

NJDOT Bridge Preservation and Asset Management Strategies

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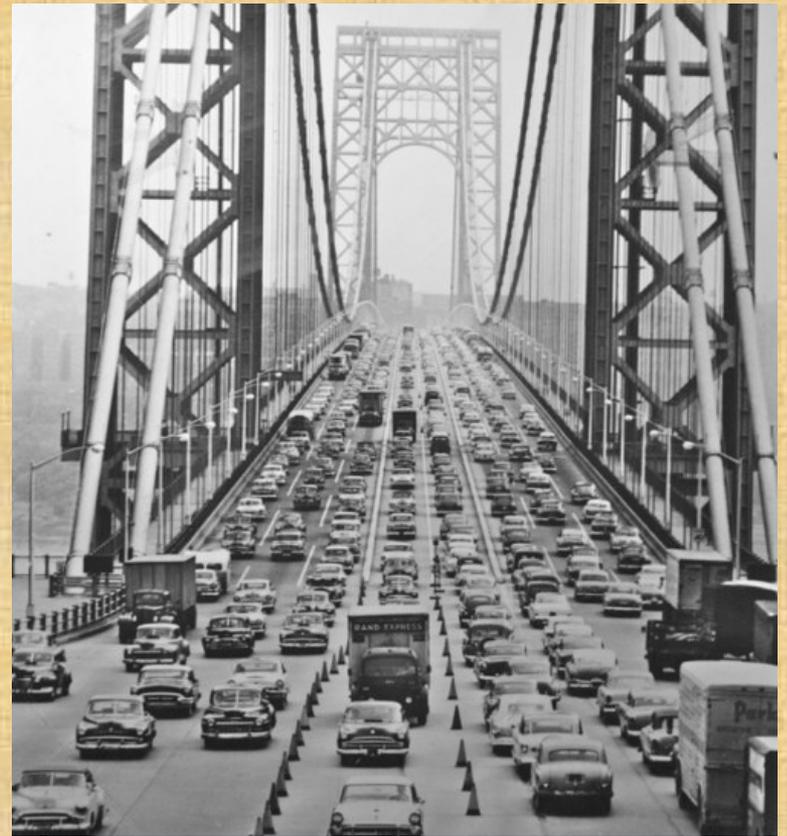
NJDOT Bridge Preservation and Asset Management Strategies

Bridge preservation is defined as actions or strategies that prevent, delay or reduce deterioration of bridges or bridge elements, restore the function of existing bridges, keep bridges in good condition, and extend their life.

Preservation actions may be preventive or condition-driven.

New Jersey: Background & Demographics

- **Population: 8.8 Million (2012)**
- **Area: 7,300 Square Miles**
- **Population density: 1,205 inhabitants per square mile**
- **690 vehicles per 1,000 people (2007)**



New Jersey: Background & Demographics

- 39,000 miles of public roadways
- 3,000 miles of State and US Highways
- 500 miles of Interstate Highways
- 6,542 Highway carrying bridges
- 2,545 State maintained highway carrying bridges
- 117 Orphan Bridges
- 17 Operational Drawbridges



NJDOT Bridge Preservation and Asset Management Strategies

- **NJDOT Bureau of Operations Support has several measures in place to preserve and extend the service life of bridges**
- **All NJDOT bridge repair work is competitively bid and performed with outside contractors through annually issued contracts**

NJDOT Annual Contract Management

- Seven State funded “If & Where Directed” contracts
- State bridge maintenance funding totals \$47 million
- Six Federally funded site specific contracts
- Federal bridge maintenance funding totals \$32 million

NJDOT State Funded Contracts

- Concrete Repair – North: \$ 9 Million
- Concrete Repair – South: \$5.5 Million
- Drawbridge & Tunnel Repair: \$15 Mil.
- Timber & Underwater Repair: \$6.5 Mil.
- Structural Steel Repair: \$4 Million
- Orphan Bridge Repair: \$1.5 Million
- Job Order Contract Repairs: \$5.5 Mil.
- *Total State Funds: \$47 Million*

