

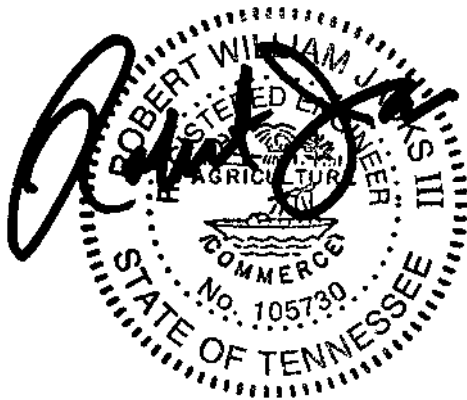


# Transportation Impact Study River Pointe Subdivision Knox County, Tennessee



2<sup>nd</sup> Revision September 2020

Prepared for:  
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9/25/2020

## TABLE OF CONTENTS

<b>SECTION</b>	<b>PAGE</b>
<b>EXECUTIVE SUMMARY</b> .....	<b>1</b>
<b>DESCRIPTION OF EXISTING CONDITIONS</b> .....	<b>4</b>
STUDY AREA .....	4
EXISTING ROADWAYS .....	6
PHOTO EXHIBITS.....	10
EXISTING TRANSPORTATION VOLUMES PER MODE .....	17
PEDESTRIAN AND BICYCLE FACILITIES .....	17
WALK SCORE .....	18
TRANSIT SERVICES.....	18
<b>PROJECT DESCRIPTION</b> .....	<b>19</b>
LOCATION AND SITE PLAN.....	19
PROPOSED USES AND ZONING REQUIREMENTS.....	21
DEVELOPMENT DENSITY.....	22
ON-SITE CIRCULATION .....	22
SERVICE AND DELIVERY VEHICLE ACCESS AND CIRCULATION.....	22
<b>TRAFFIC ANALYSIS OF EXISTING AND PROJECTED CONDITIONS</b> .....	<b>23</b>
EXISTING TRAFFIC CONDITIONS.....	23
OPENING YEAR TRAFFIC CONDITIONS (WITHOUT PROJECT) .....	41
TRIP GENERATION.....	43
TRIP DISTRIBUTION AND ASSIGNMENT .....	44
OPENING YEAR TRAFFIC CONDITIONS (WITH PROJECT).....	47
POTENTIAL SAFETY ISSUES .....	51
PAVEMENT WIDTHS OF NUMBER TWO DRIVE AND LIBRARY DRIVE.....	55
<b>CONCLUSIONS &amp; RECOMMENDATIONS</b> .....	<b>62</b>
NUMBER TWO DRIVE & NUMBER FOUR DRIVE AT ROAD "A" .....	62
NUMBER TWO DRIVE & LIBRARY DRIVE .....	65
RIVER POINTE SUBDIVISION INTERNAL ROADS .....	70

### **APPENDIX**

## APPENDIX

APPENDIX A -	HISTORICAL TRAFFIC COUNT DATA
APPENDIX B -	WALK SCORE
APPENDIX C -	KNOXVILLE AREA TRANSIT MAP AND INFORMATION
APPENDIX D -	ZONING MAP
APPENDIX E -	MANUAL TRAFFIC COUNT DATA
APPENDIX F -	ITE TRIP GENERATION RATES AND TRIP DISTRIBUTION CALCULATIONS
APPENDIX G -	CAPACITY ANALYSES – HCM WORKSHEETS (SYNCHRO 8)
APPENDIX H -	KNOX COUNTY TURN LANE VOLUME THRESHOLD WORKSHEETS
APPENDIX I -	RESPONSE LETTER TO ADDRESS REVIEW COMMENTS

## LIST OF FIGURES

FIGURE	PAGE
1. LOCATION MAP .....	5
2. TRAFFIC SIGNAGE & EXISTING LANE CONFIGURATIONS.....	9
3. PROPOSED PLAN LAYOUT – DRY GAP PIKE SUBDIVISION.....	20
4A. 2017 PEAK HOUR TRAFFIC VOLUMES – (FROM AJAX ENGINEERING, LLC COUNT ON 11/16/2017) .....	33
4B. 2020 PEAK HOUR TRAFFIC VOLUMES – CALCULATED (+2% GROWTH) .....	34
4C. 2020 PEAK HOUR TRAFFIC VOLUMES – EXISTING TRAFFIC CONDITIONS (CALCULATED).....	35
5. 2025 PEAK HOUR TRAFFIC VOLUMES – OPENING YEAR TRAFFIC (WITHOUT PROJECT) .....	42
6. DIRECTIONAL DISTRIBUTION OF GENERATED TRAFFIC DURING AM AND PM PEAK HOUR.....	45
7. TRAFFIC ASSIGNMENT OF GENERATED TRAFFIC DURING AM AND PM PEAK HOUR.....	46
8. 2025 PEAK HOUR TRAFFIC VOLUMES – OPENING YEAR TRAFFIC (WITH PROJECT).....	48
9. SUMMARY OF EXTERNAL RECOMMENDATIONS.....	72

## LIST OF TABLES

<b>TABLE</b>	<b>PAGE</b>
1. STUDY CORRIDOR CHARACTERISTICS .....	6
2A. TRIP GENERATION FOR HOMES BETWEEN RIVER POPPY ROAD AND NUMBER TWO DRIVE .....	25
2B. CALCULATION OF ADDITIONAL THRU VOLUMES ON MASCOT ROAD – 2017 TO 2020.....	25
2C. TRIP GENERATION FOR EXISTING HOMES ALONG NUMBER TWO, THREE, AND FOUR DRIVE .....	28
2D. CALCULATION OF TRAFFIC VOLUMES ON LIBRARY DRIVE AND NUMBER TWO DRIVE.....	29
2E. TRIP GENERATION FOR EXISTING HOMES ALONG NUMBER TWO, THREE, AND FOUR DRIVE .....	31
2F. CALCULATION OF TRAFFIC VOLUMES ON NUMBER TWO DRIVE AT NUMBER FOUR DRIVE ....	31
3. LEVEL OF SERVICE AND DELAY FOR UNSIGNALIZED INTERSECTIONS .....	38
4. 2020 UNSIGNALIZED INTERSECTION CAPACITY ANALYSIS RESULTS – EXISTING TRAFFIC CONDITIONS .....	39
5. TRIP GENERATION FOR RIVER POINTE SUBDIVISION.....	43
6. 2025 UNSIGNALIZED INTERSECTION CAPACITY ANALYSIS RESULTS – PROJECTED TRAFFIC CONDITIONS.....	49

## EXECUTIVE SUMMARY

### **Preface:**

Fulton Properties, LLC, is proposing a residential development adjacent to Number Two Drive in East Knox County, TN. In this report, this proposed residential development is referred to as “River Pointe Subdivision”. This development will consist of 75 single-family detached houses on 20.21± acres. This development is anticipated to be fully built-out and occupied by the year 2025. This study’s primary purpose is to determine and evaluate the potential impacts of the residential subdivision on the adjacent transportation system. The study includes a review of the operating characteristics of the existing transportation system that will provide access to the proposed development site. Recommendations and mitigation measures are analyzed and offered where traffic operations have been projected to be below traffic engineering standards.

### **Study Results:**

The findings of this study include the following:

- At full build-out and occupancy in the year 2025, the residential subdivision with 75 single-family detached houses is expected to generate 798 trips on an average weekday. Of these trips, 59 of these trips are expected to occur during the AM peak hour and 78 trips in the PM peak hour at full build-out and occupancy.
- The new proposed subdivision road entrance, Road “A”, on Number Two Drive is anticipated to operate adequately with respect to road capacity in the projected 2025 conditions when coupled with the proposed recommendations.

### **Recommendations:**

The following recommendations are offered based on the study analyses. The recommendations marked with an asterisk indicate an existing need and are not associated with the projected transportation impacts of the proposed subdivision.

- \* • It is recommended that a missing Stop Sign (R1-1) be reinstalled for the Number Four Drive approach at Number Two Drive.
- Based on a speed limit of 25-mph on Number Two Drive, the required Intersection Sight Distance (ISD) is 250 feet. With an existing road grade of -1% on the southbound approach of Number Two Drive at the proposed Road “A” intersection, the SSD is calculated to be 155 feet. With an existing road grade of

+9% on the northbound approach of Number Two Drive at the proposed Road "A" intersection, the SSD is calculated to be 140 feet. These distances should be verified and met to ensure safe traffic operations.

- It is recommended that the Road "A" entrance approach at Number Two Drive be designed and constructed with a 24" white stop bar and a Stop Sign (R1-1). The stop bar should be applied at a minimum of 4 feet away from the edge of Number Two Drive and should be placed at the desired stopping point that provides the maximum sight distance.
- \* • It is recommended that Library Drive be widened to a minimum of 18 feet in between the USPS Mascot Post Office and Number Two Drive.
- \* • It is recommended that the southbound Library Drive approach at the existing Y-intersection at Number Two Drive operate as a stop condition. A Stop Sign (R1-1) and 24" white stop bar should be installed on the Library Drive approach.
- \* • Vegetation along Number Two Drive in between Mascot Road and Library Drive needs to be removed and maintained.
- \* • It is recommended that 25-mph Speed Limit Signs (R2-1) be installed on Number Two Drive and Library Drive. These signs should be installed for southbound travel towards the new residential development.
- \* • It is recommended that the large expanse of pavement at the horizontal curve adjacent to God's Way Baptist Church on Number Two Drive be delineated with pavement markings.
- \* • It is recommended that the vegetation on the south side of Mascot Road and to the west of the intersections with Library Drive and Number Two Drive be removed to ensure proper sight distances are provided.
- \* • Knox County should consider removing the Stop Sign on the Number Two Drive approach at Tipple Drive, and it is recommended that the stop condition be assigned to the Tipple Drive approach.
- \* • It is recommended that the large expanse of pavement adjacent to Mascot Baptist Church on Number Two Drive be delineated with pavement markings.
- \* • It is recommended that Church Zone Signs be installed on each approach of Number Two Drive in advance of Mascot Baptist Church.
- It is recommended that a "No Outlet" Sign (W14-2a) be posted near the front of Road "A" off Number Two Drive. This sign can be posted below the street name sign. A 25-mph Speed Limit Sign (R2-1) should also be posted at the beginning of Road "A".

- Stop Signs (R1-1) and 24" white stop bars should be installed internally on the new streets, as shown in the report.
- Sight distance at the new internal intersections in the subdivision must not be impacted by new signage or future landscaping. For a posted speed limit of 25-mph, the intersection sight distance requirement is 250 feet. The stopping sight distance required is 155 feet for a level road grade. The road layout designer should ensure that these sight distance lengths are met, and they should be labeled on the plans.
- All drainage grates and covers for the residential development need to be pedestrian and bicycle-safe.
- The United States Postal Service (USPS) has recently implemented changes to its delivery guidelines in new residential subdivisions. If directed by the local post office, the designer should include an area within the development with a parking area for a centralized mail delivery center.
- All road grade and intersection elements, internally and externally, should be designed to AASHTO, TDOT, and Knox County specifications and guidelines to ensure proper operation.



## DESCRIPTION OF EXISTING CONDITIONS

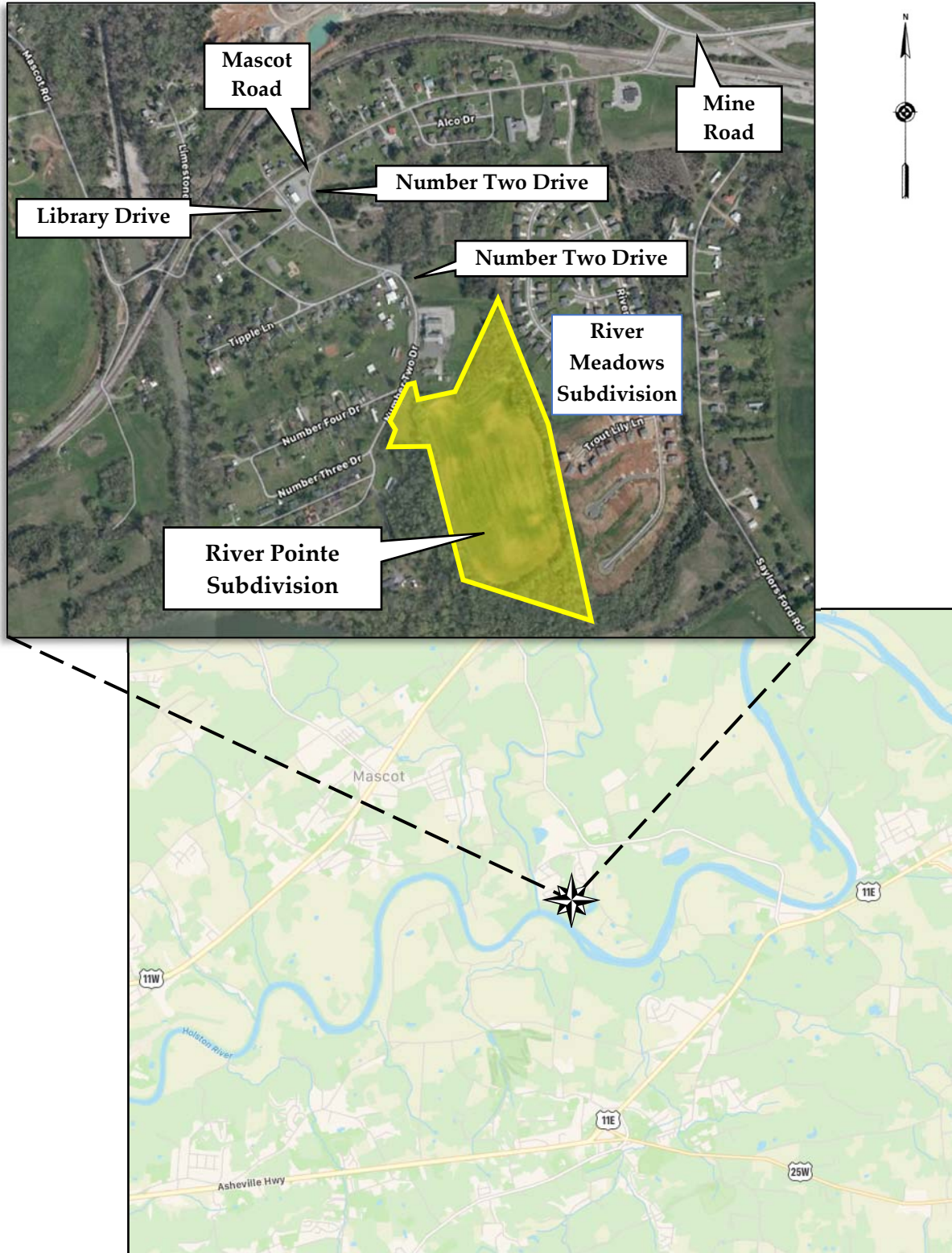
■ **STUDY AREA:**

The proposed location of this new residential development is shown on a map in Figure 1. This proposed development will be located on the east side of Number Two Drive and to the south of Mascot Road in East Knox County, TN. The outermost northern boundary of the development property at Number Two Drive is located approximately 1,600 feet to the south of the existing intersection of Number Two Drive at Mascot Road. River Pointe Subdivision will also be directly adjacent and to the west of River Meadows Subdivision.

Subdivision road access will be limited to Number Two Drive with only one road entrance. The subdivision will comprise a single looped paved internal street containing a maximum of 75 single-family detached residential houses on 20.21 acres. As requested by Knoxville/Knox County Planning, this report analyzes the new entrance intersection at Number Two Drive and the route between the development and Mascot Road.

In the study area, there are a couple of other existing residential subdivisions, individual standalone residences, undeveloped properties, a public park, a post office and library, and a couple of churches located to the north. The proposed development property currently consists of pasture for hay production and a minimal amount of woodlands.

The property for the proposed residential subdivision is being subdivided out of a larger 37.5-acre property tract and is bounded by single-family homes to the east (River Meadows Subdivision) and west across Number Two Drive, and a church to the north. A partially wooded property to the south contains a Knoxville Utilities Board wastewater treatment center (Eastbridge) adjacent to the Holston River. Old Mascot Cemetery is located to the southwest of the property site.



**Figure 1**  
**Location Map**

■ **EXISTING ROADWAYS:**

Table 1 lists the characteristics of the key existing roadways adjacent to the development property and included in the study:

**TABLE 1  
STUDY CORRIDOR CHARACTERISTICS**

NAME	CLASSIFICATION <sup>1</sup>	SPEED LIMIT	LANES	ROAD WIDTH <sup>2</sup>	TRANSIT <sup>3</sup>	PEDESTRIAN FACILITIES	BICYCLE FACILITIES
Mascot Road	Minor Collector	30 mph	2 lanes - undivided	21'	None	None	None
Number Two Drive	Local Street	Not posted	2 lanes - undivided	Variable - 18' to 28.5'	None	None	None
Library Drive	Local Street	Not posted	2 lanes - undivided	Variable - 13' to 30'	None	None	None

<sup>1</sup> 2018 Major Road Plan by Knoxville/Knox County Planning

<sup>2</sup> Edge of pavement to edge of pavement

<sup>3</sup> According to Knoxville Area Transit System Map

**Mascot Road** is classified as a Minor Collector and traverses in a generally east-west direction and provides access to residential areas, agricultural areas, and large quarry operations. Mascot Road runs in between Andrew Johnson Highway (US 11E) on its east side to Rutledge Pike (US 11W) on the west side. Mascot Road traverses just to the north of the proposed River Pointe Subdivision and provides access to other surrounding areas. Mascot Road also provides access to the 800-acre Eastbridge Business Park, which has 162 acres remaining for development. This business park is located just to the north and east of the proposed subdivision.

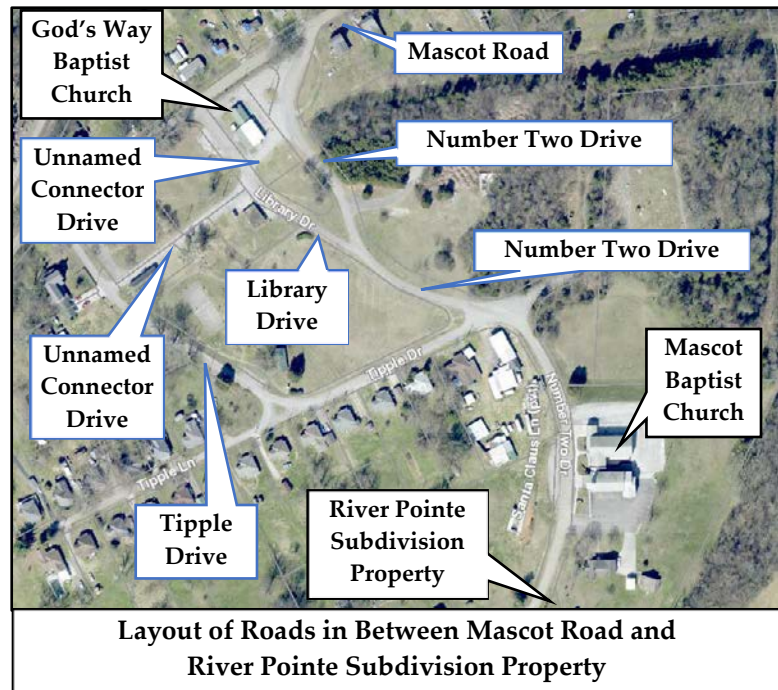
The total length of Mascot Road is just over five miles. To the west of the development, Mascot Road narrows down to a single lane at a Norfolk Southern Railroad underpass and an adjacent bridge over Flat Creek. Mascot Road to the east of the proposed



**View of Mascot Road at NS Railroad Underpass  
(Looking North)**

subdivision crosses two tracks of Norfolk Southern Railroad and intersects Mine Road at a T-intersection. At the Mine Road intersection, Mascot Road is controlled by a Stop Sign (R1-1). Mascot Road continues as the eastern leg of the T-intersection over to Andrew Johnson Highway (11E). Mascot Road at the Number Two Drive intersection is approximately 21 feet in width.

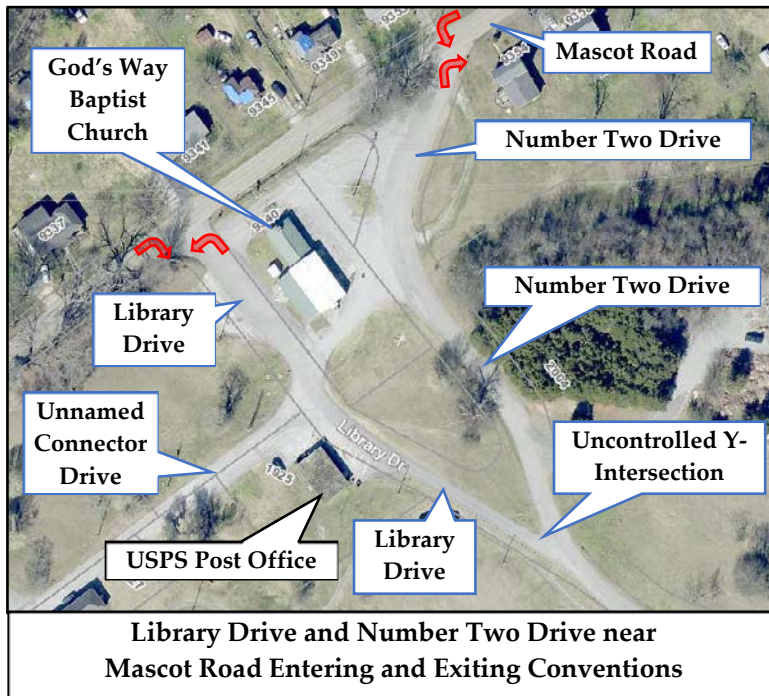
**Number Two Drive** is a local street that provides access to existing single-family homes and two churches. The road traverses in a north-south direction and has a highly variable road width along its length. Number Two Drive will provide the primary access point for travel to and from the proposed subdivision. At the intersection with Mascot Road, Number Two Drive is controlled by a Stop Sign (R1-1) and is laid out at a sharp 40° angle, which discourages and eliminates northbound left turns and eastbound right turns. Number Two Drive intersects Library Drive at a Y-intersection with a 40° interior angle. Number Two Drive and Library Drive are parts of a convoluted road layout in the study area that includes public roads, private drives, and parking



lot areas. The width of Number Two Drive is approximately 18.5 feet wide where the proposed subdivision entrance will be constructed. It is 22 feet wide in front of Mascot Baptist Church, 18.5 feet wide to the south of the Y-intersection with Library Drive, 28.5 feet wide near God's Way Baptist Church, and 22 feet at Mascot Road. To the south of the Y-intersection of Library Drive, Number Two Drive intersects Tipple Drive at a large paved skewed 4-way intersection, and southbound traffic at this intersection on Number Two Drive is controlled by a Stop Sign (R1-1). The east approach of this intersection at Tipple Drive consists of a large paved area closed to traffic and provides access to a single private property.

**Library Drive** is a local street that provides access to a church and the USPS Mascot Post Office (37806). Library Drive is approximately 500 feet in length in between Mascot Road and Number Two Drive. On the north side, Library Drive intersects Mascot Road at a 90° angle and is

controlled by a Stop Sign (R1-1). On the south side, Library Drive intersects Number Two Drive at an uncontrolled Y-intersection. The post office has angled parking directly off Library Drive. A pair of unnamed connector drives bisect Library Drive, and they connect to Number Two Drive to the east and Tipple Drive to the west. The width of Library Drive is also highly variable. It is approximately 30 feet wide at Mascot Road, 15 feet wide adjacent to the post office, and closer to 13 feet near the Y-intersection at Number Two Drive.

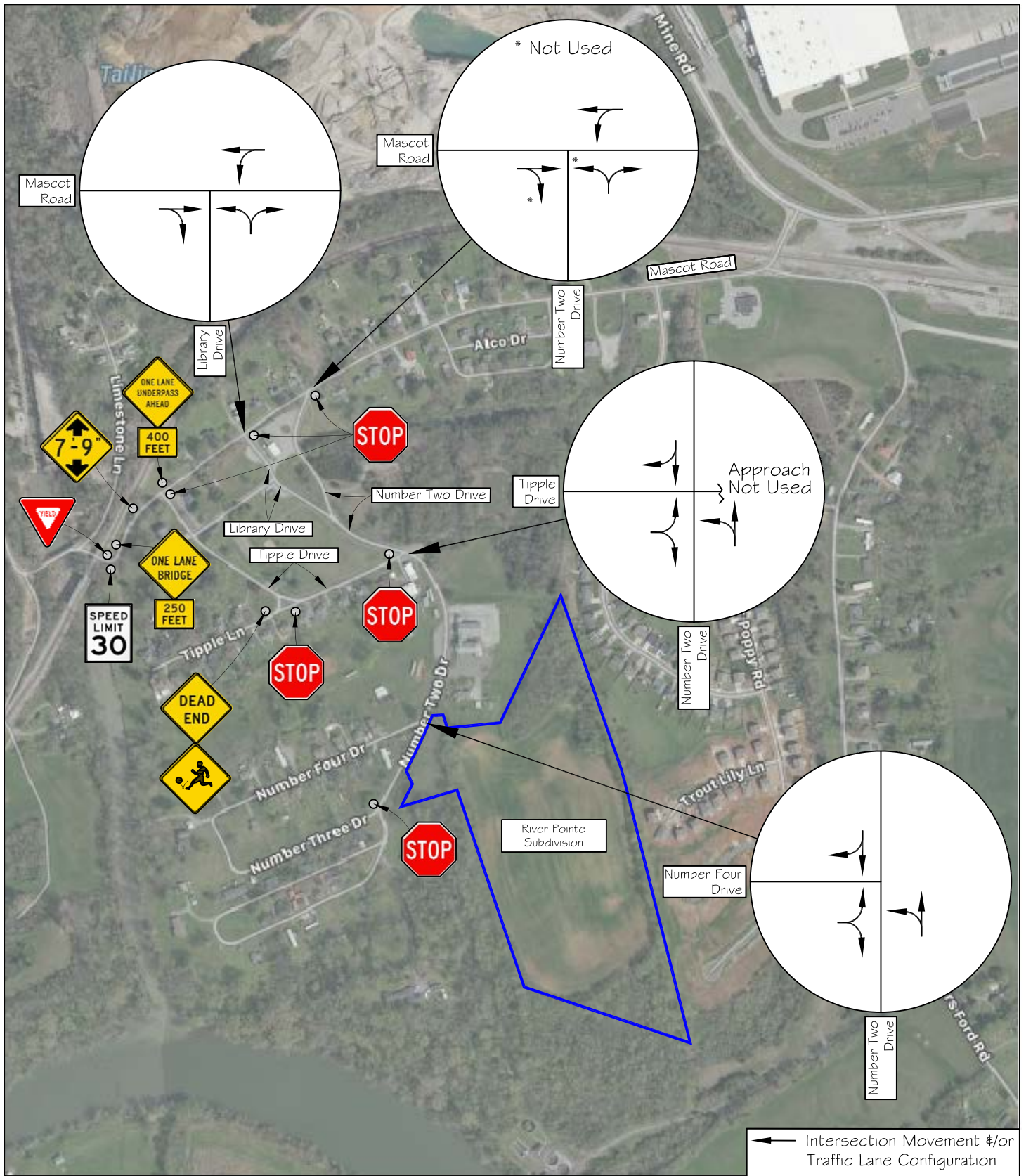


Due to the physical layout and characteristics (road widths, angle of intersections, etc.) of Library Drive and Number Two Drive, the traffic entering and exiting this area follows the following convention and is used in this study analysis:

Westbound entering vehicles traveling south towards the project site will turn right off Mascot Road onto Library Drive. Eastbound entering vehicles traveling south towards the

project site will turn left off Mascot Road onto Number Two Drive. Exiting vehicles traveling away from the project site will use Library Drive if traveling westbound on Mascot Road and use Number Two Drive if traveling eastbound on Mascot Road.

Figure 2 on the following page shows the lane configurations of the existing intersections between the project site and Mascot Road and shows traffic signage in the general study area. The pages following Figure 2 provide an overview of the site study area with photographs.



11812 Black Road  
 Knoxville, TN 37932  
 Phone: (865) 556-0042  
 Email: ajaxengineering@gmail.com

NOT TO SCALE

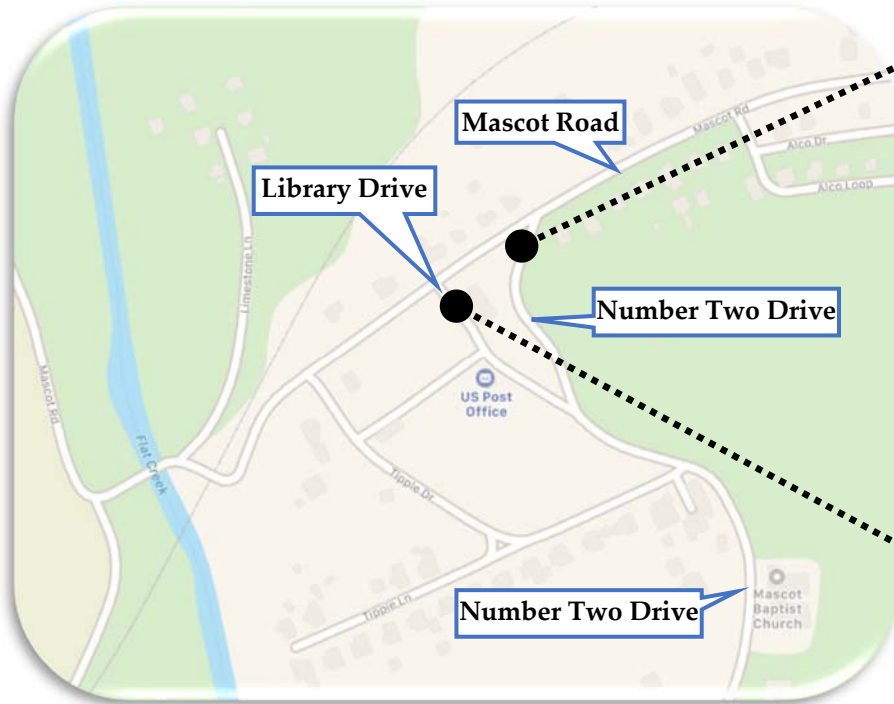


FIGURE 2

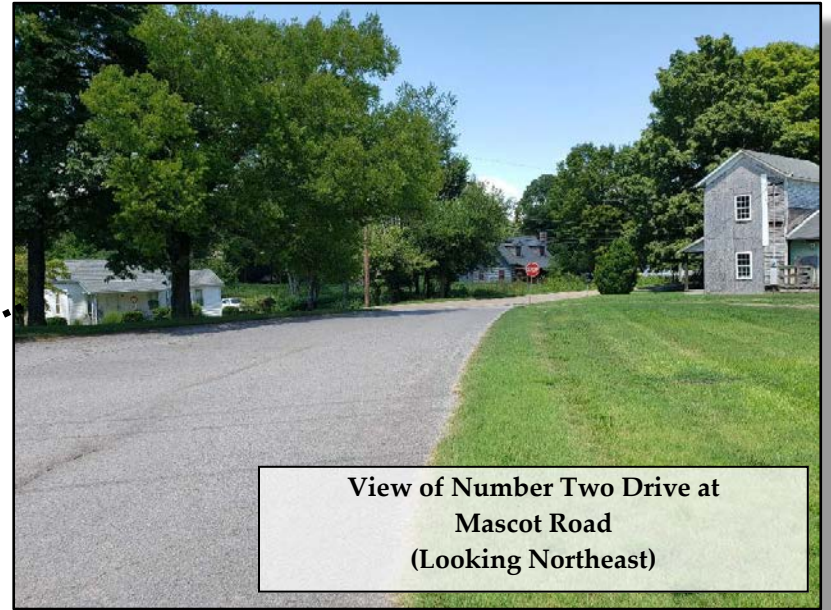
River Pointe Subdivision

Traffic Signage & Existing Lane Configurations

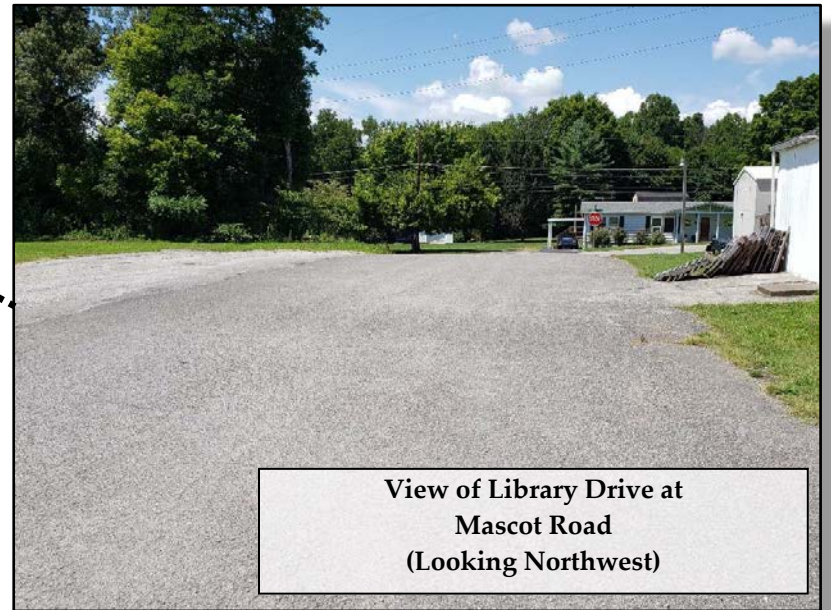
PHOTO EXHIBITS



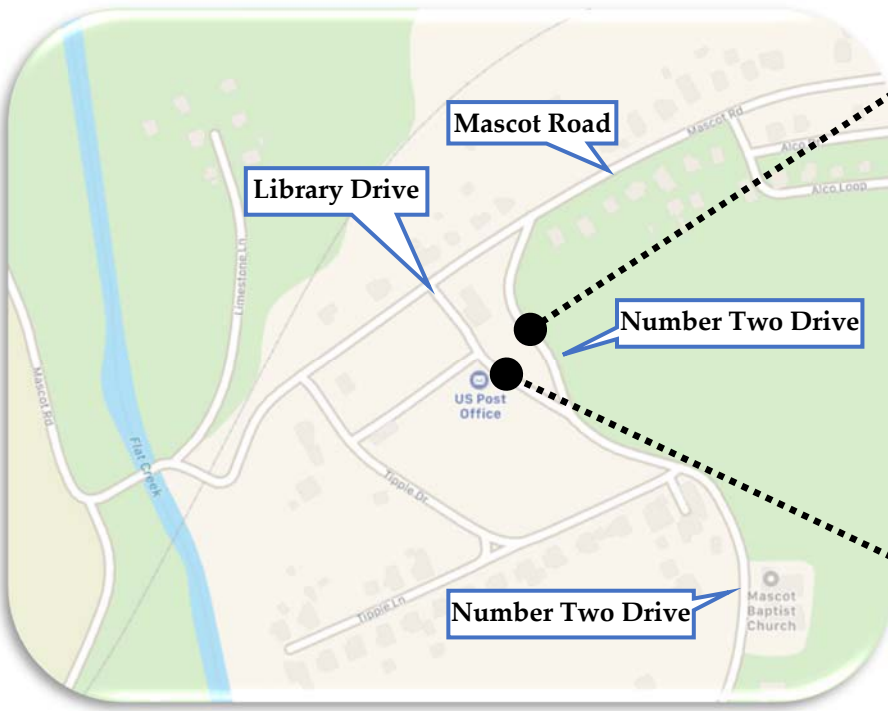
Library Drive and Number Two Drive



View of Number Two Drive at Mascot Road (Looking Northeast)



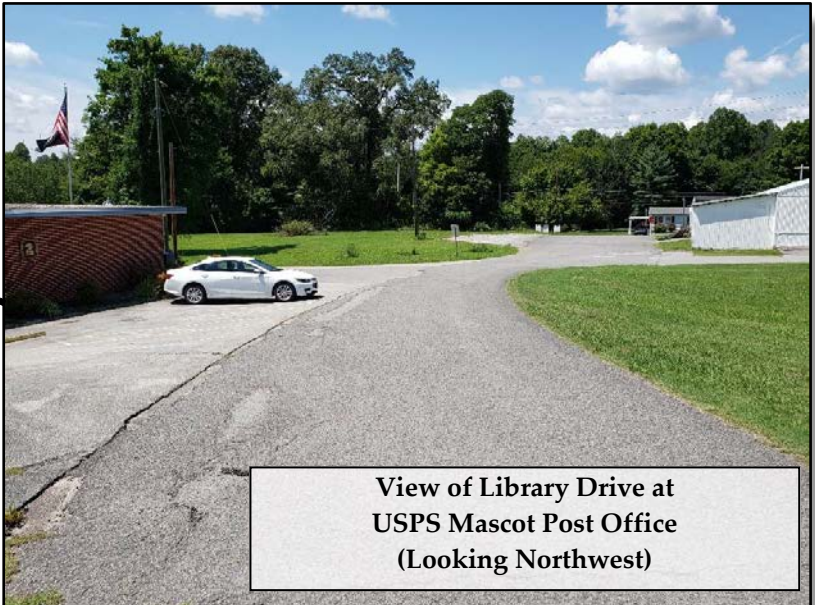
View of Library Drive at Mascot Road (Looking Northwest)



Library Drive and Number Two Drive

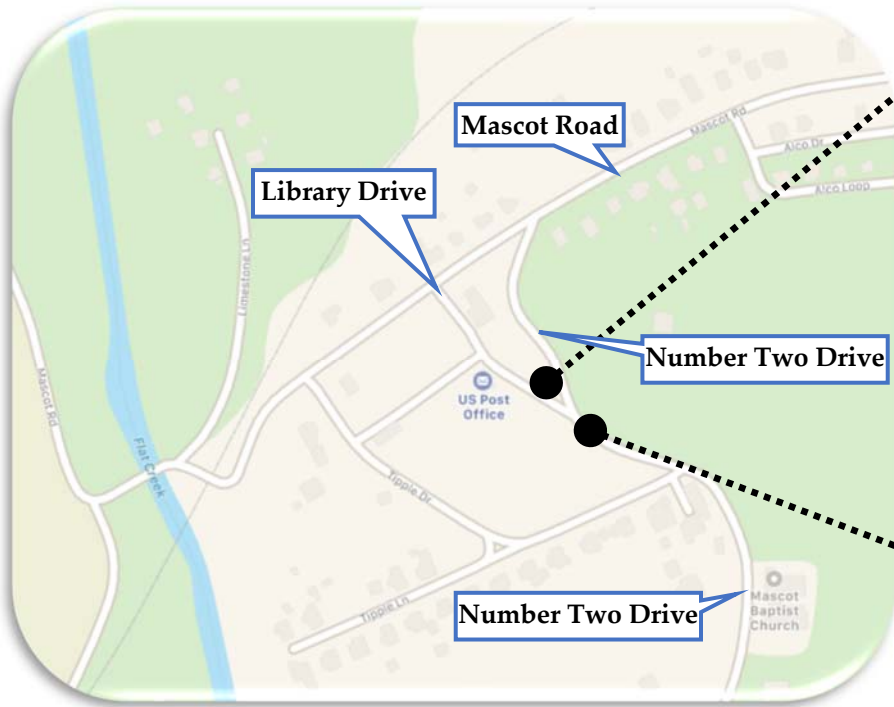


View of Number Two Drive at God's Way Baptist Church (Looking Northwest)

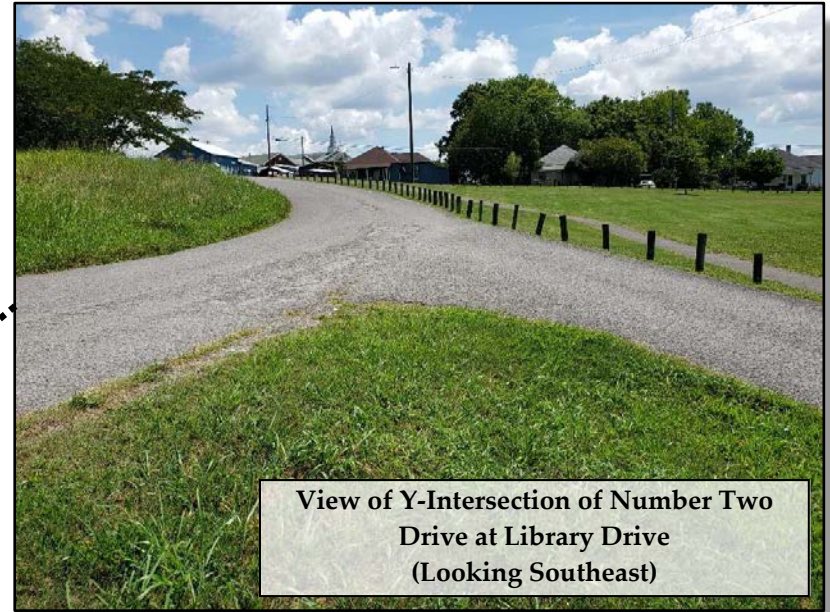


View of Library Drive at USPS Mascot Post Office (Looking Northwest)

