12-SD-21-C / 12-G-21-UR
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11/22/2021

BRIGGS STATION SUBDIVISION
Knox County, Tennessee

TRAFFIC IMPACT STUDY

Prepared For:
SITE INC

Prepared By:

CDM Smith

November 2021
Revised November 2021

BRIGGS STATION SUBDIVISION

KNOX COUNTY, TENNESSEE

TRAFFIC IMPACT STUDY

Prepared for

SITE Inc.
10215 Technology Drive, Suite 304
Knoxville, Tennessee 37932

11/22/2021

November 2021
Revised November 22, 2021

Prepared by

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Knoxville, Tennessee 37921

PROJECT NO. 261382

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INTRODUCTION

CDM Smith is pleased to submit this report to address the impact and access of a proposed residential development located on Marietta Church Road south of Hardin Valley Road in northwest Knox County. The basis for this study required the collection of traffic data, generation of anticipated traffic volumes from the proposed site and development of projected traffic volumes from normal growth and from the potential site. Analyses of the resulting traffic projections were conducted to determine the capacity and levels of service for the site accesses and adjacent intersections. This study will identify measures necessary to mitigate traffic impacts including improved roadway geometrics and traffic control devices within the environs of the proposed residential development.

According to the Knoxville-Knox County Metropolitan Planning Commission's Administrative Rules and Procedures, the proposed residential development site is identified for a Level 1 Traffic Impact Study.

Project Description

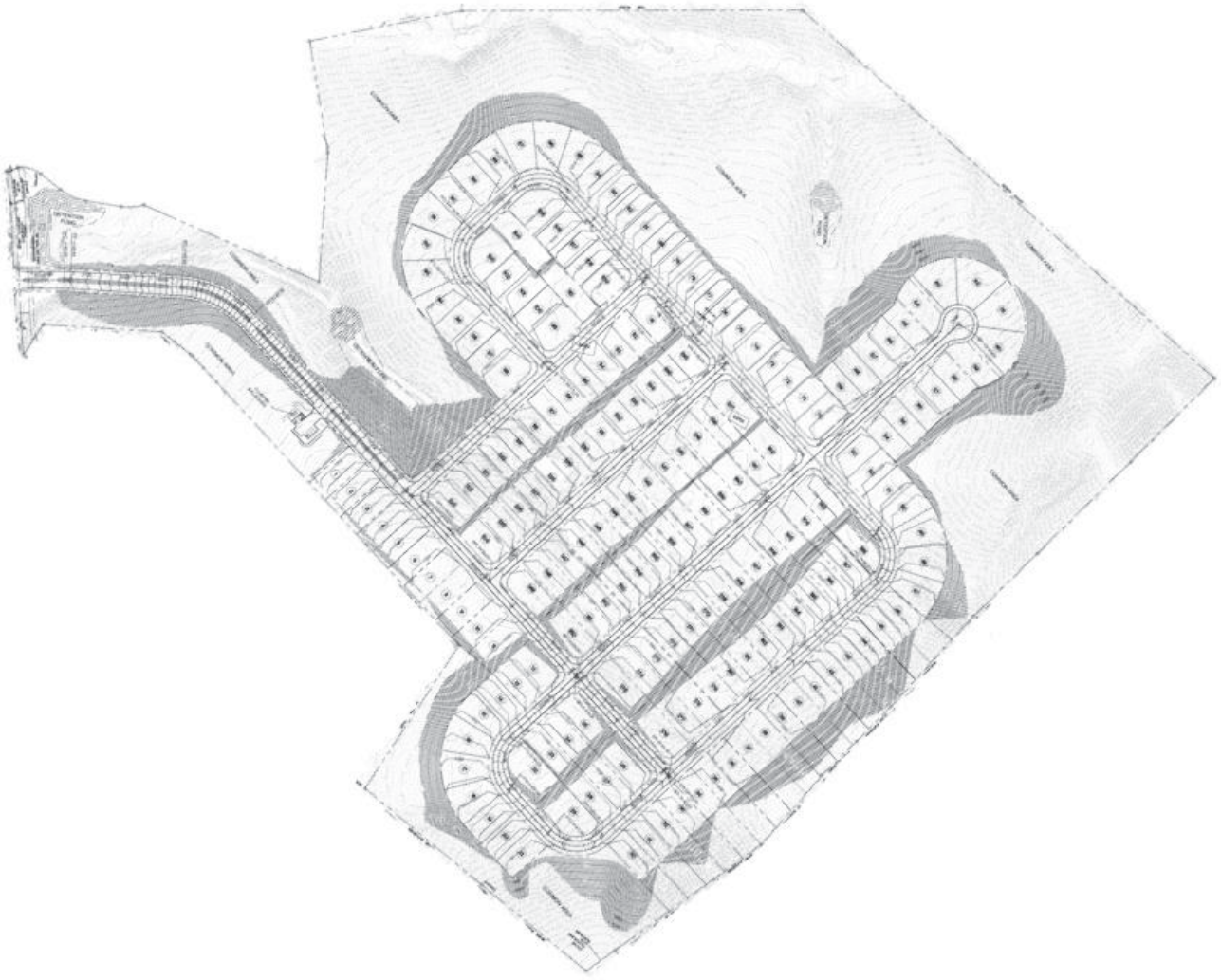
The proposed Briggs Station development is on a 94-acre property zoned PR. The proposed site will develop 188 single-family units with its access to Marietta Church Road. The proposed access to Marietta Church Road is from a median divided boulevard with 18-foot lanes for the purpose of providing an alternative to a secondary access. **Figure 1** illustrates the proposed site.

Site Location

The location of the proposed residential development is east of Marietta Church Road in northwest Knox County, Tennessee, and northwest of the Knoxville central business district (CBD). Hardin Valley Road is north of the site. **Figure 2** illustrates the site location relative to local and regional access.

SITE PLAN

Briggs Station



N

Figure 1

VICINITY MAP

Briggs Station

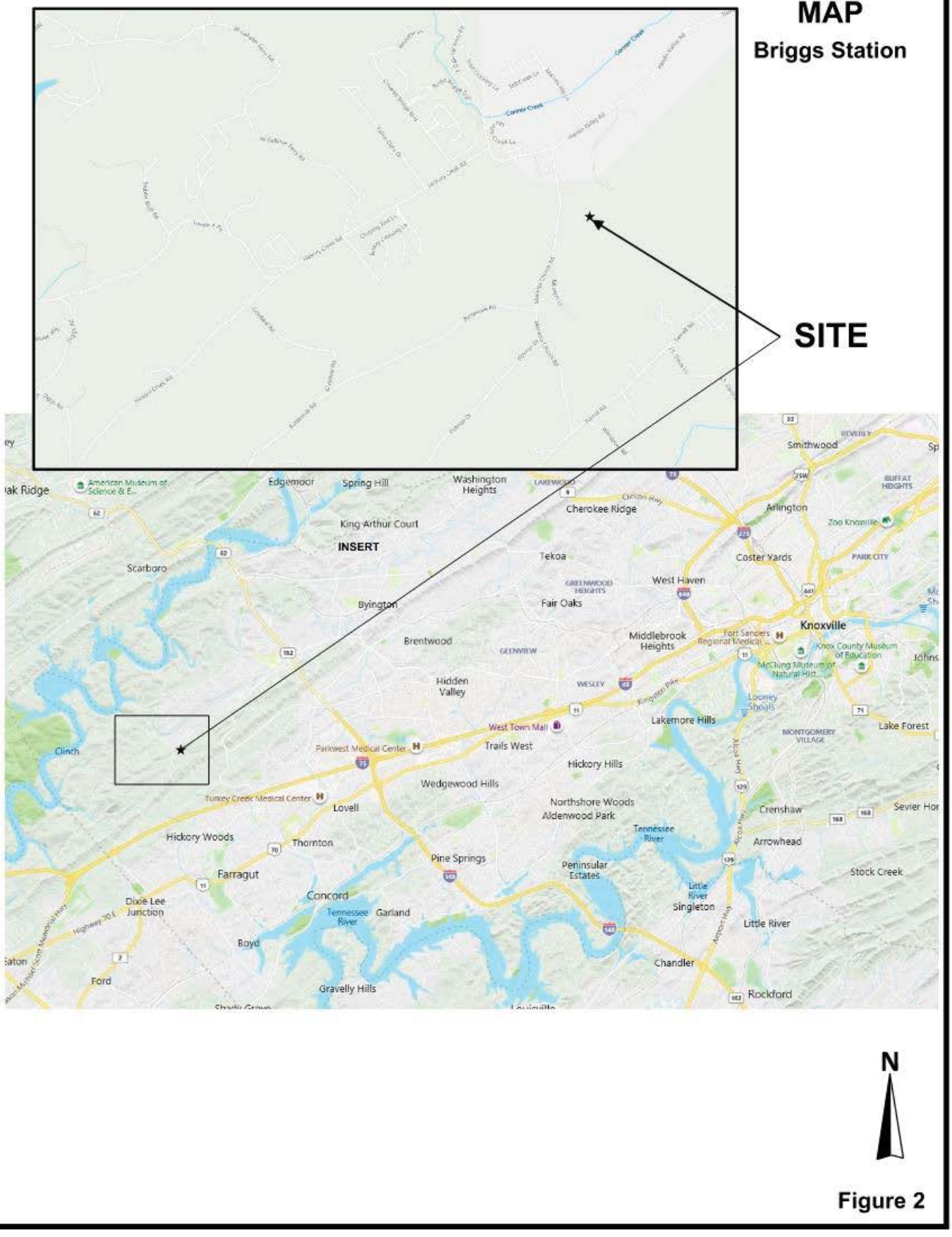


Figure 2

LOCAL AND REGIONAL ACCESS

Local Access

The proposed residential development will access Marietta Church Road on the site's west boundary. Marietta Church Road is an 18-foot two-lane Minor Collector extending south from Hardin Valley Road to Yarnell Road. Its 2019 daily traffic is approximately 2,050. This collector facility primarily serves residential subdivisions. Marietta Church Road has a posted speed limit of 30mph.

Hardin Valley Road, to the north of the site is an approximate 22-foot two-lane Minor Arterial with an approximate average weekday traffic volume of daily of 12,950 east of Steele Road. Hardin Valley Road extends east and west from the Hickory Creek Road and E. Gallaher Ferry Road intersection, just to the west of the Marietta Church Road intersection, to the Ball Camp Byington Road and Middlebrook Pike intersection to the east. Traffic can access Pellissippi Parkway (SR 162) to the east. Hardin Valley Road becomes a three-lane facility at Campbell Station Road and a signalized corridor starting at Steele Road. Hardin Valley Road includes mixed uses with residential subdivisions, schools, and commercial offices and retail development. Interstate 40/75 can be accessed from Pellissippi Parkway and Campbell Station Road to the south. The posted speed limit for Hardin Valley Road is 40mph.

Hickory Creek Road is another classified Minor Arterial which extends southwest from the site vicinity to the Watt Road corridor and the I-40/75 interchange near the Loudon County line.

There are not any KAT services in the site vicinity. Neither sidewalks nor bike facilities are available in the site vicinity.

Regional Access

Regional access to this site is Hardin Valley Road to the east where it intersects Pellissippi Parkway (S.R. 162) which extends northwest to Oak Ridge and southeast to Interstate 40 and 140. Hickory Creek Road provides access to I-40, west of Knoxville, at Watt Road.

Pellissippi Parkway extends northeast to Oak Ridge Highway and had a 2020 ADT of 76,440. Pellissippi Parkway extends south intersecting Interstate 40 and terminating at Alcoa Highway (U.S. 129) near the Knoxville Airport. Pellissippi Parkway had a 2020 ADT of 49,190 north of Hardin Valley Road and 87,150 south of Dutchtown Road. To the east, Hardin Valley Road becomes S.R. 169 (Middlebrook Pike) and intersects S.R. 131 (Lovell Road). Interstate access

is also provided from both Campbell Station Road and Lovell Road southeast of the proposed site.

Interstate 40 provides significant east and west regional access through Tennessee. To the east, Interstate 40 connects to Interstate 81, which extends into the Tri-Cities area of Tennessee and Virginia. Westbound Interstate 40 connects to Interstate 75, providing north- and southbound connections into neighboring states such as Kentucky and Georgia, respectively. Interstate 40 provides significant east and west regional access through Tennessee. South of the site, east of Watt Road, I-40/75 has a 2020 ADT of 104,520 and 142,670 east of Lovell Road

EXISTING TRAFFIC CONDITIONS

Existing Traffic Control

Marietta Church Road is posted 30mph and is STOP controlled at Hardin Valley Road without any turn lanes. The posted speed limit on Hardin Valley Road is 40mph. **Figure 3** illustrates the intersection geometry and traffic control.

Existing Traffic Volumes

CDM Smith conducted a peak-hour turning movement count for the intersection of Hardin Valley Road at Marietta Church Road October 28th of 2021. The hours counted for Hardin Valley Road at Marietta Church Road were from 7:00-9:00AM and 2:00- 6:00PM. The peak hours were found between 7:15 and 8:15 for the AM and 4:45 and 5:45 for the PM. **Figure 4** presents the existing AM and PM peak-hour traffic volumes for the study intersections.

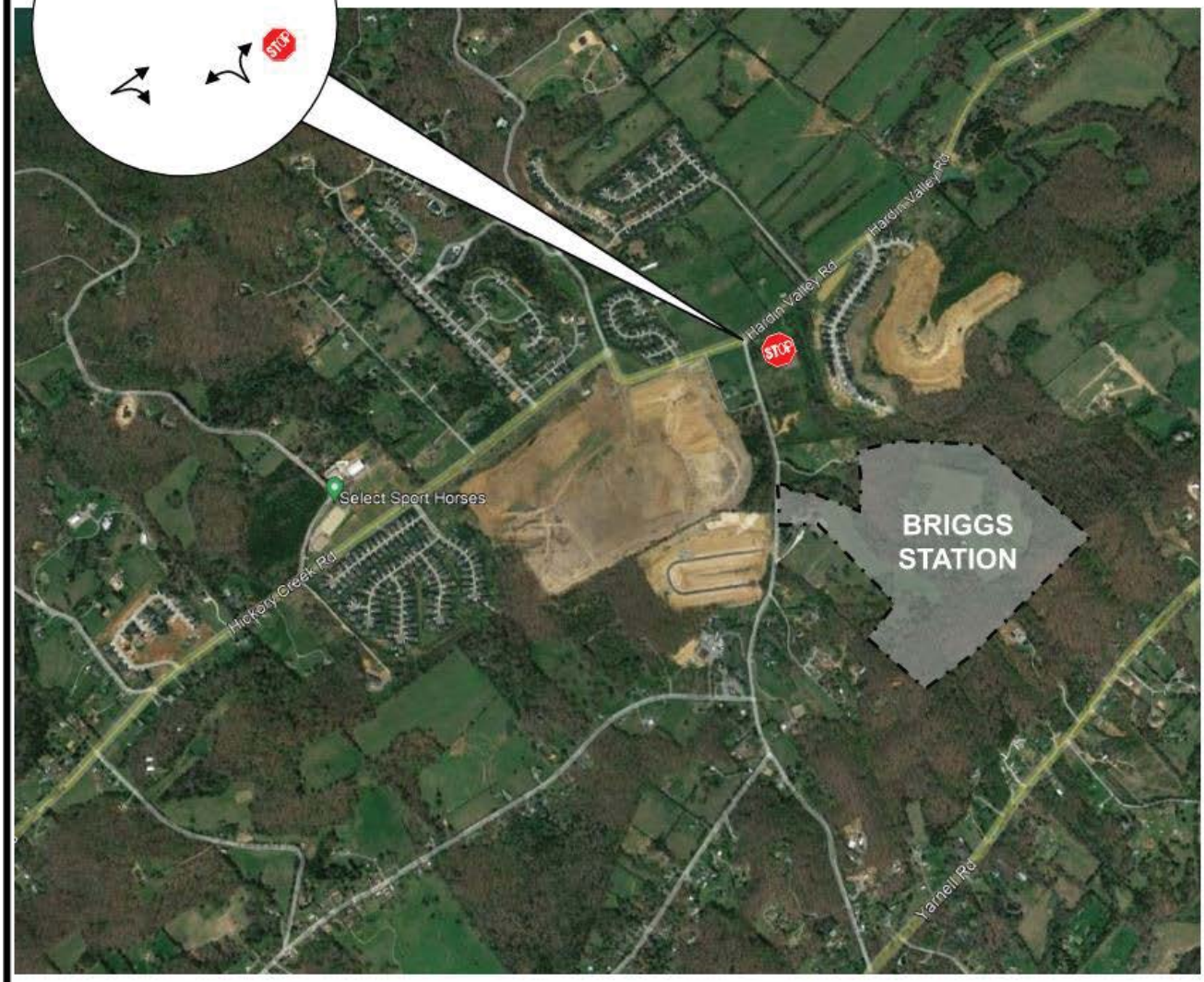
Existing Capacity and Level of Service

In order to evaluate the current operations of the traffic control devices, capacity and level of service were calculated using the **Highway Capacity Manual, Special Report 209** published by the Transportation Research Board (TRB). Signalized and unsignalized intersections are evaluated based on estimated intersection delays, which may be related to level of service (LOS).

Level of service and capacity are the measurements of an intersection's ability to accommodate traffic volumes. Levels of service for intersections range from A to F. A LOS A is the best, and LOS F is failing. For unsignalized intersections, a LOS F exceeds estimated delays of 50 seconds. For urban arterials, minor approaches may frequently experience levels of service E. A full level of service description for unsignalized intersections is presented in **Table 1**.

