



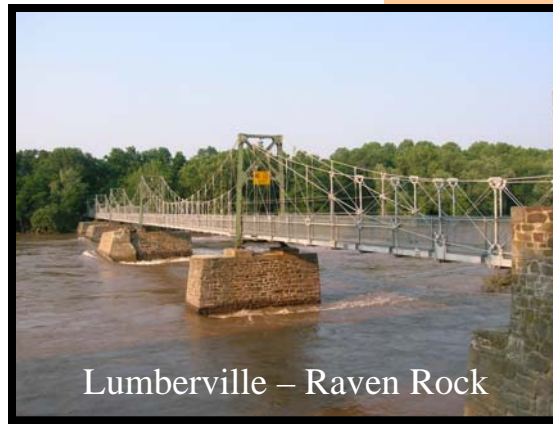
# Delaware River Joint Toll Bridge Commission

## TOLL BRIDGES

- Trenton-Morrisville
- New Hope-Lambertville
- Interstate 78
- Easton-Phillipsburg
- Portland-Columbia
- Delaware Water Gap
- Milford-Montague



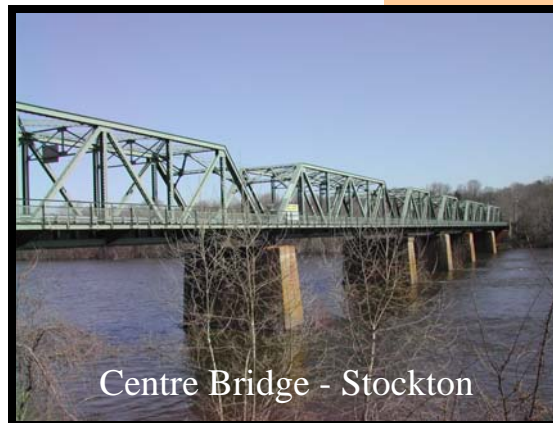
Riegelsville



Lumberville - Raven Rock



Lower Trenton



Centre Bridge - Stockton

Excerpt From the

# SIXTY-NINTH ANNUAL INSPECTION REPORT 2006

Prepared by



**SCHOOR DEPALMA**  
Engineers and Consultants

## TOLL SUPPORTED BRIDGES

- Lower Trenton
- Calhoun Street
- Scudder Falls
- Washington Crossing
- New Hope-Lambertville
- Centre Bridge-Stockton
- Lumberville-Raven Rock
- Uhlerstown-Frenchtown
- Upper Black Eddy-Milford
- Riegelsville
- Northampton Street
- Riverton-Belvidere
- Portland-Columbia

**SCHOOR DEPALMA**  
Engineers and Consultants

January 29, 2007

Honorable Frank G. McCartney  
Executive Director  
Delaware River Joint Toll Bridge Commission  
110 Wood Street  
Morrisville, PA 19067

**RE: Consulting Engineer's Sixty-Ninth Annual Inspection Report-2006  
DRJTBC Contract No. C-06-02  
Our Project Number 060093101**

Dear Mr. McCartney:

It is with great pleasure that we are submitting the Consulting Engineer's Sixty-Ninth Annual Inspection Report (2006) for the Commission's following facilities:

- A. The seven (7) Toll Bridges
- B. The thirteen (13) Toll Supported (Non-Toll) Bridges
- C. The thirty-two (32) approach bridges and roadways serving the above bridges
- D. The Commission's buildings and grounds
- E. The Commission's vehicles and equipment

This Annual Inspection Report summarizes our findings and recommendations based upon the 2006 inspection of the Toll Supported Facilities and the 2005 inspection of the Toll Facilities updated to indicate any material changes in conclusions and recommendations since the 2005 inspection. All facilities are in operating condition.

The Tenth Annual Maintenance Report which defines activities to be undertaken by the Commission's maintenance staff is published separately.

The report identifies certain ongoing capital projects amounting to an estimated cost of **\$410,571,000**. In addition, an estimated expenditure of **\$931,000** is recommended for new vehicle and equipment purchases in 2007. Therefore the total amount of ongoing capital projects and vehicle and equipment expenditures in 2007 is estimated to be **\$411,502,000**. The report also identifies future capital projects estimated at **\$417,438,000** which are programmed to be undertaken through the end of 2016.

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Justin Corporate Center, 200 State Highway Nine | PO Box 900 | Manalapan, NJ 07726-0900  
tel 732.577.9000 | fax 732.577.9888 | [www.schoordepalma.com](http://www.schoordepalma.com)

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060093101  
Honorable Frank G. McCartney  
January 29, 2007  
Page 2

We express our sincere appreciation to all of the Commission's personnel who were very helpful in assisting Schoor DePalma during all phases of our report preparation, as well as during the inspections.

It has been a pleasure to serve the Commission. Please contact us if you require any additional information.

Very truly yours,

**SCHOOR DEPALMA INC.**

Ronald F. Mieszkowski, P.E.  
Senior Vice President

RFM/MR/nac  
Encls.

**DELAWARE RIVER JOINT TOLL BRIDGE COMMISSION**  
MORRISVILLE, PENNSYLVANIA



Delaware River  
Joint Toll Bridge  
Commission

**SIXTY-NINTH ANNUAL INSPECTION REPORT**

**Toll Bridges**

**Trenton-Morrisville  
New Hope-Lambertville  
Interstate Route 78  
Easton-Phillipsburg  
Portland-Columbia  
Delaware Water Gap  
Milford-Montague**

**Toll Supported Bridges**

**Lower Trenton  
Calhoun Street  
Scudder Falls  
Washington Crossing  
New Hope-Lambertville  
Centre Bridge-Stockton  
Lumberville-Raven Rock  
(Pedestrian)**

**Uhlerstown-Frenchtown  
Upper Black Eddy-Milford  
Riegelsville  
Northampton Street  
Riverton-Belvidere  
Portland-Columbia (Pedestrian)**

**SCHOOR DEPALMA  
Engineers and Consultants**

**MANALAPAN, NEW JERSEY**

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## **INTRODUCTION**

In accordance with Federal Highway Administration (FHWA) regulations, all bridges must be inspected at least once every two (2) years, more often, if warranted, due to condition. Under the Commission's 2003 Bond Resolution, all bridges and toll facilities are to be inspected once every two (2) years. The Commission will inspect its Toll Supported Bridges in even years (2006, 2008, etc.) and the Toll Bridges in odd years (2007, 2009, etc.). The associated facilities and grounds will be inspected in the year the bridge is inspected.

This Sixty-Ninth Annual Inspection Report of bridges and facilities owned and operated by the Delaware River Joint Toll Bridge Commission contains the findings of the 2006 inspections of the Toll Supported Bridges. The conclusions and recommendations concerning the Toll Bridges are based on the 2005 inspections. Any changes from the 2005 conclusions or recommendations for the Toll Supported Bridges are indicated by text that is ***bold and italicized***. This year's inspections consisted of all thirteen (13) Toll Supported Bridges and any accompanying facilities and approach structures.

Commission District foremen and maintenance personnel provided our inspection crew with the support services and access equipment necessary for performing the inspections. Several maintenance personnel also assisted in providing a valuable 'walk down' of the bridges, prior to beginning the inspections, highlighting the major areas of concern and any previous work accomplished.

The equipment used to access the majority of the bridges (under deck) consisted of various commission owned ladders, single and dual lift trucks as well as an under-bridge unit called The Bridgmaster.

The following report highlights the significant findings observed during inspections, including recommended measures of repairing or improving noted deficiencies, either by Commission Maintenance forces or by a future contract. This report, however, does not discuss routine preventive maintenance items regularly performed by Maintenance forces. Any maintenance force level deficiencies which have been identified during the annual inspection can be found in the *Tenth Annual Maintenance Report*, published under a separate cover, which has been prepared to expedite communication of repair work to the maintenance staff. In general these routine maintenance tasks include, but are not limited to, the following:

- Removal of accumulated debris from the deck, deck joints, inlets, catch basins, and drainage pipes.
- Annual cleaning of structures (bridge flushing).
- Monitoring and repair of lighting and other electrical work
- Removal of vegetation from substructures.
- Removal of tree from below or along side of the bridges.
- Removal of graffiti from the bridges and retaining walls.
- Patching concrete and bituminous concrete spalls.
- Sealing roadway and bridge deck cracks.

- Localized cleaning and painting of rusted steel/bearings.
- Deck joint rehabilitation.
- Guide rail repair.
- Miscellaneous steel repairs.

A consistent numbering system was used to identify the bridge spans. Span numbering generally begins at the westernmost location of the bridge and increases to the east. However, a specific numbering system was not utilized for the individual structural members. The locations for individual members (stringers, floorbeams, etc.) are referenced by their relationship to known fixed points such as the bridge fascias and the piers.

Several capital improvement projects were completed within the last two years. Among these are the following:

Project	Program Cost
Substructure and Scour Remediation	\$ 4,570,688
2005 Underwater Inspection of the Toll and Toll Supported Bridges	\$ 252,186
Washington Crossing TSB Deck Joint Repairs	\$ 407,885
Northerly Crossings Corridor Congestion Mitigation Study	\$ 574,815
Scudder Falls TSB Deck Joint Replacement	\$ 1,492,701
Centre Bridge – Stockton TSB Priority Repairs	\$ 109,270
Scudder Falls Bridge Lighting Upgrade	\$ 125,292
Easton - Phillipsburg TB Sidewalk Replacement	\$ 1,681,064
Lower Trenton TSB Above Deck Painting + Sign Rehabilitation	\$ 4,567,204
Riegelsville TSB End Floorbeam Bearing Repairs	\$ 542,979
Easton - Phillipsburg TB Sign Structure Replacement	\$ 81,678
I-80 NJ Service Road Emergency Repairs	\$ 279,737
High Priority Structural Steel Repairs at the Scudder Falls TSB	\$ 839,368
I-78 Toll Plaza Roadway Approach Restriping	\$ 150,928
District 3 Toll Bridge Facilities Roof Replacement	\$ 798,889
New Hope – Lambertville TB Administration Building Terne Roof Replacement	\$ 658,281
Total	\$ 17,132,964

Many capital improvement projects are either still under review, study, design or construction. Most noteworthy are the following:

Project	Program Cost
I-78 Open Road Tolling (ORT) Lanes	\$ 43,308,000
Centre Bridge-Stockton TSB Rehabilitation	\$ 10,308,000
Milford - Montague TB Rehabilitation	\$ 18,526,000
New Hope - Lambertville TB Administration Building Addition & Renovation	\$ 4,145,000
Riverton - Belvidere TSB Rehabilitation	\$ 8,775,000
Trenton - Morrisville (Route 1) TB Rehabilitation + One Auxiliary NB Lane	\$ 102,500,000
Scudder Falls (I-95) TSB Improvements	\$ 27,400,000
Electronic Surveillance/Detection System (ESS)	\$ 26,242,000
I-78 Roadway Rehabilitation	\$ 44,570,000
NJDEP & PADEP Municipal Stormwater Compliance Program	\$ 350,000
Calhoun Street TSB Peak Hour Capacity Feasibility Study	\$ 245,000
Total	\$ 286,369,000

In 2000 the Commission adopted a “fix it right” philosophy for its Capital Program as compared to the previous “fix what’s broken” approach. The “fix it right” approach is based on the premise that whenever a project requires a bridge closure for implementation, that project must be designed so that no additional repair projects requiring a closure will be necessary for a subsequent period of at least 15 years. The estimated costs of the recommended improvements included in this report account for all costs of design, construction, construction management and inspection, and contract administration, and are consistent with the Commission’s “fix it right” approach. It is also noted that the general findings and estimated repair costs developed from the 2005 Underwater Inspection Report prepared by the Louis Berger Group, have been included in this report.

The following report will summarize significant findings, recommendations, and associated estimated costs at the end of each section for each structure. Following the main reports are the recommendations from equipment and vehicle inspections and their associated repair/replacement costs. Finally, the Schedule of Insurance is provided towards the end of this report.

## **GENERAL**

*In accordance with the Commission's Bridge Inspection Policy, this Toll bridge Facility was last inspected in 2005. The following is therefore taken from the 2005 Annual Inspection Report. Modifications to this report have been identified in bold and italic text.*

### TRENTON-MORRISVILLE TOLL BRIDGE

The Trenton-Morrisville Toll Bridge (Structure No. 20) carries U.S. Route 1 over the Delaware River between Trenton, New Jersey and Morrisville, Pennsylvania.

The main bridge is a twelve-span, simply-supported composite steel girder and concrete deck bridge with an overall length of 1,324 feet. The piers (granite-faced) and abutments are reinforced concrete. Originally constructed by the Commission in 1952 as a four-lane bridge, the bridge was widened to six lanes in 1965 for a total curb-to-curb width of 62 feet. In 1983 an aluminum median barrier was erected across the bridge, creating three southbound and two northbound lanes. The posted speed limit in the northbound direction is forty miles per hour and fifty miles per hour in the southbound lanes until midspan where the speed limit is reduced to twenty miles per hour approaching the toll plaza.

### TRENTON-MORRISVILLE APPROACH BRIDGES

The New Jersey approach includes eight additional bridge structures: Route 29 Overpass, Ramp 'N' Overpass, Ramp 'IY' Overpass, Ramp 'Y' Overpass, Union Street Overpass, Center Street Underpass, Broad Street Underpass, and Ramp 'N' Over Union Street. The Pennsylvania approach includes two separate overpass structures at Washington Street and South Pennsylvania Avenue. All ten approach bridges are owned and maintained by the Commission.

The Design Phase is completed (Contract C-380A) for the addition of the northbound auxiliary lane across the main river crossing to reduce congestion problems along the US Route 1 corridor as well as to address the rehabilitation of the main river crossing and approach structures. The limits of work will also include the flanking interchanges at Pennsylvania Avenue and NJ Route 29, in Pennsylvania and New Jersey, respectively.

### TRENTON-MORRISVILLE TOLL BRIDGE FACILITY AND GROUNDS

The one-way toll plaza, located at the Pennsylvania approach, has six toll lanes. The tollbooths are erected on concrete islands and are protected by an overhead canopy. Each lane is equipped for EZ-Pass.

The 2005 inspection included the main river bridge, all approach bridges, and the facility and grounds.

## **SIGNIFICANT FINDINGS**

### TRENTON-MORRISVILLE TOLL BRIDGE

The bridge was last painted in 1972. Generally, the condition of the painted surfaces is fair to poor, with the majority of paint deterioration occurring at localized areas exposed to the elements such as the fascia girders, steel girder ends, and bearings directly beneath the deck joints and longitudinal median joints. Typically, water infiltration from the deck joints has taken its toll on the underlying steel and bearings.

The existing deck has an LMC overlay (overlaid in 1986 with expansion dams installed). The LMC overlay exhibits significant delamination, widespread cracking and failed patches. The underside of deck exhibits signs of water infiltration with light spalling adjacent to steel girder top flanges, which also have light to moderate rust. The most significant deterioration appears to stem from the underlying construction joints, a result of the widening construction, which causes a medium longitudinal reflection crack in the overlay. The crack appears to have formed directly above the fascia stringers. Portions of the overlay along the longitudinal crack as well as in the widened portions were found to be unsound and large spalls have formed in the northbound lanes. These cracks should continue to be sealed to extend the usefulness of the existing overlay and the spalls repaired to prevent premature deterioration of the superstructure.

The deck joints consist of steel extrusions welded to the top of the original tooth dam (finger joints). The extrusions have 'Z' type anchorage embedded in the adjacent header material. Cracks and impact damage were noticed on numerous headers. Maintenance forces have experimented with various repair materials, but they appear to have failed, especially in the southbound lanes. Deck joint expansion/filler material failures were also typically found.

Several areas of the inner and outer faces of the concrete parapets, especially on the north side, were noted to exhibit patches and cracks, and some spalled areas. A horizontal crack and unsound concrete were also noted throughout most of the length of the north and south curb. Maintenance forces have begun and should continue to implement repairs to affected areas until a rehabilitation contract gets underway.

Most of the substructure bridge seats were noted to exhibit medium vertical cracks. These cracks appear stable and need only be sealed with a flexible caulk material. Epoxy coating, which generally is not present, should be applied to the bridge seats to prevent future water infiltration.

The bridge mounted cantilever sign structure is not in plumb and level. The members of the structure, including the bridge attachments have heavy rust. The sign structure should be analyzed for the recently added sign panels and a recommendation made for modifications or replacement of the sign structure.

***The 2005 Underwater Inspection Report prepared by The Louis Berger Group, Inc. under Contract C-412A, has found the substructures to be in satisfactory condition. Although no undermining was observed, several areas of the pier footings were found to be partially exposed. Estimated repair costs from the 2005 Underwater Inspection Report have been included in this report.***

#### WASHINGTON STREET OVERPASS

The paint system is in fair condition with deterioration occurring at the girder ends and at random locations throughout. The bearings exhibit moderate to heavy rust with a number of bearings exhibiting missing anchor nuts, sheared bolts and cracked welds at the sole plate/bottom flange interface. The expansion bearings are fully expanded and not functioning properly. Damage to the girder ends and bearing was caused by water infiltration through the deck joint and onto the bridge seat.

The abutment backwalls and breastwalls exhibited areas of spalling and mapcracking with efflorescence. Spalling along the underside of the deck was observed along the deck joints and the longitudinal haunch supporting stringer caused by water infiltration.

The top of the deck is in overall good condition with a few areas of spalling southbound and numerous cracks near the deck joints southbound.

The approach slabs in the southbound lanes showed signs of spalling and settling at the west approach. The northbound overlay is deteriorating at the approach slab joints.

#### SOUTH PENNSYLVANIA AVENUE OVERPASS

The northbound roadway exhibits deteriorated pavement at the center line. The southbound roadway exhibits spalled and deteriorated concrete at the center line. The deck joints exhibit small spalls in the adjacent header, minor deterioration of joint material and reflective pavement cracking. The abutments exhibit random spalls and cracking, especially at the upper backwalls. The paint condition is fair with most corrosion at the stringer ends and bearings.

The Pennsylvania side of the Route 1 southbound roadway within the Commission's jurisdiction is showing signs of heavy deterioration and settlement to the west of the South Pennsylvania Avenue Overpass. Maintenance forces have continued to overlay the areas with asphalt to maintain safe roadway conditions.

#### RAMP I Y OVER BRIDGE STREET

The paint system is in poor condition with peeling paint throughout. The deck joints are in poor condition with deteriorated joint material and evidence of water leakage on the substructure. The bearings and ends of stringers exhibited corrosion due to water infiltration from the deck joints, more so at the piers. Spalling and cracking was noted in the pier cap, pier pedestals and deck joint headers. The deck is in fair condition with areas of cracked deck patches in spans one and three.

## UNION STREET OVERPASS

The abutment backwall and breastwall exhibited a number of areas of spalling concrete with exposed reinforcement, map cracking and efflorescence. The paint is in generally fair condition with localized areas of failing paint, especially at bearings and stringer ends. The bearings appeared to be non-functioning and were observed to be overexpanded. The deck joints are in poor condition, exhibiting spalling in the deck slab, deteriorated concrete headers and deteriorated joint material, especially in the southbound lanes. The deterioration along the deck joints is causing water infiltration to the bridge seats.

Excessive roadway settlements have not changed between the Union Street Overpass and the Ramp 'N' Overpass on Route 1, adjacent to the adjoining retaining wall. Commission forces maintain that this area was built on substandard fill material with improper compaction, which may have contributed to the worsening settlements. The settlement may also be affected by the lateral movement of the adjacent retaining wall, which is approximately 30 feet high. Settlements appear generally uniform except at drainage locations, another key factor for settlement. Spacing of adjacent drainage inlets also appeared excessive, with none occurring in the highest settlement areas. At least one of the drainage inlets has been paved over in the southbound lanes to maintain a smooth riding surface.

## RAMP N OVERPASS

The abutments exhibit numerous areas of spalling concrete. The paint is in generally fair condition with localized areas of deterioration. The bearings appear to be non-functioning and were observed to be fully expanded at 50 degrees F. The deck joints are in poor condition with evidence of moisture infiltration, especially at the east abutment and numerous spalls/patches at headers. Approach and roadway slabs are in fair condition, exhibiting numerous cracks, deteriorated concrete and failing asphalt patches.

## CENTER STREET UNDERPASS

The bearings appear to be not functioning and exhibit severe rusting with areas of section loss. The frozen bearings are causing uplift in some of the masonry plates. Additionally, the deck joints appear to be not functioning properly with spalling along the headers.

Spalling was noted on the abutment backwall and breastwalls. The spalling is caused by water infiltration through the deteriorated deck joints. Also, fine vertical cracks were noted on the abutment breastwalls. These cracks are not detrimental to the structures. Simply sealing the cracks to prevent water infiltration is sufficient.

The Route 1 southbound pavement at the Center Street Underpass has several pavement spalls.

## *TRENTON - MORRISVILLE TOLL BRIDGE FACILITY*

### BROAD STREET UNDERPASS

The deck joint headers have severely deteriorated with concrete spalls and deteriorated pavement creating a rough riding surface. Deck joint armoring anchors are exposed and contain holes allowing light to be seen from below. The backwall is also in poor condition with multiple areas of spalling with exposed reinforcement and efflorescence.

The failed deck joints have caused water damage and debris build-up has consequently rusted the bearings and the ends of beams causing severe rusting and minor section loss. The bearings appear to be not functioning. The frozen bearings are causing uplift in some of the masonry plates. The paint is in poor condition with peeling paint throughout.

### RAMP N OVER UNION STREET

The bearings on both piers typically exhibit loose or missing anchor bolt nuts. A deteriorated drain pipe and scupper was observed near the west abutment.

### ROUTE 29 OVERPASS

Several of the prestressed concrete box beams exhibit exposed and rusted prestressed tendons at the ends of beams, mainly over the piers. This appears to be the result of leaking and deteriorated deck joints. The piers also exhibit spalls, incipient spalls and unsound concrete in the pier caps.

The top of deck exhibited spalling along the deck joints, while spalling with exposed reinforcement was observed on the underside of deck along the longitudinal joints.

### RAMP Y OVER ROUTE 29

The paint system is in poor condition. There are minor spalls occurring on the east end of the south abutment and also along the backwall. The deck is in generally good condition with no spalling and only minor fine cracks. There is also a longitudinal crack running along the curb face and minor fine cracks

### TRENTON-MORRISVILLE TOLL BRIDGE FACILITIES AND GROUNDS

The access tunnel underneath the toll plaza exhibited signs of moisture infiltration with water stains on the floor.

Ramps 'A', 'E', 'H' and 'J' at the US Route 1 and South Pennsylvania Ave intersection, comprised of a bituminous overlay, exhibited heavy transverse and random cracking and a moderate level of potholes. Additionally, several toll plaza concrete roadway slabs were noted to be in fair condition with spalling and cracks throughout. In general the ramps and approach roadways are in satisfactory condition, with the bituminous Pennsylvania Ramps 'A', 'E', 'H' and 'J' in overall fair to poor condition.

## *TRENTON - MORRISVILLE TOLL BRIDGE FACILITY*

The stone façade surrounding the main entrance door to the Administration Building is deteriorated. The current fire alarm system is outdated and the original elevator has been experiencing breakdowns.

