REPORT CARD FOR NEW JERSEY'S INFRASTRUCTURE

2016

infrastructurereportcard.org/nj

ASCE
AMERICAN SOCIETY OF CIVIL ENGINEERS

Capacity Operations and Maintenance Condition

METHODOLOGY

Resilience Innovation

Public Safety Future Need Funding

THE PURPOSE OF THE *REPORT CARD FOR NEW JERSEY'S INFRASTRUCTURE* IS TO INFORM THE PUBLIC AND LEGISLATORS OF THE CURRENT CONDITION OF OUR STATE'S INFRASTRUCTURE IN A CONCISE AND EASILY ACCESSIBLE FORMAT OF A SCHOOL REPORT CARD. EACH OF THE CATEGORIES OF INFRASTRUCTURE COVERED IN THE REPORT CARD IS ASSESSED USING RIGOROUS GRADING CRITERIA AND THE MOST RECENT DATA TO PROVIDE A COMPREHENSIVE ASSESSMENT OF YOUR INFRASTRUCTURE.

Photos clockwise courtesy of Flickr users: George Pankewytch, Jazz Guy, Hudconja, Ken, The Castle Group

REPORT CARD FOR NEW JERSEY'S INFRASTRUCTURE 2014

GRADING CRITERIA

ASCE HAS USED THE FOLLOWING CRITERIA TO DISCUSS AND GRADE THE STATE OF INFRASTRUCTURE:

- CAPACITY: Evaluate the infrastructure's capacity to meet current and future demands.
- CONDITION: Evaluate the infrastructure's existing or near future physical condition.
- FUNDING: Identify the current level of funding (from all levels of government) for the infrastructure category and compare it to the estimated funding need.
- FUTURE NEED: Evaluate the cost to improve the infrastructure and determine if future funding prospects will be able to meet the need.
- OPERATION & MAINTENANCE: Evaluate the owners' ability to operate and maintain the infrastructure properly and determine that the infrastructure is in compliance with government regulations.
- PUBLIC SAFETY: Evaluate to what extent the public's safety is jeopardized by the condition of the infrastructure and what the consequences of failure may be.
- RESILIENCE: Evaluate the infrastructure system's capability to prevent or protect against significant multi-hazard threats and incidents and the ability to expeditiously recover and reconstitute critical services with minimum damage to public safety and health, the economy, and national security.
- INNOVATION: Evaluate the implementation and strategic use of innovative techniques and delivery methods.

OUR REPORT CARD FOR NEW JERSEY'S INFRASTRUCTURE 2016 GRADES

Bridges	Dams	Drinking Water	Energy
D+	D	C	C+
Hazardous Waste	Levees	Parks	Ports
C	D-	D+	C
Rail	Roads	Solid Waste	Transit
C	D+	B-	D-
Waste Water			
D			

G.P.A.- D+

ASCE AMERICAN SOCIETY OF CIVIL ENGINEERS

INFRASTRUCTUREREPORTCARD.ORG/NJ

WHAT DO THE GRADES MEAN?

ASCE HAS DEFINED THE GRADING SCALE FOR THIS INFRASTRUCTURE REPORT AS:

90-100%: EXCEPTIONAL: FIT FOR THE FUTURE

The infrastructure in the system or network is generally in excellent condition, typically new or recently rehabilitated, and meets capacity needs for the future. A few elements show signs of general deterioration that require attention. Facilities meet modern standards for functionality and resilient to withstand most disasters and severe weather events.

80-89%: GOOD: ADEQUATE FOR NOW

The infrastructure in the system or network is in good to excellent condition; some elements show signs of general deterioration that require attention. A few elements exhibit significant deficiencies. Safe and reliable with minimal capacity issues and minimal risk.

70-79%: MEDIOCRE: REQUIRES ATTENTION

The infrastructure in the system or network is in fair to good condition; it shows general signs of deterioration and requires attention. Some elements exhibit significant deficiencies in conditions and functionality, with increasing vulnerability to risk.

51-69%: POOR: AT RISK

The infrastructure is in poor to fair condition and mostly below standard, with many elements approaching the end of their service life. A large portion of the system exhibits significant deterioration. Condition and capacity are of significant concern with strong risk of failure.

50% OR LOWER: FAILING/CRITICAL: UNFIT FOR PURPOSE

The infrastructure in the system is in unacceptable condition with widespread advanced signs of deterioration. Many of the components of the system exhibit signs of imminent failure.

DATA AVAILABLE IS INSUFFICIENT TO PROVIDE A GRADE

ABOUT OUR INFRASTRUCTURE

New Jersey's infrastructure includes many of our state's most iconic and recognizable features. Think about the New Jersey Turnpike, our world famous beaches, and the bridges and tunnels that connect us to our neighbors. These are not only assets that enable our economy and sustain our way of life but notable symbols of our state and what we have achieved. Periodically, the New Jersey Section of the American Society of Civil Engineers (ASCE) evaluates the state's infrastructure. Using a straightforward A to F school report card system, the *2016 Report Card for New Jersey's Infrastructure* is a snapshot of our current infrastructure conditions and needs.

VISION FOR THE FUTURE

The Report Card also outlines a vision for what our infrastructure could look like in the future if we address our needs and some of the actions needed to get there. Recommendations are included overall and in each infrastructure category discussion The Report Card is compiled by civil engineering professionals and educators in New Jersey who assign grades according to the following criteria: capacity, condition, funding, future need, operation and maintenance, public safety, resilience, and innovation. This same criteria is used by the national ASCE evaluators to develop the *Report Card for America's Infrastructure*.

When New Jersey's infrastructure was last evaluated in 2007, the state achieved a composite infrastructure grade of C- grading only 7 categories. The 2016 grade point average is a D+ grading more infrastructure statewide. The New Jersey section of ASCE evaluated 13 different aspects of our infrastructure including: Bridges, Dams, Drinking Water, Energy, Hazardous Waste, Levees, Parks, Ports, Rail, Roads, Solid Waste, Transit, and Wastewater.

As reflected in this year's G.P.A., there is much work to be done and many policy changes that need to be made in order to get our infrastructure to where it needs to be. Two bright spots, however, include New Jersey's dam inspection program, which has Emergency Action Plans for 100% of all high hazard potential dams and major improvements to portions of the New Jersey Turnpike completed since the last Report Card in 2007. At its peak, the New Jersey Turnpike Widening was the largest road construction project in the western hemisphere.

Notwithstanding the successes noted above, the news is mostly grim. Nearly 9% of New Jersey's bridges are designated as structural deficient, meaning they are in need of major repairs, rehabilitation, or replacement. Transit ridership has grown significantly in recent years but without an accompanying investment in increasing the system's capacity. Roughly 42% of New Jersey's roads are deficient, costing each New Jersey driver an estimated $1,951 annually in lost time, wasted fuel and additional vehicle

repairs and maintenance. Bridges, roads and transit in our state all receive the majority of their funding from the Transportation Trust Fund (TTF). The TTF is funded via taxes on sales of vehicle fuels and lubricants as well as a portion of our toll road revenue. Unfortunately, with the state's new budget year starting on July 1, 2016, the fund will no longer have the capacity to disburse money to new projects, having only enough revenue to pay existing debt. The level of support for this critical infrastructure funding mechanism via our state gas tax – the second lowest in the nation – must be re-evaluated. This is particularly urgent given that the tax has not been raised to keep pace with inflation for over 25 years.

Our state's economic well-being and our enviable way of life will be in jeopardy if we do not meet these public policy challenges head on and with a realistic and well-informed vision of our infrastructure's future. Failure to do so will inevitably lead to an erosion of the services we take for granted.

To that end, the Report Card offers the following steps to start raising the grades:

1. FIX THE NEW JERSEY TRANSPORTATION TRUST FUND

Bridges, roads and transit in our state all get the majority of their funding from the Transportation Trust Fund (TTF), and beginning in July 2016, it will no longer be able to fund new projects and all remaining revenue will be used to pay off existing bills. New Jersey's economy relies on transportation systems – from roads to rails – and after 25 years of not changing how we fund, it's time to decide on a long-term funding fix for transportation in New Jersey.

2. KEEP REBUILDING RESILIENT INFRASTRUCTURE

Superstorm Sandy impacted every type of infrastructure in New Jersey, and as we've rebuilt, we're not just doing it the same way – we're building more resilient infrastructure. Whenever we do work, let's prepare for the future. Damage from storms, floods, and other disasters can be minimized if our critical infrastructure is made more resilient, and every time we start a project we should see it as an investment in building a stronger core infrastructure for the future.

3. BETTER INFRASTRUCTURE STARTS WITH BETTER CHOICES

With mounting needs from age and delayed maintenance, serious attention needs to be given to assets that are ready to retire. Also, until they do reach their life expectancy, every dollar is going to be used to get the best possible performing overall system. NJDOT and others are already trying to do this by using prioritization and monitoring to strategically determine where to spend constrained resources. With evolving technology approaches and a right-on-time maintenance strategy, New Jersey's infrastructure can go from system-critical to system-driven.

The Report Card is not meant to be a commentary on, nor evaluation of, the performance of any particular government department or agency. On the contrary, our teams found that in many cases, our government officials are doing exemplary work with the limited resources allotted to them.

The New Jersey Section of ASCE represents over 4,000 current and future civil engineering professionals who live and work in our state. This report is dedicated to the engineers who go to work every day ready to solve problems and design and build the infrastructure upon which we all depend. Our current grade is clearly unacceptable. However, with dedication, ingenuity and the support of the citizens and policy makers of New Jersey we believe that great improvements are possible.

BRIDGES

D+

What You Should Know About New Jersey's Bridges

Bridges and roads are the backbone of the U.S. transportation system, allowing Americans to travel more than 2 trillion miles each year. New Jersey is the most densely populated state in the U.S. with 32,000 miles of highway, and many of New Jersey's citizens drive over multiple bridges each day. Bridge infrastructure provides critical means for traversing rivers, local roads, highways, railroads, and other obstructions that would otherwise cripple or significantly delay travel. Bridges are critical links in New Jersey's highway system. However, despite their importance, many of our bridges are old and have deteriorated without the maintenance they needed. Funding for bridge maintenance and renewal is very important but adequate funding continues to be in jeopardy.

Furthermore, New Jersey/New York Port (PANYNJ) is the third largest container port in the U.S., and New Jersey bridges are subjected to much of the truck loading associated with the distribution of the goods passing through this port. Therefore, New Jersey's bridge infrastructure is key to the successful operation of the port-to-highway delivery system. However, the ever-increasing transportation of goods via our highway network has resulted in a significant increase in the truck traffic, which has in turn created heavier loading which can accelerate wear and tear on our bridges.
New Jersey's transportation system includes a total of 6,657 bridges. Ownership of these bridges and operational responsibilities are shared by the New Jersey Department of Transportation (NJDOT) and other local entities listed below.

- 2,676 County/Municipal Owned Bridges
- 107 New Jersey Transit Bridges (only overhead bridges; rail over roadways)
- 1,054 New Jersey Turnpike Authority Bridges (New Jersey Turnpike and Garden State Parkway)
- 115 Orphan Bridges (abandoned bridges; NJDOT responsibility)
- 191 Other Agencies Bridges; generally along the Hudson River and Delaware River state border lines
- 17 Private Bridges
- 67 South Jersey Transportation Authority Bridges (Atlantic City Expressway)
- 2,430 State-Owned Bridges (NJDOT)

The 6,657 bridges listed above are the structures included in the National Bridge Inventory System (NBIS), which is administered by the Federal Highway Administration (FHWA). The average age of New Jersey's bridges is 51 years. Other bridges not considered in this category are bridges carrying trains and bridges under 20-feet in span length. The condition of the state's railroad bridges conveying train traffic are accounted for in the transit and freight categories. The bridges under 20-feet are inspected and maintained by the owners, who are generally counties and municipalities, but sufficient data is not available for consideration in grading the State's bridges.

Issues Facing New Jersey's Bridges

A careful assessment of the State's bridges brings to light the issues the State has to work on resolving. The evaluation considered eight key criteria to arrive at the grade for the State's bridges. They are: condition, capacity, funding, future need, operation and maintenance (O&M), public safety, resilience, and innovation.

BRIDGES

Condition – Of the 6,657 bridges in the State, 577 bridges or 1 in 11 (8.7%) are classified as "Structurally Deficient," which means the bridge requires significant maintenance, rehabilitation or replacement. Also, 439 bridges or 1 in 15 (6.6%) are classified as "Scour Critical" which means the streambed or banks could erode during a storm event and jeopardize the bridge's stability. Structurally Deficient and Scour Critical bridges could suddenly fail due to material deterioration or severe storm events.

The average age of New Jersey's bridges is 51 years compared to the National average which is 43 years and the expected life of 50 years. Most of New Jersey's bridges have reached their expected life.

Based on 2015 NBIS data obtained from the NJDOT, the average condition rating for the State's bridges is approximately 6, which represents a Satisfactory Condition. This rating is based on the FHWA NBIS Coding Guide scoring criteria, which ranges from 0 to 10. A 3 signifies a "Serious Condition" and a 9 denotes an "Excellent Condition." The New Jersey Turnpike Authority (NJTA) has just completed a $2.7 billion 30-mile NJ Turnpike widening program, which replaced 88 bridges and rehabilitated 7 bridges. The condition ratings for these bridges is not yet reflected in the State's NBIS data. Once new NBIS data is entered during the next cycle of inspections the above stated condition statistics will improve. Other major programs, currently underway that will have a positive impact on the condition ratings include the NJTA 33-mile Garden State Parkway widening program, which will replace 53 bridges and rehabilitate 30 bridges, and the NJDOT 3.5-mile long Pulaski Skyway Structure Rehabilitation Program. These projects and other ongoing projects will influence the overall bridge condition ratings in the State's database as these bridges get revaluated during the near future cycles of inspections.

Capacity – The capacity of the State's bridges is dependent on their ability to meet current and near future usage demands. Based on 2015 NBIS data obtained from the NJDOT, 23% of the State's bridges are classified as "Functionally Obsolete," meaning they have substandard features affecting the bridges' capacity to safely carry traffic volumes. This often results in congestion which is addressed by widening roadways and improving substandard features. For critical thoroughfares, the NJTA has recently completed an aggressive NJ Turnpike widening program and is also progressing a widening program for the southern portion of the Garden State Parkway.

The capacity of the State's bridges to meet the current and future demands is also affected by their structural conditions and their potential for scour discussed above. Scour is erosion of the stream bed material supporting a bridge's foundation. Loss of foundation support or failure of a member due to poor condition could result in a bridge being closed to traffic. Such failures could pose a safety issue in addition to the loss of capacity. Routine inspections and weight posting safeguard against these potential issues.

Funding – The current funding level is inadequate to address the maintenance, rehabilitation and replacement needs of the State's bridges. Currently, the State is spending about $1.5 to $1.6 billion per year. This investment is typically supplemented with federal funds. The State's funding source, the Transportation Trust Fund (TTF), is troubled and can only cover the program through July of 2016. The TTF issue is critical for New Jersey and needs to be addressed now to avoid jeopardizing the loss of matching federal funds.

The State has committed to provide $1.6 billion per year in FY2016 and FY2017 (October 1, 2015 to September 30, 2017). That would partly include funds from the TTF and contributions from the PANYNJ and NJ Transit. This commitment falls short,

BRIDGES

however, of providing the multi-year reliable funding source that is sorely needed to address the State's bridge improvement needs.

The 10-year Statewide Transportation Improvement Program (STIP) for FY2016 through FY2025, currently posted on the NJDOT website, includes a $32.6 billion total investment for the next ten years with $14.1 billion programed during the first four years (FY2016-FY2019). It must be noted that the amounts shown above reflect the transportation investment for both roads and bridges. The total amount dedicated to addressing the State's bridges has yet to be determined. Federal funding has been approved under the recent FAST Act (Fixing America's Surface Transportation Act). Currently, the State's TTF is the only obstacle remaining to secure the funding of the STIP for the next ten years.

Future Need – The number of bridges classified as "Structurally Deficient," "Scour Critical," or "Functionally Obsolete" is 2,544 (38%). One in every 3 bridges in New Jersey has been identified with one of these issues. Additional bridge replacements may also be needed to address congestion management or age, adding to the number of bridges requiring future funding. Hence, it is reasonably to estimate that more than 40% of the State's bridges will need funding for improvements or complete replacement in the near future.

Deferring construction to a later date will result in increased construction costs due to worsened bridge conditions. Previously designed contracts with no funding would incur additional costs to account for changes to design standards and expired permits. Delaying adequate funding to address current needs would increase the number of deficient bridges in New Jersey and lower the State's bridge infrastructure grade.

The value of New Jersey freight shipments is expected to double from $755 million in 2011 to $1.5 billion by 2040, and imports are likely to grow from $204 million to $510.7 million during the same period. The truck traffic on the State's roads and bridges will significantly increase, resulting in more use and, therefore, more bridge maintenance and improvement needs.

Operations & Maintenance – Regular maintenance and inspection is needed to keep the bridges in a state of good repair. The State's 6,657 bridges are owned and operated by various entities, as mentioned earlier, with oversight by the NJDOT. Despite the lack of adequate funding, the operation and maintenance of the State's bridges is ongoing to keep bridges in working order. The State's approach to operations and maintenance is to work on reducing the number of "Structurally Deficient" and "Functionally Obsolete" bridges. All bridges are inspected on a regular basis and the NBIS database is regularly updated. The State regularly executes bridge deck replacement programs aimed to address these deficiencies in a programmatic fashion and remove a number of bridges from these classified lists. The NJDOT has been using the available funding to address deficiencies and improve the condition of the bridges where possible, but the needs outweigh available funding and must be prioritized.

Public Safety – Public safety is and must be the State's top priority. The routine, biennial bridge inspections identified safety issues. If needed, special inspections are scheduled on a more frequent basis (annually or every 6 months) to follow up on identified safety concerns. Priority is given to address these bridges, which are usually classified as "Structurally Deficient," to address the issues using available funding. New Jersey meets the federal requirement of maintaining more than 90% of their bridges in acceptable condition with 8.7% of the bridges classified as "Structurally Deficient" (less than 10%).

BRIDGES

Resilience – Recently, in the wake of Superstorm Sandy, the design of new bridges has begun to consider the use of materials and design elements to address resiliency. NJDOT and the affiliated agencies have adopted design standards to provide long-term, low-maintenance bridges. Bridge deck replacement projects focus on the materials for the bridge deck, elimination of bridge deck joints when possible, and de-icing systems to reduce the use of salt which is corrosive to bridge structures. Bridge deck replacement projects aim to remove bridges from the "Structurally Deficient" list and to significantly extend the bridge's remaining life by incorporating other needed repairs.

Superstorm Sandy tested the State's bridge infrastructure. Damaged bridges have been repaired or replaced and have been designed to survive future storms. However, more work is needed to address the 439 "Scour Critical" bridges in the State's inventory. Resilient design is not a substitute for normal routine maintenance, but building more resilient bridges is a step towards reducing future costs and the consequences of the next storm.