2021 GEOMETRY AND TRAFFIC CONTROL

Briggs Station



LEGEND
XXX AM PEAK
(XXX) PM PEAK

N

Figure 3

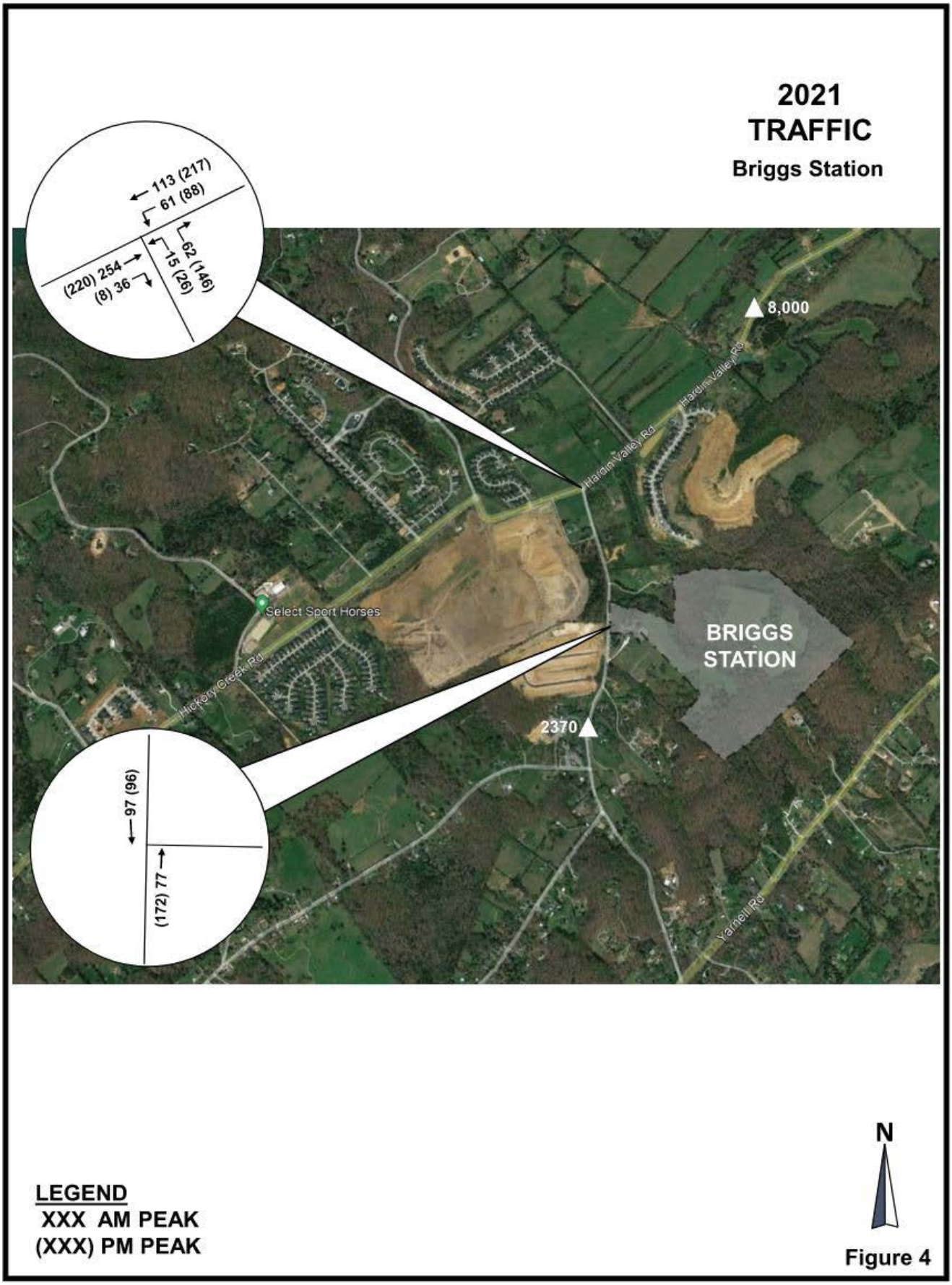

2021
TRAFFIC
Briggs Station
113 (217)
61 (88)
(220) 254
(8) 36
15 (26)
62 (146)
8,000
Hardin Valley Rd
Hardin Valley Rd
Select Sport Horses
BRIGGS
STATION
Hickory Creek Rd
2370
97 (96)
(172) 77
Yarnell Rd
N
LEGEND
XXX AM PEAK
(XXX) PM PEAK

Figure 4

TABLE 1. LEVEL OF SERVICE (LOS) DESCRIPTION FOR TWO-WAY STOP INTERSECTIONS

Level of Service	Average Control Delay per Vehicle (seconds)		
A		≤ 10.0	
B	> 10.0	and	≤ 15.0
C	> 15.0	and	≤ 25.0
D	> 25.0	and	≤ 35.0
E	> 35.0	and	≤ 50.0
F		> 50.0	

SOURCE: Highway Capacity Manual, TRB

Analyses were conducted using the Synchro Software, developed by Trafficware. **Table 2** presents the analyses of the study intersections. The analyses indicate that existing traffic conditions for the unsignalized intersections are operating at an acceptable level of service.

TABLE 2. 2021 TRAFFIC CAPACITY AND LEVEL OF SERVICE

INTERSECTION	TRAFFIC CONTROL	PEAK PERIOD	V/C	DELAY	LOS
Marietta Church Road &	STOP	AM	0.15	11.5	B
Hardin Valley Road	NB	PM	0.29	12.7	B

Note: Average vehicle delay estimated in seconds.

BACKGROUND TRAFFIC CONDITIONS

Background traffic is traffic that can be anticipated regardless of the proposed development. Traffic within the study area should continue to grow due to other developments as well as the continued growth within the surrounding area. This background traffic must be analyzed and evaluated for the purpose of establishing a baseline. The background traffic reflects the historical traffic growth and any planned adjacent development in the study area vicinity.

Background Traffic Volumes

In reviewing the ADT history in the site's vicinity, traffic growth determined an approximate 8.5-percent annually over the past 9-10 years. Therefore, for the purpose of this study, an annual compounded growth rate of 7.5-percent and a horizon year of 2025 are assumed. Therefore, using a 7.5. percent compounded growth rate until 2025, the existing traffic was grown 33.5-percent, a factor of 1.335. Grown traffic from the historical trends is illustrated in **Figure 5A**. In addition to the background growth, trips generated by adjacent and nearby development were assigned to the adjacent roadway and for the Marietta Church Road intersection with Hardin Valley Road. These trips are presented in **Table 3**.

TABLE 3. BACKGROUND TRIPS

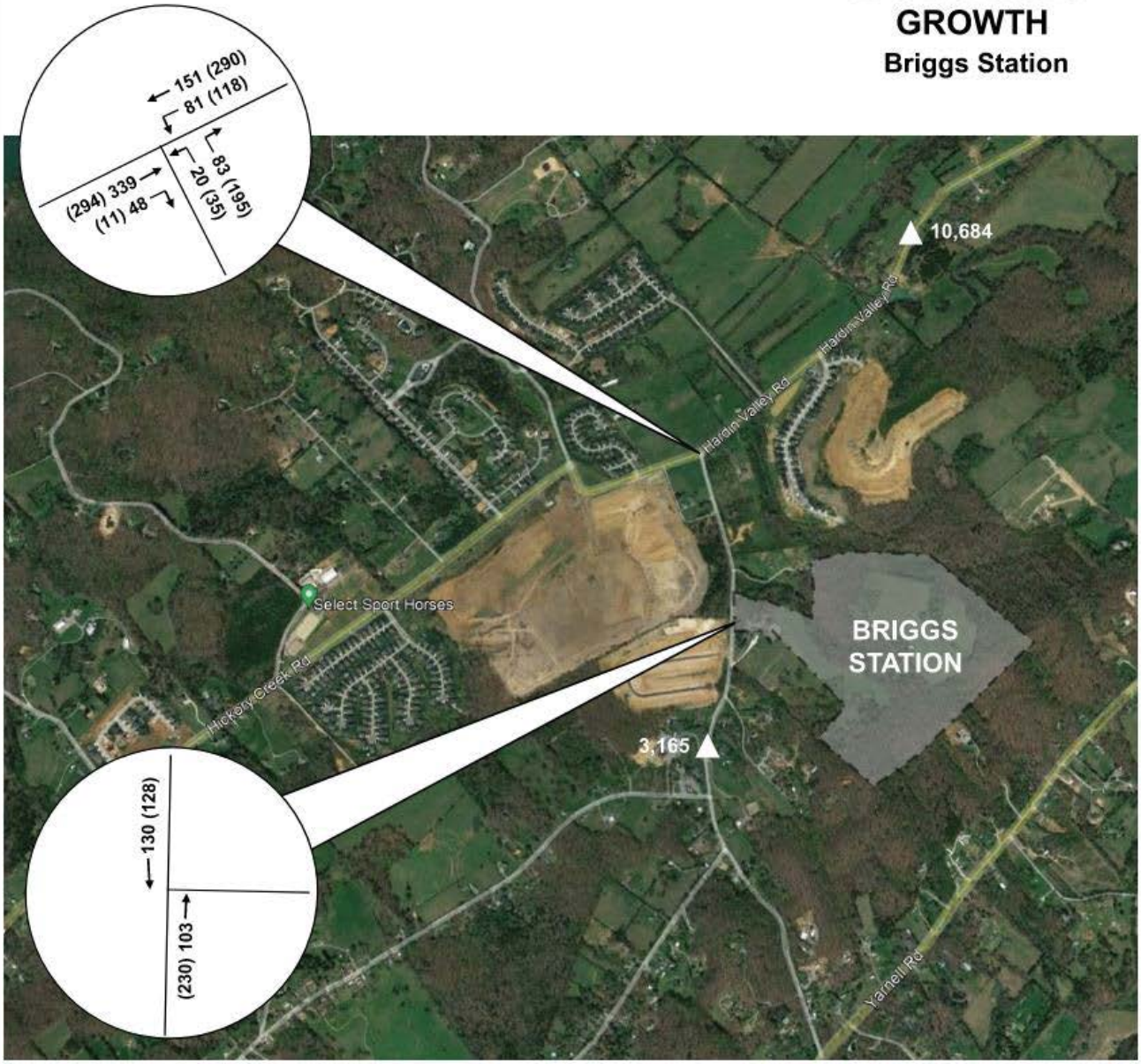
DEVELOPMENT	LAND USE	L.U.C	UNITS	DAILY TRIPS	AM PEAK		PM PEAK	
					ENTER	EXIT	ENTER	EXIT
Seal Property	Single Family	210	272	2,533	48	137	160	94
Broady Glen	Single Family	210	52	553	11	30	34	20
Vining Mill	Single Family	210	142	1,393	27	76	87	51
Hoppe/Mission Hills	Single Family	210	33	364	7	20	22	13
	Townhomes	Knox Co	45	465	6	20	22	18

Reference: Trip Generation, 11 Edition

Figure 5B illustrates the assignment of the generated trips. Trips associated with development within the site vicinity were added to the background traffic growth to estimate the total background traffic for the study intersections illustrated in **Figure 6**.

2025 BACKGROUND GROWTH

Briggs Station



Traffic projections based on a 7.5% compounded annual growth rate

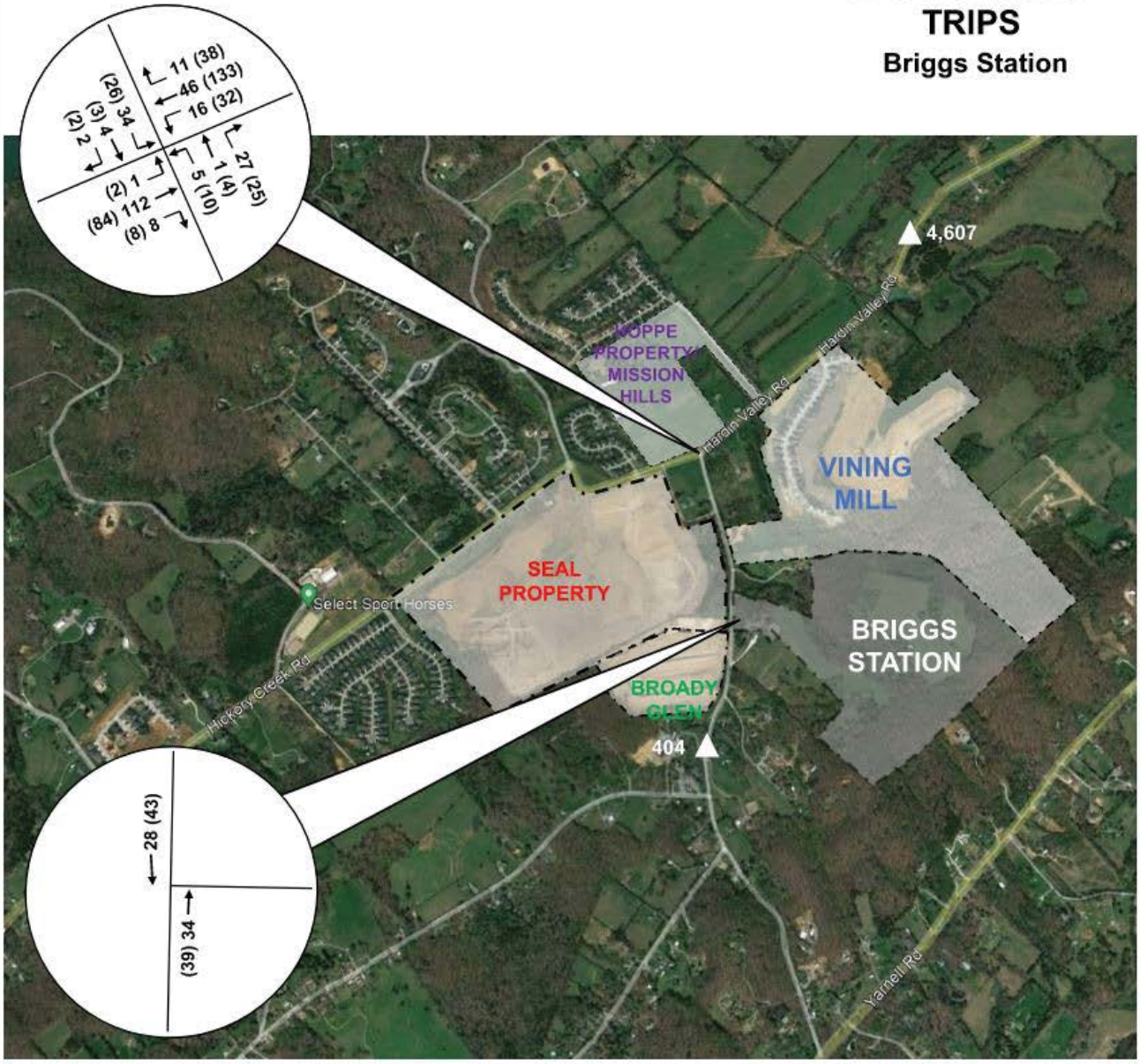
LEGEND
XXX AM PEAK
(XXX) PM PEAK

N

Figure 5A

2025 BACKGROUND TRIPS

Briggs Station



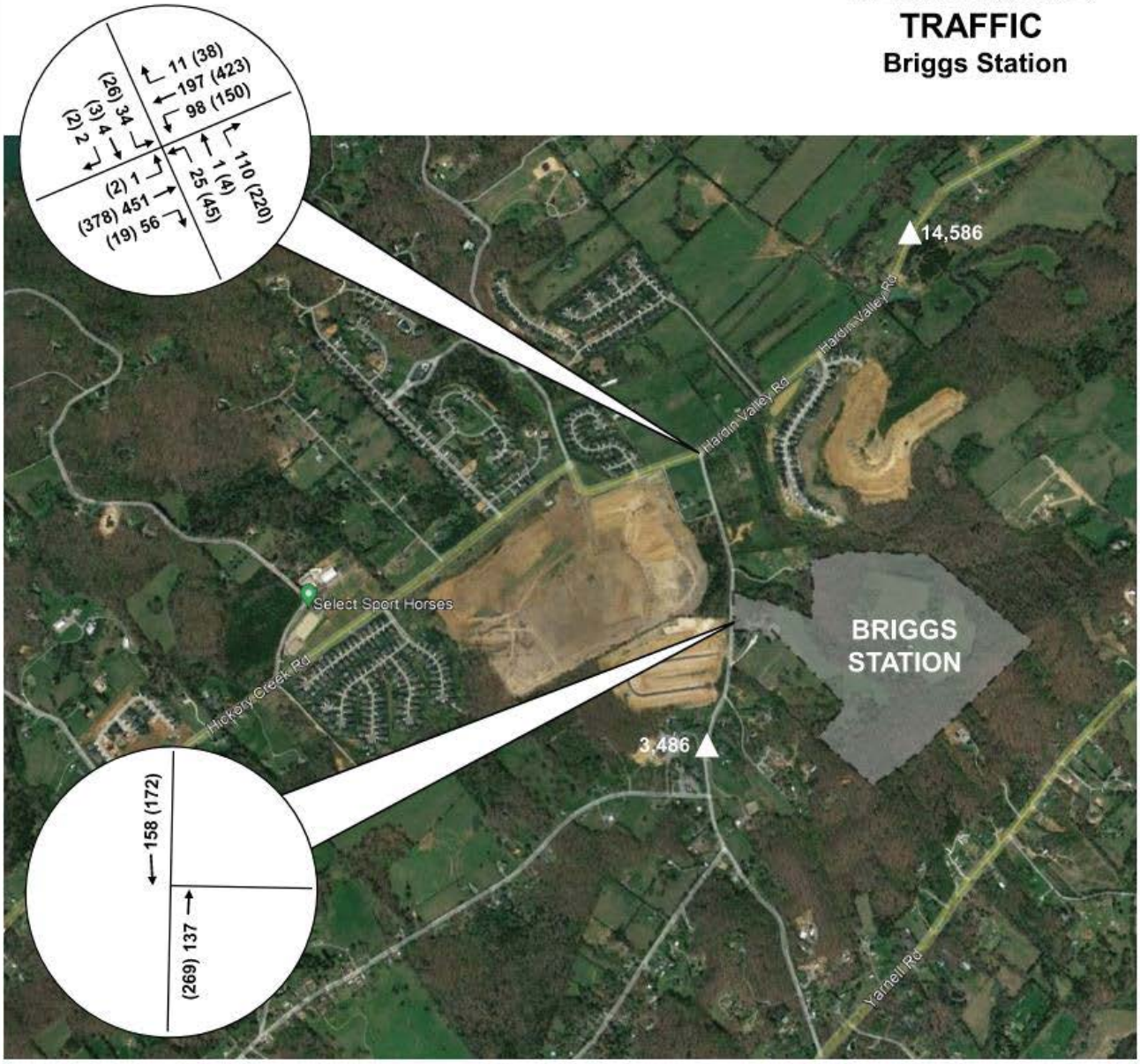
LEGEND
XXX AM PEAK
(XXX) PM PEAK

N

Figure 5B

2025 TOTAL BACKGROUND TRAFFIC

Briggs Station



LEGEND
XXX AM PEAK
(XXX) PM PEAK

N

Figure 6

Background Capacity and Level of Service

Analysis was performed with the grown traffic volumes with and without the background trips associated with the nearby developments and are presented in **Table 4**. Without background trips, the intersection of Marietta Church Road and Hardin Valley Road will operate at acceptable levels of service. With the planned adjacent and nearby development, the unsignalized Marietta Church Road and Hardin Valley Road intersection will begin to fail.

