

CIRCULATION PLAN



Contents

- A. Introduction
- B. Vehicular Circulation
- C. Plainsboro Road Traffic Calming and Improvements
- D. Roadway Access and Curb Cuts
- E. Goods Movement
- F. Bus Service
- G. Travel Demand Management
- H. Pedestrian and Bicycle Management
- I. Rail Transportation
- J. Air Transportation
- K. Implementation of Improvements
- L. Action Plan

IV. CIRCULATION PLAN ELEMENT

A. Introduction

The Township's geographic location is one which has permitted controlled growth and development. Located in southern Middlesex County, in the center of the state, the Township's populace continues to have easy and direct access to New York, Newark, Philadelphia and the surrounding cities of Trenton, Princeton and New Brunswick. Existing transportation systems are being taxed and demand on the transportation system has become overloaded as more people are drawn to this desirable local area. Transportation is much more than a matter of convenience; it is an integral part of our growing community and as such it should be accessible, reliable, and available to all residents, workers, and visitors in the Township.

As with most suburban locales, Plainsboro's primary means of transportation is the private automobile via the area's roadway network. This plan element recognizes the local population's preference for auto transportation, while promoting alternate modes such as bicycle, pedestrian, public and private bus service, rail transportation by way of the New Jersey Transit's Princeton Junction Train Station and the potential for bus rapid transit.

The majority of residents in Plainsboro utilize the northeast corridor's major roadway system, including Route 1, Route 130 and the New Jersey Turnpike. These are major links to surrounding communities, and they provide access to residential, industrial, and commercial areas.

Three (3) principal arterial roads within the Township that convey traffic to and from neighboring communities are Plainsboro Road, Scudders Mill Road and Dey Road. These roads have the highest traffic volumes on a daily basis. The highest a.m. and p.m. peak hours usually fall within the 7:00 a.m. to 6:00 p.m. time frame. As Plainsboro reaches build out, the arterial roads have and will continue to become more congested. Congested roads lead to safety concerns, problem areas such as accident locations, a general deterioration of the entire physical roadway system, and short cutting through residential neighborhoods to save time.



Landscaped Roadway Center Median

Plainsboro's Circulation Plan Element provides for a network of local, inter-municipal, and regional roadways which meet the Township's transportation

needs, based on the Land Use Plan and known outside influences. Over the past three decades the Township has seen the completion of Scudders Mill Road, College Road East, the Route 1/College Road grade separation, the Route 1/Scudders Mill Road grade separation, the realignment of Seminary Drive with Mapleton Road, the construction of Campus Road, in addition to localized roadway widening projects, installation of traffic signals, and minor intersection improvements.

A 1986 traffic report prepared by RPPW, Inc., based upon then current land use policies, outlined the need for a series of roadway and intersection improvements. Then in 1990, an Orth-Rodgers traffic study was completed which analyzed the roadway network in and around the Princeton Forrestal Center. In June 1995 and December 1998, the Second and Third Updated "Princeton Forrestal Center and Kingston Area" Comprehensive Traffic Studies were prepared by the University. All of these studies were, by reference, made a part of the 1999 Princeton Forrestal "General Development Plan" application to the Planning Board. These traffic studies are an integral part of this Master Plan and the relevant roadway improvements identified in them are included herein. In addition, this Circulation Plan Element is guided by the 1996 Transportation Improvement Project Management Plan as prepared by the Township Engineer.

Most recently a Traffic Impact Study was prepared by TRC Engineers, Inc. for the Princeton Health Care System dated May 2008. This study provides valuable information concerning roadways and intersections associated with the FMC Redevelopment Plan Area and beyond. The Study identifies conditions at certain locations and recommends improvements.

A second fundamental component of circulation planning is Transportation Demand Management which focuses on making a more efficient use of the roadway infrastructure by increasing vehicle occupancy rates and reducing peak period traffic.

The Township's circulation planning in roadway infrastructure, demand management, pedestrian, bicycle and rail circulation and bus service including bus rapid transit is detailed herein. Nearby airports and helipads and heliports are also identified. Helipads in the Township are located at Firmenich, in the Princeton Forrestal Center, at Merrill Lynch, and one may be located at the new hospital site.

This Circulation Plan Element is continually being refined on an as needed basis through direct and active Township involvement with the Central Jersey Transportation Forum (CJTF) and the Middlesex County Transportation Coordinating Committee (TCC). The CJTF has been in operation since 1999. It was formed to "address concerns of municipalities in Mercer, Middlesex, Somerset, and Hunterdon counties focused on the US 1 corridor. The key issues are east-west access; improving coordination of transportation and land use in this high growth, congested area; and transit". The CJTF is supported through the Delaware Valley Regional Planning Commission, the North Jersey Transportation Planning Authority, and the New Jersey Department of Transportation. The TCC was established by the Middlesex County Freeholders in 1976. The TCC advises the freeholders on transportation issues. Membership

in the TCC includes representation from the Freeholders, the municipalities in the County, the County's Legislative delegation, transit providers, the education and business community, and the State, regional and County transportation agencies.

B. Vehicular Circulation

1. Introduction and Overview

The vehicular circulation plan for Plainsboro Township considers local and regional needs. Existing roadways are proposed to be widened and upgraded and new roadway linkages are shown to be achieved through the subdivision and site plan review process. It should be emphasized that the vehicular circulation plan is not intended to reflect exact roadway alignments, rather the principles to achieve the Township circulation network. During subsequent implementation, further detailed analysis will be necessary to select exact roadway alignments and engineer precise intersection improvements for various projects to be undertaken. The following are methods in which overall transportation goals and policies are to be achieved:

- a. Require reverse frontage lots for all proposed roadways that are to carry substantial through traffic movements.
- b. Improve key intersections which currently operate at or are projected to operate at "D" level of service and/or exhibit hazardous safety conditions which is consistent with the Township's 1996 Transportation Improvement Plan.
- c. Develop a mechanism to seek private cash or in-kind contributions for a pro-rata share of off-site traffic improvements.
- d. Expand local bus service and ride sharing, van-pooling, and staggered work hours to reduce dependence on the private automobile.
- e. Coordinate roadway improvements with bicycle and pedestrian routes which also complement private and public open space systems.
- f. Extend Campus Road to College Road East to better utilize existing roadway infrastructure and tie together existing and emerging development patterns both within and outside the Township.
- g. Establish park-and-ride lots in existing shopping centers or at other locations where parking lot spaces are currently underutilized and can be used for this appropriate and specific transportation purpose.

- h. Construct fully operational bus shelters throughout the Township to include handicapped accessibility, appropriate lighting and landscaping, pull-off lanes if necessary, and signage.
- i. Promote the introduction of bus rapid transit into the Township by locating a route in the Township that will interconnect with other surrounding communities and otherwise service dense and appropriate employment, housing, and mixed-use activity centers.

2. Functional Classification and Improvements

In a properly conceived circulation system, each roadway is designed in accordance with its function; that is, the service that it is or will be expected to perform. Generally, the road system in the Township can be classified into five (5) functional categories: principal arterials (expressway), minor arterials, major collectors, minor collectors, and local streets.



Village Intersection Improvement

In principle, the classification system is graded in the nature of its performance. The major road classification carries regional or through traffic to the next level roadway, distributing regional traffic to an arterial system, which in turn distributes traffic to the next level of roadway, the neighborhood collector system, which in turn distributes traffic to a local street giving individual property access. In practical application, it may not be possible in all instances to achieve such a circulation principle; however, a close approximation is possible in the Township.

The primary corridors expected to experience the highest traffic volumes and greatest number of problem movements are Route 1 and Scudders Mill Road. The widening of Route 1 to six lanes, provision of additional grade separations and other access restrictions has helped to maintain through traffic flows along Route 1. These actions are considered important not only to the Princeton Forrestal Center area but to the entire Route 1 corridor. Scudders Mill Road has a similar importance, although on a smaller scale. It serves as a major arterial for the Princeton Forrestal Center, and through its connections with Dey Road and Plainsboro Road; it provides access to the New Jersey Turnpike, Route 130 and to the southern Middlesex County area.

The guiding premise in developing the Township's improvement recommendations are to maximize future operating conditions at existing intersections wherever practical and permitted by adjoining land uses.

Supplementing these actions are suggestions to realign roadways and add new links or sever existing connections to provide traffic with more direct routes and thereby avoid sensitive areas where the present character of the roadway and adjacent development(s) merit preservation.

One of the significant improvements to the circulation system is the existing Campus Road connector road which parallels Route 1 between Plainsboro Road and College Road East. This connector road will someday be extended to the existing intersection



Signalized Intersection

of Research Way and Campus Road East in association with the possible realignment of Research Way to Perrine Road. This alignment will minimally impact the existing Princeton Forrestal Center open space network which includes existing tree stands and some wetlands. The complete campus roadway is desirable and necessary. All environmental impacts will be successfully mitigated. The Research Way alignment will provide direct access to the proposed Perrine Road/Route 92 interchange. However, as previously mentioned, this alignment would impact Forrestal Center's open space plan, impact wetlands, and bring a major roadway in proximity to the Princeton Plasma Physics Laboratories.

A secondary northbound connection (right-in and right-out) at Route 1 south of College Road and a fire lane connection to the Robert Wood Johnson Foundation site are also depicted on the Circulation Map. These roadway improvements compliment the overall Campus Road design.

The projected traffic flows along Scudders Mill Road suggest that it can continue to operate as a bypass to Plainsboro Road in the short term. However, to accommodate build-out traffic needs, Plainsboro Road needs to be considered an important alternate roadway link to the southern portions of the Township. This is in terms of traffic to and from Route 1, as well as traffic to and from the east. Coupled with this recognition of continued Plainsboro Road usage, additional improvements at the Schalks Crossing Road intersection have been accomplished. The need for improvements along Plainsboro Road is a result of development build-out and will require monitoring and further in-depth review since Scudders Mill Road can maintain acceptable operating conditions for the foreseeable future. Since Plainsboro Road is also utilized as a main access corridor or route to the Town Center Shopping Center, Municipal

Center, the mixed-use Village Center, and the older village, this plan continues to discourage through-traffic movements on local residential streets like Parkway Avenue and Prospect Street which tie directly into Plainsboro Road.

The suggestions for Mapleton Road represent an example of where little or no improvement of the existing roadway is a preferred action. In this corridor, a new connection to College Road West has been proposed and implemented for the northern portion, while the southern portion has been successfully isolated by the previous deletion of the Scudders Mill Road extension. The deletion of the Scudders Mill extension was part of NJ DOT's desire to reduce the cost and impact of the Scudders Mill Road grade separation at Route 1. The effect of deleting this extension has been a reassignment of traffic to College Road. These design solutions have reduced the traffic on Mapleton Road, Seminary Drive and the west approach (Mapleton Road) at the Plainsboro Road and Route 1 intersection, and have effectively converted them into local access streets.

In 2006 the Planning Board approved the construction of a 4-way intersection of College Road, Seminary Drive, College Road West and Nursery Road as part of a new connecting link on the west side of Route 1, extending from north of Ridge Road through the Princeton Nurseries site and into College Road West, that would not only serve as access to this area, but would also tie Independence Way and the Bellemead non-residential office park development into the area roadway system.

Plainsboro's Circulation Plan Element provides for a local and regional highway network which meets the Township's transportation needs based on the Land Use Plan. It is comprised of a variety of road types from arterials such as Route 1, to local streets such as Parker Road in the Princeton Collection housing development, to principal arterials such as Scudders Mill Road.

Described below are the various road improvement proposals illustrated on **Figure 4: Circulation Map**, listed according to their functional roadway classifications. They have been advanced in recognition of future traffic volumes from the various land use proposals contained in this Master Plan. Also noted are suggested ultimate rights-of-way for the roadways. Presented below is a summary of improvement recommendations, which lists the improvements suggested for each intersection or roadway segment within the Township. A schematic depiction of potential alignments for new roadway connections is presented on the Circulation Map. These improvement recommendations are intended to supplement existing roadways and intersections, and to provide alternate routes for local and regional traffic flows.

a. Principal Arterials

The principal arterial system consists of a network of routes with the following service characteristics:



Township of PLAINSBORO

Middlesex County, New Jersey

CIRCULATION MAP

April 2008

- Heliports
- Traffic Signal
 - Existing
 - Proposed
- Bridge or Culvert
 - Existing
 - Existing
- Interchange
 - Existing
 - Existing
- Road Classification**
 - Existing**
 - Principal Arterial
 - Minor Arterial
 - Major Collector
 - Minor Collector
 - Local
 - Proposed**
 - Principal Arterial
 - Major Collector
 - Local

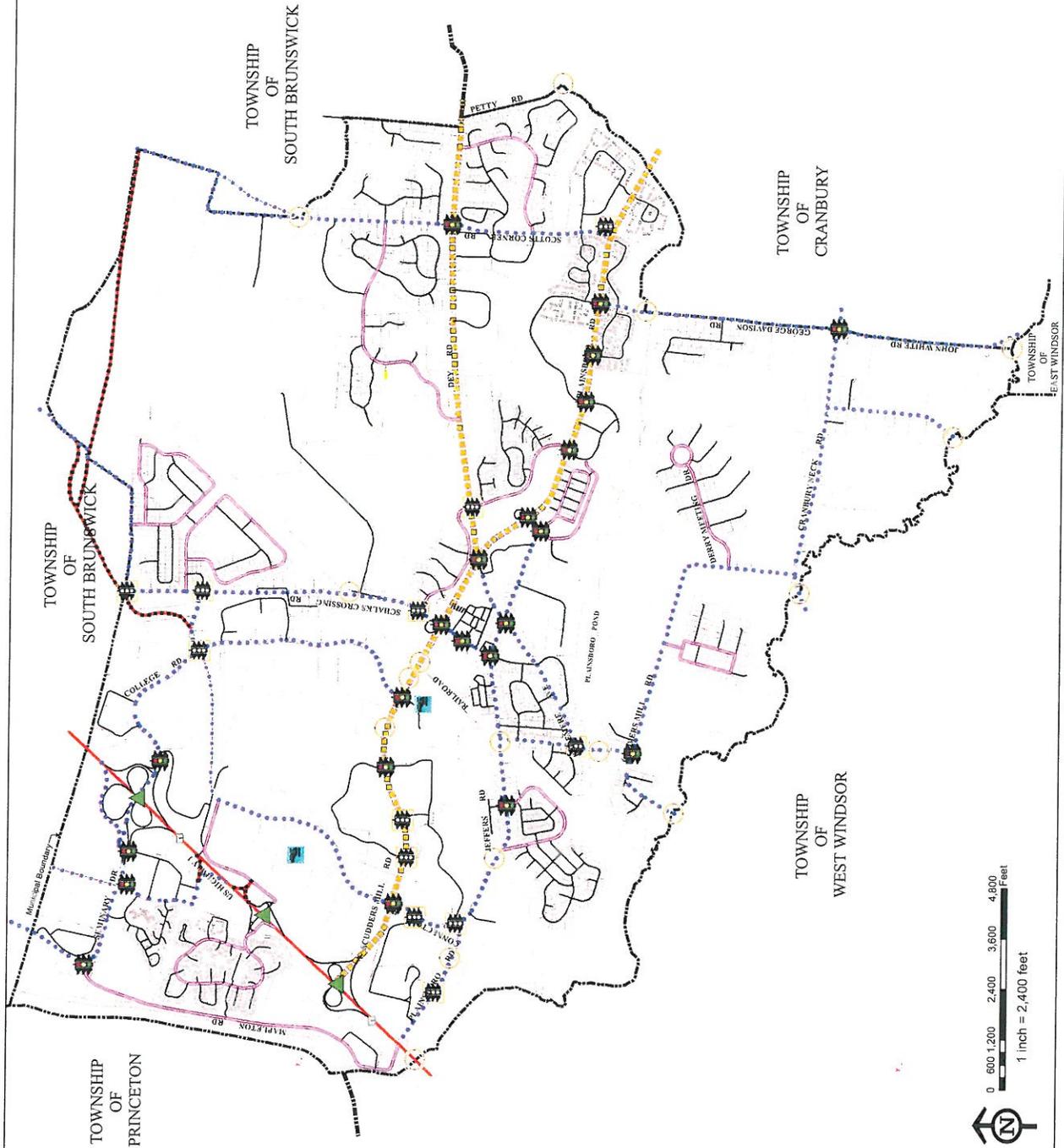


Figure 4

0 600 1,200 2,400 3,600 4,800
Feet
1 inch = 2,400 feet



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Township Engineer

- 1) Corridor movement with trip length and density suitable for substantial statewide or interstate travel.
- 2) Movements between all, or virtually all, urban areas with populations over 50,000 and a large majority of those with populations over 25,000.
- 3) Integrated movement without sub connections except where unusual geographic or traffic flow conditions dictate otherwise.

The principal arterial system is stratified into the following two design types: (1) freeways and (2) other principal arterials.

Proposed State Route 92 and existing Route 1 are in this category. Route 92 will be a limited access, 6-lane roadway with a 300 foot typical right-of-way which will ultimately extend from Route 1 in South Brunswick Township through a small section of northern Plainsboro Township to the Route 130/Route 32 intersection with direct access to Exit 8A of the New Jersey Turnpike just north of Cranbury Township.

The proposed Route 92 improvement project has a long history. In 1986, a draft Environmental Impact Statement (EIS) was prepared by NJDOT. Since 1986, the NJDOT had been revising the EIS to reflect the outcome of the public hearing process. Basically, a northerly rather than a southerly aligned Route 92 had been supported by both the NJDOT and the Township.

In the 1990's, the NJDOT was involved in preparing a final EIS. In addition, the NJDOT sought Federal Highway Administration concurrence to separate Route 92 into two design projects. One project consisted of improvements from Route 206 to Route 1 (not including the interchange). The other project consisted of the portion of Route 92 from the Route 1 interchange to Route 130. The Hightstown Bypass project had already been separated from the Route 92 project. The reason for the splitting of Route 92 into two projects was to allow the project schedule of Route 92 from Route 1 to Route 130 to proceed without being delayed by the anticipated environmental concerns associated with that portion of Route 92 from Route 206 to Route 1. There were ongoing discussions between the DOT and municipalities affected by the Route 92 alignment between Route 206 and Route 1 to evaluate alternative design strategies focusing on alignment, right-of-way, and number of travel lanes.

The final EIS was delayed until wetland determinations were made related to portions of Route 92 from Route 1 to Route 130. While the current proposed alignment could have been slightly altered by the wetlands determination, the NJDOT had no plans to

shift the design to the south. The NJDOT had stated that the precise location of the Perrine Road interchange would be finalized during the design phase of the project, which would not begin until the EIS was finalized.

