
VDOT
Virginia Department of Transportation

2026 MAINTENANCE AND OPERATIONS COMPREHENSIVE REVIEW SPECIAL STRUCTURES

Stephen C. Brich, P.E., Commissioner of Highways

September 15, 2026

BLUF: 2026 Maintenance and Operations Comprehensive Review – Special Structures

To Date:

April 2026: Overview of the 2019 Comprehensive Review

1. Pavements
2. Bridges
3. Investments (Maintenance and Operations Program/State of Good Repair Program)

May 2026: Continued the 2019 Overview of the Comprehensive Review

1. Routine Maintenance
2. Emergencies
3. Explained the tensions experienced since 2019

July 2026: Re-baselining

1. Pavements and Bridges
2. Scenarios modeled

Today:

September 2026:

1. Overview of Special Structures Program
2. No CTB Action required today
   a) October 2026: 50-Year Long-Term Plan handout

Overview

Special Structures Program Timeline



Special Structures List Introduced to the CTB (2018)

Focus on the need for funding proactive work on these critical structures – movables, tunnels and fixed-span

CTB required to report to General Assembly on large/unique structures (2018)

2018 Appropriations Act Item 450,H. – report required

December 4, 2018: CTB presentation on overall condition and funding needed.

December 5, 2018: CTB approved report and required additional study by December 2019

General Assembly created Special Structures Fund and required CTB with assistance of VDOT to review Maintenance and Operations (2019)

2019 Acts of Assembly:

- Created Special Structures Fund (no funding)
- Required review of pavements, bridges, Special Structures and routine maintenance.
- VDOT developed an **investment strategy for the long-term sustainable performance of assets**

December 2019:
CTB approved report, pavement and bridge targets

General Assembly created the Special Structures Program and dedicated funding for the Special Structure Fund (2020)

2020 Acts of Assembly:

- Dedicated state funding to the Special Structures Fund ($80M indexed)
- Created the Special Structures Program which funds the maintenance, rehabilitation and replacement of Special Structures

Special Structures Program Underway (2022 – today)

FY 2022 – Special Structures Fund received funding

September 2021 – Health Index Presented

October 2021 – CTB approved 50-Year Long Term Plan

December 2022 – CTB approved 50-Year Long-Term Plan

December 2024 – CTB approved 50-Year Long-term Plan

2025 Acts of General Assembly – Chapter 327 – Special Structure Revenue Bonds

Special Structures Program Every two years (even) (Dec 2026)

October 2026:

- CTB will receive the draft 50-Year Long-Term Plan handout

December 2026:

- CTB approval requested

How Many Special Structures Does Virginia Have?

Virginia has over 21,000 bridges and large culverts

21 of these 21,000 have been identified as “Special Structures”

- 8 Movable Bridges (bascule, swing & lift)
- 8 Tunnels (mountain, harbor, urban & runway)
- 5 Fixed-Span Bridges (segmental/post-tensioned, cable-stayed, & long truss bridges)

Median Age of Special Structures – 48 years
Youngest Structure – 10 years (Midtown Tunnel WBL)
Oldest Structure – 88 years (Gwynn’s Island swing bridge and opens the most frequently ~ 2,600 times each year)

Special Structures – Inventory (21 Facilities)

Defined By:

- Risk/Complexity
- Maintenance Cost
- Importance
  Long Detours, High Traffic, Economic Significance (Shipping and Vehicular), Access to Vital Facilities (Military and Ports)



BRISTOL

1. Big Walker Mountain Tunnel
2. East River Mountain Tunnels
3. 460 Connector Bridge

1. SMART Road Bridge

1. Rosslyn Tunnel

SALEM

1. Eltham Bridge
2. Gwynn's Island Bridge
3. Robert O. Norris Bridge

1. Benjamin Harrison Bridge
2. Varina-Enon Bridge

HAMPTON ROADS

1. Hampton Roads Bridge-Tunnel
2. Monitor-Merrimac Memorial Bridge Tunnel
3. Berkley Bridge
4. Chincoteague Bridge
5. George P. Coleman Bridge
6. High Rise Bridge
7. James River Bridge
8. I-564 Tunnel

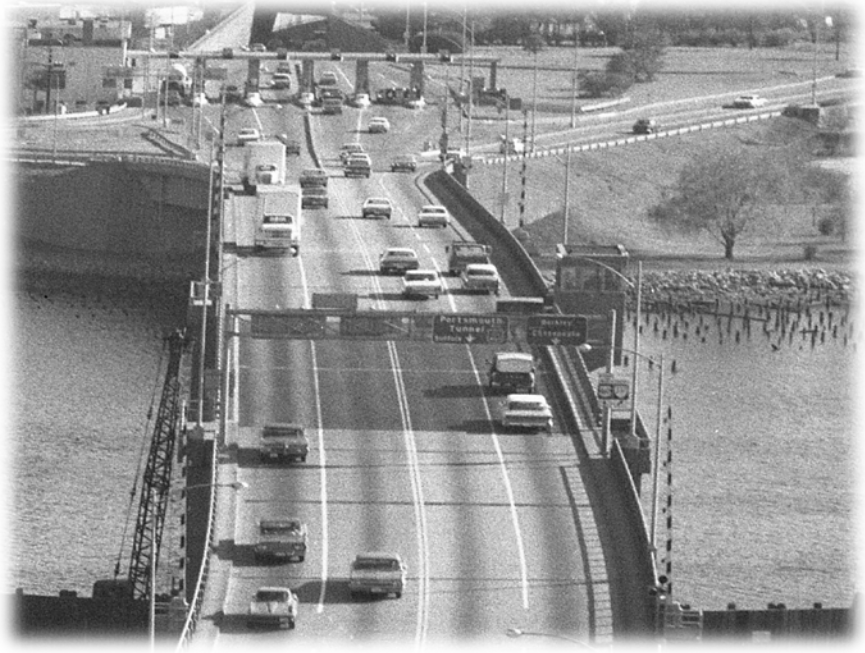
Note: Elizabeth River Midtown Tunnel, Elizabeth River Downtown Tunnel and Route 895 Pocahontas Parkway are currently operated and maintained by PPP concessionaires.

