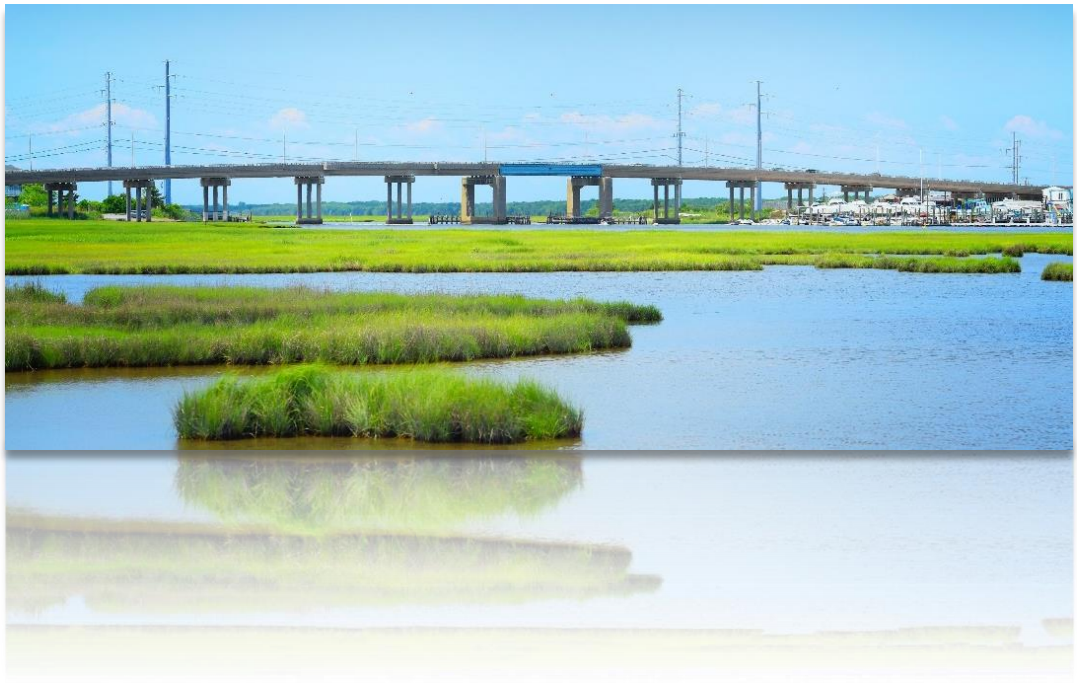
Comprehensive

BRIDGE REPLACEMENT AND IMPROVEMENT PLAN

CAPE MAY COUNTY AND BRIDGE COMMISSION BRIDGES



PREPARED BY:

Cape May County Department of Public Works and the Cape May County Bridge Commission

AUGUST 2020

Cape May County and
Bridge Commission Bridges
Ocean City-Longport Bridge(CMCBC)
17th St. Bridge
OCEAN CITY
Roosevelt Blvd. Bridge
Cedar Swamp Creek Bridge
UPPER TOWNSHIP
Tyler Bridge
Russ Chatlin Bridge
WOODBINE
Corsons Inlet Bridge (CMCBC)
DENNIS TOWNSHIP
Ludlams Thorofare Bridge
C.H-S Dennis Rd Bridge
SEA ISLE CITY
Townsends Inlet Bridge (CMCBC)
Leonards Thorofare Bridge
21st. Street Bridge
Ingrams Thorofare Bridge
25th. Street Bridge
Gravens Thorofare Bridge
Avalon Canal Bridge
Hand Avenue Bridge
AVALON
Scotch Bonnet Bridge
96th. Street Bridge
MIDDLE TOWNSHIP
STONE HARBOR
104th. Street Bridge
Great Channel Bridge
Grassy Sound Bridge (CMCBC)
WEST WILDWOOD
Glenwood Avenue Bridge
LOWER TOWNSHIP
NORTH WILDWOOD
WILDWOOD
WILDWOOD CREST
Upper Thorofare Bridge
Mill Creek Bridge
Middle Thorofare Bridge (CMCBC)
Lafayette Street Bridge
WEST CAPE MAY
Elmira Street Bridge
CAPE MAY CITY
CAPE MAY POINT
0 0.5 1 2 3 4
Miles
N

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CAPE MAY COUNTY BRIDGES

Number	Bridge Name	Municipality	Year Built
0500-001	Ingrams Thorofare	Middle Township	1967
0500-003	Gravens Thorofare	Avalon and Middle Township	1967
0500-004	Roosevelt Boulevard over Crook Horn Creek	Ocean City and Upper Township	1962
0500-005	Ludlams Thorofare	Dennis Township and Sea Isle City	1963
0500-006	96th Street	Middle Township and Stone Harbor	1930
0500-007	Lafayette Street over Cape Island Creek	Cape May and Lower Township	1927
0500-008	Avalon Canal	Avalon	1967
0500-009	Leonards Thorofare	Middle Township	1967
0500-010	21st Street	Avalon	1990
0500-011	Glenwood Avenue	Wildwood and West Wildwood	1990
0500-016	Russ Chattin over Middle Thorofare	Ocean City and Upper Township	1990
0500-017	Scotch Bonnet	Middle Township	1998
0500-018	Cedar Swamp Creek	Upper Township	1967
0500-023	104th Street	Stone Harbor	1987
0500-024	25th Street	Avalon	1987
0500-025	Court House-South Dennis Rd over Sluice Creek	Dennis and Middle Townships	1977
0500-026	Tyler Road over Sluice Creek	Upper Township	1997
0500-027	Elmira Street over Cape Island Creek	Cape May and West Cape May	1985
0500-028	Great Channel	Middle Township and Stone Harbor	1939
0500-029	Upper Thorofare	Lower Township	1939
0500-030	Mill Creek	Lower Township	1939
0500-031	Hand Avenue over Skeeter Creek	Middle Township	1982
0500-032	17th Street over Venetian-Carnival Bayou	Ocean City	2019

COMMISSION BRIDGES

Number	Bridge Name	Municipality	Year Built
3100-001	Ocean City - Longport	Ocean City and Egg Harbor Township	2002
3100-002	Corsons Inlet	Upper Township	1949
3100-003	Townsends Inlet	Avalon and Sea Isle City	1940
3100-005	Grassy Sound	Middle Township	1940
3100-006	Middle Thorofare	Lower Township	1940

GLOSSARY OF TERMS

ABBREVIATIONS

County – County of Cape May

Commission – Cape May County Bridge Commission

ICW – Intracoastal Waterway

LBFN – Local Bridges Future Needs

NBIS – National Bridge Inspection Standards

NJDEP – New Jersey Department of Environmental Protection

NJDOT – New Jersey Department of Transportation

RFP -Request for Proposals

SHPO -New Jersey State Historic Preservation Office

SJTPO - South Jersey Transportation Planning Organization

BRIDGE TERMS

Abutment – retaining wall that supporting the ends of a bridge

Bascule Span – moveable bridge with a counterweight that continuously balances a span, or "leaf"

Bent – combination of the pier and the cap

Cap- structural member which spans across the piles

Cassion – box-like structure used as a foundation

Decking – roadway portion of a bridge

Delamination- subsurface fracture planes

Efflorescence – migration of salt to surface of a porous substance

Fascia – exposed outermost girder

Fender -protects the columns and bridge structure from boats in the navigational channel

Fixed Span – bridge with no moveable spans

Functionally Obsolete - design no longer meets current geometric design standards

Girder - A beam or compound structure acting as a beam

In-line Replacement - replacement within the existing footprint of the bridge

Jacket – concrete placed around the bridge pile

Load Posted – maximum tonnage of a specific vehicle type when analysis indicates that the bridge cannot carry the legal load without overstress

Off-line Replacement – replacement outside the existing footprint of the bridge

Pier – structural support extending width of bridge to support the spans

Pile – long column driven into the ground to form part of a foundation or substructure

Programmable Logic Controller (*PLC)*– computer that accepts inputs and outputs used to control movable span

Scour – removal of sand and sediment from moving water

Spall - breakaway of concrete resulting from water infiltration or other causes

Stringer - longitudinal member of a bridge supporting the deck

Substructure – component of bridge that support the superstructure, including piers, footings and piles

Superstructure – components of the span including decking, sidewalks, railings and structural members

TL-1 rating- crash test level of vehicle traveling 31 mph

TL-4 rating – crash test level of vehicle traveling 62 mph

Trunnion bearing – a form of short axle attached to the side of a body for rotation

Waler - plank of wood, block of concrete, etc., used for support; also, horizontal member in bridge fender system

DEFINITION OF NBIS RATINGS and TERMS:

Excellent

Very Good Condition- No problems noted

Good Condition – some minor problems

Satisfactory- structural elements show minor deterioration

Fair Condition- all primary structural elements are sound but may have minor section loss, cracking, spalling or scour

Poor Condition- advanced section loss, deterioration, spalling or scour present

Serious Condition- loss of section, deterioration, spalling or scour

Critical Condition- advanced deterioration of primary structural elements. Fatigue cracks in steel or shear cracks in concrete may be present. Unless closely monitored it may be necessary to close the bridge until corrective action is taken

Imminent Failure Condition - major deterioration or section loss present in critical structural components or obvious vertical or horizontal movement affecting structure stability. Bridge is closed to traffic, but corrective action may put back in light service.

Failed condition- out of service, beyond corrective action

Priority 1 Repair – Advance deficiency on a primary bridge element or appurtenance that may eventually lead to further deterioration, load restriction, lane and/or bridge closure, or may compromise public safety if not corrected. All repairs must be completed within 90 days from notification.

Priority 2 Repair – A defect in the superstructure, substructure, or deck which, if not repaired within the next 12 months may lead to Priority 1 defects.

COMPREHENSIVE BRIDGE REPLACEMENT AND IMPROVEMENT PLAN FOR CAPE MAY COUNTY AND BRIDGE COMMISSION BRIDGES – SUMMARY

The County of Cape May (County) in collaboration with the Cape May County Bridge Commission (Commission) identifies the need to prepare and formalize a Bridge Replacement and Improvement Plan to address its aging bridge infrastructure in order to continue to provide for the structural and operational safety of its bridges to serve its residents and visitors.

This bridge plan encompasses twenty-three (23) County owned and operated bridges, as well as five (5) bridges owned and operated by the Commission. The primary emphasis on both County and Commission bridges over the next fifteen (15) years is to address critical infrastructure needs by replacing the bridges that have surpassed their serviceable life while improving and maintaining the safety and integrity of the remaining bridges.

With tourism as its primary industry, Cape May County draws nearly 10 million visitors annually to its beaches and boardwalks, fishing grounds, golf courses, historical and cultural sites, wineries and breweries, and special events. In 2019, Cape May County's tourism industry generated $6.6 billion annually and over twenty-six thousand (26,000) jobs. The economy of Cape May County is highly dependent upon its infrastructure, especially its bridges. The continued safe and efficient mobility of residents and visitors is one of the key foundations for this document and has catalyzed the recommended infrastructure improvements included herein. In addition to vehicular travel, bicycle and pedestrian accommodations will also be given careful consideration throughout the planning and design processes and will be incorporated into future new construction and improvement projects to the maximum extent possible and/or practicable.

The bridges must also provide safe passage for marine traffic. Cape May County is home to the Port of Cape May/Wildwood, the largest commercial fishing port in the State of New Jersey. It is one of the top twenty-five (25) ports in the country. The port is the center for fish processing, freezing and distribution in New Jersey. The dependable conveyance of marine vessels, including fishing fleet, recreational, and marine construction vessels, is and remains critical to the economic vitality of Cape May County.

The County and Commission bridges are subject to the National Bridge Inspections Standards (NBIS) of the United States Department of Transportation Federal Highway Administration. NBIS regulations apply to all publicly owned highway bridges longer than twenty (20) feet located on public roads. Per the NBIS regulations, bridges are inspected on a biennial basis by certified inspectors under the direction of a licensed professional engineer. The latest cycle NBIS reports identify County and Commission bridges that are structurally deficient due to their condition. The reports also identify maintenance and reconstruction elements on each bridge in order to address safety and extend the bridge's useful life.

The County has made significant investments in maintaining the safety and integrity of the bridges over their history, however, with certain of its bridges now over 75 years old, the County must now accelerate the

planning, design, permitting, and advancement of construction to reconstruct or replace the bridges per the NBIS recommendations. All bridge design elements for replacement projects will be updated to current design standards to the maximum extent possible. These design elements include standards for lane and shoulder widths, vertical and horizontal alignment, load carrying capacity, pedestrian access and approach guiderail compliance. Bridge studies will determine the viability of replacing bridges in-line or off-line. There are many factors that will be taken into consideration during each of the bridge studies, including environmental impacts, construction phasing, adjoining property impacts and costs.

The County and Commission bridges are critical components of evacuation routes in the event of flooding, hurricanes and other weather events. Many of the bridges are the primary means of connecting the barrier islands within the County. The condition of the bridges has direct economic impact on the microeconomies of Cape May County. Therefore, the County must also implement its strategic improvement plan to perform repairs on the bridges to maintain structural and operational safety until those included can be replaced.

No endeavor of this magnitude can be accomplished without a solid financial plan that responsibly takes into account its impact on County taxpayers. While both State and Federal grant sources will contribute meaningfully to the costs of implementing this plan (the County is targeting 70% non-County sources), the County is preparing for a more substantial portion, in the range of as much as fifty percent (50%), as the possible obligation of the County. Since the careful development of this plan began over 16 months ago, the Covid-19 pandemic has emerged and disrupted life as well as the National, State, and County economy in a heretofore unseen manner. The level of economic disruption to the County is not yet known and may well have impacts on certain implementation aspects of the plan, at least in the short term. It is important to note that any commitment of funding or bonding as well as the specific allocation of funds in support of this plan will be discussed and authorized on a case by case basis thru the action of a Freeholder Board Resolution.

