the heartbeat of HAMPTON ROADS TPO
TRANSPORTATION PLANNING ORGANIZATION

REGIONAL CONNECTORS STUDY

JOINT STEERING (POLICY) COMMITTEE/WORKING GROUP MEETING

October 27, 2020

Michael Baker INTERNATIONAL

Vision

"This study should establish a regional long-term vision that investigates 21st century transportation options that connect the Peninsula and the Southside across the Hampton Roads Harbor that enhance economic vitality and improve the quality of life in the region."

Goals

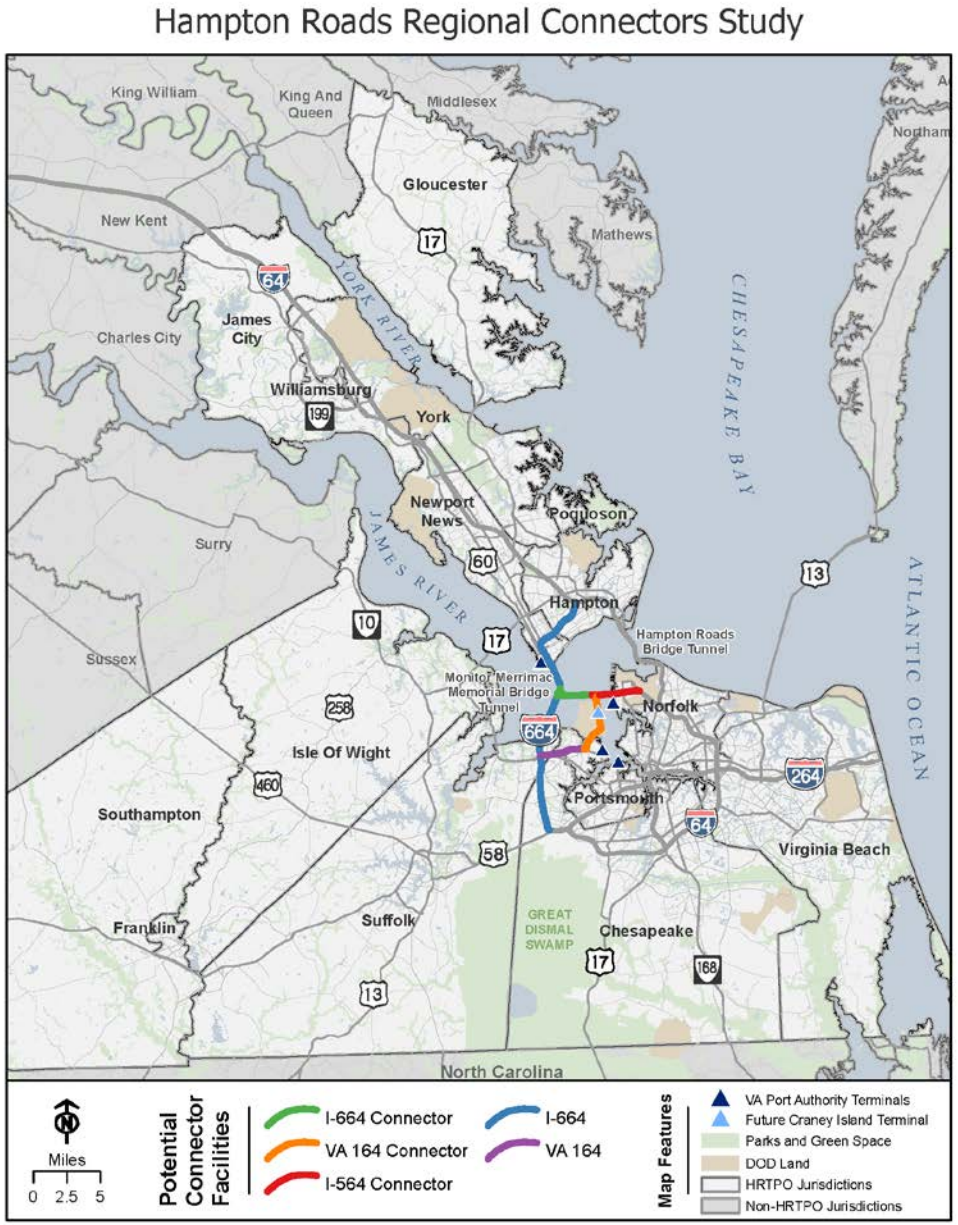
Economic Vitality

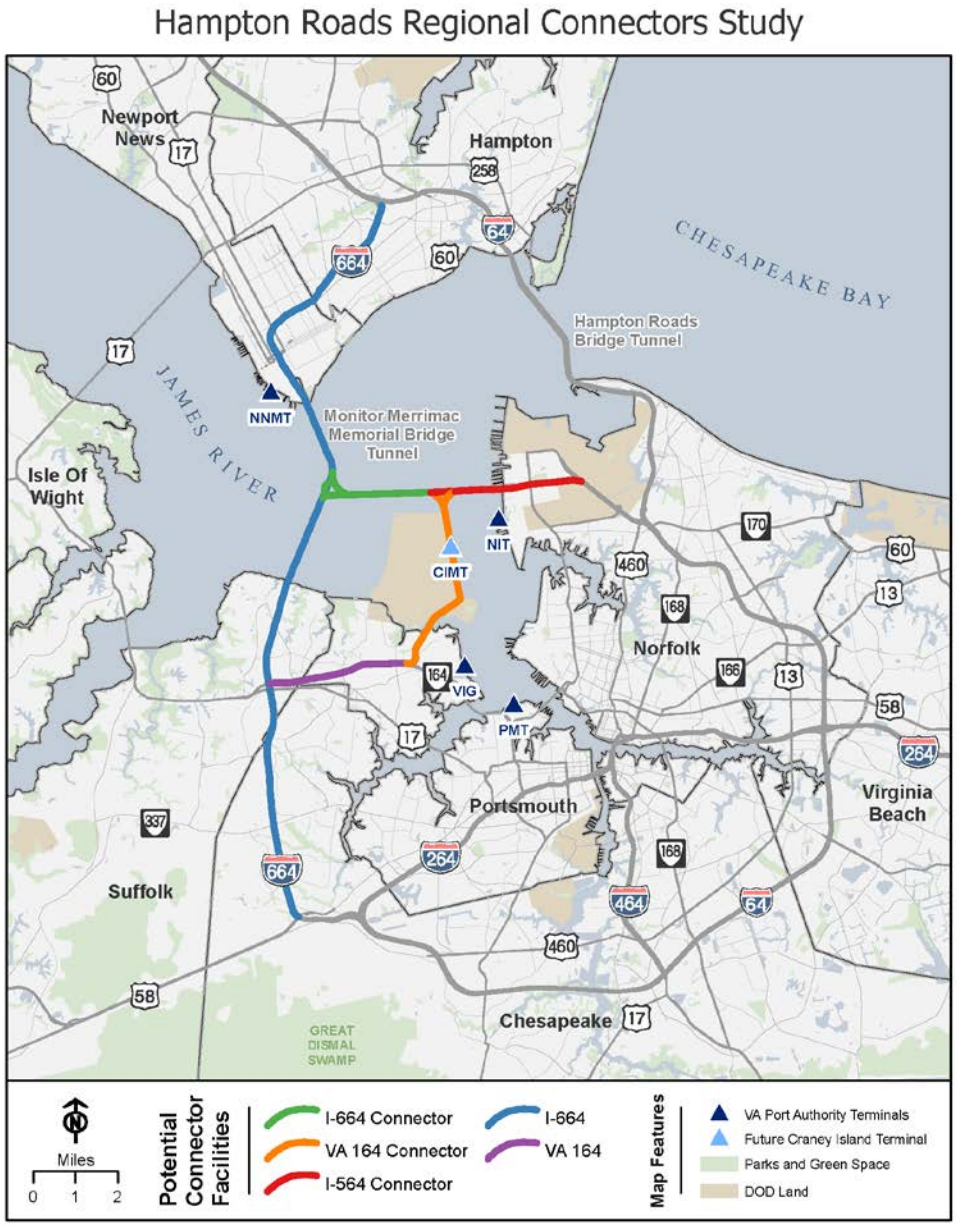
Sustainability: Equity, Community & Environmental

