

***RUFUS SMITH BALL CAMP PIKE
SUBDIVISION
Knox County***

TRAFFIC IMPACT STUDY

Prepared For:

BATSON, HIMES, NORVELL, & POE

Prepared By:



August 2003

**RUFUS SMITH RESIDENTIAL DEVELOPMENT
BALL CAMP PIKE
KNOX COUNTY, TENNESSEE
TRAFFIC IMPACT STUDY**

Prepared for

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August 2003

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INTRODUCTION

This traffic impact study was commissioned to address the impact of a proposed residential development in Knox County. The study of this development required the collection of traffic data, generation of anticipated traffic volumes from the proposed site, development of future traffic volumes from both normal growth and the site, analysis of the resulting traffic conditions, and the development of measures necessary to mitigate traffic impacts of normal traffic growth and the proposed development. Methods and procedures utilized in the study are those required for a Level 1 traffic impact study as adopted by the Knoxville/Knox County Metropolitan Planning Commission.

Project Description

The proposed project is a residential development adjacent to Ball Camp Pike. The site is approximately 25 acres with a R-1 zoning. The development will rezone the property to RP (Planned Residential) and subdivide the property for 142 single-family unit lots. Access is from a proposed street from Ball Camp Pike and a future intersection with the future realigned Ball Camp Pike planned on the north boundary of the proposed development. Figure 1 is the proposed site plan.

Site Location

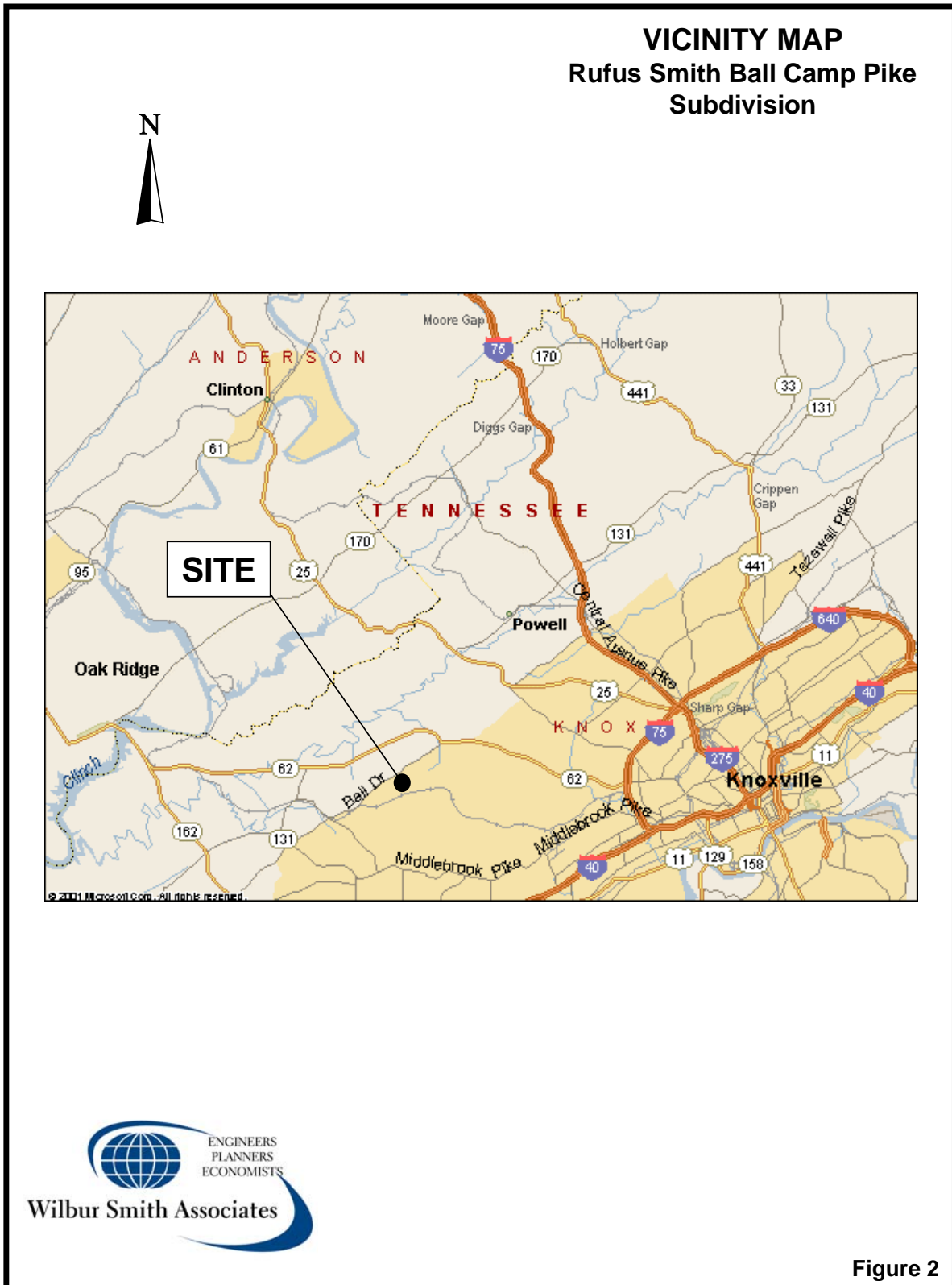
The location of the site is north of Ball Camp Pike, east of Valley Grove Lane. The site is in the northwest area of Knox County and northwest of the Knoxville central business district (CBD). The adjacent land use is residential in character. Figure 2 illustrates this location relative to local and regional access.