NJDOT Federally Funded Contracts

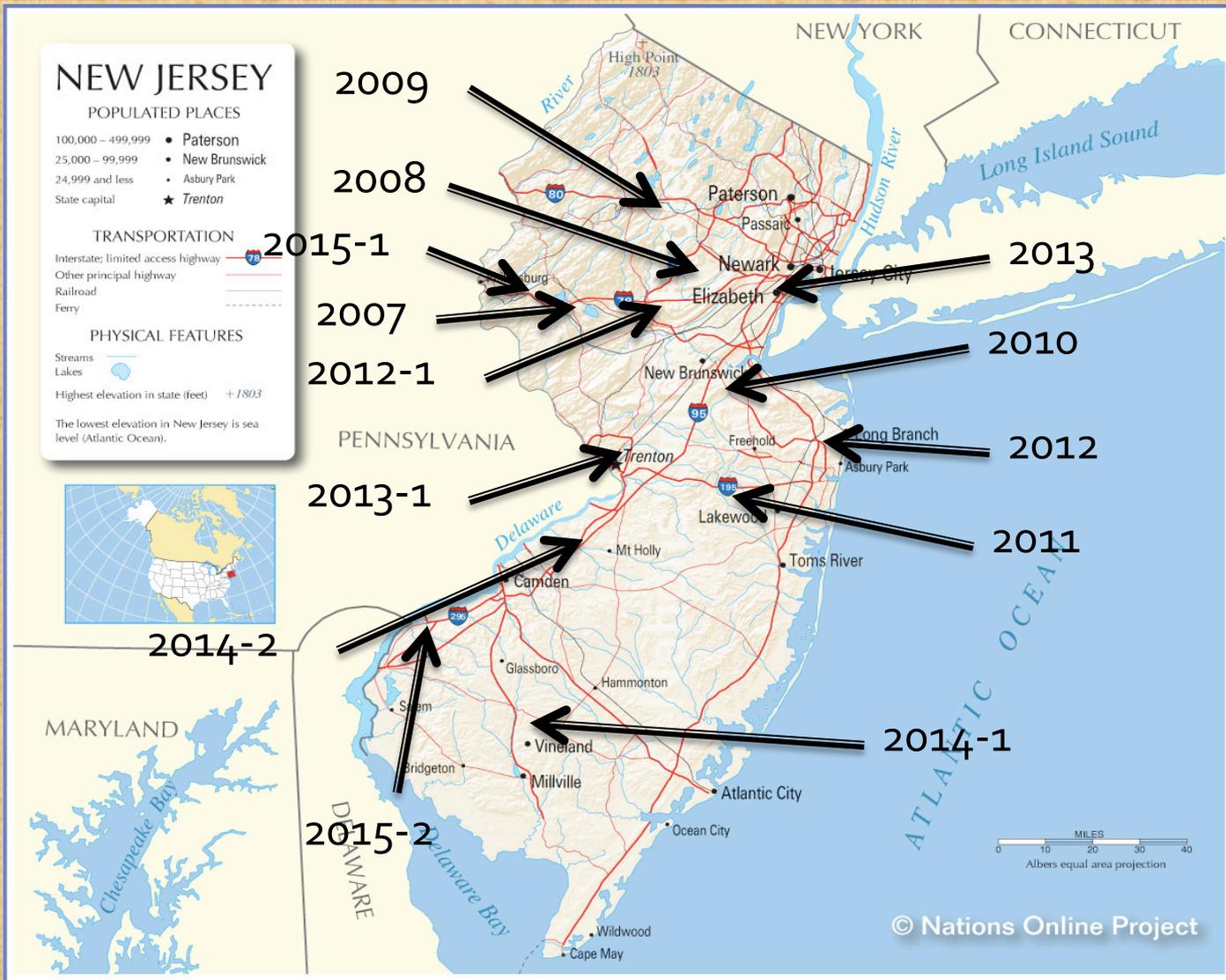
- **Bridge Preventive Maintenance Contracts: \$5 Million each (two per year)**
- **Bridge Painting Contracts: \$8 Million each (two per year)**
- **Job Order Contracts: \$3 Million each (two per year)**
- ***Total Federal Funds: \$32 Million***

Bridge Preventive Maintenance Program

- Repairs bridges with National Bridge Inventory Deck, Superstructure, and Substructure Ratings of “5” or higher on a scale of “0” to “9”
- Created in 2007 using State funds, expanded in 2009 to be Federally funded