TABLE 4. 2025 BACKGROUND TRAFFIC CAPACITY AND LEVEL OF SERVICE

INTERSECTION	TRAFFIC CONTROL	PEAK HOUR	2025 BACKGROUND					
			with Background Growth Only			Background Growth + Trips		
			V/C	DELAY	LOS	V/C	DELAY	LOS
Marietta Church Road & Hardin Valley Road	STOP NB/SB	AM	0.20 / -	13.0 / -	B / -	0.35 / 0.26	17.9 / 34.0	C / D
		PM	0.66 / -	27.9 / -	D / -	0.78 / 0.44	40.8 / 84.0	E / F
	Roundabout	AM					6.5	A
		PM					6.7	A

Note: Average vehicle delay estimated in seconds.

The analysis of the intersection of Marietta Church Road and Hardin Valley Road included a westbound left-turn lane which would be warranted with the total background traffic conditions. The mitigation of this failing Los may be a roundabout or signalization of the intersection. A single lane roundabout provides for a very good LOS.

PROJECT IMPACTS

Project conditions are developed by generating traffic based on the proposed land uses, distributing the trips to the transportation network, and again conducting analyses for capacity and level of service.

Trip Generation

Project traffic was determined using the publication, **Trip Generation, 11th Edition**. This reference is published by the Institute of Transportation Engineers (ITE) and represents national data collected for many different land uses including industrial, residential and commercial uses. **Trip Generation** is an essential tool in calculating the traffic, which may be generated by a proposed development. The study will generate traffic for 188 single-family units. From the trip generation calculations, the proposed site may generate approximately 1,800 daily trips. **Table 5** presents the trip generation of this proposed site.

TABLE 5. TRIP GENERATION

LAND USE	L.U.C	UNITS	DAILY TRAFFIC	AM PEAK ENTER	AM PEAK EXIT	PM PEAK ENTER	PM PEAK EXIT
SINGLE FAMILY	210	188	1,804	34	98	113	67

Reference: Trip Generation, 11 Edition

Trip Distribution and Assignment

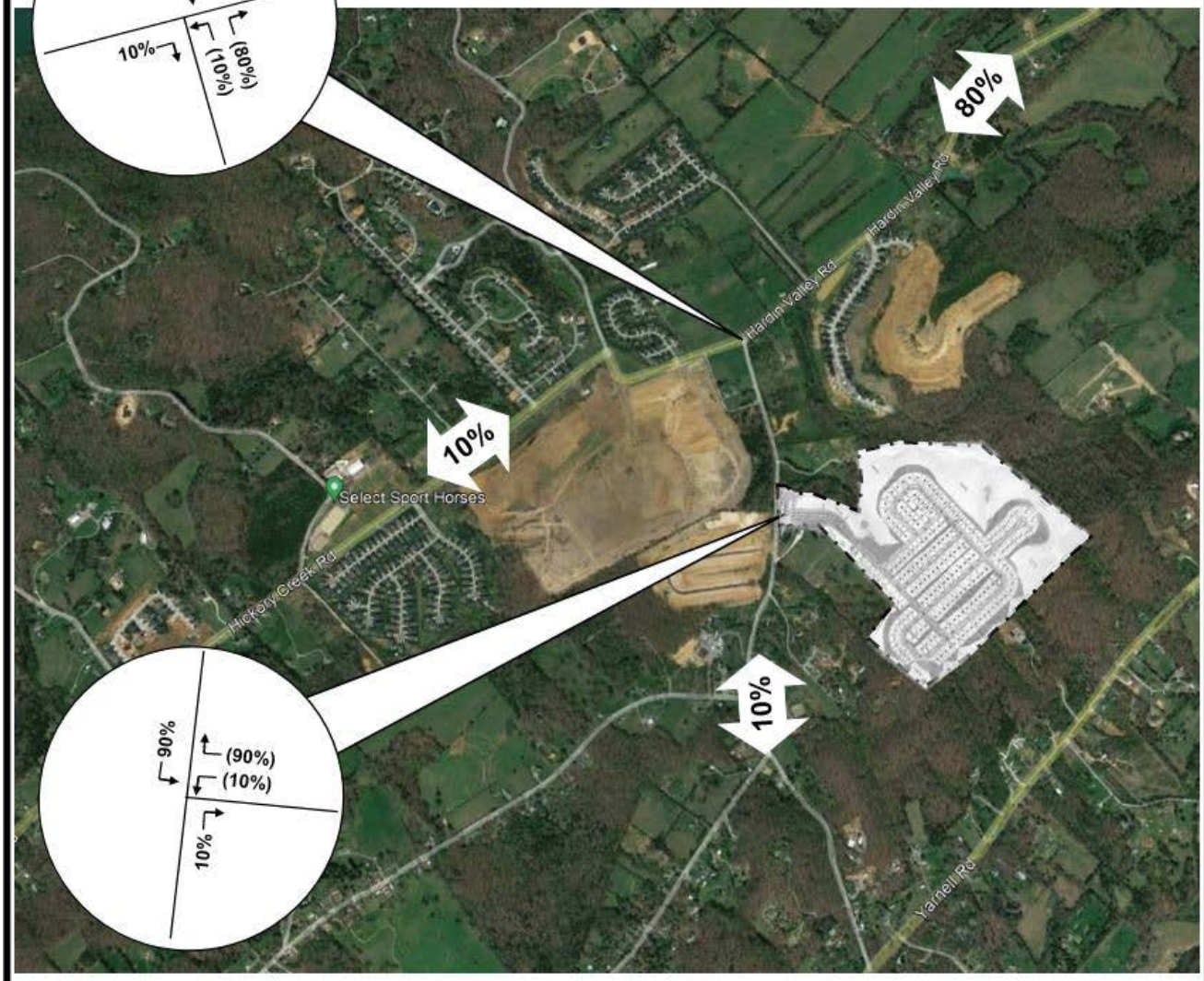
These trips were distributed to Marietta Church Road and Hardin Valley Road with 80-percent traveling Hardin Valley Road to the east of the site. Hardin Valley Road was assigned 10-percent to the west of the site. Marietta Church Road was assigned 10-percent. **Figure 7** illustrates this distribution.

Project Traffic Volumes

By multiplying the trips generated by the distribution percentages, the project traffic volumes were determined. **Figure 8** illustrates the resulting project traffic volumes associated with the proposed Briggs Station subdivision development.

TRIP DISTRIBUTION & ASSIGNMENT

Briggs Station



LEGEND
XX% Entering Trips
(XX%) Exiting Trips

N

Figure 7

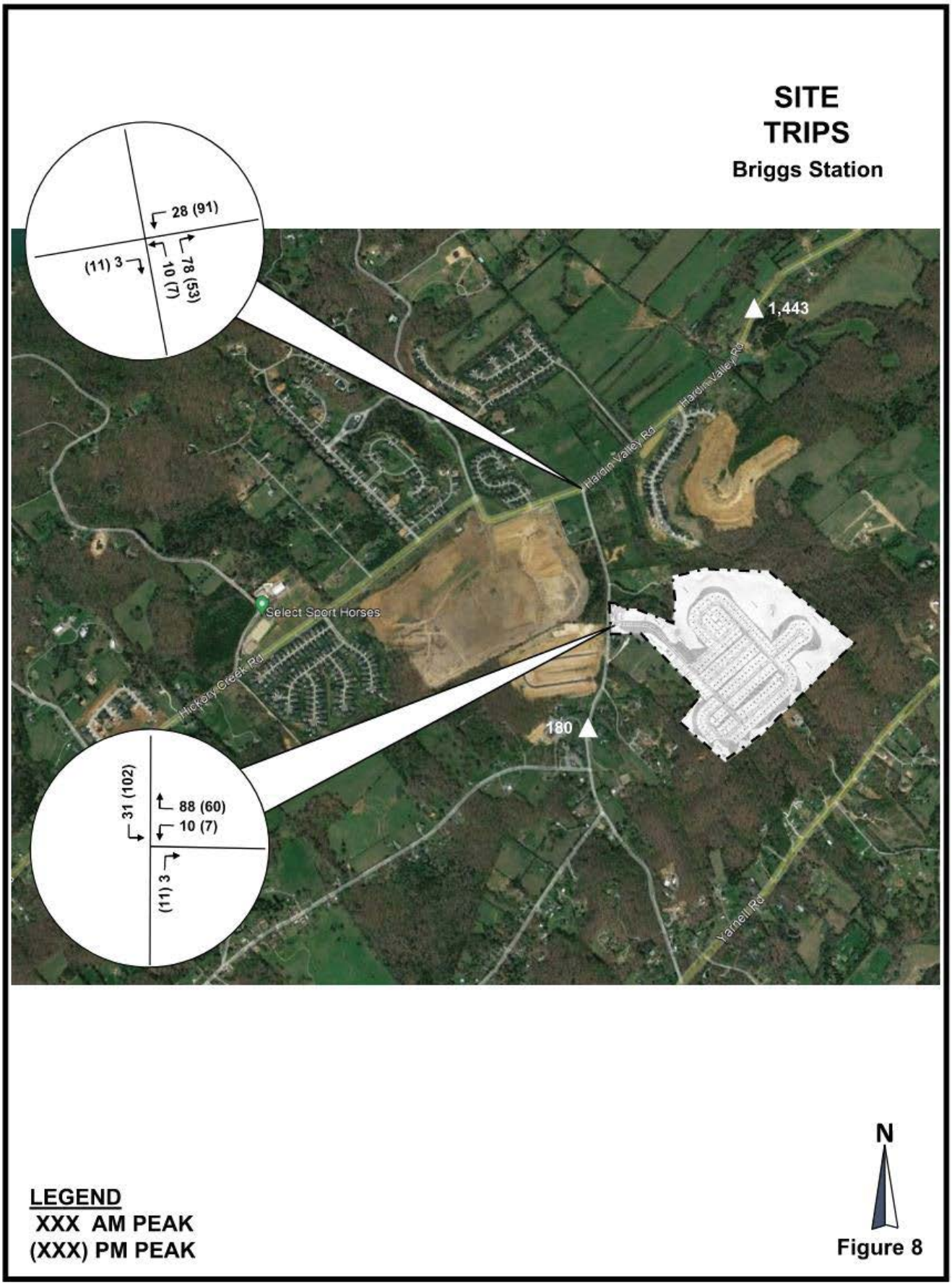

SITE
TRIPS
Briggs Station
28 (91)
(11) 3
10 (7)
78 (53)
1,443
Hardin Valley Rd
Hardin Valley Rd
Select Sport Horses
Hickory Creek Rd
180
31 (102)
88 (60)
10 (7)
(11) 3
Yarnell Rd
LEGEND
XXX AM PEAK
(XXX) PM PEAK
N

Figure 8

Total Projected Traffic Volumes

Background and project traffic volumes were added together to develop post-development traffic volumes for the year 2025. **Figure 9** illustrates this 2025 projection. For 2025 conditions, Briggs Station traffic represents less than 13-percent of the intersection of Marietta Church Road with Hardin Valley Road projected traffic volumes.

Projected Capacity and Level of Service

The development of the site has a minimal impact on the proposed site access to Marietta Church Road. The projected 2025 LOS analyses are shown in **Table 6** and summarized in **Table 7**. The results conclude that the site access street intersection with Marietta Church Road will operate at an acceptable level of service. The Marietta Church Road intersection with Hardin Valley Road would operate with a LOS F during peak hours with the projected traffic volumes and patterns.

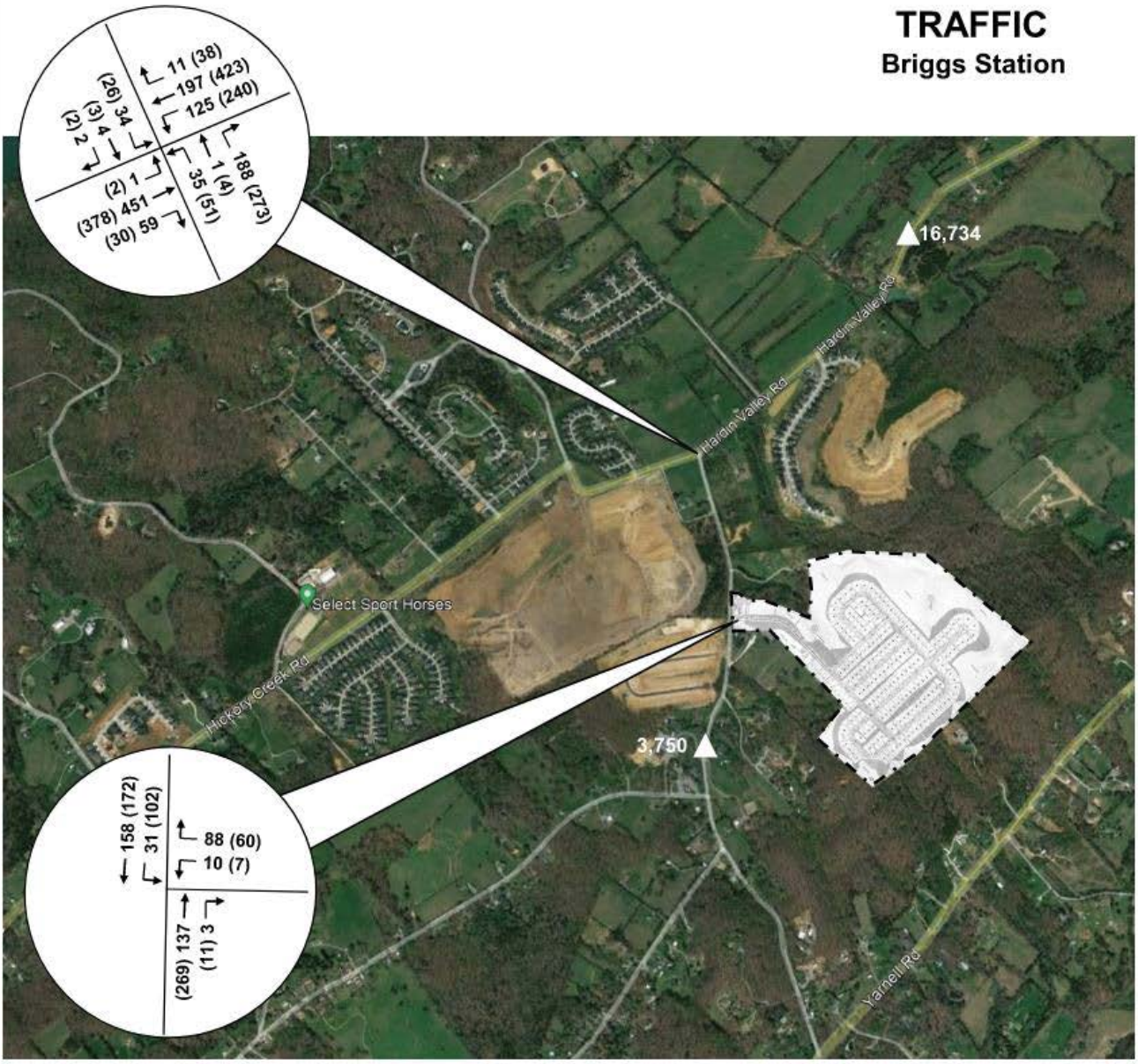
TABLE 6. 2025 PROJECTED TRAFFIC CAPACITY AND LEVEL OF SERVICE

INTERSECTION	TRAFFIC CONTROL	PEAK PERIOD	V/C	DELAY	LOS
Marietta Church Road & Hardin Valley Road	STOP NB/SB	AM	0.57 / 0.38	24.3 / 54.8	C / F
		PM	1.15 / 0.80	133.5 / 227.7	F / F
	Roundabout	AM		7.4	A
		PM		9.4	A
Marietta Church Road & Briggs Station Access Street	STOP WB	AM	0.13	9.8	A
		PM	0.11	11.0	B

Note: Average vehicle delay estimated in seconds.

With a roundabout of the Marietta Church Road intersection with Hardin Valley Road, the intersection can operate with an A LOS.

2025 PROJECTED TRAFFIC
Briggs Station



LEGEND
XXX AM PEAK
(XXX) PM PEAK

N

Figure 9

TABLE 7 SUMMARY
CAPACITY AND LEVEL OF SERVICE

INTERSECTION	TRAFFIC CONTROL	PEAK PERIOD	2021 TRAFFIC V/C	2021 TRAFFIC DELAY	2021 TRAFFIC LOS	2025 BACKGROUND V/C	2025 BACKGROUND DELAY	2025 BACKGROUND LOS	2025 PROJECTED V/C	2025 PROJECTED DELAY	2025 PROJECTED LOS
Marietta Church Road &	STOP	AM	0.15	11.5	B	0.35 / 0.26	17.9 / 34.0	C / D	0.57 / 0.38	24.3 / 54.8	C / F
Hardin Valley Road	NB/SB	PM	0.29	12.7	B	0.78 / 0.44	40.8 / 84.0	E / F	1.15 / 0.80	133.5 / 227.7	F / F
	Roundabout	AM					6.5	A		7.4	A
		PM					6.7	A		9.4	A
Marietta Church Road &	STOP	AM							0.13	9.8	A
Briggs Station Access Street	WB	PM							0.11	11.0	B

Note: Average vehicle delay estimated in seconds.

Turn Lane Evaluation

A left-turn lane warrant analysis conducted for the 2025 background and projected traffic conditions for the Hardin Valley Road intersection with Marietta Church Road determined that a left-turn lane is warranted for the background traffic conditions. The recommended left-turn storage is 100-foot with the background traffic conditions and 150-foot with the projected traffic conditions including Briggs Station residential subdivision. However, a single-lane roundabout could mitigate both the need of a westbound left-turn lane and provide for an acceptable level of service for the intersection.

