

***TOWNSHIP OF
SOUTH BRUNSWICK***

County of Middlesex

**2001 COMPREHENSIVE MASTER PLAN
TOWNSHIP WIDE CIRCULATION ELEMENT**

**APPROVED NOVEMBER 13, 2001
BY THE
SOUTH BRUNSWICK TOWNSHIP PLANNING BOARD**

**ALAIMO GROUP
ALEXANDER LITWORNIA AND ASSOCIATES**

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Alexander J. Litwornia, P.E.
New Jersey Professional Engineer No. 18396

The document original was signed and sealed in accordance with N.J.A.C. 13:41-1.3, and is filed in the Township Clerk's office.

**ALAIMO GROUP
ALEXANDER LITWORNIA AND ASSOCIATES**

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2001 COMPREHENSIVE MASTER PLAN
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1. CIRCULATION ELEMENT INTRODUCTION AND OVERVIEW

South Brunswick Township recognizes the need for a comprehensive planning and engineering approach to the development of the 2001 Master Plan Township Wide Circulation Element. This Circulation Element addresses the transportation complex in the South Brunswick region. Over the past twenty years, South Brunswick itself has experienced an explosive population increase which more than doubled its number of residents. The Township's population in 1980 was 17,127, which grew to 37,734 in 2000.¹ Land use projections for the Township and region show continued expansion. Correlating directly with the increase in population is the expansion of residential, commercial and industrial development throughout the Township. Coupled with strong growth in surrounding communities, the volumes of commuters who originate in or pass through South Brunswick has caused levels of service on local roadways to decrease dramatically. The Township's roadway network has become congested and everyone is effected. Commute times increase and the delivery of goods is delayed. Local air quality is impacted. In order to help alleviate these traffic related problems, the Township's roadway network has grown and been improved to a limited extent to accommodate the new volumes of traffic. Continued effort is necessary to provide for acceptable traffic circulation within the Township. It is critical; however, to maintain a high quality of life for all Township residents, particularly within residential neighborhoods, by applying specific traffic control techniques throughout the community.

The goal of the South Brunswick Township Circulation Master Plan is to develop a Township Wide Circulation Plan which identifies current traffic characteristics and future roadway alignments and improvements, while providing for the highest quality of life for Township residents. Future alignments and improvements are based on criteria including but not limited to: the need to protect residential neighborhoods from excessive traffic; current and projected traffic characteristics; existing and future land use; environmental resources; NJDOT, Turnpike, County and adjacent community related traffic plans and recommendations; the 1989/1992 South Brunswick Circulation Master Plans; the 1994 and 2001 South Brunswick Township Reexamination Reports; and historical Township Master Plans.

¹*1980 and 2000 U. S. Census*

Over ninety percent (90%) of all trips in the region are made by automobiles and trucks. Highway and local roads provide the critical link in the regional transportation network. Mass transportation segments for the movement of people in the region also play a vital role. South Brunswick Township residents must have ready access to the regional rail facilities and the regional park and ride lot. In addition, Township residents must have access to safe and convenient bikeways and pedestrian access ways. The current South Brunswick Parks and Recreation Master Plan provides for and encourages bike and pedestrian access in appropriate locations based on safety and convenience. The Parks and Recreation Master Plan is currently being updated to further detail walking/biking as modes of transportation.

South Brunswick Township and Middlesex County have recognized the need for comprehensive planning and engineering solutions to meet the Township's current circulation problems. Middlesex County has identified in their County Master Plan several proposed improvements, which fall under their jurisdiction, and will help reduce traffic congestion within the Township. They include the Finnegans Lane/Davidsons Mill Road connection which extends through North Brunswick Township, and proposed improvements along Deans Rhode Hall Road east of Route 130. The Township Planning Board has supported proposed projects which will reduce traffic congestion, improve overall circulation, and protect the heritage of the Township. The Township's 1994 Master Plan reexamination identifies several locations where intersection and/or roadway improvements are suggested. There was a total of thirty-two (32) intersection improvements identified in the 1994 Plan and there were fourteen (14) proposed roadway improvements.

Proposed intersection improvements primarily include the following:

- | | | | |
|---|---|---|-----------------------|
| ! | signal timing | ! | drainage improvements |
| ! | creation of left or right turning lanes | ! | re-striping |
| ! | intersection widening | ! | grading |

Proposed roadway improvements primarily include the following:

- | | |
|-----------------------|-------------------------|
| ! roadway widening | ! grading |
| ! roadway realignment | ! drainage improvements |
| ! resurfacing | ! creation of new roads |
| ! re-striping | |

Based on research documented in this report, additional options are recommended to improve traffic flow in South Brunswick. These include the proposed roadway construction shown on The Proposed Roadway and Intersection Improvements Plan P-2. Also identified are proposed intersection improvements which are also shown on The Proposed Roadway and Intersection Improvements Plan.

As a result of the review of the Municipal documents and the proposed and recommended transportation improvements, various transportation districts have been developed. These transportation districts can be seen on the Transportation Development District Plan P-1.

South Brunswick Township's existing ordinance for off-tract contributions has been reviewed and evaluated based on current rules, policies and procedures established by recent court rulings, state legislation and regulations. The new draft ordinance is provided as a separate document, and is intended to be the basis for off- tract contributions to the Township.

2. HISTORICAL GROUNDING

Over the past twenty years the Township of South Brunswick has experienced significant population growth and land use changes. The population has more than doubled, and the infrastructure has increased dramatically as the result of over 8,000 acres of vacant and agricultural lands having been developed. South Brunswick has increasingly become a regional center, as well as a link to other centers. This growth and regional role dramatically burdens the municipal roadway network. South Brunswick's officials have helped guide managed growth and achieve a relatively balanced tax base while maintaining nearly half of the municipality as open space, agricultural lands and preserved natural resources. While recognizing land owner rights to use their property, the township has developed numerous plans and documents which have provided guidance and direction for managed growth. These plans and documents include:

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Township Master Plans and Supporting Documents

- ! The 1982 Township Master Plan
- ! The 1988 Master Plan and Master Plan Reexamination
- ! The 1994 and 2000 Master Plan Reexamination Reports

Township Circulation Plans and Middlesex County Transportation Plan

- ! The 1989 Township Circulation Master Plan
- ! The 1992 Township Circulation Technical Memorandum
- ! The 1999 Middlesex County Transportation Plan

Each of these plans was examined and their specific recommendations were evaluated and listed below. This analysis provides the historical grounding of the 2000 Circulation Master Plan and the continuity of efforts by the Township to provide a working circulation infrastructure to efficiently move people and goods.

1982 TOWNSHIP MASTER PLAN

Rural

- ! Two large rural areas were designated: one was located in the Fresh Ponds area and the other in the area lying west of Route 130 and south of the Villages of Monmouth Junction and Dayton.
- ! Extensive development in rural areas was discouraged.
- ! Limiting uses in rural areas to residential, agricultural, public and open space/conservation.
- ! Lot sizes should not average more than one dwelling unit per two acres.

Residential

- ! Incompatible land uses that have existed in residential areas should be eliminated or adequately buffered and separated from residential uses.
- ! Residential uses should be separated from roads which carry primarily nonresidential traffic loads. No residential frontages should occur on these nonresidential roads.
- ! In wooded areas, residential uses should be clustered in order to preserve woodlands and enhance residential development.
- ! Residential density concentrations should be based on adequate consideration of facilities, utilities and transportation.
- ! Creation of a town center area with higher density housing, supporting commercial development with a focus on a new road network and a proposed rail passenger station.
- ! Continued recognition of the existing villages of Kendall Park, Franklin Park, Kingston, Monmouth Junction, Deans and Dayton and the creation of new villages in the vicinity of Dayton, Monmouth Junction, the Heathcote area and near Deans Lane.
- ! Development of adequate affordable housing for low and moderate income families (including senior citizens).
- ! Improvement of the existing housing stock in the Township.

Commercial

- ! A variety of commercial complexes and uses should be planned to meet varying needs of neighborhoods, retail, highway and local service professionals.

- ! The various commercial uses should not conflict with industrial and residential uses, but be compatible with them.
- ! Commercial uses should not be scattered, but located in consolidated places, so circulation and public transportation can be effectively provided.

Employment Centers

Employment Centers include industrial, research and major office centers.

- ! Major arterial roads and railroads should be directly available to industrial sites.
- ! Utilities, such as sewer, water and electric should be available.
- ! Sufficient land should be provided to allow for expansion.
- ! Residential uses near these uses should be buffered adequately.
- ! Consideration should be given to environmentally sensitive areas when designing developments in Employment Center areas. The environment should not be impaired by the development of rateables.
- ! Industries which have reduced water usage should be encouraged.

The Circulation Plan Element of 1982 also referred to the goals and objectives which were set forth in the 1974 Master Plan:

- ! Provision should be made for inter- and intra-township traffic movement.
- ! Local traffic should be separated, as much as possible, from through traffic.
- ! Provision should be made for better access to the various land use elements.

- ! Safety and efficiency for traffic should be a constant parameter for circulation design.
- ! Provision should be made for a variety of modes of transportation, including pedestrian, vehicular, equestrian, cycling and public transportation (rail, bus, etc.).
- ! Adequate separation and linkages between various transportation modes should be made.
- ! Roadways should be carefully designed to handle necessary volumes; however, they should not be over-designed.

Specific 1982 Master Plan Recommendations and Conclusions Involving:

Route 27 North of Route 518

- ! Route 27 should ultimately be widened to four lanes with paved shoulders.
- ! The intersection at Route 518 should be improved to accommodate an extension of 518 to the (then) proposed Route 522.
- ! The intersection at Sand Hills Road should be improved to provide a traffic light and accommodation of left turns for southbound Route 27 traffic.
- ! The intersection at Beekman Road needs site distance improvement, the addition of a traffic light and the ability to accommodate left turns for southbound Route 27 traffic. The increased importance of Beekman Road in future traffic circulation in the Township should be reflected.
- ! At Henderson Road, left turns for southbound Route 27 traffic needed to be accommodated. More flexibility for turning movements by widening Henderson Road in the vicinity of the traffic light should be provided.

- ! The Finnegan's Lane intersection should be improved to relocate the primary intersection to the north, opposite South Drive. This improvement also involves, Middlesex County, North Brunswick and Franklin Townships.

Route 27 South of Route 518

This section of Route 27 is shown at a lower function than the northerly section because of more restrictive development proposed in the Route 27 corridor in both Franklin and South Brunswick, and further because the traffic volumes are lighter at this end of the highway, and the opportunities for widening are more limited because of narrow right-of-way in the Kingston area. Intersection improvements in this section of Route 27 will be needed at proposed Routes 92 and 522, with the Route 92 intersection impacting the Raymond Road intersection as well.

Route 1

Several intersections were identified in 1988 as needing improvement. They include:

- ! The intersection at Ridge Road, which required intersection redesign that will be carried out as a part of the construction of (proposed) Route 92. This will be a major reconstruction project which must accommodate heavily-traveled Ridge Road as well as Route 92. In the event Route 92 is not built, the Ridge Road intersection will need to be upgraded to handle increasing traffic from employment center development. Providing jughandles at the northeast and southwest corners of the intersection should help to minimize conflicts related to turning movements in the intersection.
- ! The intersection at Stouts Lane, will have to be upgraded to provide for realigned Route 522.
- ! The intersection at New Road had many conflicting turning movements and the high volume of traffic called for redesign of the intersection. This will require installation of jughandles at the northeast and southwest corners to minimize turning movement conflicts. As the highest accident intersection in the Township, and in an area proposed for more development, is critical to upgrade

this intersection before additional development intensifies already existing problems. Because of the problems related to turning movements at the intersection, the possibility of three phase timing of the light to handle left turns more effectively should be pursued to see whether it can be accomplished without affecting the “green” time for Route 1 traffic, which is critical to the regional traffic flows.

- ! The intersection at Major Road was also one of the highest accident intersections in the Township. It was desired to reduce the traffic volumes through the intersection through the construction of the Beekman Road Extension. Due to limited sight distance for traffic at the light, “NO TURN ON RED” signs should be installed for both Major Road and Sand Hills Road traffic. As with the New Road intersection, the possibility of a left-turn phase in the traffic light cycle should be explored.

- ! At the jughandle north of Major Road, redesign will be needed to accommodate the extension of Beekman Road, which is proposed as a Secondary Arterial and a major part of the street system in the future of South Brunswick. Full four-way jughandle design should be incorporated in this at-grade intersection.

- ! At the combined intersection of Deans Lane and Henderson Road with Route 1, redesign should reflect the construction of the Henderson Road Extension to Black Horse Lane and the reduced importance of the westerly portion of Deans Lane in the overall flow of traffic in the Township. If possible, the Deans Lane jughandle with Route 1 should be eliminated, and a new jughandle added at the southwest corner of the intersection of Route 1 and Henderson Road to serve left turns from southbound Route 1 traveling toward Deans Lane.

- ! At Black Horse Lane, the intersection should be improved as necessary to handle the anticipated increase in volume due to the designation of Black Horse Lane as a major collector, and the de-emphasis on Deans Lane.

- ! At Finnegan's Lane, intersection redesign will be needed to reflect the extension of Finnegan's Lane to Route 130. Until that road extension in North Brunswick is carried out, no intersection improvements are recommended.

Route 130

Several intersection improvements were identified in 1988 as necessary along Route 130:

- ! At Dey Road, improvements will be needed because of the increasing importance of that road in the traffic circulation pattern in Cranbury and Plainsboro. A traffic light and an improved accommodation of left turns off Route 130 are needed improvements.
- ! At Georges Road south of Dayton, traffic will increase due to both residential and industrial growth, necessitating a traffic light.
- ! At Griggs Drive and Fresh Ponds Road, realigned Route 522 will cross Route 130, requiring major intersection redesign and proper routing of traffic from Dayton heading toward East Brunswick via Fresh Ponds Road. Fresh Ponds Road is an important secondary collector serving the rural area in that part of the Township.
- ! At Deans-Rhode Hall Road, the Township's second highest accident intersection, traffic light and turning lane improvements are needed to correct a very serious design problem in the intersection. This is the highest priority improvement in the Route 130 corridor.

Beekman Road between Route 27 and Route 522

This is an important link between developing areas of South Brunswick, Franklin Township and the Town Center area and (new) Route 522. It will also be an important link to Route 130 and the Turnpike since it will provide local road access to the important proposed Route 522 crossing of the railroad.

Finnegan's Lane between Route 27 and Route 130

This proposal primarily involves North Brunswick Township, but it would also provide a new crossing of the railroad. Crossings are relatively infrequent in this area.

Route 522 West of Route 1

Most of this right-of-way has been acquired through dedication. It should be developed as a part of the development of residential uses in the area.

Route 522 East of Route 130

This alignment lies along the southerly boundary of the taking line for Pigeon Swamp.

Route 535 from Cranbury to East Brunswick

This is an important county road, connecting Route 130 in Cranbury, past the entrance to the Turnpike at Exit 8A, extending through the heart of East Brunswick and into South River. It is more important as a regional roadway than as a road providing service for residents of South Brunswick.

Dey Road

This road is more important for the region than it is for the Township, serving to improve traffic flows in both Cranbury and Plainsboro.

Major Collectors

The Major Collectors shown on the 1982 Circulation Map were intended to serve primarily local needs. They should be designed to provide for two moving lanes of traffic and two paved shoulders. Four lane design is discouraged because of the difficulties it presents in gaining access to adjoining uses. Controlled access to these collectors is important. Right-of-way width should be a minimum of sixty-six feet (66'), which allows for a minimum forty foot (40') paved width and sufficient additional right-

of-way for pedestrian walks or bikeways. Residential and industrial development along these roads should have additional front yard setbacks or reverse frontage with dense planting. Direct driveway access should be kept to a minimum.

Major collectors shown on the 1982 Circulation Plan are listed below:

1. New Road between Route 27 and (proposed) Route 522.
2. Sand Hills Road.
3. Major Road.
4. Black Horse Lane and the easterly portion of Deans Lane.
5. Shalks Crossing Road extending from Ridge Road into Plainsboro.
6. Ridge Road extending from Route 1 to east of Shalks Crossing Road.
7. Stouts Lane.
8. Kingston Lane.
9. Georges Road.
10. Monmouth Junction Road east of Kingston Lane.
11. Jamesburg Road.

1988 TOWNSHIP MASTER PLAN

Rural

- ! The area adjacent to the industrial district west of Route 130 was given a land use option from traditional rural residential development. This was based on the availability of public water and sewer being able to extend west from Route 130.

- ! In all other rural areas, extensive development should be discouraged.

Residential

- ! Residential uses should be buffered from collector or higher function roadways.

- ! There should be coordination of higher density housing with supporting commercial development involving the new road network outlined in the Circulation Plan and the proposed rail passenger station.

- ! The Village of Kingston is a historic district and any land use changes in this Village must conform to preservation regulations.

The 1988 Master Plan contained a Preliminary Circulation Plan completed by Garmen Associates in 11/87. Identified problems included:

1. Congestion at all Route 1 intersections.

2. Congestion at all Route 27 intersections.

3. Cross Township circulation is limited due to the railroad.

4. Numerous large scale projects throughout the Township will create the need for new arterial roadways.

Several major goals and objectives were also identified in the Garmen Plan.

1. Route 1 should be a limited access highway.
2. Additional east-west arterials are needed.
3. Large scale projects present an opportunity to fund and construct new arterials both on and off-tract.
4. Provision of a train station would be highly desirable.
5. Numerous existing intersections throughout the Township should be improved.
6. Road widening of existing Township and county streets is recommended.
7. Traffic circulation throughout the Township should be safe and efficient.
8. Provision should be made for a variety of modes of transportation, including pedestrian, vehicular, equestrian, cycling and public transportation (rail, bus, etc.).

Specific recommendations in the 1988 Master Plan were as follows:

1. Route 1

- ! All Route 1 intersections are to be improved. Eventually make Route 1 a limited access highway.

2. Route 522

- ! Construction of a new Route 522 which would function as an arterial and to be developed with a four lane divided roadway.

3. Perrine Road - Greenlands Boulevard

- ! Perrine Road is to be widened and extended out to Route 1. The new four lane arterial extension is called Greenlands Boulevard. Greenlands Boulevard will intersect with the (new) Route 522 and Route 1.

4. Beekman Road

- ! Beekman Road is to be widened and a new extension out to Route 1 was recommended. A major intersection was also recommended at the Beekman Road/Route 1 intersection.

5. Finnegan's Lane

- ! A new intersection with Route 1 was recommended which would extend the road through North Brunswick out to Route 130.

6. Northumberland Way

- ! Construction was recommended for a new four lane arterial road parallel to Route 1 through the new Princeton Park office development. This new roadway would connect to the new Beekman interchange at Route 1, cross through Princeton Park & Town Centers and connect up with the (new) Route 522.

7. Arterial Way East and West

- ! A new East-West arterial was proposed to primarily connect Route 130 in the east with Route 1, Route 522 and out to Route 27 in the west.
- ! East of Route 130, Deans Rhode Hall Road will be realigned directly with Arterial Way and be widened.

8. Railroad Station

It was recommended that a new railroad station be built in the Deans Pond area.

9. Proposed Route 92

This proposed state roadway would connect the Route 130/Route 32 Interchange with Perrine Road, Route 1, Route 27 and continue into Franklin Township.

10. Intersections

Most of the intersections of collector or higher function roads in the Township were recommended for improvements.

1989 Circulation Master Plan and 1992 Technical Memorandum

Land Use Issues

1. There were 23 known residential projects plus 11 major tracts that could be developed as residential. It was estimated that residential dwelling units will more than double from 7,112 units to 16,826 units.
2. There were 24 nonresidential projects, along with two additional major tracts which could be developed for nonresidential. Existing office floor space totals of square footage could increase from 1,758,000 SF to approximately 9,239,000 square feet in the future, or over five times the existing amount. Warehouse and industrial space could increase from an existing total of 8,387,000 square feet to 24,936,000 square feet, or nearly triple existing figures.
3. Much of the growth in residential dwelling units would occur along Route 1.
4. Office space would also concentrate along Route 1.

5. The Route 130 area would also be heavily developed with approximately 7,000,000 square feet of new warehouse and industrial space.

The following specific roadway improvements identified in the 1989 Circulation Master Plan:

1. The widening of the New Jersey Turnpike from Exit 8A northward to provide two additional lanes in each direction.
2. The construction of Section 3 of Route 522 on a new alignment from New Road to Kingston Lane, thereby providing a bypass of Monmouth Junction.
3. The Route 1 widening project will provide a third lane in each direction, plus shoulders and acceleration/deceleration lanes wherever possible.
4. The Route 1 intersections in South Brunswick Township should have their existing traffic lights eliminated and replaced with grade separated crossings of major intersections. The following additional improvements were suggested:
 - i. The signal along Independence Way and Route 1 could remain, but Route 1 should be widened to three thru lanes in each direction.
 - ii. The Ridge Road intersection could ultimately be replaced by the (proposed) Route 92 interchange. In the interim, this signal should remain, but Route 1 should be widened to three lanes in each direction, and the Ridge Road approaches should be widened.
 - iii. The Raymond Road signal should ultimately be removed, the median opening closed, and turns into Raymond Road and Cavendish Drive should be right-in, right-out only.
 - iv. The Route 522 signal at Stouts Lane should be replaced by a grade separated interchange to serve the (future) Route 522.

- v. The Wynwood Drive/Whispering Woods Boulevard signalized intersection has been constructed to improve access to the South Brunswick Square Shopping Center. Once the Route 522 and New Road interchanges are completed, this signal should be removed and all access made right-in, right-out only.
 - vi. The New Road/West Arterial is proposed as a major new cross-town link which would intersect Route 1 in the vicinity of New Road. The existing signalized intersection should be removed and replaced with a grade separated interchange when this road construction is complete.
 - vii. Expansion of the Major Road intersection is needed to serve the access needs of the residential neighborhoods along it.
 - viii. Beekman Road should be realigned to intersect Route 1 between Deans Lane and Major Road, and to continue into Northumberland Way. A grade separated interchange will be needed at this location.
 - ix. As grade separated interchanges are completed in South Brunswick and further to the north in North Brunswick, the thru-traffic carrying capacity of Route 1 should be maximized by eliminating the traffic signals at Deans Lane, Henderson Road and Black Horse Lane. All movements into and out of the streets will become right-in, right-out only.
5. Route 27 was recommended to be widened to provide two thru lanes in each direction, from its intersection with Route 518 to the northerly Township boundary.
6. State Route 130 was recommended to have constructed a third lane in each direction from the area north of George's Road. This need is presently under study by the Department of Transportation. The area of Route 130 from George's Road southward to the Township boundary was designated as a special analysis area, in recognition of the large amount of development which could occur in that area. A consistent and systematic treatment of left turns, U-turns and jughandles

will need to be developed for this area.

7. A new Route 522 is being planned and constructed under various funding arrangements to connect Route 27 with Route 1 and Route 130, thereby providing a high capacity cross-town link to serve future circulation needs.
8. A new alignment of Route 522 should be developed from its future intersection with Route 130 eastward to the Bridge over the New Jersey Turnpike. This connection will eliminate (doglegging) of traffic on Route 130 from the new section west of 130 to the old section east of 130. The roadway should be four lanes wide.
9. Greenlands Boulevard/Perrine Road a major connection that will generally parallel Route 1 in the southern section of the Township, connecting Shalks Crossing Road to Ridge Road and the future Route 522.
10. A new connector should be built from Raymond Road to Route 522 which would be two lanes wide (one lane in each direction) plus turn lanes.
11. The Route 518 extension is proposed to connect Route 522 in the vicinity of the Route 1 interchange, to Route 27 at its intersection with Route 518. It is proposed to be two lanes wide, (one in each direction), and will be constructed in conjunction with development of the abutting properties.
12. The East-West Arterial is a major proposed connection that will join Route 27 with Route 1, Northumberland Way, George's Road and Route 130. It will generally parallel the new Route 522, and will provide additional capacity to serve the Jersey Center Metroplex project as well as opening access to additional developable lands. West of Route 1 it was proposed that the arterial be four lanes wide while to the east of Route 1 the arterial should be six lanes wide.

13. The construction of Northumberland Way will extend from a grade separated interchange at Route 1 eastward through the Jersey Center Metroplex to the vicinity of the rail station, then southward to intersect the East-West arterial and Route 522.
14. Beekman Road was proposed to be realigned to meet Northumberland Way at Route 1, and that the roadway be widened to four lanes from Route 1 to Route 27. At its intersection with Route 27, a minor realignment was recommended to align it with a local development roadway in Franklin Township.
15. A new connection would be made from Northumberland Way to Deans Lane at Blackhorse Lane, and that Blackhorse Lane be extended northward into North Brunswick to intersect the Finnegans Lane extension being planned there.
16. Henderson Road was proposed to connect Route 1 to Blackhorse Lane, to provide access to the Royal Oaks development and improve local circulation.
17. Deans Rhode Hall Road is an extension of the proposed East-West Arterial connecting it and Route 130 to a large industrial/warehouse/office tract located between the New Jersey Turnpike and Cranbury-South River Road. It was recommended to be four lanes wide in order to carry anticipated future traffic volumes.
18. Fresh Pond Road was recommended to be realigned in the vicinity of future Route 522 to provide an adequate separation from the Route 130/Route 522 intersection.
19. The intersection of Docks Corner Road with Dayton/Jamesburg Road should be realigned to provide an orthogonal approach angle.
20. The Herrod Boulevard extension was recommended to extend Herrod Boulevard northward from its present terminus north of Stults Road to intersect Docks Corner Road.

The 1994 Master Plan

Land Use Issues

1. A change in land use designation for Block 18, Lot 19.01: The 34.74 acre parcel which was zoned RR rural residential and Industrial Employment Center was changed to the office designation.
2. Block 31.01, Lot 29.13, a 0.47 acre parcel that was designated as Rural Residential and has been changed to Industrial.
3. Block 37, Lots 12.05 & 12.10 is a 12.2 acre area that requested a residential designation at village scale due to its relatively small parcel size.
4. Block 81, Lots 8.011, 8.24, 8.26 and 12 are a 65-acre site that was designated Low Density Residential. The Zoning Board of Adjustment recommended the site be redesignated to Employment Center - Office.
5. Portions of Route 1 (both sides) between Finnegans Lane and Wynwood Drive/Whispering Woods Boulevard should be amended from the existing and apparent haphazard land use designations, to a rational and comprehensive policy which generally encourages commercial and office uses with specific objectives and restrictions. This portion of Route 1 should be designated Corridor Commercial, where retail and/or office uses would be appropriate.
6. The Little Rocky Hill Area which includes miscellaneous lots located on Block 96 was changed from Single-Family Medium Density Residential between the Highgate Manor, Princeton Walk and Princeton Gate developments, to Single-Family Low Density Residential. This change resulted from the area being located adjacent to low density residential uses on its east and west sides, containing a considerable amount of freshwater wetlands and representing the headwater areas of the Heathcote Brook.

7. The areas associated with the intersection of Deans Rhode Hall Road and Cranbury-South River Road were recognized by the Planning Board to be an area suitable for commercial facilities. As a result, this intersection was designated as a Highway Commercial area.
8. The Blackhorse Lane area was changed from Mixed Medium Density Residential to Low Density Residential due to road conditions and access, environmental features and the need for sanitary sewer upgrade, which could possibly not accommodate higher densities.
9. The Heathcote/Princeton Nurseries areas which are located north and south of Ridge Road should be changed in land use designation from Low Density Residential to a new category of Single Family - Very Low Density Residential. This change was due to access constraints, environmental features and the location of planned (proposed) Route 92.
10. The Raymond Road/Route 522 area, (25 acres), a portion of Princeton Walk, should be changed from Mixed Medium Density Residential to Low Density Residential.

Circulation Issues

The 1994 Circulation Element was revised and updated since the 1988 Master Plan as a result of improved planning practices and public input. The 1994 plan also modifies the 1988 plan by acknowledging sections of Plan roads which had been built. The following changes and improvements were identified:

1. Route 92 and related improvements were eliminated from the Township Circulation Plan.
2. Roadways including the Finnigans Lane/Davidsons Mill Road connection along with improvements along Deans Rhode Hall Road east of Route 130 have been removed from the plan. This is due to the roadways falling under the jurisdiction of Middlesex County.

3. The Princeton Gate Boulevard connection between Route 27 and Route 522 was eliminated.
4. A modification was made to West Arterial. The road would connect to Route 27 through the Highgate Manor development rather than near the Route 27/Old Road intersection. This new alignment will have significantly less impact on residential uses.
5. Arterial Way from Northumberland Way west to Route 27 was reduced from six lanes to four.
6. A connection between Route 522 and Raymond Road was added.
7. The connection between Northumberland Way and the Finnegans Lane/ Davidsons Mill Road extension was eliminated due to existing development precluding the crossing of Deans Lane.
8. The connection between Route 1 and Greenlands Boulevard was extended to Ridge Road based on the Greenland's office park approval.
9. An intersection improvement and New and Ridge Roads in Monmouth Junction has occurred.
10. The Kingston Lane/George Road intersection should be signalized and turning lanes provided due to the volumes of traffic passing through the intersection.
11. The Melrich Road/Route 130 intersection was addressed to reduce unsafe vehicular turning movements at Route 130.

The 2000 Master Plan Reexamination Report

1. The Planning Board, Township Council and Environmental Commission strongly oppose the construction of Route 92 from Exit 8A on the Turnpike to Route 1.

2. The Planning Board opposes NJ Transit's plan to activate the Conrail main line and the Jamesburg line in South Brunswick as a commuter rail line connecting Ocean, Monmouth and Middlesex Counties. The Planning Board is concerned with the severe negative impact on the residential communities of Wetherhill, Culver Station, Monmouth Walk, Willow Hill and other residential areas within South Brunswick Township.
3. The Township supports the widening of Route 1 from four lanes to six lanes within South Brunswick Township; however, the Township feels there are serious design issues with the New Jersey Department of Transportation's proposal which need to be addressed.

1999 Middlesex County Transportation Plan

The 1999 Middlesex County Transportation Plans has designated South Brunswick in the "South County" study area. This area contains the largest amount of land in Middlesex County that can still be classified as rural. The South County area is experiencing increasing development pressures that have resulted relative to the area's plentiful land and its access to important regional highway corridors. South Brunswick Township is located within two strategic planning areas:

- ! The Plainsboro-Forrestal-South Brunswick Strategic Planning Area.
- ! The New Jersey Turnpike-Interchange 8A Strategic Planning Area.

