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May 20, 2021  
Revised June 7, 2021

Mr. John Anderson P.E.  
SITE Inc.  
10215 Technology Drive, Suite 304  
Knoxville, Tennessee 37932

**RE: BRIGGS STATION. MARIETTA CHURCH ROAD, KNOX COUNTY, TN.**

Dear Mr. Anderson:

CDM Smith is pleased to submit this report to address the impact and access of a proposed Briggs Station residential development with access to Marietta Church Road south of Hardin Valley Road in northwest Knox County. Discussions with Knoxville-Knox County Planning determined that this proposed residential development required a Traffic Impact Letter (TIL) to be performed to determine the adequacy of Hardin Valley and Marietta Church Road with the site impact.

If you have any questions regarding this Traffic Impact Letter, please call me.

Sincerely,  
**CDM SMITH INC.**



John F Gould, P.E.  
Senior Traffic Engineer

Enclosures



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## **BRIGGS STATION ZONE CHANGE AND PROPOSED RESIDENTIAL SUBDIVISION**

### **Project Description**

The proposed Briggs Station development is on a 94-acre property currently zoned agriculture. Proposed PR zoning would permit as many as 188 single-family units. This density of residential may require a second access as it exceeds 150 single-family units, which a single access street is permitted with respect to Knox County residential access policy. The actual development may be less than the requested zoning and will depend largely on the site topography and the subdivision layout. The layout of the site and internal residential streets will be governed by the **Knox County Subdivision Regulations** and the necessary site drainage. **Figure 1** shows the proposed site location and adjacent zoning.

### **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.

### **Existing Roadways**

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 11,070. 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.

Marietta Church Road is STOP controlled at Hardin Valley Road without any turn lanes.



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

### Existing Traffic Volumes

Automated traffic counts (ATCs) were obtained from Knoxville-Knox County Planning for Hardin Valley Road and Marietta Church Road. These ATCs were conducted in 2019, prior to the Covid-19 pandemic. Daily traffic and AM and PM peak hour traffic are illustrated in **Figure 3**. **Figure 4** illustrates 2021 traffic which reflects a factored turning movement count conducted in 2016 (factor of 1.5 to reflect 2021) for the intersection of Hardin Valley Road and Marietta Church Road. The 2019 station counts were factored by 1.2 for 2021.

### Background Traffic Volumes

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. The background traffic reflects the historical traffic growth and any planned adjacent development in the study area vicinity. Hardin Valley Road is experiencing significant growth. At the direction of Knoxville-Knox County Planning, background traffic was developed using an annual growth rate of 10-percent for the stations in the site vicinity. This growth rate is a very aggressive rate of growth but must reflect both future traffic not currently planned and currently planned developments of Vining Mill and Hoppe property subdivisions. **Figure 5** illustrates the 2019 traffic increased by a factor of 1.60 to reflect 2025 traffic with the anticipated growth. Background traffic for the station east of Steele Road (Sta. M393) reflects the growth of 4,153 exhibited by Harding Valley Road in the site vicinity as this station would experience this increased traffic but not the same rate of growth. The turning movement traffic for Hardin Valley Road intersection with Marietta Church Road reflects the 1.6 growth but also the turning movements to and from the north leg generated by the planned Hoppe Property development.

### Trip Generation and Distribution

Project conditions were developed by generating traffic for the proposed residential development and distributing the trips to the adjacent roadway. Briggs Station project trips were determined using the publication, **Trip Generation, 10th Edition**. The study generated trips for 188 single-family units. From the trip generation calculations, the proposed site may generate approximately 1,859 daily trips. **Table 1** presents the trip generation of this proposed site.

**TABLE 1. TRIP GENERATION**

LAND USE	L.U.C	UNITS	DAILY TRAFFIC	AM PEAK			PM PEAK		
				ENTER	EXIT	TOTAL	ENTER	EXIT	TOTAL
SINGLE FAMILY	210	188	1,859	34	104	138	117	69	186
SINGLE FAMILY	210	94	982	18	54	72	60	36	96
Change			877	16	50	66	57	33	90

Reference: (1) Trip Generation, 10 Edition



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Trips were also generated for the current zoning permitting the development of 94 single-family units generating 982 average daily trips. The trip generation of the proposed zoning is an additional 877 daily trips. 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 with 70-percent continuing east of Steele Road. Hardin Valley Road was assigned 10-percent to the west of the site. Marietta Church Road was assigned 10-percent. **Figure 6** illustrates this distribution.

**Projected Traffic**

By multiplying the trips generated by the distribution percentages, the project site volumes were determined. **Figure 7** illustrates the resulting assigned trips associated with the proposed Briggs Station development. Background and assigned trips were added together to develop post-development traffic volumes for the year 2025. **Table 2** presents projected traffic development for the proposed Briggs Station.

**TABLE 2. TRAFFIC PROJECTIONS**

ROAD SEGMENT	2019 ADT	GROWTH RATE 10%	2025 BACK-GROUND GROWTH	2025 BACK-GROUND TRAFFIC	TRIP ASSIGNMENT	ZONED PROJECTED TRIPS	PROPOSED PROJECTED TRIPS	2025 ZONED PROJECTED TRAFFIC	2025 PROPOSED PROJECTED TRAFFIC
Hardin Valley Rd	15,109	-	19,262	19,262	70%	687	1,301	19,949	20,563
Hardin Valley Rd	6,921	1.60	11,074	11,074	80%	786	1,487	11,859	12,561
Marietta Church Rd	2,054	1.60	3,286	3,286	10%	98	186	3,385	3,472

**Figure 8** illustrates the 2025 traffic projections. For 2025 traffic conditions, Briggs Station traffic represents an approximate 6- and 12-percent of the projected Hardin Valley Road traffic east of Steele Road, and east of Marietta Church Road, respectively. Marietta Church Road may have a 5-percent traffic impact south of the site. Adjacent roadway capacities are limited by the widths and lack of shoulders.

**Roadway Capacity and Level of Service**

Roadway segment capacities for the 2019, 2025 background, and the 2025 projected traffic conditions were examined using a generalized Florida criterium for an urbanized area. The capacity of 16,380 for the Hardin Valley Road 3-lane section east Steele Road is determined by the Knoxville/Knox County Planning Department representing a 2-lane divided arterial. A roadway capacity of 12,480 is the estimated for a 2-lane undivided arterial without left-turn lanes.



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For the 2019, this evaluation determined that Hardin Valley Road east of Steele Road exceeds capacity and operates near capacity. The evaluation of the 2019 and projected 2025 capacity and LOS is presented in **Table 3**.

**TABLE 3. TRAFFIC PROJECTIONS**

ROAD SEGMENT	COUNT STATION	FACILITY CLASSIFICATION & SECTION	CAPACITY	V/C				LOS			
				2019	2025 BACK-GROUND	2025 ZONED PROJECTED	2025 PROPOSED PROJECTED	2019	2025 BACK-GROUND	2025 ZONED PROJECTED	2025 PROPOSED PROJECTED
Hardin Valley Rd	M393	3-Lanes Minor Arterial	16380	0.92	1.18	1.22	1.26	E	F	F	F
Hardin Valley Rd	M353	2-Lanes Undivided Minor Arterial	12480 *	0.55	0.89	0.95	1.01	C	D	E	F
Marietta Church Rd	M275	2-Lane Undivided Minor Collector	12480 *	0.16	0.26	0.27	0.28	C	C	C	C

\*Note: Without left-turn lanes, the capacity for a 2-lane undivided roadway of 15,600 was reduced 20% for a capacity of 12,480

The capacity of 16,380 for the Hardin Valley Road 3-lane section east Steele Road is determined by the Knoxville/Knox County Planning Department representing a 2-lane divided arterial.

**Figures 9A, 9B, and 9C** illustrate the capacity and levels of service for the roadway segments for 2019, 2025 background, and 2025 projected traffic conditions, respectively. The results determined that Hardin Valley Road east of Marietta Church Road is approaching capacity with the 2025 background traffic conditions and should operate at a LOS D. The background traffic growth developed with the 1.6 factor represents approximately 33-percent of the roadway capacity. With the proposed development, Hardin Valley Road may exceed the segment capacity and operate at a LOS F. The mitigation would require a multi-lane (4-lane) arterial improvement from the Pellissippi Parkway (SR 163) to Marietta Church Road. The provision of left-turn lanes for Hardin Valley Road at its intersections including Marietta Church Road would improve Hardin Valley Road west of Steele Road, providing a LOS E for this roadway segment. 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 turn lane is warranted for the background traffic conditions. The recommended left-turn storage is 100-foot with the background traffic conditions and 125-foot with the projected traffic conditions including Briggs Station residential subdivision.

**Conclusion and Recommendations**

Hardin Valley Road, east of the site, should be improved to a 4-lane divided or 5-lane arterial from Pellissippi Parkway to west of Campbell Station Road where it might transition to a 3-lane arterial to west of Marietta Church Road. A 3-lane section may accommodate traffic at a LOS E with the 2025 traffic condition but may also need to be improved to a multi-lane arterial as development continues to occur along the Hardin Valley Road corridor.





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An exemption of a second access policy would be required if a subdivision density exceeded 150 single-family units.