Bridge Preventive Maintenance Program

- **Two Bridge Preventive Maintenance Contracts (BPMC) are put out to bid each year**
- **Each contract repairs roughly forty bridges along a single corridor or geographical area**



NJDOT Bridge Preventive Maintenance Contracts

Bridge Preventive Maintenance Program Structure Selection

- **Structure selection is based on inspection reports from Structural Evaluation**
- **Inspection reports note deficiencies and generate “Work Orders” for maintenance repairs**
- **Clusters of Work Orders trigger selection of a corridor for repairs**

Bridge Preventive Maintenance Program Structure Selection

- Outlying structures with deficiencies noted in Work Orders are handled by Job Order Contracts (JOC)
- JOC utilizes federal funds for “If & Where Directed” preventive maintenance repairs
- JOC follows modified FHWA approval process for construction



- Personal
 - Application Login
 - Personal Programs

- Main Dashboard
 - Dashboard
 - Capital Program
 - Contracts
 - Work Orders
 - On-Line Help
 - WO Help Basic Editing
 - WO Help Selector

- Utilities
 - Forgot Password
 - New Account
 - General Procedures
 - User Guides
 - Calculator
 - Index Server
 - FAQ

Operations - Capital Program Budget Manager Contracts

Dashboard **Work Orders**

Welcome to the Operations Work Orders - Capital Program Manager - Work Orders - Manager Dashboard

Todays Work Order Date: 8/11/2015 1:35:01 PM Work Order User : Gerald Oliveto

[SHOW CHANGE INSTRUCTIONS](#)

Work Order Listing [Work Order Editing](#)

Select WO Type Then, The action to perform:

Select WO Type: [GO](#)

Action: [GO](#)

Current Time: Tue Aug 11 13:35:36 ET

Work Order Preview

Main Dash [Main Search](#) [Main Sort](#) [Fields Dash](#)

Search: [GO](#) [Reset](#) [GO](#)

Saved Emails

Email To

- [Send Work Order General Info](#)
- [Send SE Priority Repair \(Notify\)](#)

ChkBoxes	Work View	Work Order	Work Order	Work Order Description	Structure No	Date Initiated	Initiator	Project Manager	Assigned To	Work Order Status
ALL	Order	Type	No							
<input type="checkbox"/>	<input checked="" type="checkbox"/>	BRIDGE	145	Heavy spalling along edges of deck and headers adjacent to deck joints at north and south abutments and all three (3) piers (Photos PR-1, PR-2, PR-3, PR-4 & PR-5). The deck joint membranes are debonded and distorted at spall locations with few areas of the membranes showing minor tears. Evidence of minor leakage stains were observed on the substructure elements (Photo PR-6).	1327163	10/19/2010	Amsnda DiPierro	Madeline Greene	George Franz	
<input type="checkbox"/>	<input checked="" type="checkbox"/>	BRIDGE	152		1322153	10/25/2010	Ahmad Ghorbani	Mike Moran		
<input type="checkbox"/>	<input checked="" type="checkbox"/>	BRIDGE	162		0723166	8/7/2011	Ahmad Ghorbani			
<input type="checkbox"/>	<input checked="" type="checkbox"/>	BRIDGE	168		0917158	9/14/2011	Ahmad Ghorbani			
Str. No. 1904-154, NJ Route 23 over Papakating Creek and Abandoned Conrail, Township of Wantage, Sussex County, NJ Route 23 M.P. 39.35 During our routine inspection we observed the following conditions we consider warranting priority action: 1. Severe erosion (4.0± wide x 5.0± long x 5.0± (max) deep)										

NJDOT Work Order System

Operations - Capital Program - Work Orders

Select Work Order Type **Bridge** Filter by WO Status **All WOs** Filter By

Quick Search Within Filter - WO Number or WO Description:

Current Filter: **Work_Order_Type = 'BRIDGE'** Current Search within Filter: **Work_Order_No = '8804'** WO Count: (1)



Structural Evaluation Priority Repairs: (BRIDGE)

Writer	Project Engineer	Supervisor Engineer	Group No
Meriam Michael	Robert Flanagan	Mujahid Khan	T15F

Defects Description

IH ENGINEERS were performing the routine field inspection of the subject bridge on June 10, 2015 and they observed the following defects: There is a heavy accumulation of loose concrete debris resting on the bridge seat of the center pier (Photos P1-01 and P1-02). Please note the center pier the pavement for the Southwest Boulevard roadway

Recommendation Description

We recommend that the following repairs be carried out on a Priority 1 basis: Remove the loose concrete debris from the pier bridge seat.