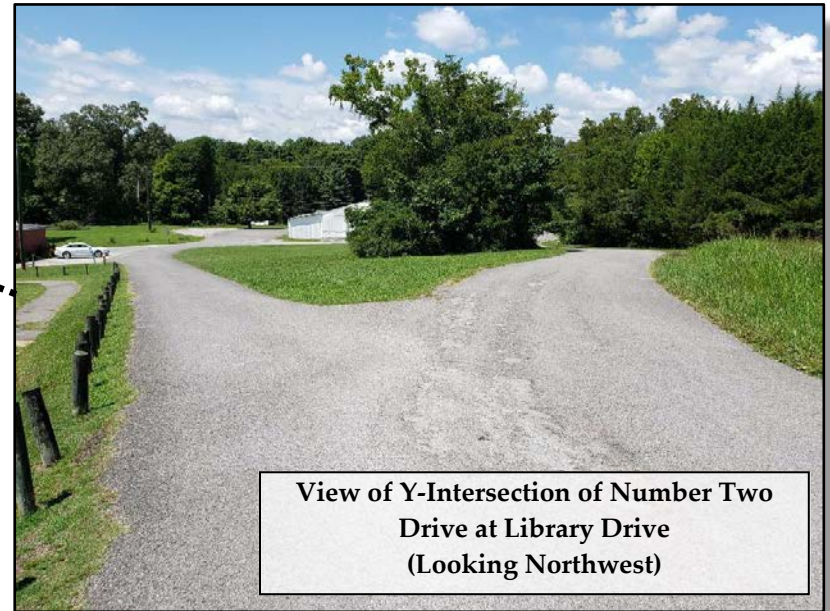




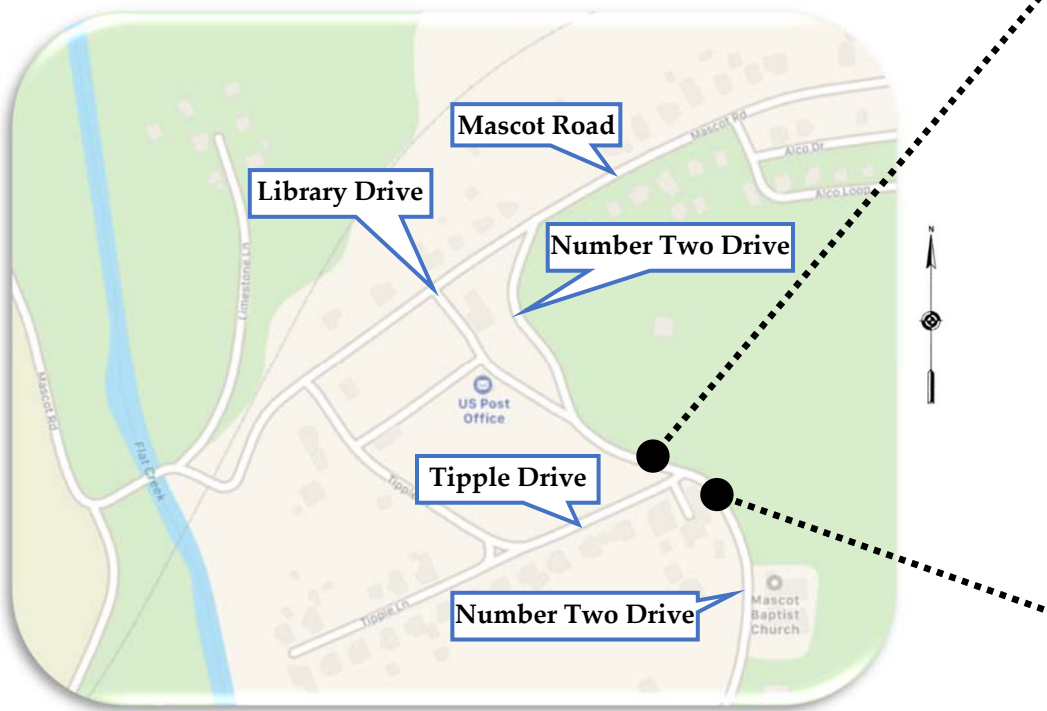
Library Drive and Number Two Drive



View of Y-Intersection of Number Two Drive at Library Drive (Looking Southeast)



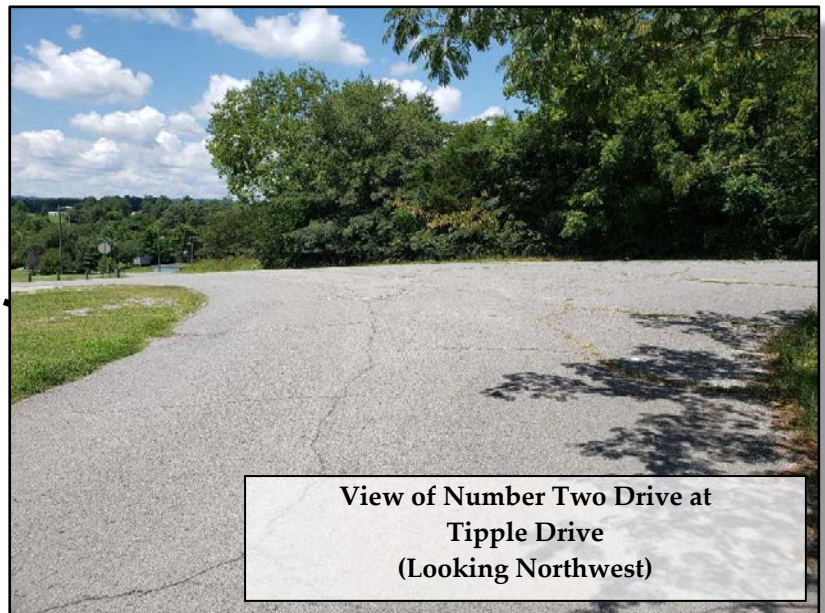
View of Y-Intersection of Number Two Drive at Library Drive (Looking Northwest)



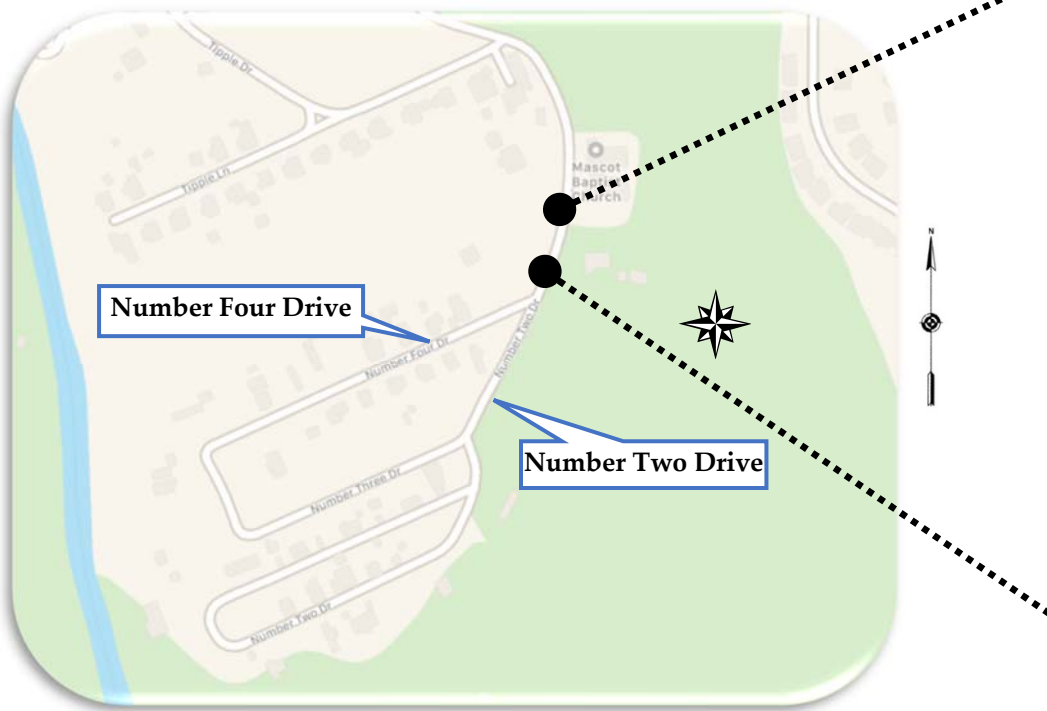
Library Drive and Number Two Drive



View of Number Two Drive at Tipple Drive (Looking Southeast)



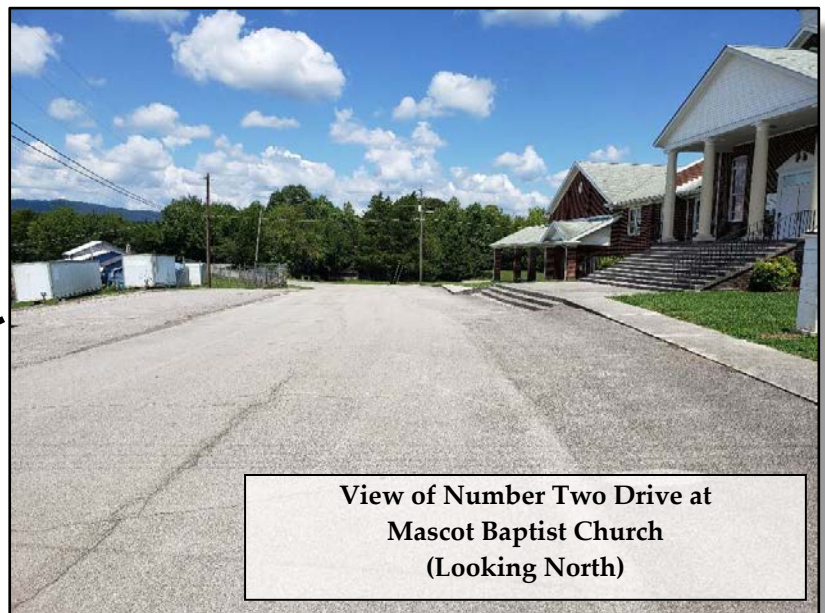
View of Number Two Drive at Tipple Drive (Looking Northwest)



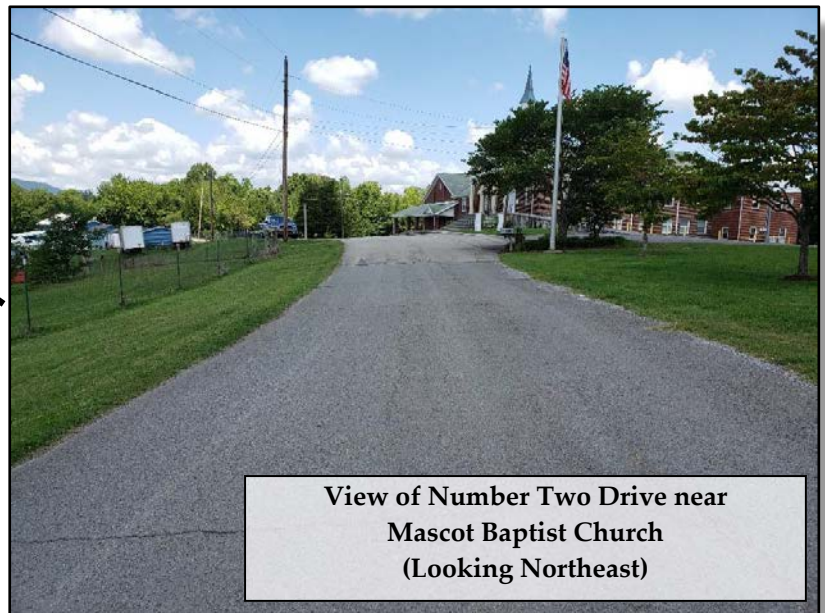
Number Four Drive

Number Two Drive

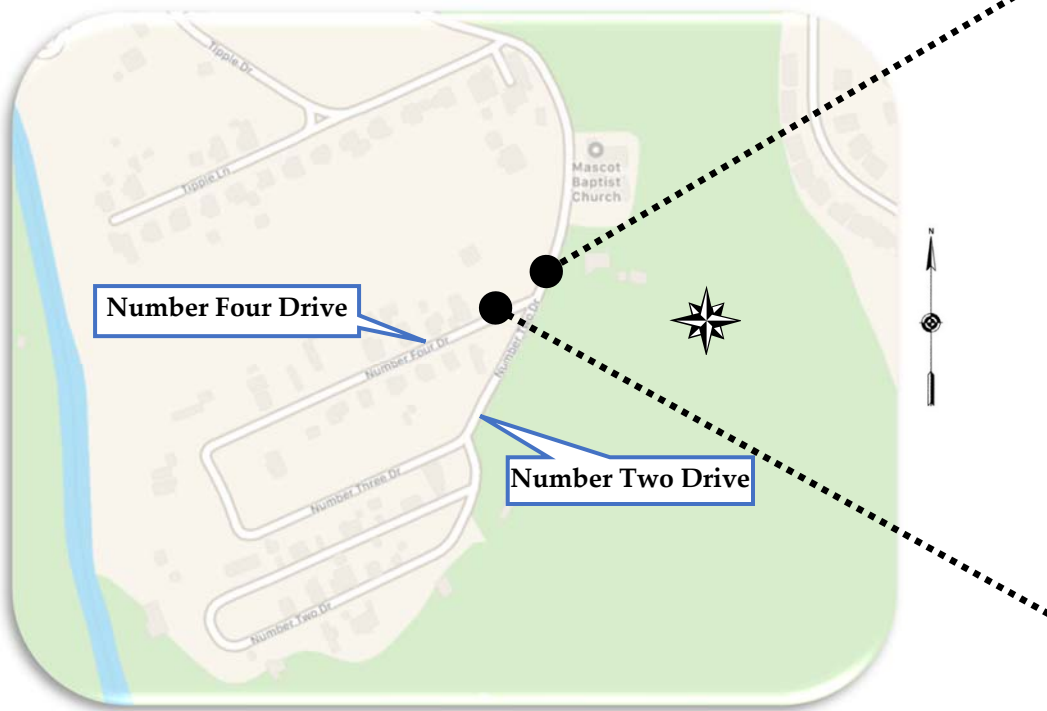
Number Two Drive



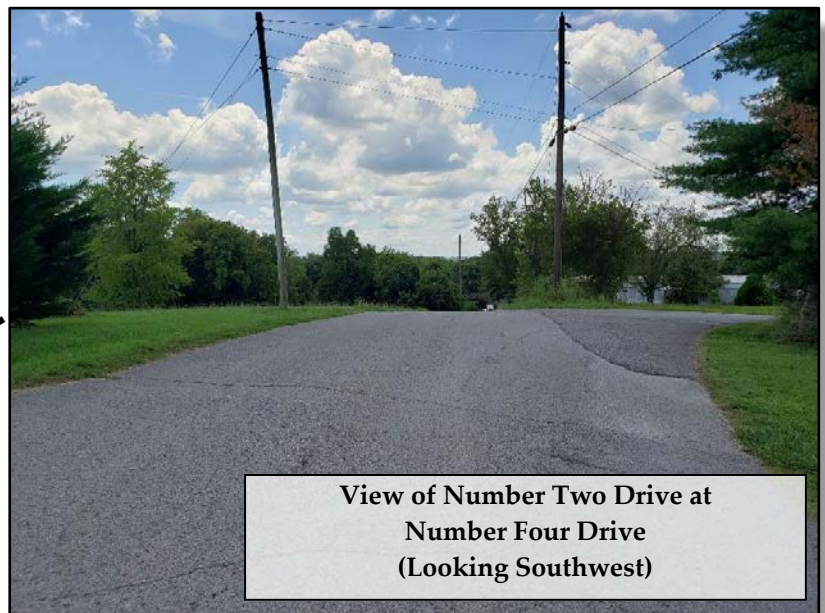
View of Number Two Drive at Mascot Baptist Church (Looking North)



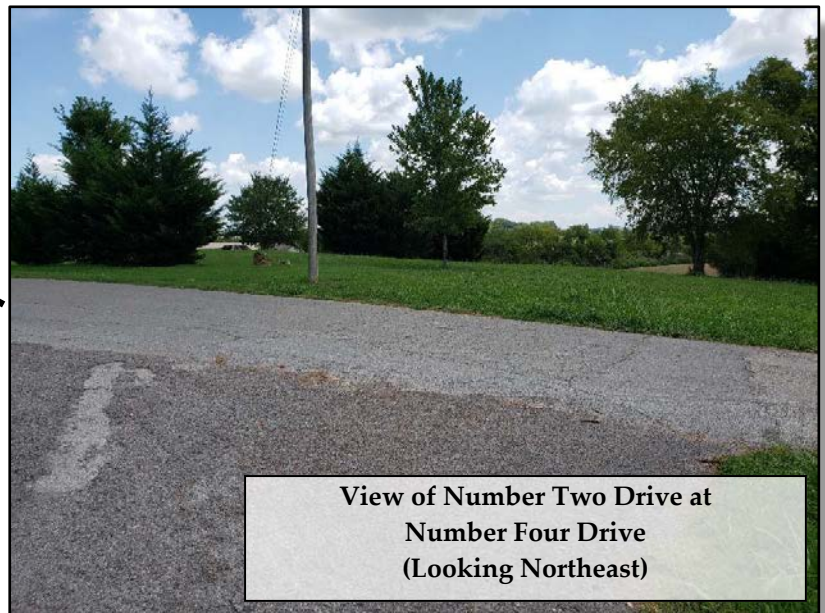
View of Number Two Drive near Mascot Baptist Church (Looking Northeast)



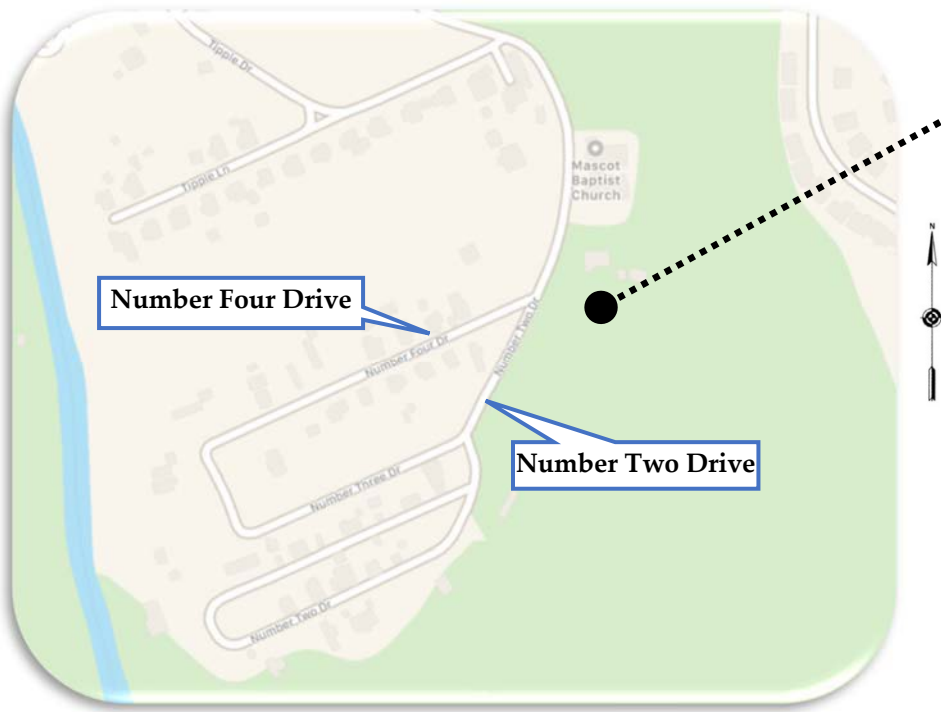
Number Two Drive



View of Number Two Drive at Number Four Drive (Looking Southwest)



View of Number Two Drive at Number Four Drive (Looking Northeast)



Number Four Drive

Number Two Drive



Number Two Drive



View of Project Site off  
Number Two Drive  
(Looking Southeast)

■ **EXISTING TRANSPORTATION VOLUMES PER MODE:**

There are three permanent vehicular traffic count locations nearby the project site. All these count locations are conducted yearly by the Tennessee Department of Transportation (TDOT). The traffic count location data is the following:

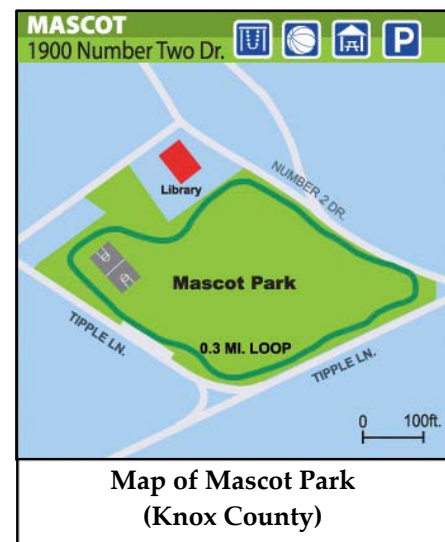
- Existing vehicular roadway traffic:
  - Average Annual Daily Traffic (AADT) on Mascot Road north and east of the project site was reported by TDOT at 7,157 vehicles per day in 2018. From 2008 – 2018, this count station has indicated a 0.2% average annual growth rate.
  - TDOT reported an Average Annual Daily Traffic (AADT) on Mine Road north of the project site at 4,709 vehicles per day in 2018. From 2008 – 2018, this count station has indicated a 1.5% average annual growth rate.
  - TDOT reported average Daily Traffic (AADT) on Mascot Road north and west of the project site at 1,959 vehicles per day in 2018. From 2008 – 2018, this count station has indicated a 0.3% average annual growth rate. All the researched historical traffic count data for this report can be viewed in Appendix A.
  
- Existing bicycle and pedestrian volumes:

The average daily pedestrian and bicycle traffic along the study corridor is not known. It is assumed that these volumes are minimal to non-existent in the study area.

■ **PEDESTRIAN AND BICYCLE FACILITIES:**

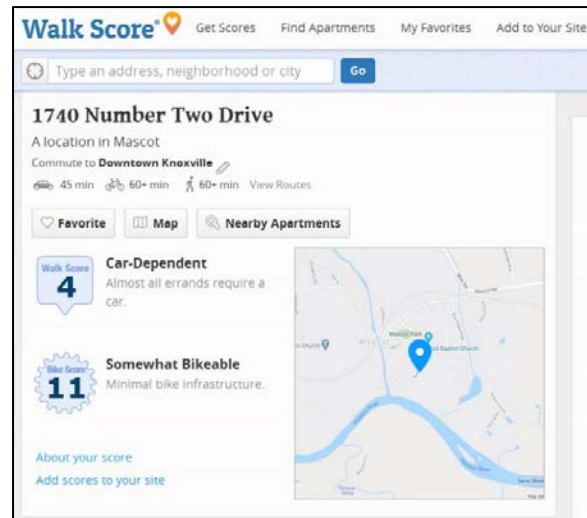
Bicycle facilities (lanes) and pedestrian sidewalks are not currently available within the project site study area or any of the studied roadways.

Nearby, a Knox County public park is provided in between Number Two Drive and Tipple Drive. Facilities at this park include a 0.3-mile paved trail, basketball courts, and playground areas. This park is open from sunrise to sunset and has utility lighting.



■ **WALK SCORE:**

A private company offers an online website at [walkscore.com](http://walkscore.com) that grades and gives scores to locations within the United States based on “walkability”, “bikeability”, and transit availability. According to the website, the numerical values assigned for the Walk Score and the Bike Score are based on the distance to the closest amenity in various relevant categories (businesses, schools, parks, etc.) and are graded from 0 to 100. The Transit Score measures how well a location is served by public transit based on distance and type of nearby transit. The Transit Score is also graded from 0 to 100.



Appendix B shows maps and other information for the Walk Score, Bike Score, and Transit Score at 1740 Number Two Drive, which is the current address for the site development property. Based on the project location, the location is given a Walk Score of 4. This Walk Score indicates that the site is almost completely dependent on vehicles for errands and travel. The site is graded with a Bike Score of 11, which means that there is minimal bike infrastructure but is somewhat bikeable. Also, based on the project location, the site is graded with a Transit Score of 0 due to no existing nearby public transportation options.

■ **TRANSIT SERVICES:**

The City of Knoxville has a network of public transit opportunities offered by Knoxville Area Transit (KAT). Bus service is not available in this area of Knox County. The overall KAT bus system map is in Appendix C. The closest public transit bus service is 9 miles away to the southwest (by roadway) near the intersection of Interstate 640 and Washington Pike. The closest bus stop on this route is located at the Walmart Super Center on Kinzel Way. This KAT service is Route 23 “Millertown”. It operates on weekdays and weekends, and this route map is also included in Appendix C. Other transit services include the East Tennessee Human Resource Agency (ETHRA) and the Community Action Committee (CAC), which provides transportation services when requested. Private taxis and ride-sharing opportunities are also available.

## PROJECT DESCRIPTION

### ■ LOCATION AND SITE PLAN:

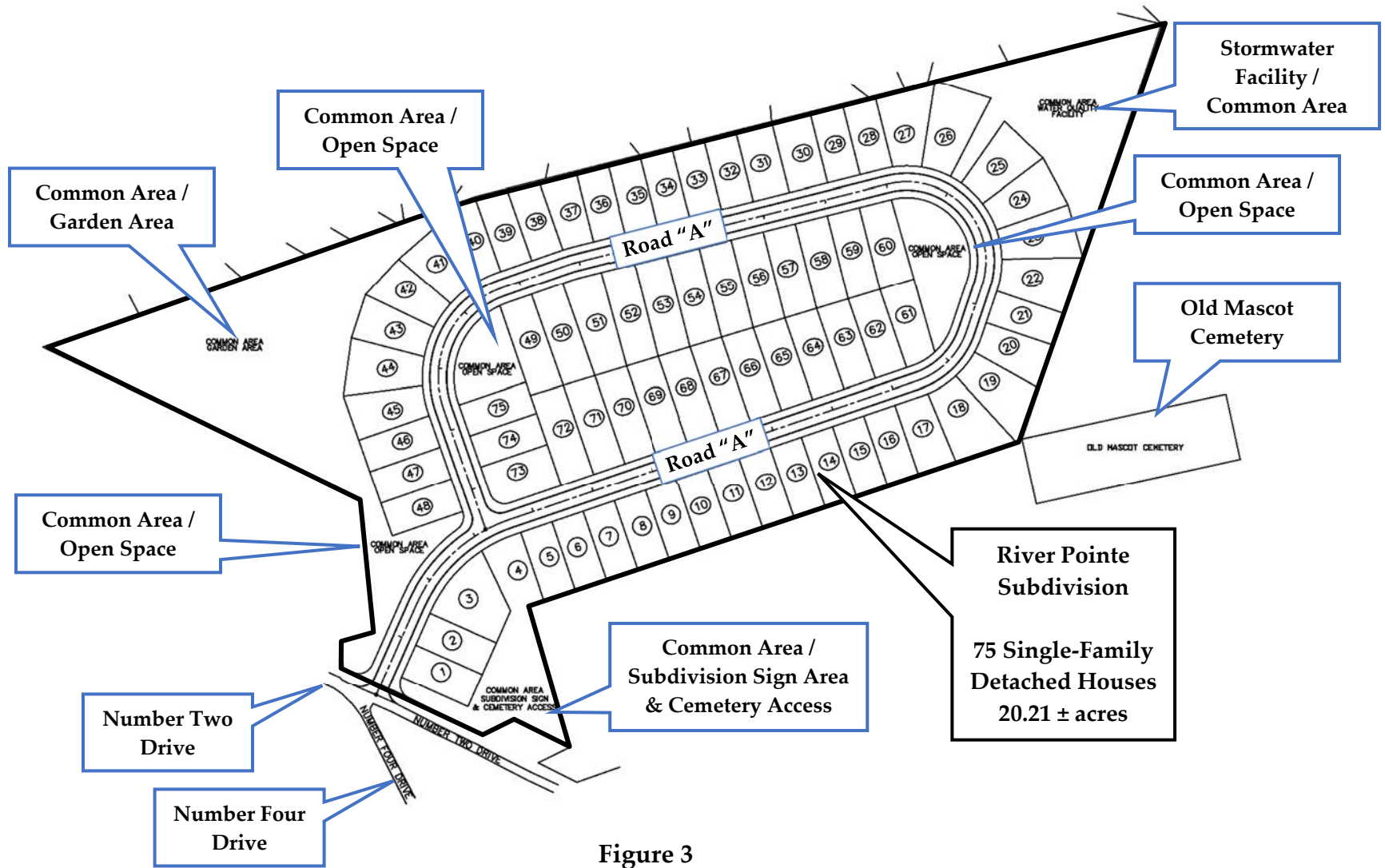
The proposed plan layout given by Robert Campbell & Associates is shown in Figure 3. As shown in the figure, one new internal looped street, Road "A", will be constructed for the subdivision. Road "A" will intersect Number Two Drive at a 90° angle and be the only entrance for the development. The proposed entrance to the subdivision will be located at the existing skewed intersection of Number Two Drive at Number Four Drive. The total length of the new street in the subdivision will be 2,567 feet (0.49 miles).

The 20.21-acre residential development will incorporate six common areas with one of these areas used for a stormwater facility. One of the larger common areas will include a garden area for the residents of the subdivision. Two common areas will be located within the interior of the looped road, which will provide sight distance easements due to the sharp internal horizontal road curves. An existing cemetery, Old Mascot Cemetery, is located adjacent to the development on the southwest side. The common area at the front of the development will provide a means of access to the cemetery.

The size of the single-family detached lots will average 8,000 square feet in size. Each home will have a garage and driveway. The area internal to the looped road will contain 27 house lots, and the remaining 48 house lots will ring the outside of the looped road.

The schedule for completion of this new residential development is dependent on economic factors and construction timelines. This project is also contingent on permitting, design, and other issues. However, for this study, it was assumed that the total construction build-out of the development and full occupancy would occur within the next five years (2025).





**Figure 3**  
**Proposed Plan Layout**  
**River Pointe Subdivision**

Not to Scale

20

■ **PROPOSED USES AND ZONING REQUIREMENTS:**

The property tract for the proposed development is within the Knox County limits, and a portion of the tract was zoned as Agricultural (A) and another portion as Industrial (I). The most recent published zoning map is provided in Appendix D. The part of the property tract that is being subdivided for the subdivision was recently requested to be rezoned to Planned Residential (PR) with a density of 1-5 units per acre. The Planned Residential (PR) zone allows for various land uses primarily within the residential realm. Uses permitted in this zone include single-family dwellings, duplexes, and multi-dwelling structures and developments. The Knox County Planning Commission approved of this rezoning on August 8, 2020, and is now scheduled for the Knox County Commission to approve the rezoning officially. The existing adjacent surrounding land uses are the following:

- The development property is bounded by Number Two Drive and the remaining portion of the parent property to the west. The remaining part of the parent tract will remain zoned as Agricultural (A), and the small sliver of property currently Industrial (I) that will not be included in the subdivision will be converted to Agricultural (A). The properties across Number Two Drive are zoned as Low Density Residential (RA) and consist of standalone single-family homes on Number Two, Three, and Four Drive.
- All the properties to the east are zoned as Planned Residential (PR) and consist of River Meadows Subdivision. Phase 1 of River Meadows Subdivision is entirely constructed and occupied, and homes in Phase 2 of River Meadows Subdivision are currently under construction.
- Mascot Baptist Church owns the property to the north, and it consists of a single-family parsonage for the church pastor. It is zoned as Low Density Residential (RA).
- A small portion of the area to the south consists of the Old Mascot Cemetery and is zoned as Industrial (I). The Knoxville Utilities Board owns the larger area to the south, and it contains the Eastbridge Wastewater Treatment Plant.



■ **DEVELOPMENT DENSITY:**

The proposed density for the River Pointe Subdivision is based on a maximum of 75 houses on 20.21 acres. These numbers compute to 3.7 dwelling units per acre, which is less than the proposed Planned Residential (PR) zoning that allows up to 5 units per acre.

■ **ON-SITE CIRCULATION:**

The total length of the new street within the development will be 2,567 feet (0.49 miles) in length and will be designed and constructed to Knox County, TN specifications. The new looped street shown in Figure 3 is labeled as Road "A". The internal roadway for the development will be paved with asphalt, include 8" extruded concrete curbs, and the lane widths will be 13 feet for a total of 26-foot pavement width. The street right-of-way within the development will be 50 feet. Concrete sidewalks are not being proposed along the internal road. Knox County will maintain the streets in the subdivision after construction.

■ **SERVICE AND DELIVERY VEHICLE ACCESS AND CIRCULATION:**

Besides residential passenger vehicles, the new street will also provide access for service, delivery, maintenance, and fire protection/rescue vehicles. None of these other types of vehicles will impact roadway operations other than when they occasionally enter and exit the development. It is expected that curbside garbage collection services will be available for this residential subdivision. Concerning fire protection and rescue vehicles, the new roads will be designed and constructed to Knox County specifications and thus expected to be adequate in size. The internal roadways in the subdivision are anticipated to accommodate the larger types of vehicles along with standard passenger vehicles.

## TRAFFIC ANALYSIS OF EXISTING AND PROJECTED CONDITIONS

### ■ EXISTING TRAFFIC CONDITIONS:

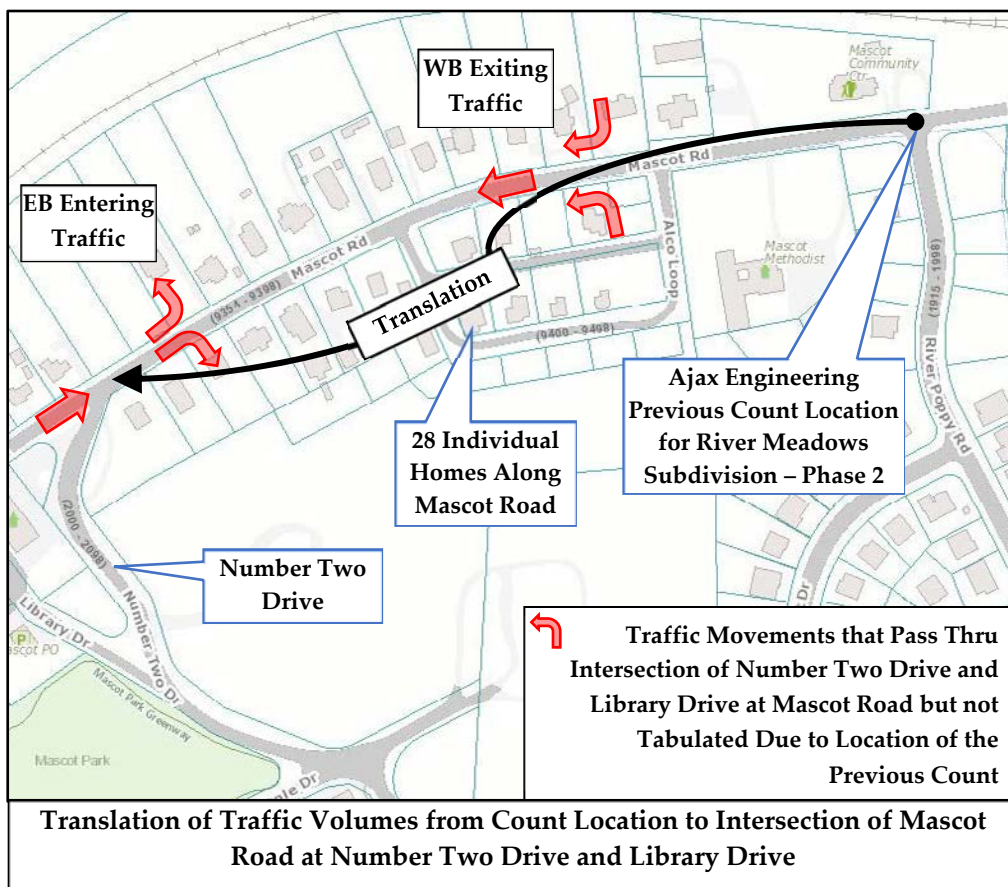
Due to the current worldwide coronavirus pandemic and schools not being fully opened at this time, usable traffic count data has not been able to be collected. Because traffic counts conducted at this time would not yield accurate data, previous traffic count data was used for this study. The most recent traffic count data adjacent to the project site was obtained for the intersection of Mascot Road at River Poppy Road. This previous traffic count was conducted on Thursday, November 16, 2017, by Ajax Engineering, LLC, for a transportation impact study for Phase 2 of the adjacent River Meadows Subdivision. The traffic movements at this intersection from this previous count were used to determine the eastbound and westbound thru volumes on Mascot Road at Number Two Drive and Library Drive.

During the previous collected traffic volumes, the AM and PM peak hour of traffic was observed on Mascot Road at 7:15 – 8:15 am and 3:30 – 4:30 pm. The November 2017 tabulated traffic counts from Ajax Engineering, LLC, can be reviewed in Appendix E and Figure 4a.

Figure 4b shows adjusted traffic volumes at the same location for the current year, 2020. The conversion of the traffic volumes from 2017 to 2020 was made by applying a +2% annual growth rate for three years. A +2% annual growth rate was assumed based on the historical data shown in Appendix A from TDOT and based on the previous study conducted for Phase 2 of River Meadows Subdivision.

Figure 4c shows the adjusted 2020 thru volumes on Mascot Road “translated” to the intersection of Mascot Road at Number Two Drive and Mascot Road at Library Drive. It also shows the volumes for Number Two Drive and Number Four Drive at the proposed location of the new entrance for the River Pointe Subdivision. The thru volumes on Mascot Road shown in Figure 4c take into account the trips that were not included in the traffic count at River Poppy Road. These include the trips generated by the homes on Mascot Road in between the count location and Number Two Drive and Library Drive. The count in 2017 was 1,500 feet to the east of these intersections. The volumes not captured in the November 2017 count include the eastbound and westbound entering and exiting movements from the existing 28 standalone single-family homes along Mascot Road in between River Poppy Road, Number Two Drive, and Library Drive.

The traffic volumes from these existing homes on Mascot Road that were not included in the previous count due to its location were estimated and calculated using Trip Generation Manual, 10th Edition, a publication of the Institute of Transportation Engineers (ITE). This process is discussed further in this report in Trip Generation, and the calculations are shown in Appendix F. The calculated generated trips were distributed based on the data from the previous transportation impact study completed for the adjacent River Meadows Subdivision and as discussed later in this report in Trip Distribution and Assignment. The previous count data at River Poppy Road showed a 65/35 split of traffic traveling to and from the east and west during the AM and PM peak hours. The exhibit below illustrates the process of translating the traffic volumes from River Poppy Road to the intersection of Mascot Road at Number Two Drive and Library Drive. The turn arrows shown in the exhibit below illustrates the traffic volumes associated with the homes that were not included in the traffic count at River Poppy Road but passed thru the Mascot Road at Number Two Drive and Library Drive intersections.



**TABLE 2a**  
**TRIP GENERATION FOR HOMES BETWEEN RIVER POPPY ROAD AND NUMBER TWO DRIVE**  
28 Single-Family Detached Houses in 2020

ITE LAND USE CODE	LAND USE DESCRIPTION	UNITS	GENERATED DAILY TRAFFIC	GENERATED TRAFFIC AM PEAK HOUR			GENERATED TRAFFIC PM PEAK HOUR		
				ENTER	EXIT	TOTAL	ENTER	EXIT	TOTAL
#210	Single-Family Housing	28 Houses	323	25%	75%		63%	37%	
				6	19	25	19	11	30
<b>Total New Volume Site Trips</b>			<b>323</b>	<b>6</b>	<b>19</b>	<b>25</b>	<b>19</b>	<b>11</b>	<b>30</b>

ITE Trip Generation Manual, 10th Edition

Trips calculated by using Fitted Curve Equation

**TABLE 2b**  
**CALCULATION OF ADDITIONAL THRU VOLUMES ON MASCOT ROAD - 2017 to 2020**  
(Translation of AJAX Count on 11.16.17 at River Poppy Road Intersection to Number Two Drive Intersection for year 2020)

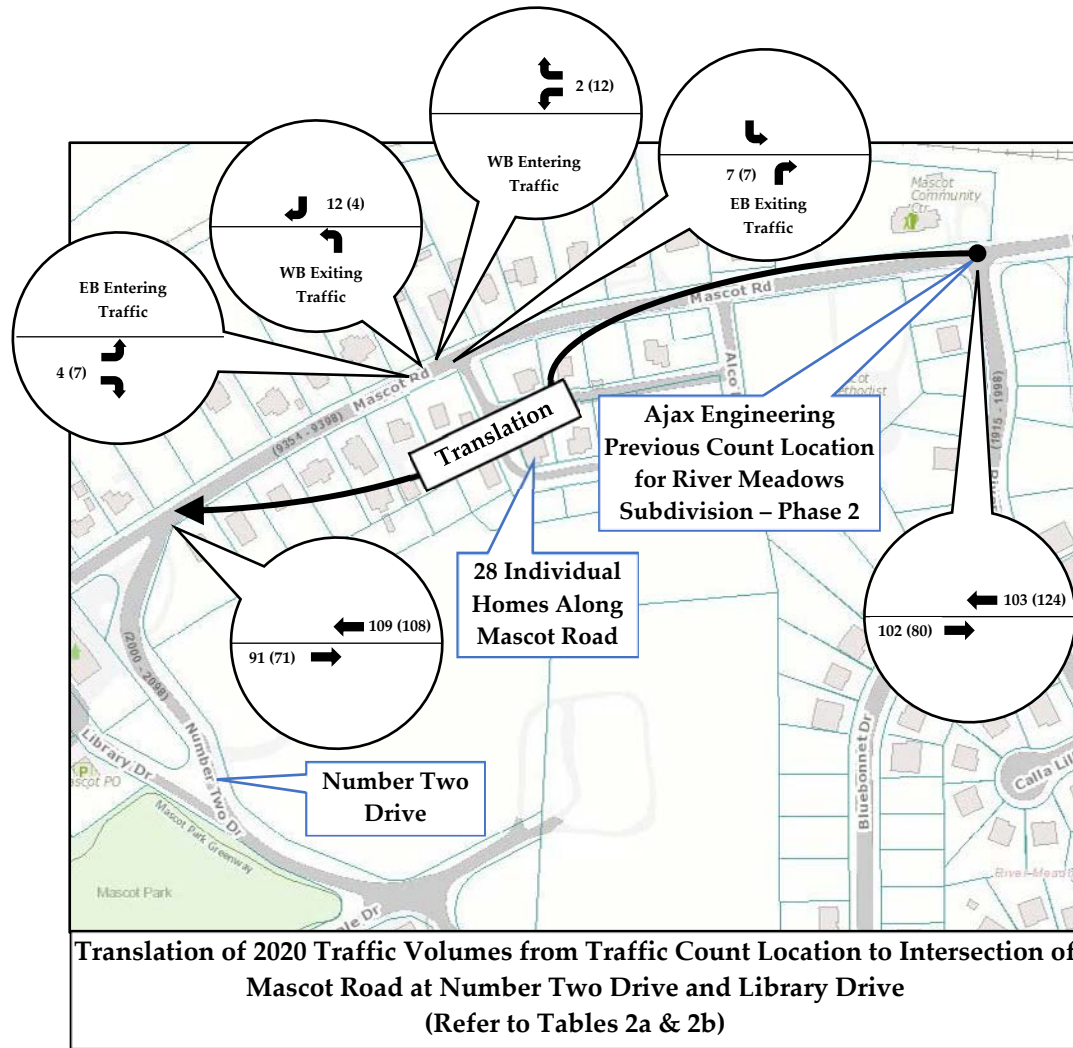
DEVELOPMENT	UNITS/SIZE	TRIP GENERATION				TRAFFIC MOVEMENT DISTRIBUTION		
		AM PEAK		PM PEAK			AM PEAK	PM PEAK
		ENTER	EXIT	ENTER	EXIT			
Homes Along Mascot Road in between River Poppy Road and Number Two Drive	28	6	19	19	11	EXIT EB *	35%	65%
							7	7
						ENTER EB **	65%	35%
							4	7
						ENTER WB *	35%	65%
							2	12
						EXIT WB **	65%	35%
							12	4

\* Volumes from these movements were tabulated during the count at River Poppy Road

\*\* Volumes from these movements were not tabulated during the count at River Poppy Road and are calculated below

	AM PEAK	PM PEAK
2017 AJAX WB Thru Volume on Mascot Road (Includes NB Left Turns from River Poppy Road)	97	117
+2% Growth Factor from 2017 to 2020	6	7
2020 Volume (Sub-total)	103	124
28 River Poppy Home Trips = Exit WB - Enter WB	10	-9
2020 Adjusted WB Thru Volume on Mascot Road at Number Two Drive (Sub-total)	113	116
Final 2020 Adjusted WB Thru Volume on Mascot Road at Number Two Drive with WB Left Turns Removed	109	108
Final 2020 Adjusted WB Thru Volume on Mascot Road at Library Drive with WB Left Turns Removed	106	104
2017 AJAX EB Thru Volume on Mascot Road (Includes EB Right Turns to River Poppy Road)	96	75
+2% Growth Factor from 2017 to 2020	6	5
2020 Volume (Sub-total)	102	80
28 River Poppy Home Trips = Enter EB - Exit EB	-3	0
2020 Adjusted EB Thru Volume on Mascot Road at Number Two Drive	99	80
Final 2020 Adjusted EB Thru Volume on Mascot Road at Number Two Drive with NB Right Turns Removed	91	71
Final 2020 Adjusted EB Thru Volume on Mascot Road at Library Drive with NB Right Turns Removed	89	67

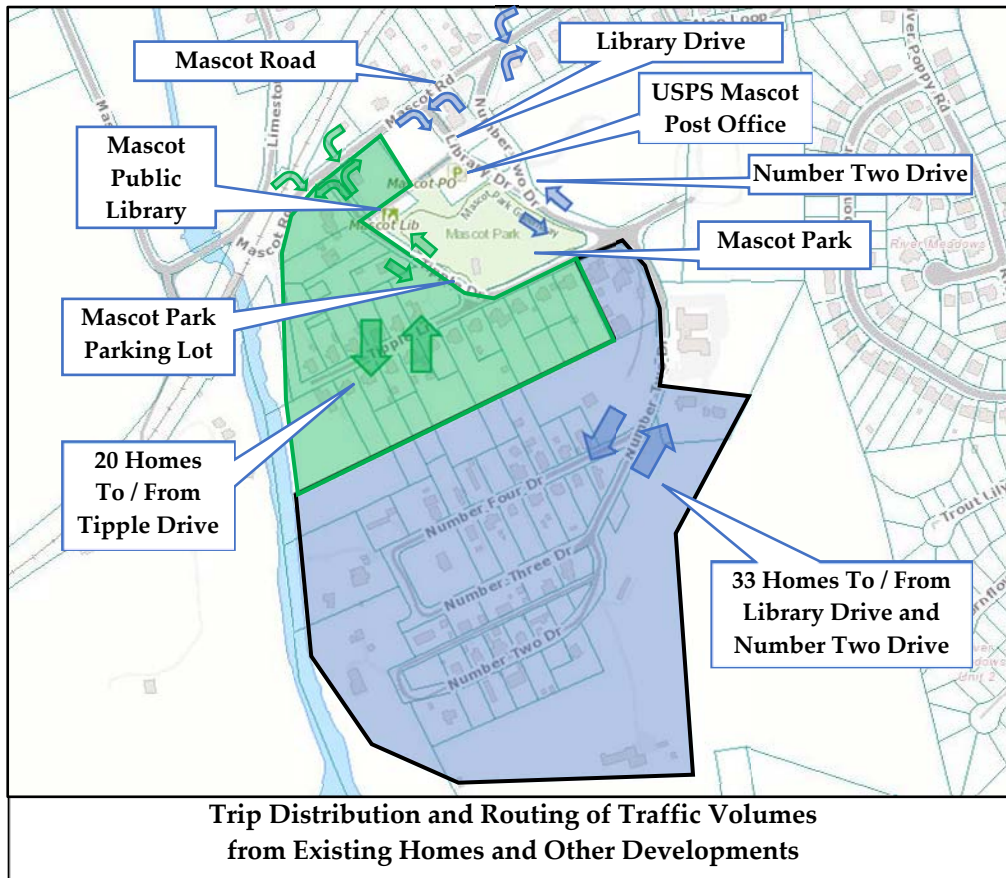
Tables 2a and 2b show the calculation and distribution of traffic volumes from the 28 houses on Mascot Road and is illustrated in the following exhibit.



