

**MEADOWS OF MILLERTOWN
FUTURE UNITS
Knox County**

TRAFFIC IMPACT STUDY

**Prepared For:
BATSON, HIMES, NORVELL, & POE**

Prepared By:



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March 2005

MEADOWS OF MILLERTOWN

KNOXVILLE, TENNESSEE

TRAFFIC IMPACT STUDY

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INTRODUCTION

Wilbur Smith Associates (WSA) is pleased to submit this report to address any further impact and access of another phase of a residential development located on Millertown Pike in northeast Knox County. The basis for this study required the collection of traffic data, generation of anticipated traffic volumes from the proposed site and development of projected traffic volumes from normal growth and from the potential site. Analyses of the resulting traffic projections were conducted to determine the capacity and levels of service for the site access and adjacent intersection. This study will develop measures necessary to mitigate traffic impacts including improved roadway geometrics and traffic control devices within the environs of the proposed residential development.

According to the Knoxville-Knox County Metropolitan Planning Commission's Administrative Rules and Procedures, the proposed residential development site is identified for a Level 1 Traffic Impact Study. Therefore, the traffic impact study will address the proposed access to Millertown Pike and Sable Point/Mary Emily Lane at Millertown Pike.

Project Description

The proposed project is another phase of the Meadows of Millertown, a residential development. Property has a pending zoning of Planned Residential (PR). The development is another 60 single-family units on 18.02 acres. The site access is to Millertown Pike from a new proposed street or the existing Sable Point Lane. Figure 1 shows the proposed site plan.

Site Location

The location of the proposed residential development is south of Millertown Pike, east of Knoxville Center, in northeast Knox County, Tennessee. Figure 2 illustrates the site location relative to local and regional access.

SITE PLAN

Meadows of Millertown



Figure 1

VICINITY MAP

Meadows of Millertown



Figure 2

LOCAL AND REGIONAL ACCESS

Local Access

The proposed development will access Millertown Pike, a 2-lane approximate 20-foot classified minor arterial. Adjacent to the site, the 2003 average daily traffic (ADT) is approximately 5,070.

Regional Access

To the southwest Millertown Pike provides regional access to Interstate 640. This Interstate access is from Washington Pike and Millertown Pike. Millertown Pike has a 2003 ADT of approximately 14,985 north of I-640. Southwest of the I-640 interchange, Millertown Pike becomes Washington Pike and intersects Broadway, which extends north and south into the Knoxville CBD. Broadway has a 2003 ADT of 37,850 near this intersection with Washington Pike. To the northeast, Millertown intersects Rutledge Pike (U.S. 11W, S.R. 1), a 4-lane divided major arterial extending northeast towards Morristown and southwest to the Knoxville CBD. Rutledge Pike, southwest of its intersection with Millertown Pike, has a 2003 ADT of approximately 13,390.

Interstate 640 connects to I-40 east and west of the Knoxville CBD and becomes I-75 to the west. In the vicinity of the Washington Pike interchange, I-640 has a 2003 ADT of 38,660. Interstate 40 is an east and west facility extending between Nashville, Tennessee and Asheville, North Carolina. The approximate 2003 ADT for I-40/75 west of I-640 is 152,130. To the east of I-640, I-40 has an ADT of 74,780. Interstate 640 intersects I-75 to the west, which extends north to Lexington, Kentucky, and to the west, I-75 turns south to Chattanooga, Tennessee.

EXISTING TRAFFIC CONDITIONS

Existing Traffic Control

The Sable Point Lane approach is STOP controlled. The posted speed limit for Millertown Pike is 40mph.

Existing Traffic Volumes

WSA conducted peak-hour turning movement counts at the intersection of Millertown Pike and Sable Point Lane in March of 2005. The hours counted were from 7:00a.m. to 9:00a.m. and 4:00p.m. to 6:00p.m. Figure 3 presents the AM and PM peak-hour traffic volumes for the study intersection.