The NJDOT never completed their final EIS document. Instead, the study of Route 92 was shifted to the New Jersey Turnpike Authority which conducted a wetland permit study and prepared a draft Environmental Impact Statement for the Route 92 project in 2004.

As a result of their work the Turnpike Authority proposed the construction of Route 92 in Middlesex County. The proposed roadway would consist of a total of six (6) access points including Route 1, Perrine Road, Route 130, Commerce Drive, Cranbury-South River Road, and the Turnpike at Interchange 8A. Proposed Route 92 would have two different roadway cross-sections. In the area between Route 1 and Route 130 the roadway cross-section would consist of two (2) lanes in each direction divided by a 36 foot wide grassed median and bordered by two twelve (12) foot wide outside shoulders. The roadway section between Route 130 and Interchange 8A of the New Jersey Turnpike would consist of three (3) lanes in each direction with a concrete median barrier and shoulders.

Route 1 is intended to handle the majority of regional traffic with limited access points. Recent improvements by the NJDOT have included establishing 6 moving lanes with a median traffic divider as well as grade separating or upgrading various intersections along Route 1 including the Scudders Mill Road overpass which was completed and placed into operation at the end of 1995. Route 1 experiences a traffic level of service "D" for short periods during the evening rush hours. With anticipated increases in volumes due to additional development which is now occurring along Route 1 between Trenton and New Brunswick, as well as the ever increasing volume of regional traffic, the capacity of Route 1 will have to be monitored and possibly adjusted to increase capacity or some alternative regional highway will need to be provided if the service provided by this key regional link is to remain acceptable.

This type of road also provides region-wide service by linking major arterials. Through their planning and design program, Plainsboro and NJDOT have protected the regional highway character of Route 1 by limiting intersections and curb cuts.

The typical right-of-way for Route 1 in Plainsboro is 150 feet, although the NJDOT is seeking up to 170 feet in certain instances on its future improvement plans for the roadway. Key principal arterial proposals for Route 1 are as follows: construct an off-ramp at or near the existing State Police Barracks location to improve

traffic movement into and out of the Princeton Forrestal Village development, re-design and upgrade Route 1 ramps at the Sayre Drive/Route 1 intersection, and study the feasibility of accommodating bus rapid transit.

While Route 1 contains six moving lanes with a median traffic divider there is a potential for a long-term future fourth travel lane in selected locations, pending completion of NJDOT design and environmental studies, which warrants continuing review of the Route 1 improvement program by the Township.

b. Minor Arterials

The minor arterial road system, in conjunction with the principal arterial system, forms a network with the following service characteristics:

- 1) Linkage of cities, larger towns, and other traffic generators are capable of attracting travel over similarly long distances.
- 2) Integrated interstate and intercounty service.
- 3) Internal spacing consistent with population density, so that all developed areas of the state are within reasonable distances of arterial highways.
- 4) Corridor movements consistent with those characteristics noted above and with trip lengths and travel densities greater than those predominantly served by collector or local systems.

Minor arterials therefore constitute routes, the design of which should be expected to provide for relatively high travel speeds and minimum interference to through movements.

Plainsboro's existing minor arterials are Scudders Mill Road, Dey Road, and Plainsboro Road between the Cedar Creek and Scudders Mill Road. These roads, with a minimum 100 foot right-of-way, will continue to serve as the major circulation spine receiving traffic from minor arterials and carrying it to and from Route 1.

They will generally have a total of four moving lanes with unpaved shoulders; a landscaped median divider is provided on Scudders Mill Road between Dey Road and Route 1; and storage for turning movements at key intersections is required. Proposed minor arterials in the Princeton Forrestal Center would all have 20 foot wide landscaped center medians. Key minor arterial proposals are as follows:

- 1) Scudders Mill Road Interchange with Route 1

Enhanced maintenance of landscaping, sidewalks, signage, and medians.
- 2) Scudders Mill Road and Campus Drive/Plainsboro Road "Link"

Address an intersection upgrade as a result of further development of the FMC properties, the Princeton Forrestal Center, and extension of Campus Road to the College Road East/Research Way intersection.

Mitigation includes the following proposed improvements: a northbound right turn lane from the Connector Road onto eastbound Scudders Mill Road, a north bound double left turn movement with split north/south phasing, a third eastbound dedicated through lane with associated far side receiving lane, and eastbound dedicated right turn lane and a dedicated westbound left turn lane with associated receiving lanes.
- 3) Scudders Mill Road and Merrill Lynch/BMS Drive #1

Construct new westbound right-turn deceleration lane and lengthen existing left-turn stacking lane; install traffic signal; and construct entrance drive into Merrill Lynch.
- 4) Scudders Mill Road and Merrill Lynch/BMS Drive #2

Consider new internal connections and diversions to other driveways to delay the need for signalization at this intersection and eliminate left-turn stacking lane by median and install traffic signal.
- 5) Scudders Mill Road and College Road East/Merrill Lynch Drive #4

The proposed mitigation at this intersection includes the following improvements: a third eastbound through lane, traffic signal operation modifications to provide an overlap green phasing on the southbound and westbound right turn lanes and a fourth westbound lane with a free flowing right turn ramp.
- 6) Dey Road

Widen Dey Road to four lanes between Scudders Mill Road and the Cranbury Township line.

Install traffic signal at Wyndhurst Drive intersection with Dey Road.

7) Scudders Mill and Schalks Crossing Road

The proposed mitigation at this intersection includes restriping to provide southbound and westbound right turn lanes and traffic signal operation modifications to provide an overlap green phasing on the southbound right turn lanes if deemed acceptable by the NJDOT, County of Middlesex and Township of Plainsboro; and the construction of a far-side eastbound jug handle if deemed necessary.

c. Collector Roadways

The collector routes generally serve travel of primarily intracounty rather than statewide importance and constitute those routes on which (regardless of traffic volume) predominant travel distances are shorter than on arterial routes. Consequently, more moderate speeds may be typical. To define collectors more clearly, this system is subclassified according to the following criteria:

- 1) Major Collector Roads. These routes (1) serve county seats not arterial routes, larger towns not directly served by the higher systems, and other traffic generators of equivalent intracounty importance, such as schools, county parks, and important agricultural areas; (2) link these places with nearby larger towns or cities, or with routes of higher classifications; and (3) serve the more important intracounty travel corridors.
- 2) Minor Collector Roads. These routes should (1) be spaced at intervals consistent with population density to accumulate traffic from local roads and bring all developed areas within reasonable distances of collector roads; (2) provide service to the remaining smaller communities; and (3) link the locally important traffic generators with their rural hinterland.

Key links between major collectors will be provided by four lane, 72-100 foot wide minor arterials. Generally, these roads would not be equipped with paved shoulders, but would, in some instances, require landscaped center medians and adequate storage capacity at important intersections.

As shown on the Circulation Map, roads in this category are existing roads. Upgrading them to their ultimate right-of-way is proposed. New road proposals include possible realignment of Scotts Corner Road with Friendship Road in South Brunswick Township, implementation of a new north-south arterial connector

route through the Princeton Forrestal Center to Route 92 and new roadways to service the Princeton Nurseries property. The realignment of Scotts Corner Road with Friendship Road will require further in-depth analysis due to the impacts on adjacent properties and accounting for Route 92 and other traffic related impacts. Key major collector proposals are as follows:

1) Route 1 Parallel Service Road

A new north-south minor arterial connector route east of and parallel to Route 1, connecting Scudders Mill Road and the Plainsboro Road "Link" with College Road East at Research Way. See alignment on the Circulation Plan Map in the PMUD Zone. The right-of-way and cartway may be reduced to that of a major collector if supported by traffic analysis.

2) College Road East and Research Way

Install traffic signal.

Provide a separate left-turn lane and a shared through-right turn lane on Service Road approach when Service Road is constructed.

Provide individual left-turn, through, and right-turn lanes on Research Way approach when service Road is constructed.

3) Research Way and Schalks Crossing Road

Install traffic signal.

Re-stripe intersection to provide separate right-turn lane on southbound Schalks Crossing Road and a separate left-turn lane on northbound Schalks Crossing Road.

Depending upon an ultimate link with Route 92, re-align and extend Research Way to connect with Perrine Road, and extend Schalks Crossing Road and Parker Avenue to Research Way. Analysis suggests that the intersection of Schalks Crossing Road and Research Way would operate at acceptable service levels even if there were no re-alignment. If re-alignment is pursued, it is recommended that Research Way/Schalks Crossing Road/Perrine Road provide two through lanes per direction between College Road East and Route 92.

4) College Road West and Seminary Drive

Provide separate right turn lane for College Road West.

Provide dual left turn movement from Seminary Drive (or new collector road).

Install traffic signal.

Consider Mapleton Road as a scenic collector.

5) Schalks Crossing Road

Engineer and construct road improvements from Scudders Mill Road to Ridge Road; secure right-of-way; engineer and construct bridge improvements over Amtrak.

Install traffic signal at intersection with Wyndhurst Drive.

6) Princeton Nurseries

Extend four lane arterial from College Road West north into the Princeton Nurseries and South Brunswick Township.

7) Grovers Mill Road and Maple Avenue

Undertake traffic calming study in front of the school complex and widen Grovers Mill Road in front of the High School where it has not been widened.

8) Plainsboro Road

Implement traffic calming to reduce vehicular speeds, improve safety of Maple Avenue/Plainsboro intersection and pedestrian and bicycle safety.

Install traffic signal between Connector Road and Route 1.

9) Plainsboro Road and Connector Link

Provide separate left and right turn lanes for eastbound Plainsboro Road.

Provide a separate left lane for westbound Plainsboro Road.

Install traffic signal.

10) Edgemere Avenue

Install traffic signal at Maple Avenue intersection with appropriate intersection improvements.

11) Connector Link

A traffic signal and intersection improvements are to be installed at the existing unsignalized intersection

12) Plainsboro Road and Medical Access Road

An intersection will be constructed with a jug handle and traffic signal.

13) Plainsboro Road and Residential/Office Access Drives

A T-intersection will be installed with traffic signalization, if warranted.

14) Plainsboro Road and Schalks Crossing Road

The proposed mitigation consists of striping the east/west Plainsboro Road approaches to provide exclusive left turn lanes, signal timing changes and signal modification if required by NJDOT.

d. Minor Collectors

These are collectors providing direct links to arterial and major collector roadways. They usually have a 60 foot right-of-way width, depending on anticipated traffic carrying capacity, and contain two moving lanes. They are distinguished from minor collector roadways which function to indirectly distribute traffic to arterials. In most cases, major collectors require reverse frontage lots, whereas minor collector roadways could have direct frontage access.

Various minor collector roadways are identified on the Circulation Plan Map. These include: Mapleton Road between Seminary Drive and Route 1, Wyndhurst Drive, Derry Meeting Drive, Woodland Drive, Enterprise Drive, Sayre Drive, Walker Gordon Drive, Farmhouse Drive, Camas Court, Harvest Drive, Middlesex Boulevard, Warren Street, Atlantic Street, Franklin Drive, and Parker Road.

e. Scenic Collectors

This roadway classification applies to Mapleton Road located along the Delaware & Raritan Canal between Route 1 and South Brunswick Township. It should have a 50 foot right-of-way and should be limited to only two moving lanes. The intent is not to widen the roadway, but to make any necessary minor repairs and improvements.

g. Rural Roads

These roads include Grovers Mill Road, Cranbury Neck Road, Nostrand Road, Eiker Road and Petty Road. They are all envisioned to have 50 foot rights-of-way and two travel lanes with turning lanes at intersections.



Rural Residential Roadway

No additional rural roadways are proposed in this plan.

h. Local Streets

The local street system, in comparison to collectors and arterial systems, primarily provides access to land adjacent to the collector network and serves travel over relatively short distances. The local road system constitutes all rural roads not classified as principal arterials, minor arterials, or collector roads.

These roadways are found in subdivisions and large developments as through streets, parking lot access drives, loops, and cul-de-sacs. They typically connect with collectors, although sometimes they are found to directly interconnect with arterials.

As a result of varied traffic analyses undertaken as part of the background studies to this Master Plan, coupled with information made available by the Township's Police Department, Traffic Safety Division, key intersections operating at peak capacity or exhibiting hazardous safety conditions were identified.

Detailed traffic engineering studies of any intersection(s) should be undertaken to determine the exact geometrics of improvements required at each location. At a minimum, adequate signalization and proper turning lane movements should be considered at intersections. Through a combination of state, county and federal funds, together with monies potentially available from application of off-tract pro-rata ordinance requirements, improvement capital should be secured for systematic upgrades at critical intersections.

Implementation of the various improvements identified in this section is in large part dependent on the roadway jurisdiction.

Figure 5: Roadway Jurisdiction Map, identifies the ownership nature of all roads within the Township.

C. Plainsboro Road Traffic Calming and Improvements

1. Objectives

The boundaries of the roadway for purposes of the work completed for this project ran from the Cranbury Township border at the east to the signalized intersection of Plainsboro Road with Wyndhurst Drive/Center Drive to the West.

Within this area, Plainsboro Road moves from a 2-lane cross section at the Cranbury Township border into a 4-lane cross section with turning lanes at various locations along the roadway. Within the study area section of the roadway actual pavement widths vary from location to location. The roadway posted speed limit within the area is 45 mph.

There are currently four traffic signals located on the roadway within the study area. The first is at the western border at Wyndhurst Drive/Center Drive. The other signalized intersections are at George Davison Road, the 4-way intersection with Hunters Glen and the Plainsboro Road intersection to the Brittany townhouse development. A proposed signal is identified for the intersection of Plainsboro Road and Scotts Corner Road.

There are nine residential communities within the study area which have access to Plainsboro Road. While the houses within these communities do not front on the roadway, many have sidewalks and pathways that run to and along Plainsboro Road. At the western end of the study area there is retail shopping and dining, as well as an office complex and a senior housing development. The Morris Davison Park is also located along this section of the roadway. This park provides ball fields and a recreation area for Township residents.

This traffic calming and improvement plan was under-taken to address a number of objectives:

- To optimize safety on the roadway for pedestrians.
- To optimize safety on the roadway for bicyclists and encourage alternative transportation usage.
- To provide safe and useful locations for bus stops to promote alternative transportation.
- To create a safer and more appealing entrance and exit from Plainsboro Road while maintaining adequate vehicle capacity along the roadway.



Township of PLAINSBORO

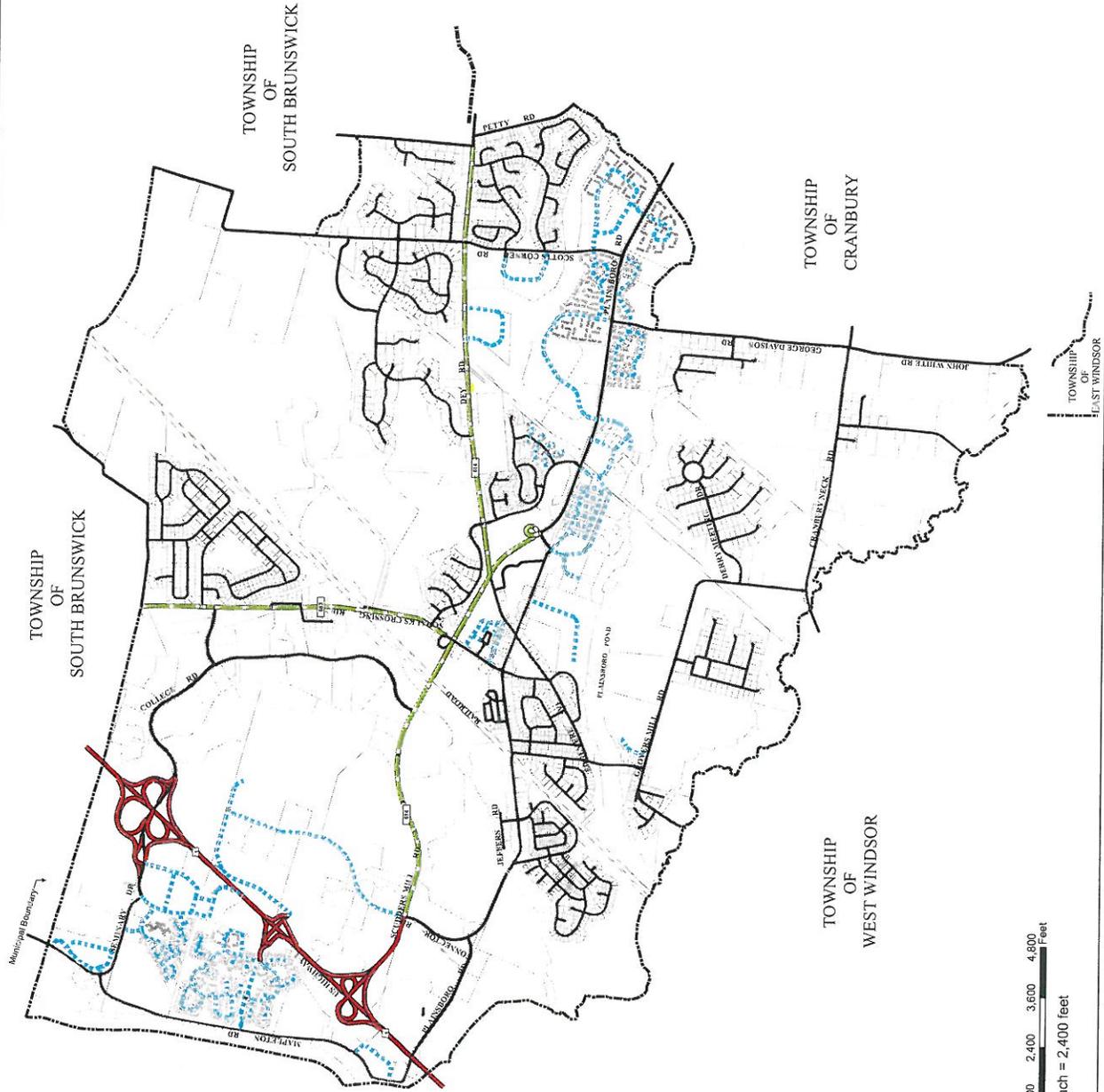
Middlesex County, New Jersey

ROADWAY JURISDICTION MAP

April 2008

Jurisdiction

-  US Highway
-  County Road
-  Private Road
-  Municipal Road



Prepared By:
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Township Engineer



Figure 5

- To insure that local motoring residents have adequate and safe access onto the roadway from local community neighborhoods.

