MERCER COUNTY MASTER PLAN

MOBILITY ELEMENT

PREPARED FOR THE

| *Mercer County Planning Board*

BY THE

| *Mercer County Planning Department*

September 8, 2010

Amended May 2016

COUNTY OF MERCER

MASTER PLAN
MOBILITY ELEMENT

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The original of this plan has been signed and sealed in accordance with the New Jersey Professional Planners Licensing Act.

Leslie R. Floyd, AICP, PP # 5681
Planning Director

Adopted by the Mercer County Planning Board, September 8, 2010.

Amended by the Mercer County Planning Board, May 2016

Richard J. Smith
Secretary

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The national and international economies are much different in 2010 than they were when the Master Plan update began in late 2003. The theme of this proposed plan is balance, which seems even more relevant today. No longer can one component of our physical environment drive the others. This is not only an impractical approach, it is also an unsustainable approach. This plan seeks to balance the challenges and opportunities presented by our transportation system, our economy, and our environment through an interrelated set of policies and strategies. Together these policies and strategies will ensure that Mercer County is positioned to succeed in the new economy to guarantee on-going improvements to places where residents live and work.

Donna M. Lewis, Director
Mercer County Planning Division

March 2010

Since the Master Plan's adoption in March 2010, there have been changes to open space and transportation funding. The Open Space Board in consultation with the County Administration will review funding through the Local Municipal/Nonprofit Assistance Program on an annual basis. This will allow more flexibility in funding open space projects with urban and regional significance. The Transportation Development District (TDD) was established 24 years ago, and over that time as land was developed or preserved, transportation improvements changed to meet the needs of new land uses. Upon approval by the Commissioner of the NJ Department of Transportation to dissolve the district, the Mobility element of the Master Plan, and all other references to the TDD throughout the Plan, including on several maps, will reflect the TDD no longer exists. The Mercer County Wastewater Management Plan (WMP) was adopted in October 2013. Lastly, to meet the recommendations of the Master Plan, the WMP will be incorporated by reference into the Mercer County Master Plan.

Leslie R. Floyd, Director
Mercer County Planning Department

May 2016

EXECUTIVE SUMMARY

Transportation infrastructure is the skeleton on which land development depends, and land development is key to both economic and environmental sustainability. In terms of the economy, roads deliver raw materials to factories and workers to their homes. Roads also facilitate public access to open space, but when new development extends along a rural road, unprotected open space may be quickly consumed. It is critical that mobility plans carefully balance conditions for economic growth and preserving environmental quality of life.

This plan presents a vision for the future of mobility in Mercer County that is conservative about recommending new roads and increased vehicular capacity. While the future presents uncertainties, the best predictor of tomorrow is today. This is not only because New Jersey, as a state, is nearing buildout under current land development policies, but also because the number of vehicles on our roadways now nearly equals the number of licensed drivers. If development policies shift to encourage density in existing centers (as NJ State policy has done and municipal policy is following), then a larger population can be supported with a mode shift to mass transit. While New Jersey counties have no direct authority over land development, this plan seeks to support economic growth in existing development centers and to add new highway capacity only when necessary to mitigate demonstrated congestion.

Over time, with sub-element additions, this plan will further support transportation mode choice by planning highway and multipurpose trail facilities to support pedestrians and cyclists. The plan also enjoins the County to work closely with state, municipal, and private transit agencies to develop a transit system that provides an effective alternative to single occupancy vehicles for longer trips.

I. INTRODUCTION

INTRODUCTION

New Jersey's County Planning Act (NJSA 40:27-1 *et seq.*) enables counties to plan for the orderly physical development of their territories, with special reference to highways and stormwater. This document updates and expands the 'Highways' element of the County Growth Management Plan that was developed in the late 1980s and amended periodically, and which continues to yield planned transportation improvements.

The context for transportation planning today is considerably different from the 1980s. The 'paradox of development pressures' was already clear then. This is the paradox that, on the one hand, reducing roadway congestion with new highways and new highway capacity can induce new land development and that, on the other hand, new land development can require new highway capacity to reduce congestion. The adage 'build it and they will come' works in both directions. The policy of the last plan was to designate highway improvements that will mitigate potential future congestion, but implement them only when land development requires it (LOS < D).[1] This policy will be carried forward in this update of the plan. This is prudent, not only because land-use decision-making rests in the hands of municipalities, but also because improvements that add single-occupancy vehicle (SOV) highway capacity now come under strict federal review for conformity with air quality attainment standards under the Clean Air Act Amendment of 1990.

Concerns about global warming are much greater today than when they inspired the Clean Air Act, and motor vehicle emission standards are likely to soon grow much tighter. While the automobile industry is vigorously seeking alternative fuel technologies, other local and international forces point to changes in transportation needs. These include the prospect of 'buildout' of the entire state of New Jersey under current land development practices; higher gasoline costs from exponential growth in developing nations; and concomitant changes in the role of the United States in global production markets.

Both the prospect of buildout and rising energy costs suggest changes in land use and transportation facilities. To continue to provide economic development opportunities while preserving open space and general quality of life, permitted development density should be increased in centers where infrastructure already exists. In response to higher energy costs and concerns about global warming, transportation facilities should provide for mode choice, that is, for leaving the car at home, or at the dealership, and walking, biking, or taking mass transit to get where you need to go.

In the global division of labor, the United States is producing fewer hard goods and more information as a commodity, with finance, R&D, design, marketing, information technology, and healthcare becoming dominant industries. New Jersey is a state leading this transformation. On one hand, globalized production increases the importance of freight transport. In Mercer County, this means accommodating local delivery services and freight distribution centers

1. Level of Service (LOS) is a measure of motor vehicle travel delay at signalized intersections, in seconds, where LOS A < 10 < B < 20 < C < 35 < D 55 < E < 80 < F. That is, at an intersection with LOS A, vehicle delay on average is less than ten seconds, while at LOS F, average delay is greater than 80 seconds. This plan requires mitigation when planned development will degrade LOS below D. See FHWA *Signalized Intersections: Information Guide* FHWA-HRT-04-091, S.7.1.2, *http://www.tfhrc.gov/safety/pubs/04091/07.htm*.

serving the northeast region. On the other hand and perhaps more importantly, almost all the industries that are growing in the US today are virtually independent of place. Not only can headquarters be moved to best attract workers, but new communication and information technologies allow individuals to work from almost anywhere. This creates pressure to attract and retain these businesses and individuals by affordably providing the highest quality of life possible. Affordability also serves location-specific workers, from firemen and school teachers to construction and landscape laborers. Mixing affordable housing into high-quality, relatively dense development centers must play a role here, together with expanding choices of travel modes for people of all income levels.

The forces identified above are only somewhat predictable, and present uncertainties that may accelerate the need for plan implementation, or change assumptions entirely:

- Online shopping and home delivery may not only change the scale and scope of brick-and-mortar retail, but also lead to greater social isolation and segregation;
- Energy costs may rise quickly and dramatically, leading to much higher demand for mass transit and mixed residential and commercial land uses;
- Global outsourcing of production may increasingly apply to 'knowledge' jobs as well as to manufacturing, regressing American prosperity to a global mean;

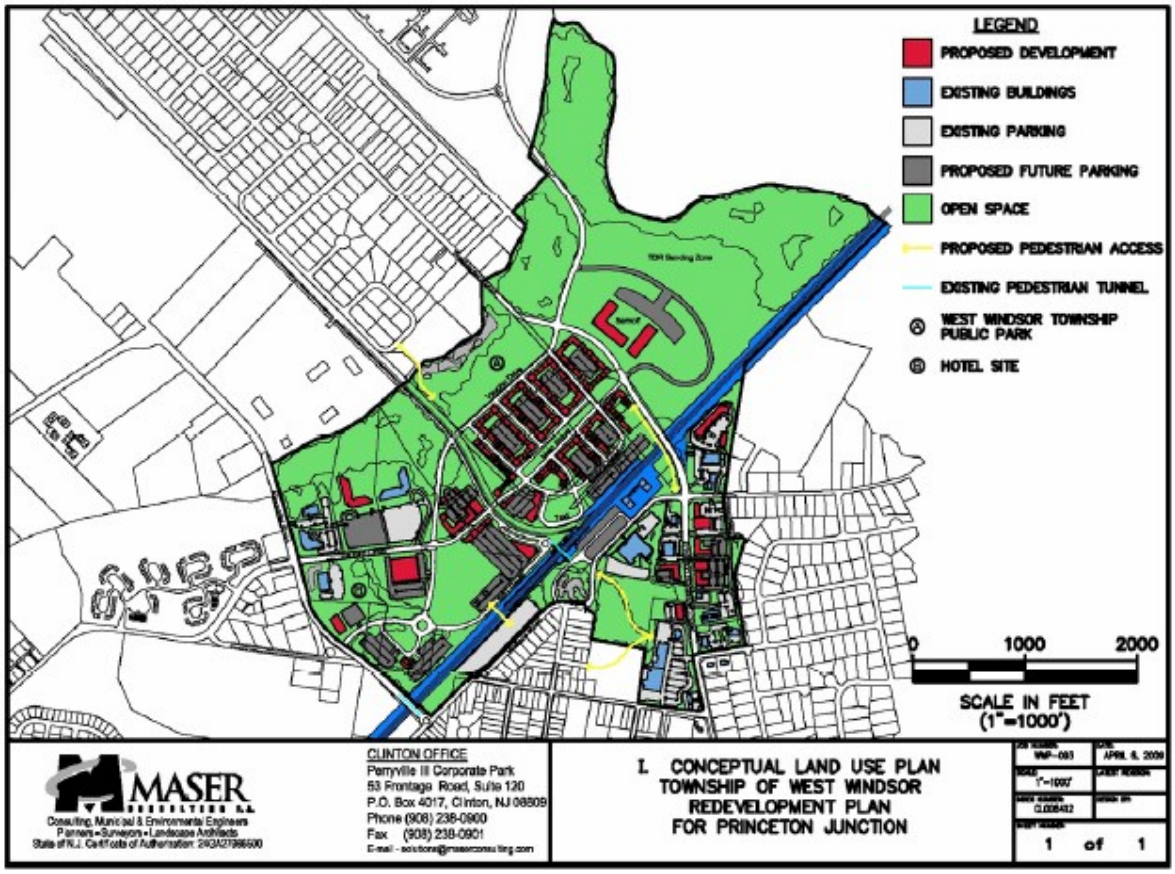


Figure 1. Princeton Jct. Station Area Plan, West Windsor 2009

- Global warming and sea level rise may lead to mass migrations, with New Jersey as an attractive destination;
- A global pandemic may dramatically affect human population growth and undermine almost all our assumptions about the future.

To the extent that these forces point to any common direction for managing future growth, it is to increase density in mixed-use centers where infrastructure already exists and to provide for transportation mode choice.

This common direction is already central to the New Jersey State Development and Redevelopment Plan and the Delaware Valley Regional Planning Commission's 2030 Plan (DVRPC is the federally-authorized Metropolitan Planning Organization [MPO] for the nine counties around Philadelphia, including Mercer). Federal policy is also turning in this direction. Both the State and the DVRPC have programs to support planning for center-based development, and the State has programs like the urban transit hub tax credit to encourage denser development. While land use zoning decisions are made at the municipal level, the State, MPO, and County can plan transportation facilities under their jurisdictions that enhance mode choice and minimize additional SOV capacity. And the County can work closely with municipalities to coordinate planning in the face of an uncertain future.

Figure 2. Hamilton Township Station Area Plan, NJ Transit 2002

II. HISTORY

HISTORY

Except for the intra-coastal waterway, almost all of the surface traffic on the eastern seaboard passes through Mercer County. Major facilities include the New Jersey Turnpike, Interstates I-95, I-195, and I-295, US Route 1, the Northeast Corridor commuter rail line (three rail operators serve Trenton Station), two freight rail lines (CSX and Conrail), inter-regional oil and natural gas pipelines, and a bulk freight seaport. In addition, state highways (especially US 206 and NJ 31) provide arterial connectors between I-95 in Mercer County and US 202/I-287 in Hunterdon and Middlesex Counties. The Delaware River Joint Toll Bridge Commission controls all five river crossings to Pennsylvania. Bus transit is provided by NJ Transit and private carriers, who mostly deliver commuters to New York City.

While the transportation resources in Mercer County are vast, the County government's formal jurisdiction over real resources is smaller than most municipalities, as shown by Figures 3 & 4 and Table 1 (see also Appendix B: Map 1). Generally, highways under state jurisdiction are interstates and principal arterials serving regional and inter-state traffic. County highways in New Jersey mostly consist of secondary arterials and collector roads serving multiple counties (500-level routes) or multiple municipalities (600-level routes). Municipalities maintain local streets as well as major and minor collectors. With suburban growth following the completion

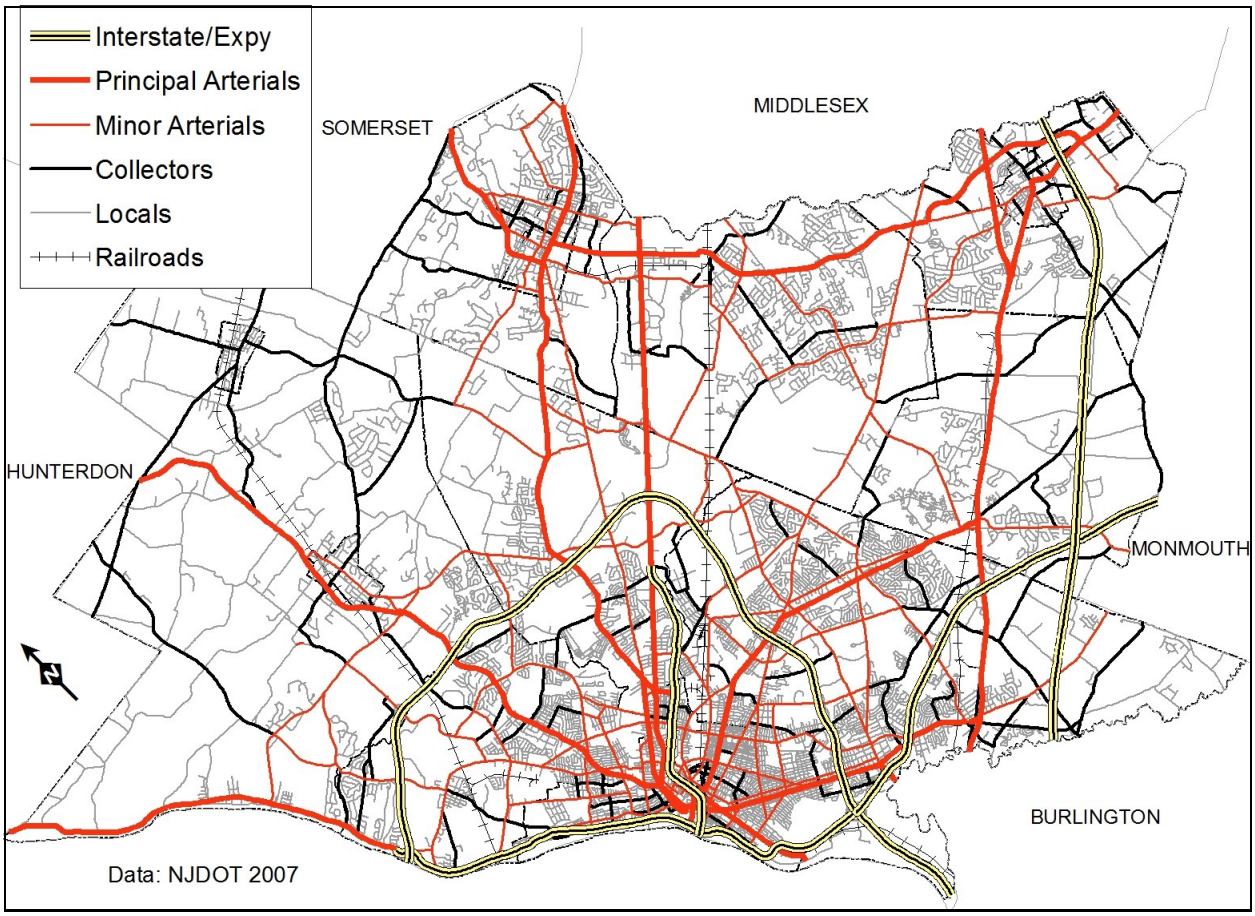


Figure 3. Roadway Functional Classification

of the interstate system in the 1970s,[1] municipal collectors now span more miles than county collectors. To maintain the inter-municipal and inter-county emphasis of county highways, the County may from time to time negotiate jurisdiction swaps with municipalities, as improvements are made, with net County mileage remaining at current levels. With jurisdiction over merely 11% of the roadway miles in the county, Mercer County must work in cooperation with its municipalities and the State to ensure a safe and efficient transportation network.

An historic example of such cooperation is the County's Transportation Development District. Authorized in 1989 by the New Jersey legislature, TDDs offered a new mechanism for funding transportation improvements. Shortly thereafter, Mercer County began working with Ewing, Hopewell, and Lawrence Townships to plan for an area targeted for development along I-95

1. Federal and State plans for major new highways in Mercer County have now been abandoned, including an I-95 connector to I-287; a realignment of NJ 31 to bypass Pennington to the Brunswick Circle on US 1B and US 206 in Trenton; and a connector between the NJ Turnpike and US 206 north of Princeton (Route 92). Plans to systematically widen state and county highways to higher classifications are also reduced, for reasons given under 'the paradox of development pressures' above.