Several areas of the sidewalk and curb along the entrance to the Administration Building exhibit cracking, settlement, spalling and failed patches.

A pavement condition assessment and settlement analysis of the US Route 1 approach roadways to the Trenton-Morrisville Toll Bridge was conducted by The Louis Berger Group, Inc. in December of 2004.

### **CONCLUSIONS**

#### TRENTON-MORRISVILLE TOLL BRIDGE

Overall, the Trenton-Morrisville Toll Bridge is in satisfactory condition and found to be structurally adequate to carry legal highway loads at the time of the inspection. The operations and maintenance buildings, toll plaza and most approach roadways and bridges appear to have been well maintained over their existence and remain in generally satisfactory condition.

The main Toll Bridge and its approach structures are in need of rehabilitation, due to the generally fair to poor condition of the bearings, severe approach settlement, deteriorated deck joints, poor paint condition and numerous defects in the concrete parapets and wearing surfaces.

An overall Rehabilitation Contract is recommended for the entire Trenton-Morrisville Facility. An In-Depth Inspection and Rating should be performed for the bridges, roadways and ramps to determine the extent of required repairs. An approach settlement study should be combined with the inspections to determine the cause of the settlements. Design and repair plans should be developed for the entire facility, which should include the following as a minimum:

- Blast cleaning and painting main river and approach bridges.
- Rehabilitate or replace the concrete deck on the main river bridge. Replace the concrete parapets and safety walk on main river bridge.
- Replace bridge mounted cantilever sign structures.
- Replace toll booths.
- Bearing, deck, deck joint and header rehabilitation of approach structures.
- Repair ends of beams at Rt. 29 overpass.
- Pennsylvania ramp re-paving.
- Substructure Rehabilitation (Including all items noted in the 9<sup>th</sup> Annual Maintenance Report)
- Route 1 roadway rehabilitation

## *TRENTON - MORRISVILLE TOLL BRIDGE FACILITY*

A settlement study of the New Jersey approaches, as well as at the South Pennsylvania Avenue Overpass, should include the investigation of the drainage pipes in the vicinity in addition to a subsurface exploration.

The bearing rehabilitation for the approach bridges should include bearing resetting, installation of missing anchor bolts, replacement of severely rusted bolts/nuts and cleaning and painting of bearings and ends of girders. In the interim the bearings should be cleaned and maintained regularly. Full deck joint rehabilitation should also be included.

The bridge mounted cantilever sign structure deflection calculations should be checked for current sign panel load. If sign structure is designed for this load, the sign panel and sign lighting should be reset to a level position. Otherwise a sign structure replacement is warranted.

The following outlines specific recommendations for each approach bridge.

### WASHINGTON STREET OVERPASS

The Washington Street Overpass is in satisfactory condition. The deck joints should be completely replaced, with associated repairs made to the backwall and headers. Repairs to the concrete spalls on the abutments should also be included. The bearings should be rehabilitated, blast cleaned and painted along with the ends of stringers and at random deteriorated locations.

### SOUTH PENNSYLVANIA AVE OVERPASS

The South Pennsylvania Ave Overpass is in satisfactory condition. The deck joints should be completely replaced, with associated repairs made to the backwall and headers. Repairs to the concrete spalls on the abutments should also be included. The bearings should be rehabilitated, blast cleaned and painted along with the ends of stringers and at random deteriorated locations.

### RAMP IY OVER BRIDGE STREET

The Ramp IY Overpass is in satisfactory condition. Due to the poor paint condition of the stringers and bearings, the entire bridge should be blast cleaned and painted. The deck joints are in poor condition and should be replaced. The bearing should be replaced at the piers and cleaned and reset at the abutments. The deck exhibited large areas of cracking and failed repairs which may justify a complete deck replacement. A deck evaluation survey should be performed to determine if the deck should be rehabilitated or replaced.

### UNION STREET OVERPASS

The Union Street Overpass is in satisfactory condition. The abutment backwall and breastwall spalls should be repaired. Random locations of the failing paint system should be blast cleaned and painted, along with the ends of girders and bearings. The bearings should be reset prior to painting. The deck slab and deck joints should be considered for replacement due to the poor condition of the underside of deck along the deck joints and the

## *TRENTON - MORRISVILLE TOLL BRIDGE FACILITY*

need to replace the approach slabs. A deck evaluation survey should be performed to determine if the deck should be rehabilitated or replaced.

The excessive roadway settlements between the Union Street Overpass and the Ramp 'N' Overpass on Route 1, adjacent to the adjoining retaining wall should be investigated and repaired under the overall Trenton-Morrisville Rehabilitation. A settlement analysis should be performed to determine the cause and method of remediation.

### RAMP N OVERPASS

The Ramp N Overpass is in satisfactory condition. The abutment backwall and breastwall spalls with exposed reinforcement and efflorescence should be repaired. Random locations of the failing paint system should be blast cleaned and painted, along with the ends of girders and bearings. The bearings should be reset prior to painting. The deck slab and deck joints should be considered for replacement due to the poor condition of the underside of deck along the deck joints and the need to replace the approach slabs. A deck evaluation survey should be performed to determine if the deck should be rehabilitated or replaced.

The slab settlements should be addressed as noted in the Union Street Overpass.

### CENTER STREET UNDERPASS

The Center Street Underpass is in satisfactory condition. The non-functioning bearings should be cleaned, reset and painted in conjunction with painting the structural steel. Additionally, the deck joints should be replaced with repairs made to the concrete header, backwall, and breastwall.

### BROAD STREET UNDERPASS

The Broad Street Underpass is in satisfactory condition. The deck joints should be replaced and the backwalls rebuilt. All substructure repairs should also be included along with the backwall repairs. The entire bridge should be blast cleaned and painted, which includes all the structural steel and bearings.

### RAMP N OVER UNION STREET

The Ramp N Over Union Street Overpass is in good condition.

### ROUTE 29 OVERPASS

The Route 29 Overpass is in fair condition due to the condition of the deck and deck joint deterioration and the spalls and exposed prestressing strands at the ends of beams. The extent of damage to the exposed tendons, in addition to the adjacent delaminated concrete should be observed in subsequent inspections. The beam spalls should be cleaned and patched. The spalls on the piers and abutments noted in the Ninth annual maintenance report should be repaired. The deck joints should be replaced and the deck spalls repaired.

## TRENTON - MORRISVILLE TOLL BRIDGE FACILITY

### RAMP Y OVER ROUTE 29

The bridge is in satisfactory condition. The structural steel and bearings should be blast cleaned and painted. The substructure spalls on the south abutment breastwall and backwall should be repaired. The curb/safety walk should be repaired and the deck sealed.

### TRENTON-MORRISVILLE TOLL BRIDGE FACILITY AND GROUNDS

The rehabilitation of the toll plaza should be included in the upcoming toll bridge rehabilitation project (T-380), as should be the addition of one-lane in the northbound direction. The current toll booths and canopies have peeling paint, deteriorating floors, and are in need of an upgraded HVAC system.

An evaluation of the access tunnel should be performed to determine the cause and remediation of the water infiltration.

The deteriorated exterior facade near the entrance should be repaired, and at the same time the main entrance door to the Administration Building should be replaced. In addition, a study should be performed to determine if the building is ADA compliant.

The HVAC system should be upgraded due to the age of the system. A study should be performed to determine the best method of upgrading. The fire alarm system should also be evaluated to determine if upgrades are needed.

It has been documented that the administration building has had problems with the roof leaking. Due to the age of the roof it is recommended that the roof be replaced on all the buildings at the facility.

The areas of sidewalk and curbing along the entrance to the Administration Building should be repaired (Maintenance).

***The Administration Building elevator has experienced multiple breakdowns, and should be upgraded or replaced.***

For a list of the required maintenance repair items, see the Tenth Annual Maintenance Report.

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**TRENTON-MORRISVILLE TOLL BRIDGE FACILITY**

**ESTIMATED COST OF RECOMMENDED IMPROVEMENTS**  
**FUNDED BY THE GENERAL RESERVE FUND**

Contract No.	Bridge and Roadway Recommended Improvements	General Reserve Fund
<b><u>Bridges, Roadways, Sidewalks, and Approaches</u></b>		
366	<b>Substructure &amp; Scour Remediation Contract</b> (Inspection) (2005 Underwater Inspection - Completed in 2006, \$17,400)	
380	<b>Trenton-Morrisville Toll Bridge Rehabilitation</b> + One Auxiliary NB Lane (Design, CMCI, Construction)	\$102,500,000
476	<b>District I Substructure and Scour Remediation</b> (Design, Construction, CMCI)	\$237,000
<b><u>Facilities and Grounds</u></b>		
468	<b>Buildings Roof Replacement</b>	\$735,000
N/A	<b>Asset Management Program *</b>	\$156,500
396	<b>Electronic Surveillance Detection System *</b>	\$1,694,000
N/A	<b>Miscellaneous Projects * (2007-2008)</b>	\$110,000
425	<b>Storm Water Compliance *</b>	\$50,000
TBD	<b>Study Administration Building for ADA Compliance and Repair</b> Main Entrance Façade and Door	\$50,000
TBD	<b>HVAC Study and Upgrade</b> (Design, Construction, CMCI)	\$389,000
TBD	<b>Elevator Upgrade</b>	\$200,000
480	<b>Fire Protection System in Computer/IT Rooms *</b>	\$52,000

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**TRENTON-MORRISVILLE TOLL BRIDGE FACILITY**

**ESTIMATED COST OF RECOMMENDED IMPROVEMENTS  
FUNDED BY THE GENERAL RESERVE FUND**

Contract No.	Bridge and Roadway Recommended Improvements	General Reserve Fund
TBD	Update General Information Documents *	\$40,000
<b>TOTAL COST</b>		<b>\$106,213,500</b>

**FUTURE REPAIR CONTRACTS**

(Subject to sufficient appropriation by the Commission)

<u>CONTRACT No.</u>	<u>DESCRIPTION</u>	<u>ESTIMATED COST</u>
479	ITS Improvements *	\$955,000
446	Elec. Toll Collection - Video Enforcement *	\$866,000
<b>TOTAL: Future Repair Contracts</b>		<b>\$1,821,000</b>

\* Commission Initiative

## NEW HOPE - LAMBERTVILLE TOLL BRIDGE FACILITY

### **GENERAL**

*In accordance with the Commission's Bridge Inspection Policy, this Toll bridge Facility was last inspected in 2005. The following is therefore taken from the 2005 Annual Inspection Report. Modifications to this report have been identified in bold and italic text.*

#### NEW HOPE LAMBERTVILLE TOLL BRIDGE

The New Hope-Lambertville Bridge (Structure No. 140) was opened to traffic on July 22, 1971 and carries U.S. Route 202 over the Delaware River between Lambertville, New Jersey and New Hope, Pennsylvania. The bridge is a ten-span steel girder and concrete deck bridge with a total length of 1,682 feet measured from center to center of bearings. The substructure units are composed of reinforced concrete; the piers are stone faced.

#### NEW HOPE LAMBERTVILLE APPROACH BRIDGES

The Commission's jurisdiction also includes loop-ramp interchanges with overpasses provided at Route 29 in New Jersey and Route 32 in Pennsylvania. The posted speed limit on the approach roadways is fifty-five miles per hour.

#### NEW HOPE LAMBERTVILLE FACILITY AND GROUNDS

Under Contract No. T-370B-2 the toll plaza and toll booths were replaced on the Pennsylvania approach. The new toll plaza has one-way toll collection replacing the two-way collection prior to the reconstruction. All lanes are equipped for EZ-Pass. The new toll plaza was erected on concrete islands and is protected with an overhead canopy the matches the Operations building roof. This contract also upgraded the power, telecommunications and data systems infrastructure of the toll facility as well as the reconstruction of the facilities parking lot.

The 2005 inspection included the main river bridge, two (2) approach structures, and the facility and grounds.

### **SIGNIFICANT FINDINGS**

#### NEW HOPE-LAMBERTVILLE TOLL BRIDGE

The New Hope-Lambertville Toll Bridge was rehabilitated under Contract No. TS-370B-3. The rehabilitation was completed and the bridge was reopened on June 7, 2004. The reconstruction effort involved concrete deck and spall repairs, reconstruction of deck expansion joints, replacement of the Latex Modified Concrete deck overlay, painting of the steel fascia girders, bearing replacements and miscellaneous steel repairs and painting.

Damage was observed to the north floorbeam tie plate near pier 5. Also, section losses and perforations were noted at a few locations at the ends of several stringers in the webs and

## *NEW HOPE - LAMBERTVILLE TOLL BRIDGE FACILITY*

flanges, but do not affect the structural capacity of the structure. The area of the holes have been blast cleaned and painted under Contract 370A. The defects to the floorbeam tie plate and the noted perforations do not appear to affect the structural integrity of the bridge at this time. A fatigue crack has been arrested by a hole drilled in the web of the south fascia stringer at Pier 4.

Transverse cracks with efflorescence were noted throughout the underside of deck. A few random locations of spalling were also observed on the underside of deck and concrete parapets, however these deficiencies do not affect the structural integrity of the deck slab. These conditions existed prior to the rehabilitation and any further deterioration should be prevented due to the addition of the LMC overlay.

***The 2005 Underwater Inspection Report prepared by The Louis Berger Group, Inc. under Contract C-412A, has found the overall condition of the underwater elements to be in overall satisfactory condition with the moderate to heavy cracking of the concrete aprons around the piers, moderate areas of collapsed concrete aprons, undermining of portions of the aprons and minor mortar loss in masonry joints of the substructure units.***

### ROUTE 29 OVERPASS

The substructure exhibits spalling, cracking and unsound concrete at several locations, however, this does not affect the structural integrity of the bridge. Peeling paint and corrosion were noted on the fascia bearings and at several stringers, mostly adjacent to the median joint and along the fascias.

### ROUTE 32 OVERPASS

The concrete rigid frame exhibited areas of mapcracking and efflorescence at the center of the intrados at the north and south ends. At the present time the defects noted do not affect the structural integrity of the structure. The roadway over the bridge is in good condition with no apparent defects. Several of the approach slabs exhibit spalling, asphalt patches and deteriorated joint material at joint locations.

### NEW HOPE-LAMBERTVILLE TOLL BRIDGE FACILITY AND GROUNDS

A space utilization study conducted at Trenton-Morrisville determined that there is a need for additional space to accommodate an increased capital program. The study identified the New Hope Lambertville facility as a potential location to accommodate this need.

Several cracks and spalls were noted at the roadway slabs and approach toll plaza slabs.

The roof of the Operations building is showing signs of wear and distress due to age. Additionally, the heating, ventilation, and air-conditioning system has been identified to be not performing acceptably.

The parking lot lighting appears to be deficient.

*NEW HOPE - LAMBERTVILLE TOLL BRIDGE FACILITY*

**CONCLUSIONS**

NEW HOPE-LAMBERTVILLE TOLL BRIDGE

The New Hope-Lambertville Toll Bridge is in good condition. An interim inspection should be performed on the floorbeam tie plate damage to determine if any stress cracks develop in the tension member. Maintenance should continue to maintain the bridge and make necessary repairs outlined in the annual maintenance reports.

ROUTE 29 OVERPASS

The Route 29 overpass is in good condition. However, substructure spalls should be repaired and the corroded bearings and ends of stringers should be spot cleaned and painted. Maintenance should continue to perform routine maintenance as needed.

ROUTE 32 OVERPASS

The Route 32 overpass is in overall good condition. Maintenance should continue to perform routine maintenance as needed.

NEW HOPE-LAMBERTVILLE TOLL BRIDGE FACILITY AND GROUNDS

*The roof of the operations building was replaced under Contract C413A-2 in 2006.*

A HVAC study should be included in the Operations building renovation that is scheduled to be performed in the near future. The parking lot lighting should also be upgraded to a better performing standard.

*A Substructure and Scour Remediation Contract (below the waterline) should be performed to repair the substructure deterioration noted in the 2005 Underwater Inspection Report.*

For a list of the required maintenance repair items, see the Tenth Annual Maintenance Report.

**NEW HOPE-LAMBERTVILLE TOLL BRIDGE FACILITY**

**ESTIMATED COST OF RECOMMENDED IMPROVEMENTS**  
**FUNDED BY THE GENERAL RESERVE FUND**

Contract No.	Bridge and Roadway Recommended Improvements	General Reserve Fund
<b><u>Bridges, Roadways, Sidewalks, and Approaches</u></b>		
366	<b>Substructure &amp; Scour Remediation Contract</b> (Inspection) (2005 Underwater Inspection - Completed in 2006, \$14,000)	
476	<b>District I Substructure and Scour Remediation</b> (Design, Construction, CMCI)	\$341,000
<b><u>Facilities and Grounds</u></b>		
397	<b>Executive Addition to NHL Toll Facility</b> (Design, CMCI, Construction)	\$4,145,000
435	<b>Replace Operations Building Roof</b> (Completed in 2006, \$688,000)	
469	<b>NHLTB Parking Lot Lighting Improvements</b>	\$150,000
N/A	<b>Miscellaneous Projects</b> * (2007-2008)	\$64,000
425	<b>Storm Water Compliance</b> *	\$50,000
N/A	<b>Asset Management Program</b> *	\$156,500
396	<b>Electronic Surveillance Detection System</b> *	\$2,060,000
480	<b>Fire Protection System in Computer/IT Rooms</b> *	\$52,000
	<b>TOTAL COST</b>	<b>\$7,018,500</b>

**NEW HOPE-LAMBERTVILLE TOLL BRIDGE FACILITY**

**ESTIMATED COST OF RECOMMENDED IMPROVEMENTS  
FUNDED BY THE GENERAL RESERVE FUND**

**FUTURE REPAIR CONTRACTS**

(Subject to sufficient appropriation by the Commission)

<b><u>CONTRACT No.</u></b>	<b><u>DESCRIPTION</u></b>	<b><u>ESTIMATED COST</u></b>
446	Elec. Toll Collection - Video Enforcement *	\$693,000
<b>TOTAL: Future Repair Contracts</b>		<b><u>\$693,000</u></b>

\* Commission Initiative

## **GENERAL**

*In accordance with the Commission's Bridge Inspection Policy, this Toll bridge Facility was last inspected in 2005. The following is therefore taken from the 2005 Annual Inspection Report. Modifications to this report have been identified in bold and italic text.*

### INTERSTATE 78 TOLL BRIDGE

The main river bridge (Structure Nos. 270 and 275) is a twin, 1,222-foot long, four girder, 7-span continuous girder bridge supported on reinforced concrete hammerhead piers and reinforced concrete stub abutments. The posted speed limit on the bridge is 55 mph.

The Interstate 78 Toll Bridge carries traffic over the Delaware River between Northampton County, Pennsylvania and Warren County, New Jersey. The facility was opened to traffic on November 21, 1989.

### INTERSTATE 78 TOLL BRIDGE APPROACH STRUCTURES (AND ROADWAYS)

The Commission's jurisdiction extends approximately 2.2 miles to the west at the Pennsylvania approach, including an interchange at Morgan Hill Road, grade separation bridges at Routes 206 (Cedarville Road) and 611, and a Welcome Center. The New Jersey approach extends approximately 4.7 miles to the east (not including Conrail over I-78 or the Route 173 structures) from the main river bridge, including grade separation bridges at Carpentersville Road, County Route 519, and Edge Road, and an additional bridge at the Still Valley Interchange. In total there are eleven (11) approach structures owned and maintained by the Commission that are part of the Interstate 78 Toll Bridge Facility.

### INTERSTATE 78 TOLL FACILITY AND GROUNDS

The one-way toll plaza, located at the Pennsylvania approach of the westbound lanes, has seven toll lanes. All tollbooths are erected on concrete islands and are protected by an overhead canopy. All lanes are equipped for EZ-Pass. Lane 7 is still operating as a coin only lane.

The 2005 inspection included the main river bridge, eleven (11) approach structures, and the facility and grounds.

## **SIGNIFICANT FINDINGS**

### INTERSTATE 78 TOLL BRIDGE

The condition of the main river bridge is good. However, the deck slab is in satisfactory condition. Although no spalls are present, the deck slab exhibits numerous transverse cracks that are more prevalent on the eastbound bridge. Leakage is indicated by the rusted stay-in-place (SIP) forms, rusted underlying steel, and deicing salt staining below the deck.

The transverse cracks in the main river bridge are numerous and appear to be increasing in number as reported in previous inspection reports. Maintenance forces have been treating the deck cracks with water sealer as they appear. Although the structural capacity of the deck slab is unaffected, a methacrylate crack healer/sealer should be utilized until a future contract to waterproof and overlay the bridge is awarded.

Fine cracks were noticed throughout the fascia concrete overhang of both eastbound and westbound structures, with light efflorescence.

In addition to the numerous transverse cracks in the concrete deck, several transverse construction joints of the deck appear to be allowing water to infiltrate below the deck, causing rusted SIP forms. This has also caused light rusting and paint peeling to underlying steel, including main girders and their field splices.

The inside webs of fascia girders typically exhibit moderate to heavy pigeon debris, which can be detrimental to the paint system. In addition the bottom flanges of several girders typically exhibit light to medium paint peeling.

The bridge deck's expansion dams have been reconstructed under Contract T-420 in 2004. These new deck joints have improved the roadway driving surface and appear to have eliminated the previous noise issues.

The substructures are in good condition. Some areas of the epoxy coating on the bridge seats at both abutments and Pier 6 westbound are chipped and peeling off. The westbound bridge pier 6 footing (land based pier) is exposed at the south end, but rock stabilizers are in place around the foundation and no threat of instability is apparent.

***The 2005 Underwater Inspection Report prepared by The Louis Berger Group, Inc. under Contract C-412A, has found the substructures of both the eastbound and westbound bridges to be in good condition, with only minor deficiencies reported.***

#### I-78 EASTBOUND OVER ROUTE 519

Minor substructure cracking and spalls were noted. The approach slabs exhibited numerous medium to wide transverse cracks that are routinely sealed by maintenance forces.

#### I-78 WESTBOUND OVER ROUTE 519

The approach slabs exhibited transverse cracking and spalling which are routinely repaired by maintenance forces. In addition, there is an open channel waterway that runs along Route 519 and under both the eastbound and westbound structures that is severely eroded, but has not compromised the pier foundation.

#### I-78 WESTBOUND OVER ROUTE 611

The deck joint material exhibits deterioration and is in need of replacement at several locations. The approach slabs exhibited transverse cracking and spalling which are routinely repaired by maintenance forces.

#### I-78 EASTBOUND OVER ROUTE 611

The approach slabs exhibited transverse cracking and spalling which are routinely repaired by maintenance forces. Minor spalls, some repaired, were also noted at several end diaphragms.

#### SERVICE ROAD OVERPASS

No significant defects were noted at the time of this inspection.

#### EDGE ROAD OVERPASS

The north and south abutment slope protection exhibited minor settlement and cracking. A few stringer bottom flanges were noted to be slightly distorted, but they do not affect the structural integrity of the bridge.

#### I-78 WESTBOUND OVER RAMP C

The ends of several stringers exhibited minor surface rust. The approach slabs and Ramp C roadway slabs exhibited transverse cracking and spalling which are routinely repaired by maintenance forces.

