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# Needs, Strategies

New Brunswick, Middlesex County



**P**lan 2045 focuses on making balanced and cost-effective investment choices for North Jersey. To accomplish this, the NJTPA's metropolitan planning process is guided by the Regional Capital Investment Strategy (RCIS), which provides investment principles and allocation objectives for various categories of funding (Chapter 4). Computer modeling of future funding scenarios guided by the RCIS found that the region would be able to meet current and future transportation demands with reasonably anticipated funding. More funding would allow an expanded list of investments, meeting more of our aspirations

# & Implementation

for the next 28 years. ● This chapter presents a fuller picture of how the region can maintain and improve its sprawling and complex transportation network through 2045. It looks at needs, strategies and implementation steps (including investments) for major modes and facilities—roads, bridges, rail, freight, pedestrian and bicycle—and key policies, including safety, technology, demand management and air quality. The full list of investments is in the Project Index (see Addendum). ● Across all these areas, the NJTPA seeks to advance the vision of the Together North Jersey plan. Throughout this chapter, icons

## 4 Vision Themes



Competitive ●



Efficient ●



Livable ●



Resilient ●



**Fort Lee, Bergen County**

indicate the connections between Plan 2045 and Together North Jersey’s four themes and 15 focus areas (see Addendum). The aim is to ensure that transportation supports and is coordinated with broader regional objectives regarding land use, environment, economic development, education and a host of other factors (see Together North Jersey p. 14). In this way, Plan 2045 becomes a guide and resource for all organizations—public and private—working towards regional progress.

**Table 5-1: Change in Pavement Conditions from 2012 to 2015**

Pavement Rating	2012	2015
Good	22.3%	25.5%
Fair or Mediocre	27.0%	27.6%
Deficient - Roughness	10.9%	10.2%
Deficient - Distress	25.5%	24.4%
Deficient - Both	14.3%	12.3%
<b>Total</b>	<b>100.0%</b>	<b>100.0%</b>

Source: NJDOT 2012 and 2015 Pavement Management System

**ROADS  
Needs & Strategies**

New Jersey’s economy is highly dependent on the state’s extensive road network. Yet heavy daily traffic imposes constant wear on roadways and causes often crippling congestion in some locations, threatening continued growth throughout the region. This can be seen particularly in employment centers such as Newark and Jersey City.



The NJTPA seeks to use investments to improve the speed, reliability and safety of auto and truck trips. At the same time, it encourages road designs that are sensitive to community character and accommodate walking, biking and transit where possible. It is a balanced approach that advances Together North Jersey’s livability and economic vitality goals, among others.

For all roadways, regardless of type and function, “Fix It First” remains a guiding investment principle. Many of the key roadways in the region were built decades ago and are due for reconstruction. Others must undergo resurfacing or other maintenance to keep up with heavy wear. Roads that show the most deterioration generally get the highest priority for funding. Where possible, efforts are made to perform cost-effective preventive maintenance to extend the life of a roadway and to limit long-term financial impact.



According to the Pavement Management System, which assesses the condition of roads and offers strategies for maintaining and preserving them, almost half (46.9 percent) of the NJDOT-maintained system is deficient.

This represents an **8 percent improvement in pavement conditions** since 2012 (Table 5-1). With VMT projected to increase by 16 percent and freight traffic by more than 40 percent by 2045, the wear and tear on the roadway system add to maintenance

**Efficient** ●  
◀ **Maintain transportation infrastructure in a state of good repair (Strategy 7.1)**



**Newton, Sussex County**

**Efficient** ●  
► **Use technology to improve transportation operations (Strategy 7.7)**

needs; however, the financing of this plan (Chapter 6) allocates sufficient resources to maintain pavement in acceptable condition through 2045.

At the same time, NJTPA funds well-targeted investments to enhance and improve the road network. Expanding or adding new roads is a limited option due to high costs, environmental impacts, and the likelihood that capacity expansion may provide only temporary congestion relief, inducing additional traffic over the long term. After careful study, some expansions may be found justified, particularly, those addressing critical “missing links,” such as the completion of access between Interstate 278 and Route 1&9 in eastern Union County.

Another way to improve traffic flow and safety is to address highway and bridge access bottlenecks. The Port Authority is looking to realign and extend the existing George Washington Bridge high-occupancy vehicle (HOV) lane on I-95 by strengthening the shoulder lane to make it usable for this purpose. This improvement would provide an uninterrupted trip for HOVs and buses approaching the bridge from U.S. Route 46. It would also establish direct access for trucks and eliminate the need for trucks to weave through passenger vehicles and an active bus stop in the Borough of Fort Lee.



The NJTPA seeks many additional improvements to roads and intersections to speed traffic flow and allow them to operate more efficiently. This includes removing bottlenecks, improving traffic signal controls and timing, installing left turn lanes, creating modern roundabouts (see sidebar), controlling road access (such as limiting driveways and curb cuts) and other strategies. In addition, new intelligent technologies, such as **centrally controlled traffic signal** systems that respond to traffic levels and real time information to allow travelers to make informed route or mode decisions, are increasingly important.

In recent years, the NJTPA and its partner agencies have also recognized the need for roads—particularly those serving residential, downtown and commercial

areas—to better accommodate all modes and all users, including walkers and cyclists and the young and old. This inclusive Complete Streets approach has garnered support from a growing number of communities (see sidebar next page).

Among the strategies consistent with Complete Streets are traffic calming measures, such as creating curb extensions at corners and traffic islands for pedestrians, narrowing or converting auto lanes to create bike lanes, and upgrading crosswalks and sidewalks. In downtown areas, these measures, combined with streetscaping, public art, pedestrian malls and other amenities, can create distinctive public spaces conducive to Transit Oriented Development—a particular focus of Together North Jersey grants and pilot projects (see Together North Jersey p. 14).



Road diet, or lane reduction, concepts—and other measures such as adding signalized intersections, creating separate travel lanes for local traffic and buses and improving parallel routes—can also be applied to create **multi-modal boulevards** along corridors targeted for residential and retail growth, such as along Route 440 in Jersey City. Also needed are signage upgrades, including **wayfinding related to tourism**—an important economic development strategy—and larger, brighter signage to help older drivers.

However, much of the costs for these and other potential road improvements fall to county and local governments, which face serious budget constraints

## Livable●

◀ Design places that meet the diverse needs of people in all age groups (Strategy 6.1)

## Roundabouts



Modern roundabouts are one key strategy for making streets safer for all users.

These roundabouts are smaller, safer and more efficient than older traffic

circles. They reduce the speed of traffic and the number of potential points of conflict. The Federal Highway Administration says modern roundabouts are one of the most effective proven safety countermeasures.

The New Jersey Department of Transportation and Federal Highway Administration are working together to implement modern roundabouts to reduce severe and fatal crashes. NJDOT offered federal Highway Safety Improvement Program funding for one roundabout project in each county as part of a pilot program. The NJTPA Board approved projects in six subregions in January 2017: Essex, Hunterdon, Monmouth, Morris and Passaic counties and the City of Newark.



Lincroft, Monmouth County

These pilot projects, which are slated to be completed within two years, will serve as models for future safety improvements in the region.

Roundabouts reduce the types of crashes where people are seriously hurt or killed by about 80 percent when compared to conventional intersections controlled by stop signs or traffic signals, according to the AASHTO Highway Safety Manual. Roundabouts can address a variety of safety concerns, such as helping to improve flow at a traditional four-way intersection or making it easier to traverse a complex five-point crossing.



## Complete Streets



Complete Streets are designed to safely accommodate all roadway users—pedestrians, cyclists and motorists, transit providers and freight movement where needed, including parcel deliveries and truck deliveries to local stores in mixed use locations. They help connect people with the places they want and need to go to, allowing them to access jobs, healthcare, education, affordable healthy food and more. They also can improve health by encouraging walking and cycling.

The NJDOT adopted a Complete Streets policy in 2009, incorporating it into their greenhouse gas reduction plan. As of late 2016, eight NJTPA subregions—Essex, Hudson, Middlesex, Monmouth, Passaic and Somerset counties and the cities of Newark and Jersey City—had adopted their own policies, as well as another 84 municipalities in the region. Statewide, eight counties and 135 municipalities have policies. Some jurisdictions have extensively implemented their policies, improving sidewalk connectivity and street crossings, and striping bike lanes or providing other bicycle accommodation. The NJTPA encourages all counties and municipalities to consider

adoption and implementation of Complete Streets policies, including appropriate accommodation for freight movement.

Communities can implement Complete Streets in a variety of ways. Examples include installing wider sidewalks, narrowing traffic lanes to slow vehicles, adding bicycle lanes, adding dedicated bus lanes and constructing median islands and additional crosswalks. Technical resources such as the 2017 State of New Jersey Complete Streets Design Guide are available to inform communities on design standards and best practices.

Research shows that investments in active transportation infrastructure, like bicycle lanes and sidewalks, can bolster local economies. When people feel safe walking a street, they are more likely to patronize local businesses. This makes walkable and bikeable downtowns more attractive to potential residents.

Together North Jersey supports Complete Streets policies and implementation because they make transportation more safe, convenient and reliable. Implementing Complete Streets policies requires public education and active consideration of changes to road design.

maintaining existing road networks. While federal funding is available for some improvements, and NJTPA has a number of programs available to assist counties with the improvements, obtaining the funding involves following a complicated and lengthy process to meet federal requirements.

In the NJTPA region, counties own more than 3,700 centerline miles (56 percent of all county roads in the state). This represents 14.5 percent of all roadway miles in the NJTPA region. Municipal roads constitute the largest share of the roadway miles, at almost 20,000 miles or 76 percent of roads in the region. Beginning in FY 2018, Local Aid to counties increased to \$400 million per year (up from \$190 million each year). However, counties and municipalities will continue to confront a growing backlog of road projects. This plan supports expanded state funding for county and local road and bridge needs.