Defects Email Contacts

robert.flanagan@dot.nj.gov; timothy.lertch@dot.nj.gov; Meriam.Michael@dot.nj.gov; Mujahid.Khan@dot.nj.gov; denise.marshall@dot.nj.gov; greg.renman@dot.nj.gov; nat.kasbekar@dot.nj.gov

Notify	Date Notified
<input type="checkbox"/>	6/18/2015 2:46:00 PM

Operations Work Order

General Work Order Information

Date Initiated	WO Type	WO Number
6/18/2015	BRIDGE	8804

Initiator	Project Manager	Assigned To	Resident Engineer	Location Description
Denise Marshall	Anthony Ennas		Gerald Oliveto	0.4 MILES S OF NJ 47

Region	Routes	County Summary	Municipality Summary
SOUTH	NJ 55	Cumberland	Vineland City

Email Contacts
Gerald.Oliveto@dot.nj.gov, Parth.Oza@dot.nj.gov

Comments

Work Order Classification: (BRIDGE)

Project Classification	WO Scope	Category Of Work	Priority	Lane Closure
Structural Evaluation	Remove	Loose Concrete Removal	P1	<input checked="" type="checkbox"/>

Structure No	Structure Name	Structure Type	Structure Route	Orphan
0609163	NJ 55 SB OVER SW BOULEVARD & CONRAIL	Steel - Stringer/Multi-beam or Girder	00055	<input type="checkbox"/>

Work Order Progress Details

Estimated Start Date	Estimated Completion Date	Estimated Cost	Estimated Crew Days	Overtime Authority No

Center Lane Miles	Lane Miles	Shoulder Miles	Ramp Miles

Example Work Order

Bridge Preventive Maintenance Program Work Orders

- Work Orders created by Structural Evaluation fall into three categories:
- Type E: Emergency Repair. Address deficiency immediately
- Type 1: Priority 1 Repair. Address deficiency within 30 days
- Type 2: Priority 2 Repair. Address deficiency within six months

Bridge Preventive Maintenance Program Work Orders & Asset Management

- If structure has no associated work order, one is created upon completion of Preventive Maintenance work
- Manual entry of work performed on a structure creates a history of preservation actions
- Work Orders accessible internally to all NJDOT employees through website login, in both office and field

Bridge Preventive Maintenance Program Work Orders & Asset Management

- Work Orders are closed out as repairs are made to a structure
- Closeout of Work Order sends necessary information back to Structural Evaluation for re-evaluation of super/sub structure and deck
- Type of repairs made, materials used, cost of repair, and completion photos all noted in Work Order closeout

Preventive Maintenance – Scope of Work

- **Comprehensive scope of work allows for many repairs to be made to keep bridges in good standing**
- **All structures on a contract are treated equally from top to bottom**
- **Scope of allowable work outlined in a joint NJDOT/FHWA Guideline document**