#### I-78 EASTBOUND OVER RAMP C

A portion of the east abutment deck joint steel armoring is missing with spalling occurring at the header. The approach slabs exhibited transverse cracking and spalling which are routinely repaired by maintenance forces. The pavement along the shoulder lines of the approach roadways exhibited deterioration and cracking with potholes occurring.

#### CARPENTERSVILLE ROAD OVERPASS

Mapcracking was observed at the ends of the abutment backwalls. Light rust was also noted on the diaphragms. Deck joint header joint material exhibits deterioration. Bearings were noted to be slightly over expanded at both abutments.

#### MORGAN HILL ROAD OVERPASS

The slope protection has settled in some areas which can be repaired by maintenance forces.

## CEDARVILLE ROAD OVERPASS

Some minor deterioration to the ends of the prestressed concrete beams was observed. The concrete beams show signs of the prestressing strands rusting through the ends of the beams. The bridge also exhibits some fully expanded and fully contracted deck joints due to the steep slope of the superstructure and subsequent damage to the strip seals

## INTERSTATE 78 FACILITIES AND GROUNDS

The I-78 roadway in New Jersey, comprised of concrete slabs, exhibits severe transverse cracking and subsequent settlements throughout the slabs. Condition surveys were performed in 1993 and 1997 by Commission engineering, indicating a significant increase in the number of cracks over the four-year period. Pavement evaluations were performed in 1997. The evaluations depict the worst locations of the cracks. In addition the shoulders along the I-78 roadway are deteriorating and in poor condition. *A slab stabilization and pavement design study was recently performed by Parsons Brinkerhoff under Contract C-424, which included in-depth testing and analysis of the roadway slabs. Results of this study can be found under separate cover..*

Maintenance has repaired the previously deflected CMU walls of the storage garage. A new salt storage facility was constructed in 2003 under contract T-392R.

When the toll plaza is reconstructed or reconfigured under Contract 427, the permanent attenuators (protective crash cushions) should be considered to be installed at the islands for increased protection of the traveling public and Commission employees.

The Toll Plaza Roadway approach restriping was completed in 2004 under contract T-422AR.

The pavement of the Administration building and the service road leading into the maintenance yard is in poor condition with multiple areas of cracking and distressed pavement. Additionally, the Exit 3 (Route 173) Ramp off Route I-78 is in poor condition exhibiting distressed pavement and numerous cracks.

*Unlike the other DRJTBC Maintenance Facilities, some of the I-78 vehicles and equipment are unprotected from rain, snow, etc. and are stored along the parking lots due to lack of storage capacity within the buildings.*

## CONCLUSIONS

### INTERSTATE 78 TOLL BRIDGE

The Interstate 78 Toll Bridge is in good condition. Although not as severe, the main river bridge deck slab condition resembles the Delaware Water Gap Toll Bridge regarding the numerous transverse cracks. In order to prevent corrosion of the deck steel from deicing chemicals, it is recommended that a waterproofing membrane and asphalt overlay be

installed. An overall Bridge Rehabilitation Contract should be performed. This contract should address the rehabilitation of the deck joints and/or bearings for the Cedarville Road and Carpentersville Road, as well as deck joint rehabilitation to several other approach bridges. All work pertaining to inspection, design, repair plans, and construction should also be included in the overall Bridge Rehabilitation Contract.

***A Substructure and Scour Remediation Contract (Below Water Line) should be performed to repair any substructure deterioration noted in the 2005 Underwater Inspection Report.***

#### I-78 EASTBOUND OVER ROUTE 519

The structure is in good condition with no major defects.

#### I-78 WESTBOUND OVER ROUTE 519

The structure is in generally good condition with no major defects. A drainage study should be performed for the channel at the Route 519 bridges to address the ongoing erosion and determine if any countermeasures are necessary.

#### I-78 WESTBOUND OVER ROUTE 611

The structure is in good condition. The deck joint seals should be repaired or replaced to prevent advanced deterioration of the underlying steel and pier cap.

#### I-78 EASTBOUND OVER ROUTE 611

The structure is in good condition with no major defects.

#### SERVICE ROAD OVERPASS

The structure is in very good condition. Maintenance should continue to maintain the structure as needed.

#### EDGE ROAD OVERPASS

The structure is in good condition with no major defects.

#### I-78 WESTBOUND OVER RAMP C

The structure is in good condition with no major defects.

#### I-78 EASTBOUND OVER RAMP C

The structure is in good condition with no major defects. The east abutment deck joint should be repaired.

#### CARPENTERSVILLE ROAD OVERPASS

The structure is in good condition. A bearing rehabilitation contract should be performed to address the deck joints and/or bearings at the west abutment in particular, to prevent further deterioration to the underlying steel and bridge seats.

#### MORGAN HILL ROAD OVERPASS

The structure is in good condition with no major defects.

#### CEDARVILLE ROAD OVERPASS

The structure is in good condition. A bearing rehabilitation contract should be performed to address the over expanded or over contracted deck joints due to the steep slope of the superstructure. Also, to prevent water infiltration that is causing the prestressing strands at the ends of the beams to rust.

#### INTERSTATE 78 TOLL FACILITY AND GROUNDS

Due to the excessive roadway slab cracking and settlement noted in the majority of the Commission-owned portion of Interstate 78 (especially the NJ portions), an Interstate 78 Roadway Rehabilitation is underway. The contract has begun with an investigation of the roadway slab condition under Contract C-424.

Permanent impact attenuators should be considered to be installed during the design of the Open Road Toll Project outlined in the Commission Initiatives.

Maintenance has indicated that the thermostat controls are obsolete and not working properly in the Operations and Maintenance Building/Welcome center. An HVAC study should be performed. ***Additionally, a study should be conducted to investigate additional vehicle and equipment storage needs.***

The administration building parking lot, maintenance lot and service road should be milled and repaved.

For a list of the required maintenance repair items, see the Tenth Annual Maintenance Report.

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**INTERSTATE 78 TOLL BRIDGE FACILITY**

**ESTIMATED COST OF RECOMMENDED IMPROVEMENTS**  
**FUNDED BY THE GENERAL RESERVE FUND**

Contract No.	Bridge and Roadway Recommended Improvements	General Reserve Fund
<b><u>Bridges, Roadways, Sidewalks, and Approaches</u></b>		
424	<b>Interstate 78 Roadway Rehabilitation</b> (Design, Construction, CMCI)	\$44,570,000
427	<b>I-78 Open Road Tolling (ORT) Lanes *</b> (Includes Impact Attenuator & ETC Video Enforcement)	\$43,308,000
366	<b>Substructure &amp; Scour Remediation Contract</b> (Inspection) (2005 Underwater Inspection - Completed in 2006, \$4,450)	
477	<b>District II &amp; III Substructure and Scour Remediation</b> (Design, Construction, CMCI)	\$98,500
<b><u>Facilities and Grounds</u></b>		
N/A	<b>Asset Management Program *</b>	\$156,500
396	<b>Electronic Surveillance Detection System *</b>	\$2,594,000
N/A	<b>Miscellaneous Projects *</b> (2007-2008) Gude Rail Improvements/Solar Lights Along Entrance Roadway	\$105,000
425	<b>Storm Water Compliance *</b>	\$50,000
480	<b>Fire Protection System in Computer/IT Rooms *</b>	\$52,000
TBD	<b>Mill and Pave Facility Parking Lots and Service Roads</b>	\$100,000

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**INTERSTATE 78 TOLL BRIDGE FACILITY**

**ESTIMATED COST OF RECOMMENDED IMPROVEMENTS**  
**FUNDED BY THE GENERAL RESERVE FUND**

Contract No.	Bridge and Roadway Recommended Improvements	General Reserve Fund
TBD	HVAC Study and Upgrade (Design, Construction, CMCI)	\$454,000
TBD	Vehicle Storage Building	\$2,622,000
<b>TOTAL COST</b>		<b><u>\$94,110,000</u></b>

**FUTURE REPAIR CONTRACTS**

(Subject to sufficient appropriation by the Commission)

<u>CONTRACT No.</u>	<u>DESCRIPTION</u>	<u>ESTIMATED COST</u>
479	ITS Improvements *	\$955,000
<b>TOTAL: Future Repair Contracts</b>		<b><u>\$955,000</u></b>

\* Commission Initiative

## **GENERAL**

*In accordance with the Commission's Bridge Inspection Policy, this Toll bridge Facility was last inspected in 2005. The following is therefore taken from the 2005 Annual Inspection Report. Modifications to this report have been identified in bold and italic text.*

### EASTON-PHILLIPSBURG TOLL BRIDGE

The Easton-Phillipsburg Toll Bridge (Structure No. 300) carries U.S. Route 22 traffic over the Delaware River. The bridge was opened on January 14, 1938. Westbound only toll collection commenced on June 4, 1989. The main river bridge consists of a 540 foot Petit thru-truss span over the river. The overall length, including the approaches on either end of the structure, is 1,010 feet. This four-lane bridge has a roadway width of 40 feet with 8 ft. concrete sidewalks located outside of the trusses on each side. The posted speed limit through the toll bridge facility is 25 mph.

### EASTON-PHILLIPSBURG TOLL BRIDGE APPROACH STRUCTURES

The Commission's jurisdiction includes a total of five (5) approach structures. A 430-foot, five-span plate girder viaduct at the New Jersey approach (Broad Street) and a 40-foot prestressed concrete box beam span over relocated Pennsylvania Route 611 on the Pennsylvania approach. In addition, the Commission's jurisdiction also includes two bridges on the Pennsylvania side; Bank Street Overpass, Third Street Overpass, and one pedestrian tunnel.

Approximately 2,000 feet of the Pennsylvania approach was reconstructed in 1982, including new superstructures for the overpasses at Bank Street, Third Street and Pennsylvania Route 611. The center bearing truss of the Broad Street Viaduct was reconstructed in 2001.

### EASTON-PHILLIPSBURG TOLL BRIDGE FACILITY AND GROUNDS

The one-way toll plaza, located at the New Jersey approach, has five toll lanes. All tollbooths are erected on concrete islands and are protected by an overhead canopy. All lanes are equipped for EZ-Pass.

The 2005 inspection included the main river bridge, five (5) approach bridges and the facilities and grounds.

## **SIGNIFICANT FINDINGS**

### EASTON-PHILLIPSBURG TOLL BRIDGE

The underside of the Easton-Phillipsburg Bridge, which includes the roadway stringers, floorbeams, and the bottom chords of the trusses, has not received an in-depth inspection due

to the limited access to those members without the installation of scaffolding or rigging, and because of the large amount of bird debris on these members. Since bird debris is known to be caustic in nature and cause deterioration of the steel, it is recommended that the underside of bridge be cleaned of all such material and then receive a hands on in-depth inspection.

The general condition of the paint system of the above-deck truss system is fair. The bridge was last painted by contract in 1984. Localized rusting was noted on the truss with numerous areas exhibited paint peeling. Impacted rust was present on a couple of the vertical chord members as well as on the lower chord gusset plate connections. Discoloration was also noted, mostly at the steel above and adjacent to the two right lanes, due to the exhaust fumes from diesel trucks. The floor system paint condition also appeared satisfactory, but with heavy bird debris throughout. Impacted rust was noted between several bridge members and the gusset plate connections.

Transverse cracks were exhibited on the main span's fiber-modified wearing course (with Rosphalt asphalt base course), mainly over floorbeam locations where underlying steel deck repairs were performed by maintenance forces. The patched areas are showing signs of deterioration with cracking and spalling. Sealed longitudinal cracks were also noted in the asphalt in the left lanes of both directions.

The sidewalk reconstruction contract was performed under Contract T-420 and was completed in 2004.

Cover plates over the openings of vertical box members at the sidewalk level were noted to exhibit heavy impacted rust, section loss, and perforations. Several cover plates were missing. Maintenance forces should repair and/or replace the plates.

Bird nesting and debris under the bridge deck of the main span continues to be a problem. Extremely heavy pigeon and starling debris and random nests were noted below deck on all floorbeams, lower chords, bracing, and on the insides of all upper box truss members. High acid levels in the droppings are detrimental to the paint system.

Three cracked welds were discovered in the sign supports attached to the bridge in the westbound lanes. Since the support structure is welded in numerous locations these cracked welds are not significant and no immediate repairs are recommended at this time.

***The 2005 Underwater Inspection Report prepared by The Louis Berger Group, Inc. under Contract C-412A, has found the substructures to be in good condition. No major problems were noted at either abutment in the underwater inspection report.***

## BROAD STREET VIADUCT

Several structural steel members exhibited areas of corrosion beneath the deck joints along curb openings and those exposed directly to the elements. Bearings exhibit light to moderate rusting, especially the base of masonry plates.

The deck overlay exhibits areas of transverse cracking and various areas of bituminous patches. Deterioration was also exhibited near the deck joints. Subsequently, several areas of the underside SIP forms exhibit corrosion, including the sidewalk.

Also at the Broad Street Viaduct, the vertical cracks, noted during the 1998 inspections at Piers 2, 3 and 4 on the vertical connection angles and repaired in 1999, appear to be in satisfactory condition. The repaired crack at Pier 3 crack was observed at the inside face of the south fascia girder. At Pier 2 and 4 the repaired cracks were observed at the floorbeam-kneebrace vertical connection angle at the north girder. Cracks begin at the base of the vertical connection angle adjacent to the floorbeam bottom flange and extended along the fillet of the angle. All repairs appear to be holding and no increase in crack sizes was noted.

Cracks were also noted in the base plates of the bridge railing posts at the north and south side of the Broad Street Viaduct. This condition was more prominent at the north side and in the center spans where the bridge curvature is the greatest.

The bird netting in span 1 has been removed and should be replaced (Maintenance).

### THIRD STREET OVERPASS

The deck joints are in poor condition. These joints, not included in the Rt. 22 repaving project in 2000, exhibit deteriorated strip seals, spalled/cracked header concrete and overall unevenness. The joints are also noted to be actively leaking with minor rusting to the ends of the fascia stringers. In addition, most of the pavement relief joints are also deteriorated.

### PEDESTRIAN TUNNEL

There were no significant defects at the time of the inspection.

### BANK STREET OVERPASS

The deck joints are in poor condition. These joints, not included in the Rt. 22 repaving project in 2000, exhibit deteriorated strip seals, spalling header concrete and settled/missing joint material. Most joints are also noted to be actively leaking. In addition, most of the pavement relief joints are also deteriorated.

The underside of deck overhang exhibited areas of spalling with exposed reinforcement and efflorescence. A number of the bearing anchor bolts on the abutments and piers have sheared off or are missing anchor bolts and exhibit light exfoliated rust. The upper portions (barrier) at the northwest and northeast retaining walls exhibit areas of spalling and delaminated concrete throughout.

The inlet at the northwest corner of the bridge has settled with erosion of the roadway slab subbase material adjacent to the inlet. The concrete sidewalls of the inlet have also spalled with several areas of missing and broken concrete. A possible cause of the deficiency is due to the clogging of the drain pipes, allowing runoff to fill the inlet and erode the roadway

slab subbase material adjacent to the inlet and deteriorating the concrete inlet walls. In addition, a cracked inlet grate was observed along Third Street just north of the Bank Street Overpass.

## ROUTE 611 OVERPASS

The concrete deck and deck joints are deteriorated throughout and have numerous patches, spalls and deteriorated joint material. Maintenance has routinely patched spalls and sealed cracks in the deck and deck joints. The west approach slabs exhibited cracking, spalling and areas of deteriorated bituminous patching.

## EASTON-PHILLIPSBURG TOLL BRIDGE FACILITY AND GROUNDS

Several existing slabs adjacent to the Toll Plaza exhibit medium to wide cracking, spalling and locations of settlement. There are also areas of spalling and cracking along the exit ramp curb east of the toll plaza. In general, the slab replacements and overall toll plaza area are in satisfactory condition with the exception of a few slabs, curbs and pavement relief joints in poor condition.

The steep embankments located at the east and south sides of the maintenance yard, adjacent to the Broad Street ramp, were previously noted to exhibit signs of localized slope failure. Eroded embankment was noted at the base of the slope. These areas appeared stable at the time of this most recent inspection.

The current diesel fuel storage tank, used by Maintenance forces for Commission owned vehicles should be studied to determine if it needs to be upgraded. The current diesel fuel tank has a capacity of 250 gallons and the fuel is dispensed with a hand operated pump. The fuel storage facility at Easton-Phillipsburg is not the same capacity and operation as the other toll facilities.

The roof on the administration building and maintenance garage have exhibited numerous leaks in the past at several locations. Water has previously leaked through the garage roof directly above high-voltage lines, staining walls in the garage. Several other leaking areas have caused staining of the ceiling tiles. The vents in the garage roof are also severely deteriorated. Maintenance forces have covered them with plywood to prevent further water leakage. Maintenance forces are addressing the leaks as they occur with remedial repairs. The roof and vents on the maintenance facility should be analyzed to estimate the costs of replacement.

## CONCLUSIONS

### EASTON-PHILLIPSBURG TOLL BRIDGE

The main river bridge is in satisfactory condition and is structurally adequate to carry legal highway loading at the time of this most recent inspection. ***This is based upon the areas of the bridge that are accessible.***

Access for inspection purposes to the main river span is limited. No underbridge inspection platform exists, and the configuration of pedestrian walkways on the structure effectively preclude the use of underbridge inspection units. Additionally, Commission owned lift trucks are unable to reach the top chords of the main trusses. For these reasons, annual inspection and maintenance operations (i.e. cleaning) have been limited.

It is recommended that a design contract be awarded, which will include but not be limited to, preparing plans and specifications for the cleaning of the underside of the bridge. Following cleaning operations, while the rigging is in place, an in-depth inspection can be performed.

A rehabilitation contract should be performed for the bridges in this facility. An In-Depth Inspection and Rating should be performed to determine the extent of required repairs. Design and repair plans should also be developed to include, at a minimum, the following items:

- Blast cleaning and painting operations
- Mill and repave the main river bridge with an appropriate polymer modified asphalt
- Bird netting installation
- Installation of under bridge inspection access system
- Approach roadway rehabilitation (Rt. 22)

#### BROAD STREET VIADUCT

The Broad Street Viaduct is in satisfactory condition. The following is a list of recommended repairs:

- Blast cleaning and painting
- Mill and repave with an appropriate polymer modified asphalt and deck/deck joint repairs
- Longitudinal trough drainage improvements to Broad Street Viaduct at curbs
- Substructure repairs and waterproofing
- Sidewalk and railing repairs

#### ROUTE 611 OVERPASS

The Route 611 Overpass is in satisfactory condition. Deck joint and/or deck reconstruction is recommended and should be included with any approach roadway work.

#### BANK STREET OVERPASS

The Bank Street Overpass is in satisfactory condition. Deck joint reconstruction and bearing repairs and cleaning/coating the ends of beams and bearings are recommended for this structure.

The inlet at the northwest corner of the bridge and the inlet along Third Street should be repaired (Maintenance).

### THIRD STREET OVERPASS

The Third Street Overpass is in satisfactory condition. Deck joint reconstruction and cleaning/coating the ends of beams and bearings is recommended.

### PEDESTRIAN TUNNEL

The Pedestrian tunnel is in very good condition. Maintenance should continue to perform routine maintenance, as necessary.

## EASTON-PHILLIPSBURG TOLL BRIDGE FACILITY AND GROUNDS

The overhead sign support structure attached to the south fascia of the Broad Street Viaduct, exhibits corrosion, a deteriorating base and peeling paint. The sign support structures on the Pennsylvania approach are in a similar condition. Cracked welds have been found on the bridge mounted sign structures over the westbound lanes near midspan of the main river bridge. Complete replacement of the three sign structures is recommended. A sign structure study has been completed under Contract C-367-B, and construction will take place at the end of 2006.

The deteriorated and cracked concrete slabs on the west side of the Toll Plaza should continue to be replaced. Several of the easterly concrete slabs, especially the westbound lanes, should also be replaced.

A study should be performed to determine the need to replace the diesel fuel storage tanks.

A study should be performed to determine the future salt storage requirements for this facility.

The roof on the administration building and garage should be replaced.

For a list of the required maintenance repair items, see the Tenth Annual Maintenance Report.

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**EASTON-PHILLIPSBURG TOLL BRIDGE FACILITY**

**ESTIMATED COST OF RECOMMENDED IMPROVEMENTS**  
**FUNDED BY THE GENERAL RESERVE FUND**

Contract No.	Bridge and Roadway Recommended Improvements	General Reserve Fund
<b><u>Bridges, Roadways, Sidewalks, and Approaches</u></b>		
436	<b>Sign Structure Replacements, Repairs &amp; Signage Upgrades</b> (Completed in 2006, \$2,711,000)	
437A	<b>E/P Toll Bridge Facility Rehabilitation</b> (Design, Construction, CMCI)	\$10,296,000
477	<b>District II &amp; III Substructure and Scour Remediation</b> (Design, Construction, CMCI)	\$9,600
464A	<b>Clean and Inspect Main Truss</b>	\$1,517,000
TBD	<b>Underbridge Access Platform</b> (Design, Construction, CMCI)	\$500,000
<b><u>Facilities and Grounds</u></b>		
475	<b>AST Diesel Fuel Storage Tank Replacement</b>	\$83,000
470	<b>Replace Roof System on Admin. Building and Garage</b>	\$514,000
480	<b>Fire Protection System in Computer/IT Rooms *</b>	\$52,000
N/A	<b>Asset Management Program *</b>	\$156,500
396	<b>Electronic Surveillance Detection System *</b>	\$2,334,000
N/A	<b>Miscellaneous Projects * (2007-2008)</b>	\$85,000
425	<b>Storm Water Compliance *</b>	\$50,000

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**EASTON-PHILLIPSBURG TOLL BRIDGE FACILITY**

**ESTIMATED COST OF RECOMMENDED IMPROVEMENTS**  
**FUNDED BY THE GENERAL RESERVE FUND**

Contract No.	Bridge and Roadway Recommended Improvements	General Reserve Fund
TBD	HVAC Study and Upgrade (Design, Construction, CMCI)	\$560,000
<b>TOTAL COST</b>		<b><u>\$16,157,100</u></b>

**FUTURE REPAIR CONTRACTS**

(Subject to sufficient appropriation by the Commission)

<u>CONTRACT No.</u>	<u>DESCRIPTION</u>	<u>ESTIMATED COST</u>
479	ITS Improvements *	\$955,000
446	Elec. Toll Collection - Video Enforcement *	\$866,000
<b>TOTAL: Future Repair Contracts</b>		<b><u>\$1,821,000</u></b>

\* Commission Initiative

## **GENERAL**

*In accordance with the Commission's Bridge Inspection Policy, this Toll bridge Facility was last inspected in 2005. The following is therefore taken from the 2005 Annual Inspection Report. Modifications to this report have been identified in bold and italic text.*

### PORTLAND COLUMBIA TOLL BRIDGE

The Portland-Columbia Toll Bridge Facility (Structure No. 400) opened to traffic on December 1, 1953 and converted to westbound only toll collection on May 25, 1989, connects Pennsylvania Route 611 at Portland, Pennsylvania with U.S. Route 46 at Columbia, New Jersey. US Route 46 merges with Interstate 80 located just north of the bridge on the New Jersey approach.