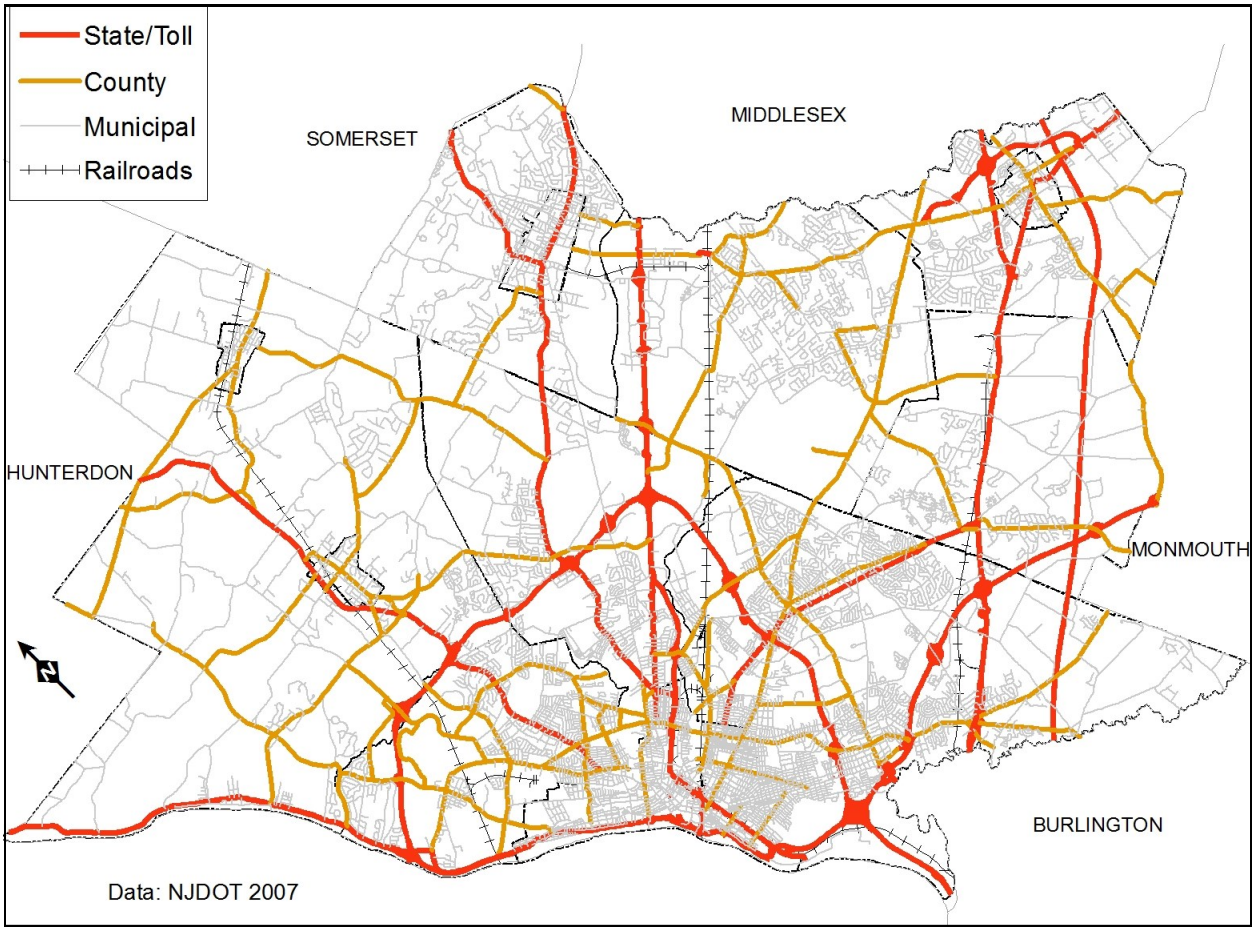


Figure 4. Roadway Jurisdiction

between Federal City Road and Scotch Road. The planning process generated consensus on long-range capital improvements to regionally manage traffic impacts from local development. Once implemented, the TDD plan created a more predictable environment for developers, with a formula for fair-share off-site traffic impact mitigation costs and the County determining where off-site mitigation efforts should be directed within the TDD. With a plan in place and the State as a partner, significant improvements were made and all substantial, buildable improvements within the boundary have been constructed. In 2016, the concerns that led to the TDD have been addressed and the majority of the land is either developed or preserved. In May 2016 the TDD was dissolved in accordance with the provisions of the Transportation Development District Act, N.J.S.A. 27:1C-14.

The role of this Mobility Element within the County's Master Plan is not only to identify specific improvements to the County highway network, but also to provide a framework for cooperation among jurisdictions with attention to potential future regional transportation needs. This is particularly a concern for preserving right of way for future uses. For example, in the 1989 update of the Mercer County 'Highways' sub-element, the most important transportation priority was supporting economic development in the US Route 1 corridor, north of the intersection of I-95, I-295 and US Route 1. The plan identified right of way for a supportive network of new or improved parallel collector roads to divert local traffic from Route 1. Significant segments of these roads have been built, and more will be as development intensifies. However, because of environmental constraints, parcels along what would be Canal Point Boulevard between Meadow Road and Nassau Park Pavilion may not be developed. Nevertheless, the transportation right of way could still be used for an elevated roadway reserved for bus rapid transit vehicles, the routes for which are now being planned by NJ Transit. This example suggests that, as the future comes closer, our vision may become clearer, and that in the interim it is important to plan for the development of a rational system to the extent possible.

What holds for motor vehicle travel holds for cooperation on other modes of transportation. Mercer County's Transportation Resources to Assist the Disabled and Elderly (TRADE) operates handicap-accessible 16-passenger mini-buses. Despite being the second largest public

	State	County	Municipal	Total	%
Interstate/Expy	117.2			**117.2**	6.5
Principal Arterial	210.3	9.4	10.8	**230.5**	12.7
Minor Arterial	1.2	117.2	78.0	**196.3**	10.8
Collector	1.3	57.4	108.8	**167.5**	9.2
Local/Ramp	46.1	12.3	1,045.3	**1,103.7**	60.8
Total	**376.0**	**196.3**	**1,243.0**	**1,815.3**	100.0
%	20.7	10.8	68.5	100.0	

Table 1. Roadway Functional Class and Jurisdiction[1]

1. Data from NJDOT 2007 GIS centerlines. See 'Access Management' below for a more detailed discussion of highway functional classification.

transit provider in the county, TRADE's services pale in comparison to the on-demand accessible services that, under federal ADA requirements, NJ Transit must provide within three-quarters of a mile of each of its scheduled bus routes (see Figure 5). Recognizing the efficiencies that may be gained, the federal United We Ride initiative in 2006 required local coordination among human service transportation providers. These include TRADE, municipal, and non-profit services that apply for funding under several federal programs, as well as NJ Transit. New Jersey identified counties as the units of 'local' coordination (Pennsylvania units are MPOs) and Mercer County subsequently appointed the Executive Director of TRADE as the local lead for coordination. Under his direction, a variety of transportation providers, passengers, and social service agencies developed the County's Human Service Transportation Coordination Plan, which now governs the allocation of federal funds to a variety of service providers, and promises to increase transit system efficiency in years to come.

As with transit services, the County's role in facilitating bicycle and pedestrian mobility must primarily be one of coordination. For pedestrians, this is because most pedestrian traffic will be within municipal population centers that County highways connect. For cyclists, coordination is necessary because local streets are generally safer than high-speed, high-volume county col-

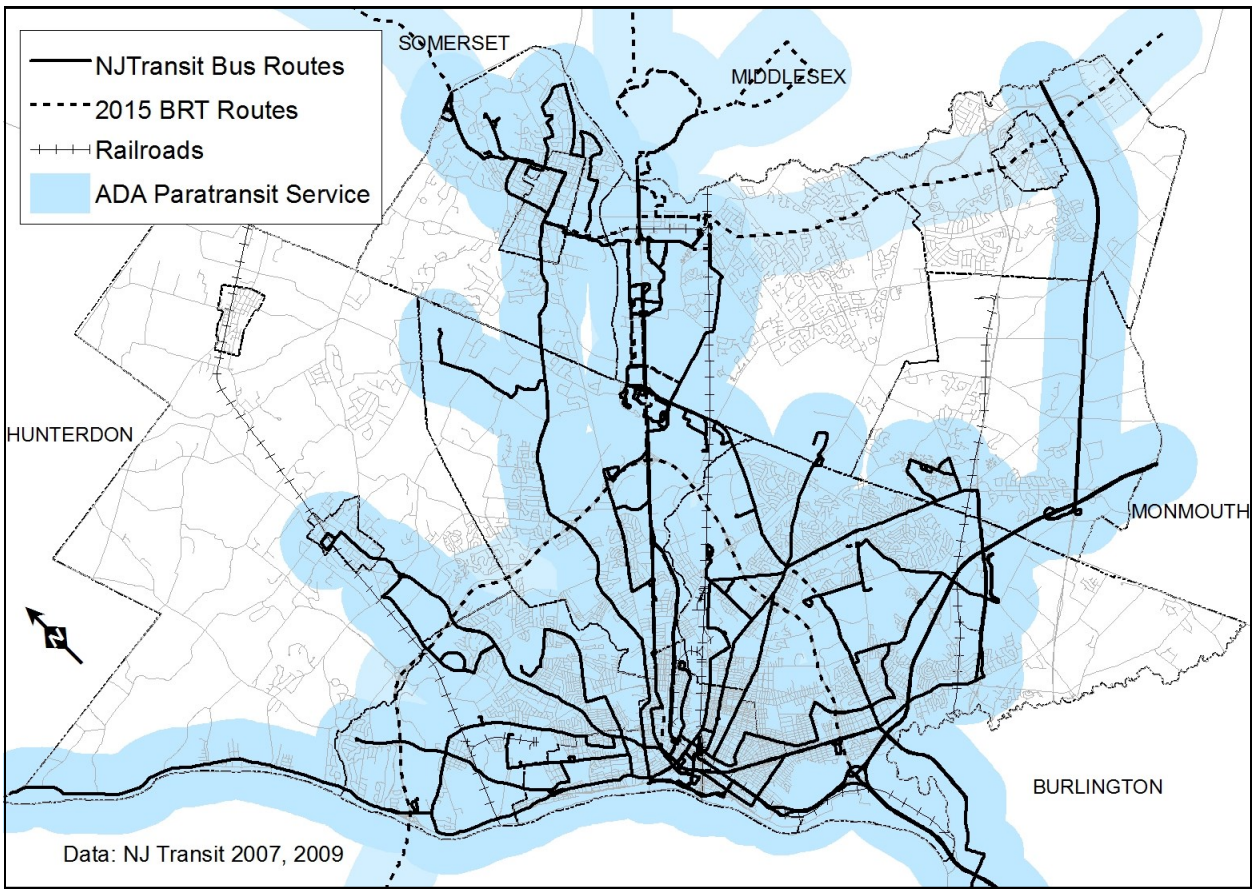


Figure 5. Bus Routes & ADA Service Area

lectors and arterials. The County therefore must encourage municipal streets that accommodate pedestrians and cyclists, and connected networks of local streets that can serve as 'bicycle boulevards' separated from high-volume motor vehicle traffic. One means for this is County staff participation in the Mercer County Bicycle-Pedestrian Task Force convened by the Greater Mercer Transportation Management Association. Of course, the County must also ensure that its own roads appropriately accommodate pedestrians and cyclists.

In aviation, Mercer County's Trenton-Mercer Airport (TTN) is the only FAA-certified commercial airport in the County, though general aviation facilities remain in operation at the Trenton-Robbinsville Airport and at the Princeton Airport, just outside of Mercer in Montgomery Township, Somerset County. In recent decades, commercial carriers have intermittently operated regional commuter services out of TTN. Sustainable commercial service probably depends on Newark and Philadelphia airports exceeding capacity. With Philadelphia undergoing major renovations and planning a new runway, it is not clear when this will be, but the administrators of Trenton-Mercer Airport continue to participate in regional aviation coordination efforts.

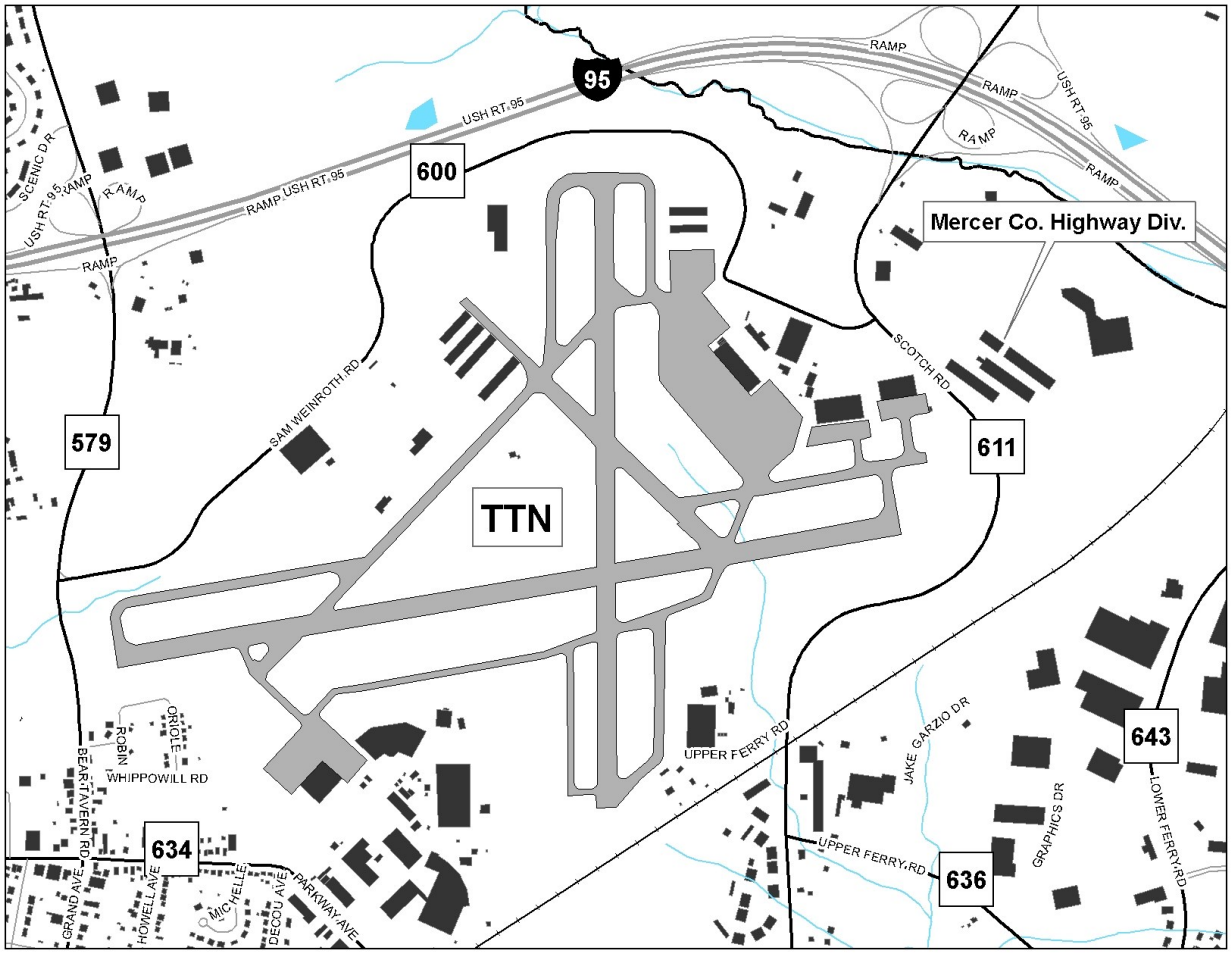


Figure 6. Trenton-Mercer Airport (TTN)

II. VISION (GOALS)

VISION (GOALS)

The vision for the County's transportation system in this plan was developed in two intensive outreach efforts with stakeholders. The first took place in 2002 in a series of interviews and meetings with municipal representatives identifying desirable characteristics and current issues for each segment of County highway (see Figure 6). The goal of this effort was to develop a plan and code for managing access points (intersections and driveways) on County highways in order to increase safety and maintain traffic capacity (see Policy 1, Strategy 2, p. 16). The other outreach effort, in 2007, convened municipalities and other stakeholders to identify a vision for growth in the county as a whole. That vision is elaborated in the core of the Mercer County Master Plan (see Figure 9). Congruent with the direction pointed by the local and global forces cited above, stakeholders painted a vision of denser growth in established centers arrayed on existing major transportation corridors, in nodes at major commuter rail stations, and in existing commercial centers augmented with residential uses.

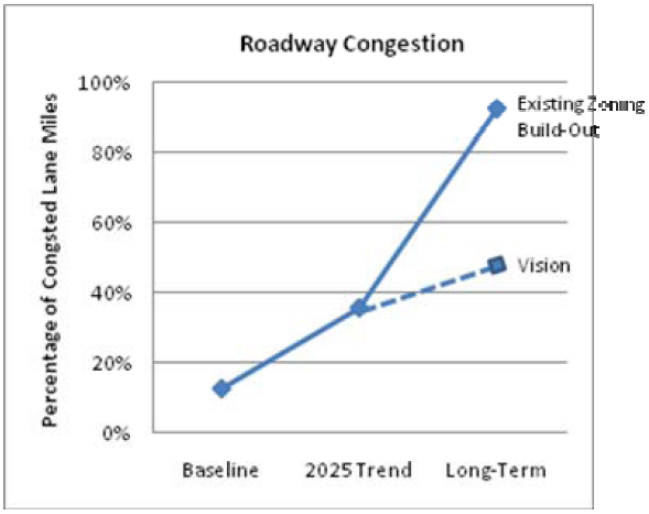


Figure 7: US1RGS Congestion Analysis (NJDOT)

A recent study by the New Jersey Department of Transportation has confirmed the long range viability of this vision. The US Route 1 Regional Growth Strategy gathered a similar mix of stakeholders from an area covering much of Mercer County and large portions of Middlesex and Somerset Counties where future development will impact the Route 1 corridor. Consultants interviewed municipal officials about their development visions and planned transportation improvements. Employment, population, and traffic congestion growth were modeled under 'build-out' and 'vision' scenarios. Under the build-out scenario, congestion predictions were dire. However, the vision scenario showed that denser development, combined with transportation projects currently on the drawing board, would retain acceptable levels of service (see Figure 7). The threats to achieving this vision are that municipal land use visions are mostly not yet codified in zoning and that funding has not been identified for most of the transportation projects. Continued coordination among municipalities, counties, MPOs, and the State of New Jersey is imperative.

The vision that grows out of these efforts is a transportation system that will enhance local development opportunities and quality of life for current residents and future generations. The system will be fitted to land use, with characteristics varying with the scale and density of development. Figure 8 illustrates elements of this variation.

In center-based developments and borough main streets, sidewalks will support pedestrian traffic and shoulder widths will accommodate cyclists, where compatible with pavement width and municipal parking ordinances. Street trees and building fronts adjacent to sidewalks will give motorists the sense that the street is a place available to a variety of users. Rear-lot park-

ing with side-street, alley, or backage-road access will increase predictability on the main street and reduce conflict hazards for motorists, cyclists, and pedestrians. Bus pull-outs will reduce delay for cyclists and through motorists.

On more rural roadway segments, shoulders will accommodate cyclists where compatible pavement widths consistently exist. Shared and consolidated driveways will reduce conflict hazards for travelers. Roadway design, appurtenances, and roadside vegetation will be appropriate to local contexts.

To preserve vehicular capacity and to provide safe alternate routes for cyclists, the County will encourage municipalities to develop a network of parallel connector roads for land access. Cul-de-sacs in new subdivisions should convert to through streets upon development of adjacent parcels, and new commercial developments should provide for off-street cross-access to neighboring parcels.

In all cases, County roadway facilities will provide adequate access to emergency service vehicles. Where feasible, signal prioritization should enhance progression for emergency service and mass transit vehicles.

Sensitive to local context, this vision of the future of mobility in Mercer County is one of "complete streets," with facilities appropriate to all travel modes. This vision will be achieved through implementation of the policies and strategies in the next section.

