Chapter 3.0

Affected Environment

3.0 Affected Environment

This chapter presents data and information related to the environment potentially affected by the Action and No-Action Alternatives. For the purpose of the EIS, "environment" has been defined broadly and includes elements of both the natural and man-made environment. As described in Chapter 1, the study area for the Penns Neck Area EIS has been structured as overlapping regions, including the SSA which is comprised of twenty municipalities in Mercer, Middlesex and Somerset counties, and the PSA which is comprised of Plainsboro Township, Princeton Borough, Princeton Township and West Windsor Township. In addition, the following sub-areas were identified for the purposes of characterizing the affected environment and examining potential project impacts:

The **core study area** was defined for considering traffic and circulation conditions and potential transportation impacts. The core study area is generally bounded by the Millstone River to the north, Alexander Road to the south, Clarksville Road to the east and Route 27 to the west.

The **study area** consists of the immediate environs of the Action Alternatives and is located in West Windsor Township, Mercer County, and a portion of Plainsboro Township, Middlesex County. The study area is bounded to the west by the D&R Canal, to the south by Alexander Road, and to the east by the NEC. The northern boundary of the study area, east of Route 1 is the Millstone River. At Route 1, the boundary turns north and then west along Mapleton Road to the Canal. Figure 3-1 presents a map of the study area.

The **expanded study area** encompasses the majority of the core study area, except for the urbanized portion located in Princeton Borough. The Borough portion of the core study area was excluded due to the relatively high concentration of existing development and impervious surfaces that limit recharge. The expanded study area was determined to sufficiently cover localized conditions in existing waterways.

The boundaries for these sub-areas were defined based on the physical extent of the alternatives under consideration and the nature of the resource and impacts to be examined.

3.1 Transportation and Mobility

3.1.1 Introduction

This section describes the existing transportation environment in the Penns Neck area of West Windsor Township, Mercer County, New Jersey. It describes the existing roadway network, public transportation services, bicycle and pedestrian facilities, and existing travel demand management programs. Finally, it highlights local travel patterns and the mobility challenges that exist for all modes of transportation in the Penns Neck area. For the purpose of this section, the focus is primarily on the core

transportation study area (core study area), which is generally bounded by Plainsboro Road/Mapleton Road to the north, Alexander Road to the south, Clarksville Road to the east and Nassau Street (State Route 27) to the west; however, some aspects of the affected transportation environment are described in terms of the primary study area or larger surrounding region. Figure 3-1 delineates the core study area as just described.

3.1.2 Existing Roadway Network

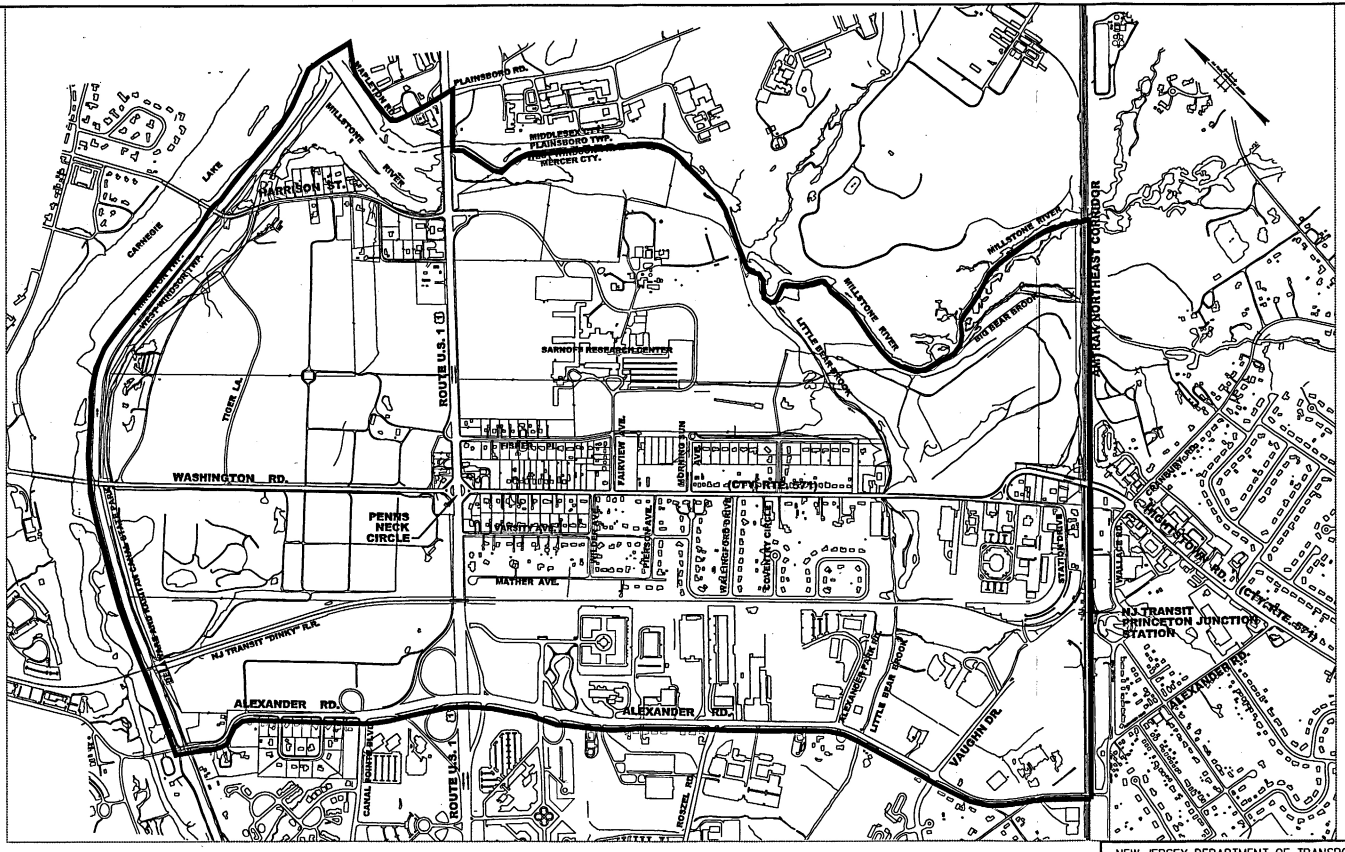
The existing roadway network in the Penns Neck area lacks the connectivity of a grid system and funnels traffic onto a few principal roads. As noted below, the major north-south transportation artery in the study area is Route 1. It functions both as an inter-regional auto and truck corridor and as a local access road for properties fronting the highway. In addition, the few parallel connector roads adjacent to either side of Route 1 are ineffective alternatives to the use of Route 1 for reaching employment and other destinations in the primary study area.

The east-west road system does not efficiently distribute traffic to and from employment centers and other destinations in the primary study area. At-grade signal-controlled intersections with Route 1 at two locations provide limited "green time" for east-west traffic. In addition, these roads are characterized by varying road widths, lane drops, lack of turning lanes, and discontinuities. Many routes pass through residential and college neighborhoods and business districts. In summary, the east-west roads do not meet existing peak period traffic demand and function at impaired levels of service. Existing roadway facilities in the Penns Neck area are described below in more detail.

3.1.2.1 U.S. Route 1

The major north-south transportation artery in the primary study area is U.S. Route 1. Route 1 is classified in the New Jersey State Highway Access Management Code as an Accessible Principal Arterial and as a Major Arterial on the Federal-Aid Highway Primary System. Route 1 functions both as an inter-regional auto and truck corridor and a local land access road. It carries high volumes of traffic and accommodates trips of moderate length between the City of Trenton in Mercer County and the City of New Brunswick in Middlesex County, as well as local and regional trips accessing properties fronting on the highway. Approximately 82,700 vehicles per day use Route 1 through the Penns Neck area, both for regional through traffic and for access to local destinations by regional and local travelers.

In 1986, NJDOT conducted the Route 1 Corridor Transportation Study, which outlined a long-term strategy for maintaining the ability of Route 1 to function as a primary arterial highway. Proposals outlined in the study and pursued over the past sixteen years include the following:



LEGEND:

STUDY AREA BOUNDARY

NEW JERSEY DEPARTMENT OF TRANSPORTATION

PENNS NECK AREA
ENVIRONMENTAL IMPACT STATEMENT

STUDY AREA

DATE: NOV. 2002
SCALE: 1"=1000'

FIGURE 3-1

- Widen Route 1 to provide three travel lanes in each direction with safety shoulders;
- Replace at-grade signal controlled intersections with grade-separated interchanges at major regional cross streets; and
- Create an adequate system of supporting minor arterial highways and collector streets to accommodate travel demand from planned future development.

The 1-mile segment of Route 1 in the core study area between the Dinky rail line and the Millstone River has three travel lanes in each direction with no safety shoulders. There are three closely-spaced at-grade signal controlled intersections at Washington Road (CR571), Fisher Place and Harrison Street. In addition, there is a grade-separated interchange at Alexander Road. North of the core study area, through Plainsboro Township, Route 1 has three travel lanes in each direction with shoulders and grade-separated interchanges at Scudders Mill Road and College Road. South of the core study area, through West Windsor Township, the cross-section of Route 1 varies between 3 and 5 travel lanes in each direction with shoulders. There are grade-separated interchanges at Meadow Road and Quakerbridge Road and at-grade signal controlled intersections at Carnegie Center Boulevard and Nassau Park Boulevard.

In 1999, NJDOT initiated a plan to develop a computerized signal management system along Route 1 from Business Route 1 in Lawrence Township to Prince Street in Edison Township. This segment includes the Penns Neck portion of Route 1. The purpose of this project was to optimize traffic flow along Route 1 utilizing existing lane capacity, but with the assistance of Intelligent Transportation Systems (ITS) technology, such as:

- Video surveillance cameras;
- Computer-coordinated traffic signals and fiber optic controls;
- Variable Message Signs; and
- Highway Advisory Radio.

In August 2000, in response to safety concerns related to Route 1-bound traffic in the AM peak period backing up onto I-295/95 in Lawrence Township, the NJDOT initiated a 240 second AM peak period signal cycle for the Nassau Park Boulevard, Carnegie Center Boulevard, Washington Road, Fisher Place and Harrison Street traffic signals. This cycle length, which is active only in the morning peak period, is designed to facilitate the progression of traffic traveling on Route 1 northbound. The 240 second cycle, the second longest cycle used in the State, allocates 70 percent or 170 seconds of cycle "green time" to Route 1. East-west cross streets receive 30 percent or 70 seconds of "green time." This allocation creates extensive delays for east-west travelers intersecting Route 1 at grade in the Penns Neck area, using Washington Road and Harrison Street. In the PM peak period, the Penns Neck area traffic signals function on a 120 second cycle. Again, given the greater volume of traffic using Route 1, north-south traffic is given priority with regard to signal cycle "green time."

3.1.2.2 East-West Roads

Set forth below are more detailed descriptions of the east-west cross streets in the Penns Neck area. The balance of traffic utilizing these roadways is presented in Table 3-1.

- Washington Road (Mercer County Route 571) is the spine of the east-west roadway network in the study area. It connects U.S. Route 130 near New Jersey Turnpike Exit 7 with Route 1 and State Route 27 (Nassau Street) in Princeton Borough. From Route 130 west to Clarksville Road, CR 571 is a four-lane roadway. West of Clarksville Road, CR 571 has two lanes. It crosses the Northeast Corridor (NEC) rail line on a two-lane bridge and turns sharply to the south where it becomes known locally as Washington Road. Washington Road crosses Route 1 at an at-grade signal controlled traffic circle (Penns Neck Circle) that provides for all turning movements. After crossing Route 1, Washington Road crosses the D&R Canal and Lake Carnegie, passes through the Princeton University campus, where there is significant pedestrian traffic, and terminates at Nassau Street.

  CR 571/Washington Road has been classified in the Princeton Community Master Plan, the Mercer County Highway Plan and the West Windsor Master Plan as a secondary arterial road. It should be noted, however, that the Mercer County Highway Plan identifies the segment of Washington Road between the NEC rail line and the D&R Canal through Penns Neck as a "proposed county to municipal road." The West Windsor Master Plan classifies the segment of Washington Road between Station Drive and the D&R Canal as a minor collector road. Washington Road carries approximately 20,100 vehicles per day east of Route 1 and 17,500 vehicles per day west of Route 1. Peak hour directional traffic volumes on Washington Road east and west of Route 1 are presented in Table 3-2, below.

- Fisher Place is located approximately 550 feet north of the Penns Neck Circle. It is a two-lane residential street that provides access to a portion of the Penns Neck neighborhood and the Sarnoff Corporation campus in West Windsor Township. Fisher Place intersects Route 1 at an at-grade signal controlled intersection with a jug-handle configuration that accommodates all traffic movements. The West Windsor Master Plan identifies Fisher Place as a local road. Some 3,000 vehicles per day utilize Fisher Place. Fisher Place provides alternate access to the main entrance to the Sarnoff Corporation property located opposite Fairview Avenue. In addition, during peak periods, it provides an alternate route for traffic trying to avoid congestion at the Route 1/Washington Road intersection.

- Harrison Street is located approximately 2,300 feet north of Fisher Place. It is a two lane roadway that connects Route 1 to Nassau Street and then Route 206 north of Princeton via Ewing Street. Harrison Street intersects Route 1 at an at-grade signal controlled intersection opposite the driveway that serves as the main

entrance to the Sarnoff Corporation campus. This intersection provides for all traffic movements. West of Route 1, Harrison Street passes through the Aqueduct Mills Historic District Extension, a residential neighborhood in West Windsor Township, crosses the D&R Canal and Lake Carnegie, and traverses several residential neighborhoods in Princeton Township and Princeton Borough.

Harrison Street, between Route 1 and the D&R Canal, is classified in the West Windsor Master Plan as a local road. The Princeton Community Master Plan classifies Harrison Street west of the canal as a major collector road. Approximately 12,100 vehicles per day use Harrison Street. See Table 3-2, below.

- Alexander Road is located approximately 2000 feet south of the Penns Neck Circle. It connects County Route 571 in Princeton Junction east of the NEC rail line to Princeton Borough. From its intersection with CR 571 west to its intersection with Wallace Road and North Post Road, Alexander Road is a two-lane local street bisecting West Windsor Township's Berrien City neighborhood in Princeton Junction. It crosses the NEC rail line on a narrow two-lane bridge and becomes a four-lane roadway with office buildings fronting on both sides of the roadway. Alexander Road intersects with Roszel Road east of Route 1. Roszel Road is a principal access route to the Carnegie Center office complex.

  Alexander Road crosses Route 1 at a grade-separated interchange that provides for all turning movements. West of Route 1, Alexander Road intersects with Canal Pointe Boulevard and again becomes a two-lane roadway. After turning sharply to the south, Alexander Road crosses the Stony Brook and the D&R Canal on a narrow bridge before entering Princeton Township and Borough. At its western terminus with Mercer Street, Alexander Road travels through the Mercer Hill Historic District.

  Alexander Road is classified in the West Windsor Master Plan as a secondary arterial road between the NEC rail line and Route 1 and a principal collector road west of Route 1. The segment of Alexander Road between the NEC rail line and CR571 is classified as a local road. The Princeton Community Master Plan classifies Alexander Road west of the D&R Canal as a major collector road. Alexander Road east of Route 1 carries approximately 25,900 vehicles per day. Approximately 20,400 vehicles per day use Alexander Road west of Route 1. Peak hour directional traffic volumes on Alexander Road east and west of Route 1 are presented in Table 3-2 below.

  Alexander Road is the most heavily used route into and out of the Princetons. As Table 3-1 shows, it carries 45% of the total 2-way east-west traffic into and out of the Princetons west of Faculty Road in the AM peak hour. Alexander Road is the dominant east-west facility east of Route 1 in the AM peak hour.

The balance of traffic into and out of the Princetons on east-west roads west of Route 1 was identified early in the Scoping process as a concern of local residents. In addition, the balance of traffic on east-west roads east of Route 1 was also identified as a matter of local concern since Washington Road bisects the Penns Neck neighborhood and Alexander Road serves a largely commercial area. As Table 3-1 demonstrates, Alexander Road carries the highest percentage of 2-way morning peak hour traffic of the three east-west roads into and out of the Princetons. Alexander Road carries a greater share of the 2-way morning peak hour traffic between the NEC rail line and Route 1, but the relative share carried on Washington Road through Penns Neck is substantial.

Table 3-1
Balance of Traffic Using East-west Routes
in the Penns Neck Area

	% of Total 2-way Traffic AM Peak Hour
West of Faculty Road	
-Alexander Road	45%
-Washington Road	32%
-Harrison Street	23%
Between NEC rail line and Route 1	
-Alexander Road	59%
-Washington Road	41%

3.1.2.3 Other Components of the Roadway Network

- NJ Route 27 is a two-lane state highway running north-south through Princeton Township and the Princeton Borough central business district. It is located approximately 1.4 miles west of Route 1 and connects Princeton Borough to the City of New Brunswick and points north.

- NJ Route 206 is a two-lane state highway running north-south. It is located approximately 1.4 miles to the west of Route 1 in Princeton Township and Borough. It connects Princeton Borough to the City of Trenton to the south and the Borough of Somerville to the north.

- Clarksville Road is a two-lane county roadway that runs north-south through West Windsor Township. It is located approximately 2.0 miles to the east of Route 1 and connects Quakerbridge Road in Lawrence Township to CR 571 in Princeton Junction.

- Roszel Road is a four-lane principal collector road running north-south approximately 0.5 miles east of Route 1 in West Windsor Township. It connects Alexander Road to the Carnegie Center office complex.

- Faculty Road is a two-lane private road owned by Princeton University but widely used by the public for local travel in Princeton Township. It runs north-south approximately 0.9 miles west of Route 1 and connects Alexander Road, Washington Road and Harrison Street.

- Carnegie Center Boulevard is a four-lane principal collector road running east-west and crossing Route 1 approximately 0.8 miles south of Alexander Road in West Windsor Township. It connects Canal Pointe Boulevard and Route 1 to the Carnegie Center Office complex.

- Canal Pointe Boulevard is a four-lane principal collector road running north-south approximately 0.2 miles west of Route 1 between Alexander Road and Meadow Road in West Windsor Township. It provides reverse access to office and retail establishments located along Route 1 and provides access to the Canal Pointe neighborhood in West Windsor Township.

- North Post Road is a two-lane minor collector road running east-west roughly parallel to Alexander Road east of the NEC rail line in West Windsor Township. It connects Clarksville Road to Alexander Road and Wallace Road in Princeton Junction.

- Cranbury Neck Road/Wallace Road is a two-lane minor collector road running north-south approximately 1.3 miles east of Route 1 in West Windsor Township. It connects North Post Road in Princeton Junction to CR 571 and provides access to Plainsboro Township across the Millstone River, north of CR 571.

- Vaughn Drive is a two-lane local road running north-south approximately 1.1 miles east of Route 1 in West Windsor Township. It is one of two roads providing access to the Princeton Junction train station and associated commuter parking lots located west of the NEC rail line.

3.1.2.4 Structurally Deficient Bridges

There are two structurally deficient bridges in the study area that must be repaired or replaced. One of these bridges is the Route 1 bridge over the Millstone River located just north of the Route 1/Harrison Street intersection which has a sufficiency rating of 55 on a scale of 0 to 100. This bridge carries more than 80,000 vehicles per day on Route 1 and is a critical link in the regional highway network. Its rehabilitation/replacement is included as part of all of the action alternatives.

The second bridge is the Alexander Road bridge over the Northeast Corridor rail line in Princeton Junction, which has a sufficiency rating of 3.3 on a scale of 0 to 100.

Alexander Road is a key travel corridor to major employment and retail destinations. Because of its low sufficiency rating, NJDOT has accepted responsibility for replacing this structure on its current alignment. The replacement of the Alexander Road bridge is being advanced by NJDOT as a project separate from the Penns Neck Area EIS.

Copies of NJDOT bridge sufficiency rating reports are provided in Appendix D.

3.1.3 Existing Travel Patterns

As described more fully in Section 3.4, the dominant land use pattern in the primary study area is single-use office and retail development, built at low density, adjacent to highways, with free parking, and beyond walking distance from major transit facilities and residential subdivisions. Residential subdivisions are isolated from one another and other uses and have been built at relatively low densities.

The dominant mode of travel to and from employment and other destinations in the study area is the single-occupant automobile. According to the *East-West Origin and Destination Study* conducted for the EIS, the average occupancy of vehicles accessing employment destinations in the primary study area is 1.21 persons per vehicle (Urbitran, 2002).

Most of the 46,000 jobs located in West Windsor and Plainsboro Townships are concentrated between Route 1 and the Northeast Corridor Line. Work sites in West Windsor are located primarily along Alexander Road and in the Carnegie Center office complex east of Route 1. Work sites in Plainsboro Township are located primarily in the Forrestal Center office complex and at work sites on Plainsboro Road and Scudders Mill Road.

Along with employment sites in Princeton Borough and Princeton Township, these PSA employment sites have a strong influence in shaping traffic patterns in the Penns Neck area. Figures 3-2 to 3-6 show the distribution of existing eastbound and westbound traffic on Washington Road, Harrison Street and Alexander Road. Traffic patterns reflect the importance of employment nodes located in West Windsor and Plainsboro Townships and the Princetons as major destinations.

Traffic on Route 1 – The employment sites in the PSA influence the relative intensity of AM peak hour traffic on Route 1. The heaviest traffic flow is in the northbound direction as measured south of Meadow Road (see Table 3-2). The AM peak hour traffic is reduced by more than half as measured north of College Road in Plainsboro. In the southbound direction on Route 1 in the AM peak hour, the heaviest traffic is measured between Washington Road and Harrison Street.

Traffic on East-West Roads – Similarly, the directional flow of AM peak hour traffic east of Route 1 shows that the dominant movement is from east to west, toward Route

1 corridor employment centers and the Princetons. This can be seen on both Alexander Road and Washington Road (see Table 3-2). West of Route 1, the directional flow of AM peak hour traffic on Alexander Road and Washington Road is more balanced (see Table 3-2). This reflects the dual influence of traffic moving from the west to east, toward the Route 1 corridor, and from the east to west, toward destinations in the Princetons. On Harrison Street the dominant movement of AM peak hour traffic is westbound, toward the Princetons. Harrison Street's limited movement in the eastbound direction in both AM and PM hours may be the constraint of the at-grade signal controlled intersection with Route 1.

Table 3-2
Directional Flow of Traffic on Key Routes

	Daily Traffic	AM Peak Hour		PM Peak Hour	
		NB	SB	NB	SB
Route 1	82,700				
Between Washington Road and Harrison Street		3,830	3,440	2,850	3,420
North of College Road (Plainsboro Twp.)		1,990	2,480	2,610	1,370
South of Meadow Road (W. Windsor Twp.)		4,530	2,570	2,910	4,390
East-West Roadways		**EB**	**WB**	**EB**	**WB**
Alexander Road					
East of Route 1 (b/w Vaughn Dr & Roszel Rd)	25,900	450	1,880	1,050	480
West of Route 1 (b/w D&R Canal & Rt 1)	20,400	870	970	1,090	950
Washington Road					
East of Route 1 (b/w NEC rail line & Rt 1)	20,100	470	1,110	1,140	550
West of Route 1 (b/w D&R Canal & Rt 1)	17,500	580	620	610	520
Harrison Street					
West of Route 1 (b/w D&R Canal & Rt 1)	12,100	310	590	380	660

Source: Penns Neck Area EIS Travel Demand Forecasting Model

Traffic west of Route 1 – The destinations of eastbound morning peak period traffic on Washington Road west of Route 1, some 80% of which are work trips (as opposed to trips to the Princeton Junction rail station or another purpose), demonstrates the significance of travel to local employment sites. As shown in Figure 3-2, the majority of trips are destined for the PSA. Some 41% of eastbound traffic on Washington Road west of Route 1 is destined for West Windsor Township, and 22% is destined for Plainsboro Township. In addition, 15% is destined for points south and west, 4% is destined for locations northwest and northeast, and 19% is destined for points east of the primary study area.

The eastbound traffic west of Route 1 on Alexander Road, some 88% is work-related, is predominantly (76 percent) destined for West Windsor Township (see Table 3-3). Another 7% is destined for Plainsboro Township, 9% is destined for points south and west, and 4% is destined for points northwest and northeast.

The majority of eastbound AM peak period traffic on Harrison Street, some 81 percent is work-related (see Table 3-3), is destined to employment sites in Plainsboro Township. As shown in Figure 3-4, some 57% of eastbound traffic is destined for Plainsboro Township, 14% is destined for West Windsor Township, 16% is destined for points east, 4% is destined for points northwest and northeast, and 2% is destined for points south and west of the primary study area.

Table 3-3
Work Trips as a Percent of Total Eastbound Traffic
West of Route 1 in the AM Peak Period

East-west Route:	Percent work trips*
Alexander Road	88%
Washington Road	80%
Harrison Street	81%

* Percentages derived from tip purpose data collected as part of the East-west Origin and Destination Study. Trips destined for Princeton Junction train station were counted as "other" and are therefore not included in % work trips.

Source: East-west Origin and Destination Survey Study Urbitran 2002

Traffic east of Route 1 – Washington Road and Alexander Road east of Route 1 serve different travel markets in the AM peak hour. As Table 3-4 shows, these trips are primarily work-related. These are the heaviest east-west traffic flows (see Table 3-2). Washington Road primarily serves employment destinations in the Princetons and Alexander Road primarily serves West Windsor employment sites. As shown in Figure 3-5, some 71% of existing westbound traffic on Washington Road east of Route 1 is destined for the Princetons and points northeast, northwest and west. Another 24% is destined for West Windsor, and only 5% is destined for locations in Plainsboro Township or south of the primary study area. Table 3-4 shows that 83% of this traffic is work-related.

The majority (65%) of existing morning peak period westbound traffic on Alexander Road east of Route 1 is destined for locations within West Windsor, including Carnegie Center and work sites along Alexander Road (see Figure 3-6). Another 32% is destined for the Princetons and points northeast, northwest and west. Only 3% of westbound AM peak period traffic on Alexander Road east of Route 1 is destined for Plainsboro Township and locations south of the primary study area.