Fortunately, the County began putting its funding plan in place in 2017 by annually dedicating a portion of its tax levy toward the bridge project. By continuing to do so and by carefully phasing design and construction over a 15-year period, the County will be able to responsibly complete replacements and improvements with modest and manageable effect on County taxpayers. Further detail is provided in the Projected Cost Estimate and Funding section of this document.

Finally, the County recognizes the impact bridge infrastructure has and will have on our County's aesthetic landscape for years to come. Each project will be seen as an opportunity to marry architectural form with function. Therefore, opportunities to integrate placemaking elements in compliance with the County's Creative Placemaking Initiative will be evaluated as a means to enhance the aesthetics of each structure in an effort for them to contribute to the surrounding natural and constructed environments. Public access to the water and recreational opportunities such as fishing will also be taken into design consideration for each bridge project. Further, as projects are developed, possibilities for creating aesthetic continuity through use of common features and elements on multiple sites will be explored. This will serve to help create an identity for the system of infrastructure and a clear recognition of County taxpayers' investments in our future.

This plan will be updated on a regular basis and as needed based upon findings of the NBIS reports and field conditions as they arise.

The following is a detailed summary of proposed bridge replacements and improvements for County and Commission bridges.

COUNTY BRIDGES

The County owns and operates twenty-three (23) bridges. The County has invested over $30,600,000 in bridge maintenance and repairs over the last ten (10) years. This includes the re-decking of bridges, substructure repairs, electrical upgrades, and guide rail replacements. The most recent County bridge to be replaced was the 17th Street Bridge in Ocean City in January 2019. A portion of this investment has been offset through reimbursements back to the County from the State's Local Bridges Future Needs (LBFN) program. We will continue to pursue this annual funding allotment for all future capital bridge improvements.

The County's bridge inventory consists of several types of bridges including span, movable bascule spans, and culvert type bridges that were constructed between the 1930s and the 1980s. There are four (4) bridges that were constructed between 1930 and 1939 that have reached the end of their service life are in immediate need of replacement.

The bridges listed below have reached the end of their service life or will reach the end of their service life within the next 10-15 years. Continued maintenance of the structures is not an option; therefore, the structures must be replaced or undergo substantial rehabilitation as part of the bridge program.

See Appendix A for representative photos of conditions and areas of concern for each bridge.

1. 96th Street (CR 657) Bridge 0500-006

This bascule span bridge was constructed in 1930 and connects the Township of Middle to the Borough of Stone Harbor. The bridge is registered on the NJ State Historic Register and the National Register of Historic Places per action by the New Jersey State Historic Preservation Office (SHPO) on March 8, 1983. It is New Jersey's only known example of a Rall-type bascule, a rare technologically distinguished movable bridge type. The bascule moves both vertically and horizontally by means of pinions that engage pivoted racks, trunnions nested in rollers, and pinned swing struts.

The 2018 NBIS report rated the overall condition of the structure as "serious" due to the superstructure condition. The deck is in "satisfactory" condition and the superstructure is in "serious" condition. While still safe for use, the NBIS report recommends this bridge be replaced.

Preserving the service life of this structure is the County's priority until the bridge span can be replaced.

The approach spans were replaced in the early 1980s and are still functional. The primary issues are related to the bascule span. The machinery and mechanisms to operate the bridge have become obsolete and replacements generally need to be custom fabricated. There are frequent emergency closings of the bridge due to electric, mechanical, and structural issues associated with the bascule span. In 2019 alone, there were three (3) emergency closures of the bridge.

The County has invested over $2,000,000 over the past ten (10) years upgrading the electrical components and repairing the bascule span. The bascule span is the original construction, and though it was partially rehabilitated during the approach span project, it is at the end of its functional life. The structural members of

the bridge have experienced fatigue cracking, and a crack in the main bridge member resulted in the emergency closure of the bridge in October 2016. Similarly, a deteriorated member in the west flanking span resulted in the bridge being closed again in the June 2018. Electrical component failure resulted in the bridge being closed to marine traffic in March 2019. A subsequent structural issue on the southwest bascule discovered on June 21, 2019 resulted in the bridge being closed to marine traffic for over 45 days. A follow-up emergency repair to restore full integrity to the member was performed in June 2020.

Floor beam 3 located at the north east quadrant of the north west bascule has experienced cracking, which was temporarily addressed by drilling arresting holes in Spring 2018, and was permanently repaired Spring 2020 by cutting the cracked section of the member out and replacing and strengthening the web. In addition, floor beam 4, which experienced significant loss of section, was sisterred and strengthened. Several severely deteriorated gusset plates and stringers have been sisterred and strengthened. All rivets with areas of active construction have been replaced with high strength bolts. Repairs have also included shimming loose members and performing electrical upgrades, all in an attempt to reduce vibrations and restore proper bascule performance by re-balancing the bridge.

In Spring 2020, the County began performing emergency structural repairs. The intent is to address emergency repairs to provide an enhanced degree of reliability to the components of the bridge to avoid continued unexpected closures until the bascule is replaced. A follow up repair contract is anticipated to address other less deteriorated structural components, rehabilitating the live load shims and anchorages to reduce vibrations, possible upgrades to the PLC, and repainting of the main bascule span are among the planned repairs. The County has initiated several measures in 2020 Emergency repairs, which will most likely continue on an as needed basis until bridge replacement.

The County has also implemented engineering controls to further protect the structure. In Spring 2019 the County installed radar feedback signs, in an attempt to slow traffic. In Spring 2020 the bridge was load posted to 15 tons, and speed tables installed as a traffic calming measures, all to reduce the vibration of the bascule span.

The County must replace this span as soon as possible.

Subject to funding being made available, County will be issuing Request for Proposals for Consulting Engineering Services in Spring 2021 to design the replacement of the bascule span. It is anticipated that it will take five (5) years to design, permit and construct the bridge. The permitting process will be longer and more complicated than typical bridge projects due to the involvement of the New Jersey State Historic Preservation Office (SHPO), which will need to review and approve the plans for the bridge replacement. The County is proposing to have the replacement span constructed off-site and then installed, which will minimize the time the bridge will be closed to both vehicular and marine traffic. Due to the expense and tolerance of installing a new bascule span, it appears that the existing bascule piers will need to be replaced. As a result, the replacement work will likely take two construction seasons to complete. We anticipate the first 9 months of construction occurring with a detour, installing a temporary fixed span for the summer month, and following up with the new bascule installation during the following 9 months under a closure.

Projected Timeline: RFP for Engineering Services: Spring 2021, Project Completion 2025-2027

Projected Range of Replacement Construction Cost: $21,500,000 - $23,000,000

Projected Impacts: Vehicular and marine traffic will need to be rerouted for two (2) 6 –9 month periods with summer traffic maintained using a temporary fixed span if the bascule is built offsite and installed. If the span needs to be constructed in-place, vehicular and marine traffic will need to be rerouted for 18-24 months. NJ State Historic Preservation Office review will result in added project costs and possible time extensions to the design of the project. There may be extraneous permit conditions that need to be satisfied due to the historic nature of the span.

There is no viable option other than to the replace the bascule span.

See photos Appendix A pages 1-3

2. Mill Creek (CR 621) 0500-030 and Upper Thorofare (CR 621) 0500-029

These concrete fixed span bridges, formerly owned by the Bridge Commission, were constructed in 1939 and are situated along Ocean Drive (CR 621) in Lower Township, west of the Bridge Commission's Middle Thorofare bridge (addressed further in this document). Both bridges are classified as structurally deficient and functionally obsolete due to their width and geometry, scour is present along the abutments and the bridge rails need to be replaced.

The Mill Creek and Upper Thorofare bridges serve as a critical link to the fishing industry and are the only current means by which goods can be transported from the ports, since they are not load posted. As a result of this importance and the fact that their replacement will require substantially less capital investment, regulatory oversight and construction duration than the Middle Thorofare Bridge, the final design and construction of the two bridges and roadway should occur in advance of the overall project. The preliminary engineering of the entire project should occur at one time, however, the final design of the high level bridge (Middle Thorofare)and its construction should occur after the construction of the lower level bridges (Mill Creek and Upper Thorofare), due to their importance to the industry and the lower capital costs associated with their construction.

The 2018 NBIS report for Mill Creek 0500-030 rated the overall condition for the structure as "fair" due to the superstructure and substructure conditions.

The 2018 NBIS Report for Upper Thorofare 0500-029 rated the overall condition of the structure as "poor" due to the condition of the substructure. The superstructure and deck are in "fair" condition, while the substructure is in "poor" condition. The County anticipates awarding a contract to address the substructure deficiencies for a spring/ fall 2020 construction. When completed, this should upgrade the substructure rating of the bridge.

Both bridges contain geometric challenges due to approach, sight distance and narrow lanes without shoulders.

The County has performed and is proposing intermediate repairs to the structures to extend their service life until the County implements a bridge replacement plan. Due to a limited window of opportunity based upon environmental constraints or potential conflict with work to be done on the Middle Thorofare Bridge, it is proposed that these repairs be phased based upon priority.

Phase 1 was completed in July 2019. Approach guide rail was installed, the bridge deck and safety walk spalls were repaired, the deck joints were sealed, and the approach roadway transition was paved. Also, the scour under all approach slabs was addressed. Phase 1 cost was $1,234,997 for both bridges.

Phase 2 will be awarded in the fall 2020 and be constructed in the fall 2020 and winter 2021. Work will address installation of scour countermeasures at the abutments, repair of the underside deck spall, repair of stringer and bridge fascia spalls and pile jacketing.

Projected Timeline: October 2020 thru May 2021

*Projected Range of Cost: *$1,3500,000 -$1,550,0000*

Projected Impacts: A single lane of vehicular traffic may be needed during a portion of the project.

*The project is being proposed for 2020 LBFN Grant funding at no costs to the County.

Phase 3 of work will consist of a cantilevered walkway on the south side of the bridge and installation of continuous beam guiderail to replace the existing deteriorated bridge rail. The current bridge rail does not meet a minimum of a TL-1 load condition and was listed in the previous NBIS bridge inspection reports as a Priority 1 required repair. The new rail will be installed in the location of the existing walkway; therefore, the walkway must be constructed in order to maintain pedestrian access.

Projected Timeline: design and permitting September 202 – June 2021, construction September 2020 - May 2022

Projected Range of Cost: *$1,650,000 - $1,8500,000

Projected Impacts: Pedestrian access will be closed during the project. A single lane of vehicular traffic will be maintained during the project.

*This project will be proposed for 2021 LBFN Grant funding at no costs to the County.

The three phases of improvements described will provide improved longevity to the bridges and will allow the County to proceed with the eventual bridge replacement as part of the overall Middle Thorofare/Ocean Drive replacement project. These repairs will result in the structures being upgraded from the current structurally deficient classification. In addition, the railing upgrades will result in a TL-4 load capacity rating conforming to required vehicular load impacts and will improve safety while reducing the County's current exposure/ liability. The cost for the replacement of these bridges is included as part of the Middle Thorofare bridge discussed later in this document.

See photos Appendix A pages 4-7.

3. Hand Avenue (CR 658) 0500-031

This box culvert type bridge was constructed in 1982 and allows Skeeter Island Creek to flow beneath Hand Avenue (CR 658) in Middle Township. The bridge must be replaced due to the undermining of the culverts, erosion of the embankments, sinkholes that have developed on the approaches, and spalling cracking and deterioration of the concrete. Extensive remedial repairs were conducted in December 2017 to minimize soil migration.

The 2018 NBIS report rated the overall condition of the structure as "fair" due to the condition of the culvert.

This replacement of this bridge is currently under design and contract plans expected to be available in Spring 2020 pending the timely approval of environmental permits.

Projected Timeline: Completion late spring 2021 or fall 2021 subject to funding being available

Projected Range of Cost: $*4,530,000 - $4,730,000

Projected Impacts: Hand Avenue will be closed for 60 days and traffic rerouted during the culvert removal and installation.

*The County anticipates that this project may be part of a Local Bridges Future Needs Grant (LBFN) funding. This estimate also includes the anticipated replacement cost of the proposed Springer's Mill Road Culvert discussed below.

After the completion of the Hand Avenue Bridge Replacement project, the County will replace Springer's Mill Road (CR643) over Dias Creek 18'x5' box culvert and timber wingwalls. The estimated cost to replace this is approximately $1.9 million. Springers Mill Road will be closed for 60 days and traffic rerouted during the culvert removal and installation. This structure is currently not part of the County's NBIS program, however it is anticipated that it will be part of the NBIS program in the future.

See photos Appendix A page 8 and 9.

4. 104th Street over Carnival Bay 0500-023

This timber pile and bulkhead bridge was constructed in 1987 and interconnects sections of Stone Harbor along Carnival Bay at 104th street. The substructure is entirely made of wood and portions of the bridge are deteriorated from the effects of marine borer activity.

The 2018 NBIS report rated the overall condition of the structure as "fair" due to the substructure. An increase in heart rot of the waler was observed and section loss due to decay and marine borer activity. In 2014, the County invested $76,260 in repairs to this bridge.

A replacement study and report, along with a cost estimate, was completed by Urban Engineers approximately 3 years ago. The County is proposing to construct substructure repairs, replace the bridge railing and resurface the deck.

Projected Timeline: Consultant will be selected Summer 2020. Project Completion 2025.