Existing Capacity and Level of Service

In order to evaluate the current operations of the traffic control devices, capacity and level of service were calculated using the **2000 Highway Capacity Manual, Special Report 209** published by the Transportation Research Board (TRB). Unsignalized intersections are evaluated based on estimated intersection delays, which may be related to levels of service (LOS).

Level of service and capacity are the measurements of an intersection's ability to accommodate traffic volumes. Levels of service for intersections range from A to F. A LOS A is the best, and LOS F is failing.

Unsignalized intersections levels of service have lower thresholds of delays. A LOS of F exceeds estimated delays of 50 seconds. For urban arterials, minor approaches may frequently experience levels of service E. A full level of service description for unsignalized intersections is presented in Table 1.

2005 EXISTING TRAFFIC Meadows of Millertown



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LEGEND
 XXX AM PEAK
 (XXX) PM PEAK



Figure 3

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

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

SOURCE: Highway Capacity Manual, TRB Special Report
209

Analyses were conducted using the Synchro Software, developed by Trafficware. Table 2 presents the analyses of the study intersection. The analyses show that operation of the unsignalized intersection is very good and acceptable.

**TABLE 2. 2005 TRAFFIC
CAPACITY AND LEVEL OF SERVICE**

INTERSECTION	TRAFFIC CONTROL	PEAK PERIOD	V/C	2005 TRAFFIC DELAY	LOS
Millertown Pk & Sable Point Ln.	STOP	AM	0.18/0.02	13.7/10.8	B/B
	NB/SB	PM	0.15/0.01	15.3/10.6	C/B

Note: Average vehicle delay estimated in seconds. STOP control analyses presented by total minor approach.

BACKGROUND TRAFFIC CONDITIONS

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

Background Traffic Volumes

Historical traffic data is reviewed to determine traffic growth trends in the study area. Millertown Pike has experienced an approximate 3-percent growth rate over the past ten years. The horizon year is assumed 2010. Build-out, however, will depend largely on the market considerations for residential development. A compounded annual growth rate of 3-percent is utilized, and a growth of 15.9 percent is applied to the 2005 traffic volumes. Figure 5 presents the resulting Year 2010 AM and PM peak-hour traffic volumes without the proposed development.

Background Capacity and Level of Service

Analysis was performed with the grown traffic volumes and is presented in Table 3. The levels of service are measured to be acceptable for the unsignalized study intersection for background conditions.

**TABLE 3. 2010 BACKGROUND TRAFFIC
CAPACITY AND LEVEL OF SERVICE**

INTERSECTION	TRAFFIC CONTROL	PEAK PERIOD	2010 BACKGROUND		
			V/C	DELAY	LOS
Millertown Pk & Sable Point Ln.	STOP	AM	0.20/0.02	14.9/11.3	B/B
	NB/SB	PM	0.17/0.01	17.0/11.1	C/B

Note: Average vehicle delay estimated in seconds. STOP control analyses presented by total minor approach.

2010 BACKGROUND TRAFFIC Meadows of Millertown



LEGEND
 XXX AM PEAK
 (XXX) PM PEAK



Figure 4

PROJECT IMPACTS

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

Trip Generation

Project traffic was determined using the publication, **Trip Generation, 7th Edition**. This reference is published by the Institute of Transportation Engineers (ITE) and represents national data collected for many different land uses including industrial, residential and commercial uses. **Trip Generation** is an essential tool in calculating the traffic, which may be generated by a proposed development. The study will generate traffic for 60 single-family units. From the trip generation calculations, the proposed site may generate approximately 650 daily trips. Table 4 presents the trip generation of this proposed site.

TABLE 4. TRIP GENERATION

LAND USE	L.U.C.	Units	DAILY TRIPS	AM PEAK		PM PEAK	
				ENTER	EXIT	ENTER	EXIT
Single Family	210	60	650	13	39	43	24

Trip Distribution and Assignment

Using the turning-movement count for the study intersection, residential development character, and the local and regional roadway network, generated trips are distributed to the adjacent streets with 90-percent distributed southwest and 10 percent to the northeast. This development phase will have access to Sable Point Lane; however, it is assumed that the trips associated with this phase will use the proposed new street to Millertown Pike. Figure 5 illustrates this distribution and assignment.

