



Transit Priority / Transit-Supportive Roads (TR-1)

Public Transit

Needs Addressed

Transit crowding, unreliable transit, long and uncompetitive transit travel times, congested and unreliable roadways (by encouraging shifts to transit).

Specific Strategies

Dedicated lanes, business and access transit (BAT) lanes, bus on shoulder treatments, transit signal priority, queue jumps, and other bus rapid transit (BRT) support facilities; express/limited-stop service. New HOV lanes with access to buses.

Complementary Strategies

Other types of projects within which transit priority improvements could be incorporated:

- Roadway repaving and restriping.
- Intersection improvements.
- Signal upgrades.

Related Projects

Similar current or planned regional projects that could guide future projects:

- Go Bus 28, Essex County – current bus service incorporates transit signal priority along Bloomfield Avenue.
- Route 9, Middlesex and Monmouth Counties – current peak period service uses shoulders; transit signal priority/queue jumps are planned.
- Bergen County BRT – planned service would include transit signal priority/queue jumps.

Locations to Consider

- Roadways with congestion, poor reliability, available right-of-way (ROW)/capacity and high transit frequency.

- Roadways serving transit routes with poor on-time performance.

Travel Market Considerations

- Consider routes serving high levels of vulnerable populations who would benefit from faster and more reliable transit.
- Emphasize the important objective of enhancing job access via transit.

Benefits

- Improves accessibility to destination by reducing transit travel time (more destinations accessible in same travel time).
- Enhances transit reliability (on-time performance).
- Enhances usability of transit.
- Optimizes existing roadway capacity by increasing transit ridership and passenger throughput.

Costs

- Relatively low for lane striping and other treatments.
- Medium when incorporating BRT support facilities.

Responsible Organizations

Agencies that may be involved in planning and design, as well as project review, approval, or permitting:

- NJDOT – responsible for roadway construction, maintenance, and operations.
- NJ TRANSIT – responsible for bus stations / stops, service planning, and operations.
- Municipalities – responsible for station / stop location, design, and access; coordination with local businesses and communities.

Assessment Factors

- How many riders would benefit?
- What are the current peak traffic conditions and transit travel times?
- What is the potential for decreasing transit travel times and improving reliability?
- Is it feasible to implement improvements while minimizing traffic impacts? What are impacts on on-street parking, loading zones, etc.?
- Are the improvements likely to attract new transit ridership?

Potential Funding Sources

Possible sources of federal and state funding for improvements:

- National Highway Performance Program (NHPP), if on NHS/federal aid roadway.
- Congestion Mitigation and Air Quality Improvement (CMAQ) Program.
- Surface Transportation Block Grant Program (STBG) – flexible funding to preserve/improve conditions/performance for federal-aid roadways.
- State Transportation Trust Fund – engineering, construction, reconstruction, or repair.
- FTA Small Starts under Capital Investment Grants Program.

Implementation Issues

Planning and design issues that may need to be considered:

- Develop a comprehensive planning approach, addressing infrastructure and operational issues.
- Conduct thorough analysis along proposed routes to ensure optimal traffic flow and safety.
- Provide good delineation of bus lanes, perhaps using red paint.
- Realize that transit signal priority is an ongoing process, requiring continuous monitoring and adjustment.

Best Practices / Links and Lessons

- [Bus Rapid Transit \(BRT\) Roadway Infrastructure Design and Best Practices](#), American Public Transportation Association, 2024. This white paper presents results of case studies and a survey of several agencies that have implemented transit priority. It includes summary information on key decisions, potential conflicts including safety issues, lessons learned, and key elements of success, along with planning and design guidance for bus lanes and technological applications.
- [Transit Priority Strategy](#), Massachusetts Bay Transportation Authority, 2023. This information features a “Bus Priority Toolkit” document, which provides guidance on how to incorporate bus priority treatments into other types of projects, e.g., repaving projects. It also identifies various types of street categories and different considerations for each, and it includes sections on planning and design for bus lane treatments, transit signal priority, and bus stop treatments, along with planning and engagement.
- [Transit Priority Best Practices](#), Southern California Association of Governments (SCAG), 2022. This document includes background planning information including estimating travel time savings, and it has sections that provide information on design elements for bus lanes, transit signal priority, queue jumps, and all-door boarding / off-board fare collection, as well as operational and service adjustments.
- [Flexible Funding Process Guidebook](#), FTA, 2024. Flexible funding supports a wide range of transit-related projects including capital improvements, accessibility enhancements, Transit Oriented Development (TOD) planning, and pedestrian / bicycle infrastructure within proximity to transit stops.



Improve Bus Stop Infrastructure / Amenities (TR-2) *Public Transit*

Needs Addressed

Need for supportive transit infrastructure; lack of shelter, shade, lighting, or other conditions that are important for transit riders, especially vulnerable population segments, such as older adults and persons with disabilities.

Specific Strategies

Add benches, bus shelters, sidewalks and ADA improvements, lighting, improve placement and design of bus stops, schedule information, and/or real-time bus information.

Related Projects

- Better Bus Stops, Metro Transit, Minneapolis – St. Paul, MN. This program has a plan for specific improvements including concrete boarding pads, shelters, lighting, pedestrian improvements, and transit information.
- Bus Stop Improvement Plan, SamTrans, San Mateo County, CA. This plan identifies preferred bus stop features and amenities and presents a plan for improvements across the system.

Locations to Consider

- High transit ridership locations.
- Areas with high numbers of persons aged 65+.
- Areas identified by local stakeholder.

Travel Market Considerations

- Strive for universal access to accommodate people with disabilities, seniors, and limited-English proficiency riders. Recognize that some communities may be less likely to request bus shelters or related infrastructure, so take proactive

steps to ensure these areas receive comparable quality and attention in bus stop improvements.

Benefits

- Enhances usability of transit, making transit more comfortable and attractive.
- May increase transit ridership, helping to optimize roadway capacity.
- May improve safety and security.

Costs

- Relatively low (plus on-going maintenance costs).

Responsible Organizations

Requires coordination between:

- NJ TRANSIT – installs and maintains bus stop signs and poles, provides funding for shelters.
- Municipalities – approves stop locations, approves shelters and maintains repairs, and replaces them, if needed.

Assessment Factors

- What is the level of current transit service?
- What is the current and potential ridership?
- What are the conditions of facilities?
- Are there safety or security issues?

Potential Funding Sources

- NJDOT, Safe Streets to Transit – provides funding to counties and municipalities to improve access to transit facilities and transit nodes.
- NJDOT, Transit Village Initiative – provides funding to designated Transit Village municipalities for improving pedestrian or bicycle connections to a transit facility or within the Transit Village.
- FTA, Grants for Buses and Bus Facilities Program - provides funding for buses and bus-related facilities.

Implementation Issues

- While NJ TRANSIT will, upon request, install a bus shelter, including a concrete pad, the requesting municipality must assume responsibility for maintenance and liability for the shelter.
- Bus shelters may not be necessary at every bus stop, but seating and route information should be considered at all stops.
- Land use and pedestrian crash data analysis can help to inform the prioritization for bus stop needs and safety improvements especially where there are issues related to access.
- Supportive / complementary pedestrian / bicycle / micromobility infrastructure and safety countermeasures are important elements to improving bus stop access and utilization.
- Parking / lane / curb management policies that reduce route operations delay, especially in urban areas, should be encouraged.
- Transit Priority / Transit Supportive Roads projects should be complemented by improved bus stop facilities where possible to incrementally support ultimate development of bus rapid transit (BRT) corridors.

Best Practices / Links and Lessons

- Needs and strategies for older adults and persons with disabilities with relation to transit are outlined in the [NJTPA Coordinated Human Services Plan](#) and 2023 Update Memo.
- [Bus Stop Design and Placement Security Considerations](#), American Public Transit Association (APTA), 2010. This document establishes recommended practices for designing, installing, and maintaining bus stops. It identifies factors to consider in selecting stops at which to install amenities, and it describes design considerations for shelters, benches, and customer information systems such as signs and message boards.
- [Bus Stop Safety Toolbox](#), NJTPA. This document provides information on design elements, as well as guidelines for providing amenities including lighting, shelters, benches, and information. It identifies criteria for identifying a good bus stop location, and it provides information on bus stop spacing, placement, configuration, signage, accessibility, signals, lighting, shelters, benches, and communication.
- [SEPTA Bus Stop Design Guidelines](#), Delaware Valley Regional Planning Commission (DVRPC), 2019. [SEPTA Bus Stop Design Guidelines](#) The purpose of this document is to provide a consistent set of guidelines for designing surface transit stops. The document includes information about curbside design, including ADA considerations, and other elements including street furniture, public art, and customer information.



Support Mobility-impaired Accessibility (TR-3)

Public Transit

Needs Addressed

Need for additional services or multimodal connections to enable use of transit for entire trips. Reverse commute challenges. Need for supportive transit infrastructure.

Specific Strategies

Americans with Disabilities Act (ADA) accessibility improvements, ramps, curb cuts, elevators at stations, as well as crosswalks near transit with audible signals, etc., paratransit and targeted service, possible new service models.

Related Projects

- NJ Travel Independence Program @ Rutgers. Travel instructors work with government agencies, community organizations, and schools to teach travel skills for public transit. Customers learn how to read bus and train schedules, plan trips, pay fares, and take safety precautions.
- Station Accessibility Program, SEPTA, Philadelphia, PA. SEPTA is planning to invest over \$1 billion to make its rapid transit and commuter rail stations accessible for all.
- EZ Ryde4Life program, EZ Ride. This program offers a demand-responsive service in partnership with transportation network companies such as Uber and Lyft throughout New Jersey.
- NJ TRANSIT rail station improvements including Brick Church, Anderson Street, New Bridge Landing, and Bradley Beach.

Locations to Consider

- Commuter rail stations with identified ADA access limitations.

Travel Market Considerations

- Strive for universal access to accommodate people with mobility, vision, and hearing disabilities.

Benefits

- Improving access and mobility for people with limited transportation options to reach essential destinations such as jobs, healthcare, and grocery store may benefit other users such as parents pushing strollers, children/families, etc.
- May improve multi-modal safety, ADA compliance assessments often reveal missing or noncompliant pedestrian infrastructure—such as curb ramps, sidewalk gaps, or poor surface conditions.

Costs

- Relatively low to high.
- ADA improvements to stations can be expensive.

Responsible Organizations

Many different agencies are responsible for different facilities and may need to coordinate:

- NJDOT – responsible for state roadways.
- NJ TRANSIT – responsible for rail stations, bus, and paratransit operations.
- Port Authority of New York and New Jersey – responsible for rail stations and ferry terminals.
- Counties – responsible for county roads; provide shared-ride paratransit services.
- Municipalities – responsible for municipal roadways, shelter maintenance; provide shared-ride paratransit services.
- Transportation Management Associations – may provide on-demand, trip planning assistance, mobility guides, and other services.

Assessment Factors

- What are the locations with a higher-than-average number of older and disabled persons?
- What are key destinations, such as shopping areas, medical services, and community / civic uses?
- What are the current levels of transit service and amenities?

Potential Funding Sources

- FTA, Enhanced Mobility of Seniors and Individuals with Disabilities – Section 5310 (formula).
- FTA, Innovative Coordinated Accessibility and Mobility Grants.
- FTA, All Stations Accessibility Program (ASAP) – provides competitive grants to transit agencies to upgrade rail stations to make them accessible for persons with disabilities.
- USDOT, ATTAIN – provides funding for mobility access and on-demand transportation service technologies, such as dynamic ridesharing and other shared-use mobility applications and information systems to support human services for elderly and disabled individuals.
- NJ TRANSIT / NJTPA, Local Mobility Initiatives Program (funded by federal CMAQ funding) - provides funding for innovative local shuttle bus services.
- Strengthening Mobility and Revolutionizing Transportation (SMART) grant program under IIJA – provides grants for advanced smart community technologies and systems to improve efficiency, including considerations to people with disabilities.

Implementation Issues

- Need to engage clients to obtain insights and experiences for planning new or improved services.
- Work with clients to help them to understand their travel options and how to access them, provide one-on-one assistance, as possible.

Best Practices / Links and Lessons

- Needs and strategies for persons with disabilities with relation to transit are outlined in the [NJTPA Coordinated Human Services Plan and 2023 Update Memo](#).
- [Improving Pathways to Transit for Persons with Disabilities](#), Mineta Transportation Institute, 2016. This document presents the results of case studies that have been effective in improving transit accessibility. The efforts undertaken can be viewed via their area of impact, including corridor Improvements, complete streets, evaluation and planning, station or stop improvements, and travel training.
- [Technical Assistance Brief: Microtransit Accessibility](#), National Aging and Disability Transportation Center (NADTC), 2023. This document identifies considerations for accommodating people with disabilities and older adults on microtransit, including whether advance notification times can be customized to meet rider needs, whether transit vehicles can meet riders at the curb by their building, and whether the system can accommodate riders who need longer times to board or alight.



Add/Improve First-Last Mile Access (TR-4)

Public Transit

Needs Addressed

Need for additional services or multimodal connections to enable use of transit for entire trips. Reverse commute challenges.

Specific Strategies

Feeder bus / shuttle services, enhanced pedestrian, bicycle, or micromobility connections to transit stations and stops.

Related Projects

- Essex Night Owl service, Newark, EZ Ride. This shuttle service runs between residential locations and Newark Penn Station to connect with bus service to EWR and PATH service to New York City.
- GoLink, DART, Dallas, TX. This program utilizes on-demand shared mobility services to connect riders to underutilized fixed-route transit services.

Locations to Consider

- Rail stations with limited bus service frequency or multimodal connections.
- Bus stops at major activity centers or along corridors with frequent service.
- See CMP analysis for areas to consider – Stations with substantial commuters with residences or jobs within 1 -2 miles radius.

Travel Market Considerations

- First-mile last-mile access is often a particular barrier for low-income and zero vehicle households, who cannot access jobs or other destinations in suburban areas, particularly during off-peak hours. In prioritizing services, consider

needs for these populations, particularly at employment outside of central business districts.

Benefits

- Improves accessibility to destinations by transit.
- Provides access for all, regardless of circumstances.
- Encourages increased transit ridership, helping to optimize roadway capacity.
- Supports pedestrian and bicycle activity, which may benefit non-transit users as well.
- Encourages increased transit ridership, helping to optimize roadway capacity.

Costs

- Relatively low to moderate.

Responsible Organizations

Many different organizations can play a role in supporting first-mile/last-mile access, including:

- NJ TRANSIT – operates and provides funding for local services.
- NJTPA – administers CMAQ program and Local Mobility Initiatives program in coordination with NJ TRANSIT.
- Private transportation service providers – operate some local transit services.
- Transportation Management Associations – some assist in planning and operating local shuttle services.

Assessment Factors

- What are the current transit services?
- What are the key origins and destinations that may not be fully served?
- What is the estimated demand for supplemental services?

Potential Funding Sources

- NJ TRANSIT / NJTPA, Local Mobility Initiatives Program (funded by federal CMAQ funding), provides funding for innovative local shuttle bus services as well as e-bikes, scooters, and parking.

Implementation Issues

- Service planning could use spatial gap analysis, which incorporates socio-economic and locational characteristics of potential riders.
- Implementing new technological applications in phases would provide the opportunity to troubleshoot any issues, as needed.
- Identify safety, complete street and bicycle, pedestrian and micromobility improvements that can support access to key transit stop locations targeting first / last mile access enhancement.
- Seek upgrades to weather protective shelters and customer amenities at key first / last mile stops.
- Incorporate transit friendly design principles into land use policies that promote improved stop conditions and access.

Best Practices / Links and Lessons

- [*First Mile, Last Mile: How Federal Transit Funds Can Improve Access to Transit for People Who Walk and Bike*](#), Advocacy Advance, 2014. This guide focuses on bicycle and pedestrian improvements, such as bicycle lanes, bicycle parking, bicycles on transit vehicles, pedestrian facilities, and ADA improvements. It also provides information on policies, advocacy campaigns, and funding sources.
- [*First Last / Mile Solutions \(webpage\)*](#), American Public Transportation Association (APTA). This webpage presents various case studies largely involving shared use mobility, micromobility (including a bikeshare system), and microtransit.
- [*Connecting Travelers to Transit with First-Mile/Last-Mile Solutions*](#), USDOT. This document describes how a first-mile/last-mile solution was implemented successfully in the Dallas area; how the project secured buy-in from key stakeholders; the benefits for commuters, system operators, and the agency; and the lessons learned from designing and implementing the program.