Connectivity & Accessibility

Safety, Resiliency, & Innovation

Study Area


Hampton Roads Regional Connectors Study
King William
King And Queen
Middlesex
Gloucester
New Kent
Mathews
James City
Charles City
Williamsburg
York
Newport News
Poquoson
Surry
Hampton
Hampton Roads Bridge Tunnel
Monitor Merrimac Memorial Bridge Tunnel
Norfolk
Sussex
Isle Of Wight
Portsmouth
Southampton
Virginia Beach
Franklin
Suffolk
Chesapeake
GREAT DISMAL SWAMP
North Carolina
YORK RIVER
JAMES RIVER
CHESAPEAKE BAY
ATLANTIC OCEAN
Miles
0 2.5 5
Potential Connector Facilities
I-664 Connector
I-664
VA 164 Connector
VA 164
I-564 Connector
Map Features
VA Port Authority Terminals
Future Craney Island Terminal
Parks and Green Space
DOD Land
HRTPO Jurisdictions
Non-HRTPO Jurisdictions


Hampton Roads Regional Connectors Study
Newport News
Hampton
CHESAPEAKE BAY
Hampton Roads Bridge Tunnel
JAMES RIVER
NNMT
Monitor Merrimac Memorial Bridge Tunnel
Isle Of Wight
NIT
CIMT
Norfolk
VIG
PMT
Portsmouth
Virginia Beach
Suffolk
Chesapeake
GREAT DISMAL SWAMP
Miles
0 1 2
Potential Connector Facilities
I-664 Connector
I-664
VA 164 Connector
VA 164
I-564 Connector
Map Features
VA Port Authority Terminals
Future Craney Island Terminal
Parks and Green Space
DOD Land

Study Phases

- Phase 1 – Existing Conditions, Stakeholder interviews, Regional Survey
- Phase 2 – Scenario Planning
- Phase 3 – Public Engagement, Alternatives Development, Alternatives Assessment, and Recommendation

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PHASE 2 - SCENARIO PLANNING UPDATE

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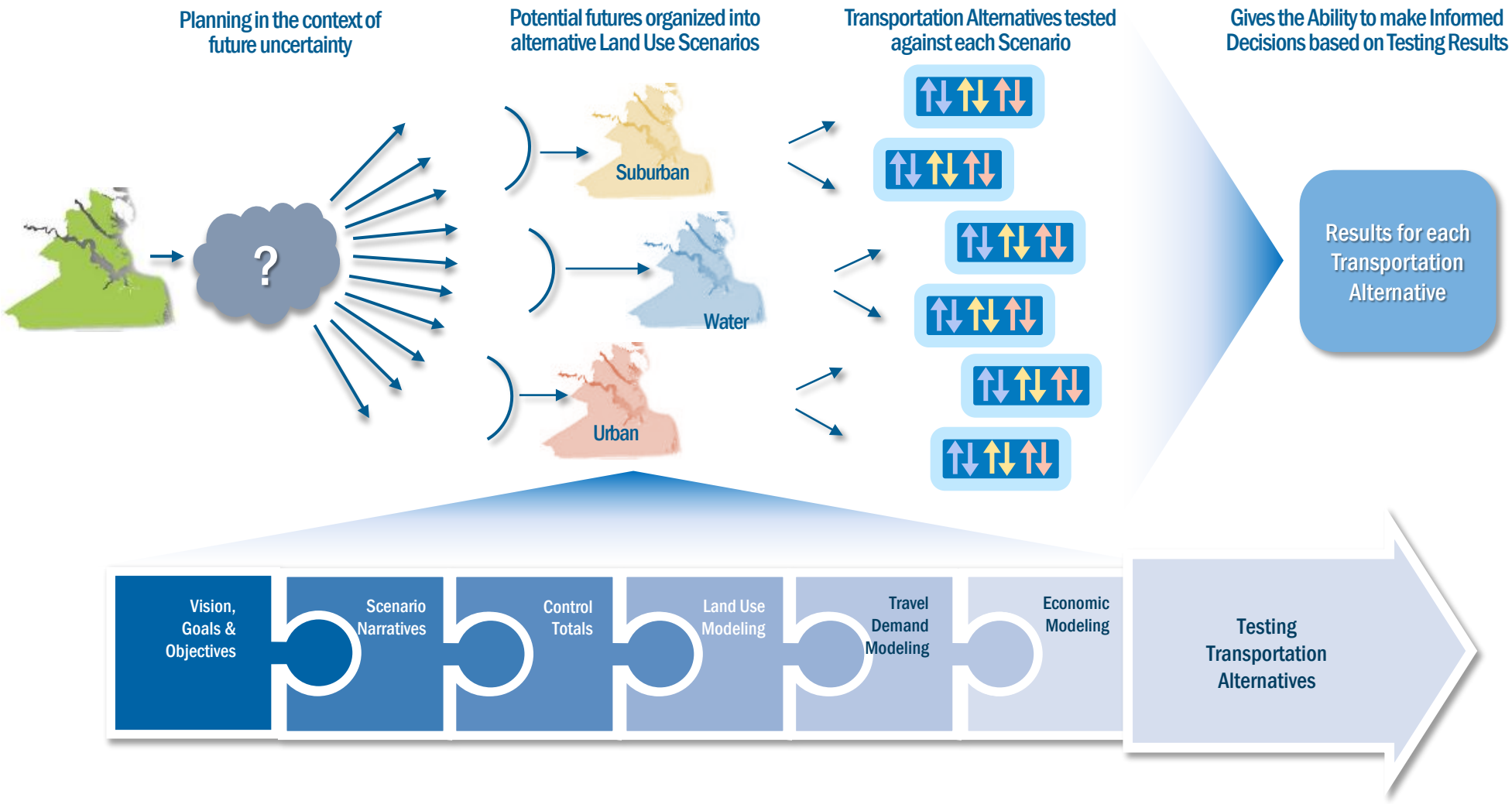
Scenario Planning Process



Scenario Narratives

Greater Growth on the Water

Growth in water-oriented activity. Port of Virginia becomes even more competitive with freight more multimodal. More dispersed housing locations. Moderate assumptions for CAV adoption and network adaptation.