Projected Construction Cost: $1,570,000 – $1,770,000

Projected Impacts: There will be lane closures at times during the project, but traffic will be maintained. There may be impacts to marine traffic during construction. The Borough will be brought into the design process in order to approve the final railing design from an aesthetic point of view.

See photos Appendix A page 10 and 11,

5. 25th Street over Avalon Canal 0050-024

This fixed span concrete bridge on timber piles was constructed in 1987 and interconnects the 25th Street portion of Avalon over Avalon Canal.

The 2018 NBIS report rated the overall condition of the structure is "fair" due the substructure, based upon the severe deterioration of the timber bulkhead at each abutment, which has caused severe erosion.

Severe deterioration of the timber bulkheads resulted in undermining of the abutments. In 2017 the County invested $219,000 for the design of scour and substructure repairs to the 21st and 25th Street bridges. However, the design did not progress in an expedient manner. As a result, the scour conditions continued and progressed such that emergency repairs had to be performed in May 2019 due to a sinkhole that closed one lane of traffic and jeopardized access to this island community.

The emergency repairs prompted the need to expedite repair of the substructure and rehabilitation of the timber bulkhead.

Projected Timeline: Abutment rehabilitation: Contract award Fall 2020, construction Winter/Spring 2021

Projected Range of Major Repairs Cost: $1,890,000-$2,090,000

Projected Impacts: There may be lane closures at times during the project, but traffic will be maintained. There will be impacts to marine traffic during construction but permittable. Possible in water construction restriction after March 1st.

See photos Appendix A page 12 and 13.

6. 21st Street over Avalon Canal 0500-010

This fixed span concrete bridge on timber piles was constructed in 1990 and interconnects the 21st Street portion of Avalon over Avalon Canal.

The 2018 NBIS report rated the overall condition of the structure is "satisfactory" due the substructure. An increase in the loss of fill from behind both the east and west bulkheads was noted.

In 2017, the County invested $219,000 for the design of scour and substructure repairs to the 21st and 25th Street bridges. The scour conditions are severe such that emergency repairs were performed in May 2019 due to a sinkhole forming beneath the pavement. Emergency repairs were conducted to substructure in May 2019 due to the undermining of the abutments. This is the sister project to the 25th Street bridge project.

The emergency repairs recently performed prompted the need to expedite repair of the substructure and rehabilitation of the timber bulkhead.

Projected Timeline: Abutment rehabilitation Fall 2020 Contract award Fall 2020, construction Winter/ Spring 2021

Projected Range of Major Repairs Cost: $1,890,000 -$2,090,000

Projected Impacts: There will be lane closures at times during the project, but traffic will be maintained. There will be impacts to marine traffic during construction. but permittable. Possible in water construction restriction after March 1st.

See photos Appendix A page 14 and 15

7. Ludlam's Thorofare (CR 625) Bridge 0500-005

This fixed span bridge was constructed in 1963 to realign and replace the smaller bridge that connects Dennis Township to the City of Sea Isle. The County is proposing to re-deck this bridge as part of an overall re-decking program for the bridges built in the 1960s due to the wear of the decking.

The 2018 NBIS rated the overall condition of the structure as satisfactory due to the superstructure and the substructure condition.

The deck is in "satisfactory" condition due to the moderate wear of the deck with exposed aggregate throughout, numerous concrete patches with fine pattern cracking, small spall and a few fine cracks with efflorescence at the underside of the deck.

The superstructure is in "satisfactory" condition due to the moderate pitting (arrested) along the girders and floor beams in span 6.

The substructure is in satisfactory condition due to large spalls and severe spalling in the concrete stems of Pier 14, 15, 16 and 17.

Projected Timeline: Consultant selected in 2022. Project completion 2025

Projected Range of Re-decking Cost: $*12,350,000-$13,400,000

Projected Impacts: This will be a project that will be completed in two (2) years during tourist off seasons. A temporary traffic signal will be used and traffic during construction will be restricted to one lane with alternating traffic over the bridge.

*The County will seek I-Bank loan funding similar to the Ingram's Thorofare re-decking project.

See photos Appendix A page 16 and 17

8. Cedar Swamp Bridge (CR 631) 0500-018

This concrete fixed span bridge was constructed in 1968 and allows Cedar Swamp to flow beneath Tuckahoe Road (CR 631).

The 2018 NBIS report rated the overall condition of the structure as “satisfactory” due the condition of the substructure. The deck is in “satisfactory” condition due the fine to medium full-length longitudinal cracks and several concrete patches in all spans.

The substructure is in satisfactory condition due to the fine pattern cracking with efflorescence along bents caps 1 and 2 and moderate to heavy weathering with a few wide vertical splits in the timber piles along the all bents.

In 2017, the County invested $6968.82 to improve the guide rail attachments.

The County will be repairing the bridge decking and guiderail as part of structural improvements in response to the NBIS report recommendations.

> *Projected Timeline*: Consultant selected 2020 Project completion 2021
>
> *Projected Range of Structural Improvements Cost*: $1,850,000-$2,025,000
>
> *Projected Impacts*: A temporary traffic signal with alternating traffic will be required during the construction duration.

The County will be planning to replace the bridge in 2030.

> *Projected Timeline*: Consultant selected 2025. Project completion 2031
>
> *Projected Range of Replacement Cost*: $7,050,000-$7,550,000
>
> *Projected Impacts*: Lane shifts, reduced lane widths. Construction will be staged to minimize impacts

See photos Appendix A page 18 and 19.

9. Leonards Thorofare (CR 601) 0500-009 and Gravens Thorofare (CR 601) 0500-003

These fixed span bridges were constructed in 1967 in a series of four (4) bridges (Leonards Thorofare, Ingrams Thorofare, Gravens Thorofare and Avalon Canal) along Avalon Boulevard (CR601) that connects Middle Township to the Borough of Avalon. The bridge decking of both bridges is in poor condition with spalls and exposed rebar.

Re-decking of the Ingrams Thorofare Bridge 0500-001 began in November 2019. Repair of the deck spalls on the Leonards Thorofare and Graven Thorfare bridges was added to this contract to extend the life of the decking. Scour and undermining repair work of the Graven's substructure was also completed in Spring 2020. The County will plan to re-deck the Gravens Thorofare and Leonards Thorofare bridges fully in ten (10) years.

The 2018 NBIS report rated the overall condition of Leonards Thorofare bridge as "satisfactory" due to the condition of the superstructure and the substructure. The deck is in "fair" condition due to wide longitudinal cracks, several random spalls and edge spalls in most of the spans. We expect this condition to be upgraded as a result of these recent repairs.

The 2018 NBIS report rated the overall condition of the Gravens Thorofare bridge as "fair" due to the substructure conditions. The deck is in "fair" condition due to wide longitudinal cracks, several random spalls and edge spalls in all spans.

The County is proposing to re-deck the Leonards Thorofare and Gravens Thorofare bridges as one project to address the spalling of both decks since both are along County Route 601.

Projected Timeline: Consultants will be selected Fall 2030. Construction proposed 2032

Projected Range of Re-decking Cost: $4,150,000- $4,350,000

Projected Impacts: Construction will occur during one (1) tourist off-season construction period (Labor Day through Memorial Day) and will result in one lane of traffic with a temporary traffic signal.

See photos Appendix A page 20-23.

10. Great Channel Bridge (CR 619) 0500-028

This bascule span bridge was constructed in 1939 as part of the Bridge Commission's Federal Public Works Administration project and connects the Borough Stone Harbor to Township of Middle and the City of North Wildwood. There is no toll collected on this bridge. The bridge was transferred from the Bridge Commission to the County in early 1991.

The 2018 NBIS report rates the overall condition of the structure as structurally deficient due to the low inventory rating and functionally obsolete. The bridge is structurally deficient due to the superstructure being in "poor" condition. The bridge is functionally obsolete due to the narrow deck geometry. The deck is in "satisfactory" condition due to fine to medium transverse cracks, areas of fine map cracking, concrete patches, small shallow spalls and asphalt patches on top of the deck. The superstructure is in "poor" condition due to the steel section losses and severe pitting at some location in the approach spans.

The County has made significant investments to maintain safety and integrity of the bridge.

In 2016 the County invested $414,000 for repairs to the bridge abutments.
In 2017, the County invested $652,770 to recoat the bridge railings of Great Channel Bridge.

This bridge is in need of immediate rehabilitation to the superstructure (stringer webs between spans 8 and 9, intersecting haunches of steel stringers, general steel section loss upgrades). In addition, the fender system is in need of replacement. These repairs are part of a planned design and repair contract scheduled for 2020 design and construction in 2021. The project has been submitted for 2020 LBFN funding and has been approved for 1.2 million dollars of a 2020LBFN grant. In addition, it is our understanding that the New Jersey I-Bank will be selecting this project for 2nd quarter funding to provide for total project cost financing (design, construction and inspection).

Projected Timeline: Design Contract 2020

Projected Range of Improvements Cost: $4,750,000 -$4,950,000

Projected Impacts: Rehabilitation will be conducted as needed over multiple years in the offseason and impact to vehicular and marine traffic should be minimal.

Replacement is recommended in order to remove the bridge from the structurally deficient category. The bridge is approaching the end of its useful life

Projected Timeline: Replacement 2029-2031

Projected Range of Replacement Cost: *$71,900,000- $161,900,000

Projected Impacts: If the replacement is performed within the existing bridge footprint, access may be unavailable for one summer season. If the bridge is constructed offline, the costs will be significantly higher, although traffic could be maintained throughout and the project will span multiple years.

*This estimate reflects in-line replacement of the bridge as a viable option (lower range), as to be determined by the bridge study

See photos Appendix A page 24 and 25.

COUNTY BRIDGES NOT IDENTIFIED FOR MAJOR IMPROVEMENT OR REPLACEMENT

The remaining County bridges listed below are in satisfactory condition and do not need major improvements or replacements within the next 10-15 years. Some of the bridges listed below may require painting of its steel members as part of routine future maintenance. Bridges that have had renovations or repairs within the past 10 years are noted below. All County bridges will be incorporated into an annual bridge maintenance plan that will maintain their safety, integrity, and extend their service life. In addition, the County Engineer is looking into initialing the use of non- chloride based de-icing agents for use on the bridges. The use of non-chloride deicing agents will reduce corrosion of steel members and accelerated concrete contamination which will have an overall benefit to preserving the structures and extending their anticipated life. Proactively painting steel members as well as sealing/painting concrete substructure components will be a relatively inexpensive means to economically extend structure life staying off major replacement or rehabilitation projects.

1. 0500-001 Ingrams Thorofare Bridge – In 2017, the County invested $1,251,956 for underwater structure repairs to the bridge. The County invested $7.9 Million to re-deck the Ingrams Thorofare bridge. Work began in November 2019 and the eastbound lane redecking was completed in May 2020. Work will begin on the westbound lane in November 2020 and the project will be completed in May 2021.

2. 0500-004 Roosevelt Boulevard Bridge over Crook Horn Creek - In 2015, the County invested $7,859,304 to re-deck the Roosevelt Boulevard Bridge.

3. 0500-007 Lafayette Street Bridge over Cape Island Creek - In 2013, the County invested $214,481 to perform emergency repairs to the tide gate related to Superstorm Sandy. In 2018, the County invested $1,513, 506 to repair the substructure.

4. 0500-008 Avalon Canal – In 2010, the County invested $4,472,373 to rehabilitate and widen the bridge.

5. 0500-011 Glenwood Avenue

6. 0500-016 Russ Chattin over Middle Thorofare

7. 0500-017 Scotch Bonnet Bridge – In 2014, the County invested $6,606 for underwater inspection of the timber pedestrian bridge. The inspection warranted the closing of the pedestrian bridge. The pedestrian bridge will be evaluated for replacement. Middle Township has expressed an interest in taking over the structure. If this occurs, the pedestrian bridge structure will be removed from the County Bridge Plan.

8. 0500-025 Court House-South Dennis Road over Sluice Creek

9. 0500-026 Tyler Road over Sluice Creek

10. 0500-027 Elmira Street over Cape Island Creek

11. 0500-032 17th Street over Venetian Carnival Bayou – In 2018, the County invested $70,000 to improve the abutments. In 2017, the County invested $2,534,589 to replace the bridge. The project was substantially completed in January 2019.

There are currently twenty (20) minor bridges in Cape May County that are not identified as part of the County's NBIS inspection cycle and thus have not yet been programmed for improvements. The State will be administering the inspection of these bridges in gall of 2020 and assessing conditions. A significant number of these bridges that are not County owned, however, the County will assist and coordinate with municipalities to identify funding sources for making the necessary repairs. The County will assess information as it becomes available and determine whether to include any or all of the applicable minor bridges within this plan.

CAPE MAY COUNTY BRIDGE COMMISSION BRIDGES

The Cape May County Bridge Commission currently owns and operates five (5) bridges; one fixed bridge (Ocean City – Longport) and four (4) single leaf bascule bridges (Corsons Inlet, Townsends Inlet, Grassy Sound, and Middle Thorofare) linking the barrier islands via Ocean Drive. The formation of the Bridge Commission in 1934 by the Board of Chosen Freeholders created the Commission to finance, construct, and operate the bridges while permitting the collection of tolls to offset capital, maintenance, and operating expenses.

The Commission's original 1939 construction plans included Great Channel, Mill Creek, and Upper Thorofare Bridges which were deeded over to the County of Cape May in 1991. Three of the five bridges (Townsends, Grassy Sound, Middle Thorofare) opened to traffic in June 1940, the fourth (Corsons) opened to traffic in 1949. The original Ocean City – Longport bridge, constructed in 1926, was acquired by the Commission in 1946, then, replaced in 1999-2002 with the new structure opening to traffic in July 2002. A portion of the original bridge was re-purposed as a fishing pier on the Atlantic County side and lies adjacent to the present-day highway bridge. The four (4) "lower bridges" (Corsons Inlet, Townsends Inlet, Grassy Sound, and Middle Thorofare) are structurally deficient, functionally obsolete, load posted for 15 tons, and all are being programmed for future replacement.