Innovation – The use of innovative techniques can also result in cost savings, allowing more bridge needs to be addressed by the available funding. Use of precast concrete bridge elements or entire precast superstructures has been used on recent projects. Such Accelerated Bridge Construction (ABC) techniques minimize traffic disruptions, improve traveler and worker safety, and result in a better overall quality and durability of the reconstructed bridges. The use of ABC techniques should be expanded to capitalize on the benefits and "get more bang for the buck".

New innovative techniques continue to emerge, and the State must embrace such new techniques. The state should also explore new project delivery methods such as Design/Build (D/B) and Public Private Partnerships (P3) which can leverage private investment. Design/Build allows the contractor to perform final design details which saves money. P3s allow use of private investment to meet critical needs which otherwise would not be met due to lack of funding.

Let's Raise the Bridge Grade

New Jersey's bridge infrastructure is aging and in need of maintenance today and plans for the future. To raise the grades, the following recommendations are made:

Transportation Trust Fund – New Jersey must resolve the failing TTF issue immediately to secure steady and adequate funding to match federal funds for projects rather than forfeit this funding. Most states collect a few cents of tax on every gallon of gas to raise enough revenue to pay for bridge and road projects in the state, and many states across the country have recently raised these slightly to keep up with the needs of their aging infrastructure. New Jersey's gas tax is the second-lowest in the nation at 14.5 cents per gallon, which is far below Pennsylvania's 55.3 cent tax, New York's 44.3 cents per gallon and the U.S. Average of 30.3. It is anticipated that a $2 billion per year TTF investment is needed to achieve the pay-as-you-go funding levels to keep up with the future needs. A 15 to 20 cent per gallon tax increase would address the TTF issue so that New Jersey could make the road and bridge repairs it needs.

Prioritization of Projects – Projects are prioritized based on need. Focusing on the "Structurally Deficient," "Functionally Obsolete," and "Scour Critical" bridge projects should be programmed to minimize the number of structures belonging to these classifications.

Stable Federal Funding– After years of short-term extensions by Congress, the recently signed FAST Act provides a steady, five-year flow of federal funding for projects. The slight increase in FAST Act funding has not yet been incorporated into the State's STIP. Moving forward, Congress should find a long-term, stable funding source for the Highway Trust Fund to ensure stable federal funding moving forward.

Innovative Approaches – Utilizing innovative, cost effective Accelerated Bridge Construction (ABC) methods would result in the more efficient use of the available funding. The savings experienced by the use of ABC methods would provide funding to address more bridge needs.

Project Delivery – New Jersey is behind the curve in the use of Design/Build (D/B) or Public Private Partnership (P3) project delivery methods. Legislation is needed for the approval to use these methods. D/B and P3 project delivery is a useful tool for delivering an individual large project or a large program to address a multitude of routine bridge replacements.

Find Out More

- www.state.nj.us/transportation/capital/stip1625/
- www.law.cornell.edu/uscode/23.usc_sup_01_32.html
- www.fhwa.dot.gov
- edocket.access.gpo.gov/cfr_2002/aprqtr/pdf/23cfr650.305.pdf
- www.fhwa.dot.gov/planning/nhs/index.html
- www.fhwa.dot.gov/bridge/britab.cfm
- United States Code (USC 23 Sec151), Code of Federal Regulations (23CFR Part 650)
- AASHTO Manual for Bridge Evaluation, First Edition, 2008
- 2015 NBIS Data for NJ Bridges provided by the NJDOT

DAMS

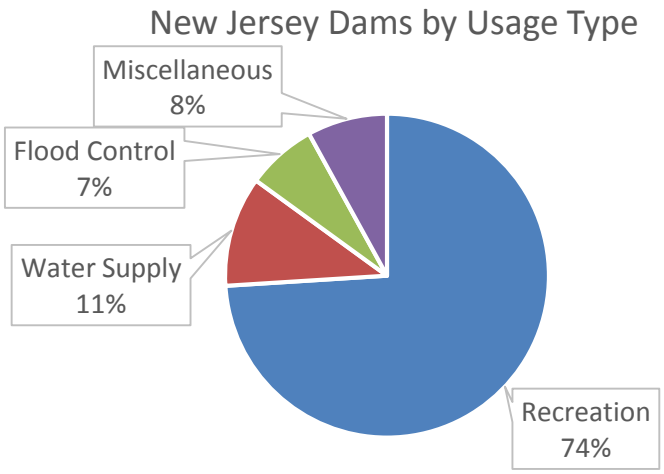
What You Should Know about New Jersey's Dams

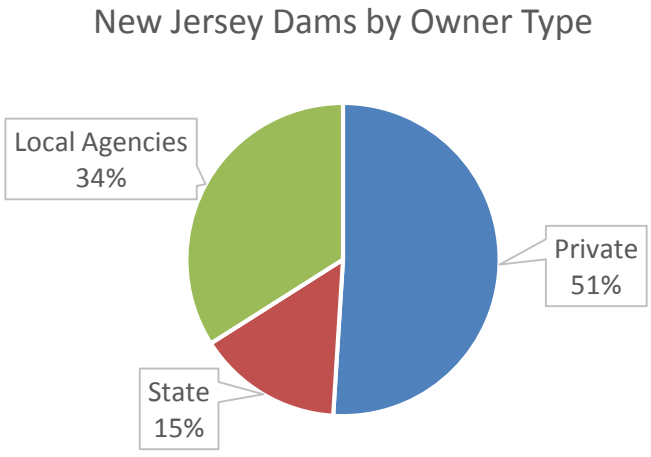
New Jersey reported a total of 1,702 dams in 2016 which are regulated by the Bureau of Dam Safety, New Jersey Department of Environmental Protection (NJDEP). Dams are generally classified as being low hazard, significant hazard or high hazard potential based on the people and property at-risk below the dam if a failure were to happen. Failure of a low hazard dam will likely result in little damage and the damage is generally contained to the dam owner's property. Significant hazard dams are those whose failure will likely cause significant economic or environmental damage. High hazard dams are those whose failure will likely cause loss of human life. Out of the 1,702 dams, 558 dams are considered high and significant hazard potential dams which means about one in every three dams in New Jersey carries potential risk. The remaining 1,144 are considered low hazard potential dams. Dams may be built for any number of purposes (recreation, water supply, flood control, etc.) and may be owned by various entities (private, state and local agencies). In New Jersey most dams are built for recreation, and just over half of New Jersey's dams are privately owned.

The Bureau of Dam Safety had 20 full-time employees in 2005. Since 2010, the Bureau has only 13 full-time employees. On average, each employee oversees about 130 dams, including 43 high and significant hazard potential dams. New Jersey is an owner-responsible inspection state meaning that the dam owner is required to hire an engineer to inspect the dam instead of state staff doing the inspections. This type of program requires fewer employees and staff have more time for review of plans and specifications as well as enforcement. In spite of these challenges, the Bureau is credited with having one of the best dam safety programs in the nation. The sometimes poor condition of the dams combined with increasing downstream development and more frequent severe weather events make potential dam failure a public safety risk as well as an economic liability with the potential to cause millions of dollars in damage. In the last five years, the Bureau of Dam Safety reported that there had been 13 dam failures in the state as well as several instances of overtopping, which is when the water height in the pool behind the dam exceeds the height of the dam.

One of the success stories of the Bureau of Dam Safety is that 100% of regulated high hazard potential dams in the state have Emergency Action Plans (EAPs). An EAP identifies potential emergency conditions at a dam and specifies preplanned actions to be followed to help prevent loss of life and minimize property damage. According to the Bureau, in 2013, 2014 and 2015, about 67, 65 and 20 high hazard dams exercised their EAPs, respectively. About 20% of the high hazard potential dams exercised their EAPs in the last five years in spite of several severe weather events in the State during that time period. Also, the Bureau has sent letters to the dam owners in the most populated counties in the past year requiring that they conduct EAP exercises.

DAMS





Issues Facing New Jersey's Dams

According to the Bureau of Dam Safety, there are 178 high and significant hazard potential dams in New Jersey that are rated poor (35 high hazard potential and 143 significant hazard potential), and a 2 significant hazard potential dams are rated as unsatisfactory; this means the dams either require immediate remedial action (unsatisfactory) or are considered unsafe for large storm events (poor). This represents about 32.2% of the total high and significant hazard potential dams in New Jersey that require remedial action including immediate and/or emergency remedial action. However, in Atlantic, Camden, Cumberland, Monmouth and Salem counties, 60% to 76% of the high and significant hazard potential dams are rated poor or unsatisfactory. Sussex and Morris counties have the most high and significant hazard potential dams (a total of 62 dams) that are in poor condition.

DAMS

Most of the 13 dam failures that occurred in the last five years happened in August 2011, when a severe storm in southern New Jersey caused the failure of 5 dams and $25 million in damage. Roughly two weeks later, the arrival of Hurricane Irene caused another 6 dams to fail and 51 to be damaged to some degree. Much of the damage during Hurricane Irene was attributed to the already wet conditions caused by the preceding storm. This sequence of events underscores the need for resilience and the need for dams to function after repeated stress or damage.

The NJDEP administers one of the few state dam restoration loan programs in the nation through two bond acts, the "Green Acres, Clean Water, Farmland and Historic Preservation Bond Act of 1992", P.L. 1992, c. 88, which is a revolving fund of $15 million, and the "Dam, Lake, Steam, Flood Control, Water Resources and Wastewater Treatment Project Bond Act of 2003", P.L. 2003, c. 162, which is a revolving fund of $95 million. For an estimated average repair cost of $1.5 million per dam (based on the average cost per project from previous loans), the state would require an investment of about $320 million to repair the 213 high and significant hazard dams that are in poor or unsatisfactory conditions. In addition to the repair of high and significant hazard dams, low hazard dams are also in need of funding for upkeep. According to the Bureau of Dam Safety, only $23.5 million had been disbursed to date, however, $25.4 million has been obligated for ongoing projects and another $22 million has been awarded for new loans over the last five years, for a total of $70.9 in dam rehabilitation funding.

Based on the 2014 New Jersey Hazard Mitigation Plan, of the 20 New Jersey counties with hazard mitigation plans, 17 counties included dam/levee failure as a hazard of concern. Of these 17, only three counties that categorized hazards into high/medium/low rankings indicated the following for dams: Somerset (high), Essex (med/high), and Monmouth (low). This shows how little attention dams receive considering the present deficient condition of the dams in New Jersey.

Over half of New Jersey's dams are privately owned. These owners are often individuals or homeowners associations who may be unaware of how to maintain their dams or what their obligations are with respect to dam safety. Therefore, EAPs for use in the event of an impending dam failure or other uncontrolled release of water remain vital. Dam owners should work with state and local officials to prepare, update and exercise EAPs to help mitigate losses resulting from dam failures.

According to 2013 EAP data, all regulated high hazard potential dams in New Jersey have EAPs that contain all the elements from FEMA-64, "Federal Guidelines for Dam Safety: Emergency Action Planning." However, there remains a need for owners to prepare, update and exercise EAPs to be better prepared for dam incidents. This highlights the need for additional dam owner education.

Let's Raise the Dams Grade

In general, some success has been achieved in the state of New Jersey by having a dam safety program, a dam restoration loan program to repair deficient dams and ensuring that all high hazard potential dams have EAPs. However, a significant

commitment is needed from the state, local, and federal government and particularly the private sector to make it a success. The following measures are recommended to promote dam safety within New Jersey:

- The state's dam restoration loan program must be increased so that adequate funding can be provided to repair and improve the safety of deficient dams as identified by the Dam Safety Bureau.
- Repair of the deficient dams should be a priority, and a goal should be established to decrease the number of deficient dams each year.
- Increase the size of the Dam Safety Bureau so that New Jersey's dams can be monitored adequately.
- Priority should be provided in raising awareness on dam safety among dam owners and the surrounding community.
- At the federal level, the National Dam Safety Program should be funded to assist the states with their dam safety program.
- At the federal level, Congress should stablish a national dam rehabilitation and repair funding program to cost share repairs to publicly owned, nonfederal, high-hazard dams.

Find Out More

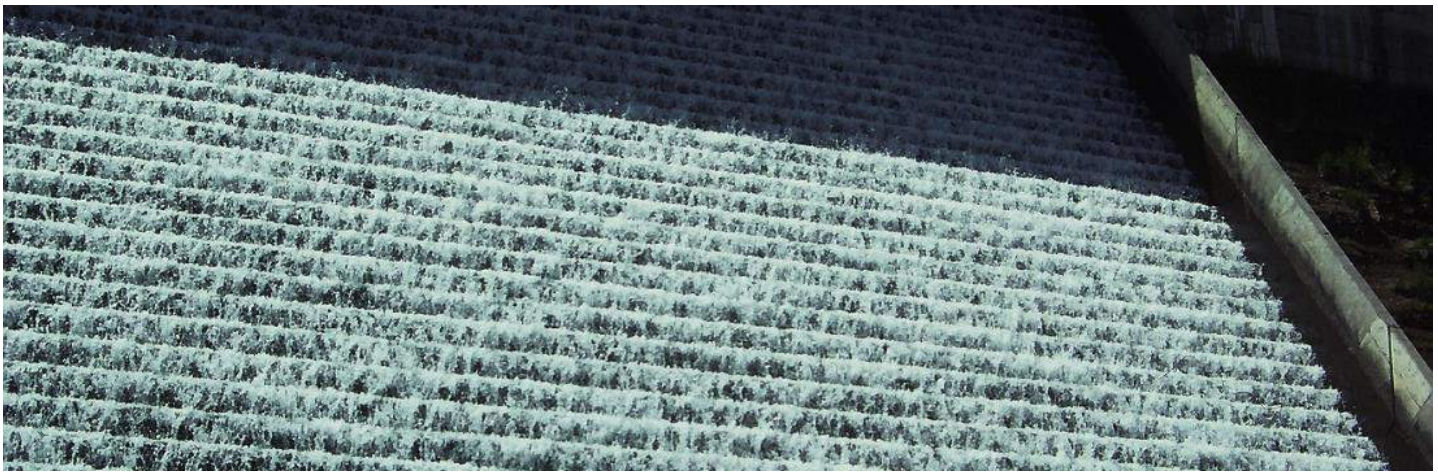
- New Jersey Department of Environmental Protection, Bureau of Dam Safety and Flood Control.
- Dam Safety Performance Report for the State of New Jersey, ASDSO Publication.
- State of New Jersey 2014 Hazard Mitigation Plan.
- The Cost of Rehabilitating our Nation's Dams, prepared by a Task Committee of the ASDSO, January 2009.
- 2012 Annual Year-in-Review, National Dam Safety Program, FEMA, July 2013.

What You Should Know About New Jersey's Drinking Water

Nearly ninety percent of New Jersey's nearly 9 million people, and the associated businesses and government facilities, rely on public community water supply systems for their drinking water. New Jersey's water supply systems were constructed largely during peak periods of development, primarily from 1890 to 1930 when major cities grew, and from 1950 to 1970, when the suburbs added roughly 3 million people. Drinking water treatment plants were largely built or rebuilt in the 1980s and after, in response to the federal Safe Drinking Water Act and complementary state legislation. However, much of New Jersey's drinking water infrastructure has now aged significantly and has not received adequate capital spending for a long time. Due to the concentration of times when much of the water infrastructure was placed in service, New Jersey will need to overhaul a lot of its existing drinking water infrastructure in the next two to three decades. Critical issues include the following:

- **Inadequate Funding**: New Jersey drinking water systems are split between investor-owned utilities, which serve roughly 40% of all customers, as well as municipal utilities and utility authorities. The investor-owned utilities have a financial incentive to invest in keeping assets working long-term, and they can request rate increases as appropriate with the Board of Public Utilities approval. While municipal systems often would like to do the same, they are under immense pressure from the elected officials and the public to reduce costs and keep rates artificially low, despite major deferred capital costs. This can lead to mounting costs and expensive emergency repairs which can ultimately cost more.
- **Inadequate Revenue Base**: Most drinking water systems in New Jersey are small; 55% have a design capacity of less than 1 million gallons per day. These systems have limited revenues and so are less able to afford expertise or management systems.
- **Inadequate Information**: There is no comprehensive system or report for understanding New Jersey's current status and drinking water utility plans to address their infrastructure needs. With the age of the supply systems today, a comprehensive review would help to plan to responsibly map future investments and prioritize critical projects.
- **Inadequate Requirements**: The focus of state and federal regulations is often on the output, such as the quality of delivered drinking water, and there are fewer requirements regarding the condition of the physical infrastructure and what should financially be put aside from water rates to responsibly reinvest in the system.

DRINKING WATER C



Issues Facing New Jersey's Drinking Water Infrastructure

New Jersey has spent many billions of dollars on putting in place drinking water infrastructure to provide clean water across the state. The ability of these systems to provide adequate services is threatened by age, lack of reinvestment, and a short-term focus. The current status of New Jersey's issues is summarized in the following table:

Capacity	New Jersey has 475 public community water supply systems. Few are large, but those large systems have most of the total and remaining capacity for growth. However, some large systems may need more water supply to meet needs through 2040.
Condition	Drinking water treatment plants are routinely meeting required standards. The integrity of distribution systems statewide is not well understood but is expected to be variable, with both good and poor systems, based on available water loss estimates.
Funding	New Jersey has inadequate information on the level of capital funding dedicated to asset management and replacement. Available funding is meeting current demands, but the demands are likely far too low due to insufficient regulatory requirements and incentives, which are only now beginning to be addressed largely due to federal mandates.
Future Need	No comprehensive, statewide analysis exists on the future needs of New Jersey's drinking water system. The most recent Statewide Water Supply Plan is from 1996. Long-term demands in northeast New Jersey may require a new water supply in central New Jersey. As asset management programs are implemented, additional financial resources will be required to address capital costs and affordability.

Operation and Maintenance (O&M)	Current O&M for water treatment plants, and especially the larger systems, appears to be adequate. No comprehensive analysis exists of O&M status statewide for distribution systems, some of which appear to be well managed but many are not.
Public Safety	Very few systems are known to violate drinking water quality standards. Public safety is threatened most commonly by local loss of service due to pipeline breaks, or localized issues with lead service lines and internal plumbing. Less frequent but of great regional concern are threats of drought and floods, forcing emergency restrictions due to insufficient supplies or inundation of treatment plants.
Resilience	Hurricane Sandy emphasized the poor resilience of water treatment systems to energy loss. Flood damages also threaten resilience. New Jersey utilities are using Hurricane Sandy Recovery federal funds, state funding and local revenues, along with state guidance and requirements, to increase resilience. Much more progress could be achieved through rigorous regulatory standards.
Innovation	The NJ Energy Resilience Bank is offering financing to water treatment systems for improved resilience through distributed energy generation. Water conservation requirements are included within the Uniform Construction Code.