The 1999 Middlesex County Transportation Plans has identified the following roadway and intersection improvements:

1. Beekman Road has been recommended to be widened and have operational improvements from New Jersey Route 27 to U.S. Route 1.
2. The intersection between Route 32, 130 and Friendship Road.

3. The intersection of County Route 522 (Ridge Road) to County Route 683 (Schalk's Crossing Road) is subject to further study.
4. County Route 522 (Ridge Road)/Perrine Road intersection.
5. County Route 522 (Ridge Road)/Georges Road intersection requires intersection improvements through signalization.
6. County Route 522 (Ridge Road) requires widening and operational improvements from U.S. Route 130 to New County Route 522, just west of the New Jersey Turnpike overpass.
7. County Route 522 (Ridge Road)/Docks Corner Road intersection.
8. County Route 522 requires a new alignment from the terminus of new County Route 522 alignment at U.S. Route 130 to old County Route 522 (Jamesburg Road) just west of the New Jersey Turnpike overpass.
9. County Route 522/Fresh Ponds Road intersection requires alignment of Fresh Ponds Road in the vicinity of new County Route 522.
10. County Route 522 (Jamesburg Road)/County Route 535 (Cranbury Road) intersection.
11. County Route 535 (Cranbury-South River Road)/County Route 610 (Deans-Rhode Hall Road) intersection improvement.
12. County Route 610 (Deans-Rhode Hall Road) requires widening and operational improvements from the proposed East/West Arterial Way to County Route 535 (Cranbury-South River Road).
13. County Route 610 (Deans-Rhode Hall Road)/Fresh Ponds Road intersection.

14. County Route 614 (Dey Road) requires widening and operational improvements from Scotts Corner Road to County Route 535 (South River Road).
15. County Route 683 (Schalk's Crossing Road)/Perrine Road intersection requires improvements at the crossing of Schalk's Crossing Road to the new constructed access road to (proposed) NJ-92.
16. Improve existing Route 522 (Ridge Road) between Route 130 and Docks Corner Road.
17. NJ-27/New Road intersection improvement.
18. NJ-27/Beekman Road intersection improvement.
19. New alignment from interchange 8A to US-1.
20. A new alignment from terminus of current Northumberland Way, South of US-1, intersecting the proposed east/west Arterial Way, and terminating at Major Road.
21. Perrine Road from County Route 683 (Schalk's Crossing Road) to County Route 522 (Ridge Road) requires widening and operational improvements. This existing roadway will feed into proposed Greenlands Boulevard from County Route 522 (Ridge Road) to US-1 at new County Route 522.
22. Widening of US-1 will occur from Sayre Drive in Plainsboro Township to Finnegan's Lane. The widening will increase Route 1 to three lanes in each direction.
23. US-1/Independence Way intersection improvement, subject to further study, involving signal removal with no crossing of highway (providing only for right turns on and off US-1).
24. US-1/County Route 522 (Ridge Road) involves the construction of a grade separated interchange.

25. A future interchange should be planned for the proposed NJ-92.
26. The US-1/Raymond Road intersection requires improvement involving signal removal with no crossing of the highway (providing only for right turns on and off US-1).
27. Subject to further study, a grade separated intersection at (new) County Route 522 (Promenade Boulevard)/US-1/Stouts Lane.
28. The US-1/Wynwood Drive/Whispering Woods Boulevard intersection improvements required signal removal with no crossing of highway.
29. Subject to further study, a grade separated interchange at the US-1/New Road intersection. This improvement should take into account the provision of future east/west movement of this location through the proposed east/west Arterial Way.
30. At US-1/Sand Hill Road/Major Road the existing intersection and grade separation should be removed.
31. The intersection of US-1/Beekman Road/Northumberland Way should be upgraded to a grade separated interchange.
32. The US-1/County Route 610 (Deans Lane) intersection requires improvement including signal removal with no crossing of highway (providing only for right turns on and off US-1).
33. Subject to further study, intersection improvement at US-1/County Route 610 (Henderson Road) including signal removal with no crossing of highway.
34. The US-1/Black Horse Lane intersection requires improvement involving signal removal with no crossing of highway (providing for only right turns on-off US-1).
35. U.S. Route 130/County Route 614 (Dey Road) intersection improvements.

36. U.S. Route 130/Broadway Road intersection improvements and median closure at Merich Road.
37. Subject to further study, a grade separated interchange at County Route 682 (Finnegans Lane)/US-1.
38. Intersection improvement at U.S. Route 130/Finnegans Lane/Davidson's Mill Road involving left-turn elimination through the installation of jug handles at Finnegans Lane/Davidsons Mill Road.

3. CURRENT CONDITIONS

South Brunswick Township is one of the larger municipalities in Middlesex County in terms of population. The Township's 2000 population of 37,734 represents an increase of over 20,000 people since 1980. The Township is also the third largest municipality in terms of square miles (40.96 sq. mi.) in Middlesex County. South Brunswick's large land area and rapid rise in population have made critical the need for the Township to continually evaluate its roadway network, and to anticipate and identify solutions to traffic circulation concerns.

South Brunswick has numerous major roadways that provide access to destinations in the Township and throughout the county and state. Major roadways in South Brunswick include the New Jersey Turnpike, State Route 1, State Route 27, State Route 130 and County Route 522. These major roadways connect the Township regionally. The surrounding growing communities which create the greatest volume of traffic moving through South Brunswick Township include the Townships of Cranbury, East Brunswick, Franklin, Monroe, North Brunswick, Plainsboro and Princeton. The vast majority of motorists traveling through South Brunswick drive alone on work related trips. Currently, only three percent (3%) of workers in Middlesex County walk or bike to work according to U. S. Census data.

There are several significant environmental features that have helped control the growth in South Brunswick Township. These same features play a role in the decision making processes when determining proposed roadway and intersection construction and rehabilitation. Freshwater wetlands, flood plain areas, hydric soils, steep slopes, lakes and streams, historic and cultural resources, and topography all influence the location and scope of proposed roadway

improvements and construction projects.

Based on NJDEP freshwater wetland mapping and current digital aerial infrared photographs, the Township has a significant amount of freshwater wetlands located on several undeveloped areas throughout the Township. This factor will play a large role in managing future growth. Major areas within the Township that include these natural resources:

- ! The southern portion of the Township between Friendship Road and the southern municipal boundary line.
- ! The area located east of the Amtrak Northeast Corridor Main Lane Railroad which extends north to the Conrail Jamesburg branch, east to Friendship and Culver Roads, and bounded to the south by the municipal boundary.
- ! A large tract located North of Friendship Road, bounded to the east by Route 130, west by Culver Road and ending at the Conrail Jamesburg Branch.
- ! The eastern portion of the Township between the New Jersey Turnpike and U.S. Route 130 and extending north from County Route 522 to Davidson's Mill Road.
- ! A central portion of the Township that extends from U.S. Route 130 west to Georges Road and bounded in the south by County Route 522 and to the north by Distribution Way.

Several wetland areas are also located adjacent to Township lakes and streams. These include those areas along the Lawrence Brook, Heathcote Brook, Carter's Brook and Oakey's Brook.

In addition to environmental resources noted, the Township also is faced with physical constraints. These constraints include the main line of the Conrail service between Philadelphia and New York. Thus, many east west connecting roadways are not able to be accommodated due to the physical difficulty of crossing the rail road and the cost of such an improvement to the roadway system.

3.1 TRAFFIC STUDY AREA CHARACTERISTICS

A. General Section

One of the initial steps in developing this Circulation Master Plan was to inventory existing conditions. This task included coordination with the County and State to determine the various transportation related activities that are occurring in the region, and the various planning activities which need to be accommodated. This included gathering the transportation plans from the County as well as from adjacent municipalities. The data gathering activities included coordination with the adjacent municipalities, the County and the State to determine what construction activities and plans are included in the Transportation Improvement Plan. Thus, the study area characteristics included identifying resources allowing the existing conditions of the roadways in the Township to be evaluated. Further growth in the Township that would occur in the future needed to be identified so that future travel patterns could be generated. This effort included estimates of future growth, what roadways would be planned and where and what development is planned to occur, to what extent and with what intensity. With this in mind, the following sections discuss the transportation parameters that were utilized in this study. It should be remembered that the data gathered was used as input into the transportation model and were used to calibrate the transportation model.

Physical inventories were taken of the Townships roadways. The physical inventories included physically traveling the Townships roadways and performing various monitoring tasks. The tasks included taking speed and delay runs, manual traffic counts and machine traffic counts including classification counts which differentiated the number of trucks on the roadways. The calibrated model can

then be used with modifications to project future traffic patterns and evaluate various transportation improvement options.

B. Travel Inventories

Travel inventories included manual turning traffic counts, machine traffic counts and speed and delay runs. The vehicle classification counts were taken at forty-one (41) locations. The counts were taken for a week and counted traffic by hour and by direction and by type of vehicle. These traffic counts were taken in September and October 1999. The list of the 15 machine count locations is as follows:

1. Ridge Road between South River Road & Tower Road
2. Ridge Road between Georges Road & U.S. Route 130
3. NJ Route 32 between Cranbury-South River Road & U.S. Route 130
4. Georges Road between U.S. Route 130 & Debra Drive
5. Deans Rhode Hall Road between Cranbury-South River Road & Fresh Ponds Road
6. Cranbury-South River Road between Davidsons Mill Road & Dunhams
7. Davidsons Mill Road between Fresh Ponds Road & Riva Avenue
8. U. S. Route 130 North of Georges Road
9. County Route 522 between New Road & Ridge Road
10. New Road between Wheeler Road & U.S. Route 1
11. U.S. Route 1 North of Blackhorse Lane.

12. U.S. Route 130 between Dey Road & Broadway Road
13. U.S. Route 1 south of Ridge Road
14. Ridge Road West of U.S. Route 1
15. Schalk's Crossing Road south of Ridge Road.

In addition to machine counts, there were manual intersection counts taken at a total of 26 intersections. These intersection counts were taken for the am and pm peak hours. The counts were taken between the hours of 7:00 a.m. and 9:00 a.m. and between the hours of 4:00 p.m. and 6:00 p.m.. The counts were taken in August and September 1999. The intersections counted manually included the following intersections:

1. Route 27/Sand Hill Road
2. South River Road/Davidson Mill Road
3. Dow Jones Drive-Schalks Crossing /Ridge Road
4. Rt. 27/New Road
5. Heathcote Brook Road/Route 27
6. Route 1/Ridge Road
7. Ridge & New Road
8. Route 522-Ridge-Jamesburg Road /Cranbury-South River Road
9. Route 535-Cranbury-South River Road /Deans Rhode Hall Road

10. Ridge/Kingston Lane
11. Route 27/Beekman Road
12. Route 27 & Raymond
13. Georges Road/Deans Lane
14. Deans Rhode Hall Road & Georges Road
15. Route 27 & Promenade
16. Routes 130 & 32
17. Dean Rhodes Hall Road/Fresh Pond Road
18. Ridge Road/Culver/Georges Road
19. Miller & Broadway Road
20. Route 27 & Henderson Road
21. Route 32 & Cranbury-South River Road
22. Perrine Road & Ridge Road
23. New Road & Friendship Road
24. Blackhorse Road & Route 1
25. Route 522 & New Road
26. Route 32 & South River Road

In addition to the traffic counts that were taken, speed and delay runs were also performed. Speed and delay runs were taken using the floating car method of performing speed and delay runs. A car would travel along a roadway and follow the car in front of it. It would not pass and would stay in the platoon. The speed of the majority of the roadways in the Township was observed in this manner and these data were recorded on a travel map. The average speeds were tabulated and shown on Map 6 (M-6). Traffic counts were taken and tabulated in Technical Report 4 and traffic count locations are shown on Map 7 (M-7).

C. Traffic Generators

A final step of the inventory process was to determine how many trips are to be generated by each section of the Township. The Township was thus separated into numerous smaller areas. These areas were reviewed to determine the amount of development that is presently in the area chosen. The development was reviewed to tabulate the number of dwelling units, the amount of industrial square footage, the amount of commercial space and these data were used with census data to determine the number of employees in the area. These data were collected to provide the general transportation model input data. The exact physical sections or zones of the Township were identified graphically on Map 3. In addition, the trip generating characteristics of each zone were tabulated in Technical Report 3.

D. Summary

The traffic area study characteristics are primary input data into the transportation model. The traffic counts were chosen at key areas to allow calibration of traffic volumes along major traffic corridors. In addition, the counts were taken to determine the amount of truck traffic on key routes so that it would be possible to verify complaints of heavy truck traffic in residential zones and would help to identify key areas of commercial and industrial activity that require truck routes. Truck volumes were counted and documented in Technical Reports 1 and 2 and the count locations were shown on Map 7.

The various data gathered in the data gathering phase has been gathered and documented in appendices. In addition, various maps have been provided to graphically depict the data collected. These maps include the following:

- o Truck Route Map - Map 4
- o Traffic Volume Flow Map - Map 5.
- o Traffic Speed Flow Map - Map 6.

This data will form the input for the existing traffic volume trip assignment and will also provide much of the input for the future traffic volume projections since the data acquired will allow for projections of model input data on a sub-area basis.

3.2 SOCIAL AND ECONOMIC CHARACTERISTICS

Social and economic characteristics of the study area have been assembled based on US Census Block and Tract Statistics, County and Municipal Population Projections, and New Jersey State Development and Redevelopment Plan Projections. The US Census information includes housing and household size, population age and distribution, income levels and travel characteristics.

It was found that South Brunswick regional population changes have been in response to interacting social and economic forces. The existing population pattern of the area and the examination of recent trends relative to other areas is perhaps the clearest index of the impact of these social and economic forces. It was determined that birth and death rates in this region do not differ greatly from most parts of the state. Birth rates generally run between twenty-one and twenty-four per thousand and death rates run between nine and ten per thousand population, leaving a net annual increase rate of about 1.0 to 1.5 percent per year. The key factor in relative population growth within this region is net migration, which in turn is associated with relative availability of employment and housing opportunities. Population size and growth trends are directly related to the number and availability of jobs and dwellings. South Brunswick's median age of 35 years also is

indicative of a relatively young working population. People tend to relocate to places where the chances for work are good and to move away from those where they are not. Retail and personal service employment are closely linked to population distribution. Suburbanization of the population results in suburbanization of some categories of private employment, particularly jobs in convenience stores like groceries, laundry and cleaning establishments, suburban shopping centers, and a substantial share of the self-employed.

A similar recognition of population analysis in regional projections is also a feature of this Circulation Master Plan. The population projections for the region are used by State agencies as the control for the other projected data (labor force, employment, housing, land use and automobiles) at the regional level.

In general, the pattern for the South Brunswick region is one of continued and substantial immigration into the study area. The principal contributor to the in-movement is continued regional job and housing growth. The migration rate varies with age and sex, and is normally heavily concentrated in the labor-force age categories. This was the pattern for the 1990 census and is expected in the detailed census data for 2000 when released.

Recent population and economic growth within the primary study area of South Brunswick, Cranbury, East Brunswick, Franklin, Monroe, North Brunswick, Plainsboro and Princeton Township represent one of the largest areas of growth in New Jersey both in absolute numbers and percentage of increase (See Tables 3.1 and 3.2). Four of the townships within the study area experienced at least a doubling of total population from 1970 through the 2000 census. South Brunswick Township's population changed from 14,058 persons in 1970 to 37,734 persons in 2000. This is an increase of 168% for the thirty (30) year period. South Brunswick's actual population growth rate is approximately 2.75% annually over the last five years according to the South Brunswick Planning Department. Directly associated with this population and economic growth within the study area are increases in traffic volume on the Township' roadway network. The increase in population results in having more vehicles on the road, while current economic growth results in having more vehicles per household. Since 1980, South Brunswick's population density (persons per square mile) has more than doubled.

Housing unit construction in South Brunswick Township from 1970 to 2000 also increased dramatically. As described in Table 3.3, the total number of homes in 1970 (3,903) grew to 13,862 in the year 2000. This represents rapid steady growth during the last three decades. Detailed 2000 census housing data have yet to be released.

**TABLE 3.1
POPULATION GROWTH
SOUTH BRUNSWICK AND ADJACENT MUNICIPALITIES**

	South Brunswick	Cranbury	East Brunswick	Franklin	Monroe	North Brunswick	Plainsboro	Princeton Township
1970	14,058	2,253	34,166	30,389	9,138	16,691	1,648	13,651
1980	17,127	1,927	37,711	31,358	15,858	22,220	5,605	13,683
1990	25,792	2,500	43,548	42,780	22,255	31,287	14,213	13,198
2000	37,734	3,227	46,756	50,903	27,999	36,287	20,215	16,027
1990 to 2000: net increase	11,942	727	3,208	8,123	5,744	5,000	6,002	2,829
% increase	46.3%	29.1%	7.4%	19.0%	25.8%	16.0%	42.2%	21.4%
2010 projection	42,418	5,311	53,803	N/A	33,592	37,889	22,063	N/A

SOURCE: US Bureau of the Census, Population Division, June 30, 1999 and 2000 Census

**TABLE 3.2
POPULATION, DENSITY AND GROWTH
COMPARISON OF AREA MUNICIPALITIES**

MUNICIPALITY	1980 Population	2000 Population	Land Area in Square Miles	Persons per Square Mile 1980	Persons per Square Mile 2000
Cranbury Township	1,927	3,227	13.42	143.59	240.46
East Brunswick	37,711	46,756	22.00	1,714.13	2,125.27
Franklin Township	31,358	50,903	46.77	670.47	1,088.36
Monroe Township	15,858	27,999	42.21	375.69	633.32
North Brunswick Township	22,220	36,287	12.04	1,845.51	3,013.87
Plainsboro Township	5,605	20,215	12.01	466.69	1,683.18
Princeton Township	13,683	16,027	16.39	834.83	977.85
South Brunswick Township	17,127	37,734	40.96	418.13	921.24

SOURCE: U.S. Bureau of the Census, Population Division, U. S. Census 1980 and 2000.

**TABLE 3.3
SOUTH BRUNSWICK
HOUSING UNITS 1970-2000**

TIME PERIOD	TOTAL NUMBER OF UNITS
1970 housing units	3,903
1980 housing units	5,626
1990 housing units	9,962
2000 housing units	13,862
HOUSING UNITS	INCREASE BY NET AND PERCENTAGE
Net increase 1970-1980	1,723
% increase 1970-1980	41%
Net increase 1980-1990	4,336
% increase 1980-1990	77%
Net increase 1970-2000	9,959
% increase 1970-2000	255%

SOURCE: 1. U.S. CENSUS 1970 – 2000
N.J. DEPARTMENT OF LABOR
SOUTH BRUNSWICK PLANNING DEPARTMENT

TABLE 3.4
Comparison of Median Household, Family and Per Capita Income
Area Municipalities
1990 Census

Municipality	Household Income 1989	Family Income 1989	Per Capita Income 1989
South Brunswick Township	\$54,305	\$59,264	\$21,881
Cranbury Township	\$65,814	\$75,147	\$31,466
East Brunswick	\$58,769	\$64,076	\$24,467
Franklin Township	\$53,300	\$59,661	\$22,208
Monroe Township	\$42,187	\$50,199	\$20,696
North Brunswick Township	\$49,900	\$57,156	\$21,734
Plainsboro Township	\$46,915	\$60,105	\$27,799
Princeton Township	\$62,288	\$76,091	\$39,767

SOURCE: U.S. Bureau of the Census, Population Division. US Census 1990

South Brunswick has entered the second millennium as a highly educated, relatively young and progressive community. Its land area includes over forty-one (41) square miles. The tax base is strong with a relatively low reliance on residential tax assessment (50%). To its benefit, South Brunswick has a high reliance on Industrial (33%) and commercial (8.5%) tax assessment. This once largely farming community has just 450 farm parcels remaining. During the later part of the 1990 decade, the issuance of residential building permits continued to grow. Over a 4-year period during this time, over 1,450 residential permits were issued representing a population increase of approximately 4,000 residents. Growth management, preservation of open space and farmlands, and traffic management is key issues in South Brunswick's 2000 Master Plan.

Land use changes in South Brunswick between 1960 and 1994 have been documented. As residential, commercial, industrial and public/quasi-public areas rapidly increased, vacant and agricultural areas decreased dramatically. As described in Table 3.5, the number of acres of vacant and agricultural land decreased by nearly 50% during this time period as described on Table 3.5. Residential acreage nearly tripled from 1,745 acres in 1960 to 4,869 acres in 1994. Industrial and commercial lands, which are significant traffic generators, more than tripled during this time period.

Real property valuation analysis also provides insight into the direction of development within a municipality. By comparing valuations to other communities within the study area, we have a better understanding of the sources of traffic. The comparisons as shown on Table 3.6 also yield valuable information concerning the health of the Township's tax base and area trends of development.

TABLE 3.5
LAND USE CHANGES 1960-1994
SOUTH BRUNSWICK

LAND USE CATEGORY	1960		1968		1980		1994	
	Total acres	%						
Residential	1,745	7	2,215	8	2,615	10	4,869	18.6
Commercial	145	.005	160	.006	240	.009	618	2.4
Industrial	1,105	4	1,620	6	1,910	7	3,053	11.6
Public and Quasi-Public	1,825	7	3,195	12	4,165	16	5,055	19.3
Vacant, Agr. & Water	21,460	82	19,300	73	17,130	66	12,645	48.2
Total	26,272	100	26,496	100	26,240	100	26,240	100

SOURCES: 1960 and 1968 data from reports on file in the Planning Department.
1980 Data based on field survey by Queale and Lynch, Inc.
1994 Data based on tax assessment records with field verification

TABLE 3.6
SOUTH BRUNSWICK TOWNSHIP
REAL PROPERTY VALUATION ¹
AREA MUNICIPALITIES

Property Type	South Brunswick Township		Cranbury Township		East Brunswick		Franklin Township		Monroe Township		North Brunswick Township		Plainsboro Township		Princeton Township	
	Parcels	%	Parcels	%	Parcels	%	Parcels	%	Parcels	%	Parcels	%	Parcels	%	Parcels	%
Residential	9,186	50.12	784	49.72	13,977	71.22	14,981	61.64	10,797	74.33	8,459	61.82	4,185	42.64	4,442	84.11
Apartments	17	2.45	3	0.25	13	1.86	21	3.21	--	--	27	6.68	16	11.22	5	2.59
Commercial	272	8.49	79	11.10	623	18.18	424	17.72	206	10.65	301	12.01	75	41.33	120	7.63
Industrial	174	33.04	17	32.50	111	7.16	152	14.27	49	8.04	57	16.53	5	2.98	2	0.25
Vacant	1,155	4.80	110	2.91	837	1.40	1,364	2.06	2,990	4.50	1,286	2.84	160	1.38	464	3.32
Farmland	450	1.09	172	3.53	145	0.17	444	1.10	699	2.50	25	0.11	121	0.46	81	2.10
Total	11,254		1,165		15,706		17,386		14,741		10,155		4,562		5,114	

SOURCE: 1996 Real Property Valuations

Technical Report No. 3 provides a summary of current planned development yields for South Brunswick Township based on the information compiled by the South Brunswick Planning Department Staff. The New Jersey Office of State Planning and Middlesex County Planning Department will also find this information extremely useful because they reference planned developments as a basis for population, employment and traffic analyses and projections.

**TABLE 3.7
SOUTH BRUNSWICK TOWNSHIP
2001 CIRCULATION MASTER PLAN**

**Summary of Projected Planned Development Yields Within the Township
Current 3/2000**

	Residential (Du)	Non-Residential (SF)
South Brunswick Township	5,369	10,704,811

As summarized in Technical Report No. 3, the South Brunswick Planning Department has compiled and is maintaining lists of residential developments and nonresidential developments which are in various stages of the development process. These developments range from already being under construction, to having only been reviewed by the Township at the concept level. By maintaining the lists, Township officials are better able to understand the pace and volume of projects which will yield additional students to the school system, additional homes and jobs for its residents, and additional vehicle trips to its road network. This ongoing effort by the Planning Department helps quantify the basis for creating transportation districts, and formulating equitable development fees. This information also provided critical data input into the transportation modeling used in this Circulation Master Plan.

The actual lists of residential and nonresidential development summarized in Table 3.7 which are in various stages of the development process have been provided as a separate Technical Report to this Circulation Element. These lists are comprehensive in that the following information about each project is provided:

1. Project name and application number.
2. Developer/applicant name.
3. Project Description including the total number of dwelling units and type of dwelling units or square footage of commercial/industrial development.
4. Current status of the project.
5. Projected vehicle trips.

The 2001 Circulation Master Plan also applies an analysis of existing land use and existing zoning (i.e., permitted uses). This analysis integrates existing traffic generators with future traffic generators to help better understand future traffic conditions possible under existing zoning. This effort resulted in the creation of Plan P-3 Centroid/District Plan. Each centroid depicted on P-3 represents an area which generates or will generate traffic, based on existing and future land uses within that centroid. This information is another input to the traffic model, helping to determine traffic impacts to area roadways and intersections. This information is also valuable for identifying where permitted future land uses and zoning may need to be reexamined and adjusted to meet the Circulation Master Plan goal of providing for the highest quality of life for Township residents.

3.3 EXISTING STUDY AREA PLANS AND DOCUMENTS

A significant number of background studies and documents related to the existing conditions and expected growth within South Brunswick Township and its adjacent communities within the study area have been assembled. The most recent master plans for these communities along with traffic engineering reports, corridor studies, and site specific traffic counts were assembled. This collection of documents also includes local zoning maps and ordinances, the State Development and Redevelopment Plan as it affects the study area, and numerous other references and data sources which contribute information to determining the current and future circulation patterns within South Brunswick Township. The purpose of this section is to compile and catalogue the

numerous documents which can contribute valuable information to the Circulation Element both now and in the future. The following documents have been compiled, analyzed and catalogued for reference as part of the South Brunswick 2001 Master Plan Circulation Element:

1. South Brunswick Township Reexamination Report, 2000: Heyer, Gruel & Associates, P.A.
2. South Brunswick Township Reexamination Report, 1994: South Brunswick Township Department of Community Development.
3. South Brunswick Township Circulation Master Plan, 1989: Garmen Associates.
4. South Brunswick Township Master Plan and Master Plan Reexamination, 1988: Zimmerman, P.P.
5. South Brunswick Township Master Plan, 1982: Queale & Lynch, Inc.
6. South Brunswick Township Environmental Resource Inventory, 1981: South Brunswick Township Department of Planning and Development.
7. South Brunswick Township Planned Residential and Non-Residential Developments, March 2000: South Brunswick Township Department of Planning and Development .
8. Township of East Brunswick Master Plan, 1990: Queale & Lynch, Inc.
9. Township of North Brunswick Master Plan Update and Reexamination Report, June 4, 1999: Thomas Vigna, P.P.
10. Township of Franklin Comprehensive Plan including 1994 reexamination Report and amendments from 8/7/92-9/8/98: Township of Franklin and Banisch Associates.

11. Princeton Community Master Plan, December 12, 1996 with amendments adopted 5/15/97 & 5/6/99: Regional Planning Board of Princeton.
12. Monroe Township Master Plan, December 3, 1998: Hexer, Gruel and Talley.
13. Plainsboro Township Master Plan, 1990: Lenaz, Mueller and Associates.
14. 1994 Middlesex County/State Roadway Composite Plan: - Middlesex County.
15. Highway Improvements Costs and Pro Rata Allocation, 1992: Garmen Associates.
16. Middlesex County Soil Survey. Soil Conservation Service.
17. United States Geological Survey Mapping. USGS.
18. New Jersey State Development and Redevelopment Plan, Office of State Planning.
19. Flood Hazard Area Mapping: New Jersey Department of Environmental Protection.
20. Freshwater Wetland Mapping: New Jersey Department of Environmental Protection.
21. Bicycle Compatible Roadways and Bikeways, April 1996: New Jersey Department of Transportation.
22. Middlesex County Transportation Plan, Middlesex County Department of Planning Transportation Division, May 1999.

3.4 ENVIRONMENTAL RESOURCES

The Township of South Brunswick has several environmental resources which need to be considered when examining the circulation patterns within the Township. Proposed improvements to the Township's existing roadway and intersection network, along with the creation of new roadways to alleviate traffic congestion, must take into account environmental resources as they impact proposed improvements. Areas of concern include freshwater wetlands, flood plain boundaries, soil characteristics, cultural and historic resource value and the location of lakes and streams. Refer to Maps M-1, M-2, M-3 and the Municipal Master Plan.

Proposed roadways described in the County Circulation Master Plan of 1994, the Township of South Brunswick 1994 Master Plan Reexamination Report, and recommendations from the Township's Planning Department have been examined in view of these environmental resources. New roadway locations have been proposed along with improvements to current roadways and their associated intersections, all in relation to area environmental features.

There are several significant features that have controlled the growth and development of South Brunswick Township. These same features play a role in the decision making processes when determining proposed roadway and intersection construction and rehabilitation. Freshwater wetlands as mapped by NJDEP, USGS Floodprone Areas, soils, lakes and streams, historic or cultural resources and topography all influence the location and scope of a proposed roadway improvement or construction project.

The purpose of examining the areas with environmental features within the Township is to identify which possible roadway improvements are feasible or permissible through the regulatory process including NJDEP permitting. Possible permits that may be required for the proposed roadway and intersection improvements include:

- ! NJDEP Stream Encroachment Permit. (major/minor)

- ! NJDEP Freshwater Wetlands Permit (Individual Permit)

- ! NJDEP Freshwater Wetlands Transition Area Waiver.
- ! NJDEP Water Quality Certification.
- ! Air Quality (Pollution Control)
- ! Historical Preservation (Archeological Study)
- ! Natural Resources: Endangered Wildlife and Plant Species. (Determined at time of wetland verification and resource value classification.)
- ! Middlesex County Soil Conservation: Soil Erosion and Sediment Control.

SOILS

The Soil Survey of Middlesex County, New Jersey 1987 and NJDEP GIS Mapping identify the following soil types within the vicinities of roadway and intersection improvements being considered. Area hydric soils and soils with poor drainage will have the greatest impact on new roadway improvements. Cross referencing this list of soil types within South Brunswick is Map M-2 "Soils," attached.