This effort was completed to attain these objectives while at the same time maintaining the necessary capacity on the roadway to serve commuter needs.

2. Methodology

Recommendations made were a result of a number of tasks completed for the analysis of Plainsboro Road. The first step in the analysis was to review existing data and previous studies related to the area. Next, field investigations were performed to verify data contained in existing reports and to obtain additional information not elsewhere provided. The consultant team then made a presentation to the Township at a Planning Board meeting held on June 11, 1998, to obtain comments on issues and problems currently identified for the roadway. Meeting comments and written comments provided by interested Township residents were incorporated into the definition of issues to be resolved for the roadway.

3. Recommendations and Implementation Timeframes

A table of recommended improvements to Plainsboro Road is provided in Table 7, which is followed by more detailed information about issues identified by mode, and then through a block by block list of improvements along Plainsboro Road.

Phase I Restriping and Crosswalk modifications include:

- a. Wyndhurst Drive intersection crosswalk on the south side, relocation of the westbound stop bar, and leader lines for the westbound left turn into the shopping center.
- b. Scotts Corner Road intersection restriping for an eastbound left turn lane, striped crosswalks on the east and north sides of the intersection, and removal of midblock cross-walk together with sidewalk leading to crosswalk east of the intersection.
- c. Plainsboro Road restriping to one lane in each direction east of Scotts Corner Road with left turn lane into Aspen and Raven Crest Drives.
- d. Phase II Restriping and Crosswalk modifications include:
 - Wyndhurst /Center to Hunters Glen/Deer Creek Intersection removal of mid-block crosswalk and the sidewalks leading to the crosswalk.
 - Hunters Glen/Deer Creek Intersection placement of crosswalk on west, north and south intersection legs.

4. Issues and Identified Suggestions

Plainsboro Road is an important roadway for the Township. It serves local commuters who are either traveling by bus or accessing by car other major roadways in the surrounding areas. It also serves as a link for motorists, pedestrians, and bicyclists from the surrounding residential area to the Morris Davison Park.

Since the needs of the users of the roadway differ, the analysis for this study looked to address the needs of each mode group separately. The following issues were developed through past studies, through field observation, through local resident comment, and through technical analysis.

The identified suggestions and solutions are all of the items considered and reviewed as part of the analysis. Many of the suggestions have been incorporated into the recommendations for improvement. Some of the items suggested have not been included in the final list of recommendations because of considerations of cost and/or the proposed implementation of other improvements that are expected to accomplish similar objectives.

a. For Buses and Bus Riders.

Issues

- Stopping at locations not designated or designed to pick up and drop off passengers.
- Safe access of bus riders to their homes (walkers) or their cars (park and riders).

Identified suggestions and solutions

- Designated bus stop locations with bus pull off areas at locations proximate to residential areas with safe accommodation for individuals waiting for or alighting from the bus.
- Installation of bus shelters at designated stops to improve the desirability of transit use.

b. For Pedestrians.

Issues

- Speed of motorists traveling on the roadway coupled with the width of roadway which pedestrians are required to cross.
- Limited visibility of some crosswalks at mid-block locations.
- Lack of sidewalk along sections of Plainsboro Road.

Identified suggestions and solutions

- Pedestrian over or underpass from the Brittany to the park.
- Construction of missing sidewalk segments and removal of inappropriate sidewalks that encourage roadway crossings at inappropriate locations.
- Installation of Pedestrian Signals.
- Installation of traffic signals at certain locations which include pedestrian signals.
- Create improved linkages between residential developments along the roadway.

c. For Bicyclists.

Issue

- Roadway is not striped or designed for bicycle compatibility yet used by bicyclists on a regular basis who need to be safely accommodated

Identified suggestions and solutions

- Restripe and narrow travel lanes to provide shoulders on both sides of the roadway where possible.
- Create horizontal curves in the roadway at locations between Hunters Glen and George Davison and George Davison and Scotts Corner.

Table 7 Plainsboro Road Recommendations

Recommendation	Priority Time Frame	Cost
1. Phase I traffic striping and crosswalk modifications	short	low
2. Complete Missing Sidewalk Sections	short	high
3. Reduce Lane Widths to 10 1/2 feet providing a striped shoulder of 4' or greater, where possible	short	low
4. Traffic Signal and realigned intersection at Thoreau and Morris Davison Park entrance	short	high
5. Traffic Signal at Deer Creek/Hunters Glen	med	med
6. Phase II traffic striping and crosswalk modifications	med	low
7. Six foot curbed and planted center medians - Between Wyndhurst and Deer Creek/Hunters Glen Between Deer Creek/Hunters Glen and Thoreau Between Scotts Corner and Township Boundary	med	med
8. Traffic Signal at Scotts Corner	med	med
9. Interconnect signals to regulate speed progression	med	low
10. Install off-road bus pull-offs at intersections	various	low
11. Horizontal curve in roadway Between George Davison and Scotts Corner	long	high

Priority Time Frame - a sequencing of projects based on ease of implementation, costs and safety considerations.

Short Term - Projects that either are easy to implement and low cost or which should be implemented at an early stage because of their impact on safety considerations even though approval and construction factors may require a longer implementation time frame.

Medium Term - Projects that are more complex or of a somewhat higher cost or which are of lower cost but which need to be sequenced in conjunction with the implementation of other medium term projects.

Long Term - Projects that are important to the overall improvement plan but which are less critical from a safety standpoint.

Costs - Order of magnitude project costs including estimates of design, administration and construction.

5. Recommended Improvements

The next step was to work block by block to address the issues for each mode along Plainsboro Road. Integrated improvements have been identified for each of the issues developed moving along the roadway.

The first improvement looked at was the reduction of lanes on Plainsboro Road from two to one in each direction. The analysis showed that two lanes will be needed in each direction to accommodate future traffic from the western end of the study area to Scotts Corner Road.

Once the lane cross section analysis was completed, other suggestions for remediation were then systematically analyzed to determine if they would improve the identified issue conditions. Since the existing pavement width along the roadway currently varies from 11 to 12 feet, the impact of a reduction of lane width to 10.5 feet throughout the entire section was assessed. This reduction would allow for the addition of shoulder space to better accommodate bicycle travel. In some locations it would also provide additional area for a landscaped median. Review of this alternative showed that adequate capacity along the roadway could still be maintained. A recommendation to reduce through travel lane width to 10.5 feet throughout the study area is therefore included in the overall list of improvements.

Reconstruction of major sections of the roadway was not considered as an option for improvement at this time because of the prohibitive costs. As a result, one of the improvements recommended in the list below, i.e. providing a 4 foot striped shoulder for bicycles, is in many places not attainable because of constrained pavement widths. In locations where a 4-foot shoulder striping is not possible, a narrower striped shoulder should still be provided. All suggested improvements are provided below working from west to east along the roadway.

a. At Wyndhurst Drive Intersection.

Bus Stop - A far side bus stop with bus shelter exists. A far side bus stop for the eastbound movement with a bus pull-off area should be designated.

Crosswalk - Provide a crosswalk on the south side of the intersection. There is no crosswalk currently striped for this movement.

Striping Modifications - These improvements will narrow the area of conflict within the intersection and allow for better guidance of turning vehicles.

- Relocate the westbound stop line approximately 12 feet further west.

- Provide leader lines in the intersection for the westbound left turn movement into the shopping, center driveway.

b. From Hunter Glen/Deer Creek Intersection to Thoreau Intersection.

Crosswalk - Remove mid-block crosswalk and the sidewalks leading to the crosswalk.

Cartway cross section

- Travel Lanes - Restripe lanes to 10.5 feet.
- Median - Provide 6 foot curbed planted median in the roadway with 1.5' spaced striping on either side.
- Shoulders - Provide shoulders on both sides of Plainsboro Road to accommodate bicycle traffic. Ideally a 4-foot shoulder on both sides of the roadway to accommodate bicycle traffic in both directions.

Sidewalks - Complete sidewalk connections on the south side of Plainsboro Road.

c. Intersection of Hunters Glen/Deer Creek.

Traffic Control - Signalize the intersection

Bus Stops - Designate far side bus stops for east and westbound traffic at the intersection and provide bus pull-offs.

Crosswalks - Place crosswalk on west side of the intersection across Plainsboro Road and on the north and south legs of the intersection.

Sidewalks - Provide sidewalk connections to the crosswalk on both sides of the street.

d. From Hunters Glen/Deer Creek Intersection to Thoreau Intersection.

Cartway cross section

- Travel Lanes - Restripe lanes to 10.5 feet.
- Median - Provide 6 foot curbed planted median in the roadway with 1.5' spaced striping on either side.
- Provide a consistent 4-foot shoulder on the south side of Plainsboro Road to accommodate bicycle traffic. Ideally a 4-foot shoulder on both sides of the roadway to accommodate bike traffic in both directions.

Sidewalks

- Complete sidewalk connections on the north and south side of Plainsboro Road.
- If sidewalk extension on south side cannot be funded, remove existing sidewalk sections on the southbound side.

e. Intersection of Plainsboro Road to Thoreau Drive.

Roadway Geometrics - Relocate entrance to the park so that it is opposite Thoreau Drive.

Traffic Control

- Signalize the relocated intersection.
- Monitor traffic flow and install a speed hump within the Brittany development if necessary to discourage motorist cut through.
- If necessary install "No Left Turn (7am to 9am)" for northbound George Davison Road at its intersection with Tennyson Drive.

Crosswalks - Provide crosswalks at the relocated intersection.

Bus Stops

- Place far side stops for both eastbound and westbound movements.
- Construct bus pull-offs for both stops.

f. From Thoreau intersection to George Davison intersection.

Cartway cross section

- Travel Lanes - Restripe lanes to 10.5 feet.
- Median - No median in this section.
- Shoulders -Provide a shoulder on both sides of Plainsboro Road to accommodate bicycle traffic. Ideally a 4-foot shoulder on both sides of the roadway.

Sidewalks

- Complete sidewalk connections on the south side of Plainsboro Road.

g. Intersection of Plainsboro Road to George Davison Road

Bus Stops - Far side stops with bus pull-offs for both east and westbound movements.

- h. From George Davison to Scotts Corner Road intersection.

Cartway cross section

- Travel Lanes - Restripe lanes to 10.5 feet.
- Median - No median in this section.
- Shoulders - Provide shoulders on both sides of roadway.

Modification to geometrics

- Introduce a horizontal curve into the roadway section.

- i. Intersection of Plainsboro Road and Scotts Corner Road.

Roadway Geometrics

- Provide a striped left turn lane to northbound Scotts Corner Road and a striped through lane for eastbound Plainsboro Road.
- Provide a striped right turn lane and a striped through lane for westbound Plainsboro Road

Traffic Control - Signalize the intersection and restripe to provide a left turn lane for eastbound movements.

Bus Stops - Far side of intersection with bus pull off for east and westbound movements.

Crosswalks - Provide striped crosswalks on the east and north sides of the intersection.

Sidewalks - Provide sidewalk connections to the proposed crosswalk locations and remove sidewalk that enters the street behind the stop bar on the north side of the intersection.

- j. From Scotts Corner Road to The Township Line.

Bus Stops - Near side at Aspen Drive for both east and westbound movements in the existing right turn deceleration lanes (coordinate with sidewalk installations).

Crosswalks

- Remove the existing crosswalk located east of the intersection of Scotts Corner Road and the sidewalk connections going to the crosswalk on both sides of the road.
- No modification recommended for existing mid-block crosswalk located close to the Cranbury Township line.

Cartway cross section

- Travel lanes -
 - Reduce number of travel lanes from 2 to 1 in each direction to the east of the Scotts Corner intersection.
 - Stripe lanes at 10.5 foot width.
- Shoulders - Provide 4 foot shoulders on both sides of Plainsboro Road to accommodate bicycle traffic.
- Median
 - Provide 6 foot curbed planted median in the roadway with 1.5' spaced striping on either side.
 - Create left turn storage lanes for Aspen Drive/Ravens Crest Drive turning movements.

Sidewalks - Complete sidewalk connections on the north and south sides of Plainsboro Road.

- Apply for NJDOT Local Aid funding to enable widening to 4 foot shoulders on both sides of the roadway so that it is fully compatible (or six foot shoulders to have the road designated as a "bike way").
- Incorporate creation of a designated east-west bicycle trail and/or connections into future Plainsboro Township efforts.

k. Motorists.

Issues

- Straight roadway geometry and lane width gives a "wide open" major arterial feel which is not consistent with the Township road desire for a minor arterial street leading into a town center and which provides an invitation for higher speed travel.
- The volumes of local Plainsboro traffic utilizing and anticipated to utilize the roadway require that the capacity of the roadway be maintained.
- There is a significant pedestrian volume along and across the roadway as walkers for surrounding neighborhoods access the park and nearby shopping center.
- The skewed nature of the signalized intersection at Wyndhurst creates a wide area turning movement conflict zone and increases the tendency for vehicles turning left into the shopping center to aim for the outbound exit.
- The off-set nature of park entrance and the entrance to the Brittany residential development create multiple conflict points and visibility limitations for pedestrians.
- There are deviating widths along the roadway.

- There are intersections with sufficient travel volume and turning movements to warrant traffic signalization.

Identified suggestions/solutions

- Restripe and narrow travel lanes which will make motorists feel more restricted and cause a tendency to slow speeds of travel.
- Install center planted curbed medians at applicable locations.
- Provide landscaping closer to the roadway where appropriate.
- Modify the striping at the intersection of Wyndhurst.
- Install traffic signals at Plainsboro Road's intersection with Hunters Glen/Deer Creek and Scotts Corner Road.
- Realign the park driveway opposite Thoreau Drive and signalize the intersection with speed humps installed on Tennyson Drive to reduce vehicle cut through from George Davison Road.
- Interconnect all signals installed along the area to provide for a traffic speed progression of 35 - 40 mph.
- Reduce the section from the Township line to the east leg of the intersection with Scotts Corner to one lane in each direction with left turn lanes and a center curbed median opposite Aspen Drive.

D. Roadway Access and Curb Cuts

This Plan seeks to reinforce the Township's approach to continue sound highway access management procedures with respect to driveway spacing along Route 1 and the Township's major arterial and collector road system. Its intention is to preserve the traffic carrying capacity of such roadways and to preclude multiple access cuts on all roadway classifications above local or minor collector streets. Depending upon a parcel's specific location, direct access to principal arterials where other access alternatives are practically available will be discouraged.

The State Highway Access Management Code (Access Code) adopted in September 1992, requires that all land development, including subdivision of land, with access to a state highway conform to the provisions contained in the Access Code. The Access Code is a comprehensive set of regulations intended to insure future mobility on the state highway system and therefore only applies to state highways. The only state highway in Plainsboro Township directly affected by the Access Code is Route 1.

The key elements of the Access Code or Code include: spacing standards, access management plans, access classification and levels, non-conforming lots, alternative access, access permits, and desirable typical sections. Highlights of the Code include:

1. Since Route 1's speed limit is 55 MPH, the driveway or street spacing standard is 330 feet. The spacing for traffic signals ranges from 1,100 feet to 2,640 feet, depending on signal timing and speed limits.
2. The Code enables municipalities and the NJ DOT to develop an Access Management Plan (AMP), a coordinated long range highway access plan.
3. The Code establishes access levels for various state highways based on highway characteristics such as speed and function. The access level indicates the permitted turning movement to and from the state highway. The desirable typical roadway section or DTS established by the Code represents NJDOT long range plans for each state highway and indicates the limits on the configuration and dimensions of a segment of a state highway. For example, Route 1 in Plainsboro is classified as having Access Level 3 and DTS 6A, which calls for right-turn in/out movements at access point with left-turn access via grade-separated interchanges or jug handles where signalized spacing standards are met. The DTS for Route 1 in Plainsboro (milepost limits 11.96 through 14.06) consists of 6 twelve-foot lanes, divided, with shoulders or parking within a 148 foot right-of-way.
4. The Code enables NJ DOT to require permit applicants to use alternate access when beneficial to the road network.
5. Access permits would be required from NJ DOT for construction or modification of any driveway or street intersecting a state highway, expansion or change in use on a lot having access to a state highway, or subdivision or consolidation of a lot having access on a state highway. Minor, major, and major with planning review categories of access permits are also established by NJ DOT based on the number of trips per day generated by the use.

Planned improvements along the Route 1 corridor have typically indicated a 6 lane configuration with an expected right-of-way ranging from 150 to 170 feet. The Township supports this policy.

The Township's support of the Access Code has been well documented by its actions and leadership on this issue over the past twenty or more years; for example, the Township strongly supported the closure of the Plainsboro Road/Route One intersection with Mapleton Road, in conjunction with the construction of the Scudders Mill Road/Route One interchange, as well as the replacement of the at-grade intersection at College Road and Route One with a grade-separated interchange. Additionally, through its numerous planning and zoning decisions involving the development of properties along Route One, most notably the general development plan (GDP) approval for the Princeton Forrestal Center, the Township has firmly established its record in support of and in compliance with the Access Code.

Of the roughly two miles of Route 1 that passes through Plainsboro or roughly four miles of total property frontage on Route 1, there are only three points of ingress/egress serving individual properties; this includes both the east and west

sides of the roadway. These three points of access include the access to the existing FMC Corporation property, the private road access to the Princeton Plasma Physics Laboratory (Stellarator Road), and the access to the NJ State Police barracks. All three of these existing conditions have existed since the 1950's and/or 1960's and there are no new ones planned or anticipated in the Township.

New Jersey Municipal Land Use Law (MLUL) requires the regulation of land adjacent to state highways in conformity with the Access Code. Approximately 80%-90% of the properties along Route 1 in Plainsboro are within an existing planned development zone (PMUD-Planned Multi-Use Development) and under an approved GDP that comply with the Access Code. With the exception of a small commercial property at the south corner of Route 1 and Mapleton Road, which property has no opportunity for access to Route 1, the remainder of the area along Route 1 in Plainsboro includes a planned hospital and medical offices (replacement University Medical Center at Princeton), along with a related long-term care facility and age-restricted residential development. The planning and zoning for this area shall comply with the provisions of the Access Code.

E. Goods Movement

Plainsboro Township understands the significance of goods movement in the development of property in the State of New Jersey as well as the effects of such movement on land use coordination. Based on the fact that the dominant mode for movement of goods in Plainsboro and throughout New Jersey is by truck, Plainsboro has established goods movement guidelines in order to stimulate commerce while ensuring public safety and quality of life for local residents and those living in adjoining communities.