Special Structures – Original Build

George P. Coleman Memorial Bridge



Berkley Bridge



Hampton Roads Bridge-Tunnel



Previous
Tolled Facilities Examples

Special Structures - Tunnels

Mountain Tunnels

Big Walker Mountain Tunnel



East River Mountain Tunnel

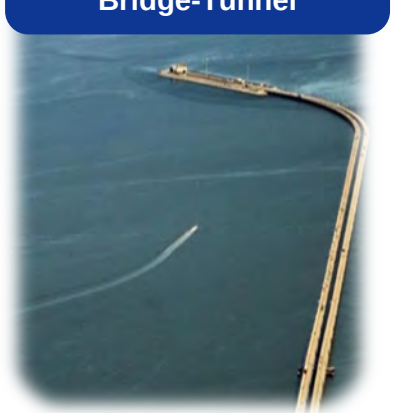


Water Tunnels

Hampton Roads Bridge-Tunnel



Monitor-Merrimac Memorial Bridge-Tunnel



Elizabeth River Tunnel (Midtown)



Elizabeth River Tunnel (Downtown)

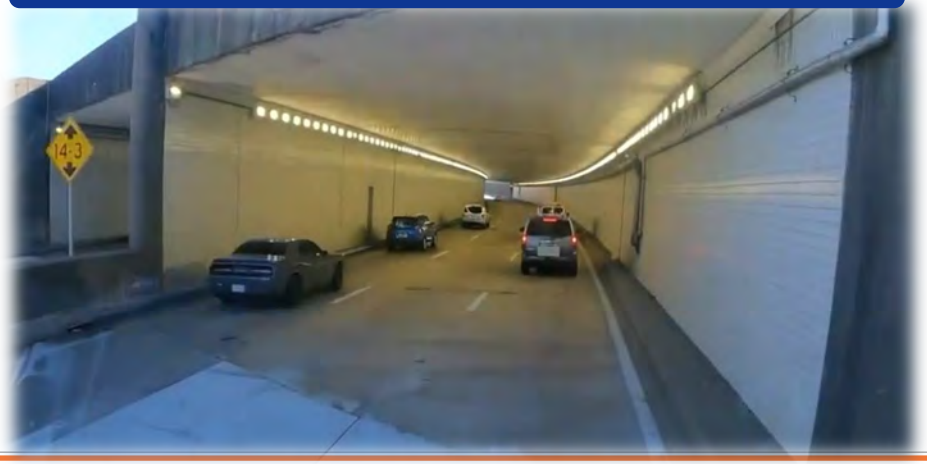


Rosslyn Tunnel



Runway Tunnels

I-564 Runway Tunnel



Special Structures - Movable Bridges

Benjamin Harrison Memorial Bridge



John B. Whealton Memorial Causeway Bridge (Chincoteague)



High Rise Bridge



Berkeley Bridge



George P. Coleman Memorial Bridge



James River Bridge



Eltham Bridge



Gwynn's Island Bridge



Special Structures – Fixed Span Structures

Grassy Creek Bridge
(460 Connector)



Gordon C. Willis
SMART Road Bridge



Varina-Enon Bridge



Robert O. Norris Bridge



Investment

Special Structures Program
50-Year Long-Term Plan

- § 33.2-374 requires the CTB approve the Special Structures Long-Term Plan biennially in even years
- The CTB approved the original plan in October 2021 and updated plans in December 2022 and December 2024
- The Special Structures 50-Year Long-Term Plan includes
  - The Special Structures Fund
  - The Maintenance and Operations Program
- The Special Structure Fund includes
  - Maintenance (e.g., Invert Slab repair)
  - Rehabilitation (e.g., Foundation work)
  - Replacement (e.g., Norris Bridge replacement) of facilities components and/or facilities
- VDOT's Maintenance and Operations Program includes
  - Daily operations (e.g., staff labor)
  - Routine maintenance (e.g., tunnel washing)
- The 50-Year Long-Term Plan includes lifecycle replacement of facility components.
  - Example, general replacement required every 10 years will be reflected in the plan every 10 years

Special Structures Investment – Summary

- Current funding source is reliable
- However, not sufficient to timely allocate funding for replacement efforts and very large capital improvements
- Advancing replacements saves on future inflationary costs
- 2025 Session of the General Assembly enacted Chapter 327: Commonwealth Transportation Special Structures Program Revenue Bond
  - Allows the Governor, CTB and the Treasury Board to issue debt Special Structures
  - $1B not to exceed $200M per year

Funding Source	Uses	Estimated Annual 2019 Budget	Budget when Special Structures Funded	Current Budget
		$ in millions		
Maintenance and Operations Program	• Daily Operations • Routine Maintenance	$50	$50	$78
Special Structures Program (funded at $80M and indexed annually)	• Maintenance • Rehabilitation • Replacement	$0	$60	$92.3