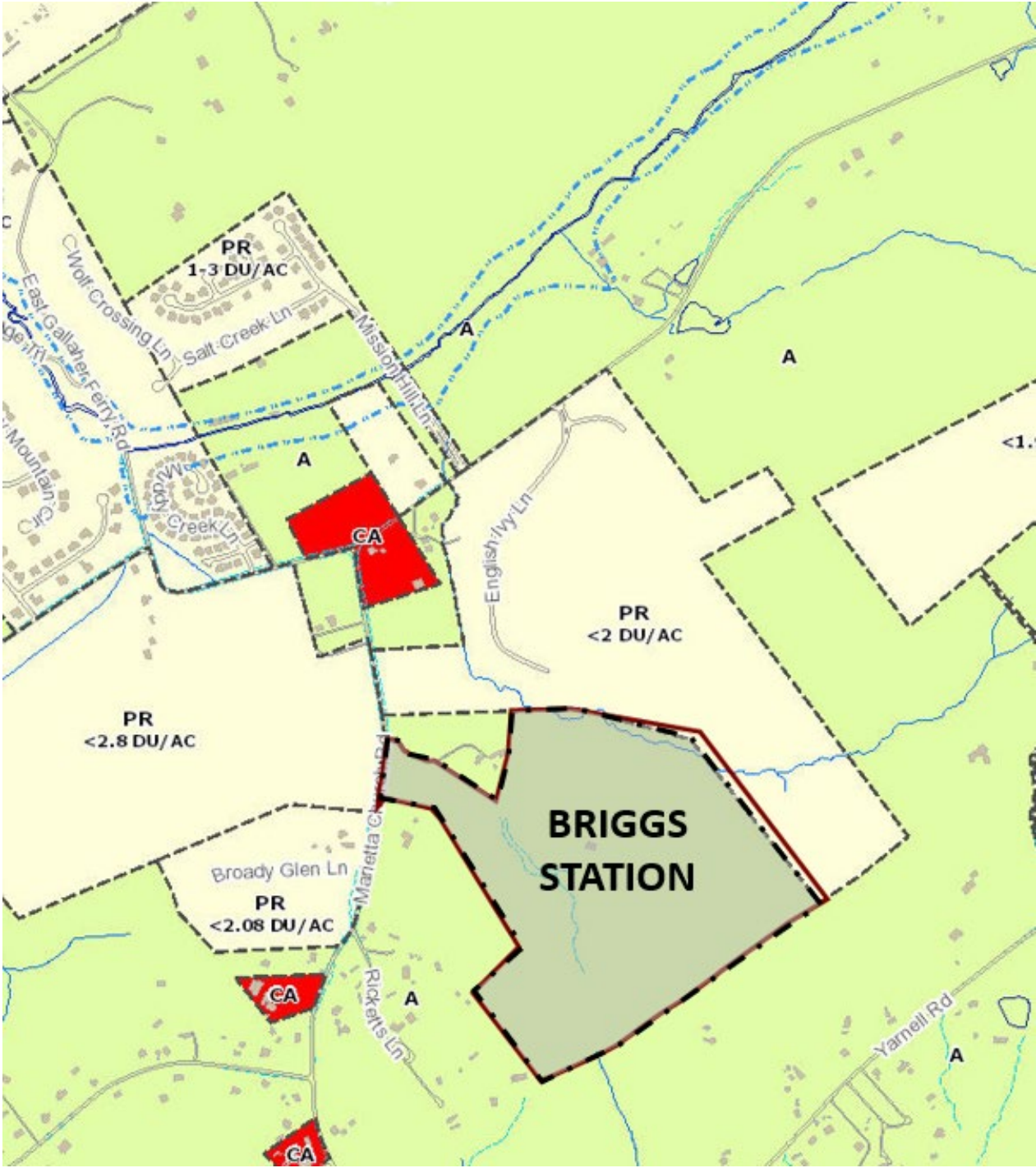
Recommendations for the proposed site include the following:

1. Construct a 125-foot left-turn lane from westbound Hardin Valley Road to southbound Marietta Church Road. (Warranted with background traffic conditions)
2. Locate the access to Marietta Church Road to insure a minimum 300-foot line of sight along Marietta Church Road.
3. Provide a second access street to and from the site if an alternative access is found feasible.
4. The subdivision layout and design shall be in accordance with current Knoxville-Knox County Subdivision Regulations.
5. 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.





**SITE**  
**Briggs Station**



**Figure 1**





**2019  
TRAFFIC  
Briggs Station**



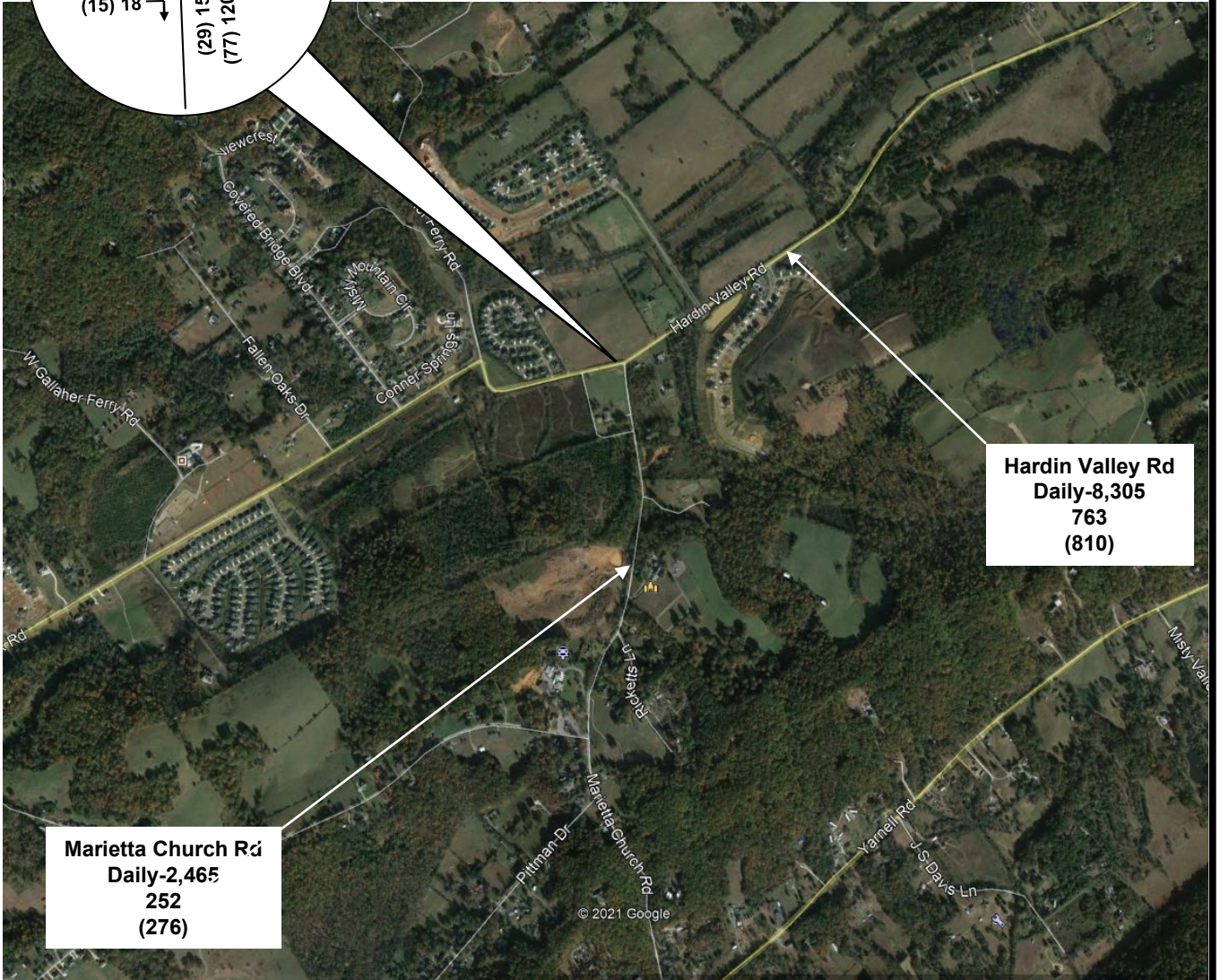
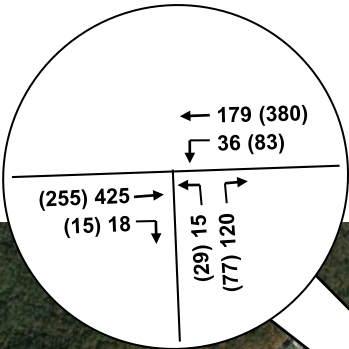
**LEGEND**  
XXX AM PEAK  
(XXX) PM PEAK