Translation of 2020 Traffic Volumes from Traffic Count Location to Intersection of Mascot Road at Number Two Drive and Library Drive (Refer to Tables 2a & 2b)

To determine the left and right-turn movements at the intersection of Mascot Road and Number Two Drive and the intersection of Mascot Road at Library Drive shown in Figure 4c, several further steps using the same process were implemented.

The first step involved determining the potential number of trips that utilize Number Two Drive and Library Drive. There are 53 existing single-family homes along Tipple Lane, Tipple Drive, Number Two Drive, Number Three Drive, and Number Four Drive. There is also a 1,100 square foot USPS post office on Library Drive, a 1,385 square foot public library, and a 3.12-acre public park.



As shown in the above exhibit, it is assumed that the existing 20 homes along Tipple Drive and Tipple Lane will enter and exit at Tipple Drive at Mascot Road and will not travel on Library Drive or Number Two Drive. The trips generated by the Mascot Public Library and the Mascot Park are assumed to only travel on Tipple Drive since the parking lot for the park is located on Tipple Drive, and the library is located on the corner of Tipple Drive. (The public library is only open on weekdays from 2 – 6 pm. Mascot Park is open from sunrise to sunset.)

It is assumed that the other 33 existing homes along Number Two Drive, Number Three Drive, and Number Four Drive will enter and exit on Library Drive and Number Two Drive at Mascot Road. As shown by the arrows in the above exhibit, based on the physical layout and characteristics of Library Drive and Number Two Drive, it is assumed that Mascot Road eastbound entering vehicles and westbound exiting vehicles utilize Library Drive exclusively. Likewise, Mascot Road eastbound exiting vehicles and westbound entering vehicles are expected



to use Number Two Drive exclusively. It is assumed that the previously discussed 65/35 split of traffic traveling to and from the east and west will occur on these two roads at Mascot Road for the existing 33 homes.

Furthermore, the USPS Mascot Post Office also attracts vehicle trips, and it is assumed that some traffic will be generated on Library Drive for this post office. The retail hours for this post office is Monday thru Friday from 7 – 11 am and Noon – 2 pm. It is also open on Saturdays from 7 – 9 am. The post office lobby is open 24 hours a day.

The trips generated by this post office are minimal, and it is assumed that the volumes that are generated follow the same assumed 65/35 split, and all entering and exiting volumes occur at the intersection of Mascot Road at Library Drive. The trips generated by the homes and post office were calculated and estimated and shown below (calculations are shown in Appendix F).

**TABLE 2c**  
**TRIP GENERATION FOR EXISTING HOMES ALONG NUMBER TWO,**  
**NUMBER THREE, AND NUMBER FOUR DRIVE**  
**33 Single-Family Detached Houses in 2020**

ITE LAND USE CODE	LAND USE DESCRIPTION	UNITS	GENERATED DAILY TRAFFIC	GENERATED TRAFFIC AM PEAK HOUR			GENERATED TRAFFIC PM PEAK HOUR		
				ENTER	EXIT	TOTAL	ENTER	EXIT	TOTAL
#210	Single-Family Housing	33 Houses	375	25%	75%		63%	37%	
				7	22	29	23	13	36
<b>Total New Volume Site Trips</b>			<b>375</b>	<b>7</b>	<b>22</b>	<b>29</b>	<b>23</b>	<b>13</b>	<b>36</b>

ITE Trip Generation Manual, 10th Edition  
Trips calculated by using Fitted Curve Equation

CALCULATION OF TRAFFIC VOLUMES ON LIBRARY DRIVE AND NUMBER TWO DRIVE

DEVELOPMENT	UNITS/SIZE	TRIP GENERATION				VIA ROUTE	TRAFFIC MOVEMENT DISTRIBUTION			
		AM PEAK		PM PEAK			AM PEAK		PM PEAK	
		ENTER	EXIT	ENTER	EXIT		ENTER	EXIT	ENTER	EXIT
Homes Along Number Two, Three, and Four Drive	33	7	22	23	13	Library Drive and Number Two Drive (33 Houses)	7	22	23	13

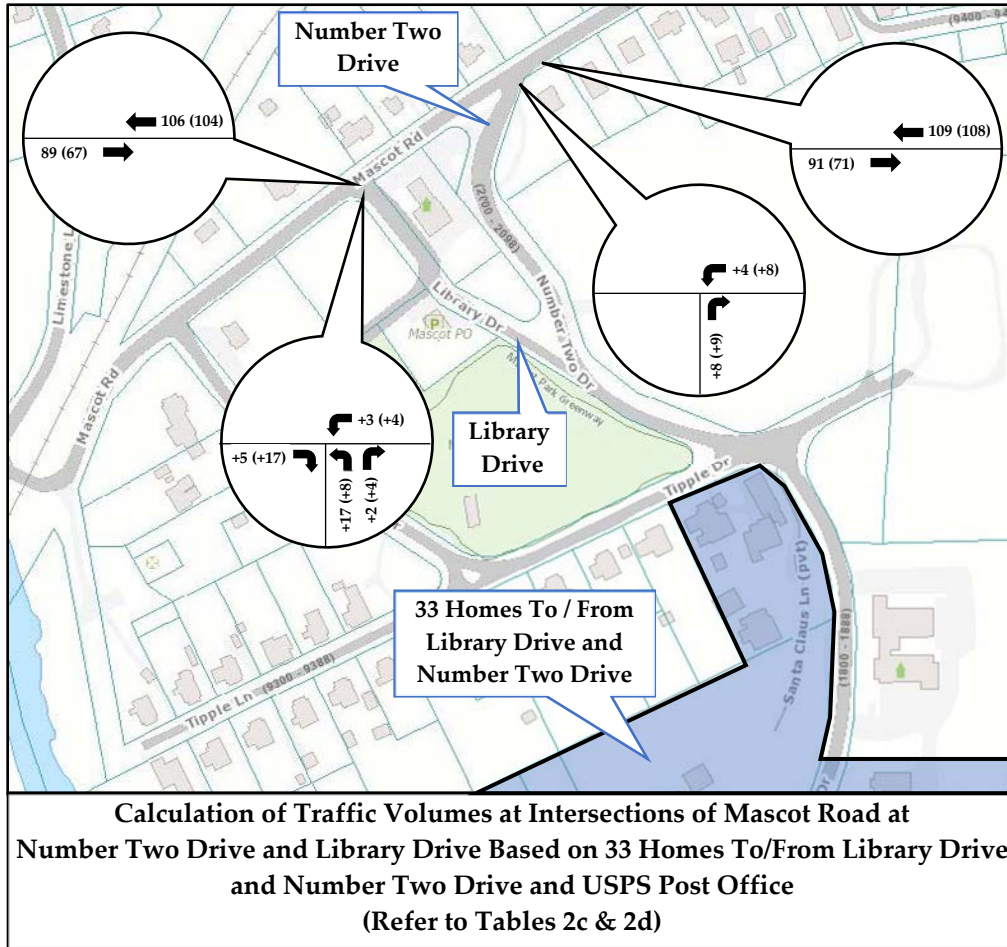
	AM PEAK	PM PEAK
EB Entering Right Turn at Library Drive (35% AM / 65% PM)	3	15
NB Exiting Left Turn at Library Drive (65% AM / 35% PM)	14	4
NB Exiting Right Turn at Number Two Drive (35% AM / 65% PM)	8	9
WB Entering Left Turn at Number Two Drive (65% AM / 35% PM)	4	8

DEVELOPMENT	UNITS/SIZE	TRIP GENERATION				VIA ROUTE	TRAFFIC MOVEMENT DISTRIBUTION			
		AM PEAK		PM PEAK			AM PEAK		PM PEAK	
		ENTER	EXIT	ENTER	EXIT		ENTER	EXIT	ENTER	EXIT
USPS Post Office	1,200 ft <sup>2</sup>	5	5	6	7	Library Drive	5	5	6	7

	AM PEAK	PM PEAK
EB Entering Right Turn at Library Drive (35% AM / 65% PM)	2	2
WB Entering Left Turn at Library Drive (65% AM / 35% PM)	3	4
NB Exiting Left Turn at Library Drive (65% AM / 35% PM)	3	3
NB Exiting Right Turn at Library Drive (35% AM / 65% PM)	2	4

TOTAL of USPS Post Office and Homes on Tipple Lane, Tipple Drive, and Number Two - Four Drive

	AM PEAK	PM PEAK
TOTAL EB Entering Right Turn at Library Drive	5	17
TOTAL NB Exiting Left Turn at Library Drive	17	8
TOTAL Exiting Right Turn at Number Two Drive	8	9
TOTAL WB Entering Left Turn at Number Two Drive	4	8
TOTAL WB Entering Left Turn at Library Drive	3	4
TOTAL NB Exiting Right Turn at Library Drive	2	4



Finally, the volumes shown in Figure 4c at the intersection of Number Two Drive at Number Four Drive are calculated based on the existing 31 houses located to the south and west of this existing intersection. This is two fewer houses than the previously mentioned 33 since two of the 33 houses are located to the north of the existing intersection of Number Two Drive at Number Four Drive. The following table and exhibit show the calculations for estimating the volumes at the intersection of Number Two Drive at Number Four Drive.

**TABLE 2e**  
**TRIP GENERATION FOR EXISTING HOMES ALONG NUMBER TWO,**  
**NUMBER THREE, AND NUMBER FOUR DRIVE**  
31 Single-Family Detached Houses in 2020

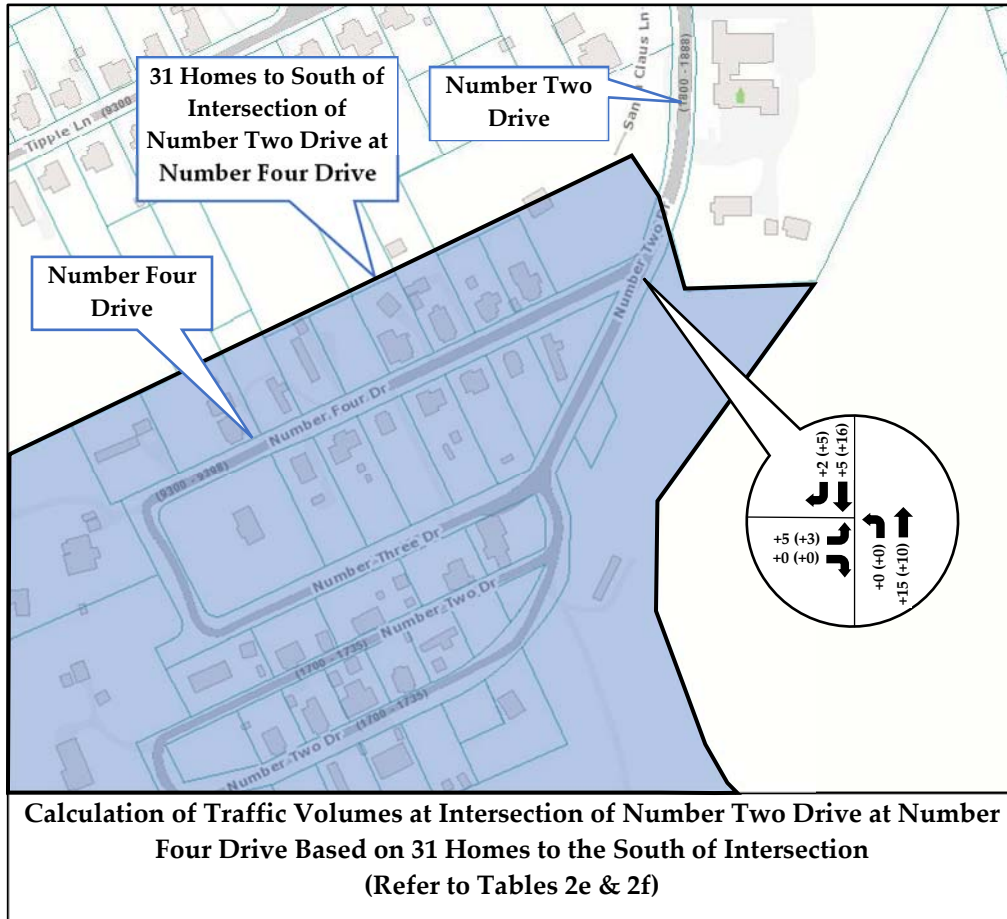
ITE LAND USE CODE	LAND USE DESCRIPTION	UNITS	GENERATED DAILY TRAFFIC	GENERATED TRAFFIC AM PEAK HOUR			GENERATED TRAFFIC PM PEAK HOUR		
				ENTER	EXIT	TOTAL	ENTER	EXIT	TOTAL
#210	Single-Family Housing	31 Houses	354	25%	75%		63%	37%	
				7	20	27	21	13	34
<b>Total New Volume Site Trips</b>			<b>354</b>	<b>7</b>	<b>20</b>	<b>27</b>	<b>21</b>	<b>13</b>	<b>34</b>

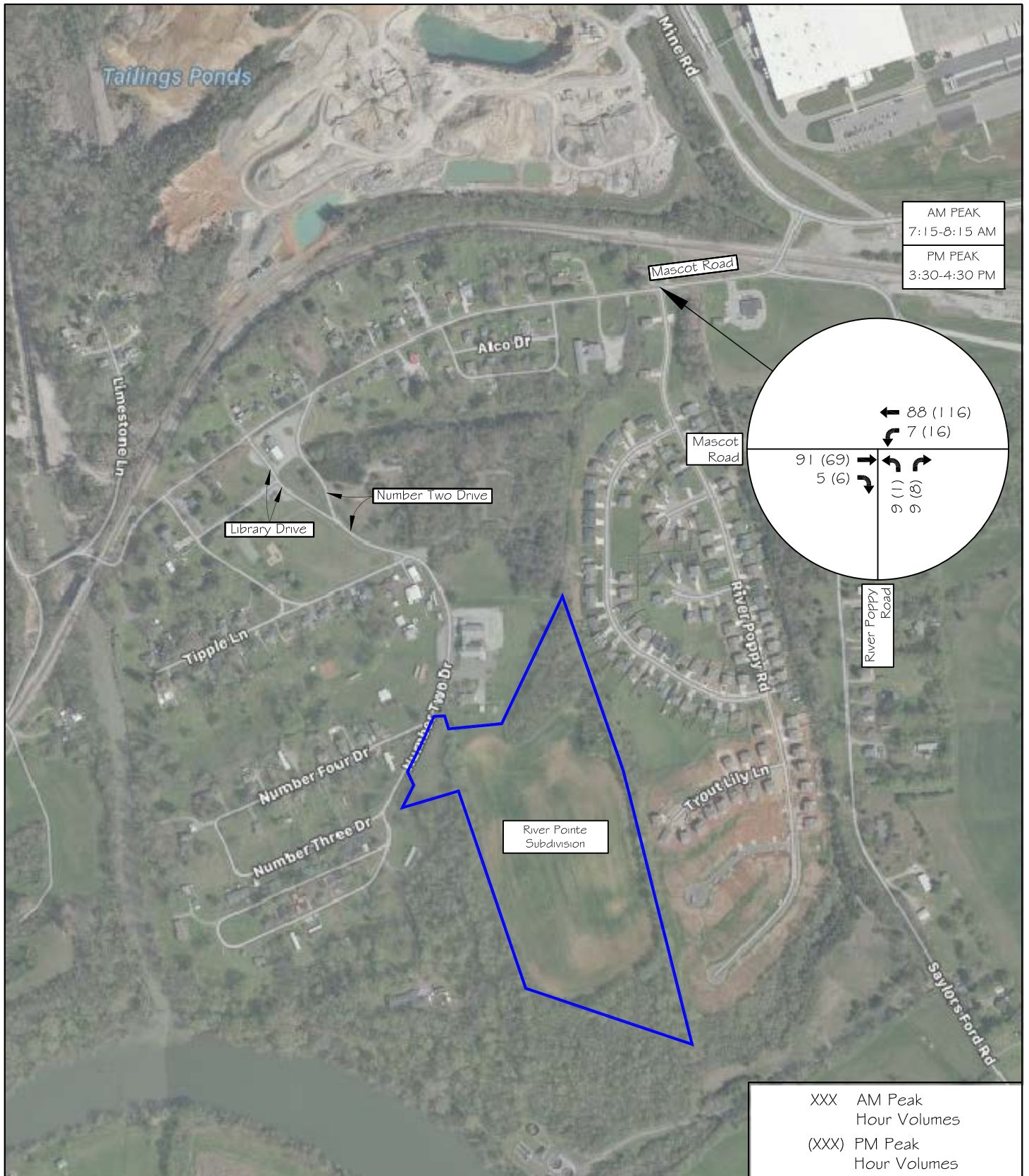
ITE Trip Generation Manual, 10th Edition  
Trips calculated by using Fitted Curve Equation

**TABLE 2f**  
**CALCULATION OF TRAFFIC VOLUMES ON NUMBER TWO DRIVE AT NUMBER FOUR DRIVE**

DEVELOPMENT	UNITS/SIZE	TRIP GENERATION				TRAFFIC MOVEMENT DISTRIBUTION				
		AM PEAK		PM PEAK		VIA ROUTE	AM PEAK		PM PEAK	
		ENTER	EXIT	ENTER	EXIT		ENTER	EXIT	ENTER	EXIT
Homes on Number Two, Number Three, and Number Four Drive	31	7	20	21	13	Number Four Drive (8 Houses)	2	5	5	3
						Number Three and Number Two Drive (23 Houses)	5	15	16	10

	AM PEAK	PM PEAK
SB Entering Right Turn at Number Four Drive	2	5
EB Exiting Left Turn at Number Four Drive	5	3
SB Thru on Number Two Drive at Number Four Drive	5	16
NB Thru on Number Two Drive at Number Four Drive	15	10





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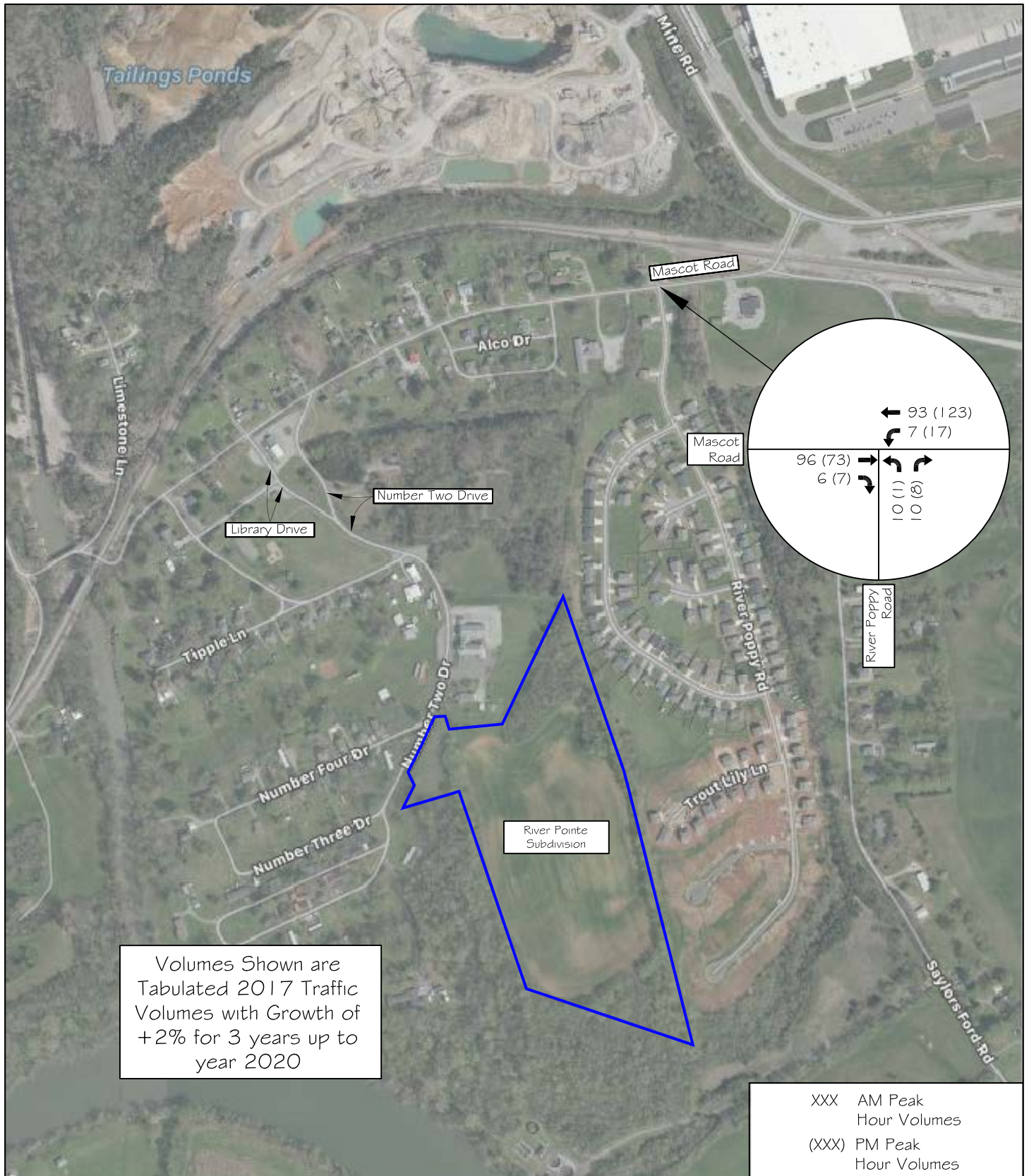
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FIGURE 4a

River Pointe Subdivision

2017 Peak Hour Traffic Volumes  
 (from Ajax Engineering, LLC Count on 11/16/2017)



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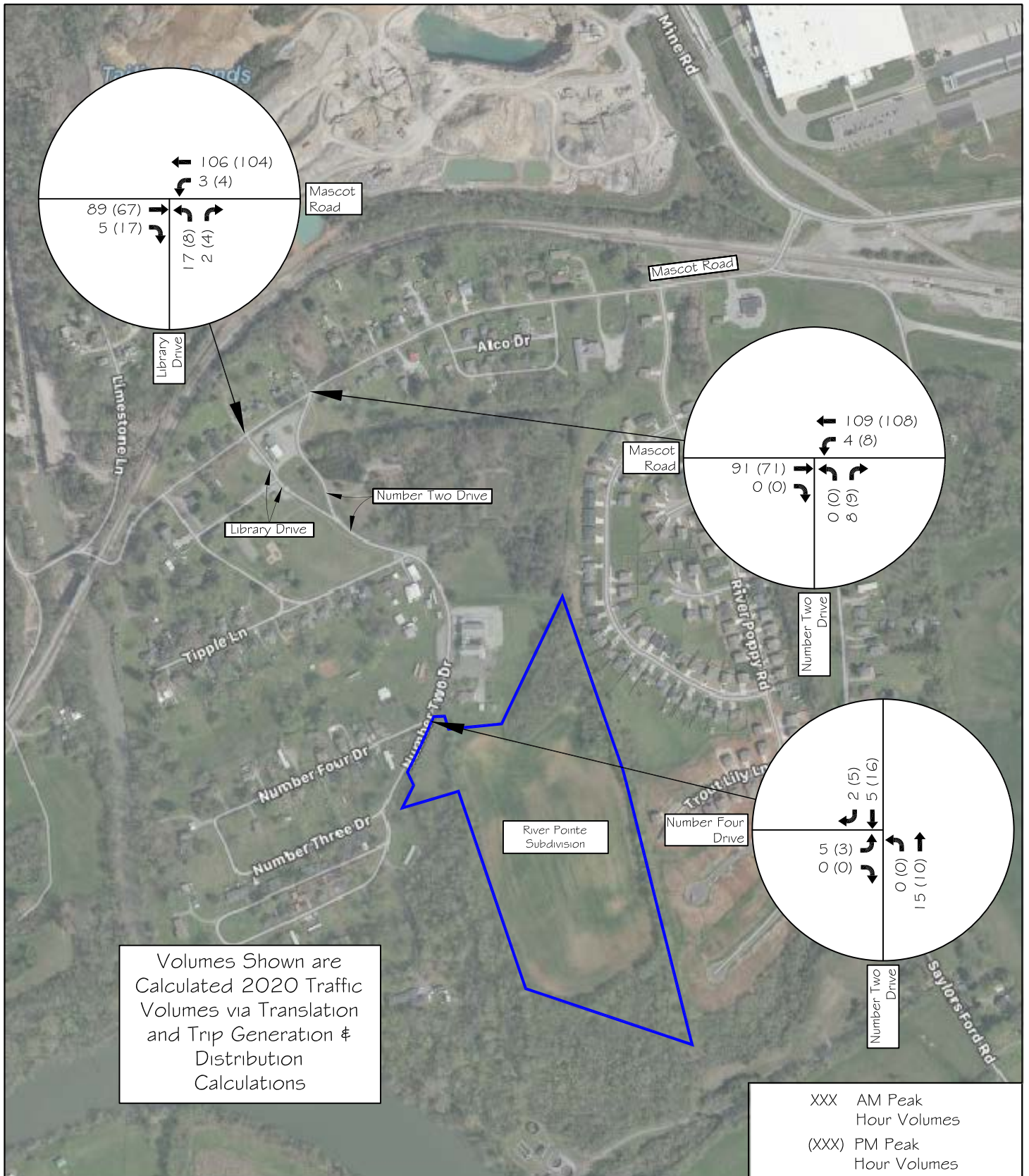
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FIGURE 4b

River Pointe Subdivision

2020 Peak Hour Traffic Volumes -  
 CALCULATED (+2% GROWTH)



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FIGURE 4c

River Pointe Subdivision

2020 Peak Hour Traffic Volumes - EXISTING TRAFFIC CONDITIONS (Calculated)



Capacity analyses were undertaken to determine the projected Level of Service (LOS) for the existing intersections for vehicular traffic. The capacity analyses were calculated by following the methods outlined in the Highway Capacity Manual (HCM) and using Synchro Traffic Software (Version 8).

Methodology:

LOS is a qualitative measurement developed by the transportation profession to express how well an intersection or roadway performs based on a driver's perception. LOS designations include LOS A through LOS F. The designation of LOS A signifies a roadway or intersection operating at best, while LOS F signifies road operations at worst. This grading system provides a reliable, straightforward means to communicate road operations to the public. The HCM lists level of service criteria for unsignalized intersections and signalized intersections.



LOS is defined by delay per vehicle (seconds), and roadway facilities are also characterized by the volume-to-capacity ratio (v/c). For example, a delay of 20 seconds at an unsignalized intersection would indicate LOS C, and this delay would represent the additional delay a motorist would experience traveling through the intersection. Also, for example, a v/c ratio of 0.75 for an approach at an unsignalized intersection would indicate that the approach is operating at 75% of its available capacity. The designations for LOS are based on delay and are reported differently for unsignalized and signalized intersections. The difference is primarily due to motorists having different expectations between the two road facilities. Generally, for most instances, the boundary of LOS D / LOS E is considered the upper limit of acceptable delay during peak periods in urban and suburban areas.

For unsignalized intersections, LOS is measured in terms of delay (in seconds). This measure is an attempt to quantify delay that includes travel time, driver discomfort, and fuel consumption. For unsignalized intersections, the analysis assumes that the mainline

thru and right-turn traffic does not stop and is not affected by the traffic on the minor side streets. Thus, the LOS for a two-way stop (or yield) controlled intersection is defined by the delay for each minor approach and major street left-turn movements. Table 3 lists the level of service criteria for unsignalized intersections. The analysis results of unsignalized intersections using the HCM methodologies are conservative due to the larger vehicle gap parameters used in the method. More often, in normal road conditions, drivers are more willing to accept smaller gaps in traffic than what is modeled using the HCM methodology. The unsignalized intersection methodology also does not account for more significant gaps sometimes produced by nearby upstream and downstream signalized intersections. For unsignalized intersections, in most instances, the upper limit of acceptable delay during peak hours is the LOS D/E boundary at 35 seconds.

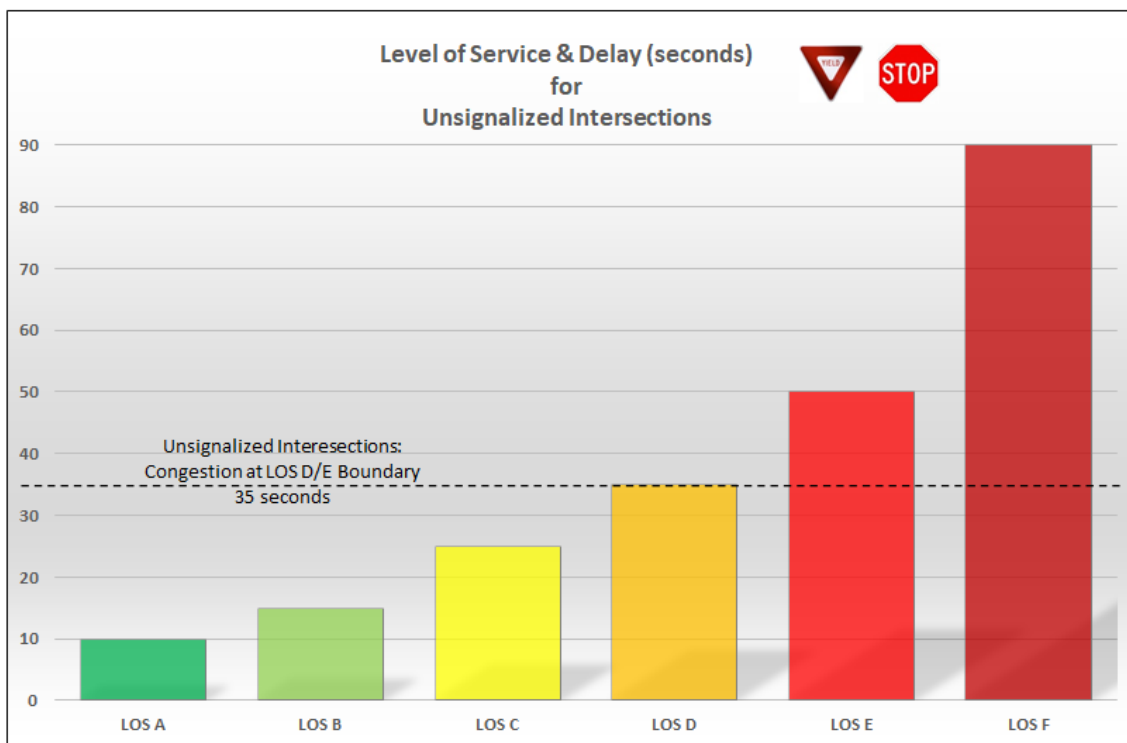
From the capacity calculations, the results from the projected peak hour vehicular traffic can be seen in Table 4 for the intersections. The intersections in the table are shown with a LOS designation, delay (in seconds), and v/c ratio (volume/capacity) for the AM and PM peak hours. Appendix G includes the worksheets from the capacity analyses for the existing peak hour vehicular traffic. As shown in Table 4, the studied intersections are calculated to operate at excellent levels with little to no vehicle delays for all the traffic movements in the existing conditions.

**TABLE 3**  
**LEVEL OF SERVICE AND DELAY FOR UNSIGNALIZED INTERSECTIONS**






LEVEL OF SERVICE	DESCRIPTION	CONTROL DELAY (seconds/vehicle)
A	Little or no delay	0 - 10
B	Short Traffic Delays	>10 -15
C	Average Traffic Delays	>15 - 25
D	Long Traffic Delays	>25 - 35
E	Very Long Traffic Delays	>35 - 50
F	Extreme Traffic Delays	>50

Source: Highway Capacity Manual, 6th Edition



**TABLE 4**  
**2020 UNSIGNALIZED INTERSECTION CAPACITY ANALYSIS RESULTS -**  
**EXISTING TRAFFIC CONDITIONS**

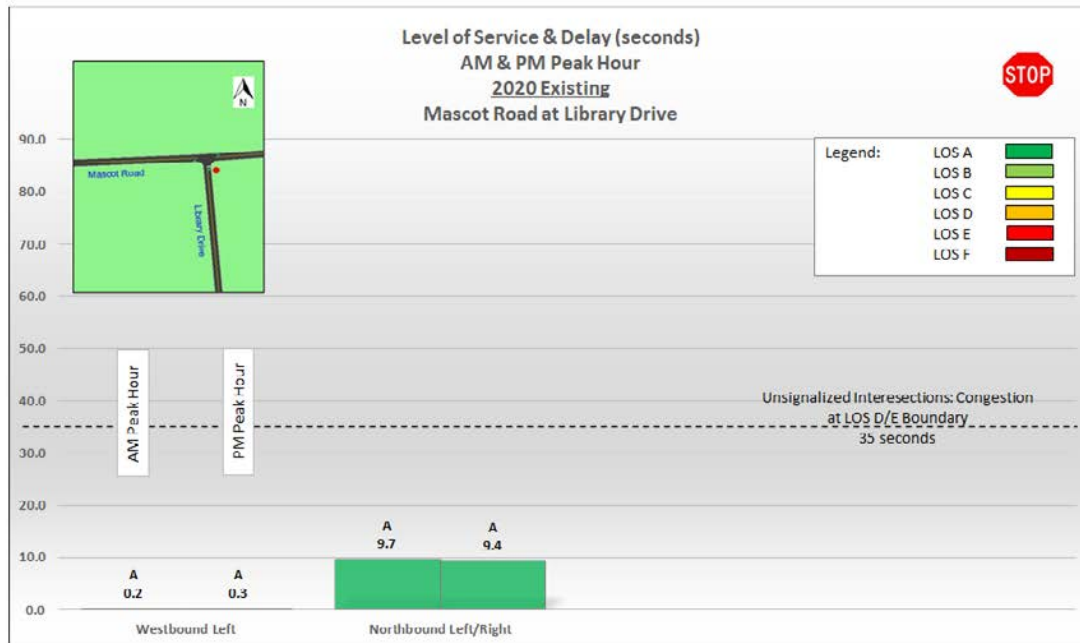
INTERSECTION	TRAFFIC CONTROL	APPROACH/ MOVEMENT	AM PEAK			PM PEAK		
			LOS	DELAY (seconds)	V/C	LOS	DELAY (seconds)	V/C
Mascot Road at Library Drive	 Unsignalized	Westbound Left	A	0.2	0.000	A	0.3	0.000
		Northbound Left/Right	A	9.7	0.030	A	9.4	0.020
Mascot Road at Number Two Drive	 Unsignalized	Westbound Left	A	0.3	0.000	A	0.6	0.010
		Northbound Left/Right	A	8.8	0.010	A	8.7	0.010
Number Two Drive at Number Four Drive	 Unsignalized	Eastbound Left/Right	A	8.6	0.010	A	8.7	0.000

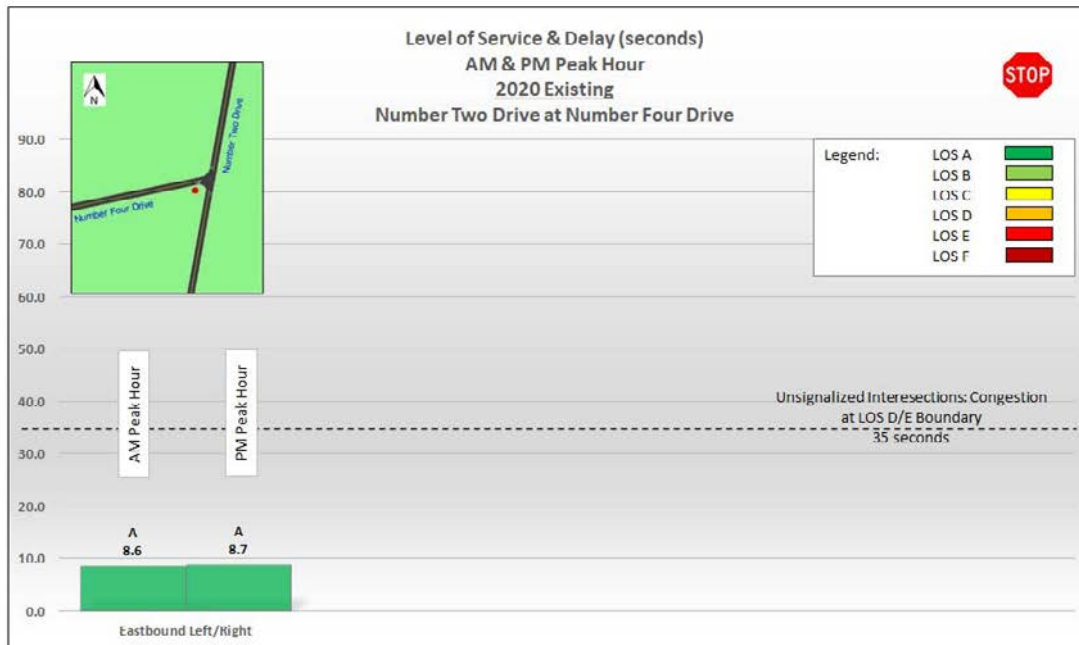
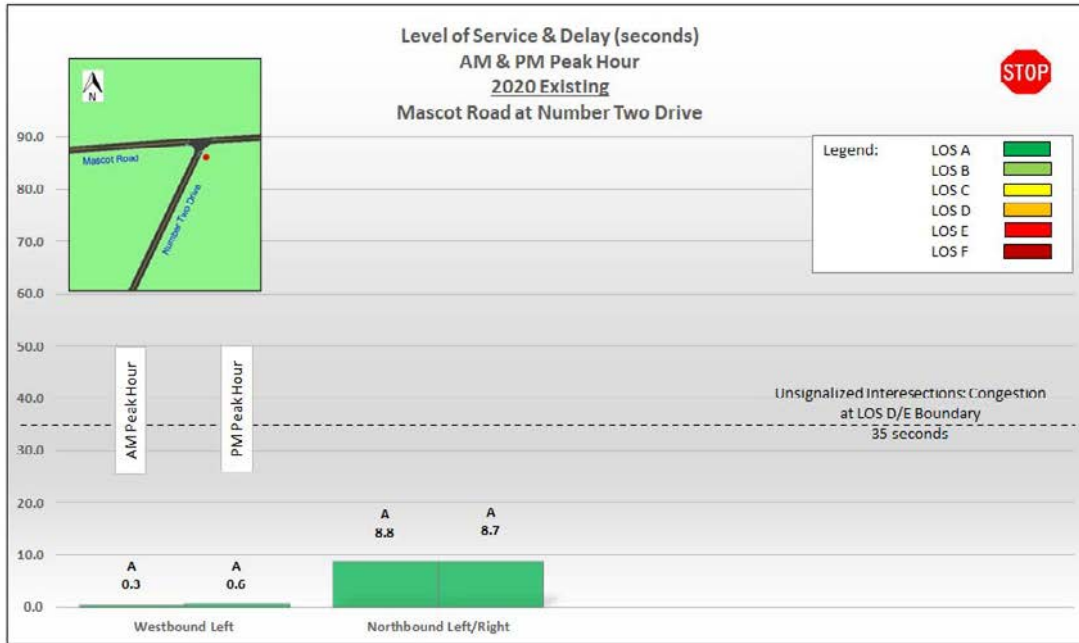
Note: All analyses were calculated in Synchro 8 software and reported with HCM 2000 methodology for unsignalized intersections

<sup>a</sup> Level of Service

<sup>b</sup> Average Delay (sec/vehicle)

<sup>c</sup> Volume-to-Capacity Ratio



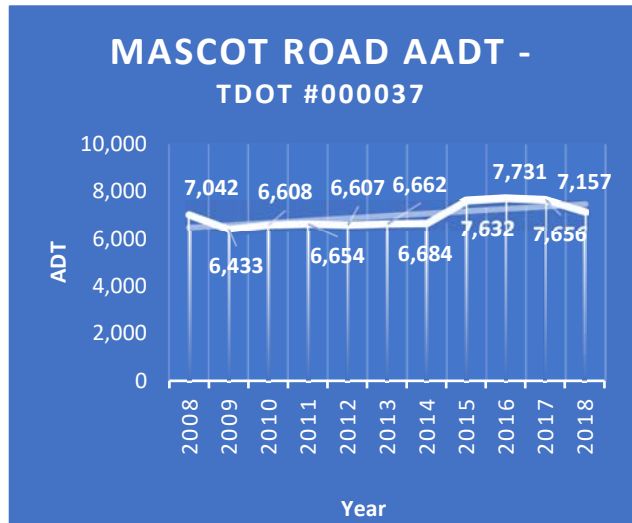


■ **OPENING YEAR TRAFFIC CONDITIONS (WITHOUT PROJECT):**

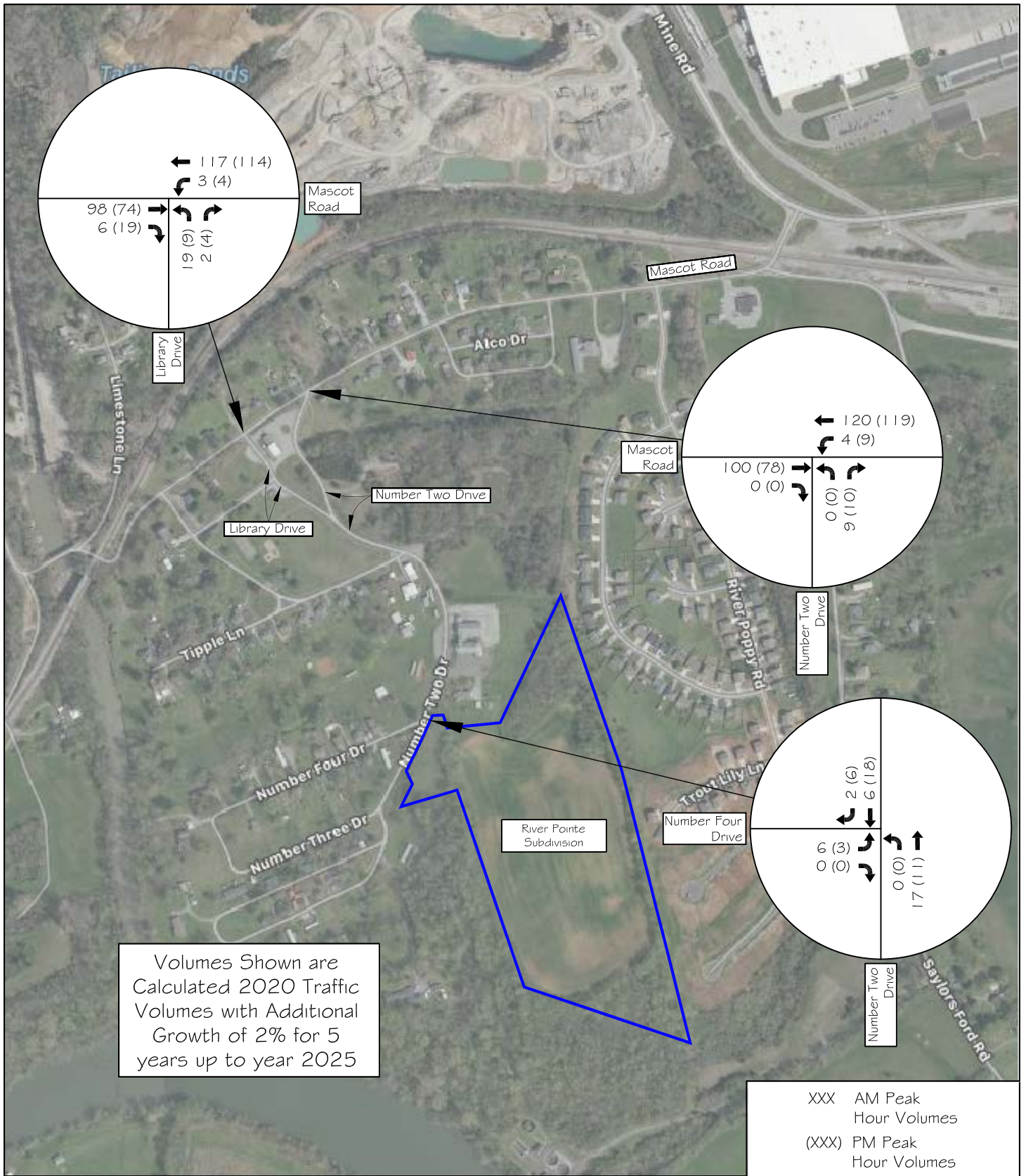
Opening year traffic volumes represent the future condition the proposed study area is potentially subject to even without the proposed project (no-build option). As previously stated, the build-out and full occupancy for this proposed new residential development is assumed to occur in the year 2025. This horizon year corresponds to five years for the subdivision to reach full capacity and occupancy.