Table 3-4
Work Trips as a Percent of Total
Westbound Traffic East of Route 1

East-West Route:	Percent Work Trips*
Alexander Road	95%
Washington Road	83%
Harrison Street	N/A

* Percentages derived from tip purpose data collected as part of the East-west Origin and Destination Study. Trips destined for Princeton Junction train station were counted as "other" and are therefore not included in % work trips.

Source: East-West Origin and Destination Survey Study Urbitran 2002

Traffic related to Princeton Junction Station – The Princeton Junction train station is the busiest station along the Northeast Corridor rail line in New Jersey. The station has 3,790 parking spaces. Average ridership at the station exceeds all other stations between Trenton and New York City, including Newark Penn Station. According to a 1998 origin and destination survey conducted by NJ Transit, approximately 6,400 daily riders use the station to travel eastbound to destinations north of the study area. The survey's daily ridership figures are based upon ridership on eastbound NJ Transit trains and four eastbound Amtrak "Clocker" trains to New York, which pick up passengers at Princeton Junction station.

Of the total daily ridership at Princeton Junction station, approximately 4,300 or 67% drive and park at the station. Another 975 or 15% arrive by automobile but do not park at the station (including carpools). Approximately 750 or 12% of train riders arrive at the station using some mode of mass transit and approximately 275 or 4% walk or bike to the station.

Although data providing a precise breakdown of peak period riders at the Princeton Junction station by train is not available, the station's peak periods of operation can be approximated by examining the number of NJ Transit and Amtrak "Clocker" trains scheduled to arrive at the station during the AM and PM peak periods. In the morning, the greatest number of eastbound (New York-bound) trains arrive at Princeton Junction station between 6:00 and 7:00AM and between 7:00 and 8:00AM (five trains in each hour).

In the evening commute period, there are a greater number of arrivals during the evening peak period with the greatest number of westbound trains arriving during the hours 5:00 to 6:00PM and 7:00 to 8:00PM (six trains in each hour). An additional five trains arrive between 6:00 and 7:00PM. Outside of the above-mentioned periods, service is much less frequent, generally every 30 minutes.

The peak hour of travel on roadways in the Penns Neck area is 7:45 to 8:45 AM and 4:45 to 5:45 PM. The peak period of train station operation is between 5:00 to 8:00 AM and 5:00 to 8:00 PM. Thus, in the morning peak period there is a limited overlap between the peak periods of local traffic and Princeton Junction train station activity. In the evening peak period, the overlap is somewhat longer. Nevertheless, east/west origin and destination data indicates that work trips to employment destinations in the PSA account for more than 80% of peak period travel on east-west routes in the Penns Neck area (see Tables 3-3 and 3-4).

3.1.4 Vehicular Travel Conditions

3.1.4.1 Travel Conditions on Route 1

Traffic flow on Route 1 through the Penns Neck area is metered by the three traffic signals located at Washington Road, Fisher Place and Harrison Street. As previously described, traffic flow on Route 1 has been optimized to the extent feasible through the use of a 240 second signal cycle in the AM peak period and a 120 second cycle in the PM peak period. Given the volume of traffic using Route 1, north-south traffic receives 70% of cycle "green time."

Even with this signal timing, aerial surveillance conducted in October 2001 (Skycomp, 2001) revealed that traffic queues on Route 1 in the Penns Neck area range from 20 to 40 vehicles per lane (3 lanes) in the morning peak period. Southbound congestion in the evening peak period typically extended back onto the Route 1 entrance ramp from Scudders Mill Road in Plainsboro. The Route 1 intersections at Harrison Street and Washington Road approach or exceed capacity [Level of Service (LOS) E-F] during the AM and PM peak period, while the Route 1 intersection with Fisher Place functions above capacity (LOS E-F) during the AM peak period and is approaching capacity (LOS C-D) during the PM peak period.

This results in average intersection delays on Route 1 ranging from 0.4 to 2.1 minutes at the Washington Road intersection and 0.8 to 1.9 minutes at the Harrison Street intersection. Average travel times on the 2.4 mile segment of Route 1 between Carnegie Center Boulevard in West Windsor Township and Scudders Mill Road in Plainsboro Township range from 4-5 minutes in the AM peak hour and 4-6 minutes in the PM peak hour. A report on the results of the intersection level-of-service analyses conducted for the EIS is included in Appendix D.

3.1.4.2 Travel Conditions on East-West Cross Streets

Aerial surveillance documented severe congestion on both Washington Road and Harrison Street approaching Route 1 (Skycomp, 2001). Washington Road experiences serious congestion at its Route 1 intersection in the westbound direction in the morning and the eastbound direction in the evening. Figures 3-7 and 3-8 depict typical traffic queues on Washington Road approaching Route 1 westbound in the morning and eastbound in the evening.

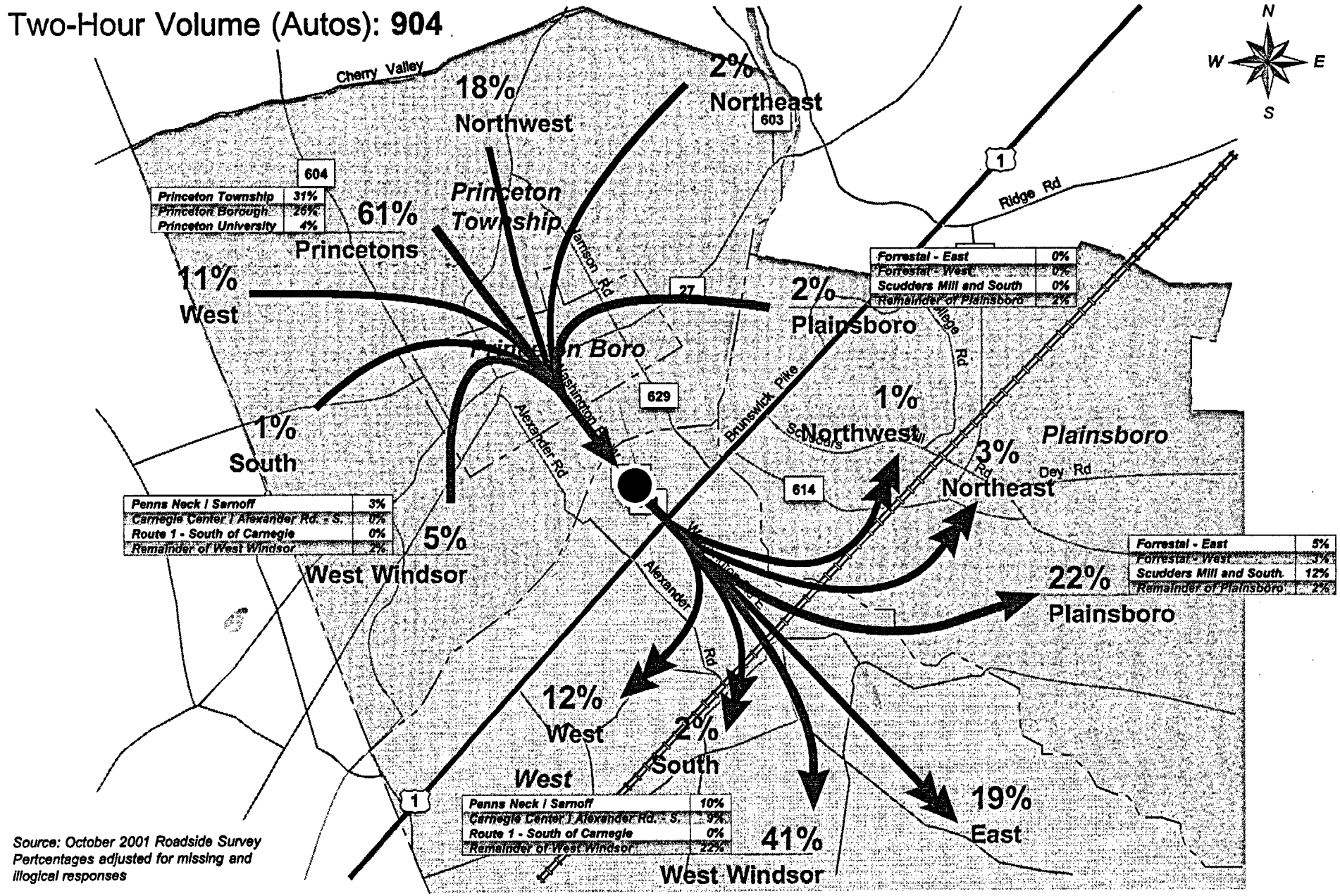
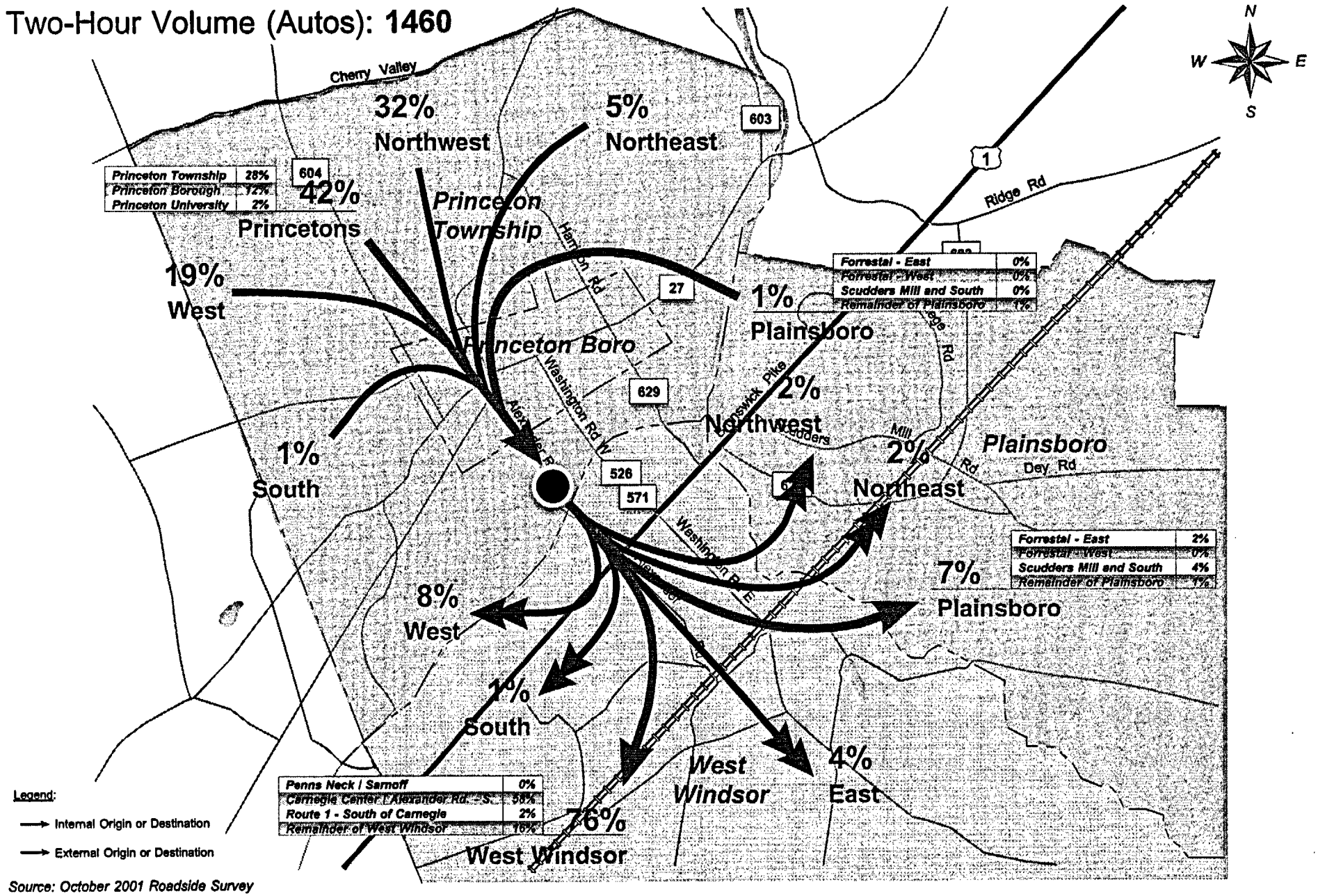


Figure 3-2: Travel Patterns at Washington Road West
Existing AM Peak Period Eastbound
April 2002

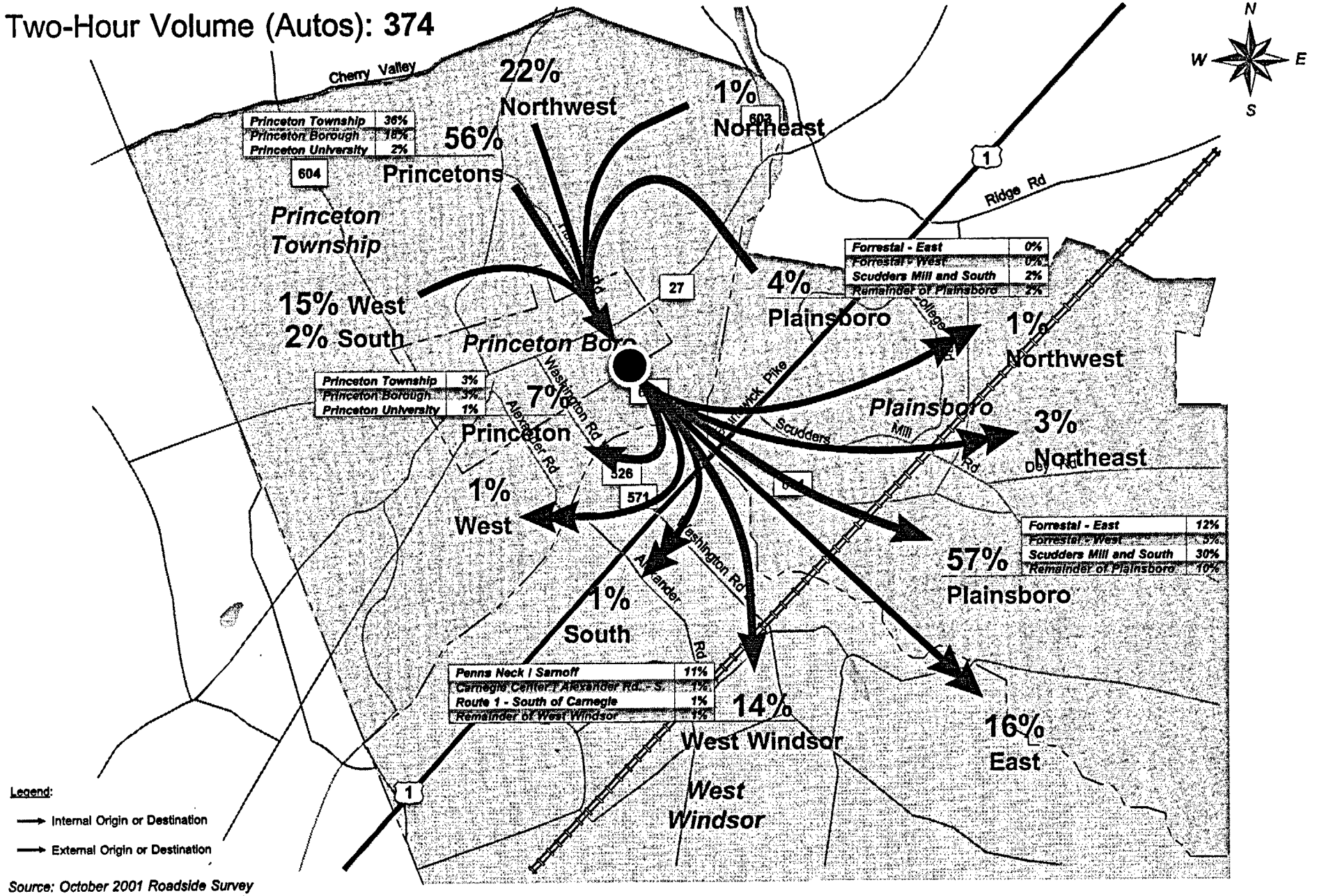
Penns Neck Local Traffic Model
New Jersey Department of Transportation
Urbitran Associates



Source: October 2001 Roadside Survey
Percentages adjusted for missing and illogical responses

Penns Neck Local Traffic Model
New Jersey Department of Transportation
Urbitran Associates

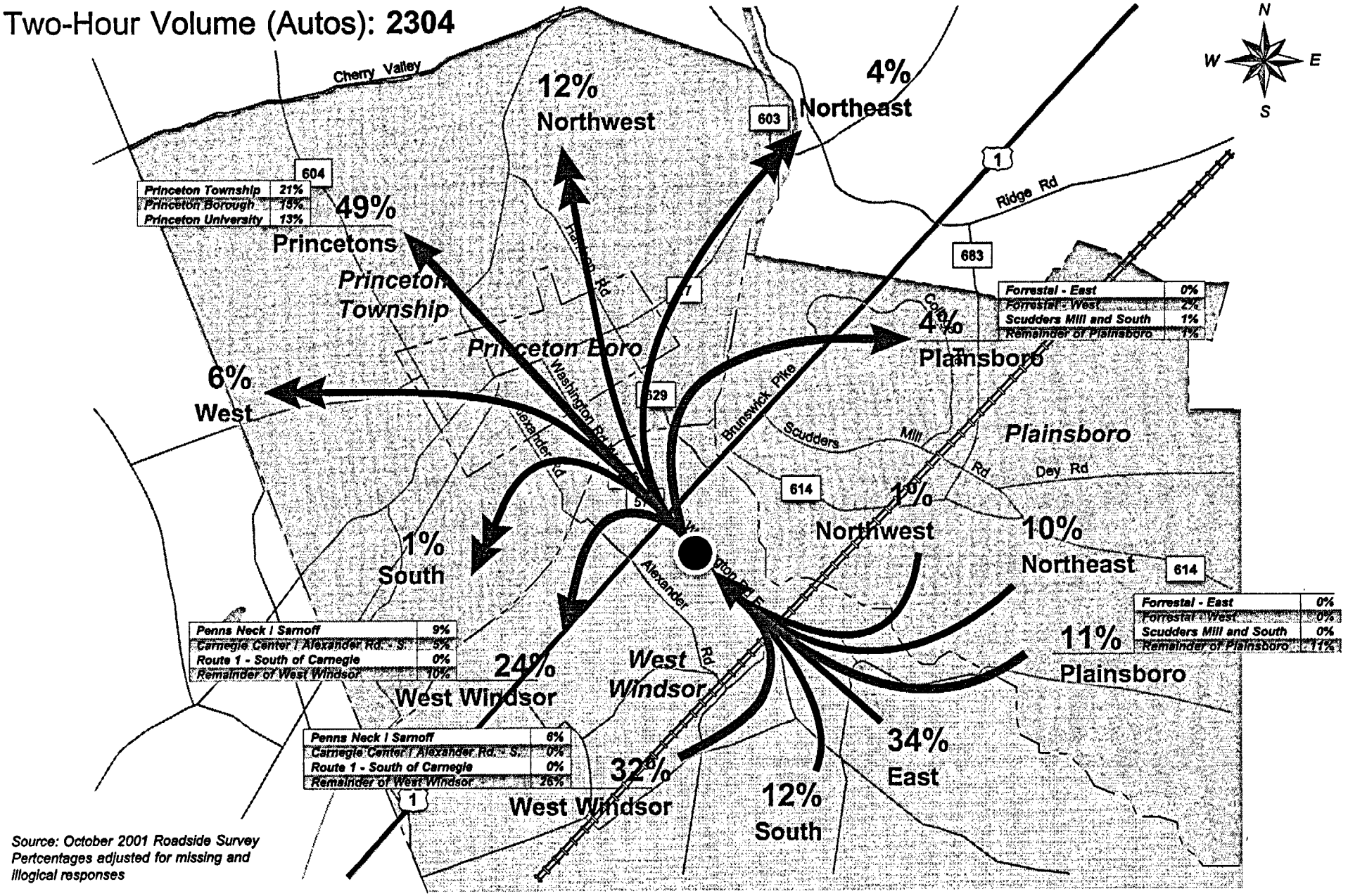
Figure 3-3: Travel Patterns at Alexander Road West
Existing AM Peak Period Eastbound
April 2002



Source: October 2001 Roadside Survey
Percentages adjusted for missing and illogical responses

Penns Neck Local Traffic Model
New Jersey Department of Transportation
Urbitran Associates

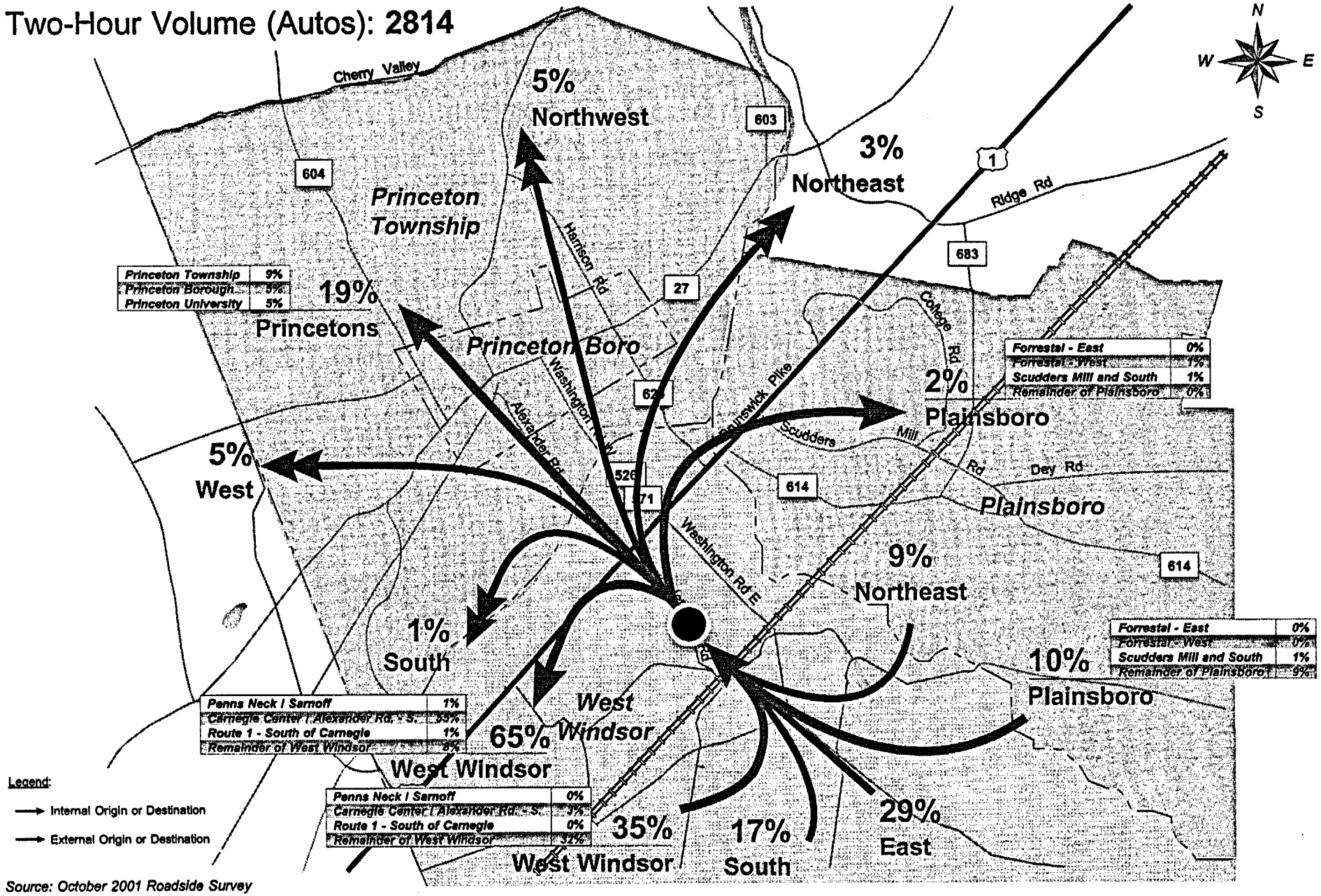
Figure 3-4: Travel Patterns at Harrison Street
Existing AM Peak Period Eastbound
April 2002



Source: October 2001 Roadside Survey
Pertcentages adjusted for missing and illogical responses

Figure 3-5: Travel Patterns at Washington Road East
Existing AM Peak Period Westbound
April 2002

Penns Neck Local Traffic Model
New Jersey Department of Transportation
Urbitran Associates



Source: October 2001 Roadside Survey
Percentages adjusted for missing and illogical responses

Figure3-6: Travel Patterns at Alexander Road East
Existing AM Peak Period Westbound
April 2002

Penns Neck Local Traffic Model
New Jersey Department of Transportation
Urbitran Associates

In the morning peak period, westbound traffic queues on two-lane Washington Road in the Penns Neck neighborhood were observed to range from 20 to 85 vehicles. The maximum observed queue extended from Route 1 east to the intersection of Wallingford Drive, approximately ½ mile away. In the PM peak period, eastbound traffic queues on Washington Road approaching Route 1 were observed to range from 35 to 70 vehicles.

The aerial surveillance documented similar congestion on Harrison Street at the Route 1 intersection in the evening peak period. Figure 3-9 depicts a typical traffic queue on eastbound Harrison Street approaching Route 1 in the evening, where traffic queues were observed to range from 20 to 75 vehicles. At the maximum observed extent, the queue extended back to Lake Carnegie.