The County has invested over $32,000,000 over the past 10 years to perform maintenance and repairs on the Commission bridges. These repairs have included superstructure, substructure repairs, partial bridge replacements, electrical/mechanical repairs, submarine cable installations, and structure recoating. While all replacement and capital improvement costs are now borne by the County, the Commission will continue to collect toll revenue to finance administration, bascule operations, inspections, and a portion of maintenance for which its revenue is sufficient.

See Appendix A for representative photos of conditions and areas of concern for each bridge.

1. Middle Thorofare Bridge (CR621) 3100-006

This bascule span bridge was constructed in 1939 and is part of a series of bridges that connects Wildwood Crest to Lower Township and the southern terminus of the Garden State Parkway. This bridge is beyond its service life and must be replaced. Safeguards related to bridge openings were installed in 2017 and 2018, while an emergency scour protection repair was completed after Hurricane Sandy (October 2012). Miscellaneous substructure and super structure repairs were completed from the 1970s through the 1990s. While still safe for travel, the 2017 NBIS Inspection Report rated the overall condition of the structure as "critical" due to the low inventory ratings. The deck rating is "satisfactory" due to medium and wide transverse cracks, several spalls and areas of exposed rebar. The superstructure condition rating is "poor" due to the painted over section loss, pitting holes, and collision damage in the steel girders. The substructure condition rating is "poor" due to the heavy collision damage, missing portions of the fender system, and undermining at Pier 8 and Pier 13.

This bridge is part of the Ocean Drive (CR621) Improvements and Bridge Replacement Project currently in Local Concept Development Phase which is anticipated to be completed before the end of 2019. The South Jersey Transportation Planning Organization (SJTPO) has been working with the County to secure supplemental State and Federal funding sources for the construction portion of the project. The Bridge Commission, the public, and the County Freeholder Board were presented eight (8) alternatives during several public meetings, and a preferred alignment for the proposed fixed-span replacement was advanced in Spring 2019. The preliminary preferred alternative (PPA) minimizes environmental impacts as well as impacts to local businesses, while maintaining traffic flow during the replacement process. Because this bridge has been identified as the first priority for replacement, rehabilitation projects will be limited to what is necessary to maintain structural integrity and safety elements until scheduled replacement construction is commenced in 2023 and completed by 2025.

Ocean Drive (CR621) Roadway Improvements and Bridge Replacements: Middle Thorofare (3100-006), Mill Creek (0500-030), Upper Thorofare (0500-029)

Projected Timeline: Complete concept development phase December 2020. Issue RFP for preliminary engineering June 2021. Final Design 2022-2024. Construction 2024-2027. See County section for phased construction description.

Projected Range of Replacement Cost: $238,000,000 to $243,000,000

Projected Impacts: There are multiple factors in the replacement of the bridge. The northern approach lanes are located adjacent to environmentally sensitive areas under the jurisdiction of US Fish and Wildlife as part of the Cape May National Wildlife Refuge. Additionally, there are multiple businesses along the proposed central location of the bridge. The County understands the importance of minimizing impacts to business. The proposed Middle Thorofare Bridge will be built "off-line" out of the current alignment to maintain existing traffic flow. Marine traffic will be maintained, however, impacts during in-water construction will require coordination and management. See County Bridge section for Mill Creek & Upper Thorofare projected impacts.

Middle Thorofare Bridge Improvements

To maintain Middle Thorofare Bridge until replacement, the Commission plans to perform capital improvements that are recommended in the NBIS Inspection reports.

A. 2019 Middle Thorofare Bridge Rehabilitation Project: This project consists of replacement of existing substandard bridge railing and approach railings. Replacement of severely damaged timber fender system, repairing impact damage to bottom of steel flanges of bascule span. Repair corrosion damaged areas of the bascule web and flanges in the vicinity of the counterweight. These defects are identified as a Priority 2 repair in the current and past NBIS reports. The project is awaiting NJDOT authorization to advertise.

   Projected Timeline: Advertisement for Construction July 2020. Construction Fall 2020 to early Summer 2021.

   Projected range of Costs: $6,400,000-$6,900,000

   Projected Impacts: The work will be performed using single lane alternating traffic permitting traffic flow during all phases of construction. There will be 2 or 3 scheduled 36-hour bascule closure periods affecting larger marine vessels. Periodic, 1 to 2-hour vehicular traffic interruptions will occur over a 2-week period to permit fender pile installation beneath bascule span.

B. Substructure Repairs (scour countermeasures south abutment and pier 13): This project addresses local soil scour at base of Pier 13 caisson type foundation which are exposing the existing H pilings within the caisson. These defects are identified as a Priority 1 repair in the current NBIS report.

   Projected Timeline: Design and construction 2021

   Projected range of Costs: $1,170,000 to $1,470,000

   Projected Impacts: Work is outside the main navigation channel so marine traffic impacts should be minimal. Minimal or no vehicular impacts are expected as the project can be constructed from the waterway.

C. Electrical Replacements: The existing motor, drive controls, and Programmable Logic Controller (PLC) system are obsolete with parts unavailable for the drive controls and PLC systems. The existing motor windings are degraded and in need of a rewinding or replacement. There is no auxiliary drive system for the bascule span, therefore failure of one of these systems will render the bascule span nonfunctional severely impacting the local fishing fleet and processing plants. This project will restore safe and reliable bascule operations allowing the 5000- 6000 annual bridge openings to continue until the bridge is replaced. Includes replacement of the main motor, drive control, and PLC, and installation of auxiliary motor, span locks, and safety gate replacement. Project scope and timeline may be adjusted depending on the bridge replacement program schedule.

   Projected Timeline: Design 2021. Construction 2021-2022

   Projected range of Costs: $540,000 to $840,000

   Projected Impacts: Bascule operations will be impacted in discrete blocks of time, 3-5 days, while new equipment is switched over to operations. Coordination with local fishing fleet will be critical.

D. Super Structure Recoating: This project will address only the most severe coating failure areas and minimal structural steel repairs. Project scope and timeline may be adjusted depending on the bridge replacement program schedule.

   Projected Timeline: Design 2023. Construction 2023-2024

   Projected range of Costs: $475,000 to $775,000

Projected Impacts: The work will be performed using single lane alternating traffic permitting traffic flow during all phases of construction. Minimal impacts to bascule operations and fishing fleet.

E. Toll booth & Control House Rehabilitation: The existing toll booth and control house interior and exterior building components are from the original 1940 construction. Project will make the buildings weathertight, upgrade electrical components, and improve toll collector work environment. Project scope and timeline may be adjusted depending on the bridge replacement program schedule.

Projected Timeline: Design and construction 2021

Projected range of Costs: $105,000-$125,000

Projected Impacts: The work will be performed using single lane alternating traffic permitting traffic flow during all phases of construction. Minimal impacts to bascule operations and fishing fleet.

See photos Appendix A pages 26-27.

2. Townsends Inlet Bridge (CR 619) 3100-003

This bascule span bridge was constructed in 1939 and connects Sea Isle City to the Borough of Avalon along Ocean Drive. This bridge has been rehabilitated several times in the past 10-15 years, and most recently Spans 1-7 were replaced in their entirety in July 2019. The installation of emergency temporary supports for pier 6 occurred in 2017, the bridge railings were replaced 2018-2019 and submarine cable will be replaced in 2019. The bascule span and toll span were rehabilitated in 2014-2015 along with substantial machinery rehabilitation and PLC replacement. In 2011, the entire bridge was repainted and in 2009 structural repairs performed to the superstructure.

The 2017 NBIS report rates the overall condition of the structure as "poor" due to the superstructure, substructure and low inventory ratings. The deck condition rating is "satisfactory" due to medium and wide transverse cracks and several spall on the top, facias and underside surfaces. The superstructure condition rating is "poor" due to painted over section loss, pitting and holes in the girders, steel beams and stringers, and bearing elements. The substructure condition rating is "poor" due to heavy collision damage and missing portions of the fender systems at piers 10 and 11 from the south. The severe section loss of the steel caisson shells and severe laminar corrosion.

Townsends Inlet Bridge Replacement

A cursory bridge replacement study was authorized by the County in 2017 and presented to the Commission in October 2017 in response to the failure of the deteriorated substructure elements and several bridge closures due to repairs. The recommended alternative by the consultant was a parallel structure built offline with a single leaf bascule main span. The study provided a brief overview of replacements options, potential environmental constraints, and preliminary costs. In order to replace the bridge a formal Local Concept Development Study must be first developed to gain project input from public officials, stakeholders, and the general public. Alternatives will be conceptualized and developed which advance the purpose and need of the project.

Projected Timeline: Concept Development 2021-2022. Preliminary engineering 2023-2024. Final Design 2024-2026. Construction 2026-2029.

Projected Range of Replacement Cost: *$65,750,000 to $167,750,000

Projected Impacts: The replacement bridge may likely be built off-line in order to maintain existing traffic flow. If an in-line replacement plan is selected, annual shutdowns between September and May will be necessary. There are environmentally sensitive areas on both approaches of the bridge, which will extend the permitting process and possibly affect proposed alignment of a new bridge. Marine traffic will be impacted if a channel relocation plan is selected.

*This estimate reflects the in-line replacement of the bridge as a viable option, as to be determined by the bridge study.

In addition to replacing the bridge in its entirety as recommended in the NBIS, the Commission and County will evaluate replacing the bridge in-kind. The replacement would not include the spans 1-7,

and the bridge placement would be in its current location. This option would provide a cost benefit by reducing construction costs and taking advantage of the recently constructed spans by incorporating them in the new bridge if feasible. This cost is reflected in the project range of replacement cost.

Townsends Inlet Bridge Improvements

To maintain Townsends Inlet Bridge until replacement, the Commission plans to perform improvements that are recommended in the NBIS Inspection reports. The Replacement of Spans 1-7 completed in July 2019 addressed the scour concerns at Piers 1 through Pier 6 presented in the NBIS report. Because the bridge is being programmed for replacement, the remaining piers are being monitored with underwater inspections at 24-month intervals and interim seabed elevation checks after significant storm events. The Commission will be performing the following repairs and improvements until the bridge is replaced:

A. Fender Reconstruction: This project consists of reconstruction of the damaged fender components from several vessel allisions. These defects are identified as a Priority 2 repair in the current and past NBIS reports.

   Projected Timeline: Design 2021. Construction 2021-2022

   Projected range of Costs: $1,720,000 to $1,920,000

   Projected Impacts: Brief vehicular traffic interferences due to installation of pilings below bascule span. Marine vessel impacts due to contractor occupying channel during construction at periodic times.

B. Structural Steel Repairs- Approach Span Strengthening: This project addresses specific steel elements within the bridge's superstructure that are reducing the load ratings. Further reduction in load ratings would require the Commission to load post below 15 Tons which would significantly impact local delivery vehicles. Low load ratings and defects are identified as a Priority 2 repairs in the current and past NBIS reports.

   Projected Timeline: Design 2023. Construction 2023-2024

   Projected range of Costs: $2,400,000 to $2,800,000

   Projected Impacts: Brief vehicular traffic interferences due to contractor moving materials to the underside of the deck. Marine vessel impacts should be minimal as no work is proposed in the navigation channel. Most structural repairs are hidden from view however SHPO will need to be consulted for any significant visual changes to the structure.

C. Bridge Controls PLC & Span Lock Maintenance: The existing PLC and auxiliary drive system is now 4 years old and has experienced problems. This project will restore reliable operation to the bascule span controls and backup systems.

   Projected Timeline: Design and Construction 2021

   Projected range of Costs: $80,000 to $100,000

   Projected Impacts: These are backup systems and impacts to vehicular and marine traffic is expected to be minimal, except during testing.

D. Super Structure Recoating: Townsends Inlet Bridge was completely recoated in 2011 under Federal Work Stimulus program using a Transportation Investment Generating Economic Recovery (TIGER) Grant. The steel coatings are degrading, and corrosion is growing at an accelerated rate. The coating system is the structural steel's first line of defense against the harsh marine environment. Repair of the coating system will arrest deterioration and extend the life of the structure until replacement.

   Projected Timeline: Design and construction 2022-2023

   Projected range of Costs: $1,025,000 to $1,525,000

Projected Impacts: The work will be performed using single lane alternating traffic permitting traffic flow during all phases of construction. Impacts to bascule operations would occur in brief, one to two week intervals.

E. Toll booth & Control House Rehabilitation: The existing control house interior and exterior building components are from the original 1940 construction. The toll booth was rehabilitated in 2015. This bridge's toll booth and control house are closest to the Atlantic Ocean and this project will make the buildings weathertight, upgrade interior & exterior electrical components, and improve toll collector work environment. This bridge is manned twenty-four (24) hours per day, seven (7) days a week, and is a vital entry point to a safe harbor from sea, second to Cape May Inlet.

Projected Timeline: Design 2022. Construction 2022-2023

Projected range of Costs: $140,000 to $180,000

Projected Impacts: The work will be performed using single lane alternating traffic permitting traffic flow during all phases of construction. Minimal impacts to bascule operations.

F. Transformer Power Feed Upgrade: The existing power feed to the bridge is supplied by a 4,060 Volt feeder cable hanging beneath the eastern safety walk on the bridge. Three (3) Atlantic City Electric owned transformers are within a concrete vault at the bascule span pier. This project would relocate the transformers to a utility pole on the Sea Isle side of the bridge and reduce the voltage to a much safer 240 Volts. A similar project was successfully completed at Middle Thorofare Bridge in 2016.

