitted	0.136			0.387							0.953	
Satd. Flow (perm)	253	3539	0	721	3391	0	0	1611	0	0	1775	1583
Satd. Flow (RTOR)					68			223				182
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Shared Lane Traffic (%)												
Lane Group Flow (vph)	10	572	0	2	1163	0	0	2	0	0	408	9
Turn Type	pm+pt	NA		pm+pt	NA			NA		Split	NA	Perm
Protected Phases	5	2		1	6		4	4		3	3	
Permitted Phases	2			6								3
Detector Phase	5	2		1	6		4	4		3	3	3
Switch Phase												
Minimum Initial (s)	6.0	15.0		6.0	15.0		6.0	6.0		6.0	6.0	6.0
Minimum Split (s)	12.0	21.0		12.0	21.0		12.0	12.0		12.0	12.0	12.0
Total Split (s)	12.0	37.0		12.0	37.0		12.0	12.0		29.0	29.0	29.0
Total Split (%)	13.3%	41.1%		13.3%	41.1%		13.3%	13.3%		32.2%	32.2%	32.2%
Maximum Green (s)	6.0	31.0		6.0	31.0		6.0	6.0		23.0	23.0	23.0
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	4.0
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0		0.0	0.0			0.0			0.0	0.0
Total Lost Time (s)	6.0	6.0		6.0	6.0			6.0			6.0	6.0
Lead/Lag	Lead	Lag		Lead	Lag		Lag	Lag		Lead	Lead	Lead
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes		Yes	Yes	Yes
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	3.0
Recall Mode	None	Min		None	Min		None	None		None	None	None
Act Effct Green (s)	30.4	29.5		30.4	29.5			6.2			20.8	20.8
Actuated g/C Ratio	0.46	0.44		0.46	0.44			0.09			0.31	0.31
v/c Ratio	0.04	0.36		0.00	0.75			0.01			0.73	0.01
Control Delay	11.3	14.8		11.0	20.5			0.0			32.1	0.0
Queue Delay	0.0	0.0		0.0	0.0			0.0			0.0	0.0
Total Delay	11.3	14.8		11.0	20.5			0.0			32.1	0.0
LOS	B	B		B	C			A			C	A
Approach Delay		14.8			20.5						31.4	
Approach LOS		B			C						C	
Queue Length 50th (ft)	2	70		0	168			0			136	0
Queue Length 95th (ft)	11	181		4	#465			0			#393	0
Internal Link Dist (ft)		1332			2747			179			1202	
Turn Bay Length (ft)	125			110								45
Base Capacity (vph)	258	1713		428	1676			353			637	685
Starvation Cap Reductn	0	0		0	0			0			0	0
Spillback Cap Reductn	0	0		0	0			0			0	0
Storage Cap Reductn	0	0		0	0			0			0	0
Reduced v/c Ratio	0.04	0.33		0.00	0.69			0.01			0.64	0.01

Intersection Summary	
Cycle Length: 90	
Actuated Cycle Length: 66.3	
Natural Cycle: 90	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.75	
Intersection Signal Delay: 21.1	Intersection LOS: C
Intersection Capacity Utilization 68.9%	ICU Level of Service C
Analysis Period (min) 15	

\# 95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 1: Old Callahan Drive & Callahan Drive



HCS7 Two-Way Stop-Control Report

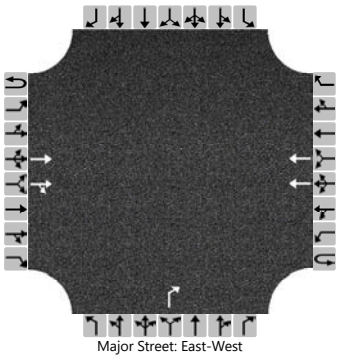
General Information

Analyst	WAS
Agency/Co.	Cannon & Cannon, Inc.
Date Performed	11/30/2020
Analysis Year	2025
Time Analyzed	AM Peak
Intersection Orientation	East-West
Project Description	2025 Background AM

Site Information

Intersection	Yow West at Callahan Dr
Jurisdiction	Knoxville / Knox Co.
East/West Street	Callahan Drive
North/South Street	Yow Commercial West
Peak Hour Factor	0.92
Analysis Time Period (hrs)	0.25

Lanes


Major Street: East-West

Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority	1U	1	2	3	4U	4	5	6		7	8	9		10	11	12
Number of Lanes	0	0	2	0	0	0	2	0		0	0	1		0	0	0
Configuration			T	TR			T					R				
Volume (veh/h)			661	1			1107					6				
Percent Heavy Vehicles (%)												3				
Proportion Time Blocked																
Percent Grade (%)										0						
Right Turn Channelized										No						
Median Type | Storage	Left + Thru								1							

Critical and Follow-up Headways

Base Critical Headway (sec)												6.9				
Critical Headway (sec)												6.96				
Base Follow-Up Headway (sec)												3.3				
Follow-Up Headway (sec)												3.33				

Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)												7				
Capacity, c (veh/h)												634				
v/c Ratio												0.01				
95% Queue Length, Q_{95} (veh)												0.0				
Control Delay (s/veh)												10.7				
Level of Service (LOS)												B				
Approach Delay (s/veh)										10.7						
Approach LOS										B						

HCS7 Two-Way Stop-Control Report

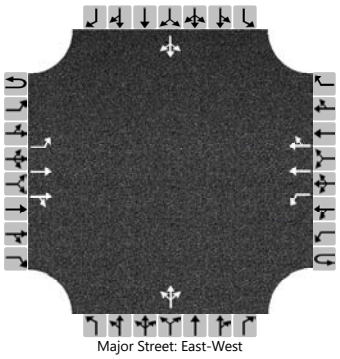
General Information

Analyst	WAS
Agency/Co.	Cannon & Cannon, Inc.
Date Performed	11/30/2020
Analysis Year	2025
Time Analyzed	AM Peak
Intersection Orientation	East-West
Project Description	2025 Background AM

Site Information

Intersection	Yow East at Callahan Dr
Jurisdiction	Knoxville / Knox Co.
East/West Street	Callahan Drive
North/South Street	Yow Comm. East / Viles
Peak Hour Factor	0.92
Analysis Time Period (hrs)	0.25

Lanes



Major Street: East-West

Vehicle Volumes and Adjustments

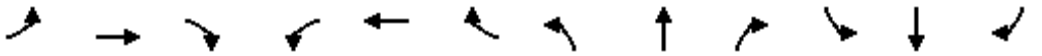
Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority	1U	1	2	3	4U	4	5	6		7	8	9		10	11	12
Number of Lanes	0	1	2	0	0	1	2	0		0	1	0		0	1	0
Configuration		L	T	TR		L	T	TR			LTR				LTR	
Volume (veh/h)	0	5	646	10	0	18	990	10		7	0	15		0	0	0
Percent Heavy Vehicles (%)	3	3			3	3				3	3	3		3	3	3
Proportion Time Blocked																
Percent Grade (%)										0				0		
Right Turn Channelized																
Median Type | Storage		Left + Thru								2						

Critical and Follow-up Headways

Base Critical Headway (sec)		4.1				4.1				7.5	6.5	6.9		7.5	6.5	6.9
Critical Headway (sec)		4.16				4.16				7.56	6.56	6.96		7.56	6.56	6.96
Base Follow-Up Headway (sec)		2.2				2.2				3.5	4.0	3.3		3.5	4.0	3.3
Follow-Up Headway (sec)		2.23				2.23				3.53	4.03	3.33		3.53	4.03	3.33

Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)		5				20					24				0	
Capacity, c (veh/h)		632				876					466					
v/c Ratio		0.01				0.02					0.05					
95% Queue Length, Q_{95} (veh)		0.0				0.1					0.2					
Control Delay (s/veh)		10.7				9.2					13.1					
Level of Service (LOS)		B				A					B					
Approach Delay (s/veh)		0.1				0.2				13.1						
Approach LOS										B						



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	514	506	622	1059	0	0	0	0	34	0	300
Future Volume (vph)	0	514	506	622	1059	0	0	0	0	34	0	300
Lane Util. Factor	1.00	0.95	1.00	0.97	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt			0.850									0.850
Flt Protected				0.950						0.950		
Satd. Flow (prot)	0	3539	1583	3433	3539	0	0	0	0	1770	0	1583
Flt Permitted				0.950						0.950		
Satd. Flow (perm)	0	3539	1583	3433	3539	0	0	0	0	1770	0	1583
Satd. Flow (RTOR)			521									140
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	541	533	655	1115	0	0	0	0	36	0	316
Turn Type		NA	Perm	Prot	NA					Prot		Prot
Protected Phases		2		1	6					7		7
Permitted Phases			2									
Detector Phase		2	2	1	6					7		7
Switch Phase												
Minimum Initial (s)		15.0	15.0	6.0	15.0					8.0		8.0
Minimum Split (s)		21.0	21.0	12.0	21.0					14.0		14.0
Total Split (s)		28.0	28.0	22.0	50.0					20.0		20.0
Total Split (%)		40.0%	40.0%	31.4%	71.4%					28.6%		28.6%
Maximum Green (s)		22.0	22.0	16.0	44.0					14.0		14.0
Yellow Time (s)		4.0	4.0	4.0	4.0					4.0		4.0
All-Red Time (s)		2.0	2.0	2.0	2.0					2.0		2.0
Lost Time Adjust (s)		0.0	0.0	0.0	0.0					0.0		0.0
Total Lost Time (s)		6.0	6.0	6.0	6.0					6.0		6.0
Lead/Lag		Lag	Lag	Lead								
Lead-Lag Optimize?		Yes	Yes	Yes								
Vehicle Extension (s)		3.0	3.0	3.0	3.0					3.0		3.0
Recall Mode		C-Max	C-Max	None	C-Max					None		None
Act Effct Green (s)		23.9	23.9	15.8	45.8					12.2		12.2
Actuated g/C Ratio		0.34	0.34	0.23	0.65					0.17		0.17
v/c Ratio		0.45	0.60	0.85	0.48					0.12		0.81
Control Delay		20.0	5.5	28.6	1.2					24.2		32.3
Queue Delay		0.0	0.0	0.0	0.0					0.0		0.0
Total Delay		20.0	5.5	28.6	1.2					24.2		32.3
LOS		C	A	C	A					C		C
Approach Delay		12.8			11.3						31.4	
Approach LOS		B			B						C	
Queue Length 50th (ft)		97	4	131	3					13		69
Queue Length 95th (ft)		142	70	m144	3					35		#184
Internal Link Dist (ft)		2461			901			890			1125	
Turn Bay Length (ft)			165	130								390
Base Capacity (vph)		1210	884	793	2313					354		428
Starvation Cap Reductn		0	0	0	0					0		0
Spillback Cap Reductn		0	0	0	0					0		0
Storage Cap Reductn		0	0	0	0					0		0
Reduced v/c Ratio		0.45	0.60	0.83	0.48					0.10		0.74

Intersection Summary	
Cycle Length: 70	
Actuated Cycle Length: 70	
Offset: 35 (50%), Referenced to phase 2:EBT and 6:WBT, Start of Yellow	
Natural Cycle: 55	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 0.85	
Intersection Signal Delay: 14.1	Intersection LOS: B
Intersection Capacity Utilization 76.4%	ICU Level of Service D
Analysis Period (min) 15	
# 95th percentile volume exceeds capacity, queue may be longer.	
Queue shown is maximum after two cycles.	
m Volume for 95th percentile queue is metered by upstream signal.	

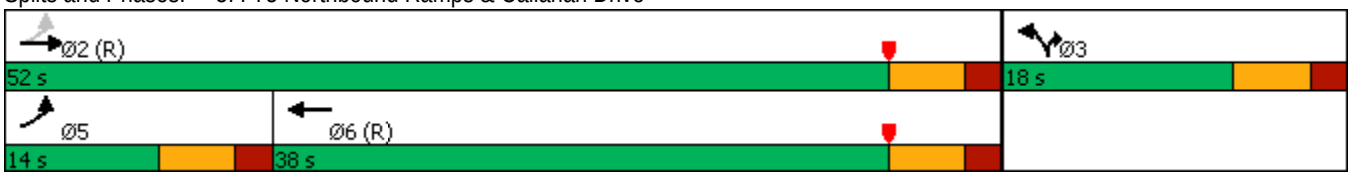
Splits and Phases: 4: I-75 Southbound Ramps & Callahan Drive

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	194	278	0	0	1274	86	445	0	274	0	0	0
Future Volume (vph)	194	278	0	0	1274	86	445	0	274	0	0	0
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	0.95	0.97	1.00	1.00	1.00	1.00	1.00
Frt					0.990				0.850			
Flt Protected	0.950						0.950					
Satd. Flow (prot)	1770	3539	0	0	3504	0	3433	0	1583	0	0	0
Flt Permitted	0.104						0.950					
Satd. Flow (perm)	194	3539	0	0	3504	0	3433	0	1583	0	0	0
Satd. Flow (RTOR)					13				288			
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Shared Lane Traffic (%)												
Lane Group Flow (vph)	204	293	0	0	1432	0	468	0	288	0	0	0
Turn Type	pm+pt	NA			NA		Prot		Prot			
Protected Phases	5	2			6		3		3			
Permitted Phases	2											
Detector Phase	5	2			6		3		3			
Switch Phase												
Minimum Initial (s)	6.0	15.0			15.0		8.0		8.0			
Minimum Split (s)	12.0	21.0			21.0		14.0		14.0			
Total Split (s)	14.0	52.0			38.0		18.0		18.0			
Total Split (%)	20.0%	74.3%			54.3%		25.7%		25.7%			
Maximum Green (s)	8.0	46.0			32.0		12.0		12.0			
Yellow Time (s)	4.0	4.0			4.0		4.0		4.0			
All-Red Time (s)	2.0	2.0			2.0		2.0		2.0			
Lost Time Adjust (s)	0.0	0.0			0.0		0.0		0.0			
Total Lost Time (s)	6.0	6.0			6.0		6.0		6.0			
Lead/Lag	Lead				Lag							
Lead-Lag Optimize?	Yes				Yes							
Vehicle Extension (s)	3.0	3.0			3.0		3.0		3.0			
Recall Mode	None	C-Max			C-Max		None		None			
Act Effct Green (s)	46.2	46.2			32.4		11.8		11.8			
Actuated g/C Ratio	0.66	0.66			0.46		0.17		0.17			
v/c Ratio	0.68	0.13			0.88		0.81		0.57			
Control Delay	22.5	0.3			29.9		40.7		8.7			
Queue Delay	0.0	0.0			0.0		0.0		0.0			
Total Delay	22.5	0.3			29.9		40.7		8.7			
LOS	C	A			C		D		A			
Approach Delay		9.4			29.9			28.5				
Approach LOS		A			C			C				
Queue Length 50th (ft)	0	0			420		101		0			
Queue Length 95th (ft)	#82	0			490		#168		60			
Internal Link Dist (ft)		901			779			1037			999	
Turn Bay Length (ft)	155						800		1000			
Base Capacity (vph)	308	2334			1630		588		510			
Starvation Cap Reductn	0	0			0		0		0			
Spillback Cap Reductn	0	0			0		0		0			
Storage Cap Reductn	0	0			0		0		0			
Reduced v/c Ratio	0.66	0.13			0.88		0.80		0.56			