Because cross-streets in the Penns Neck area carry significantly less traffic than Route 1, east-west traffic receives approximately 30% of the signal cycle "green time" at the three Penns Neck area traffic signals. This results in average intersection delays on Washington Road ranging from 2.0 to 5.0 minutes and 1.4 to 8.2 minutes on Harrison Street during peak periods. The minimum and maximum observed delays under typical conditions varied widely from 0.7 to 11.2 minutes on Washington Road and 0.4 to 11.8 minutes on Harrison Street. Average east-west travel times between Clarksville Road in West Windsor Township and Nassau Street in the vicinity of Alexander Road, Washington Road and Harrison Street, in Princeton Borough, an average travel distance of 3.6 miles, range from 10 to 13 minutes.

3.1.4.3 Accident and Safety Conditions

In addition to causing travel delays for motorists and truck drivers, traffic queues during peak hours on both local roads and Route 1 pose safety hazards. According to a status report prepared by the NJDOT of the "Top 100 Intersection Crash Locations in New Jersey by Total Severity for 1998 and 1999," the intersection of Route 1 and Washington Road (the Penns Neck Circle) was rated as the 20th worst intersection in the State. In comparison, data pertaining to the grade-separated interchange at Route 1 and Alexander Road show a much lower number of accidents.

Between 1998-2000, the accident rate for Route 1 between the Dinky Railroad overpass and Washington Road was found to be 8.55 accidents per million vehicle miles (Acc/MVM). This is almost double the statewide average. The other segments of Route 1 in the Penns Neck area exhibited operating conditions and accident rates similar to the statewide average. A summary of the detailed accident analysis of Route 1 and the signalized intersections in the Penns Neck area is discussed below.

U.S. Route 1 – Between 1998-2000, 90% of accidents occurring along Route 1 in the Penns Neck area were same direction accidents. This compares to a statewide average of 52.4% for same direction type accidents on similar facilities. Table 3-5 summarizes the accidents that occurred along Route 1 in the Penns Neck area. A total of 370 accidents were recorded along the Route 1 corridor during the study period.

Approximately 72% of the accidents that occurred on Route 1 were rear end accidents, the majority of which were related to the Penns Neck area intersections. Additionally, side swipe type accidents accounted for another 14%. This high percentage of same direction accidents is most likely caused by the chronic congestion through the area and stop-and-go traffic. Since Route 1 is a divided highway there were only four left turn accidents and no head on collisions. There were approximately 15 fixed object accidents, which mostly took place when the pavement was wet or icy. No fatal accidents occurred through the study area.

Table 3-5
Accident Characteristics Summary (1998-2000)
U.S. Route 1 between Alexander Rd and Harrison St (MP 10.7 – 12.1)
West Windsor Twp., NJ

Accident Type	1998 to 2000		Cond. Of Over Representation	
	Number	Percent	State Avg.	Y/N
Rear End	286	77.2%	52.4%	Y
Side Swipe	52	14.1%		
Right Angle	12	3.2%	22.9%	N
Head on	0	0.0%		N
Fixed Object	13	3.5%	3.9%	N
Left Turn	4	1.1%	9.8%	N
Other	3	1%	3.9%	N
Total Number of Accidents	370	100%		
Accidents with injuries	80	21.6%		

Route 1 and Washington Road Intersection – Between 1998-2000, there were 170 accidents associated with the Route 1 – Washington Road intersection (Penns Neck Circle). The analysis included accidents at the intersections and on the approaches to the intersection on both Route 1 and Washington Road. Table 3-6 summarizes the accidents at Route 1 and Washington Rd for each of the years analyzed.

Figure 3-7: Aerial view of westbound traffic queue on Washington Road approaching Route 1 in the AM peak period, October 2001 (Skycomp, Inc.)

Figure 3-8: Aerial view of eastbound traffic queue on Washington Road approaching Route 1 in the PM peak period, October 2001 (Skycomp, Inc.)

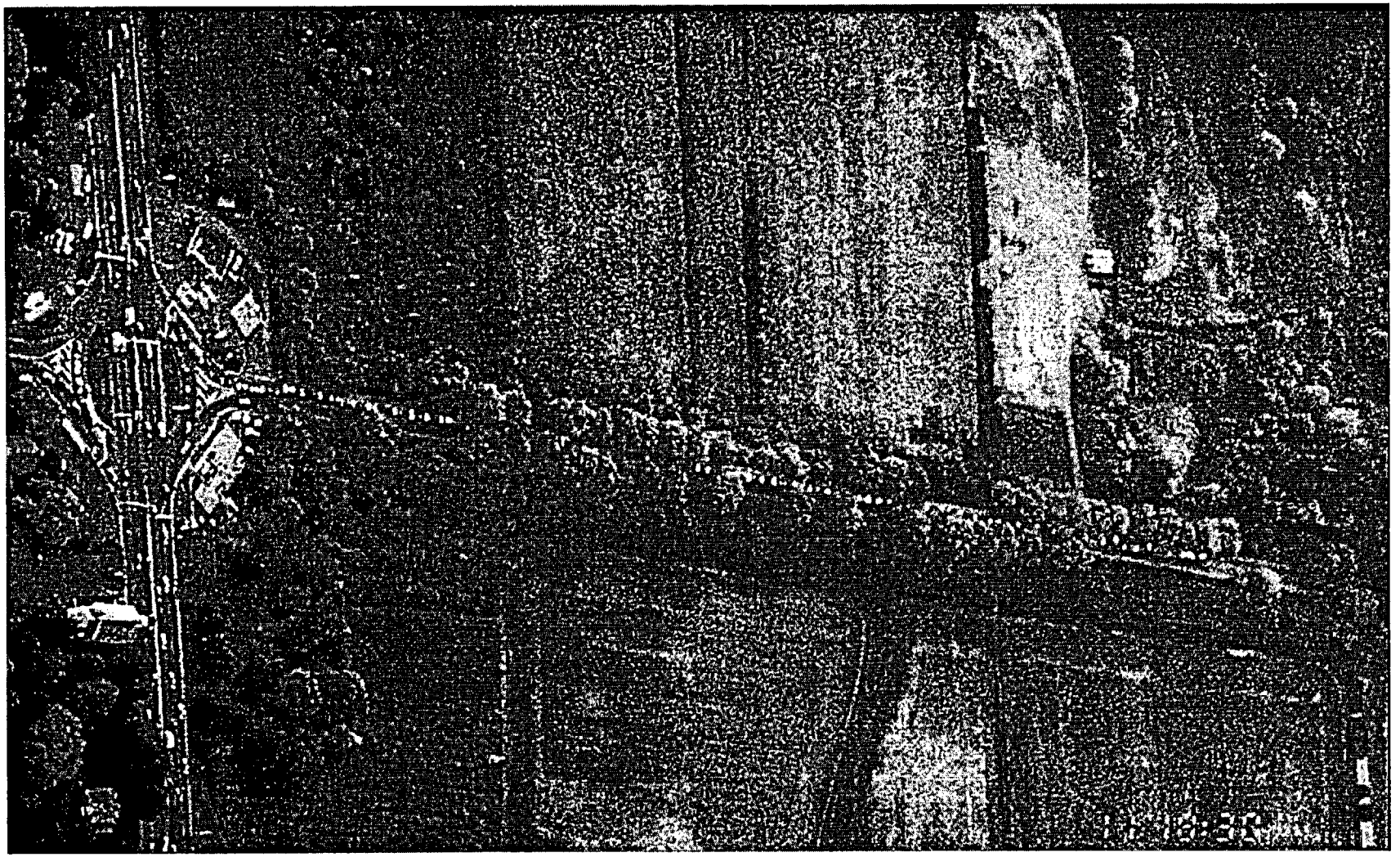


Figure 3-9: Aerial view of eastbound traffic queue on Harrison Street approaching Route 1 in the PM peak period, October 2001 (Skycomp, Inc.)

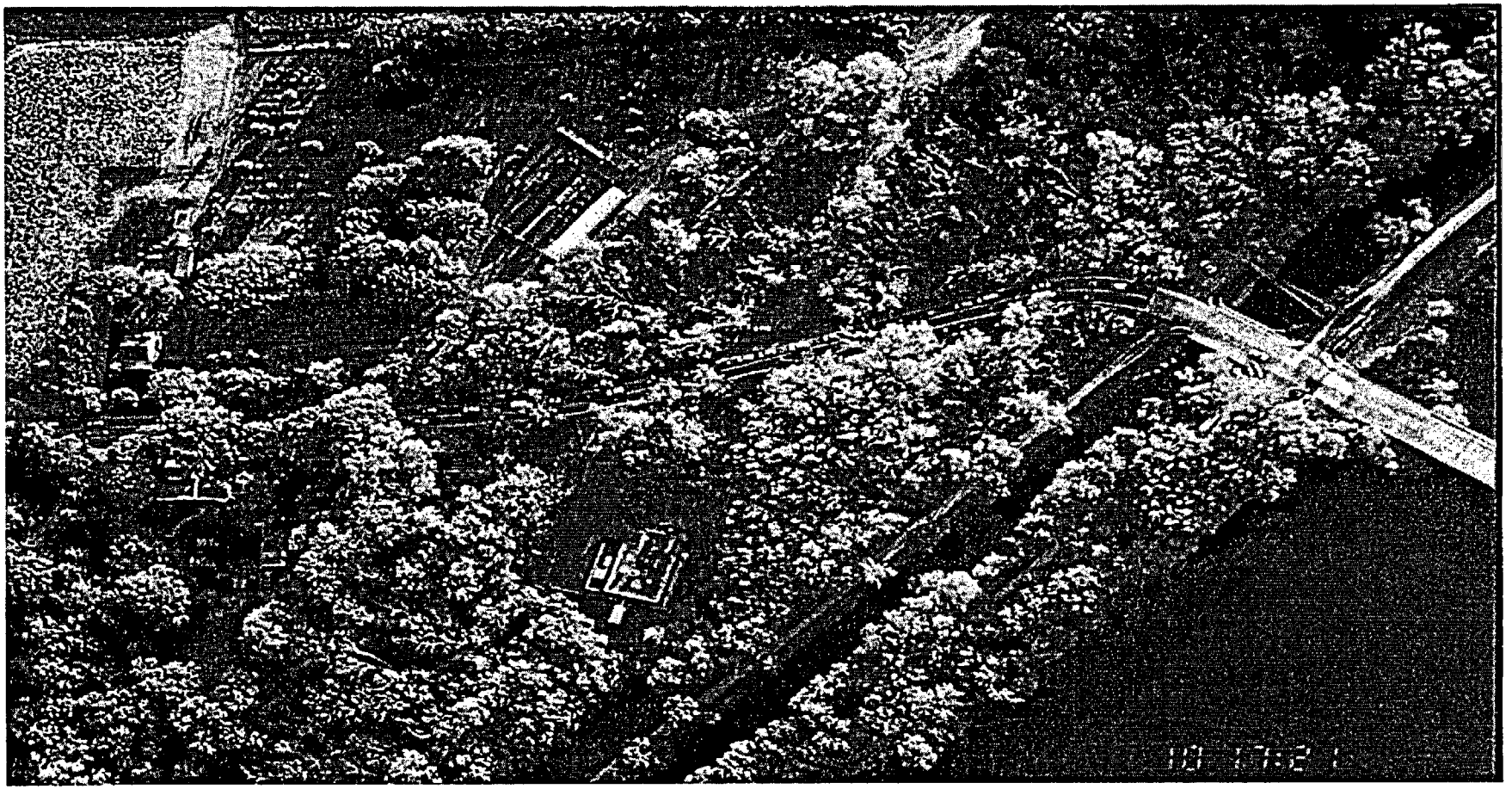


Table 3-6
Accident Characteristics Summary (1998-2000)
Route 1 at Washington Road Intersection West Windsor Twp., NJ

Accident Type	1998		1999		2000		1998 to 2000		Cond. Of Over Representation	
	No.	%	No.	%	No.	%	No.	%	State Avg.	Y/N
Rear End	40	76.9	41	77.4	51	78.5	132	77.6	52.4%	Y
Side Swipe	7	13.5	7	13.2	10	15.4	24	14.1		
Right Angle	3	5.8	4	7.5	2	3.1	9	5.3	22.9%	N
Fixed Object	2	3.8	0	0	3	4.6	5	2.9	6.6%	N
Other	0	0	1	1.9	1	1.5	2	1.2	3.9%	N
Total Number of Accidents	52	100	53	100	65	100	170	100		
Accidents with injuries	14	26.9	10	19.2	8	12.3	32	18.8		

Approximately 80% or 132 accidents were rear end accidents occurring mostly along Route 1. The topography of the area combined with the recurring congestion at the intersection may be a contributing factor to the high incidence of rear-end type accidents.

The second most common accident type at this intersection is side swipes, which account for over 14% of all accidents at the Washington Road - Penns Neck Circle. The reason for side swipe type accidents may be due to the mixing of left turn, U-turn and through traffic which utilizes the circle at the same time. Approximately 19% of the accidents that occurred involved injuries.

Route 1 and Fisher Place Intersection – Of the 54 accidents that occurred at Fisher Place over the three year period analyzed, approximately 80% were rear end type accidents. Table 3-7 summarizes the accidents at Fisher Place. This intersection showed many of the same characteristics that occurred at the Washington Road intersection.

Route 1 and Harrison Street Intersection – Of the 111 accidents at this intersection, some 73% were rear end accidents, occurring mostly on Route 1. Table 3-8 summarizes the accidents at the Harrison Street intersection. The number of accidents that occurred on Harrison Street contributed little to the total number of accidents at the intersection. However, the number of accidents at this location in 2000 increased more than 50% over the number of accidents in 1998. Also noteworthy is the fact that 20% of the accidents occurring at this location involved injuries.

Table 3-7
Accident Characteristics Summary (1998-2000)
Route 1 at Fisher Place Intersection
Princeton and West Windsor Twp., Mercer Co., NJ

Accident Type	1998		1999		2000		1998 to 2000		Cond. Of Over Representation	
	No.	%	No.	%	No.	%	No.	%	State Avg.	Y/N
Rear End	11	78.6	11	68.8	21	87.5	43	79.6	52.4	Y
Side Swipe	3	21.4	3	18.8	2	8.3	8	14.7		
Right Angle	0	0	1	1.2	0	0	1	1.9	22.9	N
Fixed Object	0	0	1	1.2	0	0	1	1.9	6.6	N
Other	0	0	0	0	1	4.2	1	1.9	3.9	N
Total Number of Accidents	14	100	16	100	24	100	54	100		
Accidents with injuries	2	14.3	3	18.8	5	20.8	10	18.5		

Table 3-8
Accident Characteristics Summary (1998-2000)
Route 1 Intersection at Harrison Street West Windsor Twp., NJ

Accident Type	1998		1999		2000		1998 to 2000		Cond. Of Over Representation	
	No.	%	No.	%	No.	%	No.	%	State Avg.	Y/N
Rear End	20	71.4	22	68.7	39	76.5	81	73	52.4	Y
Side Swipe	4	14.2	5	15.6	8	15.7	17	15.3		
Right Angle	1	3.5	1	3.1	0	0	2	1.8	22.9	N
Fixed Object	3	10.7	2	6.2	2	3.9	7	6.3	6.6	N
Left Turn	0	0	2	6.2	2	3.9	4	3.6	9.8	N
Total Number of Accidents	28	100	32	100	51	100	111	100		
Accidents with injuries	7	25	8	25	11	21.6	26			

Route 1 and Alexander Road – The accident rate in the vicinity of the Route 1 Alexander Road interchange is markedly lower than the other Penns Neck area intersections. For the segment of Route 1 between the Route 1 northbound off-ramp to Alexander Road to the Dinky railroad bridge, the total number of accidents occurring at this location was 41 over the three year period. Of these, 30 were rear end accidents, 15 of which were found to occur in the northbound direction which may be due in part to the congestion at the Washington Road traffic signal. The reduction in the number of accidents at this location as compared to the signalized intersections is most likely due to the absence of a traffic signal reducing the number of vehicle conflicts and interruption of traffic flow as well as the existence of safety

shoulders through the interchange area. In addition to accidents along Route 1, the analysis also considered accidents on Alexander Road at the Route 1 exit ramp. Over the three-year analysis period only 8 accidents were reported. A report on the accident analysis conducted for the EIS is included in Appendix D.

3.1.5 Existing Public Transportation Services

The pattern of development in the study area encourages dependency on auto use and imposes constraints on providing a comprehensive network of public transportation services. While the public transportation network provides high quality service from the PSA to external destinations, the characteristics of service within the PSA, including number of routes, frequency of service, hours of operation, required transfers and travel times, are less than optimal due, primarily, to the pattern of development in the study area.

The major transit facility, the Princeton Junction train station on the NEC rail line, serves a dual function. First, it is heavily used by commuters traveling out of the area to destinations north and south. While use of the station for this purpose is high, waiting lists for parking permits and over-capacity conditions on some peak hour trains indicates that existing demand is greater than current system capacity. The second function served by the station is to distribute commuters and visitors traveling into the study area to a variety of purposes. Because the origins and destinations of employees and visitors coming into the study area are dispersed, use of the NEC rail line and Princeton Junction Station by those traveling to destinations in the study area is limited.

The Dinky operation primarily serves residential markets in Princeton Borough and Township traveling to destinations outside the study area, as well as persons destined for downtown commercial development in Princeton Borough and Princeton University. It has limited parking capacity in Princeton Borough. In addition, service in both directions is constrained by its single-stop, single-track, single-train infrastructure, which does not meet every Northeast Corridor train stopping at Princeton Junction.

There are three local bus routes and three primary shuttle services operating in the study area. The local bus routes are long and sometimes circuitous. Frequency of service on these routes varies from approximately 30 minute to 75 minutes depending on the route. Bicycles may be carried on all local bus services. The three shuttle services operating in the primary study area serve residential and employment destinations in the primary and secondary study area and are scheduled to meet peak period trains at Princeton Junction train station.

As shown in Table 3-9 below, the role of public transit in the mobility of the primary study area varies widely, from effective in some functions to marginal in others. Approximately 22% of workers residing in West Windsor Township take public transportation to work. Of that percentage, 73% report traveling to work by train.

This comparatively high percentage reflects the significant number of West Windsor residents that use the Northeast Corridor commuter rail services out of Princeton Junction Station to commute to jobs located north and south of the PSA, e.g., New York City, New Brunswick, Newark, Jersey City and Philadelphia. At the same time, 11.7% of workers living in Plainsboro Township, 8.1% of workers living in Princeton Township and 4.9% of workers residing in Princeton Borough commute by public transportation. Almost 3 percent of Plainsboro residents use bus, primarily commuter bus, services to external destinations. For local trips, driving alone predominates, due to the largely diffused development pattern in the study area.

Table 3-9
Means of Transportation to Work

	Plainsboro Township		Princeton Borough		Princeton Township		West Windsor Township	
	No.	%	No.	%	No.	%	No.	%
Total workers 16+ years and over	11,923		5,722		7,809		10,713	
Car, truck, or van:	9,990	84%	2,893	50.6%	5,403	69.2%	7,597	70.9%
Drove alone	9,213	77%	2,418	42.3%	4,739	60.7%	7,129	66.5%
Carpooled	777	6.5%	475	8.3%	664	8.5%	468	4.4%
Public transportation:	1,394	11.7%	278	4.9%	630	8.1%	2,317	21.6%
Bus or trolley bus	348	2.9%	64	1.1%	134	1.7%	62	0.6%
Streetcar or trolley car	18	0.2%	0	0.0%	0	0.0%	0	0.0%
Subway or elevated	8	0.1%	5	0.1%	0	0.0%	45	0.4%
Railroad	1,012	8.5%	205	3.6%	496	6.4%	2,210	20.6%
Ferryboat	0	0.0%	4	0.1%	0	0.0%	0	0.0%
Taxicab	8	0.1%	0	0.0%	0	0.0%	0	0.0%
Motorcycle	0	0.0%	10	0.2%	19	0.2%	4	0.0%
Bicycle	37	0.3%	151	2.6%	226	2.9%	27	0.3%
Walked	63	0.5%	2,037	35.6%	790	10.1%	132	1.2%
Other means	33	0.3%	20	0.3%	9	0.1%	43	0.4%
Worked at home	406	3.4%	333	5.8%	732	9.4%	593	5.5%

Source: US Census Bureau (Census 2000)

3.1.5.1 Rail Services

The following rail services operate within the PSA:

- **NJ TRANSIT Northeast Corridor (NEC) commuter rail** – The NEC rail line runs parallel to Route 1 approximately 1.3 miles to the east in West Windsor Township. The heavily used Princeton Junction train station is located on the NEC rail line between Alexander Road and Washington Road. There are presently 3,790 parking spaces at the station and more than 6,400 riders use the Princeton Junction station each day.

The station is presently served by frequent peak-period commuter rail service, half-hourly off-peak service, and hourly weekend service to New York, Newark, Trenton, and intermediate stations on this line. In addition, there are currently five reverse AM peak-period NJ TRANSIT trains serving the station. The number of reverse peak trains stopping at Princeton Junction between 5AM and 9AM will increase to eight when the planned Secaucus Transfer station becomes fully operational in 2005.

- **NJ TRANSIT Princeton Shuttle (Dinky)** – The Dinky, a part of NJ Transit's NEC commuter rail services, serves residents in Princeton Borough and Township. It is a single-car, single-track shuttle service that operates between Princeton Junction station and Princeton Borough. Dinky shuttles are scheduled to meet most NEC commuter trains at Princeton Junction station; however, parking capacity in Princeton Borough is limited.

- **Amtrak** – A limited number of Amtrak intercity trains stop at Princeton Junction station. Those that do provide direct service to New York, Philadelphia, and other points on the NEC rail line between Washington, D.C. and Boston, MA. Most Amtrak service to Princeton Junction is weekday only and some trains only stop to discharge passengers.

3.1.5.2 Bus Services

The following bus routes operate within the PSA:

- **Suburban Transit (express bus commuter service)** – Suburban Transit provides limited peak hour service between Manhattan and Plainsboro Township, with certain peak and mid-day runs extending to Princeton Borough (Palmer Square) and West Windsor Township (CR571/Wallace Road). Stops in Plainsboro include: Scott's Corner Road/Quail Ridge, Scott's Corner Road/Ravens Crest, Aspen Apartments, Plainsboro Road/Deer Creek Drive, the Princeton Meadows Shopping Center, Fox Run Drive/Plainsboro Road, and Plainsboro Town Center at Shalks Corner Road.

- **Suburban Transit (local/commuter service)** – Suburban Transit also provides local/commuter bus service along Route 27 between Princeton Borough and New Brunswick. Most buses also serve the East Brunswick Transportation Center and New York's Port Authority Bus Terminal. Service is generally every 30 minutes off-peak and every 20 minutes during peak-periods in the peak direction (e.g., north in the AM peak period and south in the PM peak period). Destinations served include: Palmer Square, Kingston, Kendall Park, Franklin Park, North Brunswick- Hidden Lakes, Governor's Place, Society Hill, the New Brunswick Park-Ride & downtown New Brunswick. In addition, there is limited peak-period service to and from the Princeton Shopping Center and between Palmer Square and Dunellen (via New Brunswick).

- **NJ TRANSIT 600 Bus** – This route operates between the City of Trenton and Plainsboro Township primarily along Route 1. Service is every 30 minutes weekdays from 6:00AM to 8:00 PM. Median weekday ridership was 949 passengers in November 2001, with a median of 18 passengers per trip. Destinations served include: Quakerbridge Mall, Nassau Park shopping center, the MarketFair mall, Carnegie Center office complex, Princeton Junction train station, Princeton Meadows shopping center (Plainsboro), Forrestal Center office complex and Princeton Forrestal Village.

- **NJ TRANSIT 605 Bus** – This route operates between Quakerbridge Mall in Lawrence Township and the Montgomery Shopping Center in Montgomery Township north of Princeton Borough. Service is every 60-75 minutes weekdays between 7:30AM to 8:00 PM. Saturday service is every 75 minutes and Sunday service is every 120 minutes. Median weekday ridership was 428 in November 2001, with a median of 19 passengers per trip. Destinations served include: Montgomery Shopping Center, Princeton Shopping Center, Princeton senior housing, Griggs Farm residences, Palmer Square (Princeton Borough), the Princeton Dinky station, the MarketFair mall, Nassau Park shopping center, Mercer Mall and Quakerbridge Mall.

- **NJ TRANSIT 606 Bus** – This route operates between Washington Town Center and Princeton Borough via Hamilton Township, Lawrence Township and Trenton. Service is every 30 minutes from 6:00AM to 12:00PM weekdays. Service is every 60 minutes on Saturdays and every 75 minutes on Sundays. Median weekday ridership was 2,497 in November 2001, with a median of 35 riders per trip. Destinations served include: Hamilton Square, the Hamilton rail station, Mercerville, Ames Shopping Center, Palmer Square (Princeton Borough), Lucent Technologies in Hopewell Township (1 AM trip & 1 PM trip only), Educational Testing Service, Bristol Myers-Squibb, Mercer County Community College, Princeton senior housing and Project Freedom located in Washington Town Center.

The service characteristics of NJ TRANSIT-operated bus routes are summarized in Table 3-10 below.

Table 3-10
NJ TRANSIT Bus Routes
Service Characteristics

600 Bus	**Route:** North-South along Route 1 from Trenton to Plainsboro **Frequency:** 30 min. – 6AM to 8PM **Origins/destinations served:** Quakerbridge Mall, Nassau Park shopping center, MarketFair Mall, Carnegie Center office complex, P. Junction train station, Princeton Meadows shopping center (Plainsboro), Forrestal Center office complex, Princeton Forrestal Village * Transfer required to travel E-W **Ridership:** 1000 daily weekday riders
605 Bus	**Route:** From Quakerbridge Mall to Montgomery Shopping Center **Frequency:** 75 min. – 7:30AM to 8PM **Origins/destinations served:** Montgomery Shopping Center, Princeton Shopping Center, Princeton Senior housing, Griggs Farm residences, Palmer Square (Princeton Borough), Princeton Dinky station, MarketFair Mall, Nassau Park shopping center, Mercer Mall, Quakerbridge Mall **Ridership:** 450 daily weekday riders
606 Bus	**Route:** From Washington Township to Princeton Borough via Hamilton, Lawrence and Trenton **Frequency:** Variable, approx. 30 min. – 6AM to midnight **Origins/destinations served:** Serves origins/destinations in Hamilton Township, Hopewell Township, Lawrence Township, Princeton Borough and Township, the City of Trenton and Washington Township, including: Hamilton Square, Hamilton Rail Station, Mercerville, Ames Shopping Center, Palmer Square, Lucent Technologies in Hopewell Township (1 AM trip & 1 PM trip), ETS, Bristol Myers-Squibb, Mercer County Community College, Princeton Seniors housing and Project Freedom (Washington Twp.) **Ridership:** Given the variable service characteristics of this route, daily ridership estimates were not available.