LOCAL AND REGIONAL ACCESS

Local Access

Local access for this site is Ball Camp Pike. Adjacent to the proposed site, Ball Camp Pike is a two-lane 20-foot arterial. Site access is a proposed residential street from Ball Camp Pike. Ball Camp Pike is an east and west facility extending between Oak Ridge Highway (S.R. 62) to the east and Middlebrook Pike to the west. The 2002 average daily traffic (ADT) for Ball Camp Pike is approximately 4,970.





Regional Access

To the southwest is Middlebrook Pike (S.R. 169), extending northwest and southeast, and Lovell Road (S.R. 131), extending north and south. Middlebrook Pike has a 2002 average daily traffic (ADT) of 11,640 west of Lovell Road and 27,650 east of Lovell Road. An ADT of 8,730 is currently using Lovell Road south and 9,640 north of Middlebrook Pike. Lovell Road intersects Interstate 40/75 to the south.

Interstate 40 is an east and west facility extending between Nashville, Tennessee and Asheville, North Carolina. The approximate 2002 ADT for I-40/75 west of Pellissippi Parkway (I-140) and east of Pellissippi Parkway are 105,180 and 133,370, respectively. To the east, I-75 turns north to Lexington, Kentucky, and to the west, I-75 turns south to Chattanooga, Tennessee.

North of the proposed development is the Oak Ridge Highway (S.R. 62), which extends east and west between Oak Ridge Highway and Knoxville. The Oak Ridge Highway is a four- and five-lane facility with an ADT of 16,760.