The main river bridge consists of a ten-span steel girder system with an approximate total length of 1,309 feet, a 32-foot curb-to-curb-width and a posted speed limit of thirty five miles per hour. A rehabilitation contract performed in 1992 included replacement of the existing concrete deck with a cast-in-place deck and concrete safety parapets. The combination sidewalk and maintenance-walk were removed and a new lighting system on the downstream side of the main bridge installed. Approach roadway improvements (NJ and PA) and new drainage systems were also implemented. More recently in 1998, the main river bridge, the pedestrian bridge 1,000 feet north of the toll bridge, and approach structures were cleaned and painted by contract.

The substructures consist of reinforced concrete piers and concrete bin abutments. All substructures are founded on spread footings, except for pier 8, which is founded on piles. The piers are partially granite faced.

### PORTLAND COLUMBIA APPROACH BRIDGES

The Commission's jurisdiction on the New Jersey approach includes two additional bridges: the US Route 46 and Locust Street Overpasses. Deck and barrier replacements were made on these two bridges in conjunction with the main river bridge's 1992 rehabilitation contract.

### PORTLAND COLUMBIA TOLL BRIDGE FACILITY AND GROUNDS

The one-way toll plaza, located at the Pennsylvania approach, has three toll lanes. All tollbooths are erected on concrete islands and are protected by an overhead canopy. All lanes are equipped for EZ-Pass.

The 2005 inspection included the main river bridge, two (2) approach structures, and the facility and grounds.

## **SIGNIFICANT FINDINGS**

### PORTLAND COLUMBIA TOLL BRIDGE

The bridge was repainted in 1998. The paint is in good condition.

Fine to medium transverse cracks were observed throughout the main river bridge concrete deck. Above-deck transverse cracks, more prevalent in the middle bay, were also noted below-deck with efflorescence and indicates water infiltration.

The side bracket on the Pier 6 north bearing of span 7, which allows rotation of the bearing during expansion, was repaired subsequent to the 2003 inspection.

Several locations of steel, although cleaned and painted in 1998, exhibit small perforations or noticeable section losses, pitting and pack rust especially at support locations and the exposed fascias.

The two cantilever sign structures attached to the bridge are not plumb and level. The sign panels were recently replaced along with the EZ-Pass upgrades.

### ROUTE 46 OVERPASS

No significant defects were observed at the time of this year's inspection. The paint system is in overall good condition. Maintenance forces should continue to perform routine maintenance as needed.

### LOCUST STREET OVERPASS

The paint system is in overall good condition. The deck joints are leaking at the piers due to deteriorated joint material and gaps at the headers. The leaking is causing rust to the underlying steel and staining on the pier caps. In addition, concrete repairs made to the piers have begun to crack and spall.

### PORTLAND COLUMBIA TOLL BRIDGE FACILITY AND GROUNDS

The maintenance parking lot is in fair to poor condition with overall unevenness and cracking of the asphalt pavement. In addition, the additional storage yard and the driveway are in poor condition with numerous areas of deteriorated pavement.

***The roof on the maintenance garage and administration building has been replaced in 2006 under Contract 470.***

The HVAC controls are original to when the facility was built approximately 20 years ago. Maintenance has indicated that the controls are not working properly and that repair parts are difficult to find.

## PORTLAND COLUMBIA TOLL BRIDGE FACILITY

Permanent impact attenuators (protective crash cushions) should be installed at the islands for increased protection of the traveling public and Commission employees.

The paint system on the overhead sign structure over the eastbound roadway located at the west approach is in poor condition with areas of rust.

***The 2005 Underwater Inspection Report prepared by The Louis Berger Group, Inc under Contract C-412A was found to be in good condition. However, the report recommended spall repairs, crack repairs, and riprap channel protection around Pier 5 through 8 .***

Maintenance has indicated that the salt storage capacity is insufficient for the entire district. Additionally, the current facility is constructed of CMU walls and exhibits signs of deterioration in areas of direct contact with salt; additionally, the roof exhibited impact damage.

### **CONCLUSIONS**

#### PORTLAND COLUMBIA TOLL BRIDGE

The main river bridge is in good condition and is considered to be structurally adequate to carry legal highway loads at the time of this year's inspection. The locations of steel that exhibited small perforations or noticeable section losses, pitting and pack rust at the exposed fascias have been evaluated and due to the location and extent of the deficiencies it does not affect the load carrying capacity of the bridge.

***A Substructure and Scour Remediation Contract (Below Water Line) should be performed to repair any substructure deterioration noted in the 2005 Underwater Inspection Report.***

#### ROUTE 46 OVERPASS

The US Route 46 Overpass is in very good condition. Maintenance should continue to make repairs as needed.

#### LOCUST STREET OVERPASS

The Locust Street Overpass is in satisfactory condition. The bridge deck joints should be reconstructed (or at minimum new strip seals) to prevent advanced deterioration of the bearings and pier caps. Also, drainage troughs should be considered beneath the pier deck joints. Interim substructure repairs have been made by maintenance forces. A Rehabilitation Contract should be performed that would include the in-depth inspection, design and repair plan development for the bridge.

*PORTLAND COLUMBIA TOLL BRIDGE FACILITY*

PORTLAND COLUMBIA TOLL BRIDGE FACILITY AND GROUNDS

The maintenance (rear) parking lot and areas of the storage yard access should be reconstructed.

***The facility's sanitary system should be upgraded and connected to the municipal system to avoid any potential problems with the current septic system.***

A study of the sign structures at the Portland-Columbia Facility should be conducted to determine conformance with MUTCD requirements and the need for strengthening/replacing the structures.

A study should be performed on the HVAC controls to determine what components need upgrading, or if the entire system should be upgraded.

Permanent impact attenuators should be installed at the toll plaza.

A study is recommended to be performed to determine the District's deicing requirement. The study should include but, not limited to determining salt storage capacity, storage location, type of storage and any additional deicing capabilities.

For a list of the required maintenance repair items, see the Tenth Annual Maintenance Report.

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**PORTLAND COLUMBIA TOLL BRIDGE FACILITY**

**ESTIMATED COST OF RECOMMENDED IMPROVEMENTS**  
**FUNDED BY THE GENERAL RESERVE FUND**

Contract No.	Bridge and Roadway Recommended Improvements	General Reserve Fund
<b><u>Bridges, Roadways, Sidewalks, and Approaches</u></b>		
441	<b>Locust Street Bridge Rehabilitation</b> (Design, Construction, CMCI) Includes Impact Attenuators @ Toll Plaza	\$676,000
366	<b>Substructure &amp; Scour Remediation Contract</b> (Inspection) (2005 Underwater Inspection - Completed in 2006, \$5,000)	
477	<b>District II &amp; III Substructure and Scour Remediation</b> (Design, Construction, CMCI)	\$109,000
<b><u>Facilities and Grounds</u></b>		
439	<b>Replace Roof System on Administration Building and Garage</b> (Completed in 2006, \$307,300)	
480	<b>Fire Protection System in Computer/IT Rooms *</b>	\$52,000
N/A	<b>Asset Management Program *</b>	\$156,500
396	<b>Electronic Surveillance Detection System *</b>	\$1,500,000
N/A	<b>Miscellaneous Projects * (2007-2008)</b>	\$43,000
425	<b>Storm Water Compliance *</b>	\$50,000
TBD	<b>Rear Parking lot, Storage Yard and Driveway Paving</b>	\$268,000
TBD	<b>Maintenance Deicing Study and Implementation</b>	\$1,152,000

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**ESTIMATED COST OF RECOMMENDED IMPROVEMENTS**  
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Contract No.	Bridge and Roadway Recommended Improvements	General Reserve Fund
TBD	HVAC Study and Upgrade (Design, Construction, CMCI)	\$560,000
TBD	Municipal Sanitary Upgrade	\$650,000
471	PC Signage Study	\$78,000
<b>TOTAL COST</b>		<b><u>\$5,294,500</u></b>

**FUTURE REPAIR CONTRACTS**

(Subject to sufficient appropriation by the Commission)

<u>CONTRACT No.</u>	<u>DESCRIPTION</u>	<u>ESTIMATED COST</u>
446	Elec. Toll Collection - Video Enforcement *	\$519,000
<b>TOTAL: Future Repair Contracts</b>		<b><u>\$519,000</u></b>

\* Commission Initiative

## **GENERAL**

*In accordance with the Commission's Bridge Inspection Policy, this Toll bridge Facility was last inspected in 2005. The following is therefore taken from the 2005 Annual Inspection Report. Modifications to this report have been identified in bold and italic text.*

### DELAWARE WATER GAP TOLL BRIDGE

The Delaware Water Gap Toll Bridge (Structure Nos. 380 & 390) carries Interstate 80 across the Delaware River near Stroudsburg, Pennsylvania, providing a 'gateway' from eastern metropolitan districts to the Pocono recreational areas. Through Pennsylvania, the four-lane limited access highway crosses the width of Pennsylvania to the Ohio border and directly connects to the Ohio Turnpike. On the New Jersey side, Interstate 80 connects the Delaware Water Gap Bridge to the George Washington Bridge.

The toll bridge, built by the Commission and opened on December 16, 1953, is a twin, multi-span, steel plate girder bridge 2,465 feet in length. The dual roadways are each 28 feet wide (curb to curb), separated by an aluminum median barrier. A 5-foot wide sidewalk is located on the south side of the eastbound roadway, separated from the travel lanes by a concrete barrier. The speed limit on the approach roadways is fifty miles per hour.

Major rehabilitation work was completed in 1989, which included reconstruction of the toll plaza for one-way toll collection (8 total, westbound), deck replacement, the construction of a New Jersey approach pedestrian walkway, toll plaza access tunnel, and miscellaneous pavement replacements. Other work included in this contract consisted of the installation of the aluminum median barrier, lighting and signing. All toll lanes are equipped for EZ-Pass.

### DELAWARE WATER GAP TOLL BRIDGE FACILITY AND GROUNDS

The one-way toll plaza, located at the Pennsylvania approach, has seven (7) toll lanes. All tollbooths are erected on concrete islands and are protected by an overhead canopy. All lanes are equipped for EZ-Pass.

The 2005 inspection included the eastbound and westbound main river bridges and the facility and grounds.

## **SIGNIFICANT FINDINGS**

### DELAWARE WATER GAP TOLL BRIDGE FACILITY

The cast-in-place microsilica concrete (bridge deck slab) roadway and sidewalk deck, installed in 1989, exhibits numerous fine to medium transverse cracks. These cracks were formed during initial pouring procedures. Cores taken in 1989 and again in 1996 showed cracks to have grown to a maximum width of 1/16" at some locations, and also showed no signs of corrosion to reinforcement. The most recent inspection revealed little to no rust on

## *DELAWARE WATER GAP TOLL BRIDGE FACILITY*

the stay-in-place forms below and no significant changes in the cracks on the deck slab surface. The transverse cracking throughout the bridge deck (including the sidewalk overhang) does not pose a structural concern at this point. Although the visible portions of the deck appear unaffected, remedial action should be taken to prevent water infiltration through the cracks and the creation of future structural problems.

Longitudinal cracks were also exhibited throughout the bridge deck. Cracks appear to be located over stringer locations. Water laden with deicing chemicals penetrating the combination of transverse and longitudinal cracks may eventually cause spalling in the deck.

The paint condition of the bridge is in generally fair condition (last painted in 1978), with the exception of interior (median) and exterior fascia girders on both roadways, which exhibit moderate rusting and exfoliated rust. The median girders and fascia girders often exhibit moderate to severe impacted rust between the bottom flange plates as well as a build-up of debris. Fascia girders also exhibit rusting at the former sidewalk bracket locations. Most steel exhibits random paint peeling and areas of concrete staining occurring from the 1989 deck replacement.

Bearings also exhibit moderate to heavy rusting, with minor section loss to nuts and bolts; exposed fascia bearings exhibit the worst condition. Rocker bearings have begun to wear depressions into the masonry plates at several bearing locations. Numerous keeper angles (providing restraint against transverse movement) at the expansion bearings exhibit severe wear and rust at the retainage bolt locations. Some retainage bolts were noted to be missing.

The deck joints on the bridge are an additional concern. Deck joints, rebuilt during the deck replacement of 1989, are comprised of steel plates welded to the original finger joints, combined with steel angle armoring and strip seals. The "Seva" patch material, used as the joint header material, is showing signs of separation from the steel armoring as well as the adjacent concrete deck, allowing water to infiltrate to underlying steel and the bearings. The header material has also settled slightly and has formed medium to large spalls at some locations. Vehicular impact is escalating the deterioration. Maintenance has been repairing spalls as they develop.

It has been noted that an elevation difference is apparent at the deck joints between adjacent spans. This is most notable at Piers 3W and 4W. The differences appear to be unchanged from the last inspection. Measurements were also taken of the bearings and adjacent masonry. See the monitoring program for specific measurements.

An upper substructure partial rehabilitation was performed by Maintenance forces. Unsound concrete was removed at numerous locations on the upper portion of piers, which exposed reinforcing steel at several locations. This reinforcing steel was cleaned and epoxy coated. Due to the work effort involved, all such areas should be patched by an outside contractor to provide concrete cover over the currently exposed reinforcement bars.

## *DELAWARE WATER GAP TOLL BRIDGE FACILITY*

Additional areas of unsound concrete and incipient spalling were also noted. Most of the damage was noted on the east face of substructures.

The bridge mounted cantilever sign structure is not plumb and level. All members of the structure, including the bridge attachments, exhibit heavy rust. Maintenance forces noted a deflection of the sign structure when the current sign panel was installed. It was observed that the sign structure is deflected, however this deflection does not appear to affect the structural capacity of the sign structure.

***The 2005 Underwater Inspection Report prepared by The Louis Berger Group, Inc. under Contract C-412A, has found the substructures to be in satisfactory condition for both the eastbound and westbound bridges, due to the spalls with exposed and rusted rebar on the concrete pier caps and stems and exposure of footings with no undermining.***

### DELAWARE WATER GAP TOLL APPROACH ROADWAYS

Reconstruction of the Service Road in New Jersey, which included milling and re-paving from the concrete pavement portion of the roadway east to the Commissions jurisdiction limit with the National Park Service was underway at the time of this years inspection.

The storm water outfalls and embankment slope improvements along the New Jersey Service Road have been reconstructed.

The concrete retaining wall adjacent to the Delaware River, just south of the eastbound bridge and New Jersey Service Road, exhibits moderate to heavy spalling and scaling throughout the upper portions of the wall and barriers.

### DELAWARE WATER GAP TOLL BRIDGE FACILITY AND GROUNDS

The District III Superintendent has requested that the existing Maintenance Facility be expanded. The maintenance garage currently does not have bathroom facilities, locker room facilities and lunch room facilities as are present in the other Commission toll facilities. Several of the Commission vehicles are parked outside in the elements and away from the other equipment at this toll facility. A training/meeting room for the District is requested to allow for uninterrupted meetings that normally take place in the garage area. It is anticipated that this building expansion would be a two-story addition.

***The roof on the maintenance garage and administration building has been replaced in 2006 under Contract 439.***

Permanent attenuators (protective crash cushions) should be considered for installation at the islands for increased protection to the traveling public and Commission employees.

Maintenance has indicated that the salt storage capacity is insufficient for the entire district. In the event of a major snowstorm, a shortage of salt may occur.

## **CONCLUSIONS**

### DELAWARE WATER GAP TOLL BRIDGE

The bridge is in overall satisfactory condition and is structurally adequate to carry legal highway loading at the time of this year's inspection. The main river bridge and other Commission owned facilities appear to have been well maintained over the years.

A substructure and bearing rehabilitation contract is recommended for this facility. Repair plans should then be developed (including design) for bearing keeper plates, substructure repairs and any other required repairs. A deck condition survey should be performed due to the fine cracks observed throughout the deck.

In addition, a future rehabilitation contract is recommended for this facility. An In-Depth Inspection and Rating should be performed to determine areas requiring rehabilitation. A bridge deck condition study should also be included to determine if any deterioration has occurred. Blast cleaning and painting should also be included. Under this contract, it is recommended that a membrane waterproofing, capable of stopping reflective cracking, and an asphalt overlay be placed on the deck to prevent water seepage into the cracks. New deck joints should be included. Additionally, permanent impact attenuators should be considered to be installed at the toll plaza.

***A Substructure and Scour Remediation Contract (Below Water Line) should be performed to repair any substructure deterioration noted in the 2005 Underwater Inspection Report.***

### DELAWARE WATER GAP TOLL BRIDGE APPROACH ROADWAYS

Repairs to the concrete retaining wall adjacent to the Delaware River, just south of the eastbound bridge and New Jersey Service Road should be included in the bridge rehabilitation contract.

## DELAWARE WATER GAP TOLL BRIDGE FACILITY AND GROUNDS

A study for the expansion and modifications of the Maintenance Garage is recommended.

A study should be performed on the HVAC controls to determine what components need upgrading, or if the entire system should be upgraded.

A study is recommended to be performed to determine the District's deicing requirement. The study should include but, not limited to determining salt storage capacity, storage location, type of storage and any additional deicing capabilities.

For a list of the required maintenance repair items, see the Tenth Annual Maintenance Report.

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**DELAWARE WATER GAP TOLL BRIDGE FACILITY**

**ESTIMATED COST OF RECOMMENDED IMPROVEMENTS**  
**FUNDED BY THE GENERAL RESERVE FUND**

Contract No.	Bridge and Roadway Recommended Improvements	General Reserve Fund
<b><u>Bridges, Roadways, Sidewalks, and Approaches</u></b>		
395	<b>Northerly Corridor Congestion Mitigation Study *</b> (Completed in 2006, \$562,500)	
440	<b>DWG Open Road Tolling (ORT) Lanes &amp; One Additional WB Lane *</b> (Includes Impact Attenuators and ETC Video Enforcement)	\$4,486,000
472	<b>Substructure and Bearing Remediation Contract</b>	\$1,189,000
473	<b>Deck Condition Survey</b>	\$104,000
366	<b>Substructure &amp; Scour Remediation Contract, (Inspection)</b> (2005 Underwater Inspection - Completed in 2006, \$10,300)	
477	<b>District II &amp; III Substructure and Scour Remediation</b> (Design, Construction, CMCI)	\$252,000
<b><u>Facilities and Grounds</u></b>		
439	<b>Replace Roof System on Admin. Building and Garage</b> (Completed in 2006, \$397,000)	
474	<b>Maintenance Garage Expansion</b>	\$2,610,000
480	<b>Fire Protection System in Computer/IT Rooms *</b>	\$52,000
N/A	<b>Asset Management Program *</b>	\$156,500
396	<b>Electronic Surveillance Detection System *</b>	\$2,419,000
N/A	<b>Miscellaneous Projects * (2007-2008)</b>	\$106,000
425	<b>Storm Water Compliance *</b>	\$50,000

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**DELAWARE WATER GAP TOLL BRIDGE FACILITY**

**ESTIMATED COST OF RECOMMENDED IMPROVEMENTS**  
**FUNDED BY THE GENERAL RESERVE FUND**

Contract No.	Bridge and Roadway Recommended Improvements	General Reserve Fund
TBD	HVAC Study and Upgrade (Design, Construction, CMCI)	\$560,000
<b>TOTAL COST</b>		<b><u>\$11,984,500</u></b>

**FUTURE REPAIR CONTRACTS**

(Subject to sufficient appropriation by the Commission)

<u>CONTRACT No.</u>	<u>DESCRIPTION</u>	<u>ESTIMATED COST</u>
479	ITS Improvements *	\$955,000
440	DWG Open Road Tolling (ORT) Lanes & One Additional WB Lane *	\$187,600,000
<b>TOTAL: Future Repair Contracts</b>		<b><u>\$188,555,000</u></b>

\* Commission Initiative

## **GENERAL**

*In accordance with the Commission's Bridge Inspection Policy, this Toll bridge Facility was last inspected in 2005. The following is therefore taken from the 2005 Annual Inspection Report. Modifications to this report have been identified in bold and italic text.*

### MILFORD MONTAGUE TOLL BRIDGE

The Milford-Montague Toll Bridge (Structure No. 400) is the northern-most toll bridge across the Delaware River under the Commission's jurisdiction. Located seven miles south of the New Jersey/New York state line, the bridge connects U.S. Route 206 at Montague, New Jersey to U.S. Routes 6 and 209 at Milford, Pennsylvania.

The toll bridge, built by the Commission and opened to traffic on December 30, 1953, is a four-span continuous steel deck truss bridge approximately 1,150 feet in total length. The two-lane bridge has a roadway width of 27 feet 6 inches, with a 4 foot sidewalk located on the outside of the north truss. At the Pennsylvania approach, there are three westbound toll collection lanes that are protected by a canopy and founded on concrete islands. The three toll lanes are equipped for EZ-Pass. The posted speed limit on the New Jersey Approach is forty miles per hour.

### MILFORD MONTAGUE TOLL BRIDGE FACILITIES AND GROUNDS

In 1982 the original deck was replaced with precast concrete deck panels and stringers were relocated (and a fifth stringer added) for the addition of the cantilevered sidewalk. Also included in this 1982 rehabilitation project were modifications to the substructures and bridge lighting, and the addition of the aluminum safety barriers. Maintenance forces finished the reconstruction of the Pennsylvania toll plaza in 1999, converting it to one-way tolls. This project included removing two toll booths and their respective lanes, canopy and reconstructing slabs and installing median barrier and impact attenuators on the ends of the median barrier. In 1998 the New Jersey approach was milled and repaved by contract.

The 2005 inspection included the main river bridge and maintenance facility and grounds.

## **SIGNIFICANT FINDINGS**

### MILFORD MONTAGUE TOLL BRIDGE

The overall paint condition of the superstructure is fair, with many areas of localized poor conditions. The bridge was last sand blast cleaned and painted by contract in 1971.

The deck is composed of precast concrete deck panels, which were installed in 1982. Overall the panels are in structurally good condition with localized areas of spalling and exposed reinforcement. However, the transverse joints between precast panels, as well as

## MILFORD-MONTAGUE TOLL BRIDGE FACILITY

the full-length longitudinal joint, have a history of leaking. Heavy rusting with localized losses was noted below the deck at the median stringer, locally on adjacent stringers, and at floorbeams beneath panel and deck joints. Transverse cracks with efflorescence were also exhibited on the underside of the concrete deck panels directly beneath transverse joints, as well as other random locations. Maintenance forces have performed remedial repairs by sealing the transverse joints as a regular maintenance item, but evidence of water infiltration noted in localized areas during the inspection. In addition, loose concrete has been removed and any exposed reinforcement has been sealed with epoxy to prevent rusting.

No deck joint drainage trough is present beneath the west abutment finger joint. Water drains directly onto the bridge seat and down the abutment walls. This water leakage is most likely the cause of the past deterioration of the slope protection and swales in front of the west abutment. Maintenance forces have repaired the slope protection and swales. Underlying steel, including the bearings, also exhibit moderate rusting.

There is a slight difference in elevation (approximately ¼") at the east abutment deck joint that has the potential to snag a snow plow.