While Plainsboro does not prohibit truck traffic from traveling through the community other than for local deliveries, truck traffic is restricted from travelling through residential areas. A classification of roadways according to their ability to safely accommodate vehicles of various sizes and weights has been implemented.

Truck travel corridors have been designated to allow truck traffic to traverse through the Township from North to South and East to West directions. These travel corridors have no weight or size restrictions and allow truck traffic to reach the primary commercial and other non-residential centers located near Route 1 or Scudders Mill Road in the Township. More specifically, the traffic corridors include:

North to South-- Schalks Crossing Road and Route 1
East to West – Dey Road and Scudders Mill Road

Road restrictions have also been established for roadways that cannot handle truck traffic due to factors that may constrain the safe operation of commercial vehicles including physical conditions and land use conflicts. Pursuant to Plainsboro Code Section 96-17, trucks over four tons are excluded on specified road, except for pick-up, delivery and local service on such streets. The regulated roadways include:

<u>Name of Roadway</u>	<u>Location</u>
College Road	Mapleton Road to U.S. Route 1
College Road East	From U.S. Route 1 to Research Way
Dey Road	Between Plainsboro Road and Scudders Mill Road
Edgemere Avenue	Plainsboro Road southwesterly to Maple Avenue
George Davison Road	Entire Length
Linden Lane	Maple Avenue easterly to Prospect Avenue
Maple Avenue	Entire Length
Mapleton Road	Between U.S. Route 1 and its intersection with Academy Drive at the Plainsboro Township corporate line – South Brunswick Corporate Line
Parkway Avenue	Plainsboro Road southerly to Edgemere Avenue
Plainsboro Road	Entire Length
Prospect Avenue	Plainsboro Road southerly to Edgemere Avenue
Research Way	Entire Length
Schalks Crossing Road	Between Plainsboro Road and Scudders Mill Road
Seminary Drive	Entire Length
Wyndhurst Drive	Entire Length

Weight limits on the regulated roadways however do not apply to any vehicles used in the operation of farms which are located within the Township or utility companies serving Plainsboro Township. The **Figure 6: Goods Movement Map** illustrates the weight restricted roadways in the Township.

Managing operating speed through the Township will be essential both for allowing more closely spaced traffic signals and for reducing the impact of truck noise on residential streets

While the movement of through truck traffic will be a complex and difficult challenge, Plainsboro Township like all communities, will also have to assure that trucks have convenient access for loading and unloading.

Township ordinances establish performance standards regarding the provision of adequate loading zones. Developers will be required to identify their loading requirements and demonstrate that those requirements can be met without using adjacent streets and without being visible to neighboring properties. Developers are encouraged to develop shared loading areas so that the total space required for vehicle loading can be minimized.

F. Bus Service

1. TrainLink and Section 18

TrainLink is a shuttle bus service that provides free commuter service between the Princeton Junction Train Station and the companies in the Princeton Forrestal Center and the Princeton Forrestal Village. The Greater Mercer Transportation Management Association (TMA) manages the existing Forrestal TrainLink bus service. An A-1 Limousine bus or van is used to transport people back and forth from their place of employment.

The bus leaves the Princeton Junction Train Station making its way to Plainsboro Township via Washington Street in West Windsor Township. The bus proceeds north along Route 1 until it reaches Scudders Mill Road where it makes a right turn toward the east. It proceeds past Merrill-Lynch to the College Road East intersection with Scudders Mill Road where it makes a left turn and heads north on College Road East. The bus then proceeds across Route 1 to the Princeton Forrestal Village and eventually back onto southbound Route 1 via a slip ramp heading back to the rail station. Service is provided to and from the train station between the hours of 7:15 a.m. – 9:40 a.m. and 4:04 p.m. – 6:40 p.m.

Pick up at the train station is on the northbound side of the tracks, about three quarters of the way around the semi-circular drive which connects with Wallace Road at both ends. Drop off at the train station is on the northbound side of the tracks on the same drive in front of the station building.

TrainLink is paid for by the Princeton Forrestal Center, Merrill-Lynch, NEC, State Street, and other participating companies.

Employees of Munich Reinsurance, NEC, State Street, and others ride for free with an employee ID. Employees of participating companies without employee IDs ride free with a TrainLink Pass available from the Princeton Forrestal Center or the TMA.

Eight (8) combined TrainLink and NJ Transit bus stops are located along College Road East and one (1) is located in front of Merrill Lynch on Scudders Mill Road. Two (2) combined stops are located in the Forrestal Village. An exclusive TrainLink stop exists at 100 College Road West and four (4) others service 100, 200, and 300 series buildings located in the Forrestal Center.

On June 2, 1992 the Township submitted a Section 18 application to NJ Transit to expand the existing TrainLink service to provide public transportation between two (2) park n' shuttle lots and the Princeton Junction Train Station. The funding was approved and it started operations in 1994. The



Bus Shelter



Township of PLAINSBORO

Middlesex County, New Jersey

Goods Movement Map

April 2008

— Weight Limit: 4 Tons

Pursuant to Plainsboro Code Section 96-17, Trucks over four tons are excluded from the streets illustrated on this map, except for the pickup, delivery and local service on such streets.

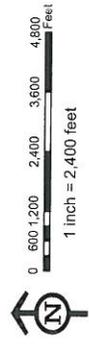
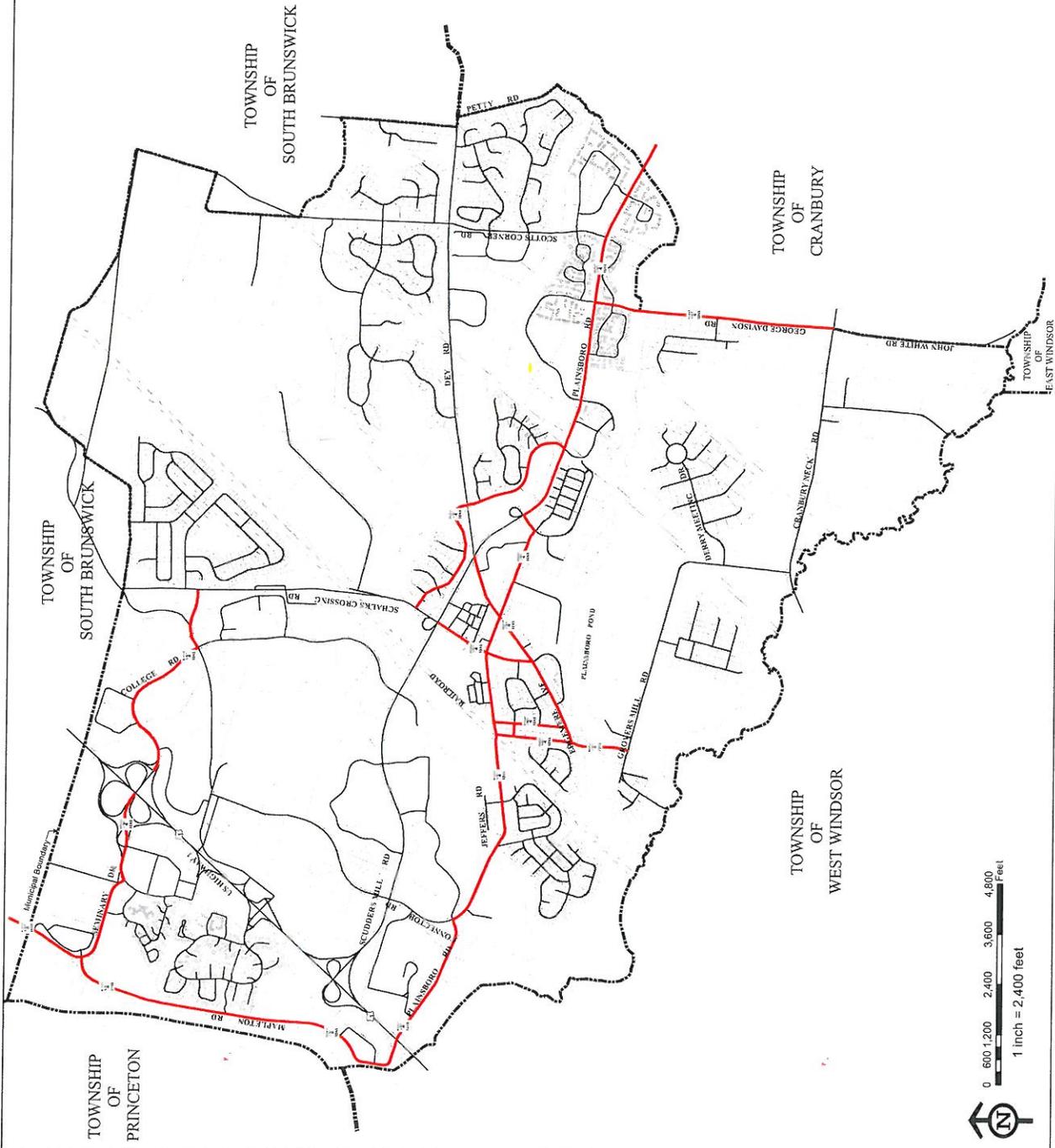


Figure 6

Prepared By:

David J. Samuel, P.E.
 Township Engineer

TrainLink service was expanded by creating new stops at the Town Center Shopping Center and the Princeton Meadows Shopping Center. The ownership of both centers indicated their acceptance of the park n' shuttle idea at no charge. The Town Center Shopping Center had over 100 empty remote parking spaces available either behind the Post Office or near the bank and another outbuilding pad site. The Princeton Meadows Shopping Center had over 80 empty remote parking spaces available located close to Plainsboro Road. Five (5) shuttle trips in the morning and evening were programmed. Up to 86% of potential ridership was serviced by the expanded morning and evening TrainLink bus service schedule, based on NJ Transit and AMTRAK average loading counts. Park n' Shuttle signs were posted in the parking lots.

Management of the Section 18 service was provided on a contract basis, similar to that provided for the existing TrainLink service. The management responsibilities included scheduling, service contracting, and general supervision. The Township was responsible for marketing and establishment of the Park n' Shuttle lots. Marketing included service announcements in the quarterly newsletter mailed to all postal patrons, press releases, and direct mailing to those on the waiting list for parking spaces at the rail station. There was no purchase of vehicles. Driver training was the responsibility for the firm chosen to provide the service which was the TMA.

The Park n' Shuttle service was supported by the Township. The fare was \$2.00 per round trip of \$40.00 per book of 20 round trip tickets. Tickets were purchased at the Municipal Building or the Plainsboro Library during normal business hours.

The Section 18 service stopped in 2002. It ran successfully from 1994 to 2002. In that 9 year time period it serviced an average of 14,300 passengers a year with the peak year being 1997 at 18,031 passengers and the lowest year being 2002 at 7,545 passengers.

As previously stated in earlier Master Plan updates the Township is pursuing funding to revive the successful Park n' Shuttle service to compliment TrainLink and NJ Transit Service and possibly expand the service to provide transportation for the elderly, families and others that have to travel within the Township to shop, go to work, see a doctor at the new hospital, visit neighbors, attend an event at a Township park or visit the municipal complex. A shuttle service could become yet another important local transportation asset to support the movement of people within the community.

2. Princeton Airporter, American Limo, and NJ Transit Service

Princeton Airporter currently picks up people at the Westin, Wyndham and Marriot hotels in Plainsboro and takes them to major New Jersey and New York airports via Dey Road to Route 130 and then onto the Turnpike.

American Limo service originates in Yardley, Pennsylvania. It provides twice daily express service to the New York Port Authority via the turn-pike. Its route through the Township is from the south along Route 1 to Scudders Mill Road, onto Schalks Crossing Road at the Town Center Shopping Center, and then Plainsboro Road to Route 130. The Limo stops along the road at the Plainsboro Plaza Town Center Shopping Center, Princeton Meadows Shopping Center, Deer Creek, Brittany, and Aspen multi-family residential developments.

New Jersey Transit provides weekday and Saturday bus service between Trenton and Plainsboro Township, servicing Quakerbridge Mall, Princeton MarketFair in West Windsor Township, Princeton Forrestal Center, the Linpro Shopping Center, and Princeton Forrestal Village.

Figure 7: Bus Routes, Stops and Shelters Map, shows the existing train link, American Limo, NJ Transit bus route, the expired Section 18 route, and where NJ Transit bus stops now exist. It also identifies additional NJ Transit bus stops along its route. The NJ Transit bus route requires eastbound buses to make a right turn from Scudders Mill Road onto Schalks Crossing Road, make a stop at the Town Center Shopping Center, and then proceed through the village onto Plainsboro Road, with another stop in front of the Enterprise Business Park, and terminating at Princeton Meadows. The return trip from Princeton Meadows does not route the buses through the village, but instead requires them to travel Scudders Mill Road and stop at the intersection with Schalks Crossing Road before proceeding onto College Road and Princeton Forrestal Village.

The Map shows the current and proposed routes for New Jersey Transit Bus Service. It is anticipated that service will be expanded onto Campus Road and to the Princeton Business Park site. Additional bus stop/shelter locations have been added to complement new routes and also reinforce service on the existing route along College Road East, Scotts Corner Road, and Dey Road. The bus shelter shown on the FMC Redevelopment site can be utilized for either a regular bus or for bus rapid transit in conjunction with hospital construction. Monies contributed by developers will be used to put new shelters and signage in place.

Establishing NJ Transit bus stops requires approval by the NJ DOT. Generally, the municipality and NJ Transit together identify the most appropriate location for bus stops. If the stop is intended for a county road, the county must also approve the proposed location. Once the proposed bus stop location is identified, the municipality and county (if the bus stop is along a county road) are required to pass a resolution officially designating the bus stop. The NJDOT reviews the proposed bus stop location and approves or denies it. If bus shelters are desired, NJ Transit must be contacted because they are responsible for funding and providing bus shelters on their routes.

A bus shelter design which is now being required and implemented has been implemented throughout the Township. This shelter design is typical



Township of PLAINBORO

Middlesex County, New Jersey

BUS ROUTES, STOPS & SHELTERS

April 2008

Bus Stops

- Existing, Bus Stop
- Existing, Bus Stop w/Benches
- Existing, Bus Stop w/Shelter
- Planned, Bus Stop
- Planned, Bus Stop w/Benches
- Planned, Bus Stop w/Shelter

Bus Routes

- Existing N.J. Transit Bus Route
- Planned N.J. Transit Bus Route
- Train Link Bus Route
- American Limo Bus Route
- Existing Bus Routes (1/4 Mile Radius)
- Planned Bus Routes (1/4 Mile Radius)

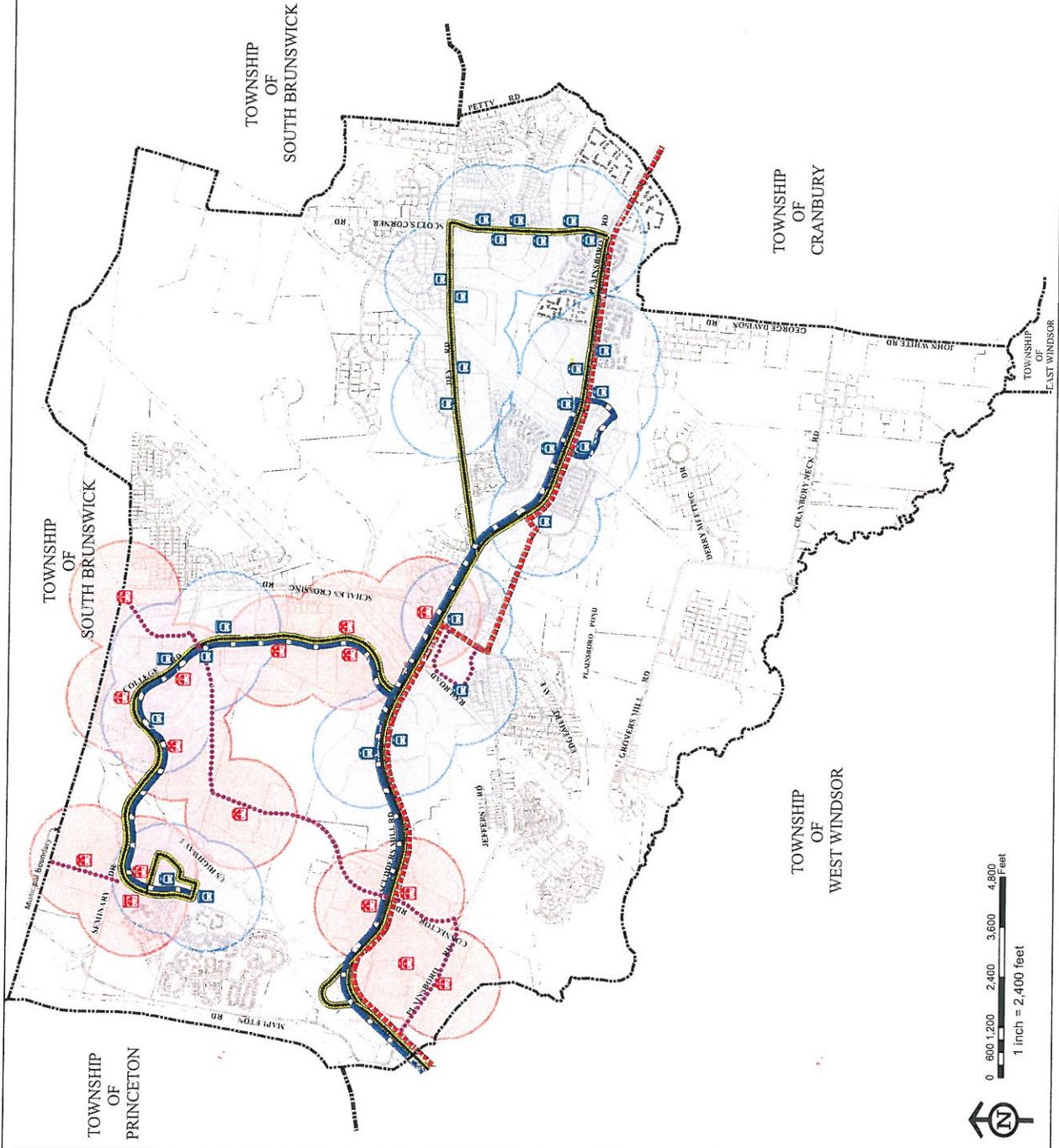


Figure 7

Prepared By:
David J. Samuel, P.E.
Township Engineer

of the one used throughout the Township at other approved locations. The shelter is placed on a concrete pad and has a metal bench, tempered glass (sides and back only), a cantilever roof, and aluminum with green powder coat finish. Another special shelter design has been used for the Village Center area.