How Is The Investment Being Used

Bristol

Big Walker Mountain Tunnel/East River Mountain Tunnel - Bristol Fan Repair

BEFORE:

Fan housing components with significant pitting, corrosion, and rust holes





AFTER:

Fan housing components after sandblasting, steel repairs, and recoat





Big Walker Mountain Tunnel/East River Mountain Tunnel - Bristol Fan Repair

BEFORE:
Significant corrosion on fan impeller

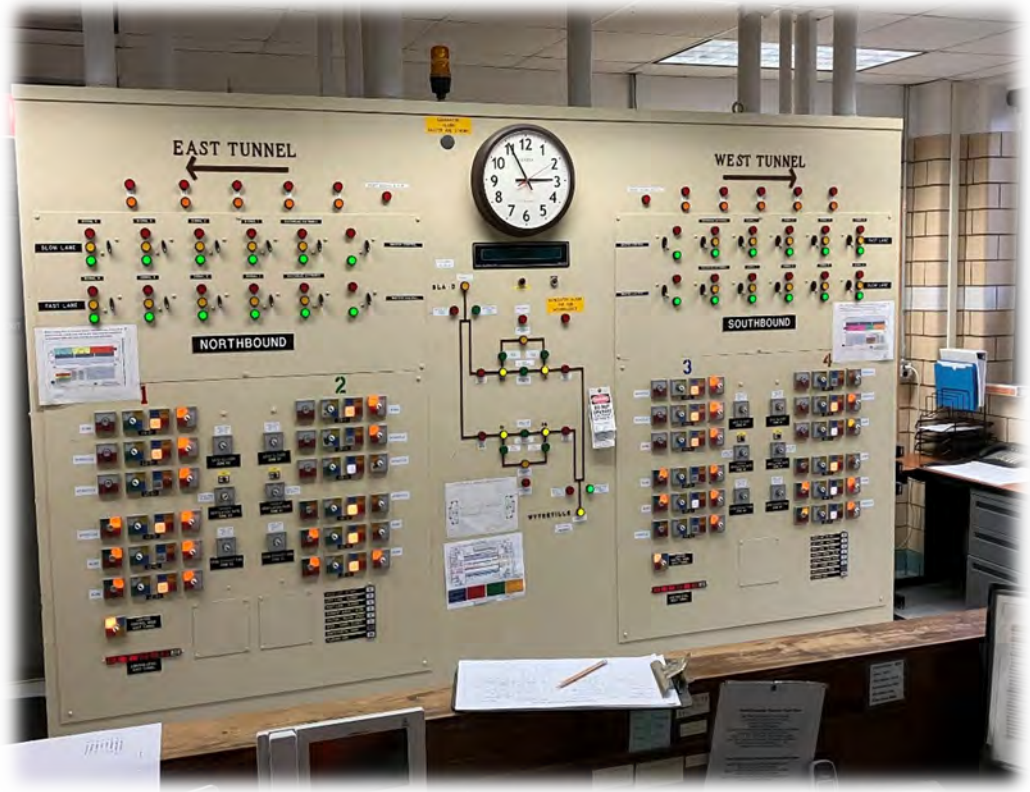


AFTER:
Fan impeller after sandblasting, steel repairs, and recoat



Big Walker Mountain Tunnel - Bristol
Supervisory Control and Data Acquisition (Control Board)

BEFORE:
1970's analog control board (original)



AFTER:
New digital control screens



Richmond

Varina-Enon Bridge - Richmond
Footing Crack Monitoring Gauges & North Approach Footing ASR (alkali–silica reaction) UNDERWAY