Traffic growth on the nearby roadways has shown relatively flat growth over the past ten years, according to the TDOT count stations (historical traffic data is shown in Appendix A). Currently, there are no known relevant significant upcoming developments adjacent to the proposed site that would indicate great future increased traffic volumes in the study area in the short term.

A +2% annual growth rate was assumed to consider any future development in the area, potential rising travel volumes, and to ensure a reasonable estimate for this study. Figure 5 shows the projected opening year traffic volumes for the year 2025 during the AM and PM peak hours based on an assumed annual growth rate of +2% applied to the translated and calculated 2020 traffic volumes. This annual growth was also used for the previous transportation impact study conducted for the nearby Phase 2 of River Meadows Subdivision.



The volumes shown in Figure 5 could potentially exist in the future, even if the proposed residential project is not constructed and developed. Due to the low volumes and low delays calculated for the existing conditions, capacity analyses were not conducted for the opening year traffic conditions without the project.



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FIGURE 5

River Pointe Subdivision

2025 Peak Hour Traffic Volumes - OPENING YEAR TRAFFIC (WITHOUT PROJECT)

■ **TRIP GENERATION:**

The estimated amount of traffic generated by the proposed residential development was calculated based upon rates and equations for peak hour trips provided by Trip Generation Manual, 10th Edition, a publication of the Institute of Transportation Engineers (ITE). A generated trip is a single or one-direction vehicle movement that is either entering or exiting the study site. The Trip Generation Manual is the traditional and most popular resource for determining trip generation rates when traffic impact studies are produced. The Manual lists and includes data for various land uses and correlates trips generated based on different variables such as dwelling units, square footage, etc. The data from ITE for the proposed land use is shown in Appendix F. A summary of this information is presented in the following table:

**TABLE 5**  
**TRIP GENERATION FOR RIVER POINTE SUBDIVISION**  
**75 Single-Family Detached Houses**

ITE LAND USE CODE	LAND USE DESCRIPTION	UNITS	GENERATED DAILY TRAFFIC	GENERATED TRAFFIC AM PEAK HOUR			GENERATED TRAFFIC PM PEAK HOUR		
				ENTER	EXIT	TOTAL	ENTER	EXIT	TOTAL
#210	Single-Family Detached Housing	75 Houses	798	25%	75%		63%	37%	
				15	44	59	49	29	78
<b>Total New Volume Site Trips</b>			<b>798</b>	<b>15</b>	<b>44</b>	<b>59</b>	<b>49</b>	<b>29</b>	<b>78</b>

ITE Trip Generation Manual, 10th Edition  
Trips calculated by using Fitted Curve Equation

For the proposed residential subdivision, with a maximum of 75 single-family detached houses, it is estimated that 15 vehicles will enter, and 44 will exit, for a total of 59 generated trips during the AM Peak Hour in the year 2025. Similarly, it is estimated that 49 vehicles will enter, and 29 will exit, for a total of 78 generated trips during the PM Peak Hour in the year 2025. The calculated trips generated for an average weekday could be expected to be approximately 798 vehicles for the proposed development in the year 2025. No trip reductions were included in the analysis.

As discussed earlier, Appendix F also contains the calculations for the trip generation and distribution of trips that were necessary to determine the turning movement traffic count volumes on Number Two Drive, Library Drive, and Number Four Drive.



■ **TRIP DISTRIBUTION AND ASSIGNMENT:**

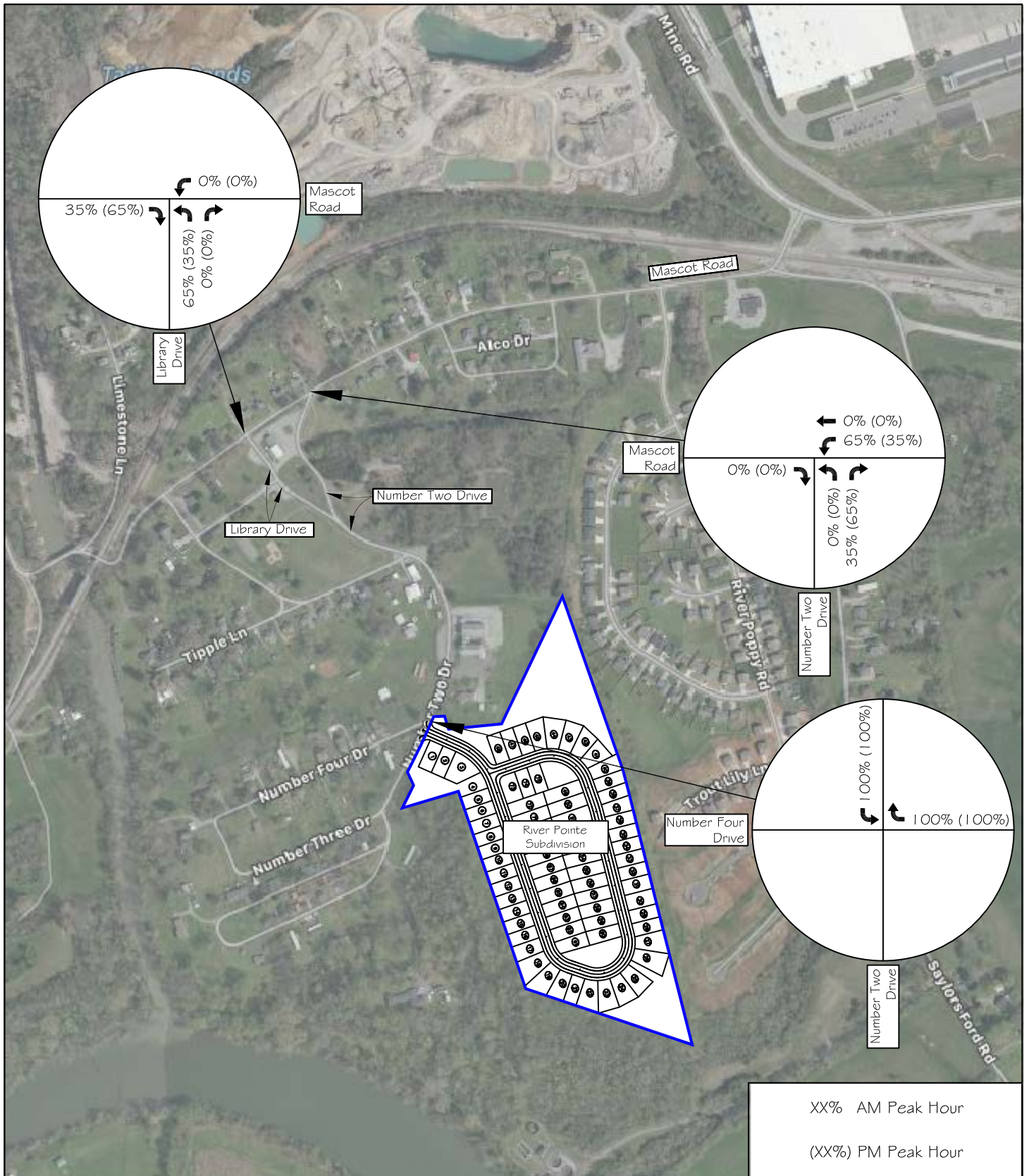
Figure 6 shows the projected distribution for traffic entering and exiting at the studied intersections. The percentages shown pertain to the trips generated by the new proposed residential dwellings in the development that were calculated from the ITE Trip Generation Manual and shown in Table 5.

The percentages that are shown in Figure 6 are based on the results of the earlier traffic count that was conducted on November 16, 2017, at the intersection of Mascot Road at River Poppy Road for the transportation impact study completed by Ajax Engineering for Phase 2 of River Meadows Subdivision.

Since this was an existing similar land use near this study development, the turning movement counts from the intersection of Mascot Road at River Poppy Road were assumed to be a reasonable estimate for the River Pointe Subdivision travel patterns. They were used to help allocate the future traffic distribution.

There are various outside developments that will potentially “attract” the projected generated traffic to and from the new residential subdivision. All these outside “attractors” are accessible by traveling eastbound and westbound via Mascot Road. In addition to employment centers and commercial development, some traffic will travel to and from a variety of public and private elementary, middle, and high schools. This site development property is currently zoned for East Knox County Elementary School, Carter Middle School, and Carter High School. The elementary school is located to the northwest of the development. The Carter Middle and High School are situated to the south. This suggests there would be some residential traffic to and from the north and south via Mascot Road for those who do not utilize public school bus transportation.

Figure 7 shows the Traffic Assignment of the computed trips that will be generated by the subdivision (from Table 5) and applied to the intersection movements based on the assumed distribution of trips shown in Figure 6.

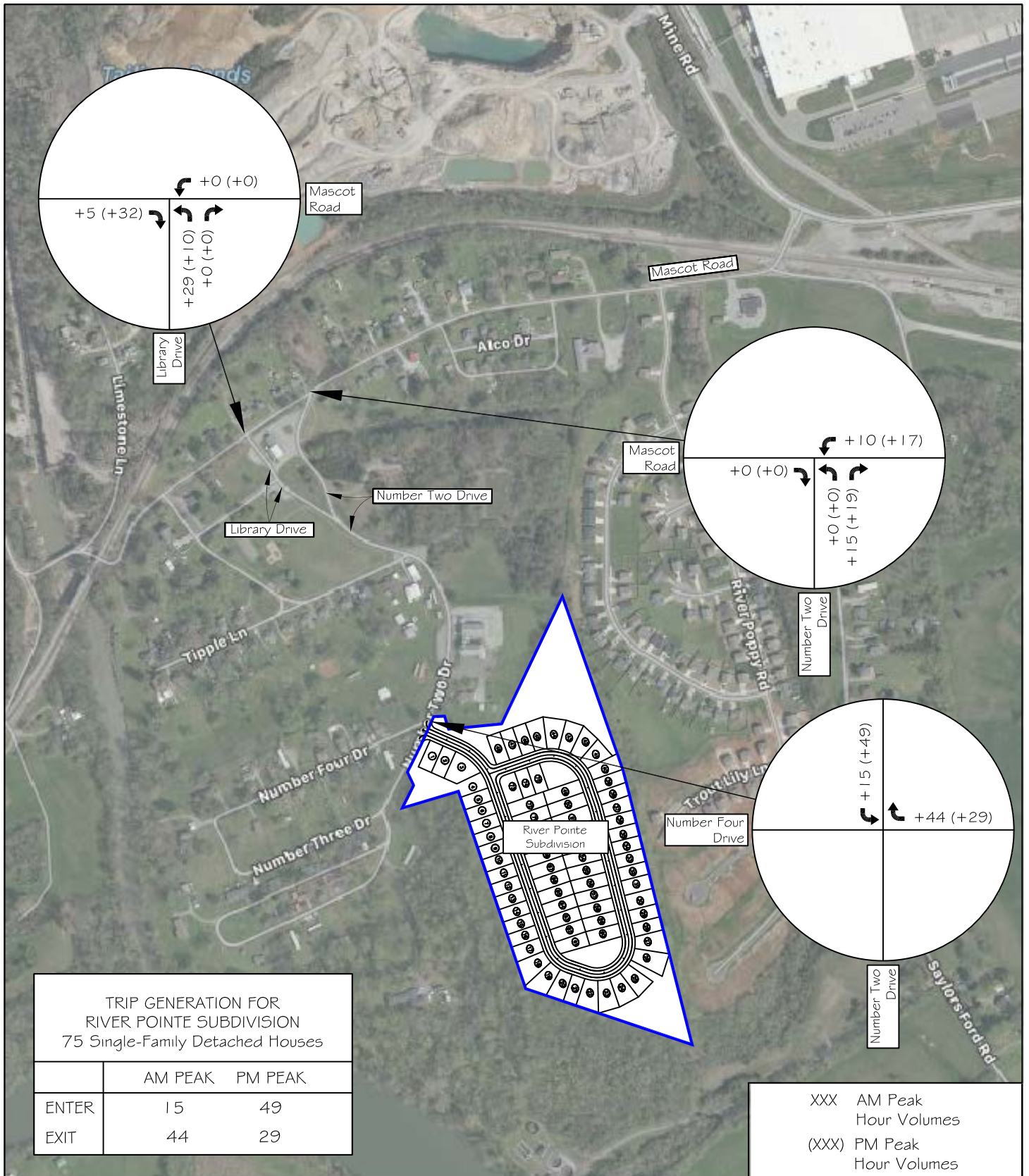


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NOT TO SCALE



FIGURE 6  
 River Pointe Subdivision  
 Directional Distribution of Generated Traffic during AM and PM Peak Hour



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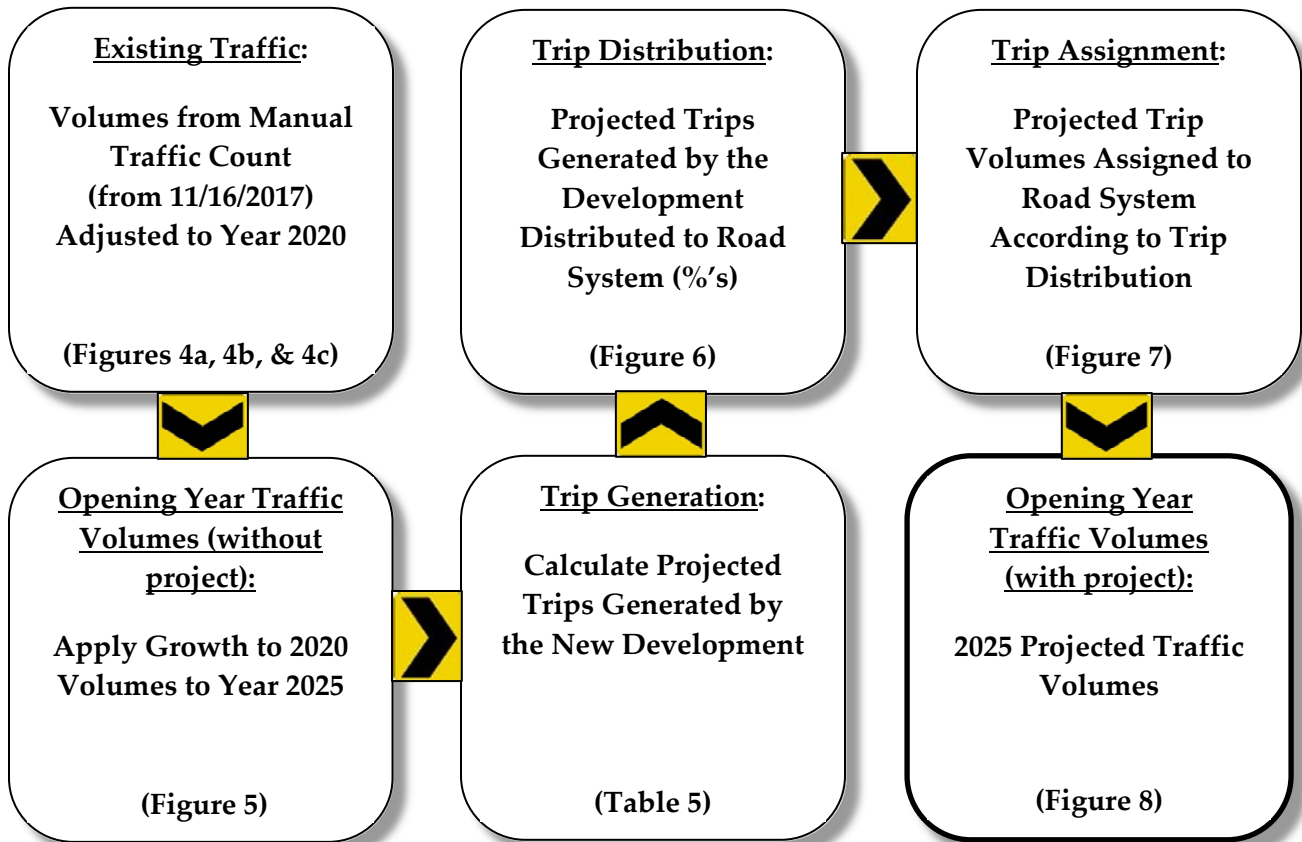
FIGURE 7

River Pointe Subdivision

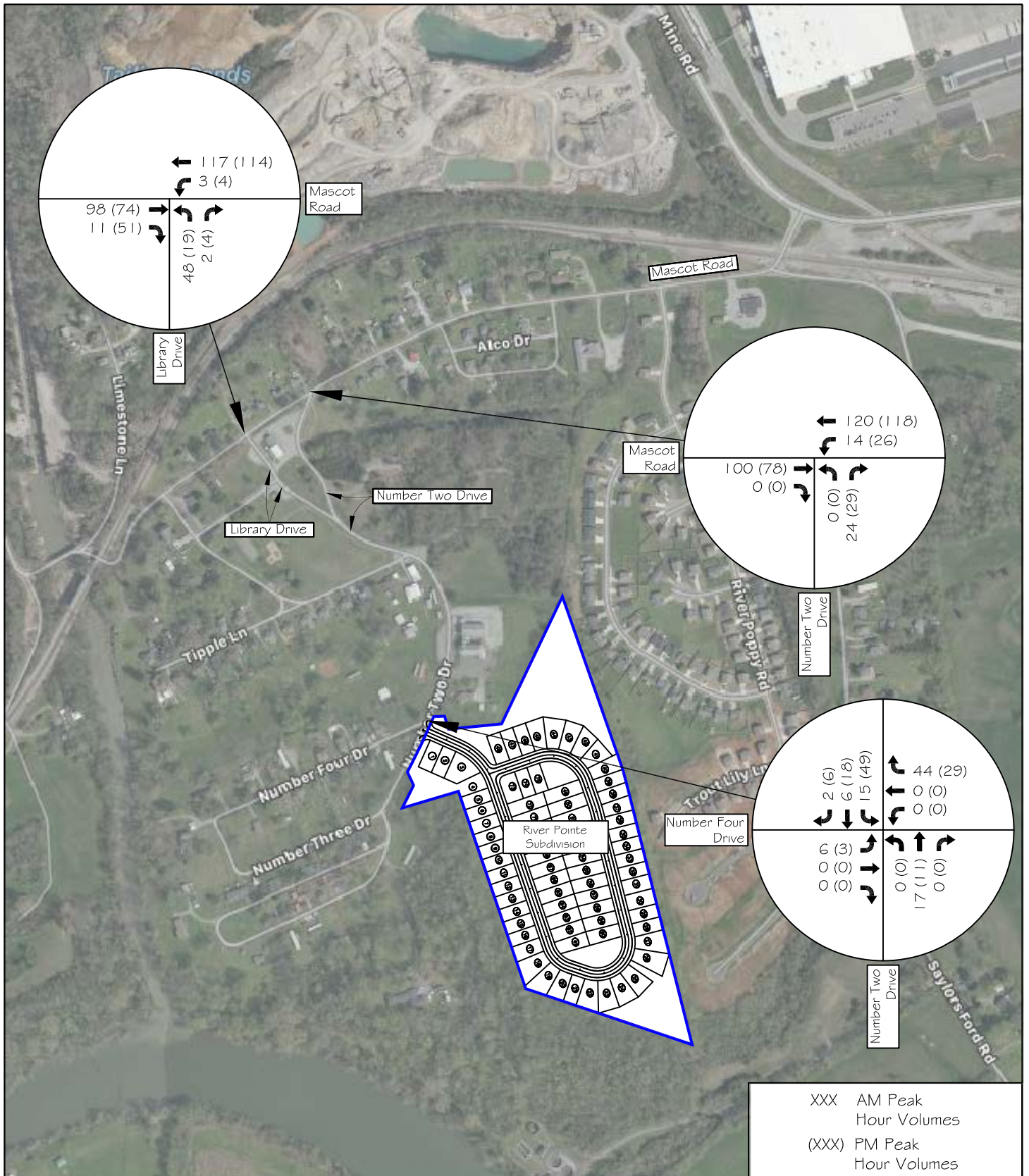
Traffic Assignment of Generated Traffic during AM and PM Peak Hour

■ **OPENING YEAR TRAFFIC CONDITIONS (WITH PROJECT):**

Overall, several additive steps were taken to estimate the total opening year projected traffic volumes at the studied intersections when the residential development is fully constructed and occupied by the year 2025. The steps are illustrated below for clarity:



To calculate the total future projected traffic volumes at the studied intersections, the calculated peak hour traffic (from ITE Trip Generation) generated by the new proposed residential development was added to the 2025 opening year traffic (shown in Figure 5) by following the predicted directional distributions and assignments (shown in Figures 6 and 7). This procedure was necessary to obtain the total projected traffic volumes at the time the development is fully built-out. Figure 8 shows the projected AM and PM peak hour volumes at the studied intersections for the year 2025.



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FIGURE 8




River Pointe Subdivision

2025 Peak Hour Traffic Volumes - OPENING YEAR TRAFFIC (WITH PROJECT)

Capacity analyses were completed to determine the projected Level of Service (LOS) for the studied intersections in the projected conditions. The capacity analyses were calculated by following the methods outlined in the Highway Capacity Manual (HCM) and using Synchro Traffic Software (Version 8).

From the capacity calculations, the results from the projected peak hour vehicular traffic can be seen in Table 6 for the intersections. Appendix G includes the worksheets from the capacity analyses for the projected peak hour vehicular traffic. As shown in Table 6, the studied intersections are calculated to operate at reasonable levels with little to no vehicle delays for the turning movements during the projected AM and PM peak hours.

**TABLE 6**  
**2025 UNSIGNALIZED INTERSECTION CAPACITY ANALYSIS RESULTS -**  
**PROJECTED TRAFFIC CONDITIONS**

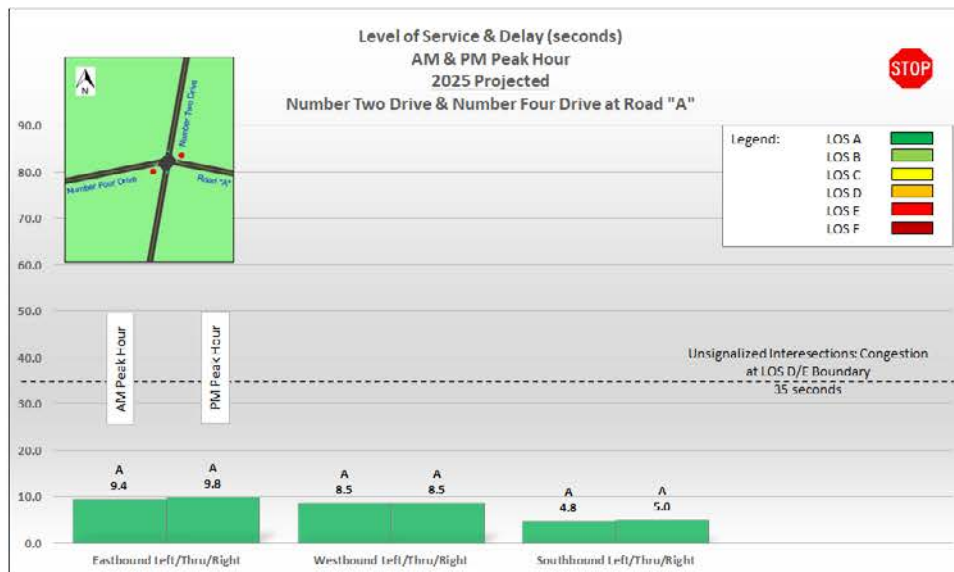
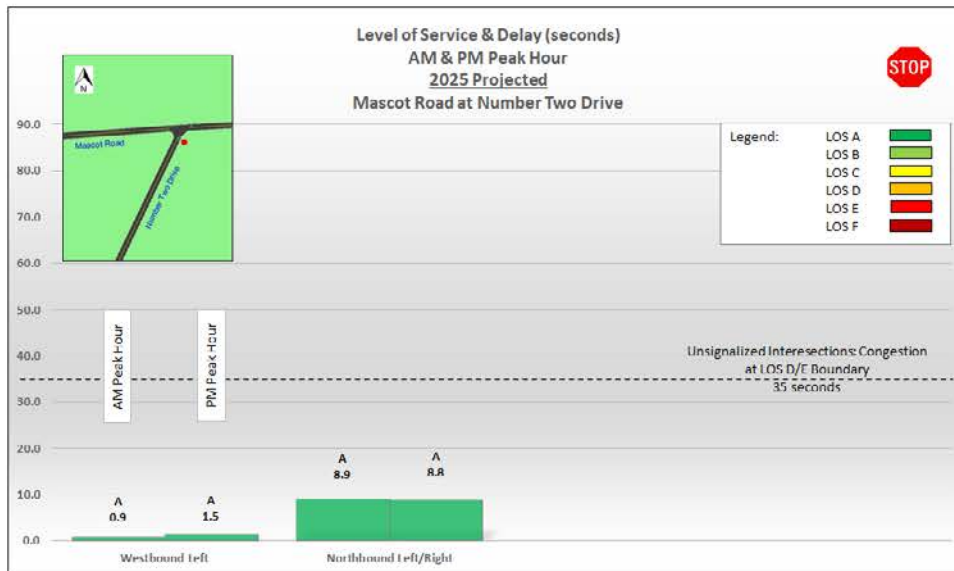
INTERSECTION	TRAFFIC CONTROL	APPROACH/ MOVEMENT	AM PEAK			PM PEAK		
			LOS	DELAY (seconds)	V/C	LOS	DELAY (seconds)	V/C
Mascot Road at Library Drive	 Unsignalized	Westbound Left	A	0.2	0.000	A	0.3	0.000
		Northbound Left/Right	B	10.2	0.070	A	9.8	0.030
Mascot Road at Number Two Drive	 Unsignalized	Westbound Left	A	0.9	0.010	A	1.5	0.020
		Northbound Left/Right	A	8.9	0.030	A	8.8	0.030
Number Two Drive & Number Four Drive at Road "A"	 Unsignalized	Eastbound Left/Thru/Right	A	9.4	0.010	A	9.8	0.000
		Westbound Left/Thru/Right	A	8.5	0.050	A	8.5	0.030
		Southbound Left/Thru/Right	A	4.8	0.010	A	5.0	0.030

Note: All analyses were calculated in Synchro 8 software and reported with HCM 2000 methodology for unsignalized intersections

<sup>a</sup> Level of Service

<sup>b</sup> Average Delay (sec/vehicle)

<sup>c</sup> Volume-to-Capacity Ratio



▪ **POTENTIAL SAFETY ISSUES:**

Potential existing and future safety issues in the study area were investigated. A discussion of a few features of the adjacent transportation system is in the following pages.

■ **EVALUATION OF TURN LANE THRESHOLDS**

The Mascot Road at Number Two Drive and Library Drive intersections were evaluated for the need for separate turn lanes for entering vehicles towards the site development in the year 2025. The design policy used for these turn lane evaluations is based on “Knox County’s Access Control and Driveway Design Policy”. This design policy by Knox County relates vehicle volume thresholds based on prevailing speeds for two-lane and four-lane roadways. This Knox County policy is based on TDOT and nationally accepted guidelines for unsignalized intersections. A determination was made to determine if turn lanes are warranted using these criteria.

Based on the projected 2025 traffic volumes at the intersection of Mascot Road at Library Drive and Number Two Drive and according to “Knox County’s Access Control and Driveway Design Policy”, separate eastbound right-turn lanes and westbound left-turn lanes will not be warranted on Mascot Road for vehicles entering towards the subdivision.

The speed classification chosen for this evaluation was based on the posted speed limit of 30-mph on Mascot Road. Therefore, this intersection evaluation used the Knox County classification for speeds of 35 mph or less with the calculated projected volumes.

■ **EVALUATION OF SIGHT DISTANCE**

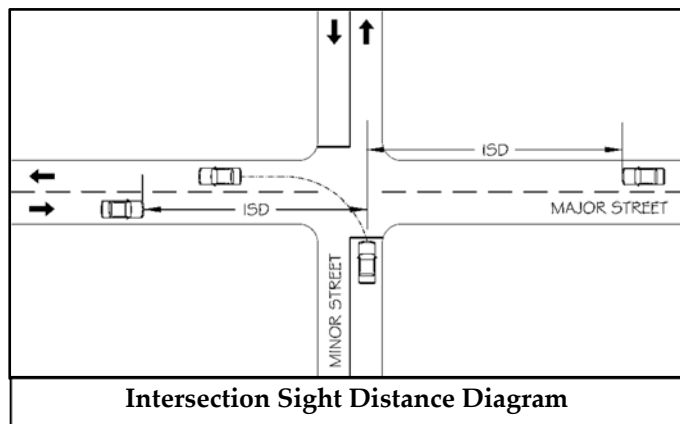
For evaluating intersections, sight distance evaluations can be categorized into two categories: Stopping Sight Distance (SSD) and Intersection Sight Distance (ISD).

*Methodology:*

SSD is the distance required for a motorist to perceive, react, and for their vehicle to come to a complete stop before colliding with an object in the road. For evaluating intersections, this object would be another vehicle entering the intersection from a minor street. SSD can be considered the minimum visibility distance standard for assessing the safety of an intersection.



ISD is based on the time required to perceive, react, and complete the desired traffic maneuver once a motorist on a minor street decides to perform a traffic maneuver. Three traffic maneuvers are available for vehicles stopped on a minor street at a 4-way intersection: left-turn from the minor road, right-turn from the minor road, and a crossing maneuver from the minor road across the major road. For turns from the minor street, ISD is needed to allow a stopped motorist on a minor street to turn onto a major street without being overtaken by an approaching vehicle. The most critical (longest) ISD is for left-turns from the minor street. The ISD for this maneuver includes the time to turn left and to clear half of the intersection without conflicting with the oncoming traffic from the left and to also accelerate to the operating speed of the road without causing approaching vehicles from the right to reduce their speed substantially. SSD can be considered the desirable visibility distance standard for evaluating the safety of an intersection. In general, SSD is more critical than ISD; however, the ISD must be at least the same distance or greater than SSD to provide safe operations at an intersection.



Based on a posted speed limit of 30-mph on Mascot Road, the required intersection sight distance is 300 feet looking each direction at the intersection of Mascot Road at Library Drive and Number Two Drive based on Knox County policy of requiring 10 feet of sight distance per 1-mph of speed. With a road grade of +5% for the eastbound approach on Mascot Road at Library Drive, the SSD is calculated to be 190 feet. With a road grade of -2% for the eastbound approach on Mascot Road at Library Drive, the SSD is calculated to be 205 feet. Based on a flat grade on Mascot Road at the Number Two Drive intersection and a posted speed limit of 30-mph, the SSD is calculated to be 200 feet for eastbound and westbound vehicles.

With a road grade of -1% for the southbound approach on Number Two Drive at the proposed Road "A" intersection and an assumed speed limit of 25-mph, the SSD is calculated to be 155 feet. With a road grade of +9% for the northbound approach on Number Two Drive at the proposed Road "A" intersection, the SSD is calculated to be 140 feet.

A cursory examination of the sight distances at the intersections was undertaken. Based on visual observation, it appears that the intersection sight distances from both the Mascot Road at Library Drive intersection and the Mascot Road at Number Two Drive are substandard for vehicles looking towards the west and marginal for views to the east. Using a Nikon Laser Rangefinder at the intersections, the intersection sight distances looking towards the west was estimated to be less than 250 feet at both intersections. The intersection sight distances at these two intersections were estimated to be right around 300 feet, looking towards the east at both intersections. The sight distances are hindered at these intersections due to vegetation and, in the case of the Number Two Drive, exacerbated by the skewed angle of the intersection.



View of Sight Distance on Mascot Road at  
Library Drive  
(Looking West)



View of Sight Distance on Mascot Road at  
Library Drive  
(Looking East)



**View of Sight Distance on Mascot Road at  
Number Two Drive  
(Looking West)**



**View of Sight Distance on Mascot Road at  
Number Two Drive  
(Looking East)**

Based on visual observation, it appears that the intersection sight distances from the proposed location of Road "A" at Number Two Drive will be adequate. Using a Nikon Laser Rangefinder at the proposed intersection location, the intersection sight distance looking towards the north and south are both estimated to be around 400 feet. A utility pole on the north side is assumed will be removed during construction, and an arborvitae tree on the north side could be an issue as it reaches full growth if not maintained.



**View of Sight Distance on Number Two Drive at  
Proposed Road "A"  
(Looking South)**



**View of Sight Distance on Number Two Drive at  
Proposed Road "A"  
(Looking North)**

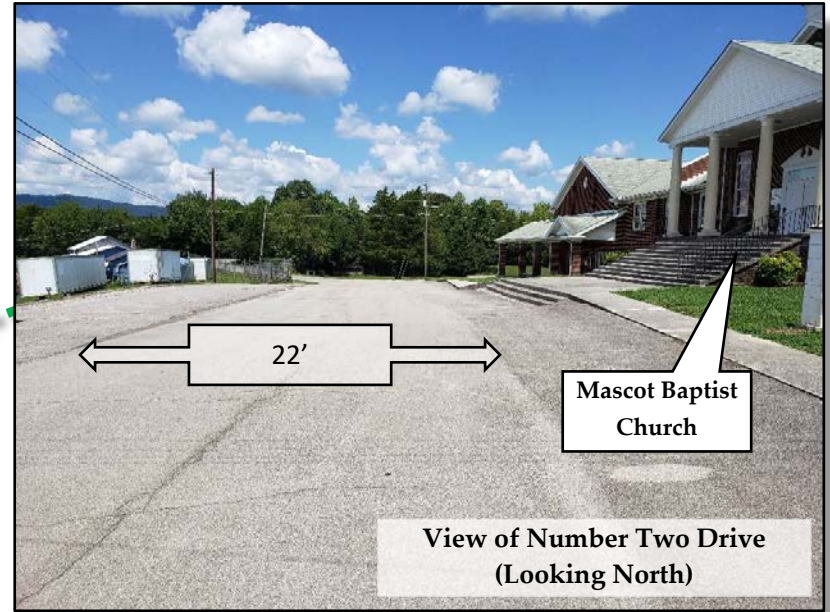
➤ **PAVEMENT WIDTHS OF NUMBER TWO DRIVE AND LIBRARY DRIVE**

Pavement widths along Number Two Drive and Library Drive are highly variable. Number Two Drive has pavement widths of 18 feet to 28.5 feet in between Number Four Drive and Mascot Road. Library Drive has pavement widths of 13 feet to 30 feet in between Number Two Drive and Mascot Road.

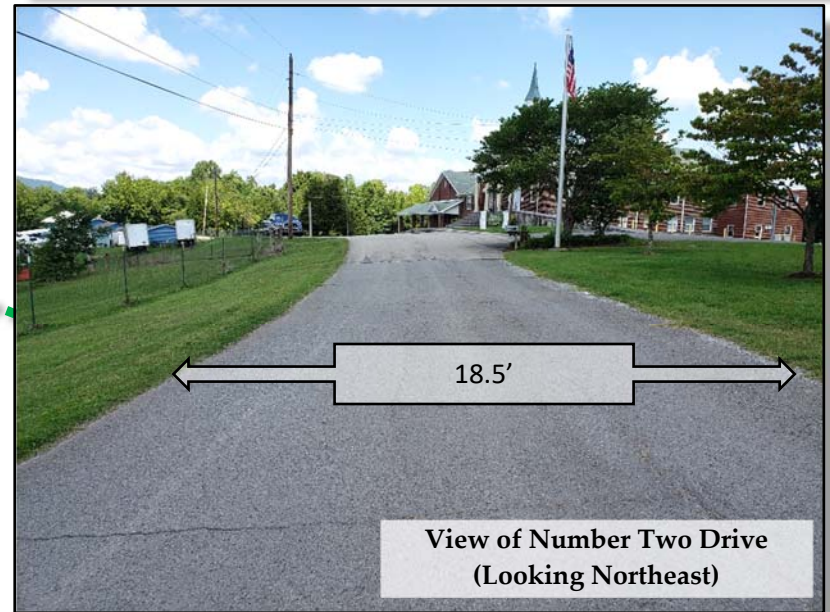
The information shown on the following pages lists the pavement width measurements that were made and shows photographs of these road width measurements locations. These road measurements are not the absolute minimum and maximum widths but are a representative sample of the roads.