Projected Timeline: Design and construction 2021

Projected range of Costs: $280,000 to $380,000

Projected Impacts: The work will be performed using single lane alternating traffic permitting traffic flow during all phases of construction. Minimal impacts to bascule operations during power switchover.

See photos Appendix A page 28 and 29.

3. Grassy Sound Bridge (CR 619) 3100-005

This bascule span bridge was constructed in 1939 and connects the Borough of Stone Harbor to Middle Township and North Wildwood along Ocean Drive (CR 619). This is the least traveled bridge among the Commission bridges. Based upon the NBIS reports, this bridge requires substantial structural upgrades and major rehabilitation of the bascule span to remain operational. This bridge will eventually need to be replaced once higher priority bridges are replaced. The 2017 NBIS report rates the overall condition of the structure as "serious" due to the superstructure. The deck is in "satisfactory" condition due to medium-wide cracking and incipient large spalls with exposed rusted rebar on the top and underside surfaces, sever delamination and spalls and exposed rebar on the fascia of several spans, and severe section losses and holes on the bridge railings.

The superstructure is in" serious" condition due to severe section losses, and holes in the steel stringers of the bascule pan. There are also paint-arrested pitting losses, and holes in the steel deck girders, stringer and on 3-stringer approach spans. The substructure is in "poor" condition due to the complete loss of fill within and around the perimeter of the abutment vault structure. There is heavy collision damage, severe decay and missing lower wales on the Pier 13 fender system.

Grassy Sound Bridge Replacement

The replacement process will likely follow Federal Highway Association guidelines to preserve Federal funding capabilities. This process includes a formal Local Concept Development Study to gain project input from public officials, stakeholders, and the general public. Alternatives will be conceptualized and developed which advance the need and purpose of the project.

Projected Timeline: Concept Development/ Preliminary Design 2029-2031. Final Design 2031-2034. Construction 2035-2038.

Projected Range of Replacement Cost: *$53,500,000 to $93,500,000

Projected Impacts: The replacement will be likely be constructed off-line to maintain existing traffic flow. Navigational impacts for bridge replacement should be coordinated with replacement plans for the County's Great Channel Bridge to the north as this is an alternate access to the Intracoastal Waterway (ICW). Grassy Sound Replacement Bridge will likely remain a movable bridge based on the existing navigational waterway depths in the area and access to the ICW and Hereford Inlet.

* This estimate reflects in-line replacement of the bridge as a viable option, as to be determined by the bridge study

Grassy Sound Bridge Improvements

To maintain Grassy Sound Bridge until replacement, the Commission plans to perform improvements that are recommended in the NBIS Inspection reports. The Commission will be performing the following repairs until the bridge is replaced:

A. Fender Reconstruction: This project consists of reconstruction of the damaged fender components from vessel collisions. These defects are identified as a Priority 2 repair in the current and past NBIS reports.

Projected Timeline: Design 2021-2022. Construction 2022-2023

Projected range of Costs: $1,850,000 to $2,250,000

Projected Impacts: Brief vehicular traffic interferences due to installation of pilings below bascule span. Marine vessel impacts due to contractor occupying channel during construction at periodic times.

B. Structural Steel Repairs- Approach Span Strengthening: This project addresses specific steel elements within the bridge's superstructure that are reducing the load ratings. Further reduction in load ratings would require the Commission to Load Post below 15 Tons which would significantly impact local delivery vehicles. Low load ratings and defects are identified as a Priority 2 repairs in the current and past NBIS reports. This project is currently in the design phase.

Projected Timeline: Design and construction 2021-2022.

Projected range of Costs: $2,360,000 to $2,760,000.

Projected Impacts: Brief vehicular traffic interferences due to contractor moving materials to the underside of the deck. Marine vessel impacts should be minimal as no work is proposed in the navigation channel. Most structural repairs are hidden from view however SHPO will need to be consulted for any significant visual changes to the structure.

C. Deck Patching, Toll Booth Curbing, and Joint Seals: General concrete repairs to the superstructure and deck, including joint seals to prevent water infiltration which leads to degradation of the concrete and steel elements.

Projected Timeline: Design 2020. Construction 2021

Projected range of Costs: $525,000 to $725,000

Projected Impacts: The work will be performed using single lane alternating traffic permitting traffic flow during all phases of construction.

D. Super Structure Recoating: Grassy Sound Bridge was completely recoated in 2011 under a Federal Work Stimulus program using a Tiger Grant. The steel coatings are degrading, and corrosion is growing at an accelerated rate. The coating system is the structural steel's first line of defense against the harsh marine environment. Repair of the coating system will arrest deterioration and extend the life of the structure until replacement.

Projected Timeline: Design and construction 2022-2023

Projected range of Costs: $1,025,000 to $1,525,000

Projected Impacts: The work will be performed using single lane alternating traffic permitting traffic flow during all phases of construction. Impacts to bascule operations would occur in brief, one to two week intervals.

E. North Bin Abutment Scour Rehabilitation/ Slope Restoration: The north bin abutment is severely scoured and eroded within the vault. This erosion unabated will affect the stability of the abutment and could lead bridge closure. This project will refill with low strength concrete, seal the abutment, and restore the slope protection. These defects are identified as a Priority 2 repairs in the current and past NBIS reports.

Projected Timeline: Design 2020. Construction 2021

Projected range of Costs: $660,000 to $960,000

Projected Impacts: Work is outside the main navigation channel so marine traffic impacts should be minimal. Minimal or no vehicular impacts are expected as the project can be constructed from the waterway and shoulder areas. If needed single lane alternating traffic control will be used to maintain traffic.

F. Bascule Span Rehabilitation: This project will be similar to the Townsends Inlet Bascule and Toll Span project in 2013-16, however is reduced in scope to only include structural steel work and mechanical/electrical work. This project includes a preliminary phase to address the severe condition of the bascule span stringers. The mechanical / electrical work will upgrade safety systems and bascule operational systems to improve operational reliability. These defects are identified as a Priority 1 repairs in the current and past NBIS reports.

Projected Timeline: Design 2020 and 2023. Construction 2020 and 2023-2024

Projected range of Costs: $5,590,000 to $6,515,000

Projected Impacts: Detours of vehicular traffic will be necessary as well as marine vessel impacts due to the bascule span positioning for construction. Work will be scheduled for the off season to minimize these impacts.

G. Substructure Repairs- Pile Jackets, scour abatement: The existing concrete piles bents exhibit spalling and exposed reinforcing steel. In 2016, two (2) severely degraded piles were jacketed. This project will install additional jackets on the most degraded concrete piles. The project will also address scour concerns at specific areas within the channel. These defects are identified as a Priority 2 repairs in the current and past NBIS reports.

Projected Timeline: Design and construction 2022

Projected range of Costs: $1,250,000 to $1,450,000

Projected Impacts: Work is outside the main navigation channel so marine traffic impacts should be minimal. Minimal or no vehicular impacts are expected as the project can be constructed from the waterway. If needed, single lane alternating traffic control will be used to maintain traffic.

See photos Appendix A pages 30-31.

4. Corson's Inlet (CR 619) 3100-002

This bascule span bridge was constructed in 1949 and connects Ocean City to Strathmere in Upper Township along Ocean Drive (CR 619). This bridge is structurally deficient and functionally obsolete and will eventually need to be replaced. The bascule span has not operated since December 2013 due to deterioration of the bascule trunnion support column. The bridge superstructure was strengthened and repainted in 2007 with bridge railings replaced in 2012. Substructure repairs and scour countermeasures at the north abutment were completed in 2015-16. Because the bascule span has not been operational for the past seven years, the infrequency of previous bascule openings, and hazardous navigational conditions of Corson's Inlet, the Commission, with endorsement from the County, is seeking to petition the US Coast Guard to close the bascule span permanently. This process is anticipated to take approximately two (2) years from the time the request is made to the Coast Guard.

The 2017 NBIS report rated the overall condition of the structure as "serious" due to the condition of the substructure. The deck condition rating is "poor" due to the large area of spalls with exposed severely corroded reinforcing on the underside of the deck slap in span 32 from the north. The superstructure condition rating is "poor" due to painted over section loss, pitting and holes in the steel girders and stringers, bearing elements, and sever pack-rust between many steel sliding plate bearings. The pin hanger assemblies appear to be frozen due to corrosion. The substructure rating is "serious" due to the severe section loss of the web and flanges on the steel built-up trunnion bearing column which is supporting the west girder at the trunnion bearing.

Corson's Inlet Bridge Replacement

The replacement process will likely follow Federal Highway Association guidelines to preserve Federal funding capabilities. This process includes a formal Local Concept Development Study to gain project input from public officials, stakeholders, and the general public. Alternatives will be conceptualized and developed which advance the need and purpose of the project.

Projected Timeline: Concept Development/ Preliminary Design 2026-2028, Final Design 2029-2031, Construction 2032-2035.

Projected Range of Replacement Cost: *$70,750,000 to $105,750,000

Projected Impacts: The replacement will be likely be constructed off-line to maintain existing vehicular traffic flow. Due to the unpredictable navigation within Corson's Inlet, marine traffic is predominantly smaller vessels which would not be significantly impacted by the bridge replacement. The north approach (Ocean City side) has environmentally sensitive areas which will increase the permitting time and affect structure's alignment choices.

* This estimate reflects in-line replacement of the bridge as a viable option, as to be determined by the bridge study.

Corson's Inlet Bridge Improvements

To maintain Corson's Inlet Bridge until replacement, the Commission plans to perform improvements that are recommended in the NBIS Inspection reports. The Commission will be performing the following repairs until the bridge is replaced:

A. Fender Reconstruction: This project consists of replacement of the fender system due to deterioration and impacts from vessel allisions. These defects are identified as a Priority 2 repair in the current and past NBIS reports.

   Projected Timeline: Design 2021. Construction 2022

   Projected range of Costs: $2,400,000 to $2,900,000

   Projected Impacts: Brief vehicular traffic interferences due to installation of pilings below bascule span. Marine vessel impacts due to contractor occupying channel during construction at periodic times.

B. Trunnion Column Repair and Span 32 Deck Repair: This project will repair steel support columns of the existing bascule span and address toll girder steel repairs adjacent to these supports. Span 32 deck has one quadrant which the deck will be replaced due to severely corroded exposed reinforcing steel. The defects are identified as Priority 1 repairs in the current and past NBIS reports. This project is currently in the design phase.

   Projected Timeline: Design 2020,.Construction 2020-2021

   Projected range of Costs: $2,925,000 to $3,325,000

   Projected Impacts: The work will be performed using single lane alternating traffic permitting traffic flow during all phases of construction.

C. Deck Patching, Toll Booth Curbing, and Joint Seals: General concrete repairs to the superstructure and deck, including deck patching and joint seals to prevent water infiltration which leads to degradation of the concrete and steel elements.

   Projected Timeline: Design 2020 and 2022. Construction 2020 and 2022

   Projected range of Costs: $480,000 to $600,000

   Projected Impacts: The work will be performed using single lane alternating traffic permitting traffic flow during all phases of construction.

D. Super Structure Recoating: Corson's Inlet Bridge was completely recoated in 2007 as part of a structural strengthening program. The steel coatings are degrading, and corrosion is advancing at an accelerated rate. The coating system is the structural steel's first line of defense against the harsh marine environment. Repair of the coating system will arrest deterioration and extend the life of the structure until replacement.

   Projected Timeline: Design and Construction 2022-2023

   Projected range of Costs: $1,025,000 to $1,525,000

   Projected Impacts: The work will be performed using single lane alternating traffic permitting traffic flow during all phases of construction.

E. Electrical/Mechanical Decommissioning: If the bascule operations are discontinued this project will selectively demolish existing electrical and mechanical systems associated with bascule operations. Existing equipment will be salvaged and repurposed to another commission bridge of similar design.

   Projected Timeline: Design and Construction 2023

   Projected range of Costs: $1,250,000 to $1,500,000

Projected Impacts: If required single lane alternating traffic control will be used during all phases of construction.

See photos Appendix A pages 32 -33.

5. Ocean City-Longport Bridge (CR 656) 3100-001

This fixed span high level bridge opened to traffic in July 2002 and connects Ocean City to Egg Harbor Township in Atlantic County. The bridge is in satisfactory condition, however, to preserve this bridge capital improvements are recommended, such as fender replacements, deck patching and new deck joints, substructure and superstructure concrete repairs, and deck membrane sealing overlay. Traffic safety improvements will also be necessary such as lane striping and signage. There is no programmed replacement of this bridge within the next 15 years.

The 2017 NBIS report rated the overall condition of the structure as "satisfactory" due to the superstructure and substructure conditions. The deck is in "satisfactory" condition due to the fine to medium transverse, longitudinal, and random cracks in the poured deck slab. The superstructure is in "satisfactory" condition due to many hairline and several fine cracks in the webs and bottom flanges of the pre-stressed girders and the concrete table girder. The substructure is in overall "satisfactory" condition due to the combination of missing wales on the fender system on all sides for the full length, and the remainder of the structure is in "satisfactory" condition due to numerous hairline and fine cracks in the pier caps and columns.

Ocean City-Longport Bridge Improvement Plan

To maintain the Ocean City Longport Bridge, the Commission plans to perform the following improvements that are recommended in the NBIS Inspection reports.

A. Fender Reconstruction: This project consists of replacement of the fender system due to deterioration. These defects are identified as a Priority 2 repair in the current and past NBIS reports.