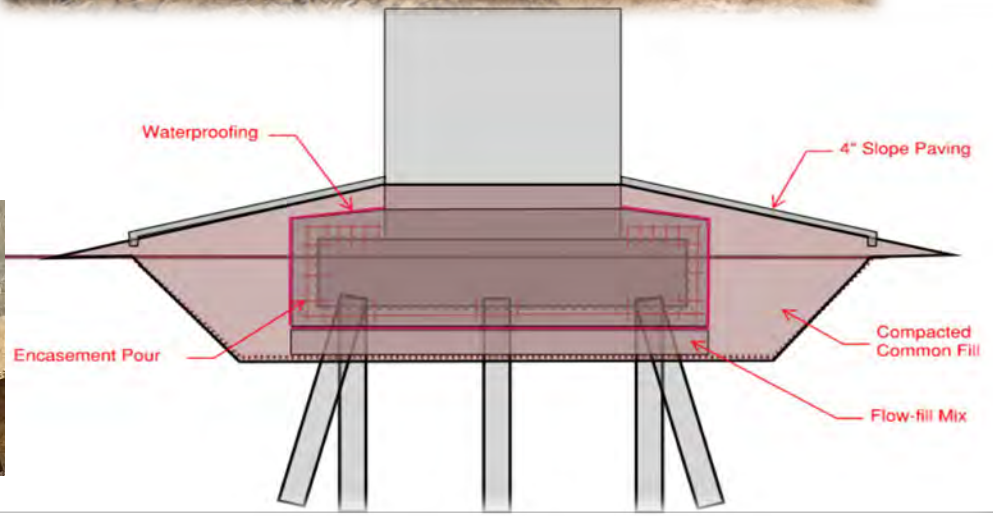
Damaged Foundation











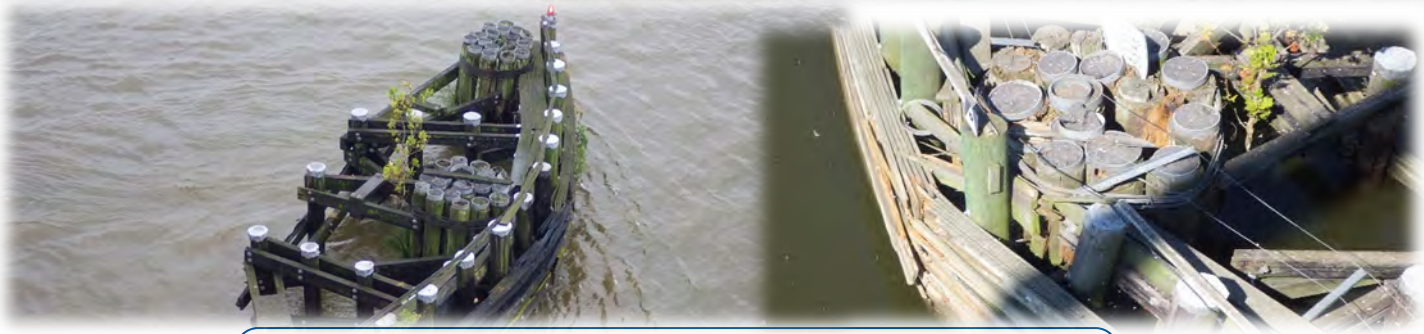
Excavation at Pier 24

Benjamin Harrison Bridge - Richmond
Fender System



AFTER:
New







BEFORE:
Old dolphins and fender (timber piles/wood)

Benjamin Harrison Bridge - Richmond
Dolphin Pier Protection Project - UNDERWAY







Benjamin Harrison Bridge - Richmond
Work Completed - Deferred Replacement of Facility for ~ 75 Years



Old Generator



New Generator Facility



New Span Lock

Wire Rope Replacement





Aerial Cable



Hampton Roads

James River Bridge – Hampton Roads Approaches – Damaged Girders - BEFORE









James River Bridge – Hampton Roads Approaches – Damaged Girders - UNDERWAY









James River Bridge – Hampton Roads Approaches – Damaged Girders - AFTER





James River Bridge – Hampton Roads
Lifting Cable Replacement - BEFORE

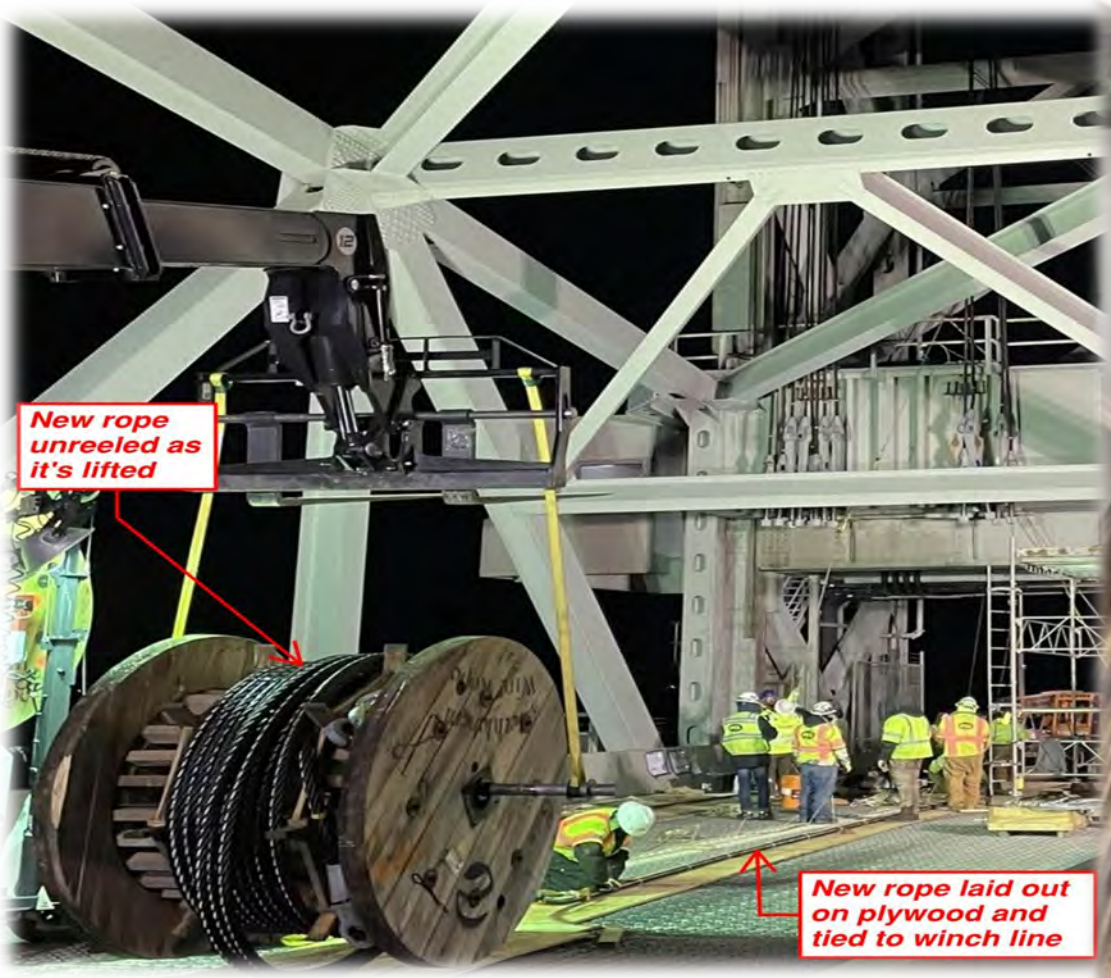








James River Bridge – Hampton Roads
Lifting Cable Replacement – UNDERWAY AND AFTER