Intersection Summary	
Cycle Length: 70	
Actuated Cycle Length: 70	
Offset: 2 (3%), Referenced to phase 2:EBTL and 6:WBT, Start of Yellow	
Natural Cycle: 60	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 0.88	
Intersection Signal Delay: 25.7	Intersection LOS: C
Intersection Capacity Utilization 76.4%	ICU Level of Service D
Analysis Period (min) 15	

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

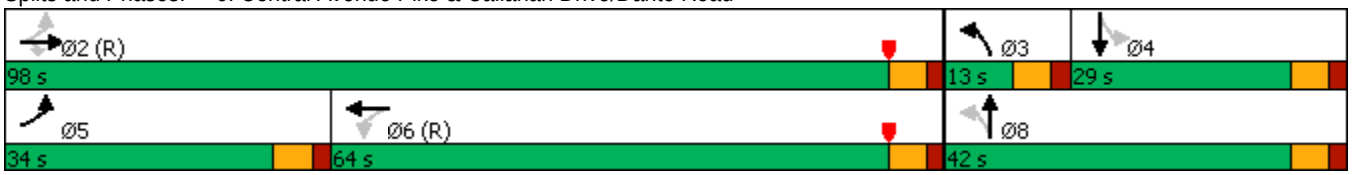
Splits and Phases: 5: I-75 Northbound Ramps & Callahan Drive



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	322	141	137	42	435	74	108	127	22	45	197	764
Future Volume (vph)	322	141	137	42	435	74	108	127	22	45	197	764
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt			0.850		0.978			0.978				0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1770	1863	1583	1770	1822	0	1770	1822	0	1770	1863	1583
Flt Permitted	0.294			0.663			0.246			0.657		
Satd. Flow (perm)	548	1863	1583	1235	1822	0	458	1822	0	1224	1863	1583
Satd. Flow (RTOR)			144		7			6				558
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Shared Lane Traffic (%)												
Lane Group Flow (vph)	339	148	144	44	536	0	114	157	0	47	207	804
Turn Type	pm+pt	NA	Perm	Perm	NA		pm+pt	NA		Perm	NA	Free
Protected Phases	5	2			6		3	8			4	
Permitted Phases	2		2	6			8			4		Free
Detector Phase	5	2	2	6	6		3	8		4	4	
Switch Phase												
Minimum Initial (s)	6.0	15.0	15.0	15.0	15.0		6.0	8.0		8.0	8.0	
Minimum Split (s)	12.0	21.0	21.0	21.0	21.0		12.0	14.0		14.0	14.0	
Total Split (s)	34.0	98.0	98.0	64.0	64.0		13.0	42.0		29.0	29.0	
Total Split (%)	24.3%	70.0%	70.0%	45.7%	45.7%		9.3%	30.0%		20.7%	20.7%	
Maximum Green (s)	28.0	92.0	92.0	58.0	58.0		7.0	36.0		23.0	23.0	
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0		4.0	4.0	
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0		2.0	2.0		2.0	2.0	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	6.0	6.0	6.0	6.0	6.0		6.0	6.0		6.0	6.0	
Lead/Lag	Lead			Lag	Lag		Lead			Lag	Lag	
Lead-Lag Optimize?	Yes			Yes	Yes		Yes			Yes	Yes	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	None	C-Max	C-Max	C-Max	C-Max		None	None		None	None	
Act Effct Green (s)	95.3	95.3	95.3	72.2	72.2		32.7	32.7		19.7	19.7	140.0
Actuated g/C Ratio	0.68	0.68	0.68	0.52	0.52		0.23	0.23		0.14	0.14	1.00
v/c Ratio	0.65	0.12	0.13	0.07	0.57		0.66	0.37		0.27	0.79	0.51
Control Delay	16.3	5.1	0.6	20.6	27.7		63.1	45.1		56.6	79.1	1.2
Queue Delay	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	0.0
Total Delay	16.3	5.1	0.6	20.6	27.7		63.1	45.1		56.6	79.1	1.2
LOS	B	A	A	C	C		E	D		E	E	A
Approach Delay		10.1			27.2			52.7			18.9	
Approach LOS		B			C			D			B	
Queue Length 50th (ft)	79	25	0	20	322		85	115		39	183	0
Queue Length 95th (ft)	223	47	4	49	518		139	180		79	269	0
Internal Link Dist (ft)		779			937			888			996	
Turn Bay Length (ft)	570			90			110			155		155
Base Capacity (vph)	617	1268	1123	636	942		172	472		201	306	1583
Starvation Cap Reductn	0	0	0	0	0		0	0		0	0	0
Spillback Cap Reductn	0	0	0	0	0		0	0		0	0	0
Storage Cap Reductn	0	0	0	0	0		0	0		0	0	0
Reduced v/c Ratio	0.55	0.12	0.13	0.07	0.57		0.66	0.33		0.23	0.68	0.51

Intersection Summary	
Cycle Length: 140	
Actuated Cycle Length: 140	
Offset: 63 (45%), Referenced to phase 2:EBTL and 6:WBTL, Start of Yellow	
Natural Cycle: 80	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 0.79	
Intersection Signal Delay: 22.2	Intersection LOS: C
Intersection Capacity Utilization 81.6%	ICU Level of Service D
Analysis Period (min) 15	

Splits and Phases: 6: Central Avenue Pike & Callahan Drive/Dante Road



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	8	1251	4	34	1068	449	1	0	9	351	0	13
Future Volume (vph)	8	1251	4	34	1068	449	1	0	9	351	0	13
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00
Frt					0.956			0.878				0.850
Flt Protected	0.950			0.950				0.995			0.950	
Satd. Flow (prot)	1770	3539	0	1770	3383	0	0	1627	0	0	1770	1583
Flt Permitted	0.087			0.095				0.995			0.950	
Satd. Flow (perm)	162	3539	0	177	3383	0	0	1627	0	0	1770	1583
Satd. Flow (RTOR)					83			164				164
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Shared Lane Traffic (%)												
Lane Group Flow (vph)	8	1307	0	35	1581	0	0	10	0	0	366	14
Turn Type	pm+pt	NA		pm+pt	NA		Split	NA		Split	NA	Perm
Protected Phases	5	2		1	6		4	4		3	3	
Permitted Phases	2			6								3
Detector Phase	5	2		1	6		4	4		3	3	3
Switch Phase												
Minimum Initial (s)	6.0	15.0		6.0	15.0		6.0	6.0		6.0	6.0	6.0
Minimum Split (s)	12.0	21.0		12.0	21.0		12.0	12.0		12.0	12.0	12.0
Total Split (s)	12.0	50.0		12.0	50.0		12.0	12.0		26.0	26.0	26.0
Total Split (%)	12.0%	50.0%		12.0%	50.0%		12.0%	12.0%		26.0%	26.0%	26.0%
Maximum Green (s)	6.0	44.0		6.0	44.0		6.0	6.0		20.0	20.0	20.0
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	4.0
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0		0.0	0.0			0.0			0.0	0.0
Total Lost Time (s)	6.0	6.0		6.0	6.0			6.0			6.0	6.0
Lead/Lag	Lead	Lag		Lead	Lag		Lag	Lag		Lead	Lead	Lead
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes		Yes	Yes	Yes
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	3.0
Recall Mode	None	Min		None	Min		None	None		None	None	None
Act Effct Green (s)	46.8	43.4		49.2	48.2			6.1			20.2	20.2
Actuated g/C Ratio	0.55	0.51		0.58	0.57			0.07			0.24	0.24
v/c Ratio	0.04	0.72		0.16	0.81			0.04			0.87	0.03
Control Delay	8.6	20.5		9.7	19.5			0.3			55.0	0.1
Queue Delay	0.0	0.0		0.0	0.0			0.0			0.0	0.0
Total Delay	8.6	20.5		9.7	19.5			0.3			55.0	0.1
LOS	A	C		A	B			A			D	A
Approach Delay		20.4			19.3			0.3			53.0	
Approach LOS		C			B			A			D	
Queue Length 50th (ft)	2	287		6	264			0			183	0
Queue Length 95th (ft)	9	474		23	#694			0			#431	0
Internal Link Dist (ft)		1332			2747			179			1202	
Turn Bay Length (ft)	125			110								45
Base Capacity (vph)	204	1860		217	1963			268			422	502
Starvation Cap Reductn	0	0		0	0			0			0	0
Spillback Cap Reductn	0	0		0	0			0			0	0
Storage Cap Reductn	0	0		0	0			0			0	0
Reduced v/c Ratio	0.04	0.70		0.16	0.81			0.04			0.87	0.03

Intersection Summary	
Cycle Length: 100	
Actuated Cycle Length: 84.6	
Natural Cycle: 100	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.87	
Intersection Signal Delay: 23.6	Intersection LOS: C
Intersection Capacity Utilization 80.0%	ICU Level of Service D
Analysis Period (min) 15	
# 95th percentile volume exceeds capacity, queue may be longer.	
Queue shown is maximum after two cycles.	

Splits and Phases: 1: Old Callahan Drive & Callahan Drive

HCS7 Two-Way Stop-Control Report

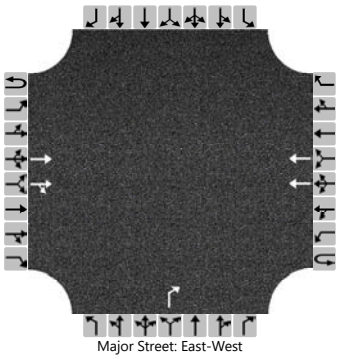
General Information

Analyst	WAS
Agency/Co.	Cannon & Cannon, Inc.
Date Performed	11/30/2020
Analysis Year	2025
Time Analyzed	PM Peak
Intersection Orientation	East-West
Project Description	2025 Background PM

Site Information

Intersection	Yow West at Callahan Dr
Jurisdiction	Knoxville / Knox Co.
East/West Street	Callahan Drive
North/South Street	Yow Commercial West
Peak Hour Factor	0.92
Analysis Time Period (hrs)	0.25

Lanes


Major Street: East-West

Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority	1U	1	2	3	4U	4	5	6		7	8	9		10	11	12
Number of Lanes	0	0	2	0	0	0	2	0		0	0	1		0	0	0
Configuration			T	TR			T					R				
Volume (veh/h)			1415	18			1507					31				
Percent Heavy Vehicles (%)												3				
Proportion Time Blocked																
Percent Grade (%)										0						
Right Turn Channelized										No						
Median Type | Storage	Left + Thru								1							

Critical and Follow-up Headways

Base Critical Headway (sec)												6.9				
Critical Headway (sec)												6.96				
Base Follow-Up Headway (sec)												3.3				
Follow-Up Headway (sec)												3.33				

Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)												34				
Capacity, c (veh/h)												337				
v/c Ratio												0.10				
95% Queue Length, Q_{95} (veh)												0.3				
Control Delay (s/veh)												16.9				
Level of Service (LOS)												C				
Approach Delay (s/veh)										16.9						
Approach LOS										C						

HCS7 Two-Way Stop-Control Report

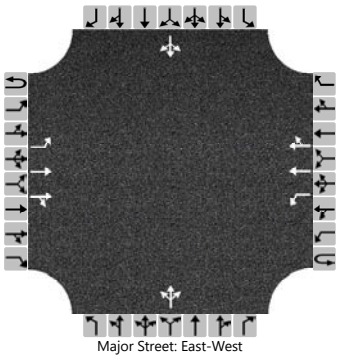
General Information

Analyst	WAS
Agency/Co.	Cannon & Cannon, Inc.
Date Performed	11/30/2020
Analysis Year	2025
Time Analyzed	PM Peak
Intersection Orientation	East-West
Project Description	2025 Background PM

Site Information

Intersection	Yow East at Callahan Dr
Jurisdiction	Knoxville / Knox Co.
East/West Street	Callahan Drive
North/South Street	Yow Comm. East / Viles
Peak Hour Factor	0.92
Analysis Time Period (hrs)	0.25

Lanes


Major Street: East-West

Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority	1U	1	2	3	4U	4	5	6		7	8	9		10	11	12
Number of Lanes	0	1	2	0	0	1	2	0		0	1	0		0	1	0
Configuration		L	T	TR		L	T	TR			LTR				LTR	
Volume (veh/h)	0	5	1392	18	0	96	1150	4		15	0	75		5	0	18
Percent Heavy Vehicles (%)	3	3			3	3				3	3	3		3	3	3
Proportion Time Blocked																
Percent Grade (%)									0				0			
Right Turn Channelized																
Median Type | Storage	Left + Thru								2							

Critical and Follow-up Headways

Base Critical Headway (sec)		4.1				4.1				7.5	6.5	6.9		7.5	6.5	6.9
Critical Headway (sec)		4.16				4.16				7.56	6.56	6.96		7.56	6.56	6.96
Base Follow-Up Headway (sec)		2.2				2.2				3.5	4.0	3.3		3.5	4.0	3.3
Follow-Up Headway (sec)		2.23				2.23				3.53	4.03	3.33		3.53	4.03	3.33