TABLE 3.8
SOUTH BRUNSWICK TOWNSHIP
AREA SOILS

Map Symbol	Mapping Unit	Drainage Classification
ChA	Chalfont Silt loam, 0-2% slopes	Somewhat Poorly Drained
ChB	Chalfont Silt loam, 2-5% slopes	Somewhat Poorly Drained
Ek	Elkton loam	Poorly Drained
Fb	Fallsington loam	Poorly Drained
Fd	Fallsington Variant loam	Poorly Drained
Hea	Hammonton loamy sand, 0-3% slopes	Moderately Well Drained
HmA	Hammonton sandy loam, 0-2 % slopes	Moderately Well Drained
Hu	Humaquepts, frequently flooded	Somewhat Poorly Drained to Very Poorly Drained
KeA	Keyport sandy loam, 0-2% slopes	Moderately Well Drained
KfA	Keyport loam, 0-2% slopes	Moderately Well Drained
LnA	Lansdowne silt loam, 0-2% slopes	Moderately Well Drained
LUA	Lansdowne Urban land complex 0-5% slopes	Moderately Well Drained and Somewhat Poorly Drained
MeA	Matapeake silt loam, 0-2% slopes	Well Drained
MeB	Matapeake silt loam, 2-5% slopes	Well Drained
MgA	Mattapex silt loam, 0-2% slopes	Moderately Well Drained
MoA	Mount Lucas silt loam, 0-2% slopes	Moderately Well Drained
MoB	Mount Lucas silt loam, 2-5% slopes	Moderately Well Drained
MsB	Mount Lucas very stony silt loam, 0-5 % slopes	Moderately Well Drained
Mu	Mullica sandy loam	Very Poorly Drained
NfA	Nixon Variant loam, 0-2% slopes	Moderately Well Drained
NfB	Nixon Variant loam, 2-5% slopes	Moderately Well Drained
Pa	Parsippany silt loam	Poorly Drained
PfB	Penn silt loam, 2-5% slopes	Well Drained
PhD	Phalanx loamy sand, 2-15% slopes	Well Drained
PM	Pits, sand and gravel	Variable

**TABLE 3.8 (continued . . .)
AREA SOILS**

Map Symbol	Mapping Unit	Drainage Classification
PW	Psammments, waste substratum	Excessively Drained to Well Drained
ReA	Reaville silt loam, 0-2% slopes	Moderately Well Drained
Rh	Reaville Variant silt loam	Poorly Drained
Ro	Rowland silt loam	Moderately Well Drained or Somewhat Poorly Drained
SaB	Sassafras sandy loam, 2-5% slopes	Well Drained
SaC	Sassafras sandy loam, 5-10% slopes	Well Drained
SgC	Sassafras gravelly sandy loam, 5-10% slopes	Well Drained
SIA	Sassafras loam, 0-2% slopes	Well Drained
SIB	Sassafras loam, 2-5% slopes	Well Drained
UC	Udorthents, clayey substratum	Moderately Well Drained to Somewhat Poorly Drained
UL	Urban Land	N/A
Wa	Watchung very stony silt loam, 0-2%	Poorly Drained
WdA	Woodstown sandy loam, 0-2% slopes	Moderately Well Drained
WdB	Woodstown sandy loam, 2-5% slopes	Moderately Well Drained
WkA	Woodstown sandy loam, clayey substratum, 0-2% slopes	Moderately Well Drained
WIA	Woodstown loam, 0-2% slopes	Moderately Well Drained
WIB	Woodstown loam, 2-5% slopes	Moderately Well Drained

FRESHWATER WETLANDS

Freshwater wetlands as shown within South Brunswick on Map M-1 will have the greatest constraint on new roadway improvements due to Federal and State permitting requirements. Freshwater wetlands are defined as an area that is inundated or saturated by surface water or groundwater at a frequency and duration sufficient to support, and that under normal circumstances does support, a prevalence of vegetation typically adapted for life in saturated soil conditions, commonly known as hydrophytic vegetation. Based on NJDEP freshwater wetland mapping and the 1995 digital aerial infrared orthophotos it has been determined that the Township has a significant amount of freshwater wetlands located on several undeveloped areas throughout the Township. The major locations within the township that include these areas include:

- ! The southern portion of the Township between Friendship Road and the southern municipal boundary line.

- ! The area located east of the Amtrak Northeast Corridor Main Lane Railroad which extends north to the Conrail Jamesburg branch, east to Friendship and Culver Roads and bounded to the south by the municipal boundary.

- ! A large tract located North of Friendship Road, bounded to the east by Route 130, west by Culver Road and ending at the Conrail Jamesburg branch.

- ! The eastern portion of the Township between the New Jersey Turnpike and U.S. Route 130 and extending north from County Route 522 to Davidson's Mill Road.

- ! A central portion of the Township that extends from U.S. Route 130 west to Georges Road and bounded in the south by County Route 522 and to the north by Distribution Way.

Several wetland areas are also located adjacent to Township lakes and streams. They include those areas located along the Lawrence Brook, Heathcote Brook, Carter's Brook and Oakey's Brook.

Standard freshwater wetlands general permits are typically required for relatively minor impacts to wetlands related to road intersection improvements. New road construction having a major impact to wetlands may require the more extensive individual permit. A freshwater wetlands individual permit would require addressing the following:

- ! The proposed regulated/prohibited activity.
- ! The public interest in preservation of natural resources.
- ! The relative extent of the public and private need for the proposed activity.
- ! The extent and permanence of beneficial and/or detrimental effects.
- ! The quality and resource value classification of the freshwater wetlands and the amount of freshwater wetlands to be disturbed.
- ! The economic value of the proposed regulated activity.
- ! The ecological value of the freshwater wetlands and impact on public health and fish/wildlife.
- ! The purpose and intended use of the proposed activity, and a schedule for the progress and completion of the proposed activity.
- ! The discharge of dredged or fill material.
- ! Alternatives to the proposed activity or discharge.
- ! Potential adverse environmental effects.
- ! All freshwater wetland vegetative communities, special aquatic sites, public use areas, wildlife refuges, and public water supply intakes in the areas affected.
- ! Potential human health or welfare impacts.

- ! Mechanisms or management practices used to minimize environmental impacts.

- ! An environmental inventory of indigenous vegetation, and wildlife in the vicinity of the project.

As a standard condition of a freshwater wetland Individual Permit, the New Jersey Department of Environmental Protection will require wetland mitigation for all wetlands to be disturbed. The wetland mitigation may include restoration, creation, enhancement, or donation of money or land or both to the mitigation bank, or to other public or private nonprofit conservation organizations. Mitigation must be performed prior to or concurrent with permitted activities that will permanently disturb wetlands or State open waters, and immediately after activities that will temporarily disturb wetlands or State open waters.

As noted there are four wetland mitigation options; they are as follows:

1. **Restoration** - Refers to actions performed on the site of a regulated activity.

2. **Creation** - Refers to establishing freshwater wetlands or State open water characteristics, habitat and functions on an upland area. Creation will be required at a ratio of two (2) acres created to one (1) acre lost or disturbed.

3. **Enhancement** - Refers to actions performed to improve the characteristics, habitat and functions of an existing degraded wetlands, such that the enhanced wetland will have resource values and functions similar to an undisturbed wetland.

4. **Contribution** - Refers to donations of money or land to the mitigation bank or to other public or private nonprofit conservation organizations.

Mitigation efforts would be carried out on-site after all efforts have been exhausted after taking into consideration costs, technology, and logistics in light of the overall project purposes. If on-site mitigation is found to be impracticable, the mitigation would be carried out within the same watershed to the maximum extent practicable.

A wetland mitigation proposal to create freshwater wetlands would address the following:

- ! The size and type of mitigation project proposed.
- ! A conservation easement or deed restriction.
- ! A monitoring and maintenance plan.
- ! The existing and proposed vegetation on the mitigation site.
- ! The existing and proposed hydrology of the site.
- ! The existing soil types and characteristics.
- ! A schedule from initiation to completion of the project.
- ! A metes and bounds description of the proposed mitigation site.

FLOOD HAZARD AREA

The flood plain/flood hazard areas as shown within South Brunswick on Map M-1 are those areas inundated by the regulatory flood including the watercourse that creates it. The regulatory flood is the 100-year flood along non-delineated watercourses or the flood hazard area design flood along delineated watercourses.

All development within the flood plain and/or within 25 feet of a stream channel requires a stream encroachment permit. The limits of the flood plain within the vicinity have been determined by reviewing NJDEP mapping. Stream encroachment permits are categorized by major and minor projects. A major stream encroachment permit requires the following:

- ! Hydrologic calculations.
- ! Hydraulic calculations.
- ! Stormwater detention design calculations.
- ! Calculations for compliance with the 20 percent net fill limitation.

The following are applicable regulated activities:

- | | |
|---|--|
| ! Excavation. | ! Requirements for structures. |
| ! Disposal of spoils. | ! Standards for fill within the flood plain. |
| ! Stormwater management. | ! Bridges and culverts. |
| ! Underground utilities in the flood plain. | |

In addition to the engineering standards, the project must also be designed in accordance with the environmental standards found within Subchapter 3 of the Flood Hazard Area Control Regulations. The following need to be addressed within the environmental report:

- | | |
|--------------------------------------|--|
| ! Protection of vegetation. | ! Protection of watercourse corridors. |
| ! Soil erosion and sediment control. | • Protection from acid soils. |
| ! Mitigation. | • Freshwater wetlands. |

- Threatened and endangered species.
- Temporary and permanent physical changes.
- The effect on health, safety, and welfare.
- Water quality and quantity.
- Existing and potential water uses.
- Parks and/or preserves.
- Vegetation.
- Wildlife and fisheries.
- Flood storage.

3.5 EXISTING LEVELS OF SERVICE

The levels of service on various roadways in the Township of South Brunswick were calculated using existing traffic counts. These levels of service are based upon the Highway Capacity Manual.

Roadway

For analyses of roadway, level of service is defined to address both mobility and accessibility concerns. The primary measure of service quality is percent time delay, with speed and capacity utilization used as secondary measures. Level of service criteria is defined for peak 15 minute flow periods, and is intended for application to segments of significant length. The peak 15 minute flow period is defined as that 15 minute time period during the peak hour that the largest amount of vehicular traffic occurs. The traffic capacity is then estimated using this time period to calculate the hourly capacity taking into account variations in traffic during the hour. The level of service criteria for roadways in the Highway Capacity Manual is found in Chapter 8 of the HCM and the definitions are shown in Table 8.1 of that text and is summarized below:

Level of Service Criteria for Roadways with Level Terrain		
<u>Level of Service</u>	<u>Percent Time Delay</u>	<u>Percent of Capacity *</u>
A	less than or equal to 30	15
B	less than or equal to 45	27
C	less than or equal to 60	43
D	less than or equal to 75	64
E	greater than 75	100
F	100	Over 100 forced flow

* Ideal capacity is 2,800 vehicles per hour for both directions.

Intersections

For analysis of intersections, level of service is defined in terms of delay, which is a measure of driver discomfort and frustration, fuel consumption, and lost travel time. Levels of service criteria are stated in terms of the average stopped delay per vehicle for a one-hour analysis period. The criteria are shown in the following table. Delay, as it relates to level of service, is a complex measure and is dependent upon a number of variables. For signalized intersections, these variables include the quality of vehicle progression, the cycle length, the green time ratio, and the volume/capacity ratio for the lane group in question. For unsignalized intersections, delay is related to the availability of gaps in the flow of traffic on the major street and the driver's discretion in selecting an appropriate gap for a particular movement from the minor street (straight across, left or right turn).

LEVEL OF SERVICE CRITERIA

Level of Service	SIGNALIZED	UNSIGNALIZED
	Stopped Delay Per Vehicle (sec)	Stopped Delay Per Vehicle (sec)
A	≤ 10	< 10
B	> 10 and ≤ 20	≥ 10 and ≤ 15
C	> 20 and ≤ 35	> 15 and ≤ 25
D	> 35 and ≤ 55	> 25 and ≤ 35
E	> 55 and ≤ 80	> 35 and ≤ 50
F	> 80	> 50

Obtained from the Transportation Research Board's Highway Capacity Manual, 1997 Edition

It is important to understand that the level of service criteria outlined above represents merely a guideline for quantifying the acceptability of delay to drivers, which is highly subjective and varies from region to region, usually according to the intensity of development in an area. A more universal measure of acceptability to drivers is the number of cycles (the time it takes for the signal to go through all of its phases one time) through which they must wait before proceeding through an intersection.

The existing levels of service were calculated and are listed below first by roadway and then by intersection.

TABLE 3.9

Existing Levels of Service for 1999 Master Plan Roadway Sections					
ROADWAY SECTION	# of Lanes	NB/EB	SB/WB	Total	Level of Service
T-1 Northumberland Loop Roadway o Route 1 to Northumberland Way	Not-Built				
T-2 Beekman Road o Route 27 to Route 1	2	364	364	728	C
T-3 Perrine Road o Ridge Road to Schalk's Crossing Road	2	67	93	160	B
C-1 Finnegans Lane o Route 27 to Route 1	2	430	364	794	C
C-2 Deans Lane/ Deans Rhode Hall Road o South River Road to Fresh Ponds Road	2	152	146	298	B
o Fresh Ponds Road to Route 130	2	95	67	162	B
o Route 130 to Georges Road	2	232	294	526	C
o From Georges Road to Route 1	2	461	447	908	D
C-3 CR 522 Extension o Route 130 to Ridge Road	Not-Built				
C-4 Cranbury-South River Road (CR 535) o Commerce Drive to Route 32	2	678	1015	1015	E
o Route 32 to Stults Road	4	924	818	1742	A
o Stults Road to Route 522	2	474	558	1032	D
o Route 522 to Deans Rhode Hall Road	2	507	726	1233	D
o Deans Rhode Hall Road to Davidsons Mill Road	2	592	805	1397	D
o Davidson Mill Road to Dunhams Corner Road	2	623	965	1588	E
C-5 Dey Road o Route 130 to Eiker Road	2	385	439	824	C

TABLE 3.9 (continued)

Existing Levels of Service for Master Plan Intersections		
	Intersection	Existing LOS
TI-1	Major Road and Northumberland Way	c
TI-2	County Route 522 & Northumberland Way	f
TI-3	New Road & Ridge Road	c
TI-4	Ridge Road & Stouts Lane	B
TI-5	Perrine Road & Ridge Road	c
TI-6	Kingston Road & Major Road	f
TI-7	NJ Route 27 & Raymond Road	C
TI-8	US Route 130, Georges Road & Wheeling Road	f
TI-9	US Route 130 & Stults Road	f
TI-10	Cranbury-South River Road & Stults Road	f
TI-11	US Route 130 & Broadway	f
TI-12	Schalk's Crossing Road & Ridge Road	C
TI-13	Perrine Road & Schalk's Crossing Road	c
TI-14	Ridge Road & Dock's Corner Road	f
TI-15	Deans Rhode Hall Road & Fresh Ponds Road	e
TI-16	NJ Route 27 & Beekman Road	D
TI-17	NJ Route 27 & Allston Road	f
TI-18	Davidsons Mill & Fresh Ponds Road	b
TI-19a	US Route 1 & CR 522	F
TI-19b	CR 522 & Stouts Lane	E

Note: The level of service readings for signalized intersections is shown as capital letters. The level of service readings for the stop sign approaches of unsignalized intersections are shown in lower case letters.

TABLE 3.9 (continued)

Existing Levels of Service for Master Plan Intersections		
	Intersection	Existing LOS
CI-1	US Route 130 & Dey Road	E
CI-2	South River Road & Ridge Road	F
CI-3	Ridge Road & County Route 522 Extension	Not Built
CI-4	South River Road & Deans Rhode Hall Road	f
CI-5	South River Road & Davidsons Mill Road	F
CI-6	US Route 130, County Route 522 & Fresh Ponds Road	F
CI-7	Georges Road, Ridge Road, & Culver Road	F
CI-8	Cranbury-South River Road & Cosco Drive	Not Built
CI-9	NJ Route 27 & Finnegans Lane	D
CI-10	NJ Route 32 & Cranbury-South River Road	F

Note: The level of service readings for signalized intersections is shown as capital letters. The level of service readings for the stop sign approaches of unsignalized intersections are shown in lower case letters.

4. PROJECTED FUTURE TRAFFIC PATTERNS

4.1 GENERAL

Future traffic patterns for the Township were projected using the Quick Response System II (QRS II) for Windows application. This is a computer program for forecasting impacts of developments on highway traffic and for forecasting impacts of highway projects on travel patterns. In addition, QRS II has complete transit ridership forecasting capabilities that can be used in the future.

This model was chosen because it is accepted by and readily available to the general transportation industry, and can be utilized to determine relatively quickly the impacts of development. The impacts include the generation of traffic, the distribution of this traffic and an estimation of the percentage of the site traffic to a specific intersection or roadway. Pro-rata share contributions for necessary roadway improvements are then calculated for any specific project. A staff memorandum was provided.

4.2 MODEL COMPONENTS

To forecast traffic, specific steps must be taken. First, a network must be created. The network consists of various representations of streets and intersections. Streets are shown as links. Intersections are shown as nodes. Streets and intersections have attributes that are important to the model. For example, the most important attribute of a street segment or link is the time that it takes to drive from one end of the street to the other. The nodes are the connections at the streets, and include various turning parameters as well as delays that may be modeled into the network.

A network must be provided before any analysis can occur. The network in these examples includes an assemblage of streets (links), intersections(nodes), traffic generators (zones) and the origins and destinations of trips (centroids). In addition, the various necessary detailed speed runs taken in the Township are summarized on Map M-6. This map shows the average speeds on the various roadways in the Township. These speeds form the basic travel time input in the model link system.

Once the street network has been developed, it is necessary to distribute trips. The trips are described as coming and going to a specific zone. The zone is the area depicted between certain streets. The trips are all distributed to this zone from a centroid. The centroid is the model's interpretation of the zonal area.

4.3 EXISTING CONDITIONS MODEL

The model created in our example was a skeleton of various mathematical components. It was necessary to tabulate the amount of development in each of the identified zones to allow determination of input data with which to determine trips. The QRS II model utilizes person trips for 24 hour periods as zonal input. Thus, the data for each zone in the Township is required. This data was obtained by reviewing the existing conditions in each zone. Each land use and development generates an amount of traffic. The number of dwelling units in each zone, and the square footage of commercial and industrial space, was primarily obtained from the Township tax records, input from Township planning staff, review of aerial photographs, field observations, and review of approved subdivision and site plans. Once this data was obtained, trips were estimated from each of the land uses and person trips were assigned to each of the zones. The actual input data was calculated and is documented by zone in Technical Report 3. The actual zonal areas are shown on Centroid/District Plan P-3.

The model was run using various mathematical formulas. The person trips were distributed throughout the network. This was considered an uncalibrated run. The traffic that was distributed in this manner was not initially accurate. Some roadway links did not operate well and had too few or too many trips assigned. These links had to be modified by adjusting the travel time and intersection delays or adding additional links to better distribute the traffic. The network was adjusted to better reflect actual traffic conditions. The model output was reviewed by performing a comparison with the existing traffic volumes that were counted on the streets and the existing speeds that were measured on the streets. The existing volumes were counted at various locations within the Township. These locations are shown on Map M-7 which shows the count locations and are depicted graphically on Map M-5 which depicts p.m. peak hour traffic volumes. The calibrated network was determined using a trial and error method. Once calibrated, the network was ready for use in estimating future traffic conditions.

4.4 FUTURE CONDITIONS TRAFFIC MODEL

A future traffic condition model was determined for the year 2020. This required a modification to the base model street system to include the additional street links and proposed improvements. Various traffic improvements were added to the model. The model was then tested to assure that all links were accurately added, and that the traffic distributions were satisfactory using test model distributions of trips.

The next step was to model the future traffic. To obtain the future traffic, future land uses were added to the existing land uses to obtain the total 2020 development. Additional development was added on a zone by zone basis. The land use maps were checked, development by zone was calculated, development plans reviewed, and projects approved were reviewed. Future anticipated growth was addressed. Some areas that previously had been proposed for development were modified to reflect environmental restrictions or other development constraints. In addition, traffic volumes measured at the external boundaries of the Township were factored up to reflect 2020 traffic conditions utilizing

growth factors obtained by the NJDOT as well as a review of growth patterns in the Township. Once the future traffic volumes and future person trips were entered into the model, the model was again run and reviewed to assure that the distributions performed were reasonable. The model was then utilized in various analyses to project future improvements and the effect of modifications to the future roadway network.

4.5 FUTURE LEVEL OF SERVICE

Once the model projected future traffic volumes were obtained, a level of service analyses could be obtained using the projected volumes and the Highway Capacity methods and definitions as described previously. The levels of service on the key roadway sections and intersections are tabulated in the following tables.

TABLE 4.1

Future Levels of Service for 2020 Master Plan Roadway Sections					
ROADWAY SECTION	# of Lanes	NB/EB	SB/WB	Total	Level of Service
T-1 Northumberland Way Connector o Route 1 to Major Road	4	704	191	895	A
T-2 Beekman Road o Route 27 to Route 1	2	417	254	671	C
T-3 Perrine Road o Ridge Road to Schalk's Crossing Road	2	379	76	455	C
C-1 Finnegans Lane o Route 27 to Route 1	4	1464	1424	2888	C
o Route 1 to Route 130	4	2017	1683	3700	C
C-2 Deans Lane/ Deans Rhode Hall Road o South River Road to Fresh Ponds Road	2	209	260	469	C
o Fresh Ponds Road to Route 130	2	279	213	492	C
o Route 130 to Georges Road	2	1191	976	2167	E
o From Georges Road to Route 1	2	1424	1042	2466	E
C-3 CR 522 Extension o Route 130 to Ridge Road	4	2246	1921	4167	D
C-4 Cranbury-South River Road (CR 535) o Commerce Drive to Route 32	4	811	1341	2152	B
o Route 32 to Stults Road	4	1339	1166	2505	B
o Stults Road to Route 522	4	1282	1241	2523	B
o Route 522 to Deans Rhode Hall Road	4	1135	1432	2567	B
o Deans Rhode Hall Rd to Davidsons Mill Road	4	1506	1219	2725	C
o Davidsons Mill Road to Dunhams Corner Road	4	738	1123	1861	B
C-5 Dey Road o Route 130 to Eiker Road	4	359	402	761	A

TABLE 4.1 (continued)

Future Levels of Service for Master Plan Intersections			
	Intersection	Future LOS	Future Improved LOS
TI-1	Major Road & Northumberland Way	f	C
TI-2	County Route 522 & Northumberland Way	f	B
TI-3	New Road & Ridge Road	f	B
TI-3a	East New Road & Ridge Road	f	D
TI-4	Ridge Road & Stouts Lane	F	D
TI-5	Perrine Road & Ridge Road	f	D
TI-6	Kingston Road & CR 522	f	D
TI-7	NJ Route 27 & Raymond Road	F	C
TI-8	US Route 130, Georges Road & Wheeling Road	f	D
TI-9	US Route 130 & Stults Road	f	D
TI-10	Cranbury-South River Road & Stults Road	f	C
TI-11	US Route 130 & Broadway	f	B
TI-12	Schalk's Crossing Road & Ridge Road	F	D
TI-13	Perrine Road & Schalk's Crossing Road	a	A
TI-14	Ridge Road & Dock's Corner Road	f	B
TI-15	Deans Rhode Hall Road & Fresh Ponds Road	f	B
TI-16	NJ Route 27 & Beekman Road	C	B
TI-17	NJ Route 27 & Allston Road	f	D
TI-18	Davidsons Mill Road & Fresh Ponds Road	e	B
TI-19a	US Route 1 & CR 522	F	E
TI-19b	CR 522 & Stouts Lane	F	C

TABLE 4.1 (continued)

Future Levels of Service for Master Plan County Intersections			
	Intersection	Future LOS	Future Improved LOS
CI-1	US Route 130 & Dey Road	F	C
CI-2	South River Road & Ridge Road	F	E
CI-3	Ridge Road & County Route 522 Extension	C	Future Intersection
CI-4	South River Road & Deans Rhode Hall Road	f	C
CI-5	South River Road & Davidsons Mill Road	F	C
CI-6	US Route 130, County Route 522 & Fresh Ponds	F	D
CI-7	George Road, Ridge Road & Culver Road	F	D
CI-8	Cranbury-South River Road & Cosco Drive	No Data	
CI-9	NJ Route 27 & Finnegans Lane	F	D
CI-10	NJ Route 32 & Cranbury-South River Road	F	D

5. PROPOSED MASTER PLAN ROADWAYS AND INTERSECTIONS

Based upon Township Planning Board and staff recommendations, public comments, current traffic congestion problems and traffic study area analyses, numerous proposed roads, and roadway and intersection improvements throughout the Township have been considered and evaluated. Plan P-2, “Proposed Roadway and Intersection Improvements,” shows the locations of the proposed roadway and intersection improvements as deemed consistent with this Circulation Element of the Master Plan.

Plan P-4, “2020 Roadway Designations,” shows future right-of-way (ROW) and cartway widths based on current NJDOT, Middlesex County, and local mapping and standards.

Roadway classifications shown on P-4 include primary and secondary arterial roadways, and primary and secondary collector roadways. Minor roadway classifications are subject to New Jersey Residential Site Improvement Standards (RSIS). Plan P-4 is subject to updating as new state and county mapping and standards are issued.

Primary arterials are to have a right-of-way of 100 feet and two (2) cartways that are each thirty-six feet (36'). Secondary arterials are to have right-of-way of eighty-eight feet (88') with a cartway width of sixty feet (60').

Primary collectors are to have a right-of-way of seventy-two feet (72') and a cartway of fifty-two feet (52'). Secondary collectors are to have a right-of-way of sixty-six feet (66') and a cartway of forty feet (40'). Other roadways in the township are minor roadways and would follow the Residential Site Improvement Standards as to right-of-way and cartway width.

The proposed transportation improvements identified on P-2 have been divided into the following categories: Township proposed roadway improvements, Township proposed intersection improvements, proposed state improvements and proposed county improvements. The Township improvements are the basis of the transportation improvement plan for South Brunswick. There are other improvements that will also occur within the Township. These improvements include state projects on state roadways and county improvements on county roadways. The county and state improvements must be input into the traffic models for future year analyses, but these improvements cannot be considered for collecting off tract contributions. The proposed improvements are as follows:

5.1 TOWNSHIP ROADWAY IMPROVEMENTS

T-1 Northumberland Roadway Connector

This improvement is a planned roadway that will service the South Brunswick Center, along US Route 1, and minimize emergency response time. The roadway will be built with developer funding and will extend Northumberland Way into the proposed development east of Route 1. The Northumberland Roadway connector will join Route 1 at its intersection with Northumberland Way and Beekman Road. To minimize emergency response time as a concern of the Fire Marshal, and reduce travel delays, the roadway will connect to Major Road. Turning movements for vehicles traveling south toward 522 on this connector will be restricted so that traffic leaving the complex will not be able to turn onto Major Road. Depending upon any developer's agreement with the NJDOT, Route 1 in this area may be required to have an overpass with associated ramps and roadway widening. Additional lane widening may be required along Route 1 when the development size is finalized and site specific traffic analyses are provided for review.

T-2 Beekman Road Improvements between Route 1 and Route 27

This roadway will require minor safety improvements and minor widening. No additional lanes are recommended and only minor shoulder improvements are anticipated. It is envisioned that this roadway will operate satisfactorily in the future with only one lane in each direction.

T-3 Perrine Road

There are minor geometric roadway changes that are proposed. No roadway widening is proposed but some geometric improvements are required for safety.

5.2 TOWNSHIP PLANNED INTERSECTION IMPROVEMENTS

TI-1 Major Road and Northumberland Way

This intersection is presently unsignalized. It is recommended that this intersection be signalized and there be geometric improvements including restriping and lane widenings on the approaches. Without signalization, this intersection will fail in the future. Traffic from the Northumberland roadway will be allowed to travel toward Route 522 without making any turns at Major Road. Traffic from Route 522 traveling north on Northumberland Roadway would be able to make turning movements at Major Road. The leg of the intersection from Major Road to the Northumberland Loop Roadway would be developer funded. With the improvements suggested, a LOS C is anticipated.

TI-2 Middlesex County Route 522 and Northumberland Way

This intersection is presently unsignalized. It is recommended that in the future this intersection be signalized and there be geometric improvements including

restriping and lane widenings on the approaches. Channelized right turn lanes on all approaches and a near side jughandle for eastbound 522 to northbound Northumberland Way. Without signalization, this intersection will fail in the future. With the improvements suggested, a LOS B is anticipated.

TI-3 Ridge Road and New Road

This intersection is in a key area in the Township and will require improvement. It is anticipated that improvements will include signalization modifications, turning restrictions, driveway modifications, and signal coordination with a new signal at New Road and Ridge Road to provide gaps to assist local residents to enter and exit driveways as well as minor geometric improvements. The area is presently developed and will allow only minor widening. The inclusion of gaps provided by the proposed signal improvements is anticipated to provide a good level of service of B for New Road and Ridge Road in the future for the citizens in the immediate area. A future LOS of D for East New Road and Ridge Road is anticipated. Roundabouts may also be possible. This can be studied as a separate project as desired by the Township.

TI-4 Ridge Road and Stouts Lane

This intersection is presently signalized and has two approach lanes on each intersection approach. In the future it is expected that signal timing changes will be required at this intersection. A LOS D is anticipated in the future at this intersection with these minor changes.

TI-5 Ridge Road and Perrine Road

At the present time both Perrine Road and westbound Ridge Road have one approach lane. Eastbound Ridge Road has two lanes, a right turn lane and a thru lane. In the future, this intersection will fail without signalization and there will have to be geometric improvements including restriping, adding left turn lanes on all approaches, as well as the realignment of Greenlands Boulevard with Perrine Road. Signalization will be needed due to sight distance restrictions at this intersection. With the proposed improvements, it is anticipated that a level of service D will be achieved in the future.

TI-6 Major Road and Kingston Lane

At the present time, each intersection approach has only one lane. This intersection has a great deal of traffic including traffic to the Crossroads Middle School. This intersection is presently unsignalized, fails now and will continue to fail in the future. It is recommended that this intersection be signalized and there be geometric improvements including an additional lane for eastbound left turns, restriping and lane widenings on the approaches. A LOS D is anticipated in the future with these improvements.