High Rise Bridge – Hampton Roads
Emergency Generator – UNDERWAY AND AFTER







High Rise Bridge – Hampton Roads
Grid Deck Replacement









Hampton Roads Bridge Tunnel – Hampton Roads Invert Slab Work

BEFORE:
Spalled Concrete and exposed rebar



AFTER:
Concrete and rebar reestablished



Berkley Bridge – Hampton Roads
Mechanical and Electrical Rehabilitation





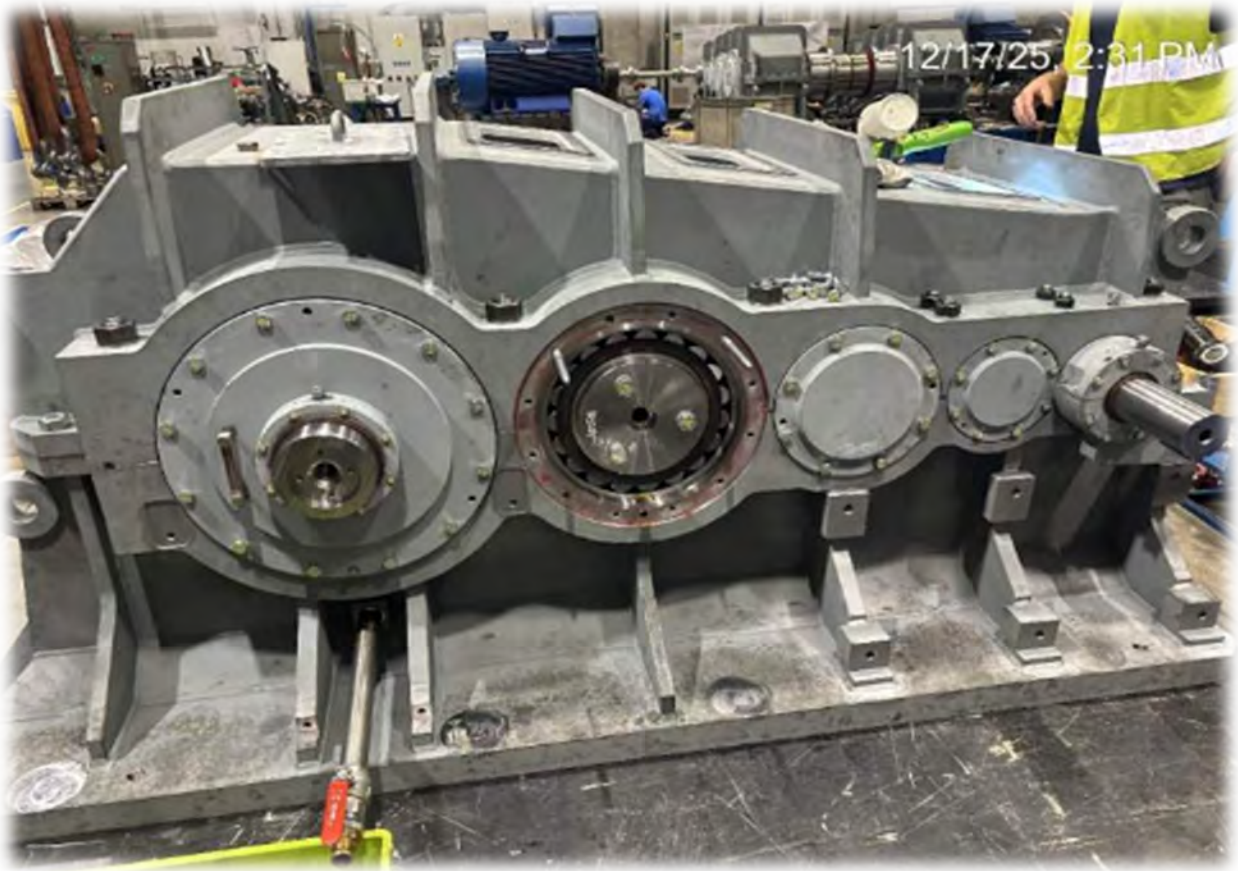




Berkley Bridge – Hampton Roads
Mechanical and Electrical Rehabilitation



Hydraulic Cylinders for Temporary Operating System

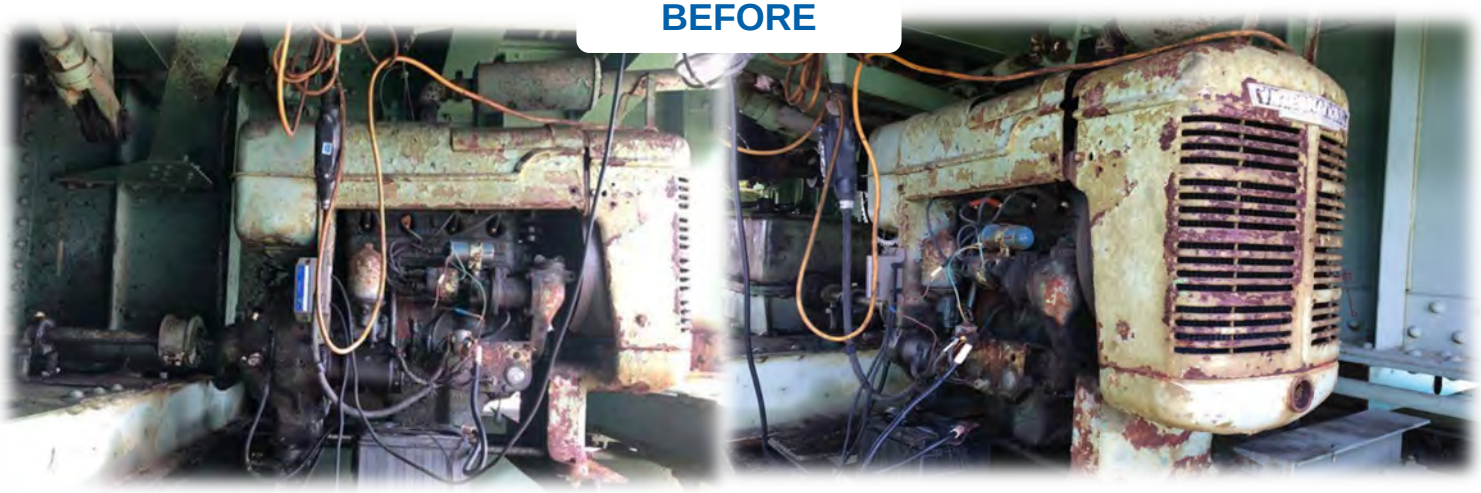


Secondary Gear Reducer

Fredericksburg

Gwynn’s Island Movable Bridge - Fredericksburg
Mechanical and Electrical Work – Deferred Replacement of Facility for ~ 50 Years

BEFORE





AFTER





Northern Virginia

Rosslyn Tunnel - Northern Virginia Rehabilitation - BEFORE

Corroded Steel Framing and Hangers



Cracked Ceiling Panel



Corroded Steel Sheeting in the Underside of Ceiling Panel





Wall Tile Conditions Before Rehabilitation

Rosslyn Tunnel – Northern Virginia Rehabilitation - AFTER

Ceiling Removed, Beams Fireproofed, Wall Tiles Repaired & New Lighting Installed



Robert O. Norris Bridge – Rt 3 over Rappahannock River Replacement – Est $724M



Robert Opie Norris Jr. 11/4/1880 – 6/21/1960

- Member Virginia House of Delegates & Senate
- Bridge Built in 1957 and named in his honor
- Bridge length 9,989 ft with 684 ft main span
- “Scary to drive cross” and 90-mile detour
- 7,560 ADT & 300 ADDT
- Fracture critical truss & pin/hanger connections

- AD date advanced from 2036 to 2028
- Construction estimate ~$724M (2028 dollars)
- New design will have “wider travel lanes, fully functional shoulders and significantly higher guardrails”



Performance

Special Structures – Long Term Sustainability

- Developed prioritization process to assess risk of individual work category activities

- Long-Term Plan
  - Periodic Updates

- Created Health Indices for tunnels and movable bridges based on safety and risk
  - No federal performance requirements