Source: NJ TRANSIT, Greater Mercer TMA

3.1.5.3 Shuttle Services

The following public and private shuttles operate in the PSA:

- Commons Shuttle is a private employer shuttle serving Merrill Lynch employees working at the Commons facility located on Roszel Road in West Windsor Township. The shuttle provides peak period van service from Princeton Junction station. Service is provided with 11-passenger vans or a 36-passenger bus operated by A-1 Limousine. A Merrill Lynch employee ID is required for boarding. Daily ridership averages approximately 31 passengers (2 per trip) in the morning and 31 (1.6 per trip) in the afternoon/evening.

- Trainlink is a private employer shuttle serving various employers in the vicinity of the Princeton Forrestal Center, including Merrill Lynch, Bristol Meyers Squibb (BMS), American Reinsurance, and others. Shuttles carry employees to and from Princeton Junction station in the morning and evening peak periods in the peak direction of travel. A reverse trip is possible on certain runs. In addition, extra trips are provided for Merrill Lynch employees only. Vans are shared with the Plainsboro Park'n Shuttle service (described below). Daily ridership for November 2001 averaged 75.4 riders in the morning and 82.3 riders in the evening. In 2001, 49% of riders were employed by Merrill Lynch, 23% by BMS, 4% by American Reinsurance, and 24% by other employers located in Princeton Forrestal Center.

- Plainsboro Park'n Shuttle is a shuttle operated by Plainsboro Township. It provides five trips every weekday from the Princeton Meadows and Plainsboro Plaza shopping centers to the Princeton Junction station in the morning peak period and return trips in the evening peak period. A vehicle-sharing arrangement allows the Trainlink shuttle fleet to be used for this Plainsboro service during the backhaul portion of the trip. Funding for this shuttle is provided by NJ TRANSIT. Tickets are $2.00 per round trip and $40.00 per book of 20 round trips. In November 2001, daily weekday ridership averaged 24 in the morning and 16 in the evening.

- NJT Wheels 976 is a fixed route shuttle service operated by NJ TRANSIT connecting various residential developments in West Windsor and Lawrence Townships to the Princeton Junction train station. Shuttles are timed to meet peak-period trains from 6:00-8:30AM and 5:30-8:30PM. Daily ridership averaged 110 (65 AM riders and 45 PM riders) in March 2001. Ridership was distributed as follows: Avalon Watch, West Windsor (51%), Avalon Run, Lawrence (17%), Avalon Run East, Lawrence (16%), Liberty Green, Lawrence (6%), Lawrence Square Village, Lawrence (4%). The adult fare is 0.50 cents and NJT monthly passes are valid.

- Princeton University Employee Shuttle "Tiger Tram" is a university-operated shuttle serving Princeton University employees. It operates every 5-8 minutes, between 5:30AM to 6:45PM, west of Route 1 along Elm Drive in Princeton Borough between University parking lot #7 and Firestone Library, with intermediate stops.

- Princeton University Student Shuttle is a university-operated intra-campus shuttle serving Princeton University students. It operates evenings, after 5:00PM, to various campus destinations. Services are every 20-40 minutes along two fixed routes.

- East Windsor/Hightstown Shuttle is operated by East Windsor Township and provides services between Princeton Junction station and Twin Rivers, Hightstown and other East Windsor destinations.

There are also a variety of smaller, privately-operated corporate shuttles providing limited service to and from the Princeton Junction train station.

Table 3-11 summarizes the service characteristics of several of these shuttles.

Table 3-11
Public & Private Shuttles
Service Characteristics

976 "Wheels" Shuttle	**Route:** Various residential developments in Lawrence and West Windsor Townships to Princeton Junction Train Station **Frequency:** Timed to meet peak hour trains leaving Princeton Junction between 6-8:30AM and trains arriving at Princeton Junction between 5:30-8:30PM **Origins served:** Residential developments along Province Line, Quakerbridge and Clarksville Roads **Ridership:** 120 daily riders
"Train Link" Shuttle	**Route:** Private employer shuttle to and from Princeton Junction Train Station **Frequency:** Timed to meet peak hour trains Destinations served: Various employment destinations in Princeton Forrestal Center **Ridership:** 80 daily riders
East Windsor Shuttle	**Route:** Municipally-operated shuttle between East Windsor and Princeton Junction Train Station **Frequency:** Timed to meet peak hour trains **Origins served:** Twin Rivers, Hightstown and other East Windsor residential neighborhoods **Ridership:** N/A
Note: There are a variety of smaller private and public shuttles that provide service to and from the Princeton Junction train station.	

Source: NJ TRANSIT, Greater Mercer TMA

3.1.6 Existing Bicycle and Pedestrian Networks and Mobility

With the exception of those living in Princeton Borough, very few workers living in the primary study area walk or bike to work. As shown in Table 3-9 above, 38% of workers living in Princeton Borough walk or bike to work. This high percentage for Princeton Borough is due to the compact mixed-use nature of Borough land uses and the presence of Princeton University, one of the Borough's largest employers. Among workers residing in Princeton Township the percentage drops to 13%. In sharp contrast, in Plainsboro Township less that 1% of resident workers report walking or biking, and in West Windsor Township only 1.5% walk or bike.

There are various reasons why pedestrian and bicycle travel is not more widely used to access employment and other destinations in the study area outside Princeton

Borough. While the terrain and local topography of the primary study area are conducive to pedestrian and bicycle travel, land uses, outside Princeton Borough, are dispersed and auto-oriented. In addition, pedestrian and bicycle infrastructure is often lacking and, in some places, perceived to be unsafe, impairing pedestrian and bicycle mobility in the primary study area.

The sidewalk network, including crosswalks, in the Penns Neck and Princeton Junction neighborhoods and Princeton Junction train station area are discontinuous, incomplete and many pedestrian routes appear to be unsafe.

The bicycle network in the primary study area is similarly discontinuous and incomplete. There are few striped bicycle lanes and separate bike paths in Plainsboro and West Windsor Township. Those routes that do exist are disconnected and travel between major origins and destinations is difficult.

Furthermore, while the existing intersection at Washington Road provides at-grade access across Route 1 (Penns Neck Circle), heavy auto traffic and frequent turning movements make traveling by foot or by bicycle across Route 1, to inter-municipal destinations within five miles, neither easy nor safe.

To help characterize the Penns Neck area pedestrian and bicycle environment, existing pedestrian facilities on key routes in the Penns Neck and Princeton Junction neighborhoods of West Windsor Township were inventoried and assessed. In addition, existing and proposed bicycle routes within five miles of the Route 1/Washington Road intersection were also inventoried and assessed.

3.1.6.1 Pedestrian Network and Level of Service

For the purposes of the pedestrian facilities inventory and analysis, the Penns Neck neighborhood was defined as the area bounded by the Sarnoff Corporation property to the north, the Dinky rail line to the south, the NEC rail line to the east and Route 1 to the west. The Princeton Junction neighborhood was defined as the area bounded by CR 571 to the north, North Post Road to the south, Clarksville Road to the east and the NEC rail line to the west, including the Berrien City neighborhood and Benford Estates.

The Penns Neck neighborhood is bisected by Washington Road (CR 571). There are existing continuous sidewalks on the eastbound side of Washington Road from Wallingford Drive to Station Drive; however, there are no sidewalks on the westbound side. In addition, there are no sidewalks on either side of Washington Road between Route 1 and Wallingford Drive.

Access to the Washington Road sidewalk for residents living on the south side of Washington Road is provided via several residential side streets. Access for residents living on the north side of Washington Road and employees working at the Sarnoff

Corporation is more difficult. Pedestrians must cross Washington Road at intersections that are not signal-controlled to the eastbound sidewalk. Crosswalks at side-streets are not well marked. In addition, the Penns Neck Circle intersection is a barrier to pedestrian travel between the Princetons and the Washington Road corridor in West Windsor Township. Heavy traffic, frequent turning movements, lack of crosswalks and an absence of pedestrian islands contribute to a perception that the intersection is unsafe for pedestrians.

Figure 3-10 shows an inventory of existing sidewalks on key pedestrian routes in the Penns Neck and Princeton Junction areas of West Windsor Township.

- Alexander Road – There are existing sidewalks on the westbound side of Alexander Road from CR 571 to its intersection with Wallace Road opposite the Princeton Junction train station. There are no sidewalks on the eastbound side of the road. Access to the westbound sidewalk for residents living on the south side of the road is difficult. There is only one marked crosswalk located at Harris Road and no signal-controlled intersections.

- CR 571 – With the exception of a small segment of sidewalk on the eastbound side of CR 571 in the vicinity of the Acme Shopping Center, there are no sidewalks on either side of CR 571 between Wallace Road and Alexander Road. From Alexander Road west to Clarksville Road, there are intermittent sidewalks on the eastbound side. Pedestrian crossings at the CR 571/Wallace Road and CR 571/Alexander Road intersections are poorly defined. There are no marked crosswalks between Wallace Road and Alexander Road and no signal-controlled intersections to facilitate pedestrian access across CR 571 from neighborhoods located on the north side of the road.

- Clarksville Road – There are continuous sidewalks on both sides of Clarksville Road between CR 571 and North Post Road. Crosswalks along this segment of roadway are generally well marked.

- North Post Road – There are intermittent sidewalks on the westbound side of North Post Road between Clarksville Road and Wood Meadow Lane. In addition, there is a sidewalk on the westbound side of North Post Road between Clarksville Road and Courtney Drive in front of the municipal complex. Further eastward, North Post Road turns sharply to the north between Courtney Drive and Wood Meadow Lane. There are no sidewalks in this area and sight lines for both motorists and pedestrians around this corner are poor. There are no sidewalks on North Post Road between Wood Meadow Lane and its intersection with Alexander Road.

- Wallace Road – There is a continuous sidewalk on the northbound side of Wallace Road between Alexander Road and CR 571, connecting to the Princeton Junction station area. There are no sidewalks on the southbound side of the road.

In addition to a discontinuous sidewalk network, several difficult pedestrian crossings were noted. These include the CR 571 bridge over the NEC rail line, the Alexander Road bridge over the NEC rail line, the Alexander Road/Wallace Road intersection and the Alexander Road/CR 571 intersection.

A qualitative assessment of the overall pedestrian environment in the Penns Neck and Princeton Junction neighborhoods was undertaken. This assessment involved field visits and the use of an evaluation framework that included measures related to infrastructure condition, sidewalk continuity and traffic and street crossing conditions. Based on the assessment, pedestrian routes were graded on the following scale:

Pedestrian Level-of-Service (LOS)

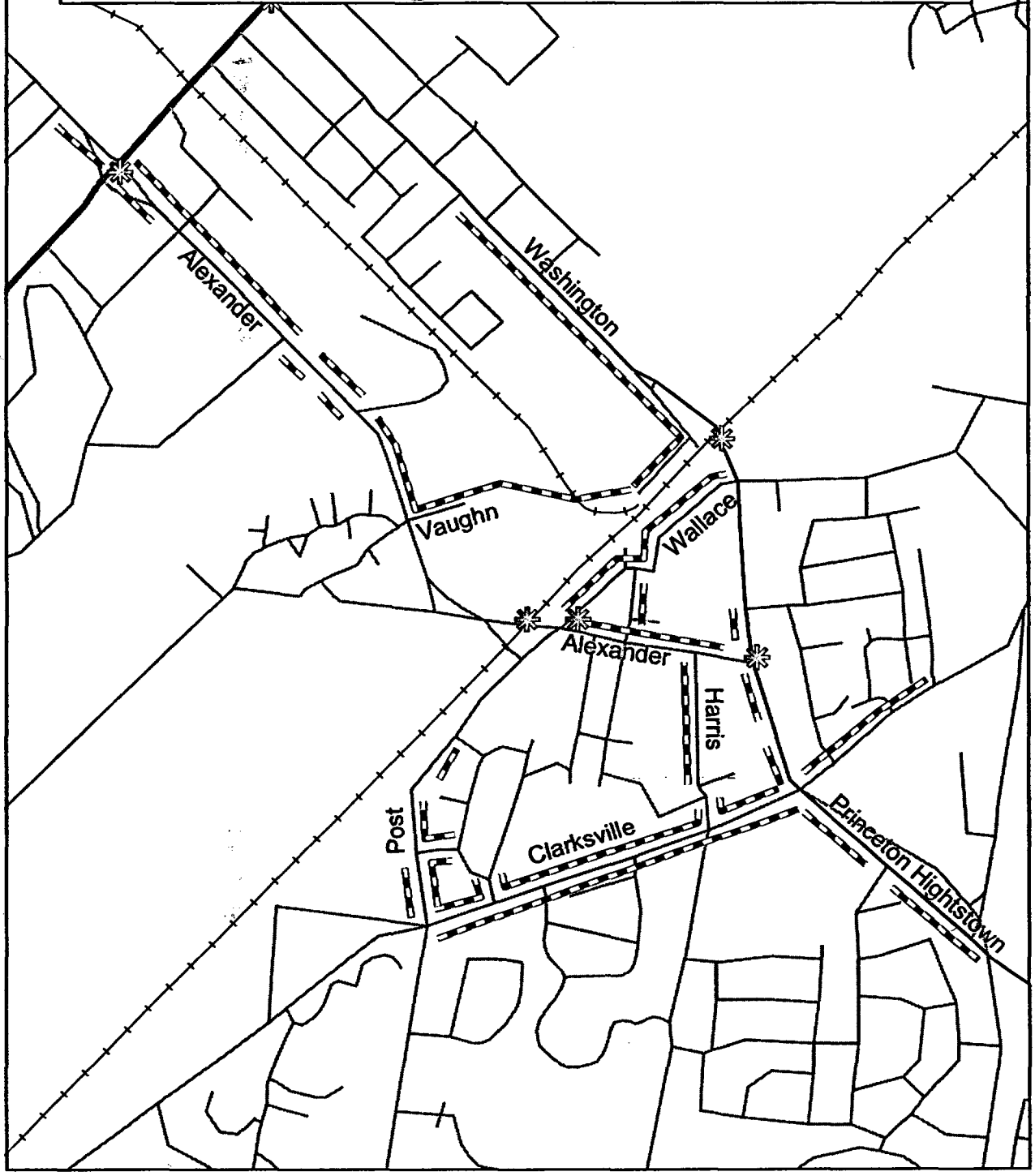
LOS A-B – Continuous sidewalks are present on one or both sides of the street. Sidewalks are in good condition, are of adequate width and are free from obstructions. Sidewalks lead to and from adjacent areas. There are minimal curb-cuts, pedestrians have high visibility and traffic volumes and speeds are generally compatible with pedestrians.

LOS C-D – Sidewalks are generally present on one or both sides of the streets; however, there are occasional missing links that break up the continuity of pedestrian routes. The sidewalks that are present are in good to fair condition and are of adequate width. Traffic speeds and volumes may be moderate to high.

LOS E-F – Sidewalks are not present or largely discontinuous. Infrastructure conditions are poor and/or traffic speeds and volumes are high and generally incompatible with pedestrian activity.

The analysis demonstrated the variability of conditions for pedestrians in the Penns Neck and Princeton Junction areas. The best performing pedestrian routes were located along Clarksville Road between CR 571 and North Post Road, where continuous sidewalks are present on both sides of the road. The worst performing routes were along CR 571 between Wallace Road and Clarksville Road, along North Post Road from Alexander Road to the West Windsor municipal complex and on Washington Road between Route 1 and Wallingford Drive. In these areas sidewalks were either non-existent or discontinuous. In addition, as previously noted there are a number of difficult crossings that impede safe pedestrian travel. Figure 3-11 provides a map of pedestrian routes and the corresponding level-of-service grades given to each route.

Figure 3-10
Existing Sidewalk Inventory



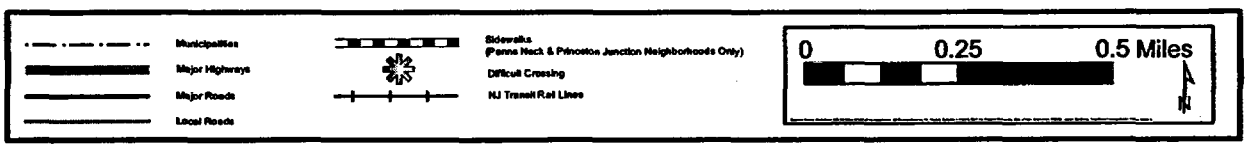
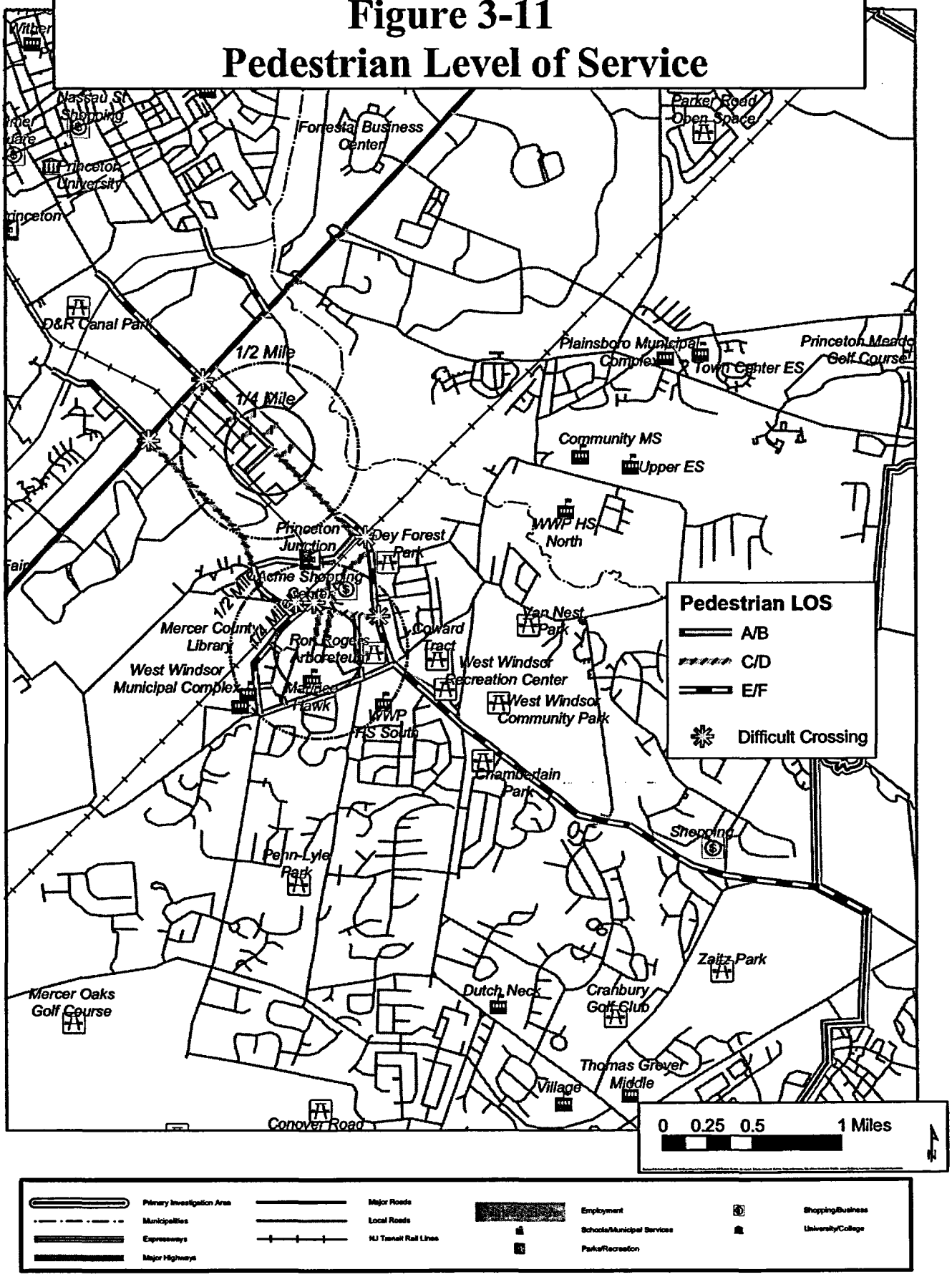


Figure 3-11
Pedestrian Level of Service



3.1.6.2 Bicycle Network and Level of Service

A review of the Plainsboro Township, Princeton Regional and West Windsor Township master plans revealed that the primary study area bicycle facilities network is in various stages of development. In Princeton Township and Princeton Borough, bicycle circulation planning is well established. There is a defined network of identified bike routes, shared use lanes and dedicated bike path facilities. Bicycle circulation planning in Plainsboro and West Windsor Township is in the formative stage and the network of facilities in both towns is not as well developed. There are only a handful of existing routes and most routes are identified as proposed. Figure 3-12 presents a map of the existing and proposed bicycle facilities in the primary study area.

A bicycle level of service assessment was conducted for existing and proposed bicycle facilities in Plainsboro and West Windsor Townships. This assessment utilized an evaluation tool developed by the University of North Carolina's Highway Safety Research Center for the Federal Highway Administration. The evaluation tool, known as the Bicycle Compatibility Index (BCI), incorporates national research related to the perceptions of bicyclists about different roadway conditions to assess the compatibility of roadways to accommodate shared use by bicyclists.

The BCI analysis uses data on local roadway and travel conditions and compares it to statistical research on how bicyclists perceive those conditions. This comparison results in a score that equates to a level-of-service (LOS) designation similar to that used to assess roadway operating conditions for vehicular travel. The data used in the analysis included:

- Presence of a bicycle lane or paved shoulder;
- Bicycle lane or paved shoulder width;
- Curb lane width;
- Curb lane traffic volume;
- Traffic volume using other lanes (if roadway is multilane);
- Posted speed limit;
- Presence of on-street parking;
- Type of roadside development (e.g., residential or other); and
- Other operational characteristics such as truck volumes, parking turnover and right-turn volumes.

Based on the BCI analysis, existing and proposed bicycle routes in Plainsboro and West Windsor Townships were graded on the following scale:

Bicycle Level-of-Service (LOS)

LOS A-B – High Bicycle Compatibility
A bike lane or wide paved shoulder is present or the travel lanes are wide enough to accommodate shared use. Traffic volumes are light to moderate and vehicular

speeds and other operational conditions, such as truck traffic volumes and right turn movements are compatible with bicycling. These routes are reasonably safe for both experienced and casual bicyclists.

LOS C-D – Moderate Bicycle Compatibility
No bike lane or wide paved shoulder is present. Curb lane width is narrow; however, traffic volumes, vehicular speeds and other operational conditions are generally compatible with shared use. These routes can accommodate experienced bicyclists, but may need altering to accommodate casual bicyclists.

LOS E-F – Low Bicycle Compatibility
No bike lane or wide paved shoulder is present. Curb lane width is narrow. Traffic volumes and speeds are moderate to high. Conditions are generally not compatible with bicycle use. These routes may need altering to accommodate even experienced bicyclists or may not be suitable for bicycle use.

The bicycle level of service analysis demonstrated varying conditions for bicyclists. Several potential bike routes in West Windsor Township performed well, with BCI scores indicating a high level of bicycle compatibility. These include, but are not limited to:

- South Mill Road between Village Road and CR571
- New Village Road between Village Road and Penn Lyle Road
- Edinburg-Dutch Neck Road between Old Trenton Road and Village Road; and
- Southfield Road between Village Road and CR571.

A variety of potential bike routes received BCI scores indicating moderate bicycle compatibility. These routes include, but are not limited to:

- Plainsboro Road between Dey Road east to the township line (Plainsboro);
- College Road between Route 1 and Scudders Mill Road (Plainsboro);
- Schalks Crossing Road between Plainsboro Road and Research Way (Plainsboro);
- Dey Road between Plainsboro Road east to the township line (Plainsboro);
- Clarksville Road between Meadow Road and CR571 (W. Windsor);
- South Post Road between Village Road and Clarksville Road (W. Windsor);
- Penn Lyle Road between Village Road and Clarksville Road (W. Windsor);
- Old Trenton Road between Quakerbridge Road and CR571 (W. Windsor);
- Meadow Road between Clarksville Road and Route 1;
- Alexander Road between Route 1 and the D&R Canal (W. Windsor);
- Washington Road between Route 1 and the D&R Canal (W. Windsor); and
- Harrison Street between Route 1 and Nassau Street (W. Windsor and Princeton).

Finally, a number of potential bike routes in Plainsboro and West Windsor received BCI scores indicating low bicycle compatibility. These routes include, but are not limited to:

- Scudders Mill Road between Route 1 east to the township line (Plainsboro)
- Plainsboro Road between Route 1 and Maple Avenue (Plainsboro);
- Alexander Road between the D&R Canal and Mercer Street (Princeton);
- Washington Road between the D&R Canal and Nassau Street (Princeton)
- CR571 from Clarksville Road east to the township line (W. Windsor);
- Clarksville Road between Quakerbridge Road and Meadow Road (W. Windsor);
- Village Road between Quakerbridge Road and South Post Road (W. Windsor); and
- Alexander Road between Route 1 and the NEC rail line (W. Windsor).

Figure 3-13 provides a map of bicycle level of service based on the application of the FHWA BCI model.

3.1.7 Existing Travel Demand Management Programs

Travel Demand Management (TDM) programs seek to reduce the number of trips made by people driving alone by influencing travel behavior. TDM involves the use of any number of strategies and support programs to reduce the number of single-occupant vehicles on the roads, particularly during commuting hours. Existing TDM programs in the primary study area were inventoried and assessed.