Let's Raise the Drinking Water Grade

New Jersey relies on its drinking water systems to protect public health and support economic vitality. The ongoing shift of development back to urban areas will falter and fail if New Jersey's water supply infrastructure in and supporting these areas is not improved and maintained. The following actions are critical to improving New Jersey's future:

- Greatly improve the ongoing maintenance and repair of New Jersey's existing drinking water infrastructure by requiring that all water supply utilities routinely assess their assets, identify critical needs, design solutions that optimize benefits at the lowest lifecycle costs, include capital funding in their annual budgets to address those needs, and set rates to ensure sufficient funds for O&M and capital costs. Information from these efforts should be compiled to provide a statewide assessment.
- Require that all water supply utility revenue be used to address utility costs first and eliminate incentives for insufficient rates that force deferral of critical O&M and capital costs.
- Implement comprehensive systems to address affordability issues for poor households, analogous to those for household energy costs.
- Create incentives for consolidation of small water supply systems, including public-public and public-private partnerships or mergers as appropriate, where improved management and reduced lifecycle costs can be achieved.

Find Out More

- ASCE. 2011. Failure to Act: The Economic Impact of Current Investment Trends in Water and Wastewater Treatment Infrastructure. Available from: www.asce.org/uploadedFiles/Issues_and_Advocacy/Our_Initiatives/Infrastructure/Content_Pieces/failure-to-act-water-wastewater-report.pdf
- Sayers, D.A., Najjar, K.F., Barr, J.K. 2015. Analysis of Calendar Year 2012 Water Audit Data from Public Water Supply Systems in the Delaware River Basin. Delaware River Basin Commission. West Trenton, NJ. Available from: www.nj.gov/drbc/library/documents/wateraudits/CY2012audit-report.pdf
- NJDEP. 2015. Drinking Water State Revolving Fund: Proposed Superstorm Sandy Funding, FFY2016 Priority System, Intended Use Plan, and Project Priority List. Available from: www.state.nj.us/dep/watersupply/pdf/sandy-iup-prop-2016.pdf
- NJDEP. 2015. New Jersey Environmental Infrastructure Financing Program (NJEIFP) Project List (Updated As of 10/15/2015). Available from: www.nj.gov/dep/dwq/pdf/NJEIFP_Project_List_151015.pdf
- NJDEP. 2015. Guidance documents for Emergency Response Planning, Auxiliary Power, Flood Protection and Asset Management. Available from: www.nj.gov/dep/watersupply/
- U.S. Environmental Protection Agency. 2009. Drinking Water Infrastructure Needs Survey and Assessment: Fourth Report to Congress. Available from: water.epa.gov/infrastructure/drinkingwater/dwns/upload/2009_03_26_needssurvey_2007_report_needssurvey_2007.pdf
- Van Abs, D.J. 2013. Water Resources Baseline Assessment Report: Prepared in Support of the Regional Plan for Sustainable Development. Prepared for New Jersey Future on behalf of the North Jersey Sustainable Communities Consortium. Trenton, NJ. Available from: togethernorthjersey.com/?page_id=19971

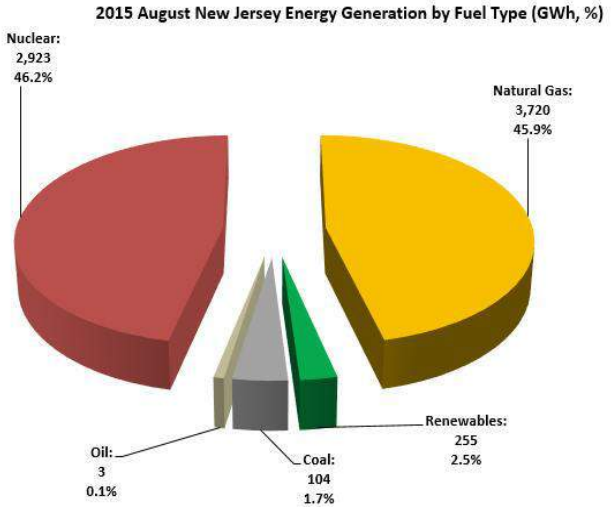
Photo Credit: Van Abs

ENERGY

C+

What You Should Know About Energy in New Jersey

New Jersey depends on nuclear power and natural gas for most of its in-state electricity generation. Currently, fuel sources for electricity production in New Jersey are dominated by nuclear energy (46.2%) and natural gas (53%), with minimal utilization of renewables (2.5%), coal (1.7%) and oil (0.1%) (Figure 1). New Jersey's renewable fuel sources for power generation are primarily from solar photovoltaics. In terms of power costs, New Jersey has one of the highest energy costs per kWh in the U.S. New Jersey's electricity prices were the tenth highest in the nation as of July 2015, far exceeding the national averages in residential, commercial and industrial energy consumption costs by 28.97%, 25.6% and 55.8% respectively.



W

In New Jersey, natural gas (NG) is the most important fuel source consumed for energy needs, for both power generation and home heating. About three of every four New Jersey households use natural gas for home heating. Currently, New Jersey's natural gas prices rank as the 45th in the nation, and its total natural gas consumption surpassed 713 trillion BTU in 2013.

The State of New Jersey has approved $938.7 million for gas utility infrastructure upgrades and mitigation projects with an additional $280 million pending. New Jersey is planning to increase its NG infrastructure. The expansion of the New Jersey's gas distribution capacity provides an opportunity for the State to take advantage of relatively low priced, and abundant, nearby natural gas supplies.

The New Jersey Department of Environmental Protection's Bureau of Mobile Sources has also launched a program called "It Pay$ to Plug In," which awards employers grants to install electric vehicle charging stations for their employees. The goal of the program is to expand the energy infrastructure necessary to encourage wider use of electric vehicles in the State.

ENERGY

Issues Facing Energy in New Jersey

New Jersey is reducing its reliance on high greenhouse gas emitting, coal-based electricity generation by planning to add 2,300 megawatts (MW) of natural gas powered generation. This will reduce its reliance on out-of-state power, particularly coal-based power. In-state power generation brings economic benefits, including additional jobs and property tax revenue.

New Jersey released its latest Energy Master Plan (EMP) in 2011. The State updated the EMP in 2015 to address emerging issues in response to the infrastructure, and energy shortage problems, that the State experienced during Superstorm Sandy in 2012 including:

1. Improving the aging critical energy infrastructure
2. Improving the Electric Distribution Companies emergency preparedness and response
3. Increasing the use of microgrid technologies and applications for distributed energy resources (DER)
4. Creating long-term financing for resiliency measures through the Energy Resilience Bank
5. Promoting and capitalizing low-carbon energy generation from organic waste to support the goal of a diverse portfolio of new, clean in-state generation

New Jersey's Oyster Creek nuclear reactor, which is the oldest operating nuclear power plant in the U.S., began operation in 1969, and is scheduled to shut down in 2019. Oyster Creek has 645 MW of generation capacity and provides power to approximately 600,000 homes. This lost capacity will need to be made up. The State expects more than 2,300 MW of additional capacity will be added by 2015-2016 energy year including Newark Energy Center-625 MW plant in Newark; LS Power-738 MW plant in West Deptford and CPV Power Development-663 MW plant in Woodbridge. In addition, BL England's repowering project, which includes fuel switching from coal to natural gas, awaits a decision on the new pipeline. The State's Gas Distribution Companies' expanding intrastate capacity provides an opportunity for the State to take advantage of relatively low priced and abundant nearby natural gas supplies.
New Jersey's currently installed Renewable Energy Technology capacity has surpassed 1.5 GW since New Jersey's Clean Energy Program started in 2001, including solar photovoltaics, biomass, fuel cells and wind technology with 1.4 GW, 31.2 MW, 1.5 MW and 9.6MW respectively. The majority (approximately 90%) of the installed capacity is distributed generation connected to the distribution system. The State installed 239.8 MW of photovoltaics in 2014 with 8,000 installations. The Gloucester Marine Terminal complex has the largest rooftop solar photovoltaic array in the U.S. In 2014, all new electricity generating capacity in the State was solar photovoltaic capacity.

The USDOE awarded a $47 million grant to the pending 25 MW Fishermen's offshore wind energy project near Atlantic City. However, the project is currently stalled in a legal conflict. Exploiting New Jersey's significant offshore wind resource would be one way to decrease energy imports from out of State and to lower New Jersey's carbon footprint.

ENERGY

In 2012, Superstorm Sandy negatively impacted New Jersey's energy infrastructure with 7.5 million New Jersey's residents affected. The Storm downed 9,441 utility poles, left more than 100 transmission lines out of service, damaged or flooded more than 4,000 transformers. While much was done to return services immediately after the storm, longer term projects to harden New Jersey's critical infrastructure and recover from these impacts are expected to take more time. The most common challenge created by the storm was power shortages and outages, but these outages can have significant impact on furthering recovery efforts as well as public health and safety.

The Department of Energy estimates that 2.8 million New Jersey customers were without power, and many counties were without power for 3 to 10 days. Power outages added to the economic hardship by closing businesses and slowing disaster mitigation efforts by rendering equipment, such as sump pumps, inoperable. Also, 94 wastewater treatment plants were flooded and lost power which resulted in 3 to 5 billion gallons of untreated wastewater being discharged into New Jersey waterways. A total of 267 of the 604 water systems across the State were without power and 37 of them issued boil water advisories following the storm. Power to healthcare facilities was down and in some areas patients had to be transported to other facilities. This experience highlighted the interdependency of State's energy system and the risks posed by such interdependency. Also this made the State aware of its resiliency issues related to its aging infrastructure. Based on this storm and other potential extreme weather experiences, a public infrastructure bank, the Energy Resilience Bank (ERB), was established with a mission of, "Realizing energy resilience for New Jersey's critical facilities through financing and technical assistance." The ERB recently started providing financial support to critical facilities, such as hospitals and wastewater treatment facilities in the storm affected counties, to upgrade their existing energy generation and off-grid capabilities.

The second problem was the transportation fuel shortage. The State experienced a large fossil fuel shortage during, and after, the Super Storm Sandy. Only the Atlantic City Jitneys, which run on compressed natural gas, were able to aid with assistance and relief efforts during and after Super Storm Sandy. Alternative fuel vehicles were able to assist during and in the immediate aftermath of the storm before traditional vehicles could get fuel. These vehicles helped with evacuations, road clearing, delivery of supplies, and power restoration.

Let's Raise the Energy Grade

- New Jersey should repair and rebuild its aging energy infrastructure for critical infrastructure resiliency, business continuity, emergency preparedness and planning to be more resilient for the next storm. This includes hardening existing assets by; a) Power Distribution Hardening through efficient vegetation management, performing targeted/selective undergrounding of critical overhead lines, moving power components of essential services from below sea-level b) Substation Hardening through flood control and avoidance, and improved backup power for

ENERGY

substations and communications c) Smart Grid and Distribution Automation through investments and tracking the effectiveness of the systems during the inclement weather events.

- Continue supporting Combined Heat Power (CHP) projects to achieve reliability and resiliency. CHP applications can give facilities black start and islanding capability to operate grid independent when needed.
- Since the establishment of the New Jersey Clean Energy Program in 2001, New Jersey has been one of the leading states in supporting innovative clean energy and energy efficiency projects. The State should continue and increase its support for innovative energy technologies and their wide-spread usage in the State. It should also provide support for projects to test and verify emerging innovative energy technologies including organic waste to energy applications. State should monitor the effectiveness of energy storage applications to couple them with Clean Energy Generation.
- Additional NG pipeline expansions should be carefully assessed to ensure that the proposed pipelines do not cross the state's valuable highlands, pinelands and green acres in order to avoid unintended impacts.
- New Jersey should also increase support to "Alternative Energy- to-Transportation Fuels" applications for emergency vehicles and other publicly owned service vehicles to displace reliance on petroleum based transportation fuels or consider how a reserve fuel strategy could alleviate shortages in the next storm.

Find Out More

- www.eia.gov/state/print.cfm?sid=NJ
- www.eia.gov/state/?sid=NJ#tabs-5
- United States Energy Information Administration. Household Energy Use in New Jersey. (2009) Available at www.eia.gov/consumption/residential/reports/2009/state_briefs/pdf/nj.pdf
- Brennan-Tonetta, M., Guran, S., Specca, D., 2014, "Feedstock Opportunities for Bioenergy Production: Assessment of Biomass Energy Potential in New Jersey" Industrial Biotechnology. December 2014, 10(6): 404-412. doi:10.1089/ind.2014.0023.
- www.nj.gov/emp/docs/pdf/2015_Final_Energy_Master_Plan.pdf
- www.acore.org/images/documents/Northeastern_Region_Report.pdf
- Halpin S.H., "The Impact of Superstorm Sandy on New Jersey Towns and Households" School of Public Affairs and Administration, Rutgers-Newark, www.spaa.newark.rutgers.edu.
- www.njdatabank.newark.rutgers.edu/sites/default/files/files/RutgersSandyImpact-FINAL-25Oct13.pdf
- www.njeda.com/erb
- www.njcleanenergy.com/renewable-energy/technologies
- Final Report for NJ Storm Hardening Recommendations and Review/Comment on EDC Major Storm Response Filings, November 26, 2014. http://www.nj.gov/bpu/pdf/reports/NJ_Major_Storm_Response-GE_Final_Report-2014.pdf
- http://portal.hud.gov/hudportal/documents/huddoc?id=CHPSept2013.pdf
- http://www.drivegreen.nj.gov/programs.html

HAZARDOUS WASTE

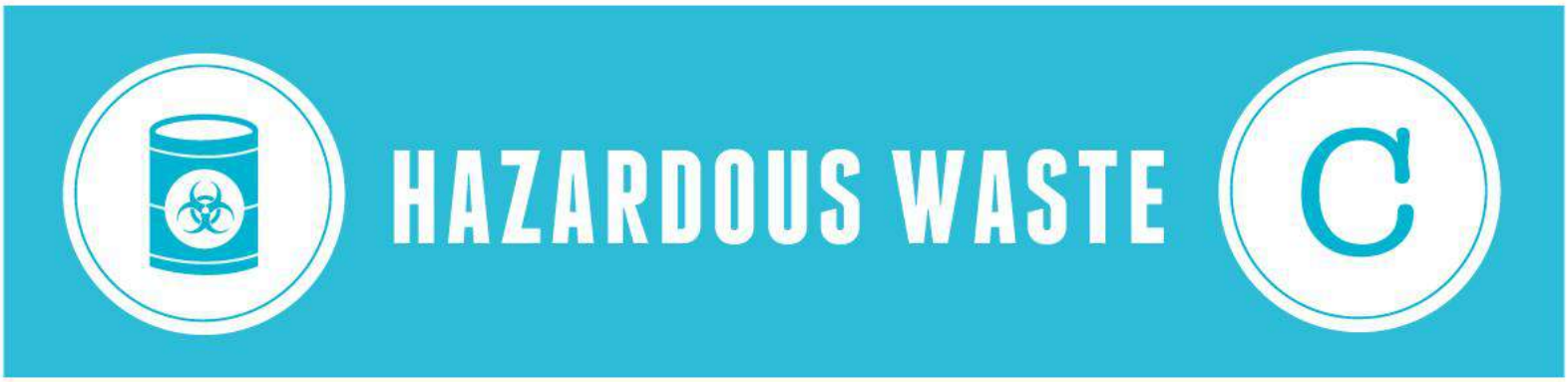
What You Should Know About Hazardous Waste in New Jersey

Hazardous waste is a waste having very specific physical characteristics (i.e. flammability, radioactive, toxic, acidic, etc.) and chemical components (i.e. lead, PCBs, Benzene, etc.), which has characterized these materials as wastes requiring special transportation, handling, treatment, storage and disposal procedures. According to the latest available data New Jersey ranks 17th among U.S. states and territories in hazardous waste generation and ranks 1st nationally in the number of contaminated sites on the National Priority List (NPL). The NPL contains the most serious uncontrolled or abandoned hazardous waste sites throughout the U.S. that are then eligible for long-term cleanup under the Federal Superfund program (see Figure 1). The latest report from the U.S Environmental Protection Agency (EPA) has 113 sites in New Jersey listed on the NPL. Federal and State funding for the New Jersey Department of Environmental Protection (NJDEP) Site Remediation Program and other waste management programs has steadily decreased over the past ten years. The budget for the NJDEP has decreased from $379 million in 2005 to $215 million in 2015, and federal funds have decreased from $40 million in 2005-06 to $13 million in 2015-16.

New Jersey has shown their commitment to improving the environment and helping residents and business owners to deal with the complexities of the NJDEP through several innovative programs such as the Licensed Site Remediation Professional (LSRP) program, the Unregulated Heating Oil Tank (UHOT) program, universal waste regulations and County Household Hazardous Waste Collection programs. All of these programs were designed to make environmental compliance less complicated, reduce the quantity of hazardous materials entering the waste stream and facilitate development of contaminated sites throughout New Jersey. Prior to having many of these programs in place the few site remediation cases were being closed and the length of time to close a case was significantly longer and restrictive to development in New Jersey. New Jersey has demonstrated the ability to establish new policies to address these issues and expedite the process of complying with NJDEP requirements.

According to the most current U.S Environmental Protection Agency (EPA) Biennial Hazardous Waste Report from 2011, the annual quantity of hazardous waste generated from all sources in New Jersey was 290,456 tons, which ranked 17th among the 56 U.S. states and territories included in the report. This quantity has shown a decrease since 1999 from 650,534 tons which marks a 45% decrease. This trend demonstrates that New Jersey has been effective in their attempt to manage the reduction of hazardous waste generation. The number of authorized Hazardous Waste Facilities (for treatment storage or disposal) in New Jersey is currently 18 facilities. This is a relatively low number of treatment, storage and disposal facilities (TSDFs) as New Jersey has ranked between 9th and 17th in hazardous waste generation during that time period.

Recycling of potentially hazardous wastes such as anti-freeze, used motor oil and automobile and dry cell batteries have increased in New Jersey from 2000 to 2012 by approximately 235%. New Jersey has also shown a commitment to reducing the hazardous waste stream with their Universal Waste Rules (N.J.A.C. 7:26A-7), which exempt the following wastes from the hazardous waste regulations, reduce the complexity of compliance and also reduce the likelihood of these materials from entering solid waste landfills.



1. Batteries;
2. Pesticides;
3. Thermostats;
4. Lamps;
5. Mercury-containing devices;
6. Oil-based finishes; and
7. Consumer electronics.