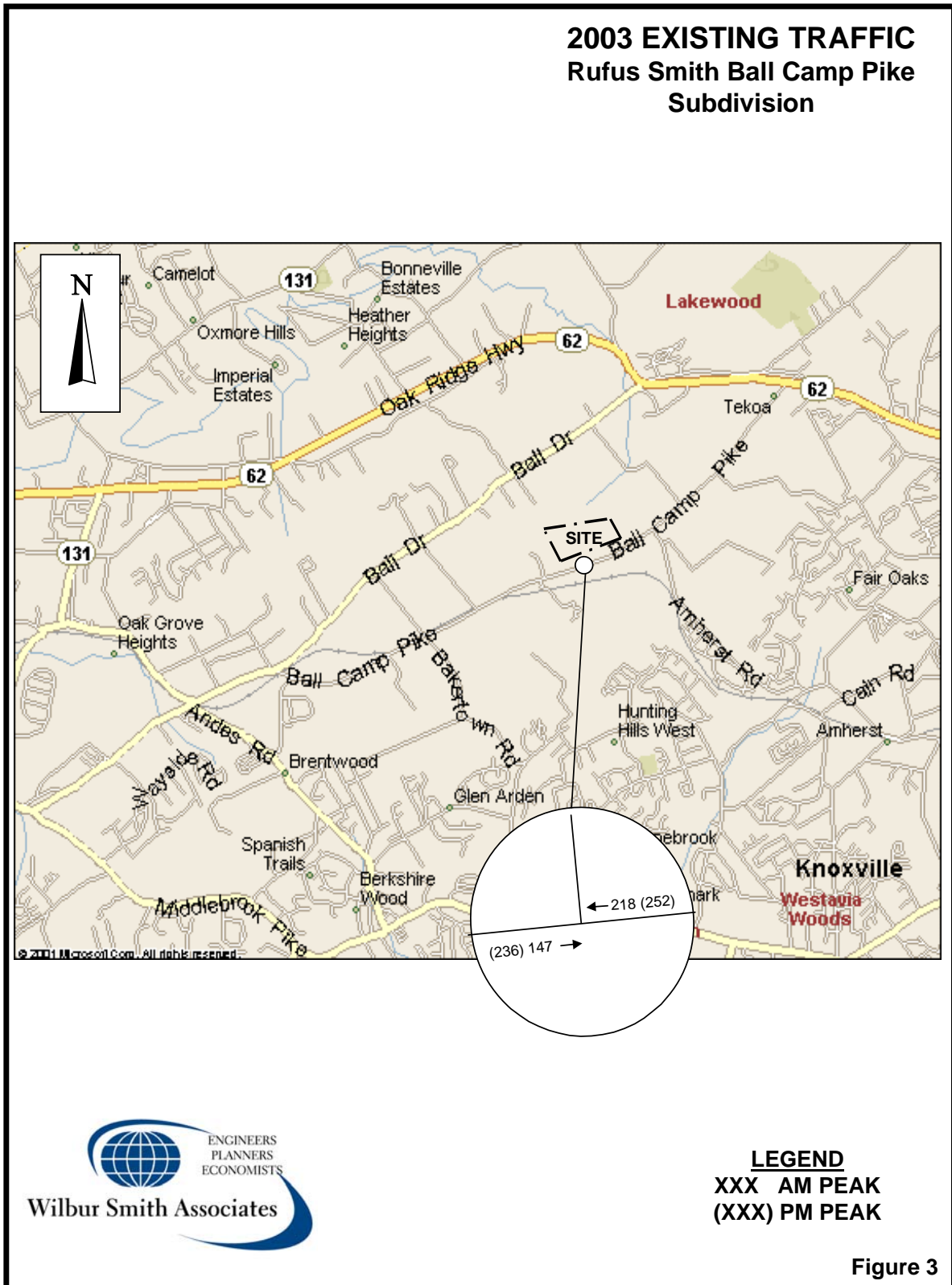
EXISTING TRAFFIC CONDITIONS

Existing Traffic Control

Currently traffic control within the study vicinity consists of traffic signal at the intersection of Ball Camp Pike at Oak Ridge Highway and a stop control at the intersection with Ball Drive. Adjacent intersections are unsignalized at Ball Camp Pike. Ball Camp Pike has a posted speed limit of 40mph.

Existing Traffic Volumes

This traffic impact study addresses the intersection of Ball Camp Pike and the proposed street accessing the proposed development. A turning-movement count for Ball Camp Pike and Amherst Road, conducted by WSA, was used to determine the peak-hour traffic traveling adjacent to the site. The AWT was found to be approximately 5,795. Figure 3 illustrates the adjacent street traffic volumes.



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 and continued growth of Knoxville and Knox County. This traffic must be developed and analyzed for the purpose of establishing a baseline.