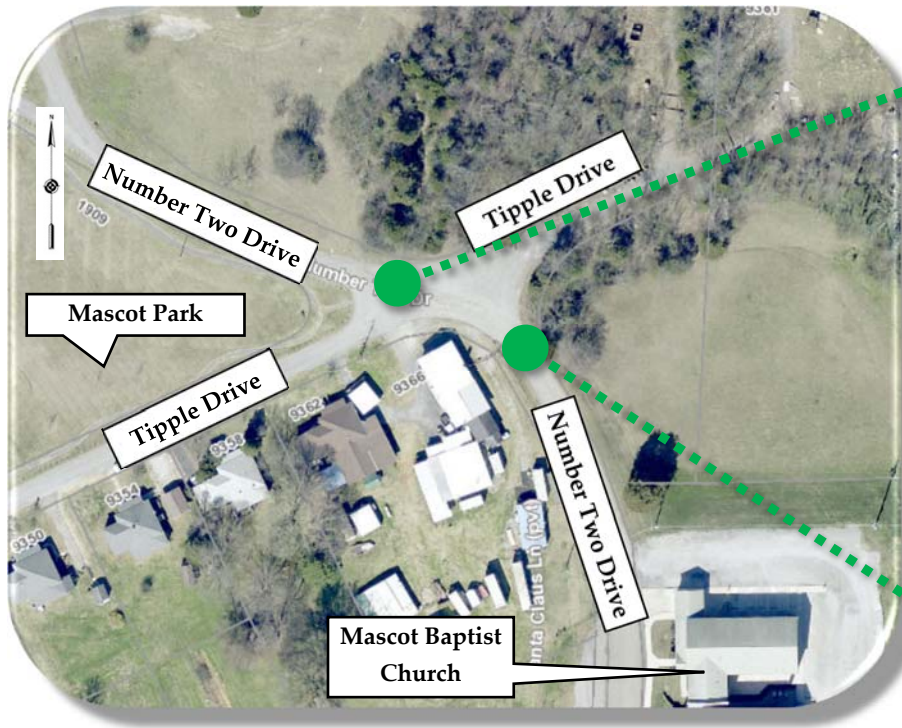
Number Two Drive



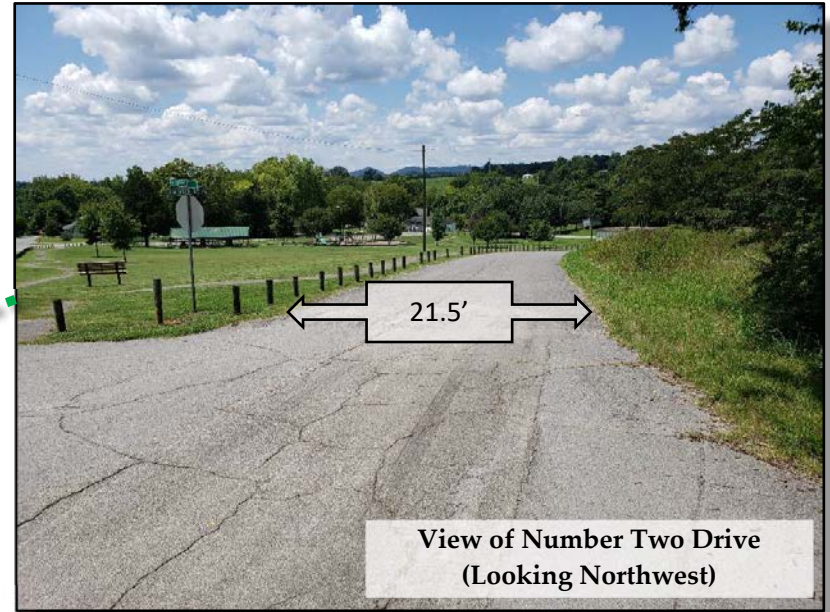
View of Number Two Drive (Looking North)



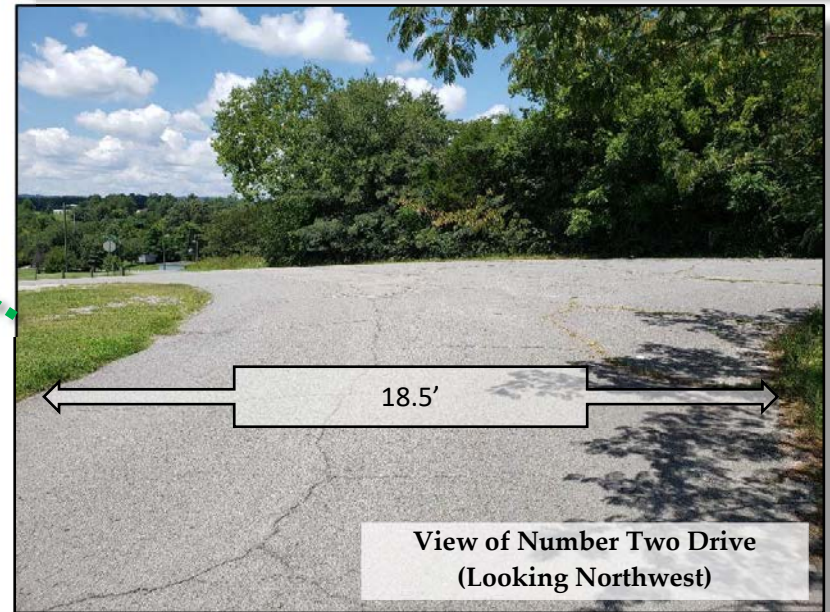
View of Number Two Drive (Looking Northeast)



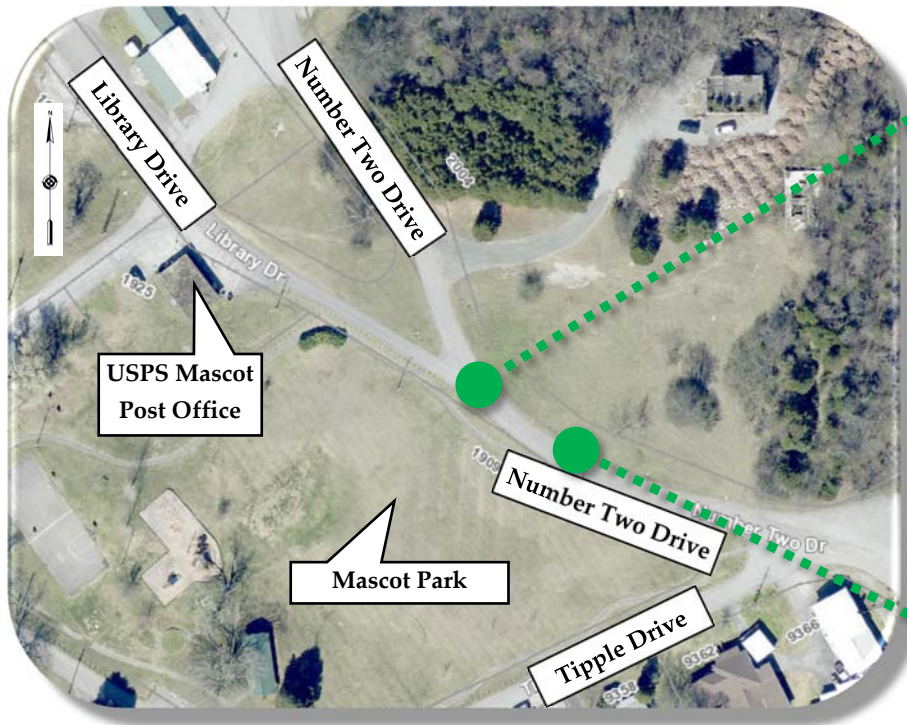
Number Two Drive



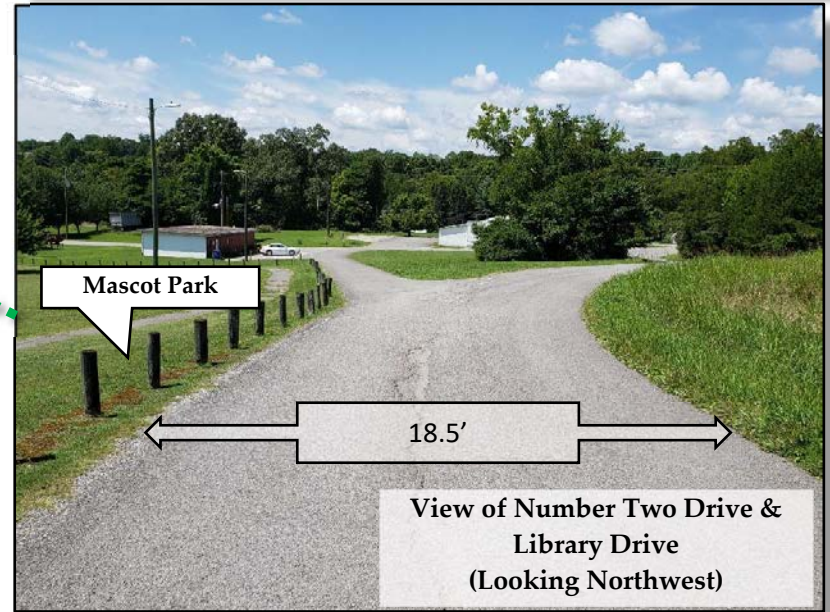
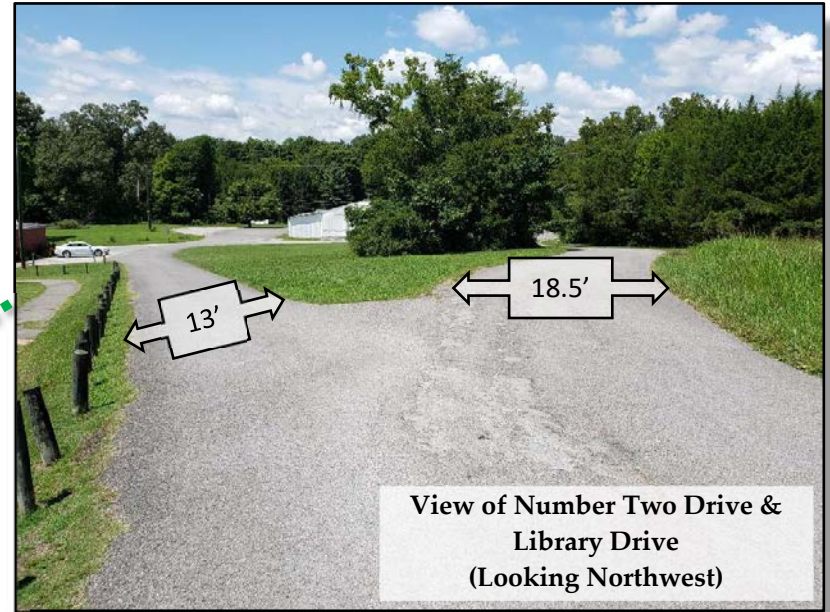
View of Number Two Drive  
(Looking Northwest)

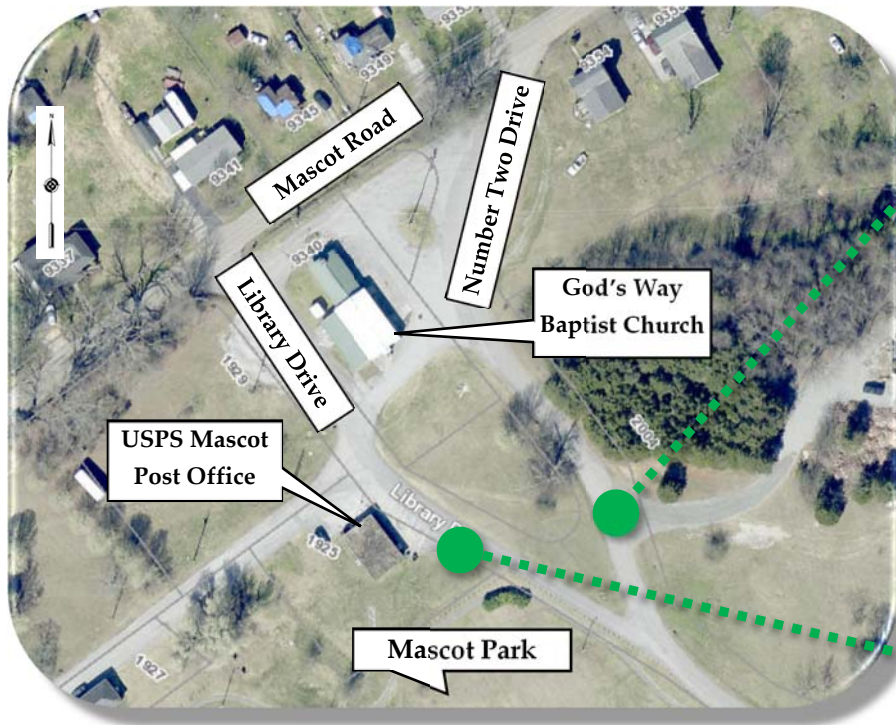


View of Number Two Drive  
(Looking Northwest)

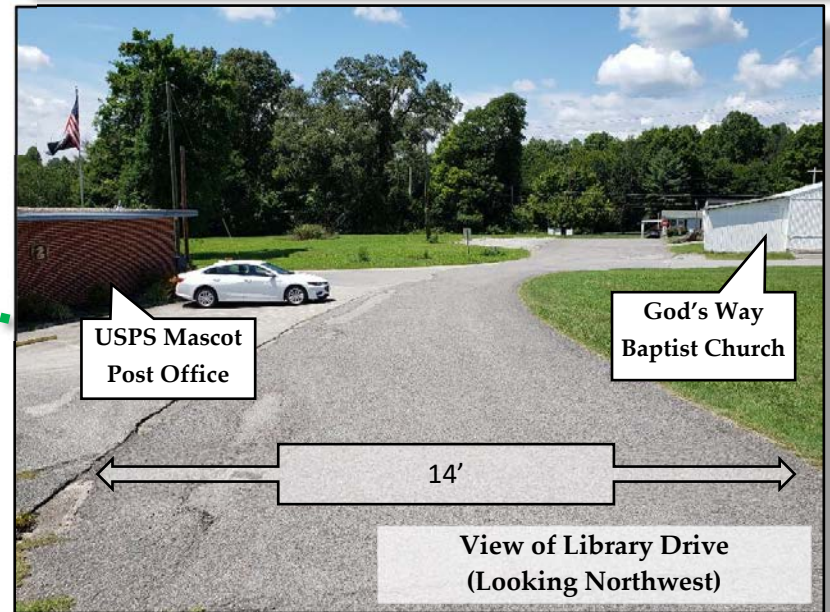
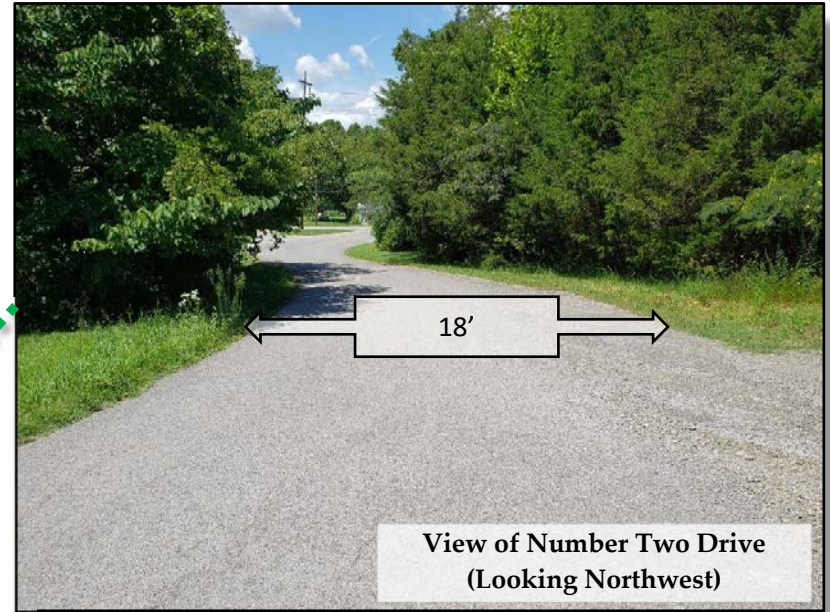


Number Two Drive and Library Drive

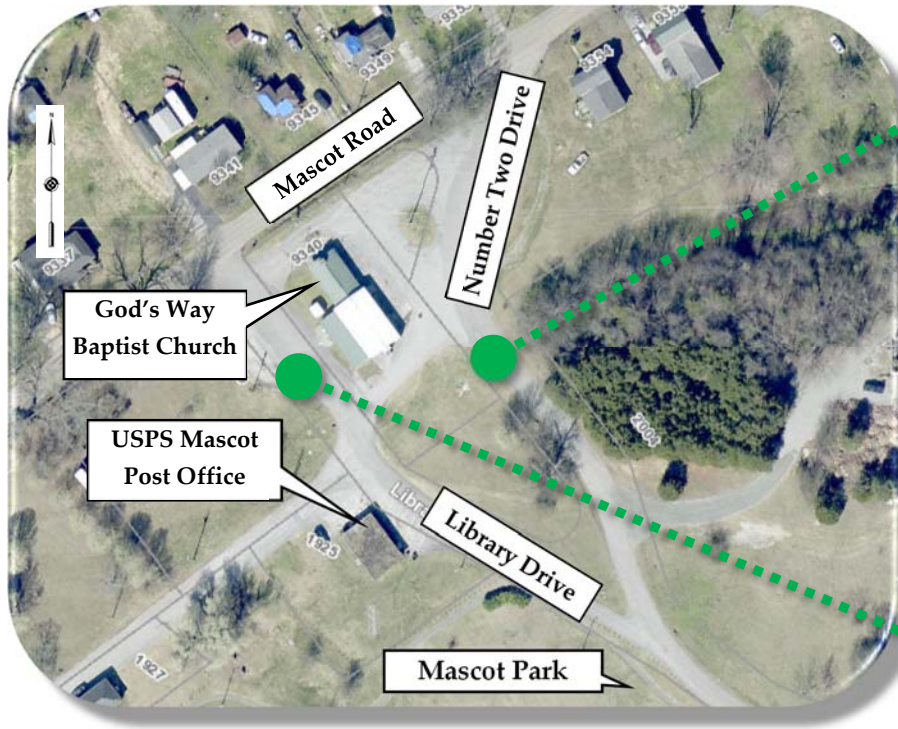




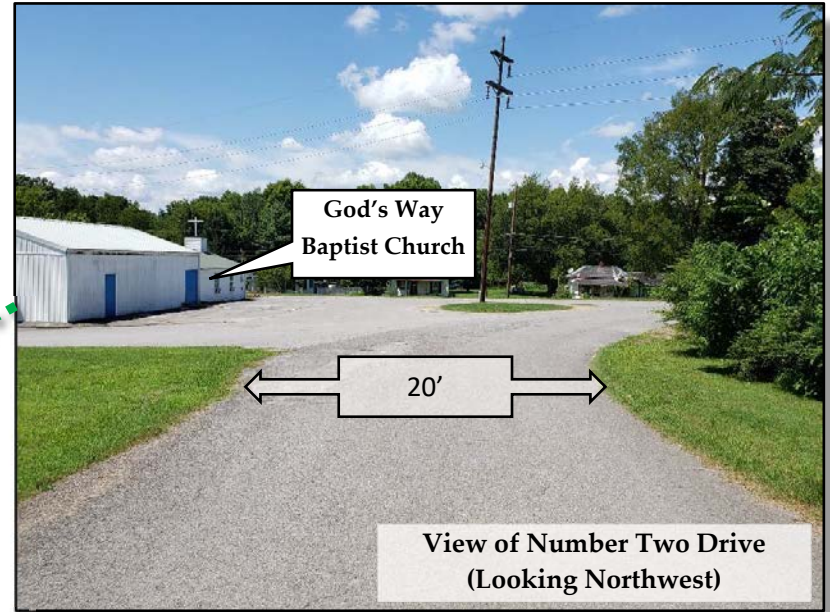
Number Two Drive and Library Drive



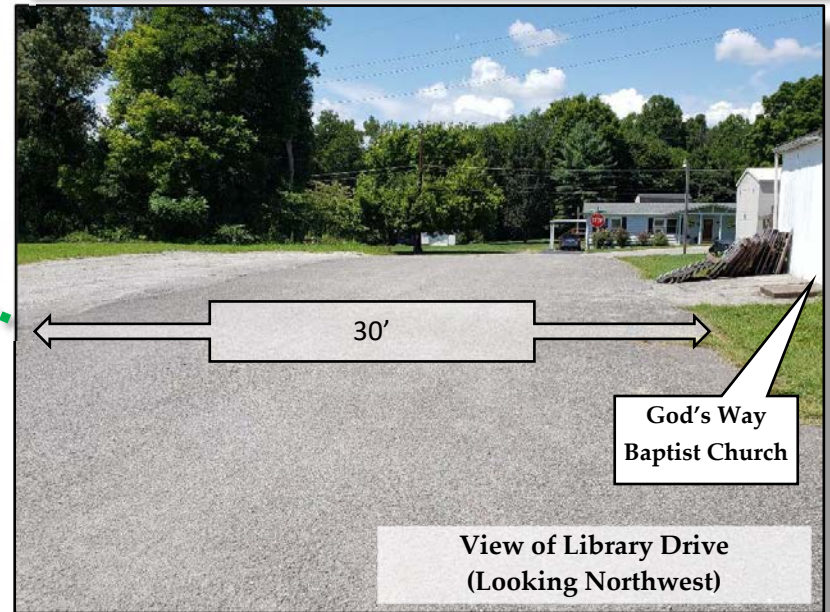




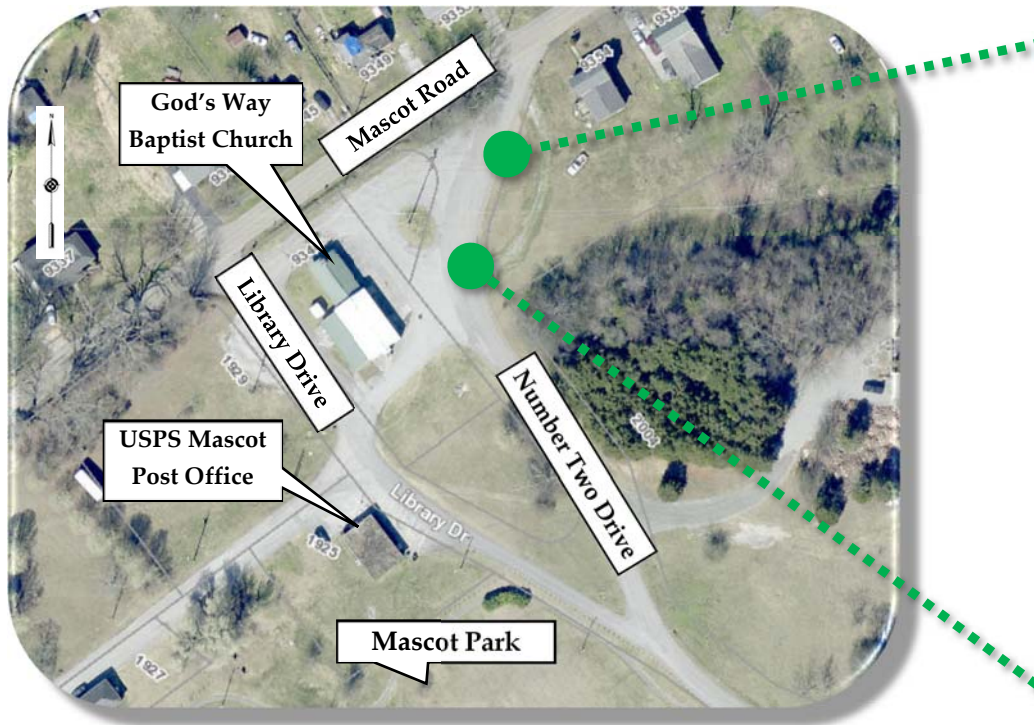
Number Two Drive and Library Drive



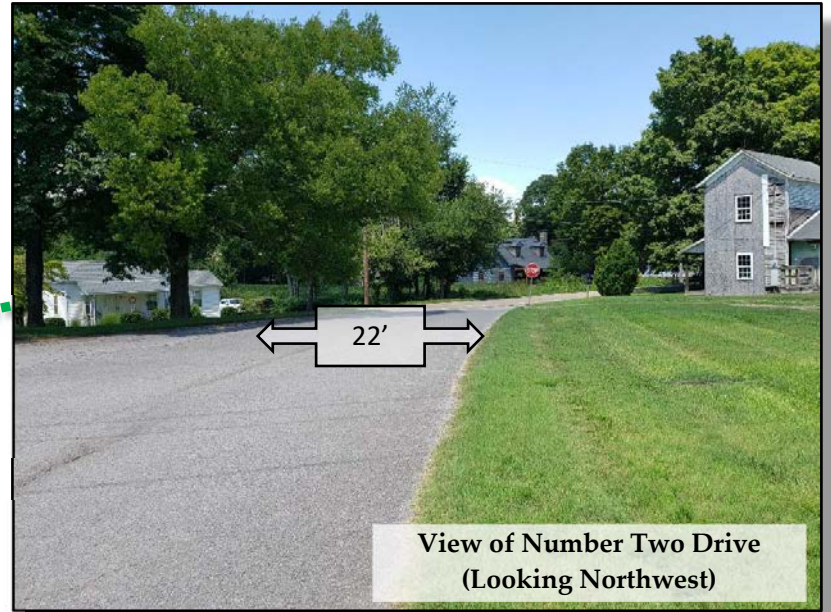
View of Number Two Drive (Looking Northwest)



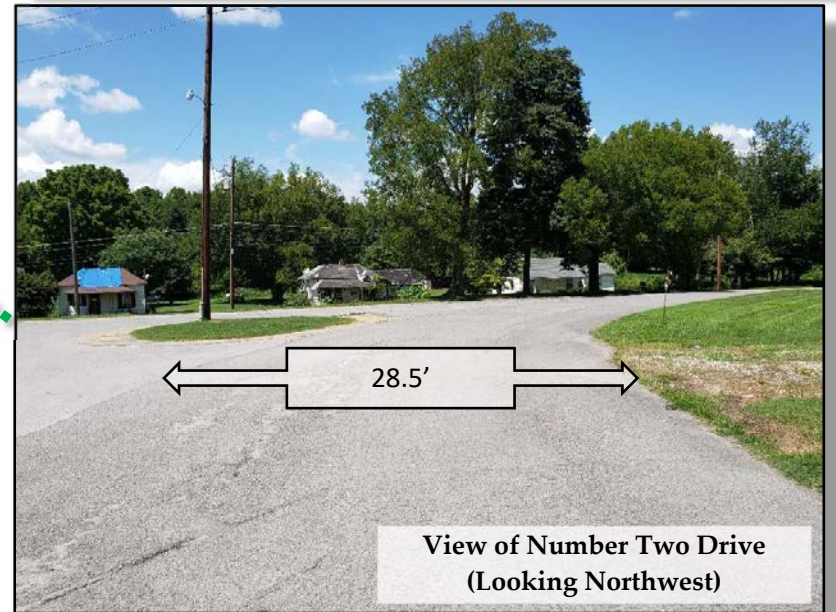
View of Library Drive (Looking Northwest)



Number Two Drive and Library Drive



View of Number Two Drive (Looking Northwest)



View of Number Two Drive (Looking Northwest)

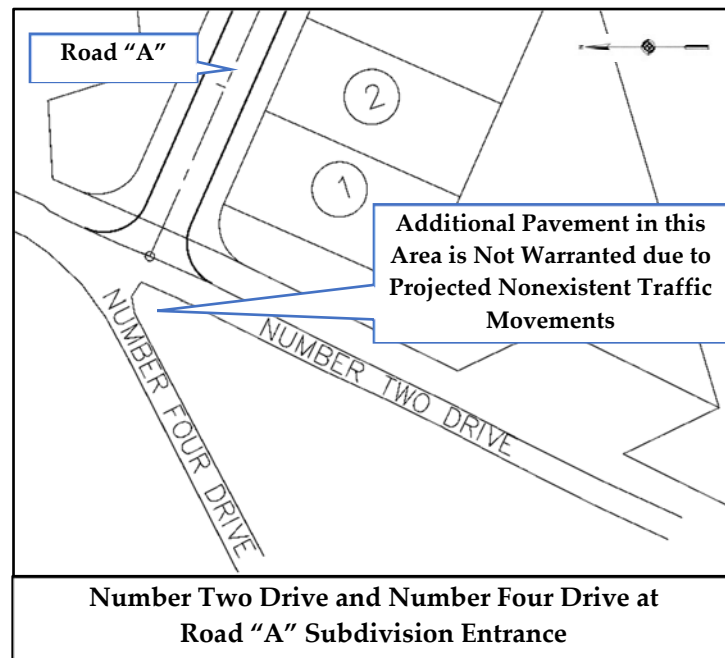
## CONCLUSIONS & RECOMMENDATIONS

The following is an overview of recommendations to minimize the transportation impacts of the proposed development on the adjacent road system while attempting to achieve an acceptable level of traffic flow and safety. A summary of the recommendations is provided at the end of this section in Figure 9. The recommendations marked with an asterisk indicate an existing need and are not associated with the projected transportation impacts of the proposed subdivision.



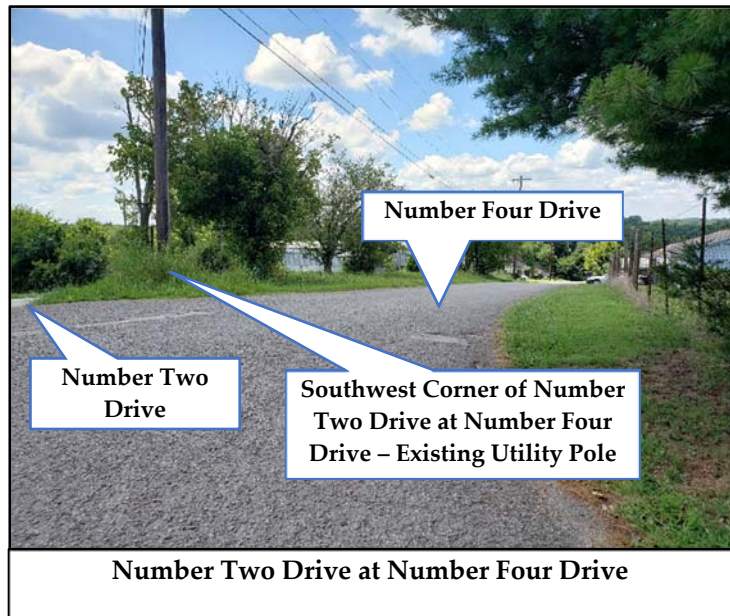
### Number Two Drive & Number Four Drive at Road "A":

- 1a) The capacity calculation results shown in Table 6 indicated that the intersection of Number Two Drive and Number Four Drive at Road "A" should operate very well during the AM and PM peak periods once the development becomes fully occupied. The level of service for exiting vehicles at Road "A" with a single lane will also operate at a particularly good level.
  
- 1b) Exclusive entering turn lanes are not recommended due to the low traffic volumes. The concept plan shows Road "A" tying into Number Two Drive roughly opposite of Number Four Drive and will create a skewed 4-way intersection.



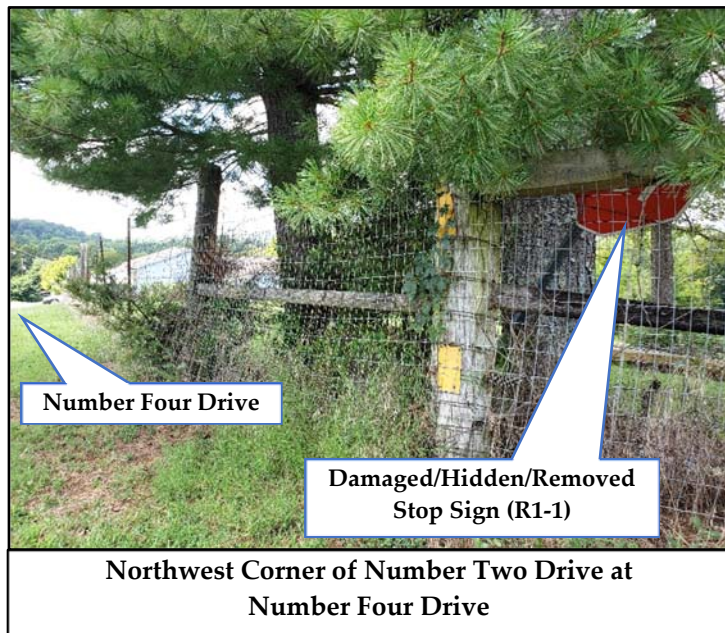
As seen in the above exhibit, the proposed subdivision entrance road, Road "A" will

intersect Number Two Drive slightly to the south of the centerline of Number Four Drive, which would make thru movements from Number Four Drive to Road "A" difficult. However, it is not expected that any motorists will make this maneuver. It is not recommended or warranted to provide additional pavement at the southwest



corner of Number Four Drive and Number Two Drive. A utility pole would need to be moved if pavement were added in this intersection corner.

- \* 1c) The existing Stop Sign (R1-1) for the Number Four Drive approach at Number Two Drive has been damaged/removed/hidden. It is currently lying behind a fence in the northwest corner. It should be reinstated back to the southwest corner for the Number Four Drive approach at Number Two Drive.



- 1d) Sight distance at the new proposed Road "A" at Number Two Drive intersection must not be impacted by new signage, future landscaping, or existing vegetation. The existing site has a utility pole and an arborvitae tree to the north of the proposed subdivision entrance location. The utility pole may need to be removed for the

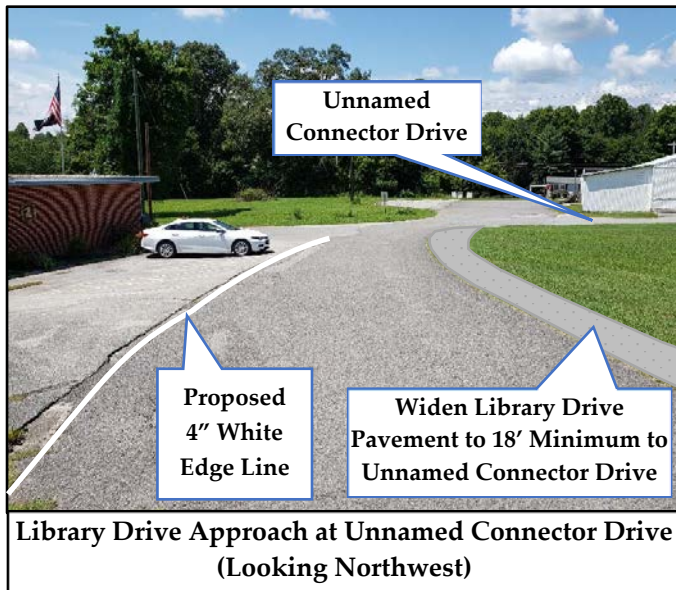
construction of the entrance, and the tree will need regular maintenance in the future to not interfere with sight distance to the north. Based on a speed limit of 25-mph on Number Two Drive, the required Intersection Sight Distance (ISD) is 250 feet. On the southbound approach of Number Two Drive at the proposed Road "A" intersection, the SSD is calculated to be 155 feet. On the northbound approach of Number Two Drive at the proposed Road "A" intersection, the SSD is calculated to be 140 feet. These distances should be verified in the design plans and must be verified by a licensed land surveyor in the field. These distances must be met to ensure safe operations.

- 1e) It is recommended that the Road "A" entrance approach at Number Two Drive be designed and constructed with a 24" white stop bar and a Stop Sign (R1-1). The stop bar should be applied at a minimum of 4 feet away from the edge of Number Two Drive and should be placed at the desired stopping point that provides the maximum sight distance.



**Number Two Drive & Library Drive:** Number Two Drive and Library Drive will be the primary access roads between the proposed residential development and outside destinations. The road widths in between Mascot Road and the proposed subdivision are adequate along Number Two Drive, but Library Drive currently has substandard road widths in between the post office and Number Two Drive.

- \* 2a) It is recommended that a minimum width of 18 feet be provided on Library Drive in between the post office and Number Two Drive to provide adequate road width. The current road width of this road in this section is between 13 feet to 15 feet. It is expected that River Pointe Subdivision residents traveling to and from the west on Mascot Road will utilize Library Drive due to the physical layout of Library Drive and Number Two Drive. It is expected that the road widening should occur on the east side of Library Drive to avoid encroaching on Mascot Park and the parking lot of the USPS Mascot Post Office. The length of the recommended road widening is approximately 275 feet.

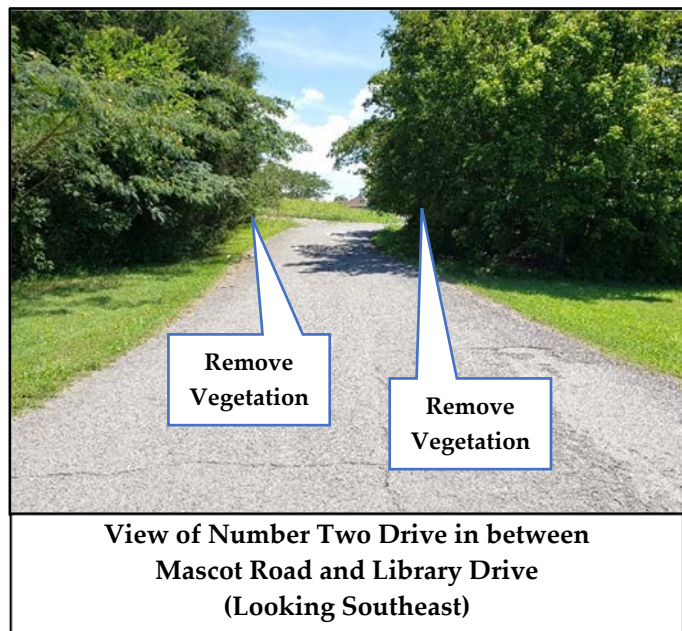


The widening of Library Drive is recommended to occur from the Y-intersection with Number Two Drive to the north up to the intersection with the unnamed connector drives that run to the north of the post office and to the south of God's Way Baptist Church. It is also recommended that a 4" white edge line be installed to delineate the roadway from the post office parking lot.

- \* 2b) It is recommended that the Library Drive southbound approach at the existing Y-intersection at Number Two Drive operate as a stop condition. A Stop Sign (R1-1) and 24" white stop bar should be installed on the Library Drive approach. Both approaches at this intersection currently operate under uncontrolled conditions.



- \* 2c) It is recommended that the vegetation along Number Two Drive in between Mascot Road and Library Drive be removed and maintained. The vegetation is currently encroaching on the roadway and interferes with sight distance along the roadway.



- \* 2d) It is recommended that 25-mph Speed Limit Signs (R2-1) be installed on Number Two Drive and Library Drive. These signs should be installed for southbound travel towards the new residential development. A speed limit sign should be installed on Number Two Drive just past God's Way Baptist Church. A speed limit sign should be installed on Library Drive just past the post office.

- \* 2e) It is recommended that the large expanse of pavement at the horizontal curve adjacent to God's Way Baptist Church on Number Two Drive be delineated with pavement markings. The roadway delineation is recommended to be a white edge line or transverse white pavement islands or as deemed appropriate or directed by Knox County Engineering. Delineating the roadway edge will be beneficial to roadway safety.

The pavement markings should be laid out to separate the parking lot and should consider the parking lot entrance and exit aisleways.



- \* 2f) It is recommended that the vegetation on the south side of Mascot Road and to the west of the intersections with Library Drive and Number Two Drive be removed to ensure proper sight distances are provided. Sight distance is hindered by existing vegetation, and in the case of Number Two Drive, sight distance is complicated due to the acute angle of the intersecting roads. The sight distance was estimated with a Nikon Laser Rangefinder at these intersections, and the distances were found to be marginal to



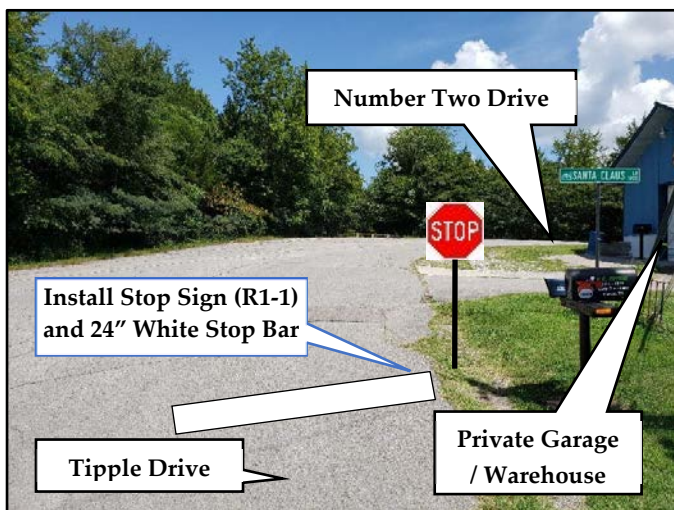
substandard. The sight distances at these intersections need to be verified by a licensed land surveyor to ensure safe vehicle operations. A land surveyor should be able to mark or delineate the amount of vegetation that will need to be removed on the south side of Mascot Road to provide the appropriate sight distance.

- \* 2g) The intersection of Number Two Drive at Tipple Drive currently operates as a quasi-4-way intersection. The 4<sup>th</sup> leg of this intersection, the east approach, has an abrupt end and continues as a driveway to an undeveloped private property to the east. Currently, this approach has a set of cinder blocks and wood posts for a road barrier. In actuality, this intersection operates as a 3-way intersection



**View of Number Two Drive Approach at Tipple Drive  
(Looking Southeast)**

with the southbound Number Two Drive approach operating under stop conditions with a Stop Sign (R1-1). However, during the field review, very few motorists were observed coming to a stop. Most of the observed motorists completed rolling stops.

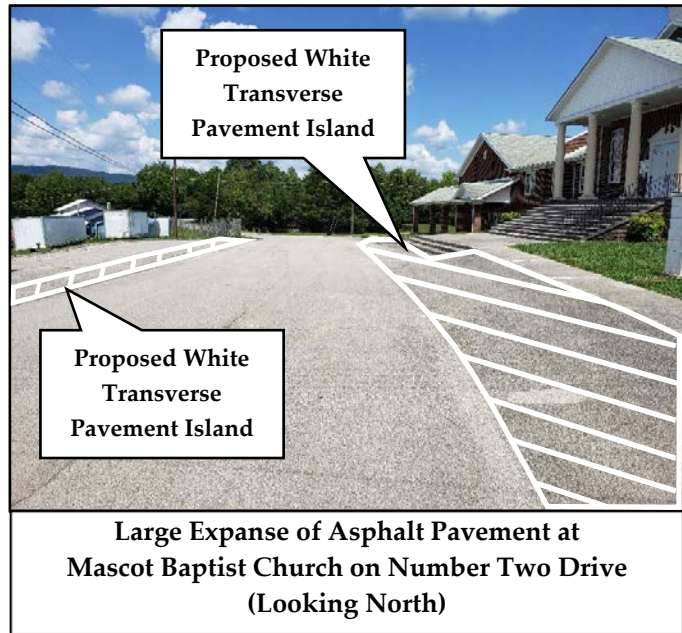


**View of Number Two Drive Approach from  
Tipple Drive  
(Looking East)**

Due to the low compliance rate, the County should consider removing this Stop Sign for this approach as it contributes to the disregard of Stop Signs. Since a more significant number of vehicles will be traveling northbound and southbound on Number Two Drive once the subdivision is developed, it is recommended that the stop condition be assigned to the Tipple Drive approach and allow Number Two Drive to operate freely. It is assumed that very few vehicles use the Tipple Drive approach at Number Two Drive. With the increase northbound

and southbound travel combined with the reduced sight distance from Tipple Drive looking to the south, it is recommended that a Stop Sign (R1-1) and a 24" white stop bar be installed on the Tipple Drive approach. Sight distance to the south is reduced from Tipple Drive due to the placement of the private garage/warehouse on the southwest corner of the intersection.