Greater Growth in Urban Centers

Significant economic diversification. Low space requirements per job. Large role for "digital port." New professionals prefer to live/work in urban settings. High level of CV adoption and low auto ownership/high TNC mode.

Greater Suburban/Greenfield Growth

Growth is suburban/ exurban, but growth includes walkable mixed-use centers. Port of Virginia becomes even more competitive. "Digital port" brings additional jobs. Housing is more suburban. High level of AV adoption and network adaptation.

WHAT THESE WILL HELP US TEST

Test greater cross-harbor travel in particular.

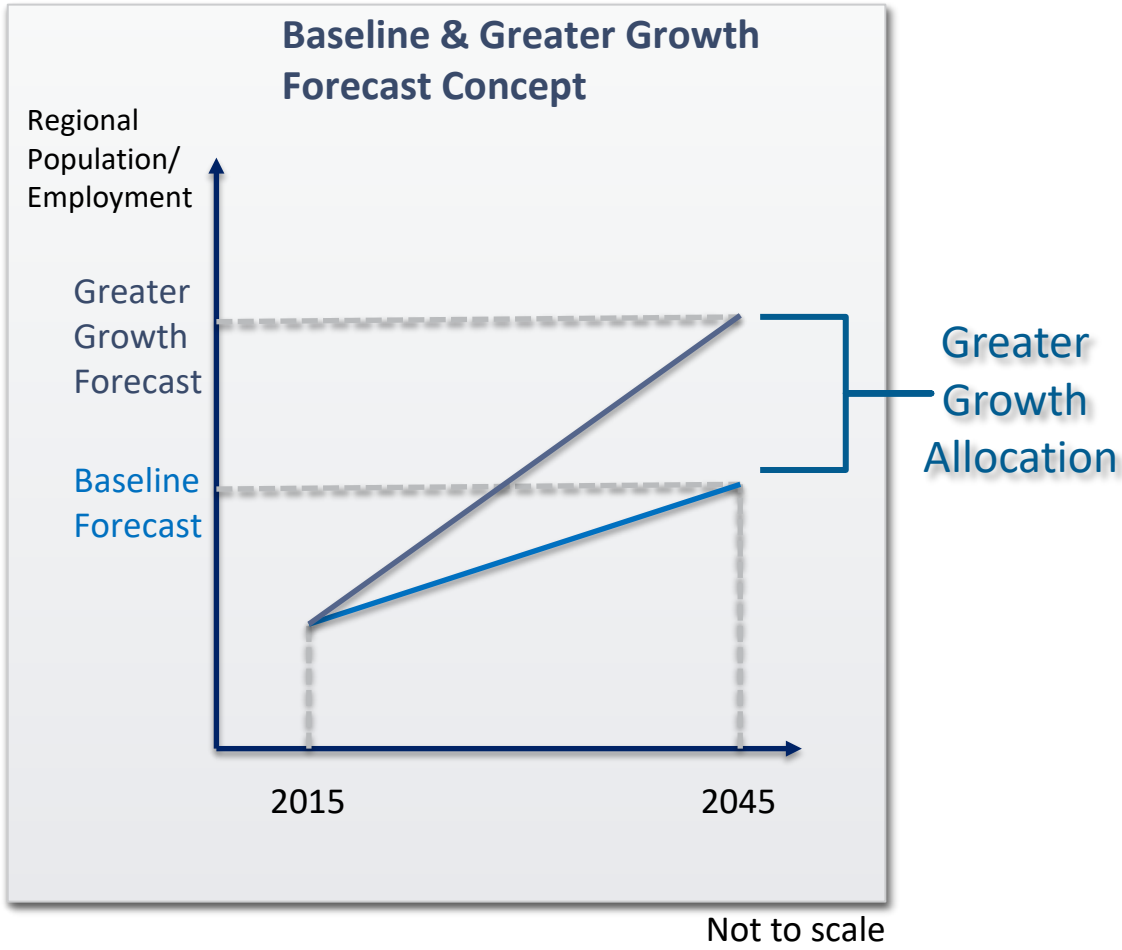
Test more urban and multimodal travel patterns.

Test more overall regional travel.

NOTE: Sea Level Rise assumed as 3 ft. in all Scenarios

Greater Growth Control Totals

- Agreed on 16% employment growth from 2015-2045
  - Additional 82,972 jobs
- HRPDC provided population growth control total using regional REMI model
  - Additional 110,460 population



