VDOT
Virginia Department of Transportation

Robert O. Norris Jr. Bridge

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COLLINS ENGINEERS INC.
ENGINEERING INGENUITY FOR 45 YEARS

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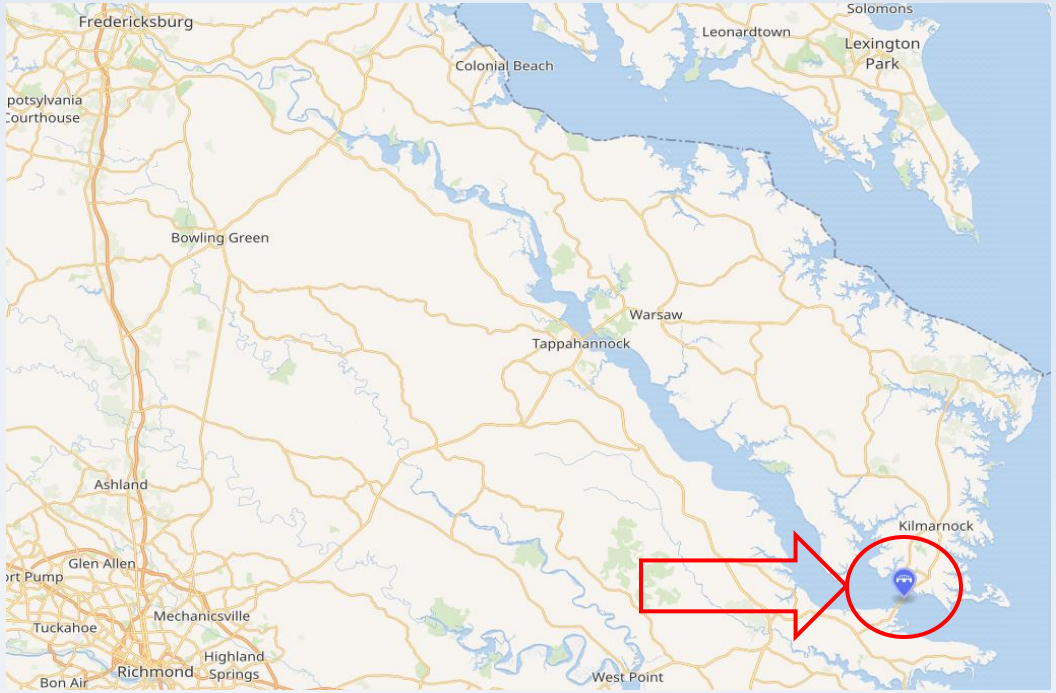
Current Configuration, Maintenance Cost, Inspection Techniques, and Scheduled Replacement of this Ageing Structure.

Robert O. Norris Jr. Bridge
Background

Located in VDOT Fredericksburg District, Norris Bridge carries Route 3 over the Lower Rappahannock River connecting the Middle and Northern Neck Peninsula, Virginia

Designed and constructed by a toll commission in the mid 1950's, Opened to traffic over 67 years ago on August 30, 1957

- **Forty-Four Spans - 9,989' Long (nearly 2 miles long)**
- Rolled Structural Steel Multi-Beam Spans
- Non-redundant Dual Girder Spans
- Deck Truss Spans
- Through Truss Spans
- **96 Fracture Critical Pins**
- **148 Non-Fracture Critical Pins**
- **48 Truss Wind-Lock Pins**



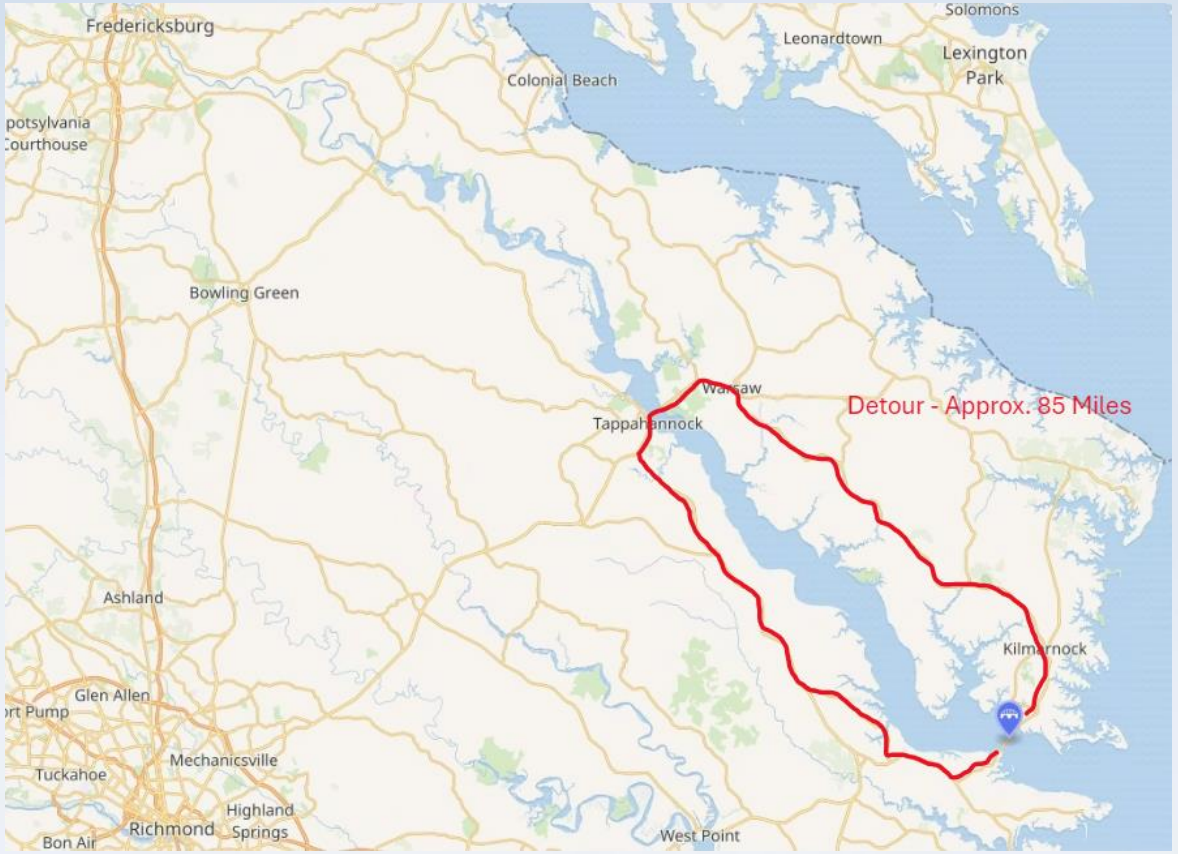
This aging structure requires extensive monitoring and complex annual inspection techniques which contribute to growing overall annual maintenance cost.