**Figure 3**



# 2021 TRAFFIC Briggs Station



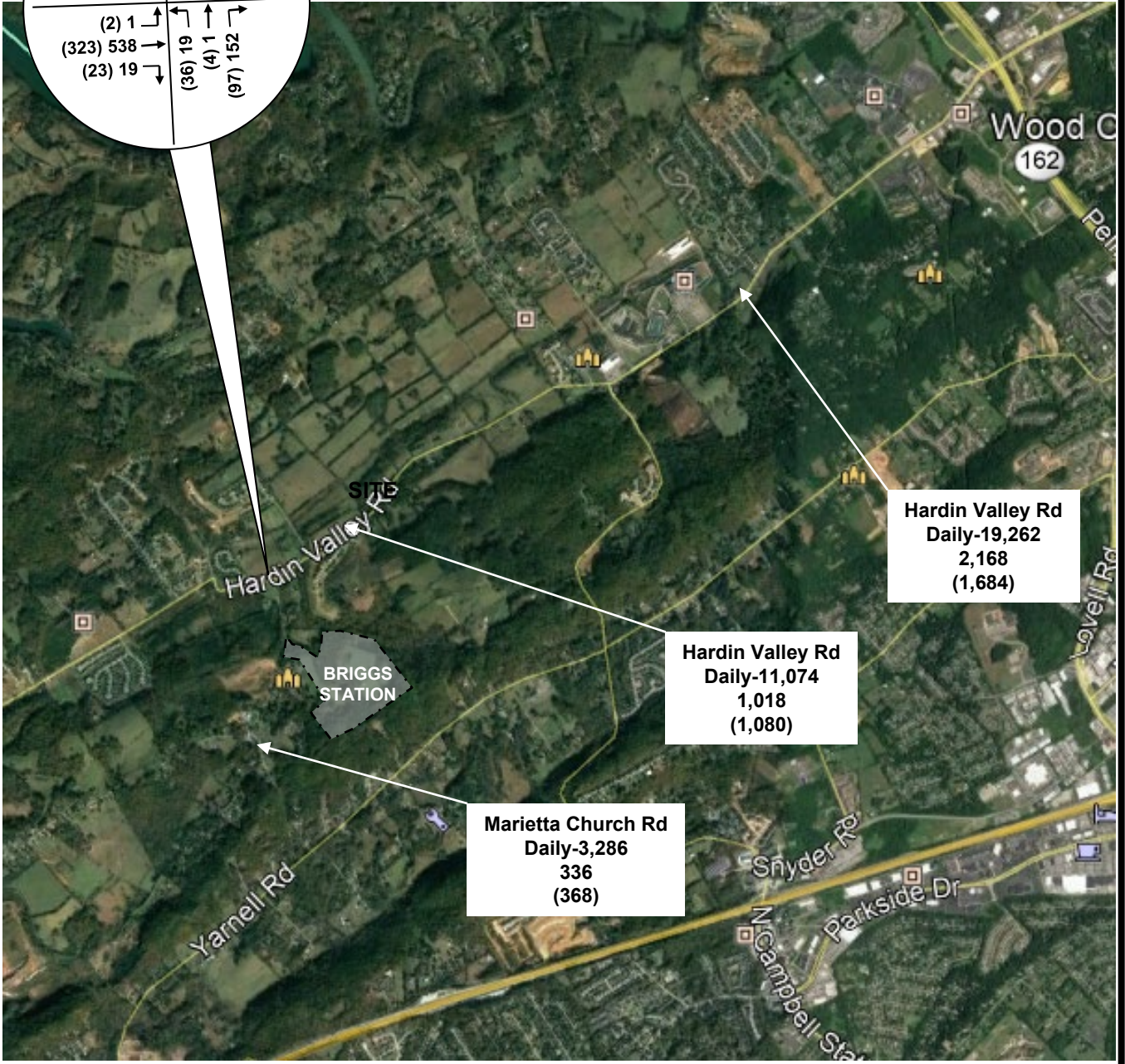
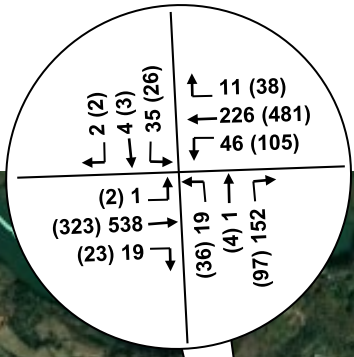
**LEGEND**  
 XXX AM PEAK  
 (XXX) PM PEAK