  - No other DOTs have performance metrics
  - Reviewed USACE risk elements
  - First in the nation

- Health Index
  - Current Condition
  - Reliability
  - Remaining service life

Special Structures – Health Index

- **Measures the Overall Health from 0 to 100**
  - Assesses individual structures and systems within a structure

- **Data Collection and Inspection**
  - Each element on each structure evaluated
  - Assigned “condition states”, which can vary from Good to Severe
  - Inspected every 2 years

- **Health Index Calculated by Weighting Elements by Safety & Risk**
  - Each element identified as Key, Major or Minor importance
  - Each element classified as High, Medium or Low risk
  - Weighting factors vary from 10 to 1

Special Structures - Movable Bridge Health Index

Movable Bridge Example
(3 Systems, 66 Elements & *18 Critical Elements*)

Electrical (28/*7*)

- ***Span Motors & Drives***
- Emergency Motors & Drives
- Electric Clutches
- Lock Motors/Actuators
- Brakes
- ***Aerial System***
- ***Riser Cables/Conductors***
- ***Conductors, Conduit & Supports***
- Pull & Junction Boxes
- ***Operator/Control/Monitor Systems***
- Limit/Proximity/Pressure Switches
- ***Skew/Position Monitor System***
- Programmable Logic Controllers
- ***Control Cabinets & Switchgear***
- Disconnect Switches
- Grounding
- Panelboards
- Transformers
- Generators
- Transfer Switches
- UPS Systems
- Lightning Protection
- Surge Protection Devices
- Navigational System
- Traffic Gates
- Traffic Signals & Signs
- Operator House
- Generator Room/Building/Pad

Structural (16/*4*)

- Live Load Shoes
- Operating Machinery Supports
- Span Lock Assemblies
- ***Primary Movable Support Members***
- ***Lift Span Towers***
- ***Wire Rope Anchorages***
- ***Counterwght & Guide Rail Supports***
- Aux Counterwght & Guide Rail Supports
- Span Guide Rail Supports
- Fenders/Pier/Substructure Protection
- Clearance Boards/Signs
- Operator House
- Generator Room/Building/Pad
- Counterwght Hangers
- Access System
- Traffic Gates