The NJTPA also seeks to prepare roads for new vehicle technologies. In particular, support for electric vehicle charging stations will encourage greater use of these vehicles, which reduces air pollution and greenhouse gases, a goal of resiliency strategies. In the long term, hydrogen fueling infrastructure may be needed. The NJTPA will continue to work with communities and organizations to encourage use of alternate fuel vehicles. At the same time, roads must be adapted to provide the communications infrastructure needed for connected and autonomous vehicles, as discussed in this chapter's technology section. These efforts will involve close coordination with companies that are leading the development of new vehicle technologies.

This plan also seeks to support the road network's vital role in accommodating many thousands of bus trips each day through a variety of improvements akin to those used for Bus Rapid Transit (BRT). To facilitate bus travel, project designs can incorporate bus pull-outs, park-and-ride access and other features. In addition, bus travel can be enhanced by "bus on shoulder" operations as seen in Middlesex County along Route 9 and under study on Route 1. Bus signal priority makes for faster bus trips that are more competitive with auto travel.

The road system also accommodates heavy truck volume. As discussed in the freight section, improvement strategies can include partnerships with the private sector to shift truck deliveries to off-peak hours, helping lessen congestion and reduce business costs. Plan 2045 supports these and other approaches to more efficient use of roads by all modes and users.

## Implementation



In the near- to mid-term, the region can expect to see significant progress in addressing its maintenance needs and reducing road project backlogs.

Through 2045, it is anticipated that **approximately \$22 billion will be invested** in preserving, repairing and reconstructing the road network. This represents approximately 17 percent of all investment, in accordance with the RCIS, discussed in more detail in Chapter 4.

There are several larger roadway improvement projects included in Plan 2045 in the near to mid-term, as follows:

- Route 3, Route 46, Valley Road and Notch/Rifle Camp Road Interchange, Contract B, Passaic County, \$136 million. Construction in 2019
- Route 80, WB Rockfall Mitigation, Warren County, \$59 million. Construction in 2020

## Efficient●

◀ **Maintain transportation infrastructure in a state of good repair (Strategy 7.1)**





**Phillipsburg, Warren County**

- Route 34, CR 537 to Washington Avenue Pavement, Monmouth County, \$90 million. Construction in 2025
- Route 9, Indian Head Road to Central Avenue/Hurley Avenue Pavement, Ocean County, \$53 million. Construction in 2019
- Route 3 and Route 495 Interchange, Hudson County, \$53 million. Construction in 2026
- Route 80, Route 15 Interchange, Morris County, \$64 million. Construction in 2022
- Route 7, Kearny, Drainage Improvements, Hudson County, \$81 million. Construction in 2020
- Route 1&9 Interchange at Route I-278, Union County, \$65 million. Construction in 2019
- Route 206 Projects, Somerset County, \$438 million. Construction in 2018

NJDOT management systems, which help guide road and bridge maintenance, and the use of performance measures discussed in Chapter 4, will help identify cost-effective projects to enhance or expand roads and other infrastructure. These projects will implement the numerous strategies identified above—intersection upgrades, improved access management, centralized traffic signals, connected vehicle technologies and more.



The projects will be developed, evaluated and funded through the NJTPA planning and capital programming process, which will include continued cooperation between the NJTPA and its partner agencies to streamline project delivery and make more cost-effective use of available funding.



Project development will be guided by the principles in the RCIS, including advancing Complete Streets, supporting resiliency to potential natural and man-made disasters, facilitating freight movement, supporting regional transit and making travel safer for all users, **including bicyclists and pedestrians** (see Chapter 4).

## **BRIDGES** **Needs & Strategies**

Repair and replacement of bridges still requires a large share of available funding, ranging from 20 to 30 percent per year. The RCIS goal is for a 20 percent allocation over the life of the plan, with the amount falling as the most critical needs are addressed. This funding is used to maintain the region's nearly 4,800 bridges, large and small. Many bridges were built decades ago. Each year, many come due for

### **Livable**

◀ **Design places that meet the diverse needs of people in all age groups (Strategy 6.1)**



**Pulaski Skyway between Jersey City, Hudson County and Newark, Essex County**

repair, improvement or replacement, and others must be continually maintained. Responsibility for this work falls mostly to the State or county governments, which have jurisdiction over most bridges (Table 5-2). The Bridge Management System, administered by NJDOT in coordination with the NJTPA, helps prioritize these projects by systematically assessing bridge conditions, life cycle costs and other factors.

About 26.2 percent of the region's bridges under the jurisdiction of NJDOT (Table 5-3) are functionally obsolete, which means they do not meet current design standards for clearance, lane and shoulder width, and/or road geometry. Another 8.6 percent are structurally deficient, meaning their deck or bridge structure is deteriorated (though such bridges may remain safe to use for many years). Investments made since 2012 have maintained and slightly improved the overall condition of the region's state-owned bridges, despite the yearly accrual of new repair and replacement needs.

In addition, NJ TRANSIT owns 525 rail bridges in the NJTPA region and 575 across all of New Jersey.

**Efficient** ●  
► **Maintain transportation infrastructure in a state of good repair (Strategy 7.1)**



**Investments in recent years** have included work on several major NJDOT bridges, totaling over \$3 billion including the following, which are complete or nearing completion:

- Route 1 & 9, Pulaski Skyway, Essex / Hudson Counties, \$1.5 billion
- Route 7, WittPenn Bridge, Hudson County, \$700 million
- Route 72, Manahawkin Bay Bridges, Ocean County, \$331 million
- Route 280/Route 21 Interchange Improvements, City of Newark, \$137 million
- Route 37, Mathis Bridge EB over Barnegat Bay, Ocean County, \$79 million
- Route 495, Route 1 & 9/Paterson Plank Road Bridge, Hudson County, \$68 million

Other major NJDOT bridges are slated for future repair or replacement, as noted in the Implementation section below.

The region’s counties face growing costs for the more than 2,100 major bridges and 4,100 county-owned minor bridges under their jurisdiction. Almost 200 major bridges are structurally deficient and 450 are functionally obsolete. Approximately 600 minor bridges are also in need of repair or replacement. Meeting the region’s existing county bridge basic repair needs is estimated to cost almost \$650 million. This does not include resources needed for bridge replacement or associated approaches, and may be vastly under-estimated. The renewal of the State’s Transportation Trust Fund in 2016 provided some help in meeting these needs. It increased the statewide County Aid program to \$400 million annually, more than doubling the previous level of \$190 million per year. Nevertheless, funding will need to increase over the long term to meet growing needs.

For bigger, more expensive county bridge projects (and selected road projects), the NJTPA’s Local Capital Delivery Program offers a means to access federal funding for repair or replacement. Balanced with safety, multimodal, community and other needs, maintaining the historic character of local bridges is a strong consideration of this program. Initial competitive grants support concept development studies in which counties and cities investigate all aspects of a potential project, including environmental, right of way, access, design, and feasibility issues. During Fiscal Year 2017, nearly \$3 million in funding was awarded for five such studies to investigate options for replacing or rehabilitating aging bridges and a sixth to explore reconfiguring a busy corridor.

The next phase is typically the Preliminary Engineering phase, in which projects are further developed and refined to a level of detail necessary to receive federal environmental approval under the National Environmental Policy Act (NEPA). This work enables a project to be considered for inclusion in the NJTPA’s annual Transportation Improvement Program (TIP).

## Implementation

Maintaining and improving bridges is critical to strengthening the region’s economy and providing safe and convenient travel for people and goods.

In the near- to mid-term, this plan calls for continued efforts to reduce the backlog of needed bridge investments and improve preventative maintenance. These will help moderate future investment needs. Additional costs savings may be realized through continued exploration of new materials, engineering techniques and project streamlining. These savings could allow for additional funding for municipal and county aid, expansion of the Local Capital Project Delivery Program or similar programs.

Major bridges slated to be addressed over the next several years include:

**Table 5-2:  
Bridges in NJTPA Region by Ownership**

Bridge Owner	Quantity
Major County Bridges	1960
NJDOT	1720
NJ TRANSIT	153
City / Town	9
Turnpike	855
All Other	96
<b>Total for NJTPA Region</b>	<b>4793</b>

Source: NJDOT 2012 Bridge Management System

**Table 5-3:  
NJDOT-owned Bridges in the NJTPA Region**

NJDOT Bridge Conditions	2012	2015
Not Deficient or Obsolete	64.8%	65.2%
Structurally Deficient	9.2%	8.6%
Functionally Obsolete	26.0%	26.2%

Source: NJDOT 2012 and 2015 Pavement Management System



## Resilient

► **Adapt infrastructure to be resilient to extreme weather events and to the impacts of climate change (Strategy 10.2)**

- Route 80 WB, 8-mile corridor with multiple bridges between McBride Avenue (CR 639) and Polify Road (CR 55), Bergen / Passaic Counties, \$340 million. Construction in 2022
- Route 3, EB, Bridge over Hackensack River and Meadowlands Parkway, Bergen / Hudson Counties, \$90 million. Construction in 2023
- Route 4, Hackensack River Bridge, Bergen County, \$84 million. Construction in 2025
- Route 80, Bridge over Passaic River, River View Drive, and McBride Avenue, Passaic County, \$61 million. Construction in 2022
- Rumson Road over the Shrewsbury River, CR 520, Monmouth County, \$66 million. Construction in 2020




In the long term, new funding will be needed to meet the demands of an ever-growing population and economy and the wear from increased travel and goods movement. The impacts of climate change are a critical concern as bridges are particularly vulnerable to storms and flooding even as they are needed for evacuation and movement of critical supplies in an emergency. Funding should be prioritized to improve resiliency of the region's bridges. Bridge repair or replacement projects must **address resiliency concerns in design and engineering**.



## TRANSIT Needs & Strategies

Every weekday, travelers make more than 928,000 trips on the region’s extensive public transportation system. Transit contributes greatly to the region’s quality of life and provides essential travel options, particularly for the disabled and those without cars. Transit usage diverts thousands of trips from roads, helping reduce congestion, safeguard air quality and cut greenhouse gas emissions.

The NJTPA seeks to support the RCIS Principle to “Expand Public Transit” by supporting investment to improve the transit network and expand services to new markets while ensuring that transit service continues to be provided at robust levels to existing markets, as demand warrants. Plan 2045 calls for continuing strategic investment to make transit a viable alternative for an increasing share of residents.