Project Traffic Volumes

By multiplying the trips generated by the distribution percentages, the project traffic volumes are determined. Figure 6 illustrates the resulting project traffic volumes associated with the proposed project.

DISTRIBUTION AND ASSIGNMENT Meadows of Millertown

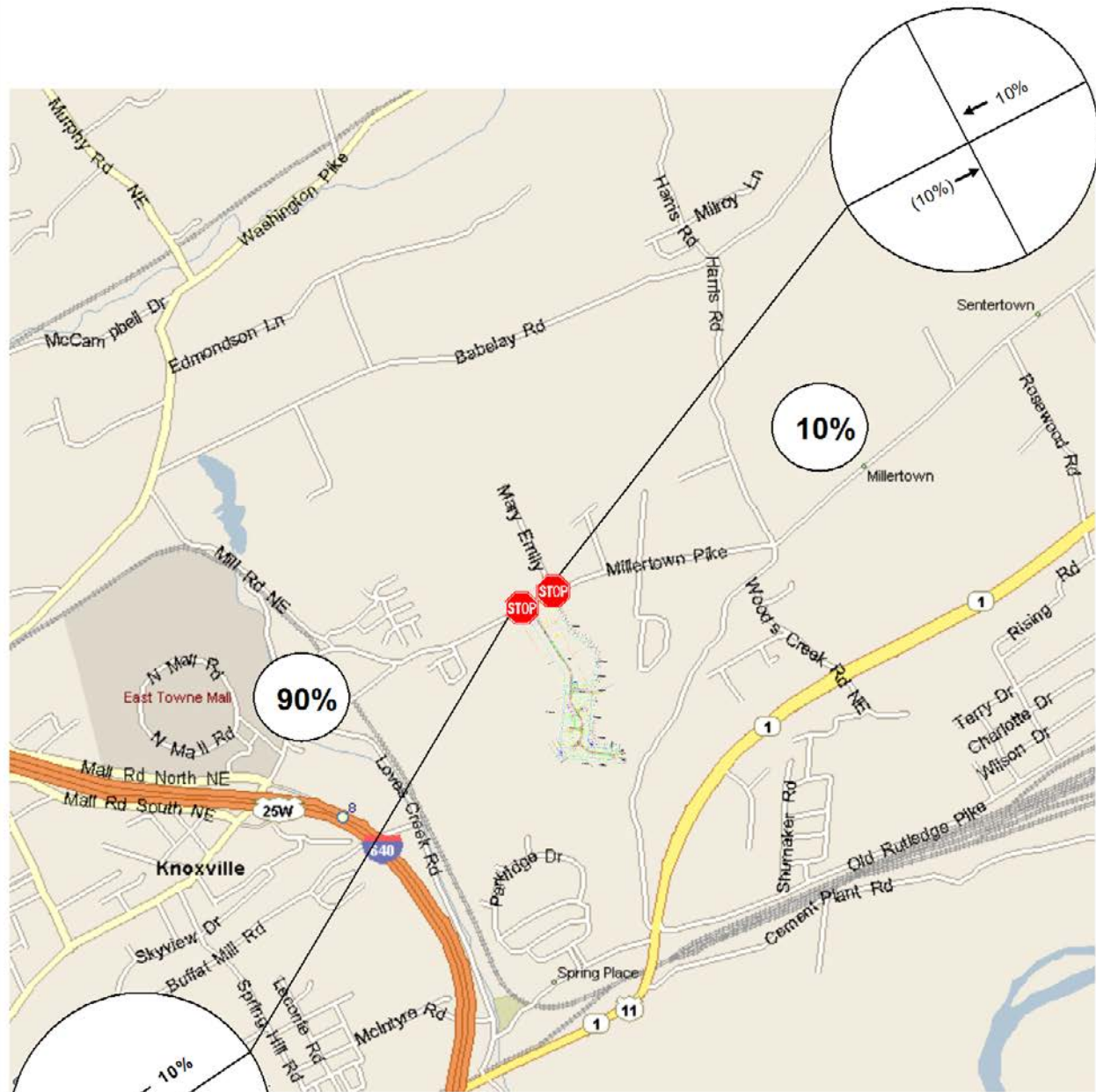
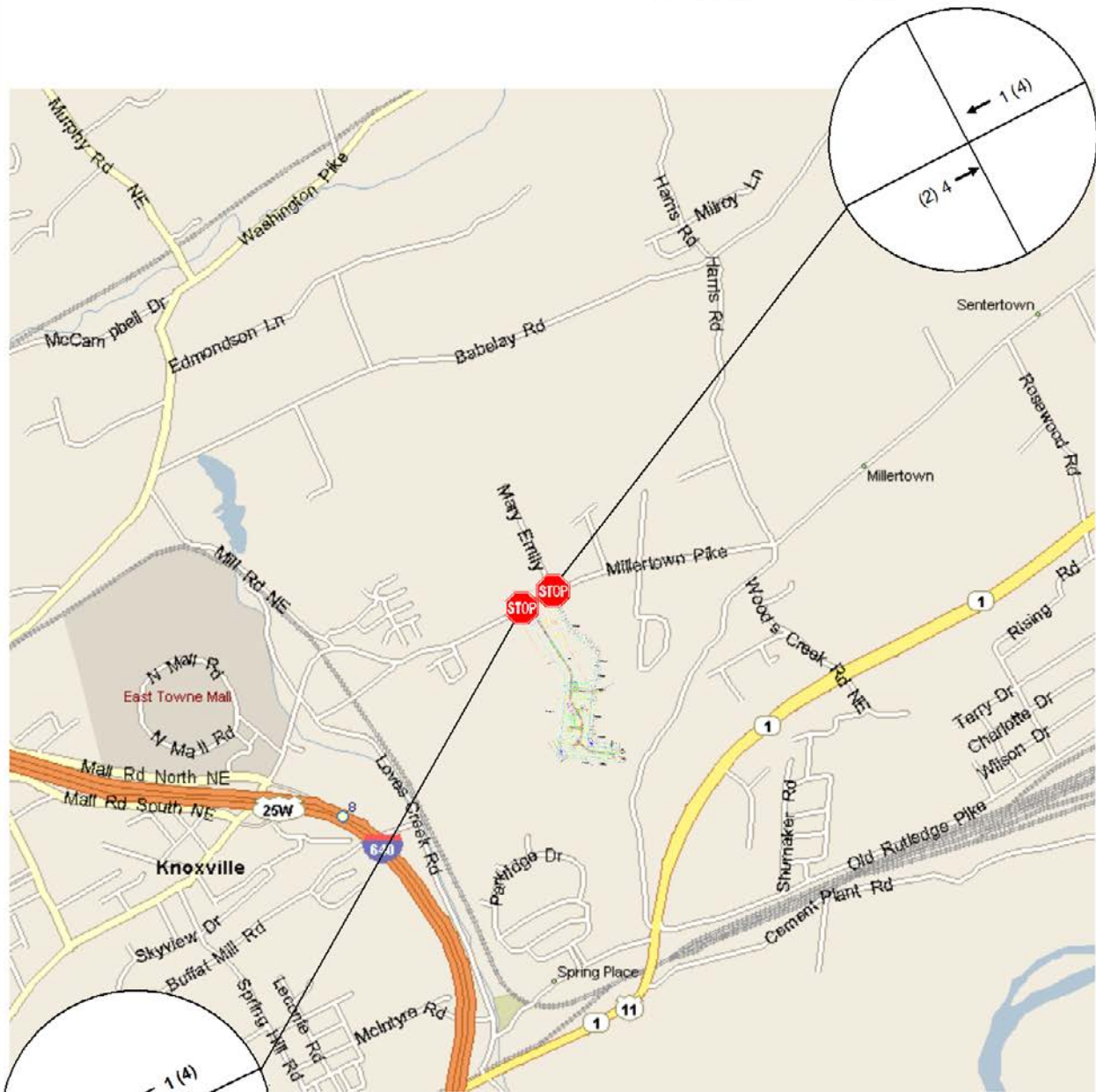