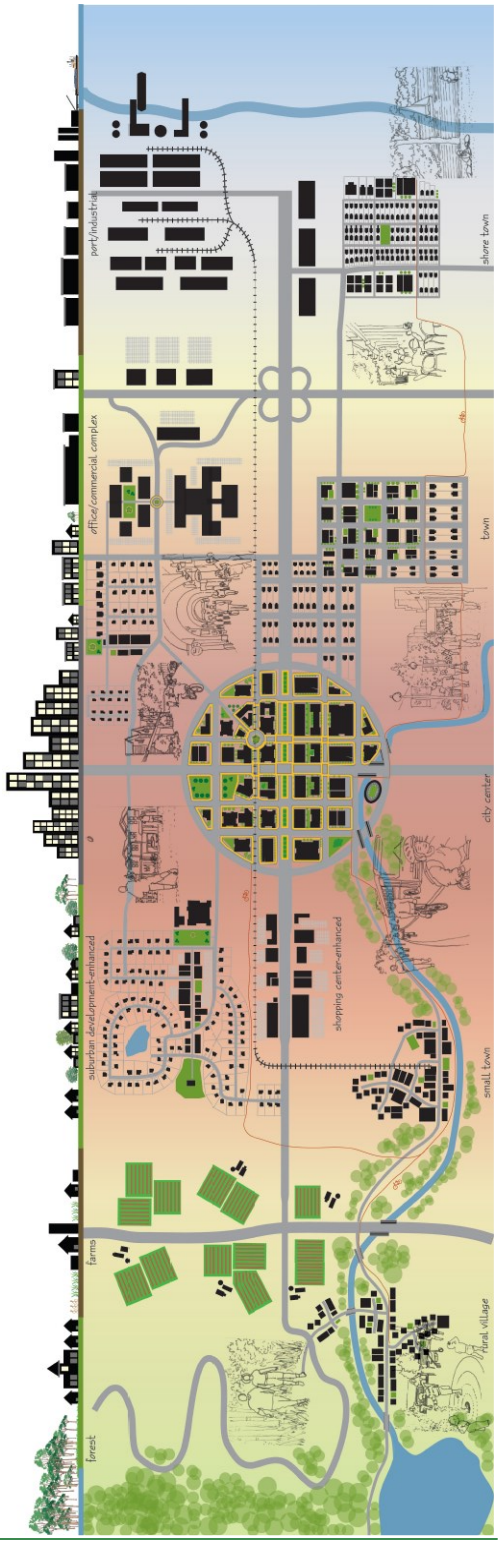


Figure 8. Transect from Mobility & Community Form: A Guide to Linking Transportation & Land Use in the Municipal Master Plan, NJDOT 2006

VISION (GOALS)

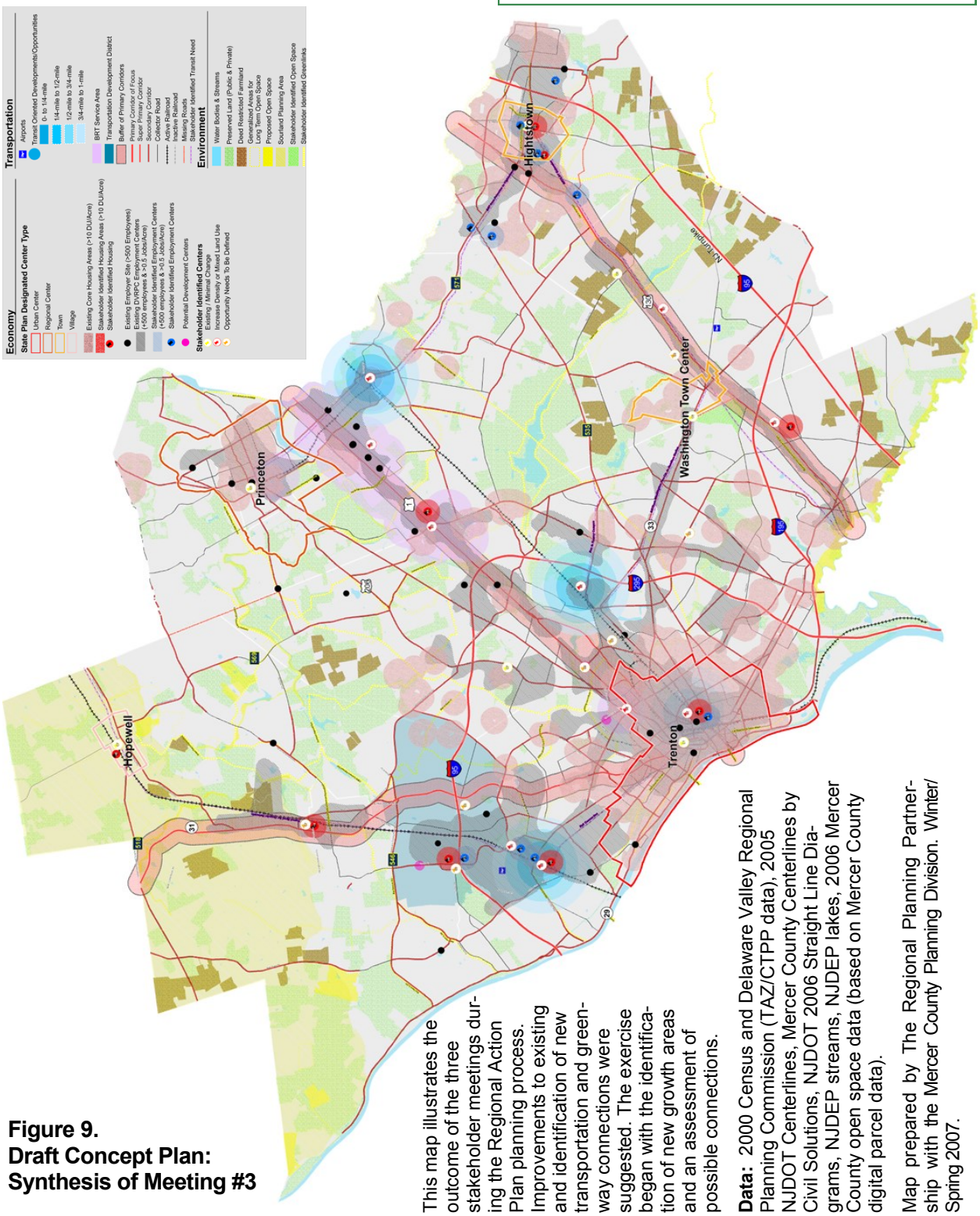


Figure 9.
Draft Concept Plan: Synthesis of Meeting #3

This map illustrates the outcome of the three stakeholder meetings during the Regional Action Plan planning process. Improvements to existing and identification of new transportation and greenway connections were suggested. The exercise began with the identification of new growth areas and an assessment of possible connections.

Data: 2000 Census and Delaware Valley Regional Planning Commission (TAZ/CTPP data), 2005 NJDOT Centerlines, Mercer County Centerlines by Civil Solutions, NJDOT 2006 Straight Line Diagrams, NJDEP streams, NJDEP lakes, 2006 Mercer County open space data (based on Mercer County digital parcel data).

Map prepared by The Regional Planning Partnership with the Mercer County Planning Division. Winter/Spring 2007.

IV. Policies & Strategies

The policies outlined in this section are intended to yield "complete streets" on the Mercer County highway system. They were developed in reference to complete streets policies recently adopted by the Federal Highway Administration, the New Jersey Department of Transportation, and other agencies. They extend beyond those examples because policies here must cover the full range of responsible management of a multimodal system.

Policy #1: Preserve existing transportation facilities

Strategy #1: Apply standards-based strategies, developing standards and information resources where necessary, to cost-effectively manage roadways, bridges, traffic controls, and safety devices

- *Transportation asset management information system:* The County will implement a computerized system for capital cost accounting and maintenance management for highway capital infrastructure. The system should facilitate cost-effective maintenance scheduling, permit processing, coordination with agencies maintaining under-pavement utilities, and customer responsiveness.

Strategy #2: Preserve highway capacity by developing an access management code for County facilities and working with stakeholders to implement local access management plans

- *Access Management Plan and Code:* The County will continue to develop and implement a network-level plan for reducing and mitigating vehicular conflict points at intersections and commercial driveways with standards for intersection and driveway spacing and geometry. Access levels for particular County routes were developed following interviews with municipal officials in 2002 and are indicated on Map 2 and Appendix A of this plan element. Full implementation of access management measures requires revision (by ordinance) to the County's Land Development Standards. Authority for counties to implement access management strategies is given by the State Highway Access Management Act (N.J.S.A. 27:7-91e).
- *Local access management plans:* The County will work with municipal stakeholders and property owners to develop strategies to better manage traffic operations, roadway design, and driveways in locations where more intensive development is planned, or where existing safety and congestion concerns warrant retrofit applications.

Policy #2: Improve safety for all travelers

Strategy #1: Include context sensitive solutions that enhance safety for all travel modes whenever implementing an improvement

- When management systems (asset management, access management, safety management) or planning studies indicate operational or geometric changes to County highways, all travel modes and local context will be considered in concept development and alternatives analysis for each project. Accommodations for pedestrians and cyclists

will be included except where their cost is excessively disproportionate to need or probable use.

Strategy #2: Analyze crash history and traffic operations to identify locations for safety improvements

- *Crash Analysis:* The County will conduct a network-level screening of mappable crash data from NJDOT to identify high-incidence intersections and segments. High priority locations on state highways and municipal streets will be referred to appropriate jurisdictions (see Figure 13, p. 27).
- *Roadway Safety Audits:* Highest incidence locations on County highways will be subjected to office and field condition reviews by a multi-disciplinary team (Highway Traffic, Engineering, Planning, local public safety) to identify and prioritize potential safety improvements.

Policy #3: Promote choice of travel mode

Strategy #1: Develop mode-specific plans for travel on County facilities

- *Transit:* New Jersey Transit and the NJ Department of Transportation have developed phased implementation plans for an express bus (bus rapid transit or BRT) core and feeder system for the US Route 1 Corridor. In light of this, as part of its 2010 federally funded planning work program, the Delaware Valley Regional Planning Commission is developing a bus transit long range concept plan for all NJ Transit bus services out of the Hamilton Garage (all of Mercer County and parts of adjacent counties). This plan will be incorporated herein in part or by reference, when complete, and Mercer County will continue to work with DVRPC and NJ Transit to refine and implement the plan.
- *Bicycle:* At the request of Mercer County in 2009, consultants to NJDOT are developing a county bicycle master plan to complement statewide and municipal bicycle master plans. This plan will be incorporated herein in part or by reference when complete, and Mercer County will begin implementing high-priority bicycle improvements on its own facilities and continue coordination with the State and municipalities on other recommended network improvements.
- *Freight:* Work with NJDOT, DVRPC, and municipalities to develop standard routes for feright vehicles, both through the county and to destinations within the county, including retail and commercial and industrial sites, distribution centers, and intermodal facilities.

Strategy #2: Strategically improve existing highway facilities to provide multi-modal transportation choices, including transit, cycling, and walking, as well as automobile travel

- Identify and implement improvements to facilities based on priorities from mode-specific plans, in addition to roadway safety audits and asset and access management systems.

Strategy #3: Work with state and local stakeholders to develop a network of off-road multipurpose trails to provide safe bicycle and pedestrian travel

- Ensure that trails developed with County open space funds are, minimally, accessible to highway and transit networks and, optimally, serve as connectors or substitutes to the highway system for non-motorized travelers.
- Continue active participation in interagency coordination efforts, including the Mercer County Bicycle-Pedestrian Task Force, Mercer County Open Space Preservation Board, Mercer County Park Commission, NJDEP, municipalities, and nonprofit agencies.

Strategy #4: Coordinate with New Jersey Transit and local community human service transit providers to implement new transit services where they are lacking and to better coordinate existing services to improve efficiency.

- *Coordinated Human Service Transportation Plan (CHSTP):* A 2006 Executive Order required recipients of federal funding for human service transportation to coordinate services. Initially only three of 70 federal funding streams were included (seniors, disabled, low-income job access); eventually all are intended to be. With DVRPC support, Mercer County developed a service coordination plan (2007), the implementation and maintenance of which is now in the hands of a committee of service providers, customers, and social service agencies led by the Director of Mercer County's Transportation Resources to Assist the Disabled and Elderly. Mercer County will continue to support the steering committee of the CHSTP and plan implementation.

Policy #4: Promote land uses that reduce reliance on automobiles

Strategy #1: Support municipal plans that concentrate mixed-use, walkable and bikeable (re)development in centers and corridors where infrastructure already exists

- Where invited, participate actively in preparation of municipal redevelopment plans and master plan updates.
- Share materials and media on the benefits of denser, mixed-use development with municipal officials and planning boards.

Policy #5: Link transportation improvements to economic and environmental goals

Strategy #1: Promote transit options to and within the County to serve regional commuters, in recognition that a jobs-to-housing imbalance is likely to persist

- Support implementation of NJ Transit Bus Rapid Transit system and complementary local bus routes to support a mode shift in favor of transit.
- Support NJDOT in linking transportation project funding to supportive changes in land use zoning.
- Continue interagency coordination in the Central Jersey Transportation Forum and support regional governance entities that may evolve from it.

Strategy #2: Promote transit options for urban commuters to suburban job sites and for intra-county commuters between neighborhoods and employment centers

- Continue close coordination with the City of Trenton and Mercer County Improvement Authority on economic redevelopment in the City, including Urban Land Institute 'triangle of opportunity' (between the State House, the Arena, and Waterfront Stadium), NJ 29 Boulevard conversion, and redevelopment efforts adjacent to Trenton Station and River LINE stations.
- When complete, incorporate in part or by reference the Delaware Valley Regional Planning Commission's long range strategic plan for bus transit.
- Investigate and, where appropriate, implement dedicated lanes, intersection queue jumping, and signal prioritization for buses.

Strategy #3: Target single occupancy vehicle capacity-adding improvements to serve areas where infrastructure already exists and limit improvements that encourage green-field development

- Implement access management plan (Policy #1, Strategy #2).
- Screen projects for unwarranted additions of SOV capacity.

Figure 10. Suburban Arterial Re-Visioned as a Complete Street
(NJDOT Complete Streets Policy PowerPoint presentation, 2010)

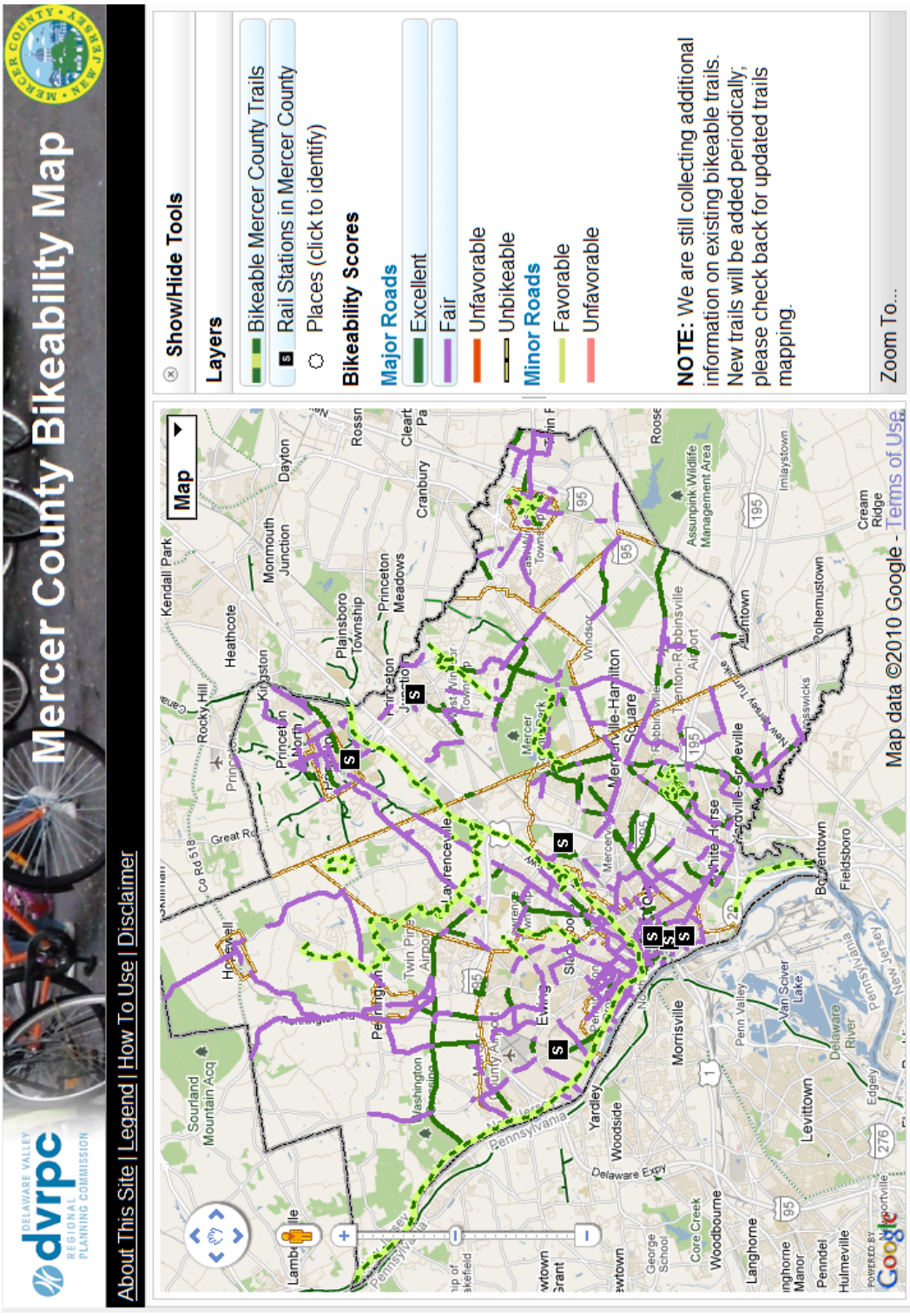


Figure 11. DVRPC Interactive Web Map used to gather community comment on 'bikeability' (bicycle level of service scores) on roads in Mercer County, 2010.

V. Partnerships and Funding

Mobility planning and transportation-related capital improvements at the county level involve a wide variety of partners and stakeholders. Sections below outline the roles of major contributors.

Delaware Valley Regional Planning Commission (DVRPC)

The DVRPC is the federally-authorized metropolitan planning organization (MPO) for the Philadelphia metropolitan area. As an MPO, DVRPC is a quasi-governmental organization whose member governments (Mercer, Burlington, Camden, and Gloucester Counties in New Jersey and Bucks, Montgomery, Chester, Delaware, and Philadelphia Counties in Pennsylvania, and the cities of Chester, Camden, and Trenton) cooperatively ratify federally-funded projects for inclusion in a 10-year, fiscally constrained Transportation Improvement Program (TIP), which is driven by DVRPC's 25-year regional plan. DVRPC also models travel demand to evaluate transportation system conformity with air quality standards set by the US Environmental Protection Agency and supplies federal funds for regional transportation planning, executing special projects in-house at the request of member governments and making grants to support local planning.

New Jersey Department of Transportation

NJDOT is a primary partner with Mercer County for local project implementation through its local aid formula funding (state funds) for bridge and highway maintenance. NJDOT is also a very active participant in developing DVRPC's TIP, since most federal funding goes to projects on state-maintained interstates and federal highways. County participation and support for these projects is vital because federal and state highways are the primary links in the county's transportation network.

New Jersey Transit Corporation

NJ Transit is the major provider of mass transit in the state of New Jersey. The County works closely with NJ Transit for bus route and service planning, identifying bus stop locations, and supporting local inter-agency coordination. NJ Transit actively cooperates with local governments to implement transit-oriented development in the vicinity of its commuter rail stations.

Municipalities

Mercer County municipalities are close partners in mobility planning because their land development plans significantly impact county highways and the mobility needs they identify are a significant stimulus for County projects. In all cases, the County carefully considers their visions for streetscape and traffic operations whenever undertaking new projects.

Non-Governmental Organizations

Several NGOs play a role in mobility planning for the County. These include:

The Greater Mercer Transportation Management Association: Locally, the TMA plays a lead role in travel demand management, with partnerships and financial support from local corporations and a mission to develop alternatives to single occupancy vehicle travel (telecommuting, ridesharing, vanpools, shuttle service subscriptions, bicycle racks and lockers, etc.). The TMA convenes the Mercer County Bicycle-Pedestrian Task Force and participates actively in transit system planning.

The Delaware River Joint Toll Bridge Commission: The bi-state Bridge Commission owns and operates all five highway crossings of the Delaware river in Mercer County and occasionally makes grants to municipalities for roadway improvements that affect river crossings.