 The current funding priorities are maintaining the system in a state of good repair and operating it in a safe and secure manner. This includes **replacing buses, railcars and locomotives** as they age, as well as attending to more than 600 rail bridges, 500-plus miles of track, signal systems, stations, and other infrastructure. The Transit Needs Appendix provides details of the region’s long-term transit investment priorities. Among the key needs and strategies are the following:

Newark, Essex County

### Efficient ●

◀ Enhance and improve existing public and private transit services (Strategy 7.4)

## Efficient ●

► **Maintain transportation infrastructure in a state of good repair (Strategy 7.1)**

► **Increase transit system capacity at strategic locations (Strategy 7.5)**

## Efficient ●

► **Use technology to improve transportation operations (Strategy 7.7)**



**The Hudson Tunnel Project/Gateway Program** The highest priority transit rail project is **constructing a new trans-Hudson tunnel** to maintain the current level of service while repairs are made to the existing century-old tunnel. There are also plans to **replace the Portal North Bridge** over the Hackensack River, which carries about 450 trains a day from Newark to New York Penn Station. In addition, the Hudson Yards Right-of-Way Preservation Project/Concrete Casing Section No. 3 would complete protective ROW construction beneath ongoing West Midtown development.

Amtrak's larger Gateway Program, which will provide additional capacity, reliability and resiliency improvements, as well as expansion of New York Penn Station, is a longer-term priority. It will be needed to meet the expected 31 percent increase in rail ridership by 2045 (see Trans-Hudson Travel p. 58). Additional capacity gained through the Gateway program is necessary for trans-Hudson services increases, such as institution of the one seat ride to New York City on the Raritan Valley line, which would also likely require additional investments in New Jersey.



**Other Commuter Rail Needs**—The region also needs to invest in technology to improve safety and efficiency, such as **Positive Train Control (PTC)** and bus signal priority, as well as improvements to the rail system, including the Midline Loop near the Jersey Avenue station on the Northeast Corridor, track improvements along the Northeast Corridor, adding tracks to other heavily used lines, upgrading signals and upgrading stations to ADA standards.

Future forecasts anticipate continued growth in demand, and indicate that existing train volumes will need to be supplemented through the selective (re)introduction of capacity in the core rail system to enable increased levels of rail service. Investments now being made in projects such as County Yard on the Northeast Corridor or the pocket track in Summit on the Morris & Essex Line are examples of what will be needed as rail service is increased.

The Hunter Flyover is among the new connections needed. It would enable eastbound Raritan Valley trains to travel from the Lehigh Line to the Northeast Corridor eastbound tracks without crossing at-grade in front of other westbound trains. The current eastbound train movement at-grade slows train services and reduces the Northeast Corridor's capacity south of Newark Penn Station. Amtrak's plans for more intercity and faster train services require the elimination of this at-grade crossing. NJ TRANSIT also needs to add trains on the Northeast Corridor to accommodate the projected growth in ridership on that line.

**Light Rail**—The region has two light rail systems: the Hudson Bergen Light Rail (HBLR) and the Newark Light Rail. Each system requires ongoing maintenance, and two proposed extensions to the HBLR line will require a major capital investment. The first is a .7-mile elevated extension across Route 440 in Jersey City to connect to a large mixed-use brownfield redevelopment project underway along the Hackensack River waterfront. The other project is the Northern Branch, which would extend the line from its terminus in North Bergen,

Jersey City, Hudson County






Hudson County, through four communities into Englewood in Bergen County. NJ TRANSIT has taken steps to increase capacity on the existing lines, by purchasing larger vehicles. However, as the system grows and capacity is added, maintenance and train storage facilities may need to be expanded.

**PATH**—The PATH system, operated by the Port Authority of NY & NJ, has seen more riders in recent years. This growing ridership is expected to continue in coming decades. In response, the Port Authority is replacing the PATH signal system, allowing trains to safely run closer together, improving stations, upgrading power substations and considering a possible extension to Newark Liberty International Airport. New development in the Journal Square and Grove Street station areas in Jersey City is pointing to the need to expand PATH station and fleet capacity to meet new demand.

**Resiliency**—Both NJ TRANSIT and the Port Authority have committed to improving the resiliency of their systems to prevent future damage and to prepare for possible future extreme weather events and security threats. This includes significant new investments in a series of hardening projects such as new rail vehicle storage, upgraded power systems, maintenance facilities, emergency control centers, security improvements and signal and communications systems resilience upgrades.

 **Bus Upgrades**—About two-thirds of transit trips are made on buses. NJ TRANSIT and private companies provide intra-state and interstate services. There will be an ongoing need for additional bus garages and layover locations to meet projected future transit demand. **The Port Authority Bus Terminal** in midtown Manhattan is the largest in the nation—and busiest in the world. It served more than 66 million passenger trips in 2014. The Port Authority recognizes that

**Hoboken, Hudson County**

**Efficient** ●

◀ **Increase transit system capacity at strategic locations (Strategy 7.5)**



the terminal has become functionally obsolete and needs to be replaced to accommodate growing demand. The agency included \$3.5 billion in funding in its 2017-2027 Capital Plan to begin the process of designing and ultimately constructing a replacement facility. The Port Authority recently completed extensive renovations of its George Washington Bridge Bus Station.

Also important is investment in bus terminals and facilities in New Jersey. NJ TRANSIT is partnering with the City of Passaic and Passaic County to implement a new bus terminal in downtown Passaic. NJ TRANSIT, Passaic County and the City of Passaic successfully partnered to win a competitive Federal Transit Administration (FTA) grant to relocate and improve the existing bus facility. Other terminals, such as the Journal Square Transportation Center, one of the busiest bus terminals in the country, provide critical local and regional service (through transfer to the PATH system).

**Other Bus Investments**—NJ TRANSIT continues to explore BRT services, which offer speed and efficiency similar to light rail but at lower costs. Bus system improvements include implementing bus signal priority, allowing buses to use shoulder lanes, and other efficiencies. The NJTPA has worked closely with NJ TRANSIT to examine potential BRT applications and other bus enhancement. Investments in alternative fuel vehicles, “smart bus” technologies and improved traveler information (on both bus and rail systems) are also needed.

**Operating Funding**—Although transit ridership is expected to continue growing, capital funding for expanding the bus and rail system is very limited in both the short and long term. NJ TRANSIT also faces constraints on its operating budget. There is a critical need for stable operating resources to supplement fare box collections and existing operating subsidies, as discussed in Chapter 6.

## Efficient ●

► Enhance and improve existing public and private transit services (Strategy 7.4)



**Private bus carriers**—Several carriers such as Academy, Lakeland, Trans-Bridge, DeCamp and Coach USA provide critical long-haul transit service from Monmouth, Somerset, Morris, Bergen Sussex, Hunterdon and Ocean counties to Newark, Jersey City and New York City. There is continued need to **identify park and ride opportunities** for their passengers, as well as bus storage facilities close to the urban core. Other private operators use smaller bus vehicles commonly known as jitneys that supplement NJ TRANSIT service primarily in Bergen, Hudson and Passaic counties, mainly providing service to New York City. Local and state government must continue efforts to insure safe and responsible jitney operations that supplement but do not compete with NJ TRANSIT.

## Livable ●

► Locate development in areas that are walkable, bikeable, and accessible by public transit (Strategy 6.4)



**Ferries**—Private ferries operated by NY Waterway, Seastreak and Liberty Landing Ferry link Bergen, Hudson and Monmouth counties with New York City. Ferries have proven to be critical linkages during disruptions to the transit and road networks—seen most dramatically in the days after September 11, 2001. Some ferry services include convenient shuttle bus connections on both sides of the river. There is a continued need for support for ferry terminals and land-side access. The NJTPA supports efforts to **facilitate multi-modal access to bus stops and ferry terminals** through improved access for pedestrians and bicyclists, as well

as through **transit-supportive land use near ferry terminals**. The NJTPA completed an Inventory and Assessment of Waterborne Transportation Resources in December 2016, which identified several opportunity sites for future passenger and freight waterborne transportation across the region.



**Transit Access**—The NJTPA encourages and supports measures that make it easier for travelers to access transit to connect **to a wide range of destinations** in the region and beyond. Such an intermodal system encourages people to use transit for a part or all of their trips. Methods for accomplishing this that must be explored include: expanding park-and-rides and developing new transit hubs; supporting local shuttles and last-mile connection services; encouraging expansion of bicycle and pedestrian access to transit, and accommodations at stations; implementing seamless and user-friendly fare integration across modes, systems and carriers; facilitating automated and off-board fare collection and expanding real-time transit information for riders; and supporting Transportation Management Associations, which provide a host of transit access programs and services (see Transportation Demand Management section). Some Transportation Management Associations are exploring partnerships with ride-hailing services such as Uber or Lyft as flexible last mile connections.

### Implementation

North Jersey's transit system faces the difficult challenge of maintaining a state of good repair on its extensive, heavily used existing infrastructure while also expanding capacity to prepare for anticipated growing ridership. To do so, the NJTPA and its partners over the long term must address the need for sufficient funding to support expanded capital investments and operations. Notably this includes the need for additional trans-Hudson rail capacity, which must be addressed cooperatively by New York, New Jersey, Amtrak and federal partners.

There are numerous proposals to expand rail capacity, but funding has not been fully identified. While some studies have been completed, some of these projects need further assessment before moving forward to determine their feasibility and potential for attracting the ridership needed to sustain operations. The project index at the back of this plan includes several rail expansions, such as the previously mentioned extensions of the Hudson Bergen Light Rail, which are recommended for implementation as funding becomes available.