TI-7 N.J. State Highway Route 27 and Raymond Road

This intersection will require geometric improvements in the future as traffic is expected to increase in this corridor and some of the turning movements are restricted. Lane widenings on Raymond Road, and turning lanes would be required with restriping as well at this intersection. This intersection is expected to operate at a level of service C in the future with the improvements suggested.

TI-8 U.S. Highway 130, Georges Road and Wheeling Road

It is recommended that this intersection be signalized and there be approach improvements on Georges Road and Wheeling Road. Improvements would include three approach lanes on Georges Road and Wheeling Road and opposing left turns for Route 130. This work must be coordinated with work at the intersection of Route 130 and Stults Road. Without signalization the approach roads to Route 130 will fail as well as the left turn movements on Route 130. The proposed improvements will provide a LOS D in the future.

TI-9 U.S. Highway 130 and Stults Road

It is recommended that this intersection be signalized and there be two approach lanes provided on Stults Road. A left turn lane would be required on Route 130 southbound. This work must be coordinated with work at the intersection of Georges Road and Wheeling Road with Route 130. Without signalization the approach road to Route 130 will fail as well as the left turns from Route 130 southbound. The proposed improvements will provide a LOS D in the future.

TI-10 Cranbury-South River Road and Stults Road

It is recommended that this intersection be signalized and there be approach improvements on Stults Road. The improvements may consist of striping to provide two approach lanes on Stults Road. Without signalization the approach road to Cranbury-South River Road will fail. The proposed improvements will provide a LOS C in the future. A left turn lane should be considered for northbound Cranbury-South River Road.

TI-11 Route 130 and Melrich Road and Broadway

It is proposed that these two intersections be improved and be reviewed together. Signalization should be provided at Broadway with a left turn lane on Route 130 north and a right turn lane for south bound Route 130 at Broadway and a left turn lane and a right turn lane for the Broadway approach to Route 130. The intersection of Melrich Road with Route 130 should be modified to provide a right turn into Melrich Road from Route 130 and a right turn out from Melrich Road to Route 130 south. Other turning movements at this intersection should be prohibited and the median on Route 130 closed at this location. Without signalization the approach road to Route 130 will fail. The proposed improvements will provide a LOS B in the future.

TI-12 Ridge Road and Schalk's Crossing Road

This intersection is presently signalized at the entrance to Dow Jones at Schalk's Crossing Road. The intersection presently has widened approach lanes but will fail in the future without additional traffic signal improvements. Additional widening will be required to facilitate increased Township traffic and the traffic from development occurring immediately to the south in Plainsboro Township. The traffic signal will require a left turn, right turn and thru the lane from Dow Jones and from Schalk's Crossing Road. In addition, the eastbound right turn lane to Schalk's Crossing Road should be improved and allowed to provide a yield approach. With these improvements, a LOS D can be anticipated in the future.

TI-13 Perrine Road and Schalk's Crossing Road

This intersection is presently unsignalized. It is recommended that this intersection be improved with geometric improvements including restriping and

lane widenings on the approaches. The need for signalization of this intersection is not anticipated but must be determined in the future as site specific development occurs. In addition, the zoning of this portion of the Township is recommended for reevaluation to determine the most advantageous mix of land uses. With land uses proposed that would be generate less traffic, it is anticipated that signalization may not be required in the future. Without signalization a good level of service A is still anticipated at this intersection with just geometric improvements.

TI-14 Ridge Road & Dock's Corner Road

Ridge Road and Docks Corner Road should be signalized to accommodate anticipated development in this corridor. Without signalization the approach road to Ridge Road will fail. It is anticipated that Dock's Corner Road should be modified to have two approach lanes: a left turn lane and a right turn lane. The proposed improvements will provide a LOS B in the future. Some realignment of the roadway will be required due to the extreme angle of the existing intersection which is unsafe.

TI-15 Deans Rhode Hall Road & Fresh Ponds Road

It is recommended that this roadway be signalized and minor geometric improvements be made to accommodate future growth in this corridor. Without signalization, some approaches will fail. With signalization a LOS B can be anticipated.

TI-16 N.J. State Highway Route 27 and Beekman Road

This intersection will require geometric improvements in the future as traffic is expected to increase in this corridor and some of the turning movements are

restricted. Lane widenings and turning lanes would be required with restriping as well. This intersection is expected to operate at a level of service B in the future with the improvements suggested. A realignment of Beekman Road should be provided to improve the operation of this intersection.

TI-17 N.J. State Highway Route 27 and Allston Road

This intersection will require geometric improvements in the future as well as signalization as traffic is expected to increase in this corridor and some of the turning movements are restricted. Lane widenings and turning lanes would be required with restriping as well. This intersection is expected to operate at a level of service D in the future with the improvements suggested. It is recommended that the possibility of making a portion of Allston Road one-way to eliminate through traffic in residential areas be studied as part of this improvement.

TI-18 Davidsons Mill Road and Fresh Ponds Road

This intersection will require geometric improvements in the future as traffic is expected to increase in this corridor and some of the turning movements are restricted. Lane widenings and turning lanes would be required with restriping as well. This intersection is expected to operate at a level of service B in the future with the improvements suggested.

TI-19 N.J. State Highway Route 1 and CR 522
TI-19a CR 522 and Stouts Lane

This area will require significant improvements in the future as traffic is expected to increase in this corridor and a far side jug-handle will be required for northbound Route 1 to make left turns onto Route 522 westbound. The future improvement will require five lanes on Route 1 in this area and will require a left turn lane on CR 522 westbound at Stouts Lane. This left turn movement may be required to be designed for a dual left turn in the future with anticipated shopping

center traffic in the area. In addition, all right turn movements at the intersection should be designed to provide a free channelized right turn. Stouts Lane will have to be widened to provide two approach lanes at Route 522. It is also recommended that Stout Lane be realigned to be further from Route 1 and realigned with the proposed jughandle. With these improvements, these intersections are expected to operate at a levels of service C and E in the future. Roadway intersections 19a and 19b are shown combined in the document tables.

5.3 COUNTY PLANNED ROADWAY IMPROVEMENTS

C-1 Finnegans Lane Extension between Route 130 and Route 27

This roadway will require minor safety improvements and minor widening within the Township. Volume projections do not indicate widening will be required to four lanes at this time. Volume projections must be reaffirmed in the future as the majority of this improvement will occur outside of the Township. It is recommended that the extension of Finnegans Lane be extended to Route 130 north of Davidsons Mill Road. A northerly alignment of the Finnegans Lane Extension is recommended.

C-2 Deans Lane/Deans Rhode Hall Road Improvements between Route 1 and Route 130

This roadway will require minor safety improvements and minor widening. Special attention may be required due to the widening under the railroad bridge. It is envisioned that this roadway will operate satisfactorily in the future with only one lane in each direction.

C-3 County Route 522 Extension between Route 130 and Ridge Road

This county roadway is to be extended from Route 130 east to Ridge Road. The

roadway is envisioned to operate well in the future with only one lane in each direction. The roadway will be widened to meet County requirements and may be widened to forty feet (40'). The bridge over the N. J. Turnpike may have to be widened as a part of this project.

C-4 Cranbury-South River Road Improvements between Conrail Rail Line and Dunhams Corner Road

This roadway will require minor safety improvements and widening to provide two travel lanes in each direction. Special attention may be required due to the widening under the Turnpike bridge. The amount of traffic in this corridor may require jug-handle type improvements as the traffic is anticipated to handle traffic from the Township and areas to the north in adjacent municipalities. This roadway will also serve as access to the New Jersey Turnpike Interchange on Route 32 thus considerable “thru” traffic is anticipated as well.

C-5 Dey Road Widening between Route 130 and Eiker Road

This roadway will require minor safety improvements and widening. It is envisioned that this roadway will require widening to four lanes in the future. This roadway is presently being widened to four lanes from Route 130 east to South River - Cranbury Road. Future development to the west in the adjacent municipalities will require this roadway to be widened further to four lanes. Thus, four lanes are recommended in this plan.

5.4 COUNTY PLANNED INTERSECTION IMPROVEMENTS

CI-1 U.S. Highway Route 130 and Dey Road

This intersection will require approach widening and modernization of the

existing signalization. The roadway is presently being improved east of Route 130 and additional improvements will be required as Dey Road is improved to four lanes west of Route 130. With the lane improvements it is anticipated that a LOS C will be achieved.

CI-2 Cranbury-South River Road and Ridge Road

This intersection is presently signalized. The intersection will require modernization, additional approach lanes and widening. With these improvements it is anticipated that a level of service E will be achieved in the future.

CI-3 Ridge Road and County Route 522 Extension

This intersection is not presently in place. It will be a new intersection and this intersection will require signalization and some widening for the westbound approach. It anticipated that this intersection will operate at a level of service C in the future.

CI-4 Cranbury-South River Road and Deans-Rhode Hall Road

This intersection is presently unsignalized. It is recommended that this intersection be signalized and there be geometric improvements including restriping and lane widenings on the approaches. Without signalization this intersection will fail. With the improvements suggested, a level of service C can be anticipated.

CI-5 Cranbury-South River Road and Davidsons Mill Road

This intersection is presently signalized. It is recommended that this intersection be modernized and there be geometric improvements including restriping and lane

widenings on the approaches. The intersection will fail in the future without the improvements suggested, a level of service of C can be expected with the improvements.

CI-6 U.S. Highway Route 130, Middlesex County Route 522 and Fresh Ponds Road

This intersection will require realignment and the extension of Route 522 east from Route 130 to Ridge Road. The intersection will require the realignment of Fresh Ponds Road further to the east. Without these improvements, the intersections will fail. With the improvements, including channelized right turn lanes for eastbound CR 522, both directions on Route 130, and modernization of the traffic signal and some lane additions, a level of service D can be expected in the future.

CI-7 Ridge Road, Georges Road and Culver Road

This intersection will require additional turning lane improvements in the future and signal modernization. Improvements will require left turn lanes on Georges Road and additional lane widening on all approaches due to the anticipated growth in this travel corridor. With improvements, a level of service D can be expected.

CI-8 Cranbury-South River Road & Cosco Drive

This intersection will occur when a new roadway is constructed to the east to service a new Cosco - Price Club warehouse complex. The intersection will require signalization and approach widening. It will be accomplished in conjunction with access to a new Cosco facility. Upon completion, the intersection should provide a good level of service A into the future. It should be

noted that this level of service will require the widening of Cranbury Road to a minimum of four lanes in this area as called for in other portions of this report.

CI-9 N.J. State Highway Route 27 and Finnegans Lane

This intersection is presently signalized. It is recommended that there be signal timing changes in the future. The intersection is anticipated to operate at a level of service E in the future. The timing changes are expected to improve the level of service to a D.

CI-10 N.J. State Highway Route 32 and Cranbury-South River Road

This intersection is presently signalized. It is recommended that there be geometric improvements including restriping and lane widenings on the approaches. An additional through lane will be required on Route 32 in the vicinity of the intersection. In addition, channelized right turn lanes are anticipated to be required for northbound Cranbury Road and eastbound Route 32 traffic. The turning movements into the Turnpike Toll Plaza create severe capacity constrictions on certain turning movements especially since there is a great deal of truck traffic in the area. Therefore turning lanes must be re-engineered to account for the heavy truck movement. In the future the intersection is anticipated to operate at a level of service F. The improvements are expected to improve the level of service to a D.

5.5 STATE PLANNED ROADWAY AND INTERSECTION IMPROVEMENTS

The NJDOT has a 1997 Summary Traffic Report that was prepared by Garmen Associates regarding the US Route 1 Corridor in South Brunswick Township. The traffic report address the widening of Route 1 through the Township and addresses future traffic volumes for the year 2015. The report was updated and a March 1998 NJDOT report, US-1 Transportation

D:\r4.doc

Needs Assessment recommends various improvements along intersections in South Brunswick as well as widening of the main line roadway. The State recommendations or proposals are noted in the below paragraphs. However, the Township and Council have not endorsed any flyovers without access to Route 1. It is essential for the Township that both sides of the Township are united.

S-1, Route 1 Widening through the Township

The NJDOT has widened Route 1 to the north and to the south of South Brunswick Township. As these improvements have been completed, it has become apparent that there will be a need for improving Route 1 in the Township by widening Route 1 as well as by improving various intersections.

The NJDOT studies recommend that the roadway be widened to six (6) lanes by adding an additional lane in each direction. The widening of Route 1 to six lanes is endorsed by the Township. It should be noted that additional widening would be required at various intersections by providing turning lanes, acceleration lanes, and widening at some key areas. It is noted that with at grade separated interchanges, the NJDOT reports indicate that a six-lane roadway should provide ample capacity to at least 2015.

The study indicates that the widening will also require intersection improvements to assure adequate capacity along the entire roadway. Widening alone would not be sufficient. Some type of intersection improvement would be required at all of the intersections along Route 1 even if the improvement would be minor. It should also be noted that the NJDOT is including the proposed Route 92 from the New Jersey Turnpike to Route 1 as an integral part of their future plan. This is inconsistent with the Township Master Plan and is not endorsed by the Township. Major improvements that would be required in the Township are noted below. Many of the NJDOT improvements recommended by the NJDOT are not endorsed by the Township. This includes the elimination of traffic signals and elimination of and the hindrance of east west traffic

movements. However, the NJDOT recommendations are noted below for reference.

Independence Way

The NJDOT has recommended that the traffic signal at Route 1 and Independence Way be removed and that Independence Way be converted into a right turn in and right turn out intersection. This recommendation is subject to further analyses and study by the NJDOT. The Township does not endorse this proposal.

Ridge Road

The near side northbound jughandle fails continuously at this time. Motorists make eastbound right turns and then make U-turns in the roadway to be able to make a westbound movement through the intersection. The NJDOT proposes is to make this a grade separated interchange. Improvement of this intersection as appropriate for a local roadway is endorsed by the Township.

Raymond Road

The state has recommended that this traffic signal be removed and that Raymond Road movements be restricted to a right turn in and a right turn out. The NJDOT has recommended that the median opening be closed as well. The Township does not endorse this proposal.

Route 522 - Promenade Boulevard

This intersection will require a far side jughandle for northbound Route 1 to westbound Route 522. The jughandle will have to surround the existing gas station and it is recommended that the jughandle meet Route 522 with a relocated or existing Stouts Lane at a traffic signal. Route 522 west of Route 1 will have to be improved and widened. The

near side jug on southbound Route 1 will need improvement as well or a far side jug handle will be required for southbound Route 1 traffic. Left turn lanes will be added for the Route 522 approaches in the near future. The Township endorses these improvements at this time. The State has recommended that this be a grade separated interchange subject to further study. The Township also endorses a future overpass.

Wynwood Drive/Whispering Woods Boulevard

The NJDOT has recommended that this traffic signal be removed and movements be restricted to a right turn in and a right turn out. The NJDOT has also recommended that the median opening be closed as well. The Township does not endorse these proposals and recommends intersection widenings and signal modernization.

New Road

This intersection requires additional widening on the approaches, expanded jughandles and geometric improvements. The NJDOT has stated that a grade separated overpass would be required subject to further study. The Township endorses these proposals with the understanding that turning movements will be preserved at the overpass.

Sand Hill Road/Major Road

This intersection requires additional widening on the approaches, expanded jughandles and geometric improvements. The NJDOT has recommended that an overpass be provided with no access to or from Route 1 at this location. The Township endorses improvements to this intersection but does not endorse the elimination of access to and from Route 1.

Northumberland Way / Beekman Road

This intersection of Beekman Road and Northumberland Way will require widening, an overpass and lane widening on Route 1 in the vicinity of the ramps. This additional intersection may be restricted by wetlands and full access may not be possible. As site development plans are finalized, this intersection improvement will be finalized. The NJDOT has recommended a grade separated interchange at this intersection. The Township endorses these improvements.

Deans Lane

This intersection requires additional widening on the approaches, expanded jughandles and geometric improvements. The NJDOT has recommended that the traffic signal at this intersection be removed and Deans Lane traffic be restricted to right turns onto and off of Route 1 only. This NJDOT improvement calling for the removal of the traffic signal is not recommended by the Township.

Henderson Road

This intersection requires additional widening on the approaches, expanded jughandles and geometric improvements. The NJDOT has recommended that the traffic signal at this intersection be removed and Henderson Road traffic be restricted to right turns onto and off of Route 1 only. This NJDOT improvement calling for the removal of the traffic signal is not recommended by the Township.

Black Horse Lane

This intersection requires additional widening on the approaches, expanded jughandles and geometric improvements. The NJDOT has recommended that the traffic signal at this intersection be removed and Black Horse Lane traffic be restricted to right turns onto and

off of Route 1 only. This NJDOT improvement calling for the removal of the traffic signal is not recommended by the Township.

Finnegans Lane

This intersection requires additional widening on the approaches, expanded jughandles and geometric improvements. The NJDOT has not recommended improvement at this intersection at this time.

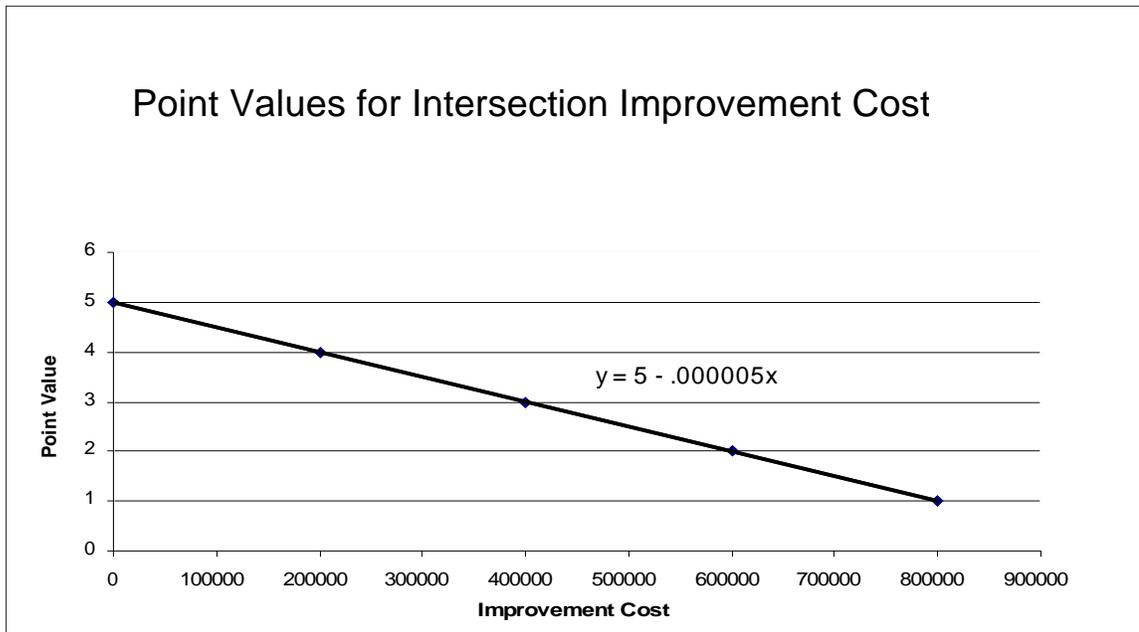
The roadway and intersection improvements noted above must be reviewed in more detail by the Township staff and Planning Board as specific proposals are advanced through the planning process. Then a more detailed analysis of the alternates performed when formal NJDOT plans or site specific projects are introduced into the planning process to address acceleration lanes, deceleration lanes, and additional capacity between major intersections due to changes in the development as presently proposed by the allowed zoning. Safety improvements along Route 1 are recommended but not at the detriment of cross township traffic.

5.6 IMPROVEMENT COST AND PRIORITY RANKINGS

General

In order to provide a guide to help prioritize the proposed intersection improvements, each improvement was assigned a point value. These point values were derived from three criteria, namely improvement cost, change in level of service and p.m. peak hour approach volume. Additional criteria may be assigned by the Township to modify these rankings in the future. Additional criteria could include safety, accidents, right-of-way, etc. The method used for each criteria is explained below and the prioritized lists are shown in Tables 5.1, 5.2, 5.3 and 5.4.

The South Brunswick Master Plan Land Use Element will provide both consistency and continuity with the Circulation Master Plan. As provided in this section, recommended intersection improvements have been prioritized as short term and long term projects. Future land use determinations within specific transportation development districts and centroids (see P-3) must reflect the most appropriate uses to control traffic impacts to the various roadways and intersections.



Improvement Cost

Point values for improvement costs were assigned according to the following graph. For example, an improvement that cost exactly \$ 200,000 would receive four (4) points, whereas a project costing \$ 800,000 would receive one (1) point. This would allow more cost effective projects to be given a higher priority and allow early accomplishment.

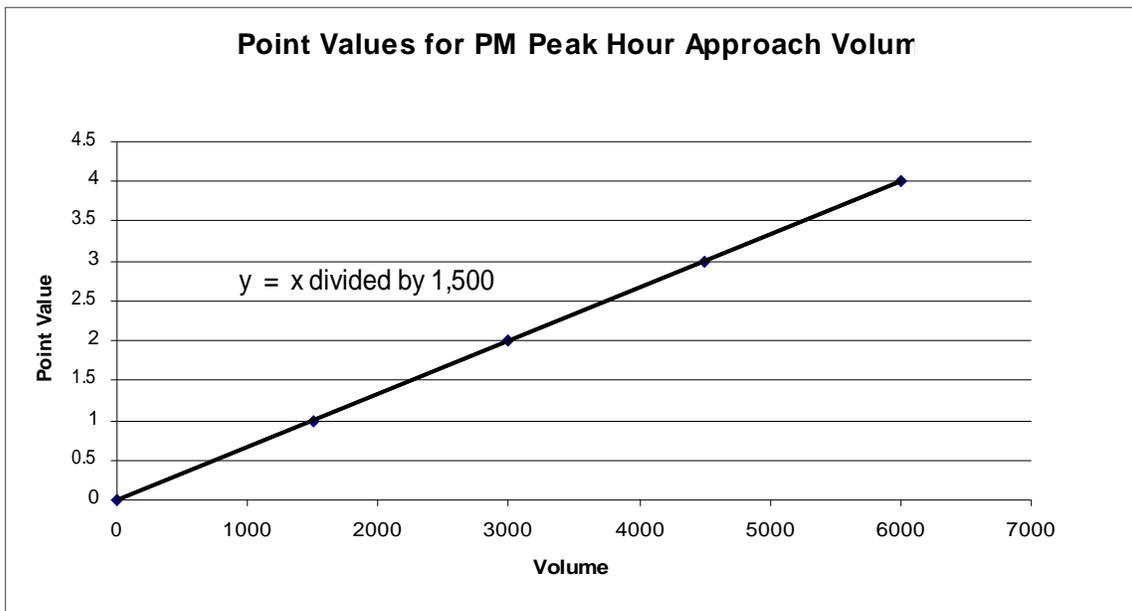
Level of Service Charges

Each level of service from A through F was assigned a number from one to six, with LOS A given a value of one (1) point and LOS F assigned a value of six (6). Point values for

changes in levels of service were determined by subtracting the future improved level of service from the future unimproved level of service. For instance, an intersection that went from an F to a C would receive three (3) points.

P. M. Peak Hour Approach Volumes

Point values for approach volumes were determined from the following graph. For example, an intersection with no volume would receive no points and an intersection with an approach volume of 6,000 would receive four (4) points. Thus, the higher the approach volume, the greater the points assigned.



**Table 5.1
2020 Intersection Improvement Rankings for County Intersections
for Master Plan Intersections**

	Intersection	Cost*	▲LOS**	Peak Hour Approach Volume***	Total
CI-06	US Route 130, CR 522 & Fresh Ponds Road	2.5	2	8.29	12.79
CI-10	NJ Route 32 & Cranbury South River Road	4.63	2	4.17	10.80
CI-05	Cranbury South River Road & Davidsons Mill Road	4.88	3	1.65	9.53
CI-09	NJ Route 27 & Finnigans Lane	4.99	2	2.14	9.13
CI-07	Georges Road, Ridge Road & Culver Road	2.75	2	3.86	8.61
CI-02	Cranbury South River Road & Ridge Road	3.88	1	3.29	8.17
CI-04	Cranbury South River Road & Deans Rhode Hall Road	3.25	3	1.92	8.17
CI-01	US Route 130 & Dey Road	2.75	3	2.1	7.85
CI-08	Cranbury South River Road & Cosco Drive	3.25	0	1.82	5.07
CI-03	Ridge Road & CR 522 Extension	3.13	0	1.92	5.05

Calculation Methods:

* Point Value = 5 - .000005 cost

** Point Value = 2020 LOS - 2020 Improved LOS

A = 1
B = 2
C = 3
D = 4
E = 5
F = 6

*** Point Value = ((2020 Peak Hour Volume)/1500)

Table 5.2
2020 Intersection Improvement Rankings for Township Intersections
for Master Plan Intersections

	Intersection	Cost*	▲LOS**	Approach Volume***	Total
TI-19	US Route 1, CR 522 & Stouts Lane	0.88	2	9.65	12.53
TI-09	US Route 130 & Stults Lane	3.00	2	6.41	11.41
TI-08	US Route 130, Georges & Wheeling Road	2.13	2	6.41	10.54
TI-11	US Route 130 & Broadway	2.75	4	3.56	10.31
TI-14	Ridge Road & Dock's Corner Road	3.38	4	1.97	9.35
TI-02	CR 522 & Northumberland Way	-0.25	4	5.52	9.27
TI-04	Ridge Road & Stouts Lane	4.74	2	2.34	9.08
TI-12	Schalk's Crossing Road & Ridge Road	4.38	2	2.34	8.72
TI-15	Deans Rhode Hall Rd & Fresh Ponds Road	3.75	4	0.64	8.39
TI-10	Cranbury South River Road & Stults Lane	3.25	3	2.10	8.35
TI-18	Davidsons Mill Road & Fresh Ponds Road	4.50	3	0.75	8.25
TI-07	NJ Route 27 & Raymond Road	3.00	3	2.23	8.23
TI-17	NJ Route 27 & Allston Road	4.13	2	1.78	7.91
TI-06	Major Road & Kingston Road	3.38	2	2.47	7.85
TI-03	New Road & Ridge Road	1.25	3	2.70	6.95
TI-16	NJ Route 27 & Beekman Road	4.38	1	1.25	6.63
TI-13	Perrine Road & Schalk's Crossing Road	3.88	0	1.14	5.02
TI-05	Perrine Road & Ridge Road	1.00	2	1.94	4.94
TI-01	Major Road & Northumberland Way	-3.00	3	2.57	2.57

Calculation Methods:

* Point Value = 5 - .000005 cost

** Point Value = 2020 LOS - 2020 Improved LOS

A = 1
 B = 2
 C = 3
 D = 4
 E = 5
 F = 6

*** Point Value = ((2020 Peak Hour Volume)/1500)

Table 5.3

**2020 Intersection Improvement Rankings for All Intersections
for Master Plan Intersections**

	Intersection	Cost*	▲LOS**	Approach Volume***	Total
CI-06	US Route 130, CR 522 & Fresh Ponds Road	2.50	2	8.29	12.79
TI-19	US Route 1, CR 522 & Stouts Lane	0.88	2	9.65	12.53
TI-09	US Route 130 & Stults Lane	3.00	2	6.41	11.41
CI-10	NJ Route 32 & Cranbury-South River Road	4.63	2	4.17	10.80
TI-08	US Route 130, Georges & Wheeling Road	2.13	2	6.41	10.54
TI-11	US Route 130 & Broadway	2.75	4	3.56	10.31
CI-05	Cranbury-South River Road & Davidsons Mill Rd.	4.88	3	1.65	9.53
TI-14	Ridge Road & Dock's Corner Road	3.38	4	1.97	9.35
TI-02	CR 522 & Northumberland Way	-0.25	4	5.52	9.27
CI-09	NJ Route 27 & Finnegans Lane	4.99	2	2.14	9.13
TI-04	Ridge Road & Stouts Lane	4.74	2	2.34	9.08
TI-12	Schalk's Crossing Road & Ridge Road	4.38	2	2.34	8.72
CI-07	Georges Road, Ridge Road & Culver Road	2.75	2	3.86	8.61
TI-15	Deans Rhode Hall Road & Fresh Ponds Road	3.75	4	0.64	8.39
TI-10	Cranbury-South River Road & Stults Lane	3.25	3	2.10	8.35
TI-18	Davidsons Mill Road & Fresh Ponds Road	4.50	3	0.75	8.25
TI-07	NJ Route 27 & Raymond Road	3.00	3	2.23	8.23
CI-02	Cranbury-South River Road & Ridge Road	3.88	1	3.29	8.17
CI-04	Cranbury-South River Road & Deans Rhode Hall	3.25	3	1.92	8.17
TI-17	NJ Route 27 & Allston Road	4.13	2	1.78	7.91
TI-06	Major Road & Kingston Road	3.38	2	2.47	7.85
CI-01	US Route 130 & Dey Road	2.75	3	2.10	7.85
TI-03	New Road & Ridge Road	1.25	3	2.70	6.95

Table 5.3 (Continued)

	Intersection	Cost*	▲LOS**	Approach Volume***	Total
TI-16	NJ Route 27 & Beekman Road	4.38	1	1.25	6.63
CI-08	Cranbury-South River Road & Cosco Drive	3.25	0	1.82	5.07
CI-03	Ridge Road & CR 522 Extension	3.13	0	1.92	5.05
TI-13	Perrine Road & Schalk's Crossing Road	3.88	0	1.14	5.02
TI-05	Perrine Road & Ridge Road	1.00	2	1.94	4.94
TI-01	Major Road & Northumberland Way	-3.00	3	2.57	2.57

Calculation Methods:

* Point Value = 5 - .000005 cost

** Point Value = 2020 LOS - 2020 Improved LOS

A = 1
 B = 2
 C = 3
 D = 4
 E = 5
 F = 6

*** Point Value = ((2020 Peak Hour Volume)/1500)

**Table 5.4
2020 Intersection Priorities
for Master Plan Intersections**

Short-Term Projects - 10 Year Horizon					
	Intersection	Cost*	▲LOS**	Approach Volume***	Total
CI-06	US Route 130, CR 522 & Fresh Ponds Road	2.50	2	8.29	12.79
TI-19	US Route 1, CR 522 & Stouts Lane	0.88	2	9.65	12.53
TI-09	US Route 130 & Stults Lane	3.00	2	6.41	11.41
CI-10	NJ Route 32 & Cranbury-South River Road	4.63	2	4.17	10.80
TI-08	US Route 130, Georges & Wheeling Road	2.13	2	6.41	10.54
TI-11	US Route 130 & Broadway	2.75	4	3.56	10.31
CI-05	Cranbury-South River Road & Davidsons Mill Road	4.88	3	1.65	9.53
TI-14	Ridge Road & Dock's Corner Road	3.38	4	1.97	9.35
TI-02	CR 522 & Northumberland Way	-0.25	4	5.52	9.27
CI-09	NJ Route 27 & Finnegans Lane	4.99	2	2.14	9.13
TI-04	Ridge Road & Stouts Lane	4.74	2	2.34	9.08
TI-12	Schalk's Crossing Road & Ridge Road	4.38	2	2.34	8.72
CI-07	Georges Road, Ridge Road & Culver Road	2.75	2	3.86	8.61
TI-15	Deans Rhode Hall Road & Fresh Ponds Road	3.75	4	0.64	8.39
TI-10	Cranbury-South River Road & Stults Lane	3.25	3	2.10	8.35
TI-18	Davidsons Mill Road & Fresh Ponds Road	4.50	3	0.75	8.25
TI-03	New Road and Ridge Road	1.25	3	2.70	6.95

Table 5.4 (continued)

Long-Term Projects, 11 - 20 Year Horizon					
	Intersection	Cost*	▲LOS**	Approach Volume***	Total
TI-07	NJ Route 27 & Raymond Road	3.00	3	2.23	8.23
CI-02	Cranbury-South River Road & Ridge Road	3.88	1	3.29	8.17
CI-04	Cranbury-South River Road & Deans Rhode Hall	3.25	3	1.92	8.17
TI-17	NJ Route 27 & Allston Road	4.13	2	1.78	7.91
TI-06	Major Road & Kingston Road	3.38	2	2.47	7.85
CI-01	US Route 130 & Dey Road	2.75	3	2.10	7.85
TI-16	NJ Route 27 & Beekman Road	4.38	1	1.25	6.63
CI-08	Cranbury-South River Road & Cosco Drive	3.25	0	1.82	5.07
CI-03	Ridge Road & CR 522 Extension	3.13	0	1.92	5.05
TI-13	Perrine Road & Schalk's Crossing Road	3.88	0	1.14	5.02
TI-05	Perrine Road & Ridge Road	1.00	2	1.94	4.94
TI-01	Major Road & Northumberland Way	-3.00	3	2.57	2.57

Calculation Methods:

* Point Value = 5 - .000005 cost

** Point Value = 2020 LOS - 2020 Improved LOS

A = 1
 B = 2
 C = 3
 D = 4
 E = 5
 F = 6

*** Point Value = ((2020 Peak Hour Volume)/1500)

CONSTRUCTION COST ESTIMATES

TI-01	<u>Major Road & Northumberland Way</u>	
!	Widen Major Road & Northumberland Way: 7,000' @ \$ 100.00	\$ 700,000
!	Right-of-Way	500,000
!	Signal, lump sum	<u>400,000</u>
		\$ 1,600,000
TI-02	<u>CR 522 and Northumberland Way</u>	
!	Widen CR 522: 1,500' @ \$ 100.00	\$ 150,000
!	Widen Northumberland Way: 1,500' @ \$ 100.00	150,000
!	Signalize	250,000
!	Right-of-Way	<u>500,000</u>
		\$ 1,050,000
TI-03	<u>Ridge Road and New Road</u>	
!	Widen New Road: 750' @ \$ 100.00	\$ 75,000
!	Widen East New Road: 700' @ \$ 100.00	75,000
!	Widen Ridge Road: 1,000' @ \$ 100.00	100,000
!	Signalize	<u>500,000</u>
		\$ 750,000

TI-04	<u>Ridge Road and Stouts Lane</u>		
	!	Widen Stouts Lane: 250' @ \$ 100.00	\$ 25,000
	!	Widen Ridge Road: 250' @ \$ 100.00	25,000
	!	Signal timing modifications	<u>2,000</u>
			\$ 52,000
TI-05	<u>Ridge Road and Perrine Road</u>		
	!	Widen Ridge Road: 500' @ \$ 100.00	\$ 50,000
	!	Widen Perrine Road: 250' @ \$ 100.00	25,000
	!	Realign Greenlands Boulevard: 750' @ \$ 500.00	375,000
	!	Signalize	250,000
	!	Right-of-way: Allow one (1) acre @ \$ 100,000	<u>100,000</u>
			\$ 800,000
TI-06	<u>Major Road and Kingston Lane</u>		
	!	Widen Major Road: 250' @ \$ 100.00	\$ 25,000
	!	Widen Kingston Lane: 500' @ \$ 100.00	50,000
	!	Signalize	<u>250,000</u>
			\$ 325,000
	!	No right-of-way	

TI-07	<u>NJ Route 27 and Raymond Road</u>		
	!	Widen NJ Route 27: 500' @ \$ 100.00	\$ 50,000
	!	Signal modifications	<u>350,000</u>
			\$ 400,000
	!	No right-of-way	
TI-08	<u>US Route 130, Georges Road & Wheeling Road</u>		
	!	Widen Georges Road: 500' @ \$ 100.00	\$ 50,000
	!	Widen Wheeling Road: 500' @ \$ 100.00	50,000
	!	Widen Route 130: 1,250' @ \$ 100.00	125,000
	!	Signalize	<u>350,000</u>
			\$ 575,000
	!	No right-of-way	
TI-09	<u>US Route 130 and Stults Road</u>		
	!	Widen Route 130: 250' @ \$ 100.00	\$ 25,000
	!	Widen Stults Road: 250' @ \$ 100.00	25,000
	!	Signalize	<u>350,000</u>
			\$ 400,000
	!	No right-of-way	

TI-10	<u>Cranbury-South River Road & Stults Road</u>	
	! Widen Cranbury-South River Road: 750' @ \$ 100.00	\$ 75,000
	! Widen Stults Road: 250' @ \$ 100.00	25,000
	! Signalize	<u>250,000</u>
		\$ 350,000
	! No right-of-way	
TI-11	<u>US Route 130 and Broadway</u>	
	! Widen Route 130: 500' @ \$ 100.00	\$ 50,000
	! Widen Broadway Road: 500' @ \$ 100.00	50,000
	! Signalize	<u>350,000</u>
		\$ 450,000
	! No right-of-way	
TI-12	<u>Ridge Road & Schalk's Crossing Road</u>	
	! Widen Ridge Road: 250' @ \$ 100.00	\$ 25,000
	! Signal improvements	<u>100,000</u>
		\$ 125,000
	! No right-of-way	

TI-13	<u>Perrine Road and Schalk's Crossing Road</u>		
	!	Widen Schalk's Crossing Road: 250' @ \$ 100.00	\$ 25,000
	!	Signalize	<u>200,000</u>
			\$ 225,000
	!	No right-of-way	
TI-14	<u>Ridge Road and Dock's Corner Road</u>		
	!	Widen Ridge Road: 500' @ \$ 100.00	\$ 50,000
	!	Widen Dock's Corner Road: 250' @ \$ 100.00	25,000
	!	Signalize	<u>250,000</u>
			\$ 325,000
	!	No right-of-way	
TI-15	<u>Deans Rhode Hall Road and Fresh Ponds Road</u>		
	!	Signalize	\$ 250,000
TI-16	<u>NJ Route 27 and Beekman Road</u>		
	!	Widen Beekman Road: 250' @ \$ 100.00	\$ 25,000
	!	Signal improvements	<u>100,000</u>
			\$ 125,000

TI-17	<u>NJ Route 27 and Allston Road</u>	
	! Widen NJ Route 27: 500' @ \$ 100.00	\$ 50,000
	! Widen Allston Road: 250' @ \$ 100.00	25,000
	! Signalize	<u>100,000</u>
		\$ 175,000
TI-18	<u>Davidsons Mill Road and Fresh Ponds Road</u>	
	! Widen Davidsons Mill Road: 500' @ \$ 100.00	\$ 50,000
	! Widen Fresh Ponds Road: 500' @ \$ 100.00	<u>50,000</u>
		\$ 100,000
	! No right-of-way	
TI-19	<u>US Route 1, CR 522 and Stouts Lane</u>	
	! Widen US Route 1: 1,500' @ \$ 100.00	\$ 150,000
	! Widen CR 522: 1,500' @ \$ 100.00	150,000
	! Widen Stouts Lane: 250' @ \$ 100.00	25,000
	! Signalize Stouts and CR 522	250,000
	! Jughandle	100,000
	! Right-of-way: Allow 1.5 acres @ \$ 100,000	<u>150,000</u>
		\$ 825,000

CI-01	<u>US Route 130 and Dey Road</u>		
	! Widen US Route 130: 500' @ \$ 100.00	\$	50,000
	! Widen Dey Road: 500' @ \$ 100.00		50,000
	! Signal improvements		<u>350,000</u>
		\$	450,000
	! No right-of-way		
CI-02	<u>Cranbury-South River Road and Ridge Road</u>		
	! Widen South River Road: 750' @ \$ 100.00	\$	75,000
	! Widen Ridge Road: 500' @ \$ 100.00		50,000
	! Signal improvements		<u>100,000</u>
		\$	225,000
	! No right-of-way		
CI-03	<u>Ridge Road and CR 522</u>		
	! Widen Ridge Road: 250' @ \$ 100.00	\$	25,000
	! Widen and construct CR 522: 1,000' @ \$ 100.00		100,000
	! Signalize		<u>250,000</u>
		\$	375,000
	! No right-of-way		

CI-04	<u>Cranbury-South River Road and Deans Rhode Hall Road</u>		
	!	Widen South River Road: 750' @ \$ 100.00	\$ 75,000
	!	Widen Deans Rhode Hall Road: 250' @ \$ 100.00	25,000
	!	Signalize	<u>250,000</u>
			\$ 350,000
	!	No right-of-way	

CI-05	<u>Cranbury-South River Road and Davidsons Mill Road</u>		
	!	Widen South River Road: 250' @ \$ 100.00	\$ 25,000

CI-06	<u>US Route 130, CR 522 and Fresh Ponds Road</u>		
	!	Widen and construct CR 522: 1,000' @ \$ 100.00	\$ 100,000
	!	Widen US Route 130: 250' @ \$ 100.00	25,000
	!	Signal improvements	350,000
	!	Right-of-way: Allow 0.25 acres @ \$ 100,000	<u>25,000</u>
			\$ 500,000

CI-07	<u>Ridge Road, Georges Road and Culver Road</u>		
	!	Widen Ridge Road: 1,000' @ \$ 100.00	\$ 100,000
	!	Widen Georges Road: 750' @ \$ 100.00	75,000
	!	Widen Culver Road: 250' @ \$ 100.00	25,000

	!	Signal improvements		<u>250,000</u>
			\$	450,000
	!	No right-of-way		
CI-08		<u>Cranbury-South River Road and Cosco Drive</u>		
	!	Widen South River Road: 500' @ \$ 100.00	\$	50,000
	!	Construct driveway: 500' @ \$ 100.00		50,000
	!	Signalize		<u>250,000</u>
			\$	350,000
	!	No right-of-way		
CI-09		<u>NJ Route 27 and Finnegans Lane</u>		
	!	Signal timing modifications	\$	2,000
CI-10		<u>NJ Route 32 and Cranbury-South River Road</u>		
	!	Widen NJ Route 32: 500' @ \$ 100.00	\$	50,000
	!	Widen South River Road: 250' @ \$ 100.00		<u>25,000</u>
			\$	75,000
	!	No right-of-way		

6. TRANSPORTATION DEVELOPMENT DISTRICTS

6.1 CRITERIA

The criteria for determining the limits for a transportation district vary. One

criterion is sheer size. Another criterion is the amount of development existing and anticipated. In this analysis, it was also determined that the previous zones should be reviewed. This review showed that many of the previous roadway improvements were no longer possible due to environmental constraints. Thus, the remaining developable areas, as well as the environmental constraints, were utilized as another criterion to determine zonal boundaries. These criteria for analyses in this study modified the zones from the previous study that included seven transportation districts or zones. In this analysis six transportation districts were chosen. The previous study used the main line of the AMTRAK as a major divider of the Township. This is a logical break between the two sides of the Township. It would enable the Township to allocate one-half of any railroad crossings to each of the two zones affected by the railroad crossing. This dividing line was also chosen in this study. This resulted in a good boundary but additional districts would be required. The additional districts on the east side of the AMTRAK main line were chosen by using the Jamesburg Branch of the CONRAIL railroad line to the south. An additional district boundary line was chosen to be Deans Rhode Hall Road between the AMTRAK main line and the Township boundary line to the east. West of the AMTRAK main line it was decided to divide the area of the Township into three districts. One district is the area south of County Route 522. One district was the area north of Route 522 and north of New Road. Another district west of the AMTRAK main line would be that portion of the Township bounded by New Road, Route 522 and Route 27. This would result in the formation of six improvement districts in total.

The choice of six improvement districts allows various costs for traffic improvements to be distributed in an area manner in the future, or allocated with the utilization of the model that would allocate the costs to each intersection and roadway slated for improvement. The improvement districts are shown in Plan P-1.

6.2 OFF TRACT IMPROVEMENT COSTS

Now that the districts have been identified and the off-tract improvement costs have been determined for the districts, it is necessary to develop an analysis of the actual cost by trip and the cost by land use within these districts. These costs were determined and are found in the following tables. It should be noted that since costs are for new trips and retail uses have pass by trips, the number of retail trips by square foot of retail use were reduced to account for the bypass trips. In addition, the total costs that were determined for improvements were reduced to only include those costs that were anticipated to be required to be provided by the Township. Thus, the tables reflect adjusted costs that take this reduction in cost into account

Table 6.1: Off-Tract Improvement Cost Per Trip (Continued)

TABLE 6.1: Off-Tract Improvement Cost per Trip						
		Cost	Adjusted Cost	Trips	\$/Trip	Adjusted \$/Trip
District 1						
TI-01	Major Road & Northumberland Way	\$1,600,000	\$1,600,000			
TI-02	County Route 522 & Northumberland Way	\$1,050,000	\$525,000			
TI-16	NJ Route 27 & Beekman Road	\$125,000	\$1,250			
CI-09	NJ Route 27 & Finnegans Lane	\$2,000	\$0			
T-3	Beekman Road	\$2,888,000	\$2,888,000			
		\$5,665,000	\$5,014,250	16,870	\$336	\$297
District 2						
TI-17	NJ Route 27 & Allston Road	\$175,000	\$57,750			
TI-19	US Route 1 & County Route 522	\$412,500	\$206,250			
		\$587,500	\$264,000	16,012	\$37	\$16
District 3						
TI-02	County Route 522 & Northumberland Way	\$175,000	\$87,500			
TI-03	New Road & Ridge Road	\$750,000	\$375,000			
TI-04	Ridge Road & Stouts Lane	\$52,000	\$17,160			
TI-05	Perrine Road & Ridge Road	\$800,000	\$400,000			
TI-07	NJ Route 27 & Raymond Road	\$400,000	\$132,000			
TI-12	Schalk's Crossing Road & Ridge Road	\$125,000	\$62,500			
TI-13	Perrine Road & Schalk's Crossing Road	\$225,000	\$225,000			
TI-19	US Route 1 & County Route 522	\$412,500	\$206,250			
T-2	Perrine Road	\$300,000	\$300,000			
		\$3,239,500	\$1,805,410	15,620	\$207	\$116

		Cost	Adjusted Cost	Trips	\$/Trip	Adjusted \$/Trip
<u>District 4</u>						
TI-15	Deans Rhode Hall Road & Fresh Ponds Road	\$125,000	\$62,500			
TI-18	Davidsons Mill Road & Fresh Ponds Road	\$100,000	\$100,000			
CI-04	Cranbury-South River Road & Deans Rhode Hall Road	\$175,000	\$0			
CI-05	Cranbury-South River Road & Davidsons Mill Road	\$25,000	\$8,250			
		\$425,000	\$170,750	5,079	\$84	\$34
<u>District 5</u>						
TI-06	Kingston Lane & Major Road	\$325,000	\$162,500			
TI-14	Ridge Road & Dock's Corner Road	\$325,000	\$107,250			
TI-15	Deans Rhode Hall Road & Fresh Ponds Road	\$125,000	\$62,500			
CI-02	Cranbury-South River Road & Ridge Road	\$225,000	\$0			
CI-03	Ridge Road & County Route 522 Extension	\$375,000	\$0			
CI-04	Cranbury-South River Road & Deans Rhode Hall Road	\$175,000	\$0			
CI-06	US Route 130, County Route 522 & Fresh Ponds Road	\$500,000	\$100,000			
CI-07	Georges Road, Ridge Road & Culver Road	\$450,000	\$90,000			
CI-08	Cranbury-South River Road & Cosco Drive	\$350,000	\$0			
		\$2,850,000	\$522,250	15,498	\$184	\$34
<u>District 6</u>						
TI-08	US Route 130, Georges Road & Wheeling Road	\$575,000	\$143,750			
TI-09	US Route 130 & Stults Road	\$400,000	\$132,000			
TI-10	Cranbury-South River Road & Stults Lane	\$350,000	\$115,500			
TI-11	US Route 130 & Broadway Road	\$450,000	\$148,500			
CI-01	US Route 130 & Dey Road	\$450,000	\$0			
CI-10	NJ Route 32 & Cranbury-South River Road	\$75,000	\$0			
		\$2,300,000	\$539,750	6,103	\$377	\$88

TABLE 6.2
OFF-TRACT IMPROVEMENT COSTS BY LAND USE

	Transportation Improvement District					
	1	2	3	4	5	6
Cost Per Trip End	\$ 297	\$ 16	\$ 116	\$ 34	\$ 34	\$ 88
<u>Land Use</u>						
Single-Family Residential:						
Trips per Unit	1.01	1.01	1.01	1.01	1.01	1.01
Cost per Unit	\$ 300	\$ 16	\$ 117	\$ 34	\$ 34	\$ 89
Townhouse Residential:						
Trips per Unit	0.54	0.54	0.54	0.54	0.54	0.54
Cost per Unit	\$ 160	\$ 9	\$ 63	\$ 18	\$ 18	\$ 48
Apartment Residential:						
Trips per Unit	0.62	0.62	0.62	0.62	0.62	0.62
Cost per Unit	\$ 184	\$ 10	\$ 72	\$ 21	\$ 21	\$ 55
Corporate Office:						
Trips per 1,000 ft. ²	1.39	1.39	1.39	1.39	1.39	1.39
Cost per 1,000 ft. ²	\$ 413	\$ 22	\$ 161	\$ 47	\$ 47	\$ 123
Professional Office:						
Trips per 1,000 ft. ²	3.66	3.66	3.66	3.66	3.66	3.66
Cost per 1,000 ft. ²	\$ 1,087	\$ 59	\$ 425	\$ 124	\$ 124	\$ 322
Research:						
Trips per 1,000 ft. ²	1.08	1.08	1.08	1.08	1.08	1.08
Cost per 1,000 ft. ²	\$ 321	\$ 17	\$ 125	\$ 37	\$ 37	\$ 95
Warehouse:						
Trips per 1,000 ft. ²	0.51	0.51	0.51	0.51	0.51	0.51
Cost per 1,000 ft. ²	\$ 151	\$ 8	\$ 59	\$ 17	\$ 17	\$ 45
Retail:						
New Trips per 1,000 ft. ^{2*}	2.47	2.47	2.47	2.47	2.47	2.47
Cost per 1,000 ft. ²	\$ 734	\$ 40	\$ 287	\$ 84	\$ 84	\$ 217

*Retail trip rates have been reduced to account for pass-by trips already existing on the highway system.

7. INTEGRATION OF THE NEW JERSEY RESIDENTIAL SITE IMPROVEMENT STANDARDS

In 1997, the New Jersey Residential Site Improvement Standards (N.J.A.C. Title 5, Chapter 21) were mandated by State legislators to supersede local residential site improvement standards. The purpose of these standards, among others, is to standardize residential infrastructure design in order to reduce development costs. Although the intent and purposes (5:21-1.3) do not specifically state improving the flow of traffic as an objective, implementation of RSIS can assist municipalities in achieving this goal.

The Standards include a street hierarchy system specific to residential development, and address cartway widths, and rights-of-way, curbs and gutters, trip generation guidelines, roadway shoulders, sidewalks, bikeways, utility areas, street grades, pavement design, street and traffic signs, and parking spaces and areas. It is recommended that these Standards be endorsed by South Brunswick Township as contributory to the Township's goal of implementing a Township-wide Circulation Element of the 2001 Master Plan.

Specific sections of the Standards described as follows should be referenced in the Municipal Land Development Ordinances. Proposed streets within South Brunswick Township that are located within residential areas would be classified in a hierarchy tailored to function. The hierarchy classification found at N.J.A.C. 5:21-4.1 is applicable only to local residential streets and is not to be considered related to the U.S. Department of Transportation, Federal Highway Administration's Functional Classification of Highways.

- ! South Brunswick Township seeks to reduce traffic in residential areas, and to direct trucks toward identified truck routes.

STREET HIERARCHY

The street hierarchy system would be defined by road function and average daily traffic (ADT), calculated by trip generation rates from the current edition of Trip Generation by the Institute of Transportation Engineers. Trip generation rates from other sources may be used if the applicant demonstrates to the appropriate approving authority that these sources better reflect local conditions.

Each residential street would be classified and designed to meet the standards for one of the street types defined in the Standards. The hierarchy includes residential access (lowest order), residential neighborhood, minor collector, and major collector (highest order), Special purpose streets in the hierarchy include rural roads and lanes, alleys, cul-de-sacs, marginal access streets, divided streets and parking loops. Each street segment between intersections would be designed based on the highest ADT served in that segment. The municipality and developer would determine the highest order street required to be used in a given residential development, considering all of the following:

- ! The size of the development (number and type of units).
- ! The actual or potential development of adjacent sites (whether there is likely to be traffic passing through from neighboring developments).
- ! The streets proposed for that area, if any, as contained in the municipal master plan.

CARTWAY WIDTH

Cartway widths for each street classification would be determined by parking and curbing requirements that are based on intensity of development. Intensity of development would be based on dwelling units per gross acre as follows:

INTENSITY	DWELLING UNITS PER GROSS ACRE^a
Low	Less than or equal to four
Medium	More than four and less than or equal to fifteen
High	More than fifteen
<p>NOTE: ^a In determining the intensity of development, the gross acreage shall not include dedicated common space or other such areas restricted from future development</p>	

Cartway widths for each street classification are described in the Standards and range from 20 feet to 30 feet. Cartway width determinations also consider possible limitations imposed by site distances, climate, terrain, and maintenance needs.

CURBS OR CURBS AND GUTTERS

Curbs or curbs and gutters are to be used for drainage purposes, safety, and delineation and protection of pavement edge. Curb requirements vary according to street hierarchy and intensity of development. Generally, curbs shall be required on streets with on-street parking.

Where curbing is not required, edge definition and stabilization is furnished for safety reasons, and to prevent pavement unraveling. Curbing may be required for: storm water management, road stabilization, delineation of parking areas, ten (10) feet on each side of drainage inlets, intersections, corners and tight radii.

Curb requirements may be waived by the appropriate municipal approving agency, and shoulders and/or drainage swales used when it can be shown that: soil and/or topography to make the use of shoulders and/or drainage swales preferable; and/or the community desires to preserve its rural character by using shoulders and/or drainage swales instead of curbs. In cases of medium development intensity, the curbing requirement may be waived where front setbacks exceed 40 feet and it can be demonstrated that sufficient on-site parking exists. South Brunswick Township may designate a curb type by Ordinance. Where curb type is not established by municipal ordinance, flexibility regarding curb type would be permitted as long as the curb type accommodates the system of drainage proposed. Generally, curb should be constructed of concrete or granite block. Curbs would be constructed according to the specifications set forth in NJAC 5:21-4.17. The curbing would be designed to provide a curb ramp in compliance with the Americans with Disabilities Act or the Barrier Free Subcode of the New Jersey Uniform Construction Code (N.J.A.C. 5:23-7) at street intersections.

It is the general policy of South Brunswick Township to have curb installed on both sides of municipal streets.

SHOULDERS

Shoulders when determined necessary would generally be four feet wide. Minor collector streets of high intensity with off-street parking, would be six feet wide on each side for all streets. Major collector streets of medium and high intensity would be eight feet wide on each side for all streets. Shoulders would be constructed of materials such as stabilized earth, gravel, crushed stone, bituminous treatment, or other forms of pavement which provide for vehicle load support.

SIDEWALKS AND GRADED AREAS

Sidewalks and/or graded areas would be required, depending on road classification and intensity of development, in accordance with the requirements set forth in the Standards.

Sidewalks would be provided when the conditions described in 1 or 2 below exist:

1. The net density of the development or project exceeds one dwelling unit per acre;
and
 - i. The development or project is located within 2,500 feet of a train station, public or school bus route;
 - ii. The development or project is located within 2,500 feet of an existing recreational, business or retail use or a site where such use is permitted by existing zoning; or
 - iii. Where the proposed streets connect to or extend existing streets which have sidewalks on both sides; or
2. The net density of the development exceeds 0.5 dwelling unit per acre and the development is located within two miles of a school.

Notwithstanding 1 and 2 above, sidewalks would only be required on one side of rural streets or rural lanes and not be required in alleys. Sidewalks would be placed parallel to the street, unless an exception has been permitted to preserve topographical or natural features, or if required to provide visual interest, or unless the applicant shows that an alternative pedestrian system provides safe and convenient circulation (e.g., in planned development). Sidewalk should also be provided along Ridge Road and replace any deficient sections along this road, to provide safe passage to Monmouth Junction School.

Pedestrian-way easements at least 10-feet wide may be required by the municipality through the center of blocks more than 600-feet long. In providing circulation or access to schools, playgrounds, shopping, adjoining residential areas, or other community facilities, the municipality may require pedestrian-way easements.

Sidewalk width would generally be four feet; wider widths may be necessary near pedestrian generators and employment centers. Where sidewalks abut the curb, and cars overhang the sidewalk, widths would be six feet. In high-density residential areas when sidewalks abut the curb, a sidewalk/graded area of at least six feet in width would be required. Sidewalks and graded areas would be constructed according to the specifications set forth in the Standards.

- ! It is the general policy of South Brunswick to have sidewalks installed on both sides of municipal streets.
- ! Sidewalks should be provided along Ridge Road to provide safe passage to Monmouth Junction School.

BIKEWAYS

Separate bicycle paths and lanes would be required only where such paths and lanes have been specified as part of South Brunswick's adopted master plan and/or official map.

Bicycle lanes, where provided, would be placed in the outside lane of a roadway, adjacent to the curb or shoulder. When on-street parking is permitted, the bicycle lane would be between the parking lane and the outer lane of moving vehicles. Lanes would be delineated with markings, preferably striping. Raised reflectors or curbs would not be used.

UTILITY AREAS

Utility mains would be located within the right-of-way or within utility easements outside the right-of-way. Utility areas would be planted with grass, ground cover, or treated with other suitable cover material.

STREET GRADE AND INTERSECTIONS

Street grades and intersection design would be constructed according to the specifications set forth in the Standards at 5:21-4.19.

PAVEMENT

Street pavement thickness would vary by street hierarchy, subgrade properties, and pavement type. Pavement design for rural, residential access, neighborhood, minor collector, and major collector streets would conform to the specifications in the Standards at 5:21-4.19.

UNDERGROUND WIRING

All electric, telephone, television, and other communication facilities, both main and service lines servicing new developments, would be provided by underground wiring within easements or dedicated public rights-of-way, and installed in accordance with the prevailing standards and practices of the utility or other companies providing such services. This requirement, as already mandated by South Brunswick, improves traffic safety and minimizes hazards for vehicles.

Lots that abut existing easements or public right-of-way, where overhead electric or telephone distribution supply lines and service connections have heretofore been

installed, may be supplied with electric and telephone service from those overhead lines, but the service connections from the utilities' overhead lines would be installed underground.

STREET AND TRAFFIC SIGNS

Design and placement of traffic signs would follow the requirements specified in the "Manual on Uniform Traffic Control Devices for Streets and Highways," published by U.S. Department of Transportation and adopted by the N.J. Department of Transportation.

At least two street name signs are to be placed at each four-way street intersection and one at each "T" intersection. Signs would be placed so as not to obstruct sight distances and under light standards, if present, so they are clearly visible. The design of street name signs should be consistent, of a style appropriate to the community, of a uniform size and color, and erected in accordance with South Brunswick's local standards.

At signalized intersections, street signs would be located on the overhead arm supporting the traffic signal, or otherwise suitably suspended over the intersection.

PARKING: NUMBER OF SPACES

An adequate number of on-street and off-street parking spaces must be required in all residential developments to accommodate residents and visitors. Accessible parking spaces for people with disabilities would be provided in accordance with the requirements of the New Jersey Barrier Free Subcode and the Americans with Disabilities Act (ADA), and shall be considered part of the total number of required spaces.

For residential developments, parking would be provided in accordance with the Standards and range from 1.5 to 3 spaces per unit.

Alternative parking standards could be accepted if the applicant demonstrates these standards better reflect local conditions. Factors affecting minimum number of parking spaces include household characteristics, availability of mass transit, urban versus suburban location, and available off-site parking resources.

Garage and driveway combinations would be counted as follows:

1. Each garage car space would be counted as 1.0 off-street parking space regardless of the dimensions of the driveway.
2. A one-car garage and driveway combination would count as 2.0 off-street parking spaces, provided the driveway measures a minimum of 18 feet in length between the face of the garage door and the right-of-way.
3. A two-car garage and driveway combination would count as 3.5 off-street parking spaces, provided a minimum parking area width of 20 feet is provided for a minimum length of 18 feet as specified for a one-car garage and driveway combination.

When housing is included in mixed-use development, a shared parking approach to the provision of parking may be considered by the applicable board.

On-street parking may not be considered as part of meeting off-street residential parking requirements, except when placed within a separate parking lot maintained by an authority other than the municipality.

PARKING SPACE SIZE

Parking spaces in residential and nonresidential development would conform to §175-118 in the Township Code. Parking spaces for people with disabilities must be in accordance with the New Jersey Uniform Construction Code and the Americans with Disabilities Act (ADA).

