Hampton Roads Bridge-Tunnel (HRBT) Expansion Feasibility Study

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Study Scope

- Augment currently planned regional improvements to reduce congestion at HRBT
- Augment regional improvements identified in HB 3202 and current, federally-approved long-range plan
- Use in-house expertise and external consultants to evaluate conceptual costs, benefits and feasibility of alternatives
- Perform high-level conceptual study; rely extensively on existing work products and traffic models
- Serve as basis for future policy-level analysis and decision making; study does not meet standards necessary for true, investment-grade decision

Study Expectations

- Review of six identified alternatives
- Develop sketch-level cost estimates of alternatives
- Develop estimates of congestion-reduction benefits of alternatives
- Provide policy-level guidance on feasibility and long-term benefits of alternatives
- Perform work in transparent and open manner accessible to public and federal, state and local officials

Study Alternatives

1. Add two additional lanes of bridge-tunnel capacity to provide a contiguous, six-lane facility

2. Add two additional lanes of reversible bridge-tunnel capacity to provide greater peak period and evacuation capacity

3. Add four additional lanes of bridge-tunnel capacity

4. Add four additional lanes of bridge-tunnel capacity, including two multimodal lanes

5. Add two additional lanes of bridge capacity to provide a contiguous, six lane facility

6. Add four additional lanes of bridge capacity

Alternative Screening Criteria

- **Congestion reduction benefit – traffic analysis**
- **Cost – sketch level concept estimate**
- **Physical Impact – right of way impact**

Congestion Benefit Relief – traffic analysis

- **Analyze design years 2018 and 2030**
- **Analyze with and without the Hampton Roads Third Crossing in-place**
- **Assume tolling at HRBT and Monitor Merrimac Memorial Bridge-Tunnel**
  - **Tolling to be electronic, on-the-fly (no adverse impact to traffic)**

Cost – Sketch Level Concept Estimates

- Estimates in 2008 dollars
- Roadway costs calculated on a lane-mile basis
- Bridge costs calculated on a square foot basis
- Tunnel costs calculated using updated historical data
- Estimates do not include preliminary engineering, right of way, utilities or sound walls or any environmental mitigation

Important Consideration

- **Any commitment to expand the HRBT will need to meet all applicable state and federal standards for a critical component of the Interstate Highway System including:**
  - **Environmental Document**
  - **Navy Coordination**
  - **U. S. Coast Guard Coordination**
  - **U. S. Army Corps of Engineers Coordination**
  - **EPA Coordination**
  - **Virginia Marine Resources Commission Coordination**
  - **Virginia Department of Environmental Quality Coordination**
  - **Public Hearings**
  - **Etc.**

Bridges vs. Tunnels

- **Bridge**
  - **Pros**
    - Requires less daily operations than tunnel
    - Not susceptible to flooding and closing during high water events
    - Provides full-width shoulders
    - Does not limit future channel deepening
  - **Cons**
    - Requires more long-term maintenance due to direct exposure to the elements
    - Susceptible to being closed during high wind events
    - Requires specialty contractors and unique construction methods
    - Extends past the shoreline for a distance of about 300 to 400 feet before tying in to existing ground on the Peninsula side
    - Requires ice and snow removal.

Bridges vs. Tunnels

- **Tunnels**
  - **Pros**
    - Does not restrict vertical clearance above channel
    - Does not conflict with the Navy regarding potential channel obstruction
    - Does not restrict shipping traffic or affecting river hydraulics (bridge tower islands)
    - Does not create additional visual or aesthetic impact
    - Better vertical alignment going under channel rather than over result in fuel savings and better air quality
    - Provides more operational flexibility and shorter response times in an emergency if new tunnel islands are connected to existing tunnel islands
  - **Cons**
    - Requires ventilation and pumping systems
    - Potentially more difficult to fight fires due to confined space
    - Tide gates required to protect from hurricanes / global warming sea level increase

HAMPTON ROADS BRIDGE-TUNNEL EXPANSION FEASIBILITY STUDY

Alternative	Type of Improvement	Appoximate Corridor Limits		Traffic Analysis (LOS)*								R/W Impacts		Construction Cost ****
				w/o HR3X				w/ HR3X						
		From		2018		2030		2018		2030		# impacted buildings	L.F. impacted sound wall	in $ Billion (2008 dollars)
				EB	WB	EB	WB	EB	WB	EB	WB			
No Build	No improvements	n/a	n/a	F (F)	F (F)	F (F)	F (F)	D (E)	C (E)	D (E)	C (F)	0	0	0
1	2 additional lanes bridge-tunnel contiguous, six lanes	Settlers Landing Road Interchange	I-64/I-564 Interchange	D/D (C/D)**	C/D (C/D)**	F/E (F/E)**	C/E (F/E)**	D/D (C/D)**	C/D (C/D)**	D/D (C/D)**	C/D (C/D)**	52	7400	2.13
2	2 additional, reversible lanes bridge-tunnel	I-64/I-664 Interchange	I-64/I-564 Interchange	B (F)	F (B)	C (F)	F (B)	B (F)	F (B)	B (F)	F (B)	71	7400	2.25
3	4 additional lanes bridge-tunnel	I-64/I-664 Interchange	I-64/I-564 Interchange	C (B)	B (B)	B (B)	B (B)	B (B)	B (B)	B (B)	B (B)	58	7400	3.24
4	4 additional lanes bridge-tunnel 3-SOV + 1-HOV each direction	I-64/I-664 Interchange	I-64/I-564 Interchange	C/A (C/A)***	B/A (C/A)***	C/A (C/A)***	C/A (C/A)***	C/A (B/A)***	B/A (C/A)***	C/A (C/A)***	C/A (C/A)***	70	7400	3.27
5	2 additional lanes high-rise bridge contiguous, six lanes	I-64/I-664 Interchange	I-64/I-564 Interchange	As noted in the report, Alternative 5 is dismissed due to adverse structural design characteristics								n/a	n/a	n/a
6	4 additional lanes high-rise bridge	I-64/I-664 Interchange	I-64/I-564 Interchange	C (B)	B (B)	B (B)	B (B)	B (B)	B (B)	B (B)	B (B)	71	7400	2.57

* traffic analysis assumes mainline automated $2.00 toll at both HRBT and MMMBT for all scenarios

** denotes 2 lanes one direction / 1-lane two direction

*** denotes 3 SOV lanes / 1 HOV lane

**** cost does not include preliminary engineering, right of way, utilities, sound walls or any environmental mitigation

denotes LOS over capacity for either AM or (PM) peak. Does not meet FHWA LOS requirement for Interstate

denotes LOS at or near capacity for AM or (PM) peak. Does not meet FHWA LOS requirement for Interstate

denotes AM and (PM) peak LOS meeting minimum FHWA LOS requirements for Interstate

detnotes Alternatives suggested to be eliminated from further consideration

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