Growth Rates

	Employment	Population
2015-2045	7.90%	17.29%
Greater Growth	7.51%	5.48%

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LAND USE MODELING

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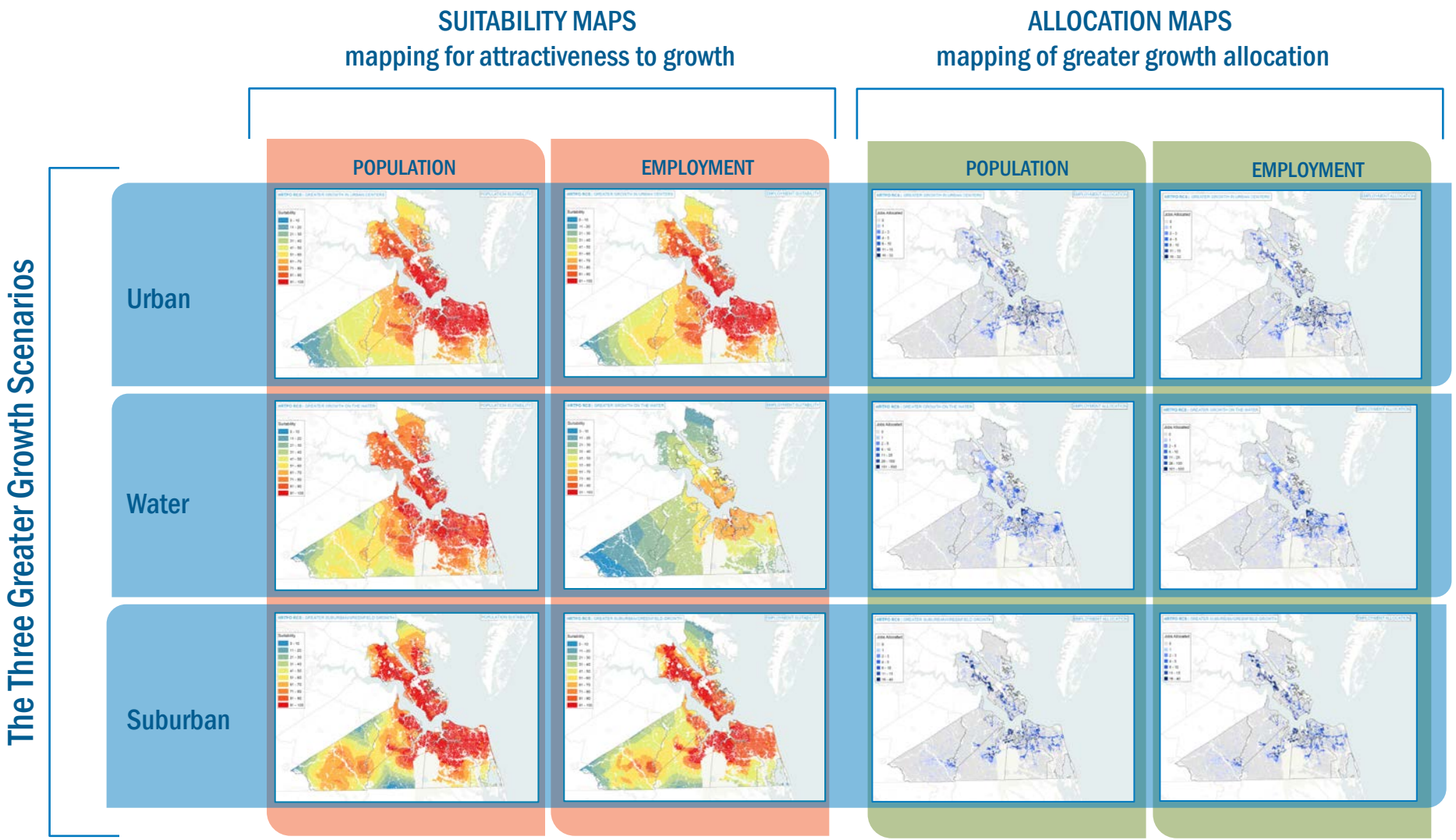
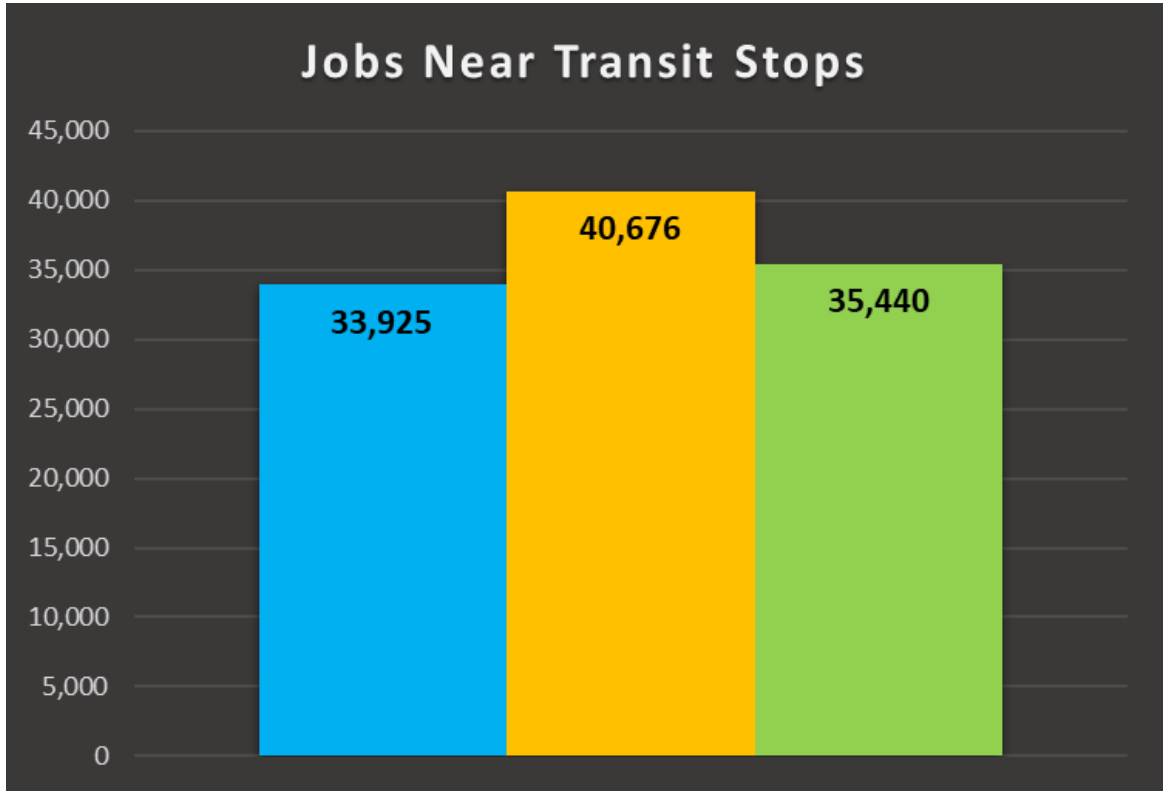
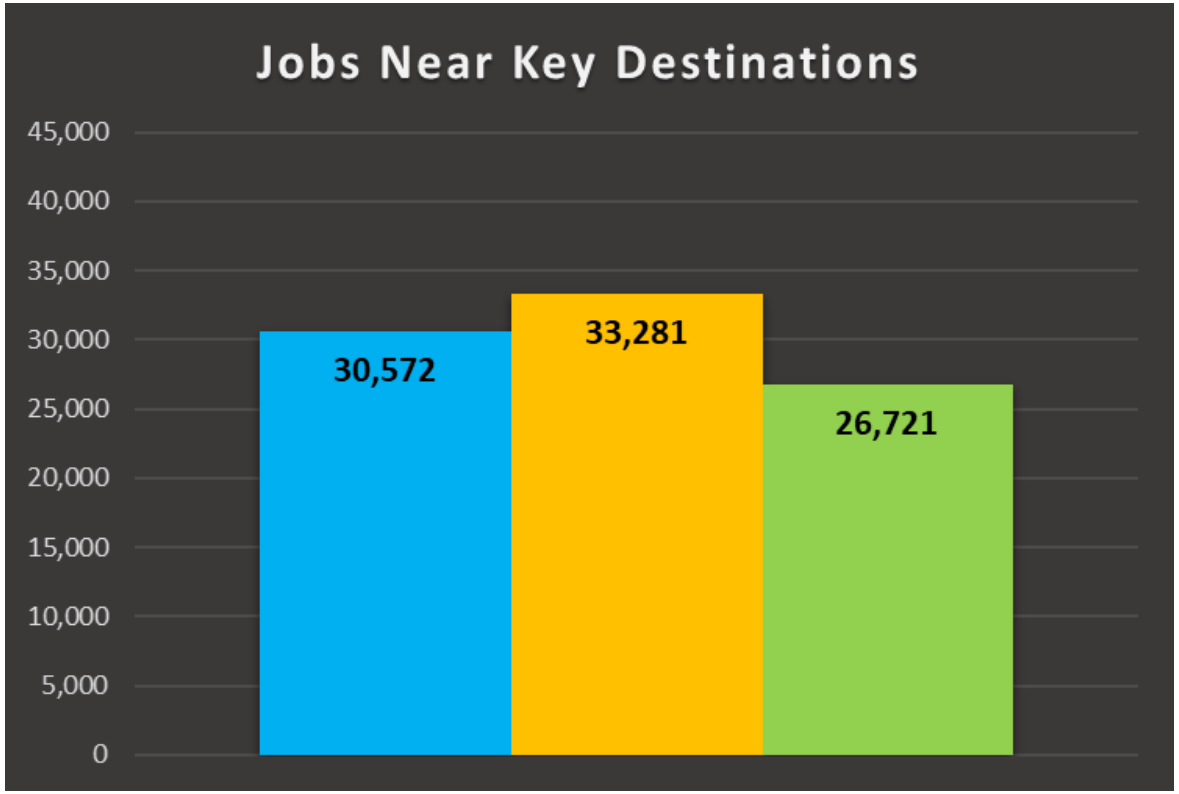
Results of the Land Use modeling