At several locations, the bridge scupper pipes are located directly above structural steel, causing water to drop onto underlying steel such as gusset plates and crossbracing. Rust is developing at these locations, especially the bottom chord.

The top and bottom truss chord inverted I-beam was noted to exhibit light rust with water staining in the horizontal web.

The deck slab expansion joints, located at pier and abutment locations, showed severe signs of leakage, signified by the moderately to severely rusted floorbeams, stringers, and diaphragms at these locations. Stringer support to floorbeams exhibited moderate to severe section loss to bolts, nuts and seat brackets.

***The 2005 Underwater Inspection Report prepared by The Louis Berger Group, Inc. under Contract C-412A, has found the substructures to be in good condition. Although no undermining was observed during the underwater inspection, the Pier 2 footing was found to be partially exposed.***

### MILFORD MONTAGUE TOLL BRIDGE FACILITIES AND GROUNDS

At the Pennsylvania approach, just east of the toll plaza, the concrete slabs exhibit severe slab deterioration. Numerous wide cracks and medium to large spalls throughout the slabs and inlet areas were present. The pavement relief joint has also deteriorated. The westbound toll plaza concrete slabs, west of the toll plaza, were recently rehabilitated by Maintenance forces in 1999 and 2000 and appear to be in generally good condition with minor patched areas.

***The roof on the maintenance garage and administration building has been replaced in 2006 under Contract 439.***

The water storage system for the facilities is showing signs of distress. The pressure vessel, original to the 1953 construction, utilizes mercury controllers and is in need of relining. Water pressure has been an issue and on occasions, the toilets will not flush. Due to the distance to the nearest fire hydrant, fire protection at the facility is below that of other toll bridge facilities. ***This work would include upgrades to the water supply system and connection to the public water supply.***

Permanent attenuators (protective crash cushions) should be considered to be installed at the islands for increased protection to the traveling public and Commission employees.

The paint system is failing on the steel cantilever sign structures with multiple areas of light rust. According to Maintenance, the sign panels also appear to have lost their reflectivity.

Maintenance has indicated that the salt storage capacity is insufficient for the entire district. In the event of a major snowstorm, a shortage of salt may occur.

## **CONCLUSIONS**

### **MILFORD MONTAGUE TOLL BRIDGE**

The toll bridge is in overall fair condition and is structurally adequate to carry legal highway loading at the time of this year's inspection.

A design contract for the Rehabilitation of the Milford-Montague Toll Bridge (Contract C430-A) is underway. Some of the proposed improvements are as follows:

- Structure Rehabilitation (Including Substructure and Superstructure, above the Waterline);
- Approach Roadway Rehabilitation/Reconstruction (including NJ/PA intersections)
- Drainage Improvements
- Slope Reconstruction and Stabilization of areas immediately surrounding scupper outfalls
- Roadway Signing and Sign Structures
- Blast Cleaning and Painting (Bridge Superstructure)
- Bridge Deck Rehabilitation
- Toll Plaza Rehabilitation
- Parking Lot Reconstruction

The finger deck joint at the west abutment should be given a trough system beneath the dam opening (similar to the east abutment) to collect water and debris. Prior to the rehabilitation above, Maintenance forces should maintain awareness of the east abutment finger joint snag potential when plowing.

## *MILFORD-MONTAGUE TOLL BRIDGE FACILITY*

Bridge scuppers should be re-directed so the water does not fall onto structural steel. This could be accomplished by the extending the drain pipes below the structural steel. Small drainage “weep” holes should also be considered in the truss' bottom chord I-beams. This work should be included in the Rehabilitation contract.

***A Substructure and Scour Remediation Contract (Below Water Line) should be performed under a separate contract and should include repair of any substructure deterioration and scour countermeasures noted in the 2005 Underwater Inspection Report.***

### MILFORD MONTAGUE TOLL BRIDGE FACILITIES AND GROUNDS

The sign panels on the sign structures should be replaced with reflective panels and should be analyzed for MUTCD conformance. The deteriorated cantilever sign structure on the west approach should be replaced. All work will be included in the bridge rehabilitation contract.

The need for permanent impact attenuators should be investigated under the rehabilitation design Contract C430-A.

It is recommended that the water supply be upgraded. Upgrades to the water supply system and connection to the public water supply is underway under Contract T-432A.

A study is recommended to be performed to determine the District's deicing requirement. The study should include but, not limited to determining salt storage capacity, storage location, type of storage and any additional deicing capabilities.

For a list of the required maintenance repair items, see the Tenth Annual Maintenance Report.

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**MILFORD-MONTAGUE TOLL BRIDGE FACILITY**

**ESTIMATED COST OF RECOMMENDED IMPROVEMENTS**  
**FUNDED BY THE GENERAL RESERVE FUND**

Contract No.	Bridge and Roadway Recommended Improvements	General Reserve Fund
<b><u>Bridges, Roadways, Sidewalks, and Approaches</u></b>		
430	<b>Rehabilitation Contract</b> (Design, Construction, CMCI)	\$18,526,000
366	<b>Substructure &amp; Scour Remediation Contract</b> (Inspection) (2005 Underwater Inspection - Completed in 2006, \$4,000)	
477	<b>District II &amp; III Substructure and Scour Remediation</b> (Design, Construction, CMCI)	\$78,000
<b><u>Facilities and Grounds</u></b>		
439	<b>Replace Roof System on Admin. Building and Garage</b> (Completed in 2006, \$279,000)	
432	<b>Municipal Water Supply Upgrade</b>	\$657,000
480	<b>Fire Protection System in Computer/IT Rooms *</b>	\$52,000
N/A	<b>Asset Management Program *</b>	\$156,500
396	<b>Electronic Surveillance Detection System *</b>	\$1,650,000
N/A	<b>Miscellaneous Projects * (2007-2008)</b>	\$74,000
425	<b>Storm Water Compliance *</b>	\$50,000

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**MILFORD-MONTAGUE TOLL BRIDGE FACILITY**

**ESTIMATED COST OF RECOMMENDED IMPROVEMENTS**  
**FUNDED BY THE GENERAL RESERVE FUND**

Contract No.	Bridge and Roadway Recommended Improvements	General Reserve Fund
TBD	HVAC Study and Upgrade (Design,Construction, CMCI)	\$397,000
<b>TOTAL COST</b>		<b><u>\$21,640,500</u></b>

**FUTURE REPAIR CONTRACTS**

(Subject to sufficient appropriation by the Commission)

<u>CONTRACT No.</u>	<u>DESCRIPTION</u>	<u>ESTIMATED COST</u>
446	Elec. Toll Collection - Video Enforcement *	\$519,000
<b>TOTAL: Future Repair Contracts</b>		<b><u>\$519,000</u></b>

\* Commission Initiative

# **ANNUAL INSPECTION REPORTS**

## **TOLL SUPPORTED BRIDGES**

## *LOWER TRENTON BRIDGE*

### **GENERAL**

The Lower Trenton Bridge (Structure No. 40), also known as the ‘Trenton Makes’ Bridge, carries Bridge Street traffic from Trenton, New Jersey to Morrisville, Pennsylvania; one of three bridges connecting these two towns.

The superstructure is a five-span subdivided Warren Truss built in 1928, with a total length of approximately 1,022 feet. The roadway consists of two lanes, one lane in each direction separated by the center truss. The substructure, originally built in 1804, widened and raised in 1874, consists of stone masonry.

The downriver truss displays the “Trenton Makes The World Takes” sign which is mounted to the truss members; hence, the nickname ‘The Trenton Makes Bridge’. The original sign was erected in 1935 and replaced in 1981.

The bridge is currently posted for a five-ton weight limit restriction and a twenty-five mile per hour speed limit. The bridge is also posted for a ten-foot vertical clearance.

In accordance with Commission’s bridge inspection policy, this structure was inspected in 2006. This inspection included all five (5) spans, the substructure units and the west approach roadway. The east approach bridge is NJDOT owned and was not part of the inspection.

### **SIGNIFICANT FINDINGS**

The bridge appears to be in good condition.

The structure has undergone extensive cleaning and painting of the above deck structural steel and sidewalk railings. As part of this renovation project, a new “Trenton Makes” sign has been installed addressing the lighting and maintenance problems associated with the old sign technology.

The sway frame between the center and outer trusses exhibits old impact damage at a few locations. Missing rivets (2 of 35 rivets) were found at the center truss top chord connection in span 4. The missing rivets and impact damage do not affect the structural capacity of the connections.

Rust stains were observed throughout the metalized superstructure, as a result of light rusting of the open grate steel decking. The steel members that were inaccessible during cleaning and metalizing in 1997, in particular portions of the truss bottom chord, are rust staining the adjacent steel since they do not have a protective coating. The bearings exhibited minor corrosion and deterioration of the anchor bolts, none of which are of major concern at this time.

## *LOWER TRENTON BRIDGE*

The substructures are in generally good condition above the waterline. The lower portions of the west abutment exhibited loose or missing mortar joints. In general mortar joints of the substructures below high water line are deteriorating.

The officer's shelter located on the Pennsylvania side of the bridge has been replaced in 2006.

An upgrade of the traffic signals at the intersection of Warren and Bridge Streets, and Warren Street and the Route 1 Ramp was performed in 2006 by the New Jersey Department of Transportation (NJDOT) via a purchase order issued to NJDOT by the Commission.

The east abutment deck joint sealer in the westbound lanes has become dislodged allowing water to infiltrate on to the bridge seat.

The 2005 Underwater Inspection Report prepared by The Louis Berger Group, Inc., has found the substructures to be in fair condition. The underwater inspection noted that the upstream portion of the substructures exhibited undermining of the concrete aprons and the PA abutment's upstream retaining wall also exhibited scour along the full length. The upstream end of pier 3 exhibited split and missing stone masonry and deteriorated mortar joints. Estimated repair costs have been included in this report.

### **CONCLUSIONS**

The bridge is in overall good condition and is structurally adequate to carry the posted weight limit at the time of the inspection.

A Substructure and Scour Remediation Contract (Below Water Line) should be performed to repair any substructure deterioration noted in the 2005 Underwater Inspection Report. Pointing of deteriorated mortar joints should also be addressed.

For a list of the required maintenance repair items, see the Tenth Annual Maintenance Report.

## LOWER TRENTON BRIDGE

### ESTIMATED COST OF RECOMMENDED IMPROVEMENTS FUNDED BY THE GENERAL RESERVE FUND

Contract No.	Bridge and Roadway Recommended Improvements	General Reserve Fund
<b><u>Bridges, Roadways, Sidewalks, and Approaches</u></b>		
398	<b>Rehabilitation Contract</b> (Design, Construction, CMCI) Above Deck Painting, Sign Rehabilitation (Completed in 2006, \$4,576,000)	
366	<b>Substructure &amp; Scour Remediation Contract</b> (Inspection) (2005 Underwater Inspection - Completed in 2006, \$22,400)	
476	<b>District I Substructure and Scour Remediation</b> (Design, Construction, CMCI)	\$419,000
<b><u>Facilities and Grounds</u></b>		
N/A	<b>Miscellaneous Projects</b> * (2007-2008)	\$22,000
396	<b>Electronic Surveillance Detection System</b> *	\$1,050,000
N/A	<b>Traffic Signal Upgrade At Warren/Bridge Streets</b> (Completed in 2006, \$11,600)	
N/A	<b>Traffic Signal Upgrade at Route 1 Ramp/Warren Street</b> (Completed in 2006, \$9,000)	
<b>TOTAL COST</b>		<b>\$1,491,000</b>

### FUTURE REPAIR CONTRACTS

(Subject to sufficient appropriation by the Commission)

<u>CONTRACT No.</u>	<u>DESCRIPTION</u>	<u>ESTIMATED COST</u>
N/A	N/A	
<b>TOTAL: Future Repair Contracts</b>		<b>\$0</b>

\* Commission Initiative

## *CALHOUN STREET BRIDGE*

### **GENERAL**

The Calhoun Street Bridge (Structure No. 60) is one of three bridges constructed to connect Trenton, New Jersey and Morrisville, Pennsylvania. Toll collection was discontinued at the time of the Commission's purchase on November 14, 1928. The truss was built in 1884 and the stone masonry substructure was built in 1859.

The bridge is a seven-span, wrought iron, pin-connected Phoenix Pratt truss with a total length of 1,274 feet. The open steel-grate roadway provides a clear width of eighteen feet, four inches between the three-beam guide rails. A timber plank sidewalk is supported by the upper truss on steel cantilever brackets. The bridge is currently posted for a three-ton weight limit and a fifteen-mile per hour speed limit.

In accordance with Commission's bridge inspection policy, this structure was inspected in 2006. This inspection included all seven (7) spans, the substructure units and both approach roadways.

### **SIGNIFICANT FINDINGS**

Since the previous inspection, no major work has been performed. There has been an additional fiber optic conduit installed across the structure with several timber planks replaced.

Interim strengthening of steel stringers and floor beams was performed under Contract No. TS-390 in 2003. The interim repairs were necessary to maintain the current bridge rating of three tons. Also, the intersection on the Pennsylvania approach was milled and repaved.

It has been determined previously that the bridge can safely support the posted vehicular loading of 3 tons when every other stringer is in satisfactory condition according to the 1998 repair contract (Contract No. 345) prepared by the DRJTBC Engineering Department in conjunction with Michael Baker Jr., Inc. The work was performed by an outside contractor, and consisted of removing and replacing of alternate (odd numbered) lines of stringers which were determined to be in unsatisfactory condition. Stringers located in the even numbered lines which were determined to be beyond repair were flame cut and removed during this contract.

Approach sidewalks exhibited wide cracks, spalling and scaling due to age and wear and tear.

The upper truss members were last painted in 1985. The paint system above the deck is in generally satisfactory to fair condition, with localized areas of peeling paint. The floor system was last painted in 1982 and the paint system is in poor condition.

The steel open-grate deck appears to be in fair condition, with signs of wear. Small sections of decking have been broken off or removed in span 1. Cracks in the span 7 deck plate have developed from vehicular wear and tear.

## *CALHOUN STREET BRIDGE*

The below-deck superstructure not included in the recent interim repairs is in poor condition. Stringers exhibited severe section loss at numerous locations, mostly in even lines. A number of stringers, mainly in even lines, had the bottom flange and lower web completely removed. Perforations of the lower webs of stringers were also noted. Floor beams typically exhibited light to moderate rust with several end floor beams exhibiting severe exfoliated rust, especially at bottom flanges and lower webs, with locations of web perforations. Minor section loss (necking) was observed at the floorbeam U-bolt supports.

Many localized areas of the transverse struts and upper chords were repaired with bolted splice plates and appear to be in fair condition with some areas in poor condition with corrosion developing in the member. Other localized areas were noted to require similar repairs, which exhibited impacted rust, causing rivets to push out and flanges of the Phoenix members to separate. Lateral Phoenix members were noted to exhibit moderate rust adjacent to weep holes in the webs. Several holes were found in the Phoenix members. The holes are occurring on the north end of the top chord of the sway frames in all spans. In addition, several areas of the Phoenix members showed signs of corrosion and impacted rust.

Several truss diagonals and counters comprised of steel bars or rods are in contact with one another. Several of these locations exhibit signs of moderate wear and corrosion. This condition was noted randomly at both upstream and downstream sides. These areas have no protective paint system and are susceptible to further rust.

Several locations of the existing intermediate post eyebar/cable tension members, as well as new reinforced tension cables, were observed to be loose.

Sidewalk timber planks (untreated) are generally in fair condition. Several have deflected both upward and downward slightly, with light to moderate deterioration. The sidewalk railing posts, adjacent to the roadway, were noted to be loose at the support base in some locations.

The upper concrete portions of the substructure units were noted to be in poor condition requiring concrete repairs and an epoxy waterproof coating. The upper pier caps exhibited stone pop-out, large spalling, incipient spalls, scaling, cracking and exposed rebar.

The 2005 Underwater Inspection Report prepared by The Louis Berger Group, Inc., has found the substructures to be in satisfactory condition. Minor to moderate scour with missing rock protection was observed during the underwater inspection at most of the substructure units, but did not affect the structural integrity at the time of the underwater inspection. Estimated repair costs have been included in this report.

*CALHOUN STREET BRIDGE*

**CONCLUSIONS**

The bridge is in overall poor condition due to severely deteriorated superstructure stringers and deterioration to the piers. It is recommended that a bridge Rehabilitation Contract be performed in the future. Overall rehabilitation should include truss member repairs as well as substructure and scour remediation, and should include reconstruction of the pier tops as well as substructure deterioration noted in the 2005 Underwater Inspection Report. Due to continued deterioration, it is also recommended that the entire floor system (stringers, floor beams, sidewalk, etc.) be replaced to improve the current rating of three-tons and to extend the useful life of the bridge. These improvements, in conjunction with blast cleaning and painting of the trusses, will also remove the lead-based paint from the bridge. Approach roadway sidewalk improvements should be included.

For a list of the required maintenance repair items, see the Tenth Annual Maintenance Report.

## CALHOUN STREET BRIDGE

### ESTIMATED COST OF RECOMMENDED IMPROVEMENTS FUNDED BY THE GENERAL RESERVE FUND

Contract No.	Bridge and Roadway Recommended Improvements	General Reserve Fund
<b><u>Bridges, Roadways, Sidewalks, and Approaches</u></b>		
394	Calhoun Street TSB Additional Capacity Alternatives Analysis *	\$245,000
447	Rehabilitation Contract (Design, Construction, CMCI)	\$14,534,000
366	Substructure & Scour Remediation Contract (Inspection) (2005 Underwater Inspection - Completed in 2006, \$33,000)	
476	District I Substructure and Scour Remediation (Design, Construction, CMCI)	\$542,000
<b><u>Facilities and Grounds</u></b>		
N/A	Miscellaneous Projects * (2007-2008)	\$22,000
396	Electronic Surveillance Detection System *	\$1,000,000
<b>TOTAL COST</b>		<b><u>\$16,343,000</u></b>

### **FUTURE REPAIR CONTRACTS**

(Subject to sufficient appropriation by the Commission)

<u>CONTRACT No.</u>	<u>DESCRIPTION</u>	<u>ESTIMATED COST</u>
N/A	N/A	\$0
<b>TOTAL: Future Repair Contracts</b>		<b><u>\$0</u></b>

\* Commission Initiative

## *SCUDDER FALLS BRIDGE*

### **GENERAL**

#### SCUDDER FALLS BRIDGE

The Scudder Falls Toll Supported Bridge (Structure No. 80) carries Interstate 95 over the Delaware River from Lower Makefield Township in Pennsylvania to Ewing Township in New Jersey.

The main river bridge is a ten-span, riveted plate girder bridge consisting of two-span continuous deck girders and alternating cantilever spans. Built by the Commission in 1959 and opened to traffic on June 22, 1961, the bridge carries two dual roadways each 27 feet wide with a concrete median barrier, and flanked by an upstream and downstream safety walk. The total length of the bridge is 1,740 feet. The substructure units are reinforced concrete, with stone facing on the piers. The posted speed limit on the bridge approach roadways is fifty-five miles per hour. The Commission's jurisdiction at this crossing also includes two Pennsylvania approach overpasses at Taylorsville Road and the Pennsylvania Canal.

#### SCUDDER FALLS PENNSYLVANIA CANAL OVERPASS

The Scudder Falls Pennsylvania Canal Overpass (Structure No. 81) carries Interstate Route 95 over the Pennsylvania Canal in Lower Makefield Township, Pennsylvania. The structure is an approach bridge to the main Scudder Falls Bridge that crosses the Delaware River.

The Pennsylvania Canal Overpass is a simple span, concrete deck, multi-stringer structure founded on reinforced concrete abutments on footings, which are supported by steel bearing piles. Opened to traffic on June 22, 1961, the bridge carries two dual roadways each 27 feet wide with a concrete median barrier, and flanked by an upriver and downriver safety walk. The total span length of the bridge is 61'-4".

#### SCUDDER FALLS TAYLORSVILLE ROAD OVERPASS

Taylorsville Road Overpass (Structure No. 82) carries Interstate 95 over Taylorsville Road in Lower Makefield Township, Pennsylvania and provides access to the main Scudder Falls Bridge over the Delaware River. The bridge was built in 1959 and opened to traffic on June 22, 1961.

The superstructure is a three-span, concrete deck, multi-stringer structure founded on reinforced concrete abutments and piers on footings that are supported by cast in place concrete piles. The bridge carries two dual roadways each 27 feet wide with a concrete median barrier. The bridge is flanked by a north and south safety walk. The total span length of the bridge is 134'-0".

## *SCUDDER FALLS BRIDGE*

In accordance with Commission's bridge inspection policy, this structure was inspected in 2006. That inspection included all ten (10) spans, the substructure units and both approach roadways. Also included were the two approach bridges, approach roadways, and roadway ramps.

### **SIGNIFICANT FINDINGS**

#### SCUDDER FALLS BRIDGE

The Commission is moving forward with plans to improve the I-95/Scudder Falls Bridge based on conclusions contained in its Southerly Crossings Corridor Study. That study found that congestion and safety problems on the bridge were a result of its narrow configuration, the proximity of adjoining interchanges, and ramps merging onto I-95.

The bridge carries more than 57,500 vehicles per day and operates at the worst level of service (LOS F) during peak rush hours. Over the next 25 years, traffic volumes are expected to increase an additional 35 percent.

In cooperation with the New Jersey and Pennsylvania Departments of Transportation, the Commission is preparing a preliminary engineering plan and an environmental assessment to select a preferred alternative that will improve safety and relieve anticipated congestion on the bridge and an approximate 4 mile stretch of I-95, from Route 332 in Bucks County, PA to Bear Tavern Road in Mercer County, NJ.

The assessment will include environmental studies, developing alternatives to improve safety and congestion, and preliminary engineering. The Commission will communicate with the public about this project through public meetings, newsletters, and a website.

The main river bridge was last painted in 1981. The paint condition is poor on the girders, which exhibit moderate to heavy paint peeling. Locations under deck joints at piers 2, 5 and 8, and pin/hangers typically exhibit the worst paint condition, with top and bottom flanges of floorbeams, ends of stringers, stiffeners, and lateral connections exhibiting moderate to heavy corrosion, obviously due to defective deck joints. Barn swallow nests and debris were observed throughout the main river bridge on stringer flanges and webs. This presents a concern as to its impact to the bridge's paint system.

The pin and hanger assemblies exhibit light to moderate rusting throughout, more so on the outside face exposed to the weather. Several areas of hangers exhibited light to moderate pitting and section loss. Ultrasonic testing was performed on the pin and hanger assemblies during the 2000 Inspections and no significant findings were found. A backup catch system is in place at all pin-hanger assemblies.

High priority structural repairs were performed in 2004 under Contract TS-421 to repair cracks in the fascia stringers as well as some of the first interior stringers at Piers 2, 5 and 8 due to advanced deterioration of the web. The work performed included the installation of

## *SCUDDER FALLS BRIDGE*

stringer-support brackets; the replacement of diaphragm members; high-strength steel bolts and rivets at various locations; and the cleaning and painting of all structural steel within three feet of the stress-relief joints.