Mechanical (22/*7*)

- Fixed/Expansion Live Load Shoes
- Span Lock Assemblies
- ***Primary Movable Support Members***
- ***Lift Span Wire Rope & Anchorages***
- Span Balance
- Counterwght Guides & Guide Rails
- Aux Counterwght & Guide Rails
- Lift Span Guide Assemblies & Guide Rails
- Centering Devices
- Span Drive Electric Motors
- ***Main Drive Enclosed Gear Boxes***
- Brakes
- ***Span Drive Couplings***
- Span Drive Bearings
- ***Span Drive Shafts***
- ***Span Drive Open Gearing***
- Emergency Drive System
- Buffers
- Generators
- ***Instrumentation Drives***
- Traffic Gates
- Operator House

Movable Bridge Health Index: Changes 2025 - 2026

2025 Summary of Health Index for each System or Component on Each Movable Bridge

Bridge	Movable Span Systems				Approach (Fixed) Span Components			
	Electrical	Mechanical	Structural	Overall HI Movable Bridge	Deck	Super-structure	Sub-structure	Overall HI Approach Spans
Benjamin Harrison								
Berkley EBL								
Berkley WBL								
Chincoteague								
Coleman								
Eltham								
Gwynn's Island								
High Rise EBL								
James River								

2026 Summary of Health Index for each System or Component on Each Movable Bridge

Bridge	Movable Span Systems				Approach (Fixed) Span Components			
	Electrical	Mechanical	Structural	Overall HI Movable Bridge	Deck	Super-structure	Sub-structure	Overall HI Approach Spans
Benjamin Harrison								
Berkley EBL								
Berkley WBL	↓							
Chincoteague								
Coleman								
Eltham								
Gwynn's Island	↑			↕				
High Rise EBL								
James River								

2025 Percentage & Number of Systems in Each Condition Category

Good	26% (14)
Fair	59% (32)
Poor	13% (7)
Severe	2% (1)

2026 Percentage & Number of Systems in Each Condition Category

Good	28% (15)
Fair	57% (31)
Poor	11% (6)
Severe	4% (2)

2 Improvements

- Fair to Good: **Gwynn's –** Electrical
- Fair to Good: **Gwynn's** - Overall (Movable)

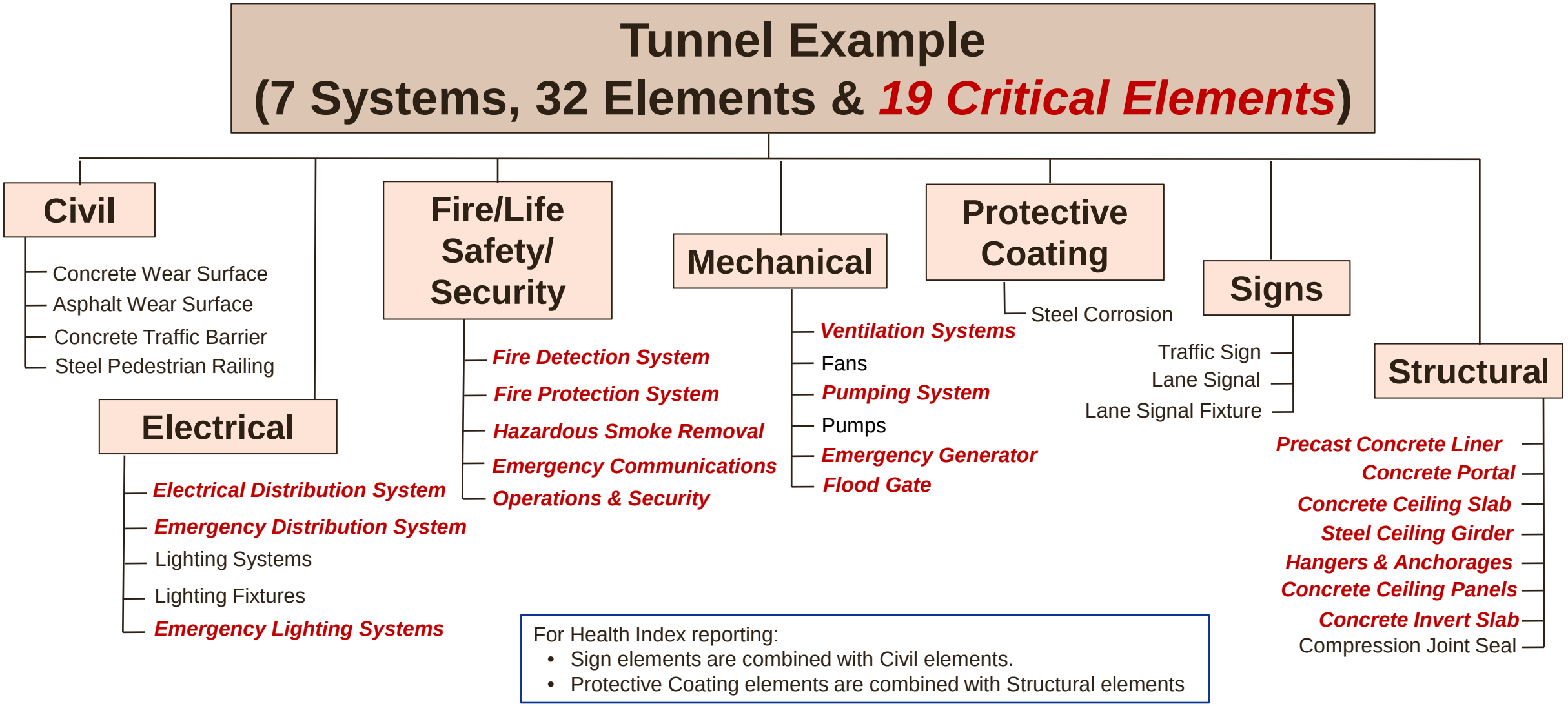
3 Deteriorations

Fair to Poor: **High Rise EBL & James River** – Overall (Movable)
Poor to Severe: **Berkley WBL** - Electrical