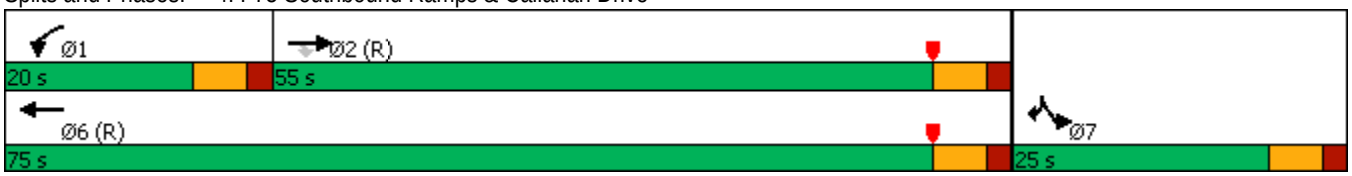
Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)		5				104					98				25	
Capacity, c (veh/h)		545				425					243				221	
v/c Ratio		0.01				0.25					0.40				0.11	
95% Queue Length, Q_{95} (veh)		0.0				1.0					1.8				0.4	
Control Delay (s/veh)		11.7				16.2					29.4				23.4	
Level of Service (LOS)		B				C					D				C	
Approach Delay (s/veh)	0.0				1.2				29.4				23.4			
Approach LOS									D				C			

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	1362	641	370	1435	0	0	0	0	52	0	298
Future Volume (vph)	0	1362	641	370	1435	0	0	0	0	52	0	298
Lane Util. Factor	1.00	0.95	1.00	0.97	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt			0.850									0.850
Flt Protected				0.950						0.950		
Satd. Flow (prot)	0	3539	1583	3433	3539	0	0	0	0	1770	0	1583
Flt Permitted				0.950						0.950		
Satd. Flow (perm)	0	3539	1583	3433	3539	0	0	0	0	1770	0	1583
Satd. Flow (RTOR)			479									98
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	1465	689	398	1543	0	0	0	0	56	0	320
Turn Type		NA	Perm	Prot	NA					Prot		Prot
Protected Phases		2		1	6					7		7
Permitted Phases			2									
Detector Phase		2	2	1	6					7		7
Switch Phase												
Minimum Initial (s)		15.0	15.0	6.0	15.0					8.0		8.0
Minimum Split (s)		21.0	21.0	12.0	21.0					14.0		14.0
Total Split (s)		55.0	55.0	20.0	75.0					25.0		25.0
Total Split (%)		55.0%	55.0%	20.0%	75.0%					25.0%		25.0%
Maximum Green (s)		49.0	49.0	14.0	69.0					19.0		19.0
Yellow Time (s)		4.0	4.0	4.0	4.0					4.0		4.0
All-Red Time (s)		2.0	2.0	2.0	2.0					2.0		2.0
Lost Time Adjust (s)		0.0	0.0	0.0	0.0					0.0		0.0
Total Lost Time (s)		6.0	6.0	6.0	6.0					6.0		6.0
Lead/Lag		Lag	Lag	Lead								
Lead-Lag Optimize?		Yes	Yes	Yes								
Vehicle Extension (s)		3.0	3.0	3.0	3.0					3.0		3.0
Recall Mode		C-Max	C-Max	None	C-Max					None		None
Act Effct Green (s)		50.5	50.5	14.0	70.5					17.5		17.5
Actuated g/C Ratio		0.50	0.50	0.14	0.70					0.18		0.18
v/c Ratio		0.82	0.67	0.83	0.62					0.18		0.89
Control Delay		26.2	8.9	49.4	4.7					35.8		55.5
Queue Delay		0.0	0.0	0.0	0.0					0.0		0.0
Total Delay		26.2	8.9	49.4	4.7					35.8		55.5
LOS		C	A	D	A					D		E
Approach Delay		20.7			13.9						52.6	
Approach LOS		C			B						D	
Queue Length 50th (ft)		411	81	112	273					30		140
Queue Length 95th (ft)		513	211	m128	m281					65		#289
Internal Link Dist (ft)		2461			901			890			1125	
Turn Bay Length (ft)			165	130								390
Base Capacity (vph)		1787	1036	487	2494					336		380
Starvation Cap Reductn		0	0	0	0					0		0
Spillback Cap Reductn		0	0	0	0					0		0
Storage Cap Reductn		0	0	0	0					0		0
Reduced v/c Ratio		0.82	0.67	0.82	0.62					0.17		0.84

Intersection Summary	
Cycle Length: 100	
Actuated Cycle Length: 100	
Offset: 66 (66%), Referenced to phase 2:EBT and 6:WBT, Start of Yellow	
Natural Cycle: 70	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 0.89	
Intersection Signal Delay: 20.4	Intersection LOS: C
Intersection Capacity Utilization 93.0%	ICU Level of Service F
Analysis Period (min) 15	
# 95th percentile volume exceeds capacity, queue may be longer.	
Queue shown is maximum after two cycles.	
m Volume for 95th percentile queue is metered by upstream signal.	

Splits and Phases: 4: I-75 Southbound Ramps & Callahan Drive



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	459	955	0	0	1012	65	789	0	793	0	0	0
Future Volume (vph)	459	955	0	0	1012	65	789	0	793	0	0	0
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	0.95	0.97	1.00	1.00	1.00	1.00	1.00
Frt					0.991				0.850			
Flt Protected	0.950						0.950					
Satd. Flow (prot)	1770	3539	0	0	3507	0	3433	0	1583	0	0	0
Flt Permitted	0.118						0.950					
Satd. Flow (perm)	220	3539	0	0	3507	0	3433	0	1583	0	0	0
Satd. Flow (RTOR)					6				98			
Peak Hour Factor	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Shared Lane Traffic (%)												
Lane Group Flow (vph)	468	974	0	0	1099	0	805	0	809	0	0	0
Turn Type	pm+pt	NA			NA		Prot		Prot			
Protected Phases	5	2			6		3		3			
Permitted Phases	2											
Detector Phase	5	2			6		3		3			
Switch Phase												
Minimum Initial (s)	6.0	15.0			15.0		8.0		8.0			
Minimum Split (s)	12.0	21.0			21.0		14.0		14.0			
Total Split (s)	24.0	58.0			34.0		42.0		42.0			
Total Split (%)	24.0%	58.0%			34.0%		42.0%		42.0%			
Maximum Green (s)	18.0	52.0			28.0		36.0		36.0			
Yellow Time (s)	4.0	4.0			4.0		4.0		4.0			
All-Red Time (s)	2.0	2.0			2.0		2.0		2.0			
Lost Time Adjust (s)	0.0	0.0			0.0		0.0		0.0			
Total Lost Time (s)	6.0	6.0			6.0		6.0		6.0			
Lead/Lag	Lead				Lag							
Lead-Lag Optimize?	Yes				Yes							
Vehicle Extension (s)	3.0	3.0			3.0		3.0		3.0			
Recall Mode	None	C-Max			C-Max		None		None			
Act Effct Green (s)	52.0	52.0			28.0		36.0		36.0			
Actuated g/C Ratio	0.52	0.52			0.28		0.36		0.36			
v/c Ratio	1.19	0.53			1.11		0.65		1.28			
Control Delay	118.5	10.6			89.5		29.8		164.8			
Queue Delay	0.0	0.0			0.0		0.0		0.0			
Total Delay	118.5	10.6			89.5		29.8		164.8			
LOS	F	B			F		C		F			
Approach Delay		45.6			89.5			97.4				
Approach LOS		D			F			F				
Queue Length 50th (ft)	~296	258			~407		218		~619			
Queue Length 95th (ft)	m#440	260			m#478		283		#853			
Internal Link Dist (ft)		901			779			1037			999	
Turn Bay Length (ft)	155						800		1000			
Base Capacity (vph)	393	1840			986		1235		632			
Starvation Cap Reductn	0	0			0		0		0			
Spillback Cap Reductn	0	0			0		0		0			
Storage Cap Reductn	0	0			0		0		0			
Reduced v/c Ratio	1.19	0.53			1.11		0.65		1.28			

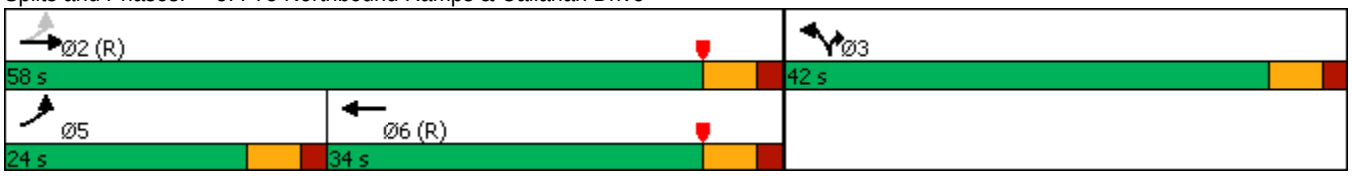
Intersection Summary	
Cycle Length: 100	
Actuated Cycle Length: 100	
Offset: 1 (1%), Referenced to phase 2:EBTL and 6:WBT, Start of Yellow	
Natural Cycle: 110	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 1.28	
Intersection Signal Delay: 77.4	Intersection LOS: E
Intersection Capacity Utilization 93.0%	ICU Level of Service F
Analysis Period (min) 15	

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

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

Splits and Phases: 5: I-75 Northbound Ramps & Callahan Drive



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	757	707	289	41	320	62	194	355	38	62	210	572
Future Volume (vph)	757	707	289	41	320	62	194	355	38	62	210	572
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt			0.850		0.976			0.985				0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1770	1863	1583	1770	1818	0	1770	1835	0	1770	1863	1583
Flt Permitted	0.143			0.386			0.235			0.364		
Satd. Flow (perm)	266	1863	1583	719	1818	0	438	1835	0	678	1863	1583
Satd. Flow (RTOR)			301		9			5				596
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Shared Lane Traffic (%)												
Lane Group Flow (vph)	789	736	301	43	398	0	202	410	0	65	219	596
Turn Type	pm+pt	NA	Perm	Perm	NA		pm+pt	NA		Perm	NA	Free
Protected Phases	5	2			6		3	8			4	
Permitted Phases	2		2	6			8			4		Free
Detector Phase	5	2	2	6	6		3	8		4	4	
Switch Phase												
Minimum Initial (s)	6.0	15.0	15.0	15.0	15.0		6.0	8.0		8.0	8.0	
Minimum Split (s)	12.0	21.0	21.0	21.0	21.0		12.0	14.0		14.0	14.0	
Total Split (s)	42.0	70.0	70.0	28.0	28.0		13.0	30.0		17.0	17.0	
Total Split (%)	42.0%	70.0%	70.0%	28.0%	28.0%		13.0%	30.0%		17.0%	17.0%	
Maximum Green (s)	36.0	64.0	64.0	22.0	22.0		7.0	24.0		11.0	11.0	
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0		4.0	4.0	
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0		2.0	2.0		2.0	2.0	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	6.0	6.0	6.0	6.0	6.0		6.0	6.0		6.0	6.0	
Lead/Lag	Lead			Lag	Lag		Lead			Lag	Lag	
Lead-Lag Optimize?	Yes			Yes	Yes		Yes			Yes	Yes	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	None	C-Max	C-Max	C-Max	C-Max		None	None		None	None	
Act Effct Green (s)	64.0	64.0	64.0	22.0	22.0		24.0	24.0		11.0	11.0	100.0
Actuated g/C Ratio	0.64	0.64	0.64	0.22	0.22		0.24	0.24		0.11	0.11	1.00
v/c Ratio	1.11	0.62	0.27	0.27	0.98		1.02	0.92		0.88	1.07	0.38
Control Delay	89.5	11.5	2.7	37.8	79.4		106.1	65.3		121.7	127.7	0.7
Queue Delay	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	0.0
Total Delay	89.5	11.5	2.7	37.8	79.4		106.1	65.3		121.7	127.7	0.7
LOS	F	B	A	D	E		F	E		F	F	A
Approach Delay		43.7			75.3			78.8			41.2	
Approach LOS		D			E			E			D	
Queue Length 50th (ft)	~527	154	12	23	248		~114	254		42	~155	0
Queue Length 95th (ft)	m#553	m193	m28	56	#442		#227	#436		#125	#302	0
Internal Link Dist (ft)		779			937			888			996	
Turn Bay Length (ft)	570			90			110			155		155
Base Capacity (vph)	711	1192	1121	158	406		198	444		74	204	1583
Starvation Cap Reductn	0	0	0	0	0		0	0		0	0	0
Spillback Cap Reductn	0	0	0	0	0		0	0		0	0	0
Storage Cap Reductn	0	0	0	0	0		0	0		0	0	0
Reduced v/c Ratio	1.11	0.62	0.27	0.27	0.98		1.02	0.92		0.88	1.07	0.38

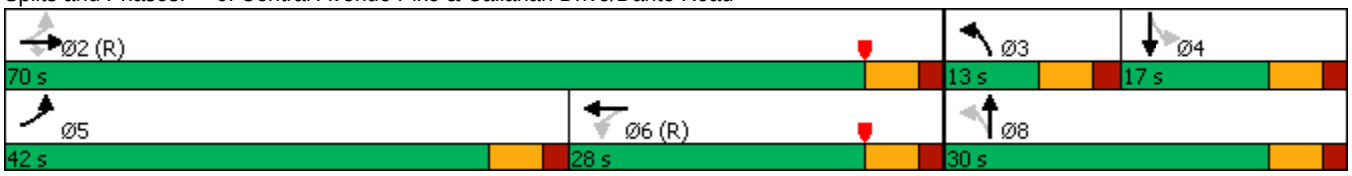
Intersection Summary	
Cycle Length: 100	
Actuated Cycle Length: 100	
Offset: 76 (76%), Referenced to phase 2:EBTL and 6:WBTL, Start of Yellow	
Natural Cycle: 110	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 1.11	
Intersection Signal Delay: 52.6	Intersection LOS: D
Intersection Capacity Utilization 110.2%	ICU Level of Service H
Analysis Period (min) 15	

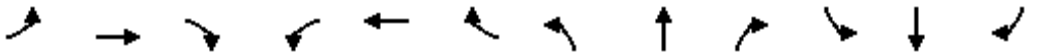
~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