PARKING AREAS

Off-street residential parking areas would be oriented to, and within a reasonable walking distance of, the buildings they are designed to serve. Access to parking lots would be designed so as not to induce queues on travel ways, and to provide adequate pedestrian circulation and safety. There must be adequate provision for ingress to and egress from all parking spaces to ensure ease of mobility, ample clearance, and safety of vehicles and pedestrians. Where sidewalks occur in parking areas, parked vehicles must not overhang or extend over the sidewalk unless an additional two feet of sidewalk width are provided to accommodate such overhang.

TABLE 7.1 CARTWAY AND RIGHT-OF-WAY WIDTHS								
Street Type^a	Total Average Daily Traffic	Traveled Way	No. of Parking Lanes^b	Parking Lane Width	Cartway Width	Curb or Shoulder^h	Sidewalk or Graded Area^j	Right-of-Way Widthⁱ
RESIDENTIAL ACCESS Low Intensity	1500* *(loop-750 each half)	20'	1	8'	28'	none	1SW 1GA	50'
Medium		20'	1	8'	28'	curb	2SW	50'
High (on-street parking)		20'	1	8'	28'	curb	2SW	50'
High (off-street parking)		20'	0	0'	20'	none	2SW	50'
NEIGHBORHOOD (All intensities)	1500	14'	2	16'	30 ^c	curb	2SW	50'
MINOR COLLECTOR Low intensity ^d with no parking	3,500	20'	0	0'	20'	none	1SW 1GA	50'
Low with one parking lane		20'	1	8'	28'	curb	1SW 1GA	50'
Medium and High Intensity		20'	1	8'	28'	curb	2SW	50'
With one parking lane		20'	2	16'	36'	curb	2SW	60'
With two parking lanes		22'	0	0'	22'	curb or shoulder	2SW	50'
With off-street parking								
MAJOR COLLECTOR Low Intensity	7,500	24'	0	0'	24'	none	2SW	50'
Medium and High		24'	0	0'	24'	curb or shoulder	2SW	50' if curb 54' if shoulder

TABLE 7.1 continued. CARTWAY AND RIGHT-OF-WAY WIDTHS								
Street Type ^a	Total Average Daily Traffic	Traveled Way	No. of Parking Lanes ^b	Parking Lane Width	Cartway Width	Curb or Shoulder ^h	Sidewalk or Graded Area ^j	Right-of-Way Width ⁱ
SPECIAL PURPOSE STREETS								
Rural street ^k	500	20'	0	0'	20'	none	2GA	40'
Rural lane ^k	200	18'	0	0'	18' 9'	none	2GA	40' 11'
Alley (one way)		18'	0	0'	18'	none	2GA	22'
Alley (two way)	250							
Cul-de-sac (stem) ^e								
Marginal access street ^f								
Divided street ^g		24'	1	18'		curb		44'
Parking loop ^l		24'	2	36'		curb		62'
One-side parking								
Two side parking								
NOTES:	<p>^a See Table ____ for definitions of street hierarchy and N.J.A.C. 5:21-4.2 for definitions of low, medium, and high intensity of development.</p> <p>^b Parking lane refers to parallel parking; except in the case of parking loop, which is perpendicular parking.</p> <p>^c The 30' cartway would accommodate two 8' parking lanes and one 14' moving lane.</p> <p>^d 20' minor collector cartways are permitted only when there is no direct building lot access to or from the street in question.</p> <p>^e Cartway and right-of-way widths of cul-de-sac stems and right-of-way requirements should conform to the applicable street type. Cul-de-sacs shall provide for a cartway turning radius of 40' feet and a right-of-way line 8 feet beyond the edge of cartway.</p> <p>^f Cartway and right-of-way widths of marginal access streets and right-of-way requirements should conform to standards of either residential access or minor collector streets, as dictated by average daily traffic. If the classification is a minor collector requiring a 36' cartway, cartway width may be reduced to 28' since frontage is restricted to one side of the street.</p> <p>^g Cartway widths of divided streets should conform to standards of street classification, as dictated by anticipated average daily traffic, and be applied to aggregate dimensions of two street segments.</p> <p>^h See N.J.A.C. 5:21-4.3© for additional requirements</p> <p>ⁱ Right-of-way width applies only to streets proposed for dedication as shown on approved plans.</p> <p>^j See N.J.A.C. 5:21-4.5 (b) for additional requirements.</p> <p>^k Rural streets and rural lanes are permitted only within developments which do not exceed an average daily traffic count of 500 and 200 respectively.</p> <p>^l An additional 10 foot effective right-of-way on each side of the cartway shall be provided when sidewalks are required.</p>							

TABLE 7.2 PARKING REQUIREMENTS FOR RESIDENTIAL LAND USES^a	
HOUSING UNIT TYPE/SIZE^b	PARKING REQUIREMENT
SINGLE FAMILY DETACHED	
2 Bedroom	1.5
3 Bedroom	2.0
4 Bedroom	2.5 ^c
5 Bedroom	3.0
GARDEN APARTMENT	
1 Bedroom	1.8
2 Bedroom	2.0 ^c
3 Bedroom	2.1
TOWNHOUSE	
1 Bedroom	1.8
2 Bedroom	2.3 ^c
3 Bedroom	2.4
HIGH RISE	
1 Bedroom	0.8
2 Bedroom	1.3 ^c
3 Bedroom	1.9
MOBILE HOME	
1 Bedroom	1.8
2 Bedroom	2.0 ^c
RETIREMENT COMMUNITY	Values shall be commensurate with the most appropriate housing unit type and size notes above that the retirement community resembles.
RECREATIONAL HOMES (Owner Occupied)	Values shall be commensurate with the most appropriate housing unit type and size noted above that the recreational homes (owner occupied) resemble.
MID-RISE APARTMENT	“GARDEN APARTMENT” values shall apply.
NOTES:	<p>^aWhen determination of the required number of parking spaces results in a fractional space for the entire development, any fraction of one-half or less may be disregarded, while a fraction in excess of one-half shall be counted as one parking space.</p> <p>^bRequirements for attached units (apartment/condominium/townhouse) include provisions for guest parking.</p> <p>^cIf applicant does not specify the number of bedrooms per unit, this parking requirement shall apply.</p>
SOURCE:	Modified and adapted from U.S. Department of Commerce, Bureau of Census, Public Use File-New Jersey (cross-tabulation of vehicles by housing unit for units constructed 1975 to 1980).

TABLE 7.3 PARKING ANGLES AND AISLE WIDTHS	
PARKING ANGLE (degrees)	AISLE WIDTH (feet)
30	12
45	13
60	18
90	24

7.1 TRAFFIC CALMING

Traffic calming is the management of traffic to improve safety, circulation, and quality of life for both pedestrians and vehicles. Traffic calming, which can be applied to streets in both residential and business areas, consists of physical modification of the street to divert non-local traffic and to control the behavior of drivers using the street, particularly to lower vehicle speed. The objective is to achieve a traffic behavior pattern that is compatible with other street activities. Traffic calming devices are typically installed as part of an area-wide scheme rather than on a single street to avoid shifting the problem from one street to another.

An important part of designing traffic calming devices is blending them into the streetscape so they become a part of the street and not an advertisement of a problem. Another essential component of any traffic calming scheme is encouraging public participation to obtain local support of the plans.

Traffic calming generally refers to measures which make it physically difficult for the car to travel at high speed. This can be done through the use of:

- § landscape features,
- § various surface treatments on the roadway,
- § alternative parking schemes, and
- § by putting “jogs” in the alignment of the road.

Despite the additional costs of these features, calmed streets can be designed for almost no extra cost. A narrow street with landscape features, surface materials, jogs, and different parking schemes-would cost approximately the same as a wide conventional street found in suburbs today.

Traffic Calming Techniques

The reduction, restriction or slowing of vehicular traffic is the goal. This could include street narrowing and reconfiguration, or introduction of paving surface interruptions. Vehicle use is inevitable but there are methods for slowing vehicle traffic within communities.

Considerations:

- § Use multiple connections in street design.
- § Arrange through streets to ensure a minimum distance of one mile between.
- § Reduce and limit speeds to 25 mph on local streets and 35 mph on collectors.
- § On-street parking may be appropriate in some sections. This slows traffic and creates a buffer for pedestrian circulation.
- § Limit township street widths: maximum of four lanes outside of hamlets and village centers; two lanes inside hamlets, village centers and historic districts.
- § Limiting the roadway use; and the occurrence of traffic signals and stop intersections are traffic calming techniques.
- Traffic calming techniques should be designed appropriately for historic areas, and historic and scenic features.

- § Incorporate traffic calming devices to reduce vehicle speed and ensure pedestrian safety.
- § Chicane/staggering.
- § Gateway/threshold.
- § Narrowing/throttle.
- § Speed table/plateau.
- § Neckdown/choker.

Traffic calming measures are traditionally instituted in residential and business areas. It is in such areas that traffic speeds should be reduced and pedestrian and residential activities given preference. Thus, various measures should be instituted in denser residential areas such as the Kingston section of the Township as well as other areas of town such as Dayton, Deans and Monmouth Junction Acres. In areas where there is heavy cut through traffic, dense residential development and heavy growth projections in nearby towns, a comprehensive special study would have to be implemented. However, the master plan can introduce various measures that can be considered, and are described in the following paragraphs. It should be noted that often one and often a combination of traffic calming measures has to be instituted to create a neighborhood that will be pedestrian and residentially friendly.

Diagonal Diverters

Diagonal diverters are used at four-way intersections to only allow specific turning movements, and not allow through traffic.

Cul-de-sacs

Cul-de-sacs can be instituted and a through street can now be converted into two dead-end roadways. Emergency access can be maintained, however, no through traffic will be allowed. This solution is often feasible and was instituted by the Township in the recent conversion of Sandor Boulevard into a cul-de-sac.

One-way Patterns

A series of one-way street patterns can minimize through traffic by causing long delays for non-local traffic that would want to quickly traverse an area. One-ways are effective as traffic calming measures when coupled with other measures such as speed bumps, chokers (defined as narrowed sections of roadway) and semi-diverters where traffic must weave in an area due to narrowed roadways coupled with wider pedestrian areas and a dedication of previous street pavement to grassed and planted areas. Some roadways, such as Allston Road, should be made into a one-way westbound roadway to minimize cut-through traffic. Thus, a coupling of measures will work in minimizing through traffic and will help to slow vehicles down.

Raised Crosswalks

Raised intersection crosswalks will act to slow down traffic. The crosswalks will also better identify school crossings, pedestrian activities and to warn motorists to drive slowly. This is a very effective measure especially when the raised crosswalk has a difference in pavement texture and act similarly to a raised bump to a degree.

Street Closures

In certain areas street closures are effective. Some streets, or small sections of streets can be converted to alleys and through traffic eliminated completely. Some street closures are more suited to commercial areas but small streets coming

off of major highways may be closed in areas where the commercial/ residential boundary exists. This will help to prevent the commercial creep into the residential areas and will also act to quickly stop cut through traffic.

Turn Prohibitions

Sometimes turn prohibitions can be instituted to prevent certain cut through movements. This is especially effective at peak hours. The turning restrictions can be limited to only peak hours and assist the residents to minimize peak hour traffic with minimal discomfort to the residents of the area.

Reduced Speed Limits

Speed limits can be reduced in residential and business areas to a twenty-five (25) mile per hour statutory limit. In other areas a statutory thirty-five (35) mile per hour suburban speed limit can be instituted. Speed limit reductions are only as effective as enforcement actions and without adequate enforcement this measure is not effective. It should be noted that often NJDOT approval will be required for speed limit reductions. That will tend to delay and sometime prohibit the ability of a municipality to effectively set the proper speed limit.

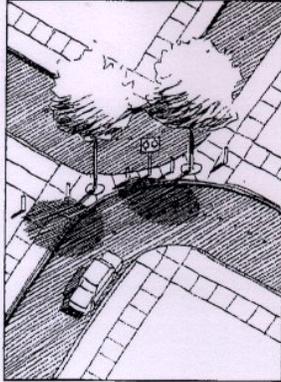
Roundabouts

In certain areas of long straight streets, traffic passing through a residential development is traveling faster than would normally be expected or desired. In these areas roundabouts can be considered. Roundabouts are really miniature traffic circles. These miniature traffic circles force motorists to slow down and change a straight “drag strip” into a safer and quieter neighborhood. The short cut becomes a longer, slower street after the institution of a few well-located roundabouts. It should be known that traffic calming measures in an area will require careful citizen planning to investigate the various measures proposed. Often the implementation of traffic calming measures comes at the cost of circuitous travel for the residents. There is always some cost involved as the same traffic calming measure that is instituted to slow down the through traffic

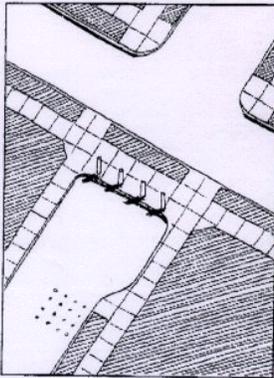
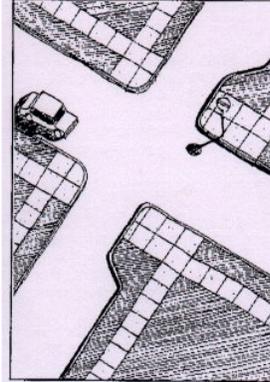
will also slow down the resident of the area. Thus, careful and continuous citizen input is required and the measures implemented should be phased in slowly to gradually change the neighborhood into a pedestrian and residential friendly area.

Sketches of the various traffic calming measures follow. Some of these measures are described in the text Traffic Calming, by Cynthia L. Howle, the American Planning Association Planning Advisory Service Report Number 456. Traffic calming measures are important in deciding which streets to improve. Residential streets or streets in certain areas should be improved only after considering citizen input and proper design considering all of the various traffic calming measures available.

Diagonal Diverters

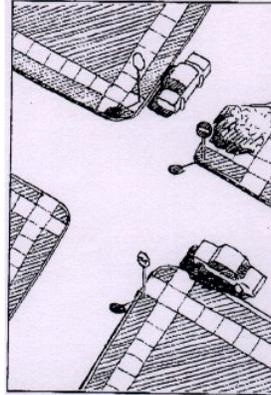


Semi-Diverters

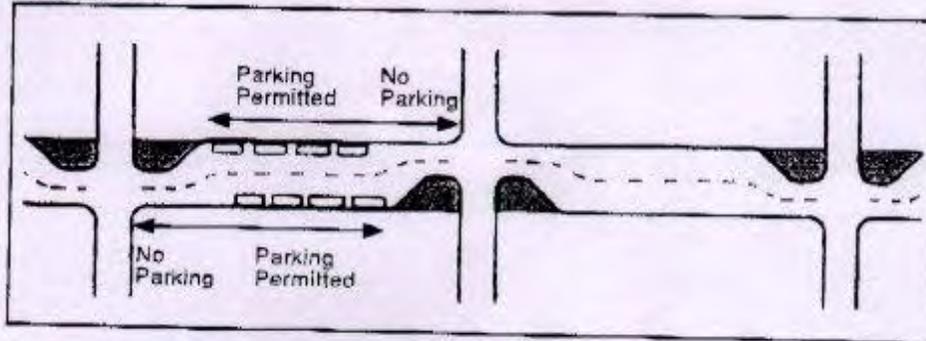


Cul-de-Sac Closures

Chokers/Narrowing



Chicanes



8. PROPOSED TRUCK ROUTES

An integral part of this study was to review the truck circulation presently in the Township. It should be noted that there is a requirement to allow trucks to access county roads and trucks cannot be prohibited from local streets for local deliveries. Trucks still use Township streets and cause problems since many of these streets are residential in nature. Thus it was desirable to identify those streets that would be used for truck traffic. The desirable truck routes were identified and are shown on Map 4. The truck routes are noted to be the following:

Route 1
Route 27
Route 32
Route 130
Promenade Boulevard CR 522
Cranbury-South River Road CR 535
Ridge Road from Route 130 to Cranbury-South River Road
Stults Road
Wheeling Road
Charles Court
Commerce Drive
Herrod Boulevard
Docks Corner Road
Corn Road
Chris Court
Heller Park Court
Nicholas Court
Tower Road
Middlesex Center Boulevard
Interstate Boulevard
Progress Road
Blackhorse Lane from Route 1 to Progress Road
Finnegan Lane from Route 27 to Route 1

It is recommended that east west truck traffic be routed onto Promenade Boulevard (CR 522). Presently, truck traffic utilizes various east-west Township roads. By assigning truck traffic to Promenade Boulevard the number of through truck trips going between Route 1 and Route 27 should be reduced on other east-west roadways.

The trucks presently using Raymond Road, or any local road as designated by this plan, should be restricted to Route 522. This will require the completion of improvements at the intersection of Route 1 and Route 522, Promenade Boulevard. When these improvements are complete, truck restrictions should be instituted on Raymond Road and NJDOT approval of truck prohibitions on this roadway requested.

By order of Ordinance No. 23-01, truck traffic including vehicles over designated weight were excluded from certain roads within the Township. These restrictions were imposed in the best interest of the health, safety and welfare of Township residents, and all those using these roadways.

Vehicles over the registered gross weight listed below are excluded from the streets or parts of streets described except for the pick up and delivery of materials on such streets.

<u>Name of Street</u>	<u>Weight</u>	<u>Location</u>
Allston Road	36 ton	From Route 27 to Hastings Road
New Road	36 ton	From Route 1 to Route 27
Sand Hills Road	36 ton	From Route 1 to Route 27
Stanworth Road	36 ton	From Route 27 to Kendall Road
Stillwell Road	36 ton	From Route 27 to Sand Hills Road

Truck volumes are noted in Technical Reports 1 and 2. These reports identify volumes by classification on numerous Township roadways. The counts are separated into 13 vehicle classifications. The classifications are identified as follows:

<u>Class</u>	<u>Description</u>
1	Motorcycles
2	Passenger Cars
3	Pickups, vans and other 2 axle, 4 -tire single unit vehicles
4	Buses
5	Two axle six-tire trucks
6	Three axle single unit trucks
7	Four or More axle single unit trucks
8	Four or less axle single trailer trucks
9	Five axle single trailer trucks
10	Six or More axle single trailer trucks
11	Five or less axle multi-trailer trucks
12	Six axle multi-trailer trucks
13	Seven or more axle multi trailer trucks

Truck traffic should be restricted from numerous Township Roads. The key to this will be the construction of various intersection improvements as well as the completion of Route 522 from Route 130 to Ridge Road and the widening of Dey Road and the Finnegan Lane Extension to Route 130 north of Davidson's Mill Road. With these improvements in place, it will then be possible to restrict truck traffic from various Township Streets such as Ridge Road west of Route 1 and Raymond Road.

New Jersey is taking steps to restrict large trucks (102" wide) to the "National Network" of highways in the state. These restrictions will not obstruct commerce in the state. All trucks doing business in the state of New Jersey will have access to all New Jersey based businesses. The crucial difference is that the large trucks not doing business in New Jersey will be prohibited from using state and county highways.

9. POTENTIAL FUNDING SOURCES

Identifying stable sources of financing for the proposed South Brunswick roadway and intersection improvements are a major consideration of the 2001 Circulation Master Plan. Public officials, especially at the local and county levels, are faced with the difficult challenge of devising ways to finance new roads and methods which will reduce the congestion that is destroying quiet, traditional, and quite often historic communities.

The financing methods must be equitable, economically efficient and politically acceptable. These challenges are even greater as the result of decreasing revenues and increasing voter resistance to public expenditures. Finding the most appropriate revenues to meet our transportation infrastructure needs is complicated further by the increasing complexity of obtaining environmental permits. Considerations for financing the proposed master plan roadways, intersections and related improvements must, therefore, be guided by an appreciation of political realities, an understanding of benefits and costs, and decisions involving environmental protection and historic neighborhood preservation.

Traditionally, County and Municipal bypass roadway improvements are funded through the NJDOT State Aid Program and, if necessary, municipal bond referendums.

A. Regional Transportation Improvement Program (TIP)

All New Jersey member counties (including Middlesex County) must first submit information regarding candidate projects in the local planning process that could be considered for the upcoming Transportation Improvement Program. A series of meetings is held with NJDOT and the counties to discuss projects and initiate the programming process. The Transportation Improvement Program is conducted in two phases: Candidate project ranking, and overall project selection. The candidate project ranking phase involves preliminary screening of new candidate projects, initial project scoring and a challenge round. All candidate projects in South Brunswick would undergo a preliminary screening. Projects must meet the following criteria:

- ! Middlesex County must be a project sponsor; South Brunswick would endorse the project.

- ! The project must meet all TEA 21 requirements.

- ! The project must be consistent with County, State and Regional plans.

- ! The project must be well defined.

- ! A reasonable cost estimate must be provided.

- ! The project must be able to be advanced within the time period.

- ! NJDOT requests that a project be "deliverable" before it can go into the TIP; meaning that preliminary engineering and environmental clearances have been obtained. Candidate projects that pass the preliminary screening are subjected to the project ranking process developed by the Regional Transportation Committee. In this process, the Middlesex County will serve as a project advocate and provide specific knowledge about the project as well as information on local needs, priorities and conditions. NJDOT provides much of the management system data. A challenge round is then conducted to allow for questioning and a revision of project scores before they are finalized. It is critical to understand that the goals and criteria of the ranking process link the TIP to the Regional Planning Process for clean air, long range planning, congestion management planning and the TEA 21 Management Systems Data (pavement management and bridge sufficiency ratings). Project scores are based on the following seven goals:
 1. Preserve and modernize key elements of the existing system. 20 points

 2. Improve safety and security. 15 points

3. Mitigate congestion. 15 points
4. Protect and improve the environment. 10 points
5. Support economic activity. 15 points
6. Improve mobility of people and goods. 15 points
7. Support land use plans and goals. 10 points

The project selection phase involves defining financial resources available. The selection of projects to be included in the TIP is based on the following criteria:

1. Funding availability.
2. Project schedule and readiness.
3. Other selection criteria including project ranking, federal mandates, contractual obligations, clean air requirements, prior commitment, regional equity, and modal equity.

B. New Jersey Transportation Trust Fund

On November 6, 1995, New Jersey voters approved the reauthorization of the Trust Fund through the reallocation of the 10 cents per gallon State Gasoline Tax. With this approval, the reauthorized Transportation Trust Fund can disburse as much as \$700 million per year in State Transportation Funds over FY 1997-2001. Recent projects include the construction of the Hightstown By-Pass Route 133. Other recent major projects include missing links involving Route 206 (Hillsborough By-Pass), Route 1 (Penns Neck) and Route 31 (Flemington By-Pass).

This State Aid Program is made up of three separate programs that distribute monies from the Transportation Trust Fund in counties and municipalities for deserving projects. All of the funding of these programs is subject to annual appropriation by the Legislature.

1. The County Aid Program

These funds are allotted to the 21 counties by a formula that takes into account the county's population and road mileage. Every year, each county develops a Capital Transportation Program (CTP) identifying projects and estimated costs. These may be improvements to public roads and bridges under county jurisdiction, public transportation or other transportation related work. Upon review and approval of the CTP, the Department provides up-front funding for the full amount of the county allotment.

2. The Municipal Aid Program

- a. Funds appropriated for municipalities in each county based on a formula that takes into account county population and municipal road mileage within the county. These funds are allotted to individual projects within various municipalities through a competitive process.
- b. Funds allotted to municipalities that qualify for urban aid under N.J.S.A. 52:27D-179 et seq.
- c. Funds allotted to Jersey City and Newark subject to review and approval of a CTP.

All 566 municipalities may apply. Projects may be improvements to public roads and bridges under municipal jurisdiction. Applications are solicited, evaluated and rated by NJDOT staff. The results are presented

to a Screening Committee comprised of Municipal Engineers and NJDOT staff appointed by the Commissioner of Transportation. The Committee evaluates the projects and makes recommendations to the Commissioner for approval. NJDOT will pay 75% of the award amount or the allotment, whichever is less, at the time that the award of construction is approved.

3. The Discretionary Aid Program

These funds are set aside to address emergency or regional needs. Any county or municipality may apply at any time. These projects are approved at the discretion of the Commissioner of Transportation. NJDOT will pay 75% of the award amount or the allotment, whichever is less, at the time that the award of construction is approved.

C. Local Aid, Local Bridge Rehabilitation

Recognizing the need to address structurally deficient bridges on the local system, NJDOT has provided \$20 million in FY2000 to counties for upgrading structurally deficient bridges through innovative engineering approaches. The funding will be distributed to the counties through a formula which considers need and population.

D. Bicycle Projects, Local System

In support of the State's Transportation VISION for the 21st Century, NJDOT has provided 6.7 million to local governments to support projects that either will result in the creation of a new independent bicycle facility or making an existing roadway bicycle compatible. The application process is the same as the municipal aid program.

E. Pedestrian Projects, Local System

To assist local governments in providing a safer environment for pedestrians, NJDOT has provided \$4.7 million for locally initiated pedestrian projects. The

application process is the same as the municipal aid program.

F. Local Aid for Centers of Place

Each year NJDOT provides funds to those communities which qualify as approved Centers of Place through the Department of Treasury's Office of State Plan. For FY2000, NJDOT has provided \$1.5 million for this program. Grants for nontraditional transportation projects that advance the State Development and Redevelopment Plan.

G. Park and Rides

In an effort to promote alternate modes of transportation, NJDOT provides assistance to communities in identifying park and ride opportunities. This assistance may be in the form of technical assistance and/or funding.

H. Smart Growth Planning Grants

To help fund planning efforts consistent with the State Development and Redevelopment Plan as administered through the Office of State Planning.

I. Additional Financing Options

More financing capacity remains in New Jersey despite the declining level of general infrastructure investment in recent years. The core of the problem is that subsequent to federal government cut backs on the aid given to New Jersey, the State never completely resolved the question of who is responsible for making infrastructure investments or what form these investments should take.

Meanwhile, our infrastructure backlog grows. Middlesex County and the South Brunswick Township would benefit from an audit of overall infrastructure needs. This process would involve ranking the proposed Circulation improvements, and identifying further commitment on behalf of the county and municipality.

! Transportation Development District TDD Funding

South Brunswick's TDD process serves to acquire developer fair share contributions toward transportation improvements within South Brunswick. Development or impact fees require land developers to contribute toward the financing of transportation infrastructure which their development will affect or utilize. The update of South Brunswick Township's ordinances regarding off-tract contributions will generate a stable source of financing infrastructure improvements.

! General Revenue Sources

General revenue derived from the various taxes collected by counties and from the property taxes collected by municipalities. General revenues are used to fund annual budgets which can include infrastructure items. This method of financing infrastructure has serious limitations. It results in inconsistent funding levels from year to year; requires that funds be accumulated over time before large projects can be completed; and places the burden of financing on current taxpayers.

! General Obligation Bonds

General obligation bonds overcome the limitations of the "pay as you go" method of general revenue sources. Obligation bonds spread the cost of a project over a number of years. Backed by the full faith and credit of the county or local government that issues the bonds, large sums of money for major projects can be funded with repayment of principal and interest over a long term. The project can be completed immediately, while the cost is spread out more evenly over the project's lifetime.

! User - Based Financing

User-based financing involves taxes, licenses, fees, charges and special assessments to finance the projects. While user-based financing takes many forms, uniting them all is a desire to shift financing of public infrastructure from the general tax base to the parties who actually use them. Special tax districts can be created whereby compulsory contributions are collected from property owners benefitting by public improvements.

! Intermediate Obligations Back by Limited Tax or Other Non-Fare Sources

Along the spectrum between general revenue bonds and obligation bonds are numerous intermediate types distinguished by the revenue sources pledged for debt service. The principal types of such obligations are:

1. Obligations secured by specific limited taxes or additions to the rates of existing taxes.
2. Obligations secured by revenues of profitable public enterprises such as bridge and tunnel tolls.
3. Intermediate financing agency bonds which is a revenue bond variant used by county and local government agencies in recent years as a means of circumventing legal limitations on full faith and credit bonds.

Bonds are best marketed in periods of low interest rates. If bond sales precede the need for funds, excess cash can be temporarily invested in federal obligations, often at a profit. The profit arises from investing in taxable federal obligations which yield more than tax exempt municipals. This device should only be used for temporary investments of funds which will eventually be spent on the project.

! Transportation Enhancements "TEA-21" Legislation

The New Jersey Department of Transportation requests county and local government agencies to submit candidate proposals for funding under the TEA-21 legislation. Under these provisions, New Jersey has been receiving at least \$6 million per year under this federal program. Transportation Enhancements include such activities as historic preservation, rehabilitation and operation of historic transportation facilities, archaeological planning and research, acquisition of scenic easements and scenic sites, and provisions for pedestrians and bicycles. Within these categories, projects must be related to transportation in function, proximity, or impact.

! New Jersey Office of State Planning "Town Center Designation/Plan Endorsement"

This designation by the Office of State Planning can be achieved following a relatively in-depth planning process. The Town Center Designation/Plan Endorsement report provides plans, goals, objectives and a general implementation agenda for the municipality to follow. OSP views this designation as an effort which will lead to greater efficiency in serving the public, reducing costs for taxpayers, providing greater protection of environmentally sensitive resources, increasing local business, and lowering housing costs. The designation is primarily a local initiative. The following benefits also result from this Designation:

1. Municipal Wastewater Assistance Program.

Designated centers and municipalities that have locally endorsed revitalization plans and programs are awarded additional points in the priority rating system.

2. Transportation Enhancements (TEA-21).

This NJDOT sponsored program provides additional priority points to Designated Centers.

3. New Jersey Historic Trust.

Funding guidelines include consistency with the State Plan and Center Designation as a factor.

4. The Transportation Trust Fund: Local Aid for Centers.

NJDOT has established a new grant program for non-traditional transportation projects. Only municipalities with designated centers are eligible to apply for this funding.

5. Other grants and financial assistance.

Implied but not specifically stated in OSP guidelines and policies of various funding agencies is the priority designation for centers. Examples include Community Development Block Grants and Small Cities Grants, Main Street NJ Program, Green Acres and Recreational Opportunities Program, NJ Clean Communities Program and the Neighborhood Preservation Program. The New Jersey State Planning Commission and the Office of State Planning places Center Designation (Plan Endorsement) high on their priority agenda. In the future, it appears that an increasing number

of New Jersey State agency programs intend to give priority points to centers when applications are submitted.

! **Neighborhood Preservation**

State aid appropriation is given in the form of grants and loans for providing assistance to municipalities conducting activities associated with the preservation of designated neighborhoods based on strategic redevelopment plans within those municipalities. This is a DCA program.