Fine transverse cracks were noted in the concrete deck above and below. Fascia soffits typically exhibit cracks with efflorescence and incipient spalling at intermittent joint locations. Throughout the underside of deck, random areas exhibited spalling, some of which had exposed rebar. The deck also shows signs of wear with aggregate pop-out and random locations of concrete and asphalt patches in the LMC overlay.

Hot-poured sealer deck joints at piers 2, 5 and 8 are worn, cracking and spalled. There are multiple temporary asphalt patches that need to be permanently repaired. The median barrier at all the deck joints is not sealed causing debris to build up on the shear locks below. Safetywalk deck joints also exhibit heavy deterioration and perforations/separations of strip seals at several locations. These openings are allowing water to infiltrate to underlying structural steel and the pin and hanger assemblies.

The substructure units are in generally good condition, with minor rust stains on pier caps. Spalling on the north end and the seat of pier 2 was noted.

Many of the railing brackets on both sides of the bridge exhibited cracks in the support brackets. There were also a few locations where the railing and brackets were dislodged.

Due to ongoing maintenance issues with the bridge lighting, a repair contract has been issued and was completed in 2006 under Contract 393F.

The 2005 Underwater Inspection Report prepared by The Louis Berger Group, Inc., has found the substructures (Piers 2 through 8) to be in good condition. Estimated repair costs from the underwater inspection report have been included in this report.

### SCUDDER FALLS PENNSYLVANIA CANAL OVERPASS

The paint condition is typically fair on all girders and poor at the girder ends. The bearings exhibit moderate to heavy corrosion with debris on the bridge seats. The backwall of the east abutment contains some spalls. The joint material in the vertical expansion joints throughout the substructure is missing or dislodged.

The 2005 Underwater Inspection Report prepared by The Louis Berger Group, Inc. under Contract (412A), has found the substructures to be in good condition. Estimated repair costs from the underwater inspection report have been included in this report.

## *SCUDDER FALLS BRIDGE*

### SCUDDER FALLS TAYLORSVILLE ROAD OVERPASS

The bridge is in fair condition due to the condition of the underside of deck at the deck joint locations and the non-functioning bearings.

The paint condition is typically fair to poor throughout.

Impact damage to the three northern stringers (bottom flanges and cover plates) in the northbound lanes of Taylorsville Road was observed with the 2<sup>nd</sup> stringer from the north being the worst. This collision damage does not affect the structural capacity of the bridge.

Several bearings are misaligned and exhibiting moderate to heavy corrosion with debris on the bridge seats. The backwall of the west abutment contains several spalls and vertical cracks. The joint material in the vertical expansion joints throughout the substructure is missing or dislodged.

The concrete deck below the joints is in poor condition. The underside of the deck at concrete header and deck joints is spalled in several locations above the piers.

The Commission-maintained portion of Interstate 95, including the Pennsylvania ramps and shoulders, is in good condition, having been rehabilitated in 1999 under the Taylorsville Road Interchange Rehabilitation contract (Capital Project No. 9904A). Both approach structures have been overlaid with bituminous concrete under this contract. The pavement is beginning to show signs of normal distress such as cracking due to age and usage.

### **CONCLUSIONS**

A Rehabilitation Contract is recommended and will be included as part of the Commission Initiative's I-95 Improvement Project which is outlined in the "Commission Initiatives" section of this report. An In-Depth Inspection and Rating Contract should be performed to determine the extent of required repairs. Combined with the In-Depth Inspection should be the development of repair plans for the main river bridge, which should include cleaning and painting, structural steel repairs, deck joint reconstruction, concrete deck rehabilitation, new parapets, safety walks and railings.

Although the main river bridge is in satisfactory condition, the paint system is poor. At piers 2, 5 and 8 the deterioration caused by water infiltration begins at the deck joints and works downward corroding the structural steel and will eventually deteriorate the concrete piers, which is evident by the spalls beginning to form at pier 2. In addition, above deck slab deterioration with numerous cracks have resulted in below deck deterioration. As a result, Contract TS-393C has been issued and completed in 2006 to preserve the useful life of the structure.

A Substructure and Scour Remediation Contract (Below Water Line) should be performed and should include repair of any substructure deterioration noted in the 2005 Underwater Inspection Report.

## *SCUDDER FALLS BRIDGE*

A Preliminary Engineering and Environmental Documentation contract (C-393A) has been awarded for improvements to the Scudder Falls Toll Supported Bridge Facility. Also due to the current traffic congestion, it is recommended that an interim capacity improvement study be undertaken to determine if anything can be done to relieve congestion and if so implement those improvements within the next two years.

### SCUDDER FALLS PENNSYLVANIA CANAL OVERPASS

The Pennsylvania Canal Overpass is generally in satisfactory condition. Although the canal bridge is in satisfactory condition, the paint system is poor.

The Pennsylvania Canal Bridge is in fair condition, however the structure should be maintained and necessary repairs be performed in order prevent further deterioration. Repairs should include cleaning and painting the girder ends and end diaphragms, and also cleaning and epoxy coating the bridge seats.

### SCUDDER FALLS TAYLORSVILLE ROAD OVERPASS

The Taylorsville Road Bridge is in fair condition, however the structure should be maintained and necessary repairs be performed in order prevent further deterioration.

A rehabilitation contract should be performed to repair the non-functioning bearings, deck joints and underside of deck spalling. This contract should be included in the Main River Bridge Rehabilitation Contract.

For a list of the required maintenance repair items, see the Tenth Annual Maintenance Report.

**SCUDDER FALLS BRIDGE**

**ESTIMATED COST OF RECOMMENDED IMPROVEMENTS**  
**FUNDED BY THE GENERAL RESERVE FUND**

Contract No.	Bridge and Roadway Recommended Improvements	General Reserve Fund
<b><u>Bridges, Roadways, Sidewalks, and Approaches</u></b>		
393C	<b>Deck Joint Replacement</b> (Completed in 2006, \$2,530,000)	
393A	<b>I95/Scudder Falls Improvement Project *</b>	\$27,400,000
366	<b>Substructure &amp; Scour Remediation Contract (Inspection)</b> (2005 Underwater Inspection - Completed in 2006, \$8,200)	
476	<b>District I Substructure and Scour Remediation</b> (Design, Construction, CMCI)	\$123,000
<b><u>Facilities and Grounds</u></b>		
393F	<b>Lighting Upgrade</b> (Completed in 2006, \$92,000)	
N/A	<b>Miscellaneous Projects * (2007-2008)</b>	\$22,000
396	<b>Electronic Surveillance Detection System *</b>	\$1,974,000
<b>TOTAL COST</b>		<b><u>\$29,519,000</u></b>

## SCUDDER FALLS BRIDGE

### ESTIMATED COST OF RECOMMENDED IMPROVEMENTS FUNDED BY THE GENERAL RESERVE FUND

#### FUTURE REPAIR CONTRACTS

(Subject to sufficient appropriation by the Commission)

<u>CONTRACT No.</u>	<u>DESCRIPTION</u>	<u>ESTIMATED COST</u>
393A	I95/Scudder Falls Improvement Project (Construction, CMCI) *	\$221,600,000
479	ITS Improvements *	\$955,000
<b>TOTAL: Future Repair Contracts</b>		<b><u>\$222,555,000</u></b>

\* Commission Initiative

## WASHINGTON CROSSING BRIDGE

### **GENERAL**

The Washington Crossing Bridge (Structure No. 100) connects Mercer County Route 546 in Hopewell Township, New Jersey with PA Route 532 (George Washington Memorial Boulevard) in the Township of Taylorsville in Upper Makefield, Pennsylvania.

The bridge consists of a six-span double Warren truss structure, with a total length of 877 feet. The steel superstructure was built in 1904. The substructures, composed of rubble stone-faced masonry, are from the original construction in 1831. The open steel grid deck provides a clear roadway width of 15 feet between the steel channel rub-rails. The downstream side of the truss supports a cantilevered, wood-planked sidewalk. The bridge was closed from August 15, 1994 to January 13, 1995 for extensive structural rehabilitation.

The bridge is currently restricted to a 15-mile per hour speed limit and a 3-ton weight limit.

In accordance with Commission's bridge inspection policy, this structure was inspected in 2006. This inspection included all six (6) spans, the substructure units and both approach roadways

### **SIGNIFICANT FINDINGS**

The deck joint support system was repaired under Contract TS-428A in 2005. This Contract consisted of repairing and replacing riser beams.

Several floorbeam stringers at multiple locations were noted to have a minor twist (buckling) to their web, mainly at the supports over the floorbeams. According to the previous reports and the current findings, the twist has not increased in severity since 1998 and the bridge appears to be handling the current loads. Several areas of pitting of the steel were also noted throughout the top flanges of floorbeams, especially near stringer bottom flanges.

Due to the Flood of June 2006, the post tensioning rods in spans 1, 4, 5 and 6 were elongated to the point where there is excessive sagging. There is also minor sagging in the post tensioning rods in spans 1, 2 and 3. As previously documented, the tie rod on the south side of span 2 was removed during the Flood of 2005. From previous analysis, performed by Lichtenstein Engineers, the rods do not affect the posted load carrying capacity.

The steel roadway railings at the north side of span 2 at floorbeam 3, span 3 at floorbeam 2 and at span 4 were damaged by debris.

Impact damage from previous floods was observed to the bottom chord in span 5, bay 3, span 4, bay 9 and span 2, floorbeam 4 diagonal. Damage resulting from the Flood of June 2006 was limited to span 5, bay 2 and span 6, bay 2 on the upstream side of the structure. At the present time, no action is required regarding the damage. The deficiencies should continue to be monitored during the regularly scheduled biennial inspections.

## WASHINGTON CROSSING BRIDGE

Although the west abutment was rehabilitated under the 1994 rehabilitation contract, it has begun to show deterioration. Wide diagonal cracks were observed at the north and south ends of the west abutment backwall. Both the north and south roadway barriers adjacent to the bridge appear to have deflected outward from backwall movement and rotation. No signs are present depicting impact damage to either barrier. In addition, the tooth dam at the west abutment was fully closed at the time of inspection. The temperature at the time was approximately 60°, indicating that the closure was not temperature related. Maintenance forces have provided a small pavement relief joint in the west approach adjacent to the west abutment and have made remedial concrete repairs. This joint has begun to exhibit signs of deterioration.

During the post flood inspection performed in early April 2005, the substructure sustained damage that warranted the closing of the bridge. A section of the Pier 5 stone facing had washed away, exposing the stacked stone core. In addition, the superstructure sustained impact damage from debris that washed downriver. The superstructure damage was incidental and does not require repair. High priority repairs to the substructure were completed by contract.

The concrete aprons at the piers exhibit wide cracks. These cracks can lead to spalling of the aprons and deterioration of the pier protection. The substructure units appear to be in fair condition, with areas of loose and missing mortar on the northern ends of the piers. A 50 SF area of damaged apron was observed at the upstream end of pier 2.

The 2005 Underwater Inspection Report prepared by The Louis Berger Group, Inc., found the substructures to be in satisfactory condition. Although pier footings were not visible during the underwater inspection due to the concrete aprons, several mortar bags of the pier footings were found to be loose, created by scour of the channel around the piers. Estimated repair costs from the 2005 Underwater Inspection Report have been included in this report.

### **CONCLUSIONS**

The bridge is in satisfactory condition due to the problems with the west abutment and scour at the piers.

An In-Depth Inspection and Rating leading to a rehabilitation contract is recommended. The last In-Depth Inspection and Rating Contract (C-326) was performed in 1992, prior to the rehabilitation done in 1994. The long term needs of the tie rods should also be investigated to determine their future use as a secondary strengthening system.

A Substructure and Scour Remediation Contract (Below Water Line) should be performed to re-point areas of missing and loosed mortar and repair any substructure deterioration found below the water line noted in the 2005 Underwater Inspection Report.

*WASHINGTON CROSSING BRIDGE*

Slight web twisting is apparent on the older bridge stringers, but when exactly the twisting occurred is unknown (possibly before the weight limit restriction). Although no repair is recommended at this time, this situation should be monitored during annual inspections.

The rehabilitation contract should include the deficiencies noted above.

For a list of the required maintenance repair items, see the Tenth Annual Maintenance Report.

**WASHINGTON CROSSING BRIDGE**

**ESTIMATED COST OF RECOMMENDED IMPROVEMENTS**  
**FUNDED BY THE GENERAL RESERVE FUND**

Contract No.	Bridge and Roadway Recommended Improvements	General Reserve Fund
<b><u>Bridges, Roadways, Sidewalks, and Approaches</u></b>		
442	<b>Rehabilitation Contract (Design, Construction, CMCI)</b>	\$13,300,000
366	<b>Substructure &amp; Scour Remediation Contract</b> (Inspection) (2005 Underwater Inspection - Completed in 2006, \$66,000)	
476	<b>District I Substructure and Scour Remediation</b> (Design, Construction, CMCI)	\$297,000
<b><u>Facilities and Grounds</u></b>		
N/A	<b>Miscellaneous Projects</b> * (2007-2008)	\$22,000
396	<b>Electronic Surveillance Detection System</b> *	\$960,000
<b>TOTAL COST</b>		<b><u>\$14,579,000</u></b>

**FUTURE REPAIR CONTRACTS**

(Subject to sufficient appropriation by the Commission)

<u>CONTRACT No.</u>	<u>DESCRIPTION</u>	<u>ESTIMATED COST</u>
N/A	N/A	\$0
<b>TOTAL: Future Repair Contracts</b>		<b><u>\$0</u></b>

\* Commission Initiative

## *NEW HOPE - LAMBERTVILLE TOLL SUPPORTED BRIDGE*

### **GENERAL**

The New Hope-Lambertville Toll Supported Bridge (Structure No. 120) connects Bridge Street in New Hope, Pennsylvania to Lambertville, New Jersey.

The bridge superstructure, constructed in 1904, is a six-span pin connected Pratt truss with a total length of 1,046 feet. The open steel grate deck provides a clear roadway width of 20 feet 7 inches between steel rub rails. A timber-plank sidewalk, installed in 1982, is supported on the downstream side by steel cantilever brackets. Abutments, wingwalls, and piers are ashlar-faced masonry; the piers are stone-filled. All substructure units are from original construction in 1814.

The current posting consists of a 4-ton loading restriction and a fifteen mile per hour speed limit. The lower chord has been strengthened with a post-tensioning rod system by contract in 1984. A three-beam guide rail system was added by Maintenance forces to both sides of the roadway.

In accordance with Commission's bridge inspection policy, this structure was inspected in 2006. This inspection included all six (6) spans, the substructure units and both approach roadways.

### **SIGNIFICANT FINDINGS**

The bridge was recently rehabilitated by J. D. Eckman under Contract No. TS-370A. The rehabilitation was completed and the bridge was reopened on June 7, 2004.

During the post flood inspection performed in early April 2005, the superstructure and portions of the sidewalk sustained impact damage caused by debris floating downstream. The damage did not appear to affect the structural integrity of the bridge and the sidewalk was repaired by maintenance.

During the Flood of June 2006, multiple areas of minor damage to several members of the upstream bottom chord were observed throughout the bridge. The damage sustained does not pose a threat to the structural integrity of the bridge.

However, in span 5 at the 2<sup>nd</sup> bay from the east, the bottom chord exhibited more damage than the other areas noted above. This built up lower chord member is comprised of two (2) steel channels connected together with lacing bars in a diagonal pattern for the full length of the member. Impact damage to this member has caused it to deflect horizontally approximately 8". The upstream channel apparently absorbed more of the impact (causing it to twist) than the adjacent downstream channel. Also, multiple lacing bars, which tie the two channels together, were observed to be distorted and buckled from the impact.

It was also observed that the top flange of the upstream channel exhibited cracks in at least 5 locations. The cracks occur directly adjacent to the rivet holes and do not appear to have propagated beyond the holes.

## *NEW HOPE - LAMBERTVILLE TOLL SUPPORTED BRIDGE*

Several post tensioning rods that run along the upstream and downstream bottom chords sustained damage where floating debris became entangled, causing them to detach from their supports. In span 3, the north post tensioning rod became completely detached from the hangers and ultimately sheared off. The failure occurred at the base of the double nut connection at the north bearing at pier 3. In span 3 at the south side, the tie rod became detached from the hangers, and elongated at pier 3, causing it to sag. A similar condition to the south post tensioning rod of span 3 occurred at the north side of span 2 and span 4. There were heavy vibrations in span 2 caused by debris entangled in the post tensioning rod. The post tensioning rods at all other locations appear to have sustained no damage.

At the north side of pier 4, the steel bracket attached to the bearing for the inspection rigging cable was disconnected. Maintenance forces should realign the cable bracket. This deficiency does not affect the structural integrity of the bridge.

Damage to the sidewalk planks was observed at one location in span 2 and two locations in span 3. It appeared that debris struck the underside of the planks causing them to lift up and become detached from the stringer supports. In span 2, in addition to the sidewalk damage, the empty utility conduit sustained damage.

Heavy debris was observed at the upstream end of pier 2 and minor to moderate debris accumulation at all of the other pier locations. A damaged section of guide rail in bay 8 of span 2 (caused by floating debris) was observed.

Multiple areas of debris were observed to be wedged throughout the upstream lower chord of the north truss.

There is a Commission owned building (formerly a firehouse) located on the Pennsylvania side that is currently being used for storage by Maintenance. There do not appear to be any major defects, with the building, however a code use and occupancy study should be conducted.

The 2005 Underwater Inspection Report prepared by The Louis Berger Group, Inc., found the substructures to be in satisfactory condition with some moderate to heavy cracking of the concrete aprons around the piers, moderate areas of collapsed concrete aprons, undermining of portions of the aprons, and minor mortar loss in masonry joints.

### **CONCLUSIONS**

The bridge has been downgraded from good to satisfactory condition due to damage sustained during the flood of 2006. Subsequent to the inspections and under the direction of the Commission, Parsons Brinkerhoff performed the rating calculations during the in-depth inspection and determined that the damage sustained by the flood did not warrant a continued bridge closure. Non-destructive testing was also performed to areas of the severely damaged bottom chord in span 5 and no evidence of cracking was found.

*NEW HOPE - LAMBERTVILLE TOLL SUPPORTED BRIDGE*

Maintenance forces repaired the damaged sidewalk planks. The DRJTBC opened the bridge to vehicular and pedestrian traffic on July 2, 2006.

Emergency repairs to the severely damaged bottom chord in span 5 were in progress at the time this report was written.

A Substructure and Scour Remediation Contract (Below Water Line) should be performed to re-point areas of missing and loosed mortar and repair any substructure deterioration found below the water line noted in the 2005 Underwater Inspection Report.

A code use and occupancy study should be conducted for the Commission owned building (formerly a firehouse) currently being used for storage by Maintenance.

For a list of the required maintenance repair items, see the Tenth Annual Maintenance Report.

**NEW HOPE-LAMBERTVILLE TOLL SUPPORTED BRIDGE**

**ESTIMATED COST OF RECOMMENDED IMPROVEMENTS  
FUNDED BY THE GENERAL RESERVE FUND**

Contract No.	Bridge and Roadway Recommended Improvements	General Reserve Fund
<b><u>Bridges, Roadways, Sidewalks, and Approaches</u></b>		
366	<b>Substructure &amp; Scour Remediation Contract</b> (Inspection) (2005 Underwater Inspection - Completed in 2006, \$24,500)	
476	<b>District I Substructure and Scour Remediation</b> (Design, Construction, CMCI)	\$369,000
467B	<b>Emergency Bottom Chord Repairs</b> (Due to Flood of June 2006) (Completed in 2006, \$600,000)	
<b><u>Facilities and Grounds</u></b>		
478	<b>Fire House Code Use and Occupancy Study</b>	\$31,000
N/A	<b>Miscellaneous Projects</b> * (2007-2008)	\$22,000
396	<b>Electronic Surveillance Detection System</b> *	\$952,000
<b>TOTAL COST</b>		<b><u>\$1,374,000</u></b>

**FUTURE REPAIR CONTRACTS**

(Subject to sufficient appropriation by the Commission)

<u>CONTRACT No.</u>	<u>DESCRIPTION</u>	<u>ESTIMATED COST</u>
N/A	N/A	\$0
<b>TOTAL: Future Repair Contracts</b>		<b><u>\$0</u></b>

\* Commission Initiative

*CENTRE BRIDGE-STOCKTON BRIDGE*

**GENERAL**

**CENTRE BRIDGE-STOCKTON BRIDGE**

The Centre Bridge-Stockton Bridge (Structure No. 160) connects PA Route 32 in Solebury Township, Pennsylvania to NJ Route 29 in Stockton, New Jersey. The bridge, opened to traffic in 1927, is a six-span, riveted steel Warren truss structure, with a total length of 825 feet. The steel open-grate deck, added to the bridge in 1990, provides a clear roadway width of 20 feet between thrie-beam railings. In addition, a six-foot timber-plank sidewalk, replaced in 1990, is supported on the downriver truss on steel cantilever brackets.

The piers and abutments were originally constructed in 1814 from random ashlar masonry, are stone-filled and rest upon timber crib foundations. In 1926 portions of the piers were encased with reinforced concrete.

The bridge is currently posted for a twenty-five mile per hour speed limit and a twenty-ton weight limit restriction (6 tons maximum per axle).

In accordance with Commission's bridge inspection policy, this structure was inspected in 2006. This inspection involved a one-day cursory visual walk through of the main bridge. The Pennsylvania Canal Overpass (Structure No.161) was also inspected in 2006.

**CENTRE BRIDGE-STOCKTON PENNSYLVANIA CANAL OVERPASS**

The Centre Bridge-Stockton Pennsylvania Canal Overpass (Structure No. 161) carries traffic over the Pennsylvania Canal in Solebury Township, PA. The structure is an approach bridge to the main Centre Bridge-Stockton Bridge that crosses the Delaware River.

The Pennsylvania Canal Overpass is a simple span, prestressed adjacent concrete box beam bridge. The roadway width is 20'-0" and the span length is 63'-0".

**SIGNIFICANT FINDINGS**

**CENTRE BRIDGE-STOCKTON BRIDGE**

The Centre Bridge-Stockton Bridge is currently in the design phase of a complete rehabilitation project under Contract TS-429A.

During an in-depth inspection in the Fall of 2005, it was determined that the lower chord members of the south truss exhibited advanced section loss that would require emergency interim repairs until the rehabilitation project was underway. The interim repairs were performed under Contract TS-429B in late 2006.

Due to the upcoming rehabilitation and recent in-depth inspection, this structure was the subject of a cursory visual inspection.

*CENTRE BRIDGE-STOCKTON BRIDGE*

The following significant findings have been transposed from the previous inspection reports for a general overview of the bridge's condition. For the most in-depth evaluation of this bridge, refer to Contract TS-429A's in-depth inspection report.

Repairs to the bottom chords were completed in 1998 (under Contract No. 344). The repairs included portions of the members of lower truss connections in spans one, two, four and five. Previous repairs under a separate contract include fascia portions of floorbeam bottom flanges, lower wind bracing, fascia stringer replacements, and a new guide rail system. Rust staining on the new galvanized members was typically noted.

The bridge was last painted in 1990 under Contract No. 304. The overall paint system, however, is fair above the roadway deck and poor below the roadway with peeling and blistering paint throughout.