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

Splits and Phases: 6: Central Avenue Pike & Callahan Drive/Dante Road





Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	9	571	1	2	791	303	0	0	2	394	2	8
Future Volume (vph)	9	571	1	2	791	303	0	0	2	394	2	8
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00
Frt					0.958			0.865				0.850
Flt Protected	0.950			0.950							0.953	
Satd. Flow (prot)	1770	3539	0	1770	3391	0	0	1611	0	0	1775	1583
Flt Permitted	0.136			0.354							0.953	
Satd. Flow (perm)	253	3539	0	659	3391	0	0	1611	0	0	1775	1583
Satd. Flow (RTOR)					69			208				182
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Shared Lane Traffic (%)												
Lane Group Flow (vph)	10	615	0	2	1177	0	0	2	0	0	426	9
Turn Type	pm+pt	NA		pm+pt	NA			NA		Split	NA	Perm
Protected Phases	5	2		1	6		4	4		3	3	
Permitted Phases	2			6								3
Detector Phase	5	2		1	6		4	4		3	3	3
Switch Phase												
Minimum Initial (s)	6.0	15.0		6.0	15.0		6.0	6.0		6.0	6.0	6.0
Minimum Split (s)	12.0	21.0		12.0	21.0		12.0	12.0		12.0	12.0	12.0
Total Split (s)	12.0	38.0		12.0	38.0		12.0	12.0		28.0	28.0	28.0
Total Split (%)	13.3%	42.2%		13.3%	42.2%		13.3%	13.3%		31.1%	31.1%	31.1%
Maximum Green (s)	6.0	32.0		6.0	32.0		6.0	6.0		22.0	22.0	22.0
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	4.0
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0		0.0	0.0			0.0			0.0	0.0
Total Lost Time (s)	6.0	6.0		6.0	6.0			6.0			6.0	6.0
Lead/Lag	Lead	Lag		Lead	Lag		Lag	Lag		Lead	Lead	Lead
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes		Yes	Yes	Yes
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	3.0
Recall Mode	None	Min		None	Min		None	None		None	None	None
Act Effct Green (s)	30.3	29.4		30.3	29.4			6.2			22.4	22.4
Actuated g/C Ratio	0.45	0.43		0.45	0.43			0.09			0.33	0.33
v/c Ratio	0.04	0.40		0.01	0.78			0.01			0.73	0.01
Control Delay	11.0	15.3		10.5	21.5			0.0			31.9	0.0
Queue Delay	0.0	0.0		0.0	0.0			0.0			0.0	0.0
Total Delay	11.0	15.3		10.5	21.5			0.0			31.9	0.0
LOS	B	B		B	C			A			C	A
Approach Delay		15.2			21.5						31.3	
Approach LOS		B			C						C	
Queue Length 50th (ft)	2	76		0	171			0			144	0
Queue Length 95th (ft)	11	192		4	#462			0			#430	0
Internal Link Dist (ft)		1332			2747			179			1202	
Turn Bay Length (ft)	125			110								45
Base Capacity (vph)	250	1715		395	1679			335			591	649
Starvation Cap Reductn	0	0		0	0			0			0	0
Spillback Cap Reductn	0	0		0	0			0			0	0
Storage Cap Reductn	0	0		0	0			0			0	0
Reduced v/c Ratio	0.04	0.36		0.01	0.70			0.01			0.72	0.01

Intersection Summary	
Cycle Length: 90	
Actuated Cycle Length: 67.7	
Natural Cycle: 90	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.78	
Intersection Signal Delay: 21.6	Intersection LOS: C
Intersection Capacity Utilization 70.2%	ICU Level of Service C
Analysis Period (min) 15	

\# 95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 1: Old Callahan Drive & Callahan Drive

HCS7 Two-Way Stop-Control Report

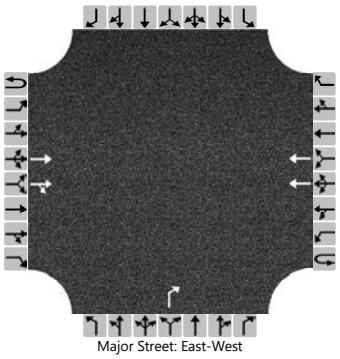
General Information

Analyst	WAS
Agency/Co.	Cannon & Cannon, Inc.
Date Performed	11/30/2020
Analysis Year	2025
Time Analyzed	AM Peak
Intersection Orientation	East-West
Project Description	2025 Combined AM

Site Information

Intersection	Yow West at Callahan Dr
Jurisdiction	Knoxville / Knox Co.
East/West Street	Callahan Drive
North/South Street	Yow Commercial West
Peak Hour Factor	0.92
Analysis Time Period (hrs)	0.25

Lanes


Major Street: East-West

Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority	1U	1	2	3	4U	4	5	6		7	8	9		10	11	12
Number of Lanes	0	0	2	0	0	0	2	0		0	0	1		0	0	0
Configuration			T	TR			T					R				
Volume (veh/h)			717	1			1010					6				
Percent Heavy Vehicles (%)												3				
Proportion Time Blocked																
Percent Grade (%)										0						
Right Turn Channelized										No						
Median Type | Storage	Left + Thru								1							

Critical and Follow-up Headways

Base Critical Headway (sec)												6.9				
Critical Headway (sec)												6.96				
Base Follow-Up Headway (sec)												3.3				
Follow-Up Headway (sec)												3.33				

Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)												7				
Capacity, c (veh/h)												606				
v/c Ratio												0.01				
95% Queue Length, Q_{95} (veh)												0.0				
Control Delay (s/veh)												11.0				
Level of Service (LOS)												B				
Approach Delay (s/veh)										11.0						
Approach LOS										B						

HCS7 Two-Way Stop-Control Report

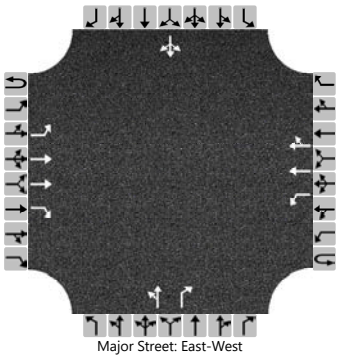
General Information

Analyst	WAS
Agency/Co.	Cannon & Cannon, Inc.
Date Performed	3/16/2021
Analysis Year	2025
Time Analyzed	AM Peak
Intersection Orientation	East-West
Project Description	2025 Combined AM

Site Information

Intersection	Yow East at Callahan Dr
Jurisdiction	Knoxville / Knox Co.
East/West Street	Callahan Drive
North/South Street	Yow Comm. East / Viles
Peak Hour Factor	0.92
Analysis Time Period (hrs)	0.25

Lanes


Major Street: East-West

Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority	1U	1	2	3	4U	4	5	6		7	8	9		10	11	12
Number of Lanes	0	1	2	1	0	1	2	0		0	1	1		0	1	0
Configuration		L	T	R		L	T	TR		LT		R			LTR	
Volume (veh/h)	0	5	646	66	0	113	990	10		20	0	35		0	0	0
Percent Heavy Vehicles (%)	3	3			3	3				3	3	3		3	3	3
Proportion Time Blocked																
Percent Grade (%)										0				0		
Right Turn Channelized		No								No						
Median Type | Storage		Left + Thru								2						

Critical and Follow-up Headways

Base Critical Headway (sec)		4.1				4.1				7.5	6.5	6.9		7.5	6.5	6.9
Critical Headway (sec)		4.16				4.16				7.56	6.56	6.96		7.56	6.56	6.96
Base Follow-Up Headway (sec)		2.2				2.2				3.5	4.0	3.3		3.5	4.0	3.3
Follow-Up Headway (sec)		2.23				2.23				3.53	4.03	3.33		3.53	4.03	3.33

Delay, Queue Length, and Level of Service

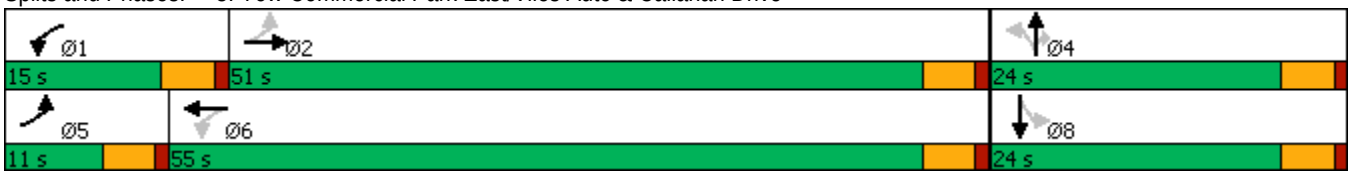
Flow Rate, v (veh/h)		5				123				22		38			0	
Capacity, c (veh/h)		632				831				231		642				
v/c Ratio		0.01				0.15				0.09		0.06				
95% Queue Length, Q_{95} (veh)		0.0				0.5				0.3		0.2				
Control Delay (s/veh)		10.7				10.1				22.2		11.0				
Level of Service (LOS)		B				B				C		B				
Approach Delay (s/veh)		0.1				1.0				15.1						
Approach LOS										C						

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	5	646	66	113	990	10	20	0	35	0	0	0
Future Volume (vph)	5	646	66	113	990	10	20	0	35	0	0	0
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.986			0.998				0.850			
Flt Protected	0.950			0.950				0.950				
Satd. Flow (prot)	1770	3490	0	1770	3532	0	0	1770	1583	0	1863	0
Flt Permitted	0.272			0.296								
Satd. Flow (perm)	507	3490	0	551	3532	0	0	1863	1583	0	1863	0
Satd. Flow (RTOR)		18			2				73			
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Shared Lane Traffic (%)												
Lane Group Flow (vph)	5	749	0	119	1053	0	0	21	37	0	0	0
Turn Type	pm+pt	NA		pm+pt	NA		Perm	NA	Perm			
Protected Phases	5	2		1	6			4			8	
Permitted Phases	2			6			4		4	8		
Detector Phase	5	2		1	6		4	4	4	8	8	
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0		5.0	5.0	5.0	5.0	5.0	
Minimum Split (s)	9.5	22.5		9.5	22.5		22.5	22.5	22.5	22.5	22.5	
Total Split (s)	11.0	51.0		15.0	55.0		24.0	24.0	24.0	24.0	24.0	
Total Split (%)	12.2%	56.7%		16.7%	61.1%		26.7%	26.7%	26.7%	26.7%	26.7%	
Maximum Green (s)	6.5	46.5		10.5	50.5		19.5	19.5	19.5	19.5	19.5	
Yellow Time (s)	3.5	3.5		3.5	3.5		3.5	3.5	3.5	3.5	3.5	
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0	1.0	1.0	1.0	1.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0			0.0	0.0		0.0	
Total Lost Time (s)	4.5	4.5		4.5	4.5			4.5	4.5		4.5	
Lead/Lag	Lead	Lag		Lead	Lag							
Lead-Lag Optimize?	Yes	Yes		Yes	Yes							
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	
Recall Mode	None	Min		None	Min		None	None	None	None	None	
Walk Time (s)		7.0			7.0		7.0	7.0	7.0	7.0	7.0	
Flash Dont Walk (s)		11.0			11.0		11.0	11.0	11.0	11.0	11.0	
Pedestrian Calls (#/hr)		0			0		0	0	0	0	0	
Act Effct Green (s)	27.0	23.8		30.9	33.2			6.6	6.6			
Actuated g/C Ratio	0.68	0.60		0.78	0.83			0.17	0.17			
v/c Ratio	0.01	0.36		0.19	0.36			0.07	0.12			
Control Delay	2.8	7.5		2.8	4.2			18.6	3.4			
Queue Delay	0.0	0.0		0.0	0.0			0.0	0.0			
Total Delay	2.8	7.5		2.8	4.2			18.6	3.4			
LOS	A	A		A	A			B	A			
Approach Delay		7.4			4.0			8.9				
Approach LOS		A			A			A				
Queue Length 50th (ft)	0	32		0	0			3	0			
Queue Length 95th (ft)	2	115		21	165			23	10			
Internal Link Dist (ft)		736			2461			639			452	
Turn Bay Length (ft)	160			150								
Base Capacity (vph)	570	3364		773	3454			966	856			
Starvation Cap Reductn	0	0		0	0			0	0			

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Spillback Cap Reductn	0	0		0	0			0	0			
Storage Cap Reductn	0	0		0	0			0	0			
Reduced v/c Ratio	0.01	0.22		0.15	0.30			0.02	0.04			

Intersection Summary	
Cycle Length: 90	
Actuated Cycle Length: 39.8	
Natural Cycle: 60	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.36	
Intersection Signal Delay: 5.5	Intersection LOS: A
Intersection Capacity Utilization 47.3%	ICU Level of Service A
Analysis Period (min) 15	

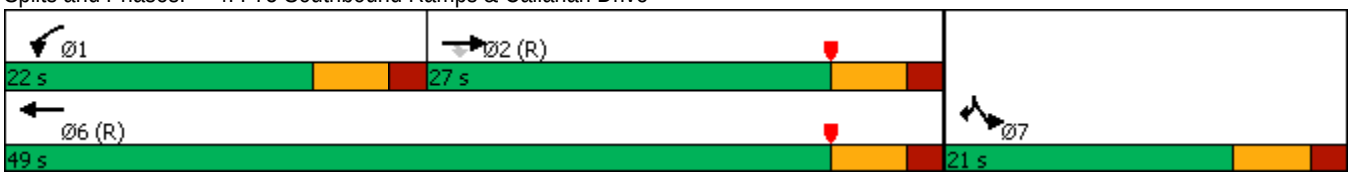
Splits and Phases: 3: Yow Commercial Park East/Viles Auto & Callahan Drive