Results of Allocations

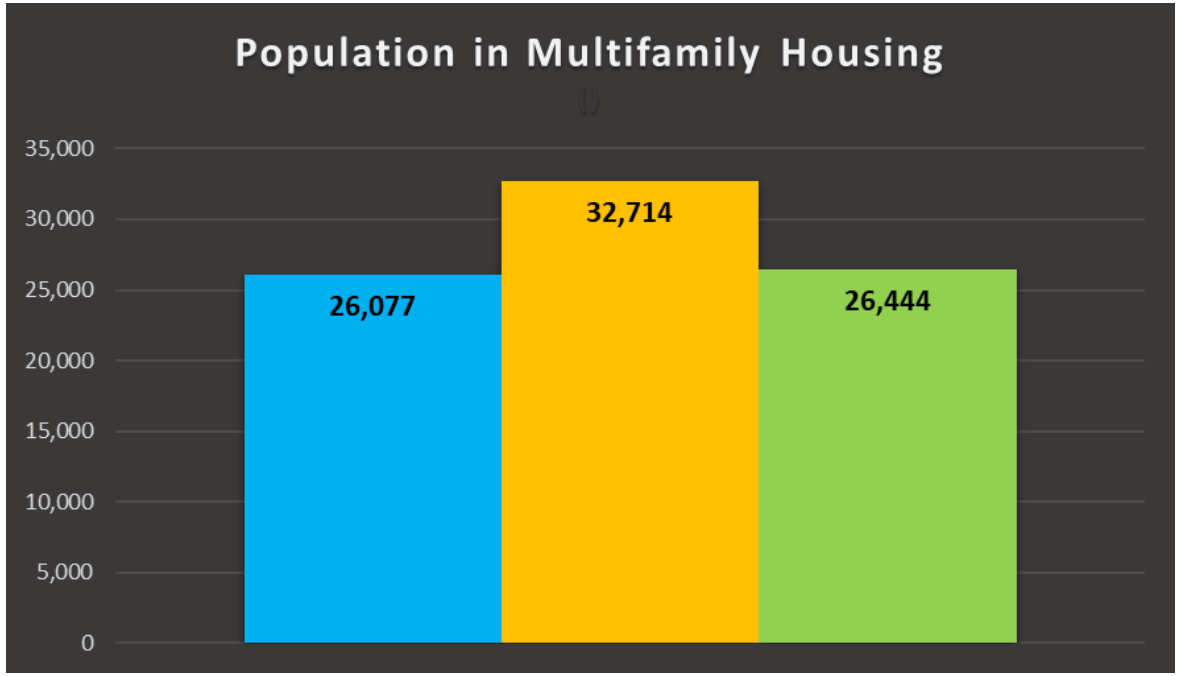


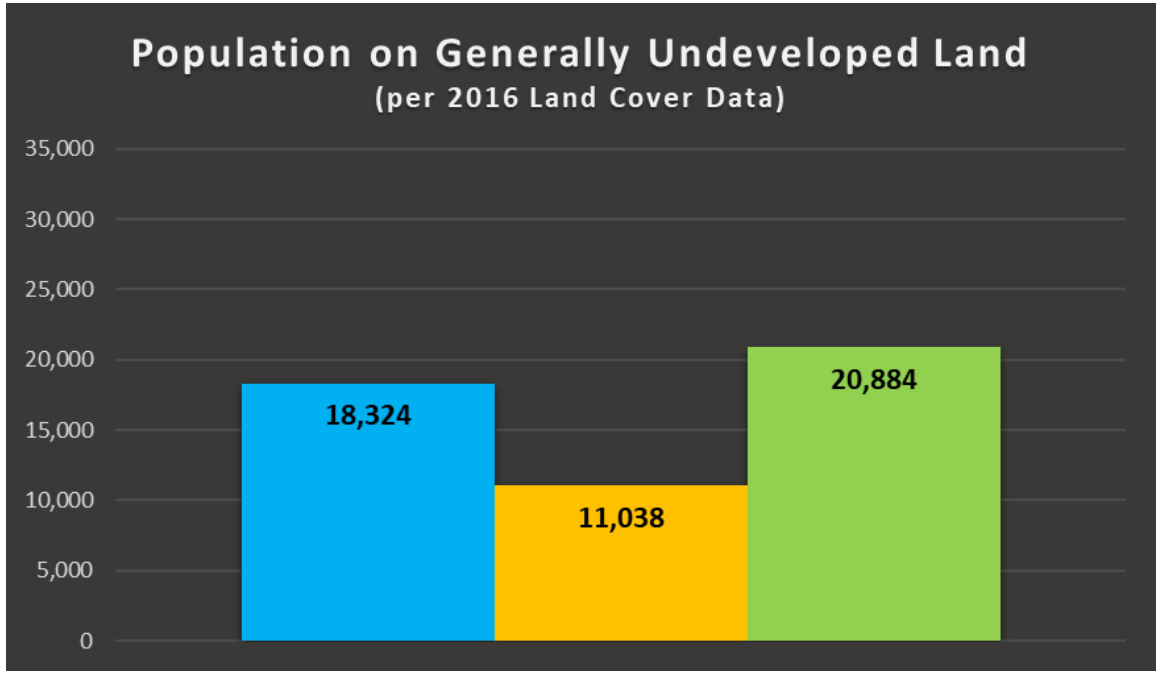


2045 Baseline w/ Tech | Greater Growth Scenario – Water | Greater Growth Scenario – Urban | Greater Growth Scenario – Suburban

Note that these outputs represent only the land use modeling output portions of the Dashboard results

Results of Allocations





2045 Baseline w/ Tech	Greater Growth Scenario – Water	Greater Growth Scenario – Urban	Greater Growth Scenario – Suburban

Note that these outputs represent only the land use modeling output portions of the Dashboard results

Land Use Modeling Conclusions

- The patterns of land use and growth for each of the Greater Growth Scenarios generally matched the Scenario Narratives
- The land use modeling results showed good differentiation between the Greater Growth Scenarios and a plausible range of alternate futures for the region
- The three Greater Growth Scenarios provided a good platform for travel demand model testing and for resilience testing of the transportation alternatives

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TRAVEL DEMAND MODELING

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Validation – Cross Harbor Travel

Screenline (2017)	Count	Model	Error	Criteria *
HAMPTON ROADS HARBOR	194,391	204,620	5.3%	+/-6%

*-Travel Demand Modeling Policies and Procedures, Version 2.00, Virginia Department of Transportation, June 2014

Validation - Regional Roadway Network (Daily)

Description	2017 Base Year	2045 Baseline w/Tech*	Change**
Vehicle-Miles Traveled	42,225,948	52,106,565	+23.4%
Vehicle-Hours Traveled	1,173,533	1,538,821	+31.1%
Delay (Hours)	221,122	365,076	+65.1%
Average Free-flow Speed (mph)	44.3	44.4	+0.2%
Average Congested Speed (mph)	36.0	33.9	-5.8%

* includes Mobility as a Service
**compared with 2017 Base Year

Validation - Regional Roadway Network (Daily)