! **Community Development Block Grant/Small Cities Community Development Block Grants**

Funds are available for projects benefitting low and moderate income. Neighborhoods are qualified locally. Groups, such as the disabled, are already qualified nationally and funds can be applied in most any community.

! **Strategic Neighborhood Assistance Program (SNAP)**

This New Jersey State aid appropriation provides assistance in the form of financial grants and technical assistance. It is a neighborhood-based program to provide both financial and technical assistance to threatened but viable neighborhoods. The program's objective is to stabilize and revitalize housing, social and economic development in the targeted neighborhoods. Presently, this is a pilot program limited to certain municipalities.

! **Main Street New Jersey**

This nationally recognized downtown revitalization program provides technical assistance to communities. Skills and knowledge are provided to communities to manage their own central business districts, improve the

economy, appearance and image of their traditional downtown. The organization of local citizens and resources is critical. Traffic control, parking and traffic calming designs are related issues.

! **Business (Special) Improvement Districts**

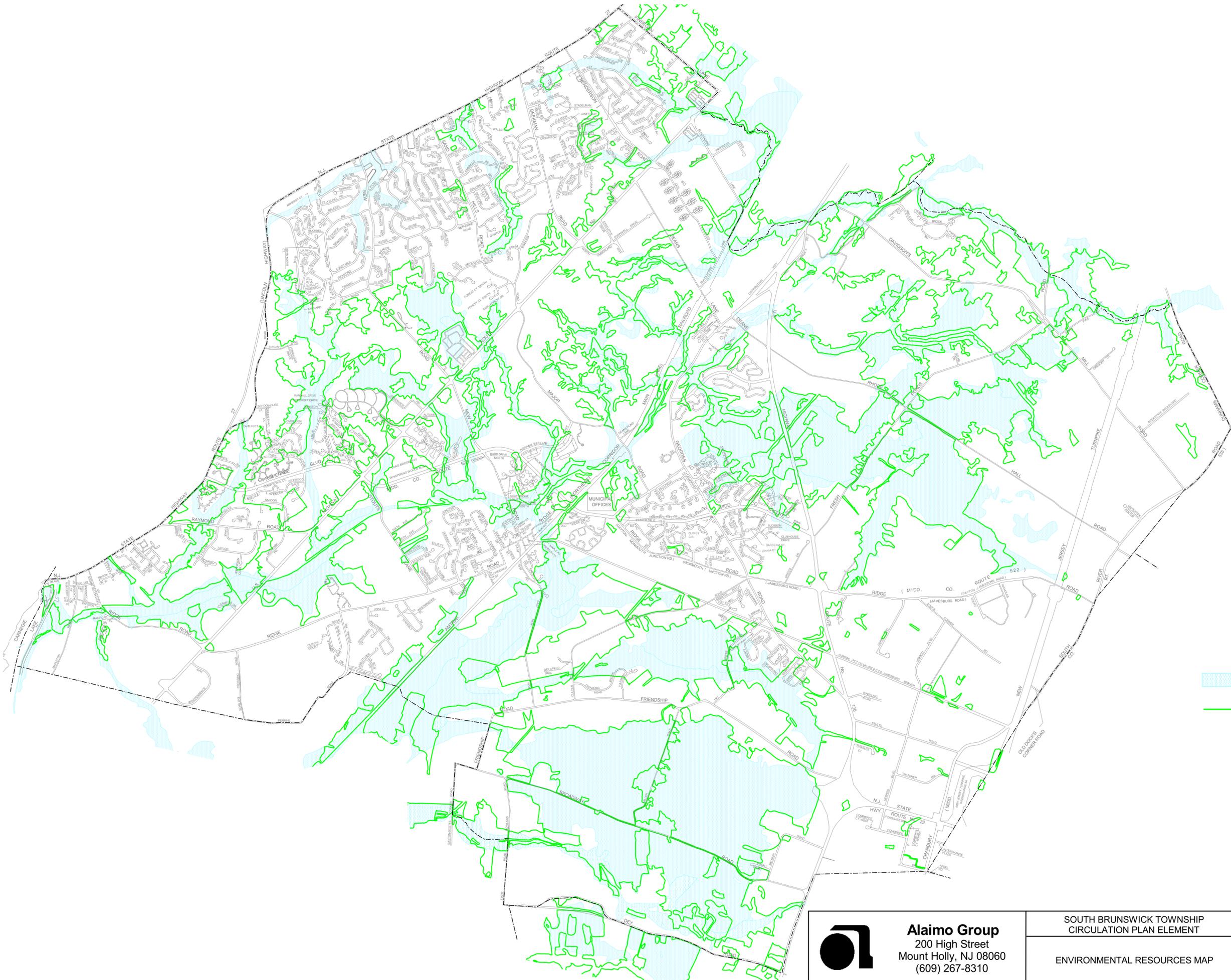
Technical assistance is provided to support economic and community development and management for New Jersey's downtown and business centers. The program provides advocacy, supporting conferences, training and technical assistance, and serves as a clearing house for research and information on business district improvements and business district management.

! **New Jersey Local Redevelopment and Housing Law**

Provides tax benefits, incentives and powers to municipalities to assist in the development or redevelopment of specific areas in the municipality. May be used to effect traffic calming techniques within designated redevelopment areas in an effort to increase pedestrian traffic and area safety.

! **National Recreational Trails Program**

Provides grants (with 20% match) for developing and maintaining trail and trail facilities. Trails can be for motorized or non-motorized, multi-use purposes.



- LEGEND
-  FLOODPRONE AREA LINE
 -  WETLANDS LINE

- REFERENCES:
1. STREET MAP PREPARED BY CME ASSOCIATES.
 2. FLOODPRONE AND WETLANDS INFORMATION FROM NJDEP GIS DIGITAL DATA, 1995.



	Alaimo Group 200 High Street Mount Holly, NJ 08060 (609) 267-8310	SOUTH BRUNSWICK TOWNSHIP CIRCULATION PLAN ELEMENT	CLIENT: SOUTH BRUNSWICK TOWNSHIP	M -1
	ENVIRONMENTAL RESOURCES MAP	PROJECT NO: M-300-025	DATE: SEPT. 2001	
			DRAWN BY: MAC / M.A.K.	CHECKED BY: JSA / AL / JR

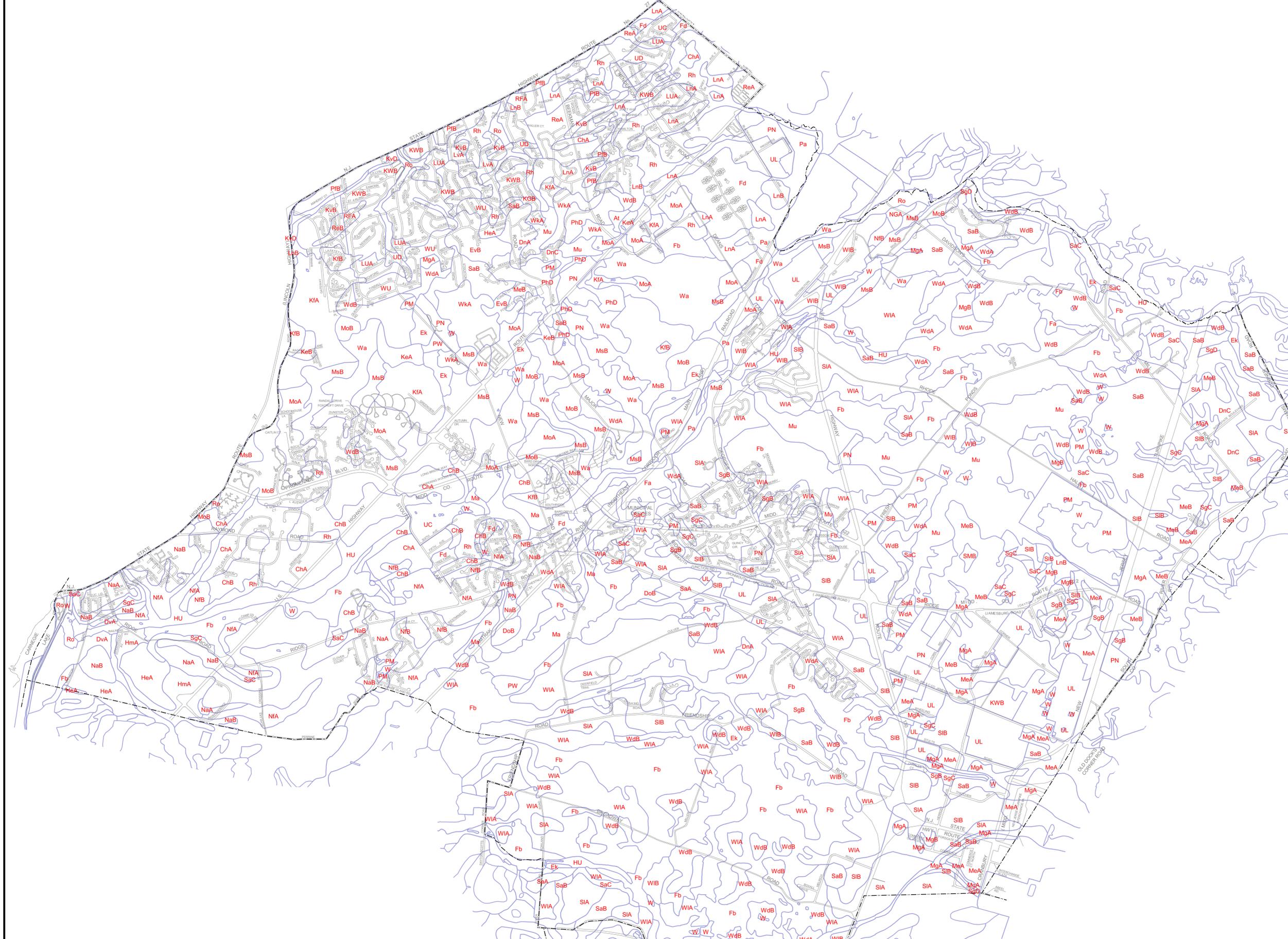
SOIL SERIES CLASSIFICATIONS

- At - Atison Sand
- ChA - Chalfont silt loam 0-2% slopes
- ChB - Chalfont silt loam 2-5% slopes
- DnA - Downer loamy sand 0-5% slopes
- DnC - Downer loamy sand 5-10% slopes
- DoB - Downer sandy loam 2-5% slopes
- DvA - Dunellen Variant sandy loam 0-2% slopes
- Ek - Elkton loam
- EVB - Evesboro sand 0-5% slopes
- EVc - Evesboro sand 5-10% slopes
- EVD - Evesboro sand 10-15% slopes
- Fa - Fallsington sandy loam
- Fb - Fallsington loam
- Fd - Fallsington Variant loam
- FrB - Fort Mott loamy sand 0-5% slopes
- HcA - Haledon Variant silt loam 0-2% slopes
- HeA - Hammonton loamy sand 0-3% slopes
- HmA - Hammonton sandy loam, clayey substratum, 0-2% slopes
- KGB - Keypot-Urban land complex 0-10% slopes
- HU - Humaquepts frequently flooded
- KWB - Kinesville-Urban land complex 0-5% slopes
- KeA - Keypot sandy loam 0-2% slopes
- KeB - Keypot sandy loam 2-5% slopes
- KfA - Keypot loam 0-2% slopes
- KfB - Keypot loam 2-5% slopes
- KfA - Klej loamy sand 0-3% slopes
- KfB - Klinesville shaly loam 0-5% slopes
- KvD - Klinesville shaly loam 5-15% slopes
- LnA - Lansdowne silt loam 0-2% slopes
- LnB - Lansdowne silt loam 2-5% slopes
- LUA - Lansdowne-Urban land complex 0-5% slopes
- LVA - Lansowne Variant silt loam 0-2% slopes
- Ma - Manahawkin muck
- MeA - Matapeake silt loam 0-2% slopes
- MeB - Matapeake silt loam 2-5% slopes
- MgA - Mattapex silt loam 0-2% slopes
- MgB - Mattapex silt loam 2-5% slopes
- MoA - Mount Lucas silt loam 0-2% slopes
- MoB - Mount Lucas silt loam 2-5% slopes
- MsB - Mount Lucas very stony silt loam 0-5% slopes
- Mu - Mullica sandy loam
- NaA - Nixon loam 0-2% slopes
- NaB - Nixon loam 2-5% slopes
- NCB - Nixon-Urban land complex 0-5% slopes
- NfA - Nixon Variant loam 0-2% slopes
- NfB - Nixon Variant loam 2-5% slopes
- NGA - Nixon Variant-Urban land complex 0-5% slopes
- PM - Pits, sand and gravel
- Pa - Parsippany silt loam
- PfB - Penn silt loam 2-5% slopes
- PhD - Phalanx loamy sand 2-15% slopes
- PN - Psamments nearly level
- PW - Psamments waste substratum
- ReA - Reaville silt loam 0-2% slopes
- ReB - Reaville silt loam 2-5% slopes
- RFA - Reaville-Urban land complex 0-5% slopes
- Rh - Reaville Variant silt loam
- Ro - Rowland silt loam
- SaA - Sassafras sandy loam 0-2% slopes
- SaB - Sassafras sandy loam 2-5% slopes
- SaC - Sassafras sandy loam 5-10% slopes
- SgB - Sassafras gravelly sandy loam 2-5% slopes
- SgC - Sassafras gravelly sandy loam 5-10% slopes
- SgD - Sassafras gravelly sandy loam 10-15% slopes
- SIA - Sassafras loam 0-2% slopes
- SIB - Sassafras loam 2-5% slopes
- SMB - Sassafras-Urban land complex 0-5% slopes
- UC - Udorthents clayey substratum
- UD - Udorthents wet substratum-Urban land
- UL - Urban land
- Wa - Watchung very stony silt loam 0-2% slopes
- WdA - Woodstown sandy loam 0-2% slopes
- WdB - Woodstown sandy loam 2-5% slopes
- WkA - Woodstown sandy loam clayey substratum 0-2% slopes
- WIA - Woodstown loam 0-2% slopes
- WIB - Woodstown loam 2-5% slopes
- W - Water
- WU - Woodstown-Urban land complex 0-5% slopes

REFERENCES:

1. STREET MAP PREPARED BY CME ASSOCIATES.
2. SOILS INFORMATION FROM NJDEP GIS DIGITAL DATA, 1995.

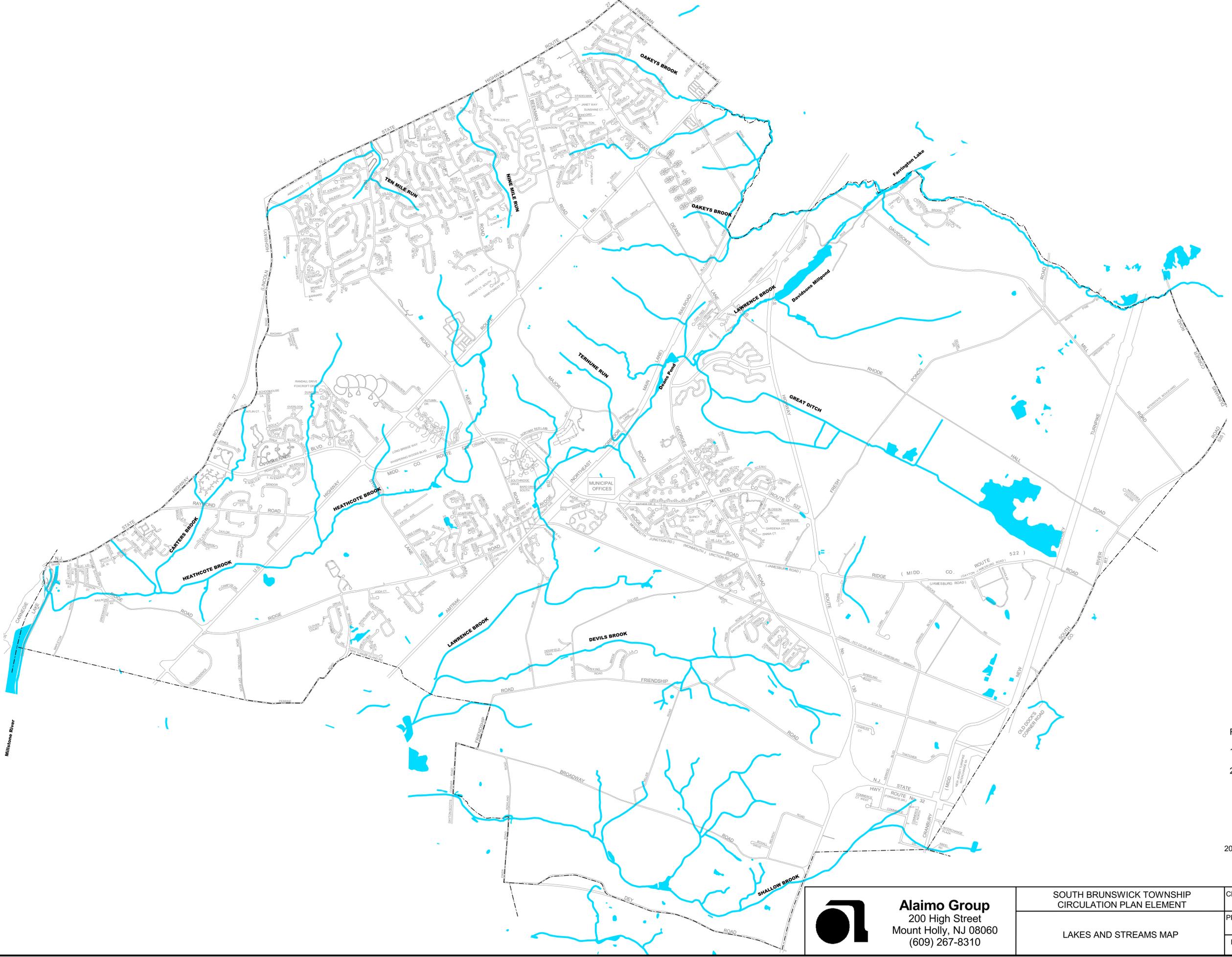
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Alaimo Group
200 High Street
Mount Holly, NJ 08060
(609) 267-8310

SOUTH BRUNSWICK TOWNSHIP CIRCULATION PLAN ELEMENT
SOILS MAP

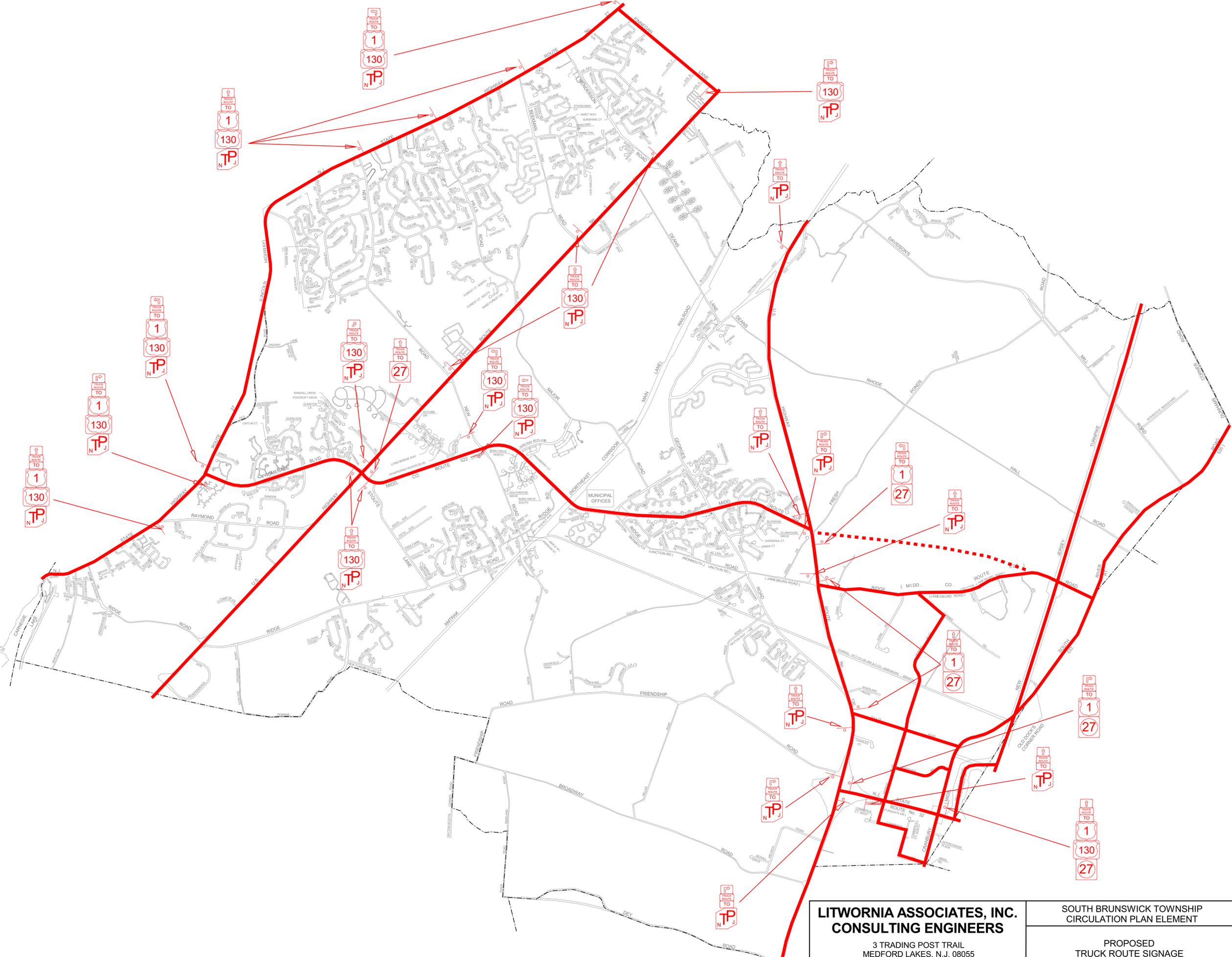
CLIENT: SOUTH BRUNSWICK TOWNSHIP	M -2
PROJECT NO: M-300-025	DATE: SEPT. 2001
DRAWN BY: MAC / M.A.K.	CHECKED BY: JSA / AL /JR



- REFERENCES:
1. STREET MAP PREPARED BY CME ASSOCIATES.
 2. LAKE AND STREAM INFORMATION FROM NJDEP GIS DIGITAL DATA, 1995.



 <p>Alaimo Group 200 High Street Mount Holly, NJ 08060 (609) 267-8310</p>	SOUTH BRUNSWICK TOWNSHIP CIRCULATION PLAN ELEMENT		CLIENT: SOUTH BRUNSWICK TOWNSHIP	M -3
	LAKES AND STREAMS MAP		PROJECT NO: M-300-025	DATE: SEPT. 2001
			DRAWN BY: MAC / M.A.K.	CHECKED BY: JSA / AL / JR



LEGEND
 ——— TRUCK ROUTE
 - - - - - FUTURE TRUCK ROUTE

REFERENCE:
 STREET MAP PREPARED BY CME ASSOCIATES.

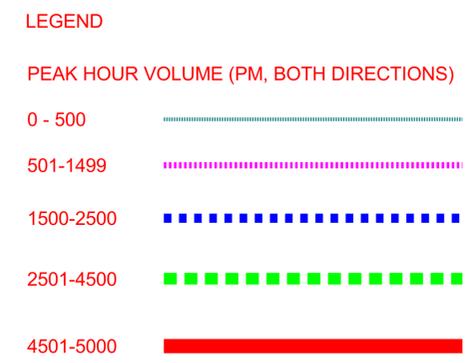
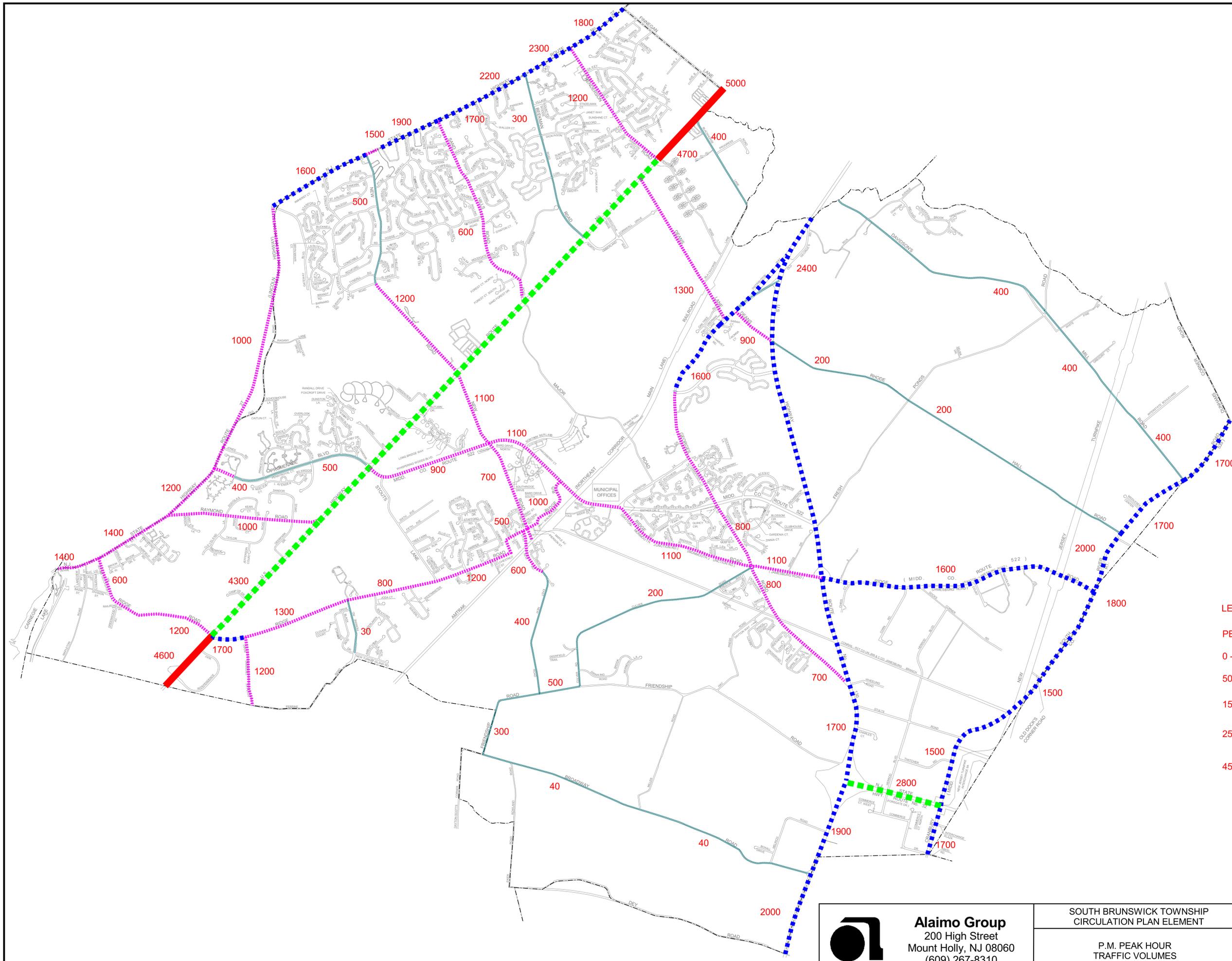


LITWORNIA ASSOCIATES, INC.
CONSULTING ENGINEERS
 3 TRADING POST TRAIL
 MEDFORD LAKES, N.J. 08055
 (609) 654-1334

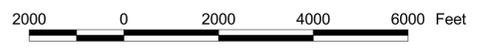
SOUTH BRUNSWICK TOWNSHIP
 CIRCULATION PLAN ELEMENT
 PROPOSED
 TRUCK ROUTE SIGNAGE

CLIENT:
SOUTH BRUNSWICK TOWNSHIP
 PROJECT NO:
 M-300-025
 DRAWN BY:
 MSS / JAC / MAC

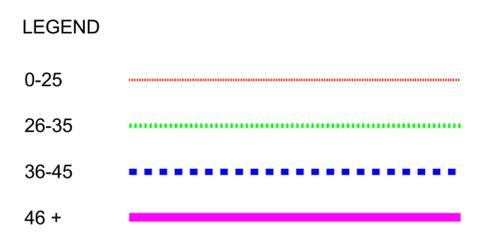
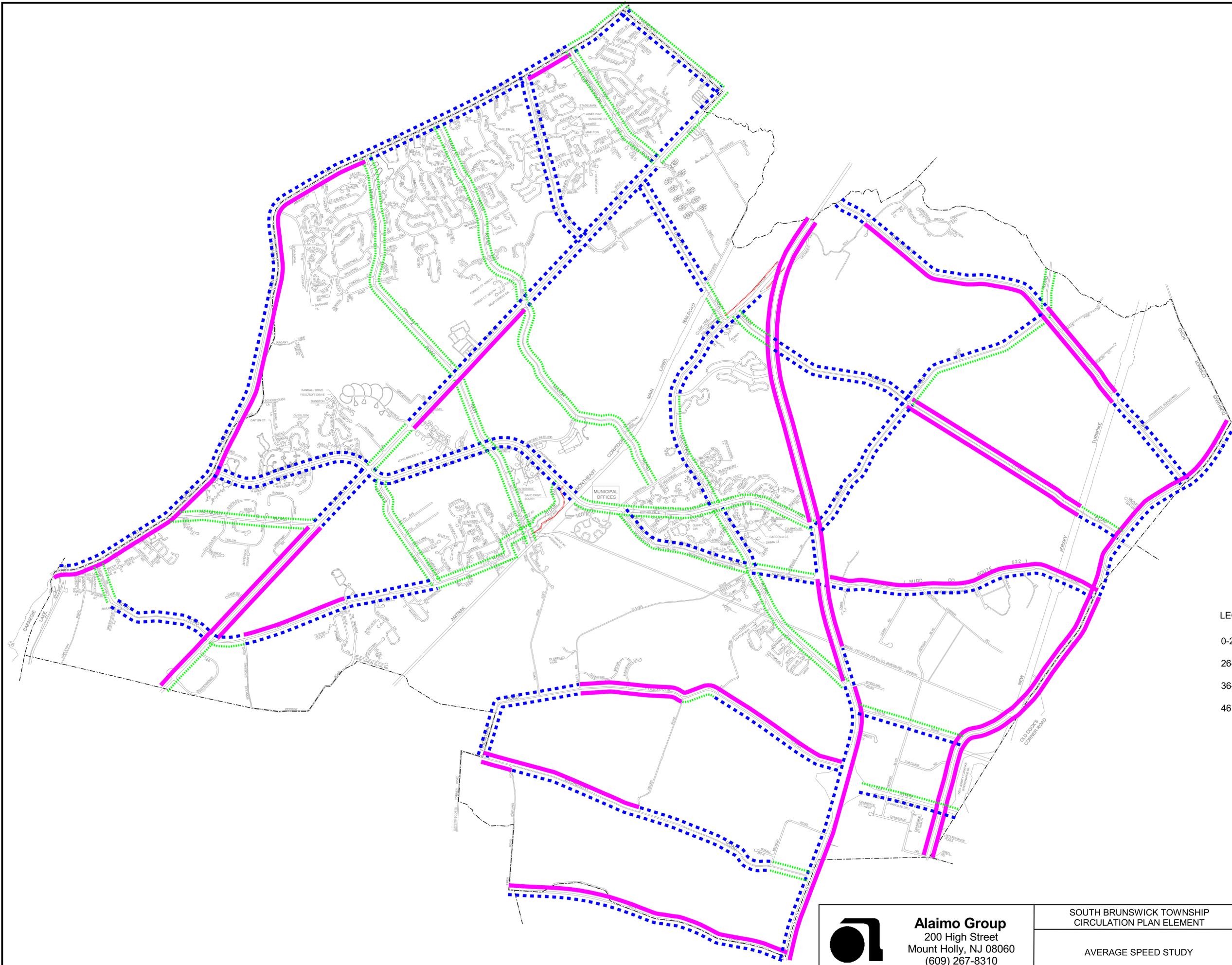
M - 4
 DATE:
 SEPT. 2001
 CHECKED BY:
 AJL / BJ



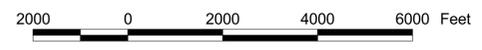
REFERENCE:
STREET MAP PREPARED BY CME ASSOCIATES.