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	524	517	622	1131	0	0	0	0	34	0	331
Future Volume (vph)	0	524	517	622	1131	0	0	0	0	34	0	331
Lane Util. Factor	1.00	0.95	1.00	0.97	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt			0.850									0.850
Flt Protected				0.950						0.950		
Satd. Flow (prot)	0	3539	1583	3433	3539	0	0	0	0	1770	0	1583
Flt Permitted				0.950						0.950		
Satd. Flow (perm)	0	3539	1583	3433	3539	0	0	0	0	1770	0	1583
Satd. Flow (RTOR)			539									140
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	552	544	655	1191	0	0	0	0	36	0	348
Turn Type		NA	Perm	Prot	NA					Prot		Prot
Protected Phases		2		1	6					7		7
Permitted Phases			2									
Detector Phase		2	2	1	6					7		7
Switch Phase												
Minimum Initial (s)		15.0	15.0	6.0	15.0					8.0		8.0
Minimum Split (s)		21.0	21.0	12.0	21.0					14.0		14.0
Total Split (s)		27.0	27.0	22.0	49.0					21.0		21.0
Total Split (%)		38.6%	38.6%	31.4%	70.0%					30.0%		30.0%
Maximum Green (s)		21.0	21.0	16.0	43.0					15.0		15.0
Yellow Time (s)		4.0	4.0	4.0	4.0					4.0		4.0
All-Red Time (s)		2.0	2.0	2.0	2.0					2.0		2.0
Lost Time Adjust (s)		0.0	0.0	0.0	0.0					0.0		0.0
Total Lost Time (s)		6.0	6.0	6.0	6.0					6.0		6.0
Lead/Lag		Lag	Lag	Lead								
Lead-Lag Optimize?		Yes	Yes	Yes								
Vehicle Extension (s)		3.0	3.0	3.0	3.0					3.0		3.0
Recall Mode		C-Max	C-Max	None	C-Max					None		None
Act Effct Green (s)		23.0	23.0	15.8	44.9					13.1		13.1
Actuated g/C Ratio		0.33	0.33	0.23	0.64					0.19		0.19
v/c Ratio		0.47	0.62	0.85	0.53					0.11		0.85
Control Delay		21.1	5.6	28.6	1.9					23.2		36.4
Queue Delay		0.0	0.0	0.0	0.0					0.0		0.0
Total Delay		21.1	5.6	28.6	1.9					23.2		36.4
LOS		C	A	C	A					C		D
Approach Delay		13.4			11.4						35.1	
Approach LOS		B			B						D	
Queue Length 50th (ft)		102	2	136	25					13		83
Queue Length 95th (ft)		148	69	m145	37					35		#211
Internal Link Dist (ft)		2461			901			890			1125	
Turn Bay Length (ft)			165	130								390
Base Capacity (vph)		1164	882	793	2267					379		449
Starvation Cap Reductn		0	0	0	0					0		0
Spillback Cap Reductn		0	0	0	0					0		0
Storage Cap Reductn		0	0	0	0					0		0
Reduced v/c Ratio		0.47	0.62	0.83	0.53					0.09		0.78

Intersection Summary	
Cycle Length: 70	
Actuated Cycle Length: 70	
Offset: 34 (49%), Referenced to phase 2:EBT and 6:WBT, Start of Yellow	
Natural Cycle: 60	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 0.85	
Intersection Signal Delay: 14.8	Intersection LOS: B
Intersection Capacity Utilization 78.8%	ICU Level of Service D
Analysis Period (min) 15	
# 95th percentile volume exceeds capacity, queue may be longer.	
Queue shown is maximum after two cycles.	
m Volume for 95th percentile queue is metered by upstream signal.	

Splits and Phases: 4: I-75 Southbound Ramps & Callahan Drive

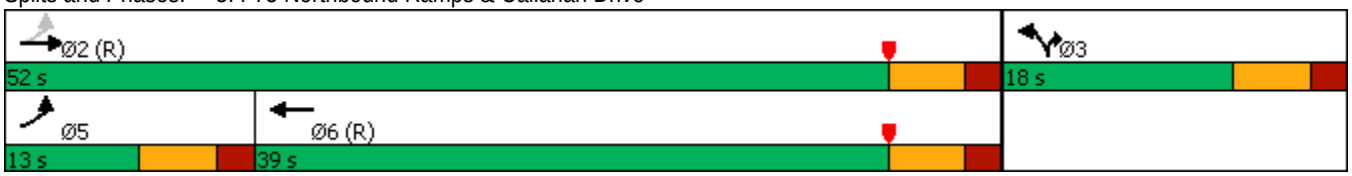


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	201	284	0	0	1298	86	493	0	274	0	0	0
Future Volume (vph)	201	284	0	0	1298	86	493	0	274	0	0	0
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	0.95	0.97	1.00	1.00	1.00	1.00	1.00
Frt					0.991				0.850			
Flt Protected	0.950						0.950					
Satd. Flow (prot)	1770	3539	0	0	3507	0	3433	0	1583	0	0	0
Flt Permitted	0.103						0.950					
Satd. Flow (perm)	192	3539	0	0	3507	0	3433	0	1583	0	0	0
Satd. Flow (RTOR)					13				288			
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Shared Lane Traffic (%)												
Lane Group Flow (vph)	212	299	0	0	1457	0	519	0	288	0	0	0
Turn Type	pm+pt	NA			NA		Prot		Prot			
Protected Phases	5	2			6		3		3			
Permitted Phases	2											
Detector Phase	5	2			6		3		3			
Switch Phase												
Minimum Initial (s)	6.0	15.0			15.0		8.0		8.0			
Minimum Split (s)	12.0	21.0			21.0		14.0		14.0			
Total Split (s)	13.0	52.0			39.0		18.0		18.0			
Total Split (%)	18.6%	74.3%			55.7%		25.7%		25.7%			
Maximum Green (s)	7.0	46.0			33.0		12.0		12.0			
Yellow Time (s)	4.0	4.0			4.0		4.0		4.0			
All-Red Time (s)	2.0	2.0			2.0		2.0		2.0			
Lost Time Adjust (s)	0.0	0.0			0.0		0.0		0.0			
Total Lost Time (s)	6.0	6.0			6.0		6.0		6.0			
Lead/Lag	Lead				Lag							
Lead-Lag Optimize?	Yes				Yes							
Vehicle Extension (s)	3.0	3.0			3.0		3.0		3.0			
Recall Mode	None	C-Max			C-Max		None		None			
Act Effct Green (s)	46.0	46.0			33.0		12.0		12.0			
Actuated g/C Ratio	0.66	0.66			0.47		0.17		0.17			
v/c Ratio	0.75	0.13			0.88		0.88		0.56			
Control Delay	31.6	0.5			29.0		47.5		8.6			
Queue Delay	0.0	0.0			0.0		0.0		0.0			
Total Delay	31.6	0.5			29.0		47.5		8.6			
LOS	C	A			C		D		A			
Approach Delay		13.4			29.0			33.6				
Approach LOS		B			C			C				
Queue Length 50th (ft)	30	0			423		113		0			
Queue Length 95th (ft)	#114	0			504		#196		60			
Internal Link Dist (ft)		901			779			1037			999	
Turn Bay Length (ft)	155						800		1000			
Base Capacity (vph)	283	2325			1660		588		510			
Starvation Cap Reductn	0	0			0		0		0			
Spillback Cap Reductn	0	0			0		0		0			
Storage Cap Reductn	0	0			0		0		0			
Reduced v/c Ratio	0.75	0.13			0.88		0.88		0.56			

Intersection Summary	
Cycle Length: 70	
Actuated Cycle Length: 70	
Offset: 2 (3%), Referenced to phase 2:EBTL and 6:WBT, Start of Yellow	
Natural Cycle: 60	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 0.88	
Intersection Signal Delay: 27.5	Intersection LOS: C
Intersection Capacity Utilization 78.8%	ICU Level of Service D
Analysis Period (min) 15	

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 5: I-75 Northbound Ramps & Callahan Drive



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	201	284	0	0	1298	86	493	0	274	0	0	0
Future Volume (vph)	201	284	0	0	1298	86	493	0	274	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	155		0	0		0	800		1000	0		0
Storage Lanes	1		0	0		0	1		2	0		0
Taper Length (ft)	150			25			210			25		
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	0.95	0.97	1.00	0.88	1.00	1.00	1.00
Frt					0.991				0.850			
Flt Protected	0.950						0.950					
Satd. Flow (prot)	1770	3539	0	0	3507	0	3433	0	2787	0	0	0
Flt Permitted	0.103						0.950					
Satd. Flow (perm)	192	3539	0	0	3507	0	3433	0	2787	0	0	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)					13				288			
Link Speed (mph)		45			45			40			40	
Link Distance (ft)		981			859			1117			1079	
Travel Time (s)		14.9			13.0			19.0			18.4	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Shared Lane Traffic (%)												
Lane Group Flow (vph)	212	299	0	0	1457	0	519	0	288	0	0	0
Turn Type	pm+pt	NA			NA		Prot		Prot			
Protected Phases	5	2			6		3		3			
Permitted Phases	2											
Detector Phase	5	2			6		3		3			
Switch Phase												
Minimum Initial (s)	6.0	15.0			15.0		8.0		8.0			
Minimum Split (s)	12.0	21.0			21.0		14.0		14.0			
Total Split (s)	13.0	52.0			39.0		18.0		18.0			
Total Split (%)	18.6%	74.3%			55.7%		25.7%		25.7%			
Maximum Green (s)	7.0	46.0			33.0		12.0		12.0			
Yellow Time (s)	4.0	4.0			4.0		4.0		4.0			
All-Red Time (s)	2.0	2.0			2.0		2.0		2.0			
Lost Time Adjust (s)	0.0	0.0			0.0		0.0		0.0			
Total Lost Time (s)	6.0	6.0			6.0		6.0		6.0			
Lead/Lag	Lead				Lag							
Lead-Lag Optimize?	Yes				Yes							
Vehicle Extension (s)	3.0	3.0			3.0		3.0		3.0			
Recall Mode	None	C-Max			C-Max		None		None			
Act Effct Green (s)	46.0	46.0			33.0		12.0		12.0			
Actuated g/C Ratio	0.66	0.66			0.47		0.17		0.17			
v/c Ratio	0.75	0.13			0.88		0.88		0.40			
Control Delay	35.3	0.3			28.9		47.5		5.6			
Queue Delay	0.0	0.0			0.0		0.0		0.0			
Total Delay	35.3	0.3			28.9		47.5		5.6			
LOS	D	A			C		D		A			
Approach Delay		14.8			28.9			32.5				
Approach LOS		B			C			C				
Queue Length 50th (ft)	40	0			435		113		0			

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Queue Length 95th (ft)	#126	0			507		#196		32			
Internal Link Dist (ft)		901			779			1037			999	
Turn Bay Length (ft)	155						800		1000			
Base Capacity (vph)	283	2325			1660		588		716			
Starvation Cap Reductn	0	0			0		0		0			
Spillback Cap Reductn	0	0			0		0		0			
Storage Cap Reductn	0	0			0		0		0			
Reduced v/c Ratio	0.75	0.13			0.88		0.88		0.40			

Intersection Summary			
Area Type:	Other		
Cycle Length: 70			
Actuated Cycle Length: 70			
Offset: 2 (3%), Referenced to phase 2:EBTL and 6:WBT, Start of Yellow			
Natural Cycle: 60			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.88			
Intersection Signal Delay: 27.4		Intersection LOS: C	
Intersection Capacity Utilization 78.8%		ICU Level of Service D	
Analysis Period (min) 15			
# 95th percentile volume exceeds capacity, queue may be longer.			
Queue shown is maximum after two cycles.			

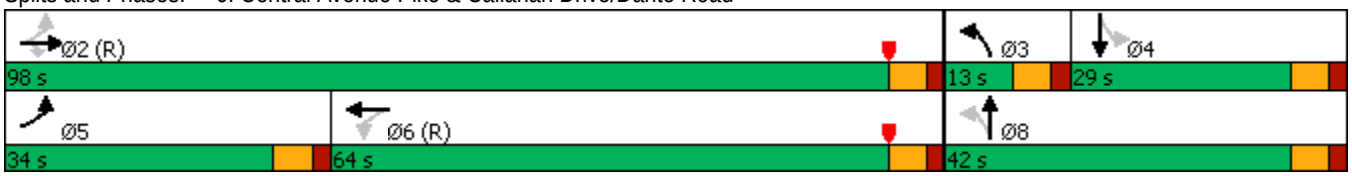
Splits and Phases: 5: I-75 Northbound Ramps & Callahan Drive

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	325	143	138	42	443	74	110	127	22	45	197	778
Future Volume (vph)	325	143	138	42	443	74	110	127	22	45	197	778
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt			0.850		0.978			0.978				0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1770	1863	1583	1770	1822	0	1770	1822	0	1770	1863	1583
Flt Permitted	0.286			0.661			0.246			0.657		
Satd. Flow (perm)	533	1863	1583	1231	1822	0	458	1822	0	1224	1863	1583
Satd. Flow (RTOR)			145		7			6				554
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Shared Lane Traffic (%)												
Lane Group Flow (vph)	342	151	145	44	544	0	116	157	0	47	207	819
Turn Type	pm+pt	NA	Perm	Perm	NA		pm+pt	NA		Perm	NA	Free
Protected Phases	5	2			6		3	8			4	
Permitted Phases	2		2	6			8			4		Free
Detector Phase	5	2	2	6	6		3	8		4	4	
Switch Phase												
Minimum Initial (s)	6.0	15.0	15.0	15.0	15.0		6.0	8.0		8.0	8.0	
Minimum Split (s)	12.0	21.0	21.0	21.0	21.0		12.0	14.0		14.0	14.0	
Total Split (s)	34.0	98.0	98.0	64.0	64.0		13.0	42.0		29.0	29.0	
Total Split (%)	24.3%	70.0%	70.0%	45.7%	45.7%		9.3%	30.0%		20.7%	20.7%	
Maximum Green (s)	28.0	92.0	92.0	58.0	58.0		7.0	36.0		23.0	23.0	
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0		4.0	4.0	
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0		2.0	2.0		2.0	2.0	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	6.0	6.0	6.0	6.0	6.0		6.0	6.0		6.0	6.0	
Lead/Lag	Lead			Lag	Lag		Lead			Lag	Lag	
Lead-Lag Optimize?	Yes			Yes	Yes		Yes			Yes	Yes	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	None	C-Max	C-Max	C-Max	C-Max		None	None		None	None	
Act Effct Green (s)	95.3	95.3	95.3	71.8	71.8		32.7	32.7		19.7	19.7	140.0
Actuated g/C Ratio	0.68	0.68	0.68	0.51	0.51		0.23	0.23		0.14	0.14	1.00
v/c Ratio	0.66	0.12	0.13	0.07	0.58		0.67	0.37		0.27	0.79	0.52
Control Delay	17.7	5.2	0.5	21.0	28.4		64.0	45.1		56.6	79.1	1.2
Queue Delay	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	0.0
Total Delay	17.7	5.2	0.5	21.0	28.4		64.0	45.1		56.6	79.1	1.2
LOS	B	A	A	C	C		E	D		E	E	A
Approach Delay		10.8			27.9			53.1			18.7	
Approach LOS		B			C			D			B	
Queue Length 50th (ft)	91	26	0	20	330		87	115		39	183	0
Queue Length 95th (ft)	204	49	4	50	537		#142	180		79	269	0
Internal Link Dist (ft)		779			937			888			996	
Turn Bay Length (ft)	570			90			110			155		155
Base Capacity (vph)	610	1268	1123	631	938		172	472		201	306	1583
Starvation Cap Reductn	0	0	0	0	0		0	0		0	0	0
Spillback Cap Reductn	0	0	0	0	0		0	0		0	0	0
Storage Cap Reductn	0	0	0	0	0		0	0		0	0	0
Reduced v/c Ratio	0.56	0.12	0.13	0.07	0.58		0.67	0.33		0.23	0.68	0.52