Using Knox County's Access Control and Driveway Design Policy, the review and evaluation of the projected traffic volumes did not determine any requirement of left- or right-turn lanes for the proposed site access street intersection with Marietta Church Road

Sight Distance

The site is proposed to have access to Marietta Church Road. Marietta Church Road has a 30mph posted speed limit requiring 300 feet of corner sight-distance by Knox County. The AASHTO minimum stopping sight distance is 200 feet. The sight distances for the proposed access intersection with Marietta Church Road exceeds 300 feet, thereby providing for acceptable line of sight. A detailed evaluation of this recommended line of sight was surveyed and is provided in the Appendix of this report.

RECOMMENDATIONS AND CONCLUSION

An exemption of a second access policy would be required if a subdivision density exceeded 150 single-family units. The site access is a divided boulevard section with 18-foot roadways, thereby having sufficient lane widths may operate with bi-directional traffic if one side of the boulevard is closed for any reason.

Recommendations for the proposed site include the following:

1. Consider a single-lane roundabout for the Hardin Valley Road intersection with Marietta Church Road, mitigating both the poor level of service and the warrant of a westbound left-turn lane (Warranted with background traffic conditions)

2. Intersection design should conform to the recommended standards and practices of the American Association of State Highway and Transportation Officials, the Institute of Transportation Engineers, and the Knox County Public Works Department.

The study of Briggs Station subdivision residential development evaluated the projected traffic conditions with 188 single-family units. Background traffic was determined using a 7.5-percent annual compounded growth rate until the year 2025. Traffic associated with the proposed project was then generated and distributed to the proposed site access. Using the identified turning movements for the projected traffic conditions, unsignalized capacity and level of service analyses were conducted using the **Highway Capacity Manual**. Unsignalized levels of service were found to be acceptable for the existing traffic conditions, but background traffic conditions indicate the Hardin Valley Road unsignalized intersection Marietta Church Road will begin to fail. The intersection of Hardin Valley Road and Marietta Church Road is further impacted with the proposed development, but its volume impact is less than 13-percent. A minimum LOS B was identified for the proposed site access street intersection with Marietta Church Road. With the recommendations of this report, the efficient and safe flow of traffic should be achieved.

APPENDIX

Trip Generation

Background Trip Distribution

Synchro Analyses

Turn Lane Evaluation

Sight-Distance Evaluation Survey

Traffic Counts

Graph Look Up

Query | Filter

DATA SOURCE:
Trip Generation Manual, 11th Ed

SEARCH BY LAND USE CODE:
210

LAND USE GROUP:
(200-299) Residential

LAND USE :
210 - Single-Family Detached Housing

LAND USE SUBCATEGORY:
All Sites

SETTING/LOCATION:
General Urban/Suburban

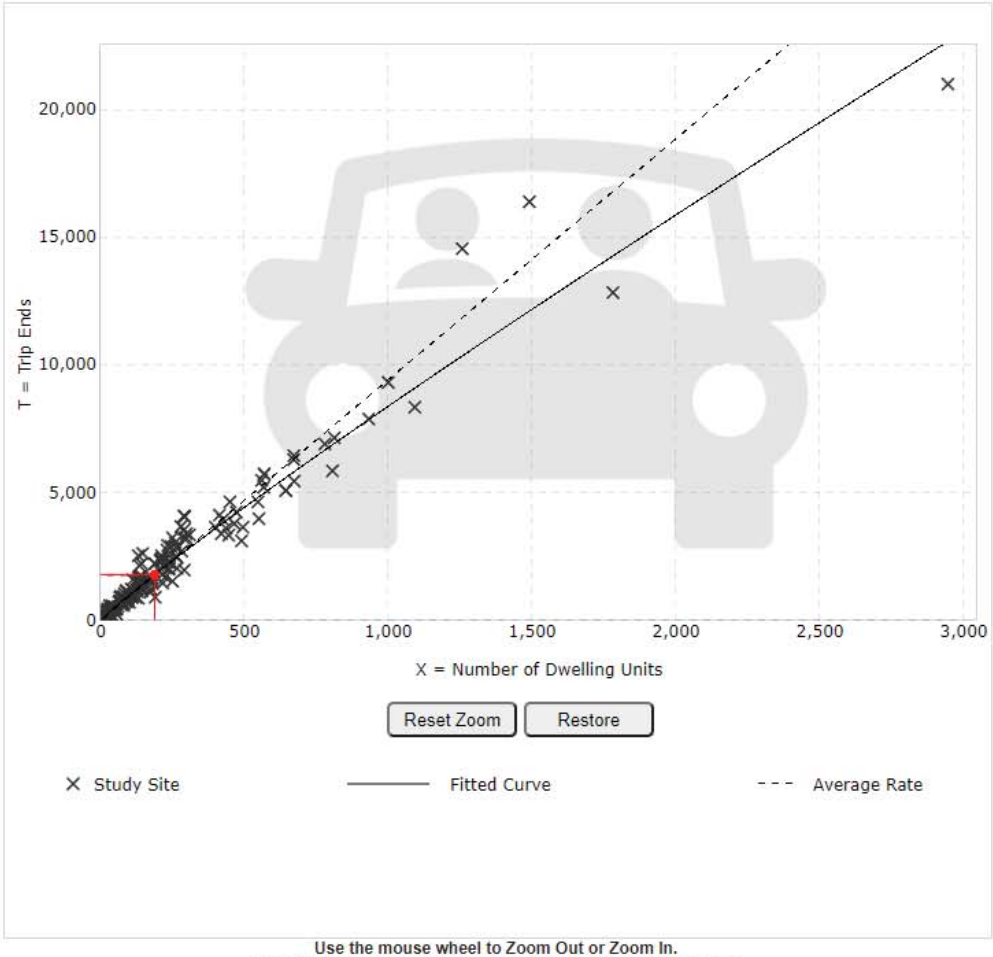
INDEPENDENT VARIABLE (IV):
Dwelling Units

TIME PERIOD:
Weekday

TRIP TYPE:
Vehicle

ENTER IV VALUE TO CALCULATE TRIPS:
188 Calculate

Data Plot and Equation



Use the mouse wheel to Zoom Out or Zoom In.
Hover the mouse pointer on data points to view X and T values.

DATA STATISTICS

Land Use:
Single-Family Detached Housing (210) Click for Description and Data Plots

Independent Variable:
Dwelling Units

Time Period:
Weekday

Setting/Location:
General Urban/Suburban

Trip Type:
Vehicle

Number of Studies:
174

Avg. Num. of Dwelling Units:
246

Average Rate:
9.43

Range of Rates:
4.45 - 22.61

Standard Deviation:
2.13

Fitted Curve Equation:
Ln(T) = 0.92 Ln(X) + 2.68

R^2:
0.95

Directional Distribution:
50% entering, 50% exiting

Calculated Trip Ends:
Average Rate: 1773 (Total), 886 (Entry), 887 (Exit)
Fitted Curve: 1804 (Total), 902 (Entry), 902 (Exit)

Graph Look Up

Query | Filter

DATA SOURCE:
Trip Generation Manual, 11th Ed

SEARCH BY LAND USE CODE:
210

LAND USE GROUP:
(200-299) Residential

LAND USE :
210 - Single-Family Detached Housing

LAND USE SUBCATEGORY:
All Sites

SETTING/LOCATION:
General Urban/Suburban

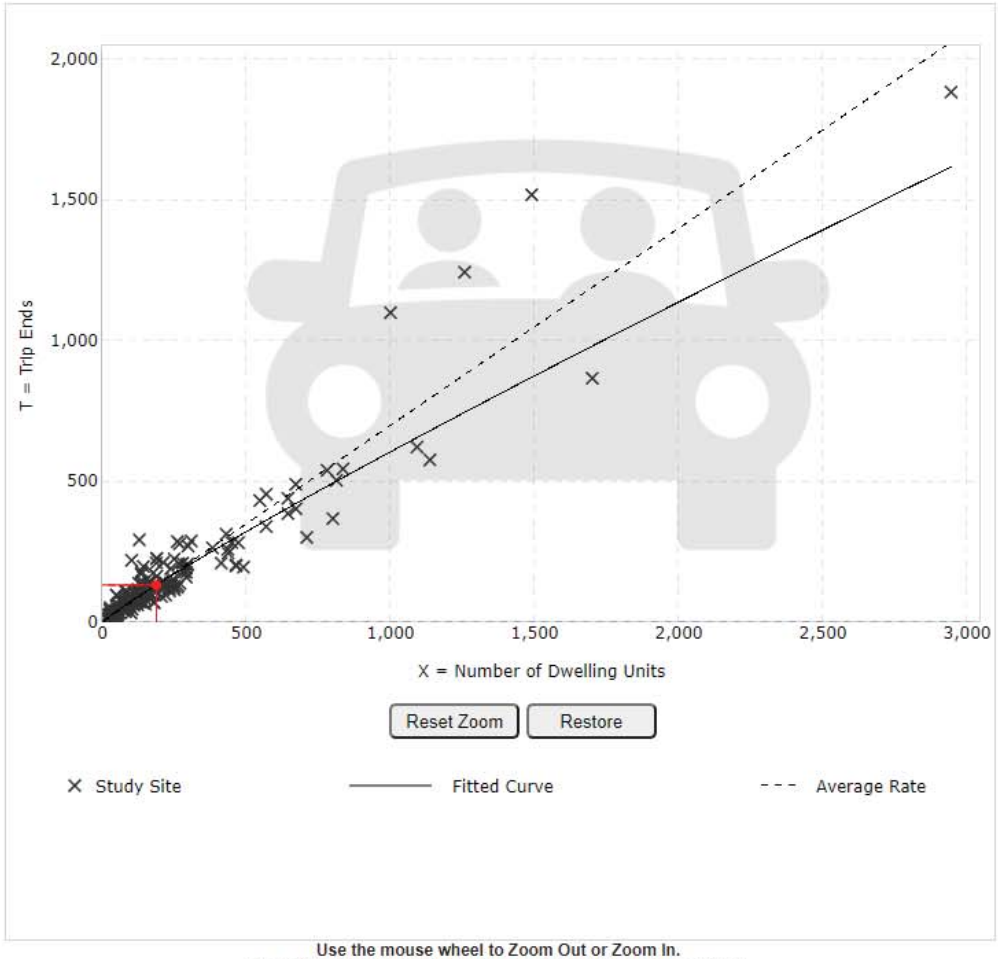
INDEPENDENT VARIABLE (IV):
Dwelling Units

TIME PERIOD:
Weekday, Peak Hour of Adjacent Street Traffic

TRIP TYPE:
Vehicle

ENTER IV VALUE TO CALCULATE TRIPS:
188 Calculate

Data Plot and Equation



Use the mouse wheel to Zoom Out or Zoom In.
Hover the mouse pointer on data points to view X and T values.

DATA STATISTICS

Land Use:
Single-Family Detached Housing (210) Click for Description and Data Plots

Independent Variable:
Dwelling Units

Time Period:
Weekday
Peak Hour of Adjacent Street Traffic
One Hour Between 7 and 9 a.m.

Setting/Location:
General Urban/Suburban

Trip Type:
Vehicle

Number of Studies:
192

Avg. Num. of Dwelling Units:
226

Average Rate:
0.70

Range of Rates:
0.27 - 2.27

Standard Deviation:
0.24

Fitted Curve Equation:
$Ln(T) = 0.91\ Ln(X) + 0.12$

R^2:
0.90

Directional Distribution:
26% entering, 74% exiting

Calculated Trip Ends:
Average Rate: 132 (Total), 34 (Entry), 98 (Exit)
Fitted Curve: 132 (Total), 34 (Entry), 98 (Exit)

Graph Look Up

Query | Filter

DATA SOURCE:
Trip Generation Manual, 11th Ed

SEARCH BY LAND USE CODE:
210

LAND USE GROUP:
(200-299) Residential

LAND USE :
210 - Single-Family Detached Housing

LAND USE SUBCATEGORY:
All Sites

SETTING/LOCATION:
General Urban/Suburban

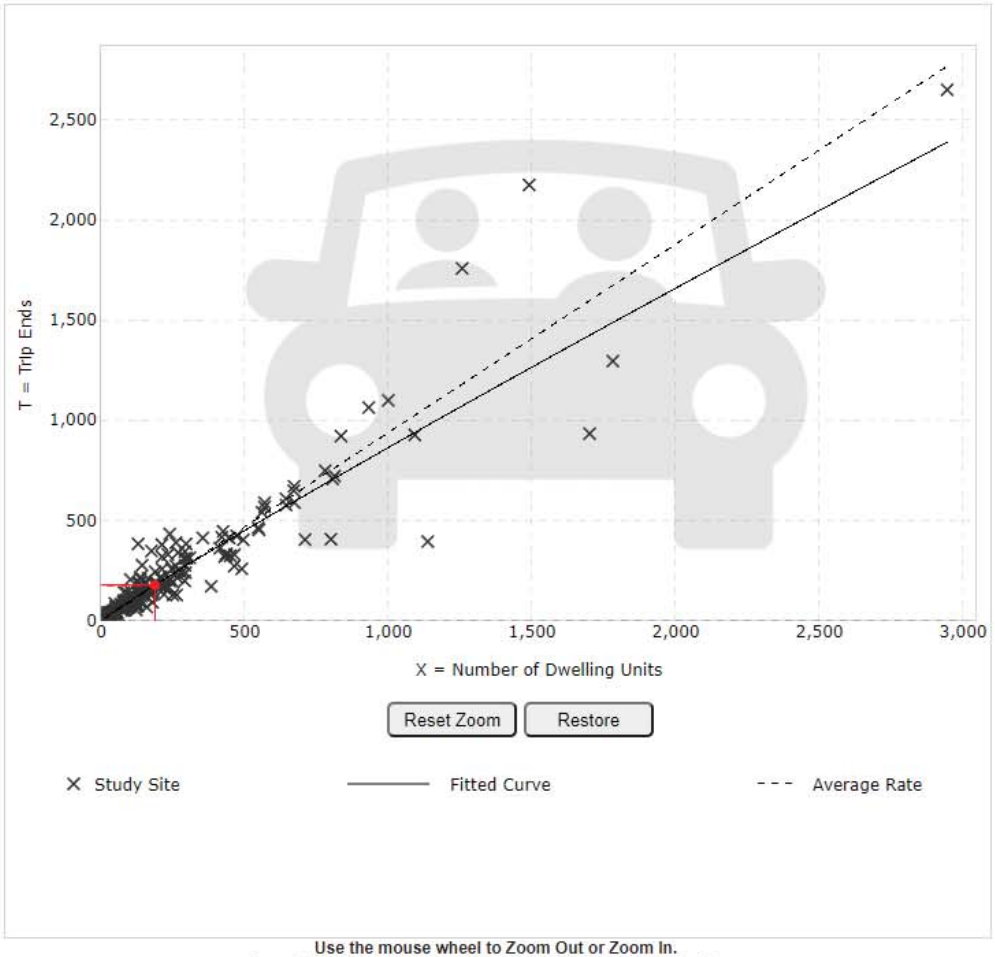
INDEPENDENT VARIABLE (IV):
Dwelling Units

TIME PERIOD:
Weekday, Peak Hour of Adjacent Street Traffic

TRIP TYPE:
Vehicle

ENTER IV VALUE TO CALCULATE TRIPS:
188 Calculate

Data Plot and Equation



Use the mouse wheel to Zoom Out or Zoom In.
Hover the mouse pointer on data points to view X and T values.

DATA STATISTICS

Land Use:
Single-Family Detached Housing (210) Click for Description and Data Plots

Independent Variable:
Dwelling Units

Time Period:
Weekday
Peak Hour of Adjacent Street Traffic
One Hour Between 4 and 6 p.m.