**Figure 4**



# 2025 BACKGROUND TRAFFIC Briggs Station



**LEGEND**  
 XXX AM PEAK  
 (XXX) PM PEAK

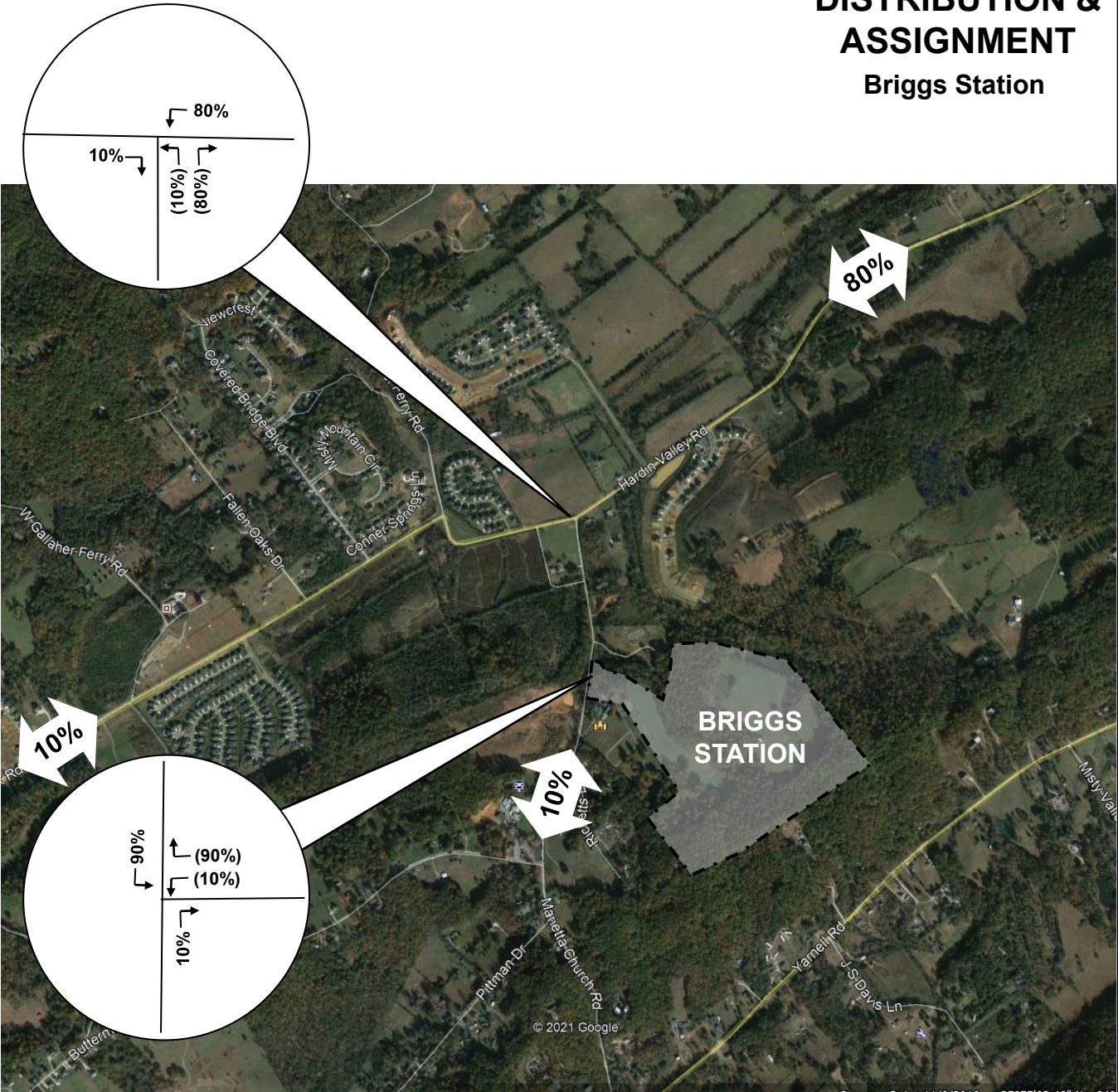


Figure 5



# TRIP DISTRIBUTION & ASSIGNMENT

## Briggs Station



**LEGEND**  
 XX% Entering Trips  
 (XX%) Exiting Trips

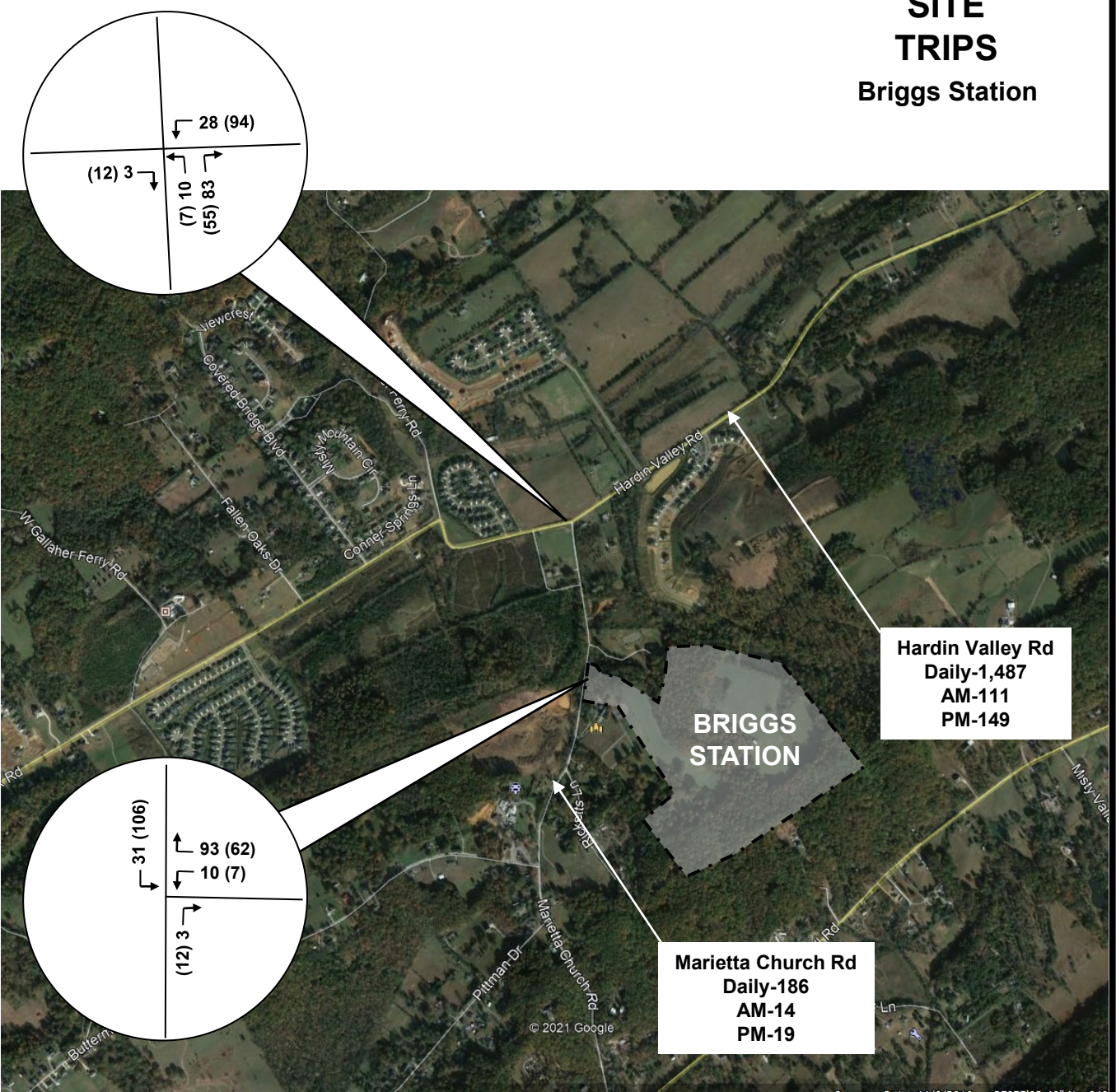


Figure 6



# SITE TRIPS

## Briggs Station



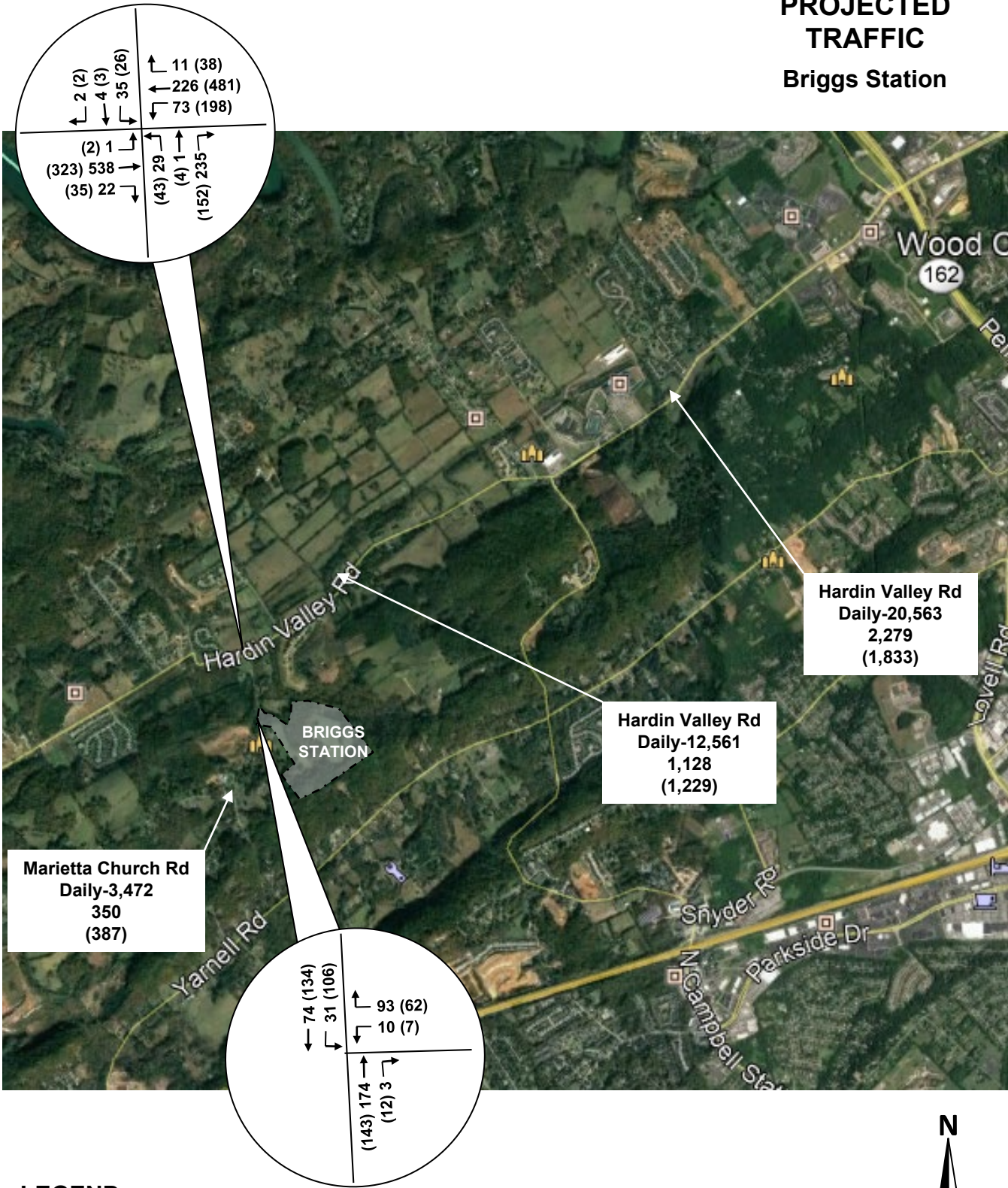
**LEGEND**  
 XXX AM PEAK  
 (XXX) PM PEAK