The Greater Mercer TMA (GMTMA) and Keep Middlesex Moving, Inc. (KMM) provide TDM services to employers located in and commuters traveling to the Penns Neck Area. The GMTMA is the designated rideshare agency for commuters who work in Mercer County regardless of where they live. This includes employers located in Princeton Borough, Princeton Township, and West Windsor Township. The GMTMA also provides TDM support services to a number of employers located in Plainsboro Township. Of the estimated 57,000 employees working in the primary study area, only approximately 1,700 commuters are registered in the GMTMA's rideshare database.

The GMTMA provides a number of support programs. These include:

- Guaranteed Ride Home – This GMTMA-administered program provides a safety net for employees who use transit, carpool or vanpool. The program provides a ride home for employees using one of these modes who have an emergency during the day or are required to work late. The ride home can be a taxi, a company vehicle, etc.

- Ride Matching – The NJDOT provides funding to GMTMA, the designated rideshare agency for commuters who work in Mercer County, to offer ride matching for persons looking to carpool or vanpool. The GMTMA supplies lists

of persons, including their home areas, work locations and similar work hours, so that matching can occur.

- Shuttle Services – As noted in an earlier section of this chapter, there are a variety of jitney/shuttle services operating in the Penns Neck area. The GMTMA administers several of these shuttles.

- Station Cars – Vehicles, usually electric, are provided at train stations to be used by groups of employees to reach their work destinations. Currently, three such vehicles are used at the Princeton Junction train station. Greater Mercer TMA administers this program on behalf of NJDOT and NJ TRANSIT.

- Commute Alternative Subsidies – To encourage employees to vanpool or use public transportation to get to and from work, employers can offer a federal tax-free fringe benefit of up to $100 per month. This direct subsidy allows employees to reduce the cost of their monthly commute in two ways: the alternatives are usually less expensive and they are subsidized. NJ TRANSIT offsets the costs of qualifying vanpools by $150 a month. In addition, the GMTMA provides an "empty-seat" subsidy to qualifying vanpools that are not entirely full.

- Marketing and Outreach – The GMTMA provides employer outreach services to promote the use of alternative travel modes and encourage the use of alternative work arrangements such as telecommuting and flexible work hours. The GMTMA also provides marketing and promotional materials to encourage the use of commuter tax benefit programs.

- Transit Information – The GMTMA serves as a transit information clearinghouse for public and private transit services operating in the greater Mercer County region.

As in other comparable suburban areas, travel demand management strategies are not widely used in the study area. According to Greater Mercer TMA (GMTMA), only twenty-two permanent carpools to Route 1 area employment sites have been organized as part of their annual ride-matching efforts. In addition, GMTMA reports that there are six registered vanpools to Route 1 area employers. All go to one company in the Carnegie Center office complex located in West Windsor Township.

According to employee survey data collected by GMTMA, workers cite irregular hours as the biggest obstacle, followed by the need to run errands before work, after work, and during the day. They are also concerned about being "stranded" in the event of an emergency. In addition, employee origins are either too close or too dispersed to lend themselves to ridesharing, and free parking strongly reinforces driving alone for commuting. Employers, though supportive in concept, offer few incentives to change travel behavior.

Figure 3-12
Bikeway Inventory

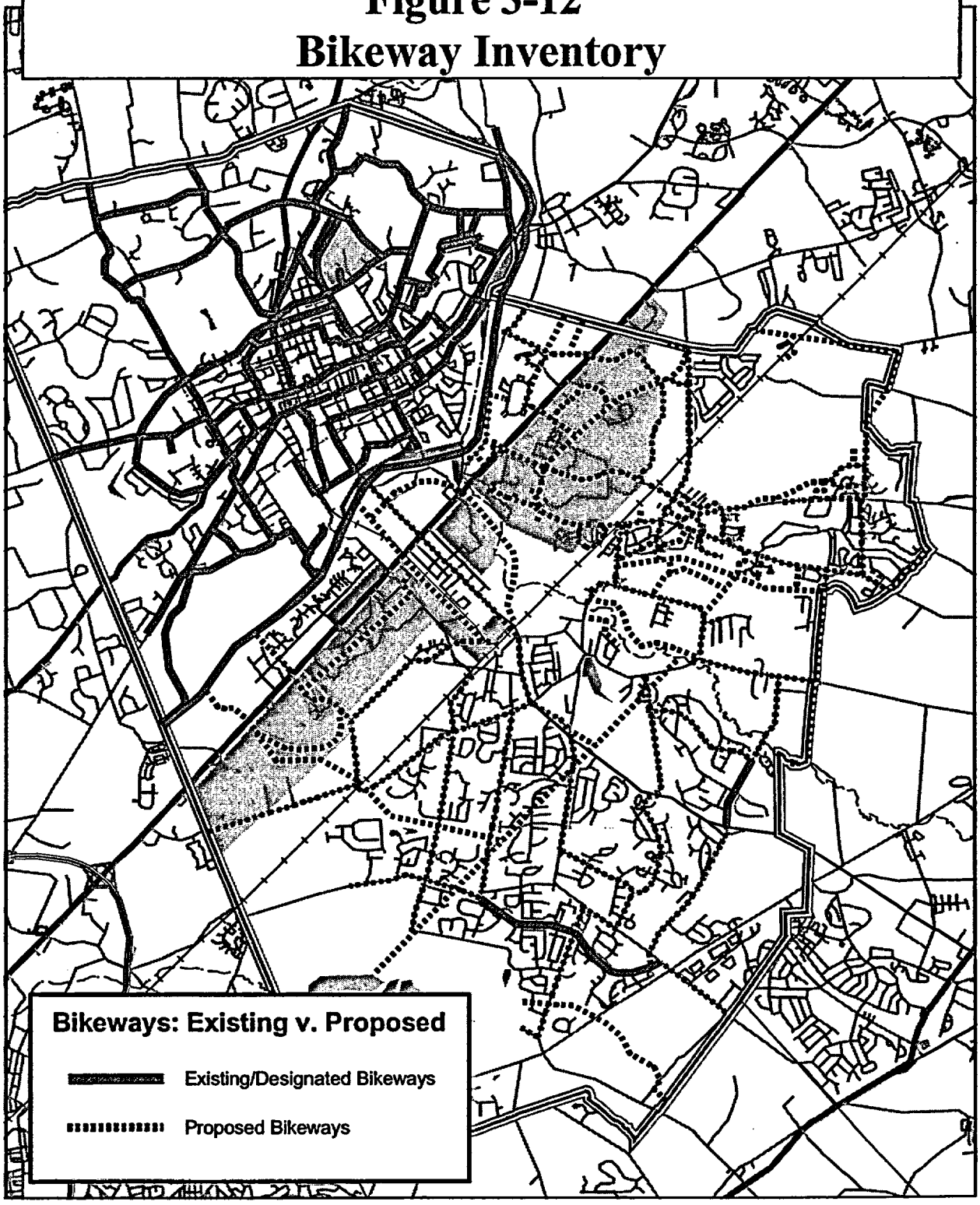
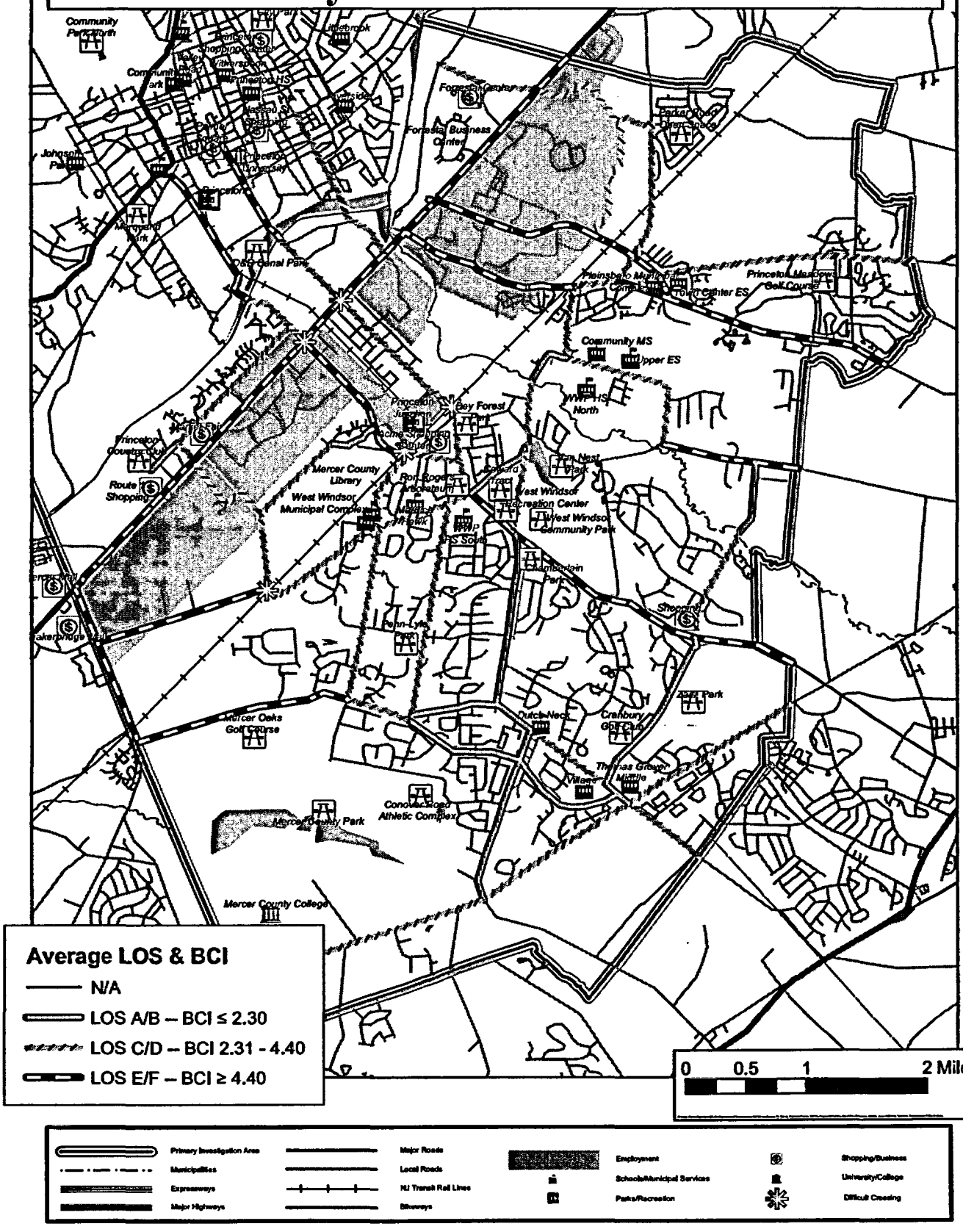


Figure 3-13
Bicycle Level of Service



While GMTMA provides a number of support programs to address these real and perceived obstacles, there are few incentives or impositions to foster alternative commute patterns. Alternative work arrangements such as telecommuting and compressed work week arrangements are limited. Employer-sponsored flex-time policies do exist, but are not early and late enough to shift travel out of peak periods; and flex-time makes car and van-pooling more difficult.

3.2 Air Quality

Under Title I of the Federal Clean Air Act of 1970, the U.S. Environmental Protection Agency (USEPA) developed National Ambient Air Quality Standards (AAQS) for specific criteria pollutants to protect public health and welfare. Table 3-12 presents the National and state AAQS.

Table 3-12
USEPA National Ambient Air Quality Standards

Pollutants	Averaging Period	New Jersey		National	
		Primary	Secondary	Primary	Secondary
Carbon Monoxide	8 hour	10 mg/m^3 (9.0 ppm)	10 mg/m^3 (9.0 ppm)	10 mg/m^3 (9.0 ppm)	10 mg/m^3 (9.0 ppm)
	1 hour	40 mg/m^3 (35.0 ppm)	40 mg/ m^3 (35.0 ppm)	40 mg/ m^3 (35.0 ppm)	40 mg/ m^3 (35.0 ppm)
Ozone	8 hour	0.08 ppm (157 µg/m^3)	0.08 ppm (157 µg/m^3)	0.08 ppm (157 µg/m^3)	0.08 ppm (157 µg/m^3)
	1 hour	0.12 ppm (235 µg/m^3)	0.12 ppm (235 µg/m^3)	0.12 ppm (235 µg/m^3)	0.12 ppm (235 µg/m^3)
Nitrogen Dioxide	1 year	0.053 ppm (100 µg/m^3+	0.053 ppm (100 µg/m^3)	0.053 ppm (100 µg/m^3)	0.053 ppm (100 µg/m^3)
Lead	3 months	1.5 µg/m^3	1.5 µg/m^3	1.5 µg/m^3	1.5 µg/m^3
Sulfur Dioxide	1 year	0.03 ppm (80 µg/m^3)	0.02 ppm (60 µg/m^3)	0.03 ppm (80 µg/m^3)	---
	24 hour	0.14 ppm (365 µg/m^3)	0.10 ppm (260 µg/m^3)	0.14 ppm (365 µg/m^3)	---
	3 hour	---	0.5 ppm (1300 µg/m^3)	---	0.5 ppm (1300 µg/m^3)
Particulate (PM 10)	1 year	---	---	50 µg/m^3	50 µg/m^3
	24 hour	---	---	150 µg/m^3	150 µg/m^3
Particulate (PM 2.5)	1 year	---	---	15 µg/m^3	15 µg/m^3)
	24 hour	---	---	65 µg/m^3	65 µg/m^3)
Total Suspended Particulates	1 year	75 µg/m^3)	75 µg/m^3)	---	---
	24 hour	260 µg/m^3)	260 µg/m^3)	---	---

The New Jersey Department of Environmental Protection (NJDEP) conducts air quality monitoring at selected sites within the state. Constituents monitored include meteorological parameters as well as selected pollutants. The most recent NJDEP Air Quality Report, for 2000, indicates that all criteria pollutant concentrations monitored in the program, except ozone, were well within the NAAQS. The closest monitoring locations to the Penns Neck Area EIS study area, and their distance and direction from the study area are tabulated in Table 3-13 below:

Table 3-13
NJDEP Air Quality Monitoring Locations

Location	Constituents Monitored	Distance/Direction From Study Area
Rider University	Met, NOx, O_3, PAMS,	5.5 miles/Southwest
Trenton	FP	9.5 miles/Southwest
Washington Crossing State Park	AP, FP	10.5 miles/West
Route 1/Georges Road	CO	12 miles/Northeast
New Brunswick	FP, NOx, O_3, PAMS, Pb	14 miles/Northeast

Notes:
AP – Acid precipitation (deposition as dry particulate matter and wet precipitation)
CO – Carbon monoxide
FP – Fine particulates (PM2.5)
Met – Meteorological parameters: wind speed/direction, temperature, relative humidity, barometric pressure, and solar radiation
NOx – Nitrogen oxides
O_3 - Ozone
PAMS – Photochemical assessment monitoring (ozone precursors)

Ozone concentrations measured at Rider University and New Brunswick were found to exceed the New Jersey 1-hour average secondary standard for 89 hours in 2000. The statewide high was 119 hours at Ancora in 2000. No exceedance of the 1-hour average primary standard for ozone occurred at Rider University or New Brunswick in 2000. The statewide 1-hour high was 4 days at Colliers Mills. The 8-hour average standard was exceeded for 11 and 10 days at Rider University and New Brunswick, respectively. The statewide 8-hour high was 19 days at Colliers Mills.

3.3 Noise

3.3.1 Noise Standards

Noise is an undesirable or unwanted sound perceived subjectively by the individual. Acceptance of a certain noise level may vary among neighborhoods, individuals, and the time of day.

Sounds heard in the environment usually consist of a range of frequencies, each at a different level. The human ear does not respond equally to identical noise levels at

different frequencies. The method of correlating human response to noise is called weighting. The weighting system used for this purpose is "A weighting" and the resultant noise level is called the "A weighted noise level" in decibels (dBA).

Research has been done to evaluate human sensitivity to noise increases and has shown that a 3 dB increase in the sound level is barely noticeable, a 5 dB increase would be a noticeable change, and a 10 dB increase would be perceived as twice as loud.

The threshold of noise interference levels shown in Table 3-14 are Leq and L10 noise levels above which noise will begin to intrude on the noise environment for the corresponding land use.

Table 3-14
Threshold for Noise Interference and Noise Abatement Criteria (dBA)

Activity category	Threshold of noise interference*		Noise abatement criteria		Description of activity category
	L_{10}	l_{eq}	L_{10}	l_{eq}	
A	48	45	60	57	Tracts of land which serenity and quiet are of extraordinary significance and serve an important public need, and where the preservation of those qualities is essential if the area is to continue to serve its intended purpose. Such areas could include amphitheaters, particular parks or portions of parks, open spaces, or historic districts that are dedicated or recognized by appropriate local officials for activities requiring special qualities of serenity and quiet.
B	58	55	70	67	Picnic areas, recreation areas, playgrounds, active (exterior) sports areas, and parks that are not included in Category A and residences, motels, hotels, public meeting rooms, schools, churches, libraries, and hospitals.
C	63	60	75	72	Developed lands, properties or activities not included (exterior) in Categories A and B above.
D	--	--	--	--	For requirements on undeveloped lands see paragraphs 11a and c of Federal Air Highway Program Manual Volume 7, Chapter 7, Section 3.
E	43	40	55	52	Residences, motels, hotels, public meeting rooms, interior school, churches, libraries, hospitals, and auditoriums.

Notes:
L_{10} = The noise level exceeded 10 percent of the time
Leq = The equivalent constant noise level containing the same amount of acoustical energy as the varying noise level.
*Source: FHWA Report "A Field Review of the Highway Traffic Noise Impact Identification and Mitigation Decision Making Process" (Appendix B, Table 5)

According to FHWA Guidance (23 CFR 772), a noise impact occurs if either of the following conditions occurs:

1. Predicted Leq noise levels approach or exceed the relevant Noise Abatement Criteria (NAC) given in Table 3-14. Noise levels that approach the NAC are defined as occurring at 1 dBA less than these criteria.

2. A substantial increase in predicted noise levels over existing noise levels even though the NAC level is not reached. This increase is considered to be 10 dBA or greater, which is roughly a doubling or more of the perceived noise levels.

3.3.2 Measurement Program

A noise measurement program was conducted in 2002 in the study area as part of this EIS. Additional information is provided in the *Noise Technical Environmental Study for the Penns Neck Area EIS*. The equipment utilized included automated digital noise measurement instrumentation. The program obtained noise levels at thirteen residential, parkland, and open space sites. Site selection was based on an examination of existing land use characteristics in the study area, the alignments of the Action Alternatives being considered in this EIS, and input from the public during the scoping process. The noise measurement locations are depicted on Figure 3-14. The measured, peak hourly Leq noise levels at the locations are presented in Table 3-15. Noise sources observed during field measurements are also presented in the table.

The NAC for all but one measurement site in the study area is 67 decibels (Category B), measured at an exterior location on the property. The one exception is the Princeton Baptist Church at Penns Neck. The church has no exterior uses associated with it. Consequently, the NAC of 52 decibels (Category E) applies.

The D&R Canal Commission has expressed their opinion that the Canal Park should be designated Category A due the stated principle in their Master Plan, "The Canal Park must retain a degree of serenity and separation from the man-made world." This opinion, expressed in a January 9, 2003 memorandum to the NJDOT and included in Appendix A, was considered by the FHWA. As the Park provides for a variety of active and passive recreational uses, and given its context in urbanizing central New Jersey, the FHWA has determined that the Master Plan principle is important and worthy of consideration in the context of examining the potential impacts of the Action and No Action Alternatives in the EIS. However, for these same reasons, the FHWA has determined that the Park meets the Category B designation. Category A is reserved for sites where quiet is extraordinarily critical to the function, such as an amphitheater.

Table 3-15
Primary and Secondary Noise Sources and Existing Measured Noise Levels
(The NAC at these sites is 67dBA Leq unless otherwise noted)

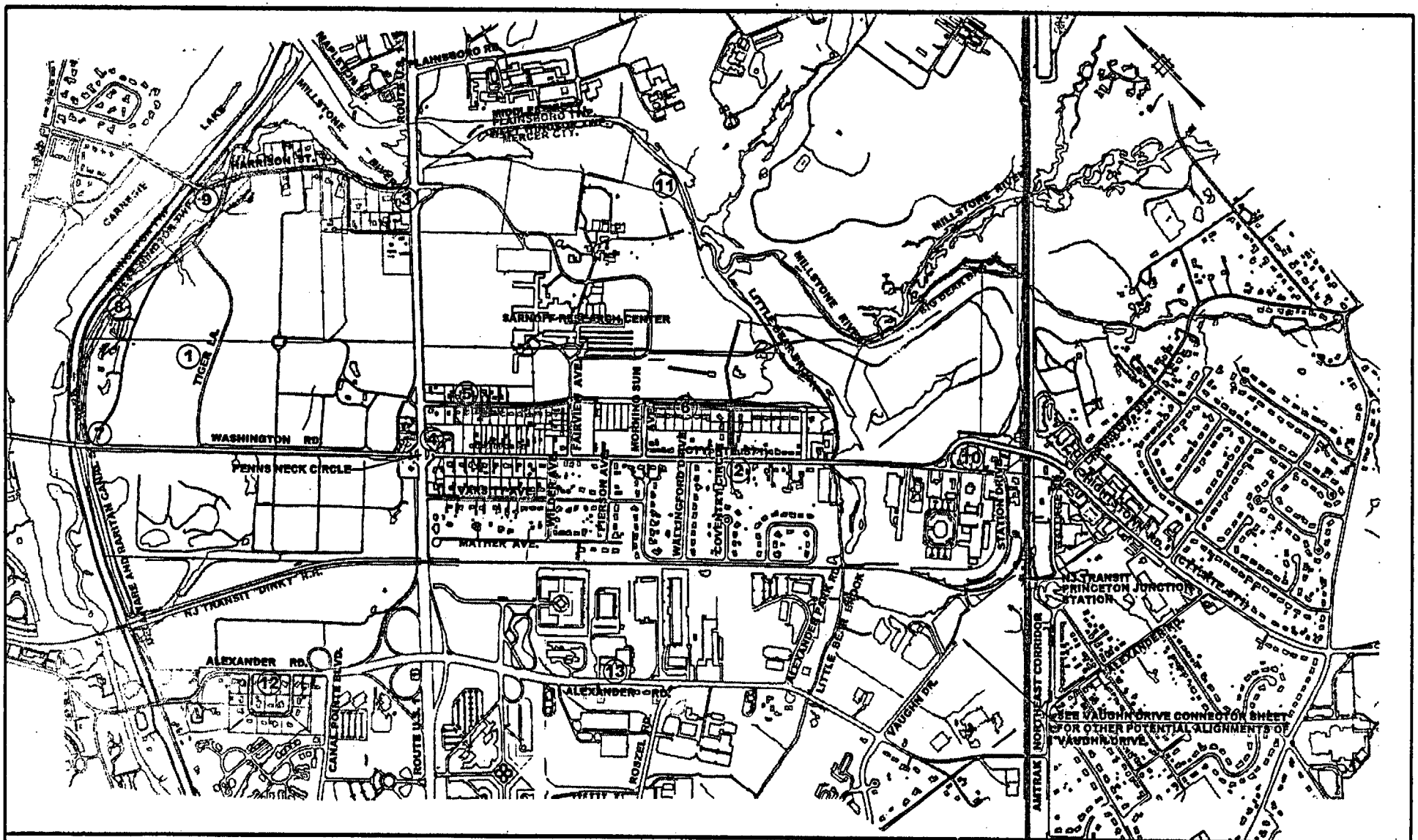
SITE	LOCATION	PRIMARY NOISE SOURCE	SECONDARY NOISE SOURCE	MAXIMUM HOURLY LEQ (dBA)
1	Princeton University Athletic Fields	Washington Road Traffic	Helicopter, Aircraft, Cicadas	49
2	130 Washington Road (Route 571)	Washington Road Traffic	Aircraft	66
3	Eden Institute Playground	Route 1 Traffic	Aircraft	71
4	Princeton Baptist Church (exterior)	Route 1 Traffic	Helicopter	72
	Princeton Baptist Church (interior), NAC 52			50
5	241 Fisher Place	Cicadas	Landscape Tools	61
6	156 Fisher Place	Local Traffic	Locusts, Landscape Tools	60
7	Delaware and Raritan Canal at Washington Road	Washington Street Traffic	Helicopters, Aircraft, Cicadas	57
8	Delaware and Raritan Canal at middle point	Cicadas	Aircraft, Helicopters	61
9	Delaware and Raritan Canal at Harrison Street	Harrison Street Traffic	Aircraft, Helicopter, Cicadas	58
10	31 Washington Road (Route 572)	Hightstown Road Traffic	Washington Road	60
11	Park area northeast corner of Sarnoff Research Center	Cicadas	Helicopters, Aircraft	53
12	558 Alexander Road	Alexander Road Traffic	Helicopters, Cicadas	67
13	698 Alexander Road	Alexander Road Traffic	Truck Loading	66

The peak hourly Leq noise levels ranged from a high of 72 dBA at Site 4 (Princeton Baptist Church, Exterior) to a low of 49 dBA at Site 1 (Princeton University Athletic Fields). Hourly Leq levels at Site 3 (Eden Institute) exceeded the NAC during the entire five hour measurement period. Hourly Leq levels at Site 4 were below the NAC (Interior) during all measurement periods. Sites 3 and 4 are adjacent to Route 1 and are subject to traffic noise.

Hourly Leq levels at Site 2 (Washington Road residence) and Site 13 (700 Alexander Road residence), approached the NAC during one peak traffic measurement hour. Traffic on Washington Road and Alexander Road is a major noise source at these sites. Hourly Leq levels a Site 12 (558 Alexander Road residence) equaled or approached the NAC during the three hour measurement period.