Expansion of the rail system must be accompanied by **transit-supportive land use measures**. This includes creating walkable neighborhoods that can support development near train stations and bus hubs. Together North Jersey promotes transit-oriented development and transit-supportive development and encourages local officials, planning boards and developers to support mixed-use developments around rail and bus transit. Such developments can foster job growth, bolster the local economy and support public transit by providing enough riders to fiscally sustain services. The NJTPA's Planning for Emerging Centers program offers

### Livable●

◀ **Locate development in areas that are walkable, bikeable, and accessible by public transit (Strategy 6.4)**

### Livable●

◀ **Locate development in areas that are walkable, bikeable, and accessible by public transit (Strategy 6.4)**

Hoboken, Hudson County





competitive grants for technical assistance to support municipalities in creating more sustainable, transit-supportive and walkable communities.

The NJTPA is also committed to investing capital and planning funds that support improved access to and sustainable land use development around PATH, ferry and private bus carrier facilities. Public sector capital investments in ferry terminals, vessels and supporting facilities should be considered over the long term to ensure their viability to meet daily travel needs, as well as the need for redundant services when other trans-Hudson transportation service is disrupted.

While the advent of automated vehicles over the next decade is expected to provide new options for personal (non-transit) travel, it may also offer opportunities for new feeder systems for transit in low density areas—possibly even through automated, on-demand bus circulation systems. The NJTPA, working with NJ TRANSIT and other partners, must assess the development and potential of future vehicle technologies to ensure wide public benefits.



## TRANSPORTATION TECHNOLOGY Needs and Strategies

Transportation technology is poised to dramatically alter transportation in the region. Self-driving and connected vehicles, new freight systems built around 3-D printing, changes in how people work and much more (see chapter 2) will affect the future of travel. There is great uncertainty about just when and how potentially transformative technologies will arise.

Yet many recent technology advances are already offering great benefit to the region. In particular, technologies collectively known as Intelligent Transportation Systems (ITS) are making the existing transportation system more efficient. These include centralized traffic signal systems that adapt to traffic flows; variable message signs to direct travelers; systems to coordinate incident management to clear crashes and incidents more quickly; integration of transit fares through smart cards; and the use of real-time data to inform travelers, manage road and transit systems and assess facility operational needs.



The NJTPA and its partner agencies are actively coordinating the adoption and application of these and other ITS systems as a means to make more efficient use of existing capacity and improve safety. One key initiative

Union County

**Efficient** ●

◀ **Use technology to improve transportation operations (Strategy 7.7)**

## Livable●

► Use public investment programs to create, connect and strengthen access to opportunity (Strategy 8AB.3)

is the joint development and updating of an ITS guidance document called **The Connected Corridor**. It includes technology standards and protocols—called the state ITS architecture—and addresses strategies for improved management of transportation systems and their operation. The Connected Corridor and other efforts to advance ITS must continue and broaden in coming years to keep pace with the expected acceleration in technology development.



The application of ITS must also be coordinated and integrated with wider technology systems. A growing number of cities, including Newark and Paterson, are beginning to **implement “Smart City” programs** that use technology to better manage and operate key civic functions including public safety, health care, public services, water, sewer systems and more. Transportation is integral to connecting all elements of Smart Cities, becoming part of the so-called “internet of things,” in which people increasingly interact with connected machines on a daily basis. If managed effectively, this will open many new opportunities for realize the livability, accessibility and other goals embodied in the Together North Jersey plan.

However, achieving effective use of technology will not solely be a responsibility of public agencies. Many ITS and Smart City technology systems are under development by private companies and are being looked to as the foundation for profitable new industries. Public-private partnerships will play an important role in ensuring investments are coordinated and equitably serve all segments of the population. Ultimately, new legal and policy frameworks must be put in place to ensure that the deployment of the most advanced technologies—including autonomous vehicles—serves the public interest. Of concern is not only investments in infrastructure and physical systems but the management, ownership and use of vast amounts of data generated by and required for the operation of many technologies. The NJTPA and MPOs around the country will play an important role serving as data repositories, assessing technology advances, and coordinating public and private interests in addressing emerging issues.

### Implementation

The region invests capital funds through the TIP each year in ITS-related projects and programs in keeping with the 4 percent investment target in the RCIS (see chapter 4). The region must be prepared to increase these investments as technologies advance. This includes upgrading infrastructure to accommodate autonomous or connected vehicles (which, among other features, depend on data from beacons and other wired roadway elements). Transit vehicles and operations must also be upgraded for new systems.

As noted, public-private partnership must be pursued where feasible to share costs and speed implementation of needed investments. In all ITS deployments, designers and operators must take measures to ensure cyber security and resilience to weather and unforeseen emergencies.

In addition to capital investments, among the key measures the NJTPA will pursue over the life of this plan for effectively implementing ITS are the following:



JEFF SWENSEN / GETTY IMAGES



**Updating ITS architecture** As noted, the Connected Corridor will be an ongoing effort to ensure all public agencies in the state coordinate technology standards and deployment.



**Planning tools and data** The NJTPA will work with its subregions, partner agencies, the private sector and other MPOs and organizations nationally to make effective use of the large volume of real-time data being generated about transportation system conditions and operations. Tools using the data will assist in **providing traveler information**, measuring system performance, planning investments and other applications.

**Corridor Management** NJTPA will cooperate with subregions and partner agencies in assessing needs along major corridors and applying technologies to aid operations. Integrated Corridor Management projects, some in cooperation with New York transportation agencies, will be supported.

**Incident management** NJTPA will continue to work with other agencies, principally TRANSCOM, a coalition of the 16 major traffic, transit and public safety agencies in the New York/New Jersey/Connecticut region, to improve the region's ability to detect, respond to, and clear traffic incidents to improve traffic flow and highway safety.

Secaucus, Hudson County

**Efficient** ●

◀ **Expand the use of innovative planning tools that promote smart development (Strategy 5.4)**



**Competitive** ●  
▶ Leverage the region's role as a major freight distribution hub (Strategy 3.2)

### **FREIGHT Needs & Strategies**



The region's good movement system is an integrated multimodal network of roads, freight rail lines and terminals, port facilities, air cargo facilities, and warehouses/distribution centers. The region's role as a freight hub for the northeastern United States is a key advantage in retaining and attracting businesses, and in **supporting the region's overall economy**.

But leveraging this key competitive asset, as called for in the Together North Jersey plan, requires addressing a host of freight infrastructure needs and issues. In particular, the region must make investments in and optimize the operations of the following modes and facilities:

**Truck movements** Both long distance and local truck trips are particularly important as nearly all freight moves via truck for at least part of its journey. Five of the six major truck corridors in the state are located in North Jersey—the New Jersey Turnpike, I-78, I-80, I-287 and NJ 17. With overall freight volumes in the region expected to grow by 40 percent through 2045, the busiest roads will see even higher truck volumes. Pavement and bridges along key trucking routes must be maintained



to meet these demands and to ensure safe, efficient truck travel. In addition, highway improvements must be supported that could improve truck flow, such as separating trucks from general purpose lanes where applicable. Over the next decade, autonomous trucks and platooning technology will require careful planning and oversight.

Local roads are also vital. They are often the only available connections between freight facilities and major highways. To enhance access to all port and airport facilities, improvements on these local connector roads are needed. These include turning lanes, increased bridge clearance, upgraded pavement, improved signal timing, improved and enhanced rail access, and upgraded intermodal transfer facilities.

For example, the Port Authority's proposed Port Street and Corbin Street Improvement Project could significantly improve the only northern access points in the regional roadway system connecting to the Port Newark/Elizabeth Marine Terminal, the largest container-handling complex in the bi-state harbor. It could improve traffic safety and travel time and reduce congestion and terminal-related intermodal truck queuing. The project also would incorporate ITS technology to reduce congestion and improve the safety of the port's roads.

#### Port Newark, Essex County





Engelwood, Bergen County

**Efficient** ●

▶ **Adopt and implement “Complete Street” policies (Strategy 7.2)**

**Competitive** ●

▶ **Leverage the region’s role as a major freight distribution hub (Strategy 3.2)**

**Efficient** ●

▶ **Prioritize brownfields for redevelopment (Strategy 5.3)**



Working to **ensure that local roads accommodate appropriate locally focused freight needs in a way that is safe for all users**—particularly in residential neighborhoods—is a priority of the NJTPA and vital for the continued economic growth of the region. Where possible, freight facilities (and ancillary users of heavy freight such as industry and warehousing) should be located proximate to major roadways and designated truck routes.

Another important need is for additional secure parking facilities for truck drivers—primarily to accommodate overnight parking to meet federal driver rest requirements. Without adequate parking, trucks park on highway shoulders creating a serious safety hazard.



*The Port District* This district encompasses publicly owned Port Authority facilities as well as privately owned marine terminals. The completion of the project to **increase clearance under the Bayonne Bridge**, together with cooperation between the public sector and private freight companies to improve on-dock rail yards, express rail, chassis handling and other operations, will ensure the port’s long-term viability. This includes providing and maintaining adequate channel depth and landside road and rail infrastructure to support larger ships that are passing through the expanded Panama Canal and are capable of carrying nearly three times the amount of cargo as older vessels. Over the long term, the region will need expanded port capacity and waterside sites to handle the projected increase in freight and port activity. Expanded capacity should also include short-sea shipping lines, which have the potential to remove trucks from regional roads.



*Warehouse and distribution center* Development of these facilities has intensified throughout the region, including construction in existing clusters and in-fill locations in more urbanized areas. Brownfield redevelopment

presents a great opportunity to **locate distribution centers closer to the region's core** thereby minimizing the miles traveled by trucks. Additionally, with vacancy rates at all-time lows and lease rates increasing, redeveloping brownfield sites may be an economically viable way to meet the need for more distribution facilities. In addition, improved truck traffic management, off-peak delivery and truck parking must be explored to accommodate these changing patterns. Communities throughout the region must advance best practices in truck management, support needed truck parking and find balanced approaches to accommodate off-peak delivery as part of complete streets programs as deliveries and warehouses increasingly become 24/7 activities.

**Freight rail** The freight rail system faces capacity constraints and issues related to legacy infrastructure. Capacity constraints include the shared passenger/freight service segment of the Lehigh Line and North-South rail connectivity. Legacy infrastructure physical constraints are most evident in the movement of freight rail industry national standard rail cars with Plate "F" dimensions (17 feet high and 10.5 feet wide) and loaded car weights of up to 286,000 pounds. As discussed in the implementation section, the NJTPA is supporting efforts to address these operational and physical constraints.