- \* 2h) Similar to the existing pavement expanse on Number Two Drive at God's Way Baptist Church, Mascot Baptist Church also has extraneous pavement adjacent to Number Two Drive. It is recommended that this section of Number Two Drive also be delineated with a white edge line or transverse white pavement islands or as deemed appropriate by Knox County Engineering.



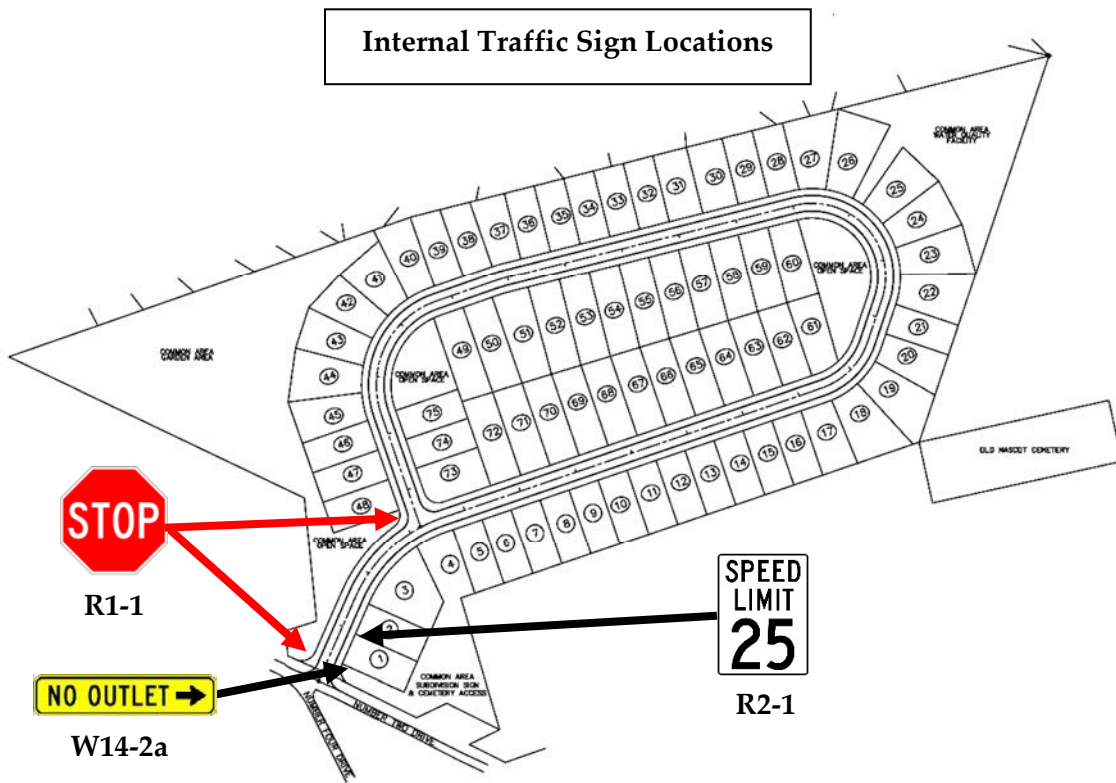
- \* 2i) It is recommended that Church Zone Signs be installed on each approach of Number Two Drive in advance of Mascot Baptist Church. It is recommended that this signage be installed on the southbound approach of Number Two Drive just to the south of the intersection of Number Two Drive at Tipple Drive. The signage for the northbound approach of Number Two Drive should be installed just to the north of the proposed subdivision entrance, Road "A".





**River Pointe Subdivision Internal Roads:** The current concept plan shows one new looped street being constructed within the development, as shown in Figure 3.

- 3a) It is recommended that a “No Outlet” Sign (W14-2a) be posted at the front of the subdivision on Road “A”. This sign can be posted below the street name sign. A 25-mph Speed Limit Sign (R2-1) should also be posted at the beginning of Road “A”.
- 3b) Stop Signs (R1-1) with 24” white stop bars and the other traffic signage should be installed at the locations as shown below:



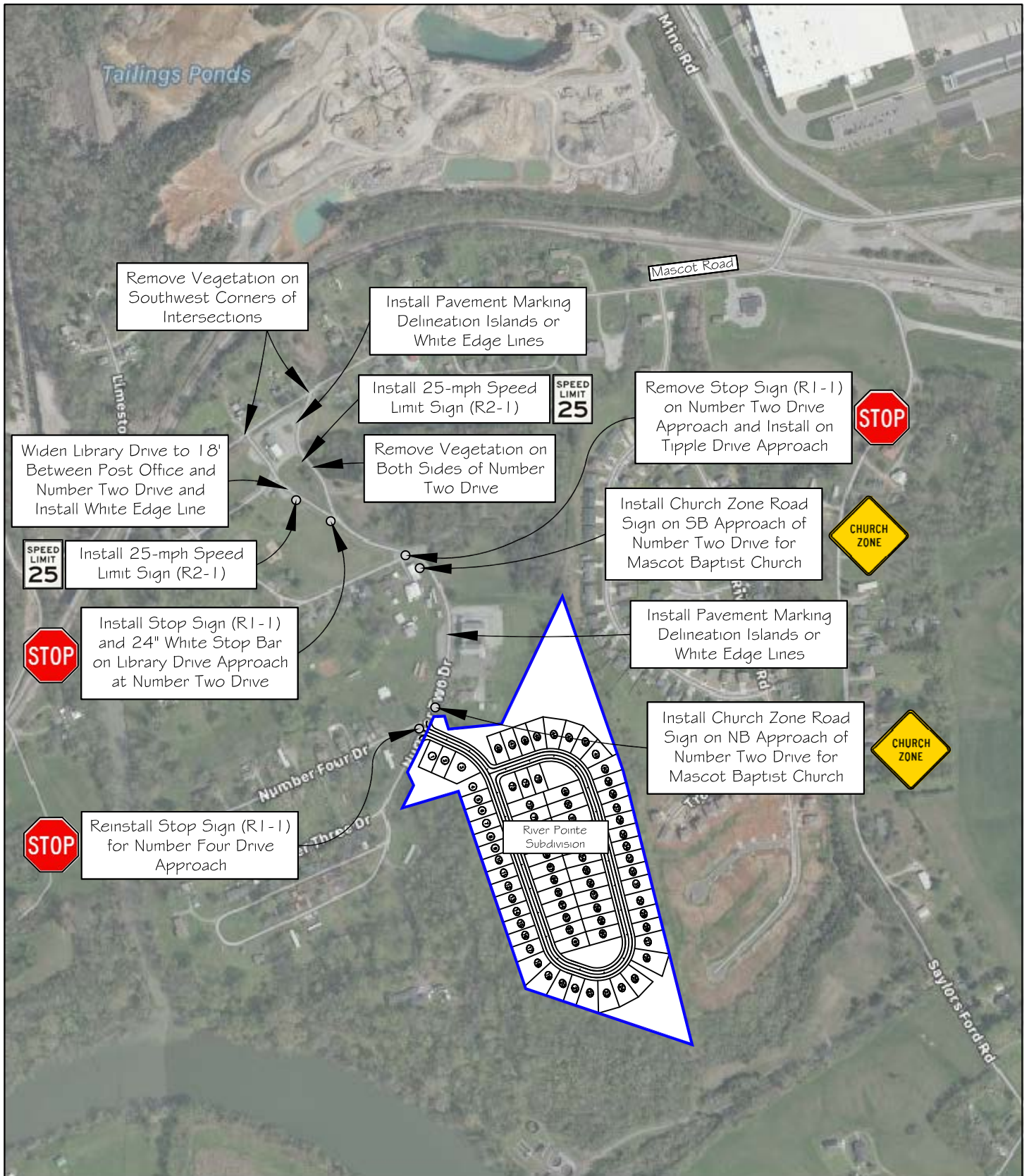
- 3c) Sight distance at the new internal intersections in the subdivision must not be impacted by new signage or future landscaping. For a posted speed limit of 25-mph in the subdivision, the intersection sight distance requirement is 250 feet. The stopping sight distance required is 155 feet for a level road grade. The road layout designer should ensure that these sight distance lengths are met, and they should be labeled on the plans.
- 3d) All drainage grates and covers for the residential development need to be pedestrian and bicycle-safe.

- 3e) The United States Postal Service (USPS) has recently implemented changes to its guidelines for delivery in new residential subdivisions. If directed by the local post office, the designer should include an area within the development with a parking area for a centralized mail delivery center.



**Centralized USPS Delivery Center**

- 3f) All road grade and intersection elements, internally and externally, should be designed to AASHTO, TDOT, and Knox County specifications and guidelines to ensure proper operation.



11812 Black Road  
 Knoxville, TN 37932  
 Phone: (865) 556-0042  
 Email: ajaxengineering@gmail.com

NOT TO SCALE



FIGURE 9

River Pointe Subdivision

Summary of External Recommendations

**APPENDIX A**

**HISTORICAL TRAFFIC COUNT DATA**

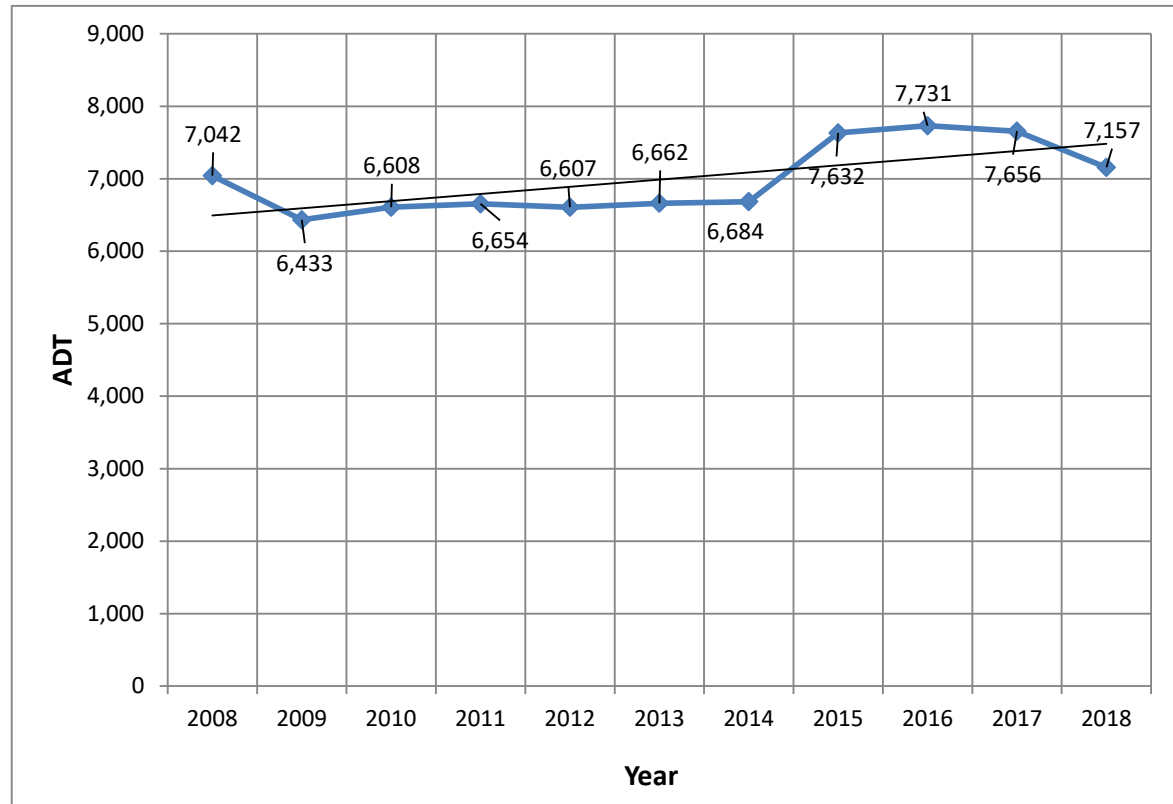
## Historical Traffic Counts

Organization: TDOT

Station ID #: 000037

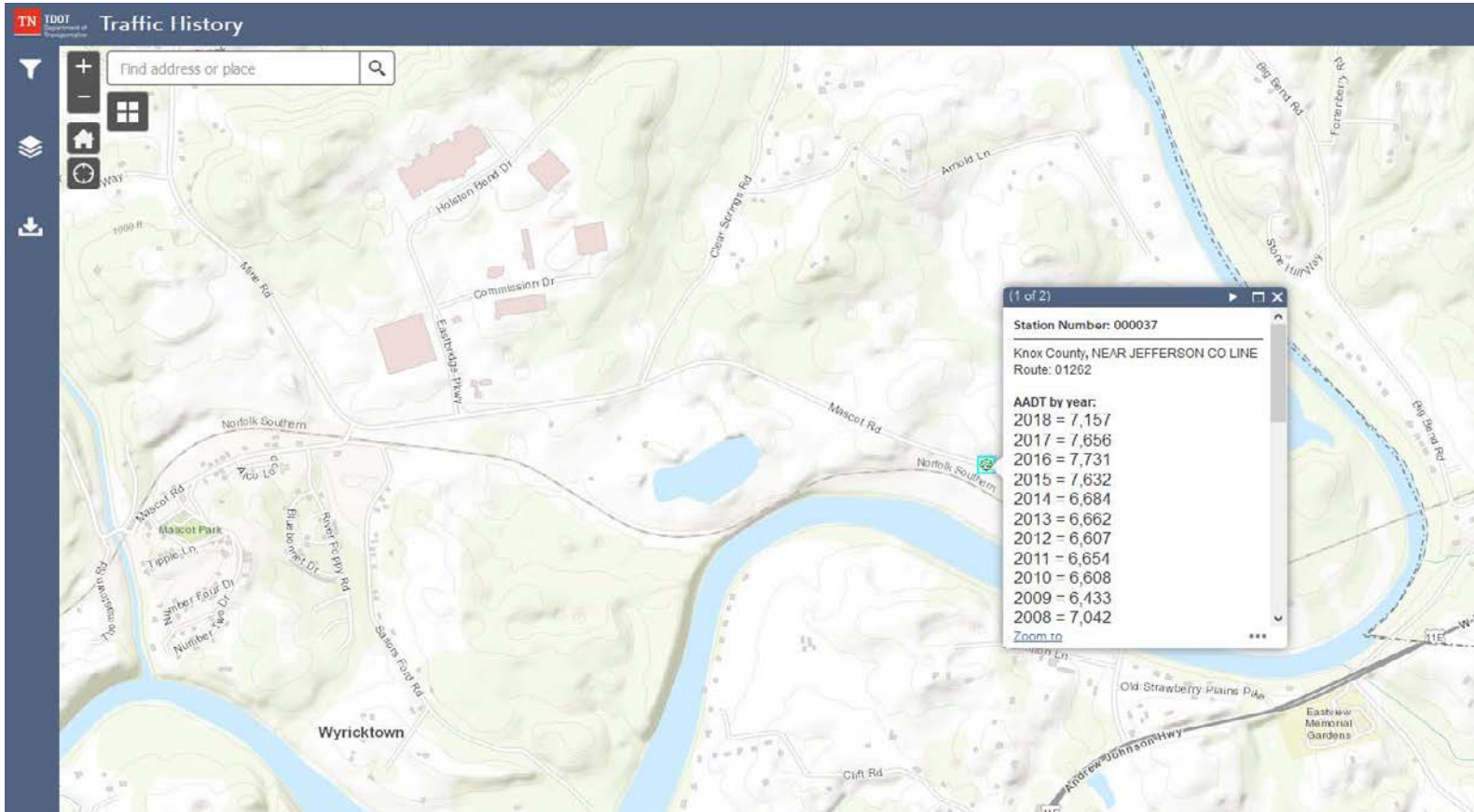
Location: Mascot Road near Jefferson County Line

YEAR	ADT	Trendline
2008	7,042	
2009	6,433	
2010	6,608	
2011	6,654	
2012	6,607	
2013	6,662	
2014	6,684	
2015	7,632	
2016	7,731	
2017	7,656	
2018	7,157	



2008 - 2018 Growth Rate = 1.6%

Average Annual Growth Rate = 0.2%





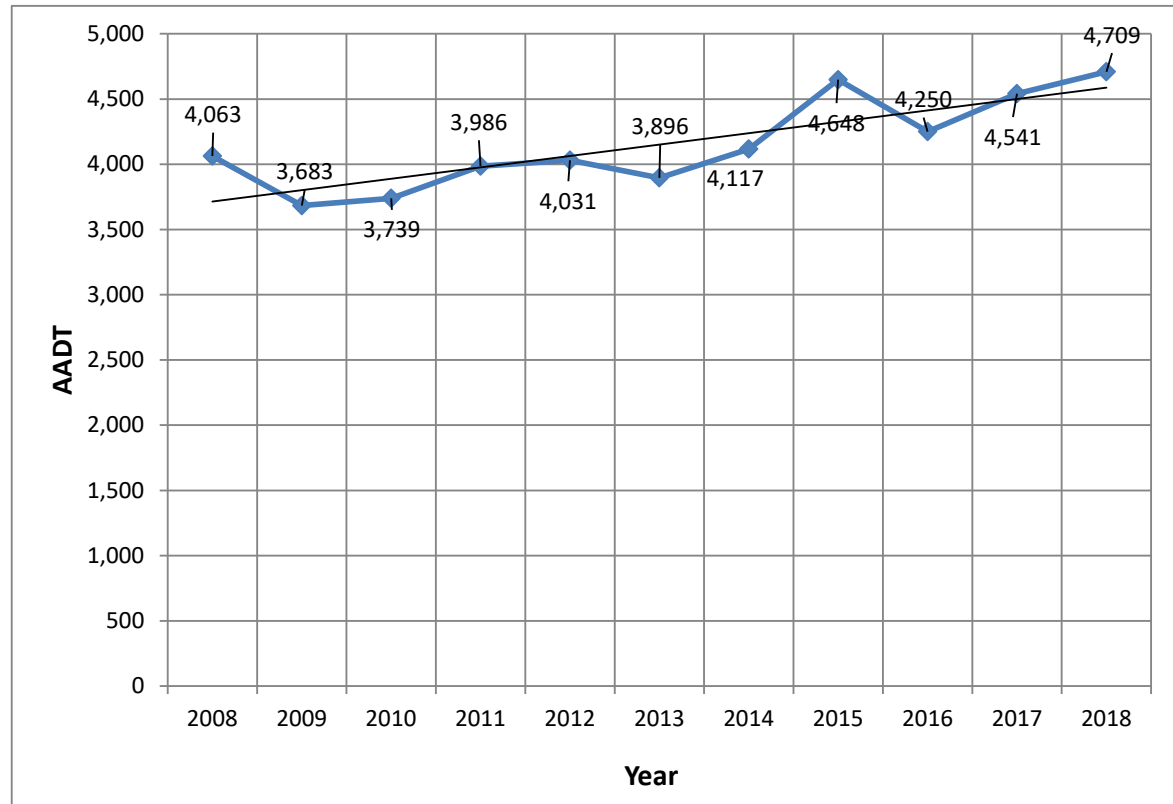
## Historical Traffic Counts

Organization: TDOT

Station ID #: 000423

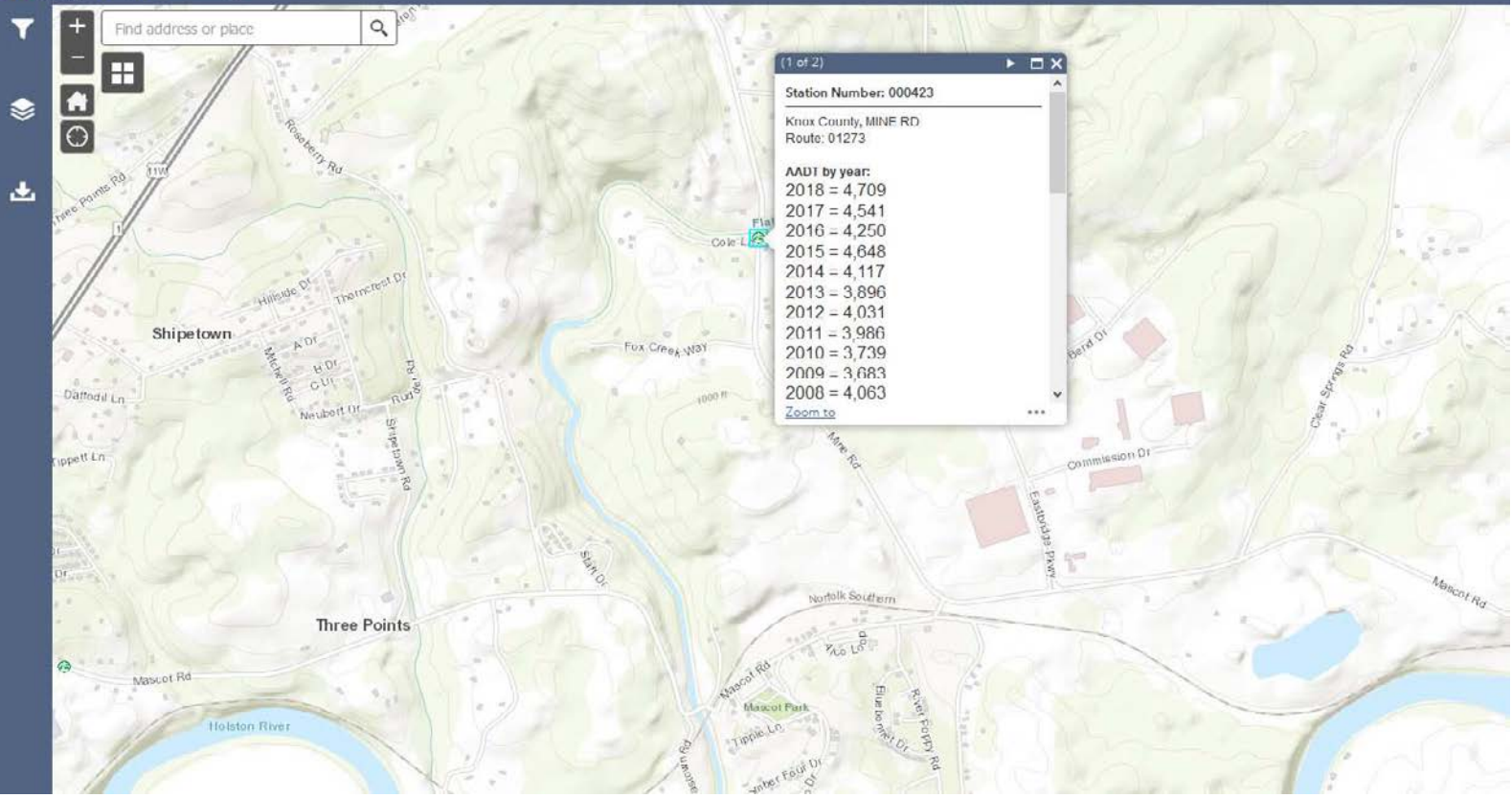
Location: Mine Road

YEAR	AADT	
2008	4,063	Trendline
2009	3,683	
2010	3,739	
2011	3,986	
2012	4,031	
2013	3,896	
2014	4,117	
2015	4,648	
2016	4,250	
2017	4,541	
2018	4,709	



2008 - 2018 Growth Rate = 15.9%

Average Annual Growth Rate = 1.5%



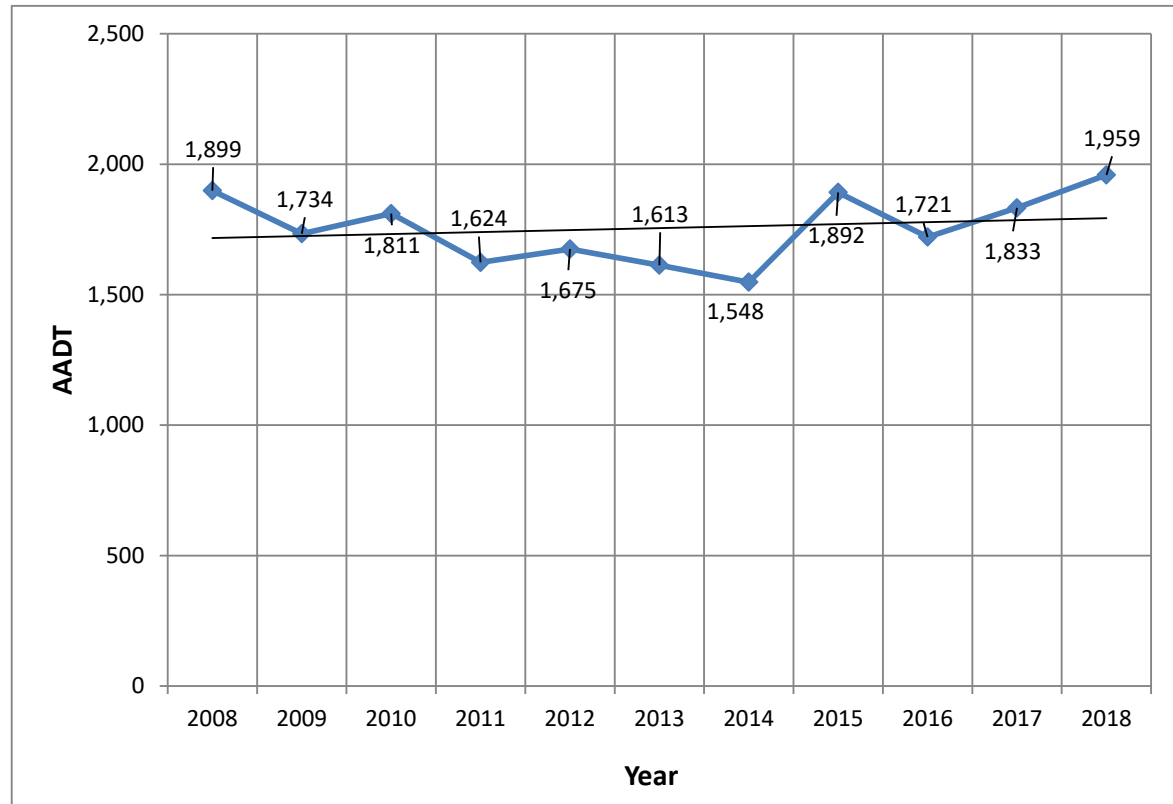
## Historical Traffic Counts

Organization: TDOT

Station ID #: 000035

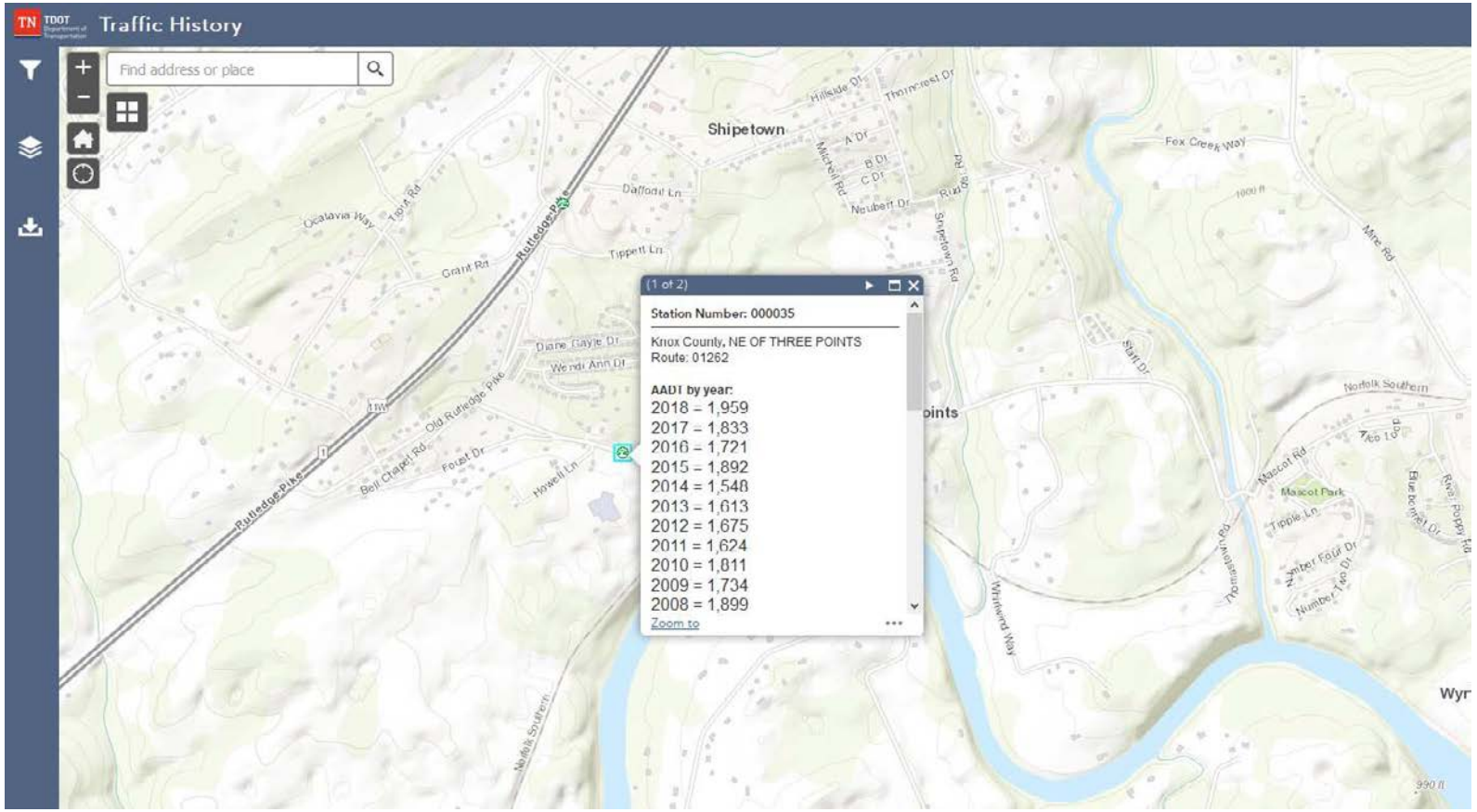
Location: Mascot Road

YEAR	AADT	
2008	1,899	Trendline
2009	1,734	
2010	1,811	
2011	1,624	
2012	1,675	
2013	1,613	
2014	1,548	
2015	1,892	
2016	1,721	
2017	1,833	
2018	1,959	



2008 - 2018 Growth Rate = 3.2%

Average Annual Growth Rate = 0.3%





**APPENDIX B**

**WALK SCORE**

# WALKSCORE


(from walkscore.com)




**Walk Score**  [Get Scores](#) [Find Apartments](#) [My Favorites](#) [Add to Your Site](#)

  [Go](#)

## 1740 Number Two Drive

A location in Mascot

Commute to **Downtown Knoxville** 

 45 min  60+ min  60+ min [View Routes](#)

[Favorite](#) [Map](#) [Nearby Apartments](#)

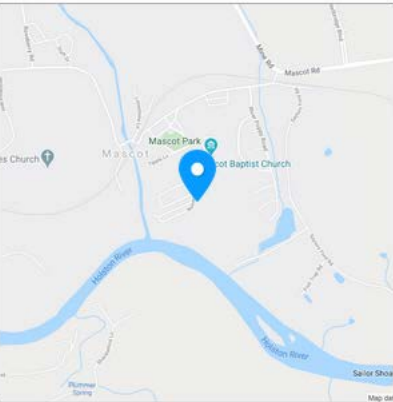
**Walk Score**  
**4**

**Car-Dependent**  
Almost all errands require a car.

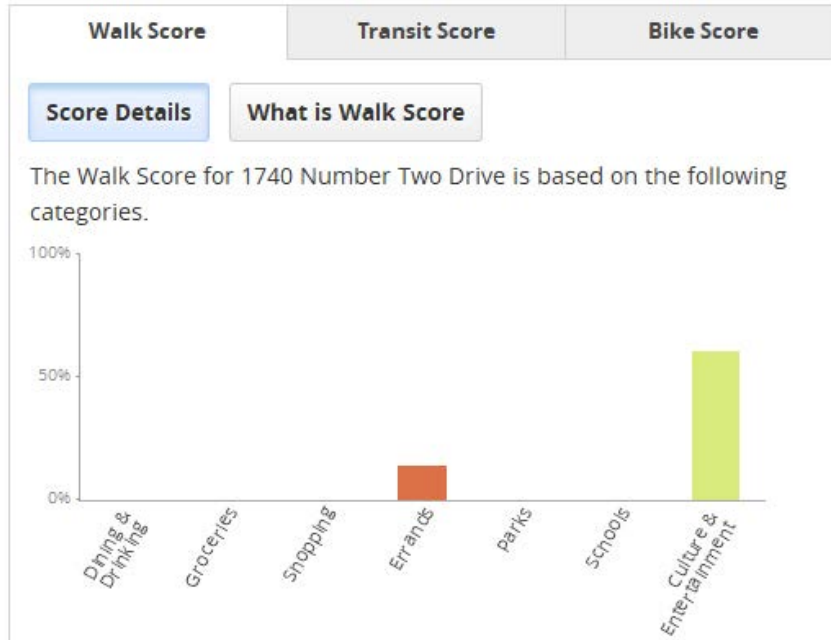
**Bike Score**  
**11**

**Somewhat Bikeable**  
Minimal bike infrastructure.

[About your score](#)  
[Add scores to your site](#)



## Scores for 1740 Number Two Drive



## Scores for 1740 Number Two Drive



Walk Score	Transit Score	Bike Score
------------	---------------	------------

Transit Score measures how well a location is served by public transit based on the distance and type of nearby transit lines.

<b>90-100</b>	<b>Rider's Paradise</b> World-class public transportation
<b>70-89</b>	<b>Excellent Transit</b> Transit is convenient for most trips
<b>50-69</b>	<b>Good Transit</b> Many nearby public transportation options
<b>25-49</b>	<b>Some Transit</b> A few nearby public transportation options
<b>0-24</b>	<b>Minimal Transit</b> It is possible to get on a bus

## Scores for 1740 Number Two Drive

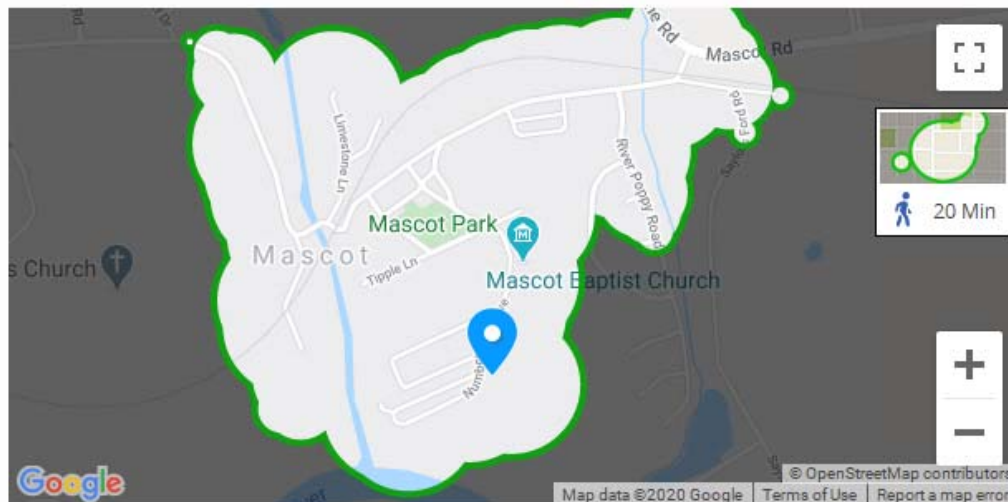


Walk Score	Transit Score	Bike Score
Bike Score measures whether an area is good for biking based on bike lanes and trails, hills, road connectivity, and destinations.		
90-100	<b>Biker's Paradise</b>	Daily errands can be accomplished on a bike
70-89	<b>Very Bikeable</b>	Biking is convenient for most trips
50-69	<b>Bikeable</b>	Some bike infrastructure
0-49	<b>Somewhat Bikeable</b>	Minimal bike infrastructure

## Travel Time Map

[Add to your site](#)

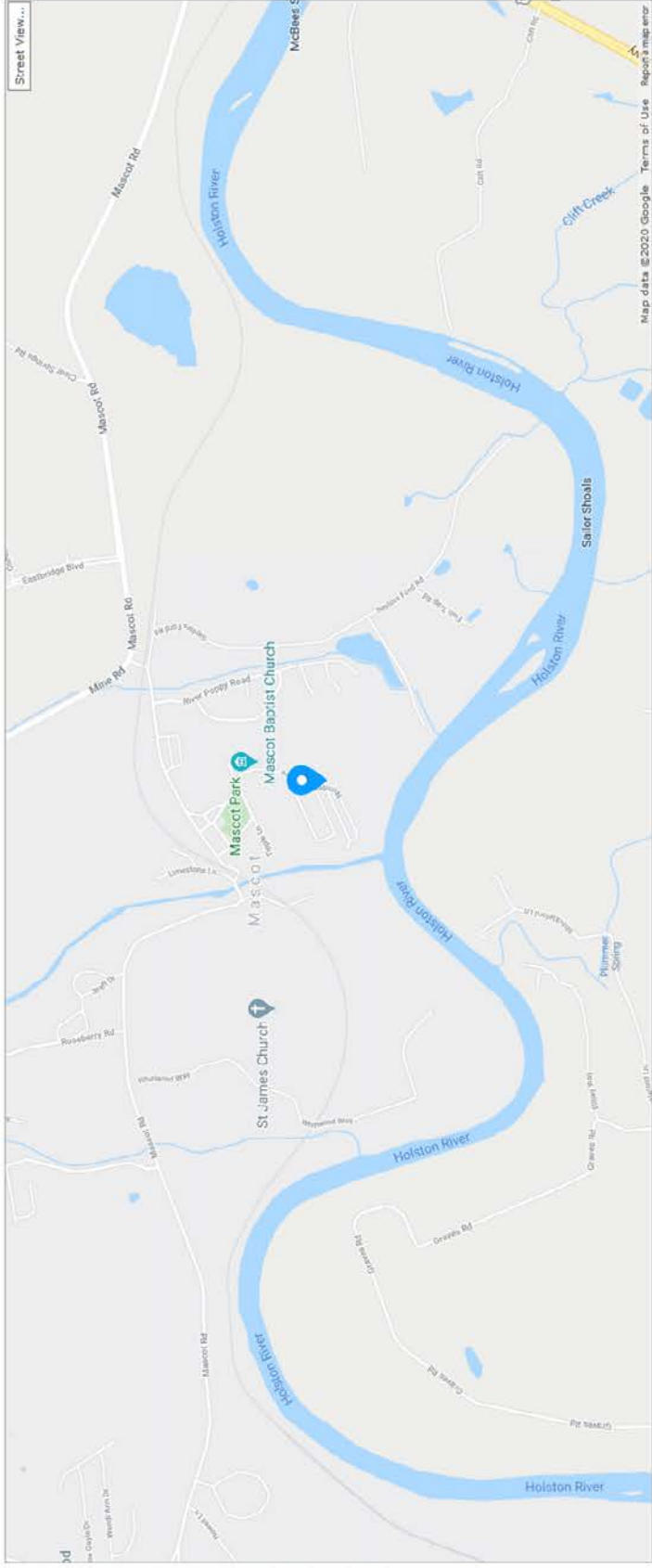
Explore how far you can travel by car, bus, bike and foot from 1740 Number Two Drive.