Table 3-15 presents noise sources as observed during field measurements at each site. Traffic on Route 1, Washington Road, and Alexander Road, as well as local streets, was the major source of noise at 10 of the 13 measurement sites. The remaining 3 sites, Site 5 (Fisher Place residence), Site 8 (D&R Canal midpoint), and 11 (Sarnoff property near the Millstone River), were located more distant from traffic noise

sources than the other 10 sites. Thus, these sites were affected primarily by other noise sources such as air traffic, insects, and landscaping activities.



LOCATIONS:

1. Princeton University Athletic Field
2. Residence at 130 Washington Road
3. Eden Institute Playground
4. Princeton Baptist Church
5. Residence at 241 Fisher Place
6. Residence at 156 Fisher Place
7. Delaware and Raritan Canal at Route 571
8. Delaware and Raritan Canal at Middle Point
9. Delaware and Raritan Canal at Harrison Street
10. Residence at 31 Washington Road
11. Park Area Northeast corner of Sarnoff Research Center
12. Residence at 558 Alexander Road, West of Route 1
13. Residence at 700 Alexander Road, East of Route 1

NEW JERSEY DEPARTMENT OF TRANSPORTATION

PENNS NECK AREA
ENVIRONMENTAL IMPACT STATEMENT

NOISE MEASUREMENT LOCATIONS

DATE: MAY 2003
SCALE: N.T.S.

FIGURE: 3-14

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3.4 Socioeconomics and Land Use

This section describes existing demographic, land use and community characteristics in the primary and secondary study areas. To document existing conditions, past and present information was obtained from the 1990 and 2000 US Census of Population and Housing, the New Jersey Department of Labor (NJDOL), the New Jersey Office of Smart Growth, the New Jersey Department of Transportation (NJDOT), the New Jersey State Data Center (NJSDC), the Delaware Valley Regional Planning Commission (DVRPC), the North Jersey Transportation Planning Authority (NJTPA), the Regional Planning Partnership (RPP), and municipal and county planning agencies. As necessary, field reconnaissance was conducted to better assess current on-the-ground conditions. In addition, this section presents population, household and employment forecasts for the SSA and PSA developed in consultation with representatives from the PSA municipalities, Middlesex County and Mercer County.

3.4.1 Socioeconomic Characteristics

3.4.1.1 Population Characteristics

Race/Ethnicity

According to the 2000 Census, approximately 72, 400 persons live in the PSA. Approximately 71% of the area's population is white, 19% is Asian, 7% is Black and 5% other races. In addition, approximately 5% of the area's population reports being Hispanic or Latino. As shown in Table 3-16, the race and ethnicity characteristics of the SSA population are similar.

Income and Poverty

As Table 3-17 illustrates, Princeton Township had the highest per capita income of all the PSA communities ($56,360), followed by West Windsor ($48,511), Plainsboro ($38,982), and Princeton Borough ($27,292). West Windsor had a median household income of $116,335 and a median family income of $127,877[1].

The percent of residents in poverty in West Windsor and Plainsboro was low compared to those in other SSA communities, 2.5 and 3.0 percent respectively (Table 3-18). The poverty rates in Princeton Borough (9.0 percent) and Princeton Township (5.7 percent) were relatively higher than in the other SSA communities.

[1] "Household" includes the total income of all persons, including unrelated individuals, in a home. "Family" includes related individuals residing in the same household. Source: US Department of Commerce, Bureau of the Census. *2000 Census of Population and Housing.*

Table 3-16
Race and Ethnicity, 2000

	2000 Population	White	Black	American Indian /Alaska Native	Asian	Other	Hispanic / Latino
Primary Study Area							
Plainsboro Township	20,215	11,608	1,480	10	6,164	953	899
Princeton Borough	14,203	11,414	921	15	931	922	1,014
Princeton Township	16,027	12,749	763	15	1,684	816	811
West Windsor Township	21,907	15,601	677	52	4,798	779	917
PSA Total	**72,352**	**51,372**	**3,841**	**92**	**13,577**	**3,470**	**3,641**
Secondary Study Area							
East Windsor Township	24,919	18,439	2,249	36	2,363	1,166	3,580
Hightstown Borough	5,216	3,989	466	4	143	523	1,048
Hopewell Borough	2,035	1,882	37	18	42	42	61
Hopewell Township	16,105	14,033	923	26	668	158	387
Lawrence Township	29,159	23,073	2,858	118	2,291	540	1,370
Pennington Borough	2,696	2,565	70	0	38	5	48
Washington Township	10,275	9,396	259	18	458	44	314
Cranbury Township	3,227	2,825	58	0	286	26	58
Jamesburg Borough	6,025	4,941	495	8	112	283	610
Monroe Township	27,999	26,025	824	8	625	176	776
South Brunswick Township	37,734	26,664	2,804	38	6,888	392	1,914
Franklin Township	50,903	28,191	13,087	132	6,404	1,836	4,102
Hillsborough Township	36,654	31,694	1,481	28	2,548	508	1,833
Millstone Borough	417	412	5	0	0	0	13
Montgomery Township	17,465	14,778	414	12	1,971	41	386
Rocky Hill Borough	658	614	8	0	14	12	39
SSA Total	**271,487**	**209,521**	**26,038**	**446**	**24,851**	**5,752**	**16,539**

Source: 2000 Census

Table 3-17
Income Levels 2000

	Median Household Income ($)	Median Family Income ($)	Per Capita Income ($)	State Per Capita Income Rank
Primary Study Area				
West Windsor Township	116,335	127,877	48,511	45
Plainsboro Township	72,097	88,783	38,982	100
Princeton Borough	67,346	102,957	27,292	268
Princeton Township	94,580	123,098	56,360	25
Secondary Study Area				
East Windsor Township	63,616	73,461	28,695	235
Hightstown Borough	64,299	72,092	28,605	240
Hopewell Borough	77,270	91,205	38,413	107
Hopewell Township	93,640	101,579	43,947	70
Lawrence Township	67,959	82,704	33,120	159
Pennington Borough	90,366	107,089	45,843	59
Washington Township	71,377	90,878	35,529	129
Cranbury Township	111,680	128,410	50,698	37
Jamesburg Borough	59,461	67,887	23,325	390
Monroe Township	53,306	68,479	31,772	178
South Brunswick Township	78,737	86,891	32,104	174
Franklin Township	67,923	78,177	31,209	186
Hillsborough Township	83,290	93,933	33,091	160
Millstone Borough	76,353	83,118	30,694	193
Montgomery Township	118,850	129,150	48,699	43
Rocky Hill Borough	79,469	100,314	48,357	48
Mercer County	**56,612**	**68,494**	**27,914**	**6**
Middlesex County	**61,446**	**70,749**	**26,535**	**9**
Somerset County	**76,933**	**90,605**	**37,970**	**1**

Source: 2000 Census

Table 3-18
Poverty Status, 2000

	Individuals		
	Number for Whom Poverty Status is Determined[2]	Number Below Poverty Level	Percent Below Poverty Level
Primary Study Area			
West Windsor Township	21,901	548	2.5
Plainsboro Township	20,201	601	3.0
Princeton Borough	7,257	656	9.0
Princeton Township	15,622	897	5.7
Secondary Study Area			
East Windsor Township	24,565	1,312	5.3
Hightstown Borough	5,197	380	7.3
Hopewell Borough	2,035	43	2.1
Hopewell Township	15,219	173	1.1
Lawrence Township	26,940	1,311	4.9
Pennington Borough	2,696	64	2.4
Washington Township	10,275	381	3.7
Cranbury Township	3,172	51	1.6
Jamesburg Borough	5,892	206	3.5
Monroe Township	27,237	908	3.3
South Brunswick Township	37,608	1,156	3.1
Franklin Township	50,102	2,535	5.1
Hillsborough Township	36,453	1,140	3.1
Millstone Borough	416	19	4.6
Montgomery Township	17,342	261	1.5
Rocky Hill Borough	658	18	2.7
Mercer County	***330,373***	***28,570***	***8.6***
Middlesex County	***731,461***	***48,205***	***6.6***
Somerset County	***293,732***	***11,061***	***3.8***

Source: 2000 US Census

3.4.1.2 Housing Characteristics

In 2000, the PSA had a total of 26,302 housing units and a vacancy rate of 3.5 percent, lower than New Jersey's 7.4 percent and Mercer County's 5.6 percent (see

[2] **Individuals for whom poverty status is determined.** Poverty status was determined for all people except institutionalized people, people in military group quarters, people in college dormitories, and unrelated individuals under 15 years old. These groups also were excluded from the numerator and denominator when calculating poverty rates. They are considered neither "poor" nor "nonpoor."

Table 3-19). Within the PSA, West Windsor had the lowest vacancy rate (2.3 percent) and Princeton Borough the highest (4.8 percent). The SSA had a vacancy rate of 3.3 percent, also lower than the state's vacancy rate. The median home value in the four PSA communities was higher than the median home value in Mercer County, Middlesex County, or New Jersey. The PSA's homeownership rate, 60.5 percent, was lower than New Jersey's (65.6 percent) and Mercer County's (67 percent). The 2000 U.S. Census information on the asking prices for homes in the PSA indicated values between $300,000 and $500,000.

Table 3-19
Median Home Value and Vacancy Rates in the PSA 1990-2000

	Median Home Value 1990 In dollars	Median Home Value 2000 In dollars	Vacancy Rate 1990	Vacancy Rate 2000
West Windsor Township	282,100	323,700	7.9%	2.3%
Plainsboro Township	211,100	229,600	11.9%	4.5%
Princeton Township	345,700	414,500	6.7%	5.1%
Princeton Borough	286,400	338,700	7.1%	3.0%
Mercer County	137,900	147,400	5.4%	5.6%
Somerset County	194,800	222,400	4.6	2.7
Middlesex County	164,700	168,500	4.5%	2.9%
New Jersey	167,700	170,800	9.1%	7.4%

Source: 1990 and 2000 US Census

3.4.2 Existing Land Use and Zoning

Land Use

The primary and secondary study areas contain a range of land use conditions. PSA and SSA land use patterns were examined using NJDEP land use/land cover data. The dataset contained fifty general land use categories with an additional 24 categories for a some areas[3]. For analysis purposes, these categories were aggregated into eight land use types: Residential, Commercial/Industrial/Mixed Urban Use, Transportation/ Communication/Utilities, Agriculture, Forest/Open Space/Recreational, Water, Wetlands/ Marshes, and Miscellaneous[4]. Figure 3-15 illustrates existing land use patterns in the SSA and Table 3-20 summarizes PSA and SSA land uses. There are 392,400 acres of land in the PSA. Land uses in the PSA are comprised of 22% residential uses; 10% commercial/industrial and mixed land uses; 1% transportation, communication and utilities; 30% forest, open space and recreational land; 2% agricultural land; 32% water, wetlands, and marshes; and 3% miscellaneous. A similar pattern and breakdown exists in the SSA.

[3] Somerset County had 74 categories which were reclassified into 50 general categories and finally into the study's eight land use types.

[4] See the *Socioeconomic and Land Use Technical Environmental Study* for land use category reclassifications.

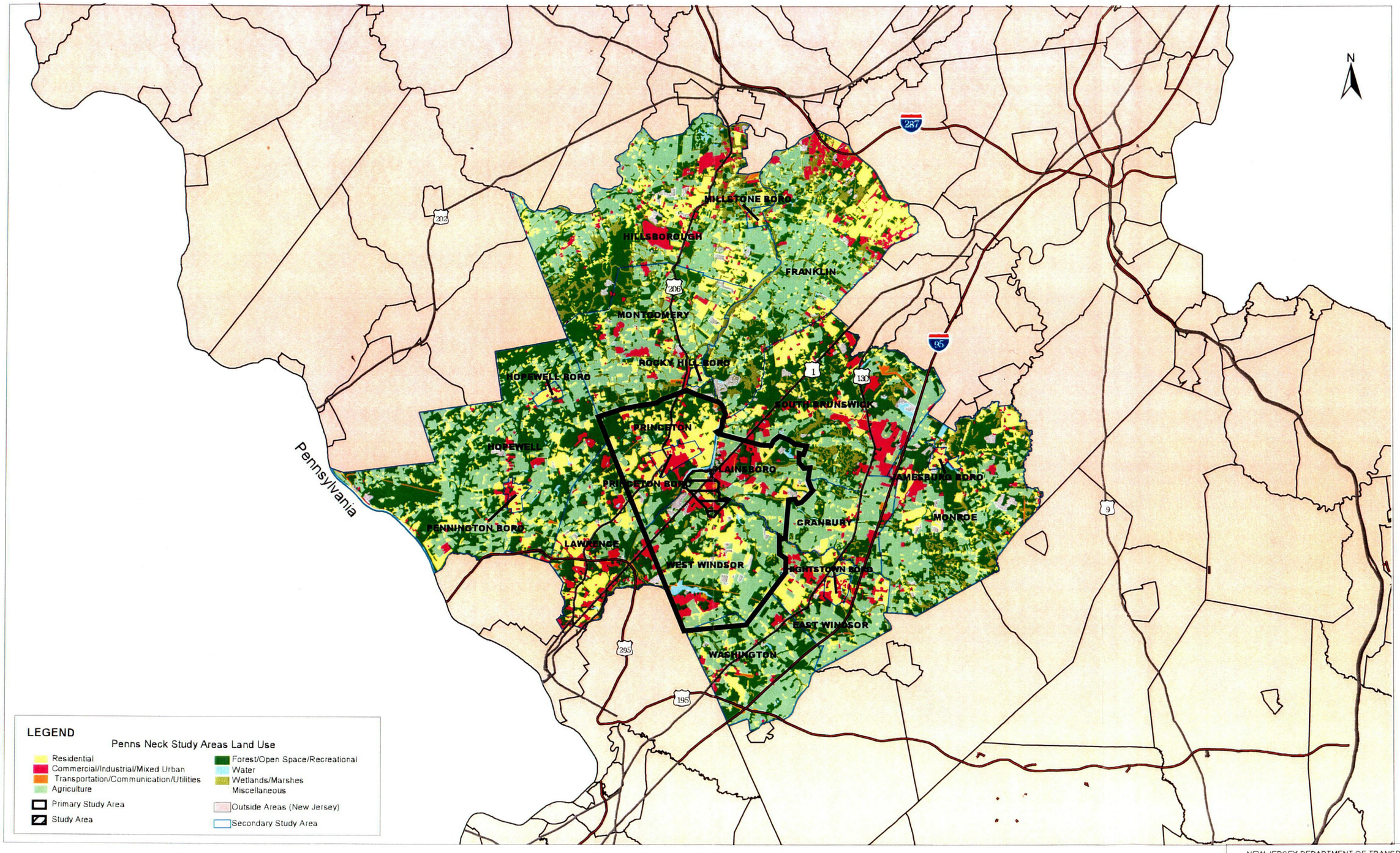
Figure 3-16 illustrates existing land uses in the Penns Neck Area. Business uses are found west of Route 1 and south of Mapleton Road. At the intersection of Harrison Street and Route 1 southbound, there are several commercial uses, including a gas station, a small office building, the Eden Institute, and a PSE&G substation. Southwest of the PSE&G substation are the agricultural and recreational fields owned by Princeton University. The fields are bounded on the west by the Delaware and Raritan Canal State Park.

South from Washington Road to Alexander Road, on the west side of Route 1, are more Princeton University-owned agricultural fields; these are intersected by the NJ TRANSIT Princeton Line (Dinky/Princeton line). South of Alexander Road on the west side of Route 1 are a number of residential developments.

On the east side of Route 1 and at the north end of the study area, Route 1 northbound abuts the Sarnoff Corporation campus. The Sarnoff campus is located between the Millstone River and the Penns Neck neighborhood. Gasoline service stations, a real estate office and a the First Baptist Church at Penns Neck complex are located adjacent to the Route 1 – Washington Road intersection (Penns Neck Circle). Commercial and office uses begin south of the Dinky rail line, near the intersection of Alexander Road and Route 1. East of Route 1, along Alexander Road, are numerous office buildings and commercial/light industrial uses. The NEC rail line forms the eastern boundary of the study area. Commercial and light industrial uses and the Princeton Junction Station are found along the railroad corridor.

Table 3-20 Land Uses

Area	Total Acreage	Residential		Transportation/ Communication/ and Utilities		Commercial and Services/ Industrial/ Mixed Urban		Agriculture		Forest/ Open Space/ Recreational		Wetlands/ Marshes		Water		Miscellaneous	
		Acres	Pct.	Acres	Pct.	Acres	Pct.	Acres	Pct.	Acres	Pct.	Acres	Pct.	Acres	Pct.	Acres	Pct.
PSA	392,082	84,758	21.6%	3,757	1.0%	40,708	10.4%	8,438	2.2%	117,744	30.0%	117,490	30.0%	8,127	2.1%	11,059	2.8%
SSA	2,822,312	474,829	16.8%	30,615	1.1%	192,537	6.8%	29,547	1.0%	952,278	33.7%	893,653	31.7%	198,028	7.0%	50,823	1.8%
Mercer County	1,576,009	363,340	23.1%	39,927	2.5%	153,570	9.7%	18,225	1.2%	452,973	28.7%	505,573	32.1%	24,859	1.6%	17,541	1.1%
Middlesex County	2,182,658	587,317	26.9%	64,628	3.0%	356,263	16.3%	56,983	2.6%	285,965	13.1%	616,221	28.2%	150,360	6.9%	64,922	3.0%
Somerset County	2,100,173	504,495	24.0%	29,760	1.4%	141,146	6.7%	18,205	0.9%	515,366	24.5%	587,961	28.0%	266,554	12.7%	36,686	1.7%
SSA Counties	5,858,840	1,455,152	24.8%	134,315	2.3%	650,978	11.1%	93,412	1.6%	1,254,304	21.4%	1,709,755	29.2%	441,773	7.5%	19,149	2.0%



Source: New Jersey Department of Environmental Protection

NEW JERSEY DEPARTMENT OF TRANSPORTATION

PENNS NECK AREA
ENVIRONMENTAL IMPACT STATEMENT

LAND USE SSA

DATE: NOVEMBER 2002
Scale: 1:250,000

FIGURE 3-15

C01

West Windsor's Princeton Junction neighborhood which includes a business and retail area and several residential neighborhoods is located east of the NEC rail line. West Windsor's Penns Neck residential neighborhood is located east of Route 1 on both sides of Washington Road North of Washington Road and east of Little Bear Brook is a portion of undeveloped land owned by Sarnoff Corporation.

Zoning

Zoning was examined in the four PSA communities based on municipal zoning maps and data provided by the Regional Planning Partnership. As shown in Figure 3-17 a majority of land in the PSA communities is zoned for residential uses. Seventy-five percent of the land in West Windsor is zoned for residential uses, 87 percent in Princeton Township, 72 percent in Princeton Borough, and 95 percent in Plainsboro.

Educational uses makes up a large part of Princeton Township, Princeton Borough, and the study area. The majority of commercial zoning in the PSA is located in West Windsor and Plainsboro Townships along and near Route 1. The central and northwestern portions of the study area are zoned primarily residential.

3.4.3 Population and Employment Trends and Forecasts

The primary and secondary study areas have experienced rapid population and employment growth over the last two decades and it is reasonable to anticipate that growth trends will continue. As shown in Table 3-21, since 1980, the SSA has added approximately 109,600 persons and 79,800 jobs. This represents a 68% increase in population and a 119% increase in employment. Since 1980, population in the PSA has increased by 36,900 persons or 93%. Over that same time period, employment in the PSA has increased by 135% or approximately 33,100 jobs.

Table 3-21
Growth Trends in the PSA and SSA

	1980	Existing*	Absolute Change	Percent Change
Primary Study Area				
Population	39,865	76,777	36,912	93%
Employment	24,544	57,672	33,128	135%
Secondary Study Area				
Population	161,888	271,480	109,592	68%
Employment	58,416	128,213	69,797	119%

* Existing = 1999, 2000, or 2001 depending on data source.
Sources: US Census Bureau, DVRPC, NJTPA, NJDOL, Urbitran Associates

3.4.4 PSA Population and Employment Forecasts

One of the significant factors that will continue to propel this trend in the PSA is the availability of vacant land with appropriate zoning and with planning approvals already in place. Virtually all significant non-residential properties in the PSA have some form of General Development Plan (GDP) approval, site plan approval, or are actively involved in obtaining the necessary approvals.

Population and employment forecasts for the PSA were developed based on a detailed land use analysis. Potential future development was categorized into two growth types:

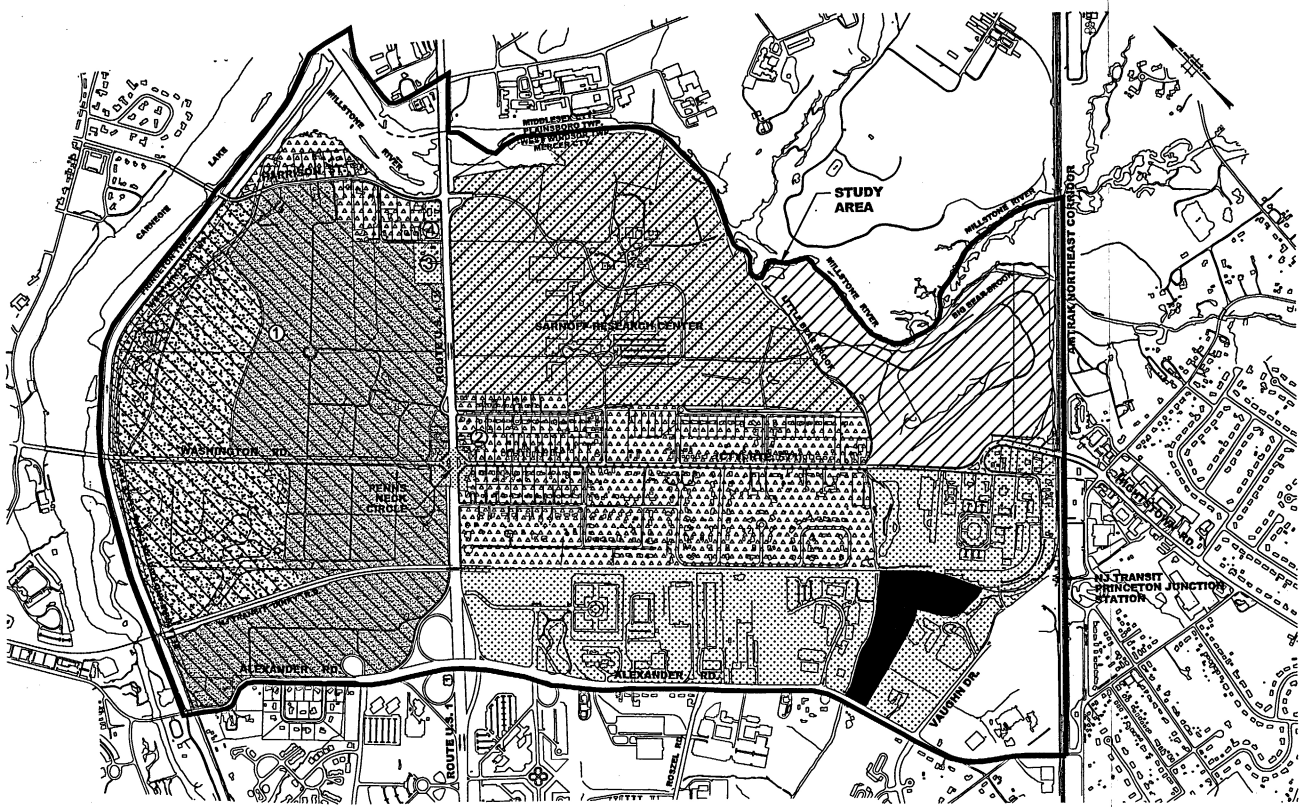
"Committed development" is that for which the developer is known, the property has an approval in place, or is actively pursuing approvals and they can be assumed to be forthcoming. As a starting point, for these properties it can be assumed that within a 20- to 30-year time frame the project will be built.

"Uncommitted development" does not have approvals in place and often does not have a known, active developer. The municipality may be resisting development of the property, or plans for the property have not been determined. Development within the 20- to 30-year time frame is less defined but still probable.

Although no specific time frame was attributed to the committed and uncommitted development totals; committed development is likely to occur within a 20-year time frame, because the developments that comprise it have approvals in place and are actively being marketed. Uncommitted development could take longer – or it could happen more quickly because of development and marketing conditions. In any event the combination of existing, committed and uncommitted development represents close to a full-build land use condition. The following summaries describe future development potential in each of the PSA municipalities.

Princeton Borough
Princeton Borough is essentially fully developed. Consequently the amount of potential residential and non-residential development is limited to an estimated 37 dwelling units and approximately 62,000 square feet of office and retail floor space.

Princeton Township
Princeton Township has a small amount of developable land remaining. Development potential includes an estimated 37 single family and townhouse dwelling units, 51 age-restricted/assisted living dwelling units and approximately 409,000 square feet of office space and 229,000 square feet of retail space.