Setting/Location:
General Urban/Suburban

Trip Type:
Vehicle

Number of Studies:
208

Avg. Num. of Dwelling Units:
248

Average Rate:
0.94

Range of Rates:
0.35 - 2.98

Standard Deviation:
0.31

Fitted Curve Equation:
Ln(T) = 0.94 Ln(X) + 0.27

R^2:
0.92

Directional Distribution:
63% entering, 37% exiting

Calculated Trip Ends:
Average Rate: 177 (Total), 111 (Entry), 66 (Exit)
Fitted Curve: 180 (Total), 113 (Entry), 67 (Exit)

TRIP GENERATION

08-Nov-21

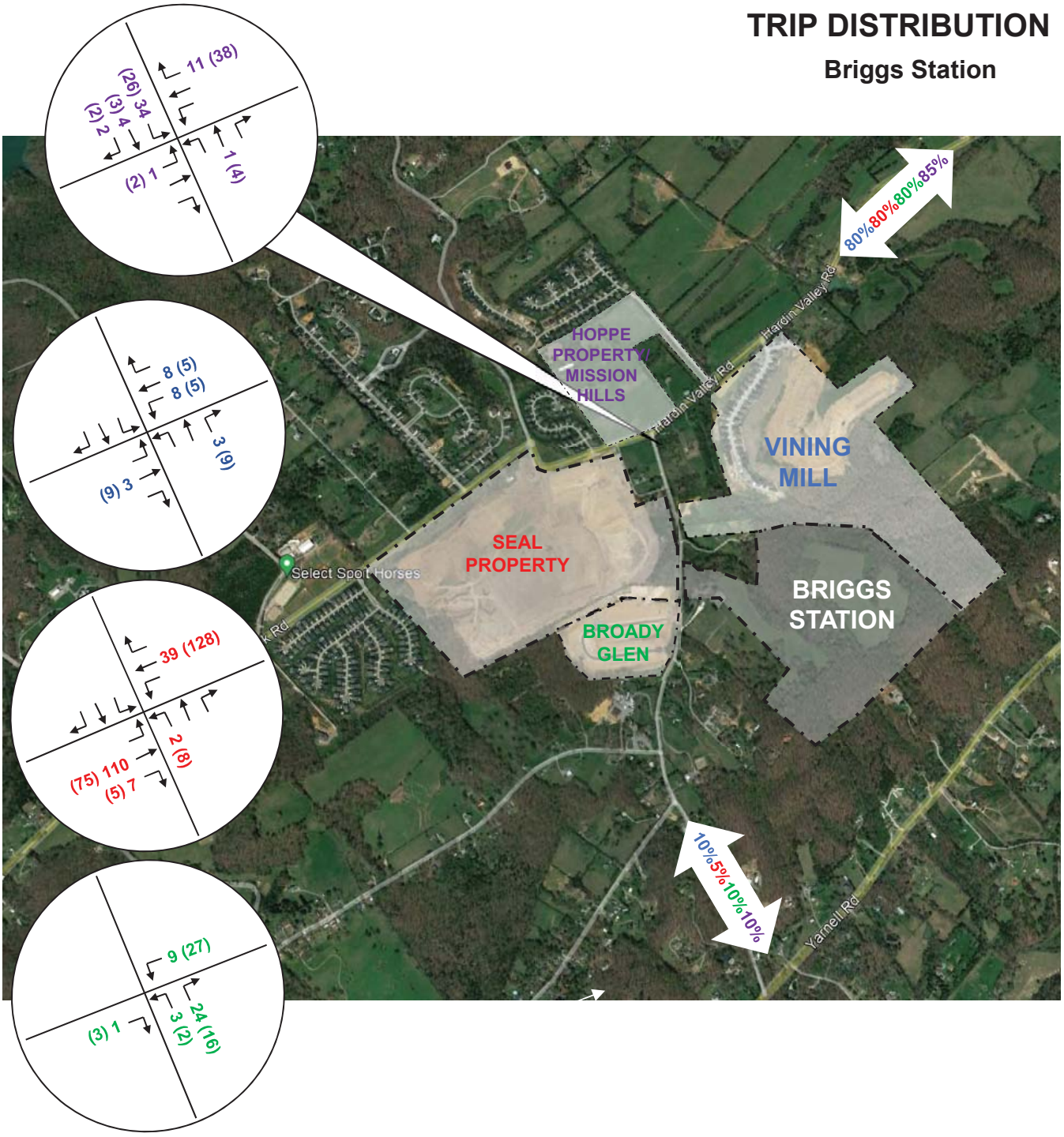
LAND USE	L.U.C	SIZE	AVERAGE DAILY TRAFFIC	AM PEAK ENTER	AM PEAK EXIT	AM PEAK TOTAL	PM PEAK ENTER	PM PEAK EXIT	PM PEAK TOTAL
SINGLE FAMILY	210	188	1,773	34	97	132	111	65	177
SINGLE FAMILY	210	272	2,565	50	141	190	161	95	256
SINGLE FAMILY	210	52	490	9	27	36	31	18	49
SINGLE FAMILY	210	142	1,339	26	74	99	84	49	133
SINGLE FAMILY	210	33	311	6	17	23	20	11	31
KNOX CO MULTI-FAMILY	225	45	406	5	19	25	18	15	32
0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0
			6,885	130	375	506	425	254	678

LAND USE	L.U.C	SIZE	REGRESSION DAILY TRAFFIC	AM PEAK ENTER	AM PEAK EXIT	AM PEAK TOTAL	PM PEAK ENTER	PM PEAK EXIT	PM PEAK TOTAL
SINGLE FAMILY	210	188	1,804	34	98	132	113	67	180
SINGLE FAMILY	210	272	2,533	48	137	185	160	94	255
SINGLE FAMILY	210	52	553	11	30	41	34	20	54
SINGLE FAMILY	210	142	1,393	27	76	102	87	51	138
SINGLE FAMILY	210	33	364	7	20	27	22	13	35
KNOX CO MULTI-FAMILY	225	45	465	6	20	26	22	18	40
0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0
			7,112	133	381	514	439	263	702

LAND USE	L.U.C	SIZE	SATURDAY DAILY TRAFFIC	SATURDAY PEAK ENTER	SATURDAY PEAK EXIT	SATURDAY PEAK TOTAL	SUNDAY DAILY TRAFFIC	SUNDAY PEAK ENTER	SUNDAY PEAK EXIT	SUNDAY PEAK TOTAL
SINGLE FAMILY	210	188	1,771	93	79	171	1,596	82	73	155
SINGLE FAMILY	210	272	2,534	132	112	244	2,340	118	105	222
SINGLE FAMILY	210	52	509	29	25	54	391	25	22	46
SINGLE FAMILY	210	142	1,349	71	61	132	1,188	63	56	118
SINGLE FAMILY	210	33	328	21	18	38	222	17	15	31
KNOX CO MULTI-FAMILY	225	45	288	11	12	23	26	12	11	23
0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0
			6,779	357	306	663	5,763	316	281	596

2025 BACKGROUND TRIP DISTRIBUTION

Briggs Station



DEVELOPMENT	LAND USE	L.U.C	UNITS	DAILY TRIPS	AM PEAK ENTER	AM PEAK EXIT	PM PEAK ENTER	PM PEAK EXIT
Seal Property	Single Family	210	272	2,533	48	137	160	94
Broady Glen	Single Family	210	52	553	11	30	34	20
Vining Mill	Single Family	210	142	1,393	27	76	87	51
Hoppe/Mission Hills	Single Family	210	33	364	7	20	22	13
	Townhomes	Knox Co	45	465	6	20	22	18

Reference: Trip Generation, 11 Edition

N

Intersection	
Int Delay, s/veh	2.8

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	254	36	61	113	15	62
Future Vol, veh/h	254	36	61	113	15	62
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	91	91	84	84	77	77
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	279	40	73	135	19	81

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	319	0	580	299
Stage 1	-	-	-	-	299	-
Stage 2	-	-	-	-	281	-
Critical Hdwy	-	-	4.12	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	-	-	2.218	-	3.518	3.318
Pot Cap-1 Maneuver	-	-	1241	-	477	741
Stage 1	-	-	-	-	752	-
Stage 2	-	-	-	-	767	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1241	-	446	741
Mov Cap-2 Maneuver	-	-	-	-	446	-
Stage 1	-	-	-	-	704	-
Stage 2	-	-	-	-	767	-

Approach	EB	WB	NB
HCM Control Delay, s	0	2.8	11.5
HCM LOS			B

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	656	-	-	1241	-
HCM Lane V/C Ratio	0.152	-	-	0.059	-
HCM Control Delay (s)	11.5	-	-	8.1	0
HCM Lane LOS	B	-	-	A	A
HCM 95th %tile Q(veh)	0.5	-	-	0.2	-

Intersection	
Int Delay, s/veh	3.9

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	220	8	88	217	26	146
Future Vol, veh/h	220	8	88	217	26	146
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	85	85	82	82	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	259	9	107	265	28	159

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	268	0	743	264
Stage 1	-	-	-	-	264	-
Stage 2	-	-	-	-	479	-
Critical Hdwy	-	-	4.12	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	-	-	2.218	-	3.518	3.318
Pot Cap-1 Maneuver	-	-	1296	-	383	775
Stage 1	-	-	-	-	780	-
Stage 2	-	-	-	-	623	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1296	-	346	775
Mov Cap-2 Maneuver	-	-	-	-	346	-
Stage 1	-	-	-	-	704	-
Stage 2	-	-	-	-	623	-

Approach	EB	WB	NB
HCM Control Delay, s	0	2.3	12.7
HCM LOS			B

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	653	-	-	1296	-
HCM Lane V/C Ratio	0.286	-	-	0.083	-
HCM Control Delay (s)	12.7	-	-	8	0
HCM Lane LOS	B	-	-	A	A
HCM 95th %tile Q(veh)	1.2	-	-	0.3	-

Intersection	
Int Delay, s/veh	2.8

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	339	48	81	151	20	83
Future Vol, veh/h	339	48	81	151	20	83
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	150	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	368	52	88	164	22	90

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	420	0	734	394
Stage 1	-	-	-	-	394	-
Stage 2	-	-	-	-	340	-
Critical Hdwy	-	-	4.12	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	-	-	2.218	-	3.518	3.318
Pot Cap-1 Maneuver	-	-	1139	-	387	655
Stage 1	-	-	-	-	681	-
Stage 2	-	-	-	-	721	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1139	-	357	655
Mov Cap-2 Maneuver	-	-	-	-	357	-
Stage 1	-	-	-	-	629	-
Stage 2	-	-	-	-	721	-

Approach	EB	WB	NB
HCM Control Delay, s	0	2.9	13
HCM LOS			B

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	564	-	-	1139	-
HCM Lane V/C Ratio	0.199	-	-	0.077	-
HCM Control Delay (s)	13	-	-	8.4	-
HCM Lane LOS	B	-	-	A	-
HCM 95th %tile Q(veh)	0.7	-	-	0.3	-

Intersection	
Int Delay, s/veh	7.1

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	378	19	150	423	45	220
Future Vol, veh/h	378	19	150	423	45	220
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	150	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	411	21	163	460	49	239

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	432	0	1208	422
Stage 1	-	-	-	-	422	-
Stage 2	-	-	-	-	786	-
Critical Hdwy	-	-	4.12	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	-	-	2.218	-	3.518	3.318
Pot Cap-1 Maneuver	-	-	1128	-	202	632
Stage 1	-	-	-	-	662	-
Stage 2	-	-	-	-	449	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1128	-	173	632
Mov Cap-2 Maneuver	-	-	-	-	173	-
Stage 1	-	-	-	-	566	-
Stage 2	-	-	-	-	449	-

Approach	EB	WB	NB
HCM Control Delay, s	0	2.3	27.9
HCM LOS			D

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	436	-	-	1128	-
HCM Lane V/C Ratio	0.661	-	-	0.145	-
HCM Control Delay (s)	27.9	-	-	8.7	-
HCM Lane LOS	D	-	-	A	-
HCM 95th %tile Q(veh)	4.7	-	-	0.5	-

Intersection	
Intersection Delay, s/veh	6.5
Intersection LOS	A

Approach	EB	WB	NB	SB
Entry Lanes	1	2	1	1
Conflicting Circle Lanes	1	1	1	1
Adj Approach Flow, veh/h	552	333	148	43
Demand Flow Rate, veh/h	563	339	151	44
Vehicles Circulating, veh/h	151	30	539	355
Vehicles Exiting, veh/h	248	660	175	14
Ped Vol Crossing Leg, #/h	0	0	0	0
Ped Cap Adj	1.000	1.000	1.000	1.000
Approach Delay, s/veh	8.3	3.8	6.6	4.3
Approach LOS	A	A	A	A

Lane	Left	Left	Right	Left	Left
Designated Moves	LTR	L	TR	LTR	LTR
Assumed Moves	LTR	L	TR	LTR	LTR
RT Channelized					
Lane Util	1.000	0.322	0.678	1.000	1.000
Follow-Up Headway, s	2.609	2.535	2.535	2.609	2.609
Critical Headway, s	4.976	4.544	4.544	4.976	4.976
Entry Flow, veh/h	563	109	230	151	44
Cap Entry Lane, veh/h	1183	1382	1382	796	961
Entry HV Adj Factor	0.981	0.982	0.981	0.980	0.975
Flow Entry, veh/h	552	107	226	148	43
Cap Entry, veh/h	1160	1357	1356	780	937
V/C Ratio	0.476	0.079	0.166	0.190	0.046
Control Delay, s/veh	8.3	3.3	4.0	6.6	4.3
LOS	A	A	A	A	A
95th %tile Queue, veh	3	0	1	1	0

Intersection	
Intersection Delay, s/veh	6.7
Intersection LOS	A

Approach	EB	WB	NB	SB
Entry Lanes	1	2	1	1
Conflicting Circle Lanes	1	1	1	1
Adj Approach Flow, veh/h	434	664	292	33
Demand Flow Rate, veh/h	442	677	298	34
Vehicles Circulating, veh/h	198	56	450	685
Vehicles Exiting, veh/h	521	692	190	48
Ped Vol Crossing Leg, #/h	0	0	0	0
Ped Cap Adj	1.000	1.000	1.000	1.000
Approach Delay, s/veh	7.3	5.6	8.1	5.9
Approach LOS	A	A	A	A

Lane	Left	Left	Right	Left	Left
Designated Moves	LTR	L	TR	LTR	LTR
Assumed Moves	LTR	L	TR	LTR	LTR
RT Channelized					
Lane Util	1.000	0.245	0.755	1.000	1.000
Follow-Up Headway, s	2.609	2.535	2.535	2.609	2.609
Critical Headway, s	4.976	4.544	4.544	4.976	4.976
Entry Flow, veh/h	442	166	511	298	34
Cap Entry Lane, veh/h	1128	1350	1350	872	686
Entry HV Adj Factor	0.981	0.982	0.980	0.980	0.969
Flow Entry, veh/h	434	163	501	292	33
Cap Entry, veh/h	1107	1325	1323	854	665
V/C Ratio	0.392	0.123	0.379	0.342	0.050
Control Delay, s/veh	7.3	3.7	6.3	8.1	5.9
LOS	A	A	A	A	A
95th %tile Queue, veh	2	0	2	2	0

Intersection	
Int Delay, s/veh	7.9

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	1	451	59	125	197	11	35	1	188	34	4	2
Future Vol, veh/h	1	451	59	125	197	11	35	1	188	34	4	2
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	150	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	1	490	64	136	214	12	38	1	204	37	4	2

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	226	0	0	554	0	0	1019	1022	522	1119	1048	220
Stage 1	-	-	-	-	-	-	524	524	-	492	492	-
Stage 2	-	-	-	-	-	-	495	498	-	627	556	-
Critical Hdwy	4.12	-	-	4.12	-	-	7.12	6.52	6.22	7.12	6.52	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Follow-up Hdwy	2.218	-	-	2.218	-	-	3.518	4.018	3.318	3.518	4.018	3.318
Pot Cap-1 Maneuver	1342	-	-	1016	-	-	215	236	555	184	228	820
Stage 1	-	-	-	-	-	-	537	530	-	558	548	-
Stage 2	-	-	-	-	-	-	556	544	-	471	513	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1342	-	-	1016	-	-	189	204	555	104	197	820
Mov Cap-2 Maneuver	-	-	-	-	-	-	189	204	-	104	197	-
Stage 1	-	-	-	-	-	-	536	529	-	557	475	-
Stage 2	-	-	-	-	-	-	476	471	-	297	512	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0	3.4	24.3	54.8
HCM LOS			C	F

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	424	1342	-	-	1016	-	-	114
HCM Lane V/C Ratio	0.574	0.001	-	-	0.134	-	-	0.381
HCM Control Delay (s)	24.3	7.7	0	-	9.1	-	-	54.8
HCM Lane LOS	C	A	A	-	A	-	-	F
HCM 95th %tile Q(veh)	3.5	0	-	-	0.5	-	-	1.6

Intersection	
Int Delay, s/veh	2.8

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	10	88	137	3	31	158
Future Vol, veh/h	10	88	137	3	31	158
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	11	96	149	3	34	172

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	391	151	0	0	152	0
Stage 1	151	-	-	-	-	-
Stage 2	240	-	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.12	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218	-
Pot Cap-1 Maneuver	613	895	-	-	1429	-
Stage 1	877	-	-	-	-	-
Stage 2	800	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	597	895	-	-	1429	-
Mov Cap-2 Maneuver	597	-	-	-	-	-
Stage 1	854	-	-	-	-	-
Stage 2	800	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	9.8	0	1.2
HCM LOS	A		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	852	1429	-
HCM Lane V/C Ratio	-	-	0.125	0.024	-
HCM Control Delay (s)	-	-	9.8	7.6	0
HCM Lane LOS	-	-	A	A	A
HCM 95th %tile Q(veh)	-	-	0.4	0.1	-

Intersection	
Int Delay, s/veh	36.1

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕		↰	↑			↕			↕	
Traffic Vol, veh/h	2	378	30	240	423	38	51	4	273	26	3	2
Future Vol, veh/h	2	378	30	240	423	38	51	4	273	26	3	2
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	150	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	2	411	33	261	460	41	55	4	297	28	3	2

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	501	0	0	444	0	0	1437	1455	428	1585	1451	481
Stage 1	-	-	-	-	-	-	432	432	-	1003	1003	-
Stage 2	-	-	-	-	-	-	1005	1023	-	582	448	-
Critical Hdwy	4.12	-	-	4.12	-	-	7.12	6.52	6.22	7.12	6.52	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Follow-up Hdwy	2.218	-	-	2.218	-	-	3.518	4.018	3.318	3.518	4.018	3.318
Pot Cap-1 Maneuver	1063	-	-	1116	-	-	111	130	627	88	131	585
Stage 1	-	-	-	-	-	-	602	582	-	292	320	-
Stage 2	-	-	-	-	-	-	291	313	-	499	573	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1063	-	-	1116	-	-	88	99	627	37	100	585
Mov Cap-2 Maneuver	-	-	-	-	-	-	88	99	-	37	100	-
Stage 1	-	-	-	-	-	-	600	580	-	291	245	-
Stage 2	-	-	-	-	-	-	219	240	-	260	571	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0	3.2	133.5	227.7
HCM LOS			F	F

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	311	1063	-	-	1116	-	-	42
HCM Lane V/C Ratio	1.146	0.002	-	-	0.234	-	-	0.802
HCM Control Delay (s)	133.5	8.4	0	-	9.2	-	-	227.7
HCM Lane LOS	F	A	A	-	A	-	-	F
HCM 95th %tile Q(veh)	14.8	0	-	-	0.9	-	-	3.1

Intersection	
Int Delay, s/veh	2.5

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	7	60	269	11	102	172
Future Vol, veh/h	7	60	269	11	102	172
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	8	65	292	12	111	187

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	707	298	0	0	304	0
Stage 1	298	-	-	-	-	-
Stage 2	409	-	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.12	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218	-
Pot Cap-1 Maneuver	402	741	-	-	1257	-
Stage 1	753	-	-	-	-	-
Stage 2	671	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	362	741	-	-	1257	-
Mov Cap-2 Maneuver	362	-	-	-	-	-
Stage 1	678	-	-	-	-	-
Stage 2	671	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	11	0	3
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	668	1257	-
HCM Lane V/C Ratio	-	-	0.109	0.088	-
HCM Control Delay (s)	-	-	11	8.1	0
HCM Lane LOS	-	-	B	A	A
HCM 95th %tile Q(veh)	-	-	0.4	0.3	-