Figure 7



# 2025 PROJECTED TRAFFIC Briggs Station

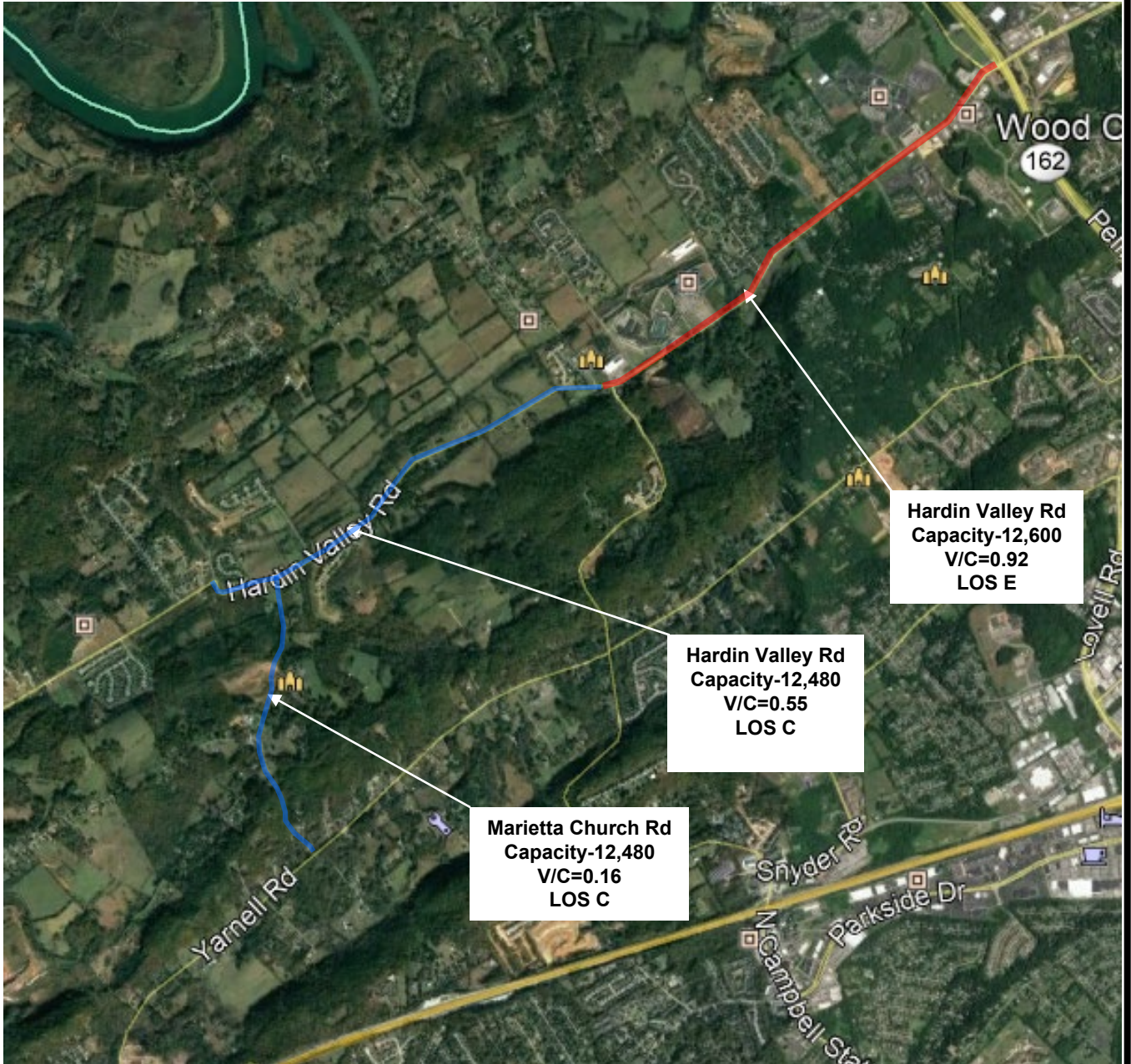


**LEGEND**  
XXX AM PEAK  
(XXX) PM PEAK

**N**  
  
Figure 8



# 2019 EXISTING LEVELS OF SERVICE Briggs Station



2-lane Undivided Section Without Left-Turn Lanes

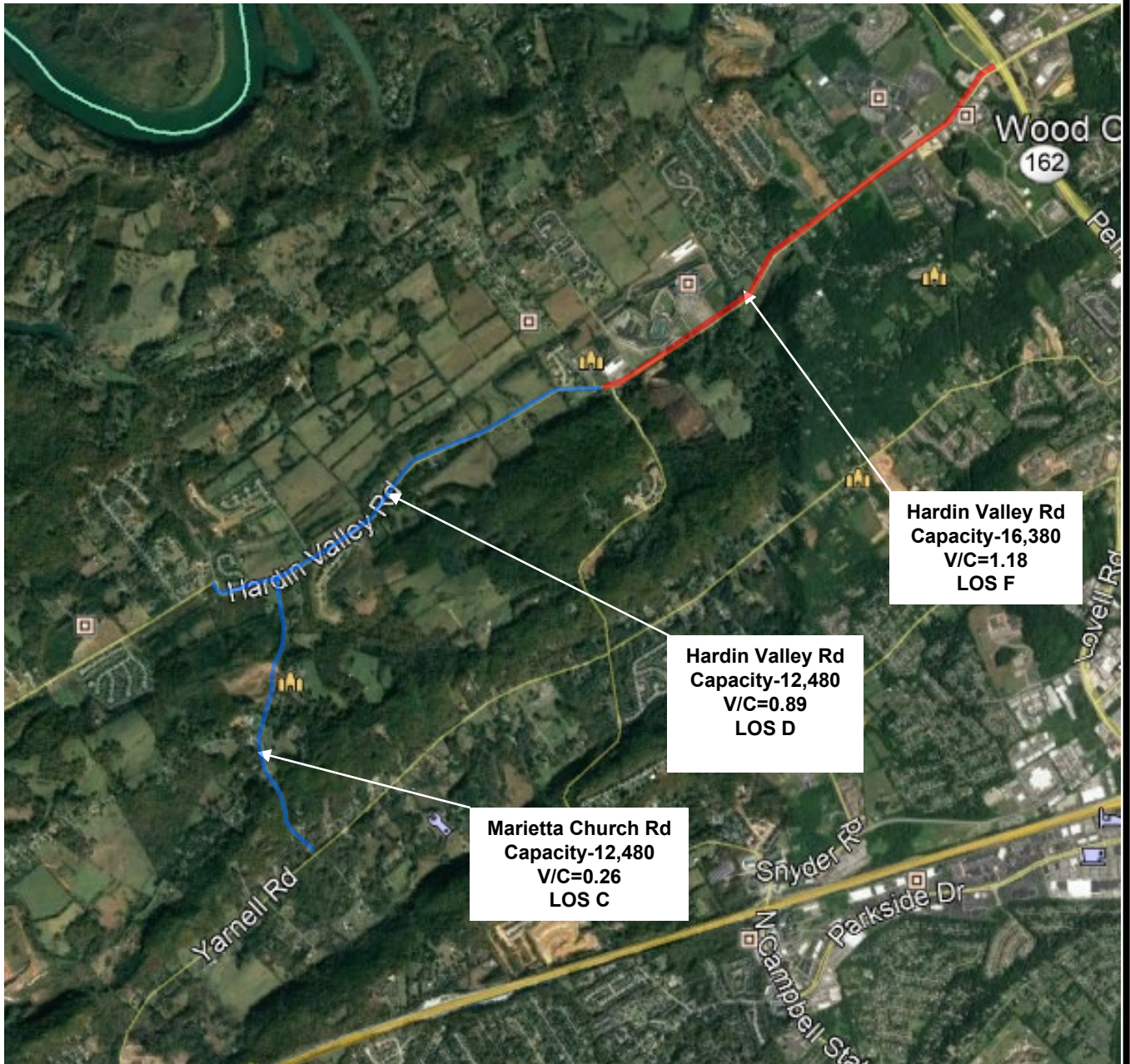
2-lane Divided Section With Left-Turn Lanes



Figure 9A



**2025  
BACKGROUND  
LEVELS OF SERVICE  
Briggs Station**



2-lane Undivided Section Without Left-Turn Lanes

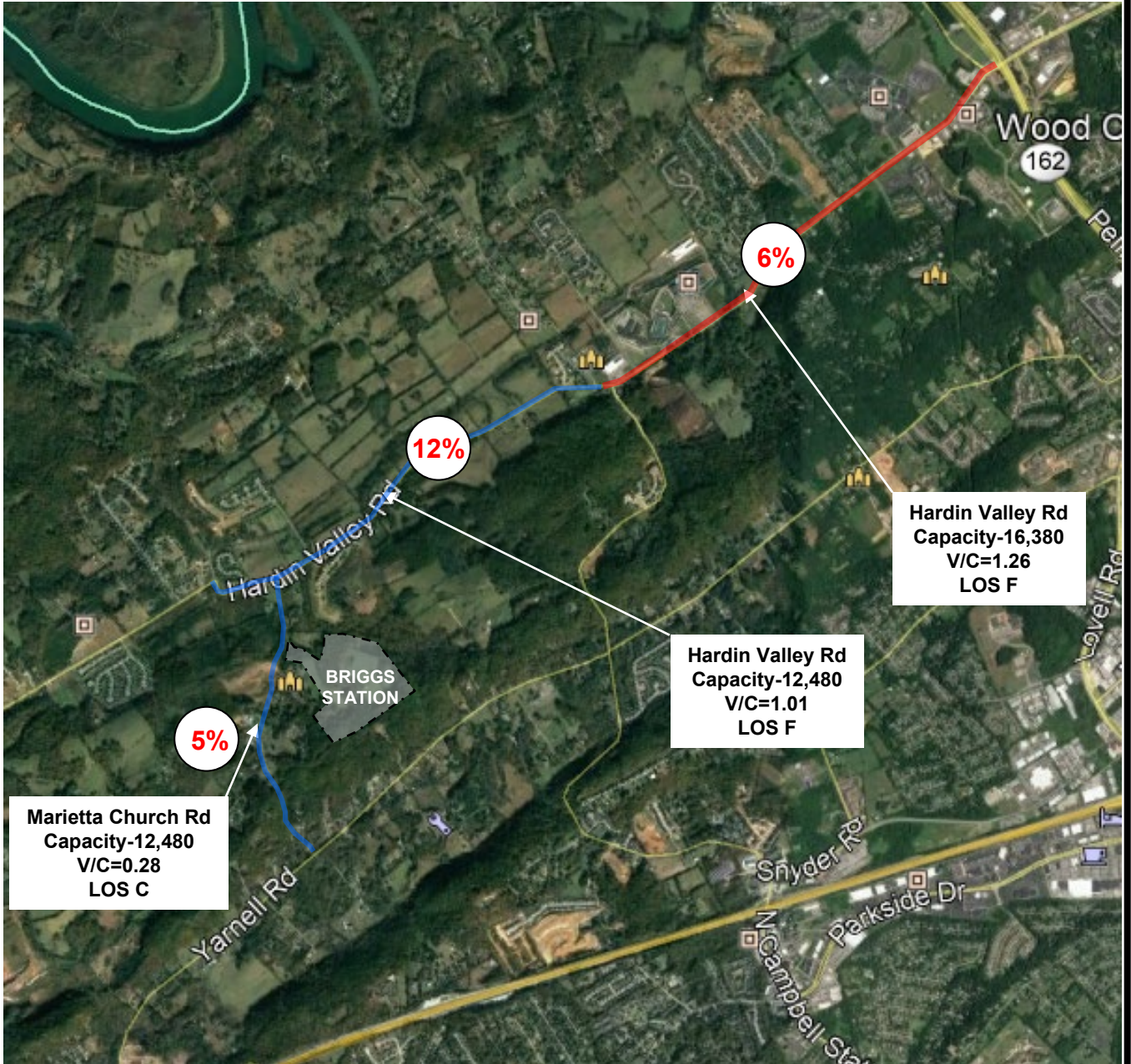
2-lane Divided Section With Left-Turn Lanes



**Figure 9B**



# 2025 PROJECTED LEVELS OF SERVICE Briggs Station



— 2-lane Undivided Section Without Left-Turn Lanes  
— 2-lane Divided Section With Left-Turn Lanes

X% Briggs Station Traffic Percentage



**Figure 9C**

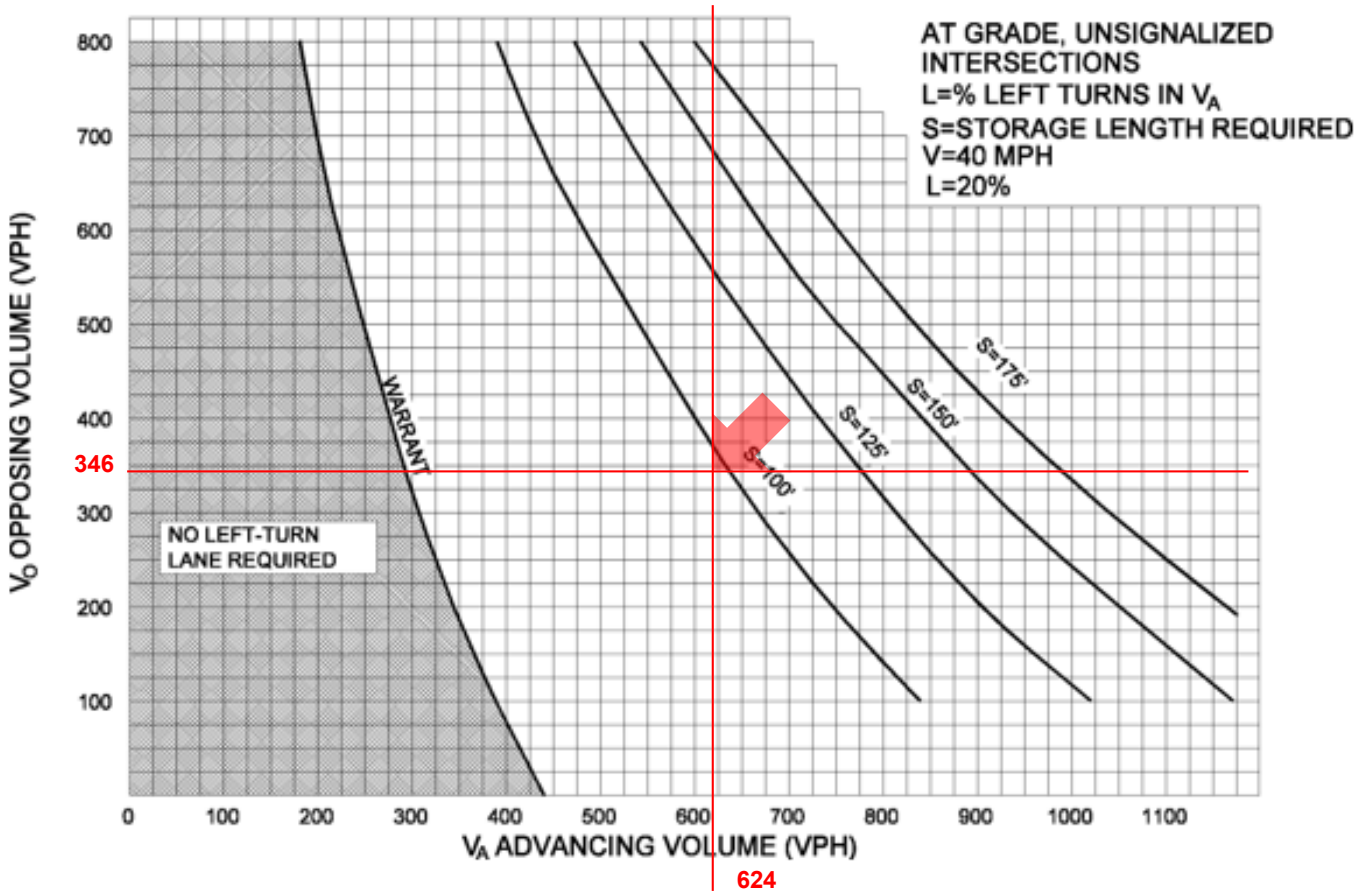
**TABLE 4 - 1  
GENERALIZED ANNUAL AVERAGE DAILY VOLUMES FOR FLORIDA'S  
URBANIZED AREAS\***