LEGEND

LAND OWNERSHIP:
- PRINCETON OWNED
- SARNOFF OWNED

LAND USE:
- AGRICULTURAL
- COMMERCIAL
- OPEN SPACE
- RESIDENTIAL
- RECREATION
- UNDEVELOPED

SITES:
1. PRINCETON U. CEMETERY
2. PRINCETON BAPTIST CHURCH & CEMETERY
3. PSE & G
4. EDEN INSTITUTE

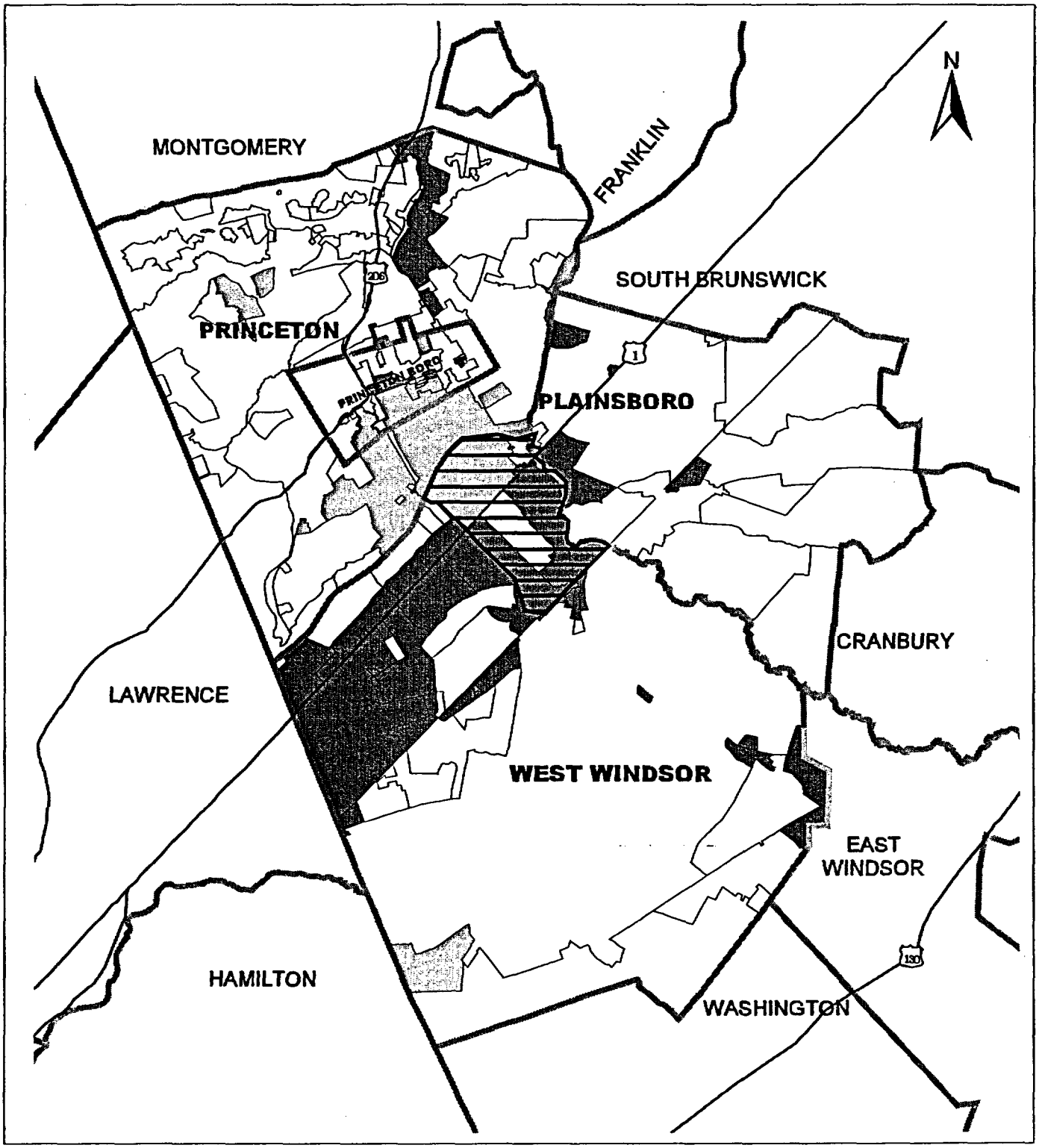
NEW JERSEY DEPARTMENT OF TRANSPORTATION

PENNS NECK AREA
ENVIRONMENTAL IMPACT STATEMENT

STUDY AREA LAND USE

DATE: NOVEMBER 2002
SCALE: 1:1000

FIGURE 3-16



Legend

- Non-Residential
- Educational
- Residential
- Study Area Boundary
- Municipal Boundaries

Source: New Jersey Regional Planning Partnership

NEW JERSEY DEPARTMENT OF TRANSPORTATION

PENNS NECK AREA
ENVIRONMENTAL IMPACT STATEMENT

ZONING

DATE: NOVEMBER 2002
Scale: 1:100,000

FIGURE 3-17

Plainsboro Township
Development potential in Plainsboro Township includes an estimated 900 dwelling units, two hotels, and approximately 6.8 million square feet of office/research floor space concentrated between Route 1 and the NEC rail line mostly in Princeton Forrestal Center.

West Windsor Township
Development potential in West Windsor Township is spread among several large corporate sites, some large residential projects, and a variety of medium-sized office development sites. There are several large developments that are currently in the development pipeline. These include:

Carnegie Center 2 is located on the east side of Route 1 and has been under development since the 1980's. Its General Development Plan (GDP) vesting was recently renewed. Altogether the project consists of about 585,000 square feet of additional office space.

Carnegie Center 3 is on the west side of Route 1 and also has had its GDP vesting renewed recently. This portion consists of about 1,170,000 square feet of office space.

Sarnoff is a major research organization with a 325-acre property. There is an approved General Development Plan that includes 600,000 square feet of existing research space, 2,400,000 square feet of new research and office space, and a hotel and conference center.

Wyeth (Cyanamid) is a major agricultural research property of about 625 acres that is currently zoned for research, office, and manufacturing. Although the property could theoretically yield as much as 8.0 million square feet of office space, a more likely scenario is some form of mixed used development with a significant open-space component. For purposes of this study it is assumed that the project could consist of about 3,900,000 square feet of office space, 500,000 square feet of research space, and 100,000 square feet of service retail.

Toll Brothers / Princeton Estates is a residential development currently under construction. The project will consists of 400 single family homes, 130 townhouses, and 635 apartments, for a total of 1,165 dwelling units.

Princeton University
Princeton University has indicated that both enrollment and employment growth are expected over the coming years to 2028. The undergraduate student body will likely increase by about 500 students (an increase of 11 percent from the current 4,500-student enrollment). Graduate students will likely grow by about one percent per year, from the current 1,500 to about 1,960 students. Faculty will also grow at about 1 percent per year, increasing

by about 300 from the current level of 1,100. Other staff levels are not expected to increase.

The University has no definite plans for development of its lands in West Windsor, but suggests that it could be possible that 300,000 square feet of research space would be built by 2028. For purposes of this analysis it is assumed that the net effect of the above faculty increase and shifting of some activity from the Princeton campus to the West Windsor campus will be that the 300-employee increase will occur on the West Windsor lands. The University further suggests that 200-300 units of University-related housing may be possible on these lands; 250 units is assumed for this analysis. No activity increase due to faculty or staff is assumed on the Princeton campus.

Including all other properties, committed development in West Windsor totals 2,898 dwelling units, 6,015,000 square feet of office space, and 275,000 square feet of retail space. Uncommitted development totals an additional 767 dwelling units, about 5,673,000 square feet of office space, and 180,000 square feet of retail.

As shown in Table 3-22, population and household growth in the PSA will be quite modest. The number of households located in the PSA is expected to increase by 17 percent, with the highest growth concentrated in West Windsor Township. Population in the PSA is expected to increase by 12 percent. This reduced rate is due to the preponderance of senior and multi-family housing in the future growth, both of which have a smaller household size than the current average.

Table 3-22
Anticipated Municipal Growth Potential

	2001	Committed Growth	Uncommitted Growth	Total	Change
HOUSEHOLDS: Plainsboro Township	9,438	455	–	9,893	+5%
Princeton Borough	3,465	37	--	3,502	+1%
Princeton Township	6,018	83	5	6,106	+1%
West Windsor Township	2,443	2,838	707	10,988	+48%
PSA TOTAL	**26,364**	**3,413**	**712**	**30,489**	**+17%**
POPULATION: Plainsboro Township	21,865	1,205	–	23,070	+6%
Princeton Borough	15,054	83	–	15,137	+1%
Princeton Township	16,947	186	10	17,143	+1%
West Windsor Township	22,911	5,949	1,483	30,343	+32%
PSA TOTAL	**76,777**	**7,423**	**1,493**	**85,693**	**+12%**
EMPLOYMENT: Plainsboro Township	27,266	22,174	650	50,090	+84%
Princeton Borough	5,561	205	--	5,766	+4%
Princeton Township	5,854	1,180	649	7,683	+31%
West Windsor Township	18,991	22,646	20,242	61,879	+226%
PSA TOTAL	**57,672**	**46,205**	**21,541**	**125,418**	**+117%**

Source: Local Area Land Use Inventory and Forecast Study, Urbitran Associates, 2002

Non-residential development, by contrast, is expected to more than double the number of jobs located in the PSA. The overall number of jobs could increase by about 117 percent, from 57,672 in 2001 to a full-build out potential of 125,418, including both committed and uncommitted development. About two thirds of the PSA's job growth could occur in West Windsor Township. There is sufficient zoned land available in that municipality that employment is likely to more than triple in West Windsor.

The Route 1 corridor has experienced rapid employment growth over the past two decades. In 1975 there were 19,760 jobs in the PSA[5], and that total grew quickly to 29,786 jobs by 1980[6]. As evidenced by NJDOL employment estimates in the two decades since 1980, employment in the 4-municipality PSA has grown steadily and consistently. Currently (2001) there are 57,672 jobs in the PSA, a three-fold increase in the 26 years since 1975. This trend is illustrated in Figure 3-18.

By extrapolating that growth on a straight-line basis to the year 2028, it can be expected that there will be approximately 97,000 jobs in the PSA, an increase of about 39,400 jobs or 68 percent from 2001. This trended growth in jobs is similar to what would occur if the committed development described above were to occur by 2028. The committed growth total of 46,200 jobs is a clear indication that there is ample developable land to support continuation of the historic trend.

By contrast, adding in the uncommitted development would produce an additional 21,500 jobs in the area. Figure 3-18 shows that the combination of committed and uncommitted growth is substantially higher than would be achieved by the simple trend line.

The experience in the Route 1 corridor has been that development is affected by economic and market conditions, and that there have been lengthy periods of sluggishness offset by other periods of fast growth. It is reasonable to anticipate that on an overall basis the next 27 years (2001 to 2028) will be similar to the past 26 years (1975 to 2001). As such, the trended growth level is a reasonable estimate of future employment growth in the PSA.

Because the composite of committed and uncommitted growth results in a spread of development across the entire PSA, the forecast methodology assumes that the sum of committed and uncommitted growth is allocated to the trend total. This would result in some level of development on major sites that have been designated as uncommitted (i.e. Wyeth / Cyanamid) and that would not show any development activity if uncommitted growth were ignored. Table 3-23 shows the resulting job growth that will occur if committed and uncommitted development are allocated together to the trended total. Also indicated are employment levels for the intermediate years (2008 and 2018) assuming a straight-line interpolation.

[5] I-95/I-695 Environmental Studies, Economic Impacts Technical Support Document, New Jersey Department of Transportation, 1978

[6] Route 1 Corridor Transportation Study, Technical Report, New Jersey Department of Transportation, 1986

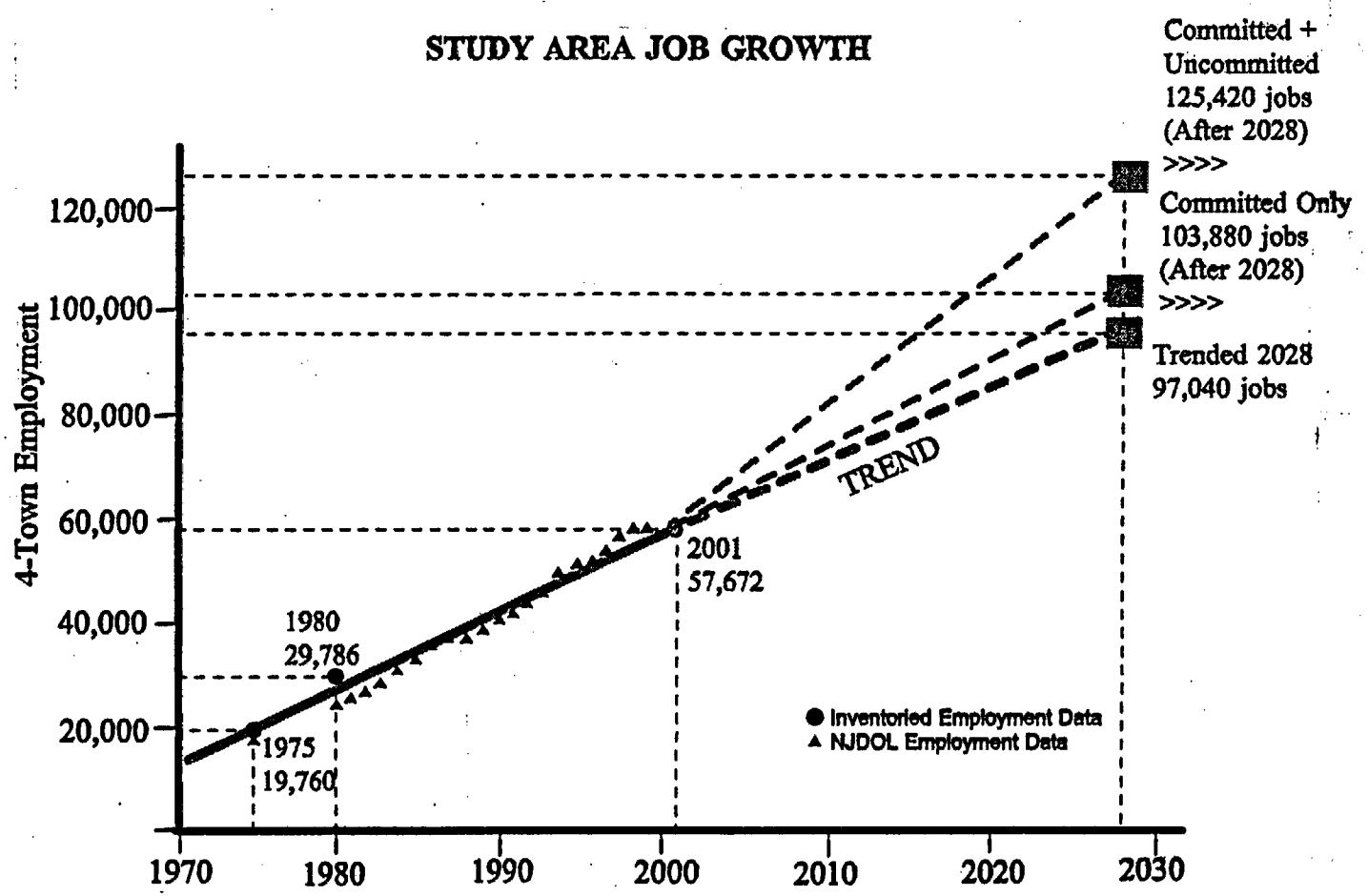
Table 3-23
Forecast Job Growth in the PSA

	2008	2018	2028
Portion of Development	15%	37%	58%
Committed Growth	6,962	16,907	26,852
Uncommitted Growth	3,245	7,882	12,518
Total Growth	10,207	24,789	39,370
Total Employment	67,879	82,461	97,042
Change from 2001	+18%	+43%	+68%

This allocation process estimates that approximately 58% of potential committed and uncommitted development is likely to occur by 2028. For example, of the 7.6 million square feet of office remaining to be developed at Princeton Forrestal Center, about 4.4 million would be constructed by 2028 according to this formula. At Wyeth (Cyanamid) about 2.6 million of the 4.4 million square foot total would be complete by 2028. Overall, it is estimated that PSA employment will increase 68% by 2028. The remaining 28,400 jobs identified by the committed and uncommitted growth – equivalent to an additional 49% growth – will occur sometime after 2028.

With respect to population and household growth, it is clear that the rate of job growth described above (68%) will far exceed the total committed and uncommitted population growth of 12%. Consequently the available labor force within the PSA will be insufficient to supply even a part of the new job demand. Therefore, the forecast methodology assumes that these pressures of high job growth and limited labor force will pressurize the housing market within the PSA. As a result it is estimated that all of the committed and uncommitted population and household development will occur by 2028. The resulting population and job growth for the PSA is summarized in Table 3-24.

As shown in Table 3-25, over the 27-year forecast period, the number of jobs located in West Windsor Township will be greater than the number located in Plainsboro Township. West Windsor employment is expected to increase from 18,991 jobs in 2001 to about 43,900 jobs in 2028, an increase of 131%. During the same period Plainsboro's employment will increase from 27,266 to about 40,530 jobs, or 49%. West Windsor will also have the highest population growth, increasing from 22,911 to about 30,340 persons from 2001 to 2028. This is an increase of about 32%. Plainsboro and the Princetons will experience considerably less population growth; total population in those three towns will increase from 53,866 to about 55,350 persons, an increase of only about 3 percent.



NEW JERSEY DEPARTMENT OF TRANSPORTATION	
PENNS NECK AREA ENVIRONMENTAL IMPACT STATEMENT COMMITTED AND UNCOMMITTED GROWTH TRENDS, PSA	
FIGURE 3-18	DATE: OCTOBER 2002

Table 3-24
Municipal Population and Employment Growth

	2001	2008	2018	2028
Households:				
Plainsboro Township	9,438	9,556	9,724	9,893
Princeton Borough	3,465	3,475	3,488	3,502
Princeton Township	6,018	6,041	6,073	6,106
West Windsor Township	7,443	8,362	9,675	10,988
PSA Total	**26,364**	**27,434**	**28,960**	**30,489**
Population:				
Plainsboro Township	21,865	22,177	22,624	23,070
Princeton Borough	15,054	15,076	15,106	15,137
Princeton Township	16,947	16,998	17,070	17,143
West Windsor Township	22,911	24,838	27,590	30,343
PSA Total	**76,777**	**79,089**	**82,390**	**85,693**
Employment:				
Plainsboro Township	27,266	30,705	35,617	40,530
Princeton Borough	5,561	5,592	5,636	5,680
Princeton Township	5,854	6,130	6,523	6,917
West Windsor Township	18,991	25,453	34,684	43,915
PSA Total	**57,672**	**67,880**	**82,460**	**97,042**

Copies of the *Local Area Land Use Inventory and Forecast, Penns Neck Area Local Traffic Forecast Model*, prepared by Urbitran Associates, July 29, 2002 are available for review on the project website and in the project document repositories. Information on both the website and repository locations can be found in Chapter 7.

3.4.5 SSA Population and Employment Forecasts

Year 2000 population estimates were compiled from the US Census Bureau. Population forecasts were obtained from the Delaware Valley Regional Planning Commission (DVRPC) and the North Jersey Transportation Planning Authority (NJTPA). These forecasts were developed as part of the federally sanctioned regional transportation planning process in consultation with affected municipalities and counties. The forecasts were approved and adopted by the respective MPO governing boards. Existing employment estimates were obtained from NJDOL. The latest municipal level data available from NJDOL is for 1999. Employment forecasts for 2000 and 2025 were obtained from DVRPC and NJTPA. Again, these forecasts were developed as part of the federally sanctioned regional transportation planning process in consultation with affected municipalities and counties, and they were approved and adopted by their respective MPO governing boards. In reviewing the various data, the project team consulted with a local advisory committee comprised of planning staff representatives for Middlesex County, Mercer County, and the four primary study area municipalities.

Population estimates and forecasts
Base year 2001 population estimates were derived using statistical interpolation techniques. Adopted MPO 2025 population forecasts prepared by DVRPC and

NJTPA, were used to derive 2028 population forecasts for the SSA municipalities using statistical extrapolation techniques. As shown in Table 3-25, population in the secondary study area is expected to grow from 274,969 in 2001 to 369,165 in 2028. This represents a 34% increase or an increase of approximately 94,000 people.

Employment estimates and forecasts

Two primary data sources for employment estimates were investigated to establish base-line employment conditions. These were NJDOL employment estimates for 1999 and 2000 employment forecasts developed by DVRPC and NJTPA. Employment figures from both sources were considered by the local planning committee. The representative from the Middlesex County Planning Department indicated a strong preference for using the 2000 employment forecasts prepared and approved by the NJTPA as the best available planning data for the towns in the NJTPA region.

However, after consideration and discussion, and based on the collective planning knowledge of committee members, it was generally agreed that the 1999 NJDOL estimates for Mercer County municipalities appeared to more accurately depict existing employment conditions than the MPO forecasts. The committee felt that the DVRPC Year 2000 employment forecasts overstated existing employment. The DVRPC 2000 employment forecasts were 17,500 jobs higher than the 1999 NJDOL estimates. In addition, the committee noted that the NJDOL estimate for Hopewell Township was low and should be further investigated, especially in light of the recent occupation of the Merrill Lynch campus on Scotch Road.

In an effort to verify the accuracy of Hopewell Township employment numbers, NJDOL source data was reviewed in greater detail. Based on a review of 2-digit SIC code data, it appeared very likely that employment at the Township's three major corporate campuses – Merrill Lynch, Janssen Pharmaceutical, and Bristol-Myers Squibb, is unreported. As such, phone inquires were made to on-site human resource personnel at each location. These inquires revealed that 2001 employment at these locations was 5,300 at Merrill Lynch, 1,200 at Janssen, and 1,600 at Bristol-Myers Squibb.

Based on the local input just described, a combination of data sources was used as the basis for EIS base-year employment assumptions. Base-year 2001 employment estimates were be derived through a process of statistical interpolation using the NJTPA 2000 employment forecasts for the municipalities in Middlesex and Somerset Counties and 1999 NJDOL estimates for the municipalities in Mercer County. In addition, 8,100 jobs will be added to the 2001 employment estimate for Hopewell Township.

With regard to future employment, the local planning committee considered 2025 MPO forecasts prepared by DVRPC and NJTPA. As was the case with the estimates and forecasts for existing employment, the Middlesex County Planning Department indicated a strong preference for using the 2025 employment forecasts prepared and approved by the NJTPA for the towns in the NJTPA region.

And again, the local planning committee expressed concern regarding the appropriateness of using the DVRPC 2025 forecasts for the SSA municipalities in Mercer County, which they believed overstated future employment. Given the decision to use 1999 NJDOL estimates, with adjustments in Hopewell Township, to derive base-year estimates, the committee requested that modified 2025 forecasts be developed.

As suggested, modified forecasts were developed using the MPO-derived municipal employment growth rates applied to the 1999 NJDOL estimates (adjusted in Hopewell Township). Final 2028 forecasts will be developed using statistical extrapolation techniques applied to the modified 2025 employment forecasts for the SSA municipalities located in Mercer County and the 2025 NJTPA forecasts for the SSA towns in Middlesex and Somerset.

As shown in Table 3-25, employment in the Secondary Study area is forecast to increase by approximately 106,000 jobs by 2028. This is an increase of 72% or slightly more than the growth rate forecast in the primary study area.

3.4.6 Distinctive Areas and Neighborhoods

A distinctive area or neighborhood is an area that has a specific geographic, zoning, and/or social context that sets them apart from other area or neighborhoods. A number of places within and adjacent to the study area have been identified as distinctive residential neighborhoods (see Figure 3-19). These include:

West Windsor Township

- Penns Neck;
- Princeton Junction, a mixed use, pedestrian-scaled area that includes the Princeton Junction business/shopping area, West Windsor's municipal complex, and the Berrien City, Sherbrooke Estates, Benford Estates, Clarksville Road, and Wellington Estates neighborhoods;
- Lower Harrison Street;
- Alexander Road (west of Route 1);
- Canal Pointe; and
- Old Bear Brook Road and Windsor Haven.

Princeton Borough & Township

- Central District, a mixed use, pedestrian-scaled area that includes the Princeton Borough CBD and the Bank Street historic district;
- Mercer Hill; and
- Upper Harrison Street, which includes the Jugtown historic district;

The general characteristics of each of these areas and neighborhoods are described below.

Penns Neck is a mixed-use community composed of single-family residences interspersed with industrial and commercial land uses. According to the 2000 U.S.

Census, the population of the Penns Neck neighborhood was 673, with 257 households. This area is generally separated from bordering uses by Route 1 to the west and commercial development to the east. The community is also bounded by Fisher Place on the north, Little Bear Brook on the east, and the Dinky/Princeton Line right-of-way on the south. The western margin of residential development is Route 1. The eastern terminus of the community borders a low-density commercial area with the Princeton Junction station on the NEC at the eastern edge of the study area.

Princeton Junction is a mixed use, pedestrian-scaled area that includes the Princeton Junction business/shopping area, the Maurice Hawk Primary School, West Windsor – Plainsboro High School (south campus), West Windsor's municipal complex, and several residential neighborhoods, including:

Berrien City is located between Wallace Road, Princeton-Hightstown Road, Clarksville-Grovers Mill Road and Berrien Avenue. Berrien City is comprised of approximately 200 residences in the Princeton Junction area and was founded in 1924 as the first planned development in West Windsor Township.

Benford Estates is located east of the NEC rail line. It is bounded to the east by Clarksville Road, and extends west to the rail line. This neighborhood abuts the Berrien City neighborhood to the east. Benford Estates is a community of approximately 80 homes that was constructed 33 years ago as one of the first sub-division-type developments in West Windsor Township.

Clarksville Road homes are located along Clarksville Road, roughly between North Post Road and Penn-Lyle Road. Clarksville Road is made up of approximately 49 residential properties that serve as an entry into West Windsor's Princeton Junction Center. Most of the homes along this half-mile stretch of Clarksville Road were built in the 1960s and 1970s in response to the construction of Maurice Hawk Elementary School and the south campus of West Windsor-Plainsboro Regional High School.

Sherbrooke Estates is located southeast of the study area, bounded by Princeton-Hightsown Road (County Route 571) on the southwest, to the Clarksville Grovers Mill Road to the southeast, Cranbury Road to the north and Landing Land to the east. Sherbrooke Estates is a residential community in the Princeton Junction area of West Windsor Township that was built in 1972.