**Air Cargo** Newark Liberty International Airport (EWR) is the region's air cargo hub. It hosts significant Federal Express and UPS facilities. There are many needs associated with moving freight to and from EWR, including improved access to air cargo facilities, improved connections between the air terminal and offsite warehouse and distribution centers and improved signage for freight-related access and facilities.



Building on these and other existing freight assets is essential to support and strengthen the region's economy. Changes in the nature of freight commerce stemming from technology and growth of e-commerce represent major challenges and uncertainties for the future. Technologies that will greatly impact freight systems include **truck platooning, autonomous vehicles, 3-D-printing** and more (see Chapter 3). As with other aspects of the regional transportation network, resiliency must continue to be addressed in all freight investment. The NJTPA and its partner agencies must work closely with the private sector to accommodate the changes and safeguard the region's freight assets.

### Implementation

The NJTPA's efforts to address freight needs and implement the strategies discussed above are overseen by the NJTPA Freight Initiatives Committee (FIC), composed of local elected officials and agency representatives from the NJTPA Board. The committee's bimonthly meetings serve as a forum for discussion of regional freight issues.

Important guidance for the FIC and NJTPA's ongoing freight planning is provided by the New Jersey Statewide Freight Plan, a federally required document, developed by a

### Efficient

◀ Use technology to improve transportation operations (Strategy 7.7)

Bayonne, Hudson County





### Competitive●

► Connect regional priorities/strategies. (Strategy 3.4)

### Efficient●

► Use technology to improve transportation operations (Strategy 7.7)

wide range of partner agencies in the state, with input from the private sector and other interests. It was finalized in fall 2017 and addresses the full range of freight issues facing the state and region.



The NJTPA continues to expand its freight planning efforts. This includes supporting the work of its subregions. One key effort is the **NJTPA's Freight Rail Industrial Opportunity (FRIO) Corridors Program**, which focuses on systematically identifying and addressing impediments to national standard (286,000 pound, Plate F) rail freight car access and physical constraints. Another initiative is the Freight Concept Development program, which investigates project concepts for eventual funding. Activities include data collection, community outreach, development of potential alternatives to address identified problems and selection of a preferred alternative and a National Environmental Policy Act classification.



Freight is integral to all aspects of the region's economy and is considered in all transportation planning and investment decision making at the NJTPA. In particular, The Connected Corridor document, discussed in the technology section, will seek to support the application of new and existing **technology to improve freight flow, operations, safety and security**. Freight issues will also be important to resiliency efforts discussed in this chapter to sustain supply chains



through major disruptive event. Safety planning must consider reducing crashes involving trucks and ensure that both autos and trucks can move in a safe and efficient manner.

## TRANSPORTATION DEMAND MANAGEMENT

### Needs & Strategies



Transportation Demand Management (TDM) encompasses a set of strategies that increase transportation system efficiency by emphasizing the movement of people rather than vehicles. By promoting transportation choices (including transit, carpooling, walking, and biking), enhancing connections between transportation modes and providing travelers with comprehensive information, the volume of traffic on roadways can be reduced. **Reducing congestion can also improve air quality and health** and the system can become more resilient in the face of short-term disruptions. These benefits keep the region competitive in attracting and retaining employers and the high-quality workforce they rely on.

Secaucus, Hudson County

### Livable●

◀ **Improve health outcomes for the region's residents (Focus Area 12)**

## Efficient●

► Enhance and improve existing public and improve transit services (Strategy 7.4)

## Efficient●

► Reduce transportation petroleum use (Strategy 11.4)

## Livable●

► Use public investment programs to create, connect and strengthen access to opportunity (Strategy 8B.3)

Asbury Park, Monmouth County



A particular focus of TDM strategies is improving access to the transit system, including getting people to and from transit stations, bus stops and park-and-rides—known as “**first-mile**” and “**last-mile**” connections. Strategies include shuttle buses and accommodations for walking and biking. Increasingly ride hailing services such as Uber or Lyft are being looked to as an option for these connections, sometimes subsidized by employers or local governments, particularly for elderly and special needs populations, as discussed below. The City of Summit partnered with Uber to launch the state’s first commuter ride-sharing program. The program offers rides in lieu of parking to city residents with commuter parking permits and subsidized rides to residents and visitors without permits to address a parking shortage around the NJ TRANSIT station. Other TDM strategies include facilitating car- and van-pools and promoting telecommuting, flextime, pre-tax transit passes and other work-related policies. Carpool matching is provided through a statewide website, njrideshare.com.



New Jersey’s eight Transportation Management Associations (TMAs) are dedicated to advancing these and other TDM strategies by working with local governments and companies throughout the region. TMAs also work with residents to provide trip planning assistance, whether by transit, car, bike, or walk; travel training on how to use the transit system for seniors and people with disabilities; and a wide range of pedestrian and bicycle safety programs, including the Street Smart pedestrian safety campaigns and Safe Routes to School. TMAs also work with employers to promote teleworking, flextime, and other **workplace policies that reduce congestion**. They also work with employers new to the NJTPA region or relocating within the region to help their employees reduce their need to commute alone.



Another focus of TDM strategies is helping address **the special mobility challenges facing seniors, low-income people, veterans and people with disabilities**. Lack of the right systems, services and policies can make it difficult for these populations to access employment, health care, education and social support. The NJTPA and its partners throughout the region have prepared a Regional Coordinated Human Services Transportation Plan (CHSTP) that identifies transportation service priorities for meeting the needs of these residents. This plan will help guide NJTPA’s long-term TDM priorities. Recommendations include expanding and coordinating customer information sources, **providing travel training** for customers and social service providers, investing in infrastructure for ADA and pedestrian accessibility, providing increased service to critical destinations like Veterans Administration medical facilities and increasing night and weekend hours for human service shuttles where feasible. The plan will help advance the goals of USDOT’s Ladders of Opportunity initiatives, a FAST Act emphasis on increased access to essential services for all residents, particularly traditionally underserved communities.





Newton, Sussex County

## Implementation

Plan 2045 is committed to advancing TDM strategies through NJTPA planning activities and programs. In particular, the NJTPA administers and coordinates the statewide TMA program, and the agency will continue to support and promote TMA work. In addition, NJTPA's programs for supporting subregional planning emphasize advancing mobility solutions that will improve system efficiency, including locally appropriate TDM strategies. Other support for TDM is provided through NJTPA's ongoing leadership in Together North Jersey, which lays the ground work for community-based development that incorporates TDM strategies.



**Funding support for shuttle buses** is another focus. The NJTPA, in cooperation with NJ TRANSIT, provides federal Congestion Management and Air Quality (CMAQ) funds for a variety of shuttle services across the region.

These shuttles play an important role for local mobility in locations that do not have fixed-route, scheduled transit service, providing first mile and last mile connections. Shuttles are operated by county and municipal agencies, non-profit organizations, and by the TMAs. Continued efforts to explore use of ride-hailing services to supplement or replace shuttles and provide on-demand services should be pursued.

Exploring new mobility options will be important in meeting the recommendations of the Regional CHSTP, which, as discussed previously, seeks to address the needs of seniors, low-income people, veterans, and people with disabilities. The NJTPA will work with its partners to advance these recommendations.

It will also seek to coordinate TDM activities with initiatives to improve transportation systems management and operations that employ Intelligent Transportation Systems (ITS) to manage travel demand, as discussed elsewhere in this chapter.

## Livable●

◀ Use public investment programs to create, connect and strengthen access to opportunity (Strategy 8B.3)