Fare, System Interconnectivity (TR-5)

Public Transit

Needs Addressed

Lack of connectivity between transit services and systems, lack of fare integration and transfers between different service providers, need for simpler, consistent, and equitable, fare and payment options.

Specific Strategies

Improve coordination of scheduling, fares, and transfers; increase use of passes and automated fare purchase and payment; implement unified one-payment fare system, provide all-agency transit passes.

Related Projects

- OMNY, New York City. This contactless payment system enables riders to pay with a credit card or mobile device to ride on various systems.
- One Fare Program, Toronto Transit Commission (TTC). TTC riders using a fare card or smart device can transfer for free between the TTC and other services.
- Clipper® BayPass pilot program, San Francisco. The program is providing a group of test users with free access to all bus, rail and ferry services in the region and is designed to measure how an all-system pass could impact travel in the region.

Locations to Consider

- Systemwide, addressing connections between NJ TRANSIT rail and bus, PATH, MTA subways, ferries, and other options.

Travel Market Considerations

- Could consider fare policies that offer lower fares for low- income populations. Consider how fare

transfer policies affect different socio-economic groups.

Benefits

- Provides access for all, regardless of circumstances.
- Enhances the usability of public transit, including connectivity of services and efficiency and convenience of transfers.
- Encourages increased transit ridership, helping to optimize roadway capacity.

Costs

- Potentially high; requires fare and revenue coordination.

Responsible Organizations

- NJ TRANSIT
- Other transit agencies

Assessment Factors

- What is the location of key connection / transfer points among transit services?
- What is the usage for transfers among services?
- What is the potential demand for increased transfers among services?
- How can fare policy and pricing help serve travelers that must use multiple services?

Potential Funding Sources

- USDOT, ATTAIN – provides funding for projects to install and operate advanced transportation technology, including electronic pricing and payment systems.
- FTA, Enhancing Mobility Innovation program – provides funding for technology projects that focus on the traveler experience and encourage ridership, including integrated fare payment systems.
- New Jersey Transportation Trust Fund. Other sources such as ballot initiatives and local option tax, advertising, issuance of bonds.

Implementation Issues

- Upgrading fare technologies is a large financial investment – improved fare technology may be cost prohibitive.
- Updated fare technologies (such as those that use smart cards or cell phones) come with increased costs for users, which can cause pushback from transit riders and potential equity issues.
- Fare policy should balance revenue objectives with rider needs and try to avoid policies that are confusing and / or regressive.
- Because of their impact on the overall transportation system, transit fare policies affect all travelers within an area, managing these policies effectively is essential for the region.

Best Practices / Links and Lessons

- [*New Fare Payment Systems and Payment Technology, National Center for Applied Transit Technology \(N-CATT\), 2022.*](#) This guidebook is a reference for considering innovative fare technology. The first section describes fare systems, payments, and policies that serve as the foundation of new fare technology. The second section provides insights from agencies who have deployed different types of fare payments or systems. The final section focuses on preparing for new fare payment technology deployment.
- [*Bay Area Transit Fare Coordination & Integration Study & Business Case, Metropolitan Transportation Commission, 2021.*](#) This study developed goals for a regional fare system that will improve the passenger experience and promote higher ridership across the region's 27 different transit operators. Based on the study's findings, the Fare Integration Task Force adopted a policy vision statement which guides ongoing work by MTC and transit operators in advancing transit fare policy initiatives.
- [*Integrated Fare Payment and Mobile Ticketing, ITS Deployment Evaluation, USDOT, 2020.*](#) This briefing paper provides a summary of work related to "Mobility Payment Integration" (MPI), which refers to a suite of advances in fare collection that collectively work to make it easier for users to pay for multiple modes of transportation. It provides information on agency costs, benefits, and challenges in implementing such technology.
- [*A Fare Framework, TransitCenter, 2019.*](#) This report profiles three transit agencies who have established "rider-friendly" principles to guide fare policy. It identifies examples of counterproductive fare policies, including transfer fees, distance-based fares, regressive fare pricing (higher costs per trip for lower-income riders), and fare evasion penalties, and recommends approaches to address these issues.
- [*NCHRP Report 101, Toolkit for Rural Community Coordinated Transportation Services*](#) gives transportation system planners, operators, and funders information on how to coordinate transportation services in rural communities and presents information needed for implementation as well as successful case studies.



Source: Google Streetview

Park-and-Ride Enhancement/Expansion (TR-6)

Public Transit

Needs Addressed

Limited available capacity to support potential public transit and carpooling options. Many current facilities are near or at capacity.

Specific Strategies

Expand capacity of existing park-and-ride facilities, add new facilities, enhance amenities at or near facilities, adjust transit schedules as needed to serve facilities, improve multi-modal connections, provide enhanced real-time information on parking availability and next train/bus information.

Related Projects

- Avandale Park-and-Ride, Winslow, NJ. As part of the early phase of implementing South Jersey Bus Rapid Transit (SJBRT) service, NJ TRANSIT plans to add 150 parking spaces to this facility. Other improvements will include an improved boarding area and shelter, improved lighting, and an improved communications system. The planned SJBRT system also will include two new park-and-ride facilities.
- Applegarth Park and Ride improvements, Monroe Township. The facility improvements including concrete and parking improvements, a new larger shelter, and lighting upgrades. The facility improvements include concrete and parking improvements, a new larger shelter, and lighting upgrades.

Locations to Consider

- Potential new locations in suburban/rural areas with potential for demand for commuter bus services.

Travel Market Considerations

- Ensure universal access so people with disabilities can access transit from parking spaces. Balance parking demand with other ways to access transit that may benefit households without vehicles.

Benefits

- Improves accessibility to destinations.
- Supports alternatives to driving alone and the usability of public transit.
- Encourages increased transit ridership, helping to optimize roadway capacity.
- May support pedestrian and bicycle activity, which may benefit non-transit users as well.

Costs

- Low to Medium-high (depend on station context, available land, types of enhancements).

Responsible Organizations

- NJDOT – may own property for current or potential park-and-ride facilities.
- NJ TRANSIT – provides services to and from park-and-ride facilities.
- Private bus operators – provide services to and from park-and-ride facilities.
- Municipalities – may need to revise plans / ordinances to authorize and support park- and-ride facilities.
- Transportation Management Associations – help administer the statewide New Jersey Rideshare carpooling and vanpooling service.
- Private property owners – may own property for potential park-and-ride facilities.

Assessment Factors

- What is the presence of current transit services that serve the park-and-ride facility?
- What is the nearby residential population who may use the facility?
- What is the potential use of the facility and increase in transit ridership?
- What other options, such as pedestrian, bicycle, micromobility options, shuttles, or micro-transit could be applied instead of adding parking capacity?

Potential Funding Sources

- FTA, Grants for Buses and Bus Facilities Program – provides funding for buses and bus-related facilities.
- Federal Congestion Mitigation and Air Quality Improvement (CMAQ) program.

Implementation Issues

- There is a need for both long-range and site-specific planning. Lots should be designed to minimize the impact on surrounding land uses.
- Lots should be strategically located to draw customers. Ease of access is an important factor in whether customers will take advantage of the services offered at the lot.
- Data needs include demographic and regional data such as mapping of major employment centers and service attractors. Data collection also may involve origin and destination surveys and catchment zone analysis to determine the number of potential customers.
- Customers may access park-and-rides in different ways, so there is a need for safe access for pedestrians, bicycles, the automobile, and those passengers transferring in from neighborhood feeder services. Planners should design the routes and bus bays while considering transfer service.

Best Practices / Links and Lessons

- *Decision-Making Toolbox to Plan and Manage Park-and-Ride Facilities for Public Transportation: Guidebook on Planning and Managing Park-and-Ride*, [TCRP Research Report 192, 2017](#). This guide includes a chapter on strategic planning. Among the key considerations are how do the transit service characteristics affect park-and-ride planning, how to estimate demand, and how to decide what type of facilities and ownership structure to use.
- *Identifying Opportunities for Expanded Park-and-Ride Capacity in South Jersey*, DVRPC, 2016. [Identifying Opportunities for Park and Ride Capacity in South Jersey](#) This study involved assessing potential new park-and-ride locations, and it identified 11 sites for future consideration. The report describes the benefits of park-and-rides, identifies three types of facilities, and key factors in identifying suitable sites. These factors include adaptability, proximity, site accessibility, visibility, safety, demand, and context.
- *Park-and-Ride Lots* (webpage), Transportation Policy Research Center, Texas A&M Transportation Institute. [Park-and-Ride Lots – Transportation Policy Research](#) This webpage includes many types of useful information including the types of park-and-ride lots, the target market, benefits, application techniques and principles, data needs, issues, costs, timeframes, and implementation examples.
- *Planning a Park-and-Ride System Literature Review*, MDPI, 2021. [Planning a Park and Ride System: A Literature Review](#) This paper presents the results of a comprehensive analysis of the available literature on P&R system planning, and studies that consider the planning sections separately are to be part of the complete research. It concludes that the planning of P&R facilities should not be regarded as a separate mobility design element but rather should be viewed as an essential component integrated into the city's urban environment.



Expand / Enhance Bus Service (TR-7)

Public Transit

Needs Addressed

Trans-Hudson capacity, transit crowding, transit reliability issues, long and uncompetitive transit travel times, reverse commute challenges.

Specific Strategies

Increase service frequency, extend hours of operation, extend routes, add stops, add new routes, consider new service models, e.g., specialized or dynamic reverse commute services, expansion of on-demand service.

Related Projects

- MTA, New York City – MTA is planning to increase bus service on 16 local routes across Brooklyn, Queens, the Bronx, and Staten Island beginning in June 2025.
- On-demand rideshare service where there are limited access to public transportation including Jersey City service provided by Via.
- LA Metro's NextGen Bus plan doubled the number of frequent Metro Bus lines and improved and expanded midday, evening and weekend service.

Locations to Consider

- Refer to CMP needs assessment for specific locations to consider.

Travel Market Considerations

- Many transit services are geared toward typical rush-hour commuters, and do not effectively serve low-income workers and other populations that work during off-peak hours/late night or have reverse commutes. Affordable, convenient local

and intercity access is needed for a variety of trip types (e.g., employment centers, medical centers, recreational opportunities, schools). Consider these population needs.

Benefits

- Improves accessibility to destinations.
- Provides access for all, regardless of circumstances.
- Enhances usability of public transit.
- Encourages increased transit ridership, helping to address traffic congestion.

Costs

- Medium (depends on level of enhancement, new services).

Responsible Organizations

- NJ TRANSIT – responsible for stations and stops, service planning, and operations.
- Municipalities – responsible for station and stop location, design, and access.
- Private bus operators

Assessment Factors

- What are the current transit services and what are the expansion possibilities?
- What is the current peak transit ridership, and what is the potential for attracting new ridership?
- Is there sufficient demand for fixed route service?
- What are the development densities and the key origins and destinations for potential service?
- What is the potential for linking increased service with multi-modal access including park-and-rides, pedestrian facilities, and bicycle facilities?

Potential Funding Sources

- FTA, Areas of Persistent Poverty Program – provides funding for planning, engineering, and technical studies or financial planning to improve transit services in any areas experiencing long-term economic distress, in rural and urban communities alike.
- FTA Capital Investment Grants (CIG) – Smart Grant Program can support expansion of bus and bus rapid transit. Small start is a simplified and potentially expedited approval process for small starts projects within the CIG program.
- FTA Job Access and Reverse Commute (JARC) program support transit projects for employment related trips especially for low income and welfare recipients Subscription revenue, example from services such as VIA/ Boxcar.

Implementation Issues

- Financial constraints typically limit the extent of possible improvements. Many agencies distinguish between the service that they can provide with current resources and the service that they hope to provide in the future with additional funds.
- It is important to recognize an inherent conflict between the objectives of increasing ridership and increasing service coverage. These objectives require opposing network design approaches. Providers must determine which objectives deserve priority.
- Selected roadway design upgrades, operational

improvements and/or transportation demand management policies will better support bus service reliability for customers while helping agencies optimize vehicle and staff use to control costs.

- Land use practices that support concentrated development and transit friendly design will increase ridership performance and market access opportunities to support enhanced services.

Best Practices / Links and Lessons

- *Transit Manager's Toolkit*, Rural Transit Assistance Program, 2024. [Transit Manager's Toolkit](#) The planning and evaluation section of this document covers developing, designing, and delivering community transportation services. It discusses fundamental operations components, planning and evaluating services.
- *Data Practices, Chapter 4* (webpage), National Center for Applied Transit Technology (NCATT). [Chapter 4 - Planning and Performance Monitoring - N-CATT](#) This on-line guidebook describes data-driven service planning methods, including ridership forecasting, market analysis, and analyzing travel demand patterns.
- *Bus Network Redesigns in the Modern Age: How U.S. Transit Agencies Adapt to Evolving Travel*, Eno Center for Transportation, May 2025. [Bus Network Redesigns in the Modern Age: How U.S. Transit Agencies Adapt to Evolving Travel - The Eno Center for Transportation](#) This article reviews how transit agencies have been restructuring their bus networks to better meet the needs of users. Agencies have been systematically assessing both their existing service and transit users' travel patterns to identify how resources can be used to better meet travel demand.



Expand / Enhance Rail Service (TR-8)

Public Transit

Needs Addressed

Trans-Hudson capacity, transit crowding, transit reliability issues, long and uncompetitive transit travel times in some locations, reverse commute challenges.

Specific Strategies

Add new tunnels (Trans-Hudson capacity), increase service frequency, extend lines, add stations, add new lines.

Related Projects

- NEC Future resulted in service development plan (SDP) defining vision for NEC rail network and necessary investments, along with Tier 1 environmental impact statement (EIS).
- MBTA Regional Rail Modernization Program, Boston.
- Northern New England Passenger Rail Authority (NNEPRA) Amtrak Downeaster passenger rail service which connects Boston, Massachusetts, with Brunswick, Maine, via stops in New Hampshire is a good example of FTA Small Starts project.

Locations to Consider

- Hudson River rail crossing / Northeast Corridor.
- Raritan Valley Line.
- Northeastern Bergen County.
- Hudson Bergen Light Rail expansion to Englewood and Route 440.

Travel Market Considerations

- Provide connecting bus/shuttle service to and from rail stations to expand access to high-capacity transit.

Benefits

- Improves accessibility to destinations.
- Provides access for all, regardless of circumstances.
- Enhances reliability of travel.
- Enhances usability of public transit.
- Encourages increased transit ridership, helping to address traffic congestion.

Costs

- High

Responsible Organizations

- NJ TRANSIT – responsible for lines and stations, service planning, and operations.
- Port Authority of New York and New Jersey – responsible for lines and stations, service planning, and operations.
- Municipalities – may be responsible for items relative to station location, design, and access.

Assessment Factors

- What are the current services and what are the expansion possibilities?
- What is the current peak ridership, and what is the potential for attracting new ridership?
- What are the development densities and the key origins and destinations for potential service?
- What is the potential for linking increased service with multi-modal access including park-and-rides, bus / shuttle service, and bike-ped facilities?

Potential Funding Sources

- Federal Railroad Administration, Consolidated Rail Infrastructure and Safety Improvement (CRISI) Grant funding – provides funding for various types of projects.
- FTA Capital Investment Grants (CIG) – Smart Grant Program can support expansion of rail service. Small start is a simplified and potentially expedited approval process for small start projects within the CIG program.

Implementation Issues

- Labor and capital costs are contributing to higher operating costs, which are affecting systems' abilities to plan and implement projects necessary for future operations.
- A preliminary alternatives assessment typically will identify one or perhaps two viable routes that meet basic requirements for speed, multiple tracks, station sites, ridership potential, and estimated cost of improvements.
- The two most basic elements of any transportation plan are the selection of station sites and the preparation of passenger train schedules.
- Multi-modal station first / last mile access improvements can help to increase potential ridership and manage park and ride expansion needs.
- Land use practices that support concentrated development and transit friendly design will increase ridership performance and market access opportunities.

- Expansion of passenger rail service shared where the tracks are owned by freight rail companies could be complex due to track capacity constraints often times freight railroads requiring passenger trains to wait for freight movement.