Figure 5

PROJECT TRIPS

Meadows of Millertown



LEGEND
 XXX AM PEAK
 (XXX) PM PEAK



Figure 6

Total Projected Traffic Volumes

Background and project traffic volumes were added together to develop post-development traffic volumes for the year 2010. Figure 7 illustrates this 2010 projection. Using these projections, mitigation measures including traffic control devices and roadway and intersection geometry can be evaluated. The requirements of left- and right-turn lanes were evaluated using the criteria adopted by the MPC.

Turn Lane Evaluation

Projected traffic volumes for the proposed street indicate that turn lanes are not required. The left-turn volume is minimal and is less than 35vph. The right-turn volume from Millertown Pike to the proposed street is 39vph and the through traffic flow is less than 500vph.

Projected Capacity and Level of Service

The development of the site has an insignificant impact on the study intersections. The projected capacity and LOS with the development is shown in Table 5. Results conclude that the study intersections would operate at a very acceptable level of service for projected traffic volumes.

TABLE 5. 2010 PROJECTED TRAFFIC CAPACITY AND LEVEL OF SERVICE

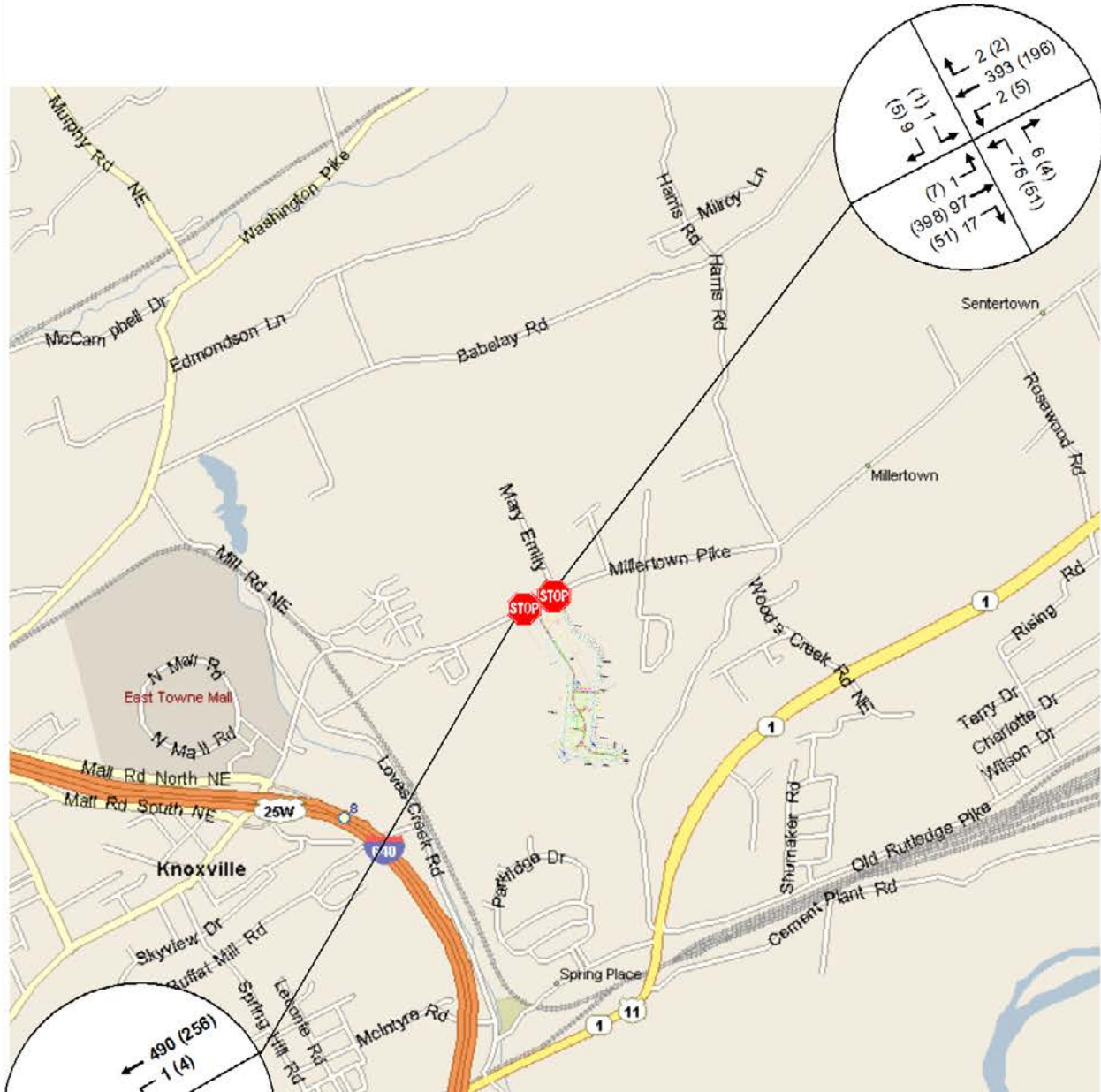
INTERSECTION	TRAFFIC CONTROL	PEAK PERIOD	2010 PROJECTED		
			V/C	DELAY	LOS
Millertown Pk & Sable Point Ln.	STOP	AM	0.20/0.02	15.0/11.3	C/B
	NB/SB	PM	0.17/0.01	17.2/11.2	C/B
Millertown Pk & Proposed Street	STOP	AM	0.09	13.8	B
	NB	PM	0.07	15.8	C