3. Bus Rapid Transit (BRT)

The Central Jersey Transportation Forum, the Greater Mercer TMA and NJDOT and others have been working to improve traffic flows within the Route 1 highway corridor and on local roadways within adjacent and adjoining communities by increasing mobility and reducing traffic congestion. One of the new and more innovative ways to address traffic within this area is to study and then implement an acceptable form of Bus Rapid Transit. This transportation system is a relatively new concept for our area although it does exist in other parts of the country and the world. For example, the Metro Rapid system in Los Angeles, which opened in June 2000, operates a total of 90 buses along 2 lines totaling 90 miles. In Pittsburg the West Busway system is an existing 5-mile long exclusive bus right-of-way constructed along an abandoned railroad right-of-way. In Ottawa, Canada "The Transitway" currently consists of 18 miles of exclusive roadway for buses plus 12 miles of exclusive shoulder lanes on highways. Other similar systems are in the planning and development stages in Boston, Las Vegas, and Northern Virginia.

BRT has been studied over the past few years as a viable long range transportation alternative for the region including portions of the Township.

BRT is a technology advanced public transportation system that uses rubber-tired vehicles on dedicated or shared roadways. The use of dedicated roadways allows BRT to operate without influence from traffic congestion and produces a more efficient, higher quality and predictable transit experience. In addition, the vehicles themselves are designed to efficiently load and unload passengers and to reduce station dwell time, with such features as midpoint doors and automated fare collection.

BRT could offer Route 1 corridor commuters an attractive alternative by reducing travel times through the use of priority treatment in areas of heavy traffic congestion. For example, BRT vehicles can be equipped with transmitters to turn traffic signals green, allowing them to travel through intersections without stopping. Roadway shoulders could be widened at intersections to allow buses to avoid queues, thus reducing travel time. By incorporating new technologies and focusing on passenger convenience and information, a BRT system could be an attractive and convenient form of public transportation. The BRT concept, if introduced into the region, would complement other forms of transportation like rail and bus service and the single occupancy vehicle.

On August 1, 2002 the Central Jersey Transportation Forum prepared a BRT analysis which presented a brief feasibility analysis for BRT

implementation in the Route 1 corridor. Following this analysis, the Forum directed NJ Transit to examine BRT alternatives. The analysis assumed use of the existing roadway network extending from I-295 in Lawrence Township to Ridge Road in Plainsboro/South Brunswick, the construction of park-and-ride lots, a concentrated land use pattern, and feeder bus routes. The proposed route would also connect with the Princeton Junction Train Station and the Dinky. The route in Plainsboro Township entered along Route 1 from the south and proceeded a short distance along Plainsboro Road where it made its way through the FMC Redevelopment site to Scudders Mill Road. The route proceeded east along Scudders Mill Road to College Road East where it continued in a northerly direction to Ridge Road and over Route 1 to the Forrestal Village area. An alternative route for the system in the Township also involved running the bus along Campus Road.

BRT is characterized as a system that can be built in sections, that is flexible as to route design and location, and that can provide service to both densely populated as well as less dense areas. The components of a BRT are as follows:

- a. Running Ways – BRT vehicles operate primarily in fast and easily identifiable exclusive transitways or dedicated bus lanes. Vehicles may also operate in general traffic.
- b. Stations – BRT stations, ranging from enhanced shelters to large transit centers, are attractive and easily accessible. They are also conveniently located and integrated with the community they serve.
- c. Vehicles – BRT uses rubber-tired vehicles that are easy to board and comfortable to ride. Quiet, high-capacity vehicles carry many people and use clean fuels to protect the environment.
- d. Service – BRT's high-frequency, all-day service means less waiting and no need to consult schedules. The integration of local and express service can reduce long-distance travel times.
- e. Route Structure – BRT uses simple, often color-coded routes. They can be laid out to provide direct, no-transfer rides to multiple destinations.
- f. Fare Collection – Simple BRT fare collection systems make it fast and easy to pay, often before you even get on the bus. They allow multiple door boarding, reducing time in stations.
- g. Intelligent Transportation Systems – BRT uses advanced digital technologies that improve customer convenience, speed, reliability, and operations safety.
- h. Running Ways – BRT can utilize or combine two or more of the following running ways: exclusive transitways, HOV lanes,

dedicated transit lanes, transit streets, mixed traffic and queue jumpers.

- i. Stations – the design of stations can vary from a single shelter to a complex transit center. They can include parking facilities, taxi stands, and support transfers to other transportation services. Many services include customer information, like maps, schedules, and real-time vehicle arrival information.
- j. Vehicles – rubber-tired vehicles that are not limited to exclusive BRT running ways but can operate on local streets where necessary.

The Greater Mercer TMA commissioned Michael Baker Jr., Inc. and SYSTRA Consulting to perform a concept study of bus rapid transit in the Route 1 corridor. The study, entitled: “A Route 1 Corridor Bus Rapid Transit Concept Study” was completed in March 2003. The objectives of the study were to:

- a. Create a vision for a Route 1 corridor BRT system.
- b. Determine the feasibility of BRT in the Route 1 corridor.
- c. Identify opportunities to create a BRT demonstration project.
- d. Complement the activities of the Central Jersey Transportation Forum.

In 2007 the NJ Transit prepared a report entitled: “Central New Jersey Route 1 BRT Alternative Analysis” which studied the transportation needs and potential transit improvements within a study and market service area which encompassed Mercer, Middlesex, and Somerset Counties and some municipalities in Bucks County, Pennsylvania. The final BRT Guideway map proposes a BRT route on both sides of Route 1 in the Princeton Forrestal Center extending up into South Brunswick Township.

The BRT program, which is under the auspices of NJ Transit, is intended to enhance the attractiveness of using buses as an alternative to automobile travel, particularly the use of single occupancy vehicles for commuting purposes. The BRT is intended to reduce commuting times through the provision of fewer local stops, dedicated lanes on highways, increased frequency of bus travel, and ultimately provide a much higher quality of service than traditional bus services. Increased BRT use would reduce traffic congestion, which in turn also mitigates pollution and losses in productivity.

Plainsboro Township is currently in discussions with NJ Transit regarding the exact location of a BRT stop within the Redevelopment Area for the FMC Corporation Site, and a route which would allow the bus to exit onto Plainsboro Road from Route 1 traveling northwards, stop and pick up or drop off passengers within the Redevelopment Area, and access Route 1 via Scudders Mill Road just north of the Redevelopment Area. A BRT stop therefore shall be provided in the Redevelopment Area at a convenient location for pedestrian access and at a

point which is safe from a vehicular traffic viewpoint. The stop shall provide the necessary road configuration to allow the bus to stop and pick up and drop off passengers without blocking or interfering with other vehicles or cyclists on, and provide for a safe, well-lit, sheltered environment for those passengers waiting at the stop. Seating, signage and a BRT system-wide map should be provided at the transit stop.

G. Travel Demand Management

The various roadway improvements described for the Township are intended to support continued growth. With their implementation a future roadway system will be available which will be responsive to expected traffic demands yet balanced against other conditions and constraints in the area.

As evident by the need to consider constrained future traffic demands, the suggested improvements by themselves will not be fully sufficient. An alternative to fully satisfying future traffic demands is to wisely manage traffic growth in such a way that the peak demands are controlled so that they match more closely with the ability of the roadway network to accommodate them without creating intolerable motorist delays. Through various management strategies, the peak traffic demands generated by area developments can be monitored and adjusted to the most efficient levels.

A variety of travel demand management strategies can be applied to regulate traffic flows. A range of possible actions have to be considered as part of any Township's travel demand management program. Several strategies are presently underway in the Township and at the Princeton Forrestal Center, in either a formal or informal sense, and others might have only minimal applicability. Morning and afternoon TrainLink shuttle bus provides service between the Princeton Junction Train Station and Forrestal Center. All stops in the Center are curbside, except Merrill Lynch and Munich Reinsurance, whose stops are at the front entrance. The shuttle makes designated stops along College Road East and terminates its run at the Princeton Forrestal Village.

Varying work hours, car pool/van pool programs, and expanded transit services may be the most effective and applicable actions in the future. Secondary actions such as coordination of site plans to compliment primary strategies or municipal direction and participation in the implementation of demand reduction programs will also be important measures.

The diversity and size of the uses within the Township lend themselves to some natural demand reduction strategies. This condition is recognized by reduced trip generation characteristics expected from large mixed use developments, and is exemplified by the overall Forrestal Center development program which places employment, residential, and retail uses in proximity to one another. Trips occurring between these types of uses do not add new traffic to the region's roadway system and can reduce overall traffic impacts. Mixed use activities are also beneficial for employees and residents in that they have retail and other service uses located more conveniently to their homes or offices.

The specific types of actions, how and when they are implemented, and an estimate of their use or effectiveness are areas that need further study. While some actions can be applied successfully on a site by site or employer by employer basis, others may be more effective when applied over a wider area and encompassing multiple sites. An operating plan describing the applicable programs, the steps for their accomplishment and a budget forecast is a desirable prerequisite for any formal plan involving transportation management strategies.

The implementation of demand reduction or management actions will likely require some form of sponsorship to provide coordination, monitoring and support. This could be through a formal Transportation Management Association, such as the Keep Middlesex Moving (KMM), or a local transportation management committee serving as a coordinator between a development, member employers, and the Township. The need for technical and support staff, office space, and project funding may also play a role in how programs are defined. A more formal structure with membership dues or assessments would allow dedicated annual funding whereas member contributions may be an easier initial step.

The various traffic improvement recommendations identified in this Master Plan element have established an outline of roadway and intersection needs to compliment and support the continued growth of the Township and surrounding area. A similar outline of transportation management actions has also been established as part of the solution to address the area's future transportation requirements. The dual approach of improving roadway and intersection capacities and monitoring traffic growth will provide the best means of dealing with the area's ongoing and future development impacts.

The Township has established a Transportation Task Force which includes representatives from major employers in Plainsboro Township as well as developers, citizen members, and the Planning Board and other appropriate boards and committees. The Task Force was specifically established to review traffic demand management and its potential impacts on the Township. The Task Force is empowered to make recommendations to the Township Committee on traffic reduction strategies to minimize adverse traffic impacts. Traffic reduction strategies will include a review of existing traffic concerns as well as a comprehensive review of regional and national strategies designed to reduce traffic congestion.

Development of a comprehensive Traffic Management Program ordinance designed to alleviate peak hour traffic movement within Plainsboro Township was adopted by the Township Committee on November 3, 1991. This traffic management ordinance included a target figure for traffic reduction as well as quantifiable methods to determine the effectiveness of individual programs. To date, the Township has received transportation management plans from Bristol-Myers Squibb and Merrill Lynch.

Members of the Task Force are appointed by the Mayor to review, monitor, manage, and advise on the implementation of the traffic management ordinance. The ordinance had the following purposes and objectives:

1. To promote efficient use of existing transportation facilities (streets, highways, intersections, overpasses, parking facilities, public transportation, etc.).
2. To reduce the impacts of traffic congestion within Township and region by reducing the number of vehicle trips, the number of vehicle miles traveled, and the concentration of vehicle trips within congested time periods compared to that which would otherwise result in meeting local commuting and other travel requirements.
3. To reduce vehicle emissions, energy use and ambient noise levels by reducing the number of vehicle trips, vehicle miles traveled, and overall traffic congestion.
4. To equitably reduce the total increase projected for peak period office-related traffic volumes generated by existing employment and new commercial and residential developments within the Township by at least ten (10) percent overall, recognizing that greater or smaller reductions may be appropriate given an individual firm's past efforts and specific traffic generation characteristics, and that reductions above ten percent may be required at sites falling under the requirements of this ordinance to offset traffic growth at sites not under influence of this ordinance.
5. To maximize the use of commute modes other than single occupant vehicles used in peak periods, through the development of company-supported and community-wide programs, incentives, and related services.
6. To minimize the share of employees driving to and from work in the Township during congested peak travel hours.

The ordinance applied to all existing businesses, complexes, and multi-tenant buildings, to all proposed residential developments of 25 or more units, and to all non-residential buildings and complexes of 15,000 square feet or more of gross building area which have not received subdivision and/or site plan approval prior to the effective date of the ordinance. The ordinance did not apply to eating and drinking establishments, retail businesses, grocery stores, shopping centers, security services, and other similar uses.

Those impacted by the ordinance were required to appoint transportation coordinators, prepare annual surveys and reports, provide an area for informational and promotional programs, and prepare a transportation management plan.

The implementation and enforcement of the Township ordinance was replaced by the Clean Air Act amendments of 1990 which required the state to prepare and adopt specific transportation control measures in order to produce cleaner air. On June 30, 1992 Senate Bill No. 35 (NJ Traffic Congestion and Air Pollution Control Act) was approved. The bill establishes a comprehensive strategy to assure compliance with federal mandates. By November 15, 1994 employers

with 100 or more employees had to submit trip reduction plans to the state that demonstrated how they would increase the average occupancy of employee vehicles by 25% during peak hours. An employer plan had to "convincingly demonstrate compliance" by November 15, 1996. Substantial monetary penalties of \$1,000 and \$5,000 per month were possible for each work location failing respectively to file an acceptable plan or to achieve reduction in peak hour travel. In California, where travel demand management programs have been instituted, positive benefits to employers have resulted in terms of reduced parking costs, shorter commute times, and increased worker productivity. The State program ended soon after it started. At this time travel demand management is not being promoted in a comprehensive manner at the state and local level. However, it remains an important TMA activity.

The Task Force utilized the services of KMM as a resource to expedite the review of strategies employed in other areas to meet similar transportation situations and to help put together the Township ordinance. Keep Middlesex Moving, Inc. was established as a public/private partnership to develop and implement plans to address traffic issues facing Middlesex County employees and residents. KMM's goals are to reduce congestion problems and to improve employee access to employment sites throughout the county. Some of the programs KMM uses to reach these goals include developing new transit opportunities, encouraging employers to implement staggered work hour programs, and helping employees and residents to form car and van pools.

The various travel demand strategies include, but are not limited to, the following:

1. Maximize the use of commuter modes other than single occupant vehicle. Encourage employers:
 - a. To appoint a traffic coordinator for traffic management within their corporation.
 - b. To implement employee ride-share programs (matching, promotion, etc.)
 - c. To provide bonus, extra vacation day, or other incentive programs for transit/ride-share users.
 - d. To implement new employee orientation programs providing incentives, information, and other inducements for commute alternatives.
 - e. To implement fare discounts to employees using transit and/or ride-sharing.
 - f. To distribute transit/ride-sharing information (flyers, bulletin board, paycheck stuffers, company newsletter, information center, etc.).
 - g. To provide on-site ticket sales and passenger amenities.

- h. To provide preferential parking, restricted parking, and to charge parking fees with differential parking costs for car and van pools.
- 2. Reduce the number of employees traveling to and from work at the same time and during peak hours of travel:
 - a. Offer flextime.
 - b. Implement staggered work hours.
 - c. Offer flextime for car/van poolers.
 - d. Allow employees to work at home as appropriate.
 - e. Establish regular work hours outside normal peak travel hours.
 - f. Set policy discouraging late afternoon meetings.
 - g. Compress the work week.
 - h. Participate in regional HOV lane evaluation program.
- 3. Increase the use of other commute modes, such as ride-sharing and car/van pooling:
 - a. Establish preferential parking and loading areas for ride-sharers.
 - b. Implement van or bus shuttles to existing rail/bus services and to serve local mid-day travel needs of ride-sharers.
 - c. Provide matching service, promotions of the matching services, vehicle purchasing (leasing), insurance, maintenance, and operating cost subsidies to van pool drivers.
 - d. Support third-party van pool services.
 - e. Provide emergency mid-day travel services for ride-sharers.
- 4. Develop and coordinate a plan in order to lower traffic capacity and maintain safety:
 - a. Adopt and announce policy supporting traffic reduction.
 - b. Approve budget for traffic reduction planning and programs.
 - c. Establish continuing planning process to reduce traffic generation.
 - d. Establish a transportation management committee to coordinate and assist in Plainsboro's traffic reduction.
 - e. Identify future roadways within Plainsboro Township.

- f. Secure service of traffic reduction consultants.
5. Conduct surveys of existing transportation measures in place and evaluate effectiveness:
 - a. Establish Task Force to implement surveys to residents, employers, and employees to establish existing residential commuting patterns, the level of interest in establishment of other commuter modes and measures taken by employers to reduce traffic generation.
 6. Provide a comprehensive program to facilitate public awareness of transportation alternatives:
 - a. Present Township efforts of traffic reduction program through presentations at special meetings and conferences with the public.
 - b. Develop articles for publication in various journals, newsletters, etc.
 - c. Send mailings to local organizations, citizen groups, and other similar groups.
 - d. Coordinate with NJ DOT and other public agencies.
 - e. Support activities to both executive and commuter levels through use of TV, radio, newsletter or newspaper.
 7. Set up policies within a work place to facilitate ride-sharing and to allow for travel in off-peak periods:
 - a. Designate a traffic coordinator to act as liaison. Traffic coordinator shall survey work force annually to gather data on place of residence, work hours, and commuter mode. Said survey shall provide:
 - Number of employees beginning and ending work by 15 minute intervals.
 - Employee residency.
 - Number of employees who are commuting to work by means other than single occupancy vehicles.
 - Description of measures taken by businesses to reduce traffic generation, including efforts to market traffic reduction measures.
 - Number of employees participating in an alternative work hour program.

- b. Compressed work weeks, staggered work hours involving a shift in the set work hours of employees at the work place:

Starting times are concentrated.

Encourage non-vehicular work trips by constructing sidewalks, paving shoulders, widening curb lanes on heavily traveled roads, and providing paved paths and storage devices for bicycle access.

- 8. Improve coverage, frequency of transit services to and from the municipality:
 - a. Construction of shelters to facilitate traffic mitigation measures.
 - b. Establishment of shuttle bus services to and from the train station in the morning and afternoon.
 - c. Establishment of an in-house or third-party ride-sharing or van - pooling program.
 - d. Coordination with public and private transit operators as potential providers of new shuttle services.
 - e. Providing shuttle service to and from the work place based on a demand response operation. Employees can arrange, by prior reservation, for pick up.
- 9. Encourage increased transit ridership:
 - a. Coordinate with New Jersey Transit to develop a comprehensive public transit service for the Township.
 - b. Door-to-door service from the train station.
 - c. Greater flexibility to meet irregular (or unexpected) trip demands.
 - d. Variability in scheduling requirements on a daily or weekly basis.
 - e. Incentive programs provided by the employer.
- 10. Review the need for a park-and-ride facility:
 - a. Park-and-ride facility shall be located with direct access off a designated collector road
 - b. Park-and-ride areas can be either dedicated to the Township or maintained by the developer
 - c. Reserve parking spaces for businesses participating in traffic reduction program.