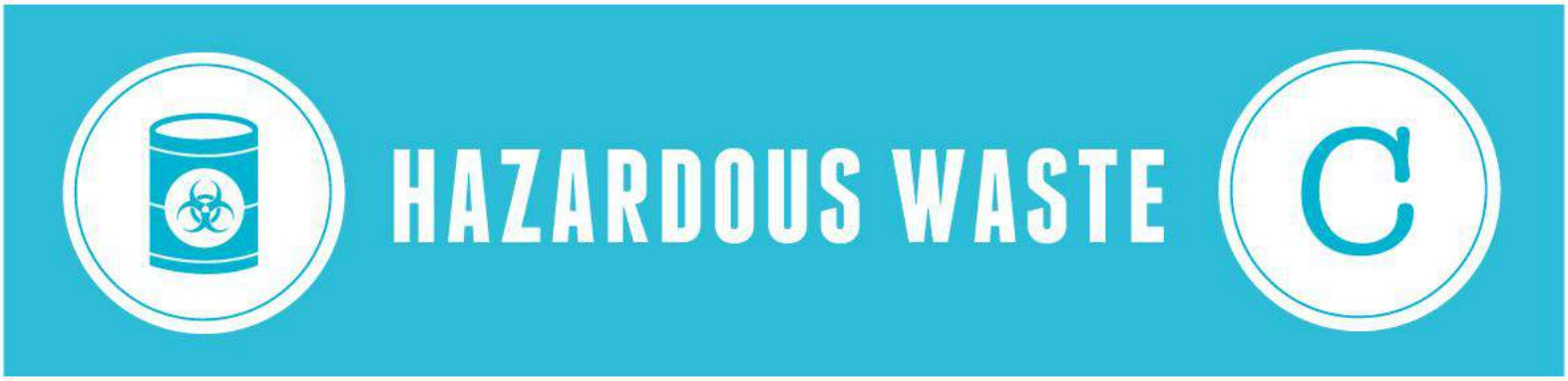
Issues Facing Hazardous Waste in New Jersey

With the success of the Licensed Site Remediation Professional (LSRP) program, the New Jersey Department of Environmental Protection (NJDEP) has made great strides in demonstrating that a favorable economic climate and a commitment to protect the environment do not have to be mutually exclusive concepts.

In 2009, the Site Remediation Reform Act (SRRA) set forth significant changes to the way in which sites are remediated in New Jersey. SRRA established the affirmative obligation for responsible parties to remediate contaminated sites in a timely manner. In order to achieve this goal, SRRA created a category of remediation professionals known as Licensed Site Remediation professionals (LSRP). LSRPs assume the responsibility of the NJDEP to oversee the remediation of contaminated sites. SRRA requires that the LSRP comply with all remediation statutes and rules and consider NJDEP-developed guidance when making remediation decisions.

Under this new remediation system, the remediating party need not wait for the NJDEP's direction and pre-approvals to commence and continue cleanups. Instead, they must initiate and complete the cleanup under the direction of an LSRP, who has responsibility for oversight of the environmental investigation and remediation. The NJDEP monitors the remediation progress and the actions of LSRPs by requiring the submittal of forms and reports as remediation milestones are reached. Effective May 7, 2012, when the LSRP program was fully implemented, all remediating parties were required to retain an LSRP and remediate their site under the new LSRP program, regardless of when the cleanup was initiated.

Based on available data compiled as of August 2015, by the NJDEP, 4,207 LSRP cases have been successfully closed since the start of the program in May 2012. There are 13,905 active cases in the SRP with 10,809 of them in the LSRP program. The following statistic best demonstrates the success of the LSRP program. Based on the available monthly metric reports from the NJDEP excluding cases that are eligible for the Unregulated Heating Oil Program (UHOT), 489 LSRP cases were closed versus 11 SRP cases closed that were not in the LSRP program. That equates to an average of 81.5 LSRP cases closed per month versus an average of 1.8 non-LSRP cases closed per month.



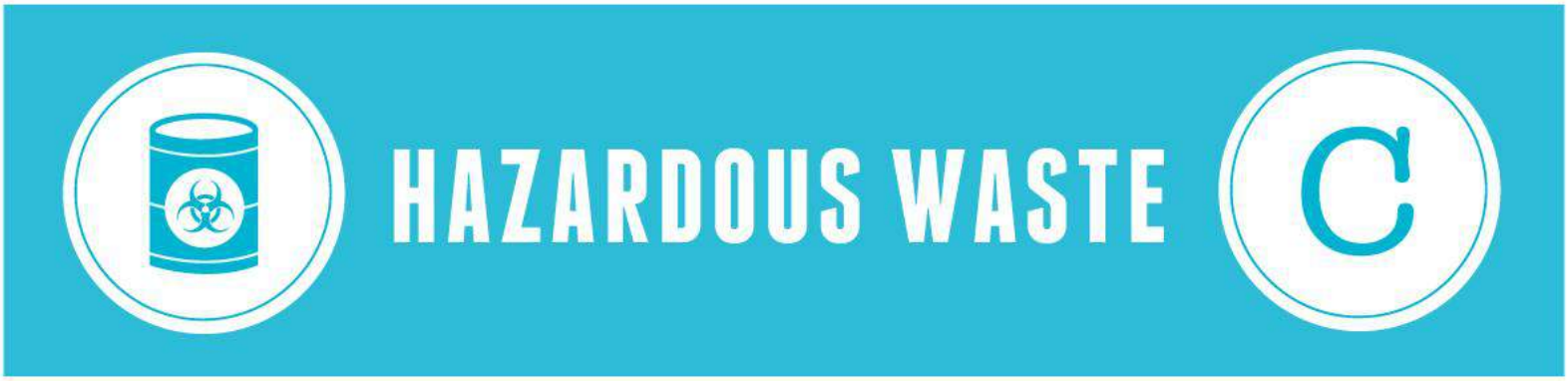
The New Jersey state budget for the NJDEP has declined from $379 million in 2005 to $215 million in 2015. From the years 2006 through 2015, the NJDEP budget fluctuated from a low of $210 million to a high of $238 million. Additionally, in the 2006 state budget, the legislature did not reinstate three previous important environmental initiatives that had begun in 2003, that collectively provided a total of nearly $400 million.

Federal funding for environmental protection in New Jersey has also decreased over the past 10 years. Total funds allocated toward site remediation and waste management were $40 million in 2005-06 and steadily declined to $13 million in the 2015-16 budget. This is a concerning statistic for a state like New Jersey that currently has the nation's highest number of NPL sites and is adding an average of 123 Site Remediation cases per month (excluding UHOT cases) while only closing an average of 82 cases from that same category.

Let's Raise the Hazardous Waste Grade

New Jersey is a diverse state that is densely populated, has a significant amount of industrial operations and has vulnerable coastal zones and other areas that are susceptible to the elements and storm surges as proven by the devastating effects of Superstorm Sandy that occurred in October 2012. For all of these reasons, funding for the NJDEP and its many programs that serve the vital function of protecting the public and the environment are a primary concern and funding for these programs should remain an important issue for the Federal and State regulators and lawmakers.

- Efforts should be made to take the following steps going forward:
- Assess overall NJDEP funding from Federal and State sources to determine if funding reductions are impacting the NJDEP's ability to achieve their mission. An evaluation of the federal funding received compared to other industrialized states with a comparable number of NPL sites is recommended.
- Coordination between the USEPA and the NJDEP is needed to make a positive impact on the escalating number of NPL sites in New Jersey.
- The current LSRP program is making a positive impact in dealing with the complex regulatory process in New Jersey. The NJDEP should continue to develop this program and continually seek feedback from current LSRPs and responsible parties that are in the program.
- Other programs such as County Household Hazardous Waste Collection programs are effective, but promotion of these programs could be increase as many residents are unaware they exist.



Find Out More

- USEPA National Priority List - www2.epa.gov/superfund/final-national-priorities-list-npl-sites-state#NJ
- ASCE Public Policy 331 - www.asce.org/issues-and-advocacy/public-policy/policy-statement-331---hazardous-waste-reduction-and-management
- Authorized NJ Hazardous Waste Facilities - www.nj.gov/dep/dshw/hwtf/anjhwf.htm
- NJDEP Department of Solid and Hazardous Waste - www.nj.gov/dep/dshw/resource/data.htm
- Association of New Jersey Household Hazardous Waste Coordinators - njhazwaste.com
- New Jersey Generation, Disposal and Recycling Statistics - www.nj.gov/dep/dshw/recycling/stats.htm
- Universal Waste Information - www.state.nj.us/dep/dshw/lrm/uwaste/uwindex.htm
- Site Remediation Program Meeting Calendar and Materials - www.state.nj.us/dep/srp/srra/stakeholder/cvp_srag
- Overview of the Licensed Site Remediation Professional (LSRP) Program - www.nj.gov/dep/srp/srra/lsrp/lsrp_program_overview.htm
- National Biennial RCRA Hazardous Waste Report - www3.epa.gov/epawaste/inforesources/data/biennialreport/index.htm
- New Jersey State and Federal Budget Data by Year - www.nj.gov/treasury/omb

LEVEES

D-

What You Should Know About New Jersey's Levees

New Jersey has approximately 126 miles of levees according to the Federal Emergency Management Agency (FEMA) Mid-term Levee Inventory (MLI). However, there is no single agency to oversee the operation and maintenance of levees nor having specific regulatory authority or responsibility over the safety of existing levees in the State. According to the U.S. Army Corps of Engineers (USACE), the 10 levees that the USACE inspects regularly have not scored well in terms of overall stability/integrity of the levees. Out of the 10 levees, five levees are rated minimally acceptable, and four levees are rated unacceptable. Additionally, many levees assessed as part of the South Jersey Levee Inventory (SJLI) did not fare well either. The study found that 24% had erosion issues, 35% had significant settlement, 29% had significant depressions, 25% showed signs of cracking, and nearly 30% showed signs of burrowing animals which can lead to reduced capacity of the levee system. Overall, the performance of levees is poor. An unexpected levee breach or failure can be catastrophic, with the flooding causing loss of life, emergency evacuations, and property damage. In general, levees are maintained by a variety of entities including local, State, and Federal government and private landowners. There is no State mandated funding available for the rehabilitation of the levees, and many municipalities do not have the resources to carry out the necessary rehabilitation work required and, in some cases, the annual maintenance needed. Also, many of the levees do not have a legal entity capable of proper operation and maintenance of these structures.

Issues Facing New Jersey's Levees

There is very little information available and often, it is contradictory. The Federal Emergency Management Agency (FEMA) Mid-term Levee Inventory (MLI) indicates that New Jersey's 126 miles of levees are located in Bergen, Essex, Gloucester, Hudson, Middlesex, Monmouth and Union counties, but the National Levee Database (NLD), developed by the U.S. Army Corps of Engineers (USACE) reported that there are 10 levees in Essex, Gloucester, Monmouth, and Union counties. The South Jersey Levee Inventory (SJLI) which was conducted by the U.S. Department of Agriculture (USDA) Natural Resources Conservation Services (NRCS) in November 2010, identified 70 levees in the south Jersey counties of Cape May, Cumberland, Gloucester and Salem.

About 85% of New Jersey's levees are owned by local communities and flood control districts that must ensure proper operation and maintenance of the levee system as well. The remaining 15% of levees are owned by USACE who operates, maintains, and evaluates levees to determine if they meet accreditation requirements. The SJLI study revealed that 70% of the levees located in Cape May, Cumberland, Gloucester and Salem counties are owned by private entities.

USACE and FEMA have differing roles and responsibilities related to levees. USACE addresses a range of operation and maintenance, risk communication, risk management, and risk reduction issues as part of its responsibilities under the Levee Safety Program. Congress created the National Committee on Levee Safety to "develop recommendations for a national levee safety program, including a strategic plan for implementation of the program." FEMA addresses mapping and floodplain management issues related to levees, and it accredits levees as meeting requirements set forth by the National Flood Insurance Program. To be recognized as providing protection from the 1-percent-annual chance flood on Flood Insurance

LEVEES

D-

Rate Maps (FIRMs), levee system must meet and continue to meet the minimum design, operation, and maintenance standards of 44 Code of Federal Regulations (CFR) Section 65.10 of the National Flood Insurance Program (NFIP) regulations (FEMA, 2007).

There have been two documented levee failures in New Jersey. On July 8, 2005, heavy rain (1.5" to 5") associated with Tropical Storm Cindy fell across New Jersey. In Logan Township (Gloucester County), emergency repairs were required at a 30-foot breach in a levee to keep the Delaware River at bay. Between June 28 and 30, 2006, heavy rain caused flooding in the Delaware River. This event caused a levee breach in the Borough of Stockton in Hunterdon County. Properly functioning levees reduce the risk of flooding for the communities. However, an unexpected levee breach or failure can be catastrophic. A complete levee failure, like dam failures, is rather infrequent and typically coincides with events that cause them such as heavy rainfall, storm surge, or hurricanes.

Let's Raise New Jersey's Levees Grade

Considering the dismal conditions of the levees in New Jersey, a significant commitment is needed from the State, local, and private sector as well as from federal government to make it a success. We recommend that the following measures be considered to promote safety of the levees in New Jersey:

- An entity must be developed or an existing entity must be assigned with sufficient resources to regulate the levees in New Jersey. In addition, coordination between the State, FEMA and USACE is essential for the performance of the annual operation, maintenance and rehabilitation of the levees in New Jersey.
- An accurate study must be performed to identify all the levees in New Jersey, similar to the study that was performed for South Jersey's four counties.
- The state needs to develop a funding mechanism to repair and improve the safety of the levees.
- Priority should be provided in raising awareness on levee safety among levee owners and the surrounding community.
- Development of national levee safety standards and a levee hazard classification system.

Find Out More

- South Jersey Levee Inventory, USDA Natural Resources Conservation Service assisting NJDEP, Bureau of Dam Safety and Flood Control, November 2010.
- State of New Jersey 2014 Hazard Mitigation Plan.
- National Levee Database, US Army Corps of Engineers.

PARKS

D+

What You Should Know About New Jersey's Parks

In New Jersey, protected trails, forests, parks, creeks and rivers provide residents and visitors with multiple outlets to enjoy outdoor recreation. The importance of the State's parks, forests and recreational areas becomes more evident as these areas serve, for the most part, as a haven for residents from the most urban and densely populated State in the nation. Unfortunately, like many states, New Jersey's state-owned parks are facing shortfalls in meeting maintenance needs and demands for access, security and general operations. The State of New Jersey currently preserves and protects 39 parks, 11 forests, and 3 recreational areas and other facilities on about 450,000 acres of state-owned land. Since 1998, the Garden State Preservation Trust (GSPT) has overseen the expenditure of some $2.7 billion to keep green space open, bolster parkland, and keep historic sites from crumbling. GSPT reports almost 390,000 acres of open space and farmland in the State were preserved between 2000 and 2013.

Between 2008 and 2015, there was a 2.6% increase in the total acreage of state-owned land dedicated to parks, forest and recreational areas. This increase in land dedication of parks, forests and recreation has kept pace for the most part, with the 2.6% increase in State's population during this same period.

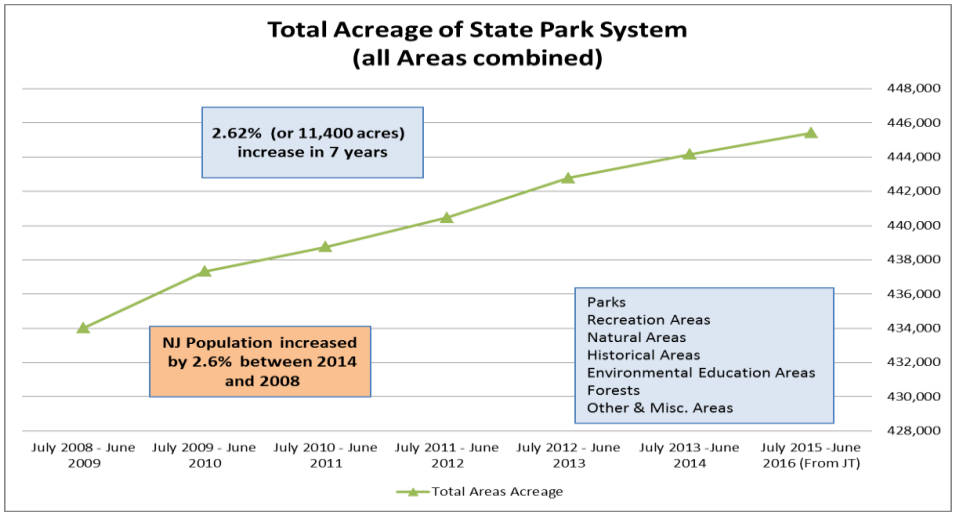


Table 1

As noted by the NJDEP, in addition to the recreational and environmental benefits, the State's parks are responsible for substantial economic benefits to New Jersey. According to the recent Statistical Report of State Park Operations Annual Information Exchange as prepared by the National Association of State Park Directors (NASPD), the estimated economic benefits of the State's parks to New Jersey is at least $1.2 billion annually. In addition to economic benefits, the State parks, forests and recreation areas also serve as a buffer and growth management tool to regulate the spread of development and, as the NJDEP refers to it, functioning as a protected area around which sustainable land use could be implemented.

PARKS

D+

Issues Facing New Jersey's Parks

Faced with an ever growing population and increased pressures for development, the funding need and the race for acquisition of open lands pose great challenges to the continued success of the programs dedicated to the creation, expansion, preservation and operation of the State's parks, forests and recreation areas. Existing programs for acquisition have allowed the State to purchase and preserve land in a progressive manner keeping pace somewhat with the growing population. Acreage inventory has increased by only 2.6% over the past seven years; in comparison, the population increased 2.6% during that same period.

According to the National Association of State Park Directors (NASPD) Statistical Report of State Park Operations 2013 Report Annual Information Exchange, between 1992 and 2012, there was an increase in the acreage of State parks, forests and recreation areas from 304,539 acres to approximately 441,110 acres. During this same period, visitation at the State's parks, forests and recreation areas increased from 10,607,830 to 17,296,524, resulting in an increase in average use density from 35 to 41 visitations per acre. Attendance was determined to have decreased in 2012, as a result of damage sustained from Super Storm Sandy although a noticeable decline in attendance was already observed prior to the storm. The decline in attendance is also due in part to the condition of the parks and forests where some facilities and amenities provided in the parks, forests and recreational areas were not available due to maintenance and security issues.

Current funding allocations are not keeping pace with the costs for maintenance and repair, security personnel and equipment and for the introduction of sustainable and resilient rebuilding of the most vulnerable facilities and infrastructure. Both the operating budget (-25%) and capital budget (-43%) have been reduced over the past seven years. In 2009, the Operating Budget for State parks represented 0.117% of the overall State Operating Budget. In 2014, it was reduced to 0.071% of the overall State Operating Budget. The Operating Budget for the State parks and forests was reduced from $38.5 million in 2009 to $36.2 million in 2014. It is anticipated that needed maintenance and repair backlog projects total close to $400 million.

As a result of Superstorm Sandy, nearly 184,000 acres of State, Federal and local public open space was inundated by storm surge. Much of this inundation occurred within state-owned parks and forests. Approximately 75% of New Jersey's park facilities sustained damage from Superstorm Sandy including serious damage to two of the State's most visited parks. Under

the State's Blue Acres Program, $330 million in post Sandy relief monies is being used to acquire and remove flood prone properties thus creating new open space to mitigate the impacts from future storm events.