 Alaimo Group 200 High Street Mount Holly, NJ 08060 (609) 267-8310	SOUTH BRUNSWICK TOWNSHIP CIRCULATION PLAN ELEMENT		CLIENT: SOUTH BRUNSWICK TOWNSHIP	M - 5
	P.M. PEAK HOUR TRAFFIC VOLUMES		PROJECT NO: M-300-025	DATE: SEPT. 2001
			DRAWN BY: MAC	CHECKED BY: JSA / AL / JR



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	AVERAGE SPEED STUDY		PROJECT NO: M-300-025	DATE: SEPT. 2001
			DRAWN BY: MAC	CHECKED BY: JSA / AL / JR

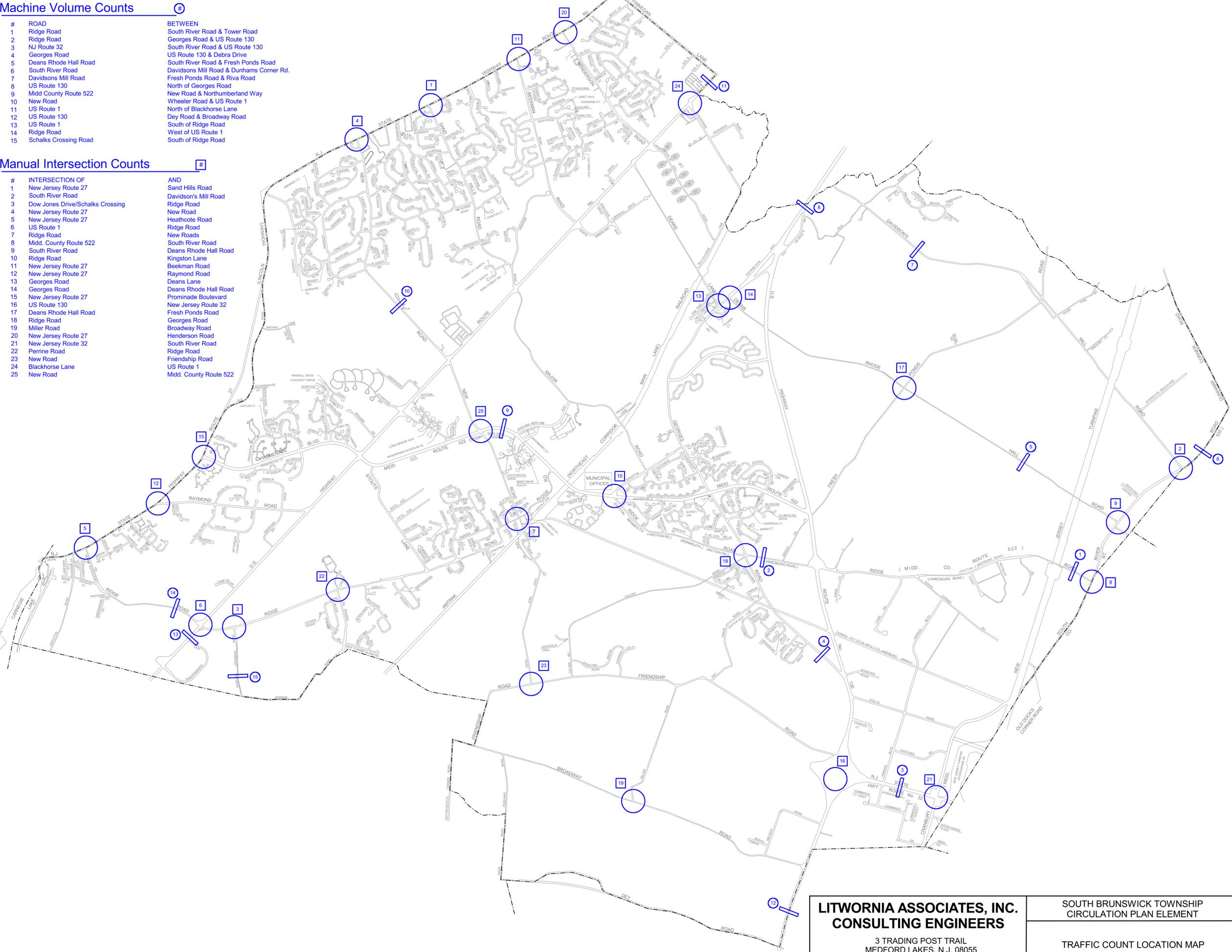


Machine Volume Counts

#	ROAD	BETWEEN
1	Ridge Road	South River Road & Tower Road
2	Ridge Road	Georges Road & US Route 130
3	NJ Route 32	South River Road & US Route 130
4	Georges Road	US Route 130 & Debra Drive
5	Deans Rhode Hall Road	South River Road & Fresh Ponds Road
6	South River Road	Davidsons Mill Road & Dunhams Corner Rd.
7	Davidsons Mill Road	Fresh Ponds Road & Riva Road
8	US Route 130	North of Georges Road
9	Midd County Route 522	New Road & Northumberland Way
10	New Road	Wheeler Road & US Route 1
11	US Route 1	North of Blackhorse Lane
12	US Route 130	Day Road & Broadway Road
13	US Route 1	South of Ridge Road
14	Ridge Road	West of US Route 1
15	Schalks Crossing Road	South of Ridge Road

Manual Intersection Counts

#	INTERSECTION OF	AND
1	New Jersey Route 27	Sand Hills Road
2	South River Road	Davidson's Mill Road
3	Dow Jones Drive/Schalks Crossing	Ridge Road
4	New Jersey Route 27	New Road
5	New Jersey Route 27	Heathcote Road
6	US Route 1	Ridge Road
7	Ridge Road	New Roads
8	Midd. County Route 522	South River Road
9	South River Road	Deans Rhode Hall Road
10	Ridge Road	Kingston Lane
11	New Jersey Route 27	Beekman Road
12	New Jersey Route 27	Raymond Road
13	Georges Road	Deans Lane
14	Georges Road	Deans Rhode Hall Road
15	New Jersey Route 27	Promenade Boulevard
16	US Route 130	New Jersey Route 32
17	Deans Rhode Hall Road	Fresh Ponds Road
18	Ridge Road	Georges Road
19	Miller Road	Broadway Road
20	New Jersey Route 27	Henderson Road
21	New Jersey Route 32	South River Road
22	Perrine Road	Ridge Road
23	New Road	Friendship Road
24	Blackhorse Lane	US Route 1
25	New Road	Midd. County Route 522



REFERENCE:
STREET MAP PREPARED BY CME ASSOCIATES.



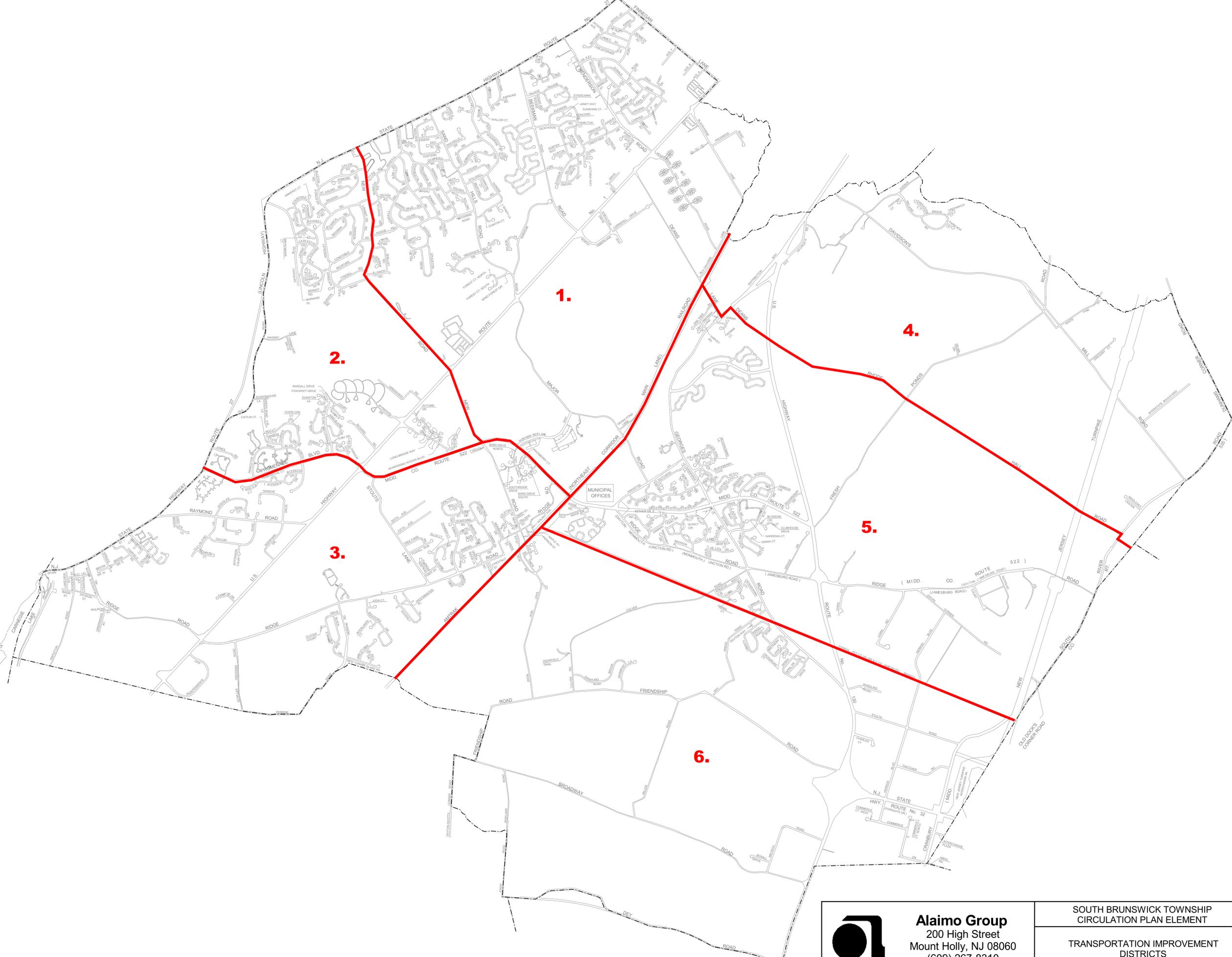
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SOUTH BRUNSWICK TOWNSHIP
CIRCULATION PLAN ELEMENT

TRAFFIC COUNT LOCATION MAP

CLIENT:
SOUTH BRUNSWICK TOWNSHIP
PROJECT NO:
M-300-025
DRAWN BY:
MSS / JAC / MAC

M - 7
DATE:
SEPT. 2001
CHECKED BY:
AJL / BJ



REFERENCE:
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200 High Street
Mount Holly, NJ 08060
(609) 267-8310

SOUTH BRUNSWICK TOWNSHIP
CIRCULATION PLAN ELEMENT

TRANSPORTATION IMPROVEMENT
DISTRICTS

CLIENT:
SOUTH BRUNSWICK TOWNSHIP

PROJECT NO:
M-300-025

DRAWN BY: MAC / M.A.K.

P - 1

DATE:
SEPT. 2001

CHECKED BY:
JSA / AL / JR



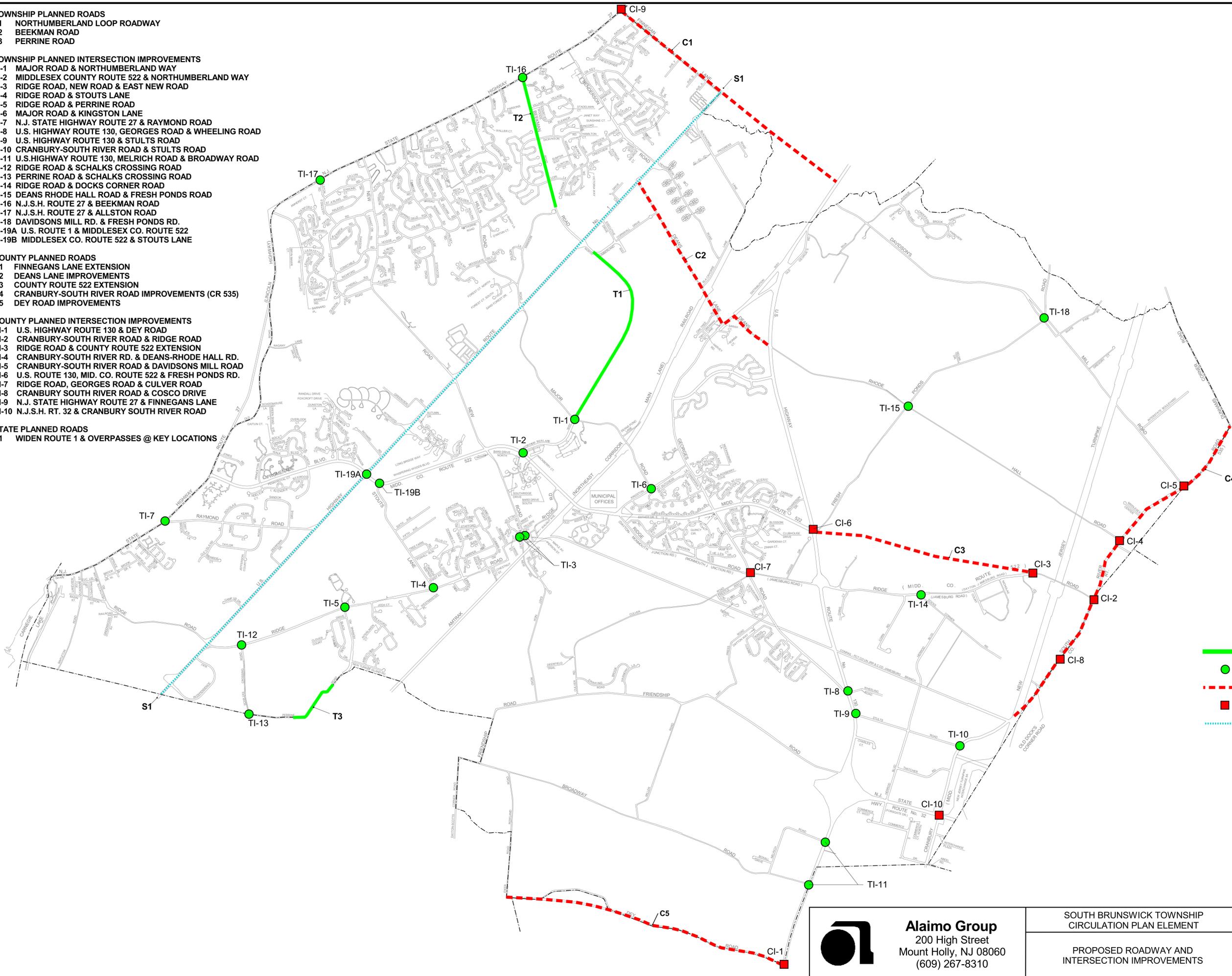
- TOWNSHIP PLANNED ROADS**
 T1 NORTHUMBERLAND LOOP ROADWAY
 T2 BEEKMAN ROAD
 T3 PERRINE ROAD

- TOWNSHIP PLANNED INTERSECTION IMPROVEMENTS**
 TI-1 MAJOR ROAD & NORTHUMBERLAND WAY
 TI-2 MIDDLESEX COUNTY ROUTE 522 & NORTHUMBERLAND WAY
 TI-3 RIDGE ROAD, NEW ROAD & EAST NEW ROAD
 TI-4 RIDGE ROAD & STOUTS LANE
 TI-5 RIDGE ROAD & PERRINE ROAD
 TI-6 MAJOR ROAD & KINGSTON LANE
 TI-7 N.J. STATE HIGHWAY ROUTE 27 & RAYMOND ROAD
 TI-8 U.S. HIGHWAY ROUTE 130, GEORGES ROAD & WHEELING ROAD
 TI-9 U.S. HIGHWAY ROUTE 130 & STULTS ROAD
 TI-10 CRANBURY-SOUTH RIVER ROAD & STULTS ROAD
 TI-11 U.S. HIGHWAY ROUTE 130, MELRICH ROAD & BROADWAY ROAD
 TI-12 RIDGE ROAD & SCHALKS CROSSING ROAD
 TI-13 PERRINE ROAD & SCHALKS CROSSING ROAD
 TI-14 RIDGE ROAD & DOCKS CORNER ROAD
 TI-15 DEANS RHODE HALL ROAD & FRESH PONDS ROAD
 TI-16 N.J.S.H. ROUTE 27 & BEEKMAN ROAD
 TI-17 N.J.S.H. ROUTE 27 & ALLSTON ROAD
 TI-18 DAVIDSON'S MILL RD. & FRESH PONDS RD.
 TI-19A U.S. ROUTE 1 & MIDDLESEX CO. ROUTE 522
 TI-19B MIDDLESEX CO. ROUTE 522 & STOUTS LANE

- COUNTY PLANNED ROADS**
 C1 FINNEGANS LANE EXTENSION
 C2 DEANS LANE IMPROVEMENTS
 C3 COUNTY ROUTE 522 EXTENSION
 C4 CRANBURY-SOUTH RIVER ROAD IMPROVEMENTS (CR 535)
 C5 DEY ROAD IMPROVEMENTS

- COUNTY PLANNED INTERSECTION IMPROVEMENTS**
 CI-1 U.S. HIGHWAY ROUTE 130 & DEY ROAD
 CI-2 CRANBURY-SOUTH RIVER ROAD & RIDGE ROAD
 CI-3 RIDGE ROAD & COUNTY ROUTE 522 EXTENSION
 CI-4 CRANBURY-SOUTH RIVER RD. & DEANS-RHODE HALL RD.
 CI-5 CRANBURY-SOUTH RIVER ROAD & DAVIDSON'S MILL ROAD
 CI-6 U.S. ROUTE 130, MID. CO. ROUTE 522 & FRESH PONDS RD.
 CI-7 RIDGE ROAD, GEORGES ROAD & CULVER ROAD
 CI-8 CRANBURY SOUTH RIVER ROAD & COSCO DRIVE
 CI-9 N.J. STATE HIGHWAY ROUTE 27 & FINNEGANS LANE
 CI-10 N.J.S.H. RT. 32 & CRANBURY SOUTH RIVER ROAD

- STATE PLANNED ROADS**
 S1 WIDEN ROUTE 1 & OVERPASSES @ KEY LOCATIONS



- LEGEND**
- T1 = TOWNSHIP ROADWAY IMPROVEMENT #
 - TI-1 = TOWNSHIP INTERSECTION IMPROVEMENT #
 - - - - C1 = COUNTY ROADWAY IMPROVEMENT #
 - CI-1 = COUNTY INTERSECTION IMPROVEMENT #
 - ⋯⋯⋯ S1 = STATE ROADWAY IMPROVEMENT #

REFERENCE:
 STREET MAP PREPARED BY CME ASSOCIATES.

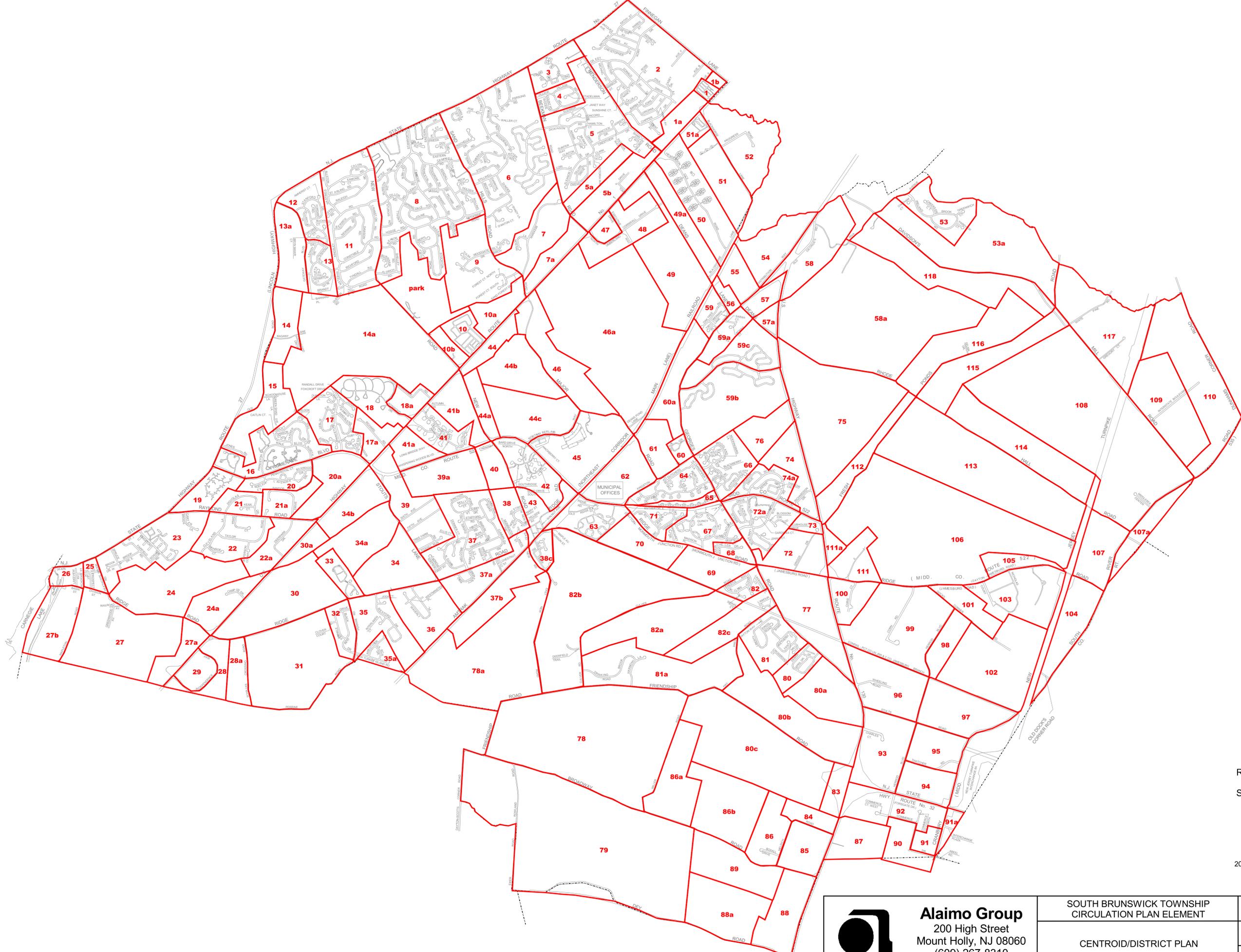


Alaimo Group
 200 High Street
 Mount Holly, NJ 08060
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SOUTH BRUNSWICK TOWNSHIP
 CIRCULATION PLAN ELEMENT

PROPOSED ROADWAY AND
 INTERSECTION IMPROVEMENTS

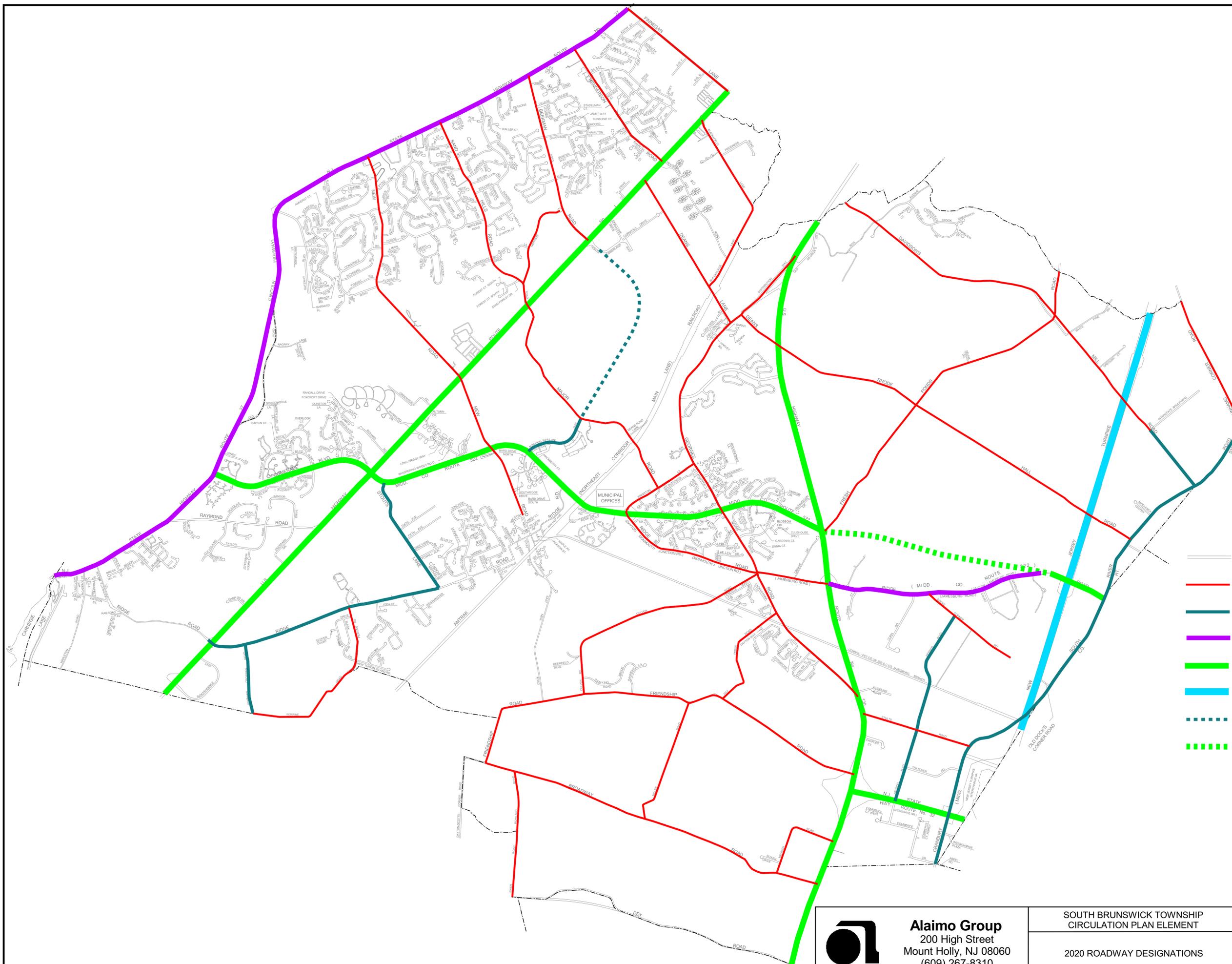
CLIENT: SOUTH BRUNSWICK TOWNSHIP	P - 2
PROJECT NO: M-300-025	DATE: DEC. 2001
DRAWN BY: M.A.K. / MAC	CHECKED BY: JSA / AL / JR



REFERENCE:
STREET MAP PREPARED BY CME ASSOCIATES.



	Alaimo Group 200 High Street Mount Holly, NJ 08060 (609) 267-8310	SOUTH BRUNSWICK TOWNSHIP CIRCULATION PLAN ELEMENT	CLIENT: SOUTH BRUNSWICK TOWNSHIP	P -3
	CENTROID/DISTRICT PLAN	PROJECT NO: M-300-025	DATE: SEPT. 2001	
			DRAWN BY: MAC / M.A.K.	CHECKED BY: JSA / AL / JR



LEGEND	TOWNSHIP REQUIRED	
	ROW R.S.I.S.	CARTWAY R.S.I.S.
EXISTING LOCAL ROADS		
EXISTING SECONDARY COLLECTOR	66'	40'
EXISTING PRIMARY COLLECTOR	72'	52'
EXISTING SECONDARY ARTERIAL	88'	66'
EXISTING PRIMARY ARTERIAL	100' +	2 @ 36'
EXISTING INTERSTATE		
PROPOSED PRIMARY COLLECTOR	72'	52'
PROPOSED PRIMARY ARTERIAL	110'	

NOTE: CARTWAY WIDTH VARIES, REFER TO AASHTO STANDARDS TABLES VI-4 AND VII-2.

REFERENCE:
STREET MAP PREPARED BY CME ASSOCIATES.




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SOUTH BRUNSWICK TOWNSHIP CIRCULATION PLAN ELEMENT
2020 ROADWAY DESIGNATIONS

CLIENT: SOUTH BRUNSWICK TOWNSHIP	P - 4
PROJECT NO: M-300-025	DATE: DEC. 2001
DRAWN BY: MAC	CHECKED BY: JSA / AL