Although the structural repairs done in 1998 have improved the overall condition of the bridge, the remaining bottom chord members, more so on the downstream side, still exhibit severe rust with significant section loss. Floorbeam steel adjacent to previous repairs to the floorbeams or horizontal gusset plates also exhibit severe section loss, up to 60% at some locations (some with perforations) of the bottom flanges and rivets to the bottom flange. The locations with the greatest section loss adjacent to a previous repair were noted at the west floorbeam of pier three and the east floorbeam over pier four. Section losses were noted to be up to 60% in the bottom flanges.

Upper horizontal tie plates of floorbeam and post connections (below the edge of the sidewalk) at the ends exhibit rivet head losses up to 80% as well as impacted rust and steel section losses up to 30%.

Increased structural losses were located in the first bay adjacent to the west abutment (Span one), all bays of Span 3, and near the east abutment (Span six as noted in previous inspection). The end floorbeams and their stringer seat connections exhibit moderate to severe rust with section losses up to 20%. East abutment bearings and horizontal gusset plates were also noted to be full of debris.

Sidewalk overhang brackets exhibit up to 40% section loss to the top flanges at intermittent locations. Channel sidewalk stringers exhibit moderate rust at localized areas with moderate to severe rust to seat angles/plates over floorbeam brackets. The worst condition of this was noted over pier four. Sidewalk stringers are also showing signs of bowing. Tie back bracket straps, as well as rivets heads, exhibited moderate to severe rust and necking with section losses up to 80%. Timber deck planks appeared to be in satisfactory condition. The substructures typically exhibit incipient spalling at upper portions of the pier caps, including efflorescence, scaling and rust stains. Loose, deteriorated and missing mortar joints were also observed. Pier three and four appeared to be in the worst condition. The water level was too high to view the aprons at the time of the inspection.

## *CENTRE BRIDGE-STOCKTON BRIDGE*

A staircase exists at the southwest corner of the main bridge, which provides access from the sidewalk above to the Pennsylvania Canal towpath below. In general the steel frame of the sidewalk exhibits moderate heavy rust and moderate exfoliated rust throughout. The staircase is not in compliance with building codes as related to, rise to run ratio, tread depth, and hand railing dimensions. Maintenance forces have performed some repairs to damaged areas of the staircase.

In addition to the general description of the significant findings above, additional inspections have been performed due to the Flood of June 2006. Such inspections noted debris buildup and damaged pier-mounted conduits.

The 2005 Underwater Inspection Report prepared by The Louis Berger Group, Inc., has found the substructures to be in fair condition. Estimated repair costs from the 2005 Underwater Inspection Report have been included in this report.

### CENTRE BRIDGE-STOCKTON PENNSYLVANIA CANAL BRIDGE

No significant findings were observed at the time of the walk through inspection.

The north ends of the east and west abutments exhibit minor spalling and mapcracking with efflorescence. Maintenance should continue to patch spalls as needed. The concrete deck is in good condition with fine cracking on the deck.

The 2005 Underwater Inspection Report prepared by The Louis Berger Group, Inc. and submitted to the Commission in 2006, has found the substructures to be in good condition. Estimated repair costs from the 2005 Underwater Inspection Report have been included in this report.

## **CONCLUSIONS**

### CENTRE BRIDGE-STOCKTON BRIDGE

The bridge is in overall fair condition. Bottom chords, although partially rehabilitated, require additional repair work to be in satisfactory condition, such as the lacing bars and localized portions of angle members. Floorbeams, bottom flanges especially, also require strengthening or replacement, including high-strength bolts at areas adjacent to previous repairs. Areas mentioned in Significant Findings with severe deterioration and section loss should also be blast cleaned and painted. Rivets with greater than 50% section loss should be replaced with high-strength bolts. Additionally, the southwest staircase is in fair condition and should be replaced to meet current building codes.

An in-depth inspection and Rehabilitation Contract is recommended for this bridge. Since the floor system (stringers, floorbeams, etc.) of the bridge is in overall fair condition and several repairs have already been made in the 1998 Repair Contract, a complete replacement of the superstructure should not be required. This contract should include an In-Depth Inspection and Rating to determine the extent of repairs and verify the current and

*CENTRE BRIDGE-STOCKTON BRIDGE*

proposed available rating. Repair plans should be developed, and should include structural steel repairs, the southwest staircase replacement, and substructure repairs. Blast cleaning and painting of the bridge should be included.

A Substructure and Scour Remediation Contract (Below Water Line) should be performed and should include repair of the substructure deterioration noted in the 2005 Underwater Inspection Report.

**CENTRE BRIDGE-STOCKTON PENNSYLVANIA CANAL OVERPASS**

The bridge is in overall good condition, with minor spalling and map cracking at the northern end of the east and west abutments.

For a list of the required maintenance repair items, see the Tenth Annual Maintenance Report.

**ESTIMATED COST OF RECOMMENDED IMPROVEMENTS**  
**FUNDED BY THE GENERAL RESERVE FUND**

Contract No.	Bridge and Roadway Recommended Improvements	General Reserve Fund
<b><u>Bridges, Roadways, Sidewalks, and Approaches</u></b>		
429	Rehabilitation Contract (Design, Construction, CMCI)	\$10,308,000
366	Substructure & Scour Remediation Contract (Inspection) (2005 Underwater Inspection - Completed in 2006, \$80,000)	
476	District I Substructure and Scour Remediation (Design, Construction, CMCI)	\$631,000
<b><u>Facilities and Grounds</u></b>		
N/A	Miscellaneous Projects * (2007-2008)	\$10,000
396	Electronic Surveillance Detection System *	\$1,060,000
<b>TOTAL COST</b>		<b><u>\$12,009,000</u></b>

**FUTURE REPAIR CONTRACTS**

(Subject to sufficient appropriation by the Commission)

<u>CONTRACT No.</u>	<u>DESCRIPTION</u>	<u>ESTIMATED COST</u>
N/A	N/A	\$0
<b>TOTAL: Future Repair Contracts</b>		<b><u>\$0</u></b>

\* Commission Initiative

*LUMBERVILLE - RAVEN ROCK BRIDGE*

**GENERAL**

The Lumberville-Raven Rock Pedestrian Bridge (Structure No.180) connects Solebury Township (Lumberville) in Pennsylvania with Delaware Township (Raven Rock) in New Jersey.

This pedestrian bridge is a five-span suspension bridge with straight backstays and a precast waffle-style concrete slab held together by longitudinal post-tensioning web cables. The floor system is strengthened by cable trusses along each suspension cable.

The bridge was closed to vehicular traffic in February of 1944. In 1947, the superstructure was re-built on the original 1856 masonry substructure. A major rehabilitation contract was completed in 1993 that included the new deck slab, pier and abutment repointing, approach sidewalks, and bridge lighting. The entire bridge was last painted in 1980 by Maintenance forces and the towers were again painted in 1990.

In accordance with Commission's bridge inspection policy, this structure was inspected in 2006. This inspection included all five (5) spans, the substructure units and both approach roadways

**SIGNIFICANT FINDINGS**

The deck is in good condition with some locations of water ponding, despite several drainage openings at the deck's edge.

The general condition of the paint system at the towers is poor. Upper structural steel, such as cables, suspension hangers and fencing exhibit moderate paint peeling. Upper and lower portions of suspension towers (including bearings) typically exhibit light rust and debris accumulation at the upper portions. Moderate rust was also noted at the tower base steel at the east abutment. Below deck (fascia) steel exhibits moderate random flange and bolted splice rust of transverse tee sections due to water infiltration at the ends of the deck and exposure.

Pitting with light to moderate section loss was exhibited on the lower horizontal wind bracing rods (below deck), several appearing to be caused by direct contact with the wood spacers or previous damage. Water infiltration through the construction joints at these locations seems to contribute to this problem. A sealant has been applied to these locations. Although appearing intact, the seal seems to be leaking as evidenced by moisture on the formwork and concrete.

The end sockets for the post tensioning at pier locations are heavily corroded as observed from below the deck. This condition appears to occur at all of the socket locations. Considering no evident damage to the deck panels, it does not appear to affect the structural integrity of the structure.

*LUMBERVILLE - RAVEN ROCK BRIDGE*

Gusset plates of the lower towers at the piers (below deck) typically exhibit moderate corrosion of the steel and rivets.

Pier concrete aprons, though underwater at the time of our inspection, were noted to be in fair to poor condition with sections washed away, spalled or cracked.

In addition to the routine inspection findings, a post Flood of June 2006 inspection was performed and some minor damage was observed. Debris accumulation was observed at the piers and on the deck. The bridge fencing was damaged due to debris impacting the bridge.

The 2005 Underwater Inspection Report prepared by The Louis Berger Group, Inc., found the substructures to be in poor condition. The underwater inspection report indicated that scour with subsequent undermining was noted at Piers 1, 2 and 3. Most locations of rock protection have been washed away and some timber cribbing has been exposed. The Pier 3 condition of undermining appears to be the most critical. Estimated repair costs from the 2005 Underwater Inspection Report have been included in this report.

At the southwest corner of the bridge, the Commission-owned stone retaining wall appears to be distorted. However, at the time of the routine inspection and again after the Flood of June 2006 Inspection, the wall appeared to be intact and stable.

## **CONCLUSIONS**

The bridge is in good condition and is structurally capable of carrying legal pedestrian loading. The bridge is in generally good structural condition.

Necking or corrosive section loss to the ends of lower horizontal wind bracing or fascia T's was observed at several locations. No increase in deterioration was noted from previous inspections.

The paint system is in poor condition. A cleaning and painting contract is recommended, especially for the towers and bearings. At minimum the upper and lower portions of the towers and bearings should be blast cleaned and painted. Recoating of the cables, hangers and fencing should also be included.

The southwest retaining wall along the Pennsylvania Canal and adjacent to Commission owned property should be reconstructed. A study should be undertaken to consider alternate solutions of repair. In addition, a cursory visual inspection of the exterior of the Commission owned house located on the Pennsylvania side, indicated that the above ground oil tank foundation is not level. However, it appeared to be stable at the time of inspection. A study should be undertaken to determine if any routine and/or necessary repairs need to be made.

*LUMBERVILLE - RAVEN ROCK BRIDGE*

A Substructure and Scour Remediation Contract (Below Water Line) should be performed and should include repair of any substructure deterioration noted in the 2006 Underwater Inspection Report.

For a list of the required maintenance repair items, see the Tenth Annual Maintenance Report.

*LUMBERVILLE-RAVEN ROCK BRIDGE*

**ESTIMATED COST OF RECOMMENDED IMPROVEMENTS  
FUNDED BY THE GENERAL RESERVE FUND**

Contract No.	Bridge and Roadway Recommended Improvements	General Reserve Fund
<b><u>Bridges, Roadways, Sidewalks, and Approaches</u></b>		
443	<b>Rehabilitation Contract</b> (Design, Construction, CMCI)	\$2,034,000
366	<b>Substructure &amp; Scour Remediation Contract</b> (Inspection) (2005 Underwater Inspection - Completed in 2006, \$39,000)	
<b><u>Facilities and Grounds</u></b>		
N/A	<b>Miscellaneous Projects</b> * (2007-2008)	\$22,000
TBD	<b>Retaining Wall Reconstruction</b> (Design, Construction, CMCI)	\$251,000
TBD	<b>House Inspection/Repair Study</b>	\$3,100
396	<b>Electronic Surveillance Detection System</b> *	\$135,000
<b>TOTAL COST</b>		<b><u>\$2,445,100</u></b>

**FUTURE REPAIR CONTRACTS**

(Subject to sufficient appropriation by the Commission)

<u>CONTRACT No.</u>	<u>DESCRIPTION</u>	<u>ESTIMATED COST</u>
N/A	N/A	\$0
<b>TOTAL: Future Repair Contracts</b>		<b><u>\$0</u></b>

\* Commission Initiative

## **GENERAL**

The Uhlerstown-Frenchtown Bridge (Structure No. 220) carries Bridge Street traffic from Uhlerstown, Tinicum Township in Pennsylvania to Frenchtown, New Jersey.

The bridge, which rests on the original masonry substructure built in 1843, consists of a six-span riveted steel Warren truss structure, built in 1931. The steel open-grate deck, added in 1949, provides a clear roadway width of 16 feet 6 inches curb to curb. A concrete-filled steel grating sidewalk is supported by the upstream truss on steel cantilever brackets.

The bridge was rehabilitated in 2001 under Contract No. TS-363. The bridge is currently posted at a 15-ton weight limit and a 15 mile per hour speed limit.

In accordance with Commission's bridge inspection policy, this structure was inspected in 2006. This inspection included all six (6) spans, the substructure units and both approach roadways

## **SIGNIFICANT FINDINGS**

When performing post Flood of June 2006 Inspections, only minor damage was observed. In the 2<sup>nd</sup> bay from pier 1 in span 2 at the 2<sup>nd</sup> stringer from the north, a small area of impact damage was observed near the midspan of the stringer with damaged galvanized coating and adjacent wood debris. No indentations or other significant damage were noted. Maintenance forces can coat the damaged area of steel with a cold applied zinc compound.

During the post flood inspections performed in early April 2005, flood damage was observed to the upstream side of the railing and sidewalk. The damage was caused by debris that drifted downstream at high velocity. At the time of the 2006 routine inspection, the damaged sidewalk railing was under repair.

Bird debris and nests were observed on many of the truss verticals and diagonals, as well as under the sidewalk. The east approach pavement is showing signs of wear.

The 2005 Underwater Inspection Report prepared by The Louis Berger Group, Inc., found the substructures to be in satisfactory condition. The underwater inspection report noted that the concrete aprons exhibited medium to wide cracks with undermining of the aprons and various locations due to washing away of the rock protection. Estimated repair costs from the 2005 Underwater Inspection Report have been included in this report.

## **CONCLUSIONS**

The bridge is in good condition.

A Substructure and Scour Remediation Contract (Below Water Line) should be performed and should include repair of any substructure deterioration noted in the 2005 Underwater Inspection Report.

*UHLERSTOWN - FRENCHTOWN BRIDGE*

Repairs to the damage to the sidewalk and railing caused by the 2004 Flood should be completed.

For a list of the required maintenance repair items, see the Tenth Annual Maintenance Report.

**ESTIMATED COST OF RECOMMENDED IMPROVEMENTS**  
**FUNDED BY THE GENERAL RESERVE FUND**

Contract No.	Bridge and Roadway Recommended Improvements	General Reserve Fund
<b><u>Bridges, Roadways, Sidewalks, and Approaches</u></b>		
366	<b>Substructure &amp; Scour Remediation Contract</b> (Inspection) (2005 Underwater Inspection - Completed in 2006, \$8,500)	
477	<b>Districts II &amp; III Substructure and Scour Remediation</b> (Design, Construction, CMCI)	\$209,000
<b><u>Facilities and Grounds</u></b>		
N/A	<b>Miscellaneous Projects</b> * (2007-2008)	\$64,000
396	<b>Electronic Surveillance Detection System</b> *	\$1,030,000
<b>TOTAL COST</b>		<b><u>\$1,303,000</u></b>

**FUTURE REPAIR CONTRACTS**  
 (Subject to sufficient appropriation by the Commission)

<b><u>CONTRACT No.</u></b>	<b><u>DESCRIPTION</u></b>	<b><u>ESTIMATED COST</u></b>
N/A	N/A	\$0
<b>TOTAL: Future Repair Contracts</b>		<b><u>\$0</u></b>

\* Commission Initiative

## **GENERAL**

The Upper Black Eddy-Milford Bridge (Structure No. 240) extends over the Delaware River and connects PA Route 32 and Hunterdon County Route 619 via Bridge Street from Upper Black Eddy, Bridgeton Township, Pennsylvania to Milford Borough, New Jersey.

The bridge, constructed in 1933, is a three-span Warren truss structure, with a total length of 700 feet. The deck consists of concrete-filled steel inverted “T”s and provides a clear roadway width of 20 feet between steel channel rubrails. In 1996 a new galvanized plate sidewalk was added to the bridge and is supported on the upriver truss on steel cantilever brackets.

Both abutments, recapped with reinforced concrete following flood damage, were originally built in 1842 with rubble-faced masonry. The piers, built in 1842, are stone-filled having also been recapped with reinforced concrete.

The bridge is currently posted for a fifteen mile per hour speed limit with no weight limit restriction.

In accordance with Commission’s bridge inspection policy, this structure was inspected in 2006. This inspection included all three (3) spans, the substructure units and both approaches.

## **SIGNIFICANT FINDINGS**

Impact damage to the north bottom chord of the north truss was observed during the routine inspection and was most likely caused by the flooding that occurred in 2005. The damage is not critical and does not threaten the structural integrity of the bridge.

Severe rusting was found at the bays adjacent to both abutments. The north and south fascia stringers and their steel shims, the steel formwork for the deck and the adjacent ends of floorbeams and horizontal gusset plates (and rivet heads) were heavily corroded and delaminating. The westernmost bay in span one (1) exhibited the worst case of rust.

Light to moderate rusting was exhibited at most of the fascia stringers (and shim plates) and in localized areas throughout the remaining structural steel. More severe rusting was observed at adjacent and underlying steel beneath openings at the rubrails (edge of roadway) and at the exposed fascia steel of the bottom chord and adjacent vertical post. Lower horizontal gusset plate connections to the floorbeams were observed to exhibit light to moderate rust with debris accumulation. Batten/tie plates of bottom chord exhibit impacted rust

Several bays of the below-deck superstructure were noted to contain bird nests and associated debris.

The stub stringers over pier one at the expansion (west) side rest on support brackets. The support bracket is in direct contact with the bottom flange of the floorbeam and is causing it to bend downward slightly.

Some locations of the galvanized steel sidewalk plates exhibited loss of galvanizing with minor section losses.

The concrete-filled steel deck is showing signs of wear, especially along the wheel lines. Edges of deck also exhibit minor concrete scaling with debris allowing water to infiltrate below deck. Steel deck joint sliding plates also show signs of wear specifically at the west abutment.

Substructure units were re-pointed in 1998 (Contract No. 347) and appear to be in satisfactory condition, except for pier one which exhibits signs of 'bulging' at the west side, no signs of distress were noticed in the pier cap. This bulging has been present since approximately 1970. This area should be visually monitored in future inspections. The west abutment, east side of pier one and west side of pier two, showed some minor mortar loss.

The east and west abutment backwalls exhibit heavy map cracking and spalling, especially on the south side. Two vertical cracks in the west abutment backwall and three vertical cracks in the east abutment backwall were also noted with efflorescence. The west face of pier 2 exhibited spalling at the north end. Similar conditions were noted at the upper portions of piers.

During the post flood inspection performed in early April 2005, minor damage was noted to the upstream railing caused by debris floating downstream. Again, following the post Flood of June 2006 Inspections, minor debris buildup on the piers was observed.

The officer's shelter septic sewer system has been reported to be malfunctioning.

The post Flood of June 2006 Inspection did not identify any deficiencies. The condition of the mortar loss of the stone facing and random loosening at the substructure units do not appear to have worsened due to the flood.

The 2005 Underwater Inspection Report prepared by The Louis Berger Group, Inc., found the substructures to be in satisfactory condition. It was recommended that scour countermeasures be put into place to prevent degradation up and downstream of the bridge. Estimated repair costs from the 2005 Underwater Inspection Report have been included in this report.

## **CONCLUSIONS**

The bridge is in overall good condition, having been well maintained throughout the years. The steel paint condition of the truss and floor system is overall satisfactory to good, having

been painted in 1992. Several areas of localized rusted and corroded steel should be spot cleaned and painted, especially in the first bays adjacent to both abutments.

It is recommended that an in-depth inspection and rating be performed for this bridge. Although this bridge is not currently posted for a weight restriction, heavy truck traffic is typical and ratings should determine if posting is necessary.

A rehabilitation contract should be considered for a complete bridge deck replacement. The new deck should provide increased protection to underlying steel. The in-depth inspection and rating should be included to study the possible alternatives (if any) for the superstructure. Based upon the current condition of the bridge, its superstructure and the current load posting, a complete superstructure replacement is not anticipated. In the interim, maintenance should repair the damaged railing caused by the 2005 flood.

The officer's shelter septic system should be properly abandoned and a new sewer line should be installed to connect into the municipal sewer system.

A Substructure and Scour Remediation Contract (Below Water Line) should be performed and should include repair of any substructure deterioration noted in the 2005 Underwater Inspection Report.

For a list of the required maintenance repair items, see the Tenth Annual Maintenance Report.

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**UPPER BLACK EDDY-MILFORD BRIDGE**

**ESTIMATED COST OF RECOMMENDED IMPROVEMENTS**  
**FUNDED BY THE GENERAL RESERVE FUND**

Contract No.	Bridge and Roadway Recommended Improvements	General Reserve Fund
<b><u>Bridges, Roadways, Sidewalks, and Approaches</u></b>		
444	Rehabilitation Contract (Design, Construction, CMCI)	\$6,476,000
366	Substructure & Scour Remediation Contract (Inspection) (2005 Underwater Inspection - Completed in 2006, \$50,300)	
477	Districts II & III Substructure and Scour Remediation (Design, Construction, CMCI)	\$695,000
<b><u>Facilities and Grounds</u></b>		
N/A	Miscellaneous Projects * (2007-2008)	\$22,000
396	Electronic Surveillance Detection System *	\$960,000
TBD	Officer's Shelter Sewer Upgrade (Design/Construction)	\$13,500
<b>TOTAL COST</b>		<b><u>\$8,166,500</u></b>

**FUTURE REPAIR CONTRACTS**

(Subject to sufficient appropriation by the Commission)

<u>CONTRACT No.</u>	<u>DESCRIPTION</u>	<u>ESTIMATED COST</u>
N/A	N/A	\$0
<b>TOTAL: Future Repair Contracts</b>		<b><u>\$0</u></b>

\* Commission Initiative

## *RIEGELSVILLE BRIDGE*

### **GENERAL**

The Riegelsville Toll Supported Bridge (Structure No. 260) connects Durham Township in Pennsylvania with Pohatcong Township in New Jersey.

The bridge, constructed in 1904, is a three-span cable suspension bridge with straight backstays and a total length of 577 feet. The open-grid steel deck, supported by a king post floorbeam system, provides a roadway width of 16 feet between steel rubrails. A timber plank sidewalk rests on floorbeam cantilevers on both fascias. The sidewalk railing is actually a double-warren truss, assisting in strengthening the bridge roadway. The substructure, originally built in 1835, was raised and built-up in 1904.

The bridge is currently posted for a two and one-half ton weight limit and a fifteen mile per hour speed limit.

In accordance with Commission's bridge inspection policy, this structure was inspected in 2006. This inspection included all three (3) spans, the substructure units and the approach roadways.

### **SIGNIFICANT FINDINGS**

Under Contract TS-391, the Riegelsville Bridge has undergone the first step in a full rehabilitation, as part of the Commission's 10-year capital program addressing improvements to many of the bridges. Work consisted of strengthening towers on the river piers, replacement of hanger blocks connecting vertical hangers to the floor beams, repair of floor beam bearings at each end of the floor beams of the three spans, concrete repair on pier two, and concrete crack repairs at the anchorages.