Rutgers University hosts several centers that serve local needs, including the *Voorhees Transportation Center*, which undertakes contract research for federal and state agencies with frequent relevance to local issues, such as the recent US Route 1 Regional Growth Strategy and managing the Penn's Neck Environmental Impact Statement process. Rutgers also hosts the federally-funded *Center for Advanced Infrastructure and Transportation* (CAIT) and a *Local Technical Assistance Program* (LTAP), which provide technical assistance and training to local transportation agencies.

Municipal and nonprofit human service transportation providers: A variety of agencies provide transportation services to seniors and to medical service clients that complement services provided by Mercer County's Transportation Resources for the Disabled and Elderly (TRADE) and the Mercer County Board of Social Services. The County has developed closer relations with these organizations through the coordinated human service transportation planning process.

Local and municipal committees and non-profit advocacy groups, such as the Transportation Sub-Committee of the Princeton Regional Planning Board, the West Windsor-Plainsboro Bicycle and Pedestrian Alliance, Ewing Township's Environmental Commission, the Stony Brook-Millstone Watershed Association, the Lawrence-Hopewell Trail, the D & R Greenway Land Trust, and others.

Mercer County Offices & Agencies

The *Mercer County Planning Division* is responsible for long-range transportation planning and is the technical liaison to the Delaware Valley Regional Planning Commission, but is only one of several County offices responsible for developing and implementing mobility services. Others include:

The *Mercer County Department of Transportation and Infrastructure,* which is comprised of four Divisions:

The Engineering Division recommends the County's annual capital program for highways, bridges, and stormwater, and develops specifications for and manages highway and bridge projects. The County Engineer is also responsible for technical review of land development proposals that impact County highway and stormwater facilities;

The Highway Division maintains County mobility infrastructure with maintenance units for roads, traffic, street trees, and mosquito control. Highway Division staff support emergency

services and manage snow-plowing and other critical maintenance activities;

Transportation Resources for the Disabled and Elderly (TRADE) operates a fleet of wheelchair accessible shuttle buses to provide scheduled and on-demand point to point transportation services for subject populations. Its call center maintains user subscriptions and schedules trips;

The Trenton-Mercer Airport (TTN) is a commercial and general service airport servicing about 9,000 flights a year. No commercial carriers currently serve the airport, but several local corporations and Ronson Aviation lease hangars and parking. The airport also hosts a Mercer County College flight school and an Air National Guard unit.

Mercer County Board of Social Services contracts for transportation services for Medicaid clients, providing more trips with van service and taxi fare reimbursements than Mercer County TRADE.

Mercer County Office of Economic Development and Sustainability manages a transit route subsidized by the federal Job Access and Reverse Commute (JARC) program, contracting with a vendor to provide scheduled service between Hamilton Station, urban neighborhoods in Trenton and Hamilton, and employers in Robbinsville, East Windsor, and Monroe Township in Middlesex County.

Private Land Developers

Private land developers are integral partners in developing transportation facilities because significant changes in land use trigger traffic studies and may require off-site mitigations when additional traffic will impact County highways.

Taxpayers

Finally, the residents of Mercer County are important partners in planning and implementing mobility services. Their taxes pay for County-funded capital maintenance and improvement projects; their calls to the Highway Division alert County staff about immediate maintenance needs; and their concerns are considered in, and often initiate, specific facility planning projects.

VI. Needs Analysis

Figure 12 shows traffic volume-to-capacity ratios for collectors and arterials in Mercer County based on 2005 data from DVRPC's Congestion Management Process. While the data are suggestive, they must be interpreted with care, as traffic volumes were imputed for many segments where counts were missing. Thus some locations that experience severe, recurrent congestion, such as the I-95 approach to the Scudders Falls Bridge, show no congestion, while segments of Spruce Street (CR 613) that experience free flow at all times are rated congested based on counts for adjacent, higher capacity segments. In 2009, at the request of the County, DVRPC began a more systematic traffic counting program that promises to deliver a more accurate and comprehensive analysis when a full cycle of counts is complete after 2011. Figure 13 shows crash rates per mile, also from the DVRPC Congestion Management Process. Data in this case are from the NJ State Police reportable crash database, in which only about 60% of crashes are mappable. On most high-incidence segments of County routes, safety projects are completed, under way, or planned. For example, the highest incidence

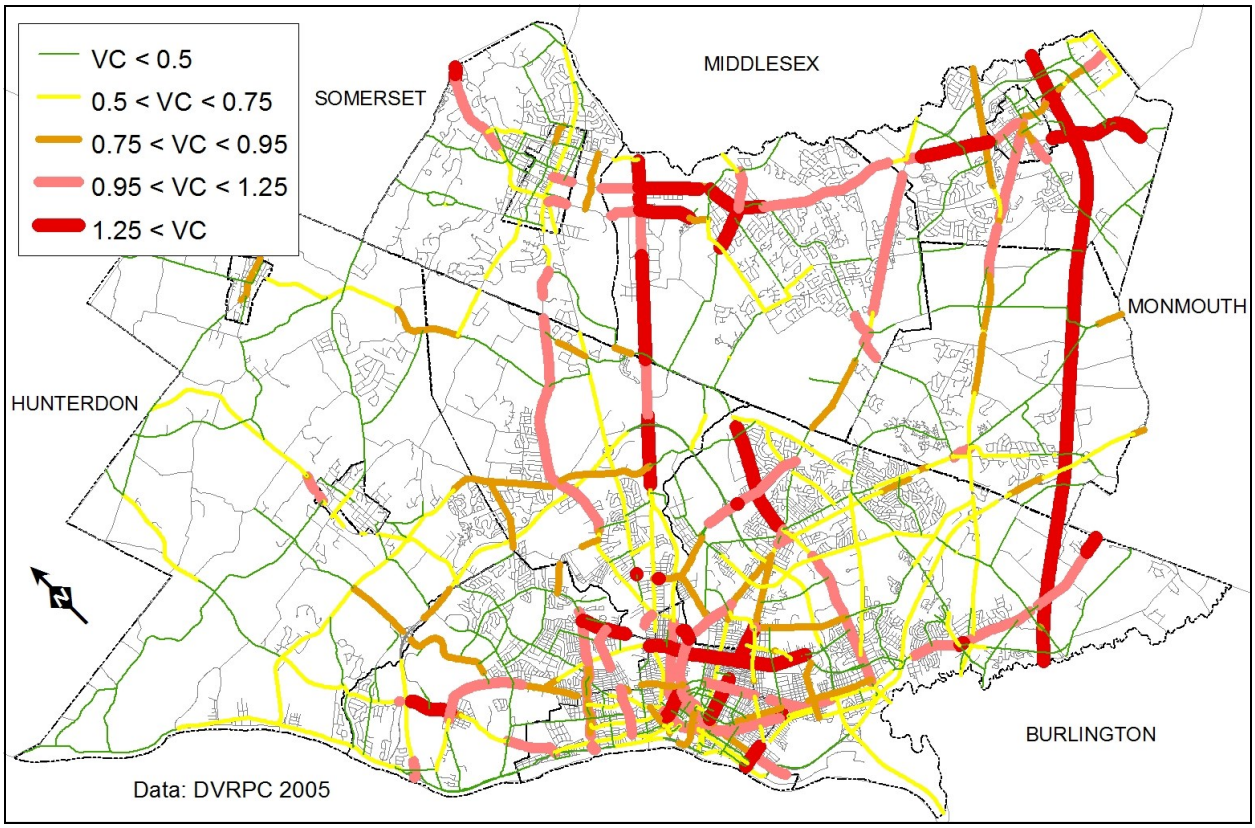


Figure 12. Volume / Capacity Ratios

segment of Hamilton Avenue (CR 606) has had a turn radius widened and signals upgraded at Clinton Avenue. Signal upgrades are programmed for Olden Avenue (CR 622), and signal upgrades are planned for Quakerbridge Road (CR 533). (These and other projects of similar minor scope are not detailed below.) In 2009, NJDOT and Rutgers University unveiled a new map-based crash analysis tool. County staff will undertake a more thorough analysis of crash frequencies on county route segments and intersections in 2010 and 2011.

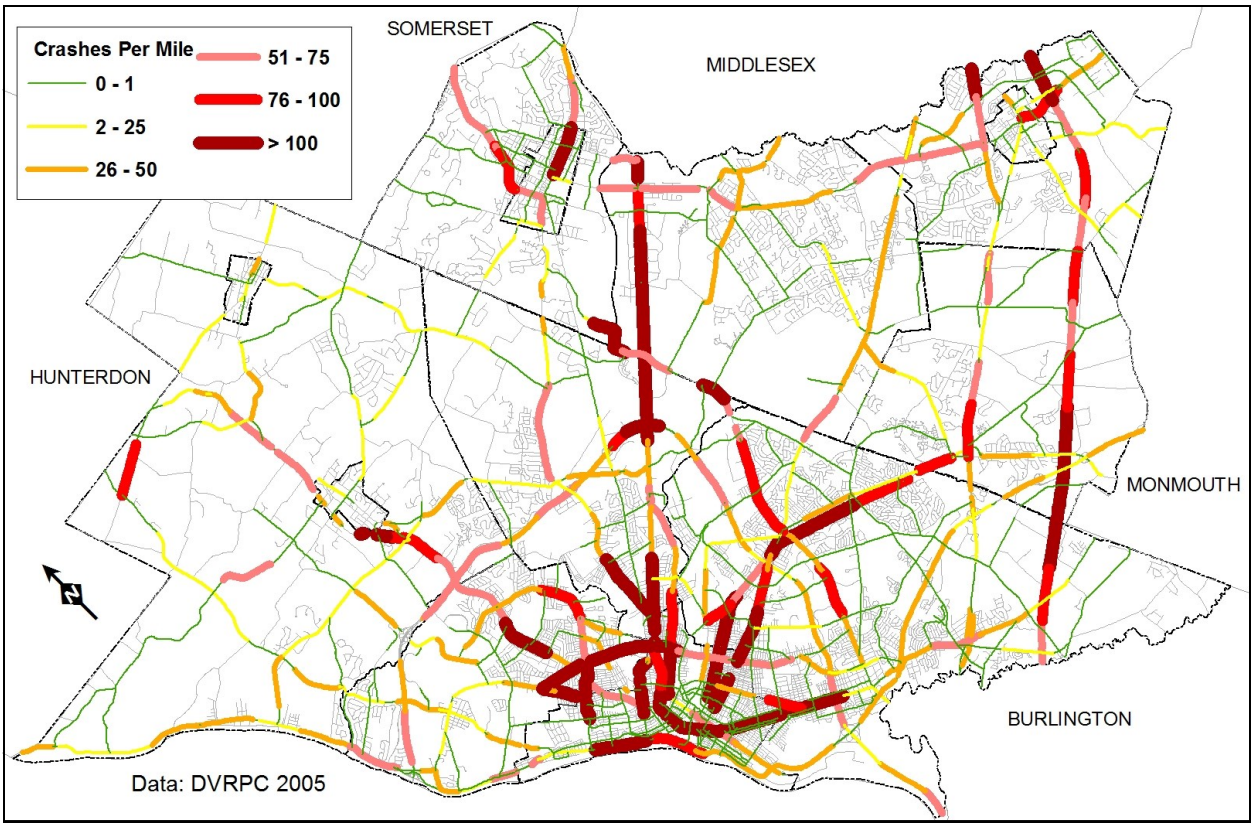


Figure 13. Crash Rates per Mile

Road Type	Interstate			State Highway			County			Municipal			Private		
Severity	Property Damage	Injury	Fatal	Property Damage	Injury	Fatal	Property Damage	Injury	Fatal	Property Damage	Injury	Fatal	Property Damage	Injury	Fatal
2003	555	135	1	2253	871	12	2392	945	8	4261	1108	6	1826	149	
2004	560	146	3	2221	809	11	2573	956	2	4076	1182	7	1753	148	
2005	548	127	3	2275	758	14	2316	946	7	4022	1084	9	1841	145	
2006	538	117	6	2003	800	10	2181	829	8	3664	1029	8	1637	143	1
2007	584	156	3	2040	731	4	2169	778	12	3844	1001	3	1892	136	
2008	498	152	4	2050	758	5	2177	719	2	3453	866	6	1715	147	
2009	568	171	1	2256	687	4	2151	691	8	3837	765	7	1753	143	
% Chg.	2.3	26.7	0.0	0.1	-21.1	-66.7	-10.1	-26.9	0.0	-10.0	-31.0	16.7	-4.0	-4.0	0.0

Table 2. Crash Severity by Facility Type in Mercer County
Source: Rutgers CAIT Plan4Safety (http://plan4safety.rutgers.edu)

Year	Statewide Rural	Statewide Small Urban	Statewide Other Urbanized	Trenton Urbanized	Hightstown Urbanized	Statewide Total
2003	18,912,000	3,504,000	164,391,000	7,134,000	1,296,000	195,237,000
2004	19,286,000	3,638,000	167,544,000	7,302,000	1,349,000	199,119,000
2005	19,696,000	3,702,000	170,736,000	7,463,000	1,479,000	203,076,000
2006	19,913,000	3,808,000	174,224,500	7,658,500	1,527,000	207,131,000
2007	18,961,000	3,741,000	176,519,700	7,645,300	1,552,000	208,419,000
2008	17,292,000	3,348,000	171,219,000	7,253,000	1,539,000	200,651,000
2009	17,107,000	3,452,000	170,177,000	7,353,000	1,497,000	199,586,000
% Chg	-9.54	-1.48	3.52	3.07	15.51	2.23

Table 3. Daily Vehicle Miles Travelled, by Area
Source: NJ DOT Bureau of Transportation Data Development
(http://www.state.nj.us/transportation/refdata/roadway/pdf/hpms2009/VMT_HIST_09.pdf)

VII. Highway Improvements

- State Projects
- Active County Projects
- Long Range County Projects

As a member government in the Delaware Valley Regional Planning Commission, Mercer County participates in the development of the federal Transportation Improvement Program (TIP) for the region, as well as the New Jersey State Transportation Improvement Program (STIP). The majority of TIP and STIP funds are formulaic and categorical, for instance for bridge, pavement, and safety management programs, with only large projects specifically listed separately. Projects that add vehicular capacity to roadways are reviewed for conformity with federal air quality attainment goals, simulating pollution reductions from congestion mitigation or pollution increases from higher travel demand induced by new, free-flow capacity.

In sections below, this plan supports and advocates projects for state, county, and a few significant municipal facilities. For the most part, these projects stem from identified issues and have undergone at least some formal planning. In some cases, such as the Penn's Neck Area congestion mitigation plan, the project has an approved Environmental Impact Study (EIS) and awaits funding in a constrained capital program. In general, the sections below do not include improvements to existing intersections, addition of auxiliary lanes, shoulders, etc. as such improvements are implemented programmatically to address safety and congestion concerns.

Projects listed below (see Appendix B: Maps 2-6) focus mainly on two primary goals, mobility and encouraging denser development where infrastructure already exists. Projects that foster the goal of improving travel mode-choice will be identified in forthcoming bicycle and transit sub-elements. The 1989 Highways plan element (superseded by this plan) was updated to include by reference projects identified in the 1992 East Windsor Traffic and Infrastructure Analysis and the 1992 Allentown Regional Transportation Study. The condition assessments in those plans are outdated, so those plans are no longer included herein. However, extant regionally-significant projects from them are included below.

The focus on mobility in projects below is represented primarily by closing gaps in network connectivity. These include, in Hopewell, the completion of Denow Road; in Ewing, extensions of Sylvia Street, Calhoun Street, and Parkway Avenue; in West Windsor completing Vaughn Drive and New Meadow Road; and in Robbinsville and Hamilton, completing the Town Center Bypass on NJ 33.

Preserving the possibility of future connections is one of the most important functions of this mobility plan. Several connections in this plan are almost inconceivable today, either because of current environmental regulations or stakeholder opposition. Conditions of the moment, however, should not forever preclude the possibility of a sensible project. For a cautionary example, the de-designation of an interstate link between I-95 in Hopewell Township and I-287 in Somerset County was hailed as a victory for preservationists in the 1970s. Today, the same groups rue the heavy truck traffic on US 206 and NJ 31 that the interstate link would have carried, and development has come anyway, filling in the proposed right of way. Seeking to avoid that fate, this plan identifies projects that may be highly desirable if conditions change. These include, in East Windsor, an arterial connector between US 206 and the NJ Turnpike (SR 92); in Lawrence, the extension of Whitehead Road; in Hamilton, missing links on Flock Road, Kuser Road, Paxson Avenue, and Estates Boulevard; in Princeton Township, the re-opening of Province Line Road; and in West Windsor, the last segment of Canal Point Boulevard and a

new connection between Village and Meadow Roads. Mercer County fully supports the preferred alternative in the Penn's Neck EIS ('Route 1 in a Cut', Alternative D2a), but would not oppose a less costly routing of a bypass closer to the Millstone River.

Projects that encourage denser development along existing corridors emphasize capacity preservation over expansion. This means that, as denser development is conceived and approved, it is crucial to implement access controls and roadway designs that elicit driver behavior appropriate to a pedestrian-oriented, main street environment. In most cases, this involves the land-side of the highway more than expensive cartway widening and realignments. For example, on US 206, Lawrence Township envisions main street development in Lawrenceville and Eldridge Park, and Princeton Township and Borough envision the road being more of an urban street than a rural highway. On NJ 31, Hopewell and Ewing Townships are developing or considering main street commercial developments. Main street character is also desired on NJ 33 in Hamilton, Robbinsville, and Hightstown. On County highways, the County supports main street designs for CR 571 in Princeton Junction (West Windsor Twp) and Hightstown, as well as on CR 622 (Olden Avenue) in Ewing. The most dramatic 'main street' project supported by the County is the conversion of NJ 29 from a limited access highway into an urban boulevard to support new, high-density, high-quality development in the core of Trenton.

STATE PROJECTS:

NJ Turnpike Extension (State Route 92) – East Windsor Twp.

Mercer County continues to support a primary arterial connection between US 206 and the New Jersey Turnpike. This would relieve congestion and truck traffic through Princeton Borough and provide an east-west alternative to CR 571, Princeton-Hightstown Road.

NJ Turnpike widening – East Windsor, Robbinsville & Hamilton Twps.

Widening the NJ Turnpike between Exit 9 and Exit 6 (PA Turnpike) from six to ten lanes is currently underway. This will improve access to distribution facilities in the eastern margin of the county and relieve congestion for through traffic on US 130 and US 1.

US 1, Penn's Neck Bypass – West Windsor Twp.

In 2004, the US EPA approved an Environmental Impact Study for "Route 1 in a Cut" rather than the initially preferred alternative of an at-grade arterial adjacent to the Millstone River. The EIS alternative would relieve congestion on the US 1 corridor by removing signals and restricting access via east and west frontage roads. New overpasses would allow continued east-west mobility on CR 571 (Princeton-Hightstown Road) and Harrison Street. Very importantly, the EIS also included the Vaughn Drive Connector, a new collector between CR 571 and Alexander Road that would improve intermodal access between US 1 and the Princeton Junction station on the Northeast Corridor commuter rail line. The signal at Carnegie Center Boulevard would also be removed.

US 1, Southbound to I-95 Safety Improvements – Lawrence Twp.

This project would mitigate congestion from access points to US 1 south of CR 533 (Quakerbridge Road) by creating an east-west connection between Quakerbridge Mall and Mercer Mall on the existing Quakerbridge Mall overpass, and creating a backage (rear site access) road along commercial uses to the south on the west side of US 1. Site access from US 1 would be right-in/right out only. These improvements would reduce congestion on CR 533 and eliminate numerous commercial driveways.