- d. Operate as a subscription service
 - e. Participate in regional park and ride lot program, local lots, and lease/ purchase lot programs.
11. Coordinate with neighboring employers on transportation management:
- a. Annual reports/surveys shall be utilized to determine whether businesses are making progress in achieving traffic reduction goals (Traffic Reduction Plan).
 - b. Each business would be permitted to choose strategies which are most appropriate, given the nature of the business and required traffic reduction goal. Liaison person established for each business.
 - c. Establishment of workshops with businesses, New Jersey Transit and traffic consultants to help facilitate traffic management.
12. Sponsor public information campaign:
- a. Hold public meetings on transportation management program.
 - b. Publish in newspaper schedules for mass transit and other alternate commuter modes.
 - c. Company newsletters listing ride-sharers.
 - d. Establish an information center located in Township on transportation alternatives.
13. Work with traffic management associations to coordinate traffic reduction programs:
- a. Hire a traffic management consultant to work with traffic management associations to assist design and implementation of overall traffic reduction program.
 - b. Prepare a traffic reduction plan to be utilized by businesses and traffic management associations.
 - c. Coordinate workshops with businesses and traffic management associations for specific program elements, such as flexible work hours and other potential resources (i.e. manual for implementing flextime).
 - d. Production of information and marketing materials as necessary to support program activities shall be distributed by traffic management associations.

- e. Provide direct program assistance to employers and develop effective communication strategies in order to implement traffic reduction program.

The Township should continue to support and encourage others to implement transportation management plans on a site to site basis. These plans can make a difference in reducing traffic congestion and improving air quality within the local area and beyond. By way of example, the Princeton Healthcare System has offered to implement trip reduction and transit strategies within the FMC Redevelopment Area. The University Medical Center of Princeton at Plainsboro (UMCP) will explore instituting an employee shuttle from Princeton to the Plainsboro facility, if no direct NJ Transit Link is established, as well as enhancing existing shuttle programs, such as TrainLink (connecting the Princeton Junction Train Station to the Health Campus). The Medical Center will be working with the other development partners on the site (Medical Office Building(s), Retirement Community, Skilled Nursing Facility, Fitness Center) to establish campus wide shuttles linking the campus with the Plainsboro Town and Village Centers and perhaps other locations in the area depending upon the demand. The Medical Center will market transit opportunities with continuous employee communications, including transit information fairs, and incentives (i.e. prizes for mass transit users).

The Medical Center also will institute a Ride Share program in collaboration with the Greater Mercer Transportation Management Association (GMTMA). According to the GMTMA, the simplest of ride-share programs can reduce vehicle commute trips to specific worksites by five (5) to fifteen (15) percent. To get the percent of use as high as possible, the Medical Center will encourage employees to enroll in the State's "Car Pooling Makes \$ense" program which gives gas cards to individuals carpooling a certain percentage of their work week. The car pool program also would include a guaranteed emergency ride home provision.

NJ Transit is planning on serving the site by Bus Rapid Transit (BRT). NJ Transit's BRT study Executive Summary noted that the BRT would increase the percentage of work trips using transit from a range of two (2) to four (4) percent to a range of five (5) to nine (9) percent in the core study area (West Windsor, Plainsboro, Princeton Township and Princeton Borough).

H. Pedestrian and Bicycle Circulation

1. Overview

Adequate pedestrian and bicycle circulation is vital to having a successful comprehensive transportation planning process that links people with places they want to go. Plainsboro has developed this plan in recognition of the importance of enhancing the level of pedestrian and bicycle circulation in the Township.

This plan was developed to provide Plainsboro residents and workers with safe and convenient linkages between their homes and points of interest and activity, such as the library and municipal building, post office, shopping areas, local parks and schools, and scenic areas. The implementation of a comprehensive pedestrian and bicycle circulation system also helps to alleviate some of the safety and traffic



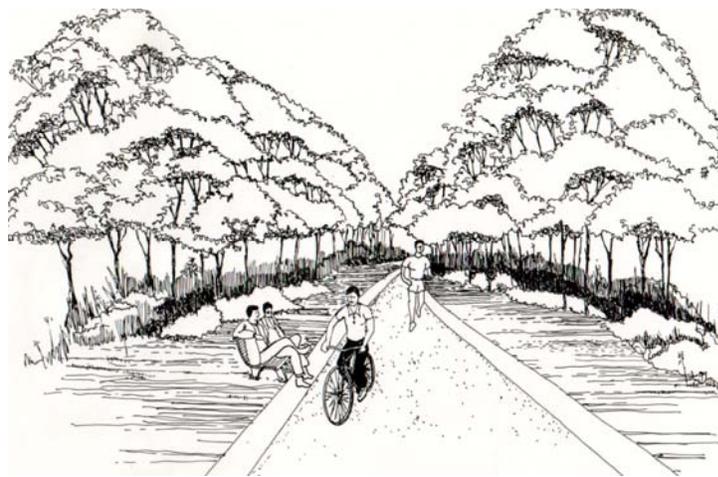
Village Sidewalk

congestion problems on local roadways. Pedestrian and bicycle pathways can and will be used for commuting purposes, as well as for recreation, which, in turn, will increase the vehicular carrying capacity of local roadways.

Pedestrian circulation and bicycle plans are intended to guide Township review boards and the Township Committee in insuring that the areas designated for pedestrian paths and/or bikeways are reserved and used for that purpose. Once these plans are fully implemented, the system can be used by Plainsboro residents to locate a preferred route of unmotorized travel to recreational or nature areas, shopping facilities, places of employment and worship, and other activity centers both within and outside the Township.

2. Types of Pathways

a. Bicycle Paths



The first type of pathway is a bicycle or bike path, which is part of the broader category of pathways known as bikeways. Bike paths are designed to accommodate both pedestrians and bicyclists, and in the

winter months, as conditions permit, may be used for cross-country skiing. Such pathways can be located throughout the Township parallel to existing streets instead of sidewalks, adjacent to or within utility rights-of-way, and through natural areas such as along stream corridors. The Delaware & Raritan Canal Commission path and the Lenape Trail are examples of this later type of pathway.

The design and engineering standards for bike paths in the Township, as much as possible, should be in accordance with the New Jersey Department of Transportation Bicycle Compatible Roadways and Bikeways Planning and Design Guidelines (NJDOT bikeway standards), which are based on national bicycle facility design standards (AASHTO Guide for the Development of Bicycle Facilities).

Generally, bike paths should at a minimum measure eight (8) feet in width and include a bituminous surface material. However, bike path widths of no more than ten (10) feet may be appropriate if bicycle traffic is generally expected



Bike Sign

to be high, where pedestrian use of path is expected to be more than occasional, where good horizontal and vertical alignment will not exist, providing safe and frequent passing opportunities, or where the path will be subjected to maintenance vehicle loading conditions that would cause pavement edge damage. Also, when a bike path is part of a multi-use pathway or trail facility, alternative surface material and pavement structure may be appropriate.

b. **Bicycle Routes**

The second type of pathway, which is also part of the broader category of bikeway, is the bicycle or bike route. Bike routes are located on existing roadways which are either wide enough to safely accommodate bicyclists without having to provide exclusive bicycle lanes (i.e., shared-roadway condition) or roadways with specially designated and appropriately identified bike lanes along both sides of the roadway. Shared-roadway bicycle routes should be located on roadways having low to moderate traffic volumes and/or speeds, a low number of trucks using the roadway, and having anywhere from 12'-15' of travel lane width in each direction, including shoulders where on-street parking does not exist.

Generally speaking, the proposed bikeway plan seeks to utilize existing and planned roadways for bike routes (whether shared-roadway or with bike lanes) where such roadways are bicycle compatible per NJDOT bikeway standards. However, where a bike route is not the appropriate option due to the considerations listed below, an off-road bike and pedestrian path is recommended.

- Incompatibility of roadway for safe bicycle usage (narrowness of roadway, traffic speeds and/or volumes, or frequent presence of trucks)
- Heavy usage of pathway by children and/or less experienced cyclists
- Need or desire to make connections within the system where roads do not exist
- Desire to provide bikeway access to natural/scenic areas

As with bike paths, the design and engineering standards for designated bike routes, as much as possible, should be in accordance with the NJDOT bikeway standards. For example, designated bike lanes along roadways should have a minimum width of five (5) feet where the roadway is curbed or four (4) feet where no curbs exist. Important components of safe bicycle routes are bicycle friendly grates and utility covers flush with the pavement surface, a smooth pavement surface free from irregularities (i.e. rumble strips), and adequate signage. Proper signage is essential to alert motorists to the fact that certain roadways will be used by bicyclists and that special care should be taken when traveling these roadways.

The Manual on Uniform Traffic Control Devices (MUTCD) should be used for signage design and placement.

All designated bike routes should be regularly inspected or monitored to insure that debris is being picked up and removed from roadway shoulders and bike lanes, and that any necessary maintenance is done in a timely manner. Such monitoring and maintenance is critical to providing a safe and attractive bikeway system.

c. Sidewalks

The Township already has an extensive network of existing sidewalks that link residential and non-residential areas together. Proposed sidewalks expand the existing system to permit improved pedestrian access throughout the Township.

Sidewalks provide for safe pedestrian movement. In residential areas, sidewalks are used by children for playing and as a way to get to school and to parks. Adults use sidewalks as a way to get to neighbors, activity centers in the community, and for exercise.

Sidewalks should be at least 5 feet wide, which is adequate for 2 pedestrians or 1 pedestrian and 1 bicyclist. In areas where the roads are too narrow for bicycles to share use of the roadway with motorists or where an off-road bike path is not feasible, sidewalks



Sidewalk

will inevitably be used by bicyclists; especially by children and less experienced bicyclists. Even though it is not recommended that sidewalks be used in this manner, the sharing of sidewalks by bicycles can be done when pedestrian or bicycle traffic is very light.

Sidewalks should be 4 inches thick, except at driveway crossings where the thickness should be increased to 6 inches. Handicapped ramps should be provided at intersections and driveways.

Typical crosswalk design and appropriate signage is shown on the “Typical Pedestrian Crossing Signs For Plan Details” exhibit on the following page.

d. Nature Trails

A 9.8-mile system of private nature trails exists within the Princeton Forrestal Center for walking and jogging. Unpaved nature trails are encouraged to exist and expand within the Princeton Forrestal Center, in Township parks, and within other natural settings, while paved



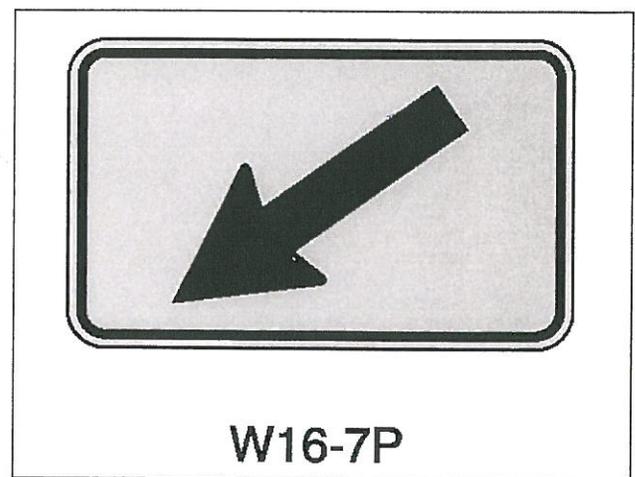
Pedestrian Bridge

pathway systems are proposed within developments to absorb heavier use. Nature trails should be located to connect with

Typical Pedestrian Crossing Signs For Plan Details



A 1988 FHWA study found that high-visibility/ladder-type crosswalk markings using a 12-inch (305-mm) stripe with 24-inch (610-mm) spacing had the highest level of motorist recognition.



recreational, historic and employment sites, and other points of interest. They provide for quiet and unspoiled walking and jogging experiences to observe pleasant scenery or for exercise, usually through heavily treed areas and along stream corridors and next to wetlands. Existing sidewalks, fire lanes and loop roads on developed properties may be used as part of the network.

Nature trails should be about three (3) to four (4) feet wide for pedestrian use only. The path may be as wide as eight (8) feet if necessary, but under no circumstances less than 1'6". The trail width should be determined by the amount and intensity of use as well as by topography and vegetation. If the trail is narrow, occasional passing areas should be provided at places with gentle slopes.

Grades of 10% or less are desirable; grades may be as great as 15%, but should be avoided or kept as short as possible. Vegetation should be removed up to seven (7) feet for vertical clearance along a trail. The color and type of material chosen for surfacing, whether grass (dense fescue turf), wood chips, fine gravel, packed earth, etc., should be compatible with the environment through which the trail passes. The surfacing material must not create unacceptable run-off or erosion problems. In order to provide directional information in an unobtrusive way, we suggest using a series of cedar bollards, two (2) feet in height, placed at various entry points and at forks in the system. The location of nature trails must give preference to the existence of natural features to minimize any negative impacts.

3. Inventory of Pedestrian and Bicycle Pathways

Through visual surveys, there is a large bicycling and jogging population that now exists in the Township. While the Township's pedestrian and bicycle pathway system is currently somewhat limited, it is continuing to



Sidewalk

expand as a result of the efforts of the Township and development community. Five (5) foot wide walkways or sidewalks are commonly found within many existing residential developments. More sidewalks and now bike paths are being approved and constructed within new residential projects like Walker Gordon Farm, Crossing at Grovers Mill, and Wicoff Estates. These pedestrian and bicycle pathway

systems are being connected with existing off-tract pathways. The Township's philosophy has been to require new residential development to provide for internal pedestrian and bicycle circulation and to contribute to the implementation of external portions of a larger and more complex municipal system.

In addition to the pathways serving residential developments, the Township has required pedestrian circulation systems within non-residential developments, i.e. Princeton Forrestal Center and Enterprise Business Center.

Major components of the existing pedestrian and bikeway system include the Lenape Trail which is located adjacent to the Cranbury Brook and connects George Davison Road and the Brittany townhouse development with Enterprise Business Center, Deer Creek and Fox Run Apartments, Pond View Drive (Waters Edge Park) and Maple Avenue (Mill Pond Park). The Lenape Trail also extends into Plainsboro Park and to Plainsboro Road across from the Municipal Complex.

Another important pedestrian pathway system exists along the Cedar Brook connecting Dey Road and Petty Road with Plainsboro Road, adjacent to the Gentry and Raven's Crest residential developments. This same system extends in back of the Aspen development along the Cranbury Brook and up to Plainsboro Road, where it runs north along Scotts Comer Road to Quail Ridge Drive and then west along Plainsboro Rd. in front of the Ashford, Hampshire, and Tamarron developments. Ultimately this network of pathways connects to the Lenape Trail and to Morris-Davison Park. Pedestrian paths also exist along Plainsboro Road connecting Hunters Glen with the Princeton Meadows Shopping Center, as well as along Plainsboro Road in the Village area.

The Princeton Forrestal Center has an extensive system of informal nature trails within wooded areas along the Bee Brook. Included along these trails are node areas that include benches, litter containers and trail bollards. Forrestal's nature trail system is largely confined to areas west of College Road East and north of Research Way. The trail system east of College Road East and south of Research Way has been removed from the Township's pathway plan to be replaced by sidewalk extensions between existing and proposed buildings and College Road East to provide pedestrian access to the College Road walkway system and the Bee Brook nature trail system located generally west of College Road East.



In addition to the nature trails, the Forrestal Center has paved walking/jogging paths along College Road East and portions of Scudders Mill Road. Additional paved pathways are planned along the extension of

Campus Road. The College Road East pathway extends across the Route 1/College Road grade separation to the Forrestal Village. A pedestrian crossing at College and Scudders Mill Roads, with a paved pathway along Scudders Mill Road, to Schalks Crossing Road, provides pedestrian and bicycle access from the Forrestal Center to the Post Office, Plainsboro Town Center Shopping Center, and the rest of the Village area.

In terms of bike routes, the Township's only posted bike route is located in the Forrestal Center along Research Way and College Road East.

Another important pedestrian/bike path network in the Township exists within the D&R Canal Commission Park, which connects Princeton and West Windsor Township to South Brunswick Township along scenic Carnegie Lake.

4. Master Plan Network

The primary goal of this plan is to foster the creation of a coordinated and comprehensive network of multi-use pedestrian and bicycle pathways throughout the Township – connecting residential, recreational, community facilities, commercial and employment areas. An effort has also been made to coordinate the Township's bikeway system with bikeways planned in neighboring Townships, Middlesex County and the State.



Village Sidewalks

switching back and forth of the bike paths from one side of a street to another.

The proposed bikeway system is intended to compliment existing and planned pedestrian pathways in the Township. In order to avoid redundancy between the bicycle and pedestrian pathway networks, an effort has been made, where feasible and appropriate, to utilize existing and planned pedestrian pathways for both bicyclists and pedestrians. For reasons of bicycle safety and convenience, the bikeway system has been designed with an eye towards maximizing continuity within the overall system. This is achieved by avoiding the creation of dead-end bike paths and minimizing the

In recent years, plans have been approved and, in some cases, construction has actually taken place to implement important pathway segments in the Township. Most recently, sidewalk improvements have been completed in the Village area along Edgemere Avenue, Parkway Avenue and Plainsboro Road. Additional pedestrian and bikeway

improvements are planned throughout the Township and particularly along Plainsboro Road in the vicinity of Morris Davison Park in response to traffic calming improvements recommended by the Planning Board. Funding for these improvements is being sought from the New Jersey DOT Transportation Enhancement Activities Program.

The 1990 Pathways Plan identified a new pathway network in the Township's farmland preservation area (R-100 and R-150 zones), along Grovers Mill Road, Cranbury Neck Road., as well as along the PSE&G right-of-way and a portion of the Millstone River. Among the most critical of these pathways would appear to be the one along the PSE&G right-of-way. This pathway connection will function to link the farmland preservation area of the Township, as well as the educational facilities area along Grovers Mill Road (Middle, Upper Elementary, North High School and planned Montessori School), with the residential and non-residential areas along and north of Plainsboro Road. This proposed pathway would connect with the existing Lenape Trail, further enhancing its usefulness as a pedestrian and bicycle path. A pedestrian/bicycle access easement from PSE&G, who have granted similar easements elsewhere in the State, will be necessary to make this pathway a reality.