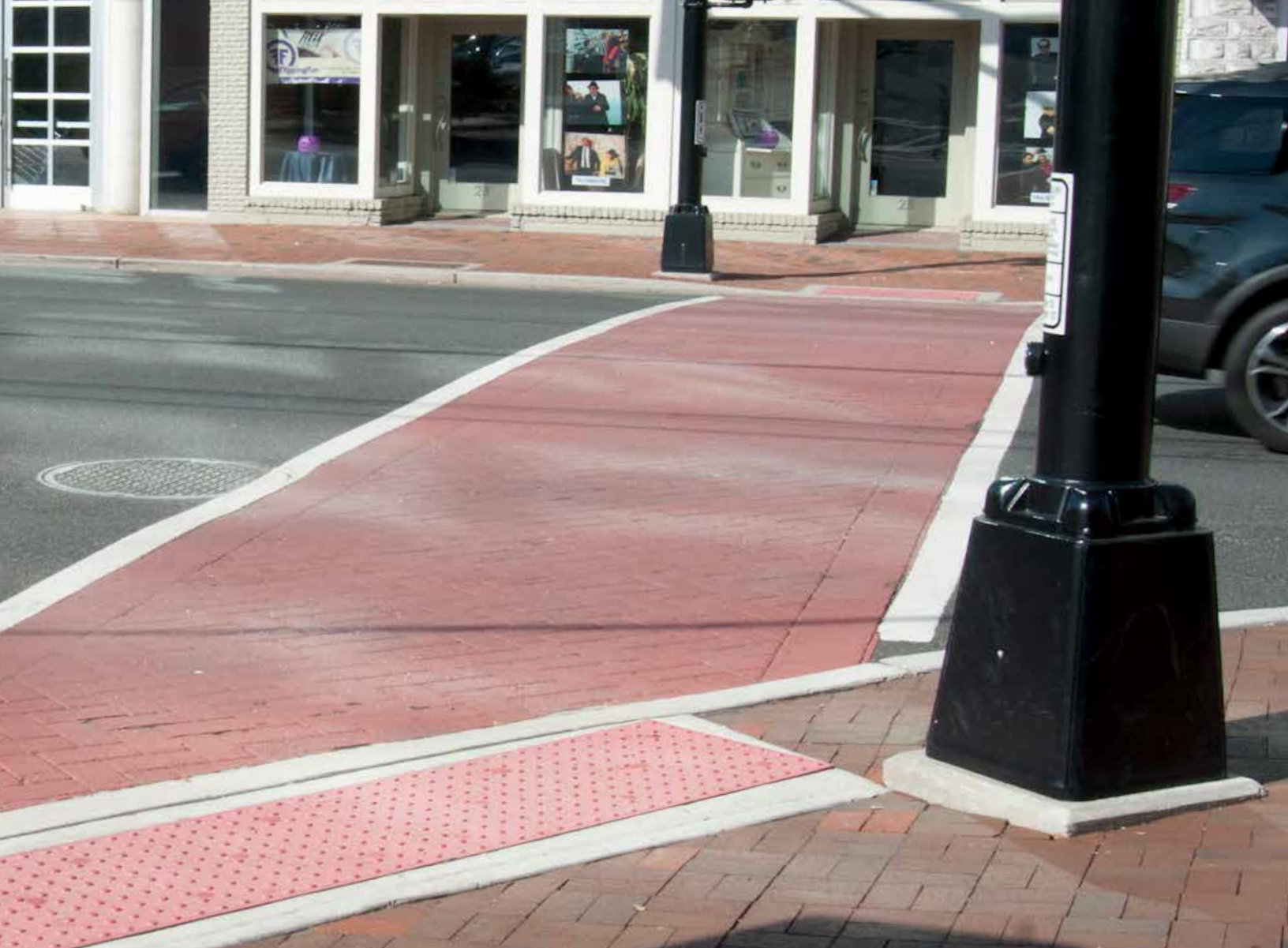
## Red Bank, Monmouth County

### **SAFETY** **Needs and Strategies**

Transportation safety is among the NJTPA's highest priorities. As part of the development of Plan 2045, the NJTPA Board added "Make Travel Safer" to the list of broad goals guiding the NJTPA planning process (see NJTPA Goals p. 8). This goal seeks to "Improve overall system safety, reducing serious injuries and fatalities for all travelers on all modes." To fulfill the goal, Plan 2045 commits to continuing safety investments and support for safety programs in cooperation with partners throughout the region.

But addressing safety issues presents great challenges. Transportation safety involves a complex interaction of human behavior, technology, engineering, education and enforcement as well as the natural environment. And the stakes are high for finding effective solutions. In addition to the tragic human toll of injuries and fatalities, crashes can cause disruptions and delays with far-reaching economic impacts.

Progress is being made. The region's overall crash rates have been steadily declining, even amid growth in both population and vehicle miles traveled. However, crashes resulting in pedestrian injuries and fatalities make up a larger share of the crashes that do occur. Distractions—notably from smart phone use—are



on the rise for drivers and pedestrians alike. Nationally, about 10 percent of fatalities can be attributed to distraction. As mentioned in Chapter 3, FHWA has classified New Jersey as a pedestrian “focus” state and the City of Newark a pedestrian “focus” city because of the high rate of pedestrian fatalities and injuries. The state is also a “focus” state for intersection crashes.

The strategies being pursued by NJTPA to improve safety include the following:



**Improving Local Roads** Sixty percent of serious crashes and fatalities occur on local county and municipal roads, according to the State’s Strategic Highway Safety Plan (SHSP). The NJTPA helps subregions **reduce crashes on county and municipal roadways** through the Local Safety Program, which uses federal Highway Safety Improvement Program (HSIP) funding to support high-impact safety improvements (map, next page). Since 2005, the NJTPA has allocated nearly \$100 million for motorist, bicycle and pedestrian safety improvements on local and county roads including installation of upgraded traffic control and pedestrian count-down signals, new signage and crosswalks, reflective striping, and other measures.

To address crashes in rural areas, the NJTPA launched its High Risk Rural Roads Program in 2009. Since then, the NJTPA has allocated more than \$16 million

### Efficient ●

◀ **Use New Jersey’s Strategic Highway Safety Plan to improve transportation safety (Strategy 7.6)**



## Efficient

► Use New Jersey's Strategic Highway Safety Plan to improve transportation safety (Strategy 7.6)

► Adopt and implement "Complete Streets" policies (Strategy 7.2)

## Livable

► Create safe and healthy buildings, neighborhoods and communities through planning and design (Strat 12.5)

► Expand the use of Crime Prevention Through Environmental Design (CPTED) strategies (Strategy 12.6)

in federal funds to improve safety on crash-prone rural roads. Work supported by this program includes skid-resistant surface treatments, guiderails, reflective pavement markings, rumbles strips and advanced warning signs. The NJTPA also provides planning support to its subregions to meet national standards for signage and road safety and to conduct studies of corridors and high-crash locations. These programs will continue and expand under Plan 2045.



**New Jersey's Strategic Highway Safety Plan** The NJTPA and a broad coalition of state agencies and safety stakeholders partnered with NJDOT to develop this plan, which was completed in 2015. The plan used a data-driven approach to identify the following priority emphasis areas: lane departures, aggressive driving, drowsy and distracted driving, intersections, mature drivers, and pedestrians and bicycles. Infrastructure improvements prioritized in the SHSP include rumble strips to reduce lane departure crashes; roundabouts and high visibility traffic signals to improve intersection safety, particularly for older drivers; traffic calming or road diets to address aggressive driving and better accommodate pedestrians; and sidewalks or curb extensions to address pedestrian safety needs. **The Safety Plan guides all NJTPA safety planning efforts.**



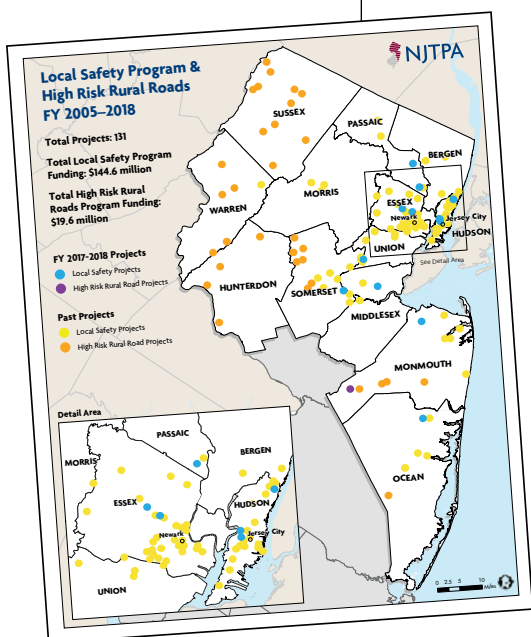
**Pedestrian education and enforcement** The **Street Smart NJ pedestrian safety education and enforcement campaign** is supported by the NJTPA in cooperation with the Transportation Management Associations, law enforcement, community groups, local elected officials and schools. Participating communities have grown to more than 60 in 2017. The campaign works to raise awareness of pedestrian and motorist laws and change behaviors that cause crashes, injuries and fatalities (see Street Smart NJ p. 95).



**Youth safety** The NJTPA, in coordination with the NJTPA and other MPOs in the state, administers the **Safe Routes to School (SRTS) program**, which allocates federal funds to enable and encourage children, including those with disabilities, to walk and bicycle to school. The program funds physical safety improvements (such as crosswalks) as well as pedestrian and bicycle safety education for elementary school children. The TMA's are instrumental in these educational efforts. Street Smart NJ campaigns also include activities at schools and youth centers.



**Crime Prevention Through Environmental Design (CPTED)** This is a set of principles and strategies that enable inter-disciplinary community teams to **reduce actual and perceived opportunities for criminal activity** by integrating safety considerations into community planning and design. Together North Jersey supported two CPTED initiatives, offering training to community teams in Paterson and Newark that resulted in evaluations and recommendations for enhancing community safety, including potential improvements to pedestrian and transit facilities. NJTPA will seek to expand CPTED training opportunities to other communities.





**System Security** In conjunction with safety programs, NJTPA will continue to work with its partners to fund new strategies, technologies and projects that help prevent and better prepare the region for possible security threats. NJTPA will also work to advance projects that address transportation security; to disseminate information on transportation security; to coordinate with state, county and local emergency operations agencies; and to conduct transportation network analyses to determine the most effective recovery investment strategies.

### Implementation

The NJTPA is committed to the ongoing funding of transportation safety programs, projects, studies and educational campaigns that make transportation safer for all users. The RCIS includes investment principles to “Make Travel Safer” and “Support Walking and Bicycling” (see Chapter 4) and calls for NJTPA to allocate approximately 3 percent of overall spending to direct safety improvements, while also fully incorporating safety enhancements in other investments. Safe travel, particularly for walking and biking, are key components of making the region more livable and resilient.

In making safety investments and implementing the safety strategies discussed above, the NJTPA will seek to:

- Expand the capabilities of county and local governments to develop and implement projects through the Local Safety and High Risk Rural Roads programs.
- **Follow the recommended priority improvements** identified in New Jersey’s Strategic Highway Safety Plan
- Reduce the region’s high rate of pedestrian injuries and fatalities, including by continually recruiting and expanding regional partners in the Street Smart NJ pedestrian safety campaign and related initiatives to improve education and enforcement.



Asbury Park, Monmouth County

**Efficient** ●  
 ◀ Use New Jersey’s Strategic Highway Safety Plan to improve transportation safety (Strategy 7.6)



**Sparta, Sussex County**

**Efficient**

► Use technology to improve transportation operations (Strategy 7.7)

- Encourage and support implementation of Complete Streets policies (see sidebar p. 66)
- Integrate safety analysis and design considerations into project concept development studies, subregional planning and TMA work programs.
- Encourage and support safety-related planning through Together North Jersey initiatives including CPTED and other efforts involving arts, housing and other areas.
- Consider freight movement in safety planning studies and programs, including addressing the need for additional truck parking, safeguards at railroad crossings and measures to reduce auto-truck conflicts.



- Take advantage of the latest **technologies to enhance transportation safety**, including working with the private sector to ensure new technologies (including autonomous vehicles) adequately address public safety.

In all these implementation efforts, the NJTPA will work to bolster its ability to monitor and analyze safety conditions on the transportation system. This will allow it to better fine tune its programs and ensure investments are cost-effective. Already, the NJTPA and its partners collect and make extensive use of crash and other safety data in developing and evaluating Street Smart NJ campaigns, Local Safety/High Risk Rural Roads programs and other efforts. This data-oriented approach to safety is becoming more systematic now that federal requirements for safety performance measures have been implemented.