Note: Average vehicle delay estimated in seconds. STOP control analyses presented by total minor approach.

Sight Distance

The project is proposed to access Millertown Pike. Millertown Pike has a posted speed limit of 40mph, and measured sight-distance for its access to Millertown Pike exceeds 600 feet to the northeast and southwest. A speed limit of 40mph requires a minimum sight-distance of 305 feet to meet the minimum stopping sight-distance for American Association of State Highway and Transportation Officials (AASHTO) and 400 feet to meet the Knox County Minimum Corner Sight-distance Standard. Therefore the measured sight-distance is more than adequate for safe egress.

2010 PROJECTED TRAFFIC Meadows of Millertown



LEGEND
 XXX AM PEAK
 (XXX) PM PEAK



Figure 7

RECOMMENDATIONS

The analyses conducted and the review of the traffic volumes identified the following recommendations:

- Minimize landscaping, using low growing vegetation, and signing at the proposed street accesses to insure that safe sight distance is maintained.
- Use a minimum intersection radius of 30-foot for the efficient and safe ingress and egress of the site.
- Post the proposed streets with STOP signs (R1-1) at the proposed residential street at Millertown Pike.
- Intersection design should conform to the recommended standards and practices of the American Association of State Highway and Transportation Officials, the Institute of Transportation Engineers, and the Knox County Department of Engineering and Public Works.

CONCLUSION

The study of this proposed residential development evaluated the projected traffic conditions. Background traffic was determined using a 3-percent annual compounded growth rate until the year 2010. Traffic associated with the proposed project was then generated and distributed to the proposed site access. Using the identified turning movements for the projected traffic conditions, unsignalized and signalized capacity and level of service analyses were conducted using the **2000 Highway Capacity Manual**. Unsignalized levels of service were found to be acceptable for the existing traffic conditions, and continued to be acceptable for background with and without the proposed development for the study intersections. With the recommendations of this report, the efficient and safe flow of traffic should be maintained.

APPENDIX

Trip Generation

HCS Unsignalized Analyses

Traffic Count