Other major bike paths include those planned along Grovers Mill Road, Plainsboro Road, Dey Road, and within the Village area. Bike paths are also planned in order to link the Village area and east side of the Township with areas west of the Amtrak rail road, including: Walker Gordon Farm, FMC/Firmenich complexes, and the Princeton Forrestral Center including connections across Route 1 at the Scudders Mill Road and College Road to the Forrestral Village, Princeton Landing, Princeton Nurseries and the D&R Canal.

The following two maps, **Figure 8: Pedestrian Circulation Plan Map** and **Figure 9: Bikeway Plan Map**, shows existing, as well as planned and proposed sidewalks, pedestrian paths, trails, and bikeways to be constructed by developers, the Township and others.

5. Supplemental Facilities

To improve the quality of the proposed pathways system, it is important to provide supplemental or accessory facilities. These facilities will make the pathways and designations along the pathways more enjoyable, thus encouraging their greater use.

Bike parking facilities should be provided at various stopping points along a pathway for security and weather protection. For example, shopping centers, the Municipal Center and employment centers should have adequate parking facilities that are conveniently located near building entrances or other highly visible areas that are self-policing. As noted by the American Association of State Highway and Transportation Officials, bicycle parking that is not properly designed will encourage bicyclists to use trees, railings, and other appurtenances for bicycle parking, which may lead to damage to such structures.

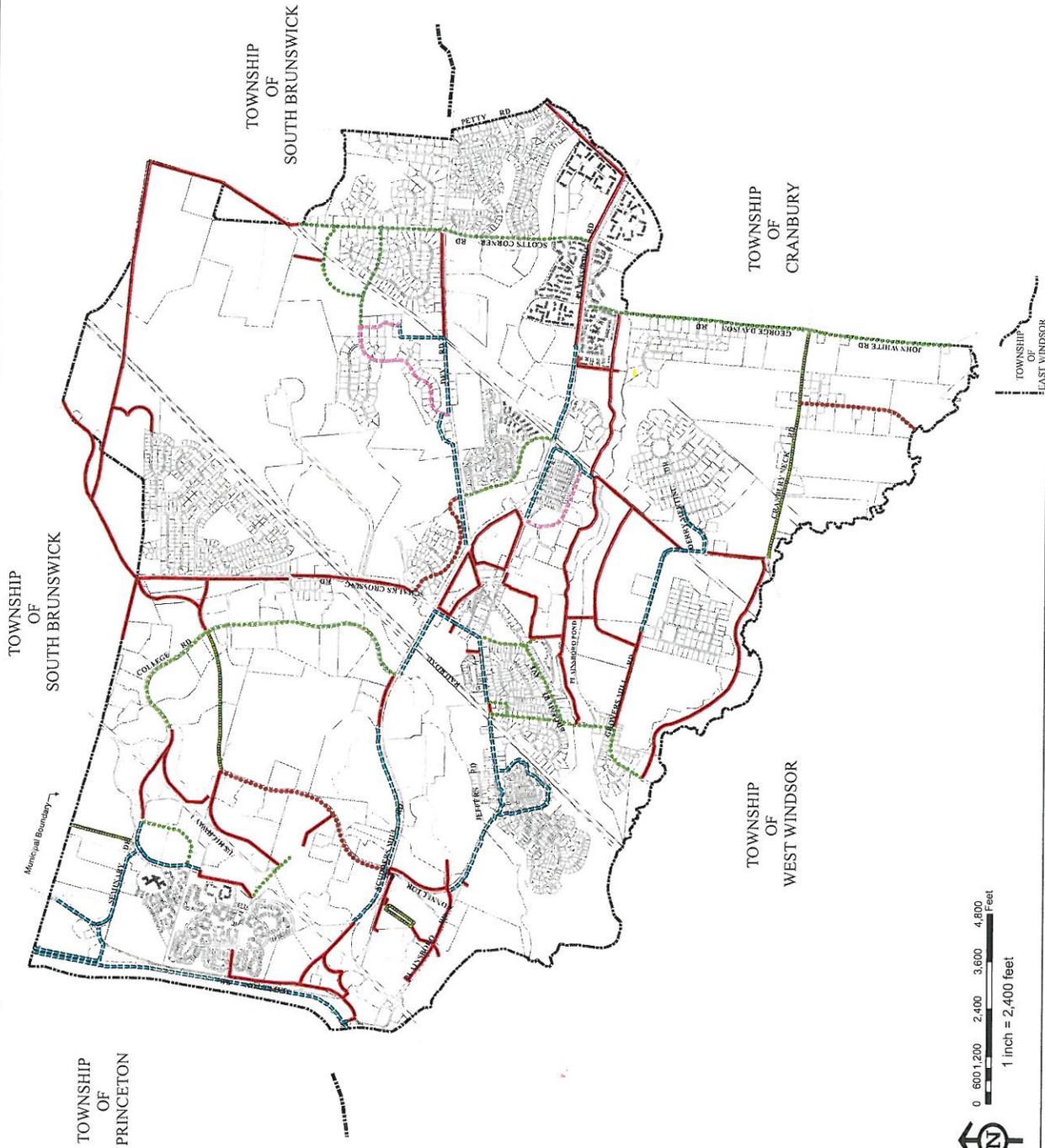


Township of PLAINSBORO

Middlesex County, New Jersey

BIKEWAY PLAN

April 2008



Bike Paths

- Existing Bike Path
- Planned Bike Path

Bike Routes

- Existing Bike Route / Dedicated Bike Lane
- Existing Bike Route / Shared Roadway
- Planned Bike Route / Dedicated Bike Lane
- Planned Bike Route / Shared Roadway

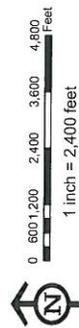


Figure 8



Prepared By:
David J. Samuel, P.E.
Township Engineer



Township of PLAINSBORO

Middlesex County, New Jersey

PEDESTRIAN CIRCULATION PLAN

April 2008

Existing Sidewalks, Pathways & Nature Trails

- 4' - 5' Wide Sidewalk, Existing
- 6' - 8' Wide Pathway, Existing*
- 4' - 6' Wide Nature Trail, Existing

Planned Sidewalks, Pathways & Nature Trails

- 4' - 5' Wide Sidewalk, Planned
- 6' - 8' Wide Pathway, Planned*
- 4' - 6' Wide Nature Trail, Planned
- Upgrade to 8' Wide Pathway, Planned*

* Shared Pedestrian and Bicyclist Pathways

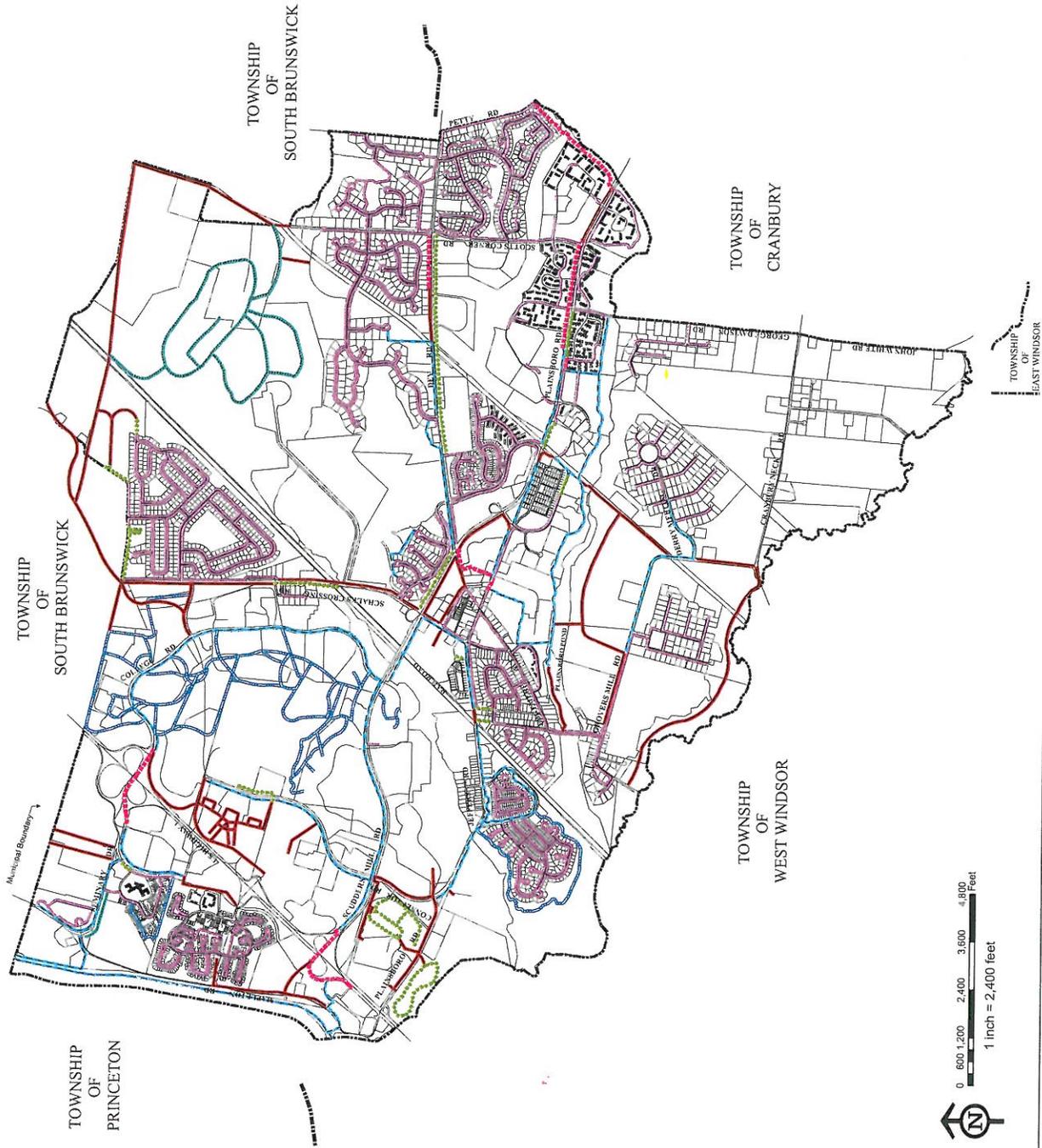


Figure 9

Prepared By:

 David J. Samuel, P.E.
 Township Engineer



Sheltered Bike Rack

Accessories such as park benches, trash receptacles, exercise stations and rest areas with restroom facilities and water fountains should be considered along bicycle and pedestrian trails. The Township's plan does not specifically address these supplemental facilities for several reasons. Since the pathways system has been designed to lead pedestrians and Bicyclist's into activity centers, accessories such as rest rooms and water fountains should be provided in conjunction with existing structures and park facilities. Parking facilities would also be provided within these activity centers. If these centers do not have adequate accessory facilities, provision should be made to provide them. Also, it will be easier to properly locate and determine the types of accessory facilities needed after the paths have been used over a period of time.

6. Implementation

In order for the Township to have a successful pedestrian and bicycle pathway system, an implementation strategy is important. Initially, the Township should amend its zoning, subdivision and site plan review ordinances to encourage the development of pedestrian and bicycle pathways by:

- Adding new definitions for pedestrian and bikeway facilities
- Specifying bicycle parking requirements for new development and redevelopment
- Providing bicycle parking facilities design standards
- Identifying the NJDOT Bicycle Compatible Roadways and Bikeways Planning and Design Guidelines as the principal standards for bikeway facilities



Bike Sign

After such ordinances are amended, the Township's Community Development, Recreation and Police Departments should work together to prepare and distribute a pathways plan package. Included in this package should be a detailed pathways map(s), generally accepted "Rules of the Road," and safety tips.

One of primary means by which the pedestrian circulation and bikeway plans will be implemented will be through the development process, whereby a developer of new development or redevelopment requiring subdivision and/or site plan approval(s), would be required to construct on-tract and possibly off-tract pathways as a condition of plan approval.

While the development approval process will be the primary means of implementing the pedestrian circulation and bikeway plans, an important secondary means of implementing such plans will be through the Township itself, as a result of funds obtained through County, State and/or federal programs. For example, funds may be available in the future through the State DOT Transportation Enhancement Activities Program, funded through the U.S. DOT SAFETEA-20 Program.

In order to communicate the existence of a planned bikeway system in the Township and to demonstrate early progress in the implementation of the bikeway plan, an effort should be made to quickly move ahead with the implementation of those portions of the proposed system that can be done so without significant expense or effort. For example, one task that should be considered for early action is the posting of "bike route" signs along those roadways proposed as bike routes that already comply with NJDOT bikeway standards.

7. Recommended Priority Bikeways

On September 22, 1998, a public outreach meeting or workshop was held in the Community Room of the Municipal Building. The purpose of this meeting was to obtain meaningful public feedback regarding the issue of where in the Township bikeway facilities are needed and what priority should be given to such facilities. With this in mind, the participants, including members of the various Township boards and committees, broke up into small work groups and proceeded to reach consensus about where bikeway improvements are needed and what priority should be given to each. The recommendations of the small work groups were used to create the following list of proposed bikeways that they recommend be given high priority. The proposed bikeway plan includes all bikeway facilities recommended at that meeting as follows:

Scudders Mill Road

- *From BMS west to existing pathway near Route 1 overpass.*
- *From Schalks Crossing Road East to P-Loop.*

Plainsboro Road

- *From P-Loop/Enterprise Drive east to Cranbury border.*
- *From Schalks Crossing Road west to Connector Road ending at Scudders Mill Road.*

PSE&G Right-of-Way

- *From Grovers Mill Road northeast to Woodland Drive.*

Scotts Corner Road

- *From Plainsboro Road north to Park Drive.*

Research Way

- *From College Road East to Schalks Crossing Road.*

Schalks Crossing Road

- *From Plainsboro Road north to Scudders Mill Road.*

Cranbury Neck Road

- *From Grovers Mill Road east to Cranbury border.*

I. Rail Transportation

As the Township continues to experience population growth, a greater burden is placed on Plainsboro's road network. As a result, there is a need to integrate alternative modes of transportation into the Township's circulation system.

One of these transportation methods involves rail transportation facilities. There is one existing rail station, the Princeton Junction Train Station that serves the majority of Plainsboro's rail commuters. In addition, another rail facility is being planned in South Brunswick which also could eventually serve Township rail commuters.

1. Princeton Junction Train Station

The Princeton Junction Train Station services most of Mercer County's and part of Middlesex County's rail transit needs. Since the closest rail stations are in New Brunswick, Trenton, and Hamilton Township many commuters travel to Princeton Junction from Ewing Township, Hamilton Township, Lawrence Township, Princeton Township and Borough, Washington Township, South and North Brunswick Townships, Cranbury Township as well as Plainsboro Township. In addition, Pennsylvania commuters use the Princeton Junction Train Station.

The Princeton Junction Train Station provides Amtrak and New Jersey Transit service. Amtrak service provides links south to Philadelphia and Washington D.C. and further down the eastern coast. New Jersey Transit service has scheduled service to New York's Penn Station and various stops in New Jersey.

With regard to parking facilities at the Princeton Junction Train Station, these facilities are currently at capacity during morning rush hours. There

are both daily and permit parking lots at the station area. These parking lots are owned by New Jersey Transit, West Windsor Parking Authority and private interests.

2. South Brunswick Train Station

One planned train station facility is being considered in South Brunswick Township. The new station is proposed along the northeast corridor at the end of Northumberland Way.

The impact of this rail station on Plainsboro commuters is difficult to determine until plans are finalized for the rail station. However, if the station is built, it is reasonable to expect that many of the Plainsboro residents on the NJ Transit waiting lists for Princeton Junction will benefit from the South Brunswick train station. In addition, Plainsboro residents currently using the Princeton Junction Station may decide to use the South Brunswick Station because of its proximity.

J. Air Transportation

There are no airport hazard areas within the Township. The only air strip in the Township was located within Princeton Forrestal Center which was closed in 1988. Currently, the Township is serviced regionally by the Princeton Airport and the Trenton-Robbinsville Airport, and internationally through the Mercer County Airport, Philadelphia International and Newark.

Several corporate residents have helipad facilities including 800 and 900 Scudders Mill Road (Wyndham Hotel) and the Princeton Forrestal Center. A helipad facility may someday be proposed as part of the FMC Redevelopment Plan as a permitted use in the event of special facilities like a trauma center.

K. Implementation of Improvements

It is the Township's goal to implement all identified projects with the least impact on the Township tax payers. This is to be accomplished by encouraging NJDOT Route 1 improvements and the construction of Route 92, working with the County to have roadways under their jurisdiction improved, and by having land developers within the Township undertake or contribute toward roadway infrastructure improvements. The latter component is seen as having two parts: improvements within the Princeton Forrestal Center, and those outside it. Improvements within the Center are to be undertaken by the Center as specified in general development plan approvals. Outside the Princeton Forrestal Center, a combination or hybrid of Transportation Improvement District and Transportation Development Districts, impact fees, and negotiated improvements may be needed. All of these options are detailed below:

1. Traffic Management Plan (TMP)

Traffic improvements within the Princeton Forrestal Center are governed by a traffic management plan which seeks to coordinate the planning and development of sufficient acreage in the area of growth along Route 1, to

influence positively the pattern and quality for development in the area and to conserve the ecological resources of the Township.

The Traffic Management Plan (TMP) was proposed by Princeton University to the Planning Board as evidence of its ongoing commitment to the Township. Under this planning approach, rather than relying on a single projection of Forrestal Center's impact when complete in the distant future, the Township is assured that periodic assessments of the traffic impact of the Forrestal Center will be made and improvements will be implemented should they prove necessary and feasible. In addition, the plan reaffirms the University's commitment to assist the Township in gaining roadway improvements which will benefit the region.

2. Transportation Improvement District (TID)

The Transportation Improvement District (TID) is a logical component of the Master Plan in that it creates a mechanism to define and help finance specific off-tract improvements in a part of the Township ready to undergo major development. The TID can be considered a "sub-plan," enabled by the State's Municipal Land Use Law (MLUL) to further detail and refine master plan policies for managing growth in Plainsboro Township.

TID's are unified geographic areas. These areas are largely underdeveloped and are collectively zoned to accommodate much greater development than other locations within the Township. These areas are also targets for development pressures.

The Township has previously utilized a TID to foster construction of the College Road/Route 1 grade separation.