Best Practices / Links and Lessons

- [Railroad Corridor Transportation Plans: A Guidance Manual, FHWA, 2005.](#) This document provides guidance to proponents of new or improved high-speed intercity rail services or systems. It emphasizes the need for a corridor plan to properly define all the elements that must be addressed in order to provide higher speeds and improved frequencies for intercity rail passenger service, while maintaining or improving freight and commuter services.
- [MBTA Rail Vision Final Report, 2020.](#) The Rail Vision study evaluated different ways of providing service (increasing frequency, reducing travel time, improving connectivity) and infrastructure improvements (e.g., accessible platforms, electrification, multiple-unit vehicles) to help answer these fundamental questions.
- [Commuter Rail: Most Systems Struggling to Recover Ridership Following the COVID-19 Pandemic, US Government Accountability Office \(GAO\), 2025.](#) The study process included interviews of system officials, who identified ways that they have adapted service to attract riders and better meet changing passenger needs. These adaptations include expanding operations beyond traditional commuting hours, offering free fares and flexible passes for certain passengers, and strategically expanding and adapting service based on community needs and feedback.



Expand/Enhance Ferry Service (TR-9)

Public Transit

Needs Addressed

Trans-Hudson capacity, transit crowding.

Specific Strategies

Increase fleet size, improve terminal facilities, improve multi-modal access to ferry service – Example feeder bus service.

Related Projects

- Recent South Amboy Ferry service to Wall Street and potential Carteret ferry service to NYC.
- Edgewater ferry service to NYC.
- Hudson County Ferry Service Expansion Study.
- New York City Comprehensive Waterfront Plan, NYC Planning, 2021.

Locations to Consider

- Potential route origins include Jersey City, Bayonne, Elizabeth, Englewood Cliffs, and Alpine.
- Other potential sites for expanded or new ferry services include Edgewater, Long Branch, Newark, Elizabeth, and Belford / Highlands / Atlantic Highlands.

Travel Market Considerations

- Consider service affordability and access to low-income waterfront communities.

Benefits

- Improves accessibility to destinations.
- Enhances usability of public transit, including improved rider comfort.
- Enhances reliability / provides service redundancy.
- Encourages increased transit ridership, helping to address traffic congestion.

Costs

- Medium

Responsible Organizations

- NJ TRANSIT – responsible for some terminals, service planning, and operations.
- Port Authority of New York and New Jersey – responsible for some terminals, service planning, and operations.
- Private operators – responsible for other terminals, service planning, and operations.
- Municipalities – may be responsible for items relating to terminal location, design, and access.

Assessment Factors

- What are the current ferry services and what are the expansion possibilities?
- What is the current peak transit ridership, and what is the potential for attracting new ridership?
- What are the development densities and the key origins and destinations for potential service?
- What is the potential for linking increased service with multi-modal access including buses, shuttles, pedestrian facilities, and bicycle facilities?

Potential Funding Sources

- [FTA, Electric or Low-Emitting Ferry Pilot Program](#) – provides funding for electric or low-emitting ferries and charging equipment, using alternative fuels or on-board energy storage systems.
- [FTA, Passenger Ferry Grant Program](#) – supports capital projects to establish new ferry service, and repair and modernize ferry vessels, terminals, and facilities and equipment in urbanized areas.

Implementation Issues

- Ferry service is distinct from other modes for several reasons, including the regulations and challenges of the marine operating environment and the wide range in vessel and terminal designs and capacities.
- Each ferry system has unique operating conditions, ridership levels, route geography, and other service characteristics that define vessel and terminal infrastructure needs.
- Ferry systems are complex and dynamic. System elements such as vessels, terminals, and operations are highly integrated and affected by many operating conditions that cannot be controlled. This integration of system elements and dynamic operating environment can make it challenging to identify one system element that may relieve a capacity constraint.
- Landside transit and micromobility connections can increase multi-modal access needed to support sufficient ridership, manage parking requirements and provide first/last mile

connections to surrounding communities.

- Fare integration / cross-honoring and real-time traveler information strategies between traditional transit modes and ferry services can increase overall transit ridership and regional resilience during emergencies and incidents.

Best Practices / Links and Lessons

- [TCRP Report 152: Guidelines for Ferry Transportation Services, Transportation Research Board of the National Academies, 2012](#). This report provides guidelines for planning, marketing, operating, and managing a ferry system. The report includes findings from a survey of 43 operators and in-depth case studies of eight operators. Guidance is aimed at policymakers and entrepreneurs considering launching or expanding ferry services and includes criteria for evaluation of cost-effectiveness and viability.
- [TCRP Synthesis 102: Integrating Ferry Services with Mass Transit \(Payne et al. 2013\)](#). This report examines the integration between land- and water-based transit systems and explores successful aspects of seamless integration. The report is a resource for improving existing ferry-transit interfaces, and it includes a literature review and the results of a survey focused on gathering information regarding multimodal schedule coordination, fare coordination, facilities coordination, and passenger communications.
- [Quantitative Procedures for Designing and Operating Ferry Services, National Academies of Sciences, Engineering, and Medicine, 2023](#). This report provides guidance for defining system capacity and understanding capacity challenges and provides quantitative procedures for designing and operating services. It presents capacity concepts and analysis focused on vessels, terminals, and service schedules, and discusses the relationships and dependencies between these elements.



Transit Preservation/Resilience (TR-10)

Public Transit

Needs Addressed

Disruptions to service due to infrastructure conditions, impacts of extreme weather events, rehabilitation and maintenance needs.

Specific Strategies

New bridges with higher vertical profiles, track rehabilitation and elevation, signal and communication system protection, rolling stock rehabilitation and replacement, redesigning bus network by continually analyzing the routes that are high in demand to optimize routes and schedule.

Related Projects

- Resilience Program, NJ TRANSIT – comprehensive capital improvements program aimed at making transportation system even stronger, more durable, and more reliable. Each project contributes in a significant way to system-wide integrated resiliency. Specific planned projects include the following:
- Utilization of the NJ Transit Delco Lead Storage and Inspection Facility to enhance rail equipment storage and operations by developing the under-utilized Delco Lead Storage and Inspection Facility. This facility is strategically located along the Northeast Corridor (NEC) in an inland area not prone to flooding, situated in North Brunswick Township, NJ, and the City of New Brunswick.
- NJ Transit, Long Slip Fill and Rail Enhancement. The project will modify the Long Slip — a 2,000-foot former barge canal adjacent to the Hoboken Terminal Yard — to eliminate it as a conduit for flood water.
- Raritan River Bridge Replacement will replace the

existing swing bridge that carries NJ TRANSIT's NJCL trains over the Raritan River between Perth Amboy and South Amboy.

- NYC MTA's Bus Network redesign – involving adjustments to local and express routes and their schedules focused on improving speed, frequency and subway connections.
- NJ Transit New Bus Hudson is a network redesign program to adapt to changing community needs taking into consideration transfers, time of day for the service and frequency.

Locations to Consider

- NJ TRANSIT and PATH facilities including rail system bridges, tracks and other facilities in low-lying areas and those vulnerable to climate change.

Travel Market Considerations

- Needs of transit dependent, and populations who may face greater barriers to mobility must be considered for full community resiliency.

Benefits

- Improved service reliability / fewer delays.
- Reduced bridge and track deterioration.

Costs

- High but necessary, and important for overall preservation of the system.

Responsible Organizations

- NJ TRANSIT – owns and maintains rail system infrastructure and rolling stock.
- Port Authority of New York and New Jersey – owns and maintains infrastructure and rolling.

Assessment Factors

- What is the current condition of facilities?
- What is the current service frequency and ridership on those facilities?
- What are the threats associated with extreme weather impacts? What infrastructure is most vulnerable?
- What facility treatment provides the lowest life-cycle cost?

Potential Funding Sources

- FTA, State of Good Repair Grants Program (formula) - provides capital assistance for maintenance, replacement, and rehabilitation projects of high-intensity fixed guideway and motorbus systems. The Resilient Transit Act of 2023 added funding to provide direct resiliency funding.

Implementation Issues

- Transit agencies may face funding issues, Some agencies are chronically underfunded making it difficult to invest in long term resilience projects. Old and aging infrastructure may not be easily fixed and may require replacement which needs substantial capital.
- Investment in long terms investments related to resilience need political and public support.

Best Practices / Links and Lessons

- [*Improving Resiliency of Transit Systems Threatened by Natural Disasters, TCRP, 2017.*](#) [*Improving Transit Resilience Database, Voorhees Transportation Center \(VTC\).*](#) The guides describe useful case studies, process aids, guidance documents, analysis frameworks, and other resources available to practitioners as they take steps to improve transit resilience. Each resource profiled in the guide, along with others, are included in the database.
- [*Transit Resilience Guidebook, Federal Transit Administration \(FTA\), 2024.*](#) This document presents recommendations and examples for identifying and addressing vulnerabilities and building resilience. It outlines a phased approach to building resilience throughout a project's lifecycle. It recommends climate data sources and community vulnerability screening tools for informing a vulnerability assessment. It also provides references to detailed primers and step-by-step guidance on conducting a vulnerability assessment, along with information on training and potential funding sources.



Sidewalks/Pedestrian Improvements (PB-1)

Pedestrian, Bike & Micromobility

Needs Addressed

Lack of pedestrian access, comfort, and safety.

Specific Strategies

Sidewalks, crosswalks, trails, safer street crossings, pedestrian countdown signals. (May be part of a broader complete streets strategy [PB-3].)

Related Projects

- Better Streets Plan, San Francisco, 2010. provides a unified set of policies and guidelines for the design of the pedestrian realm. The Plan seeks to balance the needs of all street users, with a particular focus on the pedestrian environment and how streets can be used as public space.
- Montgomery County (MD) Pedestrian Master Plan, 2023.
- NJDOT / NJTPA Roadway Safety Audits reports / program conducted to assess safety side of pedestrian / sidewalk needs identification.
- Roadway diet projects by NJDOT provide insight into sidewalk, complete streets and improved pedestrian vs. vehicle design needs.

Locations to Consider

- Locations accessing transit and connecting to activity centers, areas with high pedestrian crashes, areas with high walkability potential based on land use patterns, and gaps in sidewalk networks.
- Refer to needs assessment for specific locations to consider.

Travel Market Considerations

- Provides an affordable transportation option but needs to be designed with consideration of all

abilities. Designs should consider strollers and people in wheelchairs (i.e., ample widths, ADA-accessible ramps). Prioritization may consider needs of zero-vehicle households/vulnerable populations.

Benefits

- Improves accessibility to destinations.
- Provides access for all, regardless of circumstances.
- Enhances the usability of public transit.
- Increases the viability of walking, bicycling, and other micromobility options.
- Improves safety.
- May reduce vehicle trips and reduce traffic congestion and emissions.
- May enhance economic vitality.

Costs

- Relatively low in many locations.

Responsible Organizations

- Counties and municipalities – incorporate pedestrian accommodations into roadway improvement projects.
- NJDOT – administers grant programs including Safe Routes to Schools.
- NJ TRANSIT – provides pedestrian safety education.

Assessment Factors

- What are key nearby destinations, such as transit stations / stops, schools, shopping areas, etc.?
- What is current or anticipated potential for pedestrian activity?
- What is the crash history or identified safety hazards?
- Where are there gaps in pedestrian networks or potential difficulties at crossings?

Potential Funding Sources

- Federal-Aid Highway Programs - National Highway System (NHS) funds may be used to construct pedestrian walkways and facilities on land adjacent to any highway on the NHS.
- Surface Transportation Program (STP) - funds for either the construction of pedestrian walkways or non-construction projects (such as maps, brochures and public service announcements) related to safety.
- Other Federal sources: [Pedestrian and Bicycle Funding Opportunities](#).
- NJDOT, Municipal Aid program - provides funding for various projects, including pedestrian safety.
- NJDOT, Safe Routes to Schools – infrastructure grants for planning, design, and construction or installation of sidewalks, crosswalks, signals, traffic-calming, and bicycle facilities.
- NJTPA Complete Streets Technical Assistance, Demonstration Library
- NJTPA Planning for Emerging Centers, Transit Hub Program

Implementation Issues

- Diverse user groups (seniors, persons with disabilities, children) have varying mobility needs.
- Urban and downtown areas may have limited space, crowded conditions, and competing uses, which present a challenge to design and implementation.
- Suburban areas may pose challenges with limited access/limited places for crossing, higher speeds.
- Agencies could consider expanding or initiating annual programs to make small visible improvements on a regular basis to build momentum and community support. Examples include sidewalk replacement programs, curb ramp programs, lighting and safety and annual tree planting programs.

- To eliminate barriers to transit stops and first/last mile access and pedestrian mobility, capital improvement and state of good repair project policies for both roads and bridges should seek inclusion of sidewalk / pedestrian facilities, and elimination of gaps in the sidewalk network.
- Regular analysis of pedestrian-involved vehicular crash data and presence of mobility-impaired populations should inform safety and roadway geometry improvement for the proximal sidewalk network.

Best Practices / Links and Lessons

- [PEDSAFE, Pedestrian Safety Guide and Countermeasure Selection System, FHWA, 2013](#). This online guide provides a list of engineering, education, and enforcement treatments to improve pedestrian safety and/or mobility based on user input about a specific location. The guide also includes a chapter that discusses issues related to setting priorities and developing strategies for implementing pedestrian improvements.
- [Pedestrian Safety Action Plan Toolbox, NJDOT, 2014](#). This document provides an overview of Complete Streets, and it provides guidance on various improvement approaches including intersection treatments, mid-block crossings, safe access to transit, pedestrian lighting, enforcement, Safe Routes to School, and senior mobility.
- [Challenges of Pedestrian Mitigation in Urban Environments \(webpage\), National Traffic Design](#). This webpage explores the challenges that can arise when implementing pedestrian mitigation in complex urban environments, from crowded streets and diverse user groups to infrastructure constraints and the need for innovative solutions, and it provides strategies for addressing these challenges.
- NJTPA Active Transportation Network Analysis was done as part of the [Regional Active Transportation Plan](#) and developed regional active transportation network recommendations. The study also developed equity and high crash network analysis.



Bicycle Facilities/Improvements (PB-2)

Pedestrian, Bike & Micromobility

Needs Addressed

Lack of bicycle access, comfort, and safety.

Specific Strategies

Bicycle routes, on-street bike lanes, lane markings, cycle tracks, trails, signage. (May be part of a broader complete streets strategy [PB-3].)

Related Projects

- Bicycle Network Plan for Wards 3 and 4, Plainfield, NJTPA--This report provides several recommendations to promote bicycling and walking by creating a “loop”. This plan will help to connect residents, parks, businesses, schools, and other points of interest.
- Central Bergen Bicycle and Pedestrian Study -- This study aims to advance a complete streets approach, addressing existing conditions that make it challenging for pedestrians and bicyclists to travel safely, especially on high-traffic roads.

Locations to Consider

- Locations accessing transit and connecting to activity centers, areas with high bicycle crashes, and areas with few facilities with high bicycle level of comfort or to fill gaps in networks, and based on local priorities.
- Refer to needs assessment for specific locations to consider.

Travel Market Considerations

- Provides an affordable transportation option but needs to be designed with consideration of all abilities. Prioritization may consider needs of disadvantaged populations.

Benefits

- Improves accessibility to destinations.
- Provides access for all, regardless of circumstances.
- Enhances the usability of public transit.
- Increases the viability of walking, bicycling, and other micromobility options.
- Improves safety.
- May reduce vehicle trips and reduce traffic congestion and emissions.

Costs

- Relatively low.

Responsible Organizations

- NJDOT – administers bikeway grant program and bicycle safety initiatives.
- NJ TRANSIT – allows bicycles on trains and buses, provides bicycle parking at most train stations.
- Counties and municipalities – incorporate bicycle accommodations into road improvement projects.

Assessment Factors

- What are the origins and destinations of current and potential future bicycle trips?
- What are the current / potential links to other multi-modal facilities?
- What is the crash history, identified safety factors?
- Where are there gaps in current networks?

Potential Funding Sources

- Federal sources: [Pedestrian and Bicycle Funding Opportunities](#).
- FHWA, Transportation Alternatives Set-Aside Program – provides funding for “non-traditional” projects including design and construction of on-road and off-road trail facilities.
- NJDOT, Municipal Aid – Provides funding for various types of projects, including bikeways.
- NJDOT, State Aid, Bikeways – Provides funding for projects of different types, including network expansion, connectivity, and safety.
- NJTPA Complete Streets Technical Assistance, Demonstration Library
- NJTPA Planning for Emerging Centers, Transit Hub Program

Implementation Issues

- Bicyclists’ perceptions are the key to determining roadway compatibility.
- Determining how traffic operations and geometric conditions affect a bicyclist's decision to use or not use a specific roadway is the first step in assessing the bicycle compatibility of a roadway.
- It is necessary to have a methodology to determine compatibility if roadways for allowing comfortable and efficient operation of both bicycles and motor vehicles.
- Consider incorporating bicycle treatments into roadway improvement projects. For example, when a street is resurfaced, lanes could be narrowed or reduced when the street is re-striped to provide for bike lanes, wide curb lanes, landscaping, lighting, and other amenities.