Let's Raise the Parks Grade

Additional funding is needed to address maintenance and repair of infrastructure and equipment. Existing funds need to be reallocated back to parks to support much needed repair and maintenance items that have been deferred due to recent budget cuts. A priority listing of urgent repair projects needs to be addressed under the Capital Budget with a reallocation of the CBT to this urgent need. An analysis of entrance fees also needs to be conducted to identify those facilities and locations where increased fees can be absorbed and accepted

Find Out More

- Statistical Report of State Park Operations: 2013-2014, Annual Information Exchange (July 1, 2013-June 30, 2014), National Association of State Park Directors, Volume 36, May 2015
- Green Acres – www.state.nj.us/dep/greenacres
- US Bureau of the Census, 2010 Census of Population
- NJDEP Green Acres Program Local Government Assistance Application Land Application and Park Development
- Environmental Trends Report, NJDEP Office of Science,
- (www.state.nj.dep.dsr.trends)
- Statewide Comprehensive Outdoor Recreation Plan (SCORP), 2013-2017, Green Acres Program, New Jersey Department of Environmental Protection.
- Garden State Preservation Trust Fund
- Acreage Report For Lands Under The Jurisdiction Of The Department of Environmental Protection, Division of Parks and Forestry, Natural and Historic Resources, Office Of Resource Development, January 2015
- American Planning Association, Planning Advisory Service, Standards for Outdoor Recreational Areas, January, 1965
- Garden State Preservation Trust Fund
- New Jersey Historic Trust Fund
- New Jersey Corporate Business Tax
- New Jersey Trails Association
- New Jersey Conservation Foundation
- New Jersey Office for Planning Advocacy
- NJDEP Staff, Office of Parks and Forestry
- NJDEP Bureau of Legal Services and Stewardship
- NJ Spotlight, News, Issues and Insight for New Jersey

PORTS

What You Should Know About New Jersey's Ports

New Jersey is an important international gateway for freight moving into and out of the U.S. New Jersey has major seaports and marine terminals located in the northern and the southern regions of the state. They directly serve the surrounding 26 county regions, providing 143,410 direct jobs and 251,730 total jobs in the state. They also contribute over $20 billion in business income and more than $4.9 billion in federal, state and local tax revenues. The port and inland waterway system bring in over $1.6 billion in revenue to New Jersey, and they contribute over $3.3 billion to the national economy.

To evaluate the adequacy of New Jersey's maritime infrastructure, waterway access, availability of terminals, efficiency of movement at multimodal connectors, and how resilient the system is to potential disruptions must be considered. For containerized freight, it is also important to consider adequacy of international distribution centers to bring this cargo into the domestic freight transportation system. These elements will be analyzed from both the perspective of available capacity (which is related to the service timeframe) and the level of current investment (capital as well as maintenance dollars). This evaluation analyzes both of these parameters, integrates the findings, and evaluates the condition and performance characteristics of these infrastructure components.

Issues Facing New Jersey's Ports

Capacity – North Jersey Ports - The North Jersey maritime port and rail yard system is currently the largest center for the import/export and transfer of container freight on the east coast, and the second largest (after Los Angeles/Long Beach) in the United States. Foreign-Trade Zone No. 49 (FTZ 49), administered by The Port Authority of New York and New Jersey, is ranked #7 in imports and #17 in exports in the country out of 271 foreign-trade zones for foreign-value of merchandise received for fiscal year 2014, according to the recently released report of the Foreign-Trade Zones Board.

Last year (2014) the Port of New York and New Jersey handled more international cargo than ever before, surpassing the $207 billion mark in the total value of all cargo handled. The Port's container traffic has had an annual growth of over 5.4% compared to the previous year. It has increased from about 2.6 million total containers in 2004 to 3.3 million in 2014. To meet the projected increases in volume of cargo coming through the Northern Seaport Complex, a $2.7 billion investment has been made to reconfigure existing terminals, deepen the harbor's channels and berths, and improve inland intermodal access by truck and rail.

Capacity – South Jersey Ports - The Port of Camden was established in 1834. Its waterway access is through a 103-mile, 40-foot deep navigation channel from Philadelphia to the mouth of the Delaware Bay. The Delaware River Ports (from Philadelphia, PA and Camden, NJ to Wilmington, DE) handle more than 100 million tons of goods annually and are home to the largest petrochemical complex on the East Coast. Philadelphia alone is the world's largest freshwater port. Most of the goods handled at these ports are imported breakbulk and bulk cargoes that are transferred to trucks and trains that move

PORTS

the freight within a 200 to 300-mile radius of landing. Cargoes include lumber, steel and cocoa. In 2014, the Port of Camden hit a new record with a total cargo volume in excess of 2.3 million tons. The Delaware River Port Authority forecasts a 2 to 2.5 fold increase in cargo of all types over the next 20 years and has planned investments of $650 million for terminal development to receive this cargo.

Condition – North Jersey Ports - Approximately $1.6 billion has been invested by the U.S. Army Corps of Engineers (USACE) to construct navigation improvements, providing adequate channel and berth access (50-foot depth) for the "New Panamax" vessels. With this construction expected to be completed in 2016, channel and berth depth are no longer a limitation through 2023 and beyond. In addition, the current height of the Bayonne Bridge, or air draft, will no longer be an impediment for the largest containerships because of the ongoing work to elevate the bridge deck to 215 feet. The raised bridge is estimated to cost over $1 billion with completion in 2017, a year later than the anticipated completion of the enlarged Panama Canal in late June 2016.

Condition – South Jersey Ports - Since 2010 the dredging of the Delaware has been underway within the existing 40-foot Delaware River federal navigation channel to be deepen to 45 feet from Philadelphia Harbor, PA and Beckett Street Terminal, Camden, NJ along a 102.5-mile distance to deepwater in the Delaware Bay. The deeper channel will provide for more efficient transportation of containerized, dry bulk (steel and slag) and liquid bulk (crude oil and petroleum products) cargoes to and from the Delaware River ports, with estimated net annualized benefits of more than $13 million to the U.S. economy.

Funding and Future Need – North Jersey Ports - With respect to capital investments for maritime infrastructure; a planning, design and construction period of 10 years is considered (2014 to 2023) for major infrastructure development. Hence a planning horizon of 2023 by the PANYNJ has been selected as the point in the future to evaluate current capital construction and projects in-place. Two of the PANYNJ's capital investment projects, Bayonne Bridge Roadway Elevation and Greenville Yards Port Development are about 4.1% and 1.1%, respectively, of the total capital investment dollars. State of Good Repair projects equate to about a $7.9B share of the capital plan at about 28.8%.

Funding and Future Need – South Jersey Ports - The expected investments within SJP were estimated to be around $200 million out of the $260 million between 2011 and 2017, excluding Tiger grants. "In an alliance with Conrail and Salem County, New Jersey, the SJPC has been able to leverage $117 million in local infrastructure investment, including parts of the Paulsboro Marine Terminal construction, for about $24 million in Transportation Investments Generating Economic Recovery (TIGER) grants" (2014 SJPC Annual Report).

PORTS

Operation and Maintenance – USACE is responsible for federal channel maintenance dredging activities. A 2014 change in federal legislation regarding the maintenance of federal channels down to the depth of 50 feet became 100% a federal responsibility where it once was to be cost-shared beyond 45 feet by the local sponsor (the Port Authority of New York and New Jersey in this case). Currently, dredged maintenance material is both placed in the ocean at the Historic Area Remediation Site (HARS) by capping the site and capping existing impacted landfills and brownfields when unsuitable for ocean placement. More than a million cubic yards per year falls into this latter category. Currently, the USACE's annual O&M (operations and maintenance) funding from the U.S. Congress does not adequately provide the money needed to fully maintain all of the harbor's many channels. Each year some projects must be deferred. This problem will grow unless there is a significant increase in the budget for New York Harbor O&M program, particularly after the capital program is perhaps completed within the next year.

Given the current investment and improvements in productivity, and planned improvements to Greenville Yard Port Authority Terminal (as part of PANYNJ Capital Plan), the container terminals and their on-dock rail capabilities are anticipated to be adequate to 2023. Growth in container exports may impact terminal congestion if volumes increase more rapidly than currently forecasted.

According to AAPA (News Release April 25, 2015), connections at nearly 1/3rd of the nation's ports need a minimum of $100 million each in upgrades to handle projected 2025 freight volumes. With respect to landside access, currently North Jersey's marine terminals generate nearly 22,000 truck movements each day. According to recent projections, the number of container-related trucks generated by port activity could increase to upwards of 62,000 per day and non-container trucks to approximately 11,000 per day by 2026.

Resilience – Superstorm Sandy has caused significant damage to infrastructure in the Region. "Resiliency" became an important term hence the need brought in investment opportunities in the area. Federal funding contributed billions of dollars in improvement in flood protection for the Region.

The Capital Plan provides funding for the Superstorm Sandy Program, which includes permanent repair, mitigation, and resiliency projects forecasted in the 2014-2023 period. Out of the $1.0 billion of capital investment over ten years, $474 million of spending is estimated to occur between 2014 and 2018, where only 8.6% is slated for Port commerce.

Innovation – A series of projects are in various stages of implementation in order to relieve projected volumes of rail and truck traffic in this region. The PANYNJ has adopted an expansive roadway capital plan to improve its network of vital roadways servicing Port Newark/Elizabeth and Port Jersey terminal facilities. Every facet of this plan contributes to maximized logistics efficiency by creating greater roadway capacity, increased traffic flow, and enhanced safety standards and is to be completed by 2019. This project known as "Portway Phase I" includes numerous roadway network and rail enhancements to increase safety and support seamless connections by separating heavy truck traffic flows from other traffic

PORTS

flows and permitting trains to move through the region without congestion. Some of the projects have been completed; others are ongoing or are awaiting funding, particularly several of the regional rail improvements. Some of the rail improvements by the PANYNJ include two loading tracks at Port Newark Container Terminal, bringing their total to four and offering 10,000 linear feet with capacity for approximately 250,000 lifts per year. ExpressRail Elizabeth, which serves the APM and Maher terminals, has expanded to 53,000 feet of on-dock track, enough to accommodate four 10,000-foot trains.

Warehousing and distribution centers need to be located in convenient places for the cargo owners to move their goods to market. Construction of these facilities is typically under the control of private entities. However, because of the need for efficient connections between the seaport and these first points-of-rest, public agencies must work with the private parties to create good connectivity. Local road and highway connectivity is crucial in the truck dominated Northern Seaport Complex; rail connectivity is also important for hinterland movements.

Continued funding of the Portway project and others like it by NJ Department of Transportation and other agencies is vital to the success of the intermodal infrastructure necessary to maintain smooth flow of cargo movement to the inland warehouses and distribution centers. With respect to warehousing and distribution centers, the report card does not specifically address their adequacy to handle the forecasted cargo volumes because this infrastructure is typically constructed and held by the private sector as mentioned. However without sufficient capacity in this component, the rest of the system cannot fully meet its design potential to serve the region and the nation's demand for freight.

There is an opportunity for greater synergy between North Jersey ports and the South Jersey ports. The ports to the north are concentrating on efficiently handling containers and automobiles whereas the south Jersey ports are concentrating on providing niche services for breakbulk and bulk cargoes. Finding ways to provide the transportation connections between the two areas would provide the state with a greater opportunity to leverage the import and export freight handling capabilities and capacities of each to minimize congestion, improve reliability to cargo owners and keep transportation costs low. This partnership could be a win-win for both regions of the state while providing new economic development opportunities along the corridor connecting these gateways.

Let's Raise the New Jersey's Ports

In general, there are sufficient capital investments to keep pace with the demand for infrastructure capacity in the channels, terminals and intermodal connectors. Over the past 8 years since the last report card, significant capital investments have been made with additional funding opportunities coming from Sandy recovery funding to make facilities more resilient. If additional investment is needed, it is at the locations between the port areas and the main road and rail routes to eliminate chokepoints. However, continued system monitoring and additional planning will be necessary to ensure that the available transportation capacity at New Jersey's seaports, waterways and intermodal connectors is adequate to meet the demands for international gateways both for import as well as export cargo over the coming decades.

PORTS

Further, it is equally important that the current system of channels, terminals, and the supporting intermodal infrastructure is adequately funded and maintained to provide efficient and effective transportation services. Public agencies will have to partner with private entities to ensure that international and regional distribution centers are not overburdened.

Investments in New Jersey's seaports and waterways as part of the Port infrastructure are necessary as the expansion of facilities must keep pace with projected freight growth, particularly the container facilities. The various agencies and authorities' plan and continue to plan for the future transportation infrastructure requirements for freight. There may be a possibility of linking the two seaport regions in the north and the south to leverage greater market share, productivity and more jobs for the state. Leadership from Trenton is needed to help guide the development of this potential economic bridge.

In order to raise the grade C further, the plans for the future expansion and modernization of the current facilities and the maintenance of those facilities must be fully funded. This funding must be effectively utilized and should come from a variety of sources both public and private.

Find Out More

- The US Waterway System, Transportation Facts and Information, US Army Corps of Engineers (USACE) June 2015
- US Army Corps of Engineers (USACE) Navigation Data Center, Waterborne Commerce Statistics Center, 2012
- US Army Corps of Engineers (USACE) FACT SHEET: New York & New Jersey Harbor (50 ft. Deepening) Navigation Project as of January 2014
- AAPA News release April 21, 2015
- Historical Trade Statistics, Port Authority of New York New Jersey (PANYNJ) 2014
- South jersey Freight Transportation and Economic development Assessment, Dec 2010 New Jersey Department of Transportation, NJDOT
- Delaware River Port Authority (DRPA), 2014 Annual report
- South Jersey Port Corporation (SJPC), 2013 Annual report
- Transportation Capital Program, Fiscal Year 2016 New Jersey Department of Transportation, NJDOT
- Capital Plan Summary 2014-2023 Port Authority of New York New Jersey (PANYNJ)

RAIL

C

What You Should Know About New Jersey's Freight Rail Network

In New Jersey, freight railroads move nearly 38 million tons of goods in over one million carloads annually. In terms of dollar value the Port of New Jersey, along with the port of New York, imports and exports more than any port in the country. New Jersey is served by approximately 1,000 miles of rail freight lines. Eighteen freight railroads currently operate within the State of New Jersey, including:

- 3 large (Class I) railroads which include Norfolk Southern (NS), CSX Transportation (CSX) and the Canadian Pacific Railway (CP),
- 1 medium (Class II) regional railroad,
- 7 Class II and smaller Class III local railroads, and
- 7 switching and terminal railroads, most notably the Consolidated Rail Corporation (Conrail).

Class I and Canadian railroads account for over 67% of the rail mileage operated in New Jersey, with CSX operating about 250 trains and NS moving 160 trains daily throughout the State.

Capacity – Railroads are private owners of rail track infrastructure that they must maintain as well as manage capacity. Rail performs an important capacity task for the State's economy by moving large quantities of goods into and out of the State without further congesting roads which are often at capacity at critical junctures. As rail freight volumes grow, the need for additional capacity is eminent, but there are limited resources to build in the area, therefore, it is of extreme importance to manage the existing multimodal transportation logistics to allow for freight growth.

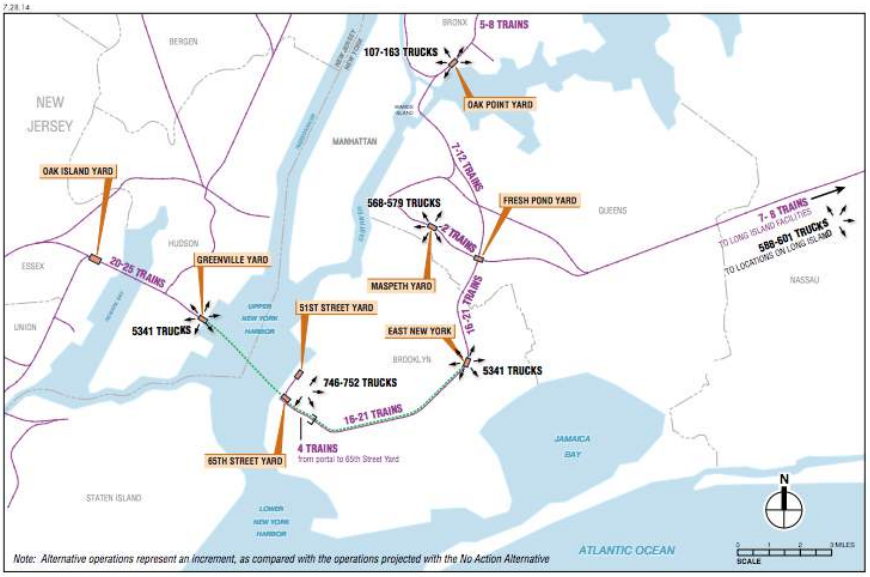


FIGURE 5-17
Rail Tunnel with Truck Access Alternative Daily Operations
CROSS HARBOR FREIGHT PROGRAM

A particularly important portion of New Jersey's freight rail network is into and out of the Port of New York and New Jersey. The network is far better developed and better connected to the national rail network west of the Hudson River in New Jersey than it is east of the Hudson River, in New York. Critical rail connections to the eas wwt-of-Hudson market are remote, inefficient, or have capacity restrictions. The result is that the region is overwhelmingly dependent on trucks for moving freight across congested chokepoints to and from the east-of-Hudson counties. Consequently, highways in both States leading to and serving the east-of-Hudson counties, and the communities they traverse, experience the greatest proportion of surface freight transport impacts, and freight shippers, receivers, and carriers throughout

the region suffer the acute and chronic negative effects of growing highway congestion. This freight-related traffic congestion inconveniences everyone involved and inflicts environmental and economic costs on the region.

To improve the movement of freight in the Port region the Federal Highway Administration (FHWA) and the Port Authority of New York and New Jersey prepared a Tier I Environmental Impact Statement for the Cross Harbor Freight Program. This study evaluated numerous alternatives for the improvement of transportation capacity and operation. After a review of public and agency comments the FHWA released the Tier I Record of Decision (ROD) in January 2016. It identified two Preferred Alternatives – the Enhanced Railcar Float Alternative and the Rail Tunnel Alternative – for additional review in a Tier II EIS. As stated in the ROD, "Tier II will include analyses based on engineering designs and site-specific effects, development of site-specific mitigation measure, and cost estimates, as appropriate."

Issues Facing New Jersey's Freight Rail Network

Condition and Safety – Private freight railroads in New Jersey are responsible for maintaining their own tracks and ensuring the existing freight rail infrastructure is preserved in a state of good repair. While railroads have a business interest in maintaining their tracks, the Federal Railroad Administration (FRA) is charged with the regulating the overall safety of our nation's rail network, and it conducts on-the-ground inspection and enforcement activities throughout the U.S., including New Jersey. They provide technical expertise and direction in the execution and administration of state rail safety programs to ensure maximum safety in railroad operations relevant to railroad track. The FRA also serves as a liaison between freight railroads and the government to ensure railroads in New Jersey follow the minimum standards of operation, safety and infrastructure.