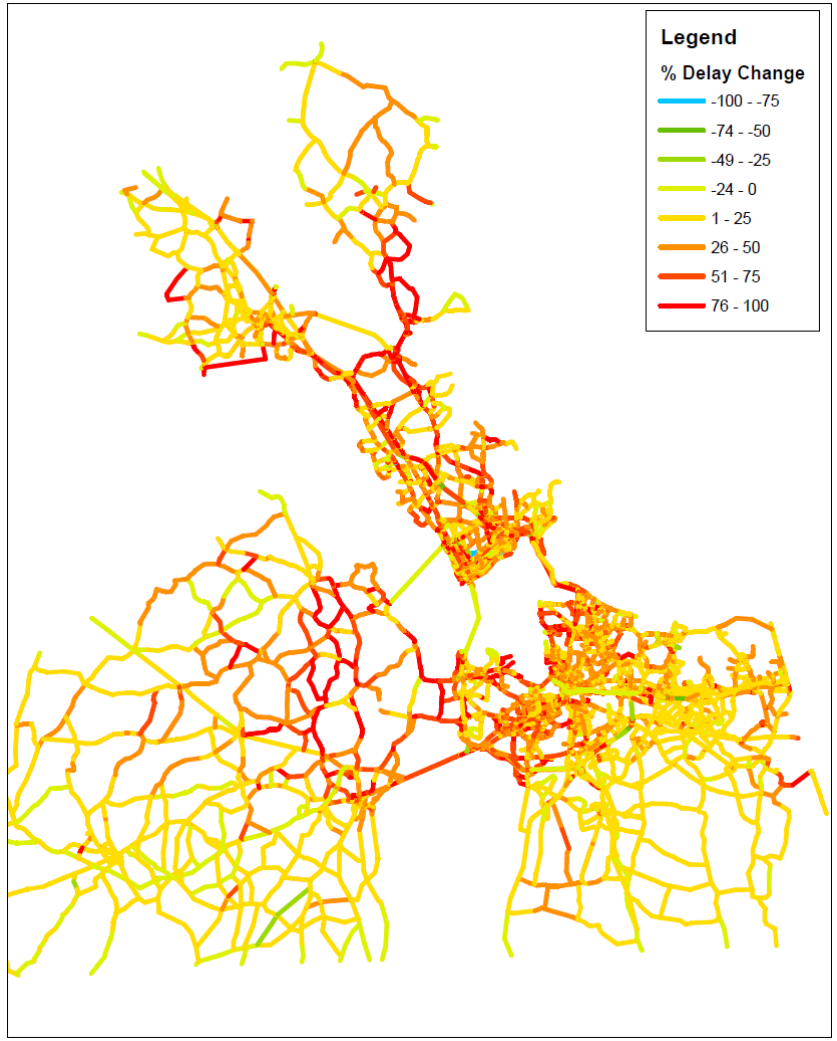
Description	2045 Baseline w/Tech	2045 Greater Growth Scenario - Water	Change *	2045 Greater Growth Scenario - Urban	Change*	2045 Greater Growth Scenario - Suburban	Change *
Vehicle-Miles Traveled	52,106,565	55,576,661	+6.6%	56,351,507	+8.2%	61,889,830	+18.8%
Vehicle-Hours Traveled	1,538,821	1,708,757	+11.0%	1,569,875	+2.0%	1,922,009	+25.0%
Delay (Hours)	365,076	450,519	+23.4%	291,644	-20.1%	496,414	+36.0%
Average Free-flow Speed (mph)	44.4	44.2	-0.4%	44.1	-0.7%	43.4	-2.3%
Average Congested Speed (mph)	33.9	32.5	-4.1%	35.9	+5.9%	32.2	-5.0%

*compared with 2045 Baseline w/ Tech

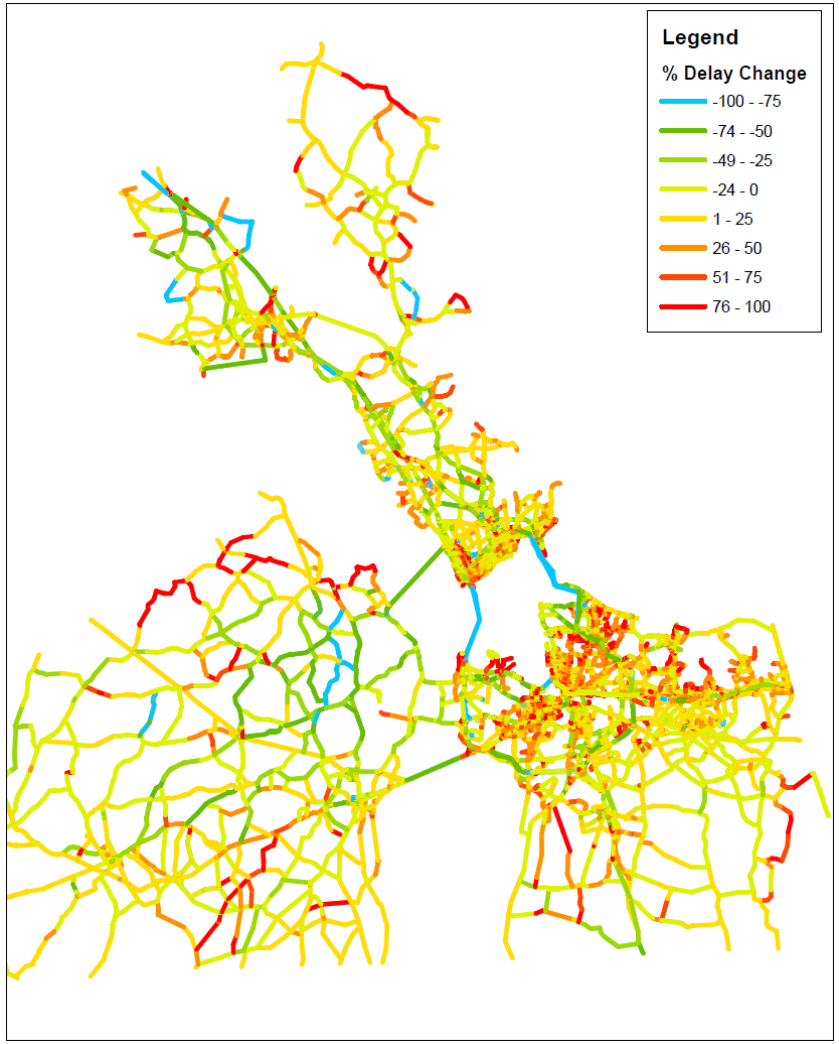
Change in Daily Delay Due to Congestion

(Compared with 2045 Baseline w/Tech)