US 1 at Franklin Corner Road – Lawrence Twp.

In conjunction with the above projects, a flyover at this intersection would remove the last traffic signal on the main line of US 1 through Mercer County.

NJ 29 Boulevard Conversion – City of Trenton

The County supports efforts by the City of Trenton to convert the limited access portions of NJ 29 through downtown Trenton into an urban boulevard, in conjunction with parking improvements and a local street network that would create substantial infill development opportunities and re-establish connections between the City and the Delaware River.

NJ 31, Pennington Circle – Hopewell Twp.

The County supports NJDOT plans to improve the safety of operations at this location and to implement access management measures along the corridor to preserve mobility.

US 206, Whitehorse Circle – Hamilton Twp.

The County supports study and improvements at this key connector between the interstate, state, county, and local systems, where operations are confusing and hazardous.

US 206, Traffic Calming – Princeton Borough and Twp.

The County supports a concept plan for roundabouts and complete street concepts developed in an NJDOT study in service of the Princetons.

I-295 Ramps at NJ 33 – Hamilton Twp.

Several incomplete interchanges now provide access between I-295 and state and local highways. A concept development study by NJDOT recommended pairs of roundabouts that would provide better access while consuming less right of way. A street parallel to NJ 33 between Hamilton Avenue and NJ 33 would relieve congestion on the roadway segment that now carries NJ 33 and the convergence of County Routes 618, 614, 606 and 535. A complete interchange at NJ 33 might also permit local stops and an intermodal station for express busses (BRT) routed between Burlington County and the US Route 1 corridor.

NJ 33, Robbinsville Town Center Bypass – Robbinsville Twp.

Township plans for town center development on both northeast and southwest sides of NJ 33 depend on implementation of a bypass providing arterial access to US 130. The County supports the bypass, as well as connections to it and to the town center via Kuser Road and Estates Boulevard.

ACTIVE COUNTY PROJECTS:

Active County projects are mostly associated with (re)development opportunities. DTS (desirable typical section) denotes the travelled way and roadside buffer characteristics for the segment, as detailed in Section VIII below.

Princeton Junction & Penn's Neck – West Windsor Twp.

To support more intense development in Princeton Junction around the Northeast Corridor train station, a number of pedestrian safety and access management improvements are planned for Princeton-Hightstown Road (CR 571). In conjunction with the Penn's Neck improvements on US Route 1 and the Vaughn Drive Connector, modifications will be made to the western approaches to the CR 571 Northeast Corridor overpass (DTS 2B). West of Route 1, a realignment of Harrison Street (CR 629) to pass over 'Route 1 in a Cut' will provide continued access to Route 1 from northern Princeton Borough (DTS 2A).

New Meadow Road – West Windsor Twp.

To provide better access to the new Meadow Road overpass from the east side of US Route 1, Meadow Road will be straightened (DTS 2A) and its intersection with Clarksville Road (CR 638) will be improved. A further extension of Meadow Road to Village Road would further improve east-west travel options (see below). The Clarksville Road bridge over the Northeast Corridor tracks is an 'orphan' from transfer of the Northeast Corridor from Conrail to Amtrak. This bridge is functionally obsolete and should be replaced with state or federal funds.

Denow Road Extension – Hopewell Twp.

No longer an active county project in accordance with the May 2016 Mercer County Master Plan amendment to dissolve the Transportation Development District, future improvements are not expected.

Mercer Crossings (CR 653, CR 583, CR 613, CR 622) – Ewing Township

In support of Ewing Township's Olden Avenue Redevelopment Plan and in an effort to bring more consistent planning to adjacent areas in Lawrence Township and the City of Trenton, Mercer County has been coordinating a multi-municipal redevelopment planning process. Main street/complete street and access control recommendations are being developed for Princeton Avenue (CR 583/US 206-S), Spruce Street (CR 613), and Olden Avenue (CR 622), almost entirely within the existing cartway. The most significant improvement would be an extension of Calhoun Street (CR 653, DTS 2B) through the vacant Boehm Porcelain facilities and perhaps through Capitol Plaza, thus enhancing mobility options and frontage for infill development.

Sylvia Street/Scotch Road Extension (CR 611) – Ewing Twp.

Vacant General Motors and Naval Air Warfare Station industrial sites in Ewing provide 100+ acres of infill development opportunity. Extending Scotch Road south of Parkway Avenue (CR 634, DTS 2A) would enhance mobility options and frontage for development.

West Trenton Bypass (CR 634) – Ewing Twp.

Redirecting Parkway Avenue (DTS 2B) closer to the Trenton-Mercer Airport, between parcels fronting West Upper Ferry Road and the 'Birdland' neighborhood, would improve interstate access to the GM and Navy redevelopment sites and reduce congestion at the constrained intersection of West Upper Ferry and Bear Tavern Roads. Developer traffic impact studies may indicate sufficiency of intersection improvements rather than a bypass.

Allentown Bypass (CR 539) – Robbinsville Twp.

Allentown Borough in Monmouth County directly abuts Robbinsville Township in Mercer County. Monmouth County and Allentown have developed a concept for a new road that would allow through traffic to bypass the historic borough. A very short segment of this road would be in Mercer County, making a connection to County Route 526 over property owned by the Township of Robbinsville (DTS 2A).

LONG-RANGE COUNTY PROJECTS:

While the County has no immediate plans for their implementation, the network connections listed below may be desirable to support future development opportunities. In most cases, current environmental regulations for stream and wetland encroachment create a very high hurdle for implementation. In some cases, stakeholder opposition deferred earlier implementation. The County will continue to work closely with state and local stakeholders to facilitate projects when they become feasible.

Canal Point Boulevard Extension – West Windsor Twp.

Extending Canal Point Boulevard across Duck Pond Run to Nassau Park Boulevard would nearly complete a collector road (DTS 2B) reliever on the western side of US Route 1 and provide right of way for a bus rapid transit guideway.

Bus Rapid Transit Right of Way through 'Cyanamid' & Carnegie Center – West Windsor Twp.

To provide reasonable access to development sites on the east side of US Route 1, a right of way corridor should also be preserved for bus rapid transit guideway or a collector road (DTS 2A) though the former Cyanamid agricultural experiment station (now owned by mall developer General Growth Properties), across Duck Pond Run, and through Carnegie Center to the Princeton Junction 'Dinky' right of way.

Bus Rapid Transit Right of Way I-95/295 to Quaker Bridge Mall – Lawrence Twp.

To provide access to a planned transportation center at or adjacent to Quaker Bridge Mall, right of way should be preserved to move express bus vehicles (BRT) between dedicated lanes on the interstate to the transportation center (DTS 2A).

Meadow Road Extension – West Windsor Twp.

A 95 foot right of way corridor exists between housing developments to the west of Village Road that could connect to the Clarksville Road bridge over the Northeast Corridor line without crossing Duck Pond Run. This would provide another connection to the US Route 1 corridor (DTS 2A), via Meadow Road, relieving congestion on Quakerbridge Road (CR 533) and Princeton-Hightstown Road (CR 571).

Fackler Road Extension (CR 569) – Lawrence Twp.

County Route 569 connects Hopewell Borough to the US Route 1 corridor via Carter Road, Fackler Road, with a jog on Princeton Pike and Province Line Road. DVRPC recommended aligning the intersection of Carter Road and Fackler Road at US 206 in Lawrence.

Parkway Avenue Extension (CR 634) – Ewing Twp.

Another east-west connection could be improved by extending Parkway Avenue in Ewing directly through to Southard Street in Trenton (DTS 2A), continuing on Perry, Lincoln, and Chambers to connect to US 206 east of the City. Through traffic currently has to jog south on Calhoun Street and Ingham Avenue. Vacant industrial buildings now stand in the right of way, which lies in Ewing Township's Olden Avenue Redevelopment Area.

Whitehead Road Extension (CR 616) – Lawrence Twp.

The segment of Whitehead Road Extension through Lawrence Township was opposed in the 1970s and deferred. Completing this segment (DTS 2B) would provide a continuous east-west connection (combined with the completion of Flock Road) from Robbinsville Town Center to the Trenton-Mercer Airport. Improving this travel-way would remove through traffic from neighborhood streets in Lawrence traveling between US 1 and US 206, and to points west via Spruce Street and Eggerts Crossing Road.

Flock Road Extension (CR 649) – Hamilton Twp.

Completing Flock Road across Miry Run (DTS 2A) would provide a direct connection from the Robbinsville Town Center to I-295 at Sloan Avenue and on to Hamilton Station on the Northeast Corridor line. Congestion would be relieved on Old Trenton Road (CR 525) at Hughes Drive and at Flock Road.

Paxson Avenue – Hamilton Twp.

Paxson Avenue has a missing link across Miry Run. Filling in this link (DTS 2A) would provide a direct connection between Whitehorse-Hamilton Square Road and Hughes Drive at the entrance to Mercer County Park, bypassing Hamilton Square and providing an alternate travel route avoiding several congested intersections.

Kuser Road Extension – Hamilton Twp.

With the completion of the Robbinsville Town Center Bypass on NJ 33, the extension of Kuser Road (DTS 2B) to the bypass and the planned southern section of the Town Center would provide an alternate route (off NJ 33) to the commercial development at the Town Center and on US 130.

Estates Blvd Extension – Hamilton Twp.

Completing the missing segment of Estates Boulevard (DTS 2A) and connecting it to Kuser Road near the Town Center bypass would provide benefits similar to Kuser Road Extension. Both Kuser and Estates would then provide alternative travel ways and relievers to NJ 33.

Province Line Road Bridge – Princeton Twp.

The replacement and restoration of traffic on the Province Line Road bridge over Stony Brook would re-open another east-west connection (DTS 2A) and provide an alternative to Carter Road in Lawrence and the Great Road in Princeton.

VIII. ACCESS MANAGEMENT

- Functional Classification & Access Levels
- Access Management Implementation

ACCESS MANAGEMENT

For every mile traveled, limited access freeways are the safest and highest capacity roadways in America. They are so because of access controls, that is, because of controls on the spacing, geometry, and operations of the points at which vehicles can access the roadway. In recent decades, a considerable body of research and engineering practice has evolved that implements access management controls on lower classes of roadway. Under the authority granted by the New Jersey State Highway Access Management Act (N.J.S.A. 27:7-89 *et seq.*), this mobility plan partially implements a set of standards for managing access to County primary and secondary arterials and major and minor collectors. Full implementation (e.g., driveway geometry) requires an update to the County's Land Development Standards, implemented by ordinance.

The safety and mobility benefits of access management result from reducing potential conflicts between vehicles. Each potential conflict increases the chances for a crash and increases 'friction' for through drivers, who must slow or stop to accommodate the other driver's movement. For example, a driver turning left may present conflicts for drivers behind, approaching, and on the cross street. Geometric changes can dramatically reduce the number of conflicts. For example, converting a standard intersection into a modern roundabout reduces the number of conflict points from 32 to twelve. Auxiliary lanes increase safety and maintain capacity by removing turning vehicles from through traffic. Table 2 shows the safety benefits of reducing the number of driveways.

Unsignalized Access Points per Mile	Average Spacing (ft)	Relative Crash Rate
10	1056	Reference
20	528	+ 40%
30	352	+ 80%
40	264	+ 110%
50	311	+ 140%
60	176	+ 200%
70	151	+ 250%

Table 4. Driveway Spacing & Crash Rates[1]

Functional Classification and Access Levels

For federal regulatory compliance and funding, every public highway is assigned one of the Federal Highway Administration's functional classifications (see Table 5 for a summary and *http://www.fhwa.dot.gov/planning/fcsec2_1.htm* for details). Because of the rural-urban distinction, the classification is clean only at the level of arterials, collectors, and locals. Even there, the classification of individual road segments may change across the urban-rural boundary, such as CR 571 and CR 579 changing from urban minor arterials into rural major collectors (see Appendix B, Map 1). From FHWA's perspective, this is appropriate because of the hierarchy of *access* associated with functional classification. Rural major collectors should have about the same access priority as urban minor arterials.

1. Transportation Research Board *Access Management Manual* (2003) p. 150.

Class	Rural	Urban
Arterials	Interstates	
	Principal	Freeways & Expys.
		Principal
	Minor	Minor
Collectors	Major	Collector
	Minor	
Locals	Road	Street

Table 5. FHWA Functional Classifications

While some jurisdictions tie their access levels to highway functional classification (Figure 14), there are problems with doing this in New Jersey, where a principal arterial like US 206 evolved from a pre-colonial footpath and crosses a 1792 stone arch bridge that remains structurally sufficient for heavy trucks. Consequently, when NJDOT adopted an access management code in 1992, it identified six 'access levels' that define permitted turning movements to and from the highway, and it designated 19 'desirable typical sections' (DTS) to define cross section elements, including medians, the number of travel lanes, shoulders, and required right of way. While there remains an association with functional classification, both access level and DTS assignments vary somewhat independently over the length of a highway, depending on the character of development the road is passing through. These assignments are detailed for every segment of every state highway in 'Appendix B' of the NJ State Highway Access Management Code (see *http://www.state.nj.us/transportation/business/accessmgt/NJHAMC/*). In some cases, including for US 206, some segments have an access level equivalent to 'local street' and a DTS to remain 'as existing', even if it is a principal arterial with one lane in each direction and no shoulders.

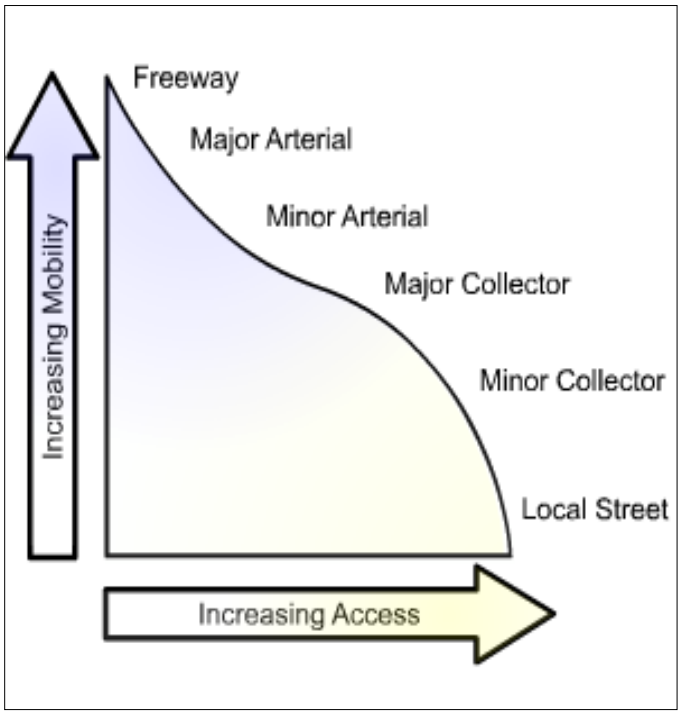


Figure 14. Functional Classification and Access Priority

In addition to roadway geometry, an effective access management system should identify desirable spacing standards for signalized and unsignalized access points, whether those are other highways or private driveways. On limited access interstates and freeways, abutting properties are permitted no direct access to the highway. On 'land access highways', the New Jersey State Highway Access Code (N.J.A.C. 16:47) permits driveways for 'conforming' parcels, that is, for parcels with longer frontage lengths at higher speed limits (single family residential driveways are deemed 'conforming' regardless of frontage). Access permits for 'non-conforming' parcels are conditional on a set of complex

equations.

A common complaint with the New Jersey Highway Access Code is that it is too complex. The Mercer County access management code is intended to be much simpler.[1] This is possible because the County does not expect any of its highways to 'grow up' to be freeways and because only a relatively small area of the county is still classed as 'rural' by the Census Bureau. Though simpler, this system satisfies the requirements of the State code [N.J.S.A. 27:16-1(i)] because its spacing standards are more rigorous.

Table 6 (p. 41) summarizes key characteristics for each of the access levels used by Mercer County. The first column lists a numerical code indicating the access level associated with a particular functional class designation (in column 3). The second column lists the *highest* NJDOT access level associated with roadways of this classification. (For reasons explained above, the lowest NJDOT access level in almost every functional class is effectively 'local street'.) Other columns contain characteristics associated with each of the County's access levels.

The driveway spacing standards adopted here are based on access management standards for local jurisdictions recommended by the Pennsylvania Department of Transportation, which were developed following a nationwide review of state and local practices (see 'codes and programs' at *http://www.accessmanagement.info/resources.html*). The last columns in Table 4 compare driveway spacing standards from the NJDOT Access Code (based on stopping sight distance at various speeds) to those in the PennDOT access management model local ordinance. As with the NJDOT code, Mercer County exempts individual and dual-shared driveways to single family residences from driveway spacing requirements, other than corner clearance. Mercer County will apply NJDOT standards for signalized intersection spacing. Paragraphs below illustrate Mercer County access levels.

Access Level #1—Major Arterial.

The primary function of roads with this access level is to serve major through traffic movements. These roads are typically high-volume and high-speed, with four travel lanes and a curbed median or two-way center left turn lane (TWTL), and are subject to the highest level of site access control. Typically, driveway access is right-in/right-out only, with acceleration and deceleration lanes for high volume driveways. Left turns are limited to protected left turn lanes or jug-handles, with queue storage adequate to remove exiting vehicles from through traffic. New or altered driveways should be spaced at least 600' apart, with signalized intersections separated by 1/2 mile.

Examples of roads with features similar to Access Level #1 in Mercer County include Quakerbridge Road (CR 533) between Lawrence Station Road and Province Line Road and Scotch

1. The County is authorized to implement its own code by the act of legislature that enabled the state code [N.J.S.A. 27:7-89 *et seq.*] This act also revised county powers over highways under their jurisdiction [N.J.S.A. 27:16-1(i)] and the Municipal Land Use Law, which requires that municipal subdivision and site plan ordinance provisions be in 'conformity with any access management code adopted by the county under R.S. 27:16-1 with respect to any county roads within the municipality' [N.J.S.A 40:55D-8b(11)].

Mercer Co. Acc . Level	NJDOT Acc. Level	Functional Class Corresp.	Speed	Lanes	DTS	Median	Turning	NJDOT Intersection	NJDOT Driveway	Mercer Driveway
1	3	Major Arterial	50-55 (55)	4	4F	Non-traversable	Right-in/right-out, left turn bay/jug-handle, right turn & acceleration lanes	2,430	330	600
2	4	Minor Arterial	35-50 (45)	2-4	4F, 2B	Non-traversable, striped	Right & left turn lanes, acceleration lanes	1,980	275	400
3	5	Major Collector	30-40 (40)	2	2B, 2A	None, striped	Left turn lanes, two-way left turn lane	1,760	185	200
4	6	Minor Collector	30-35 (35)	2	2A	None	Left turn lane as necessary for spacing and safety	1,540	150	100
5	6	Local Street	25-35 (25)	2	2A	None	Spacing and safety	1,100	105	*

Table 6. Mercer County Access Levels

Notes:

Mercer Co. Acc. Level: Mercer County Access Level code.

NJDOT Acc. Level: Most restrictive NJDOT Access Level code applicable to roads in this functional class.

Functional Class Corresp.: Indicates rough correspondence between Access Levels and FHWA Functional Classification of roadways.