**What's Nearby**

- Restaurants:**
  - Pizza Plus 2.2mi
- Coffee:**
  - Pike House Coffee 7.5mi
- Bars:**
  - Rising Moon Saloon 3.2mi
- Groceries:**
  - Town and Country Market & G... 2.4mi
- Parks:**
  - Mascot Park .4mi
- Schools:**
  - East Knox Elementary School 2.3mi
- Shopping:**
  - Little Recalls Repeats 1.8mi
- Entertainment:**
  - Redbox 7.3mi
- Errands:**
  - US Post Office .3mi
- Search Nearby:**



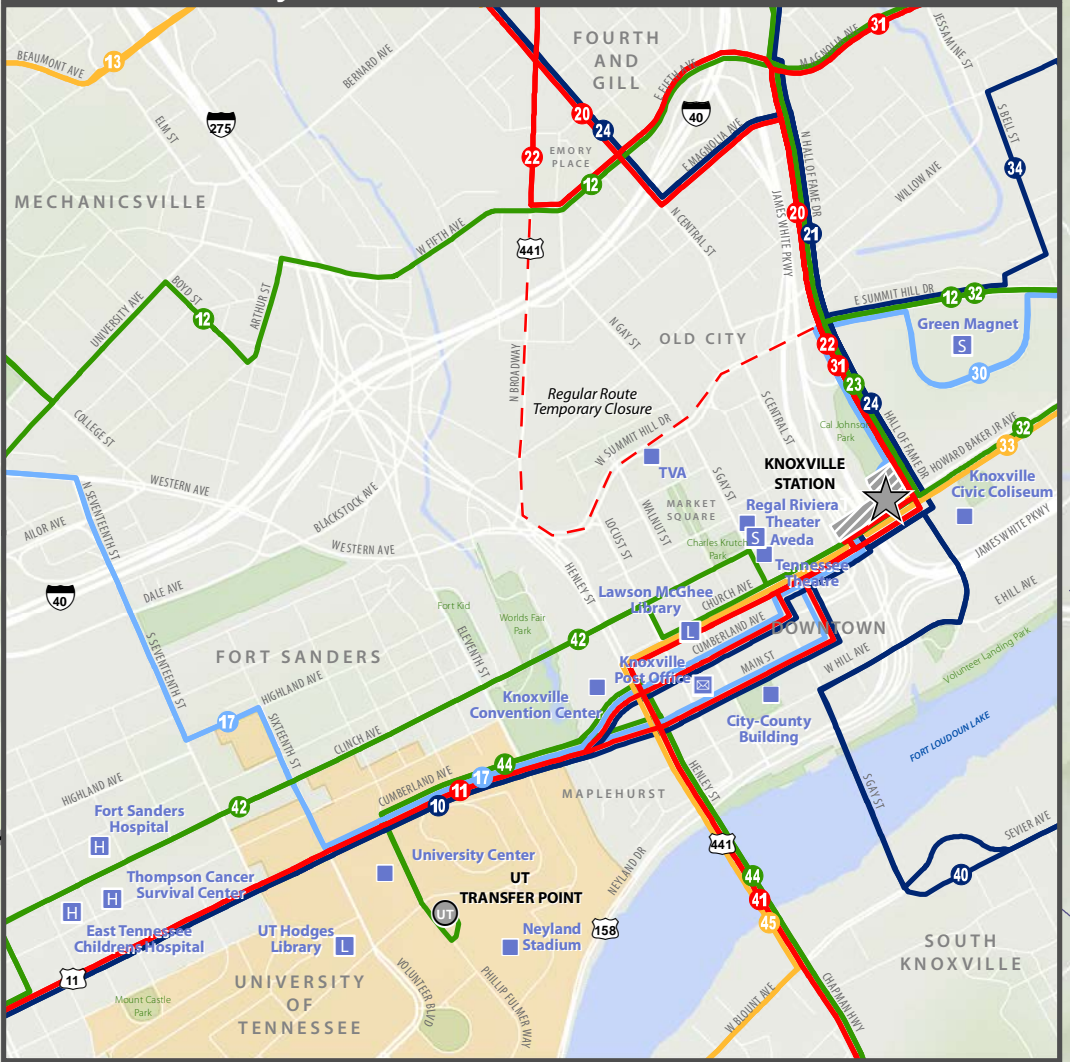
Map data ©2020 Google Terms of Use Report a map error

Something missing? Add a place

**APPENDIX C**

**KNOXVILLE AREA TRANSIT MAP AND INFORMATION**

# Knoxville City Center



**Legend**

- Transfer Point
- Lift Service Area Boundary

**Points of Interest**

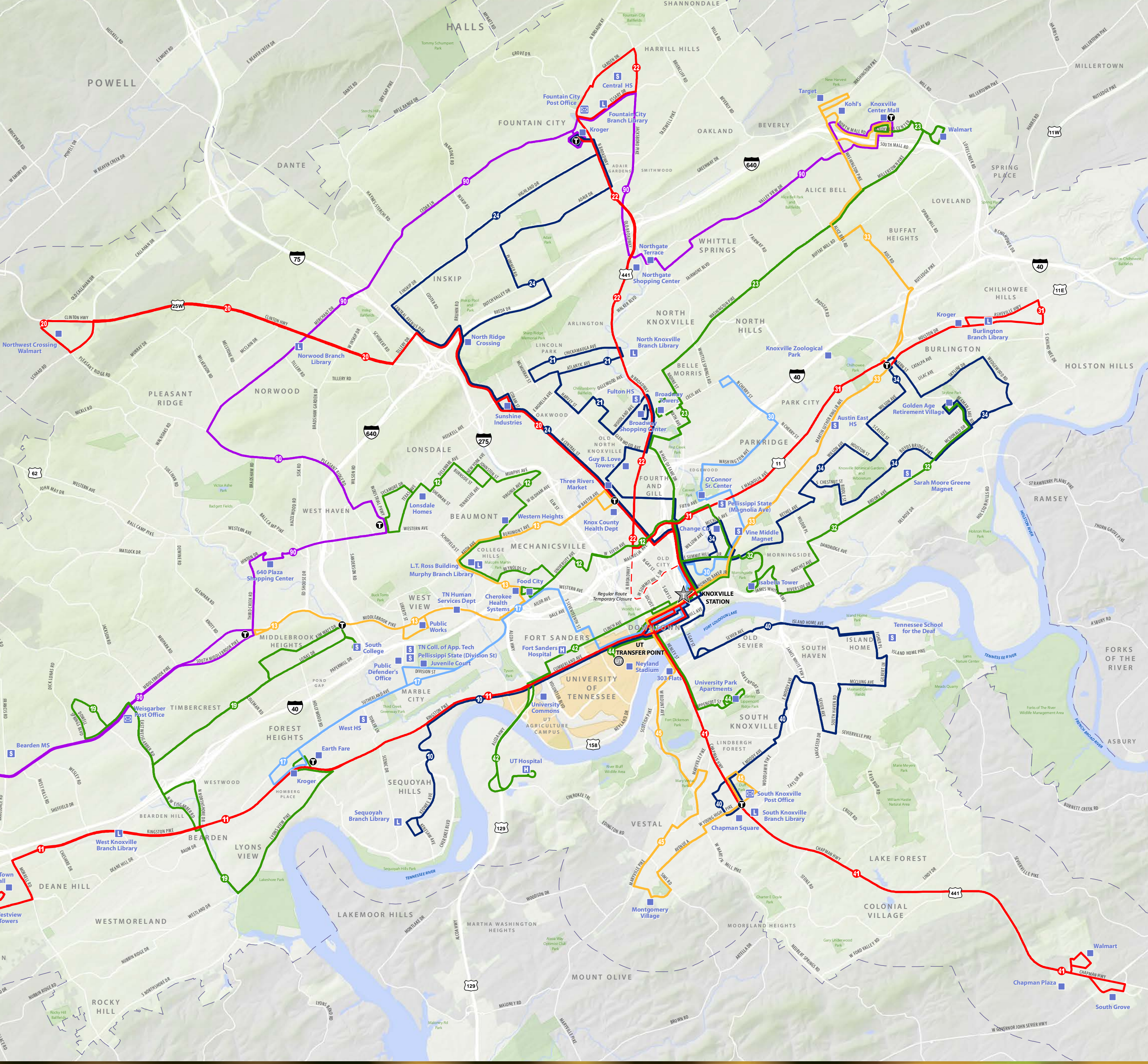
- Hospital
- Library
- Post Office
- School
- Point of Interest

**Distances**

0 5 10 Minutes Walking

0 5 10 Minutes Biking

0 0.5 1 Map Scale in Miles



## FARE INFORMATION

With a base fare of \$1.50, KAT offers a variety of passes. Please note that only the fares marked with an asterisk can be purchased when boarding the bus. Others are available at KAT's Customer Service Counter at Knoxville Station (301 Church Ave.) or by mail via [katbus.com](http://katbus.com).

FARE TYPE	REGULAR FARE	REDUCED FARE
One-Ride Pass*	\$1.50	\$0.75
1 Day Pass*	\$4.00	\$2.00
7 Day Pass	\$15.00	\$7.50
30 Day Pass	\$50.00	\$25.00
20 Ride Pass	\$25.00	\$12.50
Transfer*	\$0.50	\$0.25

### REDUCED FARE INFORMATION

A reduced fare is available to those who qualify. Qualifying individuals include seniors age 65 or over, Medicare card holders, students under the age of 18, and persons with disabilities. Proper identification (Medicare card or a valid KAT I.D. card) is required before boarding. For more information on how to obtain a discounted-fare I.D. visit [katbus.com/fares](http://katbus.com/fares) or call 637-3000.

### BUS STOPS ONLY!

KAT buses stop ONLY at locations designated by bus stop signs. Generally, bus stops are located at least every 1/4 mile along the route.

### KAT HOLIDAYS

KAT buses do not run on the following holidays:

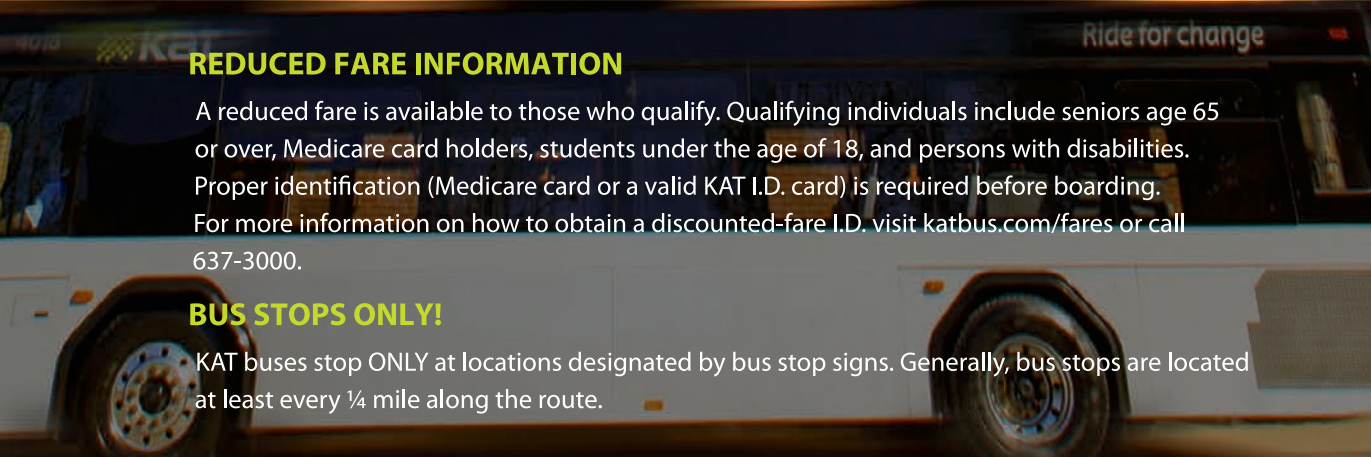
- New Year's Day
- Thanksgiving
- Independence Day
- Christmas

Please note that KAT's Knoxville Station Customer Service counter is also closed during those days.

KAT buses run on a Saturday schedule on the following holidays:

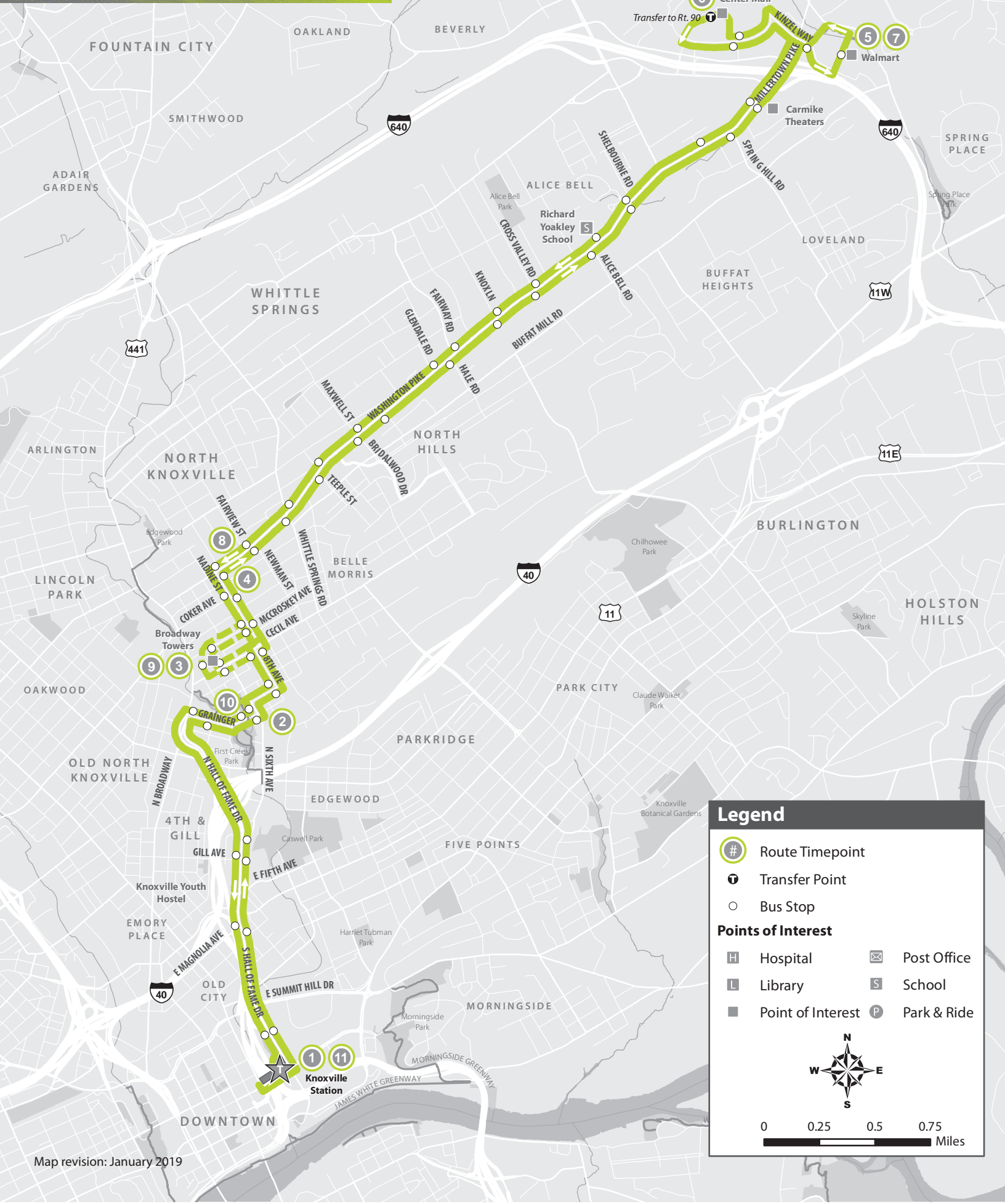
- Martin Luther King, Jr. Day
- Day after Thanksgiving
- Memorial Day
- Christmas Eve
- Labor Day

KAT's administrative offices are closed on all holidays listed above.



# 23 MILLERTOWN

(Weekdays and Weekends)



### Legend

- # Route Timepoint
- T Transfer Point
- Bus Stop

### Points of Interest

<span style="border: 1px solid black; padding: 2px;">H</span> Hospital	<span style="border: 1px solid black; padding: 2px;">✉</span> Post Office
<span style="border: 1px solid black; padding: 2px;">L</span> Library	<span style="border: 1px solid black; padding: 2px;">S</span> School
<span style="border: 1px solid black; padding: 2px;">■</span> Point of Interest	<span style="border: 1px solid black; padding: 2px;">P</span> Park & Ride

0 0.25 0.5 0.75 Miles



# MILLERTOWN

(Weekdays and Weekends)

## SERVES:

- ★ Broadway Towers
- ★ Carmike 10 Cinemas
- ★ Knoxville Center Mall
- ★ Knoxville Station/Downtown

Regal Knoxville Center 10

★ Walmart: Millertown Pike



Information Updated: January 2019

Going away from downtown							Going toward downtown						
T Transfer to:						Rt. 90 Westbound							
Knoxville Station—Platform I	Grainger at Sixth	Broadway Towers	Nadine at Washington Pk	Walmart	Knoxville Center Mall (Arrives)		Knoxville Center Mall (Leaves)	Walmart	Washington at Fairview	Broadway Towers	Sixth at Grainger	Knoxville Station	
1	2	3	4	5	6	Bus Goes On To Serve	6	7	8	9	10	11	
WEEKDAY SCHEDULE													
A.M.	—	—	—	—	—	—	—	5:30	5:37	5:49	—	5:56	6:10
	—	—	—	—	—	—	—	6:30	6:37	6:49	—	6:56	7:10
	6:15	6:24	—	6:29	6:45	6:55	Rt. 33	7:30	7:37	7:49	—	7:56	8:10
	7:15	7:24	—	7:29	7:45	7:55	Rt. 33	8:30	8:37	8:49	8:54	8:56	9:10
	8:15	8:24	—	8:29	8:45	8:55	Rt. 33	9:30	9:37	9:49	9:54	9:56	10:10
	9:15	9:24	9:27	9:29	9:45	9:55	Rt. 33	10:30	10:37	10:49	10:54	10:56	11:10
	10:15	10:24	10:27	10:29	10:45	10:55	Rt. 33	11:30	11:37	11:49	11:54	11:56	12:10
	11:15	11:24	11:27	11:29	11:45	11:55	Rt. 33	12:30	12:37	12:49	12:54	12:56	1:10
P.M.	12:15	12:24	12:27	12:29	12:45	12:55	Rt. 33	1:30	1:37	1:49	1:54	1:56	2:10
	1:15	1:24	1:27	1:29	1:45	1:55	Rt. 33	2:30	2:37	2:49	2:54	2:56	3:10
	2:15	2:24	2:27	2:29	2:45	2:55	Rt. 33	3:30	3:37	3:49	3:54	3:56	4:10
	3:15	3:24	3:27	3:29	3:45	3:55	Rt. 33	4:30	4:37	4:49	—	4:56	5:10
	4:15	4:24	4:27	4:29	4:45	4:55	Rt. 33	5:30	5:37	5:49	—	5:56	6:10
	5:15	5:24	—	5:29	5:45	5:55	Rt. 33	6:30	6:37	6:49	—	6:56	7:10
	6:15	6:24	—	6:29	6:45	6:55	Rt. 33	7:30	7:37	7:49	—	7:56	8:10
	7:15	7:24	—	7:29	7:45	7:55	Rt. 33	8:30	8:37	8:49	—	8:56	9:10
	8:15	8:24	—	8:29	8:45	8:55	Rt. 33	9:30	9:37	9:49	—	9:56	10:10
	9:15	9:24	—	9:29	9:45	9:55	Rt. 33	10:30	10:37	10:49	—	10:56	11:10
	10:15	10:24	—	10:29	10:45	10:55	—	I-40 to Downtown		—	—	—	11:10
	11:15	11:24	—	11:29	11:45	To Garage							

Need help reading this schedule?

Need other general information on how to ride?

[Click here to Download the General Schedule Information pdf](#) available from [katbus.com](http://katbus.com)



# MILLERTOWN

(Weekdays and Weekends)

## SERVES:

- ★ Broadway Towers
- ★ Carmike 10 Cinemas
- ★ Knoxville Center Mall
- ★ Knoxville Station/Downtown
- ★ Regal Knoxville Center 10
- ★ Walmart: Millertown Pike



Information Updated: January 2019

Going away from downtown							Going toward downtown						
Transfer to:						Rt. 90 Westbound							
Knoxville Station—Platform I	Grainger at Sixth	Broadway Towers	Nadine at Washington Pk	Walmart	Knoxville Center Mall (Arrives)		Knoxville Center Mall (Leaves)	Walmart	Washington at Fairview	Broadway Towers	Sixth at Grainger	Knoxville Station	
1	2	3	4	5	6	Bus Goes On To Serve	6	7	8	9	10	11	
SATURDAY SCHEDULE													
A.M.	—	—	—	—	—	—	7:30	7:37	7:49	—	7:56	8:10	
	7:15	7:24	—	7:29	7:45	7:55	Rt. 33	8:30	8:37	8:49	—	9:10	
	8:15	8:24	—	8:29	8:45	8:55	Rt. 33	9:30	9:37	9:49	—	10:10	
	9:15	9:24	—	9:29	9:45	9:55	Rt. 33	10:30	10:37	10:49	—	11:10	
	10:15	10:24	—	10:29	10:45	10:55	Rt. 33	11:30	11:37	11:49	—	12:10	
	11:15	11:24	—	11:29	11:45	11:55	Rt. 33	12:30	12:37	12:49	—	1:10	
P.M.	12:15	12:24	—	12:29	12:45	12:55	Rt. 33	1:30	1:37	1:49	—	2:10	
	1:15	1:24	—	1:29	1:45	1:55	Rt. 33	2:30	2:37	2:49	—	3:10	
	2:15	2:24	—	2:29	2:45	2:55	Rt. 33	3:30	3:37	3:49	—	4:10	
	3:15	3:24	—	3:29	3:45	3:55	Rt. 33	4:30	4:37	4:49	—	5:10	
	4:15	4:24	—	4:29	4:45	4:55	Rt. 33	5:30	5:37	5:49	—	6:10	
	5:15	5:24	—	5:29	5:45	5:55	Rt. 33	6:30	6:37	6:49	—	7:10	
	6:15	6:24	—	6:29	6:45	6:55	Rt. 33	7:30	7:37	7:49	—	8:10	
	7:15	7:24	—	7:29	7:45	7:55	Rt. 33	8:30	8:37	8:49	—	9:10	
	8:15	8:24	—	8:29	8:45	8:55	Rt. 33	9:30	9:37	9:49	—	10:10	
	9:15	9:24	—	9:29	9:45	9:55	Rt. 33	10:30	10:37	10:49	—	11:10	
	10:15	10:24	—	10:29	10:45	10:55	—	I-40 to Downtown		—	—	11:10	
	11:15	11:24	—	11:29	11:45	To Garage							
SUNDAY SCHEDULE													
A.M.	—	—	—	—	—	—	7:30	7:37	7:49	—	7:56	8:10	
	—	—	—	—	—	—	8:30	8:37	8:49	—	8:56	9:10	
	8:15	8:24	—	8:29	8:45	8:55	Rt. 33	9:30	9:37	9:49	—	10:10	
	9:15	9:24	—	9:29	9:45	9:55	Rt. 33	10:30	10:37	10:49	—	11:10	
	10:15	10:24	—	10:29	10:45	10:55	Rt. 33	11:30	11:37	11:49	—	12:10	
	11:15	11:24	—	11:29	11:45	11:55	Rt. 33	12:30	12:37	12:49	—	1:10	
P.M.	12:15	12:24	—	12:29	12:45	12:55	Rt. 33	1:30	1:37	1:49	—	2:10	
	1:15	1:24	—	1:29	1:45	1:55	Rt. 33	2:30	2:37	2:49	—	3:10	
	2:15	2:24	—	2:29	2:45	2:55	Rt. 33	3:30	3:37	3:49	—	4:10	
	3:15	3:24	—	3:29	3:45	3:55	Rt. 33	4:30	4:37	4:49	—	5:10	
	4:15	4:24	—	4:29	4:45	4:55	Rt. 33	5:30	5:37	5:49	—	6:10	
	5:15	5:24	—	5:29	5:45	5:55	Rt. 33	6:30	6:37	6:49	—	7:10	
	6:15	6:24	—	6:29	6:45	6:55	Rt. 33	7:30	7:37	7:49	—	8:10	
	7:15	7:24	—	7:29	7:45	7:55	—	To Garage					
	8:15	8:24	—	8:29	8:45	8:55	—	To Garage					

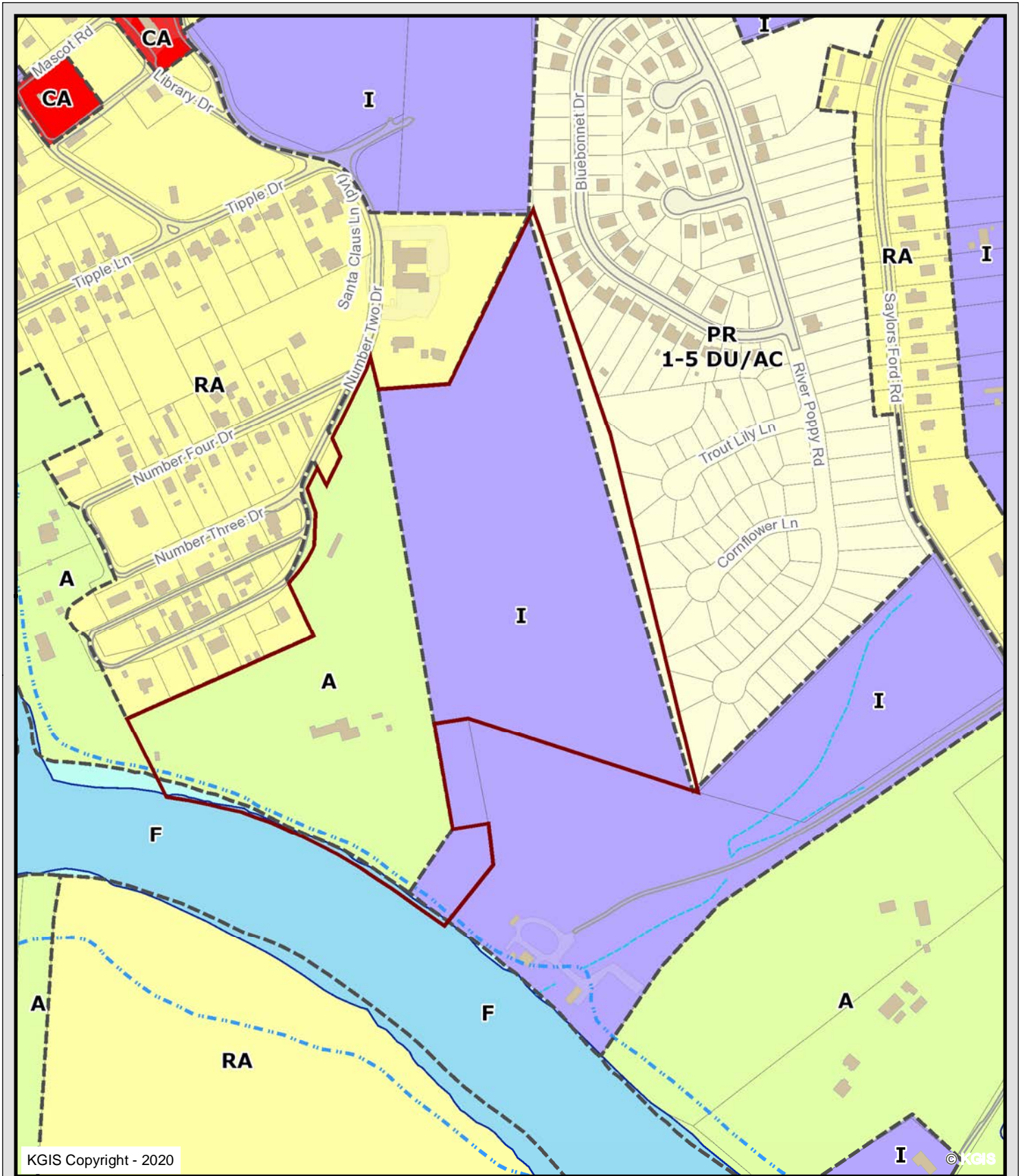
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**APPENDIX D**

**ZONING MAP**



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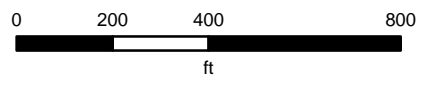
### River Pointe Subdivision

Zoning Map

Knoxville - Knox County - KUB Geographic Information System



Printed: 8/11/2020 at 2:51:47 PM



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**APPENDIX E**

**MANUAL TRAFFIC COUNT DATA**

## TRAFFIC COUNT DATA

Major Street: Mascot Road (WB - EB)  
 Minor Street: River Poppy Road (NB)  
 Traffic Control: Stop Control on River Poppy Road

11/16/2017 (Thursday)  
 Sunny/Mild  
 Conducted by: Ajax Engineering

TIME BEGIN	Mascot Road		River Poppy Road		Mascot Road		VEHICLE TOTAL	PEAK HOUR
	WESTBOUND		NORTHBOUND		EASTBOUND			
	LT	THRU	LT	RT	THRU	RT		
7:00 AM	2	11	3	3	15	0	34	
7:15 AM	0	13	2	3	15	1	34	7:15 AM - 8:15 AM
7:30 AM	3	39	2	1	31	2	78	
7:45 AM	2	17	2	1	24	1	47	
8:00 AM	2	19	3	4	21	1	50	
8:15 AM	0	14	1	2	14	3	34	
8:30 AM	0	13	3	4	10	0	30	
8:45 AM	1	4	1	0	13	2	21	
TOTAL	10	130	17	18	143	10	328	
2:00 PM	1	7	1	0	19	0	28	
2:15 PM	0	16	0	1	25	1	43	
2:30 PM	2	26	0	2	27	1	58	
2:45 PM	2	17	0	1	19	2	41	
3:00 PM	0	10	0	1	7	0	18	
3:15 PM	2	12	1	3	9	0	27	
3:30 PM	5	54	0	4	8	0	71	3:30 PM - 4:30 PM
3:45 PM	7	25	0	0	23	2	57	
4:00 PM	1	16	0	2	16	2	37	
4:15 PM	3	21	1	2	22	2	51	
4:30 PM	1	18	0	5	14	1	39	
4:45 PM	7	15	0	1	13	2	38	
5:00 PM	1	27	4	3	20	3	58	
5:15 PM	3	19	1	5	29	4	61	
5:30 PM	0	12	1	1	17	0	31	
5:45 PM	3	21	0	0	18	1	43	
TOTAL	38	316	9	31	286	21	701	

Existing Traffic Volumes were collected and tabulated using CountCam System

### 2017 AM Peak Hour 7:15 AM - 8:15 AM

TIME BEGIN	Mascot Road		River Poppy Road		Mascot Road	
	WESTBOUND		NORTHBOUND		EASTBOUND	
	LT	THRU	LT	RT	THRU	RT
7:15 AM	0	13	2	3	15	1
7:30 AM	3	39	2	1	31	2
7:45 AM	2	17	2	1	24	1
8:00 AM	2	19	3	4	21	1
<b>TOTAL</b>	<b>7</b>	<b>88</b>	<b>9</b>	<b>9</b>	<b>91</b>	<b>5</b>
PHF	0.58	0.56	0.75	0.56	0.73	0.63

### 2017 PM Peak Hour 3:30 PM - 4:30 PM

TIME BEGIN	Mascot Road		River Poppy Road		Mascot Road	
	WESTBOUND		NORTHBOUND		EASTBOUND	
	LT	THRU	LT	RT	THRU	RT
3:30 PM	5	54	0	4	8	0
3:45 PM	7	25	0	0	23	2
4:00 PM	1	16	0	2	16	2
4:15 PM	3	21	1	2	22	2
<b>TOTAL</b>	<b>16</b>	<b>116</b>	<b>1</b>	<b>8</b>	<b>69</b>	<b>6</b>
PHF	0.57	0.54	0.25	0.50	0.75	0.75

**APPENDIX F**

**ITE TRIP GENERATION RATES AND TRIP DISTRIBUTION CALCULATIONS**

# Land Use: 210

## Single-Family Detached Housing

### Description

Single-family detached housing includes all single-family detached homes on individual lots. A typical site surveyed is a suburban subdivision.

### Additional Data

The number of vehicles and residents had a high correlation with average weekday vehicle trip ends. The use of these variables was limited, however, because the number of vehicles and residents was often difficult to obtain or predict. The number of dwelling units was generally used as the independent variable of choice because it was usually readily available, easy to project, and had a high correlation with average weekday vehicle trip ends.

This land use included data from a wide variety of units with different sizes, price ranges, locations, and ages. Consequently, there was a wide variation in trips generated within this category. Other factors, such as geographic location and type of adjacent and nearby development, may also have had an effect on the site trip generation.

Single-family detached units had the highest trip generation rate per dwelling unit of all residential uses because they were the largest units in size and had more residents and more vehicles per unit than other residential land uses; they were generally located farther away from shopping centers, employment areas, and other trip attractors than other residential land uses; and they generally had fewer alternative modes of transportation available because they were typically not as concentrated as other residential land uses.

Time-of-day distribution data for this land use are presented in Appendix A. For the six general urban/suburban sites with data, the overall highest vehicle volumes during the AM and PM on a weekday were counted between 7:15 and 8:15 a.m. and 4:00 and 5:00 p.m., respectively. For the two sites with Saturday data, the overall highest vehicle volume was counted between 3:00 and 4:00 p.m. For the one site with Sunday data, the overall highest vehicle volume was counted between 10:15 and 11:15 a.m.

The sites were surveyed in the 1980s, the 1990s, the 2000s, and the 2010s in California, Connecticut, Delaware, Illinois, Indiana, Maryland, Minnesota, Montana, New Jersey, North Carolina, Ohio, Oregon, Pennsylvania, South Carolina, South Dakota, Tennessee, Vermont, and Virginia.

### Source Numbers

100, 105, 114, 126, 157, 167, 177, 197, 207, 211, 217, 267, 275, 293, 300, 319, 320, 356, 357, 367, 384, 387, 407, 435, 522, 550, 552, 579, 598, 601, 603, 614, 637, 711, 716, 720, 728, 735, 868, 903, 925, 936

# Single-Family Detached Housing (210)

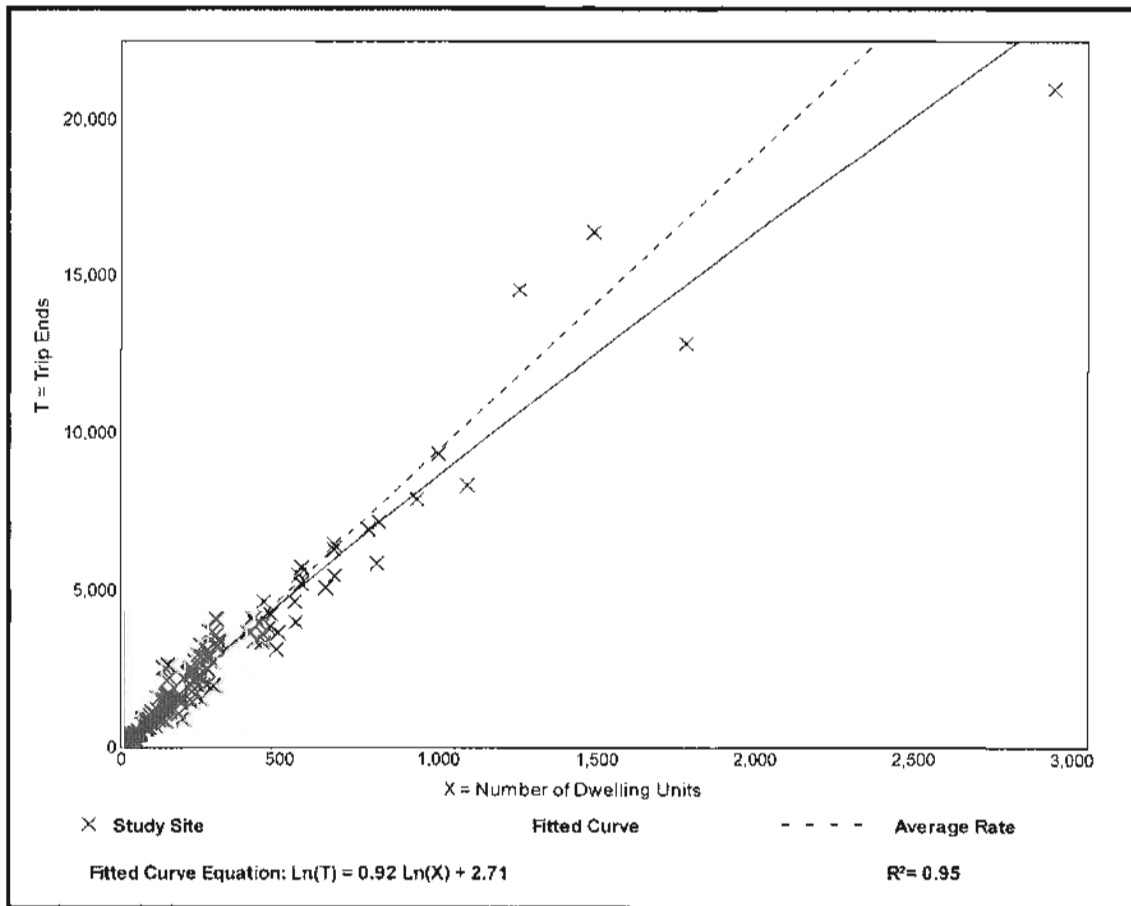
Vehicle Trip Ends vs: Dwelling Units  
On a: Weekday

Setting/Location: General Urban/Suburban  
Number of Studies: 159  
Avg. Num. of Dwelling Units: 264  
Directional Distribution: 50% entering, 50% exiting

### Vehicle Trip Generation per Dwelling Unit

Average Rate	Range of Rates	Standard Deviation
9.44	4.81 - 19.39	2.10

### Data Plot and Equation



# Single-Family Detached Housing (210)

Vehicle Trip Ends vs: Dwelling Units  
 On a: Weekday,  
 Peak Hour of Adjacent Street Traffic,  
 One Hour Between 7 and 9 a.m.

Setting/Location: General Urban/Suburban

Number of Studies: 173

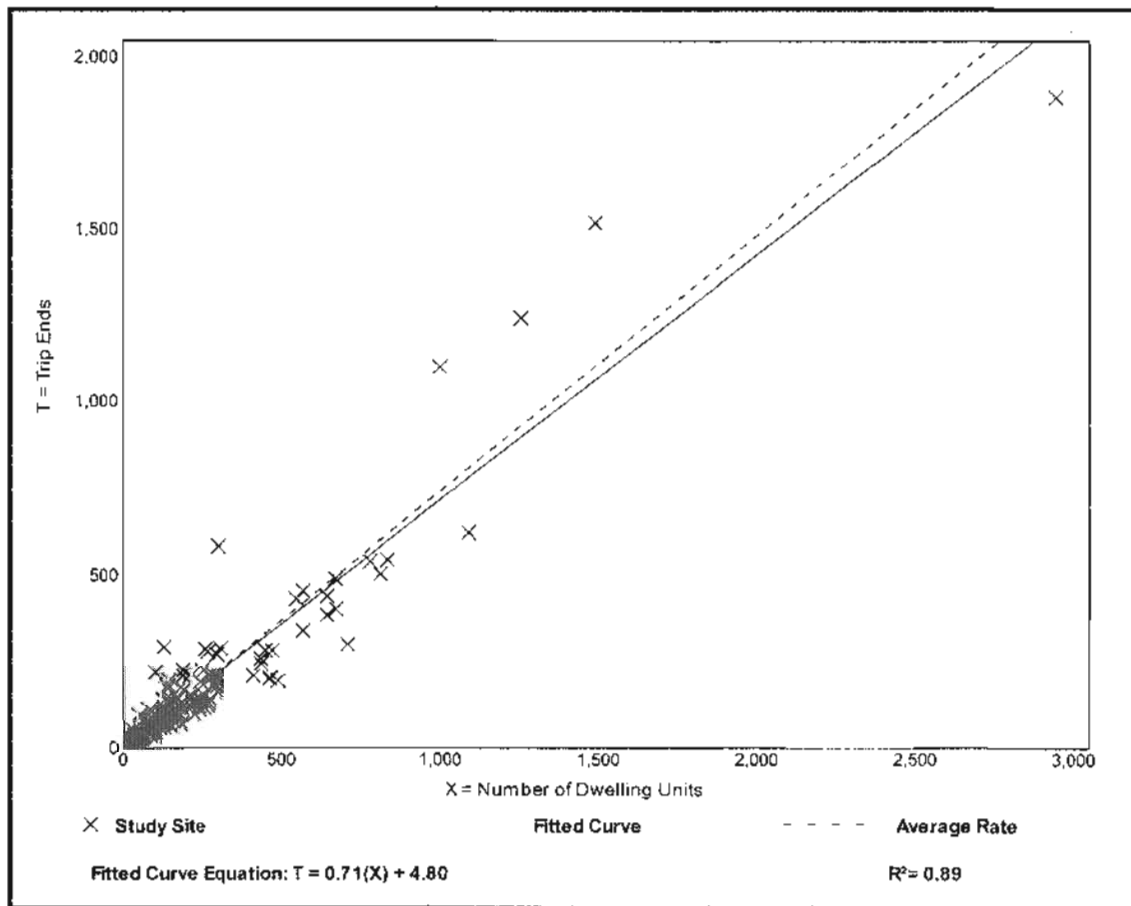
Avg. Num. of Dwelling Units: 219

Directional Distribution: 25% entering, 75% exiting

## Vehicle Trip Generation per Dwelling Unit

Average Rate	Range of Rates	Standard Deviation
0.74	0.33 - 2.27	0.27

## Data Plot and Equation



# Single-Family Detached Housing (210)

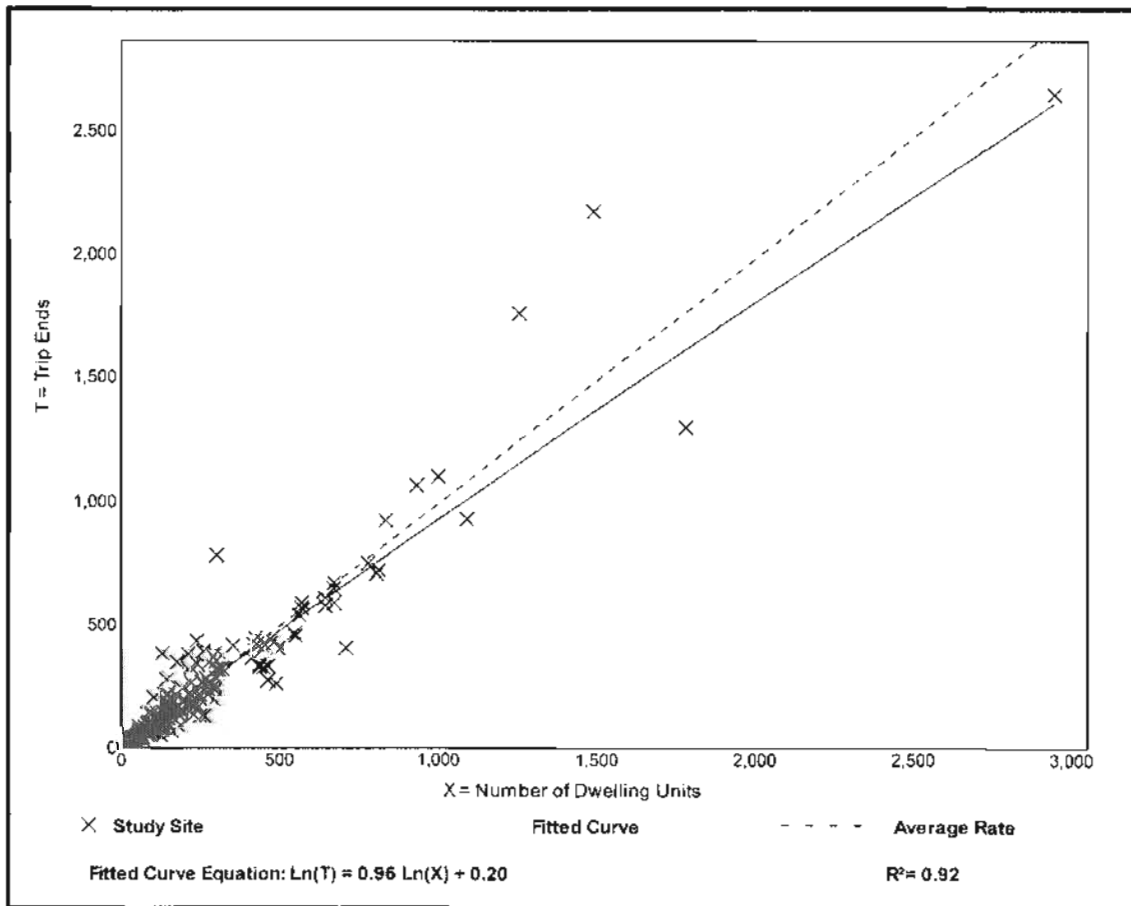
**Vehicle Trip Ends vs: Dwelling Units**  
**On a: Weekday,**  
**Peak Hour of Adjacent Street Traffic,**  
**One Hour Between 4 and 6 p.m.**