Preventive Maintenance Header Repair

BEFORE



AFTER



NJ Route 33 Westbound over US Route 9 Southbound; BPMC 2012

Preventive Maintenance Curb Repair

BEFORE



AFTER



NJ Route 79 over NJ Route 18; BPMC 2010

Preventive Maintenance Deck Repair

BEFORE



AFTER



Dunns Mill Road over Interstate 295; BPMC 2014-2

Preventive Maintenance Joint Re-Seal

BEFORE



AFTER



Old York Road over Interstate 295; BPMC 2014-2

Preventive Maintenance Sidewalk Installation

BEFORE



AFTER



Gordon's Corner Road over NJ Route 18; BPMC 2010

Preventive Maintenance Deck Crack Sealing



Preventive Maintenance Deck Corrosion Inhibitor

APPLICATION PHOTOS



Brighton Avenue over NJ Route 18; BPMC 2010

Preventive Maintenance Approach Slab Repairs

BEFORE



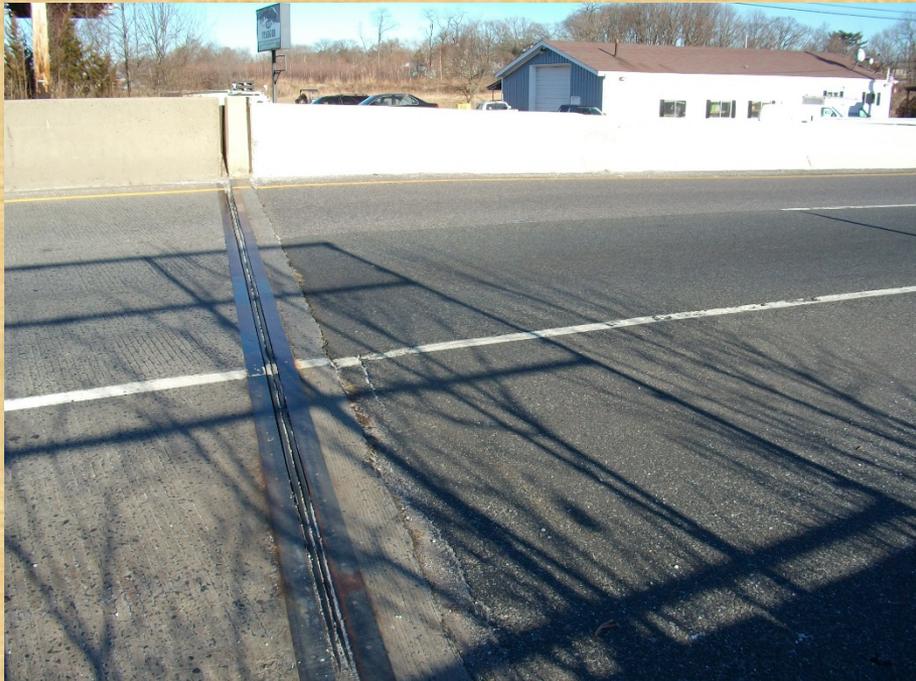
AFTER



NJ Route 31 over Interstate 95; BPMC 2013-1

Preventive Maintenance Hot Mix Asphalt Patch

BEFORE



AFTER



NJ Route 35 Southbound over Matawan Creek; BPMC 2012

Preventive Maintenance Fence Installation

BEFORE



AFTER



NJ Route 34 Southbound over NJ Route 18; BPMC 2010

Preventive Maintenance Traffic Line Re-Striping

BEFORE



AFTER



Klockner Road over Interstate 295; BPMC 2013-1

Preventive Maintenance Installation of Reflective Delineators

BEFORE



AFTER



NJ Route 55 Northbound over Mays Landing Road; BPMC 2014-1

Preventive Maintenance Replacement of Structure ID Plates



Preventive Maintenance Substructure Concrete Repair

BEFORE



AFTER



Squankum Road under NJ Route 18; BPMC 2012

Preventive Maintenance Waterproofing Epoxy

BEFORE



AFTER



Deal Road over NJ Route 18; BPMC 2010

Preventive Maintenance Substructure Crack Sealing



Arena Drive under Interstate 295; BPMC 2013-1

Preventive Maintenance Lubrication of Bearings



Preventive Maintenance – Scope of Work

- Bridge deck sweeping
- Cleaning of scuppers and pipes
- Raised Pavement Marker replacement
- Repair of damaged bridge guide rail and guide rail bridge attachments
- Repair erosion, scour

Preventive Maintenance – Scope of Work

- Average cost per bridge for full preventive maintenance treatment:

\$125,000

Preventive Maintenance Contracts

Public Communication

- **NJDOT Traffic Operations Division consulted for allowable lane closure hours prior to contract advertisement to minimize traffic impacts**
- **NJDOT Communications and NJDOT Community Relations Divisions consulted prior to construction**

Preventive Maintenance Contracts Public Communication

- **NJDOT Communications Office issues a Press Release and notifies media outlets of upcoming contract and construction**
- **NJDOT Community Relations notifies individual affected townships (mayor, police chief, EMS) of upcoming work**

Press Release BPMC 2014-2



STATE OF NEW JERSEY

DEPARTMENT OF TRANSPORTATION

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[2014 News Releases](#)

[2013 News Releases](#)



P.O. Box 600
Trenton, NJ

Contact: Steve Schapiro
609-530-4280

RELEASE: July 28, 2014

Work to repair dozens of bridges along I-295 in Camden and Burlington counties to begin Twenty-seven bridges will receive preventive maintenance

(Trenton) - NJDOT officials today announced the start of a bridge maintenance project that will make repairs to [27 bridges](#) along stretches of I-295 in Camden and Burlington counties.