Work is underway on:

- Benjamin Harrison
- Berkley EBL & WBL
- James River

Tunnel – Health Index



For Health Index reporting:

- Sign elements are combined with Civil elements.
- Protective Coating elements are combined with Structural elements

Tunnel Health Index: Changes 2025 - 2026

2025 Summary of Health Index for Each System on Each Tunnel						
Tunnel	Civil	Electrical	Fire/Life Safety/Security	Mechanical	Structural	Overall HI
Big Walker						
East River						
Hampton Roads Eastbound						
Hampton Roads Westbound						
Monitor Merrimac						
Rosslyn						
I-564						

2025 Percentage & Number of Systems in Each Condition Category	
Good	28% (10)
Fair	63% (22)
Poor	9% (3)
Severe	0% (0)

2026 Summary of Health Index for Each System on Each Tunnel						
Tunnel	Civil	Electrical	Fire/Life Safety/Security	Mechanical	Structural	Overall HI
Big Walker			↓			
East River						
Hampton Roads Eastbound						
Hampton Roads Westbound			↓			
Monitor Merrimac			↓	↓		
Rosslyn		↑		↓	↑	
I-564				↓		

2026 Percentage & Number of Systems in Each Condition Category	
Good	31% (11)
Fair	46% (16)
Poor	23% (8)
Severe	0% (0)

2 Improvements

Fair to Good: **Rosslyn** - Electrical
Fair to Good: **Rosslyn** - Structural

6 Deteriorations

Good to Fair: **I-564** – Mechanical
Fair to Poor: **Big Walker -** Fire/Life Safety/Security
Fair to Poor: **Hampton Roads WBL** - Fire/Life Safety/Security
Fair to Poor: **Monitor Merrimac** - Fire/Life Safety/Security
Fair to Poor: **Monitor Merrimac** - Mechanical
Fair to Poor: **Rosslyn** - Mechanical

Work is underway on:

- Big Walker & East River
- HRBT
- MMMBT
- I-564

Special Structures – Fixed Span Bridge Health Index*

Varina-Enon Bridge Example (3 Components, 24 Elements)

Deck
- Precast Concrete Deck
- Precast Concrete Top Flange
- Joint Assembly w/o Seal
- Bridge Railing
- Wearing Surface
- Concrete Reinforcement Protection
- Deck Drains
- Joint Effectiveness
- Reinforced Concrete Approach Slab

Superstructure
- Precast Closed Box Girder
- Steel Main Cables
- Elastomeric Bearing
- Fixed Bearing
- Disc Bearing
- Steel Protective Coating
- Concrete Protective Coating
- Beam/Girder Ends

Substructure
- Precast Concrete Column
- Reinforced Concrete Abutment
- Reinforced Concrete Pile Cap/Footing
- Precast Concrete Pier cap
- Reinforced Concrete Wing wall
- Protected Slope – Riprap
- Channel



*** Same methodology used for conventional bridges to estimate remaining life and asset value**

Fixed Span Bridge Health Index: Changes 2025 - 2026

2025 Summary of Health Index for Each Component on Each Fixed Span Bridge				
Bridge Name	**Deck**	**Superstructure**	**Substructure**	**Overall**
460 Connector Bridges				
HRBT* Approaches				
MMMBT** Approaches				
Norris Bridge				
Smart Road Bridge				
Varina Enon Bridge				
Willoughby Bay Bridges				

2025 Percentage & Number of Components in Each Condition Category	
Good	43% (9)
Fair	52% (11)
Poor	5% (1)
Severe	0% (0)

2026 Summary of Health Index for Each Component on Each Fixed Span Bridge				
Bridge Name	**Deck**	**Superstructure**	**Substructure**	**Overall**
460 Connector Bridges				
HRBT* Approaches				
MMMBT** Approaches				
Norris Bridge				
Smart Road Bridge				
Varina Enon Bridge				
Willoughby Bay Bridges			↑	

2026 Percentage & Number of Components in Each Condition Category	
Good	47.5% (10)
Fair	47.5% (10)
Poor	5% (1)
Severe	0% (0)

Notable Projects in 10 Year Plan

- HRBT Approaches and Willoughby Bay Bridges will be complete
- Preservation emphasis for:
  - Varina-Enon
  - MMMBT Approaches
- 460 Connector structural health monitoring system installation
- Smart Road structural health monitoring system operational
- Norris Bridge advertisement in 2028

*Hampton Roads Bridge Tunnel
**Monitor Merrimac Memorial Bridge Tunnel

1 Improvement

- Fair to Good: **Willoughby Bay –** Substructure ↑

No Deteriorations

NEXT STEPS

Upcoming CTB Meetings

Description	CTB Meeting Date
Routine Maintenance Set Targets	October 14, 2026
CTB approval	December 9, 2026