Intersection Summary	
Cycle Length: 140	
Actuated Cycle Length: 140	
Offset: 60 (43%), Referenced to phase 2:EBTL and 6:WBTL, Start of Yellow	
Natural Cycle: 80	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 0.79	
Intersection Signal Delay: 22.5	Intersection LOS: C
Intersection Capacity Utilization 82.3%	ICU Level of Service E
Analysis Period (min) 15	

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 6: Central Avenue Pike & Callahan Drive/Dante Road

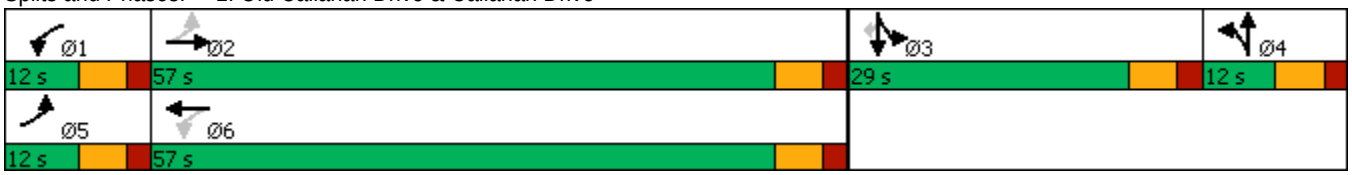


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	8	1262	4	34	1106	464	1	0	9	355	0	13
Future Volume (vph)	8	1262	4	34	1106	464	1	0	9	355	0	13
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00
Frt					0.956			0.878				0.850
Flt Protected	0.950			0.950				0.995			0.950	
Satd. Flow (prot)	1770	3539	0	1770	3383	0	0	1627	0	0	1770	1583
Flt Permitted	0.079			0.095				0.995			0.950	
Satd. Flow (perm)	147	3539	0	177	3383	0	0	1627	0	0	1770	1583
Satd. Flow (RTOR)					78			149				149
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Shared Lane Traffic (%)												
Lane Group Flow (vph)	8	1319	0	35	1635	0	0	10	0	0	370	14
Turn Type	pm+pt	NA		pm+pt	NA		Split	NA		Split	NA	Perm
Protected Phases	5	2		1	6		4	4		3	3	
Permitted Phases	2			6								3
Detector Phase	5	2		1	6		4	4		3	3	3
Switch Phase												
Minimum Initial (s)	6.0	15.0		6.0	15.0		6.0	6.0		6.0	6.0	6.0
Minimum Split (s)	12.0	21.0		12.0	21.0		12.0	12.0		12.0	12.0	12.0
Total Split (s)	12.0	57.0		12.0	57.0		12.0	12.0		29.0	29.0	29.0
Total Split (%)	10.9%	51.8%		10.9%	51.8%		10.9%	10.9%		26.4%	26.4%	26.4%
Maximum Green (s)	6.0	51.0		6.0	51.0		6.0	6.0		23.0	23.0	23.0
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	4.0
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0		0.0	0.0			0.0			0.0	0.0
Total Lost Time (s)	6.0	6.0		6.0	6.0			6.0			6.0	6.0
Lead/Lag	Lead	Lag		Lead	Lag		Lag	Lag		Lead	Lead	Lead
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes		Yes	Yes	Yes
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	3.0
Recall Mode	None	Min		None	Min		None	None		None	None	None
Act Effct Green (s)	51.8	48.3		54.3	53.2			6.1			23.2	23.2
Actuated g/C Ratio	0.56	0.52		0.59	0.57			0.07			0.25	0.25
v/c Ratio	0.04	0.71		0.17	0.83			0.04			0.84	0.03
Control Delay	9.2	21.2		10.4	21.2			0.3			52.1	0.1
Queue Delay	0.0	0.0		0.0	0.0			0.0			0.0	0.0
Total Delay	9.2	21.2		10.4	21.2			0.3			52.1	0.1
LOS	A	C		B	C			A			D	A
Approach Delay		21.2			21.0			0.3			50.2	
Approach LOS		C			C			A			D	
Queue Length 50th (ft)	2	315		7	315			0			191	0
Queue Length 95th (ft)	9	502		24	#768			0			#458	0
Internal Link Dist (ft)		1332			2747			179			1202	
Turn Bay Length (ft)	125			110								45
Base Capacity (vph)	188	1966		208	1978			245			443	508
Starvation Cap Reductn	0	0		0	0			0			0	0
Spillback Cap Reductn	0	0		0	0			0			0	0
Storage Cap Reductn	0	0		0	0			0			0	0
Reduced v/c Ratio	0.04	0.67		0.17	0.83			0.04			0.84	0.03

Intersection Summary	
Cycle Length: 110	
Actuated Cycle Length: 92.6	
Natural Cycle: 100	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.84	
Intersection Signal Delay: 24.3	Intersection LOS: C
Intersection Capacity Utilization 81.7%	ICU Level of Service D
Analysis Period (min) 15	

\# 95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 1: Old Callahan Drive & Callahan Drive



HCS7 Two-Way Stop-Control Report

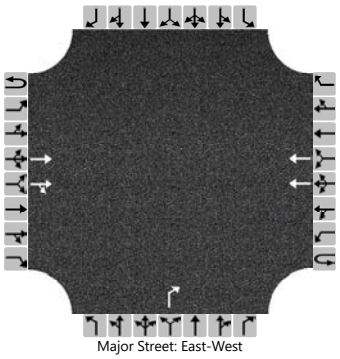
General Information

Analyst	WAS
Agency/Co.	Cannon & Cannon, Inc.
Date Performed	11/30/2020
Analysis Year	2025
Time Analyzed	PM Peak
Intersection Orientation	East-West
Project Description	2025 Combined PM

Site Information

Intersection	Yow West at Callahan Dr
Jurisdiction	Knoxville / Knox Co.
East/West Street	Callahan Drive
North/South Street	Yow Commercial West
Peak Hour Factor	0.92
Analysis Time Period (hrs)	0.25

Lanes


Major Street: East-West

Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority	1U	1	2	3	4U	4	5	6		7	8	9		10	11	12
Number of Lanes	0	0	2	0	0	0	2	0		0	0	1		0	0	0
Configuration			T	TR			T					R				
Volume (veh/h)			1399	18			1236					31				
Percent Heavy Vehicles (%)												3				
Proportion Time Blocked																
Percent Grade (%)										0						
Right Turn Channelized										No						
Median Type | Storage	Left + Thru								1							

Critical and Follow-up Headways

Base Critical Headway (sec)												6.9				
Critical Headway (sec)												6.96				
Base Follow-Up Headway (sec)												3.3				
Follow-Up Headway (sec)												3.33				

Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)												34				
Capacity, c (veh/h)												341				
v/c Ratio												0.10				
95% Queue Length, Q_{95} (veh)												0.3				
Control Delay (s/veh)												16.7				
Level of Service (LOS)												C				
Approach Delay (s/veh)										16.7						
Approach LOS										C						

HCS7 Two-Way Stop-Control Report

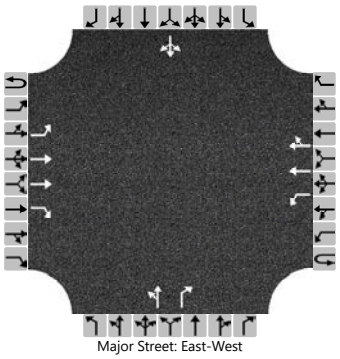
General Information

Analyst	WAS
Agency/Co.	Cannon & Cannon, Inc.
Date Performed	3/16/2021
Analysis Year	2025
Time Analyzed	PM Peak
Intersection Orientation	East-West
Project Description	2025 Combined PM

Site Information

Intersection	Yow East at Callahan Dr
Jurisdiction	Knoxville / Knox Co.
East/West Street	Callahan Drive
North/South Street	Yow Comm. East / Viles
Peak Hour Factor	0.92
Analysis Time Period (hrs)	0.25

Lanes


Major Street: East-West

Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority	1U	1	2	3	4U	4	5	6		7	8	9		10	11	12
Number of Lanes	0	1	2	1	0	1	2	0		0	1	1		0	1	0
Configuration		L	T	R		L	T	TR		LT		R			LTR	
Volume (veh/h)	0	5	1392	33	0	122	1150	4		68	0	160		5	0	18
Percent Heavy Vehicles (%)	3	3			3	3				3	3	3		3	3	3
Proportion Time Blocked																
Percent Grade (%)										0				0		
Right Turn Channelized		No								No						
Median Type | Storage		Left + Thru								2						

Critical and Follow-up Headways

Base Critical Headway (sec)		4.1				4.1				7.5	6.5	6.9		7.5	6.5	6.9
Critical Headway (sec)		4.16				4.16				7.56	6.56	6.96		7.56	6.56	6.96
Base Follow-Up Headway (sec)		2.2				2.2				3.5	4.0	3.3		3.5	4.0	3.3
Follow-Up Headway (sec)		2.23				2.23				3.53	4.03	3.33		3.53	4.03	3.33

Delay, Queue Length, and Level of Service

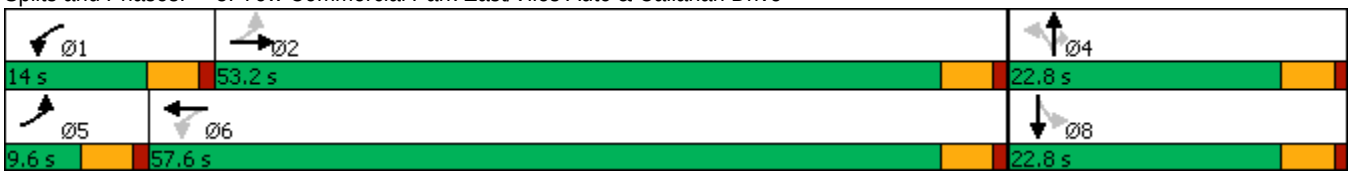
Flow Rate, v (veh/h)		5				133				74		174			25	
Capacity, c (veh/h)		545				419				95		348			131	
v/c Ratio		0.01				0.32				0.78		0.50			0.19	
95% Queue Length, Q_{95} (veh)		0.0				1.3				4.1		2.7			0.7	
Control Delay (s/veh)		11.7				17.5				118.6		25.2			38.8	
Level of Service (LOS)		B				C				F		D			E	
Approach Delay (s/veh)		0.0				1.7				53.1				38.8		
Approach LOS										F				E		

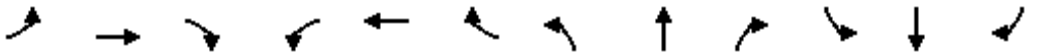
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	5	1392	33	122	1159	4	68	0	160	5	0	18
Future Volume (vph)	5	1392	33	122	1159	4	68	0	160	5	0	18
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.997							0.850		0.893	
Flt Protected	0.950			0.950				0.950			0.990	
Satd. Flow (prot)	1770	3529	0	1770	3539	0	0	1770	1583	0	1647	0
Flt Permitted	0.214			0.095				0.742			0.939	
Satd. Flow (perm)	399	3529	0	177	3539	0	0	1382	1583	0	1562	0
Satd. Flow (RTOR)		4			1				130		73	
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Shared Lane Traffic (%)												
Lane Group Flow (vph)	5	1484	0	127	1211	0	0	71	167	0	24	0
Turn Type	pm+pt	NA		pm+pt	NA		Perm	NA	Perm	Perm	NA	
Protected Phases	5	2		1	6			4			8	
Permitted Phases	2			6			4		4	8		
Detector Phase	5	2		1	6		4	4	4	8	8	
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0		5.0	5.0	5.0	5.0	5.0	
Minimum Split (s)	9.5	22.5		9.5	22.5		22.5	22.5	22.5	22.5	22.5	
Total Split (s)	9.6	53.2		14.0	57.6		22.8	22.8	22.8	22.8	22.8	
Total Split (%)	10.7%	59.1%		15.6%	64.0%		25.3%	25.3%	25.3%	25.3%	25.3%	
Maximum Green (s)	5.1	48.7		9.5	53.1		18.3	18.3	18.3	18.3	18.3	
Yellow Time (s)	3.5	3.5		3.5	3.5		3.5	3.5	3.5	3.5	3.5	
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0	1.0	1.0	1.0	1.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0			0.0	0.0		0.0	
Total Lost Time (s)	4.5	4.5		4.5	4.5			4.5	4.5		4.5	
Lead/Lag	Lead	Lag		Lead	Lag							
Lead-Lag Optimize?	Yes	Yes		Yes	Yes							
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	
Recall Mode	None	Min		None	Min		None	None	None	None	None	
Walk Time (s)		7.0			7.0		7.0	7.0	7.0	7.0	7.0	
Flash Dont Walk (s)		11.0			11.0		11.0	11.0	11.0	11.0	11.0	
Pedestrian Calls (#/hr)		0			0		0	0	0	0	0	
Act Effct Green (s)	44.3	40.3		49.7	48.2			9.2	9.2		9.2	
Actuated g/C Ratio	0.65	0.59		0.73	0.71			0.13	0.13		0.13	
v/c Ratio	0.01	0.71		0.42	0.48			0.38	0.51		0.09	
Control Delay	3.4	13.5		9.7	6.0			36.0	16.1		0.7	
Queue Delay	0.0	0.0		0.0	0.0			0.0	0.0		0.0	
Total Delay	3.4	13.5		9.7	6.0			36.0	16.1		0.7	
LOS	A	B		A	A			D	B		A	
Approach Delay		13.4			6.4			22.0			0.7	
Approach LOS		B			A			C			A	
Queue Length 50th (ft)	1	220		12	82			27	14		0	
Queue Length 95th (ft)	3	370		49	229			74	74		0	
Internal Link Dist (ft)		736			2461			639			452	
Turn Bay Length (ft)	160			150								
Base Capacity (vph)	364	2602		357	2882			382	532		485	
Starvation Cap Reductn	0	0		0	0			0	0		0	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Spillback Cap Reductn	0	0		0	0			0	0		0	
Storage Cap Reductn	0	0		0	0			0	0		0	
Reduced v/c Ratio	0.01	0.57		0.36	0.42			0.19	0.31		0.05	