UNINTERRUPTED FLOW HIGHWAYS						FREEWAYS					
Level of Service						Interchange spacing $\geq$ 2 mi. apart					
Lanes Divided	A	B	C	D	E	Lanes	A	B	C	D	E
2 Undivided	2,000	7,000	13,800	19,600	27,000	4	23,800	39,600	55,200	67,100	74,600
4 Divided	20,400	33,000	47,800	61,800	70,200	6	36,900	61,100	85,300	103,600	115,300
6 Divided	30,500	49,500	71,600	92,700	105,400	8	49,900	82,700	115,300	140,200	156,000
STATE TWO-WAY ARTERIALS						Interchange spacing $<$ 2 mi. apart					
Class I ( $>0.00$ to 1.99 signalized intersections per mile)						Level of Service					
Lanes Divided	A	B	C	D	E	Lanes	A	B	C	D	E
2 Undivided	**	4,200	13,800	16,400	16,900	4	22,000	36,000	52,000	67,200	76,500
4 Divided	4,800	29,300	34,700	35,700	***	6	34,800	56,500	81,700	105,800	120,200
6 Divided	7,300	44,700	52,100	53,500	***	8	47,500	77,000	111,400	144,300	163,900
8 Divided	9,400	58,000	66,100	67,800	***	10	60,200	97,500	141,200	182,600	207,600
Class II (2.00 to 4.50 signalized intersections per mile)						Level of Service					
Lanes Divided	A	B	C	D	E	Lanes	A	B	C	D	E
2 Undivided	**	1,900	11,200	15,400	16,300	4	22,000	36,000	52,000	67,200	76,500
4 Divided	**	4,100	26,000	32,700	34,500	6	34,800	56,500	81,700	105,800	120,200
6 Divided	**	6,500	40,300	49,200	51,800	8	47,500	77,000	111,400	144,300	163,900
8 Divided	**	8,500	53,300	63,800	67,000	10	60,200	97,500	141,200	182,600	207,600
Class III (more than 4.5 signalized intersections per mile and not within primary city central business district of an urbanized area over 750,000)						BICYCLE MODE					
Level of Service						(Note: Level of service for the bicycle mode in this table is based on roadway geometrics at 40 mph posted speed and traffic conditions, not number of bicyclists using the facility.) (Multiply motorized vehicle volumes shown below by number of directional roadway lanes to determine two-way maximum service volumes.)					
Lanes Divided	A	B	C	D	E	Paved Shoulder/ Bicycle Lane Coverage	A	B	C	D	E
2 Undivided	**	**	5,300	12,600	15,500	0-49%	**	**	3,200	13,800	$>13,800$
4 Divided	**	**	12,400	28,900	32,800	50-84%	**	2,500	4,100	$>4,100$	***
6 Divided	**	**	19,500	44,700	49,300	85-100%	3,100	7,200	$>7,200$	***	***
8 Divided	**	**	25,800	58,700	63,800	PEDESTRIAN MODE					
Class IV (more than 4.5 signalized intersections per mile and within primary city central business district of an urbanized area over 750,000)						(Note: Level of service for the pedestrian mode in this table is based on roadway geometrics at 40 mph posted speed and traffic conditions, not number of pedestrians using the facility.) (Multiply motorized vehicle volumes shown below by number of directional roadway lanes to determine two-way maximum service volumes.)					
Level of Service						Level of Service					
Lanes Divided	A	B	C	D	E	Sidewalk Coverage	A	B	C	D	E
2 Undivided	**	**	5,200	13,700	15,000	0-49%	**	**	**	6,400	15,500
4 Divided	**	**	12,300	30,300	31,700	50-84%	**	**	**	9,900	19,000
6 Divided	**	**	19,100	45,800	47,600	85-100%	**	2,200	11,300	$>11,300$	***
8 Divided	**	**	25,900	59,900	62,200	BUS MODE (Scheduled Fixed Route)					
NON-STATE ROADWAYS						(Buses per hour)					
Major City/County Roadways						(Note: Buses per hour shown are only for the peak hour in the single direction of the higher traffic flow.)					
Level of Service						Level of Service					
Lanes Divided	A	B	C	D	E	Sidewalk Coverage	A	B	C	D	E
2 Undivided	**	**	9,100	14,600	15,600	0-84%	**	$>5$	$\geq 4$	$\geq 3$	$\geq 2$
4 Divided	**	**	21,400	31,100	32,900	85-100%	$>6$	$>4$	$\geq 3$	$\geq 2$	$\geq 1$
6 Divided	**	**	33,400	46,800	49,300	ARTERIAL/NON-STATE ROADWAY ADJUSTMENTS					
Other Signalized Roadways (signalized intersection analysis)						DIVIDED/UNDIVIDED					
Level of Service						(alter corresponding volume by the indicated percent)					
Lanes Divided	A	B	C	D	E	Lanes	Median	Left Turns	Lanes	Adjustment Factors	
2 Undivided	**	**	4,800	10,000	12,600	2	Divided	Yes		+5%	
4 Divided	**	**	11,100	21,700	25,200	2	Undivided	No		-20%	
Source: Florida Department of Transportation 02/22/02						Multi	Undivided	Yes		-5%	
Systems Planning Office						Multi	Undivided	No		-25%	
605 Suwannee Street, MS 19						ONE-WAY FACILITIES					
Tallahassee, FL 32399-0450						Decrease corresponding two-directional volumes in this table by 40% to obtain the equivalent one directional volume for one-way facilities.					
http://www11.myflorida.com/planning/systems/sm/los/default.htm											

\*This table does not constitute a standard and should be used only for general planning applications. The computer models from which this table is derived should be used for more specific planning applications. The table and deriving computer models should not be used for corridor or intersection design, where more refined techniques exist. Values shown are two-way annual average daily volumes (based on  $K_{100}$  factors) for levels of service and are for the automobile/truck modes unless specifically stated. Level of service letter grade thresholds are probably not comparable across modes and, therefore, cross modal comparisons should be made with caution. Furthermore, combining levels of service of different modes into one overall roadway level of service is not recommended. The table's input value defaults and level of service criteria appear on the following page. Calculations are based on planning applications of the Highway Capacity Manual, Bicycle LOS Model, Pedestrian LOS Model and Transit Capacity and Quality of Service Manual, respectively for the automobile/truck, bicycle, pedestrian and bus modes.  
 \*\*Cannot be achieved using table input value defaults.  
 \*\*\*Not applicable for that level of service letter grade. For automobile/truck modes, volumes greater than level of service D become F because intersection capacities have been reached. For bicycle and pedestrian modes, the level of service letter grade (including F) is not achievable, because there is no maximum vehicle volume threshold using table input value defaults.