Speed: Speed range for this class of road (target for progression speed for signalized access point spacing [*NJDOT Intersection*] & unsignalized access point spacing [*NJDOT Driveway*]).

Lanes: Typical number of through travel lanes.

DTS: Desirable Typical Section code (lane configuration and right of way required) for roadway 'buildout'.

Median: Typical median treatment.

Turning: Desirable turning controls.

NJDOT Intersection: **Illustrative**, optimal spacing (feet) for signalized intersections.

NJDOT Driveway: **Illustrative,** New Jersey DOT's speed-based spacing (feet) for lot frontage 'conformity' from Access Code, excluding single-family homes.

Mercer Driveway: Non-residential driveway spacing (feet), developed from Pennsylvania DOT's Model Municipal Ordinance Handbook. Spacing on local streets controlled by stopping sight distance and corner clearance.

Road (CR 611) between I-95 and Washington Crossing Road.

Figure 15. Quakerbridge Road (Access Level 1)

Access Level #2—Minor Arterial.

The primary function of roads with this access level is to serve major through traffic movements, but speeds and volumes are somewhat less than for Level #1 roads, and the level of access control is somewhat lower. There may be one or two through travel lanes in each direction. Auxiliary lanes will be required for left or right turns, with bay lengths adequate to remove expected queuing from through traffic. Where existing driveway spacing is close, the left turn lane may be in the form of a two-way left-turn lane. New or altered driveways should be spaced at least 400' apart, with signalized intersections about 2/5 mile apart.

Figure 16. Whitehorse-Mercerville Road (Access Level 2)

Examples of County roads with this proposed access level include Whitehorse-Mercerville Road (CR 533) near Klockner, and Olden Avenue (CR 622) between Parkway Avenue and Arctic Parkway.

Access Level #3—Major Collector.

These roads should balance the needs for mobility and access, with moderate volumes and speeds. The existing level of development on adjacent land is relatively low, and while development potential is relatively high, planning, zoning, and roadway DTS should all point to low-density development. The access controls on these two-lane roads will be left and right auxiliary turn lanes at intersections and high-volume commercial driveways. Signalized intersections should about 1/3 mile apart, but driveways may be as little as 200' apart.

Figure 17. Carter Road (Access Level 3)

Examples of County roads that may have this access level are Carter Road (CR 569) between US 206 and Elm Ridge Road, and most segments of CR 636 along its entire length (Parkside Avenue, Ewingville Road, Upper Ferry Road).

Figure 18. Potential Implementation of Mercer County DTS 2B, Access Level 3

Access Level #4—Minor Collector.

These roads also have a balance between mobility and access needs. The characteristics of these roads are similar to those for Level #3 roads, but in contrast to Level #3 roads, the existing level of development on adjacent land is relatively high, and development potential is relatively low. The proposed regulations for this level would govern access only with spacing standards and related safety design standards, including turn lanes at high volume intersections. Signalized intersections should still be at least 1500' apart, but driveways may be spaced 100' apart.

Figure 19. Bear Tavern Road (Access Level 4)

Examples of County roads proposed to have this level are Cranbury Road (CR 615) between CR 571 and the County line, and Bear Tavern Road (CR 579) through Hopewell Township.

Access Level #5—Local Street.

The primary function of these roads is to provide direct access to adjacent land uses. While still serving regional mobility, the history of these roads requires them to also serve as local streets with low speed limits. Signalized intersections should be no closer than 1000' apart. Driveway access controls for this level focus upon safety standards (e.g., stopping sight distance, corner clearance).

Figure 20. Hamilton Avenue (Access Level 5)

Examples of roads with this access level are urban streets, such as Hamilton Avenue (CR 606) and Chambers Street (CR 626) in Trenton.

Access Management Implementation

This plan implements right of way reservation standards based on five access levels and associated desirable typical sections (DTS). Table 6 above shows DTS associations with access levels. Maps 2-6 (in Appendix B) display DTS assignments for each segment of County highway, showing comparable DTS assignments for State highways. County access level and

NJDOT			Mercer		
Cartway	Travel Lane	12(11)*	Travel Lane	12(11)	12(11)
	Left Turn Lane	14(11)	Center Aux/ Median	14(11)	14(11)
	Shoulder	12(8)	Bike Lane	6(5)	15(12)
			Parking	9(7)	
			Shoulder (no prkg.)	12(8)	12(8)
Border	Border	15(10)	Streetside Buffer	7(5)	15(10)
			Sidewalk	7(4)	
			Property Side Buffer	1(1)	

* Preferred element width (minimum width) in feet.

Table 7. Roadway Cross Section Elements

DTS assignments are displayed in tabular form in Appendix A. State data are from the State Highway Access Management Code's Appendix B (*http://www.state.nj.us/transportation/business/accessmgt/NJHAMC/*).

Mercer County Desirable Typical Sections (DTS) were developed with reference to NJDOT DTSs. However, because the County does not maintain roads of a similar scale, the County has only five DTSs, compared to nineteen for the state. State DTSs were developed before highway agencies commonly considered the needs of cyclists. Mercer County bicycle lane and shoulder requirements were taken from more recent standards promulgated by the Federal Highway Administration (FHWA), the American Association of State Highway and Transportation Officials (AASHTO), and the New Jersey Department of Transportation (NJDOT) and add six feet to the cartway width. Table 5 shows the preferred and minimum cross-section elements used to calculate right of way requirements. Table 6 applies those cross section element specifications to DTS categories used by the County, which are comparable to the State's. In locations where a municipality desires on-street parking, an additional six feet of right of way is required to accommodate both parking and cyclists on shoulders. At intersections and high volume access points, the County Engineer may require additional right of way for auxiliary lanes. Finally, like the State, Mercer County includes a DTS that maintains the road in its current configuration (1A), applied where road widening would destroy the existing urban land use fabric. In such settings, the County will require right of way consistent with existing nearby parcels (also considering future operational and intersection improvements), and will work with municipalities on accommodating cyclists with strategies such as limiting parking to one side of the street.

DTS Code	Description	Lanes	LTL/ Median	Shoulders	Borders	ROW
	Pref. Width ft)	12	14	12	15	
2A	2 lanes	2	0	2	2	78
2B	2 lanes + TWTL*	2	1	2	2	92
4F	4 lanes + TWTL	4	1	2	2	116
1A	As Existing**					As Existing

* Curbed median with left turn storage and U-turn provision preferred over two-way turn lane (TWTL).

** DTS 1A retains current geometry and ROW where limited by urban character. Cyclists can be accommodated by limiting parking to one side only.

Table 8. Mercer County
Desirable Typical Sections (DTS)

Desirable typical sections for County highways are intended to be the 'buildout' for those highways, with associated capacity limits. They were assigned considering existing local context, municipal land use zoning, open space and farmland preservation efforts, and development opportunities. With the adoption of this plan, these desirable typical sections, as applied to particular county road segments, will define right of way dedications required for approval of subdivision and site plans.

Access management provisions of this plan are prospective, not retroactive. That is, existing driveways and intersections are grandfathered with temporary access permits, which are revocable upon changes in land use that generate significant new traffic or upon owner-initiated changes in driveway design. Where size or configuration of a site or subdivision under review precludes compliance with driveway spacing standards identified in Table 6, the developer may be required to install access and site circulation facilities that anticipate shared- or cross-access by neighboring properties when they develop. In this case, the right to future cross or shared access will be recorded with the deed and a temporary permit will be granted that expires with development of the neighboring site(s). Triggers for County review of subdivision and site plans, including traffic impact studies, are as identified in Mercer County's Land Development Standards in effect at the time of application.

Where existing access conditions create hazards or interrupt the free flow of traffic, the County may work with municipalities and property owners to develop and implement local access management plans. Such plans may require shared- or cross-accesses and driveway consolidation, as well as changes to traffic operations on the County highway.

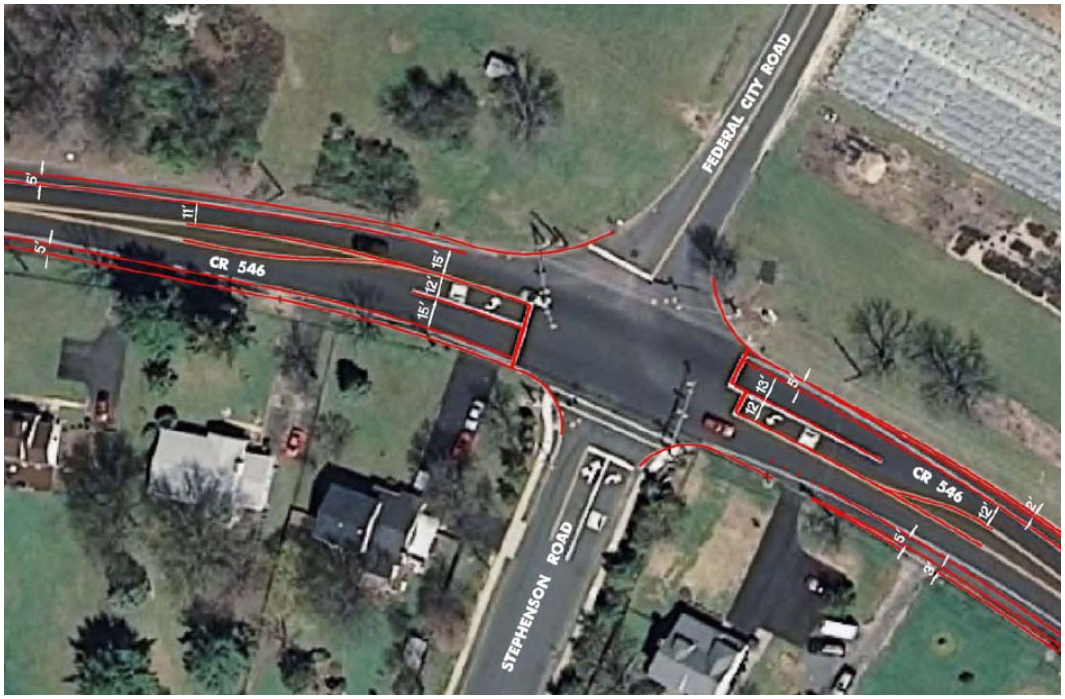


Figure 21. Concept for Bike Lanes on CR 546 at Federal City Rd.

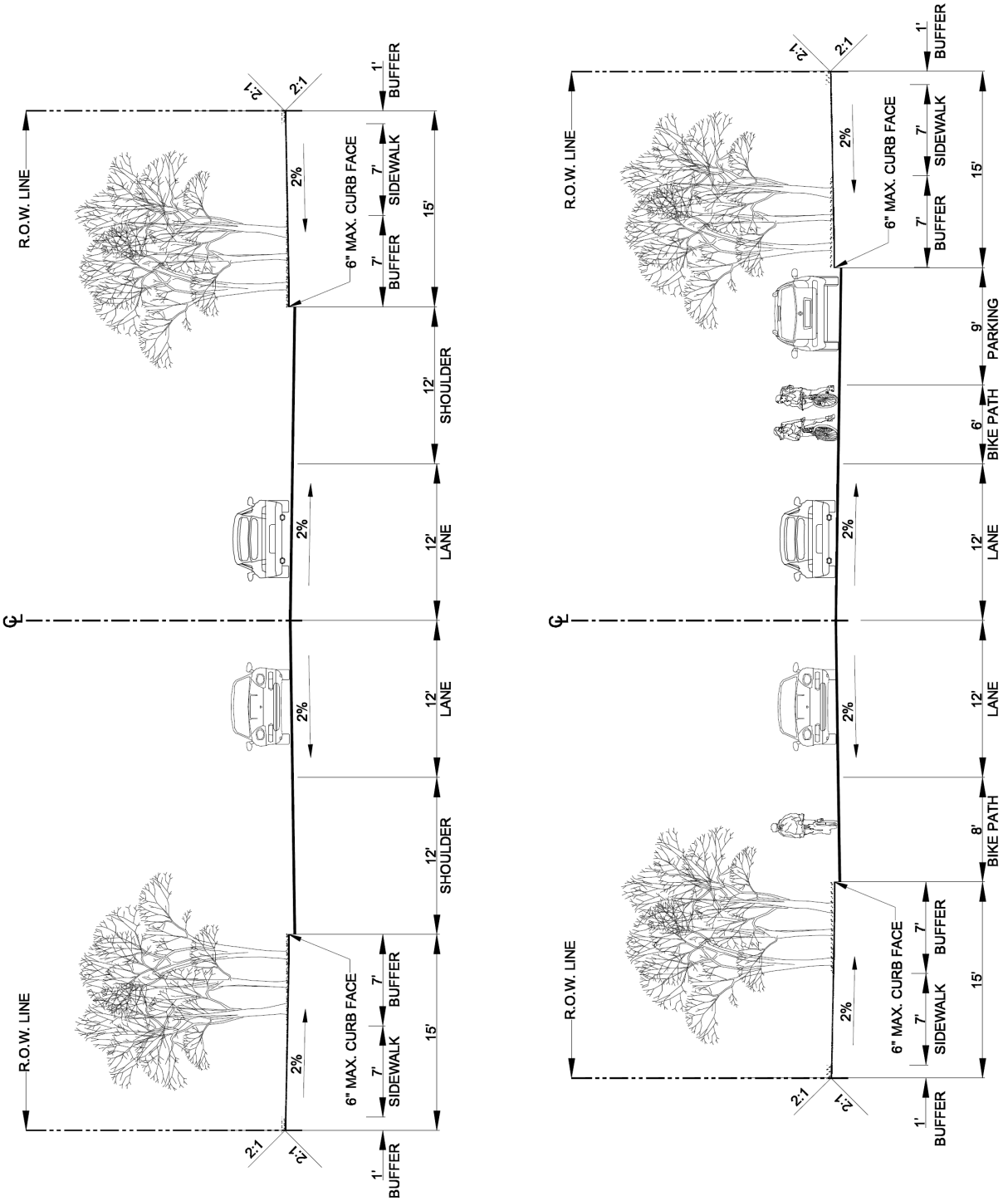


Figure 22. Alternative Implementations of Mercer County DTS 2A

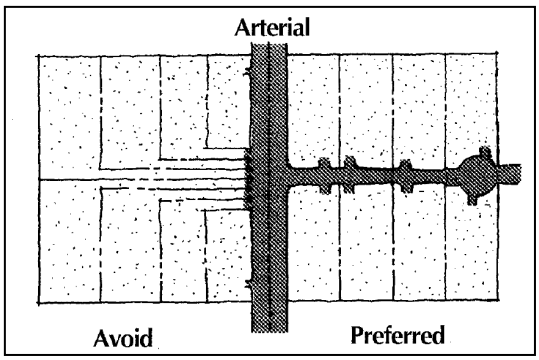
Appendix A: Access Class and Desirable typical section assignments

Town	CR	Name	From	To	SRI	MP_Start	MP_End	Miles	Access	DTS
E Windsor	524	Old York Rd	County Line	I-195/New Canton	00000524__	7.68	8	0.32	3	2A
E Windsor	539	N Main St	Boro Line	County Line	00000539__	52.619	53.162	0.543	4	2A
E Windsor	539	Old York Rd	Boro Line	I-195/New Canton	00000539__	44.905	51.084	6.179	3	2A
E Windsor	571	Princeton-Hightstown Rd	Rt 130	NJ 133	00000571__	35.368	36.47	1.102	2	4F
E Windsor	630	Windsor - Perrineville Rd	Old York Rd/Rt 539	County Line	11000630__	0	1.1	1.1	4	2A
E Windsor / Hights	571	Stockton St	N Main St Hightstown	Rt 130	00000571__	34.52	35.365	0.845	5	1A
E Windsor / Hights	571	Etra Rd	County Line	S Main St Hightstown	00000571__	31.307	34.09	2.783	4	2A
Ewing / Lawrence	613	Spruce St	Princeton Ave	1860' N of Shabakunk Cr	11000613__	0	0.555	0.555	4	2B
Ewing / Trenton	634	Parkway Ave	Parkside Ave	Ingham	11000634__	4.1	4.93	0.83	3	2A
Ewing Twp	579	Bear Tavern Rd	Upper Ferry Rd	I-95	00000579__	2.21	3.109	0.899	3	4F
Ewing Twp	579	Bear Tavern Rd	I-95	Bus Turnaround	00000579__	3.109	3.89	0.781	3	2B
Ewing Twp	579	Bear Tavern Rd	Bus Turnaround	Township Line	00000579__	3.89	4.303	0.413	3	2A
Ewing Twp	579	Grand Ave	Sullivan Way	W Upper Ferry Rd	00000579__	1.529	2.21	0.681	4	2A
Ewing Twp	579	Sullivan Way	Lower Ferry Rd	Grand Ave	00000579__	0.942	1.529	0.587	3	2A
Ewing Twp	600	Sam Weinroth Dr	Scotch Rd	CR 579/Bear Tavern Rd	11000600__	0	1.69	1.69	5	2A
Ewing Twp	600	Sam Weinroth Dr	CR 579 Bear Tavern	CR 611 Scotch	11021387__	0	1.1	1.1	5	2A
Ewing Twp	611	Scotch Rd	Parkway Ave	Ewing Cemetery	11000611__	0	0.27	0.27	3	2B
Ewing Twp	611	Scotch Rd	Ewing Cemetery	Reading RR Br	11000611__	0.27	0.966	0.696	3	2A
Ewing Twp	611	Scotch Rd	Reading RR Br	I-95	11000611__	0.966	1.9	0.934	2	2A
Ewing Twp	613	Spruce St Ext	1860' N of Shabakunk Cr	Stoneham Rd	11000613__	0.555	1.223	0.668	5	2A
Ewing Twp	613	Spruce St Ext	Stoneham Rd	Ewingville Rd	11000613__	1.223	1.28	0.057	5	2A
Ewing Twp	622	N Olden Ave Ext	CR 634	CR 583	11000622__	4.125	6.33	2.205	2	4F
Ewing Twp	627	Prospect St	Parkway Ave	Olden Ave	11000627__	0	0.678	0.678	5	2B
Ewing Twp	627	Prospect St	Olden Ave	Spruce St.	11000627__	0.678	1.25	0.572	5	2A
Ewing Twp	634	Parkway Ave	Decou Ave	Olden Ave	11000634__	1.46	3.25	1.79	3	4F
Ewing Twp	634	Parkway Ave	Olden Ave	Parkside Ave/Rt 636	11000634__	3.25	4.1	0.85	3	2B
Ewing Twp	634	W Upper Ferry Rd	Rt 29	CR 579/Bear Tavern Rd	11000634__	0	1.173	1.173	4	2A
Ewing Twp	634	W Upper Ferry Rd	CR 579/Bear Tavern Rd.	Decou Ave	11000634__	1.173	1.46	0.287	3	4F
Ewing Twp	636	Ewingville Rd	500' NE of Buttonwood	Scotch Rd/Rt 611	11000636__	2.16	5.71	3.55	3	2B
Ewing Twp	636	Parkside Ave	Parkway Ave.	Olden Ave	11000636__	0.921	1.57	0.649	4	2B
Ewing Twp	636	Parkside Ave Ext	Olden Ave	500' NE of Buttonwood	11000636__	1.57	2.16	0.59	4	2B
Ewing Twp	637	Jacobs Creek Rd	Rt 29	Bear Tavern Rd/Rt 579	11000637__	0	1.05	1.05	4	2A
Ewing Twp	639	Arctic Pkwy	N Olden Ave	Spruce St	11000639__	0	0.33	0.33	5	2A
Ewing Twp	643	Lower Ferry Rd	Ewingville Rd	Hopewell Twp line	11000643__	3.02	4.13	1.11	4	2B
Ewing Twp	643	Lower Ferry Rd	NJ 29	Ewingville Rd	11000643__	0	3.02	3.02	4	2A
Ewing Twp	648	Whitehead Rd Ext	CR 636	Ewing Business Park	11000648__	0	0.62	0.62	5	2B
Hamilton / Lawr	616	Whitehead Rd	620' N PA RR Br	Assunpink Cr	11000616__	0.262	0.867	0.605	5	2A
Hamilton Twp	524	S Broad St	Us 206	I-195	00000524__	0	1.637	1.637	3	2B
Hamilton Twp	524	S Broad St	I-195	Yardville 5 Pts	00000524__	1.637	1.912	0.275	3	2B
Hamilton Twp	524	Yardville-Allentown Rd	Yardville 5 Pts	Rt 130	00000524__	1.912	2.182	0.27	3	2B
Hamilton Twp	524	Yardville-Allentown Rd	Rt 130	County Line	00000524__	2.182	5.324	3.142	3	2B
Hamilton Twp	533	Mercerville-White Horse Rd	S Olden Ave	Nottingham Way	00000533__	1.418	3.495	2.077	2	4F