"The Department is committed to keeping New Jersey's bridges in a state of good repair," said Acting Commissioner Joseph Bertoni. "Investing in existing assets by doing preventive maintenance promotes safety and extends the useful life of infrastructure before more costly repair or replacement projects are needed."

To help extend the service life of these bridges, NJDOT will be performing different levels of bridge maintenance work at each location including deck patching, curb repair, expansion joint reconstruction, header reconstruction, sidewalk repair, deck crack repairs, cleaning of drainage systems, power washing, and application of a corrosion inhibitor.

Work also will be performed below each structure, including repairs to abutment walls and piers, epoxy waterproofing, and lubrication of bearings.

NJDOT's contractor, Nagi Construction, is scheduled to begin work Monday, July 28, starting on structures in Bordentown, with operations progressing southward. Some of the structures carry I-295 over local roads, while some carry local roads over I-295.

- To minimize inconvenience for motorists traveling on Route 295 during the busy summer vacation season, there will be no lane closures on I-295 through Labor Day.
- Work on Monday through Thursday will be restricted to off-peak hours, mid-morning to mid-afternoon, or overnight hours.

Preventive Maintenance Contracts

Public Communication

- **Weekly Traffic Interference Reports sent to NJDOT Traffic Operations Division prior to construction**
- **Active lane closures are posted on NJDOT 511 System**
- **Variable Message Boards in area of construction are activated when work zone is active**

NJDOT 511 Website

511 Get connected and go!

Home About Traffic Cameras Mega Projects Travel Links FAQs 511NJ Partners RSS My 511NJ Services

511 Mega Projects*

I-295 Direct Connection

I-295/I-76/Route 42 Direct Connection

Camden County

[View map and incidents](#)
[Even more information](#)

511 Pulaski Skyway Project*

PULASKI SKYWAY REHABILITATION

TRAVEL TIMES MAP AND INCIDENTS

MORE INFORMATION @skywayrehab

511 Port Authority of NY&NJ

Airport Parking Information

EWL LGA JFK

Current Parking Lot Status*

Lot Name	Last Updated	Percent Occupied
Short Term Parking A, B, C	08/11/15 02:09 PM	83%

511 Severity Alert

Bayonne Bridge midday closure for August 11th has been cancelled.

G.W. Bridge NY-Bound Upper Level Expressway Overnight Construction Week of Aug 10 Only 1 Lane Open; Mon-Thu 10P-5A and Fri 1159P-8A. Cars use lower level.

511 Popular Travel Routes*

Driving times for...

Shore Traffic

Garden State Parkway South

- From the Raritan Toll Plaza to Exit 117, Sandy Hook, via the local lanes (8mi.) :08
- From the Raritan Toll Plaza to Exit 98, Belmar, via the express lanes (28mi.) :27
- From the Raritan Toll Plaza to Exit 98, Belmar, via the local lanes (28mi.) :27
- From the Raritan Toll Plaza to Exit 63, Long Beach Island, via the express lanes (62mi.) 1:07
- From the Raritan Toll Plaza to Exit 63, Long Beach Island, via the local lanes (62mi.) 1:02
- From the Raritan Toll Plaza to Exit 38, Atlantic City, via the express lanes (89mi.) 1:27

Interactive Map

511 Cameras

Live Streaming Traffic Cameras

511 Current Incidents

Checked Counties: View by Counties of NJ Go

- As of 2:09pm, there's an Overturned tractor trailer on the **New Jersey Turnpike - Hudson County Extension** local lanes westbound exiting at Interchange 14 - I-78 in Newark. All lanes blocked.
- As of 2:07pm, there's a Collapsed Manhole on **NJ 28** eastbound CR 529/Washington Ave in Dunellen. Left lane blocked.
- As of 2:03pm, there's a Disabled vehicle on **US 30** eastbound at US 130/Collingswood Circle in Collingswood. Right turn lane closed use caution.
- As of 1:45pm, there's Parking related on **La Guardia Airport Terminal A Parking P7** in New York.