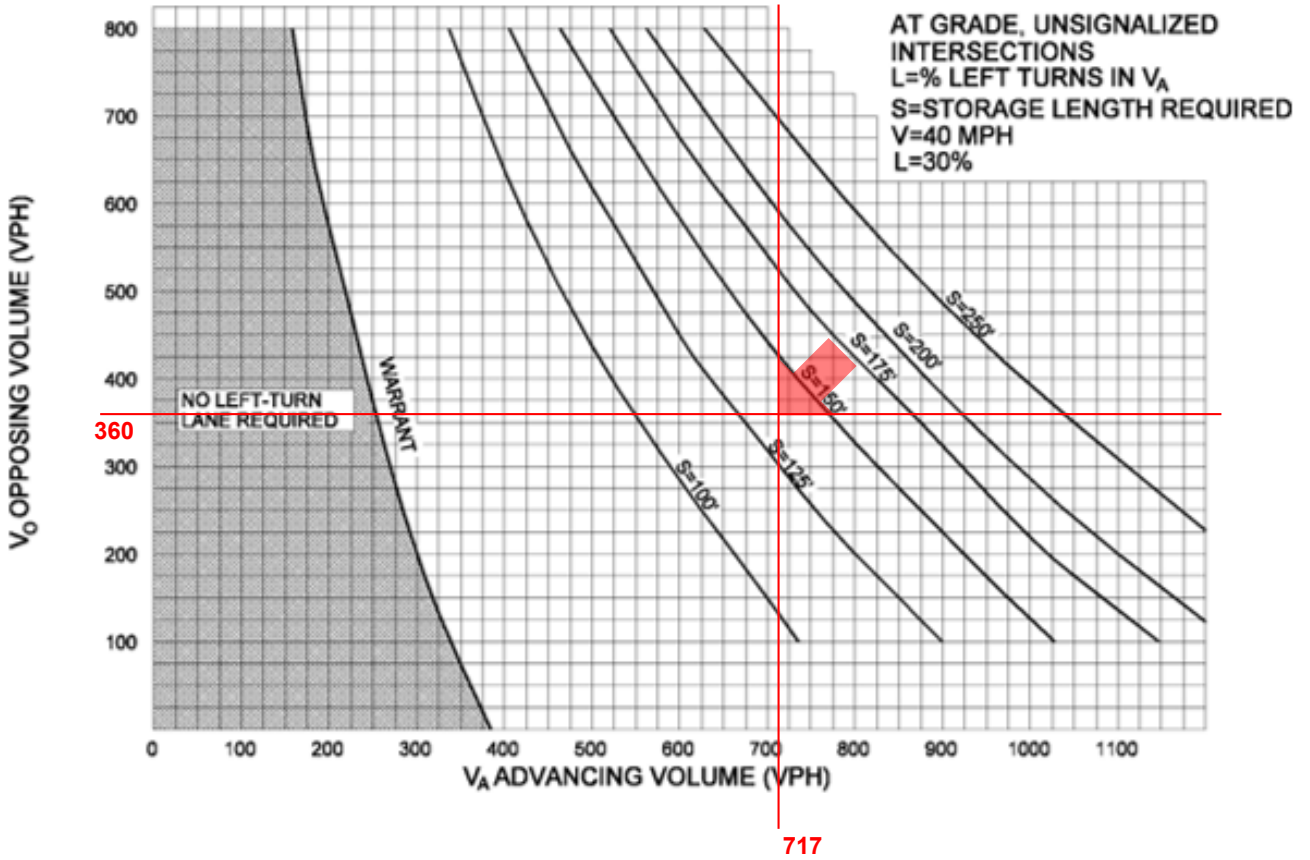


# HARDIN VALLEY ROAD LEFT-TURN LANE FOR THE WESTBOUND APPROACH TO MARIETTA CHURCH ROAD (2025 Background Traffic)



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

(2025 Traffic Projections)



**VOLUME**

Marietta Church Rd S/O Hardin Valley Rd(35.91655, -84.21111)

Day: Thursday  
Date: 9/26/2019

City: Knoxville  
Site #: 093M275

DAILY TOTALS					NB	SB	EB	WB	Total		
					1,094	960	0	0	2,054		
AM Period	NB	SB	EB	WB	TOTAL	PM Period	NB	SB	EB	WB	TOTAL
0:00	0	1			1	12:00	16	13			29
0:15	2	2			4	12:15	14	10			24
0:30	1	0			1	12:30	12	16			28
0:45	0	3	1	4	7	12:45	10	52	11	50	102
1:00	1	0			1	13:00	12	16			28
1:15	0	0			0	13:15	20	11			31
1:30	0	0			0	13:30	13	14			27
1:45	0	1	0		1	13:45	9	54	22	63	117
2:00	0	0			0	14:00	14	25			39
2:15	0	0			0	14:15	12	15			27
2:30	1	1			2	14:30	21	17			38
2:45	0	1	0	1	2	14:45	12	59	16	73	132
3:00	0	0			0	15:00	13	22			35
3:15	0	0			0	15:15	18	14			32
3:30	0	0			0	15:30	10	22			32
3:45	0	0			0	15:45	13	54	34	92	146
4:00	0	0			0	16:00	22	30			52
4:15	1	1			2	16:15	19	17			36
4:30	0	0			0	16:30	29	25			54
4:45	0	1	0	1	2	16:45	31	101	29	101	202
5:00	1	3			4	17:00	27	19			46
5:15	2	2			4	17:15	37	20			57
5:30	5	2			7	17:30	41	26			67
5:45	1	9	1	8	17	17:45	29	134	17	82	216
6:00	2	6			8	18:00	23	30			53
6:15	6	6			12	18:15	15	17			32
6:30	13	4			17	18:30	19	15			34
6:45	25	46	7	23	69	18:45	14	71	14	76	147
7:00	17	11			28	19:00	8	15			23
7:15	32	17			49	19:15	12	15			27
7:30	31	19			50	19:30	10	12			22
7:45	29	109	18	65	174	19:45	6	36	17	59	95
8:00	44	10			54	20:00	5	9			14
8:15	42	12			54	20:15	6	11			17
8:30	41	14			55	20:30	2	8			10
8:45	34	161	12	48	209	20:45	5	18	7	35	53
9:00	17	18			35	21:00	7	8			15
9:15	18	12			30	21:15	7	13			20
9:30	7	7			14	21:30	3	4			7
9:45	10	52	11	48	100	21:45	3	20	4	29	49
10:00	17	10			27	22:00	1	2			3
10:15	17	10			27	22:15	2	5			7
10:30	12	9			21	22:30	2	1			3
10:45	12	58	6	35	93	22:45	2	7	0	8	15
11:00	9	13			22	23:00	0	2			2
11:15	8	11			19	23:15	1	2			3
11:30	11	17			28	23:30	3	0			3
11:45	14	42	14	55	97	23:45	1	5	0	4	9
<b>TOTALS</b>	<b>483</b>	<b>288</b>			<b>771</b>	<b>TOTALS</b>	<b>611</b>	<b>672</b>			<b>1283</b>
<b>SPLIT %</b>	<b>62.6%</b>	<b>37.4%</b>			<b>37.5%</b>	<b>SPLIT %</b>	<b>47.6%</b>	<b>52.4%</b>			<b>62.5%</b>

DAILY TOTALS					NB	SB	EB	WB	Total
					1,094	960	0	0	2,054

AM Peak Hour	8:00	7:00			7:45	PM Peak Hour	16:45	15:45			16:45
AM Pk Volume	161	65			210	PM Pk Volume	136	106			230
Pk Hr Factor	0.915	0.855			0.955	Pk Hr Factor	0.829	0.779			0.858
7 - 9 Volume	270	113	0	0	383	4 - 6 Volume	235	183	0	0	418
7 - 9 Peak Hour	8:00	7:00			7:45	4 - 6 Peak Hour	16:45	16:00			16:45
7 - 9 Pk Volume	161	65	0	0	210	4 - 6 Pk Volume	136	101	0	0	230
Pk Hr Factor	0.915	0.855	0.000	0.000	0.955	Pk Hr Factor	0.829	0.842	0.000	0.000	0.858

### VOLUME

Hardin Valley Rd E/O Marietta Church Rd(35.926323, -84.199747)

Day: Thursday  
Date: 9/26/2019

City: Knoxville  
Site #: 093M353

DAILY TOTALS					NB	SB	EB	WB	Total		
					0	0	3,494	3,427	6,921		
AM Period	NB	SB	EB	WB	TOTAL	PM Period	NB	SB	EB	WB	TOTAL
0:00			1	5	6	12:00			41	54	95
0:15			3	2	5	12:15			40	51	91
0:30			2	2	4	12:30			56	47	103
0:45			0	6	2	12:45			48	185	45
				11	2	17			197		93
1:00			3	0	3	13:00			38	45	83
1:15			2	0	2	13:15			40	53	93
1:30			0	0	0	13:30			48	44	92
1:45			2	7	3	13:45			49	175	63
				3	5	10			205		112
2:00			0	0	0	14:00			42	79	121
2:15			0	0	0	14:15			48	52	100
2:30			1	1	2	14:30			52	52	104
2:45			2	3	1	14:45			52	194	56
				2	3	5			239		108
3:00			2	2	4	15:00			56	58	114
3:15			1	0	1	15:15			50	63	113
3:30			1	1	2	15:30			72	75	147
3:45			0	4	0	15:45			39	217	102
				3	0	7			298		141
4:00			4	1	5	16:00			49	105	154
4:15			6	1	7	16:15			75	70	145
4:30			3	0	3	16:30			80	88	168
4:45			6	19	1	16:45			84	288	87
				3	7	22			350		171
5:00			4	3	7	17:00			66	104	170
5:15			16	2	18	17:15			86	80	166
5:30			17	6	23	17:30			86	78	164
5:45			15	52	5	17:45			67	305	70
				16	20	68			332		137
6:00			27	9	36	18:00			68	95	163
6:15			30	17	47	18:15			51	81	132
6:30			58	10	68	18:30			51	63	114
6:45			84	199	19	18:45			38	208	63
				55	103	254			302		101
7:00			94	26	120	19:00			38	58	96
7:15			119	37	156	19:15			32	56	88
7:30			103	56	159	19:30			28	59	87
7:45			105	421	67	19:45			31	129	76
				186	172	607			249		107
8:00			113	36	149	20:00			14	53	67
8:15			85	48	133	20:15			21	50	71
8:30			75	34	109	20:30			15	34	49
8:45			80	353	51	20:45			15	65	34
				169	131	522			171		49
9:00			71	38	109	21:00			9	41	50
9:15			51	50	101	21:15			26	26	52
9:30			38	40	78	21:30			21	27	48
9:45			41	201	34	21:45			10	66	20
				162	75	363			114		30
10:00			41	41	82	22:00			11	18	29
10:15			54	35	89	22:15			2	10	12
10:30			51	32	83	22:30			3	6	9
10:45			37	183	32	22:45			6	22	6
				140	69	323			40		12
11:00			46	40	86	23:00			1	1	2
11:15			41	34	75	23:15			2	4	6
11:30			44	46	90	23:30			6	2	8
11:45			49	180	50	23:45			3	12	3
				170	99	350			10		6
TOTALS			1628	920	2548	TOTALS			1866	2507	4373
SPLIT %			63.9%	36.1%	36.8%	SPLIT %			42.7%	57.3%	63.2%

DAILY TOTALS					NB	SB	EB	WB	Total		
					0	0	3,494	3,427	6,921		
AM Peak Hour			7:15	7:30	7:15	PM Peak Hour			16:45	15:45	16:30
AM Pk Volume			440	207	636	PM Pk Volume			322	365	675
Pk Hr Factor			0.924	0.772	0.924	Pk Hr Factor			0.936	0.869	0.987
7 - 9 Volume	0	0	774	355	1129	4 - 6 Volume	0	0	593	682	1275
7 - 9 Peak Hour			7:15	7:30	7:15	4 - 6 Peak Hour			16:45	16:30	16:30
7 - 9 Pk Volume	0	0	440	207	636	4 - 6 Pk Volume	0	0	322	359	675
Pk Hr Factor	0.000	0.000	0.924	0.772	0.924	Pk Hr Factor	0.000	0.000	0.936	0.863	0.987