Background Traffic Volumes

Using historical TDOT ADT count data from 1997 on Ball Camp Pike, an annual growth rate of 3 percent was determined. Background traffic was projected for the year 2008 using a 3.0 percent annual compounded growth rate. Completion of this development will depend largely upon market considerations; however, a five-year build-out seems reasonable. Figure 4 illustrates the resulting 2008 background traffic. This traffic is obtained growing existing traffic by a total of 15.9 percent.

DEVELOPMENT IMPACTS

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

Trip Generation

Project traffic for the single-family units was determined using the publication, **Trip Generation, 6th Edition**. The **Trip Generation** 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. From the trip generation calculations, the proposed site may generate approximately 1,430 daily trips. Table 1 presents the trip generation of this proposed site.

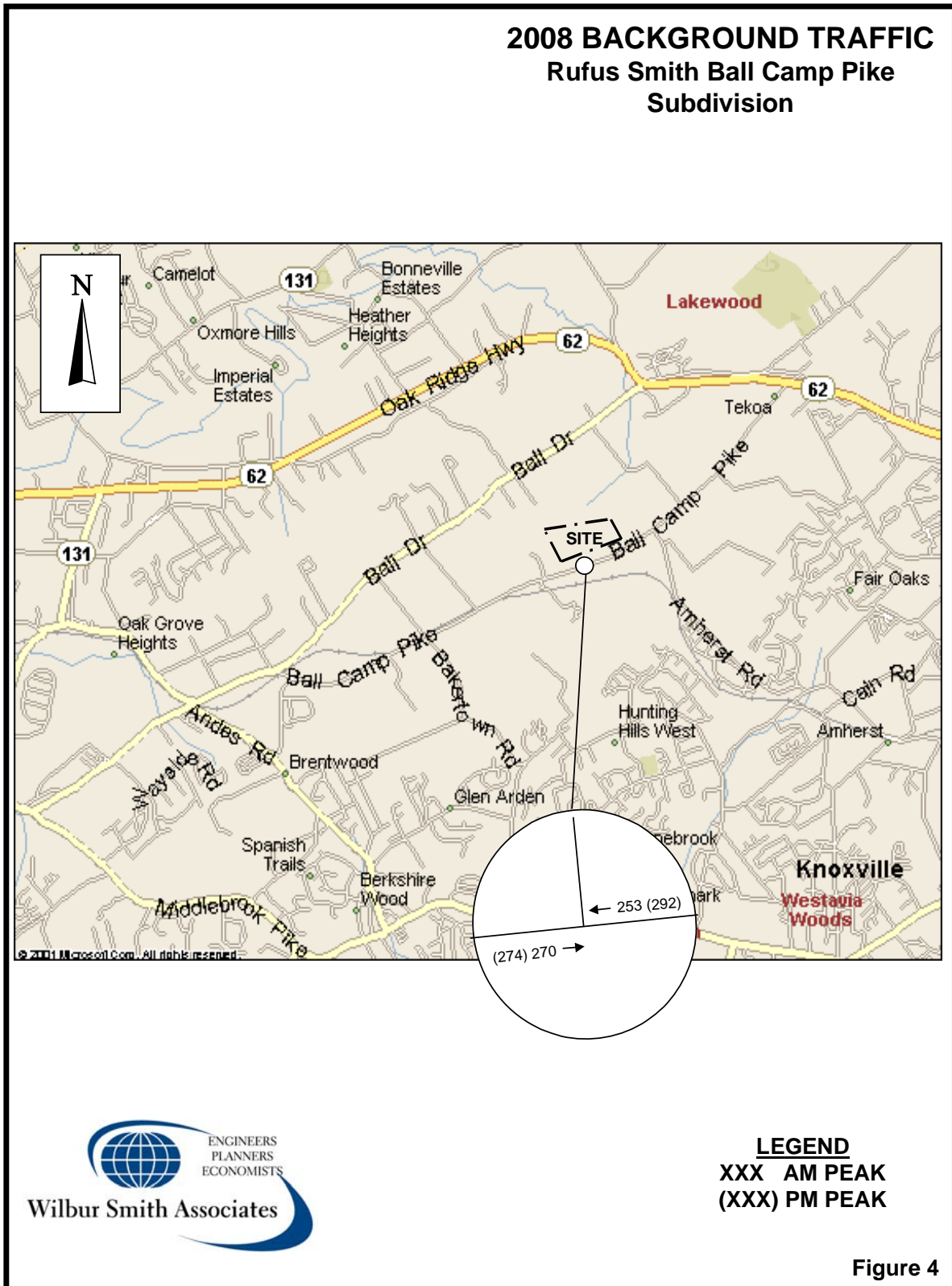


TABLE-1

TRIP GENERATION

LAND USE	L.U.C.	Units	DAILY TRIPS	AM PEAK		PM PEAK	
				ENTER	EXIT	ENTER	EXIT
Single Family	210	142	1,431	27	82	94	53

Trip Distribution and Assignment

Using the turning-movement count conducted for Ball Camp Pike and Amherst Road, the trip assignment assumes approximately 35 percent of the residential trips will turn to the west and 65 percent to the east. Figures 5 illustrate this distribution and assignment.

Project Traffic Volumes

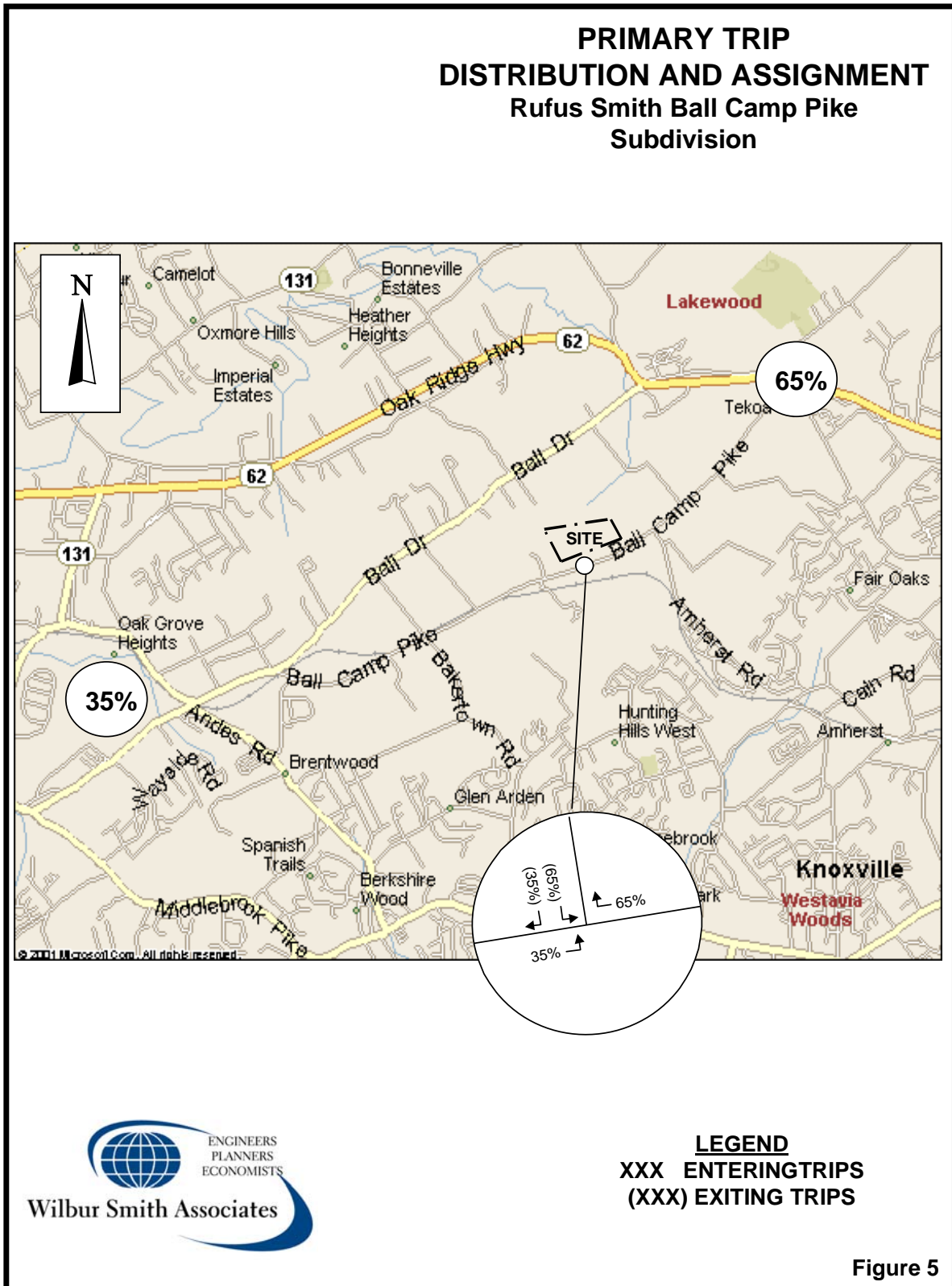
By multiplying the trips generated by the distribution percentages, the project traffic volumes were determined. Figure 6 illustrates the resulting project traffic volumes associated with the proposed project.