Best Practices / Links and Lessons

- [BIKESAFE, Bicycle Safety Guide and Countermeasure Selection System, FHWA](#). Similar to the pedestrian guide, this guide provides information on countermeasures, as well as a chapter on implementation.
- [Planning for NJ TRANSIT Bus Service alongside Bicycle Facilities, DVRPC, 2024](#). This report recommended several strategies to reduce bus–bicycle interactions. These recommendations fall into three categories: street design, stakeholder communication, and operational strategies.
- NJTPA Active Transportation Network Analysis was done as part of the [Regional Active Transportation Plan](#) and developed regional active transportation network recommendations. The study also developed equity and high crash network analysis.



Complete Streets/Safety Measures (PB-3)

Pedestrian, Bike & Micromobility

Needs Addressed

Lack of pedestrian and bicycle access, comfort, and safety, first-mile/last-mile transit needs.

Specific Strategies

Traffic calming and road diets, intersection improvements for pedestrians, pedestrian plazas, turning restrictions, protected lanes.

Related Projects

- Port Authority of New York and New Jersey received a federal RAISE grant to transform the 12th Street corridor in Jersey City near the Holland Tunnel with safer and more inviting features for pedestrians and bicyclists traveling through the neighborhoods adjacent to the corridor.
- Downtown Main Street Streetscape Project, Toms River.
- Oakland Borough, Bergen County Complete and Green Street study.
- Plainfield City, Union County – Bicycle Corridor and Network Plan.
- Current and Completed Complete Street projects in NJTPA can be found at <https://www.njtpa.org/completestreets.aspx>.
- NJDOT Road diet studies – examples include Livingston Avenue in New Brunswick and West Avenue in Ocean City.

Locations to Consider

- See CMP analysis for areas to consider.

Travel Market Considerations

- Complete streets promote beneficial health outcomes and affordable transportation options.

Benefits

- Improves accessibility to destinations.
- Provides access for all, regardless of circumstances.
- Enhances the usability of public transit.
- Increases the viability of walking, bicycling, and other micromobility options.
- Improves safety.
- May reduce vehicle trips and reduce traffic congestion and emissions.
- May enhance economic vitality.

Costs

- Relatively low.

Responsible Organizations

- NJDOT – responsible for state roadways.
- NJ TRANSIT – responsible for rail stations, bus operations.
- Counties – responsible for county roadways.
- Municipalities – responsible for municipal roadways, planning / zoning for adjacent land uses.

Assessment Factors

- Is the corridor an important connection between residential areas, retail centers, community / civic uses, multi-modal transportation connections, etc.?
- What is the presence and frequency of bus service along the corridor?
- Are there high crash rates, high traffic volumes, cut-through traffic, frequent turning movements, speeding, parking violations, and other dangerous driving behavior?
- Is the corridor frequently used by emergency vehicles, and are there alternative vehicular travel routes?

Potential Funding Sources

- Federal sources: [Pedestrian and Bicycle Funding Opportunities](#).
- USDOT, RAISE grants.
- NJDOT, Municipal Aid – Provides funding for various project types
- NJTPA Complete Streets Technical Assistance, Demonstration Library
- NJTPA Planning for Emerging Centers.

Implementation Issues

- Use of crash data, particularly for pedestrians and bicyclists, may be useful in identifying appropriate locations for Complete Streets Design needs to accommodate and balance various, sometimes competing, users, e.g., pedestrians, bicyclists, commercial vehicles, and emergency response vehicles.
- Seek to relate to land use planning policies and requirements, Transit Friendly design, and TDM objectives.
- A flexible approach to design is a critical component of Complete Streets. The key to achieving greater flexibility is understanding all possible approaches and applying appropriate designs to achieve desired outcomes.

Best Practices / Links and Lessons

- [A Guide to Measuring Complete Streets Progress, Smart Growth America, National Complete Streets Coalition, 2024](#). This report examines what policy implementers and practitioners at a local agency can measure to support Complete Streets policy implementation, discusses the end goal of these performance measures, and provides guidance on how to choose the metric categories and measures that will support the community's vision and goals.
- [Complete and Green Streets for All, Model Complete Streets Policy and Guide, NJDOT, 2019](#). This document is a "one-stop" resource for adopting and implementing Complete Streets policies and practices. The guide is designed to provide assistance for developing or updating a policy. It includes a set of checklists to use to ensure that Complete Streets are considered throughout the project development process.
- [New Jersey Complete Streets Design Guide, New Jersey Department of Transportation, 2017](#). The guide includes a toolbox that provides a primer on common design treatments and their typical applications, design considerations, and how they impact different modes. The guide emphasizes the role of context and flexibility during the design process and describes the benefits and applications of numerous design options.



Micromobility Options (PB-4)

Pedestrian, Bike & Micromobility

Needs Addressed

Congestion on urban streets, lack of travel options, opportunity to substitute for short transit trips.

Specific Strategies

Bike share, electronic scooters, dockless bikes, etc., with supporting infrastructure such as lane and curb management (see strategy SM-4).

Related Projects

- Citi Bike, New York City's bike share system, also extends to Jersey City and Hoboken in New Jersey. There are 82 stations in Jersey City and Hoboken.
- The Citi Bike program in Hoboken will be expanding its docking capacity. The new City Hall docking station will be the first in New Jersey to use Lyft's new Pillar system, which has a modular design that allows for flexible and smaller installations, making it easier to deploy in areas with high curbside demand. The new docking stations can also expand and be retrofitted to support charging for e-bikes.

Locations to Consider

- Urbanized areas with a density of land uses, activity centers, transit station areas.

Travel Market Considerations

- Micromobility has the potential to benefit low-income communities with a new, affordable transportation options; special pricing for low-income members of the community can boost participation. Note that micromobility options may not serve all facets of the community (e.g., individuals with disabilities).

Benefits

- Improves accessibility to destinations.
- Provides access for all, regardless of circumstances.
- Enhances the usability of public transit.
- Increases the potential for multi-modal travel options.
- May reduce vehicle trips and reduce traffic congestion and emissions.
- May enhance economic vitality.

Costs

- Relatively low.

Responsible Organizations

May involve coordination among agencies:

- Counties and municipalities – for roads under local jurisdiction.
- Municipalities – typically responsible for entering into legal agreements with service.

Assessment Factors

- What are likely locations for demand?
- What are key origins and destinations?
- What safety issues need to be considered?

Potential Funding Sources

- Federal-aid projects may include funding for sidewalks and on-street bike lanes, which may be used by micromobility users.
- NJ TRANSIT / NJTPA – Local Mobility Initiatives Program, funded by federal CMAQ funding (competitive) – eligible projects now include support for micromobility such as bikes, e-bikes and scooters.

Implementation Issues

- Micromobility options are well suited in densely populated urbanized areas with numerous origins and destinations within short geographic distances. They can also support first / last mile access at suburban transit stations and stops in less densely populated areas.
- Micromobility services can be implemented and managed by municipalities or private entities. Typical requirements include vehicle charging and demand-based repositioning, online or application-based payment and reservation systems, and policies regarding use and return.
- Micromobility can form an important component of Mobility as a Service (MaaS) integrating multiple modes of transportation into a unified application-based demand and payment systems.
- Micromobility devices, which can include bicycles, scooters and other rolling modes, may present challenges as persons operate and park them in the public right-of-way, sometimes blocking sidewalks. Cities may need to remove parked or abandoned devices that block sidewalks and multi-use paths.
- Because micromobility devices are capable of varying speeds between pedestrian and automobile travel, and because roadways often lack spaces to safely accommodate them, New Jersey law (cite

statute(s) regulates where / how they may be operated (i.e., on roadways, sidewalks, etc.) and whether licensing is required for users.

Best Practices / Links and Lessons

- [New Jersey Micromobility Guide, NJDOT Bicycle and Pedestrian Resource Center, 2025](#). This guide serves as a resource for micromobility users, collecting and summarizing the laws and safety best practices that can make riders safer. The guide clarifies if and how micromobility riders can bring their devices onto public transportation, and it provides tips, answers common questions, and clarifies how different devices are regulated.
- [Micromobility, Emergence of New Transportation Modes, online factsheet, USDOT](#). This resource provides information in several areas including safety and infrastructure, access and mobility, data, regulation, and funding, and it describes a few success stories, including Santa Monica, Chicago, and Los Angeles.
- [7 critical mistakes in micromobility and how to avoid them \(webpage\), ATOM Mobility, 2023](#). This guide describes mistakes in planning and how to avoid them. These mistakes are overestimating the number of rides, starting with an insufficient fleet to cover operating costs, not budgeting all potential expenses, not being flexible with business models, choosing the wrong software partner, not securing long-term permits, and ineffective management.
- [Understanding and Tackling Micromobility: Transportation's New Disruptor, Governors' Highway Safety Association, 2020](#). This publication explores six challenges— oversight, funding, data collection, enforcement, infrastructure and education—and the role that State Highway Safety Office (SHSOs) and partners can play to help address them.



Employer-Based TDM (DM-1)

*Travel Demand
Management*

Needs Addressed

Bottlenecks and unreliable roadways, overcrowded and unreliable bus transit, opportunities to reduce single-occupant vehicle travel.

Specific Strategies

Encourage telework, encourage ridesharing, vanpool assistance, shuttles, commuter benefits ordinances, employer outreach and incentive programs.

Related Projects

- New Jersey's eight Transportation Management Associations (TMAs) work with employers to implement programs that reduce traffic congestion and improve air quality.
- Vanpool programs under 511NY Rideshare program across the Hudson Valley and New York City and long Island at employers such as New York Life, Swiss Re Foundation, IBM, Pfizer, Bayer Corp., and Verizon.

Locations to Consider

- Systemwide.
- Prioritize major employment centers and congested commute corridors.

Travel Market Considerations

- Providing transportation options or helping lower transportation costs to job sites not on fixed-route transit could expand job opportunities for low-income workers.

Benefits

- Improves accessibility to destinations.
- Provides access for all, regardless of circumstances.
- Enhances the usability of public transit.
- Increases the potential for multi-modal travel options.
- Reduces vehicle trips and may reduce traffic congestion and emissions.
- May enhance economic vitality.

Costs

- Relatively low.

Responsible Organizations

- NJTPA – administers the statewide Transportation Management Association (TMA) program.
- TMAs (EZ Ride, Hudson TMA, RideWise, goHunterdon, KMM, Avenues in Motion, Greater Mercer TMA) – administer various alternative commute programs.
- NJ TRANSIT – funds the TMAs to promote transit and vanpooling
- Municipalities – adopt TDM ordinances.
- Private sector – employers, developers implement programs.

Assessment Factors

- Where are the major employment and residential concentrations, and flows of commuters driving alone that could be matched?
- What is the willingness of employers to support, participate, and contribute to programs?
- What is the estimated effectiveness of various programs and incentives to workers to participate?

Potential Funding Sources

- Federal Congestion Mitigation and Air Quality (CMAQ) program – flexible funding source for transportation projects and programs to help meet the requirements of the Clean Air Act.
- Surface Transportation Block Grant Program.
- Employer Investments and incentives through direct subsidies, on-site amenities, allowing telework and alternative schedules.
- Membership fees for Transportation Management Associations.

Implementation Issues

- Ridesharing, carpooling, and vanpooling programs are relatively easily implemented but require changes in personal driving habits. Public agencies can encourage and facilitate these programs by providing employee incentives such as a guaranteed ride home program, marketing, and preferential parking.
- Telecommuting, flexible work hours, and compressed work weeks are strategies that are relatively easily implemented but may not be appropriate for all employers. Businesses need to consider the possible need for operational changes and whether they can function effectively with a substantial number of employees not at work.
- Transportation Management Associations (TMAs) need sustainable funding sources to maintain their services.

Best Practices / Links and Lessons

- [Funding Transportation Demand Management Incentive Programs, Denver Regional Council of Governments, 2025](#). This paper reviews various potential funding streams for financial incentives for mode shift through case study research, including interviews with peer transportation demand management and metropolitan planning organizations around the nation.
- [“What Strategies are Best for You?” Texas A&M Transportation Institute, Transportation Policy Research Center](#). Series of on-policy briefs, including description, impacts, success stories, and implementation issues for various strategies, including transportation management associations, trip reduction options, flexible work hours, compressed work weeks, telecommuting, carpooling, and vanpooling.
- [Standards for the Transportation Demand Program, San Francisco Planning Commission, 2021](#). This guide establishes the specific requirements necessary for a development project’s compliance with the TDM Program requirements of the city planning code. It provides an overview of the overall process for a TDM Plan, the requirements and standards for a TDM Plan, and the monitoring and reporting process after a development project has been entitled.
- [TRB's Transit Cooperative Research Program \(TCRP\) Report 95: Traveler Response to Transportation System Changes](#), Chapter 19 - Employer and Institutional TDM Strategies. Based on case study review, this chapter evaluates the relative importance of particular categories of TDM strategies (e.g., support versus incentives), and to some degree, of particular strategies (e.g., a transit subsidy versus an HOV parking discount), through pair-wise comparisons from the sample.



Regional/Local TDM Programs & Incentives (DM-2)

Travel Demand Management

Needs Addressed

Bottlenecks and unreliable roadways (including weekend and seasonal locations), opportunities to reduce single-occupant vehicle travel.

Specific Strategies

Regional ridesharing support, programs to encourage biking/walking, incentives for ridesharing or transit for special events or seasonal events, promotions, discount/ reward programs, targeted bus and shuttle service, mobility on demand.

Related Projects

- Transportation Demand Management and Mobility Plan, NJTPA – This plan identifies regional policies and strategies that will increase traveler choices while also minimizing the negative impacts of single-occupant vehicle travel on congestion, air quality, and safety.
- Monmouth County Tourism and Event Travel Demand Management Study – This project addressed congestion related to large events and tourism through the application of TDM policies and practices at several specific locations.

Locations to Consider

- Systemwide.
- Shore areas in Monmouth and Ocean Counties and other tourism locations.
- Event locations, including Meadowlands Sports Complex, Prudential Center, Rutgers University sports facilities, Monmouth Park, and PNC Bank Arts Center.
- Schools and community centers.

Travel Market Considerations

- Affordable transportation options can help reduce financial burdens on low-income families.
- Responsible Organizations.
- NJ TRANSIT – schedules, promotes, and provides special transit service.
- TMAs – develop and promote programs.

Benefits

- Improves accessibility to destinations.
- Enhances the usability of public transit.
- Increases the potential for multi-modal travel options.
- Reduces vehicle trips and may reduce traffic congestion and emissions.
- May enhance economic vitality, including attractiveness of resorts and special event destinations.

Costs

- Relatively low.

Responsible Organizations

- NJ TRANSIT – schedules, promotes, and provides special transit service.
- TMAs – develop and promote programs.
- Municipalities – provide local shuttle services.
- Private sector – venue operators, business associations.
- Schools and other public/private organizations.

Assessment Factors

- What kinds of options are feasible to shift travel behavior (e.g., spread time of trips, shift to transit or other modes)?
- What are opportunities and willingness of the business community, venues, and others to sponsor or participate in programs?
- Where are areas with high travel peaks and bottlenecks for seasonal activities and special events?

Potential Funding Sources

- Federal Congestion Mitigation and Air Quality (CMAQ) program – flexible funding source for transportation projects and programs to help meet the requirements of the Clean Air Act.

Implementation Issues

- Special event management requires good interagency coordination. Event planning needs to address and integrate traffic flow, parking, pedestrian flow, shuttles, and possible impacts on neighboring streets and neighborhoods.
- Requires interagency coordination between MPOs, DOTs, TMAS, transit agencies for alignment of priorities, data sharing and implementation.
- Requires consistent data collection and evaluation to calculate VMT reduction, Greenhouse gas impacts etc.