Intersection Summary	
Cycle Length: 90	
Actuated Cycle Length: 68.2	
Natural Cycle: 70	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.71	
Intersection Signal Delay: 10.9	Intersection LOS: B
Intersection Capacity Utilization 68.0%	ICU Level of Service C
Analysis Period (min) 15	

Splits and Phases: 3: Yow Commercial Park East/Viles Auto & Callahan Drive





Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	1416	687	370	1454	0	0	0	0	52	0	307
Future Volume (vph)	0	1416	687	370	1454	0	0	0	0	52	0	307
Lane Util. Factor	1.00	0.95	1.00	0.97	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt			0.850									0.850
Flt Protected				0.950						0.950		
Satd. Flow (prot)	0	3539	1583	3433	3539	0	0	0	0	1770	0	1583
Flt Permitted				0.950						0.950		
Satd. Flow (perm)	0	3539	1583	3433	3539	0	0	0	0	1770	0	1583
Satd. Flow (RTOR)			485									98
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	1523	739	398	1563	0	0	0	0	56	0	330
Turn Type		NA	Perm	Prot	NA					Prot		Prot
Protected Phases		2		1	6					7		7
Permitted Phases			2									
Detector Phase		2	2	1	6					7		7
Switch Phase												
Minimum Initial (s)		15.0	15.0	6.0	15.0					8.0		8.0
Minimum Split (s)		21.0	21.0	12.0	21.0					14.0		14.0
Total Split (s)		54.0	54.0	20.0	74.0					26.0		26.0
Total Split (%)		54.0%	54.0%	20.0%	74.0%					26.0%		26.0%
Maximum Green (s)		48.0	48.0	14.0	68.0					20.0		20.0
Yellow Time (s)		4.0	4.0	4.0	4.0					4.0		4.0
All-Red Time (s)		2.0	2.0	2.0	2.0					2.0		2.0
Lost Time Adjust (s)		0.0	0.0	0.0	0.0					0.0		0.0
Total Lost Time (s)		6.0	6.0	6.0	6.0					6.0		6.0
Lead/Lag		Lag	Lag	Lead								
Lead-Lag Optimize?		Yes	Yes	Yes								
Vehicle Extension (s)		3.0	3.0	3.0	3.0					3.0		3.0
Recall Mode		C-Max	C-Max	None	C-Max					None		None
Act Effct Green (s)		49.7	49.7	14.1	69.7					18.3		18.3
Actuated g/C Ratio		0.50	0.50	0.14	0.70					0.18		0.18
v/c Ratio		0.87	0.72	0.83	0.63					0.17		0.89
Control Delay		29.5	11.1	49.1	4.7					34.9		54.8
Queue Delay		0.0	0.0	0.0	0.0					0.0		0.0
Total Delay		29.5	11.1	49.1	4.7					34.9		54.8
LOS		C	B	D	A					C		D
Approach Delay		23.5			13.7						51.9	
Approach LOS		C			B						D	
Queue Length 50th (ft)		449	115	112	287					30		146
Queue Length 95th (ft)		#573	268	m128	m298					64		#295
Internal Link Dist (ft)		2461			901			890			1125	
Turn Bay Length (ft)			165	130								390
Base Capacity (vph)		1757	1030	490	2467					354		395
Starvation Cap Reductn		0	0	0	0					0		0
Spillback Cap Reductn		0	0	0	0					0		0
Storage Cap Reductn		0	0	0	0					0		0
Reduced v/c Ratio		0.87	0.72	0.81	0.63					0.16		0.84

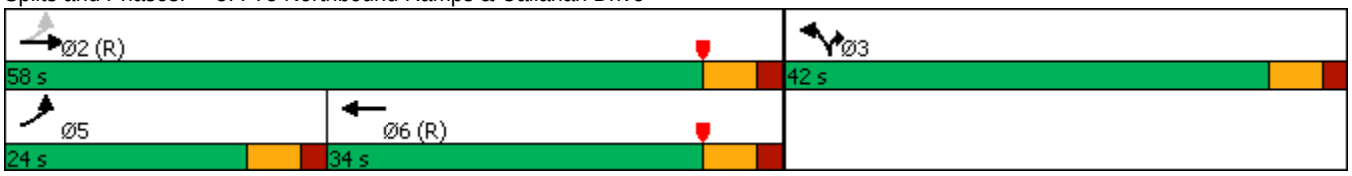
Intersection Summary	
Cycle Length: 100	
Actuated Cycle Length: 100	
Offset: 64 (64%), Referenced to phase 2:EBT and 6:WBT, Start of Yellow	
Natural Cycle: 80	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 0.89	
Intersection Signal Delay: 21.7	Intersection LOS: C
Intersection Capacity Utilization 95.2%	ICU Level of Service F
Analysis Period (min) 15	
# 95th percentile volume exceeds capacity, queue may be longer.	
Queue shown is maximum after two cycles.	
m Volume for 95th percentile queue is metered by upstream signal.	

Splits and Phases: 4: I-75 Southbound Ramps & Callahan Drive

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	490	978	0	0	1018	65	802	0	793	0	0	0
Future Volume (vph)	490	978	0	0	1018	65	802	0	793	0	0	0
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	0.95	0.97	1.00	1.00	1.00	1.00	1.00
Frt					0.991				0.850			
Flt Protected	0.950						0.950					
Satd. Flow (prot)	1770	3539	0	0	3507	0	3433	0	1583	0	0	0
Flt Permitted	0.118						0.950					
Satd. Flow (perm)	220	3539	0	0	3507	0	3433	0	1583	0	0	0
Satd. Flow (RTOR)					6				98			
Peak Hour Factor	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Shared Lane Traffic (%)												
Lane Group Flow (vph)	500	998	0	0	1105	0	818	0	809	0	0	0
Turn Type	pm+pt	NA			NA		Prot		Prot			
Protected Phases	5	2			6		3		3			
Permitted Phases	2											
Detector Phase	5	2			6		3		3			
Switch Phase												
Minimum Initial (s)	6.0	15.0			15.0		8.0		8.0			
Minimum Split (s)	12.0	21.0			21.0		14.0		14.0			
Total Split (s)	24.0	58.0			34.0		42.0		42.0			
Total Split (%)	24.0%	58.0%			34.0%		42.0%		42.0%			
Maximum Green (s)	18.0	52.0			28.0		36.0		36.0			
Yellow Time (s)	4.0	4.0			4.0		4.0		4.0			
All-Red Time (s)	2.0	2.0			2.0		2.0		2.0			
Lost Time Adjust (s)	0.0	0.0			0.0		0.0		0.0			
Total Lost Time (s)	6.0	6.0			6.0		6.0		6.0			
Lead/Lag	Lead				Lag							
Lead-Lag Optimize?	Yes				Yes							
Vehicle Extension (s)	3.0	3.0			3.0		3.0		3.0			
Recall Mode	None	C-Max			C-Max		None		None			
Act Effct Green (s)	52.0	52.0			28.0		36.0		36.0			
Actuated g/C Ratio	0.52	0.52			0.28		0.36		0.36			
v/c Ratio	1.27	0.54			1.12		0.66		1.28			
Control Delay	151.8	10.7			91.5		30.1		164.8			
Queue Delay	0.0	0.0			0.0		0.0		0.0			
Total Delay	151.8	10.7			91.5		30.1		164.8			
LOS	F	B			F		C		F			
Approach Delay		57.8			91.5			97.0				
Approach LOS		E			F			F				
Queue Length 50th (ft)	~339	250			~413		223		~619			
Queue Length 95th (ft)	m#448	m274			m#471		289		#853			
Internal Link Dist (ft)		901			779			1037			999	
Turn Bay Length (ft)	155						800		1000			
Base Capacity (vph)	393	1840			986		1235		632			
Starvation Cap Reductn	0	0			0		0		0			
Spillback Cap Reductn	0	0			0		0		0			
Storage Cap Reductn	0	0			0		0		0			
Reduced v/c Ratio	1.27	0.54			1.12		0.66		1.28			

Intersection Summary	
Cycle Length: 100	
Actuated Cycle Length: 100	
Offset: 0 (0%), Referenced to phase 2:EBTL and 6:WBT, Start of Yellow	
Natural Cycle: 120	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 1.28	
Intersection Signal Delay: 81.7	Intersection LOS: F
Intersection Capacity Utilization 95.2%	ICU Level of Service F
Analysis Period (min) 15	
~ Volume exceeds capacity, queue is theoretically infinite.	
Queue shown is maximum after two cycles.	
# 95th percentile volume exceeds capacity, queue may be longer.	
Queue shown is maximum after two cycles.	
m Volume for 95th percentile queue is metered by upstream signal.	

Splits and Phases: 5: I-75 Northbound Ramps & Callahan Drive



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	490	978	0	0	1018	65	802	0	793	0	0	0
Future Volume (vph)	490	978	0	0	1018	65	802	0	793	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	155		0	0		0	800		1000	0		0
Storage Lanes	1		0	0		0	1		2	0		0
Taper Length (ft)	150			25			210			25		
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	0.95	0.97	1.00	0.88	1.00	1.00	1.00
Frt					0.991				0.850			
Flt Protected	0.950						0.950					
Satd. Flow (prot)	1770	3539	0	0	3507	0	3433	0	2787	0	0	0
Flt Permitted	0.103						0.950					
Satd. Flow (perm)	192	3539	0	0	3507	0	3433	0	2787	0	0	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)					7				238			
Link Speed (mph)		45			45			40			40	
Link Distance (ft)		981			859			1117			1079	
Travel Time (s)		14.9			13.0			19.0			18.4	
Peak Hour Factor	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Shared Lane Traffic (%)												
Lane Group Flow (vph)	500	998	0	0	1105	0	818	0	809	0	0	0
Turn Type	pm+pt	NA			NA		Prot		Prot			
Protected Phases	5	2			6		3		3			
Permitted Phases	2											
Detector Phase	5	2			6		3		3			
Switch Phase												
Minimum Initial (s)	6.0	15.0			15.0		8.0		8.0			
Minimum Split (s)	12.0	21.0			21.0		14.0		14.0			
Total Split (s)	30.0	69.0			39.0		31.0		31.0			
Total Split (%)	30.0%	69.0%			39.0%		31.0%		31.0%			
Maximum Green (s)	24.0	63.0			33.0		25.0		25.0			
Yellow Time (s)	4.0	4.0			4.0		4.0		4.0			
All-Red Time (s)	2.0	2.0			2.0		2.0		2.0			
Lost Time Adjust (s)	0.0	0.0			0.0		0.0		0.0			
Total Lost Time (s)	6.0	6.0			6.0		6.0		6.0			
Lead/Lag	Lead				Lag							
Lead-Lag Optimize?	Yes				Yes							
Vehicle Extension (s)	3.0	3.0			3.0		3.0		3.0			
Recall Mode	None	C-Max			C-Max		None		None			
Act Effct Green (s)	63.0	63.0			33.0		25.0		25.0			
Actuated g/C Ratio	0.63	0.63			0.33		0.25		0.25			
v/c Ratio	1.00	0.45			0.95		0.95		0.92			
Control Delay	47.7	2.8			37.6		59.1		43.3			
Queue Delay	0.0	0.0			0.0		0.0		0.0			
Total Delay	47.7	2.8			37.6		59.1		43.3			
LOS	D	A			D		E		D			
Approach Delay		17.8			37.6			51.3				
Approach LOS		B			D			D				
Queue Length 50th (ft)	~184	63			327		264		211			

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Queue Length 95th (ft)	m#363	m64			m#377		#385		#343			
Internal Link Dist (ft)		901			779			1037			999	
Turn Bay Length (ft)	155						800		1000			
Base Capacity (vph)	499	2229			1162		858		875			
Starvation Cap Reductn	0	0			0		0		0			
Spillback Cap Reductn	0	0			0		0		0			
Storage Cap Reductn	0	0			0		0		0			
Reduced v/c Ratio	1.00	0.45			0.95		0.95		0.92			

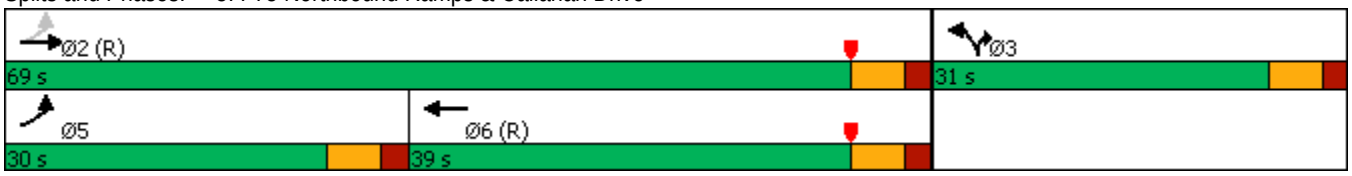
Intersection Summary			
Area Type:	Other		
Cycle Length: 100			
Actuated Cycle Length: 100			
Offset: 0 (0%), Referenced to phase 2:EBTL and 6:WBT, Start of Yellow			
Natural Cycle: 90			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 1.00			
Intersection Signal Delay: 35.8		Intersection LOS: D	
Intersection Capacity Utilization 95.2%		ICU Level of Service F	
Analysis Period (min) 15			