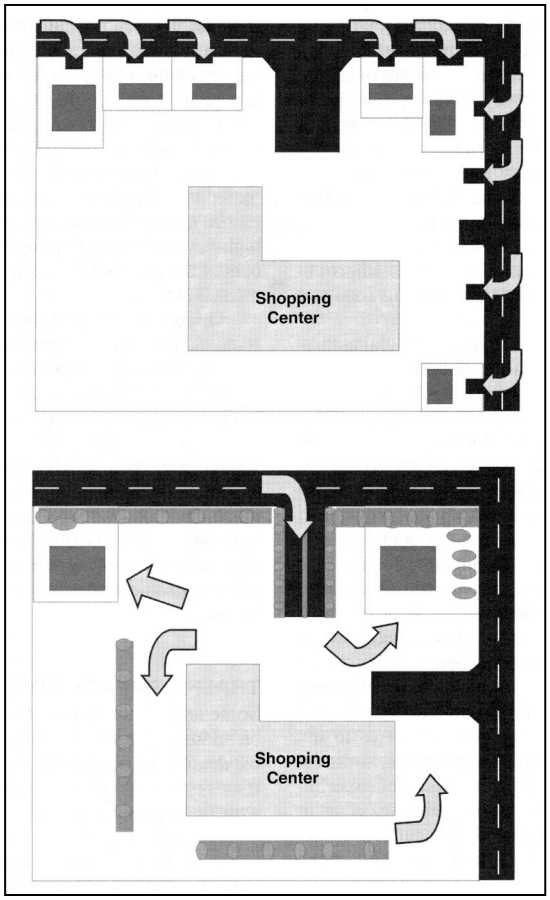
Town	CR	Name	From	To	SRI	MP_Start	MP_End	Miles	Access	DTS
Hamilton Twp	533	Mercerville-White Horse Rd	Nottingham Way	Sloan Ave.	00000533__	3.495	4.397	0.902	2	4F
Hamilton Twp	533	Quakerbridge Rd	Sloan Ave.	Lawrence Station Rd	00000533__	4.397	6.825	2.428	2	4F
Hamilton Twp	533	White Horse Ave.	S Broad St	S Olden Ave	00000533__	0	1.418	1.418	3	2B
Hamilton Twp	535	E State St	Logan Ave/City Line	Whitehead Rd	00000535__	0	0.599	0.599	5	1A
Hamilton Twp	535	E State St Ext	Whitehead Rd	Klockner Rd	00000535__	0.599	1.901	1.302	4	1A
Hamilton Twp	535	Mercerville-Edinburg Rd	Rt 533	Dube Rd	00000535__	3.42	4.36	0.94	3	2B
Hamilton Twp	535	Mercerville-Edinburg Rd	Dube Rd	Flock Rd	00000535__	4.36	4.75	0.39	3	2B
Hamilton Twp	535	Mercerville-Edinburg Rd	Flock Rd	Hughes	00000535__	4.75	5.11	0.36	3	4F
Hamilton Twp	535	Mercerville-Edinburg Rd	Hughes	Township Line	00000535__	5.11	5.519	0.409	3	4F
Hamilton Twp	535	Nottingham Way	E State St Ext	Mercerville 5 pts	00000535__	3.29	3.44	0.15	3	4F
Hamilton Twp	606	Hamilton Ave	Johnston Ave	Rt 33	11000606__	2.01	3.57	1.56	3	2B
Hamilton Twp	609	Church St	Yardville 5 Pts	Rt 130	11000609__	0	0.25	0.25	5	2A
Hamilton Twp	609	Church St	Rt 130	Main St Groveville	11000609__	0.25	0.68	0.43	5	2A
Hamilton Twp	614	Nottingham Way	Assunpink Creek	Rt 33	11000614__	0	0.97	0.97	4	1A
Hamilton Twp	616	Whitehead Rd	E State St Ext/Rt 635	620' N PA RR Br	11000616__	0	0.262	0.262	5	2A
Hamilton Twp	618	Nottingham Way	Rt 535 & Rt 533	Rt 33 At Twp Line	11000618__	0	2.81	2.81	5	2A
Hamilton Twp	619	Kuser Rd	225' SE Rudner Ave	Rt 533	11000619__	0	1.41	1.41	4	2B
Hamilton Twp	619	Kuser Rd	CR 606	225' SE Rudner Ave	11000619__	1.41	1.75	0.34	4	2B
Hamilton Twp	620	Arena Dr	I-295	S Broad St	11000620__	0	1.05	1.05	3	2B
Hamilton Twp	620	Arena Dr	Olden Ave	I-295	11000620__	1.05	2.13	1.08	3	2B
Hamilton Twp	649	Flock Rd	CR 533 QB Road	CR 535 Old Trenton Rd	11031986__	0	0.945	0.945	3	2B
Hamilton Twp	649	Sloan Ave.	American Metro	I-295	11000649__	0.875	1.64	0.765	2	4F
Hamilton Twp	649	Sloan Ave.	I-295	CR 533	11031986__	0.945	1.59	0.645	3	4F
Hamilton Twp	649	Sweet Briar Ave	Whitehead Rd	American Metro	11000649__	0	0.875	0.875	3	2A
Hamilton Twp	652	Nottingham Way	East State St ext	new Rt 33	11000652__	0	0.13	0.13	3	2B
Hamilton Twp	672	S Broad St	Groveville-Allentown Rd	County Line	11000672__	0	1.486	1.486	3	2A
Hamilton Twp	672	S Broad St	Rt 524	Groveville-Allentown Rd	11000672__	1.486	2.17	0.684	3	2A
Hightstown / E Wind	633	Monmouth St	Broad St Hightstown	Rt 33	11000633__	0	1	1	5	2A
Hightstown Boro	539	N Main St	Franklin St/Rt 33	Boro Line	00000539__	51.874	52.619	0.745	5	1A
Hightstown Boro	539	Old York Rd	Etra Rd/Rt 571	Boro Line	00000539__	51.084	51.518	0.434	5	1A
Hightstown Boro	539	S Main St	Mercer St Hightstown	Etra Rd/Rt 571	00000539__	51.518	51.874	0.356	5	1A
Hightstown Boro	571	S Main St	Etra Rd	Stockton St.	00000571__	34.09	34.52	0.43	5	1A
Hopewell Borough	518	Louellen Ave / Broad St	W Boro Line	E Boro Line	00000518__	9.504	10.813	1.309	5	1A
Hopewell Borough	654	West Broad St	borough line	CR 518	11000654__	2.521	3.05	0.529	5	1A
Hopewell T / Ewing	647	Nursery Rd	CR 579	CR 611	11000647__	0	1.78	1.78	4	2A
Hopewell T / Lawr	546	Penn-Law Rd	Blackwell Rd	Rt 206	00000546__	6.366	8.129	1.763	3	2B
Hopewell T / Lawr	640	Main St	Pennington Circle	Welling Ave	11000640__	0	0.83	0.83	5	2A
Hopewell Twp	518	Hopewell-Rocky Hill Rd	E Boro Line	County Line	00000518__	10.813	11.906	1.093	3	2B
Hopewell Twp	518	Lambertv-Hopewell Tp	Harbourton-Mt Airy Rd	Borough Line	00000518__	4.508	9.504	4.996	3	2A
Hopewell Twp	546	Wash Cross-Penn Rd	Rt 29	Penn-Law Rd	00000546__	0	6.366	6.366	3	2B
Hopewell Twp	569	Carter Rd	Elm Ridge Rd/Rt 625	2836' N R Hill/Cherry V	00000569__	4.801	6.628	1.827	3	2A
Hopewell Twp	569	Hopewell-Princeton Rd	2836' N R Hill/Cherry V	4314' N R Hill/Cherry V	00000569__	6.628	6.697	0.069	3	2A

Town	CR	Name	From	To	SRI	MP_Start	MP_End	Miles	Access	DTS
Hopewell Twp	569	Hopewell-Princeton Rd	4314' N R Hill/Cherry V	Boro Line	00000569__	6.697	8.232	1.535	3	2A
Hopewell Twp	579	Bear Tavern Rd	Township Line	497' NE Mt Airy Rd	00000579__	4.304	8.911	4.607	3	2A
Hopewell Twp	611	Scotch Rd	I-95	Rt 546	11000611__	1.9	3.55	1.65	2	4F
Hopewell Twp	612	Marsh. Corner-Woodv. Rd	Rt 654	County Line	11000612__	0	2.45	2.45	4	2A
Hopewell Twp	623	Pennington-Harbourton Rd	Rt 579	Borough Line	11000623__	0	2.77	2.77	4	2A
Hopewell Twp	624	Pennington-Rocky Hill Rd	Boro Line	Centerville-Titus Mill	11000624__	0.663	1.98	1.317	3	2A
Hopewell Twp	624	Pennington-Rocky Hill Rd	Titus Mill Rd & CR 624	Arvida Dr	11061002__	0	0.141	0.141	3	2A
Hopewell Twp	625	Elm Ridge Rd	Rt 624	Carter Rd/Rt 569	11000625__	0	2.21	2.21	4	2A
Hopewell Twp	631	Ingleside Ave	Rt 546	Borough Line	11000631__	0	0.559	0.559	5	2A
Hopewell Twp	632	Blackwell Rd	Penn_Law Rd	1000' Northeasterly	11000632__	0.62	0.87	0.25	4	2A
Hopewell Twp	632	Pennington-Lawrenceville Rd	Cr 640	Blackwell Rd	11000632__	0	0.62	0.62	4	2A
Hopewell Twp	654	Pennington-Hopewell Rd	Rt 31	borough line	11000654__	0	2.521	2.521	3	2A
Lawrence Twp	533	Quakerbridge Rd	Lawrence Station Rd	D&R Canal	00000533__	6.8	8.622	1.822	1	4F
Lawrence Twp	546	Franklin Corner Rd	Rt 206	Rt 1	00000546__	8.148	9.98	1.832	3	2B
Lawrence Twp	569	Carter Rd	Rt 206	Rosedale Rd/Rt 604	00000569__	2.1	4.123	2.023	3	2A
Lawrence Twp	569	Carter Rd	Rosedale Rd/Rt604	Elm Ridge Rd/Rt 625	00000569__	4.123	4.801	0.678	3	2A
Lawrence Twp	608	Lawrence Station Rd	Quaker Bridge Rd	near Fire Center	11000608__	0	0.77	0.77	4	2A
Lawrence Twp	616	Whitehead Rd Ext	Assunpink Cr	Alt Rt 1	11000616__	0.867	1.35	0.483	4	2B
Lawrence Twp	638	Grovers Mill Rd ext	US 1	Quaker Bridge Rd	11071417__	0	0.81	0.81	2	4F
Lawrence Twp	645	Brunswick Circle Ext	Brunswick Circle	CR 583	11000645__	0	0.21	0.21	4	2B
Pennington Boro	623	W Franklin Ave	W Borough Line	Rt 31	11000623__	2.77	2.87	0.1	4	2A
Pennington Boro	624	Delaware Ave	Main St	Town line	11081029__	0	0.64	0.64	5	1A
Pennington Boro	624	Delaware Ave.	Main St.	Boro line	11000624__	0	0.663	0.663	5	1A
Pennington Boro	631	Ingleside Ave	Borough Line	Rt 640	11000631__	0.559	0.77	0.211	5	1A
Pennington Boro	640	Main St	Welling Ave	1000' S Of N Boro Line	11000640__	0.83	2.035	1.205	5	1A
Pennington Boro	640	Main St	1000' S of N boro line	NJ 31	11000640__	2.035	2.23	0.195	5	2A
Princeton Boro	604	Elm Rd	Rosedale Rd	Stockton St/Rt 206	11000604__	2.501	2.95	0.449	5	2A
Princeton Twp	571	Washington Rd	Us 1	Boro Line	00000571__	42.383	43.671	1.288	2	2A
Princeton Twp	605	River Rd	Rt 27	Somerset Co Line	11000605__	0	0.76	0.76	4	2A
Princeton Twp	629	Harrison St	Borough Line	N End Carnegie Lake Br	11000629__	0	0.539	0.539	5	2A
Princeton Twp	629	Harrison St	N End Carnegie Lake Br	D&R Canal	11000629__	0.539	0.636	0.097	4	2A
Princetons / Lawr	604	Rosedale Rd	Carter Rd	Elm Rd Princeton	11000604__	0	2.501	2.501	3	2A
Robbinsv / W Wind	526	Robbinsville-Edinburg Rd	Mercer St	CR 535	00000526__	3.639	6.22	2.581	3	2A
Robbinsv / W Wind	641	Windsor Rd	CR 535	Main St	11000641__	0	2.2	2.2	4	2A
Robbinsville Twp	526	Robbinsville-Allentown Rd	Us 130	Rt 33	00000526__	6.58	6.876	0.296	3	2A
Robbinsville Twp	526	Robbinsville-Allentown Rd	County Line	Us 130	00000526__	6.876	10.124	3.248	3	2A
Robbinsville Twp	526	Robbinsville-Allentown Rd	CR 526 Realignment	Us 130	11121762__	0	0.26	0.26	3	2A
Robbinsville Twp	526	Robbinsville-Edinburg Rd	Rt 33	Mercer St	00000526__	6.22	6.58	0.36	3	2B
Robbinsville Twp	641	Church St	Main St	Rt 130/33	11121039__	0	0.181	0.181	5	2A
Trenton / Ewing	653	Calhoun St	W State St	Princeton Ave.	11000653__	0	1.53	1.53	4	1A
Trenton / Hamilton	606	Hamilton Ave	S Broad St	Johnston Ave	11000606__	0	2.01	2.01	3	1A
Trenton / Hamilton	622	Olden Ave	N Clinton Ave	Arena Dr	11000622__	0	2.921	2.921	4	1A

Town	CR	Name	From	To	SRI	MP_Start	MP_End	Miles	Access	DTS
Trenton / Hamilton	626	Chambers St	RR Bridge Near E State	Broad St	11000626__	0	2.07	2.07	5	1A
Trenton / Hamilton	650	Lalor St	Rt 29	S Broad St	11000650__	0	1.2	1.2	5	1A
Trenton / Lawrence	583	Princeton Ave	Calhoun St	Rt 206	00000206Z_	44.291	45.36	1.069	4	2B
Trenton City	579	Sullivan Way	Rt 29	Lower Ferry Rd	00000579__	0	0.942	0.942	3	2A
Trenton City	622	Olden Ave	CR 583	N Clinton Ave	11000622__	2.921	4.125	1.204	4	1A
Trenton City	635	E State St	Wall St	City Line	11000635__	0.191	1.13	0.939	5	1A
Trenton City	636	Parkside Ave	State St	Parkway Ave.	11000636__	0	0.921	0.921	4	2A
Trenton City	n/a	Cass St	S Broad St	Rt 29	11111527__	0	0.58	0.58	5	1A
Trenton City		Raoul Wallenberg	S Clinton Ave	E State St/Rt 635				0	5	2A
W Windsor / E Wind	535	Old Trenton Rd	Robbinsville-Edinburgh	N of Millstone Br.	00000535__	7.62	10.2	2.58	3	2B
W Windsor / E Wind	535	Old Trenton Rd	N of Millstone Br.	County Line	00000535__	10.2	11.823	1.623	3	4F
W Windsor / E Wind	571	Princeton-Hightstown Rd	NJ 133	S Mill Rd	00000571__	36.47	39.797	3.327	2	4F
W Windsor Twp	526	Edinburg Rd	Village Rd W	CR 535	00000526__	1.9	3.42	1.52	3	2A
W Windsor Twp	526	Old Trenton Rd	CR 535	CR 535 W of Edinburg	00000526__	3.42	3.64	0.22	3	2B
W Windsor Twp	526	S Mill Rd	Woodmere Way	Rt 571	00000526__	0	0.864	0.864	3	2A
W Windsor Twp	535	Old Trenton Rd	Township Line	Robbinsville-Edinburgh	00000535__	5.519	7.39	1.871	3	2B
W Windsor Twp	571	Princeton-Hightstown Rd	S Mill Rd	CR 638	00000571__	39.797	40.314	0.517	2	2B
W Windsor Twp	571	Princeton-Hightstown Rd	CR 638	S Approach Pr Jct Br	00000571__	40.314	40.97	0.656	3	2B
W Windsor Twp	571	Washington Rd	N Approach Pr Jct Br	Rt 1	00000571__	41.33	42.383	1.053	3	2B
W Windsor Twp	602	S Post Rd	Old Trenton Rd/Rt 535	Lake Mercer	11000602__	0	0.64	0.64	5	1A
W Windsor Twp	615	Cranbury Rd	Rt 571	County Line	11000615__	0	1.85	1.85	4	2A
W Windsor Twp	629	Harrison St	D&R Canal	Rt 1	11000629__	0.636	1.13	0.494	4	2A
W Windsor Twp	638	Clarksville Rd	NEC Bridge	N Post Rd	11000638__	2.334	3.5	1.166	3	2B
W Windsor Twp	638	Clarksville Rd	N Post Rd	Cranbury Rd/Rt 615	11000638__	3.5	5.03	1.53	4	2A
W Windsor Twp	638	Grovers Mill/Clarksville Rd	US 1	NEC Bridge	11000638__	0	2.334	2.334	2	4F
W Windsor Twp	644	Village Rd East	CR 526	New Village Rd	11000644__	0	0.81	0.81	4	2A



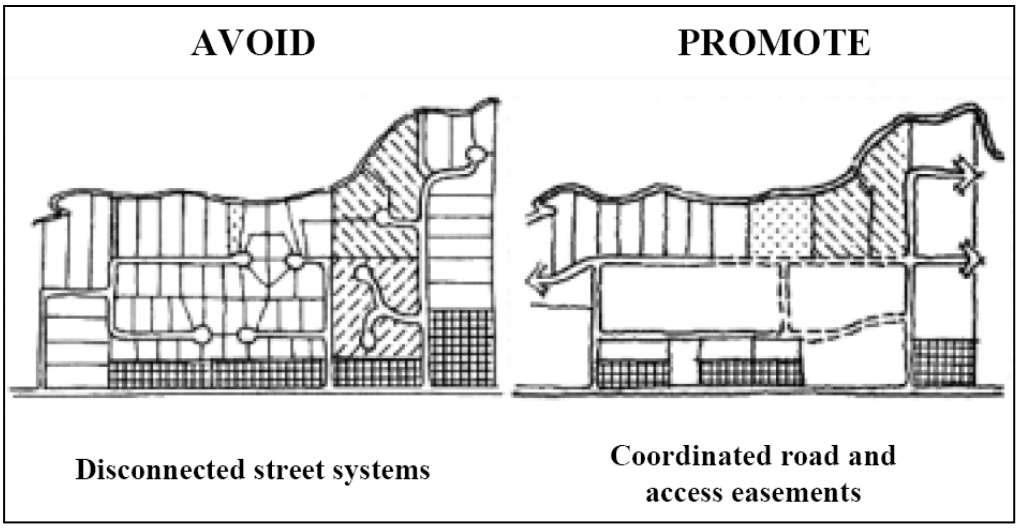
23a. *Flag Lots* should be avoided because they create many adjacent openings.