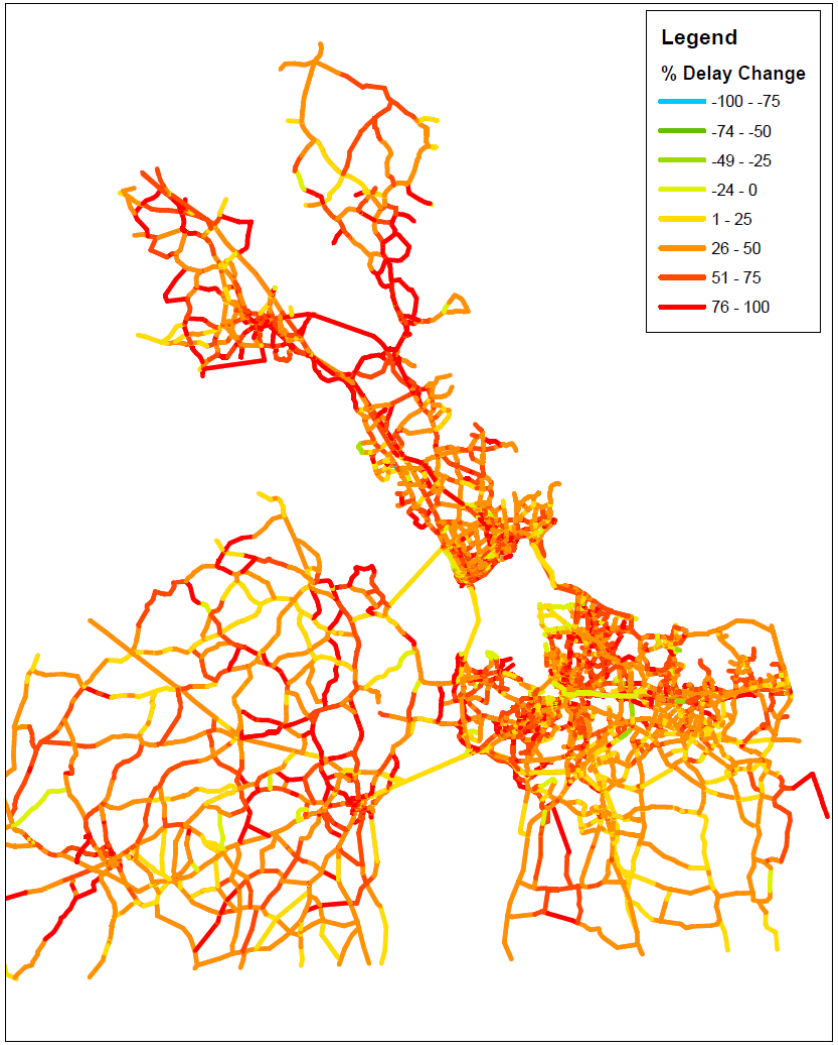
Greater Growth Scenario - Water



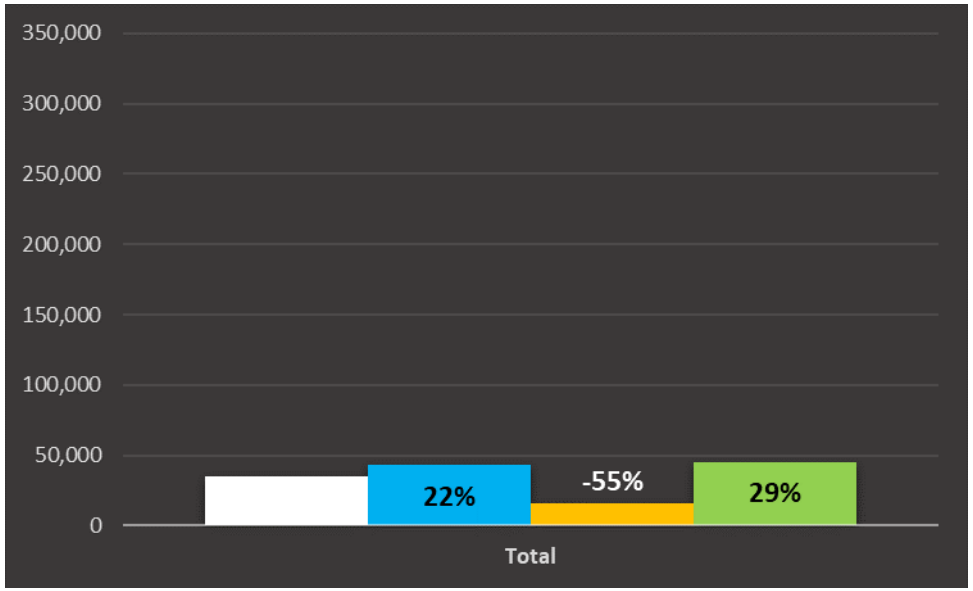
Greater Growth Scenario - Urban



Greater Growth Scenario - Suburban

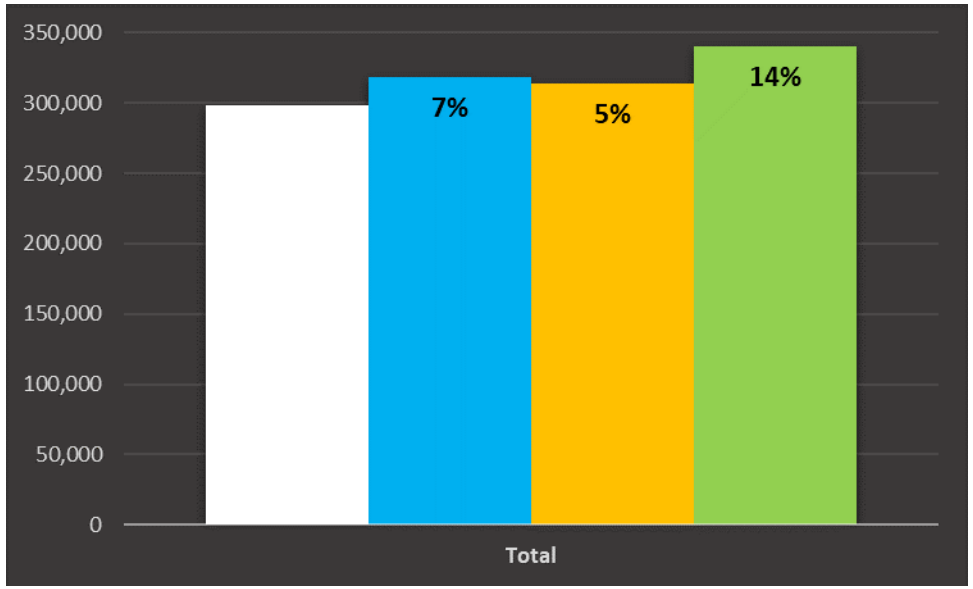


2045 Daily Delay* on Harbor Crossings



xx % – percent change in daily delay compared with 2045 Baseline w/Tech
* units in hours

2045 Daily Vehicle Volume on Harbor Crossings



xx % – percent change in daily volume compared with 2045 Baseline w/Tech

2045 Baseline w/ Tech | Greater Growth Scenario – Water | Greater Growth Scenario – Urban | Greater Growth Scenario – Suburban

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ECONOMIC MODELING

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Assessing Economic Performance

- **Today's Focus - Scenario Evaluation:** How do the characteristics of the Greater Growth Scenarios change the relative efficiency of trips in the Hampton Roads region and what does this mean in terms of societal costs and impacts on the regional economy?