**Setting/Location: General Urban/Suburban**  
 Number of Studies: 190  
 Avg. Num. of Dwelling Units: 242  
 Directional Distribution: 63% entering, 37% exiting

## Vehicle Trip Generation per Dwelling Unit

Average Rate	Range of Rates	Standard Deviation
0.99	0.44 - 2.98	0.31

## Data Plot and Equation



**TRIP GENERATION FOR RIVER POINTE SUBDIVISION**

**75 Single-Family Detached Houses**

ITE LAND USE CODE	LAND USE DESCRIPTION	UNITS	GENERATED DAILY TRAFFIC	GENERATED TRAFFIC AM PEAK HOUR			GENERATED TRAFFIC PM PEAK HOUR		
				ENTER	EXIT	TOTAL	ENTER	EXIT	TOTAL
#210	Single-Family Detached Housing	75 Houses	798	25%	75%		63%	37%	
				15	44	59	49	29	78
<b>Total New Volume Site Trips</b>			<b>798</b>	<b>15</b>	<b>44</b>	<b>59</b>	<b>49</b>	<b>29</b>	<b>78</b>

ITE Trip Generation Manual, 10th Edition  
 Trips calculated by using Fitted Curve Equation



## TRIP GENERATION FOR RIVER POINTE SUBDIVISION

### 75 Single-Family Detached Houses

75 Residential Houses = X

---

#### Weekday:

Fitted Curve Equation:  $\ln(T) = 0.92 \ln(X) + 2.71$

$$\ln(T) = 0.92 * 4.32 + 2.71$$

$$\ln(T) = 6.68$$

$$\underline{\underline{T = 798 \text{ trips}}}$$

---

#### Peak Hour of Adjacent Traffic between 7 and 9 am:

Fitted Curve Equation:  $T = 0.71(X) + 4.80$

$$T = 0.71 * 75 + 4.80$$

$$\underline{\underline{T = 59 \text{ trips}}}$$

---

#### Peak Hour of Adjacent Traffic between 4 and 6 pm:

Fitted Curve Equation:  $\ln(T) = 0.96 \ln(X) + 0.2$

$$\ln(T) = 0.96 * 4.32 + 0.20$$

$$\ln(T) = 4.34$$

$$\underline{\underline{T = 78 \text{ trips}}}$$

**TRIP GENERATION FOR HOMES BETWEEN RIVER POPPY ROAD AND NUMBER TWO DRIVE**

28 Single-Family Detached Houses in 2020

ITE LAND USE CODE	LAND USE DESCRIPTION	UNITS	GENERATED DAILY TRAFFIC	GENERATED TRAFFIC AM PEAK HOUR			GENERATED TRAFFIC PM PEAK HOUR		
				ENTER	EXIT	TOTAL	ENTER	EXIT	TOTAL
#210	Single-Family Housing	28 Houses	323	25%	75%		63%	37%	
				6	19	25	19	11	30
<b>Total New Volume Site Trips</b>			<b>323</b>	<b>6</b>	<b>19</b>	<b>25</b>	<b>19</b>	<b>11</b>	<b>30</b>

ITE Trip Generation Manual, 10th Edition

Trips calculated by using Fitted Curve Equation

**TRIP GENERATION FOR HOMES BETWEEN RIVER POPPY ROAD AND NUMBER TWO DRIVE  
28 Single-Family Detached Houses in 2020**

**28 Residential Houses = X**

---

**Weekday:**

Fitted Curve Equation:  $\ln(T) = 0.92 \ln(X) + 2.71$

$$\ln(T) = 0.92 * 3.33 + 2.71$$

$$\ln(T) = 5.78$$

$$\underline{\underline{T = 323 \text{ trips}}}$$

---

**Peak Hour of Adjacent Traffic between 7 and 9 am:**

Fitted Curve Equation:  $T = 0.71(X) + 4.80$

$$T = 0.71 * 28 + 4.80$$

$$\underline{\underline{T = 25 \text{ trips}}}$$

---

**Peak Hour of Adjacent Traffic between 4 and 6 pm:**

Fitted Curve Equation:  $\ln(T) = 0.96 \ln(X) + 0.2$

$$\ln(T) = 0.96 * 3.33 + 0.20$$

$$\ln(T) = 3.40$$

$$\underline{\underline{T = 30 \text{ trips}}}$$

**TRIP GENERATION FOR EXISTING HOMES ALONG NUMBER TWO,  
NUMBER THREE, AND NUMBER FOUR DRIVE  
33 Single-Family Detached Houses in 2020**

ITE LAND USE CODE	LAND USE DESCRIPTION	UNITS	GENERATED DAILY TRAFFIC	GENERATED TRAFFIC AM PEAK HOUR			GENERATED TRAFFIC PM PEAK HOUR		
				ENTER	EXIT	TOTAL	ENTER	EXIT	TOTAL
#210	Single-Family Housing	33 Houses	375	25%	75%		63%	37%	
				7	22	29	23	13	36
<b>Total New Volume Site Trips</b>			<b>375</b>	<b>7</b>	<b>22</b>	<b>29</b>	<b>23</b>	<b>13</b>	<b>36</b>

ITE Trip Generation Manual, 10th Edition

Trips calculated by using Fitted Curve Equation

**TRIP GENERATION FOR EXISTING HOMES ALONG NUMBER TWO, THREE, AND FOUR DRIVE**  
**33 Single-Family Detached Houses in 2020**

**33 Residential Houses = X**

---

**Weekday:**

Fitted Curve Equation:  $\ln(T) = 0.92 \ln(X) + 2.71$

$$\ln(T) = 0.92 * 3.50 + 2.71$$

$$\ln(T) = 5.93$$

$$\underline{\underline{T = 375 \text{ trips}}}$$

---

**Peak Hour of Adjacent Traffic between 7 and 9 am:**

Fitted Curve Equation:  $T = 0.71(X) + 4.80$

$$T = 0.71 * 33 + 4.80$$

$$\underline{\underline{T = 29 \text{ trips}}}$$

---

**Peak Hour of Adjacent Traffic between 4 and 6 pm:**

Fitted Curve Equation:  $\ln(T) = 0.96 \ln(X) + 0.2$

$$\ln(T) = 0.96 * 3.50 + 0.20$$

$$\ln(T) = 3.56$$

$$\underline{\underline{T = 36 \text{ trips}}}$$

**TRIP GENERATION FOR EXISTING HOMES ALONG NUMBER TWO,  
NUMBER THREE, AND NUMBER FOUR DRIVE  
31 Single-Family Detached Houses in 2020**

ITE LAND USE CODE	LAND USE DESCRIPTION	UNITS	GENERATED DAILY TRAFFIC	GENERATED TRAFFIC AM PEAK HOUR			GENERATED TRAFFIC PM PEAK HOUR		
				ENTER	EXIT	TOTAL	ENTER	EXIT	TOTAL
#210	Single-Family Housing	31 Houses	354	25%	75%		63%	37%	
				7	20	27	21	13	34
<b>Total New Volume Site Trips</b>			<b>354</b>	<b>7</b>	<b>20</b>	<b>27</b>	<b>21</b>	<b>13</b>	<b>34</b>

ITE Trip Generation Manual, 10th Edition

Trips calculated by using Fitted Curve Equation

**TRIP GENERATION FOR EXISTING HOMES ALONG NUMBER 2, 3, AND 4 DRIVE**  
**31 Single-Family Detached Houses in 2020**

**31 Residential Houses = X**

---

**Weekday:**

Fitted Curve Equation:  $\ln(T) = 0.92 \ln(X) + 2.71$

$$\ln(T) = 0.92 * 3.43 + 2.71$$

$$\ln(T) = 5.87$$

$$\underline{\underline{T = 354 \text{ trips}}}$$

---

**Peak Hour of Adjacent Traffic between 7 and 9 am:**

Fitted Curve Equation:  $T = 0.71(X) + 4.80$

$$T = 0.71 * 31 + 4.80$$

$$\underline{\underline{T = 27 \text{ trips}}}$$

---

**Peak Hour of Adjacent Traffic between 4 and 6 pm:**

Fitted Curve Equation:  $\ln(T) = 0.96 \ln(X) + 0.2$

$$\ln(T) = 0.96 * 3.43 + 0.20$$

$$\ln(T) = 3.50$$

$$\underline{\underline{T = 34 \text{ trips}}}$$

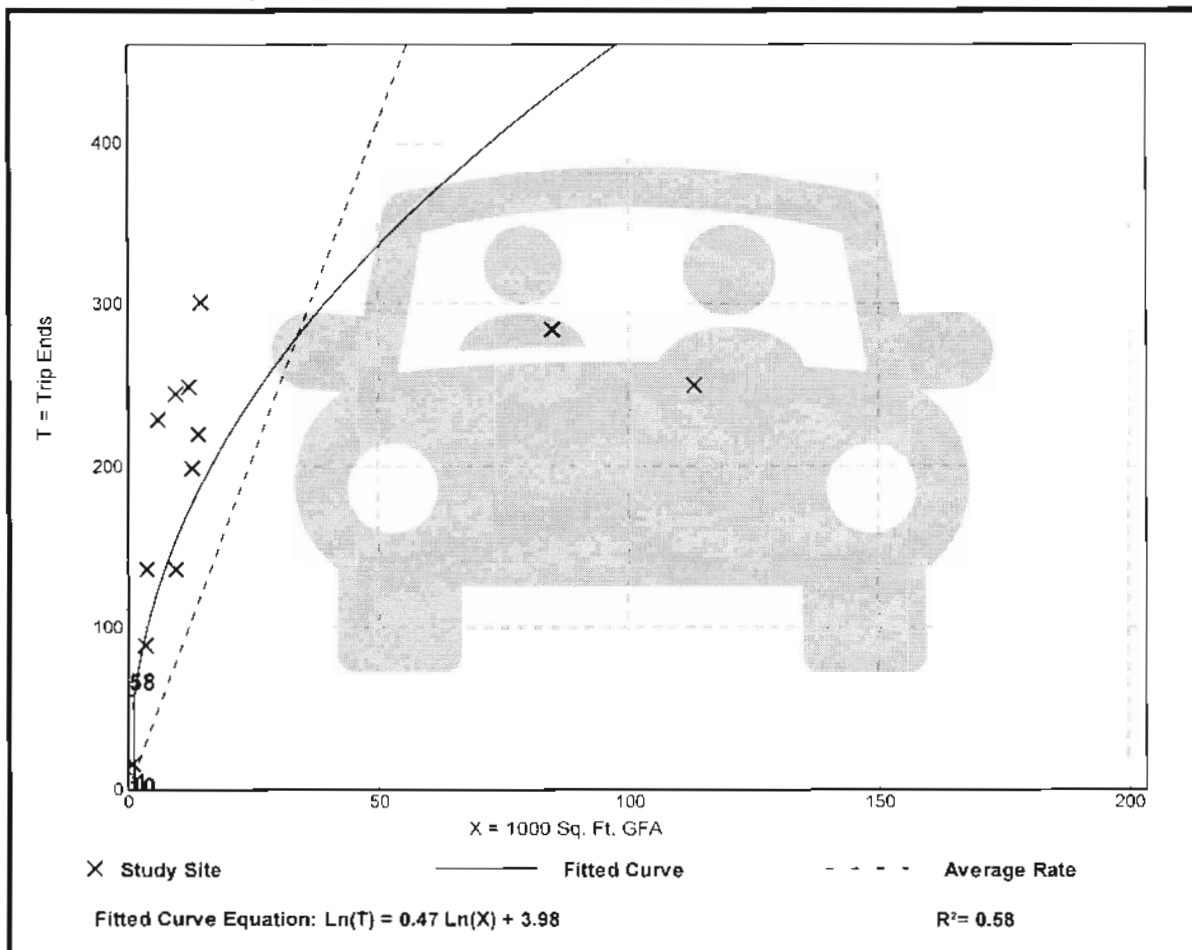
# United States Post Office (732)

**Vehicle Trip Ends vs:** 1000 Sq. Ft. GFA  
**On a:** Weekday,  
 Peak Hour of Adjacent Street Traffic,  
 One Hour Between 7 and 9 a.m.  
**Setting/Location:** General Urban/Suburban  
 Number of Studies: 12  
 Avg. 1000 Sq. Ft. GFA: 24  
 Directional Distribution: 52% entering, 48% exiting

## Vehicle Trip Generation per 1000 Sq. Ft. GFA

Average Rate	Range of Rates	Standard Deviation
8.28	2.21 - 38.17	9.67

## Data Plot and Equation



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AVERAGE RATE =>  $\frac{10 \text{ (TOTAL)}}{5 \text{ (ENTER)}} = 2$   
 $\frac{5 \text{ (EXIT)}}{5 \text{ (ENTER)}} = 1$





**CALCULATION OF ADDITIONAL THRU VOLUMES ON MASCOT ROAD - 2017 to 2020**  
 (Translation of AJAX Count on 11.16.17 at River Poppy Road Intersection to Number Two Drive Intersection for year 2020)

DEVELOPMENT	UNITS/SIZE	TRIP GENERATION				TRAFFIC MOVEMENT DISTRIBUTION		
		AM PEAK		PM PEAK			AM PEAK	PM PEAK
		ENTER	EXIT	ENTER	EXIT			
Homes Along Mascot Road in between River Poppy Road and Number Two Drive	28	6	19	19	11	EXIT EB *	35%	65%
							7	7
						ENTER EB **	65%	35%
							4	7
						ENTER WB *	35%	65%
							2	12
						EXIT WB **	65%	35%
							12	4

\* Volumes from these movements were tabulated during the count at River Poppy Road

\*\* Volumes from these movements were not tabulated during the count at River Poppy Road and are calculated below

	AM PEAK	PM PEAK
2017 AJAX WB Thru Volume on Mascot Road (Includes NB Left Turns from River Poppy Road)	97	117
+2% Growth Factor from 2017 to 2020	6	7
2020 Volume (Sub-total)	103	124
28 River Poppy Home Trips = Exit WB - Enter WB	10	-9
2020 Adjusted WB Thru Volume on Mascot Road at Number Two Drive (Sub-total)	113	116
Final 2020 Adjusted WB Thru Volume on Mascot Road at Number Two Drive with WB Left Turns Removed	<b>109</b>	<b>108</b>
Final 2020 Adjusted WB Thru Volume on Mascot Road at Library Drive with WB Left Turns Removed	<b>106</b>	<b>104</b>
2017 AJAX EB Thru Volume on Mascot Road (Includes EB Right Turns to River Poppy Road)	96	75
+2% Growth Factor from 2017 to 2020	6	5
2020 Volume (Sub-total)	102	80
28 River Poppy Home Trips = Enter EB - Exit EB	-3	0
2020 Adjusted EB Thru Volume on Mascot Road at Number Two Drive	<b>99</b>	<b>80</b>
Final 2020 Adjusted EB Thru Volume on Mascot Road at Number Two Drive with NB Right Turns Removed	<b>91</b>	<b>71</b>
Final 2020 Adjusted EB Thru Volume on Mascot Road at Library Drive with NB Right Turns Removed	<b>89</b>	<b>67</b>

CALCULATION OF TRAFFIC VOLUMES ON LIBRARY DRIVE AND NUMBER TWO DRIVE

DEVELOPMENT	UNITS/SIZE	TRIP GENERATION				VIA ROUTE	TRAFFIC MOVEMENT DISTRIBUTION			
		AM PEAK ENTER	AM PEAK EXIT	PM PEAK ENTER	PM PEAK EXIT		AM PEAK ENTER	AM PEAK EXIT	PM PEAK ENTER	PM PEAK EXIT
Homes Along Number Two, Three, and Four Drive	33	7	22	23	13	Library Drive and Number Two Drive (33 Houses)	7	22	23	13

	AM PEAK	PM PEAK
EB Entering Right Turn at Library Drive (35% AM / 65% PM)	3	15
NB Exiting Left Turn at Library Drive (65% AM / 35% PM)	14	4
NB Exiting Right Turn at Number Two Drive (35% AM / 65% PM)	8	9
WB Entering Left Turn at Number Two Drive (65% AM / 35% PM)	4	8

DEVELOPMENT	UNITS/SIZE	TRIP GENERATION				VIA ROUTE	TRAFFIC MOVEMENT DISTRIBUTION			
		AM PEAK ENTER	AM PEAK EXIT	PM PEAK ENTER	PM PEAK EXIT		AM PEAK ENTER	AM PEAK EXIT	PM PEAK ENTER	PM PEAK EXIT
USPS Post Office	1,200 ft <sup>2</sup>	5	5	6	7	Library Drive	5	5	6	7

	AM PEAK	PM PEAK
EB Entering Right Turn at Library Drive (35% AM / 65% PM)	2	2
WB Entering Left Turn at Library Drive (65% AM / 35% PM)	3	4
NB Exiting Left Turn at Library Drive (65% AM / 35% PM)	3	3
NB Exiting Right Turn at Library Drive (35% AM / 65% PM)	2	4

TOTAL of USPS Post Office and Homes on Tipple Lane, Tipple Drive, and Number Two - Four Drive

	AM PEAK	PM PEAK
TOTAL EB Entering Right Turn at Library Drive	5	17
TOTAL NB Exiting Left Turn at Library Drive	17	8
TOTAL NB Exiting Right Turn at Number Two Drive	8	9
TOTAL WB Entering Left Turn at Number Two Drive	4	8
TOTAL WB Entering Left Turn at Library Drive	3	4
TOTAL NB Exiting Right Turn at Library Drive	2	4

CALCULATION OF TRAFFIC VOLUMES ON NUMBER TWO DRIVE AT NUMBER FOUR DRIVE

DEVELOPMENT	UNITS/SIZE	TRIP GENERATION				TRAFFIC MOVEMENT DISTRIBUTION				
		AM PEAK		PM PEAK		VIA ROUTE	AM PEAK		PM PEAK	
		ENTER	EXIT	ENTER	EXIT		ENTER	EXIT	ENTER	EXIT
Homes on Number Two, Number Three, and Number Four Drive	31	7	20	21	13	Number Four Drive (8 Houses)	2	5	5	3
						Number Three and Number Two Drive (23 Houses)	5	15	16	10

	AM PEAK	PM PEAK
SB Entering Right Turn at Number Four Drive	2	5
EB Exiting Left Turn at Number Four Drive	5	3
SB Thru on Number Two Drive at Number Four Drive	5	16
NB Thru on Number Two Drive at Number Four Drive	15	10

**APPENDIX G**

**CAPACITY ANALYSES – HCM WORKSHEETS (SYNCHRO 8)**

## EXISTING TRAFFIC CONDITIONS

# HCM Unsignalized Intersection Capacity Analysis

## 3: Library Drive & Mascot Road

9/25/2020



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (veh/h)	89	5	3	106	17	2
Sign Control	Free			Free	Stop	
Grade	5%			-2%	-7%	
Peak Hour Factor	0.90	1.00	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	99	5	3	118	19	2
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage (veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume			104			101
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			104			101
tC, single (s)			4.1			6.2
tC, 2 stage (s)						
tF (s)			2.2			3.3
p0 queue free %			100			100
cM capacity (veh/h)			1500			960

Direction, Lane #	EB 1	WB 1	NB 1
Volume Total	104	121	21
Volume Left	0	3	19
Volume Right	5	0	2
cSH	1700	1500	782
Volume to Capacity	0.06	0.00	0.03
Queue Length 95th (ft)	0	0	2
Control Delay (s)	0.0	0.2	9.7
Lane LOS		A	A
Approach Delay (s)	0.0	0.2	9.7
Approach LOS			A

Intersection Summary			
Average Delay			0.9
Intersection Capacity Utilization	18.0%	ICU Level of Service	A
Analysis Period (min)			15

# HCM Unsignalized Intersection Capacity Analysis

## 5: Number Two Drive & Mascot Road

9/25/2020



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	→			←	←	←
Volume (veh/h)	91	0	4	109	0	8
Sign Control	Free			Free	Stop	
Grade	1%			0%	-4%	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	101	0	4	121	0	9
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage (veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume			101		231	101
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			101		231	101
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			100		100	99
cM capacity (veh/h)			1504		760	960

Direction, Lane #	EB 1	WB 1	NB 1
Volume Total	101	126	9
Volume Left	0	4	0
Volume Right	0	0	9
cSH	1700	1504	960
Volume to Capacity	0.06	0.00	0.01
Queue Length 95th (ft)	0	0	1
Control Delay (s)	0.0	0.3	8.8
Lane LOS		A	A
Approach Delay (s)	0.0	0.3	8.8
Approach LOS			A

Intersection Summary			
Average Delay		0.5	
Intersection Capacity Utilization	19.0%		ICU Level of Service A
Analysis Period (min)		15	



# HCM Unsignalized Intersection Capacity Analysis

## 9: Number Two Drive & Number Four Drive

9/25/2020



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (veh/h)	5	0	0	15	5	2
Sign Control	Stop			Free	Free	
Grade	8%			9%	-1%	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	6	0	0	17	6	2
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage (veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	23	7	8			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	23	7	8			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	99	100	100			
cM capacity (veh/h)	998	1082	1626			
<b>Direction, Lane #</b>	<b>EB 1</b>	<b>NB 1</b>	<b>SB 1</b>			
Volume Total	6	17	8			
Volume Left	6	0	0			
Volume Right	0	0	2			
cSH	998	1626	1700			
Volume to Capacity	0.01	0.00	0.00			
Queue Length 95th (ft)	0	0	0			
Control Delay (s)	8.6	0.0	0.0			
Lane LOS	A					
Approach Delay (s)	8.6	0.0	0.0			
Approach LOS	A					
<b>Intersection Summary</b>						
Average Delay			1.6			
Intersection Capacity Utilization		13.3%		ICU Level of Service		A
Analysis Period (min)			15			

# HCM Unsignalized Intersection Capacity Analysis

## 3: Library Drive & Mascot Road

9/25/2020



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↻			↻	↻	
Volume (veh/h)	67	17	4	104	8	4
Sign Control	Free			Free	Stop	
Grade	5%			-2%	-7%	
Peak Hour Factor	0.90	1.00	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	74	17	4	116	9	4
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage (veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume			91		207	83
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			91		207	83
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			100		99	100
cM capacity (veh/h)			1516		784	982

Direction, Lane #	EB 1	WB 1	NB 1
Volume Total	91	120	13
Volume Left	0	4	9
Volume Right	17	0	4
cSH	1700	1516	840
Volume to Capacity	0.05	0.00	0.02
Queue Length 95th (ft)	0	0	1
Control Delay (s)	0.0	0.3	9.4
Lane LOS		A	A
Approach Delay (s)	0.0	0.3	9.4
Approach LOS			A

Intersection Summary			
Average Delay		0.7	
Intersection Capacity Utilization	18.7%	ICU Level of Service	A
Analysis Period (min)	15		

# HCM Unsignalized Intersection Capacity Analysis

## 5: Number Two Drive & Mascot Road

9/25/2020



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	→			←	←	↘
Volume (veh/h)	71	0	8	108	0	9
Sign Control	Free			Free	Stop	
Grade	1%			0%	-4%	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	79	0	9	120	0	10
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage (veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume			79		217	79
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			79		217	79
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			99		100	99
cM capacity (veh/h)			1532		772	987

Direction, Lane #	EB 1	WB 1	NB 1
Volume Total	79	129	10
Volume Left	0	9	0
Volume Right	0	0	10
cSH	1700	1532	987
Volume to Capacity	0.05	0.01	0.01
Queue Length 95th (ft)	0	0	1
Control Delay (s)	0.0	0.6	8.7
Lane LOS		A	A
Approach Delay (s)	0.0	0.6	8.7
Approach LOS			A

Intersection Summary			
Average Delay		0.7	
Intersection Capacity Utilization		22.3%	ICU Level of Service
Analysis Period (min)		15	A

# HCM Unsignalized Intersection Capacity Analysis

## 9: Number Two Drive & Number Four Drive

9/25/2020



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (veh/h)	3	0	0	10	16	5
Sign Control	Stop			Free	Free	
Grade	8%			9%	-1%	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	3	0	0	11	18	6
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage (veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	32	21	23			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	32	21	23			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	100	100	100			
cM capacity (veh/h)	987	1063	1605			
Direction, Lane #	EB 1	NB 1	SB 1			
Volume Total	3	11	23			
Volume Left	3	0	0			
Volume Right	0	0	6			
cSH	987	1605	1700			
Volume to Capacity	0.00	0.00	0.01			
Queue Length 95th (ft)	0	0	0			
Control Delay (s)	8.7	0.0	0.0			
Lane LOS	A					
Approach Delay (s)	8.7	0.0	0.0			
Approach LOS	A					
Intersection Summary						
Average Delay			0.8			
Intersection Capacity Utilization		13.3%		ICU Level of Service		A
Analysis Period (min)			15			

**OPENING YEAR TRAFFIC CONDITIONS (WITH PROJECT)**

# HCM Unsignalized Intersection Capacity Analysis

## 3: Library Drive & Mascot Road

9/25/2020



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↩			↩	↩	
Volume (veh/h)	98	11	3	117	48	2
Sign Control	Free			Free	Stop	
Grade	5%			-2%	-7%	
Peak Hour Factor	0.90	1.00	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	109	11	3	130	53	2
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage (veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume			120		251	114
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			120		251	114
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			100		93	100
cM capacity (veh/h)			1480		741	944

Direction, Lane #	EB 1	WB 1	NB 1
Volume Total	120	133	56
Volume Left	0	3	53
Volume Right	11	0	2
cSH	1700	1480	747
Volume to Capacity	0.07	0.00	0.07
Queue Length 95th (ft)	0	0	6
Control Delay (s)	0.0	0.2	10.2
Lane LOS		A	B
Approach Delay (s)	0.0	0.2	10.2
Approach LOS			B

Intersection Summary			
Average Delay		1.9	
Intersection Capacity Utilization		18.6%	ICU Level of Service A
Analysis Period (min)		15	

# HCM Unsignalized Intersection Capacity Analysis

## 5: Number Two Drive & Mascot Road

9/25/2020



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	→			←	←	↗
Volume (veh/h)	100	0	14	120	0	24
Sign Control	Free			Free	Stop	
Grade	1%			0%	-4%	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	111	0	16	133	0	27
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage (veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume			111		276	111
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			111		276	111
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			99		100	97
cM capacity (veh/h)			1491		711	948

















Direction, Lane #	EB 1	WB 1	NB 1
Volume Total	111	149	27
Volume Left	0	16	0
Volume Right	0	0	27
cSH	1700	1491	948
Volume to Capacity	0.07	0.01	0.03
Queue Length 95th (ft)	0	1	2
Control Delay (s)	0.0	0.9	8.9
Lane LOS		A	A
Approach Delay (s)	0.0	0.9	8.9
Approach LOS			A

Intersection Summary			
Average Delay		1.3	
Intersection Capacity Utilization	23.8%		ICU Level of Service A
Analysis Period (min)		15	

# HCM Unsignalized Intersection Capacity Analysis

## 9: Number Two Drive & Number Four Drive/Road "A"

9/25/2020

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	6	0	0	0	0	44	0	17	0	15	6	2
Sign Control		Stop			Stop			Free			Free	
Grade		8%			0%			9%			-1%	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	7	0	0	0	0	49	0	19	0	17	7	2
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage (veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	109	60	8	60	61	19	9			19		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	109	60	8	60	61	19	9			19		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	99	100	100	100	100	95	100			99		
cM capacity (veh/h)	827	826	1080	933	825	1065	1624			1611		
<b>Direction, Lane #</b>	<b>EB 1</b>	<b>WB 1</b>	<b>NB 1</b>	<b>SB 1</b>								
Volume Total	7	49	19	26								
Volume Left	7	0	0	17								
Volume Right	0	49	0	2								
cSH	827	1065	1624	1611								
Volume to Capacity	0.01	0.05	0.00	0.01								
Queue Length 95th (ft)	1	4	0	1								
Control Delay (s)	9.4	8.5	0.0	4.8								
Lane LOS	A	A		A								
Approach Delay (s)	9.4	8.5	0.0	4.8								
Approach LOS	A	A										
<b>Intersection Summary</b>												
Average Delay			6.0									
Intersection Capacity Utilization			19.6%		ICU Level of Service				A			
Analysis Period (min)			15									



# HCM Unsignalized Intersection Capacity Analysis

## 3: Library Drive & Mascot Road

9/25/2020



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	→			←	↔	↔
Volume (veh/h)	74	51	4	114	19	4
Sign Control	Free			Free	Stop	
Grade	5%			-2%	-7%	
Peak Hour Factor	0.90	1.00	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	82	51	4	127	21	4
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage (veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume			133		243	108
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			133		243	108
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			100		97	100
cM capacity (veh/h)			1464		748	952

Direction, Lane #	EB 1	WB 1	NB 1
Volume Total	133	131	26
Volume Left	0	4	21
Volume Right	51	0	4
cSH	1700	1464	777
Volume to Capacity	0.08	0.00	0.03
Queue Length 95th (ft)	0	0	3
Control Delay (s)	0.0	0.3	9.8
Lane LOS		A	A
Approach Delay (s)	0.0	0.3	9.8
Approach LOS			A

Intersection Summary			
Average Delay		1.0	
Intersection Capacity Utilization		19.2%	ICU Level of Service A
Analysis Period (min)		15	

# HCM Unsignalized Intersection Capacity Analysis

## 5: Number Two Drive & Mascot Road

9/25/2020



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	→			←	←	↘
Volume (veh/h)	78	0	26	118	0	29
Sign Control	Free			Free	Stop	
Grade	1%			0%	-4%	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	87	0	29	131	0	32
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage (veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume			87		276	87
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			87		276	87
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			98		100	97
cM capacity (veh/h)			1522		705	978

Direction, Lane #	EB 1	WB 1	NB 1
Volume Total	87	160	32
Volume Left	0	29	0
Volume Right	0	0	32
cSH	1700	1522	978
Volume to Capacity	0.05	0.02	0.03
Queue Length 95th (ft)	0	1	3
Control Delay (s)	0.0	1.5	8.8
Lane LOS		A	A
Approach Delay (s)	0.0	1.5	8.8
Approach LOS			A

Intersection Summary			
Average Delay		1.9	
Intersection Capacity Utilization	24.3%		ICU Level of Service A
Analysis Period (min)		15	

# HCM Unsignalized Intersection Capacity Analysis

## 9: Number Two Drive & Number Four Drive/Road "A"

9/25/2020



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Volume (veh/h)	3	0	0	0	0	29	0	11	0	49	18	6
Sign Control		Stop			Stop			Free			Free	
Grade		8%			0%			9%			-1%	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	3	0	0	0	0	32	0	12	0	54	20	7
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage (veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	177	144	23	144	148	12	27			12		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	177	144	23	144	148	12	27			12		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	100	100	100	100	100	97	100			97		
cM capacity (veh/h)	746	725	1059	808	722	1074	1600			1620		
<b>Direction, Lane #</b>	<b>EB 1</b>	<b>WB 1</b>	<b>NB 1</b>	<b>SB 1</b>								
Volume Total	3	32	12	81								
Volume Left	3	0	0	54								
Volume Right	0	32	0	7								
cSH	746	1074	1600	1620								
Volume to Capacity	0.00	0.03	0.00	0.03								
Queue Length 95th (ft)	0	2	0	3								
Control Delay (s)	9.8	8.5	0.0	5.0								
Lane LOS	A	A		A								
Approach Delay (s)	9.8	8.5	0.0	5.0								
Approach LOS	A	A										
<b>Intersection Summary</b>												
Average Delay			5.5									
Intersection Capacity Utilization			20.7%		ICU Level of Service					A		
Analysis Period (min)			15									

**APPENDIX H**

**KNOX COUNTY TURN LANE VOLUME THRESHOLD WORKSHEETS**

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	200 - 249	250 - 299	300 - 349	350 - 399	
98+11 = 109 100 - 149 150 - 199	300 245	235 200	185 160	145 130	120 110	100 90	
200 - 249 250 - 299	205 175	170	140 125	115 105	100 90	80 70	
300 - 349 350 - 399	155 135	Mascot Road at Library Drive  2025 Projected AM WB Left Turns = 3  Turn Lane NOT Warranted		110 100	95 85	80 70	65 60
400 - 449 450 - 499	120 105			90 80	75 70	65 60	55 50
500 - 549 550 - 599	95 85		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	60 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.

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

Mascot Road at Library Drive  
 2025 Projected AM EB Right Turns = 11  
 Turn Lane NOT Warranted

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 50 - 99					Yes	Yes Yes
100 - 149 150 - 199			Yes	Yes Yes	Yes Yes	Yes Yes
200 - 249 250 - 299	Yes	Yes Yes	Yes Yes	Yes Yes	Yes Yes	Yes Yes
300 - 349 350 - 399	Yes Yes	Yes Yes	Yes Yes	Yes Yes	Yes Yes	Yes Yes
400 - 449 450 - 499	Yes Yes	Yes Yes	Yes Yes	Yes Yes	Yes Yes	Yes Yes
500 - 549 550 - 599	Yes Yes	Yes Yes	Yes Yes	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.

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	200 - 249	250 - 299	300 - 349	350 - 399
100	300	235	185	145	120	100
100 - 149	245	200	160	130	110	90
150 - 199	205	170	140	115	100	80
200 - 249	175	140	125	105	90	70
250 - 299	155	110	95	80	65	65
300 - 349	135	100	85	70	60	60
350 - 399	120	90	75	65	55	55
400 - 449	105	80	70	60	50	50
450 - 499	95	70	65	55	45	45
500 - 549	85	65	60	50	40	40
550 - 599	75	65	55	45	40	35
600 - 649	70	60	50	40	35	30
650 - 699	65	55	45	35	30	30
700 - 749	60	50	40	30	30	30
750 or More	60	50	45	40	35	30

Mascot Road at  
Number Two Drive  
  
2025 Projected AM  
WB Left Turns = 14  
  
Turn Lane NOT  
Warranted

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

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

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

Mascot Road at Number Two Drive  
 2025 Projected AM EB Right Turns = 0  
 Turn Lane NOT Warranted

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 50 - 99					Yes	Yes Yes
100 - 149 150 - 199			Yes	Yes Yes	Yes Yes	Yes Yes
200 - 249 250 - 299	Yes	Yes Yes	Yes Yes	Yes Yes	Yes Yes	Yes Yes
300 - 349 350 - 399	Yes Yes	Yes Yes	Yes Yes	Yes Yes	Yes Yes	Yes Yes
400 - 449 450 - 499	Yes Yes	Yes Yes	Yes Yes	Yes Yes	Yes Yes	Yes Yes
500 - 549 550 - 599	Yes Yes	Yes Yes	Yes Yes	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.



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	200 - 249	250 - 299	300 - 349	350 - 399
100 - 149 150 - 199	300 245	235 200	185 160	145 130	120 110	100 90
200 - 249 250 - 299	205 175	170	140 125	115 105	100 90	80 70
300 - 349 350 - 399	155 135		110 100	95 85	80 70	65 60
400 - 449 450 - 499	120 105		90 80	75 70	65 60	55 50
500 - 549 550 - 599	95 85		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

74+51 = 125

114

100 - 149

Mascot Road at Library Drive

2025 Projected PM WB Left Turns = 4

Turn Lane NOT Warranted

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	60 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.

**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

Mascot Road at Library Drive  
 2025 Projected PM EB Right Turns = 51  
 Turn Lane NOT Warranted

RIGHT-TURN VOLUME	THROUGH VOLUME PLUS LEFT-TURN VOLUME *					
	350 - 399	400 - 449	450 - 499	500 - 549	550 - 600	+ / > 600
Fewer Than 25						Yes
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.

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	200 - 249	250 - 299	300 - 349	350 - 399
100 - 149	300	235	185	145	120	100
150 - 199	245	200	160	130	110	90
200 - 249	205	170	140	115	100	80
250 - 299	175	140	125	105	90	70
300 - 349	155	110	95	80	80	65
350 - 399	135	100	85	70	70	60
400 - 449	120	90	75	65	65	55
450 - 499	105	80	70	60	60	50
500 - 549	95	70	65	55	55	50
550 - 599	85	65	60	50	50	45
600 - 649	75	65	55	50	45	40
650 - 699	70	60	55	50	40	35
700 - 749	65	55	50	45	35	30
750 or More	60	50	45	40	35	30

Mascot Road at  
Number Two Drive  
  
2025 Projected PM  
WB Left Turns = 26  
  
Turn Lane NOT  
Warranted

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

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

**TABLE 4B  
RIGHT-TURN LANE VOLUME THRESHOLDS  
FOR TWO-LANE ROADWAYS WITH A PREVAILING SPEED OF 35 MPH OR LESS**

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

Mascot Road at  
Number Two Drive

2025 Projected PM  
EB Right Turns = 0

Turn Lane NOT  
Warranted

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 50 - 99					Yes	Yes
100 - 149 150 - 199			Yes	Yes	Yes	Yes
200 - 249 250 - 299	Yes	Yes	Yes	Yes	Yes	Yes
300 - 349 350 - 399	Yes	Yes	Yes	Yes	Yes	Yes
400 - 449 450 - 499	Yes	Yes	Yes	Yes	Yes	Yes
500 - 549 550 - 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.

**APPENDIX I**

**RESPONSE LETTER TO ADDRESS REVIEW COMMENTS**



11812 Black Road  
Knoxville, Tennessee 37932  
Phone (865) 556-0042  
[ajaxengineering@gmail.com](mailto:ajaxengineering@gmail.com)

September 18, 2020

**PROJECT NAME:** River Pointe Subdivision TIS

**TO:** Knoxville-Knox County Planning

**SUBJECT:** TIS Comment Response Document for River Pointe Subdivision  
(10-SB-20-C/10-C-20-UR)  
Review Comments dated September 15, 2020

Dear Knoxville-Knox County Planning Staff:

The following comment response document is submitted to address comments dated September 15, 2020.

1. **On page 9 and other figures, the legibility of most all figures is very poor and the numbers are very difficult to read. Please provide clear, legible figures for the report.**

Response: The revised report has included legible figures throughout the report.

2. **On page 26, the study cites 31 existing houses. Is this supposed to be 33 as noted earlier on the page?**

Response: No, the cited 31 houses is correct. This discrepancy is explained in the revised document with the following sentence added to the end of page 30 (previously page 26): "This is two fewer houses than the previously mentioned 33 since two of the 33 houses are located to the north of the existing intersection of Number Two Drive at Number Four Drive."

- a. **Please add trip generation summary tables and figures to show the incremental steps in the traffic accumulation from the count location to Number Two Drive.**

Response: Tables and exhibits were added after page 24 to show the incremental steps in the traffic accumulation from the count location to the site

driveway and estimating traffic volumes at the existing intersections. This included adding Tables 2a thru 2f to the document. It is believed that this additional information added to the report will help to show the incremental steps.

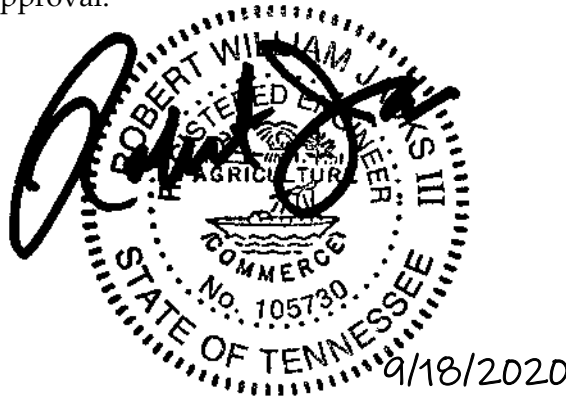
In addition to the requested revisions, other changes in the report include the following:

- Updated Title Page
- Updated Table of Contents
- Updated page footers
- Revised and updated Table numbers
- Updated Figures 4c, 5, and 8
- Updated Level of Service calculations in Appendix G and Tables 4 and 6 (previously Tables 3 and 5)
- Made a few minor grammatical changes to improve readability
- Updated Appendix F calculations
- Updated Appendix H calculations
- Added Appendix I to include this response letter

If you have any questions or further comments, please feel free to contact me at any time. I look forward to your review and approval.

Sincerely,

Ajax Engineering, LLC  
Robert W. Jacks, P.E.





11812 Black Road  
Knoxville, Tennessee 37932  
Phone (865) 556-0042  
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September 25, 2020

**PROJECT NAME:** River Pointe Subdivision TIS

**TO:** Knoxville-Knox County Planning

**SUBJECT:** TIS Comment Response Document for River Pointe Subdivision  
(10-SB-20-C/10-C-20-UR)  
Review Comments dated September 25, 2020

Dear Knoxville-Knox County Planning Staff:

The following comment response document is submitted to address comments dated September 25, 2020.

1. On pages 23-32, the “translation” of volumes from the count location at River Poppy Road to the access points on Mascot Rd needs to be revised. The volumes need to balance through the system taking into account all traffic entering and leaving Mascot Rd. There is an attached figure demonstrating the process.
  - a. For example, the year 2020 103 westbound AM peak through vehicles on Mascot Rd leaving the River Poppy Rd intersection decreased by 2 at the multiple homes between there and Number Two Drive. Then, gain 12 vehicles from the same area resulting in 113 westbound AM through vehicles approaching Number Two Drive, which 4 of these turn left onto Number Two Drive.

Response: This revised method of estimating future traffic volumes in the study area has been added to the report. This resulted in changes throughout the report. These changes were made in Figures 4c, 5, and 8; Tables 2b, 4 and 6; illustrations on pages 26 and 30; and Appendices F, G, and H.



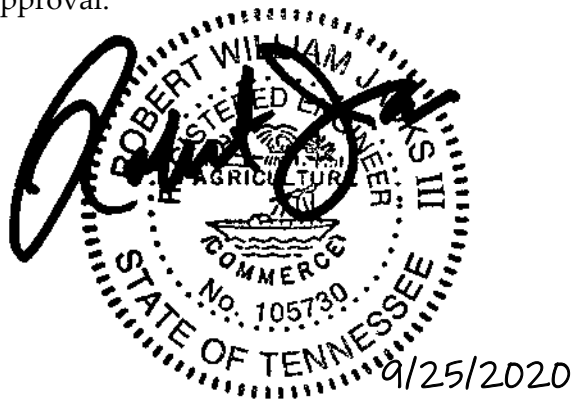
In addition to the requested revisions, other changes in the report include the following:

- Updated Title Page
- Updated Table of Contents
- Updated page footers
- Added Appendix I to include this response letter

If you have any questions or further comments, please feel free to contact me at any time. I look forward to your review and approval.

Sincerely,

Ajax Engineering, LLC  
Robert W. Jacks, P.E.



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