### VOLUME

Hardin Valley Rd W/O Brooke Willow Blvd(35.935283, -84.177278)

Day: Tuesday  
Date: 10/29/2019

City: Knoxville  
Site #: 093M393

DAILY TOTALS					NB	SB	EB	WB	Total			
					0	0	7,381	7,628	15,009			
AM Period	NB	SB	EB	WB	TOTAL	PM Period	NB	SB	EB	WB	TOTAL	
0:00			4	4	8	12:00			131	124	255	
0:15			6	6	12	12:15			110	121	231	
0:30			3	4	7	12:30			119	116	235	
0:45			1	14	2	16	12:45		90	450	77	438
1:00			0	2	2	13:00			85	102	187	
1:15			1	0	1	13:15			83	92	175	
1:30			3	1	4	13:30			96	90	186	
1:45			0	4	0	3	13:45		86	350	143	427
2:00			1	1	2	14:00			173	127	300	
2:15			1	2	3	14:15			120	151	271	
2:30			2	0	2	14:30			103	135	238	
2:45			0	4	0	3	14:45		138	534	131	544
3:00			1	2	3	15:00			121	150	271	
3:15			2	8	10	15:15			97	187	284	
3:30			3	3	6	15:30			243	155	398	
3:45			2	8	2	15	15:45		170	631	157	649
4:00			9	2	11	16:00			155	131	286	
4:15			8	1	9	16:15			137	175	312	
4:30			12	7	19	16:30			149	176	325	
4:45			9	38	5	15	16:45		133	574	162	644
5:00			16	3	19	17:00			150	179	329	
5:15			20	5	25	17:15			151	160	311	
5:30			34	12	46	17:30			143	184	327	
5:45			27	97	14	34	17:45		146	590	166	689
6:00			37	22	59	18:00			122	157	279	
6:15			51	38	89	18:15			128	131	259	
6:30			76	105	181	18:30			120	115	235	
6:45			80	244	247	412	18:45		96	466	108	511
7:00			164	182	346	19:00			95	101	196	
7:15			175	245	420	19:15			72	64	136	
7:30			228	235	463	19:30			57	55	112	
7:45			216	783	234	896	19:45		39	263	63	283
8:00			184	253	437	20:00			46	66	112	
8:15			261	175	436	20:15			38	74	112	
8:30			177	69	246	20:30			39	69	108	
8:45			144	766	82	579	20:45		35	158	43	252
9:00			144	75	219	21:00			20	36	56	
9:15			104	79	183	21:15			21	30	51	
9:30			105	91	196	21:30			28	40	68	
9:45			91	444	84	329	21:45		13	82	34	140
10:00			104	64	168	22:00			10	17	27	
10:15			133	66	199	22:15			12	17	29	
10:30			110	85	195	22:30			10	12	22	
10:45			67	414	84	299	22:45		12	44	8	54
11:00			67	75	142	23:00			7	11	18	
11:15			106	88	194	23:15			12	10	22	
11:30			111	84	195	23:30			6	8	14	
11:45			111	395	108	355	23:45		3	28	12	41
<b>TOTALS</b>				3211	2956	<b>6167</b>	<b>TOTALS</b>			4170	4672	<b>8842</b>
<b>SPLIT %</b>				52.1%	47.9%	<b>41.1%</b>	<b>SPLIT %</b>			47.2%	52.8%	<b>58.9%</b>

DAILY TOTALS					NB	SB	EB	WB	Total
					0	0	7,381	7,628	15,009

AM Peak Hour			7:30	7:15	7:30	PM Peak Hour			15:30	16:15	15:30
AM Pk Volume			889	967	1786	PM Pk Volume			705	692	1323
Pk Hr Factor			0.852	0.956	0.964	Pk Hr Factor			0.725	0.966	0.831
7 - 9 Volume	0	0	1549	1475	3024	4 - 6 Volume	0	0	1164	1333	2497
7 - 9 Peak Hour			7:30	7:15	7:30	4 - 6 Peak Hour			17:00	16:15	17:00
7 - 9 Pk Volume	0	0	889	967	1786	4 - 6 Pk Volume	0	0	590	692	1279
Pk Hr Factor	0.000	0.000	0.852	0.956	0.964	Pk Hr Factor	0.000	0.000	0.977	0.966	0.972



# TRIP GENERATION

## SINGLE-FAMILY RESIDENTIAL (188 UNITS)-ITE Trip Generation, 10th Ed

### DAILY TRIPS

$$\ln(T) = 0.92\ln(X) + 2.71$$

$$\ln(T) = 0.92\ln(175) + 2.71$$

$$T = 1,859$$

### AM PEAK HOUR OF ADJACENT STREET

$$T = 0.71(X) + 4.8$$

$$T = 0.71(175) + 4.8$$

$$T = 138$$

### PM PEAK HOUR OF ADJACENT STREET

$$\ln(T) = 0.96\ln(X) + 0.20$$

$$\ln(T) = 0.96\ln(175) + 0.20$$

$$T = 186$$

## SINGLE-FAMILY RESIDENTIAL (94 UNITS)-ITE Trip Generation, 10th Ed

### DAILY TRIPS

$$\ln(T) = 0.92\ln(X) + 2.71$$

$$\ln(T) = 0.92\ln(175) + 2.71$$

$$T = 982$$

### AM PEAK HOUR OF ADJACENT STREET

$$T = 0.71(X) + 4.8$$

$$T = 0.71(175) + 4.8$$

$$T = 72$$

### PM PEAK HOUR OF ADJACENT STREET

$$\ln(T) = 0.96\ln(X) + 0.20$$

$$\ln(T) = 0.96\ln(175) + 0.20$$

$$T = 96$$



Via Email: [gouldjf@cdmsmith.com](mailto:gouldjf@cdmsmith.com)

**JUNE 4, 2021**

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

## **RE: Briggs Station Rezoning Review TIL Comments**

Dear Mr. Gould,

The Transportation Impact Letter (TIL) for the above referenced rezoning case that was received on May 20, 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 TIL that we require further information/revision on for this case review:

1. Please make the following text edits (mark-up sheets are also provided to you as reference):
  - Page 3-
    - Include the ATC data in the attachments
    - Include the trip generation worksheets in the attachments
    - Add "Church" to Marietta Road in second to last sentence.
  - Figure 6- correct the trip distribution splits as shown to match the report  
**Edits made in the report document.**
2. The TIL was specifically required due to the Knox County Growth Policy Plan for a rezoning of higher density than permitted under Ag zoning in the Rural Area of 1 DU per acre and as such this should be referenced in the report. Please include a quantification of the total number of daily trips that would be produced in a before and after scenario, i.e., under current 1 DU per acre versus what is being proposed for the rezoning case.  
**TIL provides trip generation and analysis of the zoned SFU density**
3. For ease of reference and to improve readability, please include a graphic that depicts which segments apply to the capacities assumed for the segment-level analysis shown in Table 3.  
**Figures 9A-C revised with highlighted segments.**

4. The values selected from the Florida Department of Transportation (FDOT) generalized capacity tables should be reconsidered and additional information provided as follows:
  - The 3-lane section of Hardin Valley Rd from Campbell Station Rd to near Pellissippi Parkway should be given a capacity of 16,380 vehicles per day (vpd) based on the values from the table that provide a base capacity of 15,600 vpd for a 2-lane roadway with a 5% bonus for a “divided” facility with turn lanes. For the purposes of capacity calculation, a divided roadway consists of either a non-traversable median or a continuous center turn lane. This capacity value is also supported by various sources including the Federal Highway Administration (FHWA) guidance on road diet candidates, which are typically conversions of 4-lane undivided roadways to a 2-lane with continuous center turn lane, i.e., “3-lane” roadway.  
Capacity of 16,380 estimated for Hardin Valley Rd east of Steele Rd representing a 2-lane undivided/unsignalized section
  - The capacity value reported for the 2-lane section of Hardin Valley Rd west of Campbell Station Rd of 12,480 is accurate for the current situation, but the TIL could emphasize that its full capacity of 15,600 could be achieved with addition of left turn lanes at existing intersections such as Marietta Church Rd and any new major roadway connections as they occur with new development as a possible recommendation.  
Noted in the TIL of capacity improvement with added left-turn lanes and reflected in the recommendations of the TIL.
5. The 10% growth rate value that was directed by Knox Planning for the background growth was specific to the immediate vicinity of the site and could be modified for segments of Hardin Valley Rd east of Campbell Station Rd. One option is to apply the gross traffic growth calculated for segments west of Campbell Station Rd and add that amount to other segments or to utilize an approach of calculating trip generation of approved/planned development in addition to a more traditional/moderate background growth rate in the 1-2% range.  
Background growth east of Steele Rd revised with volume growth (Not Growth rate) of segment west of Steele Rd
6. The TIL should note that the 80% distribution assumed for traffic from this subdivision continuing the entire segment of Hardin Valley Rd would be a worst-case scenario since in reality there are intermediate destinations such as the schools and other roadways such as Campbell Station Rd that will remove a certain amount of traffic from this distribution.  
Revised projected traffic east of Steele Rd reflecting 70% of generated trips.

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 TIL. This rezoning case is due to be heard by the Knoxville-Knox County Planning Commission at their June 10, 2021 meeting and as such there is very limited time available to make these revisions, but please let me know if you have any questions or would like to discuss these comments.



Sincerely,



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

CC: Liz Albertson, AICP, Knoxville-Knox County Planning  
Amy Brooks, AICP, Knoxville-Knox County Planning  
Jim Snowden, P.E., Knox County Engineering and Public Works  
John Sexton, P.E., Knox County Engineering and Public Works  
Aaron Fritts, Knox County Engineering and Public Works



**Knoxville-Knox County Planning** | [KnoxPlanning.org](http://KnoxPlanning.org)  
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