23b. *Out-Parcels* in commercial developments should be accessed via internal circulation.

Figure 23. Access Management Concepts
Source: TRB Access Management Manual, 2003

23c. *Connected network* of local streets allows local trips off of arterial roads. Break 'super-blocks,' connect cul-de-sacs.



APPENDIX B: MAPS

- 1. Jurisdiction and FHWA Functional Classes
- 2. Planned Projects - County Extent
- 3-6. Planned Projects - Quadrant Maps

MERCER COUNTY MASTER PLAN

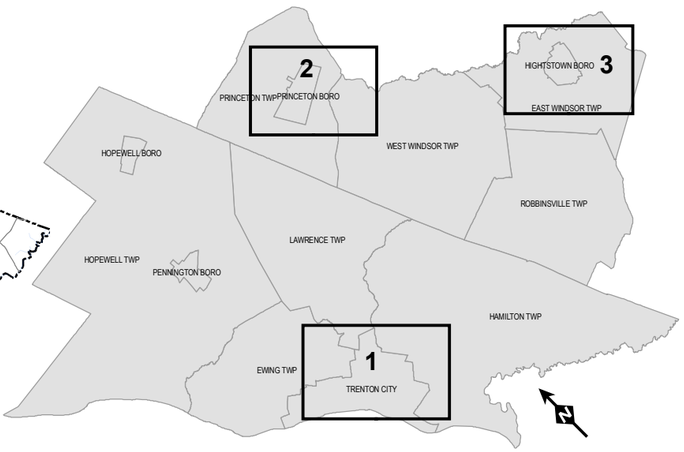
Interstate/Expy
- Interstate/Expy

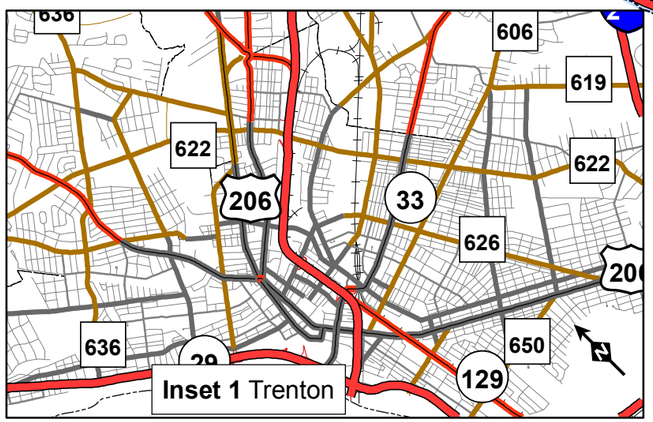
Principal Arterial
- N.J.D.O.T.
- County
- Municipal

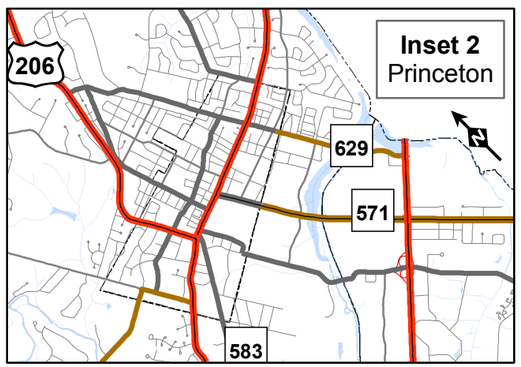
Minor Arterial
- N.J.D.O.T.
- County
- Municipal
- Census Urbanized (2000)

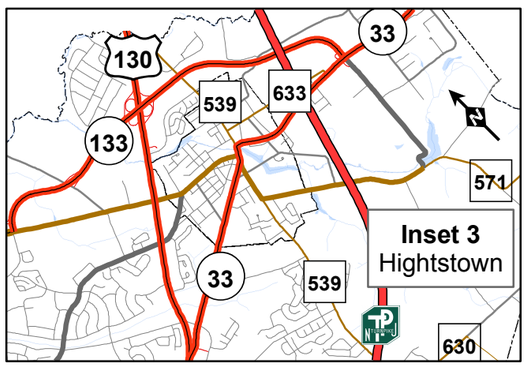
Collector
- N.J.D.O.T.
- County
- Municipal

Local Roads & Ramps
- N.J.D.O.T.
- NJ Turnpike
- County
- Municipal
- Railroads









Road Mileage by Functional Class and Jurisdiction

	State	County	Municipal	Total	%
Interstate/Expy	117.2			**117.2**	6.5
Principal Arterial	210.3	9.4	10.8	**230.5**	12.7
Minor Arterial	1.2	117.2	78.0	**196.3**	10.8
Collector	1.3	57.4	108.8	**167.5**	9.2
Local/Ramp	46.1	12.3	1,045.3	**1,103.7**	60.8
Total	**376.0**	**196.3**	**1,243.0**	**1,815.3**	100.0
%	20.7	10.8	68.5	100.0	

Data: NJDOT GIS Centerlines 2007

Map 1. Highway Jurisdiction & FHWA Functional Classes

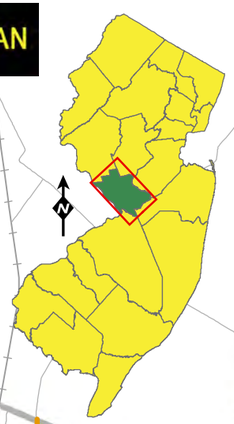
MERCER COUNTY MASTER PLAN

Desirable Typical Sections
w/ Comparable NJDOT & Munic.

- 1A As Existing
- 2A 2 Lanes
- 2B 2 Lanes w/TWTL
- 4E 4 Lanes (NJDOT only)
- 4F 4 Lanes w/Med or TWTL
- 6A 5+ Lanes w/Med (NJDOT only)
- New Right of Way
- Preserved Farms
- Preserved Open Space

NJDOT

Munic.



Boro of Princeton

Township of Princeton

Boro of Hightstown

East Windsor Township

Township of West Windsor

Robbinsville Township

Boro of Hopewell

Township of Hopewell

Lawrence Township

Boro of Pennington

Township of Ewing

City of Trenton

Township of Hamilton

0 0.5 1 2 3 4 5 Miles

Printed: 1/3/2011

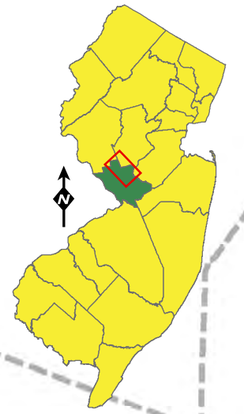
Existing Roads: NJDOT, 2010
Streams: NJDEP, 2008
Open Space: Mercer Planning, 2009
GIS Adaptations: Mercer Planning, 2010

Map 2: Planned Projects & ROW Requirements

MOBILITY PLAN (HIGHWAYS)
MERCER COUNTY, NJ
Adopted September 8, 2010

MERCER COUNTY MASTER PLAN

MOBILITY PLAN (HIGHWAYS)
MERCER COUNTY, NJ
Adopted September 8, 2010



Desirable Typical Sections
w/ Comparable NJDOT & Munic.

- 1A As Existing
- 2A 2 Lanes
- 2B 2 Lanes w/TWTL
- 4E 4 Lanes (NJDOT only)
- 4F 4 Lanes w/Med or TWTL
- 6A 5+ Lanes w/Med (NJDOT only)
- New Right of Way
- Preserved Farms
- Preserved Open Space

NJDOT
Munic.

Existing Roads: NJDOT, 2010
Streams: NJDEP, 2008
Open Space: Mercer Planning, 2009
GIS Adaptations: Mercer Planning, 2010

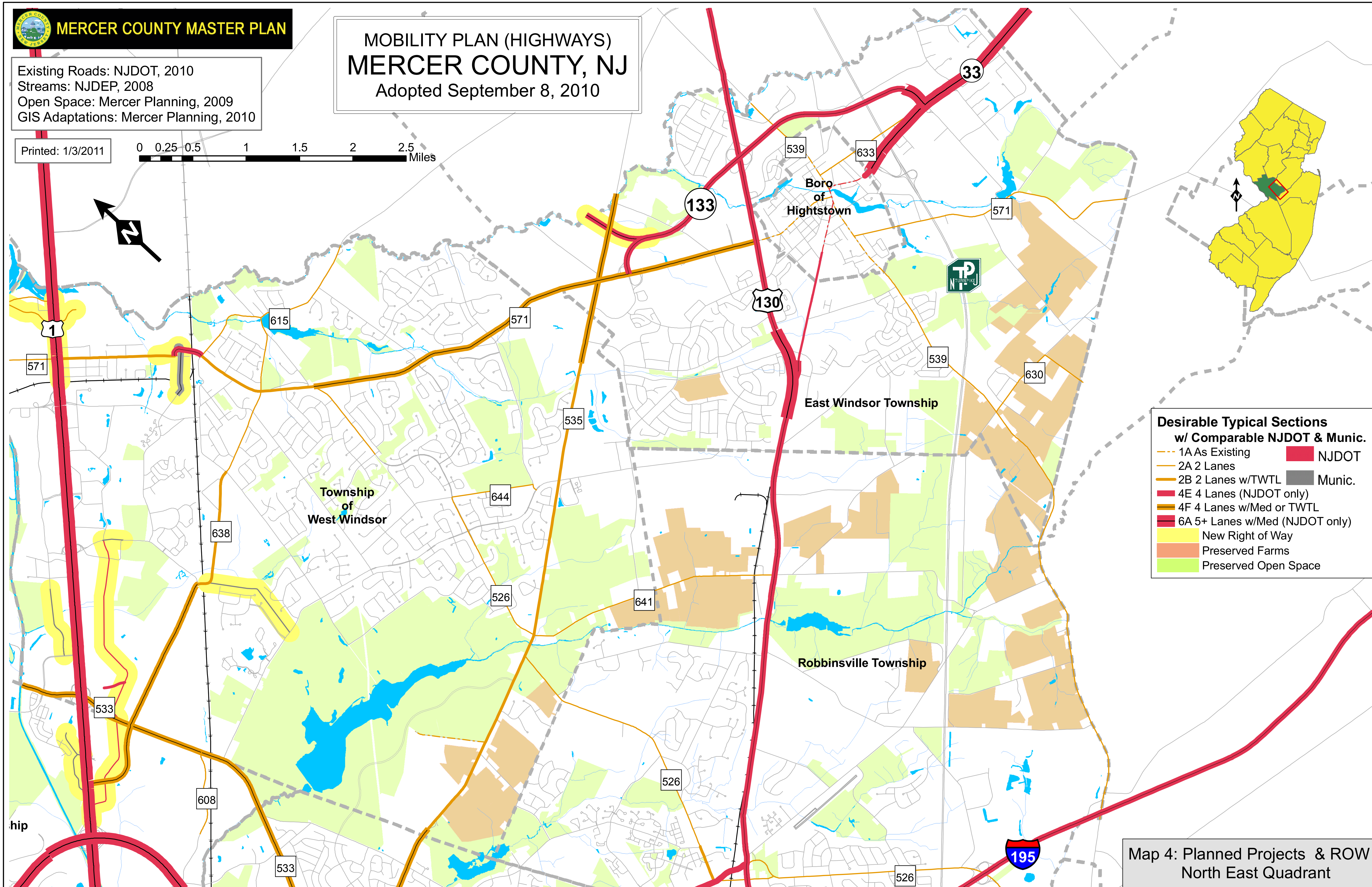
0 0.25 0.5 1 1.5 2 2.5 Miles

N

605
206
27
629
Boro of Princeton
1
571
Township of Princeton
518
604
638
Boro of Hopewell
569
569
206
533
654
625
608
518
31
612
Lawrence Township

Printed: 1/3/2011

Map 3: Planned Projects & ROW
North West Quadrant



MERCER COUNTY MASTER PLAN
MOBILITY PLAN (HIGHWAYS)
MERCER COUNTY, NJ
Adopted September 8, 2010
Existing Roads: NJDOT, 2010
Streams: NJDEP, 2008
Open Space: Mercer Planning, 2009
GIS Adaptations: Mercer Planning, 2010
Printed: 1/3/2011
0 0.25 0.5 1 1.5 2 2.5 Miles
N
Boro of Hightstown
East Windsor Township
Township of West Windsor
Robbinsville Township
hip
33
133
130
1
195
539
633
571
615
535
644
638
526
641
630
533
608
Desirable Typical Sections w/ Comparable NJDOT & Munic.
1A As Existing
2A 2 Lanes
2B 2 Lanes w/TWTL
4E 4 Lanes (NJDOT only)
4F 4 Lanes w/Med or TWTL
6A 5+ Lanes w/Med (NJDOT only)
New Right of Way
Preserved Farms
Preserved Open Space
NJDOT
Munic.
Map 4: Planned Projects & ROW
North East Quadrant

MERCER COUNTY MASTER PLAN

Desirable Typical Sections
w/ Comparable NJDOT & Munic.

- 1A As Existing
- 2A 2 Lanes
- 2B 2 Lanes w/TWTL
- 4E 4 Lanes (NJDOT only)
- 4F 4 Lanes w/Med or TWTL
- 6A 5+ Lanes w/Med (NJDOT only)
- New Right of Way
- Preserved Farms
- Preserved Open Space

NJDOT
Munic.

Existing Roads: NJDOT, 2010
Streams: NJDEP, 2008
Open Space: Mercer Planning, 2009
GIS Adaptations: Mercer Planning, 2010

0 0.25 0.5 1 1.5 2 2.5 Miles

N

Township of Hopewell
Boro of Pennington
Lawrence Township
Township of Ewing
City of Trenton

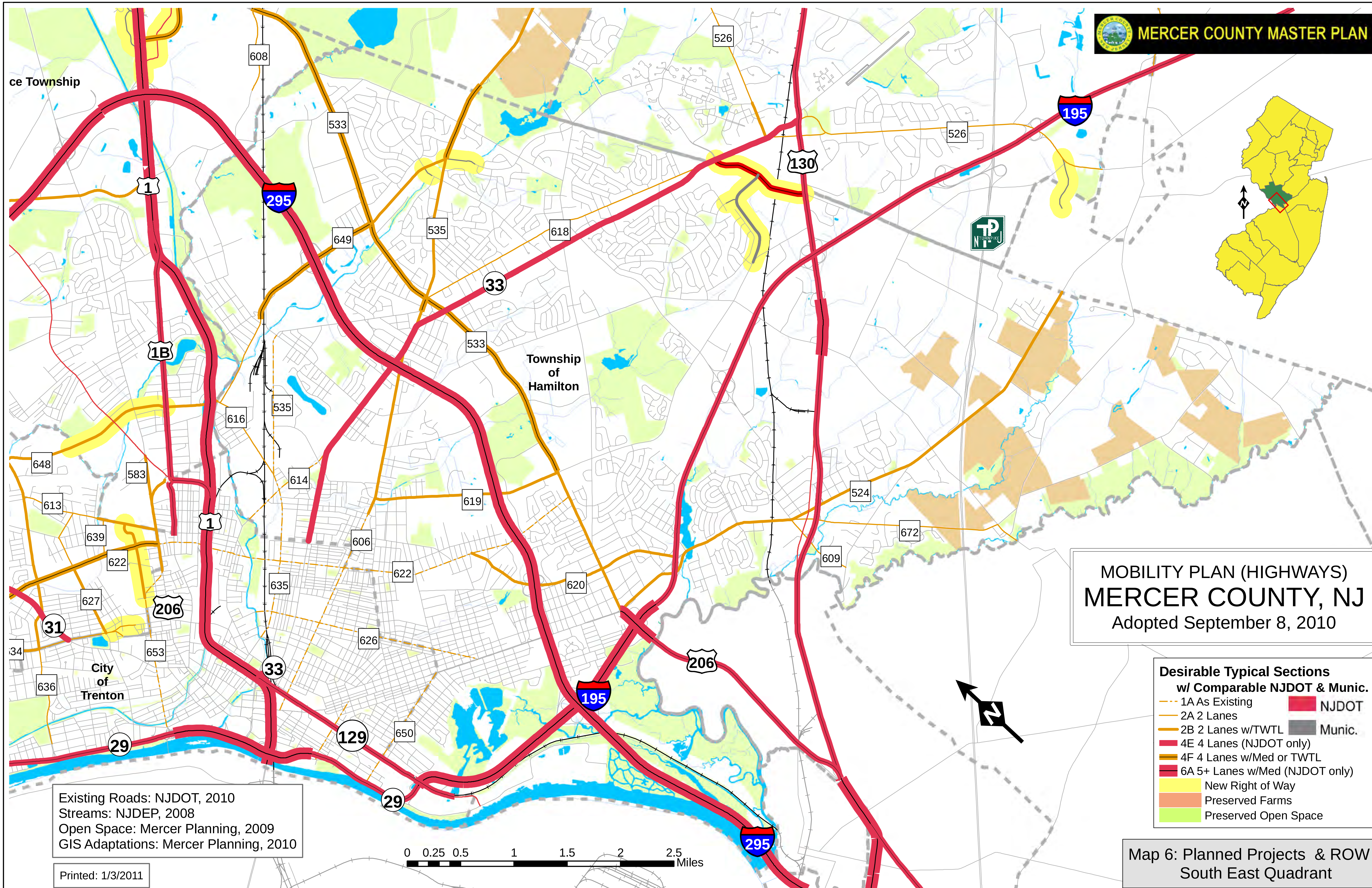
518 654 625 612 624 546 632 640 631 623 611 647 579 600 637 643 636 648 583 613 639 622 627 634 653

31 1 1B 95 206 29

MOBILITY PLAN (HIGHWAYS)
MERCER COUNTY, NJ
Adopted September 8, 2010

Printed: 1/3/2011

Map 5: Planned Projects & ROW
South West Quadrant



MERCER COUNTY MASTER PLAN
MOBILITY PLAN (HIGHWAYS)
MERCER COUNTY, NJ
Adopted September 8, 2010
Desirable Typical Sections w/ Comparable NJDOT & Munic.
1A As Existing
2A 2 Lanes
2B 2 Lanes w/TWTL
4E 4 Lanes (NJDOT only)
4F 4 Lanes w/Med or TWTL
6A 5+ Lanes w/Med (NJDOT only)
New Right of Way
Preserved Farms
Preserved Open Space
NJDOT
Munic.
Map 6: Planned Projects & ROW
South East Quadrant
Existing Roads: NJDOT, 2010
Streams: NJDEP, 2008
Open Space: Mercer Planning, 2009
GIS Adaptations: Mercer Planning, 2010
Printed: 1/3/2011
0 0.25 0.5 1 1.5 2 2.5 Miles
Township of Hamilton
City of Trenton
ce Township