Operations & Maintenance – New Jersey industries that rely on freight rail include power generation, waste disposal, warehousing and distribution, chemical manufacturing and food products manufacturing. These industries require their products to be shipped by freight rail— including coal for power generation, food and associated products for food processing, and chemicals for the chemical and pharmaceutical industries. Utilities, agriculture, mining, and manufacturing, also ship by rail. The industries described above are important to the New Jersey economy and the state can continue to support these industries by ensuring the condition of the state's freight and passenger rail system. Without a rail system that can accommodate continued growth in these industries, it will be more difficult to achieve the same level of economic outputs. Millions of private and public dollars are devoted to the operations and maintenance of New Jersey's freight rail system improvements each year, but the needs far outweigh available financial resources. Many freight rail infrastructure improvements are currently being advanced by the public and private sectors throughout the state, but the cost for completion of these improvements is estimated to be nearly $1.5 billion.

RAIL

C

Public Safety – Even though railroads are the most environmentally conscious way to move large freight, the volume of freight trains traveling through residential neighborhoods and environmentally sensitive area has been a major concern to the public. For example, trains carrying millions of gallons of crude oil are passing through neighborhoods in Bergen County and over a reservoir every day. Similar conditions exist in other areas in the state. Residents in Bergen County have reached out to authorities in an effort to reduce the amount of traveling trains containing hazardous material. The New Jersey State Senate advanced legislation in 2015 to better prepare the State in the event of an oil train accident. The proposed legislation will require railroad companies carrying 200,000 or more gallons of petroleum or petroleum-based product or 20,000 gallons of other hazardous substances to submit a discharge response, cleanup, and contingency plan to the New Jersey State Department of Environmental Protection. The bill would require the plan to be renewed every 5 years unless the department requires a more frequent submission. This would be a major step to protect citizens from potential spills that could harm the reservoirs, sensitive environmental resources and residents.

The number of pedestrians utilizing freight railroad grade crossings where speeds go up to 50 miles per hour is a significant public safety concern. According to the FRA, the U.S. has about 136,000 public at grade crossings, and in 2015 there were 240 fatalities at rail grade crossings. New Jersey, with 1,529 public grade crossings had 5 fatalities in 2015. On February 2015, a train crash in a New York City suburb was the deadliest in Metro-North Railroad's history. The train crash killed six and injured 12 after a train crashed into a vehicle on the tracks. The crash highlighted existing concerns about railway grade crossings.

Grade crossing warning systems, which include gates and flashing lights, are jointly funded by the federal government, states and railroads. The railroads themselves are responsible for the installation and upkeep of grade crossing warning systems. In the U.S., it is required railroad signals begin flashing 25 seconds before the train arrives, but grade crossing need to be studied individually to determine the amount of time the railroad signal should be turned on before a train approaches the intersection.

There are currently multiple programs in the state of New Jersey that focus on grade crossing safety. NJDOT and railroad agencies are committed to implementing programs and equipment to enhance pedestrian safety along railroad tracks, including additional warning signs, gate skirts that discourage ducking beneath the gate and education campaigns that focus on changing behavior at rail lines, all in an effort to avoid any more fatalities.

Funding – New Jersey does not have a permanent, guaranteed tax revenue source for freight rail initiatives. Tax revenue from freight rail goes into the State's general treasury fund, and New Jersey's rail tax rates are low and generate limited revenue. Rail taxes in the neighboring state New York are 26 times higher than in New Jersey.

On December 4, 2015, President Obama signed into law the Fixing America's Surface Transportation Act, or "FAST Act." It is the first law enacted in over ten years that provides long-term federal funding, providing certainty for surface transportation; meaning States and local governments can move forward with critical transportation projects. The FAST Act would establish both formula and discretionary grant programs that will make federal funding available to advance critical transportation projects that would benefit freight movements.

RAIL C

In New Jersey, the only continuous State funding source for freight rail initiatives is the New Jersey Rail Freight Assistance Program, which draws funds from the State's Transportation Trust Fund. Currently, the NJ Freight Rail Assistance Program receives a $10 million annual appropriation. At this level, the program is capable of supporting smaller and more localized improvements but not major initiatives. The available funding is not enough to consider most grant applications. This trend is expected to continue, with the difference between needs and available funds growing ever larger as demand for freight rail service expands. At a minimum, the program should maintain its current funding level, and additional funding should be secured as demand increases.

Future Need – New Jersey's rail system faces many challenges that are unique to the State. Much of the rail network is shared by several different entities, both passenger and freight. Improving Trans-Hudson mobility between New York City and New Jersey, achieving and maintaining a state of good repair, and complying with unfunded regulatory mandates are added challenges when the demand for more freight and passenger rail service is growing. Overall freight demand is projected to grow by about 64 percent between 2007 and 2035 and rail freight demand is expected to grow by about 48% during the same period. Some of the recommended rail improvements in New Jersey include,

- Upgrading secondary/light density short lines to handle the current industry standard 286,000 lb. (286K) rail cars.
- Ensure freight rail infrastructure is maintained in a state of good repair.
- Promote preservation of ROW rail rights for future need.
- Repair and rehabilitation of the Delair Bridge to ensure continued freight rail access to southern New Jersey
- Expanding intermodal yard capacity, particularly in northern New Jersey.

Resilience – In 2012 Superstorm Sandy struck the Mid-Atlantic and New England area which prompted officials to suspend transportation services in advance of the storm's arrival. The Class I freight railroads removed rolling stock from the area, as well as repositioned equipment to accommodate the potential diversion of international maritime cargo from Northeast ports.

The impacts on New Jersey's rail transportation systems were extensive after the storm. The impacted area experienced significant damage from flooding and high winds. CSX and Norfolk Southern sustained minor damage and were able to restore services within the first week, but the damage at other facilities including Greenville Yard, an intermodal freight transport facility that includes a container terminal located on the Upper New York Bay in the Port of New York and New Jersey, was significant with all facilities and one rail car float destroyed.

Hundreds of millions of dollars have been spent to date by multiple agencies, with hundreds of millions of additional funds needed to complete restoration of services. Resiliency to weather related environmental factors should be a consideration in the assessment of any component of the freight rail infrastructure.

RAIL

C

Let's Raise the Freight Rail Grade

- New Jersey should reevaluate the percentage allocation of State transportation funds to rail projects.
- New Jersey needs to start emulating surrounding states in their funding efforts. Some examples include Ohio, which has created an independent agency to oversee freight rail assistance, Wisconsin, which uses a portion of the State transportation budget to fund rail assistance programs, and Connecticut, which exempts railroads from the State's gross earning tax if they use the money they save in capital improvements.
- The New Jersey Rail Freight Assistance Program, which draws funds from the State's Transportation Trust Fund, should maintain its current funding level, and additional funding should be secured as demand increases and larger projects need to be supported.
- New Jersey needs to maintain the freight rail infrastructure in a state of good repair and must upgrade secondary/light density short lines.

With a more stable rail network and operational framework in place, rail freight volumes in New Jersey will continue to grow, driven by advances in freight rail productivity. These advances include double stack cars and more powerful locomotives pulling longer trains. In order to accommodate the growing need capacity need, New Jersey must prioritize issues to improve the freight service in the State, which will require a vision to foresee future needs and a plan of action to fulfill them. Funding has been a growing concern in previous years, but with the "FAST" act in effect and other funding opportunities, New Jersey will benefit to improve and maintain its current rail network.

Find Out More

- New Jersey State Department of Transportation. http://www.state.nj.us/transportation/freight/rail/plan.shtm
- http://www.state.nj.us/transportation/freight/rail/projects.shtm
- http://www.state.nj.us/transportation/commuter/pedsafety/pdf/NJSafetyalongRailroads_000.pdf
- http://www.state.nj.us/transportation/about/safety/hrgcp.shtm
- Port Authority of NY & NJ: http://www.panynj.gov/port/cross-harbor.html
- New Jersey Legislature. http://www.njleg.state.nj.us/bills/bills0001.asp
- North Jersey Transportation Planning Authority. http://www.njtpa.org/Planning/Regional-Studies/Recently-Completed-Studies/2040-Freight-Industry-Level-Forecasts/2040-Freight-Forecasts/FreightForecastStudyFinalReport.aspx
- North Jersey News. http://www.northjersey.com/news/trains-carrying-oil-cause-concern-in-north-jersey-1.1008473?page=all
- Federal Highway Administration: http://safety.fhwa.dot.gov/xings/xing_facts.cfm
- Federal Railroad Administration: http://safetydata.fra.dot.gov/OfficeofSafety/publicsite/Query/gxrtally1.aspx

ROADS

What You Should Know About New Jersey's Roads

New Jersey's central location between the Northeast's major cities of Washington, D.C., Baltimore, Philadelphia, Boston and New York as well as the close proximity of major shipping ports make New Jersey's road system a vital conduit for ensuring the economic prosperity of the entire Northeast region and beyond. The ability of New Jersey's roadways to carry these goods and services, which bring economic prosperity to the residents of New Jersey and the surrounding region, is largely dependent on the physical condition of the roadway infrastructure.

New Jersey's roadway system has more than 39,000 miles of roadways considering state,, county and municipal governments and toll authority's jurisdictions. Lined up end to end, they would circle the equator 1.5 times! Although the New Jersey Department of Transportation (NJDOT) and toll road authority jurisdiction represents only about 7% of the total statewide mileage, approximately two-thirds of all traffic (66%), including high percentages of heavy trucks, is carried on these roads. Forty-one percent of the vehicles traveling on NJDOT's main roads are heavy trucks, while 25% of the vehicles traveling on the toll roadways are heavy trucks.[1] By Federal Highway Authority (FHWA) standards, a fully-loaded tractor-trailer may have a total weight of up to 40 tons, compared to full-size sedans weighing close to two tons, so heavy trucks deteriorate roads much faster than cars. With such a high volume of use, especially for truck traffic, it's not hard to see why New Jersey spent the most money in the country on their roads, over $2 million per mile of State-owned roadway, in 2012.[2] To put that in perspective, this was over three times the rate spent by the next highest state, Massachusetts. However, it still has not been sufficient investment to eliminate the backlog of needs and there is no funding source in place for New Jersey to maintain that kind of spending going forward. Meanwhile, the state's roads continue to be congested and in poor condition.

Traffic congestion costs New Jersey residents a total of $5.2 billion annually and $861 per driver annually in the form of lost time and wasted fuel. Estimates show that by 2030, vehicle travel in New Jersey is expected to increase by 15%, further increasing congestion in the most densely populated state in the country. Forty-two percent of New Jersey's roadway system is deficient, meaning rough or distressed/cracked. The average New Jersey driver loses $1,951 annually as a result of driving on deficient roads. The State has not raised its gas tax in 25 years, and there is no long-term Federal funding solution in place. In order to prevent further deterioration of New Jersey's roadways, each dollar must be efficiently spent and innovative solutions must be implemented. NJDOT's Asset Management approach has prioritized pavement rehabilitation, keeping New Jersey in a "state of good repair." This forward thinking combined with increased Federal and state funding will go a long way to fix our state's deteriorating roadway infrastructure over time.

ROADS

Issues Facing New Jersey's Roads

Capacity – Sixty-four percent (64%) of New Jersey's major urban highways are congested.[3] Population and economic growth in New Jersey have resulted in increased demands on the State's major roads and highways, leading to increased wear and tear on the transportation system. Vehicle miles traveled in New Jersey increased by 26% from 1990 to 2012, exceeding 74 billion miles in 2012. By 2030, vehicle travel in New Jersey is projected to increase by another 15%.[4]

The New Jersey Turnpike Authority recently completed a major capacity improvement project on the New Jersey Turnpike in 2014, adding 170 lane-miles. The Authority is also in the process of a capacity increase on a 50-mile stretch of the Garden State Parkway. These expansions are in coordination with a proposed interchange of I-95 and the Pennsylvania Turnpike Extension in Pennsylvania, which will complete a missing gap in the I-95 corridor that extends north-south along the entire east coast. When I-95 is connected, this should benefit the New Jersey roadway system as truck traffic traveling through the State will no longer be forced onto overly congested highways and local roadways.

Once the aforementioned capacity increases are completed, investment for congestion relief will be targeted toward low-cost/high-return strategies like signal optimization and deployment of Intelligent Transportation Systems (ITS).[1] Signal optimization is a concept where groups of traffic signals are re-timed to reduce delay for vehicles on the roadway system. ITS involve integrating advanced communication technologies into the transportation infrastructure, such as variable message signs and cameras. As New Jersey is the most densely populated state in the nation, there is little room to construct new or wider roadways to handle both the current congestion and congestion resulting from future growth.

Condition – NJDOT has an Asset Management approach to strategically determine where to spend their constrained resources. This approach considers the existing condition and life span of roadway assets to better predict when and where to make future roadway improvement investments to keep the roadway infrastructure in operation. The desire is that this approach will enable them to be more proactive rather than reactive when it becomes necessary to make repairs to the roadway infrastructure.

ROADS

D+

The current functional adequacy of the New Jersey State Highway System is as follows (see ***Table 1***)[5]:

Table 1

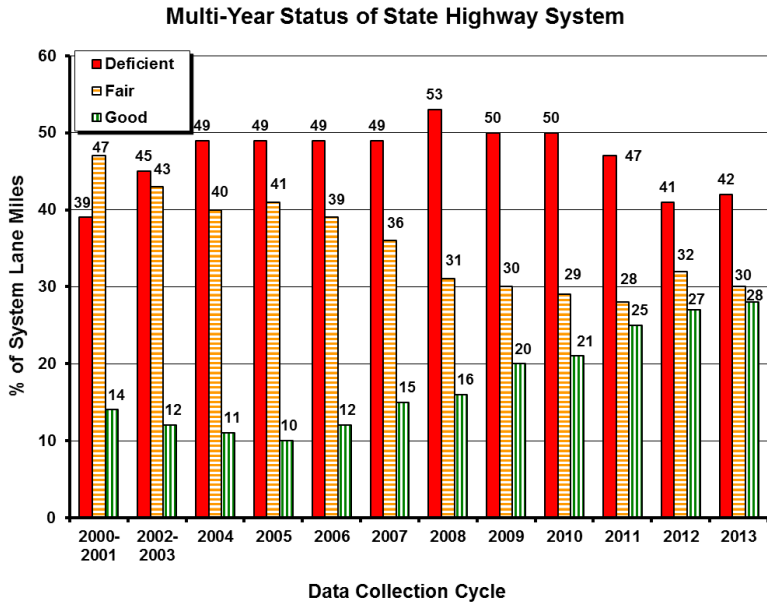
CONDITION	OF TOTAL SYSTEM
Good	28%
Fair/Mediocre	30%
Deficient, Rough Only	10%
Deficient, Distressed Only	22%
Deficient, Rough and Distressed	10%

The results underscore the severity of the deficiency backlog. Driving on deficient roads costs New Jersey motorists a total of $11.8 billion annually in the form of additional vehicle operating costs, congestion-related delays and traffic crashes.[4]

However, while 42% of the system is deficient, this is down from as high as 53% in 2008. Also, the percentage of "good" roadways has increased each year since 2005 when it was as low as 10% (see ***Figure 1***).[5]

New Jersey's Asset Management approach to preserve and improve the transportation system appears to be working since the trend over the last decade is clearly in the right direction. The target objective percentage of pavement in acceptable condition is 80% in 2022 if the annual constrained investment target of approximately $260 million for Road Assets is achieved.[1]

Figure 1



Source: NJDOT Pavement Management System

Funding and Future Need – The primary funding sources for New Jersey's roads are from the Federal and state governments. The Federal government provides a significant return to New Jersey in road funding based on the revenue generated in the State by the Federal motor fuel tax. New Jersey's Transportation Trust Fund (TTF) is funded by taxes on gasoline and diesel sales, vehicle sales, motor vehicle and Heavy Truck registration fees and a portion of the revenue generated by New Jersey's toll roads. New Jersey has the second lowest gas tax in the country at 14.5 cents-per-gallon, trailing only Alaska.[6] To put that in perspective, adjacent states such as New York and Pennsylvania levy 44.3 and 55.3 cents-per-gallon respectively in addition to the Federal rate. New Jersey has not raised its gas tax since 1990.

ROADS

D+

The annual statewide constrained investment target for New Jersey's infrastructure from 2013 through 2022 is recommended at $3.3 billion (see ***Figure 2*** for breakdown)[1]. The budget is constrained because the major funding sources - the FHWA, Federal Transit Administration and New Jersey's TTF - provide insufficient funds to meet all of the State's needs. New Jersey's efforts to improve its transportation system will be hindered by the State's need to spend approximately $1.2 billion annually in paying off outstanding debt. Over the next decade, a total of approximately $13 billion will be spent on debt service.[4]

Figure 2

The FHWA estimates that each dollar spent on road, highway and bridge improvements results in an average benefit of $5.20 in the form of reduced vehicle maintenance costs, reduced delays, reduced fuel consumption, improved safety, reduced road and bridge maintenance costs and reduced emissions as a result of improved traffic flow.[4] It's that simple – the more money invested up front, the more savings down the road.

Going forward, the outlook for increased Federal funding is bleak. Signed into law in December 2015, the FAST Act (Fixing America's Surface Transportation Act) has effectively continued the program structure and funding through 2020 that was enacted in the 2012 MAP-21 Act (Moving Ahead for Progress in the 21st Century Act). While the MAP-21 Act and now the FAST ACT have improved several procedures that in the past had delayed projects, neither act addresses long-term funding challenges facing the Federal surface transportation program. While this reauthorization of Federal funding provides stability through fiscal year 2020, it has effectively eliminated the chance of the needed increase in Federal funding levels for the next five years. At the State level, discussions continue around fixing the State's Transportation Fund, but no progress has been made to date.

Operation and Maintenance – The NJDOT awarded $202 million for pavement projects in 2014, including maintenance and resurfacing projects throughout the State. However, the NJDOT Pavement Management System identified 508 additional deficient pavement sections needing future restoration totaling an estimated $955 million.[5] Many of the highways in New Jersey were built in the 1950s, and most roads have a maximum life of about 50 years. Many of the State's roads have now reached the end of their life, and now the need for additional repairs simply to maintain the existing roadway network is evident. The backlog of pavements needing future restoration will only increase unless funding levels are dramatically increased.

ROADS

D+

Public Safety – Traffic crashes in New Jersey claimed the lives of 2,945 people between 2008 and 2012. New Jersey's overall traffic fatality rate of 0.79 fatalities per 100 million vehicle-miles of travel is lower than the national average of 1.13. Of greater concern, the traffic fatality rate on New Jersey's rural roads is more than two and a half times higher than that on all other roads in the State.[4] According to a study conducted by the FHWA, $100 million spent on highway safety improvements will save 145 lives over a 10-year period.[3]

The Road Information Project (TRIP) estimates that roadway features are likely a contributing factor in approximately one-third of fatal traffic crashes. In terms of dollars, traffic crashes in which roadway features were a contributing factor cost New Jersey residents a total of $2.9 billion each year in the form of lost household and workplace productivity, insurance costs and other financial costs.[4]

While the fatality rate in New Jersey is below the national average, investments in traffic safety, specifically in the rural roads, need to be a priority. Reducing congestion and improving the condition of New Jersey's roads, along with investments to specifically improve substandard roadway features, will improve safety. FHWA's MAP-21 and FAST ACT have continued the Highway Safety Improvement Program, the goal of which is to achieve a significant reduction in traffic fatalities and serious injuries based on a data-driven approach that focuses on performance. New Jersey continues to take advantage of this Federal-aided program with over $40 million programmed in 2014.[7]

Resilience – New Jersey's roadway system faced a tremendous test in 2012. Within the two weeks following Superstorm Sandy in October and November 2012, more than 650 weather-related roadway incidents were reported in the area is covered by the North Jersey Transportation Planning Authority region, including flooding, sinkholes, road collapses, downed trees, downed electric poles or wires, crashes, emergency repairs and other incidents.[8] Major roads experienced full closures for more than two days after the storm. Every county, municipality, and transit provider in the northern New Jersey region suffered some level of damage and still needs ongoing financial investment to realize a full recovery.