Table 3-25

Population and Employment Forecasts (SSA)

	POPULATION				EMPLOYMENT			
	2001 Estimate	2028 Forecast	Absolute Change	Percent Change	2001 Estimate	2028 Forecast	Absolute Change	Percent Change
SECONDARY STUDY AREA (SSA)								
Mercer								
East Windsor Township	25,328	36,378	11,049	44%	5,141	6,460	1,319	26%
Hightstown Borough	5,216	5,220	4	0%	3,309	3,924	615	19%
Hopewell Borough	2,035	2,041	5	0%	469	829	360	77%
Hopewell Township	16,383	23,883	7,501	46%	9,574	19,015	9,441	99%
Lawrence Township	29,633	42,432	12,799	43%	23,103	29,463	6,360	28%
Pennington Borough	2,702	2,868	166	6%	2,513	3,292	779	31%
Washington Township	10,467	15,657	5,189	50%	2,491	5,400	2,909	117%
Middlesex County								
Cranbury Township	3,231	3,348	117	4%	6,621	10,511	3,890	59%
Jamesburg Borough	6,031	6,185	154	3%	2,009	2,992	983	49%
Monroe Township	28,513	42,378	13,865	49%	7,974	17,935	9,961	125%
South Brunswick Township	38,214	51,186	12,972	34%	31,121	51,048	19,927	64%
Somerset County								
Franklin Township	51,386	64,414	13,028	25%	36,596	67,339	30,743	84%
Hillsborough Township	37,033	47,809	10,776	29%	7,543	16,846	9,303	123%
Millstone Borough	412	465	53	13%	149	173	24	16%
Montgomery Township	17,718	24,124	6,405	36%	9,435	18,496	9,061	96%
Rocky Hill Borough	666	777	111	17%	499	1,231	732	147%
Secondary Study Area Total	**274,969**	**369,165**	**94,197**	**34%**	**148,547**	**254,953**	**106,406**	**72%**

Original Sources: US Census Bureau, DVRPC, NJTPA, NJDOL

Wellington Estates is roughly bounded by Clarksville-Grovers Mill Road, North Lyle Road, Indian Run/Arnold Drive and North Post Road. Wellington Estates is a community of approximately 180 residences located in the vicinity of Clarksville Road in the Princeton Junction area of West Windsor Township.

Lower Harrison Street. This neighborhood is located along Harrison Street and Eden Way between Route 1 and the Delaware & Raritan Canal. This neighborhood is an area of approximately 6 single-family homes known locally as the Lower Harrison Street neighborhood. Non-residential uses include Larry's Sunoco Service Station, an office building that is currently for sale, the Eden Institute for Autistic Children, and the PSE&G substation. The portion of this neighborhood located between Harrison Street and the Millstone River is designated as the Aqueduct Mills Historic District Extension.

The **Old Bear Brook Road** neighborhood is located along Old Bear Brook Road, between Bear Brook Road and Alexander Road. It is a community of approximately 13 single-family homes.

Windsor Haven is located south-west of Alexander Road. Windsor Haven is a 184-unit condominium development in West Windsor Township that includes 20 percent affordable housing.

Alexander Road includes residences located on the south side of Alexander Road, west of Canal Pointe Boulevard. This neighborhood includes residence fronting Alexander Road and a small neighborhood characterized by older single family homes on a U-shaped street.

Canal Pointe is located on the west side of Route 1, south of Alexander Road and west of Canal Pointe Boulevard. Canal Pointe is comprised of single family homes and condominiums.

Central District is located on either side of Nassau Street in Princeton Borough, extending from Bank Street to Moore Street and encompassing Palmer Square. Central District is the heart of the Princeton business district. The **Bank Street** historic district is included in this area, just off the north side of Nassau Street in Princeton Borough. This residential neighborhood dates to the late nineteenth century.

The **Mercer Hill** neighborhood extends west from University Place along Mercer Street, Stockton Street and Monument Drive. The western boundaries of Mercer Hill are Springdale Road and Edgehill Street.

Upper Harrison Street, which is the Princeton portion of Harrison Street, between the D&R Canal and Nassau Street. Upper Harrison Street is higher in density than many other neighborhoods in Princeton. This area includes the **Jugtown** historic

district, which was settled as early as 1695. Jugtown is located on either side of Nassau Street from Princeton Avenue to Harrison Street.

3.4.6.1 Commercial/Institutional Areas

In addition to the mixed-use and primarily residential areas located within or near the study area, a number of institutional and commercial areas have been identified. Within the study area, Princeton University and the Sarnoff Corporation own significant amounts of land, much of it along Route 1. Most of the land owned by Princeton University is undeveloped and is used either for agriculture or for their sports activities. The University has plans to develop this land as campus expansion, although no specific plans have been designed. Most of the land owned by Sarnoff is undeveloped and is maintained as either lawn or forest. Sarnoff recently received approval of their General Development Plan from West Windsor Township. The Plan calls for up to 3 million square feet of office/research development and hotel/conference space. Other commercial and institutional neighborhoods within and around the study area are listed below, categorized geographically as being on Route 1, west of Route 1 and east of Route 1.

On Route 1

- Princeton Forrestal Center and Village, located on Route 1 north of the study area. The Center is a complex of office uses served by its own internal roadway system. The village is a hotel, office and retail complex.

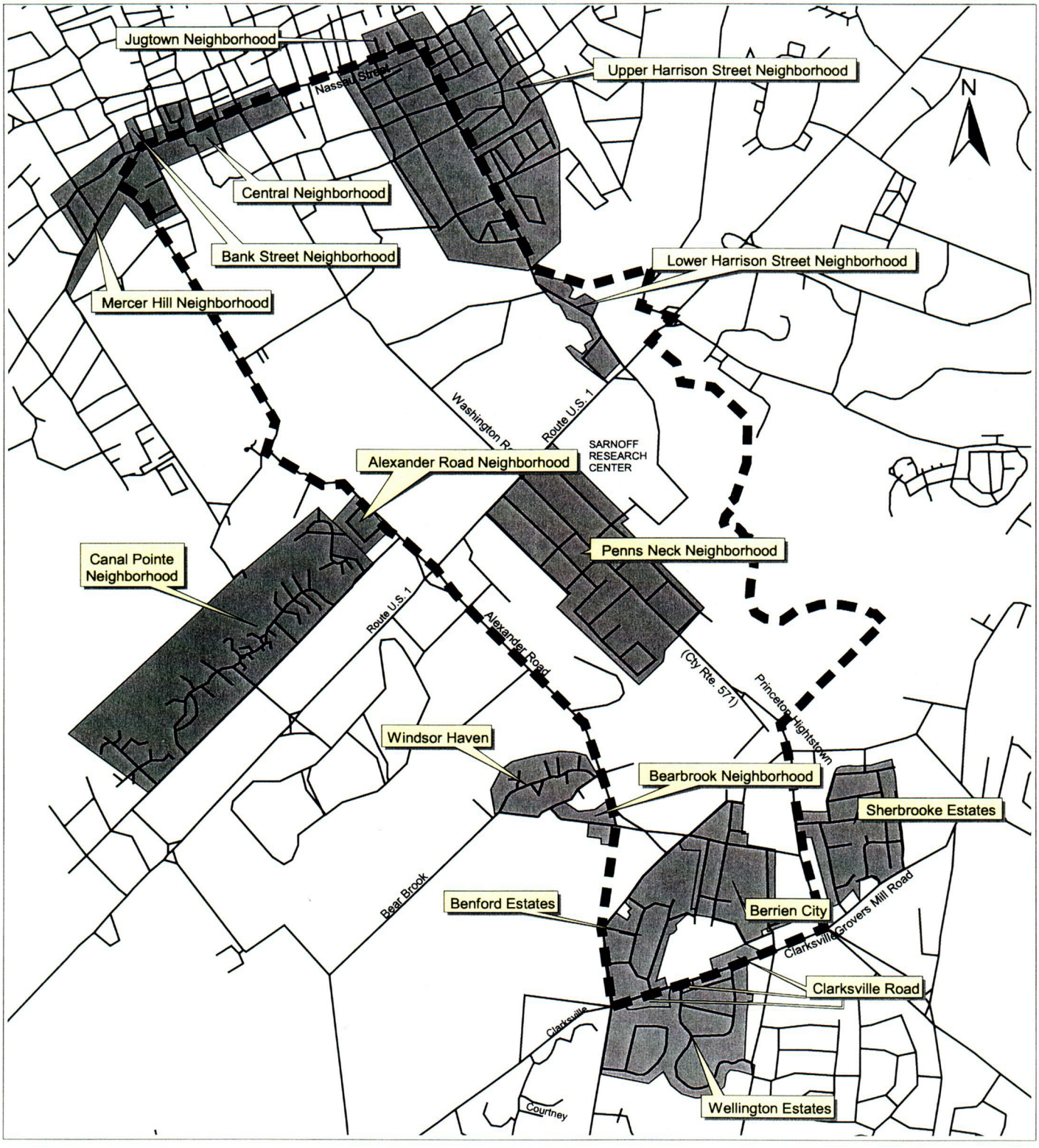
- Carnegie Center, located on Route 1 south of the study area. The Center is a complex of office uses and a hotel that is served by its own internal roadway system.

- Princeton MarketFair and corridor businesses, on Route 1 south of the study area. The MarketFair is a shopping center complex that is flanked to the north and south along Route 1 by other retail and office uses.

East of Route 1

- Washington Road business corridor, located between Route 1 and Station Drive in the study area. Existing business and office uses are clustered east of Route 1 along Washington Road, primarily east of Wallingford Drive, and along Station Drive. A small office complex just west of the Princeton Junction Station is part of this corridor.

- Alexander Road corridor businesses, located within the study area. Commercial and office uses abut both sides of Alexander Road between Route 1 and the NEC corridor rail line.



Legend

- Distinctive Neighborhoods
- Core Study Area Boundary
- Roads

Source: Neighborhood locations determined through interviews with community leaders.

NEW JERSEY DEPARTMENT OF TRANSPORTATION

PENNS NECK AREA
ENVIRONMENTAL IMPACT STATEMENT

DISTINCTIVE NEIGHBORHOODS

DATE: FEBRUARY 2003
Scale: 1:31,680

FIGURE 3-19

C02

- Princeton Junction Shopping District along CR 571, east of the study area. Several small strip shopping centers and stand alone businesses and offices are found on both sides of Route 571 east of the NEC corridor. This area is also described above as part of the mixed use Princeton Junction area.

- Plainsboro Road and Scudders Mill Road corridor businesses, located north of the study area. West of the Plainsboro town center, Plainsboro Road and Scudders Mill Road are flanked by a number of large corporate office campuses.

West of Route 1

- Princeton Borough Central Business District, located in Princeton Borough. Nassau Street and cross streets, centered on Palmer Square, are developed with retail and office uses. This area is also described above as part of the mixed-use Central District area.

- Princeton Shopping Center, located west of the study area in Princeton Township. The Center is a clustered retail use.

3.4.7 Community Facilities

Community services in West Windsor are generally located to the east of Route 1; none are located within the study area. The West Windsor Police Department, Fire Department, Twin W First Aid Squad, Court House, Senior Center, Post Office and Town Hall are all located in a Municipal Complex east of Route 1, on Clarksville Road. West Windsor Township has two volunteer fire companies, one located on Alexander Road and one on South Mill Road, both east of Route 1. The nearest hospital, which is most often used by West Windsor residents, is the Princeton Medical Center located in Princeton Borough, west of Route 1.

3.4.8 Parks, Recreation, and Open Space

The expanded study area contains designated state, local, and private parks, recreation areas, and open space resources. The Delaware and Raritan Canal State Park is located along the border of West Windsor and Princeton Townships. To the west of the canal, Lake Carnegie serves as an active and passive recreational resource. West Windsor Township has a greenbelt deed restriction on a property located along Little Bear Brook, between Alexander and Washington Road, for the purpose of conservation and floodplain protection.

Sarnoff Corporation has agreed to grant a greenbelt deed restriction to West Windsor as part of their approved General Development Plan. The greenbelt would encompass an area of approximately 14 acres on either side of Little Bear Brook, north of Washington Road. The boundaries of the greenbelt will be defined by Sarnoff after a Penns Neck Area EIS preferred alternative is selected.

Sarnoff Corporation makes their ball fields, open lawn areas, and forest along the Millstone River and Little Bear Brook available to West Windsor Township residents.

3.4.9 State, Regional, County, and Community Plans

West Windsor Master Plan
The Township of West Windsor's *Master Plan* contains a circulation element that identifies a need for action to address congestion and mobility issues in Penns Neck. The township states that its overall circulation plan is to divert regional and county traffic away from local roadways and residential areas. The plan states that, although implementing solutions to this problem is not universally favored, solutions are needed to reduce traffic congestion on Route 1 and to divert traffic away from Washington Road.

The land use plan element of the *West Windsor Master Plan* identifies the desire for a balance of land uses, including residential, commercial, and natural areas. The plan identifies the Route 1 corridor as a location to encourage planned office and research parks.

Plainsboro Master Plan
The *Plainsboro Master Plan*, Circulation Plan element, identifies Route 1 as one of the major links in the Northeast Corridor's roadway system. The plan also states the importance of improving traffic flow on major roadways to prevent accidents and divert regional traffic from residential neighborhoods. The Master Plan projects that Route 1 will experience high traffic volumes and a number of problem movements, and identifies grade separations and access restrictions as improvements that would benefit Plainsboro and the rest of the Route 1 corridor.

Princeton Master Plan
The *2001 Reexamination Report* of the *Princeton Community Master Plan* identifies the need to ensure that any transportation or development action does not exacerbate existing traffic problems by increasing the amount of traffic through downtown Princeton or change the distribution of traffic among the routes to and from downtown Princeton. In addition, public and Roundtable sentiment is for an equitable balance of traffic on east-west routes: Harrison Street, Washington Road and Alexander Road.

Mercer County Growth Management Plan
The Highways section of the *Mercer County Growth Management Plan* identifies Route 1 as one of the fastest growing development regions in the nation. The plan defines county roads as roads that serve regional needs, connecting various municipalities and carrying moderate volumes of traffic. The Plan specifically states that the roadway most in need of improvement is Route 1.

The Delaware Valley Regional Planning Commission Horizons 2025 Plan
The Delaware Valley Regional Planning Commission (DVRPC) *Horizons 2025 Plan* designates the Route 1 corridor in the Princeton area as a Metro Sub-Center. Specifically, the corridor, which is home to 110,000 jobs, is designated as a Suburban Growth Center that has emerged as a satellite center around Philadelphia. Suburban Growth Centers are designated for their regional significance and concentration of job growth. The DVRPC Transportation Plan includes in its vision minimizing congestion and delay for system users and using transportation to advance economic development. Making improvements to Route 1 at Penns Neck would address both goals by improving transportation access in an area identified as a major growth center.

New Jersey State Development and Redevelopment Plan
In 1986, the New Jersey State Planning Act was signed into law and the *State Development and Redevelopment Plan* (SDRP) was adopted. In 1992, the SDRP was updated and revised, and in March 2001, after the cross acceptance process was completed, the plan was adopted by the State Planning Commission.

Regulations for the Review Zone of the Delaware and Raritan Canal State Park
The regulations stipulated for development within the Review Zone of the Delaware and Raritan Canal State Park reflect the overall objectives of the Park *Master Plan*. These objectives are to preserve the Park's multiple purposes: a recreational resource, a vehicle for enhancing urban areas, a source of potable water, an ecological preserve, and an historic site.

3.4.10 Agriculture — Farmland

Historically, large portions of the study area were farmed until the middle of the 20th Century. The relatively recent development of the Penns Neck area has changed the land use characteristics from an agricultural focus to that of residential and office use. The lands most recently used for agricultural purposes are the Princeton University properties to the west of Route 1. Parcels owned by the Sarnoff Corporation and Princeton University within the study area are assessed as farmland under New Jersey's Farmland Assessment Act, which allows a special assessment for farmland that qualifies under the act.

The Agriculture Retention and Detention Act (ARDA) (NJSA 4:1C-1 et seq. 1983) was established to protect lands with farmland potential in New Jersey. Pursuant to provisions of NJSA 4:1C-18, Agricultural Development Areas (ADAs) may be determined by county agricultural boards and certified by the State Agricultural Development Committee. These areas are then reserved for agricultural use under the premise that preservation of such activities is beneficial for all citizens of New Jersey. The ADAs are subject to the provisions of ARDA and subsequent revisions, which require, among other concerns, special application and permitting in the case of roadway construction within an ADA. The Mercer County Division of Planning has verified that there are no ADAs within the study area; therefore, special permitting

would not be required if an Action Alternative is selected. A copy of the verification letter can be found in Appendix A.

The Federal Farmland Protection Policy Act of 1981 (FPPA) requires federal agencies to evaluate the adverse effects of federal programs on the preservation of farmland and to consider alternative actions that could lessen such effects. Farmland, as defined by this act, includes four categories of agricultural land classified by the United States Department of Agriculture (USDA) Natural Resource Conservation Service (NRCS), formerly Soil Conservation Service, by soil type: prime farmland, unique farmland, farmland of statewide importance, and farmland of local importance. Soils of prime, unique, statewide, and local importance have been identified within the study area and are reported in Section 3.7.1.1.

3.5 Cultural Resources

Section 106 Process

The Section 106 process was initiated during preparation of a Draft Environmental Assessment for the project in 1996. When the level of NEPA documentation was elevated to an EIS, formal Section 106 consultation was temporarily suspended. However, informal consultation with the State Historic Preservation Office (SHPO) and three Section 106-consistent meetings with the designated Consulting Parties occurred during EIS preparation. In informal consultation, the SHPO has reiterated their opinions on previously surveyed properties and has indicated their position with respect to opinions in the cultural resources reports prepared during the EIS (Appendix A: SHPO, March 3, 2003). These opinions are reflected in the information presented in this EIS. Formal Section 106 consultation will resume upon selection of a preferred alternative, which will occur following the Draft EIS Public Hearing.

The NEPA EIS and Section 106 processes are merged in this project, to take advantage of the extensive public involvement component established for the NEPA EIS process. This process began during Scoping, well before selection of a Preferred Alternative. By merging the processes, the SHPO and Consulting Parties have been active participants since Scoping and have helped shape the findings and interpretations contained in the EIS and cultural resources documents. The merged process is anticipated to yield a Record of Decision containing the full range of environmental commitments from both the EIS and Section 106 elements.

The public involvement activities required by Section 106 have also been coordinated with the Penns Neck Area EIS public involvement process to provide a single, comprehensive process (Appendix A: VTPI memo, September 2002). Specific Section 106 activities have included public notification of Section 106-related document availability at designated repositories, solicitation of public comment on those documents, presentation of cultural resources information to the Roundtable and solicitation of comment, and public opportunity to review and comment on cultural resources information at two In-Progress Review (public) Forums. An

upcoming activity is the DEIS public hearing, where public comment on cultural resources will be sought.

Cultural Resources Surveys

Historic architectural surveys were conducted within the Area of Potential Effects (APE), under Section 106 of the National Historic Preservation Act of 1966, as amended. Three investigations were undertaken, the first completed in 1986 and the second in 1996. The most recent study was performed to complement the two previous investigations and evaluate additional properties located in the vicinity of new alternatives, as well as properties which had reached 50 years of age during the intervening years. Additional review authority includes Section 101(b)(4) of the National Environmental Policy Act of 1969; Sections 1(3) and 2(b) of Executive Order 11593; guidelines developed by the Advisory Council on Historic Preservation; and "Procedures for the Protection of Historic Properties," as set forth in 36 CFR 800.

The National Register nomination criteria for determining property eligibility (36 CFR Part 63) were utilized in this evaluation. The criteria specify, "The quality of significance in American history, architecture, archaeology, and culture is present in areas, sites, buildings, structures and objects that possess integrity of location, design, setting, materials, workmanship, feeling and association, and

A) that are associated with events that have made a significant contribution to the broad patterns of our history; or
B) that are associated with the lives of persons significant in our past; or
C) that embody the distinctive characteristics of a type, period, or method of construction, or that represent the work of a master, or that possess high artistic values, or that represent a significant and distinguishable entity whose components may lack individual distinction; or
D) that have yielded, or may be likely to yield, information important in pre-history or history."

3.5.1 Area of Potential Effects

For the purposes of this investigation, the APE for historic architectural resources and the APE for archaeological resources were defined. The historic architectural APE encompasses the footprints of all Action Alternatives and includes those areas with a clear view to the architectural resources of any proposed actions. The archaeological APE comprises the aggregate of the areas that could be physically impacted by the Action Alternatives. Figure 3-20 shows the boundaries of the APE's.

3.5.2 Historic Resources

Twelve historic architectural properties were identified in the APE and are shown in Figure 3-21.

Aqueduct Mills Historic District
The hamlet of Aqueduct Mills is located at the junction of the Plainsboro-Kingston Road with Route 1. Aqueduct Mills is the site of the earlier of the two principal gristmill locations within West Windsor Township. The first mill, which may have been constructed as early as the 1730s, was purchased by Jacob Scudder in 1749. The hamlet consists of only four houses and a dry stone wall, which remain to the present day and are located at the northern edge of the study area, north of the Millstone River and west of Route 1.

The significant characteristics of the Aqueduct Mills Historic District which form the basis of the recommendation of National Register eligibility include the presence of buildings, structures, sites, and landscape features that convey its historical association as a nineteenth century crossroads hamlet (National Register Eligible, SHPO Opinion: 12/20/88).

Aqueduct Mills Historic District Extension
An extension of the Aqueduct Mills Historic District is bounded by Route 1 to the east, Harrison Street to the south, the D&R Canal to the west and the Aqueduct Mills Historic District to the north. The Extension consists of a group of nineteenth century residential properties that are related to the Historic District settlement to the north (National Register Eligible, SHPO Opinion: 07/08/98).

Covenhoven-Logan-Silvers House
The Covenhoven-Logan-Silvers House is located at 31 Logan Drive on the east side of Logan Drive, approximately 620 feet northwest of Route 1 in West Windsor Township. It is a two-story wood framed building, the oldest portions of which probably date to ca. 1836. Road returns from 1754 suggest that William Covenhoven, a member of the pioneer families of Penns Neck, owned the property and may have erected the original portion of the present house. The house is recommended eligible as one of the few remaining examples of an eighteenth century Dutch farmhouse in West Windsor (National Register Eligible, SHPO Opinion: 03/10/97).

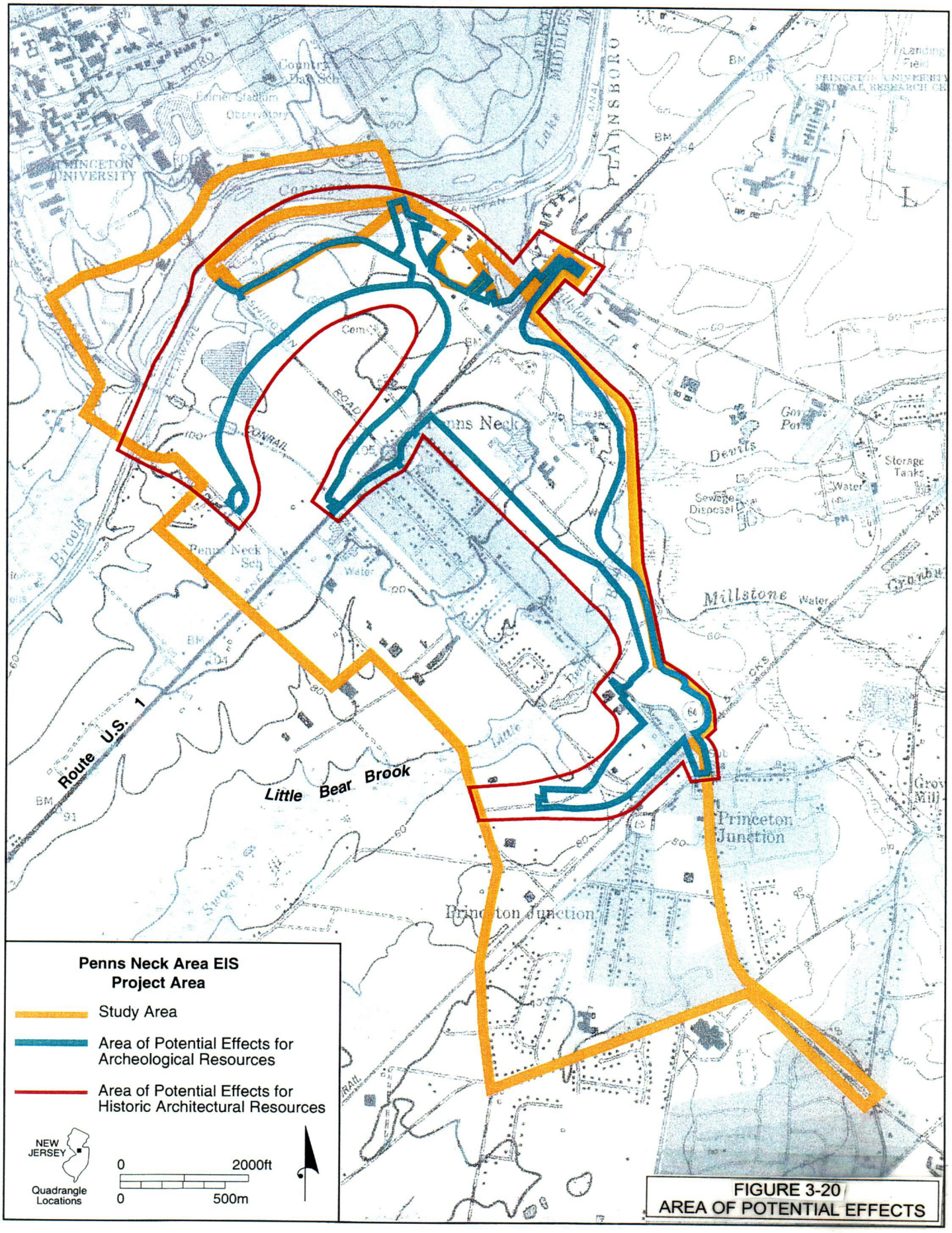


FIGURE 3-20
AREA OF POTENTIAL EFFECTS

Details of the *Princeton, NJ* (USGS 1954, photorevised 1981) and *Hightstown, NJ* (USGS 1954, photorevised 1981) 7.5-minute quadrangles, showing the Penns Neck Area EIS Project area. A composite of all of the proposed action alternatives is shown as the area of potential effects within the study area.

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