   Projected Timeline: Design 2021. Construction 2022-2023

   Projected range of Costs: $1,975,000 to $2,375,000

   Projected Impacts: Brief vehicular traffic interferences due to installation of pilings below bascule span. Marine vessel possible impacts due to contractor occupying channel during construction at periodic times. Channel width is 150 ft.

B. Deck Sealer Rehabilitation: The bridge deck was cast with an early version of high-performance concrete (HPC) and has exhibited numerous temperature and shrinkage cracks, which are now permitting water to permeate into the deck. If not addressed, this water infiltration will lead to premature degradation of the deck. Complete deck sealer to address significant map cracking in deck surface, including new joint seals. This project will significantly increase the service life of the concrete deck which is now almost two decades old. A life cycle alternatives analysis will be conducted to determine the best method to seal the deck system.

   Projected Timeline: Design 2022, Construction 2023-2024

   Projected range of Costs: $1,700,000-$4,700,000

   Projected Impacts: The work will be performed using single lane alternating traffic permitting traffic flow during all phases of construction.

C. Superstructure/Substructure Repairs (spalls, bearings, and deck): General concrete repairs to the superstructure, substructure, and underside of deck.

   Projected Timeline: Design 2022, Construction 2023

Projected range of Costs: $925,000 to $1,125,000

Projected Impacts: The work will be performed using single lane alternating traffic permitting traffic flow during all phases of construction.

See photos Appendix A page 34 and 35.

PROJECTED COST ESTIMATES AND FUNDING

Funding to carry out the Comprehensive Bridge Replacement and Improvement Plan for County and Bridge Commission projects will be provided by the County from a number of sources in addition to the County's own direct investment. Outside funding sources, both grant and very low interest rate loans, include Federal Aid, State Aid, and the New Jersey Infrastructure Loan Financing (I-bank).

As part of its Statewide Capital Investment Strategy, the NJDOT is focusing on preventive maintenance, rehabilitation and selective replacement of bridges. This program was initiated in recognition of funding needs that go well beyond what is currently available at the local level or through the Local Bridges Future Needs Program. The I-Bank is an independent State Financing Authority that is authorized to issue revenue bonds for the purpose of making loans to finance the construction of eligible major environmental and transportation infrastructure projects

As shown in the below Tables, the **total** projected cost for bridge replacement and improvement from 2020-2035 for both County and Commission Bridges ranges between $603 Million to $890 Million.

The estimated total costs are comprehensive and include conceptual design, public information sessions, engineering consulting fees, permit preparation and application fees, right-of-way acquisition, environmental mitigations, demolition of existing structures and construction costs. The County will be seeking to secure funding by outside agencies to cover at least seventy percent (70%) of project costs, however, the County has prepared a financial plan to cover up to fifty percent (50%) of project costs as a precautionary measure. It is important to note that any commitment of funding or bonding as well as the specific allocation of funds in support of this plan will be discussed and authorized on a case by case basis thru the action of a Freeholder Board Resolution. The life expectancy on all replacement projects is seventy-five (75) years.

As referenced earlier, fortunately, the County put the first element of its financing plan in place beginning in 2017 by annually dedicating a portion of its tax levy toward the bridge project. By continuing to do so and by carefully phasing design and construction over a 15-year period, the County is able to responsibly complete these very substantial and critical infrastructure replacements and improvements with modest and manageable effect on County taxpayers. For example, at just five-tenths of a penny annually on the County tax rate for fifteen years, the County is able to bond, over several years and phases, more than $500 Million towards these projects if ultimately needed. To aid in context, this amounts to an annual increase of approximately $12.50 for $250,000 of assessed value in order to fully fund the County's share of the total projects at a County funding percentage of just over fifty percent (50%). This is certainly not overly burdensome given the magnitude of the projects, their critical nature, and the economic and quality of life benefits received by having such important infrastructure fully functional.

Finally, it's important to note that the County's very strong financial position and ability to initiate significant upfront costs for planning, engineering design, permitting, and construction without third party support is a powerful tool towards attracting and maximizing both State and Federal Funding for the projects contemplated. In this manner, the County demonstrates its seriousness about moving projects forward to "shovel ready" condition, a status that "turns heads" and facilitates robust State and Federal partnership funding.

TABLE A: SUMMARY OF BRIDGE REPLACEMENT AND IMPROVEMENT PROJECTS including PROJECTED COST RANGE CAPE MAY COUNTY BRIDGES

BRIDGE	Project Estimate (lower limit)	Project Estimate (upper limit)	PROJECT	PROJECT START	PROJECT COMPLETION
1. 96th Street 0500-006	$21,500,000	$23,000,000	Bridge Replacement	2019	2026
2. Mill Creek 0500-030 and Upper Thorofare 0500-020	$1,350,000	$1,550,000	Phase 2 Scour and Spall Repair	2020	2020
	$1,650,000	$1,850,000	Phase 3 Pedestrian	2020	2021
3. Hand Avenue 0050-031 and Springers Mill	$4,530,000	$4,730,000	Bridge Replacement	2020	2021
4. 104th Street 0500-023	$1,570,000	$1,770,000	Bridge Replacement	2024	2025
5. 25th Street 0500-024	$1,890,000	$2,090,000	Abutment Replacement	2020	2020
6. 21st Street Bridge 0500-010	$1,890,000	$2,090,000	Abutment Replacement	2020	2020
7. Ludlams Thorofare 0500-005	$12,350,000	$13,400,000	Deck Rehabilitation	2022	2025
8. Cedar Swamp Bridge 0500-018	$1,850,000	$2,025,000	Guide Rail & Deck Repairs	2020	2021
	$7,050,000	$7,550,000	Bridge Replacement	2025	2031
9. Leonards 0500-009 and Gravens 0500-003	$4,150,000	$4,350,000	Deck Rehabilitation	2020	2022
10. Great Channel 0500-028	$3,750,000	$3,950,000	Bridge Rehabilitation	2020	2021
	$71,900,000	$161,900,00			
TOTAL COUNTY BRIDGE PROJECT COST	**$135,430,000**	**$230,255,000**			

TABLE B: SUMMARY OF BRIDGE REPLACEMENT AND IMPROVEMENT PROJECTS including PROJECTED COST RANGE COMMISSION BRIDGES

BRIDGE	Project Estimate (lower limit)	Project Estimate (upper limit)	PROJECT	PROJECT START	PROJECT COMPLETION
1. Ocean City - Longport 3100-001	$1,975,000	$2,375,000	Fender Reconstruction	2021	2023
	$1,700,000	$4,700,000	Deck Sealer Rehabilitation (Latex or Other Overlay)	2022	2024
	$925,000	$1,125,000	Superstructure Repairs (spalls, bearings, deck)	2022	2023
2. Corsons Inlet 3100-002	$2,400,000	$2,900,000	Fender Reconstruction	2021	2022
	$2,925,000	$3,325,000	Trunnion Column Rehab & Span 32 Deck Rehab	2020	2021
	$480,000	$600,000	Deck Patching Toll Booth Curb, and Joint Seals	2020	2022
	$1,025,000	$1,525,000	Superstructure Recoating	2022	2023
	$1,250,000	$1,500,000	Electrical/Mechanical Decommissioning	2023	2023
	$70,750,000	$105,750,000	Bridge Replacement	2026	2035
3. Townsends Inlet 3100-003	$1,720,000	$1,920,000	Fender Reconstruction	2021	2022
	$2,400,000	$2,800,000	Structural Steel Repairs-Approach Span Strengthening	2023	2024
	$80,000	$100,000	Bridge Controls PLC and Auxiliary Drive Maintenance	2021	2021
	$1,025,000	$1,525,000	Superstructure Recoating	2022	2023
	$140,000	$180,000	Toll Booth and Control House Rehab	2022	2023
	$280,000	$380,000	Transformer Power Feeder Upgrade	2021	2021
	$65,750,000	$167,750,000	Bridge Replacement – Concept Development & Prelim Design	2021	2029

4. Grassy Sound 3100-005	$1,850,000	$2,250,000	Fender Reconstruction	2021	2023
	$2,360,000	$2,760,000	Structural Steel Repairs – Approach Span Strengthening	2020	2021
	$625,000	$825,000	Deck Patching Toll Booth Curb, and Joint Seals	2021	2022
	$1,025,000	$1,525,000	Superstructure Recoating	2022	2023
	$660,000	$960,000	Slope Restoration/North Bin Abutment Scour Rehabilitation	2020	2021
	$4,535,000	$6,635,000	Bascule Span Rehab (incl. temp stringer repair)	2020	2024
	$1,250,000	$1,450,000	Substructure Repairs – Pile Jackets/ Scour Countermeasures	2022	2022
	$53,500,000	$93,500,000	Bridge Replacement	2029	2038
5. Middle Thorofare 3100-006	$6,400,000	$6,900,000	Railing Replacement, Fender Replacement, Bascule Steel Repairs	2020	2021
	$1,170,000	$1,470,000	Substructure Repairs (scour countermeasure S. Abutment & Pier 13)	2021	2021
	$540,000	$840,000	Electrical Rehabilitation – Auxiliary Motor, PLC Upgrade, Main Motor, Gates, Span Locks	2021	2022
	$475,000	$775,000	Superstructure Recoating	2023	2024
	$105,000	$125,000	Toll Booth & Control House Rehabilitation	2021	2021
(This project is part of the Ocean Drive Upgrades and Bridge Replacements and includes Mill Creek 0500-029 and Upper Thorofare 0500-030)	$238,300,000	$243,000,000	Bridge Replacements – (3) bridges + Culvert and approximately 2.7 miles (includes bridge lengths)	2020	2027
TOTAL BRIDGE COMMISSION PROJECT COST	**$467,200,000**	**$660,050,000**	This overall cost includes the County's Roadway and Bridge Replacements as part of Ocean Drive Upgrades and Bridge Replacements Project Noted Above		
TOTAL CAPE MAY COUNTY AND BRIDGE COMMISSION COSTS	**$602,630,000**	**$890,305,000**			

APPENDIX A:

PHOTOGRAPHS REPRESENTATIVE OF

COUNTY AND COMMISSION BRIDGE CONDITIONS AND AREAS OF

CONCERN

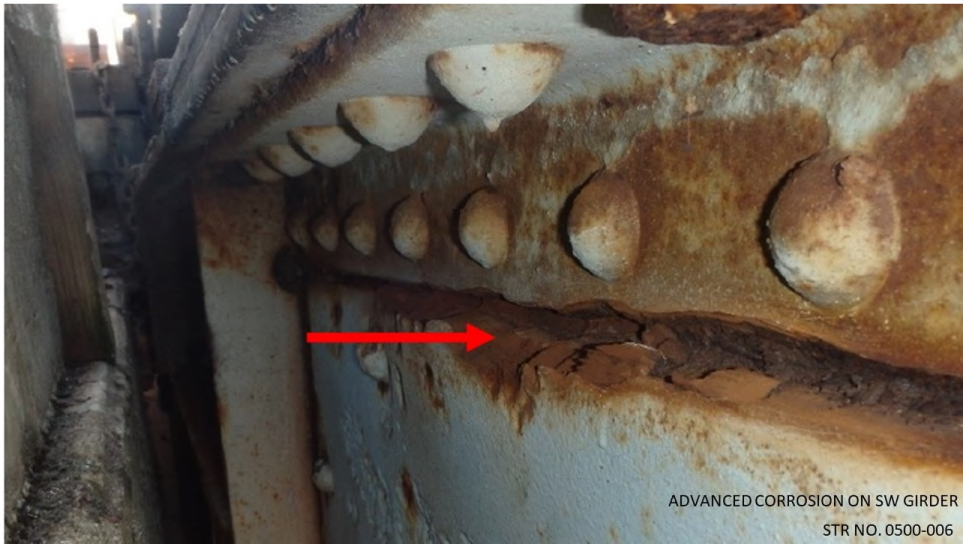
2019

APPENDIX A

REPRESENTATIVE PHOTOGRAPHS OF CAPE MAY COUNTY AND BRIDGE COMMISSION BRIDGE CONDITIONS AND AREAS OF CONCERN

2019

Str No. 0500-006 96th STREET BRIDGE over GREAT CHANNEL



ADVANCED CORROSION ON SW GIRDER

STR NO. 0500-006

FLOORBEAM NO 4 ROTATED

STR NO. 0500-006

MODIFIED FLOORBEAMS EXHIBIT DEFORMATIONS

STR NO. 0500-006

- FLOORBEAM 3 WITH A SHEAR CRACK IN THE LOWER PORTION OF THE WEB
- HORIZONTAL HOLE AT THE FLANGE INTERFACE
- CAPE MAY COUNTY DRILLED THE ARRESTING HOLE.