Since Superstorm Sandy, elected officials have led the effort to not only repair and rebuild what was damaged and destroyed, but to "harden" the transportation network to prevent and minimize future damage and limit system interruptions during future extreme weather events. Since extreme weather events are expected to occur with greater frequency and intensity in the region, it is important to identify the climate change-related threats to the transportation system and to educate the public and elected officials about the need for transportation infrastructure resiliency investments.[8]

ROADS

Innovation – New Jersey is in the process of developing innovative techniques and delivery methods to improve the State's roadways.

NJDOT has developed an Innovative Pavement Preservation Plan that focuses on reducing the substantial backlog of deficient pavements while at the same time utilizing a multi-year prioritization approach containing a "mix of fixes" for pavements in various condition stages. The New Jersey Turnpike Authority is investing in Intelligent Transportation Systems strategies to help manage roadway congestion in addition to its recent capacity improvements. The Authority installed more than 3,000 sensors along the New Jersey Turnpike and Garden State Parkway, and dynamic message signs capable of disseminating travel time or alert information to motorists have been deployed every 3 miles on the Turnpike and every 5 miles on the Parkway. NJDOT has also deployed similar equipment and technologies.

Innovative finance mechanisms, including public-private partnerships (P3s), are becoming more prevalent in New Jersey on major infrastructure projects. However, currently, not all agencies have the option to use P3s in the same way. Once the major agencies in New Jersey get on board with such mechanisms, there will be less of a burden on consumers. However, to be effective, mechanisms such as P3s cannot replace dedicated Federal and State revenue, but rather must supplement them.

Let's Raise the Roads Grade

- Reduce the percentage of deficient roadways from 42% to 20% by 2022
- Encourage the use of asset management programs to provide for the most efficient use of maintenance and repair investment
- Ensure the sustained sufficiency and reliability of New Jersey's Highway Trust Fund by raising the State's gas taxes and identifying and incorporating necessary additional revenue streams
- Increase investment from all levels of government to repair New Jersey's highway systems
- Continue the Highway Safety Improvement Program successes by investing in projects that will reduce injuries and fatalities

ROADS

Find Out More

- [1] FY 2013-2022 Statewide Capital Investment Strategy, March 2012.
- [2] 21st Annual Report on the Performance of State Highway Systems (1984-2012), September 2014.
- [3] TRIP: Key Facts About New Jersey's Surface Transportation System and Federal Funding, April 2015.
- [4] TRIP: New Jersey Transportation by the Numbers: Meeting the State's Need for Safe and Efficient Mobility, January 2015.
- [5] NJDOT Report to the Governor and the Legislature on New Jersey's Roadway Pavement System, Fiscal Year 2014. March 2015.
- [6] American Petroleum Institute: State Motor Fuel Taxes: Notes Summary, 10/1/2015.
- [7] New Jersey Highway Safety Improvement Program (HSIP) 2014 Annual Report.
- [8] Plan 2040: North Jersey Transportation Planning Authority (NJTPA) Regional Transportation Plan for Northern New Jersey, 2014.

SOLID WASTE B-

What You Should Know About Solid Waste in New Jersey

Solid waste management practices, and the infrastructure to process the waste, are very significant to New Jersey and the surrounding metropolitan regions. New Jersey residents generate almost three times as much waste than the national average, with each person creating about 12.5 pounds per day. After accounting for New Jersey's aggressive recycling programs, New Jersey still disposes of almost twice as much waste per person than the national average. (Figure 1) This high disposal rate, coupled with New Jersey's high population density of 1,195 people per square mile, puts New Jersey's waste generation density over 32 times higher per square mile than the average of the lower 48 states (0.23 tons U.S. vs 7.52 tons NJ per square mile per day), even with the recycled materials deducted, New Jersey's disposal density is approximately 22.5 times higher than the average of the lower 48 states (0.15 tons U.S. vs 3.42 tons NJ per square mile per day). (Figure 2) It quickly becomes evident that the solid waste infrastructure in New Jersey must not only work reliably and efficiently, but it must also do so in a way that minimizes the environmental impacts given the pressure on the system.

Figure 1 – Comparison of Solid Waste generated, disposed and recycled per person per day in the U.S. and New Jersey.

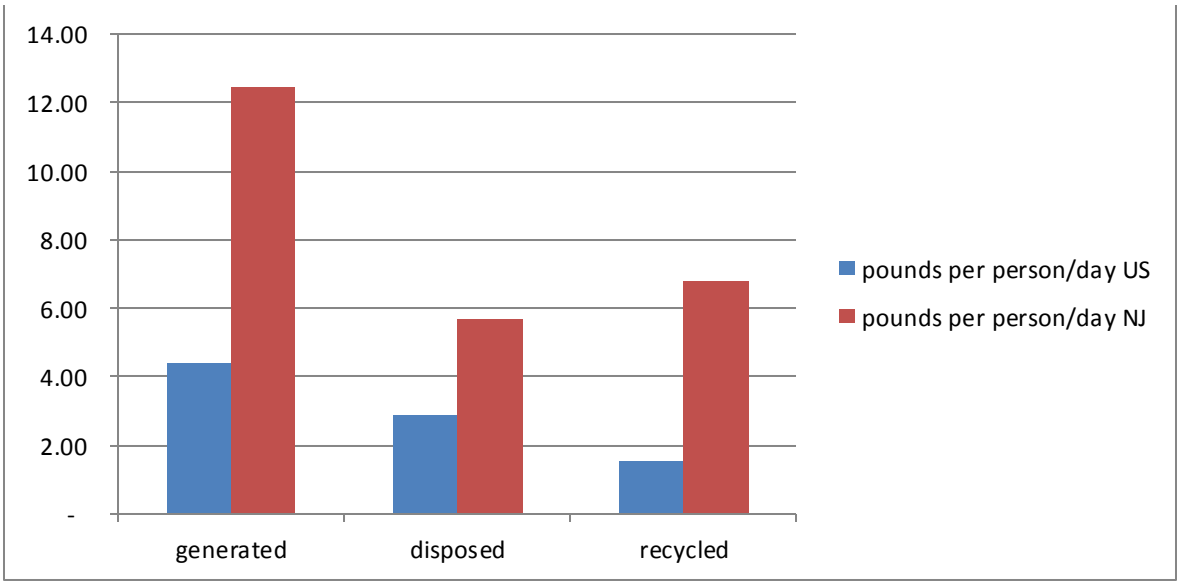
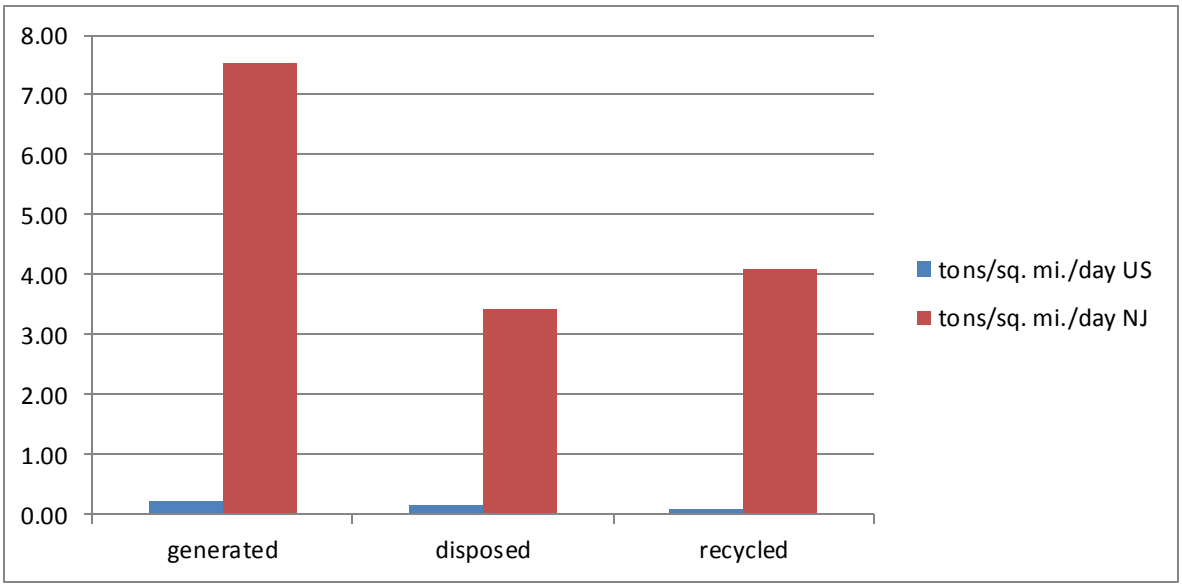


Figure 2. Comparison of Solid Waste generated, disposed and recycled per square mile per day in the U.S. and New Jersey.

SOLID WASTE B-



Issues Facing Solid Waste in New Jersey

Waste disposal and recycling costs in New Jersey are also among the highest in the nation. The tipping fees in New Jersey are almost 50% higher than the national average ($49.78 U.S. vs $72.39 NJ per ton in 2013). This should come as no surprise given the higher capital and operating costs in the region.

Despite the large difference in magnitude for the New Jersey solid waste industry as compared to the nation, New Jersey has made some progress in addressing these issues. The recycling rates are among the highest in the nation with approximately 54% of the waste generated diverted to recycling versus a national average of 34.5% in 2012. In 2012, New Jersey recycled 6.8 pounds per person per day. This amount is actually higher than the national average of total amount of waste generated per person per day of 4.4 pounds. There is currently an over capacity of recycling facilities with many privately owned operations closing down due to fewer markets and lower prices for recycled materials. While New Jersey's recycling rates are expected to continue increasing, there will be fewer facilities to accept the materials. Several counties have also recently converted to single stream recycling and these facilities are also able to increase their capacity to meet supply.

The infrastructure to collect, transport, recycle or properly dispose of solid waste is adequate and competitive, although expensive. The active landfills are using newer bioreactor landfill technology that recovers more methane and greatly reduces the potential for contamination of the underlying aquafers. Active (versus passive) landfill gas (LFG) collection systems are installed at all active landfills and most of the larger closed landfills. Active LFG collection systems keep the landfill under negative pressure to draw the landfill gas out through the gas collection wells whereas a passive collection

system relies on the buildup of gas pressure within the landfill to force the gas out of the collection wells, which leads to more fugitive LFG emissions into the atmosphere.

New Jersey's landfills, incinerators, and recycling centers have adequate capacity to handle its waste disposal needs. However, its high tipping fees are mainly responsible for 35% of New Jersey's disposed solid waste to travel out of State. This causes more traffic on the highways as well as additional wear and tear on the roads. The high tipping fees are required to cover the higher capital and operating costs within New Jersey.

Let's Raise the Solid Waste Grade

New Jersey's current policies for solid waste management are ahead of most State's policies, and there is proposed legislation that could go further to better manage food waste, electronics and waste paint. However, New Jersey continues to struggle with: the high rate of waste generated per person that isn't being addressed, current lack of incentives for recycling of food waste and technologies to better utilize recycled materials, and its high disposal and recycling costs.

- New Jersey needs to reduce the amount of waste generated per person and increase the recycling rate in order to manage our solid waste within New Jersey. This can be addressed through better markets for recycled materials which would help to improve the economics of recycling.
- Establishing facilities that convert source separated food waste to produce energy and organic fertilizers and soil amendments would also help New Jersey to increase its recycling rate. A "Paint Stewardship Bill" that would charge a small fee upon purchase of the paint to cover the cost of recycling the paint back to the distributor is also being considered in the New Jersey State Legislature.
- Development and deployment of clean energy technologies that utilize solid waste-based feedstock would reduce disposal costs, reduce emissions of fossil-fuel based greenhouse gasses and create jobs in New Jersey. To reduce the risk of implementing new technologies and to speed the commercialization process, funds that are already collected through the Recycling Enhancement Act for this purpose need to be spent accordingly, rather than diverted for other uses.

Find Out More

- 2012 Generation, Disposal and Recycling Rates in New Jersey, www.state.nj.us/dep/dshw/recycling/stat_links/2012disposalrates.pdf
- Municipal Solid Waste Generation, Recycling, and Disposal in the United States: Facts and Figures for 2012, epa.gov/epawaste/nonhaz/municipal/pubs/2012_msw_fs.pdf
- Municipal Solid Waste Generation, Recycling, and Disposal in the United States Tables and Figures for 2012, epa.gov/epawaste/nonhaz/municipal/pubs/2012_msw_dat_tbls.pdf
- Landfill Tipping Fees in the USA 2013, www.cleanenergyprojects.com/Landfill-Tipping-Fees-in-USA-2013.html

- Vintage 2012 – State Tables of Population as of July 1, 2012, www.census.gov/popest/data/historical/2010s/vintage_2012/state.html
- Assessment of Biomass Potential Energy in New Jersey, Version 2.0, ecocomplex.rutgers.edu/BIOMASS_ASSESSMENT_2.0_2015.pdf

TRANSIT

D-

What You Should Know About New Jersey's Transit System

The State of New Jersey has an extensive multi-modal transit system that serves local, regional and interstate travel in urban, suburban and rural areas. Many of the system's services are operating near or at capacity and key segments of the system, particularly the trans-Hudson rail and bus infrastructure that carry passengers between New Jersey and New York City, are near capacity and simultaneously in need of major rehabilitation and expansion. Of great concern at this time is that the organizations responsible for this infrastructure - Amtrak, NJ TRANSIT (NJT) and the Port Authority of New York and New Jersey (PANYNJ) - have not identified funding for the needed investments; although they are aware of these needs and with the limited available resources are taking action to define and prepare plans for the needed improvements.

As of 2013, the transit system in New Jersey served over 1.3 million passenger trips on an average weekday via 21 rail lines operated by NJT (twelve rail and three light rail lines), Amtrak (Northeast Corridor Line, which is shared with NJT), the PANYNJ (five PATH system rail lines), Delaware River Port Authority (PATCO High Speed Line), 252 NJT bus routes and additional bus routes operated by private carriers, and several ferry services. These services operate throughout the State and connect New Jersey to New York City and Philadelphia. These public sector agencies carried over 90% of the annual transit passenger trips in 2013.

New Jersey's extensive transit system is used by approximately 11% of commuters traveling to work, second only to New York in the percentage of commuters who ride transit. This high percentage of transit use is a result of an extensive legacy system, and investments in the system by the responsible public sector transit agencies in previous decades. However, the system is becoming a victim of its success. Core system infrastructure is nearing the end of its useful life. For instance, the Northeast Corridor Line Portal Bridge and the Hudson River Tunnel have been in service since 1910. In addition, while population and jobs have increased in locations accessible to transit, investments have not been made in recent years to expand the system to serve growing demand.

Key segments of the existing transit system are near or at capacity and New Jersey's Transportation Trust Fund (TTF), which is essential for funding NJT, will run out of funding beginning in FY 2017, unless a new source of revenue is identified. Considering this situation, transit systems are not prepared to support the future economic growth of New Jersey and facilitate commerce to neighboring states in the region.

New Jersey's Transit Service Operators and Ridership

Transit Operators in NJ, in Descending Order for Average Weekday Trips*	2013 NTD Average Weekday Trips	2013 NTD Annual Passenger Trips
NJT Bus, Rail, Light Rail	901,578	264,373,715
PATH	280,687	71,725,863
PATCO	36,587	10,542,383
Coach: Orange-Newark-Elizabeth	32,170	10,294,583
NY Waterway	24,378	7,080,061
Short Line: Hudson	15,839	4,538,549
Academy	15,319	4,055,180

TRANSIT

Rockland Coaches	10,185	2,843,122
Suburban	9,205	2,831,637
DeCamp	6,741	1,934,275
Amtrak NJ stations	NA	1,642,654
Lakeland	5,759	1,635,691
Total	**1,338,448**	**383,497,713**

* Data is from the US Federal Transit Administration National Transit Database (NTD) and, for Amtrak, from the Amtrak FY 2014 Fact Sheet for NJ

Capacity – Between 2003 and 2013, ridership on the three most heavily used transit systems in New Jersey (NJT, PATH and PATCO) increased by over 16%. This increase occurred despite ridership downturns due to the 2008–2009 recession and the Superstorm Sandy service outages in 2012. The increase in ridership has subjected the system to significant strain, with the core system at or near capacity in peak hours. A significant portion of New Jersey's transit ridership utilizes trans-Hudson road and railroad infrastructure and two terminals in New York: the Port Authority Bus Terminal (PABT) and Penn Station New York (PSNY). The core trans-Hudson infrastructure is at capacity in peak hours with no additional rail service possible between Newark and Penn Station New York.

The PABT serves about 225,000 trans-Hudson bus trips. The buses that carry these trans-Hudson passenger trips utilize roads in New Jersey, mid-day storage facilities, the Lincoln Tunnel and the PABT itself. The key elements of this system are near or at capacity in the morning and evening peak periods. The Port Authority has concluded that the PABT must be replaced since it is at capacity and was not built for the taller, longer, heavier modern buses of today. The building's structural slabs supporting bus operations will need to be replaced in 15 to 25 years, and there is inadequate bus parking, staging, and circulation space. In March 2016 the Port Authority issued an invitation to compete in an international design competition for the replacement of the PABT. At this time a funding source has not yet been identified for this project, but there are indications that the Port Authority is reviewing its long term capital program priorities.

Also, a major concern is the capacity of the trans-Hudson road system utilized by buses. The large majority of trans-Hudson buses serving the PABT operate on Route 495, which connects the New Jersey Turnpike and Route 3 with the Lincoln Tunnel. In the peak periods it is heavily congested, causing extensive backups in both New Jersey and New York. In the morning peak period an exclusive bus lane, known as the XBL, provides a bus only route on Route 495, but it is currently at capacity. In addition, significant congestion on Route 495 in the afternoon peak period impacts PABT bus reliability. A program of investments has not been defined to expand capacity in the morning or afternoon peak period to accommodate anticipated ridership growth.

NJT bus garages and its bus fleet are near or at capacity. Infrastructure, fleet, and operating funding limitations have inhibited the expansion of bus service. Since 2005 only one new bus route was added, but due to limited funding that route was discontinued.