Intersection	
Intersection Delay, s/veh	7.4
Intersection LOS	A

Approach	EB	WB	NB	SB
Entry Lanes	1	1	1	1
Conflicting Circle Lanes	1	1	1	1
Adj Approach Flow, veh/h	555	362	243	43
Demand Flow Rate, veh/h	566	369	248	44
Vehicles Circulating, veh/h	181	41	539	396
Vehicles Exiting, veh/h	259	746	208	14
Ped Vol Crossing Leg, #/h	0	0	0	0
Ped Cap Adj	1.000	1.000	1.000	1.000
Approach Delay, s/veh	8.7	5.2	8.2	4.4
Approach LOS	A	A	A	A

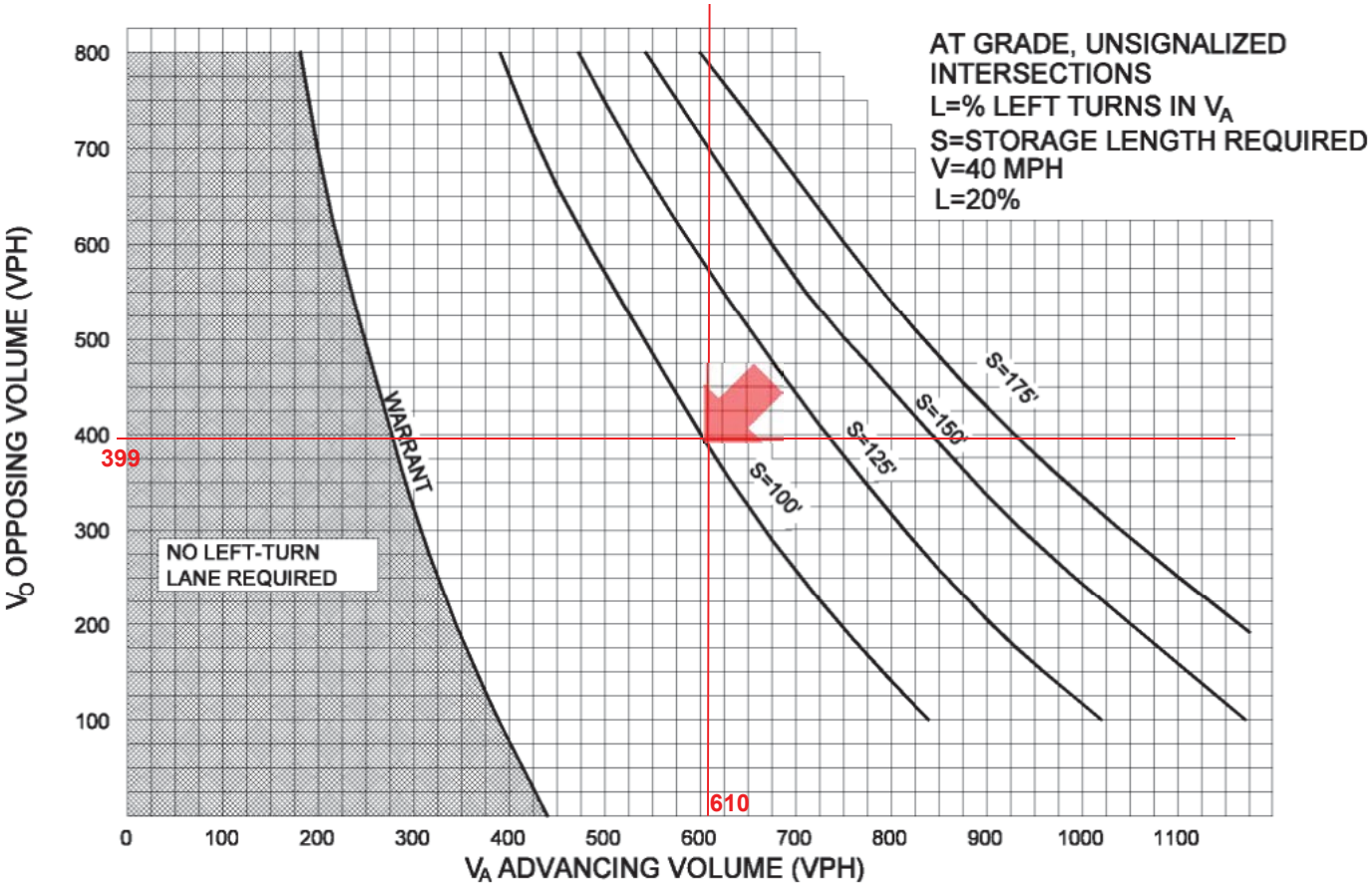
Lane	Left	Left	Left	Left
Designated Moves	LTR	LTR	LTR	LTR
Assumed Moves	LTR	LTR	LTR	LTR
RT Channelized				
Lane Util	1.000	1.000	1.000	1.000
Follow-Up Headway, s	2.609	2.609	2.609	2.609
Critical Headway, s	4.976	4.976	4.976	4.976
Entry Flow, veh/h	566	369	248	44
Cap Entry Lane, veh/h	1147	1323	796	921
Entry HV Adj Factor	0.981	0.980	0.980	0.975
Flow Entry, veh/h	555	362	243	43
Cap Entry, veh/h	1125	1297	780	899
V/C Ratio	0.493	0.279	0.311	0.048
Control Delay, s/veh	8.7	5.2	8.2	4.4
LOS	A	A	A	A
95th %tile Queue, veh	3	1	1	0

Intersection	
Intersection Delay, s/veh	9.4
Intersection LOS	A

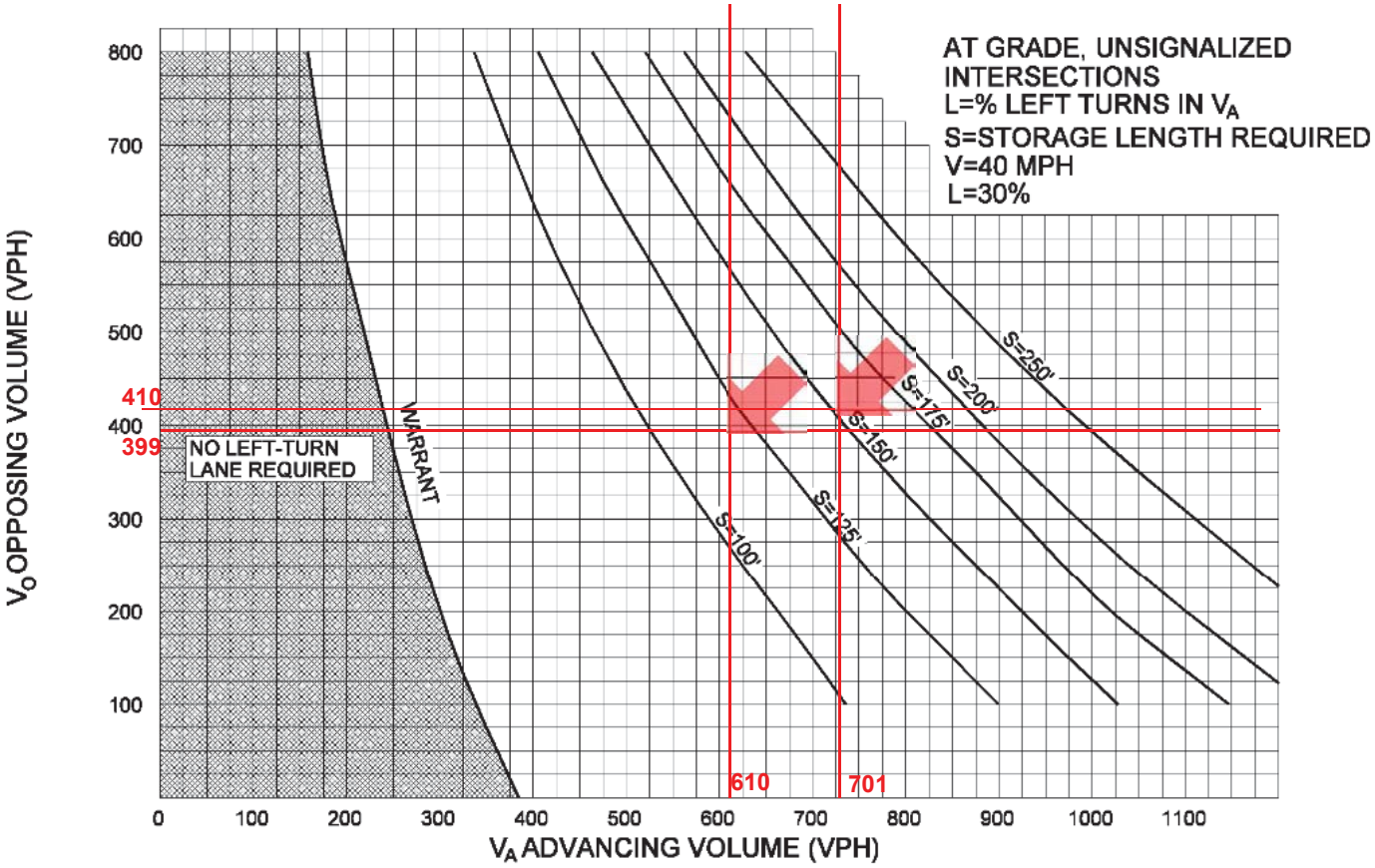
Approach	EB	WB	NB	SB
Entry Lanes	1	1	1	1
Conflicting Circle Lanes	1	1	1	1
Adj Approach Flow, veh/h	446	762	356	33
Demand Flow Rate, veh/h	455	777	363	34
Vehicles Circulating, veh/h	298	62	450	791
Vehicles Exiting, veh/h	527	751	303	48
Ped Vol Crossing Leg, #/h	0	0	0	0
Ped Cap Adj	1.000	1.000	1.000	1.000
Approach Delay, s/veh	8.7	10.0	9.3	6.7
Approach LOS	A	A	A	A

Lane	Left	Left	Left	Left
Designated Moves	LTR	LTR	LTR	LTR
Assumed Moves	LTR	LTR	LTR	LTR
RT Channelized				
Lane Util	1.000	1.000	1.000	1.000
Follow-Up Headway, s	2.609	2.609	2.609	2.609
Critical Headway, s	4.976	4.976	4.976	4.976
Entry Flow, veh/h	455	777	363	34
Cap Entry Lane, veh/h	1018	1295	872	616
Entry HV Adj Factor	0.980	0.980	0.981	0.969
Flow Entry, veh/h	446	762	356	33
Cap Entry, veh/h	998	1270	855	597
V/C Ratio	0.447	0.600	0.416	0.055
Control Delay, s/veh	8.7	10.0	9.3	6.7
LOS	A	A	A	A
95th %tile Queue, veh	2	4	2	0

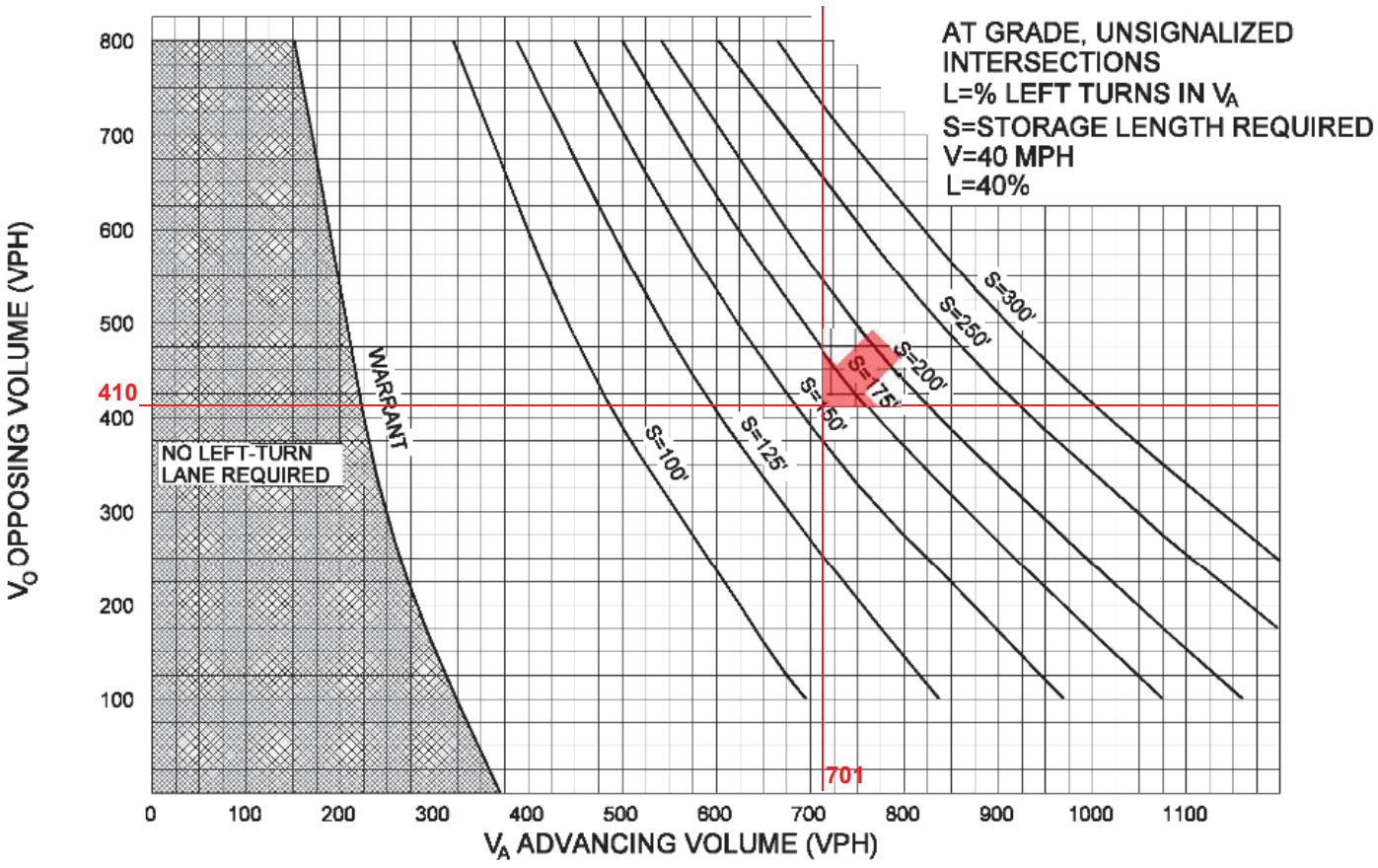
HARDIN VALLEY ROAD LEFT-TURN LANE FOR THE WESTBOUND APPROACH TO MARIETTA CHURCH ROAD



HARDIN VALLEY ROAD LEFT-TURN LANE FOR THE WESTBOUND APPROACH TO MARIETTA CHURCH ROAD



HARDIN VALLEY ROAD LEFT-TURN LANE FOR THE WESTBOUND APPROACH TO MARIETTA CHURCH ROAD



MARIETTA CHURCH ROAD
LEFT-TURN LANE
FOR THE SOUTHBOUND APPROACH TO
PROPOSED SITE ACCESS STREET

TABLE 4A

LEFT-TURN LANE VOLUME THRESHOLDS
FOR TWO-LANE ROADWAYS WITH A PREVAILING SPEED OF 35 MPH OR LESS

(If the left-turn volume exceeds the table value a left -turn lane is needed)

OPPOSING VOLUME	THROUGH VOLUME PLUS RIGHT-TURN VOLUME *					
	100 - 149	150 - 199 172	200 - 249	250 - 299	300 - 349	350 - 399
100 - 149 150 - 199	300 245	225 200	185 160	145 130	120 110	100 90
200 - 249 280 250 - 299	205 175	170 102 150	140 125	115 105	100 90	80 70
300 - 349 350 - 399	155 135	135 120	110 100	95 85	80 70	65 60
400 - 449 450 - 499	120 105	105 90	90 80	75 70	65 60	55 50
500 - 549 550 - 599	95 85	80 70	70 65	65 60	55 50	50 45
600 - 649 650 - 699	75 70	65 60	60 55	55 50	45 40	40 35
700 - 749 750 or More	65 60	55 50	50 45	45 40	35 35	30 30

OPPOSING VOLUME	THROUGH VOLUME PLUS RIGHT-TURN VOLUME *					
	350 - 399	400 - 449	450 - 499	500 - 549	550 - 599	= / > 600
100 - 149 150 - 199	100 90	80 75	70 65	60 55	55 50	50 45
200 - 249 250 - 299	80 70	72 65	460 55	55 50	50 45	45 40
300 - 349 350 - 399	65 60	60 55	50 50	50 45	45 40	40 40
400 - 449 450 - 499	55 50	50 45	45 45	45 40	40 35	35 35
500 - 549 550 - 599	50 45	45 40	40 40	40 35	35 35	35 35
600 - 649 650 - 699	40 35	35 35	35 35	35 30	35 30	30 30
700 - 749 750 or More	30 30	30 30	30 30	30 30	30 30	30 30

* Or through volume only if a right-turn lane exists.