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

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

Splits and Phases: 5: I-75 Northbound Ramps & Callahan Drive



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	768	713	295	41	322	62	195	355	38	62	210	575
Future Volume (vph)	768	713	295	41	322	62	195	355	38	62	210	575
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt			0.850		0.976			0.985				0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1770	1863	1583	1770	1818	0	1770	1835	0	1770	1863	1583
Flt Permitted	0.148			0.383			0.235			0.364		
Satd. Flow (perm)	276	1863	1583	713	1818	0	438	1835	0	678	1863	1583
Satd. Flow (RTOR)			307		9			5				599
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Shared Lane Traffic (%)												
Lane Group Flow (vph)	800	743	307	43	400	0	203	410	0	65	219	599
Turn Type	pm+pt	NA	Perm	Perm	NA		pm+pt	NA		Perm	NA	Free
Protected Phases	5	2			6		3	8			4	
Permitted Phases	2		2	6			8			4		Free
Detector Phase	5	2	2	6	6		3	8		4	4	
Switch Phase												
Minimum Initial (s)	6.0	15.0	15.0	15.0	15.0		6.0	8.0		8.0	8.0	
Minimum Split (s)	12.0	21.0	21.0	21.0	21.0		12.0	14.0		14.0	14.0	
Total Split (s)	43.0	70.0	70.0	27.0	27.0		13.0	30.0		17.0	17.0	
Total Split (%)	43.0%	70.0%	70.0%	27.0%	27.0%		13.0%	30.0%		17.0%	17.0%	
Maximum Green (s)	37.0	64.0	64.0	21.0	21.0		7.0	24.0		11.0	11.0	
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0		4.0	4.0	
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0		2.0	2.0		2.0	2.0	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	6.0	6.0	6.0	6.0	6.0		6.0	6.0		6.0	6.0	
Lead/Lag	Lead			Lag	Lag		Lead			Lag	Lag	
Lead-Lag Optimize?	Yes			Yes	Yes		Yes			Yes	Yes	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	None	C-Max	C-Max	C-Max	C-Max		None	None		None	None	
Act Effct Green (s)	64.0	64.0	64.0	21.0	21.0		24.0	24.0		11.0	11.0	100.0
Actuated g/C Ratio	0.64	0.64	0.64	0.21	0.21		0.24	0.24		0.11	0.11	1.00
v/c Ratio	1.10	0.62	0.27	0.29	1.03		1.03	0.92		0.88	1.07	0.38
Control Delay	84.3	11.9	2.8	39.3	93.2		107.4	65.3		121.7	127.7	0.7
Queue Delay	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	0.0
Total Delay	84.3	11.9	2.8	39.3	93.2		107.4	65.3		121.7	127.7	0.7
LOS	F	B	A	D	F		F	E		F	F	A
Approach Delay		41.7			88.0			79.2			41.1	
Approach LOS		D			F			E			D	
Queue Length 50th (ft)	~529	160	16	23	~270		~115	254		42	~155	0
Queue Length 95th (ft)	m#558	m206	m30	57	#456		#230	#436		#125	#302	0
Internal Link Dist (ft)		779			937			888			996	
Turn Bay Length (ft)	570			90			110			155		155
Base Capacity (vph)	729	1192	1123	149	388		198	444		74	204	1583
Starvation Cap Reductn	0	0	0	0	0		0	0		0	0	0
Spillback Cap Reductn	0	0	0	0	0		0	0		0	0	0
Storage Cap Reductn	0	0	0	0	0		0	0		0	0	0
Reduced v/c Ratio	1.10	0.62	0.27	0.29	1.03		1.03	0.92		0.88	1.07	0.38

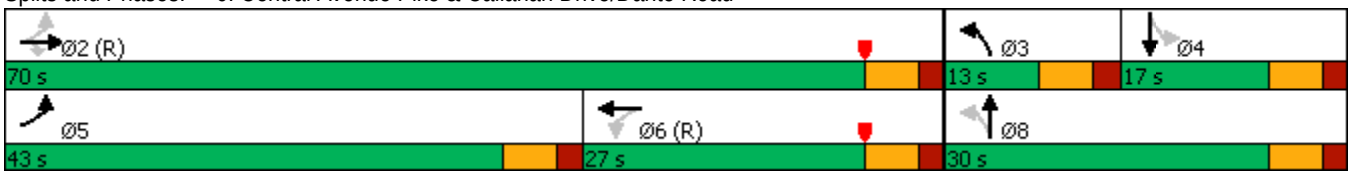
Intersection Summary	
Cycle Length: 100	
Actuated Cycle Length: 100	
Offset: 75 (75%), Referenced to phase 2:EBTL and 6:WBTL, Start of Yellow	
Natural Cycle: 110	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 1.10	
Intersection Signal Delay: 53.0	Intersection LOS: D
Intersection Capacity Utilization 110.9%	ICU Level of Service H
Analysis Period (min) 15	

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

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

Splits and Phases: 6: Central Avenue Pike & Callahan Drive/Dante Road



APPENDIX D – SIGNAL WARRANT SPREADSHEETS

TRAFFIC SIGNAL WARRANT ANALYSIS - VOLUME WARRANTS

Intersection : Proposed Site Access / Viles Auto at Callahan Drive
City or County : City of Knoxville Date of Count: Year 2025 Projected
State : Tennessee Day of Week of Count: Average Weekday

Are warranting volumes to be adjusted for speeds or built up area? . . . . . Yes
Adjustment factor for day of week and month of year of count 1.00
Number of Lanes: Major Street . . 2 Minor Street . . . 1

Time	Major Street Actual Volume App #1	App #2	Total	Adjusted Total Volume,	Minor Street Actual Volume –	Adjusted Total Volume,
Beginning						
6:00 am	0	0	0	0	0	0
7:00	634	952	1586	1586	46	46
8:00	656	849	1505	1505	56	56
9:00 am	0	0	0	0	0	0
10:00	0	0	0	0	0	0
11:00	782	928	1710	1710	115	115
12:00 noon	943	898	1841	1841	143	143
1:00	0	0	0	0	0	0
2:00	970	932	1902	1902	125	125
3:00 pm	1075	1037	2112	2112	153	153
4:00	1261	1246	2507	2507	168	168
5:00	1439	1226	2665	2665	259	259
6:00 pm	0	0	0	0	0	0
7:00	0	0	0	0	0	0
8:00	0	0	0	0	0	0

Note: , No adjusment made
– Where more than one minor approach exists use the higher approach volume
. Number of hours shown is the minimum meeting the MUTCD requirements. Additional hours outside of the count period may meet the MUTCD specified volume levels.

Warrant #1A (8 Hr. - Min. Vol.) Percent of Warrant Major	Minor
0	0
378	44
358	53
0	0
0	0
407	110
438	136
0	0
453	119
503	146
597	160
635	247
0	0
0	0
0	0
Warranting Volumes	
420	105
Total Hours Meeting	
Warrant = 6 .	
Warrant Met No	

Warrant #1B (8 Hr. - Interruption) Percent of Warrant Major	Minor
0	0
252	87
239	106
0	0
0	0
271	217
292	270
0	0
302	236
335	289
398	317
423	489
0	0
0	0
0	0
Warranting Volumes	
630	53
Total Hours Meeting	
Warrant = 7 .	
Warrant Met No	

Combination (Warrants 1A & 1B) Percent of Warrant Major	Minor
0	0
315	55
299	67
0	0
0	0
339	137
365	170
0	0
377	149
419	182
497	200
529	308
0	0
0	0
0	0
Warranting Volumes	
504	84
Total Hours Meeting	
Warrant = 6 .	
Warrant Met No	

Warrant #2 (Four Hour Vols.) Warrant Volume	Percent of Warrant
0	*****
60	77
60	93
0	*****
0	*****
60	192
60	238
0	*****
60	208
60	255
60	280
60	432
0	*****
0	*****
0	*****
Warranting Volumes From MUTCD Fig. 4-8	
Total Hours Meeting	
Warrant = 6 .	
Warrant Me Yes	

Warrant #3 (Peak Hour Vols.) Warrant Volume	Percent of Warrant
0	*****
80	58
80	70
0	*****
0	*****
80	144
80	179
0	*****
80	156
80	191
80	210
80	324
0	*****
0	*****
0	*****
Warranting Volumes From MUTCD Fig. 4-6	
Total Hours Meeting	
Warrant = 6 .	
Warrant Me Yes	

***** Major Street volume is so low that no Minor Street warrant exists

Comments: (include any information which may be useful to the reviewer)

Minor Street Traffic Estimated from Hourly Distribution of Trips & Collected TMC Data

Analysis Prepared by: CANNON AND CANNON, INC.
Wesley Stokes, P.E.
Date: 03/25/22
Time: 09:17

Developed by: T. Darcy Sullivan, P.E. VC/R1
Distributed by: Tennessee Transportation Assistance Program (TTAP)

APPENDIX E – TURN LANE WARRANT SHEETS

TABLE 5B KNOX COUNTY RIGHT-TURN LANE VOLUME THRESHOLDS FOR 2-LANE ROADWAYS WITH A PREVAILING SPEED OF 36 TO 45 MPH	Project No: Project Name: Notes:

RIGHT-TURN VOLUME	THROUGH VOLUME PLUS LEFT-TURN VOLUME *					
	< 100	100 - 199	200 - 249	250 - 299	300 - 349	350 - 399
Fewer Than 25						
25 - 49						
50 - 99						
100 - 149						
150 - 199						
200 - 249						Yes
250 - 299					Yes	Yes
300 - 349				Yes	Yes	Yes
350 - 399			Yes	Yes	Yes	Yes
400 - 449			Yes	Yes	Yes	Yes
450 - 499		Yes	Yes	Yes	Yes	Yes
500 - 549		Yes	Yes	Yes	Yes	Yes
550 - 599	Yes	Yes	Yes	Yes	Yes	Yes
600 or More	Yes	Yes	Yes	Yes	Yes	Yes

RIGHT-TURN VOLUME	THROUGH VOLUME PLUS LEFT-TURN VOLUME *					
	350 - 399	400 - 449	450 - 499	500 - 549	550 - 599	= / > 600
Fewer Than 25						
25 - 49					Yes	Yes
50 - 99				Yes	Yes	Yes
100 - 149			Yes	Yes	Yes	Yes
150 - 199		Yes	Yes	Yes	Yes	Yes
200 - 249	Yes	Yes	Yes	Yes	Yes	Yes
250 - 299	Yes	Yes	Yes	Yes	Yes	Yes
300 - 349	Yes	Yes	Yes	Yes	Yes	Yes
350 - 399	Yes	Yes	Yes	Yes	Yes	Yes
400 - 449	Yes	Yes	Yes	Yes	Yes	Yes
450 - 499	Yes	Yes	Yes	Yes	Yes	Yes
500 - 549	Yes	Yes	Yes	Yes	Yes	Yes
550 - 599	Yes	Yes	Yes	Yes	Yes	Yes
600 or More	Yes	Yes	Yes	Yes	Yes	Yes

* Or through volume only if a left-turn lane exists

Intersection	Time Period	Through Volume	Right-Turn Volume	Right-Turn Lane Warranted (Yes / No)
Site at Callahan	AM Peak	646 / 2 = 323	66	No
Site at Callahan	PM Peak	1392 / 2 = 696	33	Yes

Note: Callahan Drive has two lanes in eastbound direction so through volumes were divided by two for warrant calculation

Source: Knox County Department of Engineering and Public Works "Access Control and Driveway Design Policy"

APPENDIX F – MPC COMMENTS

Date: April 25, 2022

Project Name: Callahan Industrial Development

To: Knoxville-Knox County Planning

Subject: TIS Comment Response Document for Callahan Industrial Development
Review Comments Dated: April 14, 2022 (Knoxville-Knox County Planning)

Dear Knoxville-Knox County Planning staff,

The following comment response document is submitted to address comments dated April 14, 2022:

Knoxville-Knox County Planning (April 14, 2022)

1. **Reviewer Comment: Please include additional information regarding any existing uses (building square footage, tenants, etc.) that are incorporated into this overall development which are being accounted for in trip generation. Both the prior TIS and this one evaluated a total of 575,000 sf of industrial uses but it is not clear whether that total includes the existing businesses that currently access Wilbanks Rd or is for new tenants only. In order for the reviewing agencies to track future development and determine whether TIS updates are needed we need this TIS to provide the breakdown between total square feet of new versus existing uses. Additionally, if there is any information available at this time as to each new parcel's expected building size it would be helpful to include that in the TIS.**

   Response: A breakdown of each parcel's expected building size is now included in TABLE 3 on page 11 of the Revised TIS. Parcels 6, 8, & 10 are existing industrial uses that are included in the overall site development size of 575,000 sf. They were included in the Trip Generation calculations since they will have access to the newly proposed intersection at Callahan Drive.

2. **Reviewer Comment: Page 5 - please add Wilbanks Road to the Existing Roadway Conditions list and document its conditions.**

   Response: Requested revisions made and reflected on page 5 of the Revised TIS.

3. **Reviewer Comment: Please expand and clarify regarding the mixing of old and new count data that were used in the development of this report.**

   a. Page 6 - the TIS notes that one location was re-counted in 2022, but does not discuss how that compared with the original count in 2020 and the original assumption about increasing the counts by a 20% Covid factor. Please elaborate on the acceptability of using the previous counts at the other study intersections based on findings of comparing 2022 to 2020 counts at the one location that was re-counted.

   Response: The updated turning movement count indicated that all movements except for the through movements along Callahan Drive were similar to the original

study with the 20% Covid factor increase. The through movements along Callahan Drive were slightly lower in the most recent count when compared to the original count and 20% Covid factor increase. The difference is not believed to be drastic enough to warrant a re-count of the other study intersections. It is expected that the other study intersections would experience a similar pattern if re-counted.

b. Also on Page 6, provide additional explanation regarding the statement made of "Adjustments were made to the 2020 raw traffic data to arrive at 2022 volumes to be utilized in this study" in terms of what specific adjustments were made since they appear to be the same volumes in the previous TIS that were termed as 2020 volumes at that time.

Response: This statement is in reference to increasing the 2020 raw traffic data by the 20% Covid factor. The TIS has been revised to retain reference to the 2020 existing traffic data since it is what was utilized for all but one of the study intersections.

c. Page 9 – it states that growth rate is applied from 2022 to 2025 however the majority of the existing counts are from 2020 so please clarify that a 5-year growth rate was actually applied to those counts.

Response: A 5-year background growth rate was applied to each intersection except for the re-counted intersection. At the re-counted intersection, a 3-year growth rate was applied to arrive at the 2025 background year since the data was collected in 2022. The TIS has been revised on Page 9 to provide clarification.

Sincerely,

Wesley Stokes, P.E.