Best Practices / Links and Lessons

- [*A New Route to Better Travel for All: the Regional TDM Plan Transportation Demand Management Practices, Summary Report, Southwest Pennsylvania Commission, 2019.*](#) This review of national best practices highlights effective strategies applied in different areas. The report considers both effective practices related to conventional strategies like vanpooling, as well as new and emerging strategies such as shared mobility options, integration of TDM within active transportation system management, and application of technology to support “Mobility on Demand.”
- [*Planned Special Events \(webpage\), FHWA, 2024.*](#) FHWA has launched the Planned Special Events (PSE) website to support transportation practitioners that focus on mobility planning for PSEs. Planned special events (PSEs) refer to public activities with scheduled times, locations, and durations that can significantly affect transportation system operations. Managing travel for planned special events involves advanced operations planning, stakeholder coordination and partnerships, developing multiagency transportation management plans, making the public and event patrons aware of potential travel impacts, and coordinating agency services and resource sharing. This new site spotlighting mega-PSEs such as the 2026 FIFA World Cup™, highlights PSE-focused webinars and tools to support PSE practitioners.
- [*ATDM Program Brief: Linking Demand Management and Traffic Management, FHWA.*](#) The concept of active transportation and demand management (ATDM) provides a framework to understand TDM and traffic management strategies as a holistic approach to expand traveler choices. By linking the two often-separate programs together, there is a greater opportunity to improve traveler information and travel options. [*Strengthening linkages full report 2019*](#)



Pricing Strategies (DM-3)

*Travel Demand
Management*

Needs Addressed

Bottlenecks and unreliable roadways, overcrowded and unreliable bus transit, opportunities to reduce single- occupant vehicle travel.

Specific Strategies

Peak hour road/bridge tolls, other road pricing, transit subsidies/discounted fares, other transit pricing policies, peak and off-peak transit fares, parking pricing (peak hour pricing, dynamic pricing).

Related Projects

- Manhattan Central Business District Tolling Program – vehicles entering the Congestion Relief Zone in Manhattan—local streets and avenues at or below 60th Street—are charged a toll.
- Long Island Rail Road (LIRR) and Metro- North Peak Fares - Peak fares are charged during weekday rush hours on trains scheduled to arrive in NYC terminals between 6 a.m. and 10 a.m. or depart NYC terminals between 4 p.m. and 8 p.m.
- Dynamic pricing on High Occupancy Toll lanes on Virginia interstate highways (I-495, I-395, and I-95).

Locations to Consider

- Major activity centers.
- Congested roadways.

Travel Market Considerations

- Consider who is affected by pricing and in what ways, particularly low-income populations. Consider equitable distribution of revenue and how it might work to increase or improve transit options in low-income communities.

Benefits

- Increases use of multimodal options.
- Improves reliability.
- Reduces vehicle trips, traffic congestion, and emissions.

Costs

- Relatively low.

Responsible Organizations

- NJ Turnpike Authority – manages NJ Turnpike and Garden State Parkway.
- NJ TRANSIT – provides transit services.
- Port Authority of New York and New Jersey – manages bridge and tunnel crossings, PATH.
- Delaware River Joint Toll Bridge Commission – manages bridge crossings.
- Municipalities – responsible for parking policies.

Assessment Factors

- Where are areas with high travel peaks / bottlenecks?
- How much does the peak travel demand exceed transportation system capacity?
- What is the estimated impact of pricing in reducing peak hour travel or parking demand?
- What is the anticipated impact on other facilities?

Potential Funding Sources

- USDOT, Advanced Transportation Technology and Innovative Mobility Development (ATTIMD) – provides funding for projects to install and operate advanced transportation technology, including electronic pricing, toll collection, payment, HOV lanes, cordon pricing, and congestion pricing.
- Better Utilizing Investments to Leverage Development (BUILD) Transportation Discretionary Grant program and Infrastructure for Rebuilding America (INFRA) Grant Program.
- Public Private Partnerships.

Implementation Issues

- Roadway pricing strategies may work best in congested areas and / or locations with parallel routes. Policies need to be aggressive to see impacts, but they also need to minimize the burden on low-income communities.
- Need to build buy-in through pilot programs and robust community engagement. Need to provide good driver education on how pricing strategies work and what are the benefits.
- Consider parking pricing strategies to reduce vehicle traffic, make more efficient use of parking facilities, and generate revenue.
- Peak period transit fares may help to cover increased operating costs, but they may generate equity concerns over the higher fares and possible difficulties in accessing new fare payment technology.

Best Practices / Links and Lessons

- [What Is Congestion Pricing? - Congestion Pricing - FHWA Office of Operations](#) webpage, FHWA. This webpage provides information on congestion pricing as a means of using market forces to reduce the impacts of traffic congestion. It describes congestion pricing strategies, their benefits, the uses of technology, and project examples.
- [“Parking Pricing,” TDM Encyclopedia, Victoria Transport Policy Institute, 2019.](#) This on-line resource describes means of charging users directly for parking facilities and services, and the impacts upon vehicle travel. The guide identifies specific parking pricing techniques, pricing methods, and implementation approaches, and it provides estimates of costs, revenues, and impacts upon travel behavior.
- [“Fare Strategies,” Transportation Policy Research, Texas A&M Transportation Institute.](#) This on-line resource describes different transit fare strategies including peak pricing, target markets, benefits, application techniques and principles, implementation issues, and implementation examples.
- [Learning from Roadway-Pricing Experiences, Boston Region MPO, 2023.](#) This study assessed the methods and impacts of multiple roadway-pricing strategies. It included five case studies, and interviews with local planners highlighted the benefits and challenges of implementing different roadway-pricing strategies.
- FHWA’s Value Pricing Pilot Program (VPPP). The program provided transportation agencies with options to manage congestion on highways through tolling and other pricing mechanisms. The VPPP is intended to demonstrate whether and to what extent roadway congestion may be reduced through application of congestion pricing strategies, and the magnitude of the impact of such strategies on driver behavior, traffic volumes, transit ridership, air quality and availability of funds for transportation programs. The findings from the project reports can be found on the website: [Value Pricing Pilot Program - Congestion Pricing - FHWA Office of Operations.](#)



Source: NJTPA

Land Use/Urban Design/Transit-Supportive Development *Land Use*

Needs Addressed

Preponderance of single-occupancy vehicle (SOV) travel.

Specific Strategies

Municipal planning and zoning that enables high-density mixed-use development; municipal redevelopment planning; Transit Village designation.

Related Projects

- Route 9 TOD Plan – FTA provided a grant to NJ TRANSIT for a study of a 21-mile corridor, proposed for bus rapid service, in Monmouth and Middlesex Counties.
- Mahwah Station TOD study – NJ TRANSIT is conducting a study of the potential for transit-oriented development and transit-friendly improvements around the station.
- The NJ TRANSIT Transit Friendly Planning program has conducted many other studies, including Jersey City, Somerville, Aberdeen-Matawan, Metropark, Paterson, Waldwick, and Bayonne – 34th St.
- NJTPA Transit Hubs program

Locations to Consider

- Systemwide.
- Prioritize locations near transit stations and major activity centers, consistent with community plans.

Travel Market Considerations

- Potential to pair affordable housing with transit-oriented uses.

Benefits

- Improves accessibility to destinations.
- Provides access for all, regardless of circumstances.
- Enhances feasibility of increased public transit.
- Increases the potential for multi-modal travel options.
- Reduces vehicle trips and may reduce traffic congestion and emissions.
- May enhance economic vitality.

Costs

- May yield cost savings.

Responsible Organizations

- Municipalities – responsible for conducting planning and preparing planning documents in support of transit-oriented development, e.g., authorizing mixed-use development.
- NJDOT – along with NJ TRANSIT, responsible for administering Transit Village program.
- NJ TRANSIT – responsible for transit service planning and station maintenance / improvements.

Assessment Factors

- What is the presence of current transit services, and how much new service possibly could be justified by increased station-area development?
- What is current ridership and how much new ridership could station-area development generate?
- What is the development and redevelopment potential in the station area?

Potential Funding Sources

- FTA, Pilot Program for Transit-Oriented Development Planning – Section 20005(b) – provides funding to local jurisdictions to integrate land use and transportation planning with a new fixed guideway or core capacity transit capital investment.
- NJDOT, Local Aid, Transit Village program – this program provides funding to designated Transit Village municipalities for projects that will enhance walking, biking and/or transit ridership within a half mile of the transit facility.
- NJTPA, Emerging Centers program – provides funding for planning studies that address increased demand for diverse, mixed-use places that are economically sustainable and that provide social, cultural, educational, and economic opportunities for all members of the community while supporting transit, bicycling and walking.

Implementation Issues

- Need municipal master plans and zoning ordinances that allow higher densities and mixed-use development.
- Need land use design elements that are supportive of multi-modal transportation options, including public transit, walking, and bicycling.
- Need complementary roadway design, possibly including elements of complete streets, road diets, and traffic calming.
- Need to address parking issues, including minimum parking requirements and the potential for alternative approaches such as shared use parking.

- Need to engage transit operators regarding the location and design of transit facilities, particularly rail stations and bus stops.

Best Practices / Links and Lessons

- [*Transit Friendly Planning: A Guide for New Jersey Municipalities, NJ TRANSIT, 2022.*](#) This document provides guidance on preparing transit-supportive land use plans to guide development and redevelopment near existing or proposed transit facilities. It provides information on design, development, access, circulation, parking, and active transportation.
- [*Gentle Density and Missing Middle Housing Guide, NJ TRANSIT, 2024.*](#) This document provides practical tools and insights for building medium-density multi-family housing that is integrated into existing single-family or transitional neighborhoods. It provides illustrative examples, guidance on planning and zoning, and implementation approaches.
- [*Together North Jersey Guidebook for Transit Hub Planning, NJTPA, 2019.*](#) The guidebook is intended to help communities develop strategic plans for transit-oriented development around transit hubs. It provides tools and best practices based on successful examples from New Jersey and elsewhere.



Arterial Operations (SM-1)

Transportation Systems Management & Operations

Needs Addressed

Bottlenecks and unreliable major roadways.

Specific Strategies

Traffic signal upgrades, signal coordination and optimization, active traffic management, adjustable lanes.

Related Projects

- NJDOT, Adaptive Signal Control Technology – NJDOT has invested in adaptive signal corridors along Route 130, Route 168, and Route 32, with plans for further expansion to Route 40 and Route 18.
- Meadowlands Adaptive Signal System for Traffic Reduction (MASSTR) – this system incorporates 126 traffic signals into a self-adaptive network. The system adjusts signal timings based upon traffic flow rather than fixed or actuated timings. Signals along jurisdictional boundaries are continuously coordinated for optimal operation, and traffic conditions and signal operations are monitored and controlled in real-time at a traffic Management Center.

Locations to Consider

- See CMP analysis for areas to consider.
- Roadways with poor reliability.

Travel Market Considerations

- Consider operations strategies that support multimodal mobility, rather than just vehicle mobility (e.g., improvements to transit operations, walking, bicycling). Ensure that local

movements and accessibility are not hindered by emphasis on regional mobility.

Benefits

- Improves reliability.
- Reduces congestion delay, optimizing existing capacity.
- Reduces bus travel times.
- Reduces vehicle emissions.

Costs

- Relatively low.

Responsible Organizations

- NJ Turnpike Authority – responsible for NJ Turnpike and Garden State Parkway.
- NJDOT – responsible for roadway construction, maintenance, and operations.
- Counties and municipalities – responsible for roads under their jurisdiction.

Assessment Factors

- What are the current congestion levels, and what is the potential for reducing congestion?
- What are the current peak hour traffic volumes; how many vehicles would benefit from improvements?

Potential Funding Sources

- USDOT, ATTAIN – provides funding for projects to install and operate advanced transportation technology, including integrated corridor management.

Implementation Issues

- Funding for equipment and staff resources often remains scarce. The result is that many traffic signals operate with poor timing and/or ill-functioning equipment, leading to unnecessary delays and costs for travelers across all modes.
- Signal performance measures profoundly change all aspects of traffic signal operations from planning to design and implementation through better-informed, data-driven decisions.
- Upgrading and maintaining proper signal timing can be labor intensive and time consuming. Signal retiming is recommended every three to five years. Resources required for signal retiming typically include 20 to 30 staff hours per intersection and a usual cost of \$3,500 to \$4,000 per intersection.
- Jurisdictional issues can arise when major streets cross agency boundaries; best practices for addressing these issues involve joint policies and procedures for maintaining coordination.
- Improved road geometry (e.g., turning radii for trucks), bus pullouts, enhanced / safer crosswalks, increased illumination and other supportive facility and safety enhancements complement better arterial flow and operations.

Best Practices / Links and Lessons

- [Automated Traffic Signal Performance Measures \(webpage\), FHWA Arterial Management Program](#). Includes links to many resources, including on-demand webinars and videos.
- [PennDOT, automated traffic signal performance measure \(ATSPM\)](#) program is statewide in scale. PennDOT has implemented ATSPMs where high-resolution controllers and field communications are available. System allows users to analyze various performance metrics.
- [Performance-Based Management of Traffic Signals, NCHRP Research Report #954, 2020](#). This guidebook provides information to help agencies invest in signal performance measures as part of a comprehensive approach to performance-based management.



Freeway Operations/Regional System Management (SM-2)

*Transportation Systems
Management & Operations*

Needs Addressed

Bottlenecks and unreliable highways/major roadways.

Specific Strategies

Traffic incident management, work zone management, special events management, central reporting, coordinated responses, ramp control, dynamic junction control, lane control, shoulder use, variable/dynamic speed limits, queue warning, real-time information to travelers.

Related Projects

- Route 1 congestion relief pilot project in South Brunswick, which includes hard shoulder running.
- I-476, suburban Philadelphia, PA. Current traffic and incident management system includes ramp metering. PennDOT is now proposing “flex lanes,” which would enable using inside shoulders as travel lanes in response to extreme congestion or incidents.
- TRANSCOM – Cooperative and coordinated effort to regional transportation management, including sharing of real-time travel data.

Locations to Consider

- See CMP analysis for areas to consider.

Travel Market Considerations

- The need for affordable, convenient travel alternatives.

Benefits

- What existing operational strategies are in place?
- What are primary causes of delay?
- How do the high-crash locations relate to traffic volumes?

Costs

- Relatively low.

Responsible Organizations

- NJ Turnpike Authority – responsible for NJ Turnpike and Garden State Parkway.
- NJDOT – responsible for state roads.

Assessment Factors

- What existing operational strategies are in place?
- What are primary causes of delay?
- How do the high-crash locations relate to traffic volumes?

Potential Funding Sources

- USDOT, ATTAIN – provides funding for projects to install and operate advanced transportation technology, including integrated corridor management.
- National Highway Performance Program (NHPP) – provides funds for operational improvements on National Highway System (NHS).
- Congestion Mitigation and Air Quality Improvement Program (CMAQ) – Funds projects to reduce traffic congestion.
- Surface Transportation Block Grant Program (STBG)- provides funding for wide range of highway projects including operations.

Implementation Issues

- Public and private agencies must willingly share information and invest resources, especially across jurisdictional boundaries. This requires considerable planning, organization, and a favorable policy environment that encourages interaction and constant communication between all possible stakeholders.
- There is a need for coordinated system architecture and communication between agencies.
- Considerations should be given to multimodal options for resilience during incident response – example transit modes and park-and-ride facilities.
- Considerations should be given to pricing strategies and managed lanes for additional capacity.

Best Practices / Links and Lessons

- [“Aggressive Incident Clearance,” Mobility Investment Priorities, TAMU, 2025.](#) This document provides guidance for establishing a program to facilitate the removal of disabled or abandoned vehicles from roadways. Such a program includes quick removal operational procedures, specialized tolls and infrastructure, and laws and policies aimed at affecting the same and timely resolution of incidents.
- [Traffic Incident Management, webpage, FHWA.](#) This webpage provides information on developing a planned and coordinated multi-disciplinary process to detect, respond to, and clear traffic incidents so that traffic flow may be restored as safely and quickly as possible. It includes information on technology and techniques, responder training, and performance measures.
- [Regional Transportation Systems Management and Operations Case Studies Technical Report, FHWA, 2024.](#) This report presents examples of regionally coordinated transportation systems management and operations programs focusing on the relationship between the institutional, systems, and operational areas of a regional program that contribute to its success. The report provides a summary of the case studies and the common use cases that emerge to support the case for regional transportation systems management and operations.



STARTING MONDAY
CONSTRUCTION
11 PM - 5 AM

Source: NJDOT

Traveler Information/Trip Planning (SM-3)

Transportation Systems
Management & Operations

Needs Addressed

Bottlenecks and unreliable highways/ major roadways; transit reliability; opportunities to reduce single-occupant vehicle travel.

Specific Strategies

Web-based real-time multimodal information, traffic camera video, variable message signs, construction project information.