TRANSIT

Transit Ridership Growth of Public Sector Agencies

NJ Public Sector Transit Sponsors / Operators	2003 NTD Annual Passenger Trips	2013 NTD Annual Passenger Trips	% Increase over 10 years
NJT Bus, Rail, Light Rail	222,348,751	264,373,715	19
PATH	66,284,718	71,725,863	8
PATCO	8,863,911	10,542,383	19
Total	**297,497,380**	**346,641,961**	**16.5**

Condition – New Jersey's transit system is one of the State's undeniable assets, connecting residents across New Jersey through rail, bus and ferry services, most of which originated between 50 and 150 years ago. The result is that the infrastructure used by these services requires ongoing rehabilitation, modernization and reconfiguration to maintain a state of good repair and serve the State's growing and changing mobility needs.

NJT Infrastructure Systems

Rail Infrastructure	Commuter Rail	Light Rail	Total
Passenger Stations	165	62	227
Passenger Parking	over 64,600	over 8,100	over 72,700
Rail Layover Yards & Maintenance Facilities	16	5	21
Undergrade Bridges	572	35	607
Overhead Bridges	103	52	155
Moveable Bridges	12	0	12
Track Miles Maintained (Not including Amtrak's Northeast Corridor)	544.4	108	652.4
Interlockings	106	52	158
Signals	1,336	293	1,629
Grade Crossings	320	120	440
Switches	1,290	282	1,572
Miles of Catenary	264	51	315
Electric Substations	52	22	74

Bus Infrastructure	
Bus Stations	30
Bus Stops	over 18,700
Passenger parking	over 18,900
Bus Maintenance Facilities	18
Bus Layover Areas (Loops Owned and Maintained)	10

In 2009, as part of a larger review of transit systems within the U.S., the Federal Transit Administration (FTA) found that NJT's infrastructure was in a state of good repair. Since then, NJT's capital program has included investment in the system's infrastructure. Improvement in the condition of bridges provides an example of the benefit of continuing investment. In 2009, 78% of NJT railroad bridges were in good/fair condition. In 2013, the percentage in good/fair condition

TRANSIT

had increased to 83%. Even as progress has been made in improving rail bridge conditions, moveable bridges are an area of concern, as demonstrated by the damage to NJT's Raritan River Drawbridge on the North Jersey Coast Line by Super Storm Sandy. To address the extensive damage to that bridge, NJT is receiving a grant from the FTA to replace it.

NJT works to maintain its rail passenger stations, but many station facilities, especially platforms, are no longer in a state of good repair. Among the factors influencing the deterioration of station facilities are snow and ice conditions during the winter months and the application of snow melting material. Newark Penn Station and the Elizabeth Station are examples of platforms in need of major repairs/replacement. Portions of platforms at these stations have been taken out of service for repairs.

Another factor pertaining to rail stations is the provision of accessibility for people with disabilities. In conformance with the Americans with Disabilities Act, key stations have been upgraded to provide accessibility. However, many stations do not provide accessibility, and limited funding has inhibited the application of accessibility features at more stations.

Amtrak's Northeast Corridor Line, utilized by both Amtrak and NJT operations, includes key infrastructure in need of significant overhaul or replacement. Infrastructure of concern between Newark and New York Penn Station are the Highland (or Sawtooth) Bridges, Portal Bridge, and the North (Hudson) River Tunnels. Amtrak has developed the $20 billion Gateway Program to address these facilities, but at this time the funding sources have not yet been defined.

The Port Authority Bus Terminal (PABT) in New York City is a key element of the infrastructure utilized by New Jersey's bus system. As described above, the PABT, is at capacity and nearing the end of its useful life. The Port Authority is investing $90 million on interim repairs, but they not yet identified the estimated $7 to 10 billion for the needed replacement.

Transit rolling stock is another element of the transit system's infrastructure in need of ongoing attention. NJT's current capital improvement program calls for the continued replacement of vehicles which are approaching or passed their FTA useful life, including the exiting electric multiple unit (EMU) fleet and Cruiser Buses. NJT currently has seen reliability decrease across its fleet, with measured mean distances between failures trending down to averaging 84,000 miles for FY 2015, below the 106,242 miles of FY 2013 or 93,671 miles of FY 2012.

Both PATH and PATCO have made significant progress in addressing their infrastructure needs. In 2009 PATH replaced its entire 350 rail car fleet. PATH is currently replacing its signal system with a state of the art communications based train control system, which will improve reliability and increase peak capacity. PATCO is now overhauling its entire rail car fleet. In addition, PATCO is replacing the entire track system on the Ben Franklin Bridge.

Operations and Maintenance – In a constrained fiscal environment, New Jersey's transit agencies have been faced with rising costs, and New Jersey consumers have seen a resulting decrease in service. NJT has reported a decrease in both vehicle revenue miles and hours since 2009. Additionally, NJT has seen on-time performance decrease across the board on all rail lines and a number of key bus routes. Furthermore, operating expenses have increased for NJT, PATCO and

TRANSIT

PATH since 2009. While operating expenses for NJT and PATCO increased at rates less than the CPI inflation of 7.8% (7.21% and 5.58% respectively), PATH registered a 39.36% increase in operating expenses between 2009 and 2013.

Public Safety – New Jersey's transit agencies have made great strides to improve overall safety on public transit within New Jersey. Rail and transit fatalities have decreased 69% between 2002 and 2012. NJT Bus Operations have a safety record which is very good for the industry, ranking 2nd in Vehicle Miles Traveled per traffic incident among direct operators within the top 25 urbanized areas.

Funding – New Jersey's transit system is only as good as the service the agencies provide to the public. That service is dependent on the funding the transit agencies receive for both capital investment and O&M. For FY 2016, NJT covered 48% of its O&M costs through the fare box. The result is that other revenue sources are needed, which is primarily provided every year by subsidy from state and federal funds. New Jersey has a very high cost of living, and subsequently New Jersey's transit agencies rank among the highest in cost per trip. PATH and PATCO rank third and fourth nationally among heavy rail operators in costs per a trip. NJT's light rail operations also rank 4th and 7th nationally.

PATH and PATCO, as subsidiaries of multi-modal agencies, receive capital funds and O&M subsidy from their parent agency's revenue producing operations and by FTA grants for some capital projects. In contrast, NJT is reliant for capital funds and O&M subsidy on state and federal funding. NJT's state funding is primarily from New Jersey's TTF. The TTF, which funds highway, transit, and other transportation projects, is supported by a gas tax which has not been raised since 1988. At this time the TTF is projected to be depleted by July 1, 2016; and New Jersey has already had to borrow from the general fund to keep it solvent for the current fiscal year.

The funding mechanisms for transportation projects within New Jersey are broken. While transportation is still currently being funded, the damage to New Jersey's infrastructure is already occurring. Without a TTF which is solvent, New Jersey cannot undergo major infrastructure projects to replace infrastructure that is stressed under current utilization. Long term planning cannot efficiently occur as planners are limited to proposing projects which they believe will be funded in long range state transportation plans.

Resilience – Superstorm Sandy exposed the vulnerability of New Jersey's transit system to severe weather and a changing climate. NJT suffered significant damage to their facilities in Hoboken and Kearny, suffering hundreds of millions in damage to infrastructure and rail vehicles which were flooded by the storm surge. In response to the damage, NJT, PATH and Amtrak all have taken steps to fortify their infrastructure and operations from future storms. While New Jersey will be better prepared for the next storm, the risk to future service interruptions and damage will remain due to the nature of New Jersey's transit infrastructure and the close location of the urban areas to the coast.

While all agencies have been proactive in modifying their facilities to prevent future damage, there are still several key components of infrastructure which pose a risk to continued normal operations. Amtrak has expressed concern regarding the continued long term viability of the North River Tunnels under the Hudson River. Both tunnels suffered flooding due to the storm and need to be taken out of service to mitigate the damage. Without an additional set of tunnels under the Hudson River, rail operations between New Jersey and New York City will suffer significantly with rail capacity dropping

TRANSIT

from 24 to 6 trains an hour. The positive news on this subject is that NJT and Amtrak are working collaboratively to construct new tunnels so that the old tunnels can be overhauled. However, funding for this project has not yet been identified.

Innovation – Working with available resources, New Jersey's transit agencies have applied innovative approaches to transit operations and passenger service. Examples include:

- PATH – Converting its railroad signal system to a state of the art communications based train control signal system to improve reliability and increase capacity.
- PATH and PATCO – Both agencies have implemented new fare collection technology that utilizes a tap and go fare card, improving fare gate convenience.
- NJT – Mobile phone ticketing is now available for rail, light rail and bus services.
- NJT – Bus priority technology has been implemented on Bloomfield Avenue for the GoBus route 25.
- All agencies – Improving the provision of real time train information to keep passengers informed.
- The application of innovative technologies is encouraging, but considering the size of NJT's system, more extensive use of innovative approaches are needed. For instance, numerous transit agencies are implementing bus priority treatments and bus rapid transit projects to upgrade and expand transit service using these modest cost methods. Since NJT implemented its two GoBus routes several years ago, such projects have not been advanced.

Future Need – New Jersey has a history of preparing long range plans for the development of its transportation infrastructure. In the 1980s, NJT prepared long range investment plans for the integration of the historically separate rail lines in North Jersey and the related expansion of rail service to New York Penn Station. That was followed by the planning and construction of the Hudson-Bergen Light Rail System to support the economic development and mobility needs of New Jersey's Hudson River waterfront. Beginning in the late 1990s and into the 2000s, NJT planned the Access to the Region's Core (ARC) Project to expand trans-Hudson transit capacity and increased rail service within northern New Jersey to serve forecasted demand during the 2020s and 2030s. That project was cancelled as construction was beginning in 2010. Since then a long term system-wide investment plan to accommodate growth and changing mobility needs has not been prepared. The deteriorating condition of core capacity infrastructure, including the PABT and the Northeast Corridor infrastructure between Newark and New York, has prompted action to plan for the future of these facilities. However, funding has not yet been identified for design and construction of new facilities.

The current lack of investment and long range planning in transit infrastructure does not support the State's future growth and economic development needs. The current transit system is already near or at capacity with very limited capability for growth within existing operations and infrastructure. Furthermore, the lack of dedicated funding for capital investment and operating and maintenance costs create great uncertainty for the future of the transit system.

TRANSIT

Let's Raise the Transit Grade

There are many solutions to ensure that New Jersey has a vibrant expansive transit infrastructure which supports future economic growth. New Jersey's leaders must develop a multi-faceted approach which account for all stakeholder needs. Key considerations when developing a transit policy for New Jersey include:

Establishing a dedicated funding source for New Jersey's infrastructure that is indexed to inflation.

Development of a vision plan for the State's transit system through an open and public process that is the basis for the capital investment plan for NJT, PATCO and PATH.

The inclusion of local communities in developing future transit system development plans and ensuring future growth within New Jersey is mindful of including transit access in development plans.

Exploration of innovative financing methods, including public private partnerships in the development of new infrastructure and sustaining existing assets.

Investment in New Jersey's educational institutions to promote the exploration of how technology can be utilized to reduce operating and maintenance costs.

Find Out More

- NJ TRANSIT. 2015 Annual Report http://www.njtransit.com/pdf/NJTRANSIT_2015_Annual_Report.pdf
- NJ TRANSIT. Meeting Minutes http://www.njtransit.com/tm/tm_servlet.srv?hdnPageAction=BoardMinutesTo
- FTA: NTD National Transit Database http://www.ntdprogram.gov/ntdprogram/data.htm
- The Port Authority of NY & NJ: Capital Plan Summary 2014 – 2023
- The Port Authority of NY & NJ: 2014 Annual Report
- Amtrak The Northeast Corridor: http://nec.amtrak.com/
- Northeast Corridor Infrastructure and Operations Advisory Commission. Northeast Corridor Five-Year Capital Needs Assessment
- Federal Railroad Administration. NEC Future http://necfuture.com/
- Federal Railroad Administration. Office of Safety Analysis http://safetydata.fra.dot.gov/officeofsafety/default.aspx

What You Should Know About New Jersey's Wastewater Infrastructure

Nearly 90% of New Jersey's nearly 9 million people, along with most businesses and government facilities, rely on public wastewater systems to collect and treat their sewage. New Jersey's sewer collection systems were constructed largely during peak periods of development, including from 1890-1930 (when combined sewers were still considered appropriate technology) and from 1950-1970, when our suburbs added roughly 3 million people. Wastewater treatment plants for sanitary sewage were largely built or rebuilt in the 1980s and 1990s, in response to the federal Clean Water Act and complementary state legislation. National studies and anecdotal evidence indicate that New Jersey wastewater infrastructure has not received adequate capital spending for many years. Much of New Jersey's existing wastewater infrastructure will need to be overhauled in the next two to three decades, along with billions of dollars for control of combined sewer overflows. Critical issues include the following:

- **Inadequate Information**: There is no comprehensive system for understanding the current status and needs for wastewater infrastructure rehabilitation and upgrades. Without this knowledge, New Jersey cannot identify the most pressing needs or plan well for the future.
- **Inadequate Requirements**: The lack of information is caused by a primary focus of state and federal regulations on the output (the quality of treated effluent discharges), and not necessarily on the physical infrastructure that delivers wastewater to the treatment systems or will ensure the discharge quality.
- **Inadequate Funding**: Municipal utilities and utility authorities run most of New Jersey's wastewater systems, and are under great pressure to reduce costs and rates despite major deferred capital costs and aging assets.
- **Inadequate Revenue Base**: Most wastewater treatment plants in New Jersey are relatively small; a majority have a design capacity of less than 2.5 million gallons per day. These systems have limited revenues from a limited customer base and, therefore, are less able to afford sophisticated management systems or expertise.

Issues Facing New Jersey's Wastewater Infrastructure

New Jersey has spent many billions of dollars on wastewater infrastructure. The ability of these systems to provide adequate services is threatened by inadequate reinvestment. The current status of our issues is summarized in the following table.

Capacity	New Jersey has nearly 200 wastewater treatment plants. Few are large, but those large systems have most of the total and remaining capacity for growth. Few systems have current wastewater management plans with a good analysis of future needs.
Condition	Wastewater treatment plants are routinely meeting required treatment requirements. The integrity of collection systems statewide is not well understood, but is expected to be fairly poor based on anecdotal evidence with some exceptions. It is also of note that Hurricane Sandy damaged major plants and collection systems in some coastal areas.

Funding	New Jersey has inadequate information on the level of capital funding dedicated to asset management and replacement. Available funding is meeting current demands, but the demands are likely far too low due to insufficient regulatory requirements and incentives, which are only now beginning to be addressed largely due to federal mandates.
Future Need	No comprehensive analysis exists of future needs. As asset management programs and new regulatory requirements (including controls on overflows from combined sewers, which carry both sewage and stormwater) are implemented, additional financial resources will be required to address capital costs and affordability. Utilities must plan for replacement and rehabilitation costs well into the future, to better control costs to utility customers.
Operation and Maintenance (O&M)	Current O&M for wastewater treatment plants appears to be adequate, especially the larger systems; few permit violations occur. O&M for sewage collection pipelines is highly variable by system, and no comprehensive analysis exists of O&M status statewide.
Public Safety	CSOs and sanitary sewer overflows threaten public health in a fewer than 25 municipalities, along with the affected water bodies. Most other waters are impaired primarily by stormwater and nonpoint sources of pollution (such as contaminated runoff water from lawns and farms) rather than by wastewater treatment plants, with the exception of nutrient pollution that has yet to be resolved.
Resilience	Hurricane Sandy emphasized the poor resilience of wastewater treatment systems to suffer energy loss and to storm surge on the coast. New Jersey utilities are using Federal Sandy Recovery funds, state funds and utilities revenues, along with state guidance and requirements, to increase resilience. Much more progress could be achieved through rigorous regulatory standards.
Innovation	The New Jersey Energy Resilience Bank is offering financing to wastewater systems for improved resilience through distributed energy generation. Green infrastructure is receiving increased support, particularly to control CSOs. Water conservation requirements are included within the Uniform Construction Code.

Let's Raise the Wastewater Grade

New Jersey relies on its wastewater collection and treatment systems to protect public health, protect the environment, and support economic vitality. While some improvements have been made, progress on improving wastewater infrastructure has been offset by new and continued problems. Responses to Hurricane Sandy and ongoing promotion of asset management are offset by additional years in which utilities are not sufficiently investing in their systems. The ongoing shift of

development back to urban areas will falter and could fail if our wastewater infrastructure in these areas is not improved and maintained. The following actions are critical to improving our future:

- Greatly improve the ongoing maintenance and repair of our existing wastewater infrastructure by requiring that all wastewater utilities routinely assess their assets, identify critical needs, design solutions that optimize benefits at the lowest lifecycle costs, include capital funding in their annual budgets to address those needs, and set rates to ensure sufficient funds for O&M and capital costs.
- Require that all wastewater utility revenue be used to address utility costs, and eliminate incentives for insufficient rates that force deferral of critical O&M and capital costs.
- Implement comprehensive systems to address affordability issues for poor households, analogous to those for household energy costs.
- Create incentives for consolidation of small wastewater systems, including public-public and public-private partnerships or mergers as appropriate, where improved management and reduced lifecycle costs can be achieved.
- Improve availability of both state and federal funding through the State Revolving Fund and associated New Jersey financing programs.

Find Out More

- ASCE. 2011. Failure to Act: The Economic Impact of Current Investment Trends in Water and Wastewater Treatment Infrastructure; www.asce.org/uploadedFiles/Issues_and_Advocacy/Our_Initiatives/Infrastructure/Content_Pieces/failure-to-act-water-wastewater-report.pdf
- New Jersey Department of Environmental Protection. 2014. New Jersey 2012 Integrated Water Quality Monitoring and Assessment Report; www.state.nj.us/dep/wms/bears/2012_integrated_report.htm
- NJDEP. 2015. Clean Water Financing Proposed Priority System, Intended Use Plan, and Project Priority List for Federal Fiscal Year 2016; www.nj.gov/dep/dwq/cwpl.htm
- NJDEP. 2015. New Jersey Environmental Infrastructure Financing Program (NJEIFP) Project List (Updated As of 10/15/2015); www.nj.gov/dep/dwq/pdf/NJEIFP_Project_List_151015.pdf
- NJDEP. 2015. Guidance documents for Emergency Response Planning, Auxiliary Power, Flood Protection and Asset Management; www.nj.gov/dep/dwq/erp_guidance.htm
- U.S. Environmental Protection Agency. 2010. Clean Water Needs Survey 2008: Report to Congress; water.epa.gov/scitech/datait/databases/cwns/upload/cwns2008rtc.pdf
- Van Abs, D.J., A. McClean, I. Tsoulou, Y. Gao and T. Evans. 2014. Water Infrastructure in New Jersey's CSO Cities: Elevating the Importance of Upgrading New Jersey's Urban Water Systems. A Report for New Jersey Future. Rutgers-The State University of New Jersey. New Brunswick, NJ; www.njfuture.org/2014/05/06/new-report-water-infrastructure

800-548-ASCE (2723)
REPORTCARD@ASCE.ORG
WWW.INFRASTRUCTUREREPORTCARD.ORG/NJ

ASCE
AMERICAN SOCIETY OF CIVIL ENGINEERS