The legal basis for establishing a TID area is the Circulation and Utility Elements of this Master Plan. Essentially, the Township must identify the needed infrastructure improvements in one of these plans. Also, an ordinance must be enacted, based on these elements or studies, which contains standards that indicate how the impact of a particular project is to be measured.

To summarize, the following steps must be taken when establishing a TID area:

- a. Identify a related high growth area in the Township.
- b. Determine what road improvements are necessary in this growth area.
- c. Revise the transportation and /or utility element of the master plan to reflect the proposed TID area.
- d. Prepare an ordinance which identifies the standards by which to measure the share of future road improvements that is located

within the new TID area to be assessed with respect to each development application.

3. Transportation Development Districts (TDD)

The New Jersey Transportation Development District Act of 1989 involves financing transportation improvements in growth corridors. As stated in the Act, "Creation of these financing districts provides a mechanism in which the state, counties and municipalities will have the means to work together to respond to transportation needs on a regional bases as determined by growth conditions rather than upon the pre-existing municipal and country boundaries."

Basically, the Act encourages counties to become the leading agency in establishing a TDD area. However, the Act also leaves open the potential for the state or municipalities to form TDD's.

Transportation Development Districts (TDD) are another option to channel private monies into roadway infrastructure improvements. While the concept is sound, the implementation is problematic. The level of coordination needed among various government agencies is cumbersome, while the proportion of municipal dollars required is prohibitive.

In 2000, the state legislature set out to revise the 1989 TDD Act by introducing a new piece of legislation, the Transportation Enhancement District Act (TED). The TED process is a voluntary and cooperative partnership to share expenses of proposed transportation improvements, through a long-term comprehensive planning approach between public and private sectors. The TED provides for voluntary collaboration across local governments and with state transportation agencies and the private sector. It provides increased flexibility in meeting present and future transportation needs, in a locally driven process. The TED affords local governments the legal tools to determine how to fund transportation investments that support economic growth, by planning for and accessing both new development and redevelopment.

4. Impact Fees

To pay for expanded community services necessitated by significant growth over the last decade, municipalities are focusing upon the private sector to assist in paying for these services. Development impact fees are one way to shift the burden of paying for expanded or new facilities and improvements to developers.

5. Negotiated Improvements

Other than the previous use of a TID, all other non-governmental monies for infrastructure improvements have been negotiated from developers as part of the approval. This will continue as the only mechanism until a formal method is developed. While the timing of improvements is difficult

to program through negotiations, they can be often in excess of any predetermined formula and aimed where most urgently needed.

6. County Improvements

Many of the identified improvements are under county jurisdiction and must be included in the county's capital improvement program. It is anticipated that the county will incur expenses for the improvement beyond what is unattainable through private efforts.

7. Township Improvements

The Township's role has traditionally been to maintain the local roads which are constructed as part of development. While this is expected to continue, the Township's role has expanded to examine roads under other jurisdictions, primarily county, and work with the county to program necessary improvements. Additionally, the county has implemented a policy whereby the Township may acquire land needed to construct or widen a county road. Plainsboro reviews these items on a case by case basis. It is also anticipated that some roads under municipal jurisdiction will require improvement beyond normal maintenance. The Township may have to expend funds for some of these improvements if developer monies are unavailable.

L. Action Plan

The list below was taken from the Plainsboro Township Petition for State Plan Endorsement. It contains 27 projects that the Township would like to be able to implement. **Figure 10: Possible Projects To Be Funded by State**, locates these projects. Many of them would require some level of either funding or regulatory approvals, or both. The Township recognizes that the particular funding mechanisms as well as the regulatory requirements in New Jersey are very complex. It is anticipated that Initial Plan Endorsement will enable the Township to begin a dialogue with the respective State agencies which may be able to provide the Township with technical, financial or regulatory assistance as appropriate.

The State agencies represented on the State Planning Commission have agreed to offer their assistance, both technical and advisory, in order to help Plainsboro advance its planning efforts. However, it needs to be understood that this project list does not and should not be interpreted to create an expectation that would negate the need for respective environmental approvals or any other situation that would violate a law or regulation. And despite the name of the figure identified above, which identifies possible projects to be funded by the state, it needs to be clear that the State Planning Commission cannot commit state resources, including funding, beyond that which is appropriate and available during any particular budget cycle. However, it is expected that projects within an endorsed plan will receive a higher level of priority for the types of available funding.

It is further recommended that prior to final site plan approval of any project of submission of a parcel within the Township, that the extent of wetlands should be verified on these projects by obtaining a Letter of Interpretation (LOI) from NJDEP to the extent required by existing state regulations. Projects within the list below that reference funding by NJDOT will receive priority consideration for funding consistent with program requirements and subject to available funds.

1. Primary Priority Projects as Identified by Plainsboro

Figure Location 1: Upgrade or replacement of the Schalks Crossing Road railroad bridge to include widening for a bike and pedestrian path on the east side of the bridge. Roadway and east side pathway improvements on both approaches to the bridge and bike path and sidewalk construction to connect the Princeton Collection, other residential areas and the Princeton Forrestal Center to the north with the Village Center area to the south.

Figure Location 2: Construction of a pedestrian/bicycle bridge over the Cranbury Brook and construction of 8-foot wide pedestrian/bicycle pathways on both sides of the new bridge. The new pedestrian/bicycle pathway will begin at Grovers Mill Road and extend to the Township's existing Lenape Trail system. Construction of the new pathway will involve upgrade to the Township's Recycling and Conservation Center roadway access and permission from PSE&G to construct a bridge and pathway across the Cranbury Brook within their utility tower right-of-way. While PSE&G has not been receptive to Township initiatives in the past involving pedestrian and bikeway improvements within their rights-of-way, recent agreements reached between PSE&G and West Windsor Township involving such improvements, suggest a possible softening of their position on this matter.

Figure Location 3: Design and implementation of a much needed traffic calming project along Grovers Mill Road generally in front of the new West-Windsor /Plainsboro North Campus High School, the Upper Elementary School and the Middle School. This traffic-calming project would involve additional road widening, crosswalks, sidewalks and pathways, signage, landscaping within roadway islands and along school roadway frontages, and possibly some new, improved or additional site lighting.

Figure Location 4: Design and Implementation of traffic calming along Plainsboro Road between Morris Davison Park on the west and the municipal border with Cranbury Township on the east, near the Aspen and Ravens Crest residential developments. This project will compliment existing traffic calming improvements along this roadway to the west.

Figure Location 5: Design and construct traffic calming along Plainsboro Road between Wyndhurst Drive/Center Drive (at the main entrance to the Princeton Meadows shopping center) on the east and Enterprise Drive and the P-loop jug handles on the west to include landscaping, crosswalks, signage and bus shelters.



Township of PLAINSBORO

Middlesex County, New Jersey

POSSIBLE PROJECTS TO BE FUNDED BY STATE

April 2008

Priority I

1 → 10

Priority II

11 → 16

Priority III

17 → 26

Note: Refer to Initial Plan Endorsement Petition Report - "Expected State Benefits" for specific project details.

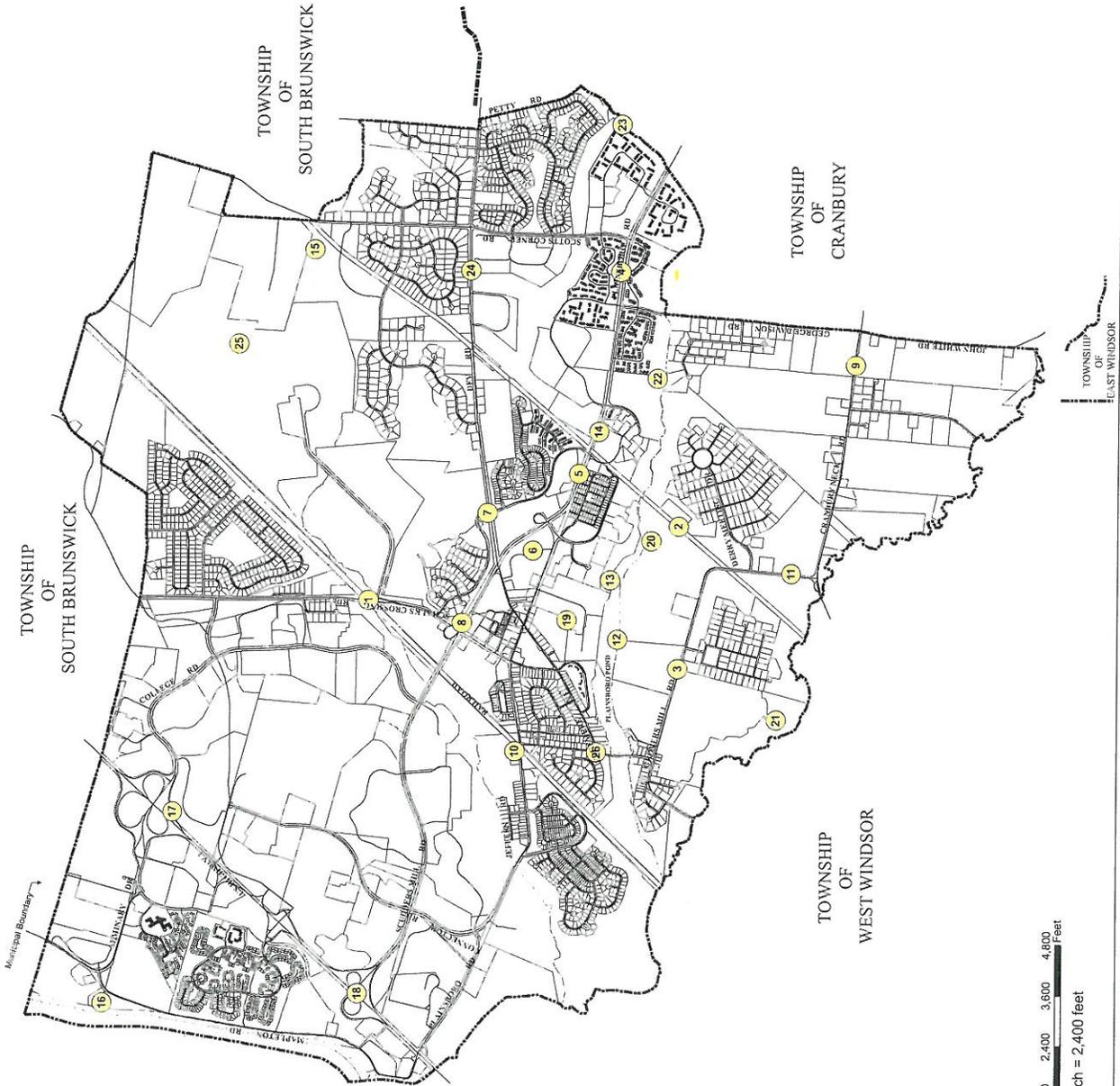


Figure 10

Prepared By:

 David J. Samuel, P.E.
 Township Engineer

Figure Location 6: Upgrade and construction of an eight (8) foot wide pedestrian/bicycle pathway system on the Municipal Complex site along Scudders Mill Road, Plainsboro Road and a connection between these two (2) roads through the site as shown on the Master Plan bikeway plan.

Figure Location 7: Traffic signalization at the intersection of Dey Road and Wyndhurst Drive. This improvement will make it safer for school buses to enter and exit the adjacent elementary school site and improve pedestrian/bicycle circulation in the area.

Figure Location 8: Construction of a sidewalk extension along the north side of Scudders Mill Road from the intersection of Scudders Mill Road and Schalks Crossing Road on the west to the location of the existing bus stop to the east. This project would also include the placement of a new bus shelter in this area.

Figure Location 9: Reconstruct Cranbury Neck Road from its Intersection with Grovers Mill Road on the west, to its border with the Township of Cranbury at John White Road on the east. Reconstruction is to involve the provision of bike lanes on both sides of the road and appropriate bike signage and directional signage.

Figure Location 10: Pathway construction of the village area Plainsboro Road bike path project (south side of Plainsboro Road) from the Community Gardens on the west to Prospect Avenue on the east. This project is fully engineered and ready to move to the construction phase.

2. Secondary Priority Projects Identified by Plainsboro Township

Figure Location 11: Pathway construction along the eastern edge of Grovers Mill Road. This project will connect an existing Princeton Crossing residential development with bike lane implementation along Cranbury Neck Road.

Figure Location 12: Construction of a pedestrian/bicycle bridge across the Plainsboro Pond with pathways on either side of the bridge making connections to the Lenape Trail and Grovers Mill Road. This bridge and pathway project will serve as access to a Middle School, the Upper Elementary School and the North Campus High School as well as access to the Township's linear park system.

Figure Location 13: Resurfacing and making other needed improvements to the existing six (6) foot wide Lenape Trail system located along the Plainsboro Pond and Cranbury Brook to more safely accommodate existing and anticipated walkers and joggers and bicycle usage. Widen to eight (8) feet where appropriate and possible with functional sensitivity to existing environmental resources.

Figure Location 14: Sidewalk construction along the frontage of the Princeton Meadows Shopping Center, from both intersections of Center Drive with Plainsboro Road.

Figure Location 15: A pathway interconnection between Community Park and the Plainsboro Preserve and the Environmental Education Center along Scotts Corner Road from the Community Park driveway entrance to the Plainsboro Preserve driveway entrance.

Figure Location 16: Design and construction of a pedestrian/bicycle bridge over the D & R Canal, connecting the Township's pathway system on the east side of the Canal with the D&R Canal pathway on the west side of the Canal.

3. Longer Term Priority Projects Identified by Plainsboro Township

Figure Location 17: Construction of a pathway along the Route One frontage of the Robert Wood Johnson Foundation to connect the North Campus office development and other Princeton Forrestal Center projects near Campus Road to the south with the existing pathway network to the north along College Road, including the Princeton Forrestal Village on the west side of Route One. This connection would greatly improve access between these two areas, as called for in the Master Plan bikeway plan.

Figure Location 18: Upgrade and maintenance of the existing sidewalk system across the Scudders Mill Road grade separation location at Route One.

Figure Location 19: Upgrade and maintenance of the existing Township pathway located within an existing park (Plainsboro Park) and extending along the edge of a large apartment complex (Fox Run). This will connect Plainsboro Road with the Lenape Trail.

Figure Location 21: Design and construction of a natural pathway along the Plainsboro Pond/Cranbury Brook connection with the projects No.12 and No. 20 to complete a pathway loop and to serve as a unique nature trail.

Figure Location 22: Upgrade and maintenance of the existing pathway that connects Plainsboro Road with the Lenape Trail. It is located between a townhouse development (Brittany) and an existing apartment complex (Deer Creek).

Figure Location 23: Design and construction of a pathway along the Cedar Brook between Petty Road and Plainsboro Road to service residential developments in the area.

Figure Location 24: Construction of a pathway along the northern edge of Dey Road between the PSE&G power line right-of-way and Scotts Corner Road. Pathway will provide for continuous access along Dey Road into the Village Center area of the Township.

Figure Location 25: Upgrade and maintenance of existing trails within the “Plainsboro Preserve” area of the Township to enhance opportunities to better observe and make use of this large natural area.

Figure Location 26: Evaluation, design and construction of a traffic signal at the intersection of Edgemere Avenue and Maple Avenue. This signal will improve traffic flow during both the AM and PM peak hours and result in traffic calming. Crosswalks and sidewalk connections would also be considered for this project.

4. The Township, NJDOT and others should participate in the discussions regarding the BRT and look to link regional employment centers, new facilities and Plainsboro Village accordingly.
5. Township, NJDOT, OSG and others should continue participating in discussion and study efforts regarding the Route 1 Regional Growth strategy Study being conducted by NJDOT for the purposes of exploring land use policies to support a BRT.
6. Where practical, implement multiple roadway and pedestrian and bikeway pathway projects in accordance with all existing local, county and state regulations and funding contract requirements with the assistance of NJDOT, OSG, and NJDEP, as appropriate, to advise on application of applicable design standards and environmental regulatory requirements.
7. Schedule and meet with NJDEP representatives to discuss the project known as the Campus Road Extension.
8. Re-activate “Park and Ride” service to Princeton Junction Station. Install bus shelters at key locations throughout the township along the existing Bus Route 600 service line. Continue to work with NJ Transit on study of BRT options for Plainsboro.
9. Reconstruct +/- one (1) mile of Cranbury Neck Road from its intersection with Grovers Mill Road on the west, its border with the Township of Cranbury at John White Road on the east. Reconstruction to involve the provisions of bike lanes on both sides of the road and appropriate bike lane signage & directional signage. Implementation of several identified pedestrian, bicycle & pathway improvements with the assistance of NJDOT, OSG and NJDEP, as appropriate, to advise on application of applicable design standards and environmental regulatory requirements.
10. Design and implement traffic calming projects with the assistance of NJDOT, OSG, and NJDEP, as appropriate to advise on applicable design standards and environmental regulatory requirements.
11. Install traffic signal at intersection of Dey Road and Wyndhurst Drive in order to facilitate safer ingress and egress to and from elementary school site, and also improve pedestrian/bicycle circulation in the area.

12. Construction of new sidewalk extension as identified in the township pedestrian plan and installation of a new bus shelters where appropriate with the assistance of NJDOT, OSG, and NJDEP, as appropriate, to advise on application of applicable design standards and environmental regulatory requirements.
13. Upgrade or replace Schalks Crossing Road railroad bridge to include widening for a bike path on one side and a sidewalk on the other with the assistance of NJDOT, OSG and NJDEP, as appropriate, to advise on applicable design standards and environmental regulatory requirements.
14. Explore funding related to consideration and review of BRT options for Plainsboro.
15. Consider an amendment to the Township Code (Chapter 85, Subdivision & Site Plan regulations) specifically requiring that new or modified access to US Route 1 be in accordance with the State Highway Access Code (SHAC).

In addition to the physical improvements noted on Figure 10 it is equally important to continue to pursue and support expanded New Jersey Transit 600 bus service and Bus Rapid Transit, the construction of bus shelters, encourage trip reduction strategies and continue to find ways to reduce the dependence on the private automobile to access services, employment and recreation needs.

The Township should continue to be active in the Central Jersey Transportation Forum and Middlesex County Coordinating Committee. It is important that Route 1 continues to work in an efficient manner through the Township and as such the Township should continue to support improvements like the extension of Campus Road and Nursery Road, the construction of a slip ramp from Route 1 into the Forrestal Village, and the construction of Route 92. It is important to point out that no new curb cut access points are associated with any Forrestal development activity and that the proposed Medical Center will utilize an existing FMC Route 1 curb cut. The Township feels that it is important to maintain and support the transportation integrity of the Route 1 corridor.