Related Projects

- NJDOT Intelligent Transportation System (ITS) architecture – includes cameras, travel time sensors, dynamic message signs, and roadway weather information devices.
- TRANSCOM – this coalition of 16 transportation and public safety agencies was created to provide a cooperative, coordinated approach to regional transportation management. It provides a free service that allows various user groups to access real-time event and link (travel time) data.
- Integrated Corridor Management Studies – the NJTPA participated in studies with NJDOT and other regional agencies using federal grant funding from a program to help cities or regions combine numerous information technologies and real-time travel information from highway, rail, and transit operations.
- NJ TRANSIT Mobile App – this app enables trip planning and mobile ticketing, as well as providing real-time rail and bus arrival and departure information and My Transit alert push notifications.

Locations to Consider

- Systemwide.
- Particularly prioritize for congested corridors, routes, and for multimodal travel information.
- Targeted applications for special events, road weather management, and work zones.

Travel Market Considerations

- Information should be accessible to limited English proficiency populations and populations without access to web/mobile technology.

Benefits

- Reduces travel time and congestion delay, optimizing existing capacity.
- Encourages multimodal options.
- Reduces vehicle emissions.

Costs

- Relatively low.

Responsible Organizations

- NJ Turnpike Authority – responsible for NJ Turnpike and Garden State Parkway.
- NJDOT – responsible for state roads.
- Transportation Management Associations – provide travel information and trip planning assistance.

Assessment Factors

- What are ways in which travelers access travel information pre-trip? While en-route?
- What private sector and other opportunities are there?

Potential Funding Sources

- USDOT, Advanced Transportation Technologies and Innovative Mobility Deployment (ATTAIN) program – provides funding for projects to install and operate advanced transportation technology, including advanced traveler information systems.

Implementation Issues

- Maintaining and upgrading these systems to reflect the most up-to-date technology requires implementation and maintenance funding.
- The same infrastructure that provides traveler information also enables more effective incident management and performance measurement – which can mean a greater return on the investment.

Best Practices / Links and Lessons

- [Real-Time Travel Information Program \(webpage\), FHWA](#). This webpage provides information on several types of approaches, including travel time messaging guidance, message sign operation, and driver use of real-time travel time information.
- [Work Zone Management Program \(webpage\), FHWA](#). This webpage provides information on the potential applications of ITS technology in work zones, including traffic monitoring and management, traveler information, incident management, enhancing safety of both the road user and worker, enforcement, and work zone planning.
- [ITS Architecture Implementation Program \(webpage\), FHWA](#). This webpage provides several sources of guidance, including a Regional ITS Architecture Assessment Checklist, a maintenance white paper, and a guidance document with supporting examples of each architecture product.



Parking/Lane/Curb Management (SM-4)

*Transportation Systems
Management & Operations*

Needs Addressed

Opportunities for micro-mobility options.

Specific Strategies

New parking management approaches, including dynamic parking pricing; designation of short-term and off-street passenger and freight loading zones; bicycle and scooter parking facilities; charging stations; mobility hubs that co-locate bus stops, ridehailing locations, and package delivery zones; flex lanes for parklets, bike corrals, in-street dining, markets, and special events.

Related Projects

- ParkMobile parking software – is in use in Jersey City, Newark, Hoboken, Elizabeth, and New Brunswick, among others. Users can access the app online via a mobile web browser and on smartphones.
- New York City, Curb Management Action Plan – this plan identifies 10 action items to maximize the City’s curb space to serve multiple and varied needs, improving mobility, access, and the flow of people, goods, and services, while moving the city closer to achieving its sustainability goals.
- Philadelphia, PA – will be conducting curbside management using the [INRIX IQ](#) suite. INRIX IQ Road Rules will hold data on streets, sidewalks, and curbs and will allow staff to communicate rule changes across internal departments and to external stakeholders.

Locations to Consider

- Within urban and suburban activity center areas, including Newark, Jersey City, and Hoboken.

Travel Market Considerations

- Affordable modes of transportation (e.g., buses, bicycles) often compete for street space with on-street parking. Consider the needs of these users.

Benefits

- Improves vehicular traffic flow and less congestion.
- Increases utilization of multi-modal options including micromobility.
- Increases efficiency of freight deliveries.
- Improves multi-modal safety.
- Improves parking utilization.

Costs

- Relatively low.

Responsible Organizations

- NJDOT – for streets under state jurisdiction.
- Counties – for streets under county jurisdiction.
- Municipalities – program management, inventory and mapping, et al.

Assessment Factors

- Physical dimensions of travel lanes, cartway, on-street parking, and right-of-way.
- Location of driveways / curb cuts.
- Location of parking signs / regulations, including loading zones.
- Current on-street parking and loading zone usage.
- Location of multi-modal facilities, including bus stops and bicycle lanes.
- Location of stormwater management infrastructure, including manholes and drains / grates, and fire hydrants.
- Adjacent and nearby land uses.

Potential Funding Sources

- Federal Strengthening Mobility and Revolutionizing Transportation (SMART) grant – provides funding for demonstration projects focused on advanced smart community technologies and systems for transportation efficiency and safety.

Implementation Issues

- Curb management policies typically are most beneficial and necessary in busy areas such as commercial centers, entertainment districts, and mixed-use areas.
- There is a need to balance multiple uses through both policy and design.
- A digital curb inventory can help cities to visualize, analyze, and update curb strategies and regulations and communicate with the private sector so that they can manage commercial delivery fleets, park scooters, and guide ride hailing in real time.

Best Practices / Links and Lessons

- [“Create a Curb-Management Framework in 7 Steps,” *Planning Magazine*, American Planning Association, 2022.](#) This document describes a prioritization process for curb functions. It provides a lens for creating policy, treatments, and monetization, plus helping cities to better evaluate technology and partnership opportunities. The seven goals of a curb management program are to set goals, identify land use, create a digital curb inventory, understand use, define a strategy, launch a pilot program, and prepare a user-friendly guide.
- [“Modernizing Curbside Management,” *ParkMobile*, 2022.](#) This web-based article describes how cities may be able to use smart parking technology for digital curb management. It describes the shortcomings of static curb management and the benefits of new technology, including maximizing curbside value, creating more equitable access, streamlining compliance and enforcement, and increasing efficiency for loading and unloading.
- [Curb Management Action Plan, New York City DOT, 2023.](#) Among the action items are the following: Prioritize curb uses to meet neighborhood needs; Make deliveries to businesses and homes safer, sustainable, and more efficient; designate curb space to make passenger pickups and drop-offs easier; expand bike parking to make traveling by bike more convenient; and provide space for Dining Out NYC, waste containerization, street furniture, and other public realm improvements.



Road Geometry (RC-1)

Roadway Capacity/Resiliency

Needs Addressed

Bottlenecks and unreliable highways/ major roadways.

Specific Strategies

Bottleneck removal: lane reconfiguration, clearance widening, interchange modifications, intersection improvements / turning lanes, roundabouts, other geometric elements.

Related Projects

- I-295 & Route 29 interchange, Ewing – this interchange, reconstructed as part of the recent Scudders Falls Bridge project, features two roundabouts to facilitate safe and efficient traffic flow.
- Roundabouts at many locations in North Jersey including Haines Avenue in Newark near EWR, Avenue E in Bayonne under Turnpike Exit 14A, Route 28 & South Avenue in Westfield, and High Mountain Road & Franklin Lakes Road in Franklin Lakes.

Locations to Consider

- See Specific Strategies and CMP analysis for areas to consider, identified roadway segments include roadways with significant congestion, unreliable travel times, and high traffic volumes.

Travel Market Considerations

- Wide roadways create longer pedestrian crossing times, especially for people with lower mobility.

Benefits

- Improves vehicular traffic flow and less congestion.
- Reduces bus travel times.
- Potential for increased utilization of multi-modal options including micromobility.
- Improves multi-modal safety.
- Reduces vehicle emissions.

Costs

- Medium

Responsible Organizations

- New Jersey Turnpike Authority – responsible for NJ Turnpike and Garden State Parkway.
- NJDOT – responsible for state roadway construction, maintenance, and operations.
- Counties and municipalities – responsible for roads under their jurisdiction.

Assessment Factors

- What is the extent of current congestion and the potential for reducing the congestion?
- What are the peak period traffic volumes, i.e., how many travelers are affected by current delays and could benefit from improvements?
- What is the availability of alternative travel routes?

Potential Funding Sources

- FHWA Highway Safety Improvement Program (HSIP) – provides federal funding aimed at significantly reducing traffic fatalities and serious injuries on all public roads, including those not owned by the state.
- NJTPA Local Safety / High Risk Rural Roads Programs – the NJTPA solicits candidate projects from its subregions every other fiscal year for these programs, which fund cost-effective solutions that can make an immediate impact on their target areas.
- NJDOT Local Aid.
- USDOT High-Priority – Commercial Motor Vehicle program – provides funding for innovative and impactful projects that seek to reduce crashes, injuries, and fatalities involving large trucks and buses.

Implementation Issues

- Need sufficient right-of-way to accommodate optimal roadway design and/or striping.
- Design should balance on-street parking, micromobility, bicycle and pedestrian mobility and truck access and delivery needs.
- Coordination needs between multiple levels of government (local, county, state) and non-road providers (i.e., transit, micromobility).
- May need to consider how to incorporating context-appropriate roadway geometry requirements into municipal Master Plan and zoning regulations for development applications and Transit Oriented Development (TOD) projects.
- Coordinate design with safety countermeasure adoption and implementation (e.g., traffic

calming). Need to ensure that design does not create safety hazards.

- Environmental considerations.

Best Practices / Links and Lessons

- [Traffic Bottlenecks \(webpage\), FHWA](#). This webpage focuses upon the Localized Bottleneck Reduction (LBR) Program and the root causes, impacts, and potential solutions to traffic chokepoints that are recurring events. This program is targeted at point-specific locations (e.g., ramps, lane squeezes, weave areas, and abrupt changes in highway alignments) or small corridors of delay, as opposed to larger “mega-projects” or systemic congestion.
- [An Agency Guide on Overcoming Unique Challenges to Localized Congestion Reduction Projects, FHWA, 2011](#). This document provides guidance on overcoming barriers and challenges to implementing localized congestion relief projects. It presents and describes examples of institutional, design, funding and safety challenges that agencies face when trying to develop unique solutions to localized congestion problems.
- [Roundabouts \(webpage\), FHWA](#). This webpage contains extensive information on roundabouts, including technical materials and research (including NCHRP Report 1043, [Guide for Roundabouts | The National Academies Press](#)), outreach and educational resources, and connections to other transportation safety topics.



Source: Google Streetview

Managed Lanes (RC-2)

Roadway Capacity/Resiliency

Needs Addressed

Bottlenecks and unreliable highways/ major roadways.

Specific Strategies

High-occupancy vehicle (HOV) lanes, high-occupancy toll (HOT) lanes, reversible / adjustable lanes.

Related Projects

- New Jersey Turnpike High Occupancy Vehicle (HOV) Lanes – the far left lanes of the outer roadways between Interchanges 11 and 14 are designated for use only by high-occupancy and fuel-efficient vehicles northbound on weekdays from 6-9 AM and southbound on weekdays from 4-7 PM.
- Route 1 Hard Shoulder Running, South Brunswick – shoulder use is allowed during the peak periods between Independence Way and Raymond Road.
- Long Island Expressway – has a 40-mile HOV lane, which also allows Clean Pass vehicles (electric and hybrid).
- I-287 HOV Lanes – these lanes are no longer in use but were operational in the early 1990s for some time).
- Route 29 Hard Shoulder Running, Hamilton, NJ – northbound shoulder use between MP .5 and 1.5 is allowed during the weekday morning peak period.

Locations to Consider

- Roadways with congestion, poor reliability, and high transit frequency.
- See CMP analysis for areas to consider.

Travel Market Considerations

- Consider benefits for transit vehicles to provide

more reliable, efficient transit service. Consider implications of tolling/pricing on low-income and disadvantaged population groups.

Benefits

- Enhances reliability.
- Improves vehicular traffic flow and less congestion.
- Reduces bus travel times.
- Encourages alternatives to single-occupant vehicles.
- May reduce vehicle emissions.

Costs

- Potentially high, may consider public-private partnership opportunities.

Responsible Organizations

- NJ Turnpike Authority – responsible for NJ Turnpike and Garden State Parkway.
- NJDOT – responsible for state roads.
- Private sector – may play role in developing managed lanes.

Assessment Factors

- What are the current congestion levels, and what is the potential for reducing congestion?
- What are the current peak hour traffic volumes; how many vehicles would benefit from improvements?
- What are the physical requirements of the lane, relative to existing travel lanes and available right-of-way?

Potential Funding Sources

- USDOT, ATTAIN – provides funding for projects to install and operate advanced transportation technology, including electronic pricing, toll collection, payment, HOV lanes, cordon pricing, and congestion pricing.
- USDOT, Better Utilizing Investments to Leverage Development (BUILD) grant program – provides grants for surface transportation infrastructure projects with significant local or regional impact.

Implementation Issues

- Managed lanes may work best in congested corridors with few travel options, in locations where separation of vehicle types is desired, and areas where expanding capacity is not feasible.
- Planning needs to consider operational issues such as access to the lanes, type of barrier, signage, and enforcement.
- Often applied on limited access roadways with some applications on arterial roadways.
- Often applied for congestion relief (e.g., HOV) relief, transit priority (XBL, bus lanes) and operational management (e.g., truck lanes, recreational areas). Many but not all applied during peak travel periods.
- Reversible lanes may work well in corridors where traffic flow is heavily imbalanced for a short period of time.
- The endpoint treatment requires particular care and attention – common treatments extend across an intersection, requiring complex signals and inefficient timing strategies. If poorly executed, these intersections may become expensive and confusing. Locating a safe mid-block left turn across the favored travel direction can also be difficult.
- Impacted businesses may complain of denial to

traffic, and there is an increased potential for crashes depending on left turn demand, mid-block geometric conditions, and a large grouping of vehicles in the favored traffic direction.

- Various operational issues – barrier type, integration with the existing freeway, signing, and enforcement – require non-traditional approaches.
- Infrastructure and operational conflicts with micromobility, bicycle and pedestrian access and mobility needs (especially at intersections) when applied on arterial roadways.
- Use of managed lanes can present public perception, acceptance and policy challenges when lanes appear to operate below practical vehicle capacity (sometimes despite moving more people than all parallel general-purpose lanes combined). Strategies to incorporate lower vehicle occupancies (e.g., 2+ HOV) or allow for a wider mix of vehicles (e.g., EV/ZEV vehicles; motorcycles, trucks, buses) can be applied to increase usage levels.

Best Practices / Links and Lessons

- [Managed Lanes: A Primer, FHWA, 2008](#). This document defines managed lanes, provides examples, and identifies and describes success stories. It identifies best practices in three key areas: planning and project development, facility monitoring and evaluation, and life-cycle considerations.
- [Priced Managed Lane Guide, FHWA, 2012](#). This guide assists in considering, planning, and implementing priced managed lanes projects. The guide provides detailed profiles of 21 priced managed lane projects and updates the 2003 Guide for HOT Lane Development. It also describes how applying performance management principles to highway operations can improve the effectiveness of operations programs.
- [“Managed \(HOV/HOT\) Lanes,” Mobility Investment Priorities, Texas Transportation Institute](#). This briefing paper describes the types of facilities, target markets, benefits, implementation issues, and success stories.



New Road Capacity (RC-3)

Roadway Capacity/Resiliency

Needs Addressed

Bottlenecks and unreliable highways/ major roadways.

Specific Strategies

New roadway connections, add lanes, widen lanes.

Related Projects

- NJ Turnpike Interchange 6 to 9 Widening Program – this project added 170 lane miles of roadway, widening the mainline from 6 lanes to 12 lanes (6 in each direction).
- Garden State Parkway Widening, Exits 30 to 80 – this project widened the parkway from two to three lanes in each direction, along with increased shoulder widths.
- I-80, Riverview Drive to Polifly Road project – this planned major reconstruction project includes widening 1.6 miles of westbound I-80 through Paterson from three to four lanes (NOTE: CMP Review in process).
- Route 537 West Main Street Corridor Roadway Improvements project, Monmouth County – Section A (*CMP Study and Review Completed*).

Locations to Consider

- Last resort – to consider only if travel demand management, alternate mode, operations, or geometric improvement solutions are insufficient; consider managed lane capacity before general capacity.
- May be needed for areas with significant bottlenecks, or anticipated growth and development needs that cannot be accommodated by other strategies.

- Must include complementary operations and demand management.