STR NO. 0500-006

STR NO. 0500-006

Str No. 0500-030
over MILL CREEK

Str. No. 0500-030 over MILL CREEK

- GUIDE RAIL REQUIRES RENEWAL
- ADVANCED CORROSION
- CERTAIN DETAILS DO NOT MEET NJDOT STANDARDS

Str No. 0500-029
over UPPER THOROFARE

Str No. 0500-029 over UPPER THOROFARE

- STRINGERS EXHIBITING SPALLNIG WITH EXPOSED REINFORCING STEEL AND EFFLOURESCENCE
- EXPOSED REINFORCING SHOWS EVIDENCE OF CORROSION
- EFFLOURESCENCE INDICATES SALT INTRUSION
- CONCRETE DECK ALSO EXHIIBITING SPALLING WITH EXPOSED REINFORCING STEEL AND EFFLOURESCENCE

Str No. 0500-029
over UPPER THOROFARE

DECK REPAIRS TO JOINTS AND SPALLS

REPAIRS TO THE ABUTMENTS AND THE GUIDERAIL

STR No. 0500-029

RECENT REPAIRS BY SOUTH STATE AND RVE
STR No. 0500-029

Str No. 0500-031 Hand Avenue
over Skeeter Island Creek

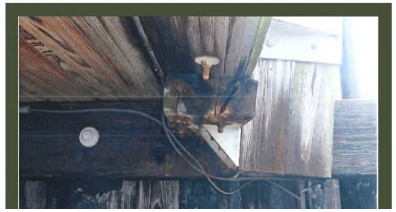
DETERIORATED REINFORCED CONCRETE
STR No. 0500-031

NW WINGWALL DISPLACED +/-7-IN
STR No. 0500-031

UNDERMINING
UNDER STRUCTURE
STR No. 0500-031

DETERIORATED REINFORCED CONCRETE
STR No. 0500-031

Str No. 0500-023 104th Street over Carnival Bay



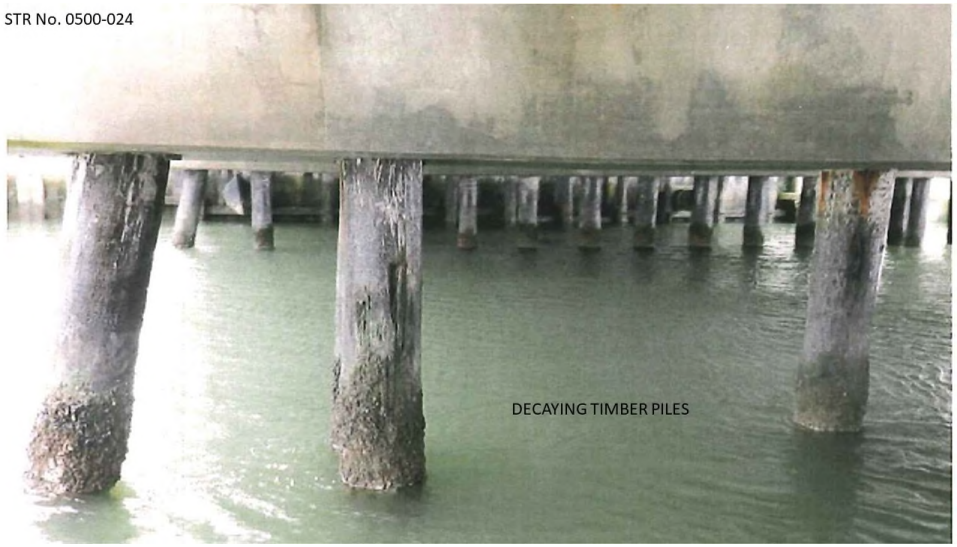
Str No. 0500-023 104th Street
over Carnival Bay

- South Timber Railing, 4th post from the west end is rotated up
- South Timber Railing, 4th post form the west end has wide splits in the bottom timber blocking
- Priority 2 Repairs recorded for both

Str No. 0500-024 25th Street over Avalon Canal

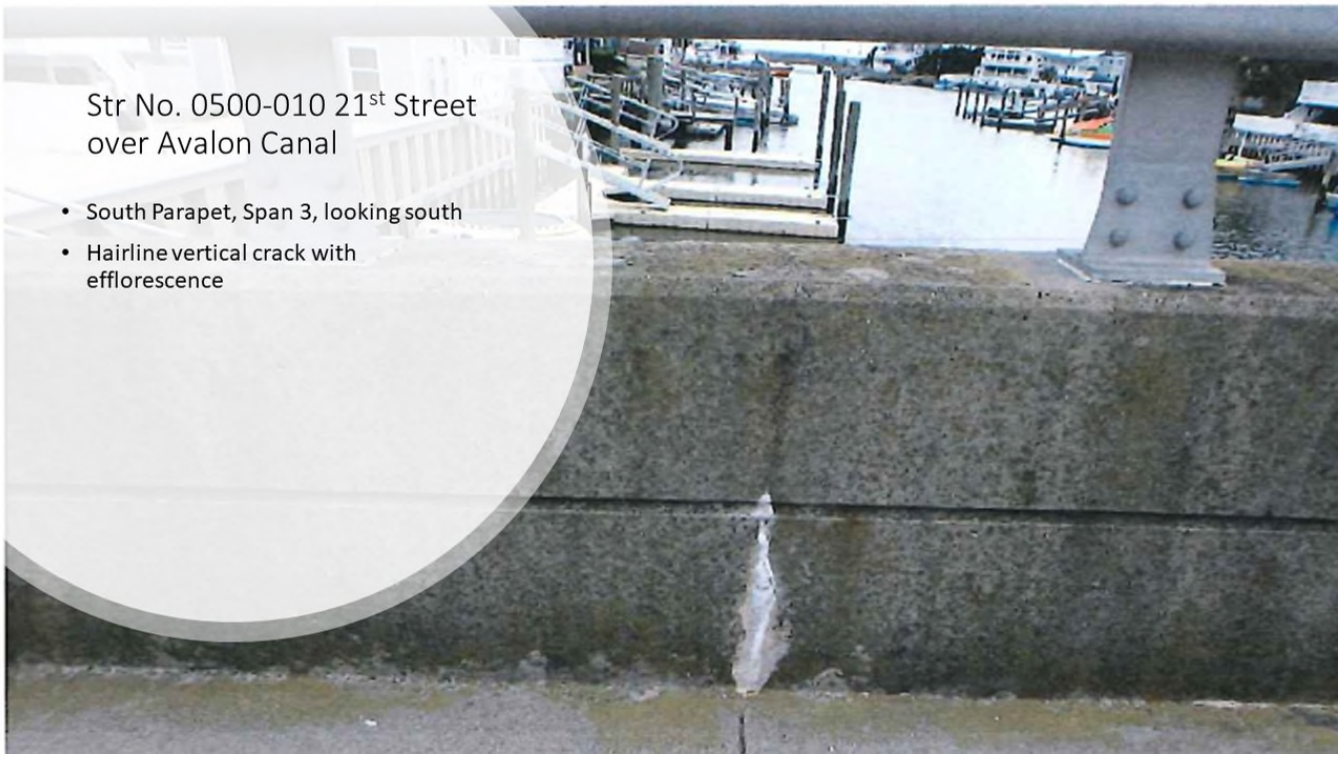
Str No. 0500-024 25th Street over Avalon Canal
• Timber bulkheads are exhibiting advanced decay.
• Active fill loss emergency repair Summer of 2019 by South State Inc.
• Steel Plates and flowable fill temporarily stabilize abutment soils until permanent fix applied
07/11/2019

STR No. 0500-024
CRACK IN NORTHEAST WINGWALL


STR No. 0500-024
DECAYING TIMBER PILES

Str No. 0500-010 21st Street over Avalon Canal

Str No. 0500-024 21st Street over Avalon Canal
• Timber bulkheads are exhibiting advanced decay.
• Active fill loss emergency repair Summer of 2019 by South State Inc.
• Steel Plates and flowable fill temporarily stabilize abutment soils until permanent fix applied
07/11/2019


Str No. 0500-010 21st Street over Avalon Canal
• South Parapet, Span 3, looking south
• Hairline vertical crack with efflorescence

Str No. 0500-005 CR 625 over Ludlams Thorofare

Str No. 0500-005 CR 625 over Ludlams Thorofare

- Southeast corner of Pier 14, looking west
- ¼-inch wide vertical crack with corrosion staining in the pier stem located within the tidal zone.

Str No. 0500-005 CR 625 over Ludlams Thorofare

- Several precast prestressed reinforced concrete beams exhibiting spalling near mid-span.
- Typically, defects near mid-span indicative of bending greater than design intention.
- Exposed reinforcing steel strands have corroded
- Priority 2 Repair recorded

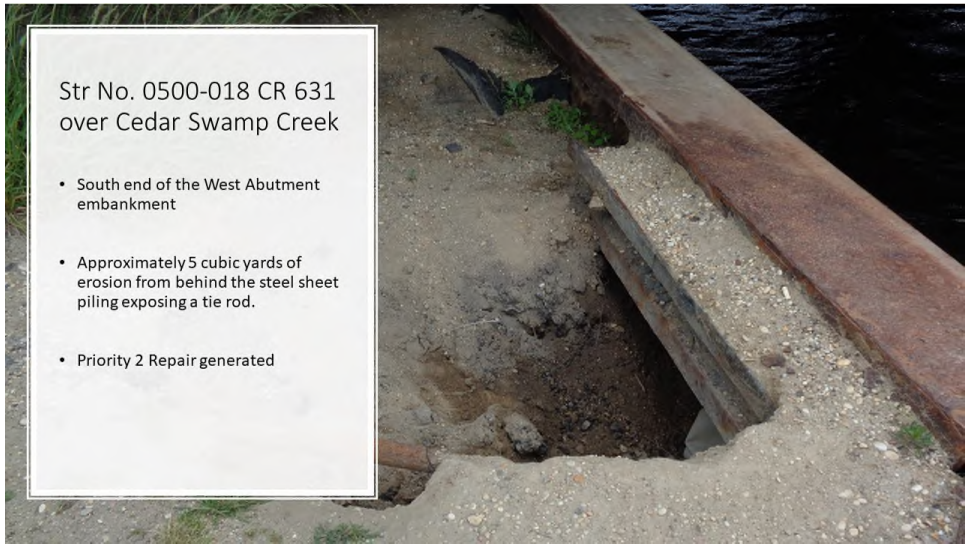
Str No. 0500-005 CR 625 over Ludlams Thorofare

- South end of Pier 16, looking Northwest
- Timber piling exhibiting advanced deterioration with moderate abrasion and splintering of the timber piles.

Str No. 0500-018 CR 631
over Cedar Swamp Creek

Str No. 0500-018 CR 631
over Cedar Swamp Creek
• South end of the West Abutment embankment
• Approximately 5 cubic yards of erosion from behind the steel sheet piling exposing a tie rod.
• Priority 2 Repair generated

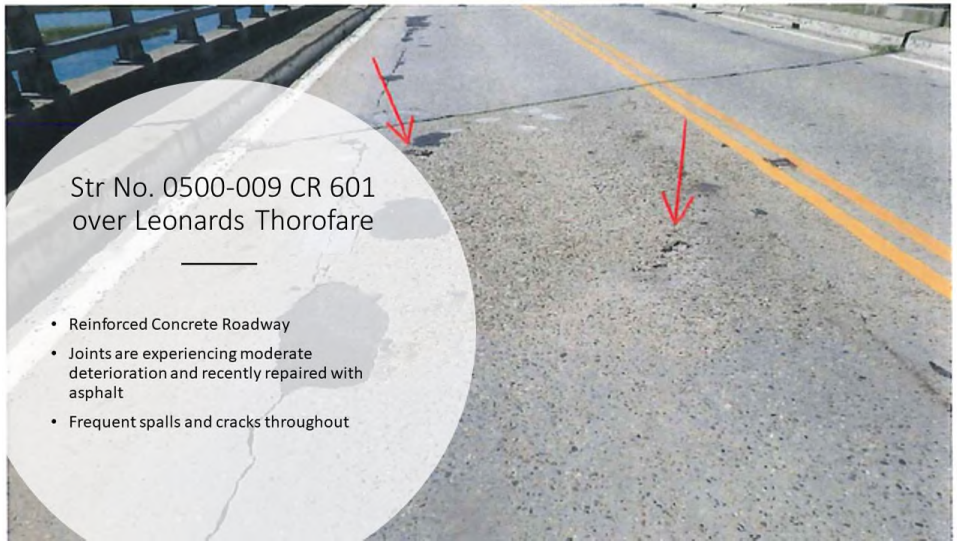
Str No. 0500-018 CR 631
over Cedar Swamp Creek
• South end of the East Abutment embankment
• Approximately 15 cubic yards of erosion from behind the steel sheet piling exposing drainage pipe.
• Priority 2 Repair generated


Str No. 0500-018 CR 631
over Cedar Swamp Creek
• South end of the West Abutment embankment
• Approximately 5 cubic yards of erosion from behind the steel sheet piling exposing a tie rod.
• Priority 2 Repair generated

Str No. 0500-009 CR 601
over Leonards Thorofare

Str No. 0500-009 CR 601 over Leonards Thorofare

- Prestressed precast reinforced concrete beam in Span 4, Beam 5
- Short longitudinal cracks along the edges with minimal corrosion staining



Str No. 0500-009 CR 601 over Leonards Thorofare

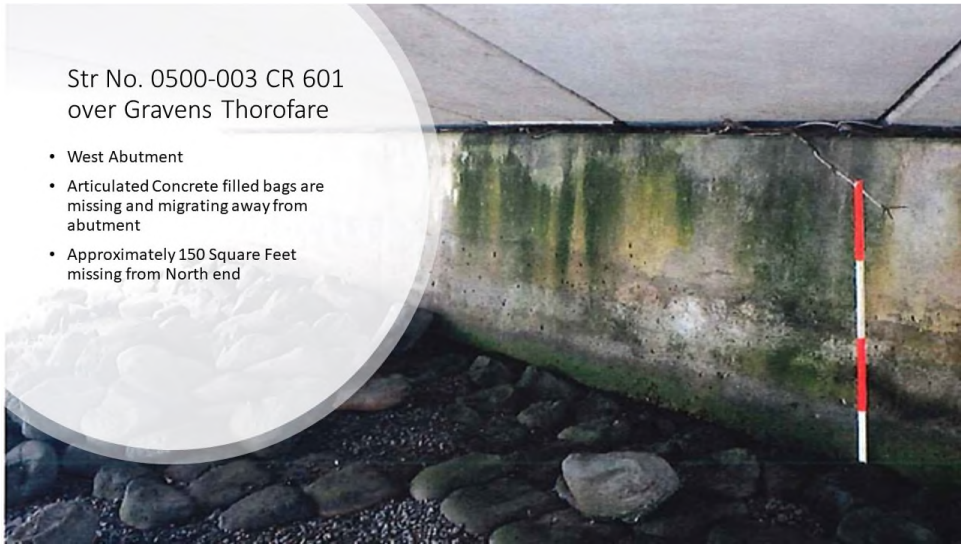
- Reinforced Concrete Roadway
- Joints are experiencing moderate deterioration and recently repaired with asphalt
- Frequent spalls and cracks throughout