FHWA recently established five national performance measures for the purpose of carrying out the Highway Safety Improvement Program (HSIP) and for State DOTs and MPOs to use in assessing serious injuries and fatalities, and are discussed in the sidebar.

## Street Smart

**P**edestrian safety has become a growing concern not only in New Jersey, but across the country. The number of pedestrians killed in vehicle crashes in the United States jumped 11 percent to nearly 6,000 in 2016, according to the Governors Highway Safety Association. And traffic deaths overall—including drivers and passengers—were up 6 percent nationwide that year, according to the National Safety Council.

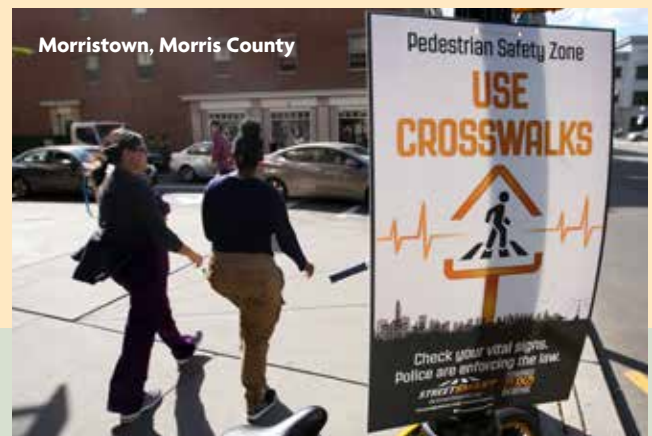
The FHWA has designated New Jersey a pedestrian safety focus state and Newark as a focus city due to high rates of pedestrian injuries and fatalities.

Engineering—like the NJTPA's Local Safety and High Risk Rural Roads Program—and enforcement can make roads safer for all users, but education is also critical. The NJTPA's Street Smart NJ campaign, first piloted in 2013, is a public education, awareness and behavioral change campaign focused on pedestrian safety. It complements law enforcement efforts in communities throughout New Jersey. Since its inception, more than 60 communities have participated in Street Smart NJ, with the goal of increasing that number to 100 in the coming years.

The campaign has five core messages. Motorists are told to Stop for Pedestrians and Obey Speed Limits, while pedestrians are reminded to Wait for the Walk and Use Crosswalks. A fifth message, Heads Up, Phones Down, encourages both motorists and pedestrians to avoid distractions.

The campaign uses street signs, posters, banners, safety tip cards, coasters, cup sleeves and other materials, along with advertising and social media to encourage pedestrians and motorists to practice these safe behaviors.

Street Smart NJ has proven successful. An analysis of pre- and post-campaign data in 2016 found a 28 percent reduction in pedestrians jaywalking or crossing against the signal and a 40 percent reduction in drivers failing to yield to crossing pedestrians or cyclists.



## Toward Zero Deaths

**E**ach year, hundreds of people die in crashes on New Jersey's roads. The state's Strategic Highway Safety Plan adopted a "Towards Zero Deaths" approach to safety, which states that even one traffic-related death is unacceptable. USDOT promotes a "Toward Zero Deaths" approach, while New York City, Boston and other cities have adopted "Vision Zero."

The idea of "zero deaths" may seem highly ambitious, but it is based on the idea that all crashes are preventable

if the right mix of leadership, policies, engineering improvements, education and enforcement are applied together. In 2016, the National Safety Council, the National Highway Traffic Safety Administration, FHWA and the Federal Motor Carrier Safety Administration announced their partnership in the "Road to Zero" initiative, which aims to eliminate traffic fatalities within 30 years. The "Road to Zero" partnership expands beyond transportation agencies to include non-profit groups and technology companies in this coordinated approach to highway safety.



## Newark, Essex County

These safety measure target-setting efforts, together with technologies providing new sources of real time data, will allow NJTPA its regional partners to continue the progress being made ensuring a safe and reliable transportation network for all users.

### **BICYCLE/PEDESTRIAN SAFETY & CONNECTIVITY** **Needs and Strategies**

Walking and biking are integral to regional mobility and contribute to quality of life, economic vitality, healthy living and environmental protection. The NJTPA continues to make increasing the share of walking or bicycling trips a priority, as reflected in the RCIS Investment Principle to “Support Walking and Biking.”

Less than 4 percent of work trips and only 10 percent of non-work trips in the region are made by foot or bicycle. This varies significantly around the region. For example, 9 percent of work trips in Hudson County are made by cycling or walking, while only 1 percent of people in more rural areas like Sussex County walk or bike to work.

Walking and biking are becoming more popular each year, and the demand for safer bicycle and pedestrian facilities is growing. Across all age groups, fewer



Americans are getting drivers licenses, according to a recent study by the University of Michigan Transportation Research Institute. Upgrading facilities to allow bicyclists and pedestrians to safely and conveniently reach transit, shopping, employment, entertainment, and service locations is a NJTPA priority. This supports overall economic development and is particularly important for low-income communities where many people depend on walking and biking for transportation.



Streets with good **bicycle and pedestrian infrastructure strengthen communities** by enhancing safety, equity and civic life. As discussed previously, this plan supports Complete Streets policies, which encourage making walking and biking an attractive mode for short trips and recreation, and creating transportation independence for those who do not drive, such as children, elderly and disabled populations.

Bike share programs are a promising new strategy in densely populated areas. Bike sharing is an innovative way for people wanting to make bicycle trips to simply pick up a bike, use it, and return it within the share system's service area. Bike shares are often combined with other transportation modes (e.g. transit). In Hudson County, Hoboken and Jersey City have bike share programs and Rutgers University is in the process of launching a bike share program concentrated around its New

### Livable●

◀ **Create safe and healthy buildings, neighborhoods and communities through planning and design (Strategy 12.5)**

## Livable ●

► **Improve health outcomes for the region's residents (Focus Area 12)**

► **Create vibrant places and neighborhoods that will attract and retain residents, workers, and visitors (Focus Area 6)**

► **Create vibrant places and neighborhoods that will attract and retain residents, workers, and visitors (Focus Area 6)**

## Efficient ●

► **Reduce transportation petroleum use (Strategy 11.4)**

Montclair, Essex County



Brunswick campus. Asbury Park in Monmouth County also has a bike share programs.



Residents throughout the region are increasingly walking and biking as part of **active, healthy lifestyles**. Plan 2045 supports development of trails that provide opportunities for walking and cycling. Such facilities can link communities, provide recreation and create alternatives to driving. Better connections among modes of transportation, such as transit with cycling, enable residents to get the benefits of walking and bicycling through their daily activities. Moreover, as zero-emission transportation modes, walking and biking contribute to improved air quality and help protect the environment.

## Implementation

The NJTPA will continue to support infrastructure improvements that make biking and walking safer and to improve access to transit for cyclists and pedestrians. Efforts are also underway to create more walking and cycling trails throughout the region, and to create connections between trails and to recreational, employment, residential and other destinations.

The NJTPA will pursue various measures to support walking and biking, including:



- Assisting counties and municipalities with Complete Streets policy development and implementation. This includes land use policies that support walking and biking through **mixed-use development**, particularly in downtown areas and at transit hubs.
- Working with subregions to incorporate bicycle and pedestrian projects into the Transportation Improvement Program (TIP).
- Providing funding for subregional bicycle and pedestrian planning studies.
- Continuing the **Planning for Emerging Centers program**, which assists municipalities in planning for more sustainable, transit-supportive and walkable communities.
- Encouraging expansion of bicycle and pedestrian access to transit, including the installation of bike racks and lockers at stations and other accommodations.
- Supporting expanded bicycle trails and designated bicycle routes including the East Coast Greenway, Morris Canal Greenway (see Morris Canal Greenway p. 105), Union Transportation Trail and 9/11 Memorial Trail.



- Working with partner agencies to ensure improvement projects are designed to **enhance walking and biking opportunities** whenever feasible.
- Continuing to work with partners in Together North Jersey to coordinate efforts to improve walking and biking around the region.

As discussed in the safety section, the NJTPA is also actively engaged in the Street Smart NJ pedestrian safety public education campaign, which aims to improve driver and pedestrian behaviors to make streets safer for everyone. (See Street Smart page 95). The NJTPA will seek to expand this and other educational activities to enhance walking and biking opportunities.



Ringoes, Hunterdon County

## Safety Performance Measures



HWA established five national performance measures for State DOTs and MPOs to use in assessing serious injuries and fatalities.

These performance measures are the five-year rolling averages, on all public roads, of: number of fatalities; rate of fatalities per 100 million vehicle miles traveled (VMT); number of serious injuries; rate of serious injuries per 100 million VMT; and number of non-motorized fatalities and non-motorized serious injuries.

NJDOT, in collaboration with NJTPA, the two other MPOs in the state and the New Jersey Division of

Highway Traffic Safety, set annual targets for each of these measures for 2018. The 2018 targets were set after analyzing past trends in crash data and are consistent with the New Jersey Strategic Highway Safety Plan (SHSP) long-term Towards Zero Deaths goal of reducing serious injuries and fatalities by 2.5 percent each year. These targets, together with technologies providing new sources of real time data, will allow NJTPA and its regional partners to continue the progress being made ensuring a safe and reliable transportation network for all users.





**Aftermath of Superstorm  
Storm in Lake Como,  
Monmouth County**

## **RESILIENCY, CLIMATE CHANGE & AIR QUALITY Needs and Strategies**

The changes in global climate that are projected to occur in coming decades will have a significant impact on the region's transportation infrastructure. The region is expected to see more frequent and intense extreme weather events, rising sea level, record rainfalls, frequent inland and coastal flooding, above average temperatures and more frequent "ozone alert" days. This must all be considered when planning for the future.

The crippling effects of Hurricane Irene and Superstorm Sandy highlighted the need for improved resiliency for the entire multi-modal transportation system. Sandy left a great swath of damage to homes, businesses, the electrical grid and transportation systems across the region. The damage to transportation infrastructure was in many cases unprecedented, severing links critical to the region's mobility, economy and way of life. Years later, the region continues to recover and rebuild from Sandy. The region has also experienced nor'easters that flooded roads, making them impassable and forcing evacuations.