Robert O. Norris Jr. Bridge Characteristics

- **Average Daily Traffic – 8,165**
- Truck Traffic <500 / Day
- 45-Ton Vehicle Weight Limit
- Bridge - Width Curb to Curb – 22.97 feet
- Vertical Clearance – 14.24 feet
- Mean High Water Clearance of 110 feet
- Water Depth greater than 60 feet deep
- **Detour Length – 85.13 miles**

Required Inspection Intervals

- Regular / In Depth – 24 / 48 Months
- NSTM – 12 Months
- Underwater – 36 Months



Robert O. Norris Jr. Bridge Characteristics

Not classified as fatigue prone due to the low volume (<500) of average daily truck traffic;
BUT…

- Does contain fatigue prone details requiring hands-on inspections
  - Pin Plates – Category E
  - Riveted connections – Category D

Non-Redundant Steel Tension Members

- Hands-on inspection
  - Dual Girder spans' tension areas
  - Floorbeams' tension areas
  - Truss spans' tension members
  - 96 Fracture Critical Bridge Pins
  - 148 Non-fracture critical pins
  - 48 Truss wind-lock pins

Robert O. Norris Jr. Bridge
Inspection Procedures

Access Methods Required:

- Under-Bridge Inspection Vehicle (UBIV)
- Bucket Truck for through truss spans
- SPRAT compliant rope access for bottom chord
- Safety / Inspection Boat

Inspection Time = 5 weeks with 2 teams, minimum

Robert O. Norris Jr. Bridge
Inspection Procedures

Communication: Cell phones and two-way radios by: Team Leaders, Traffic Flagging Personnel, and Equipment Operators

Traffic Control: Daily single lane closures of varying lengths, alternating lanes as required

- Automated Flagging Devices (AFAD) with radio equipped, certified flagging personnel required for all bridge lane closures

United States Coast Guard: Navigation channel clearance deviation filed which prompted a Notice to Mariners publishing to mariners

Community Outreach: Social Media, TV, and Radio news releases about 10 days ahead

Robert O. Norris Jr. Bridge
Recent Rehabilitations

1995-1996: Deck Replacement, Structural Steel Rehabilitation, Pin Replacements ($22M)

2000: Pile Jackets ($0.3M)

2006: Abutment Scour Repair from Hurricane Isabel ($1.2M)

2008: Structural Steel Rehabilitation ($2.5M)

2012: Paint (not thru-truss) ($22.5M)

2017: Structural Steel Rehabilitation ($1.1M)

2018: Deck Overlay Replacement with Rosphalt ($4.3M)

2019: Way-In-Motion – Traffic Monitoring

2019: Strain Gages on Specific Elements (@$0.3M)

2024: Digital Message Signs at each approach ($1.2M)

1995-2018: Multiple pin replacements with secondary support system (@$3M)

Robert O. Norris Jr. Bridge
Future Rehabilitations

Structural Steel Rehabilitation with secondary support system at multiple pin and hanger locations (estimated $11M), September 2024 advertisement

Pile Jackets: as funding allows

Robert O. Norris Jr. Bridge Maintenance Challenges

- **Funding**
  - Long, Complex Structure
- **Narrow Lanes with no shoulder**
  - Must use AFADs due to lack of flagger escape route
- **Deicing salts**
  - Bridge cleaning every year
- **Coastal Environment**

General Condition Ratings:

- Deck - 5
- Superstructure - 5
- Substructure – 5
- Channel – 7

Photo from www.tapconet.com

Robert O. Norris Jr. Bridge
Future Plans

Norris Bridge is identified as a Special Structure due to its complexity.

Special Structure Program includes 25 structures across Virginia with dedicated funding

- Complex, Movable, Tunnel

Robert O. Norris Jr. Bridge
Future Plans

Special Structures 50-Year Plan included replacement of the Norris Bridge estimated @ 2036

- $14.9 M allocated in Six-Year Improvement Program, through Special Structures allocations, for preliminary engineering work necessary for the Norris Bridge replacement

Preliminary engineering activities underway ahead of construction:

- Survey work (complete)
- Norris Bridge site assessment (complete)
- Geotechnical review (complete)
- National Environmental Policy Act (NEPA) review (underway)
- Advanced right of way acquisition (underway)
- Utility assessment (underway)

Public comment for the NEPA document planned end of calendar 2024

VDOT is working to obtain funding with a goal of advancing the replacement date

Robert O. Norris Jr. Bridge

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We are happy to take your

Questions?