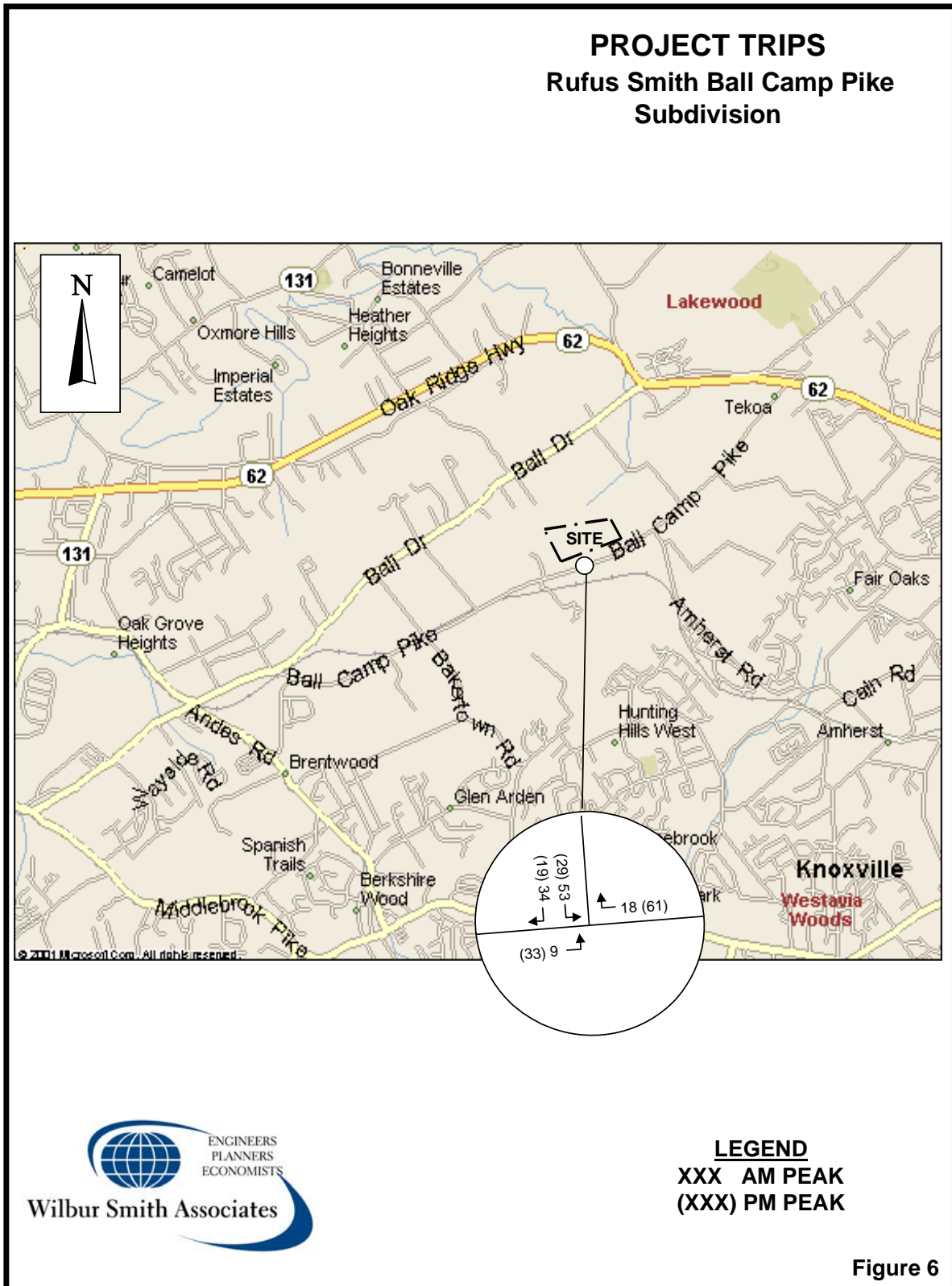
Total Projected Traffic Volumes

Background and project traffic volumes were added together to develop post-development traffic volumes for the year 2008. Figure 7 illustrates this 2008 projection. Using this projection, mitigation measures including traffic control devices and roadway and intersection geometry can be evaluated. The projected ADT on Ball Camp Pike may become approximately 5,900 to the east and 5,470 to the west.

Projected Capacity and Level of Service

In order to evaluate the 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. Signalized and unsignalized intersections are evaluated based on estimated intersection delays, which may be related to level of service (LOS). Level of service and capacity are the measurements of an intersection's ability to accommodate traffic volumes. Levels of service for intersections range from A to F. A LOS of