View Events by State:
 NJ NY CT ALL

Preventive Maintenance Bridge Painting

- Allowable painting procedures include:
 - SSPC SP-3 Power Tool Cleaning; Beam Ends
 - SSPC SP-3 Power Tool Cleaning; Entire Bridge
 - SSPC SP-10 Near White Blast; Entire Bridge

Preventive Maintenance

Bridge Painting – Scope of Work

- Substructure
concrete repair
- Structural steel
repair
- Reset bearings
- Lubricate
bearings
- Epoxy
Waterproofing



Bridge Painting – Cost

- Average cost per bridge for full bridge painting treatment:

\$350,000

Preventive Maintenance Bridge Painting

- **Structure selection based on inspection reports from Structural Evaluation noting paint condition**
- **Painting contracts coordinated with Preventive Maintenance contracts to avoid duplicate work and fully treat structures**

Preventive Maintenance Bridge Painting



Monmouth Road over NJ Route 18; BPMC 2010, BPC 2013-3

Preventive Maintenance Bridge Painting



Sylvania Ave over Memorial Dr, NJ Transit; BPMC 2012, BPC 2010-3

Bridge Painting SSPC SP-10 Near White Blast; Full Bridge

BEFORE



AFTER



I-295 over Jacksonville Road

Bridge Painting SSPC SP-10 Near White Blast; Full Bridge

BEFORE



AFTER



Thomas Street over Columbia Trail

Bridge Painting

SSPC SP-3 Power Tool Cleaning; Full Bridge

BEFORE



AFTER



Lower Ferry Road over I-95

Preventive Maintenance Bridge Painting

- Upon completion of painting contract, Work Orders are created for each structure noting painting treatment applied
- Structural Evaluation notified of contract completion for re-evaluation of paint condition and updating of SI&A sheets

Drawbridge Preventive Maintenance



Drawbridge Preventive Maintenance

- **First contract to be introduced in 2016**
- **Joint effort between NJDOT and FHWA to amend NJDOT's Bridge Preventive Program to include drawbridge repairs**
- **Seventeen operational highway drawbridges under NJDOT jurisdiction**

Drawbridge Preventive Maintenance Scope of Work

- **Cleaning & Lubrication of Drawbridge Lift Cables**
- **Cleaning & Lubrication of Drawbridge Sheave Assembly & Lift Cables**
- **Drawbridge Pest Control Brush Replacement**
- **Steel Surface Preparation & Spot Painting**

Drawbridge Preventive Maintenance Scope of Work

- Service Warning Gongs
- Service Junction Boxes
- Service Warning/Barrier Gate Mechanical Equipment
- Lubricate Span Lock
- Service Span Lock Mechanical & Electrical Equipment



Drawbridge Preventive Maintenance Scope of Work

- Service Machinery/Motor Brake
Mechanical & Electrical Equipment
- Service Span Motor
- Service Control System Cabinetry
- Service Louver Assembly
- Service Power Distribution
Transformers

Preventive Maintenance Increasing Scope of Work

- **Scope of work for the Bridge Preventive Maintenance Program increases each year with approval from FHWA**
- **Consultation with Structural Evaluation, surrounding states, and product manufacturers for new repair procedures and improved technology**

Preventive Maintenance Considerations for 2016

- **New Items for 2016?:**
 - Bridge deck diamond grinding
 - Approach slab diamond grinding
 - Thin overlay of bridge decks
 - Carbon wrapping concrete columns
 - Carbon wrapping concrete beams

NJDOT Bridge Preservation and Asset Management Strategies

- **Continuous maintenance keeps the bridges of New Jersey in a state of good standing**
- **Close relationship between NJDOT and FHWA maximizes federal funding**
- **Coordination between maintenance programs greatly extends the service life of bridges**

NJDOT Asset Management Strategies

Long Term Goals

- **Develop system to directly input work performed on a structure into the Combis Asset Management System**
- **Develop software to model deterioration and predict preventive maintenance treatment cycles**
- **Secure funding and implement contracts based on model predictions**

Questions?



NJDOT Bridge Preservation and Asset Management Strategies



Thank you!

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