MARIETTA CHURCH ROAD
RIGHT-TURN LANE
FOR THE NORTHBOUND APPROACH TO
PROPOSED SITE ACCESS STREET

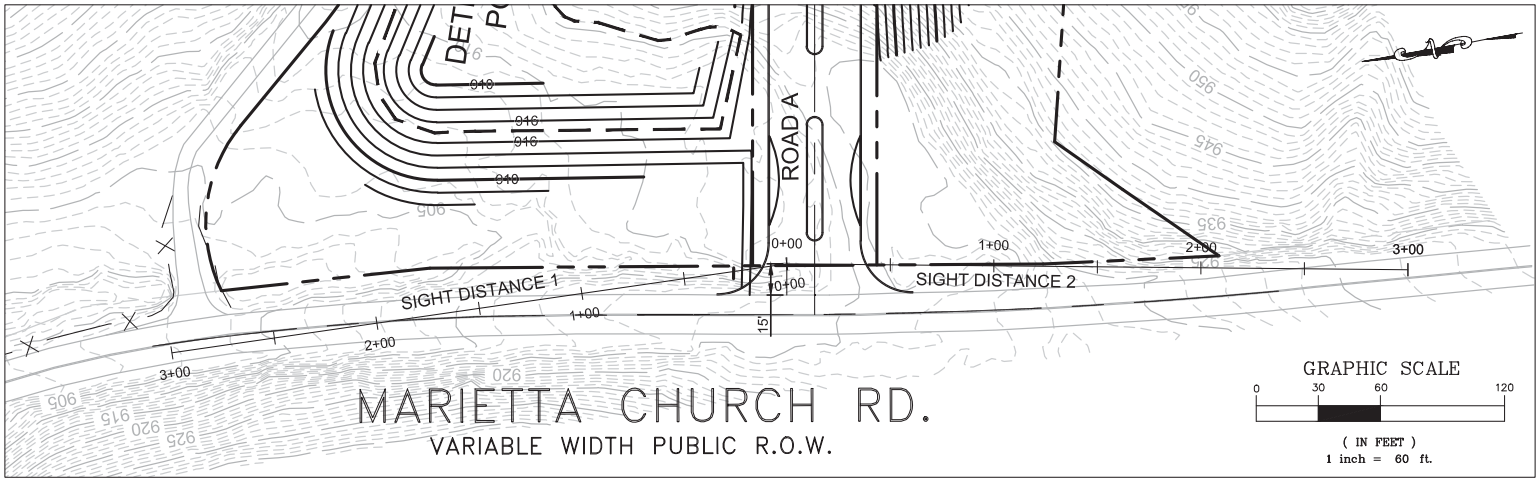
TABLE 4B

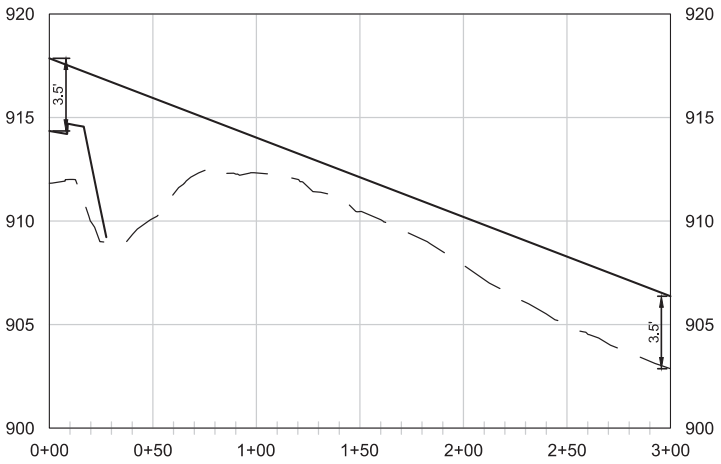
RIGHT-TURN LANE VOLUME THRESHOLDS
FOR TWO-LANE ROADWAYS WITH A PREVAILING SPEED OF 35 MPH OR LESS

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						
250 - 299						Yes
300 - 349					Yes	Yes
350 - 399				Yes	Yes	Yes
400 - 449			Yes	Yes	Yes	Yes
450 - 499			Yes	Yes	Yes	Yes
500 - 549		Yes	Yes	Yes	Yes	Yes
550 - 599		Yes	Yes	Yes	Yes	Yes
600 or More	Yes	Yes	Yes	Yes	Yes	Yes

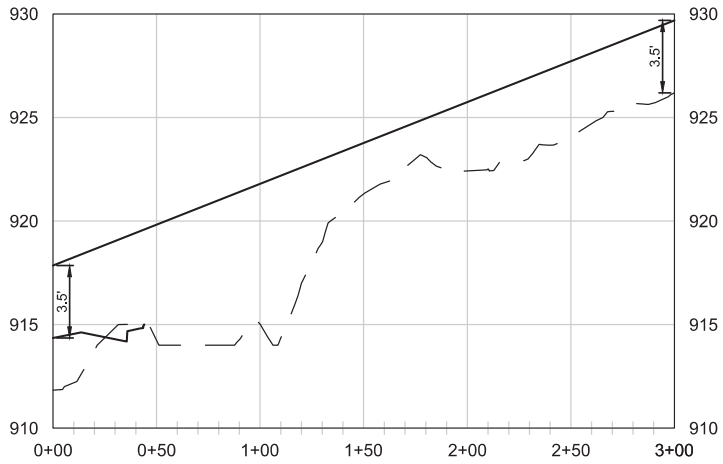
RIGHT-TURN VOLUME	THROUGH VOLUME PLUS LEFT-TURN VOLUME *					
	350 - 399	400 - 449	450 - 499	500 - 549	550 - 600	+ / > 600
Fewer Than 25						
25 - 49						Yes
50 - 99					Yes	Yes
100 - 149				Yes	Yes	Yes
150 - 199			Yes	Yes	Yes	Yes
200 - 249		Yes	Yes	Yes	Yes	Yes
250 - 299	Yes	Yes	Yes	Yes	Yes	Yes
300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





Sight Distance 1
Horizontal Scale: 1"=60'
Vertical Scale: 1"=6'



Sight Distance 2
Horizontal Scale: 1"=60'
Vertical Scale: 1"=6'

SITE, INCORPORATED
CIVIL ENGINEERS & SURVEYORS
10215 Technology Drive
Suite 304
Knoxville, TN 37932
(865) 777-4160
www.site-incorporated.com

Sight Distances

Briggs Station Subdivision

1928 Marietta Church Road
Knox County, Tennessee
Parcel ID: 129 128

ISSUE DATE: 10/28/21
SITE PROJECT#: 2039
FILE: Concept Plan

ST

CDM Smith, Inc.

1100 Marion Street, Suite 300
Knoxville, TN 37921
865-963-4300

File Name : MariettaChurch_HardinValley
Site Code : 00000000
Start Date : 10/28/2021
Page No : 1

Groups Printed- Unshifted

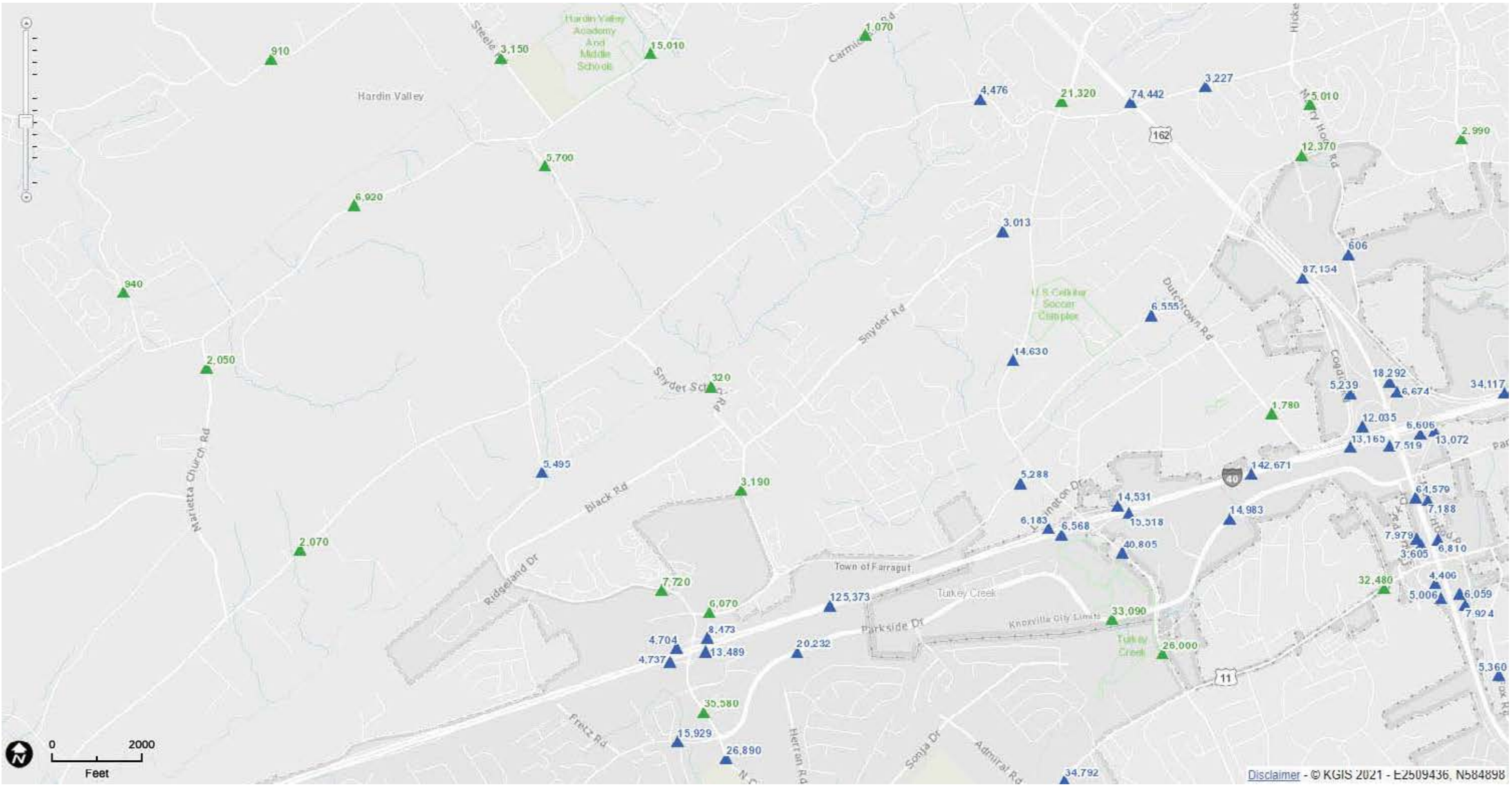
	MARIETTA CHURCH RD Southbound				HARDIN VALLEY RD Westbound				MARIETTA CHURCH RD Northbound				HARDIN VALLEY RD Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
07:00 AM	0	0	0	0	6	22	0	28	0	0	15	15	0	56	5	61	104
07:15 AM	0	0	0	0	16	25	0	41	1	0	12	13	0	57	8	65	119
07:30 AM	0	0	0	0	17	27	0	44	2	0	17	19	0	70	10	80	143
07:45 AM	0	0	0	0	17	35	0	52	8	0	17	25	0	61	12	73	150
Total	0	0	0	0	56	109	0	165	11	0	61	72	0	244	35	279	516
08:00 AM	0	0	0	0	11	26	0	37	4	0	16	20	0	66	6	72	129
08:15 AM	0	0	0	0	12	40	0	52	3	0	22	25	0	41	1	42	119
08:30 AM	0	0	0	0	11	36	0	47	3	0	15	18	0	33	4	37	102
08:45 AM	0	0	0	0	9	17	0	26	2	0	9	11	0	34	5	39	76
Total	0	0	0	0	43	119	0	162	12	0	62	74	0	174	16	190	426
*** BREAK ***																	
02:00 PM	0	0	0	0	13	39	0	52	6	0	10	16	0	36	1	37	105
02:15 PM	0	0	0	0	11	37	0	48	3	0	13	16	0	32	6	38	102
02:30 PM	0	0	0	0	14	21	0	35	7	0	15	22	0	38	2	40	97
02:45 PM	0	0	0	0	18	51	0	69	7	0	15	22	0	34	4	38	129
Total	0	0	0	0	56	148	0	204	23	0	53	76	0	140	13	153	433
03:00 PM	0	0	0	0	11	29	0	40	3	0	18	21	0	39	3	42	103
03:15 PM	0	0	0	0	16	32	0	48	2	0	15	17	0	49	4	53	118
03:30 PM	0	0	0	0	13	40	0	53	9	0	15	24	0	33	1	34	111
03:45 PM	0	0	0	0	23	75	0	98	8	0	10	18	0	26	2	28	144
Total	0	0	0	0	63	176	0	239	22	0	58	80	0	147	10	157	476
04:00 PM	0	0	0	0	23	89	0	112	4	0	23	27	0	50	7	57	196
04:15 PM	0	0	0	0	19	53	0	72	5	0	17	22	0	40	2	42	136
04:30 PM	0	0	0	0	17	52	0	69	4	0	26	30	0	55	2	57	156
04:45 PM	0	0	0	0	23	51	0	74	6	0	37	43	0	53	1	54	171
Total	0	0	0	0	82	245	0	327	19	0	103	122	0	198	12	210	659
05:00 PM	0	0	0	0	21	43	0	64	10	0	37	47	0	64	3	67	178
05:15 PM	0	0	0	0	26	67	0	93	7	0	32	39	0	54	3	57	189
05:30 PM	0	0	0	0	18	56	0	74	3	0	40	43	0	49	1	50	167
05:45 PM	0	0	0	0	30	55	0	85	11	0	33	44	0	40	1	41	170
Total	0	0	0	0	95	221	0	316	31	0	142	173	0	207	8	215	704
Grand Total	0	0	0	0	395	1018	0	1413	118	0	479	597	0	1110	94	1204	3214
Apprch %	0	0	0		28	72	0		19.8	0	80.2		0	92.2	7.8		
Total %	0	0	0	0	12.3	31.7	0	44	3.7	0	14.9	18.6	0	34.5	2.9	37.5	

CDM Smith, Inc.

1100 Marion Street, Suite 300
Knoxville, TN 37921
865-963-4300

File Name : MariettaChurch_HardinValley
Site Code : 00000000
Start Date : 10/28/2021

	MARIETTA CHURCH RD Southbound				HARDIN VALLEY RD Westbound				MARIETTA CHURCH RD Northbound				HARDIN VALLEY RD Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 07:15 AM																	
07:15 AM	0	0	0	0	16	25	0	41	1	0	12	13	0	57	8	65	119
07:30 AM	0	0	0	0	**17**	27	0	44	2	0	**17**	19	0	**70**	10	**80**	143
07:45 AM	0	0	0	0	17	**35**	0	**52**	**8**	0	17	**25**	0	61	**12**	73	**150**
08:00 AM	0	0	0	0	11	26	0	37	4	0	16	20	0	66	6	72	129
Total Volume	0	0	0	0	61	113	0	174	15	0	62	77	0	254	36	290	541
% App. Total	0	0	0		35.1	64.9	0		19.5	0	80.5		0	87.6	12.4		
PHF	.000	.000	.000	.000	.897	.807	.000	.837	.469	.000	.912	.770	.000	.907	.750	.906	.902
Peak Hour Analysis From 02:00 PM to 05:45 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 04:45 PM																	
04:45 PM	0	0	0	0	23	51	0	74	6	0	37	43	0	53	1	54	171
05:00 PM	0	0	0	0	21	43	0	64	**10**	0	37	**47**	0	**64**	**3**	**67**	178
05:15 PM	0	0	0	0	**26**	**67**	0	**93**	7	0	32	39	0	54	3	57	**189**
05:30 PM	0	0	0	0	18	56	0	74	3	0	**40**	43	0	49	1	50	167
Total Volume	0	0	0	0	88	217	0	305	26	0	146	172	0	220	8	228	705
% App. Total	0	0	0		28.9	71.1	0		15.1	0	84.9		0	96.5	3.5		
PHF	.000	.000	.000	.000	.846	.810	.000	.820	.650	.000	.913	.915	.000	.859	.667	.851	.933



Hardin Valley Academy And Middle Schools
Hardin Valley
910
3,150
15,010
1,070
4,476
21,320
74,442
3,227
5,010
2,990
162
12,370
5,700
6,920
3,013
606
87,154
940
6,555
Dutchtown Rd
Snyder Rd
U.S. Cellular Soccer Complex
2,050
320
14,630
5,239
18,292
6,674
34,117
1,780
12,035
6,606
13,165
7,519
13,072
Marietta Church Rd
5,495
5,288
142,671
40
Black Rd
3,190
14,531
14,983
64,579
7,188
6,183
6,568
15,518
2,070
Ridgeland Dr
40,805
7,979
3,605
6,810
Town of Farragut
4,406
7,720
32,480
5,006
6,059
7,924
125,373
Turkey Creek
6,070
Parkside Dr
Knoxville City Limits
33,090
8,473
4,704
4,737
13,489
20,232
Turkey Creek
26,000
11
5,360
35,580
Fretz Rd
15,929
26,890
Herron Rd
Sonja Dr
Admiral Rd
34,792
0
2000
Feet
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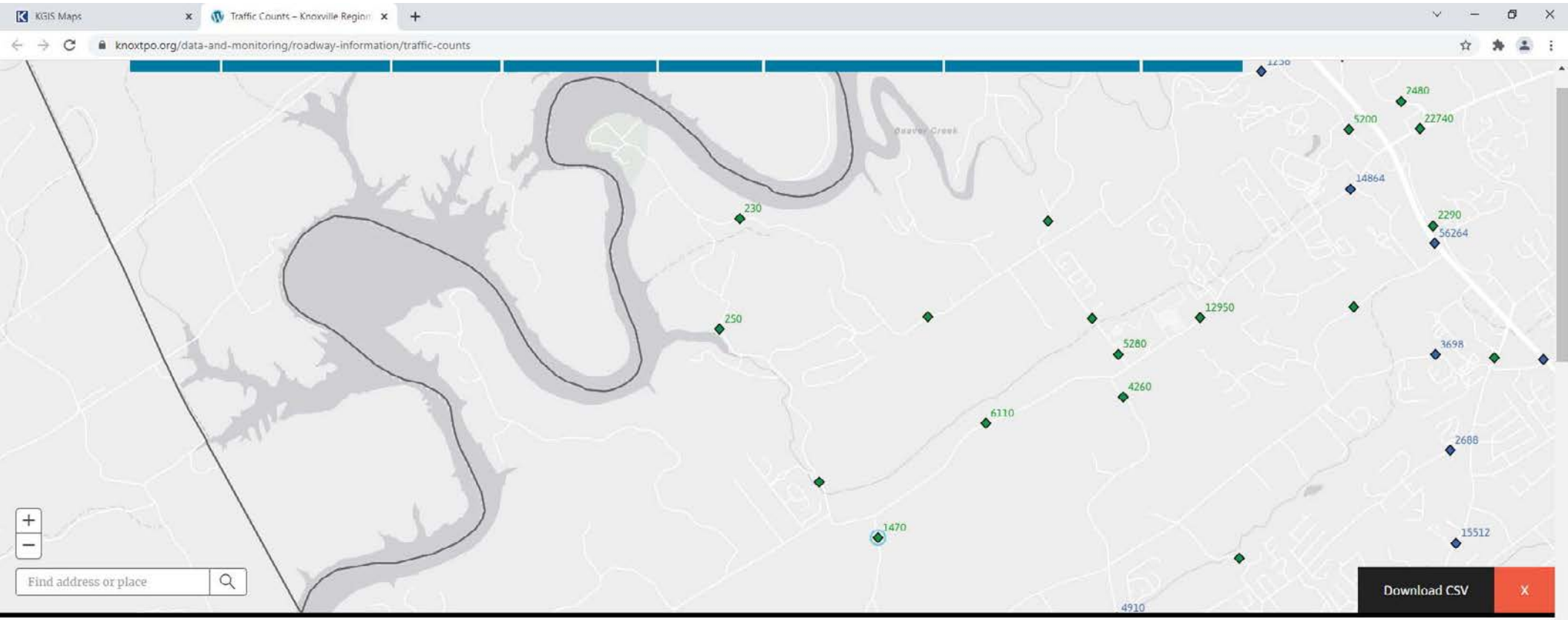