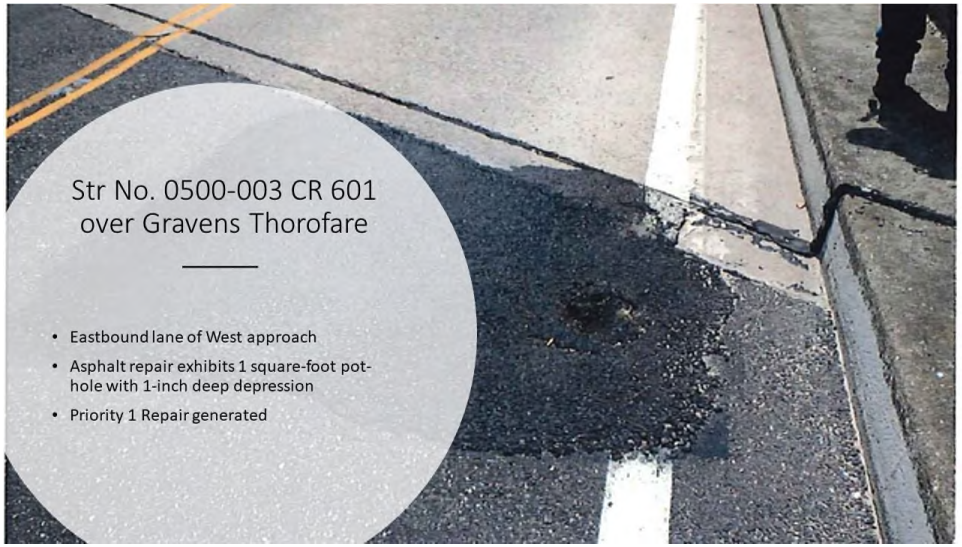
Str No. 0500-009 CR 601 over Leonards Thorofare

- Timber Piles exhibiting moderate to severe weathering
- Lengths of detached cross-bracing [not shown]
- Wide splits and checks where the piles interface with mudline
- Soil stabilization becoming separated at bottom

Str No. 0500-003 CR 601
over Gravens Thorofare

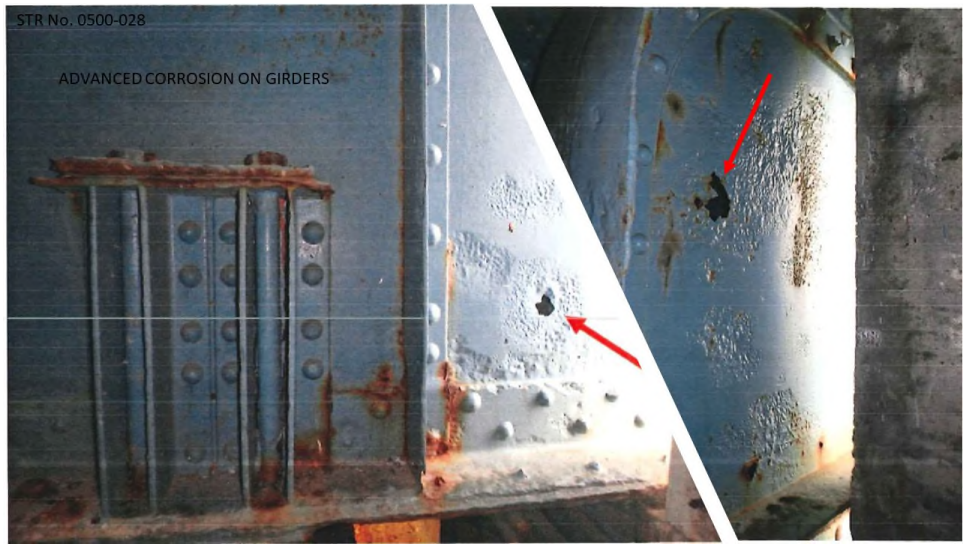
Str No. 0500-003 CR 601
over Gravens Thorofare
• West abutment, North end looking southwest [shown]
• Both abutments undermined ~6-feet deep
• Priority 1 Repair generated

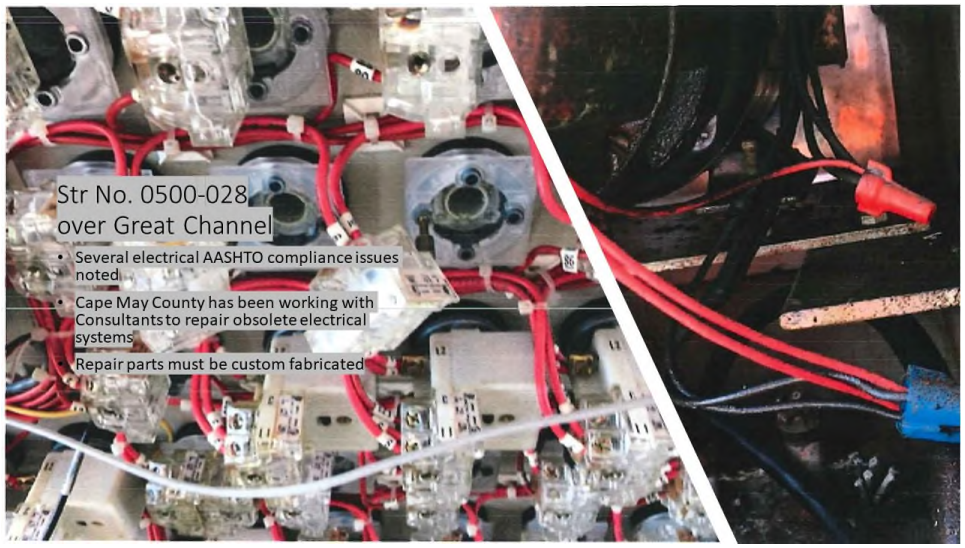

Str No. 0500-003 CR 601
over Gravens Thorofare
• West Abutment
• Articulated Concrete filled bags are missing and migrating away from abutment
• Approximately 150 Square Feet missing from North end


Str No. 0500-003 CR 601
over Gravens Thorofare
• Eastbound lane of West approach
• Asphalt repair exhibits 1 square-foot pot-hole with 1-inch deep depression
• Priority 1 Repair generated

Str No. 0500-003 CR 601
over Gravens Thorofare
• Southwest approach embankment looking Northeast
• Moderate erosion of +/-10 Cubic Yards
• Priority 1 Repair generated

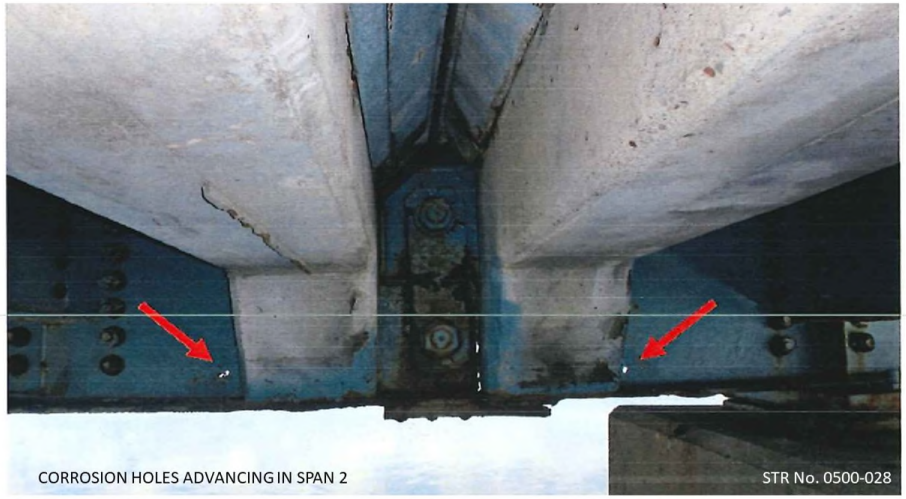
Str No. 0500-028
over Great Channel





0500-028
over Great Channel

- Machinery is under lubricated and exhibiting advanced deterioration
- Main racks and pinions teeth are corroded and scaling
- Racks show heavy wear
- Grease has been pushed off open faces of gear teeth due to span heavy balance condition
- Auxiliary drive machinery is non-operational
- Repair parts must be custom fabricated



Str No. 3100-006 CR 621
over Middle Thorofare

Str No. 3100-006 CR 621
over Middle Thorofare

- Precast Reinforced Concrete Piles exhibiting longitudinal cracking with corrosion staining of reinforcing steel
- VOID AT SOUTHEAST CORNER OF PIER 8

Str No. 3100-003 CR 619
over Townsends Inlet

Str No. 3100-003 CR 619 over Townsends Inlet

- SUPERSTRUCTURE EXHIBITNG ADVANCED CORROSION

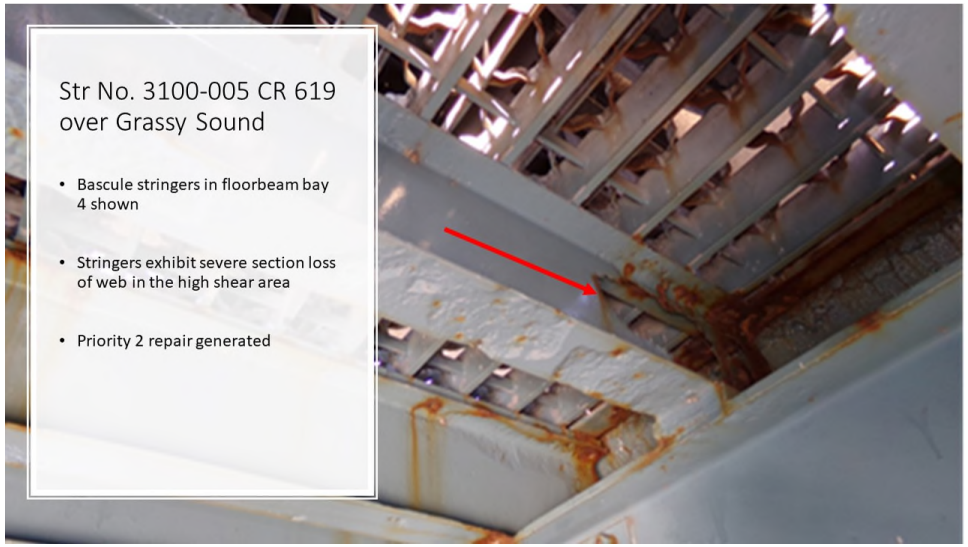
Str No. 3100-005 CR 619
over Grassy Sound

Str No. 3100-005 CR 619 over Grassy Sound

- North Abutment shown
- Complete loss of fill due to scour
- Large Spall with exposed corroded reinforcing steel on underdeck of slab

Str No. 3100-005 CR 619 over Grassy Sound

- Timber Piling and Wales exhibit Areas of moderate to severe checking, splitting, and rot
- Steel hardware has advanced corrosion and are typically necked down



Str No. 3100-005 CR 619 over Grassy Sound

- Bascule stringers in floorbeam bay 4 shown
- Stringers exhibit severe section loss of web in the high shear area
- Priority 2 repair generated

Str No. Str No. 3100-005 CR 619 over Grassy Sound

- Precast Reinforced Concrete Piles exhibiting longitudinal cracking with corrosion staining of reinforcing steel
- Concrete encasements shown in Severe condition with missing sections and large cracks

Str No. 3100-002 CR 619
over Corsons Inlet

Str No. 3100-002 CR 619 over Corsons Inlet

- West Bascule girder outside trunnion bearing support column, looking north
- Severe section loss of column allowing longitudinal movement during operation
- Priority 1 Letter generated

Str No. 3100-002 CR 619 over Corsons Inlet

- Span 32 from north
- Large area of spalls with exposed severely corroded steel reinforcing steel
- Priority 1 Letter generated

Str No. 3100-002 CR 619 over Corsons Inlet

- Wide cracks in the vault roof slab and edge spalls along the joint with missing expansion filler
- Large shallow spalls
- Large delamination of the concrete curb
- Previous repairs have reached then end of their design life

STR No. 3100-002

ARROWS DESIGNATE SUPPLEMENTAL BOLTED ON ANGLES AT TYPICAL FIXED AND BASCULE SPANS

Str No. 3100-001 CR 656
over Great Egg Harbor Bay

Str No. 3100-001 CR 656 over Great Egg Harbor Bay

FENDERS REQUIRE IMPROVEMENTS

Str No. 3100-001 CR 656 over Great Egg Harbor Bay

- Concrete girders shown
- Hairline longitudinal cracks along the bottom flange and web at midspan

Str No. 3100-001 CR 656 over Great Egg Harbor Bay

- Pier caps and bearings shown
- Spalls with cracks exposing aggregate in close proximity to bearing elements

Str No. 3100-001 CR 656 over Great Egg Harbor Bay

- Concrete wearing surface shown
- Joints have spalling with exposed aggregate and missing expansion filler
- Map, transverse and longitudinal cracks frequent in the concrete wearing surface