Infrastructure needs to be able to withstand environmental and other disruptions and to quickly resume normal operations. In addition to the impacts of major



storms, more frequent lesser storms and sea level rise will make inundated roads and nuisance flooding more common in the future, leading to regular road closures and ongoing damage and disruption.

The NJTPA will continue to work with partner agencies to assess vulnerabilities and prepare investments and emergency plans to ensure resiliency. Coordinating across state and regional lines is particularly important given the potential for widespread impacts. One notable effort is NJTPA's participation in FHWA's Post Hurricane Sandy Transportation Resilience Study in NY, NJ and CT conducted through a partnership with agencies in the three states, including NJ TRANSIT and the Port Authority of New York & New Jersey. Recommendations of this study must be addressed in ongoing planning and investments. Example strategies include climate-risk-adjusted benefit-cost analyses during the planning phases for adaptation strategies and programming adaptation strategies at appropriate time frames given the possible pace of climate change.



Study of vulnerabilities and resiliency strategies within the region are also important. For example, the NJTPA is coordinating a study to **develop a climate resilience and adaptation plan** for the New Jersey portion of the Passaic River Basin. Other study and planning efforts have been undertaken along

### Resilient

◀ Identify the region's vulnerabilities to extreme weather and climate change (Strategy 10.1)

**Resilient** ●  
▶ **Improve management of stormwater runoff and use green infrastructure solutions to mitigate the impacts of extreme weather and climate change (Strategies 10.4 and 14.1)**

**Mantoloking, Ocean County**



the Jersey Shore and flood-prone areas with involvement of NJTPA subregions. Together North Jersey has also sponsored local studies to explore resiliency, such as in Jersey City and Hoboken. Similar systematic study efforts must continue and be expanded to other areas with greater involvement of local officials and the private sector.

Strategies to address vulnerabilities identified through resiliency studies must be adapted to the circumstances in each locale and on specific facilities. Strategies include:

- Engineering solutions to retrofit bridges and other infrastructure such as the installation of berms and raising of walls to protect the approaches to Route 37 in Ocean County and Route 7 in Hudson County from flooding, as examined during the FHWA resiliency study.
- Building projects with design standards that provide greater protection. For example, protecting roadway embankments from failures due to high winds and flooding and using pavement materials that can withstand extended high temperatures
- Enhancing systems operations, which involves incident management with emergency alerts and messaging about transportation alternatives.
- Collaborating and coordinating among transportation providers, including Transportation Management Associations that operate shuttles and vanpools.



- **Addressing roadway flooding** with gray infrastructure, such as porous pavement; green infrastructure, such as bioswales, which are landscaped areas that collect stormwater; and streetscapes that minimize pavement and use street-tree pits to facilitate infiltration and detention of runoff.

A larger regional strategy involves planning and building system redundancy. This may take the form of emergency management plans that designate alternative evacuation routes or physical upgrades to parallel routes and facilities. The latter can be expensive but may be justified on heavily traveled corridors. One high priority example is the need for redundant rail access to New York City, which would be achieved by the Hudson Tunnel Project, which supports the Gateway Program (see Trans-Hudson Travel p. 58).

Air quality is another key area of concern in the region. The NJTPA has responsibility under federal law for overseeing and supporting efforts to reduce emissions from the transportation sector. This includes using computer modeling to demonstrate that projects in its Transportation Improvement Program (TIP) and long-range transportation plans, like this one, have a net positive impact on air quality and conform to the state goals for achieving its federally mandated standards (called air quality conformity). The NJTPA also has responsibility for allocating federal Congestion Mitigation and Air Quality (CMAQ) funding for projects that reduce emissions and work to improve air quality.

Numerous strategies discussed elsewhere in this chapter can reduce regional emissions, particularly by cutting the number, length and duration of vehicle trips. They include: encouraging the use of public transit and ridesharing; addressing congestion with upgraded road designs, adaptive traffic signals and other improvements; encouraging development that accommodates walking and biking; and many others. In addition, new technologies discussed in this chapter also can

# Transportation Clean Air Measures

**T**he NJTPA continues to fund innovative projects to **reduce transportation-related emissions** through its Transportation Clean Air Measures (TCAMs) Program supported by federal Congestion Mitigation and Air Quality (CMAQ) funds. With guidance from the NJTPA Board and a Technical Advisory Committee, and working closely with regional and local partners, the NJTPA has advanced many priority TCAMS including:

## **Local Traffic Signal Optimization/Adaptive Project**

By more efficiently managing traffic, the systems—as implemented in Ocean County and slated for Newark and Hackensack—have realized significant reductions in congestion, travel time and emissions.

## **North Jersey Regional Truck Replacement Program**

Identified in the PANYNJ's Clean Air Strategy, this program replaces older, polluting drayage trucks (service from an ocean port to a rail ramp, warehouse, or other destination) that serve marine terminals with newer cleaner models. All old trucks are scrapped.

## **Fleet Modernization & Replacement Program for Cargo Handling Equipment**

Identified in the PANYNJ's Clean Air Strategy, this program is replacing about 100 yard tractors and

## **Livable**

◀ **Improve conditions for communities that are disproportionately burdened by air pollution** (Strategy 12.7)

similar pieces of cargo handling equipment at the Port Authority's Marine Terminals with cleaner equipment versions, including alternative powered equipment.

## **Marine Vessel Repower Program**

This program replaces older marine diesel engines with new cleaner versions. Currently this New Jersey Department of Environmental Protection program includes two high-speed catamaran ferries, one excursion vessel, and three commercial fishing vessels.



improve air quality, including encouraging use of alternative fuel vehicles and systems to achieve more efficient freight distribution. All these efforts also are valuable in helping to reduce greenhouse gas emissions, which must remain a regional priority in cooperation with state and local agencies.

The NJTPA is working with communities and organizations in the region to encourage use of alternate fuel vehicles. The NJTPA is partnering with three pilot municipalities (Montclair, Secaucus and Woodbridge) to develop local readiness plans to facilitate the use of electric and natural gas vehicles in those communities. The plans will consider how municipal regulations and infrastructure can be improved

to advance the use of alternative fuel vehicles, including a review of local zoning and land use ordinances, permitting requirements and potential locations for infrastructure. In addition, some general guidance is being developed for any town to use.

### Implementation

The recognition of regional vulnerabilities after Sandy resulted in greater commitments by the NJTPA and its partner agencies to integrate resiliency into all transportation planning and programming activities. For Plan 2045, the NJTPA added an RCIS resiliency principle which states, “Investments should be made to mitigate risks associated with climate change, extreme weather, homeland security, and other threats. Investments should consider criticality of infrastructure, vulnerability and level of risk.”

In keeping with this principle, the NJTPA will pursue the following measures to implement the resiliency strategies discussed above:

- Continue to fund capital projects to address damage from Sandy and prepare roads, the transit system and other infrastructure for future events;
- Work with partners to address recommendations of the FHWA study following Sandy and other resiliency studies.
- Support and assist efforts to address the resiliency recommendations of the Together North Jersey plan, including working with partners through the Together North Jersey resiliency task force.
- Encourage resiliency to be considered in all subregional and TMA grant and study programs administered by the NJTPA.
- Work with state and local emergency management agencies to assist in preparing plans for disruptive events and minimizing impacts.
- Advance the use of alternative fuel vehicles by encouraging communities to adopt compatible local zoning and land use requirements and install fueling infrastructure, following guidance drawn from NJTPA’s alternative fuel pilot projects.
  - Continue funding **projects that reduce emissions and improve air quality** through the Transportation Clean Air Measures Program (see Transportation Clean Air Measures p. 103). These have included replacement of trucks and construction vehicles with lower-emissions equipment; installation of cleaner-burning ferry engines; and installation of adaptive traffic signal systems.



- Update the Regional Greenhouse Gas Inventory and Mitigation Plan. This data can assist in evaluating strategies to reduce greenhouse gas emissions in all phases of transportation project development.

For all these measures, the NJTPA will seek to involve a wide range of public and private partners in keeping with NJTPA’s role as coordinating body, forum for information exchange and data repository. Additionally, certain Sandy recovery projects will be completed in the near term by the Port Authority and NJ TRANSIT, including repair, restoration and replacement of damaged facilities, replacement of damaged equipment, hardening of certain facilities, backup equipment purchases and creation of a microgrid for NJ TRANSIT.

### Livable●

► **Improve conditions for communities that are disproportionately burdened by air pollution (Strategy 12.7)**

Franklin Township,  
Somerset County





Little Falls, Passaic County

## Morris Canal Greenway

**P**edestrians and cyclists could one day be able to closely follow the route of the historic Morris Canal, winding their way from Liberty State Park along the Hudson River to the Delaware Water Gap.

The NJTPA launched a year-long study in July 2017 to explore the steps necessary to create a public greenway that spans six counties in North Jersey.

Some portions of the canal have been preserved, like Waterloo Village in Byram Township, Sussex County. Visitors can explore the restored buildings and walk along the canal path, getting an idea of what life was like in a 19th century canal town. In other places along the canal's route, county and local officials have worked to create parks and trails. But these trails lack linkages and much of the canal pathway remains incomplete and inaccessible.

The Morris Canal Greenway Corridor Study will build on past planning studies supported by the NJTPA. It



Clifton, Passaic County

brings together a broad group of stakeholders, including local, county and state officials, non-profit organizations, community groups and members of the diverse Morris Canal Working Group, which is dedicated to preserving and celebrating the historic canal.

The canal was a technological marvel when it opened in the early 1830s. Through a series of 23 lift locks and inclined planes, the canal overcame an elevation change of 1,674 feet, carrying coal 102 miles across North Jersey from the Delaware River to New York Harbor.

By the early 1900s trains made the canal obsolete. Although it shut down in 1924, the canal remains an important part of the region's history. Segments of the canal have also found new life as a popular recreational greenway in several communities.