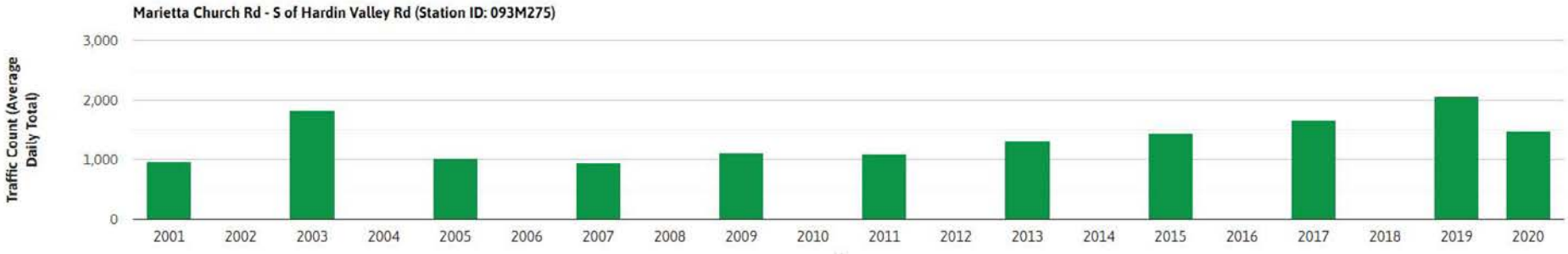

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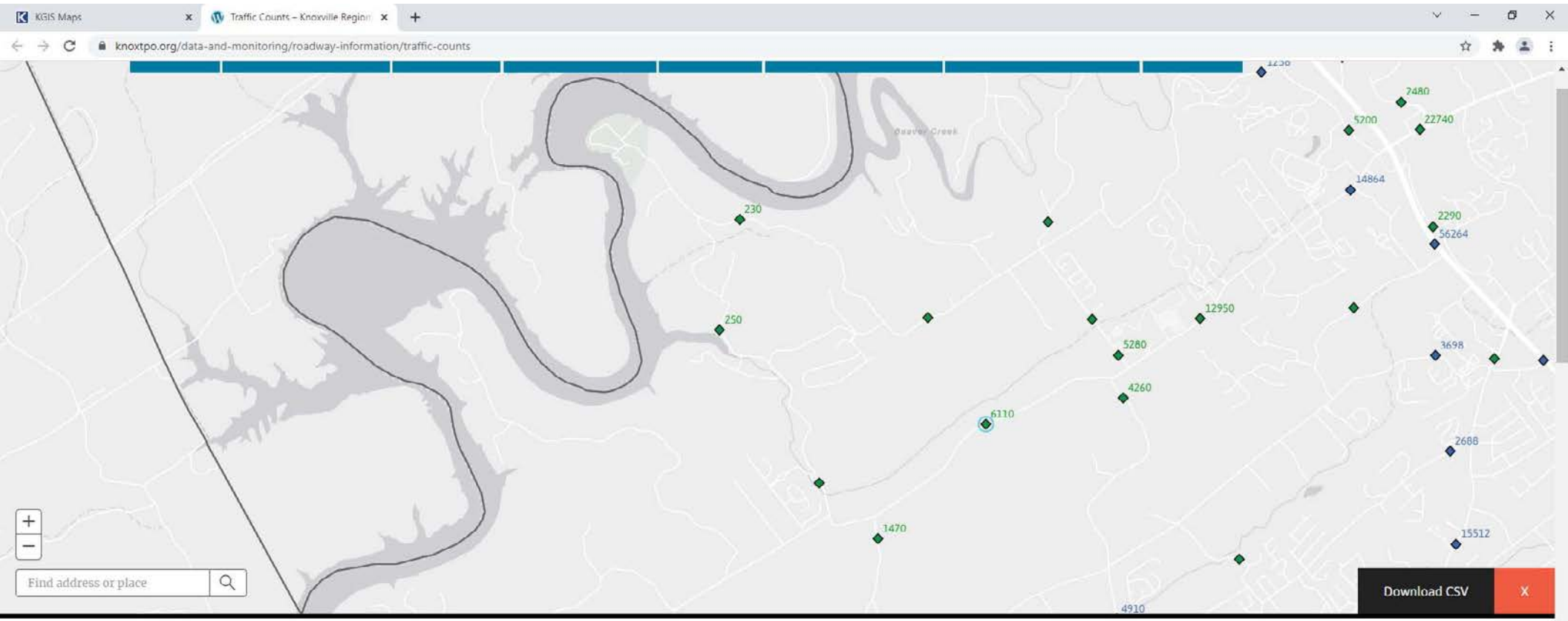

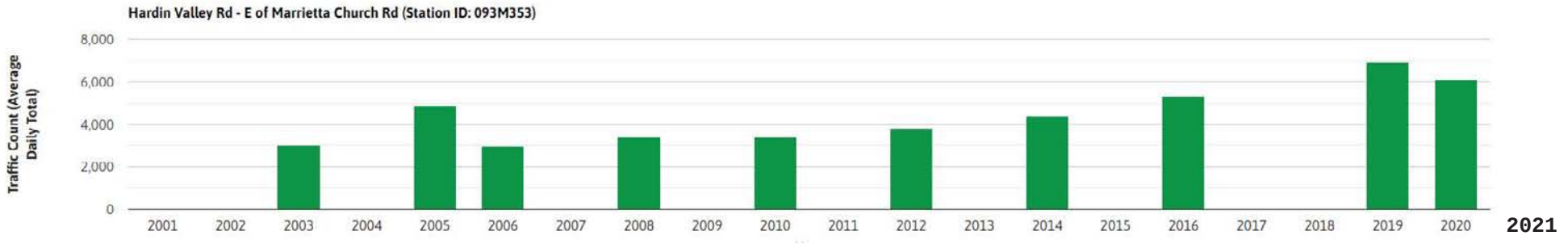

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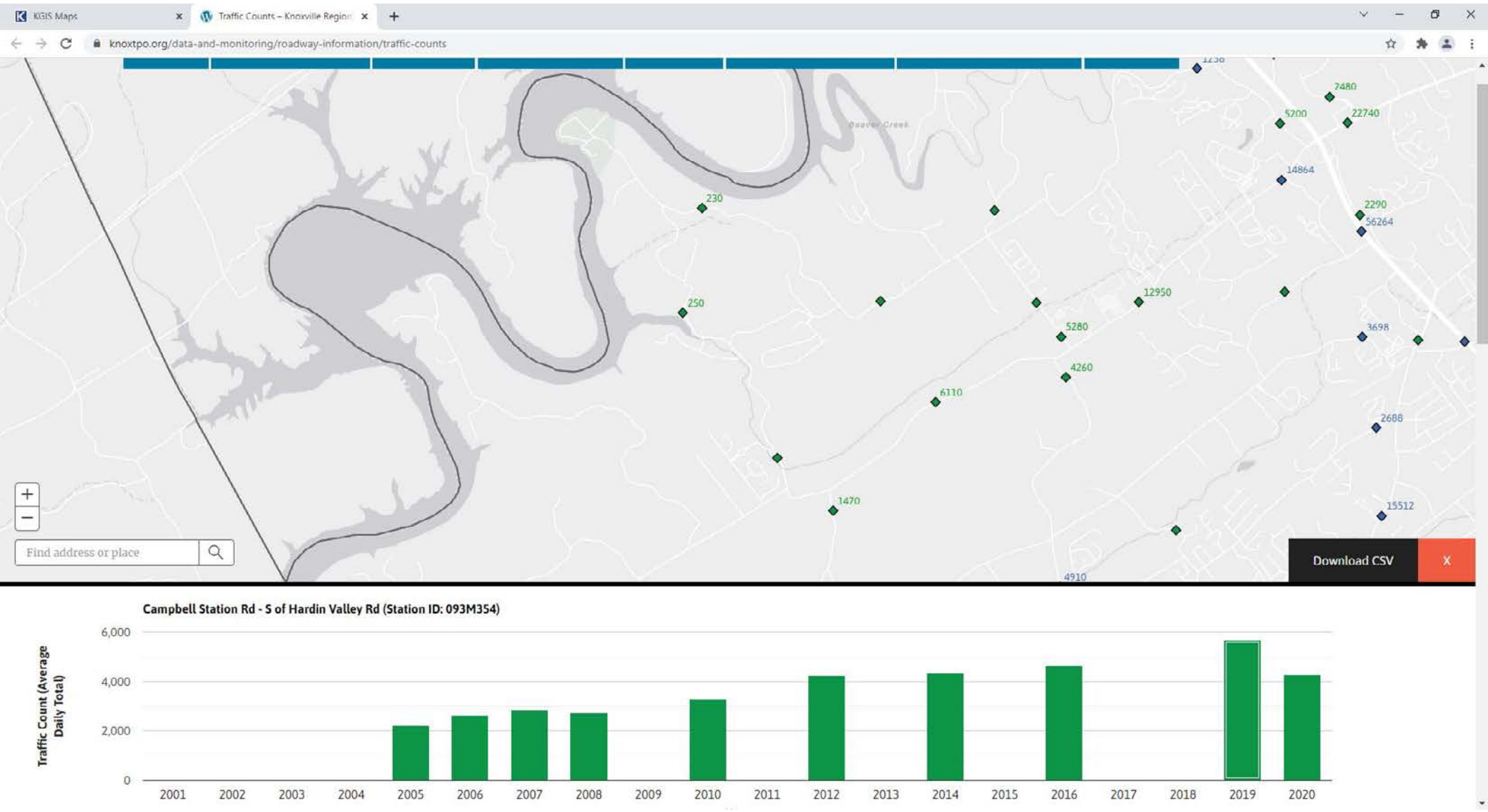
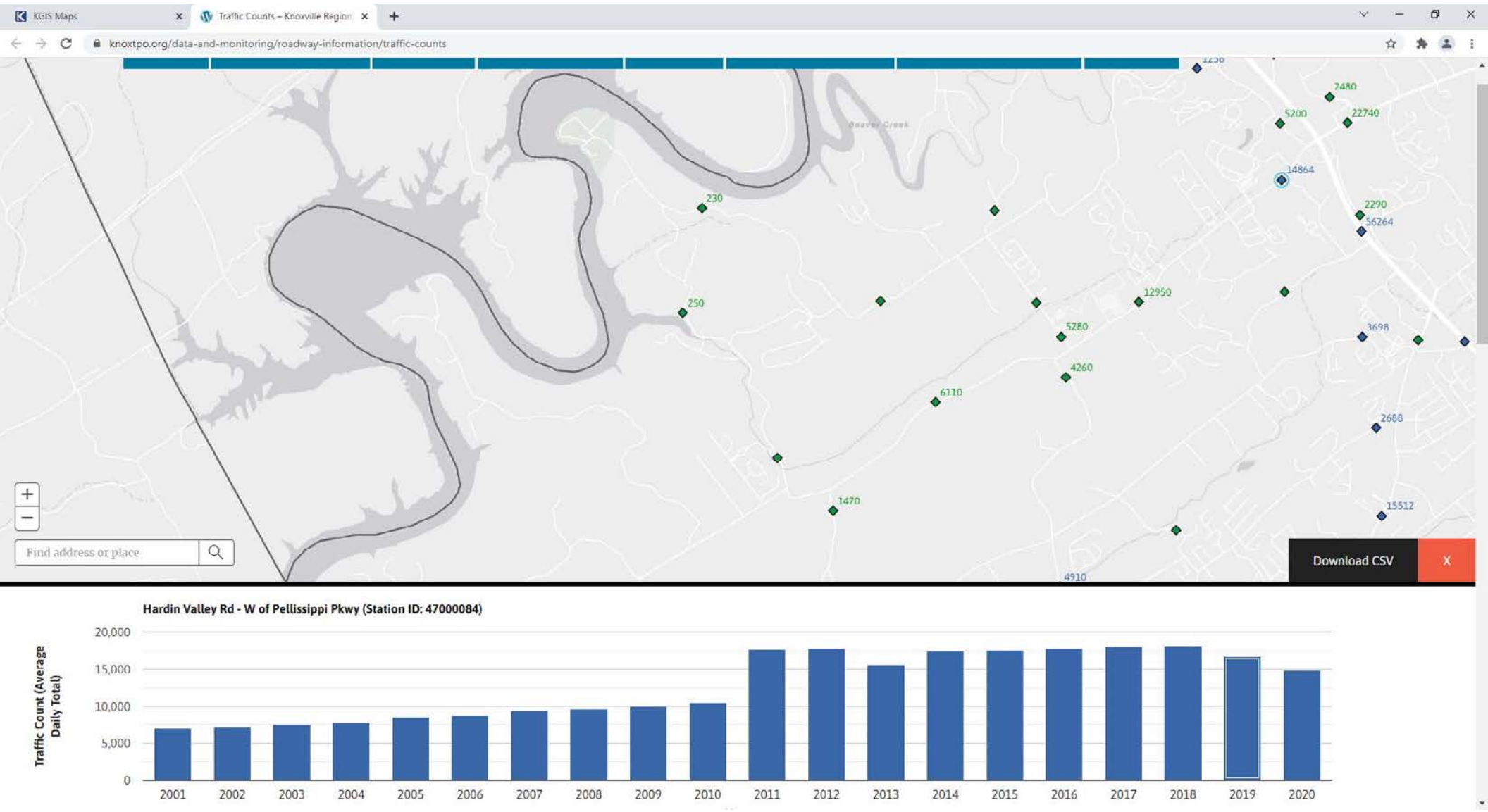

KGIS Maps
Traffic Counts – Knoxville Region
knoxtpo.org/data-and-monitoring/roadway-information/traffic-counts
7480
5200
22740
14864
230
2290
56264
250
12950
5280
3698
4260
6110
2688
1470
15512
4910
Find address or place
Download CSV
X
Campbell Station Rd - S of Hardin Valley Rd (Station ID: 093M354)
Traffic Count (Average Daily Total)
6,000
4,000
2,000
0
2001
2002
2003
2004
2005
2006
2007
2008
2009
2010
2011
2012
2013
2014
2015
2016
2017
2018
2019
2020


KGIS Maps
Traffic Counts – Knoxville Region
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7480
5200
22740
14864
230
2290
56264
250
12950
5280
3698
4260
6110
2688
1470
15512
4910
Find address or place
Download CSV
X
Hardin Valley Rd - W of Pellissippi Pkwy (Station ID: 47000084)
Traffic Count (Average Daily Total)
20,000
15,000
10,000
5,000
0
2001
2002
2003
2004
2005
2006
2007
2008
2009
2010
2011
2012
2013
2014
2015
2016
2017
2018
2019
2020


CDM
Smith

Via Email: gouldjf@cdmsmith.com

NOVEMBER 12, 2021

John F. Gould, P.E.
CDM Smith
1100 Marion St., Suite 300
Knoxville, TN 37921

RE: Briggs Station Subdivision TIS Review Comments (12-SD-21-C/12-G-21-UR)

Dear Mr. Gould,

The Transportation Impact Study (TIS) for the above referenced concept plan case that was received on November 8, 2021 has been reviewed by staff from Knox County Engineering and Public Works (EPW) and Knoxville-Knox County Planning. We have identified the following comments related to the TIS that we require further information/revision on for this case review:

1. Page 8 (Figure 4)- Please add a volume bubble for through traffic at the proposed site driveway on Marietta Church Road. Added

2. Page 11- Add capacity analyses under traffic arising only from the percentage background growth but less the other sites in the vicinity (using volumes in Figure 5A). This will help clarify the various sites impact on traffic conditions. Added

3. Page 12 (Figure 5A)- Please add a volume bubble for through traffic at the proposed site driveway on Marietta Church Road. Added

4. Page 13- Please provide a spreadsheet or separate figures for each nearby development to facilitate checking of the traffic associated with each. Added in the appendix figure

5. Page 14 (Figure 6)- Please add a volume bubble for through traffic at the proposed site driveway on Marietta Church Road. Added

6. Page 19 (Figure 9)- The through traffic values at the site driveway are not correct based on the associated volumes at Hardin Valley Road/Marietta Church Road. Please check and correct as needed. Also correct any associated analyses. Corrected

7. Appendix- The left-turn lane warrant analysis for Marietta Church Road at the site driveway cites the northbound approach, but it should be the southbound approach. Corrected

8. On page 18 the TIS makes the statement that "The development of the site has an insignificant impact on the study intersections" and "The Marietta Church Road intersection with Hardin Valley Rd would operate at acceptable level of service for projected traffic volumes and patterns." These statements appear to be in conflict with the results shown in Table 6 and 7, which indicate that delay increases by almost triple between the Background and Development scenarios with associated significant increases in V/C ratios. The Level of Service also degrades to F for both AM and PM peaks for Marietta Church at Hardin Valley which is not considered "acceptable". Please address and revise as necessary. Revised

9. Please include the results for delay and LOS for the "mitigated" scenario of constructing a roundabout along with the other scenarios that are reported in Table 7. Added

Please provide **a PDF** of the following: **a signed and sealed letter** addressing these concerns in a **comment response sheet** (with the indication of where/how the comments were addressed) attached to the back of a **fully revised TIS**. Revisions are due no later than Monday, November 22, 2021 by noon. If you have any questions, please contact me.

Sincerely,

Mike Conger, P.E.
Knoxville-Knox County Planning

CC: Mike Reynolds, AICP, Knoxville-Knox County Planning
John Sexton, P.E., Knox County Engineering and Public Works
Stephanie Hargrove, Knox County Engineering and Public Works
Aaron Fritts, Knox County Engineering and Public Works