The bridge was last painted by contract in 1985. The structural steel paint condition is fair above the bridge deck and poor below the bridge deck. The cable and upper suspension rods coating is in satisfactory condition.

Under vehicular impact, excessive vibrations were previously noted in spans 1 and 2, especially at pier 1 and pier 2, however the addition of the elastomeric floorbeam bearings has lessened the effect. Two (2) vertical suspension rod hangers adjacent to the towers in each span were noted to be loose. The tension in the rod hangers was reduced due to the addition of the elastomeric bearings, therefore no repair is required.

Both the north and south ends of several channel floorbeams have previously had web plates and/or replacement channels welded to the existing beams. Several floorbeams exhibit rusting and a failed zinc-coated paint system.

The majority of the perforations in the lower web of the floorbeam channels, mainly above king posts, have been repaired. However, there are a few locations where perforations exist, above the king posts and near the south suspenders anchor points. The lower wind bracing angles exhibit peeling and blistering paint and exhibit moderate to locally severe

## *RIEGELSVILLE BRIDGE*

rusting with subsequent section loss throughout. These conditions occur mostly beneath the sidewalks. These losses to the wind bracing do not impact the structural rigidity of the bridge at this time.

Medium transverse cracks were observed in the upriver tower horizontal saddle plates at piers 1 and 2. These cracks have been present for at least the past 9 years and have not increased in size, and therefore do not affect the structural integrity of the bridge.

At the southern lower diagonal brace at the north tower of the east abutment, as well as the northern lower diagonal brace at the south tower of pier two, signs of bending or possibly vehicular impact were noted.

Several U-shaped hangers connecting cables, more prevalent at the midspan locations, exhibited rusting and minor necking. With the present posting, repairs are not required at this time.

The following locations exhibited areas of deterioration and corrosion:

- Several floorbeam channels above the king post in span 3 exhibited perforations through the web.
- Bottom flanges and webs of floorbeams, especially near horizontal gusset plates and suspension hanger lower connections to floorbeams with poor weld conditions.
- Horizontal bracing angles at tower upper lateral struts.
- Top of sidewalk floorbeams and shim plates beneath timber nailers.
- Several lower wind bracings (also pitting and perforations)
- Lower hanger rod blocks.

A cleaning and pointing contract was completed for the substructure in 1998 and mortar joints are typically in good condition. However the tops of piers and abutments still exhibit severe scaling and spalling throughout bridge seats and backwalls in the area directly below the end floor beams. The spalling varies in depth from 2 inches to over 6 inches. The spalling does not occur near the tower supports. Concrete apron slabs above the water line at the base of piers were noted in the past to also exhibit undermining, scaling and cracking that do not effect the structural integrity of the bridge at this time.

A portion of the pier apron was washed away during the rains of Hurricane Ivan in the early fall of 2004. Further damage was sustained during the Flood of June 2006, which washed away an additional section of concrete apron.

Construction Contract TS-461A is currently in progress to repair the damaged concrete aprons and address the additional damage due to the Flood of June 2006. Construction is scheduled to commence in late 2006.

## *RIEGELSVILLE BRIDGE*

During the post Flood of June 2006 Inspection, only minor damage was observed. The lower rail of the upstream sidewalk railing exhibited minor impact damage and did not require immediate repair. Additionally, debris accumulation had occurred and should be addressed by Maintenance.

Both approach roadways exhibit cracking, unevenness and general deterioration, more so at the New Jersey approach and adjacent sidewalk/parking area.

The 2005 Underwater Inspection Report prepared by The Louis Berger Group, Inc., found the substructures to be in fair condition. A section of the concrete apron at pier 2 has been washed away. The east abutment exhibited moderate erosion and loss of concrete slope protection. Estimated repair costs from the 2005 Underwater Inspection Report have been included in this report.

### **CONCLUSIONS**

The bridge is in fair condition, with an overall fair to poor paint condition.

It is recommended that a complete bridge rehabilitation contract be performed. The purpose of the rehabilitation contract should not only address the deficiencies of the bridge, but also investigate the possibility of increasing the current load rating of 2-1/2 tons.

The design for the Rehabilitation Project should begin with an In-Depth Inspection and Rating to determine the extent of required repairs. A study should be included with this inspection contract to determine the feasibility of a floor system rehabilitation. It is assumed that the suspension cable system will not be modified. A contract to develop rehabilitation plans and specifications should then be completed, which is assumed to include as a minimum, floorbeam replacement along with the associated hanger rod attachment blocks, blast cleaning and painting steel of the suspension cable and hangers, substructure repairs and milling and repaving the approaches and NJ Officers' shelter parking area.

A Substructure and Scour Remediation Contract (Below Water Line) should be performed and should include repair of any substructure deterioration noted in the 2005 Underwater Inspection Report. In the interim, the washout of the pier apron that occurred during the rains of Hurricane Ivan in the early fall of 2004, and again in June 2006, should be repaired.

For a list of the required maintenance repair items, see the Tenth Annual Maintenance Report.

**RIEGELSVILLE BRIDGE**

**ESTIMATED COST OF RECOMMENDED IMPROVEMENTS  
FUNDED BY THE GENERAL RESERVE FUND**

Contract No.	Bridge and Roadway Recommended Improvements	General Reserve Fund
<b><u>Bridges, Roadways, Sidewalks, and Approaches</u></b>		
445	<b>Rehabilitation Contract</b> (Design, Construction, CMCI)	\$6,102,000
366	<b>Substructure &amp; Scour Remediation Contract</b> (Inspection) (2005 Underwater Inspection - Completed in 2006, \$39,400)	
461	<b>Concrete Pier Apron Repair</b> (Design, Construction, CMCI)	\$211,000
<b><u>Facilities and Grounds</u></b>		
N/A	<b>Miscellaneous Projects</b> * (2007-2008)	\$22,000
396	<b>Electronic Surveillance Detection System</b> *	\$960,000
<b>TOTAL COST</b>		<b><u>\$7,295,000</u></b>

**FUTURE REPAIR CONTRACTS**

(Subject to sufficient appropriation by the Commission)

<u>CONTRACT No.</u>	<u>DESCRIPTION</u>	<u>ESTIMATED COST</u>
N/A	N/A	\$0
<b>TOTAL: Future Repair Contracts</b>		<b><u>\$0</u></b>

\* Commission Initiative

## *NORTHAMPTON STREET BRIDGE*

### **GENERAL**

The Northampton Street Toll Supported Bridge (Structure No. 280), just south of the Easton-Phillipsburg Toll Bridge, connects Easton, Pennsylvania to Phillipsburg, New Jersey.

The bridge, although aesthetically resembling a suspension bridge, is a double cantilever truss structure, adjoined by a center (main) suspended span. The three-lane open-grid steel grate deck provides a clear roadway width of 32 feet and a total bridge length of 550 feet. The current bridge was constructed in 1895, with major rehabilitation and repairs done due to flood damages.

The bridge is currently posted for a three-ton weight limit and a twenty-five mile per hour speed limit.

In accordance with Commission's bridge inspection policy, this structure was inspected in 2006. This inspection included all three (3) spans, the substructure units and the approach roadways.

### **SIGNIFICANT FINDINGS**

The bridge is in satisfactory condition due to the recent damage caused by the Flood of June 2006, which resulted in several damaged stringers with the most severely damaged stringer in span 2, which is approximately 5" out of plane. Due to the redundancy of the floor system, the stringers remain functional in this current state.

A new safety line was recently installed along both the upstream and downstream lower chords. These new safety lines allow maintenance and inspection access to the underside of the bridge.

An eyebar on the north truss is slightly bowed in the direction of the roadway, however not directly in the path of traffic. The deficiency does not affect the structural integrity of the structure.

Following the Flood of June 2006, inspections were performed to evaluate the flood damage. The initial investigation from the roadway and sidewalks revealed several areas of damaged sidewalk planks located on the north side of all 2 spans.

Upon visual inspection of the bottom chords and surrounding areas, no evidence was found of any significant structural damage caused by the flood which would warrant bridge closure. General impact scrapes, scratched paint and minor localized dents/bends to the steel members were noted. There were several missing navigational lights and damaged/missing architectural lights beneath the bridge, including several broken electrical conduits and exposed wires. The electrical panel near the upstream side of Pier 1 was also damaged. Most of the damage noted, including the navigational lights and abrasions/paint scrapes, appears to have been caused by the Flood of 2005.

## *NORTHAMPTON STREET BRIDGE*

The most significant damage appears to be damaged/twisted fascia roadway stringer in span 2 at the north side in bay L9-L10. The stringer was impacted approximately 5 feet from L9 and was noted to be approximately 5” out of plane. Although no apparent damage was noted to the connections, one (1) of the riser beams sustained a 4” long broken weld.

Subsequent to the inspections, an additional walk-through inspection was performed to determine the extent of damage to the bridge lighting and whether the current Construction Contract TS-393F needed to be modified as a result of the flooding damage. This visual inspection was limited to the roadway and two (2) access roads beneath the bridge. Additional damage was noted to the downstream fluorescent lighting fixtures. However, since the decorative lighting was not de-energized or re-lamped since the flood, it is difficult to determine if the lighting fixtures which do not show physical damage are not operating.

The 2005 Underwater Inspection Report prepared by The Louis Berger Group, Inc., found the substructures to be in satisfactory condition. No additional damage was found following a subsequent inspection due to the Flood of June 2006.

### **CONCLUSIONS**

The bridge is in satisfactory condition. Damage caused by the flood to the main superstructure (bottom chord) does not require repairs at this time. However, the damage to the northern sidewalk railing, sidewalk planks and stringers should be repaired by heat straightening or other acceptable method.

It is recommended that the fluorescent fixtures on the downstream side of the bridge be re-lamped and tested. Any fixture or wiring found to be defective should be replaced for a complete operating system.

For a list of required maintenance repair items, see the Tenth Annual Maintenance Report.

**NORTHAMPTON STREET BRIDGE**

**ESTIMATED COST OF RECOMMENDED IMPROVEMENTS**  
**FUNDED BY THE GENERAL RESERVE FUND**

Contract No.	Bridge and Roadway Recommended Improvements	General Reserve Fund
<b><u>Bridges, Roadways, Sidewalks, and Approaches</u></b>		
TBD	<b>Repair Floor System Stringers</b> (Design, Construction, CMCI) Due to the Flood of June 2006	\$200,000
366	<b>Substructure &amp; Scour Remediation Contract</b> (Inspection) (2005 Underwater Inspection - Completed in 2006, \$400)	
477	<b>Districts II &amp; III Substructure and Scour Remediation</b> (Design, Construction, CMCI)	\$48,000
N/A	<b>Inspection/Access Cable/Lifeline</b> (Completed in 2006, \$124,000)	
<b><u>Facilities and Grounds</u></b>		
N/A	<b>Miscellaneous Projects</b> * (2007-2008)	\$106,000
396	<b>Electronic Surveillance Detection System</b> *	\$960,000
<b>TOTAL COST</b>		<b><u>\$1,314,000</u></b>

**FUTURE REPAIR CONTRACTS**

(Subject to sufficient appropriation by the Commission)

<u>CONTRACT No.</u>	<u>DESCRIPTION</u>	<u>ESTIMATED COST</u>
N/A	N/A	\$0
<b>TOTAL: Future Repair Contracts</b>		<b><u>\$0</u></b>

\* Commission Initiative

## *RIVERTON-BELVIDERE BRIDGE*

### **GENERAL**

The Riverton-Belvidere Toll Supported Bridge (Structure No. 320.0) carries Water Street across the Delaware River and connects Riverton, Lower Mount Bethel Township, Pennsylvania with the Town of Belvidere, New Jersey.

The bridge, constructed in 1904, is a four-span, riveted steel, double Warren truss structure, with a total length of 653 feet. The steel open-grate deck provides a clear roadway width of 16 feet between three-beam railings. In addition, a concrete-filled steel-grating sidewalk is supported on the upriver truss with steel cantilever brackets.

The piers and the Pennsylvania abutment are rough ashlar-faced masonry and stone-filled. The piers are supported on timber cribs and lower portions are concrete-filled steel sheet piling (1929-32). The New Jersey abutment, including its wingwalls, is constructed of concrete on timber piles.

The bridge is currently posted for a fifteen-mile per hour speed limit and an eight-ton weight limit restriction.

Due to the upcoming rehabilitation project under Contract C-371A and the in-depth inspection involved with that contract, a one-day cursory visual walk-through inspection of the bridge was performed during the 2006 Annual Inspections.

### **SIGNIFICANT FINDINGS**

The following significant findings have been transposed from the previous inspection report to give a general description of the condition of the bridge. The in-depth inspection performed under Contract C-371A would be the most current re-evaluation of this bridge. The bridge will be rehabilitated under Contract TS-371A.

The paint condition has localized areas of poor conditions at supports and intermittent locations. Paint peeling was noted at upper and lower steel locations exposed to the elements. The bridge was last cleaned and painted in 1981. The upper superstructure paint system is satisfactory to fair.

Moderate to heavy impacted rust and deterioration was noticed in the lower chord batten plates and angle members. Debris accumulation has clogged drain (weep) holes in the bottom chords. Connections of the bottom chord and vertical truss members are severely deteriorated with rivet head losses and moderate to severe impacted rust.

Localized rust was exhibited throughout stringers, floorbeams and lower wind bracing. Typically little or no losses were observed but there are random areas with moderate losses to the stringer webs. Increased deterioration was observed in the first bay adjacent to the west abutment (span one), on the flanges and lower webs of stringers and floorbeams, as well as the end of deck bearing bars exhibited heavy rust. Perforations were also noted in the webs of several sidewalk brackets and at the north end of the east abutment floorbeam. In the first bay of span one, maintenance forces have performed remedial repairs to several steel

## *RIVERTON-BELVIDERE BRIDGE*

members. Some areas, however, still require repair, especially perforations in stringers (and their riser beams) and the end floorbeam.

The underside of the sidewalk generally exhibits severe corrosion to the metal forms, especially at the outer edges. The top surface of the sidewalk exhibits heavy concrete scaling throughout with locations of exposed steel grating (rusted) and overall unevenness. The edge of the sidewalk steel grate and fascia plate exhibit heavy rusting and section losses due to water infiltration from the concrete deck. The approach sidewalk is in poor condition exhibiting deterioration and cracking throughout.

The upper lateral wind bracing is in fair condition, exhibiting corrosion and necking at end connections.

Several finger joint teeth of the pier 2 tooth dam, especially at the north side, have broken off due to corrosion and the area filled in with bituminous patch material. The tooth dam and some additional teeth remain lifted/buckled at some locations from impacted rust. The east support riser beam for the deck joint also exhibits severe section loss and corrosion, which may have contributed to the problem. The bituminous patch material may prevent proper thermal expansion of the bridge.

The thermal relief joint at Pier 2 is comprised of stub stringers seated on brackets attached to the floorbeam. The stub stringers are loosely bolted to the brackets through slotted holes with the shim plates also becoming loose.

The vertical diagonal truss members at the sidewalk level have connection tie plates in which several exhibit impacted rust, corrosion and subsequent bending.

The bridge railing behind the newly installed three-beam guide rail on the south side of the bridge is rusted throughout and is staining the guide rail with rust.

The officer's shelter at the New Jersey approach is not protected from traffic impact by means of guide rail or other device. Moreover, the New Jersey approach pavement is in fair to poor condition with cracking, rutting and spalling. The interface of the east abutment deck joint with the approach pavement is worn and discontinuous. The Pennsylvania approach pavement is in fair to poor condition.

Adjacent to the southeast retaining wall at the rear of the officer's shelter, the embankment and neighboring sidewalk have settled. Additional riprap has been added to the embankment by Maintenance forces and appears to have stabilized the slope. The concrete sidewalk has settled and cracked and appeared to have stabilized during at the time of inspection. The base of the outer concrete foundation appears to be at an inadequate depth and too close to the edge of the embankment. The shelter's foundation appears satisfactory.

Commission owned property also includes a storage garage located on the New Jersey side of the bridge. The roof of the structure is comprised of a corrugated material. Heavy moss growth was observed throughout the roof. Maintenance has indicated that repairs have been performed to prevent leaks in the roof and additional repairs are required.

## *RIVERTON-BELVIDERE BRIDGE*

The 2005 Underwater Inspection Report prepared by The Louis Berger Group, Inc., found the substructures to be in satisfactory condition. Estimated repair costs from the 2005 Underwater Inspection Report have been included in this report.

### **CONCLUSIONS**

The bridge is in overall fair condition due to the condition of the superstructure and deck joints. It is recommended that a bridge rehabilitation contract be performed.

The overall rehabilitation should begin with an in-depth inspection and rating to determine the extent of the required repairs. Based on the current condition of the bridge, it is assumed that the entire floor system will be replaced to improve the current condition and rating of the bridge. This method will also remove the lead based paint on the bridge combined with blast cleaning. Repair plans should be developed for replacement of the stringers, floorbeams, and the sidewalk, blast cleaning and painting of the truss, expansion tooth dam replacement, substructure repairs, approach milling and repaving, and guide rail at the officer's shelter.

A separate contract should be issued to replace the roof of the storage garage in order to protect equipment being stored in the structure.

A Substructure and Scour Remediation Contract (Below Water Line) should be performed and should include repair of any substructure deterioration noted in the 2005 Underwater Inspection Report.

The embankment behind the Officer's shelter should continue to be monitored by Maintenance forces as well as during annual inspections.

For a list of the required maintenance repair items, see the Tenth Annual Maintenance Report.

**RIVERTON-BELVIDERE BRIDGE**

**ESTIMATED COST OF RECOMMENDED IMPROVEMENTS  
FUNDED BY THE GENERAL RESERVE FUND**

Contract No.	Bridge and Roadway Recommended Improvements	General Reserve Fund
<b><u>Bridges, Roadways, Sidewalks, and Approaches</u></b>		
371	<b>Rehabilitation Contract</b> (Design, Construction, CMCI)	\$8,775,000
366	<b>Substructure &amp; Scour Remediation Contract</b> (Inspection) (2005 Underwater Inspection - Completed in 2006, \$9,100)	
477	<b>Districts II &amp; III Substructure and Scour Remediation</b> (Design, Construction, CMCI)	\$193,000
<b><u>Facilities and Grounds</u></b>		
N/A	<b>Miscellaneous Projects</b> * (2007-2008)	\$11,000
396	<b>Electronic Surveillance Detection System</b> *	\$830,000
TBD	<b>Replace Storage Garage Roof</b>	\$253,000
<b>TOTAL COST</b>		<b><u>\$10,062,000</u></b>

**FUTURE REPAIR CONTRACTS**

(Subject to sufficient appropriation by the Commission)

<u>CONTRACT No.</u>	<u>DESCRIPTION</u>	<u>ESTIMATED COST</u>
N/A	N/A	\$0
<b>TOTAL: Future Repair Contracts</b>		<b><u>\$0</u></b>

\* Commission Initiative

## **GENERAL**

The Portland-Columbia Pedestrian Bridge (Structure No. 360) connects Portland Borough (Upper Mount Bethel Township), Pennsylvania with Columbia (Knowlton Township), New Jersey, just north of the Portland-Columbia Toll Bridge.

The Pedestrian Bridge is a four-span continuous, thru-deck steel girder system, with a concrete deck and built-up girders with a total length of 770 feet. The width of the walkway is 9'-6" between girder centers. The present bridge was reconstructed in 1958, following the flood of 1955, and original vehicular traffic was diverted to the main river bridge.

The former bridge lighting was removed and replaced, under contract in 1990, with high-mast lighting at each approach. In 1996, new approach guide rails and an ADA access ramp were added to the New Jersey side. More recently in 1998, this bridge, as well as the main river bridge and its approaches, were blast cleaned and painted under Contract No. 346

In 2003, Contract TS-388 was completed for the construction of a handicap accessible ramp at the west approach and bridge deck modifications.

In accordance with Commission's bridge inspection policy, this structure was inspected in 2006. This inspection included all four (4) spans, substructure units, and both approaches.

## **SIGNIFICANT FINDINGS**

The bridge paint system is currently in good condition, having been painted recently. Light rust was exhibited below the bridge deck on the cross frames and adjacent to open steel grate drains from water flow through the drains and collecting on steel members.

The concrete deck remains in satisfactory condition, with moderate scaling, unevenness and random transverse cracks and spalls. Minor areas of under-deck spalling were noticed at random locations, some with slightly exposed rebar. Random transverse joints were noticed to allow water to infiltrate resulting in incipient spalling and moist concrete below. The concrete adjacent to open steel grates exhibits light to moderate scaling and deterioration resulting from deteriorated seals. No trough system is present beneath the open steel grates.

The substructures are in generally satisfactory condition. Mortar joints on the upstream side of the piers have deteriorated.

The northwest wingwall exhibited signs of movement (approx. 2" outward). The wall appears stable and no threat is apparent. No change in movement was noted.

No apparent damage from the Flood of June 2006 was observed. Minor accumulation of debris was noted at the north sides of the piers. No significant changes were noted to the erosion at the southeast and southwest corners of the bridge.

The 2005 Underwater Inspection Report prepared by The Louis Berger Group, Inc., found the substructures to be in satisfactory condition. The underwater inspection report indicated that all piers were noted to have broken, missing or undermined sections of concrete aprons, with marine growth and debris. Estimated repair costs from the 2005 Underwater Inspection Report have been included in this report.

## **CONCLUSIONS**

The overall condition of the bridge is good. The bridge has been well maintained and is structurally capable of carrying legal pedestrian loading at the time of this year's inspection.

Drainage troughs should be considered beneath the open steel grates to protect underlying steel. Deck remediation should also be included to extend its useful life.

An overall deck and deck drainage enhancement project should be considered, which should include repair plans, drainage system options and feasibility, deck waterproofing alternatives and construction.

A Substructure and Scour Remediation Contract (Below Water Line) should be performed to repair any substructure deterioration noted in the 2005 Underwater Inspection Report.

For a list of the required maintenance repair items, see the Tenth Annual Maintenance Report.

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**PORTLAND-COLUMBIA PEDESTRIAN BRIDGE**

**ESTIMATED COST OF RECOMMENDED IMPROVEMENTS**  
**FUNDED BY THE GENERAL RESERVE FUND**

Contract No.	Bridge and Roadway Recommended Improvements	General Reserve Fund
<b><u>Bridges, Roadways, Sidewalks, and Approaches</u></b>		
366	Substructure & Scour Remediation Contract (Inspection) (2005 Underwater Inspection - Completed in 2006, \$58,000)	
477	Districts II & III Substructure and Scour Remediation (Design, Construction, CMCI)	\$109,000
<b><u>Facilities and Grounds</u></b>		
N/A	Miscellaneous Projects * (2007-2008)	\$22,000
396	Electronic Surveillance Detection System *	\$120,000
<b>TOTAL COST</b>		<b><u>\$251,000</u></b>

**FUTURE REPAIR CONTRACTS**

(Subject to sufficient appropriation by the Commission)

<u>CONTRACT No.</u>	<u>DESCRIPTION</u>	<u>ESTIMATED COST</u>
N/A	N/A	\$0
<b>TOTAL: Future Repair Contracts</b>		<b><u>\$0</u></b>

\* Commission Initiative