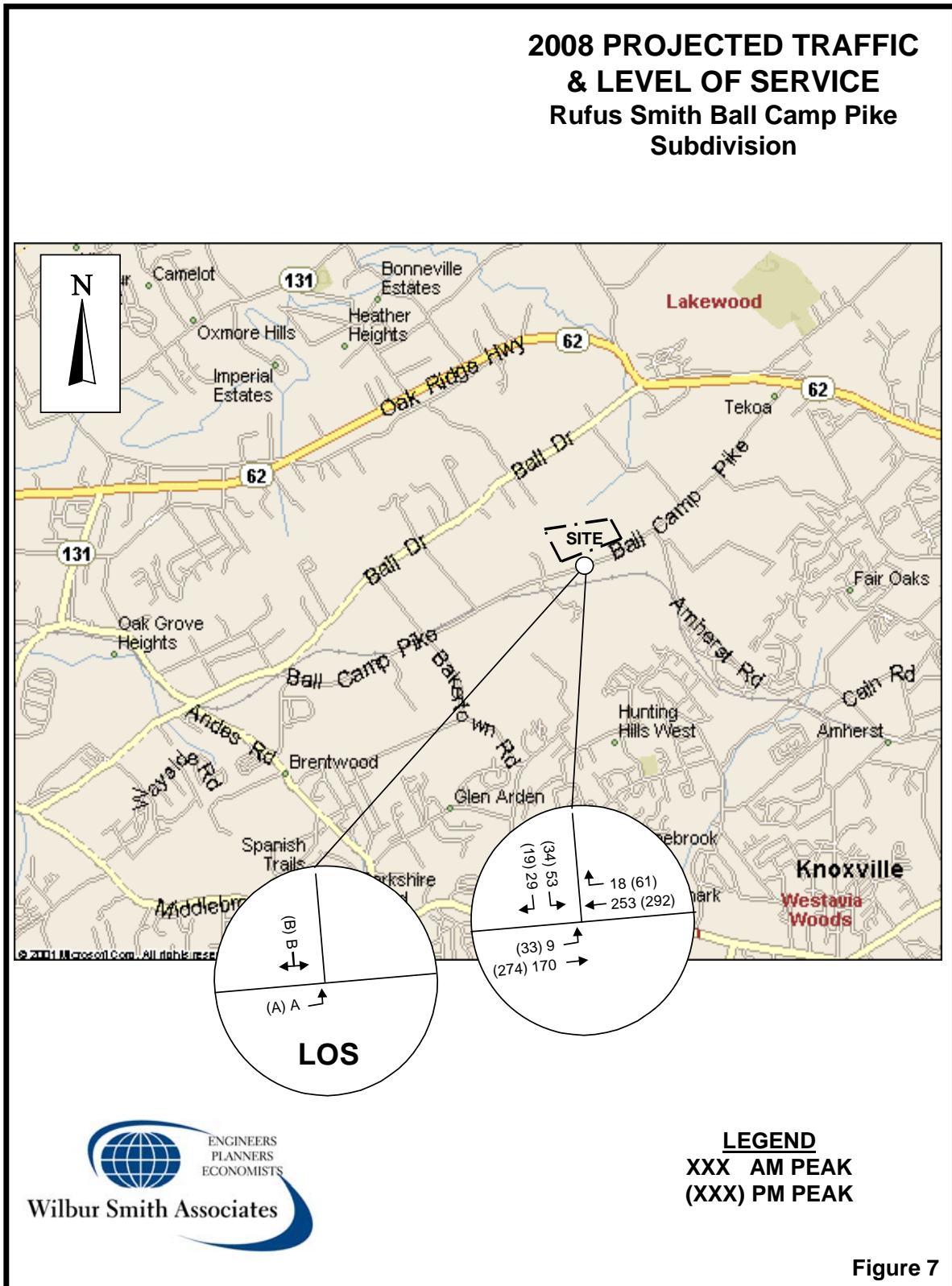


Figure 7

A is the best, and LOS F is failing.

For unsignalized intersection levels of service have lower thresholds of delays. A LOS of F exceeds estimated delays of 45 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 Tables 2.

TABLE-2
LEVEL-OF-SERVICE (LOS) DESCRIPTION
FOR TWO-WAY STOP INTERSECTIONS

LOS	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: 2000 Highway Capacity Manual, TRB Special Report 209

Analyses were conducted using the Synchro Software, developed by Trafficware. Table 3 presents the unsignalized analyses of the projected traffic conditions. For unsignalized traffic control of the proposed access street, a LOS of B or better was determined for the egress and the left-turn ingress.

TABLE-3
2008 PROJECTED
LEVELS OF SERVICE

INTERSECTION	AM PEAK			PM PEAK		
	V/C	DELAY	LOS	V/C	DELAY	LOS
Ball Camp Pike & Proposed Site Access	0.10	11.7	B	0.09	12.9	B

Note: Unsignalized average vehicle control delay estimated in seconds for proposed street approach.

Sight Distance

The project access is proposed to Ball Camp Pike, a 20-foot two-lane roadway. The road's speed limit is currently posted for 40mph. Measured sight distance to the west is approximately 460 feet and is unrestricted to the east (exceeds 400 feet). The required distance is 325 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. The proposed site access, therefore, meets both criteria and is acceptable for safe operations.

Turn Lane Evaluation

Using Knox County's Access Control and Driveway Design Policy, the review and evaluation of the projected traffic volumes did not determine any requirement of left- or right-turn lanes. Projected traffic was found to be well below the traffic volume thresholds.

Accident History

For Ball Camp Pike, an investigation of accidents found that this facility experienced a total of 115 accident over the past two years. Beginning from the month of May of 2001, 66 property damage, 45 injury, and 4 fatality intersection collisions occurred on Ball Camp Pike.

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 street access 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 street with a STOP sign (R1-1) at Ball Camp 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 City of Knoxville Public Works Department.

CONCLUSION

The study of this proposed residential development evaluated the projected traffic conditions. Background traffic was determined using a 3.0 percent annual compounded growth rate until the year 2008. 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. A minimum LOS B was determined for the left-turn ingress and the site egress during the peak hours.

The proposed development was identified as having a minimal impact on the adjacent street and intersections. With the recommendations of this report, the efficient and safe flow of traffic should be maintained.

APPENDIX

TRIP GENERATION CAPACITY AND LOS ANALYSES TRAFFIC COUNTS