Travel Market Considerations

- Consider the full range of air quality, noise, traffic, and safety impacts roadway expansion can have on surrounding community.

Benefits

- Improves vehicular traffic flow and less congestion.
- May reduce vehicle emissions.

Costs

- Potentially high.

Responsible Organizations

- New Jersey Turnpike Authority – responsible for NJ Turnpike and Garden State Parkway.
- NJDOT – responsible for state roadway construction, maintenance, and operations.
- Counties and municipalities – responsible for roads under their jurisdiction.

Assessment Factors

- What is the extent of current congestion and the potential for reducing the congestion?
- What are the peak period traffic volumes, i.e., how many travelers are affected by current delays and could benefit from improvements?
- What is the availability of alternative travel routes and travel modes?

Potential Funding Sources

- National Highway Performance Program (NHPP) – provides funding to improve the condition and performance of the National Highway System (NHS) and supports the construction of new facilities.

Implementation Issues

- Federal Congestion Management Process requirements (*add citation link here*) allow for addition of new road capacity subject to MPO review requirements. Although, these include exemptions for limited safety / bottleneck improvements, larger applications require consideration of multi-modal alternative primary strategies and inclusion of multimodal complementary strategies, consistent with regional air quality regulatory status.
- Additional lanes are best suited for roads that have exhausted most other lower cost or more rapid implementation time options for increasing and maximizing capacity. New lanes and roads are most beneficial in urban corridors that have the necessary right-of-way for this construction. The road or area that is considered for this project should also be very congested to justify the effort and expense to develop the project.
- Although the planning and design aspects of additions and new roads are complex, the primary elements of uncertainty are acquiring right-of-way and reducing the effects on the environment and the local community.

Best Practices / Links and Lessons

- [“Adding New Lanes or Roads,” Mobility Investment Priorities, Texas A&M Transportation Institute, 2025.](#)
This guide identifies the best candidates, potential benefits of roadway expansion, implementation examples, application techniques and principles, and potential issues. It discusses the need for environmental impact studies, need to consider current and future demand, and data needs.
- FHWA Congestion Management Process (in particular, Congestion Management Process Guidebook): [Congestion Management Process \(CMP\) | Organizing and Planning for Operations - FHWA Office of Operations](#) , [Congestion Management Process Guidebook - Congestion Management Process - Planning - FHWA](#) and Case Studies of the Congestion Management Process ([HTML](#)).



Source: Google Streetview

Expand Bridge, New Bridge (RC-4)

Roadway Capacity/Resiliency

Needs Addressed

Bottlenecks and unreliable highways/ major roadways.

Specific Strategies

Widen bridge, build replacement bridge, add new span.

Related Projects

- Pulaski Skyway – in addition to replacing the 3.5-mile deck, this project includes rehabilitating the ramps, steel superstructure and substructure; strengthening the structure against seismic events; improving drainage and lighting; and repainting the structure.
- Wittpenn Bridge – this project involved replacing the bridge over the Hackensack River and realigning Fish House Road on the west side of the river. The new bridge is located north of the existing bridge. The new bridge has a greater vertical clearance, and it accommodates bicycle and pedestrian traffic.
- Goethals Bridge Replacement – this project involved constructing two new parallel cable-stayed bridge to replace the original Goethals Bridge. This bridge has space reserved for possible future transit service.
- Sea Bright Rumson Bridge – this project was for the replacement of the aging drawbridge connecting Rumson and Sea Bright in Monmouth County.
- Replacement of aging Locust Avenue bridge, Mitchell Street culvert and Marion Avenue culvert in Essex County.

Locations to Consider

- Last resort – to consider only if operations or geometric improvement solutions are insufficient; consider managed lane capacity before general capacity.
- May be needed for areas with significant bottlenecks, or anticipated growth and development needs that cannot be accommodated by other strategies.
- Must include complementary operations and demand management strategies.

Travel Market Considerations

- Build bridges with pedestrians, cyclists, and transit users in mind; consider ways bridges can enhance connectivity among communities those who may face greater barriers to mobility.

Benefits

- Improves vehicular traffic flow and less congestion.
- May reduce vehicle emissions.

Costs

- Potentially high.

Responsible Organizations

- NJ Turnpike Authority – responsible for NJ Turnpike and Garden State Parkway.
- NJDOT – responsible for bridge construction, maintenance, and operations.
- Counties and municipalities – responsible for bridges under their jurisdiction.

Assessment Factors

- What is the extent of current congestion and the potential for reducing the congestion?
- What are the peak period traffic volumes, i.e., how many travelers are affected by current delays and could benefit from improvements?
- What is the availability of alternative travel routes and travel modes?

Potential Funding Sources

- USDOT, [Bridge Investment Program](#) – provides funding for bridge replacement, rehabilitation, preservation, and protection projects that reduce the number of bridges in poor condition, or in fair condition at risk of declining into poor condition.

Implementation Issues

- For BIP Bridge Project grants, FHWA is statutorily required to consider specific benefits including whether the benefits of a project outweigh the total project costs. Similarly, for BIP Large Bridge Project grants, there is a statutory requirement that FHWA evaluate whether a Large Bridge project is cost effective. FHWA is also required to develop a template for applicants to use to summarize project needs and benefits and to enable applicants to use data from the National Bridge Inventory to populate the template. FHWA developed the Bridge Investment Program Benefit-Cost Analysis Tool (BIP BCA Tool) to help applicants for either BIP Bridge Project or Large Bridge Project grants to summarize project costs and benefits, and to obtain data from the NBI in preparation of the economic analysis required for both Bridge Project and Large Bridge Project applications.
- Significant environmental, waterway / coastal protection and maritime vessel clearance permitting requirements and regulations can impact the range of acceptable design options, add potential costs associated with environmental mitigation measures, and substantially impact engineering to implementation time frames.
- Regional bridges may involve tolling or other

congestion pricing / policy strategies.

- Inclusion of pedestrian, bicycle and micromobility facility access with optimal design can present challenges.
- Inclusion of transit priority and managed lanes for larger structures may be desired / required.
- As key constriction points within the travel network, application of traveler information, incident management support and availability of emergency / evacuation shoulder lanes should be considered / incorporated.
- Safety countermeasures, especially with oversize or hazardous commercial vehicles, may need attention.
- Good design practice always will require a combination of basic engineering principles, experience, and judgment in order to furnish the best possible structure to suit an individual site within reasonable economic limitations. It does not preclude justifiable exceptions, provided the exceptions are based on sound engineering principles.

Best Practices / Links and Lessons

- [Bridges and Structures \(webpage\), FHWA](#). This webpage provides a compilation of technical reference information such as research reports, manuals, training, design examples, policy documents, and links to other resources.
- [Bridges and Structures Design Manual, 6th Edition, NJDOT, 2016](#). This manual, supplemented by other NJDOT baseline documents and operating procedures and policies, is the vehicle by which the design of bridges and structures is implemented. It includes a compilation of NJDOT Structural Design guidance, specification interpretations, standard practices, details and standards.



Road and Bridge Preservation/Resilience (RC-5)

Roadway Capacity/Resiliency

Needs Addressed

Disruptions to service due to infrastructure conditions, impacts of extreme weather events; rehabilitation and maintenance needs.

Specific Strategies

New bridges with higher vertical profiles and improved design (to prevent scour), raised roadway profiles, sheet piling, increased pavement overlay thickness, maintenance activity such as culvert clearing.

Related Projects

- Normandy Beach Roadway Elevation project, Toms River and Brick – this state-funded project will raise three streets. The project also includes repaving and drainage improvements.
- Resilient Northeastern NJ plan -- this plan includes recommended capital projects to address coastal flooding, and the recommendations include several projects to raise roads and construct flood barriers.
- Route 40/322 project, Atlantic County, NJ -- this project will raise approximately one mile of roadway to reduce flooding. Construction will include new pavement, new curbs and sidewalks, relocation of aerial and underground utilities, and new drainage.

Locations to Consider

- Roads, bridges, and other facilities in areas vulnerable to extreme weather impacts
- Identified needs based on pavement and bridge management systems; asset management plan.

Travel Market Considerations

- Consider full community resiliency, such as the

travel needs of transit dependent, population groups who may face greater barriers to mobility, when selecting roads for resiliency improvements.

Benefits

- Improved reliability / fewer delays due to road closures and related impacts.
- Reduced road and bridge deterioration.

Costs

- High but necessary, and important for overall preservation of the system.

Responsible Organizations

- NJDOT – responsible for state roads and bridges.
- Port Authority of New York and New Jersey – responsible for six crossings.
- Counties and municipalities – responsible for roads and bridges under their jurisdiction.

Assessment Factors

- What are the threats due to inland flooding, sea level rise storm surge, and temperature extremes?
- What facilities may be vulnerable: roads, bridges, signals, other?
- What is the current condition of facilities, and what is their vulnerability?
- What are the current and projected traffic volumes?
- What is the availability of alternative emergency travel routes?

Potential Funding Sources

- National Highway Performance Program (NHPP) – provides funding to improve the condition and performance of the National Highway System (NHS).
- USDOT, Promoting Resilient Operations for Transformative, Efficient, and Cost-saving Transportation Program (PROTECT) – provides funding to ensure surface transportation resilience to natural hazards including climate change, sea level rise, flooding, extreme weather events, and other natural disasters through support of planning activities, resilience improvements, community resilience and evacuation routes, and at-risk coastal infrastructure.
- NJDOT Local Aid program – provides funding for improvements to county roads and municipal streets.

Implementation Issues

- In general, there is a need to comprehensively inventory infrastructure, grade it based on levels of criticality and vulnerability, and then develop a phased plan detailing how resiliency measures will be taken.
- The ability to “zoom-to” particular segments or mile-posts of the state highway network will enable viewing the climate-borne challenges that a particular asset might face.
- Significant environmental, waterway / coastal protection and maritime vessel clearance permitting requirements and regulations can impact range of acceptable design options, add potential costs associated with environmental mitigation measures and substantially impact engineering to implementation time frames.
- Facilities may involve tolling or other congestion pricing / policy strategies.
- Inclusion of pedestrian, bicycle and micromobility facility access with optimal design can present challenges.

- Inclusion of transit priority and managed lanes may be desired / required.
- Application of traveler information, incident management support and availability of emergency / evacuation shoulder lanes should be considered / incorporated.
- Safety countermeasures, especially with oversize or hazardous commercial vehicles, may need attention.

Best Practices / Links and Lessons

- [Resilience Improvement Plan, NJTPA, 2024](#). In accordance with the guidelines of the federal PROTECT program, this document provides a risk-based assessment of vulnerable transportation assets. It encompasses immediate and long-term planning, demonstrates a systemic approach, and displays consistency with state and local hazard mitigation plans, and it provides a list of recommended prioritized investment projects.
- [Climate Resilience: Options to Enhance the Resilience of Federally Funded Roads and Reduce Fiscal Exposure, Government Accountability Office \(GAO\), 2021](#). The report identified 10 options to help states improve the climate resilience of federally-funded roads. The options included, among others: integrating climate resilience into FHWA policy and guidance; expanding the availability of Emergency Relief (ER) funding for post-disaster climate resilience improvements; and expanding the availability of discretionary funding for climate resilience improvements.
- [Vulnerability and Adaptation Assessment Framework, FHWA, 2018](#). This guide is for use in analyzing the impacts of climate change and extreme weather on transportation infrastructure, assessing adaptation options, and modifying decision-making processes. The framework is designed to help to identify key considerations, questions, and resources that can be used to develop and implement a climate change vulnerability assessment.



Source: MKSK

Reduce or Remove Highway Capacity/Barriers (RC-6) *Roadway Capacity/Resiliency*

Needs Addressed

Roadway reliability and safety issues, lack of safe and comfortable pedestrian and bicycle connections, opportunities to reduce single-occupant vehicle travel through transit-oriented development and other strategies.

Specific Strategies

Remove highway, convert highway to urban boulevard, tunnel the highway, cap the highway, reduce number of lanes.

Related Projects

- Sheridan Boulevard, New York City – this project transformed the Sheridan Expressway, an interstate highway, to a pedestrian-friendly boulevard, providing residents and visitors a direct connection to the Bronx River waterfront and Starlight Park.
- Park East Freeway, Milwaukee -- the 0.8-mile elevated Park East Freeway spur was replaced with a boulevard, and the street grid was restored to enhance access to downtown, surrounding neighborhoods, and the Milwaukee Riverwalk.
- Inner Loop East, Rochester – the project eliminated 12 roadway lanes designed for high-speed traffic, freeing up 5.7 acres of land for mixed-use development along a new, walkable boulevard. The redesigned corridor includes landscaping, protected cycle tracks, wide sidewalks, and frequent crosswalks.

Locations to Consider

- Highways running through urban centers and neighborhoods.

Travel Market Considerations

- Reducing or removing highway capacity and enhancing connectivity has the potential to restore communities disrupted by the original highway construction and on-going effects.

Benefits

- New walkable urban space.
- Improved street and multi-modal connectivity.
- Increased community development and redevelopment opportunities.
- Reduced environmental and public health impacts.

Costs

- High

Responsible Organizations

- NJDOT – responsible for state roadway construction, maintenance, and operations.
- Counties and municipalities – responsible for local street network, land use planning, and redevelopment.

Assessment Factors

- To what extent is the highway creating barriers to local accessibility and connectivity?
- What are the peak period traffic volumes, and how could the volumes be redistributed?
- What are the multi-modal circulation opportunities?
- What are the redevelopment opportunities?
- How would removal of the highway compare to rehabilitating it in terms of costs and benefits?
- How can past adverse impacts to disadvantaged communities be addressed?

Potential Funding Sources

- USDOT, Reconnecting Communities Pilot Grant Program – provides funding for projects to reconnect communities harmed by past transportation infrastructure decisions, through community-supported planning activities and capital construction projects that are championed by those communities.
- USDOT, Better Utilizing Investments to Leverage Development (BUILD) grant program – provides grants for surface transportation infrastructure projects with significant local or regional impact.

Implementation Issues

- Need an urban vision not dominated by automobiles and favoring short trips by different modes, such as walking and biking, along routes that are part of the city fabric, like well-connected streets and multiuse path networks.
- Decision-making should be driven by a long-term community investment strategy rather than by the short-term pressure of spending federal allocations.
- Need control of land by local government and clear regulations, such as form-based codes that create walkable urban places and shape new development that supports priorities like affordable housing and job creation.

- Need to establish anti-displacement protections that keep residents currently living around highways in place once the highway is gone.

Best Practices / Links and Lessons

- [Freeways without Futures \(webpage\), Congress for the New Urbanism \(CNU\), 2025.](#) This webpage provides updated information on CNU's Highways to Boulevards initiative, which focuses on removing unnecessary freeways from cities. The information includes summaries of completed projects, which highlight the potential impacts and benefits of removing highways. The examples provide useful insights into the political and social capital necessary for a successful removal effort and serve as guidance for future highway removal projects.
- [Four Principles for a Federal Highways to Boulevards Program, CNU, 2021.](#) The following are the four principles: root the program in community priorities, adopt new metrics that create streets for people, invest in holistic neighborhood repair, and prevent displacement of legacy residents.



Source: Google Streetview

First Mile, Last Mile Truck Access (FR-1)

Freight

Needs Addressed

Trucks may not have efficient access between employment centers and main roads. Truck traffic may have negative impact on local roads.

Specific Strategies

Planning and zoning regarding location of centers relative to main roads, traffic impact analysis, designated truck routes, physical improvements to truck routes, address geometric deficiencies, e.g., tight turns, low clearances.

Related Projects

- Union County Truck Mobility Study, 2021 – project included a focus on identifying areas where trucks interact with pedestrians and bicyclists.
- Port Street Corridor Improvement Project – Port Authority project, will upgrade the critical northern roadway access point into the Port Newark and Elizabeth Marine Terminal.
- Port of Camden Access and Infrastructure Resiliency Project – project will reconstruct and improve several roadways to improve access between the port and nearby highways, and [it also will provide improve lighting, sidewalks, signage, pavement markings, curbs, and ADA ramps.](#)
- NJTPA and NJDOT truck parking studies.

Locations to Consider

- Close to I-95 in rural Middlesex County.
- North of I-195 in Monmouth County.
- Sussex County.
- Between I-80 and I-78 in Warren County.
- South of I-78 in Hunterdon County.

Travel Market Considerations

- Consider noise and air quality impacts of congested freight on surrounding communities; consider workforce development opportunities.

Benefits

- Reduced truck travel time between centers and main roads while also mitigating increases in congestion, impacts on local roads, and adjacent land uses.

Costs

- Varies but generally low to medium.

Responsible Organizations

- NJDOT – for state roads.
- Counties / municipalities – for roads under their jurisdiction.
- Municipalities – for land use planning and development approval decisions.

Assessment Factors

- What are the local land use patterns relative to the current / potential location of warehouses and distribution centers?
- What is the estimated size of the employment center, number of employees, number of truck trips?
- What are the truck travel patterns relative to the local roadway network, and what are the impacts to local roads, other transportation system users, and surrounding land uses?
- What are the physical / geometric constraints of the local roadway network?

Potential Funding Sources

- FHWA, National Highway Freight Program (NHFP) -- supports investment in infrastructure and operational improvements that strengthen economic competitiveness, reduce congestion, reduce the cost of freight transportation, improve reliability, and increase productivity.
- NJDOT, Local Freight Impact Fund -- provides funding to local jurisdictions for projects to mitigate freight impacts. Project must involve access to a port, warehouse / distribution center, or other freight node. The program seeks to improve large truck access, routing, and mobility along the local roadway system.

Implementation Issues

- Need to balance truck routing needs with other transportation modes, surrounding land uses, and neighborhood impacts. Operational and design issues relating to pedestrian, bicycle, emergency management / response, mobility impaired accessibility, and parking / curbside management are likely to be encountered.
- Urban areas and downtown areas often have limited space for facilitating truck flows, pick-ups, and deliveries.
- Need to balance commercial vehicle access roadway design requirements in master plan, land use development regulations, zoning, and related

site design policies.

- Consider if dedicated truck lanes, routes, or facilities may be suitable for certain municipalities or corridors.
- Traveler information systems for commercial vehicle operators may help with roadway routing, restrictions, clearance / weight advisory and allowable parking guidance.

Best Practices / Links and Lessons

- [Distribution Warehousing and Goods Movement Guidelines, NJ Office of Planning Advocacy, 2022.](#)

This document was prepared largely in response to community concerns about the extent and impacts of new warehouse / distribution development. It includes information on traffic impact analysis / road planning and how to accommodate truck access and circulation.

- [Delivering New York, A Smart Truck Management Plan for NYC, NYC DOT, 2021.](#) This plan identifies new and creative approaches to accommodate freight growth while expanding intermodal delivery methods, particularly for “the last mile.” In particular, it addresses the need to improve management of freight during the most congested times of day, by encouraging off-hour deliveries, providing better access to the curb, testing innovative delivery methods, improving truck routing, and streamlining regulations for smarter, data-driven governance.



Rail Freight (FR-2)

Freight

Needs Addressed

Rail capacity needs, congested and unreliable freight corridors.

Specific Strategies

Improve system connections, address weight / clearance issues, improve track and bridge conditions, upgrade / add sidings, provide grade crossing / safety improvements.

Related Projects

- ExpressRail, Port of New York and New Jersey – four on- and near-dock ExpressRail facilities connect to two Class 1 railroads, CSX and Norfolk Southern, extending rail service to key inland markets.
- New York New Jersey Rail, Port Authority of New York and New Jersey – short line rail between Jersey City and Brooklyn, only remaining carfloat service on New York Harbor. Recent project included building a new rail lift bridge and executing resiliency work at the rail yard.
- Morris / Warren County Rail Corridor Study, NJTPA – examined the infrastructure and operational improvements necessary to modernize the corridor, helping it to accommodate taller and heavier cars and generate future economic development.
- Point - No - Point Bridge project – replacement bridge along key rail freight route complemented nearby Superfund site remediation by preventing additional truck traffic carrying contaminated dredged silt through local communities.

Locations to Consider

Priority areas from New Jersey Freight Rail Strategic Plan. Examples include:

- HX Corridor
- Raritan Valley Corridor
- Amboy Corridor
- Coast Line Corridor
- Morris/Warren Corridor
- Black River & Western Corridor

Travel Market Considerations

- Consider grade crossing delays, safety, air quality, and noise impacts on surrounding community; consider workforce development opportunities, particularly in underrepresented communities.

Benefits

- Improve rail operating speeds and service reliability.
- Reduce traffic congestion by increasing goods movement by rail.
- Reduce roadway noise and emissions from trucks in communities.

Costs

- Varies from medium to high.

Responsible Organizations

- Private operators – responsible for rail infrastructure and operations.
- Counties – some counties (e.g., Morris) may own lines.
- NJDOT – provides funding for selected strategic improvements.

Assessment Factors

- What is the current condition of facilities, what is the extent of physical restrictions?
- What are current and potential rail freight volumes?
- Who are the current customers, and what are the economic / business development opportunities?
- What are potential issues associated with access to rail yards and localized traffic congestion?

Potential Funding Sources

- Federal Railroad Administration, Consolidated Rail Infrastructure and Safety Improvement (CRISI) Grant funding – provides funding for various types of projects including improved short line or regional railroad infrastructure.

Implementation Issues

- Large capital costs and multiple level regulatory requirements for implementing infrastructure improvements. May need to justify use of public funds and need good public-private coordination. May need to obtain right-of-way.
- Freight rail improvements work best in locations where intermodal freight connections can be consolidated and where shipments travel over 500 miles.
- Target markets may include areas with freeways with substantial truck freight traffic, regions containing many train-truck interaction points, or corridors with traffic congestion caused by freight rail traffic crossings.
- Freight rail markets vary, ranging from large and potentially high-value shipment time sensitive movements across long distances (e.g., containers from ports to interior U.S. markets, finished automobiles) to less time sensitive high volume heavy bulk commodities (e.g., aggregates, plastics, lumber, chemicals, etc.) with longer transit times than truck.
- Some shippers lack direct access (i.e., sidings) to network. Use of common load/unload facilities (i.e., bulk transfer, team tracks, container terminals

and other staging locations) may require intermodal truck transfer to facilitate shipper origination / delivery.

- May need to consider potential for community concerns related to perceptions of noise and safety. Also, may need to consider the potential for delay impacts to emergency response.

Best Practices / Links and Lessons

- [State Rail Plan Guidance, FRA, 2013](#). This document establishes a required standard format for state rail plans. It calls for descriptions of all freight rail proposals under consideration, including intermodal connections and facilities. The plan should identify projects as service changes or physical improvements and whether they are improvements or new additions to the existing rail network in the State.
- [Freight Rail Industrial Opportunities Program, Final Report, NJTPA, 2019](#). This report summarizes work to assess opportunities in seven corridors. It includes summary information on weight and geometric restrictions and estimated improvement costs. It identifies common solutions to eliminate vertical restrictions that were recommended as potential improvements at specific locations in the study area, and it discusses industrial opportunities and economic impacts.



Source: Google Streetview

Freight Operations / Off-Hours Delivery (FR-3)

Freight

Needs Addressed

Congested freight corridors, bottlenecks and unreliable highways/ major roadways.

Specific Strategies

Attended deliveries (received by business staff), unattended deliveries, freight lockers, and urban distribution.

Related Projects

- Off-Hours Delivery Program, New York City – provides financial incentives for businesses to shift deliveries to off-peak hours, between 7 p.m. to 6 a.m. The incentives specifically aim to help smaller businesses that face financial barriers to transitioning to off-hour deliveries.

Locations to Consider

- Within urban areas.

Travel Market Considerations

- Consider impacts of congested freight on surrounding communities, particularly communities with poor air quality. Collaborate with communities, educational organizations, agencies, and private sector companies to market, recruit, and retain workers from under-represented demographics and communities.

Benefits

- Reduces delivery times.
- Reduces on-street congestion in immediate area of business and surrounding roadway network.
- Improves multi-modal safety.
- Reduces emissions.

Costs

- Low, policy-based.

Responsible Organizations

- Private businesses – willing to accept off-hour deliveries.
- Suppliers / trucking companies – willing to make off-hour deliveries.
- Public agencies – coordinate with businesses and suppliers, provide information and education, possibly provide financial incentives.

Assessment Factors

- What is the extent of current truck traffic and its impact?
- What is the current availability and use of on-street loading zones?
- How many potential receiving businesses (retail, food stores, restaurants) are there, and how many shippers / carriers are involved?
- How many deliveries potentially could be shifted?
- What is the potential for unattended deliveries?

Potential Funding Sources

- FHWA Congestion Relief Program – provides funding for projects that support activities to reduce or shift highway users to off-peak travel times or to non-highway travel modes during peak travel times.
- FHWA, National Highway Freight Program (NHFP) – supports investment in infrastructure and operational improvements that strengthen economic competitiveness, reduce congestion, reduce the cost of freight transportation, improve reliability, and increase productivity.
- USDOT, SMART Grants Program – provides grants for demonstration projects focused on advanced smart community technologies and systems in order to improve transportation efficiency and safety. Delivery/logistics is included as a technology area for eligible projects.

Implementation Issues

- Large businesses within the retail and food industries may be more willing to adopt an OHD program. Targeting these businesses with multiple locations, typically in multiple cities, will therefore result in more efficient use of resources, leading to an increased success rate for long-term program implementation.
- Tools and strategies to make overnight deliveries feasible for businesses include installing low-noise equipment for delivery vehicles, building security retrofits to enable unattended deliveries, and safety equipment such as security cameras.

- Need to balance truck routing needs with other transportation modes, surrounding land uses, and neighborhood impacts. Operational and design issues relating to pedestrian, bicycle, emergency management / response, mobility impaired accessibility, and parking / curbs management are likely to be encountered.
- Urban areas and downtown areas often have limited space for facilitating truck flows, pick-ups, and deliveries.
- Need to balance commercial vehicle access roadway design requirements in master plans, land use development regulations, zoning, and related site design policies.
- Need to consider if dedicated truck lanes, routes, or facilities may be suitable for certain municipalities or corridors.
- Traveler information systems for commercial vehicle operators may help with roadway routing, restrictions, clearance / weight advisory, and allowable parking guidance.

Best Practices / Links and Lessons

- [Off Peak Delivery, US DOT, Climate Change Center, 2024](#). This guide provides information on program benefits, cost considerations, funding opportunities, complementary strategies, case studies, and other resources.
- [Off-Hour Delivery Guidebook – Engaging Large Retailers in Off-Hour Delivery Programs, Rensselaer Polytechnic Institute, Center for Infrastructure, Transportation, and the Environment, 2023](#). This guidebook was developed to advance knowledge on how best to foster off-hour delivery programs in urban areas, with a particular focus on large retailers. The guide discusses the key details of the processes and partnerships that are essential to implementing OHD and covers the basic concepts for OHD programs and their implementation.



Source: Google Streetview

New Truck Rest Areas/ Truck Parking Information Systems (TPIS) (FR-4)

Freight

Needs Addressed

Roadway safety issues, lack of availability of safe parking locations for trucks and commercial vehicles.

Specific Strategies

Development of truck parking along major freight corridors (I-95, I-78, and I-80).

Consideration of development of Truck Parking Information System (TPIS) to collect and disseminate information on availability of parking at these locations.

Related Projects

- NJDOT pilot tests of truck parking information systems.
- [Atlanta Regional Truck Parking Assessment Study](#).
- [Expanding Truck Parking in Pennsylvania](#).

Locations to Consider

- Near freeway interchanges, logistic hubs, and parks.

Travel Market Considerations

- Considerations should be locations of new truck parking and increased emissions due to idling of trucks and the impacts to the local community.

Benefits

- Addresses one of the biggest challenges to freight industry – availability of truck parking.
- Safety of truck drivers.
- Support compliance to federal Hours of Service requirement.

Costs

- Low to medium based on availability of land and whether land needs to be acquired, and the type of construction needed, type of ownership – public or private.

Responsible Organizations

- NJDOT.
- Local municipalities.
- Private truck stop developers.

Assessment Factors

- Freight truck volumes.
- Parking demand.
- Availability of vacant land.
- Considerations of local zoning.
- Community feedback.

Potential Funding Sources

- National Highway Freight Program (NHFP).
- Federal Grants – Infra and Raise.
- Advanced Transportation Technology and Innovation (ATTAIN) program.
- Public Private Partnerships.

Implementation Issues

- Land acquisition and stakeholder buy-in.
- Resistance from local communities.
- Zoning restrictions from local communities.

Best Practices / Links and Lessons

- [FHWA Truck Parking Development Handbook](#) was developed to help planners, practitioners and policy makers and provides information regarding estimating truck parking demand benefits and costs of truck parking development of strategies.
- [Clearinghouse for Truck Parking Publications](#) from FHWA Freight Professional Capacity Building Program provides a repository of studies related to truck parking.
- [National Coalition on Truck Parking](#) – gets inputs from key stakeholders and supports development of innovative approaches to solve nations truck parking problems.
- Successful public Private Partnership examples in Weed, CA and Fernley, NV.
- [Truck Parking Zoning and Guidance from Atlanta Regional Commission.](#)



Safety Countermeasures

Direct Safety

Needs Addressed

Bottlenecks and unreliable highways/ major roadways, roadway reliability issues, pedestrian safety issues, bicycle safety issues, roadway safety.

Specific Strategies

For roadway departures, design improvements at curves; for intersections, turning lanes at stop-controlled intersections; for bike-ped, medians and refuge islands; enforcement; and education.

Related Projects

- Local Safety Program Projects, NJTPA – these projects receive grants through the NJTPA’s local Safety and High-Risk Rural Roads programs, which provide federal funds to counties and cities for cost-effective solutions that can make an immediate impact on their target areas.

Locations to Consider

- Areas with identified high numbers of crashes.
- The NJTPA Congestion Management Process (CMP) analysis can help to identify specific locations to consider.

Travel Market Considerations

- Take into account the higher rate of traffic crashes in certain communities and ensure safety improvements are implemented where they’re most needed.

Benefits

- Improved safety – reduced crashes, fatalities, injuries, and property damage.
- Improves reliability.
- Enhances the usability of public transit.
- Increases the viability of walking, bicycling, and other micromobility options.

Costs

- Generally low.

Responsible Organizations

- NJDOT – responsible for state roadways.
- NJ TRANSIT – responsible for rail stations, bus operations.
- Counties – responsible for county roadways.
- Municipalities – responsible for municipal roadways.

Assessment Factors

- What are the most frequent crash factors?
- What factors involve roadway design and what factors involve driver/bicyclist/pedestrian behavior?

Potential Funding Sources

- USDOT, Safe Streets and Roads for All (SS4A) Grant Program – provides funding to improve roadway safety for all users by reducing and eliminating serious injury and fatal crashes through the development, refinement, and implementation of [comprehensive safety action plans](#).
- USDOT, Advanced Transportation Technologies and Innovative Mobility Deployment (ATTIMD) – provides funding to install and operate advanced transportation technology, including projects for advanced safety systems, including V2V and V2I communications, technologies associated with automated vehicles, and other collision avoidance technologies.

Implementation Issues

- In order to identify proper solutions to a safety issue, that issue must initially be identified and understood. To do so, crash studies are necessary.
- In addition to the reactive approach to safety, proactive approaches such as Road Safety Audits (RSAs), may be useful. RSAs are formal safety performance examinations of existing or planned roadway segments or intersections by an independent audit team who qualitatively estimates and reports on potential road safety issues and identifies opportunities for safety improvements. These studies seek to identify potential or existing issues before they result in crashes, and they have shown useful in defending tort liability.

Best Practices / Links and Lessons

- [Proven Safety Countermeasures, FHWA, 2021](#). These strategies are designed for all road users and types of roads – from rural to urban, from high-volume freeways to two-lane State and county roads, from signalized crossings to horizontal curves. Each countermeasure addresses at least one safety focus area – speed management, intersections, roadway departures, or pedestrians/bicyclists – while others are crosscutting strategies that address multiple safety focus areas.
- [Strategic Highway Safety Plan \(SHSP\), NJDOT, 2020](#). This plan identifies potential strategies in each of seven main emphasis areas: equity, lane departures, intersections, driver behavior, pedestrians and bicyclists, other vulnerable road users, and data.
- [State of New Jersey Highway Safety Plan \(HSP\), Division of Highway Traffic Safety \(DHTS\)](#). This plan identifies potential countermeasure strategies in several program areas including alcohol and other drugs, pedestrian and bicycle safety, occupant protection, police traffic services, community traffic safety programs, public information and paid media, other vulnerable road users, and traffic records.
- [Cost Effective Local Road Safety Planning and Implementation, American Traffic Safety Services Association, 2012](#). This document is a general guide that local officials can utilize to identify and quantify existing safety issues, identify potential solutions to those issues, and identify potential state and local partnerships to fund them.