→ *Compares **3 Greater Growth Scenarios** to the **2045 Baseline***

Drivers of Economic Results

- Relative to the 2045 Baseline with Tech:

Performance	Greater Growth Scenario - Water	Greater Growth Scenario - Urban	Greater Growth Scenario - Suburban
Trip Length	↓	↓	↑
Speed	↓	↑	↓
Congestion	↑	↓	↑
Crash Rates (CAVs)	--	↓	↓↓
Fuel Consumption and Emissions (Electric CAVs)	--	↓	↓↓
Vehicle Occupancy	↓	↑	↑

Findings Start with Performance Changes

Growth

Technology

Land Use

Trips by Mode

Miles

Travel Time

Congestion

Crash Rates

Societal Cost / Benefit Measures

- Travel time & reliability
- Vehicle operating costs
- Safety
- Emissions

Impacts on the Economy

Focus on Travel Efficiency in Scenarios

To understand the relative efficiency of scenarios, we focus the economic analysis on trips that would be made in both the 2045 Baseline Scenario and in the Greater Growth Scenarios.

The analysis is performed in the TREDIS model – the most widely used model for transportation economic analysis

Economic Results – Societal Costs of Travel in 2045 (Annual, $M)

All $ in Millions	Societal Costs of Travel (Components and Total)					Change in Cost from 2045 Baseline
Scenario	Emissions	Safety	Vehicle Operating Cost	Travel Time & Reliability	TOTAL COST	
Baseline	$4,215	$4,151	$9,464	$17,284	**$35,114**	--
Water	$4,148	$4,155	$9,392	$18,090	**$35,786**	**$672**
Urban	$3,657	$3,511	$8,717	$14,180	**$30,064**	**-$5,050**
Suburban	$3,643	$2,425	$9,284	$17,370	**$32,722**	**-$2,392**

Note: Scenario totals include only the trips that would be made in both the baseline and in the scenarios

Economic Results – Impacts on the Economy in 2045 (Annual, $M)

	Economic Impact (Relative to 2045 Baseline with Tech)
Greater Growth Scenario	**Value Added (GRP) in $M**
Water	-$6
Urban	$893
Suburban	$59

GRP – Gross Regional Product (total value of production minus intermediate goods and services)

Note: Results include only the impact of trips that would be made in both the baseline and in the scenarios
Economic impacts from performance improvements are evaluated by comparing scenarios

Economic Analysis Summary

Economic Efficiency – Significant Variation Across Greater Growth Scenarios

- **Water**: Mostly negative outcomes – except for environmental benefits and operating costs savings from minor reductions in trip length
- **Urban:** Positive outcomes – travel is more efficient (time, cost), safer, and less environmentally harmful
- **Suburban:** Mixed outcomes – worsening congestion counteracted by safer and “greener” travel with widespread adoption of electric CAVs

Phase 2 - Deliverables

- Scenario Planning Methodology White Paper – Complete
- Memo Summarizing Economic Trends and Opportunities – Complete
- Memo Summarizing Travel Behavior Data Review – Mid-November
- Memo Summarizing Travel Demand Model Evaluation – Mid-November
- Tech Memo on Drivers, Spatial Assumptions, and Travel Parameters – Complete
- Tech Memo on Performance Measures – Complete
- Technical Guide on Scenario Evaluation – Early-December

RECOMMENDED ACTION

- Agenda Item 5 – Steering (Policy) Committee approval of Phase 2 completion, including Greater Growth Scenario Planning differentiation and travel demand modeling performance measures.

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MANDATED AND OTHER POTENTIAL SEGMENTS

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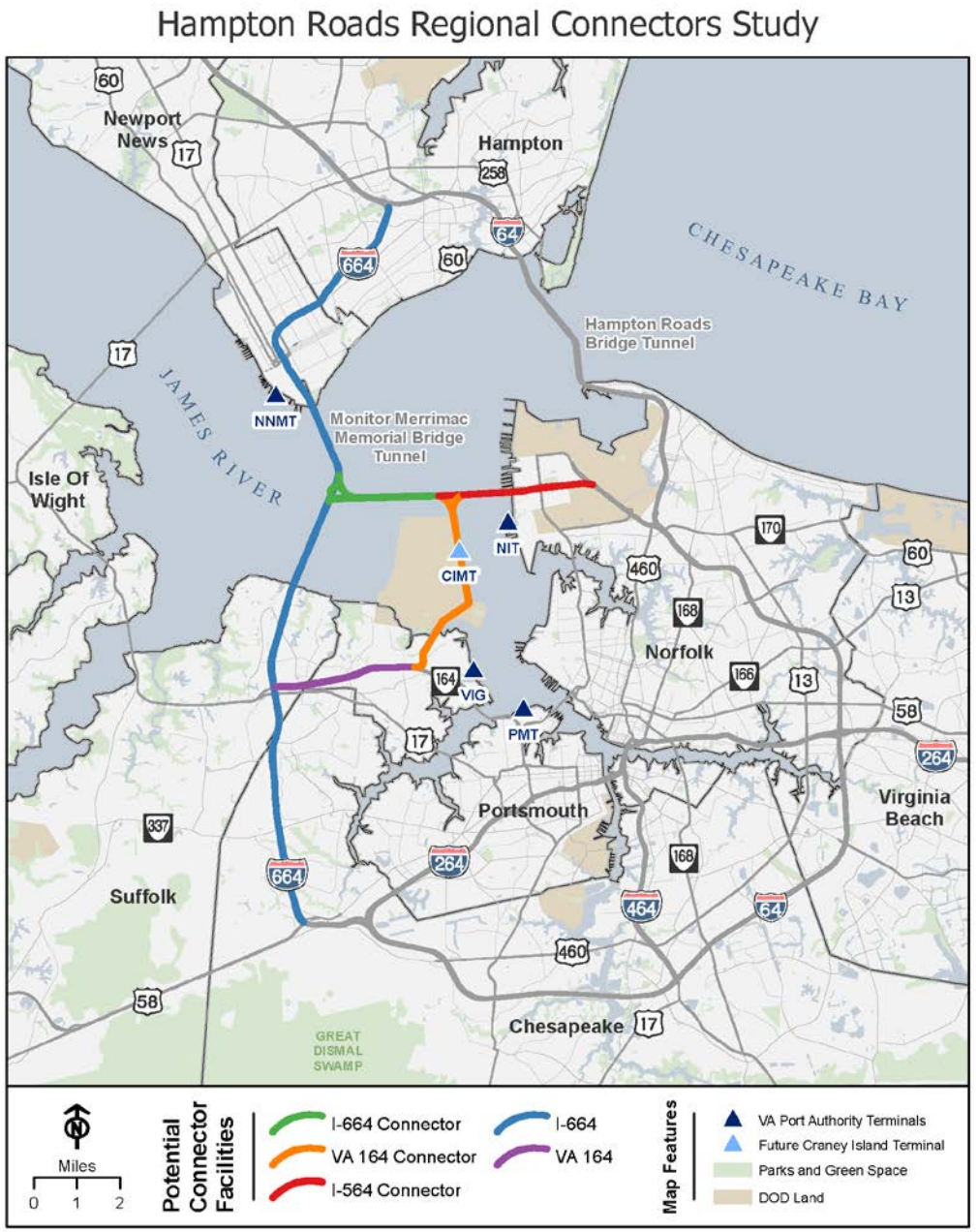
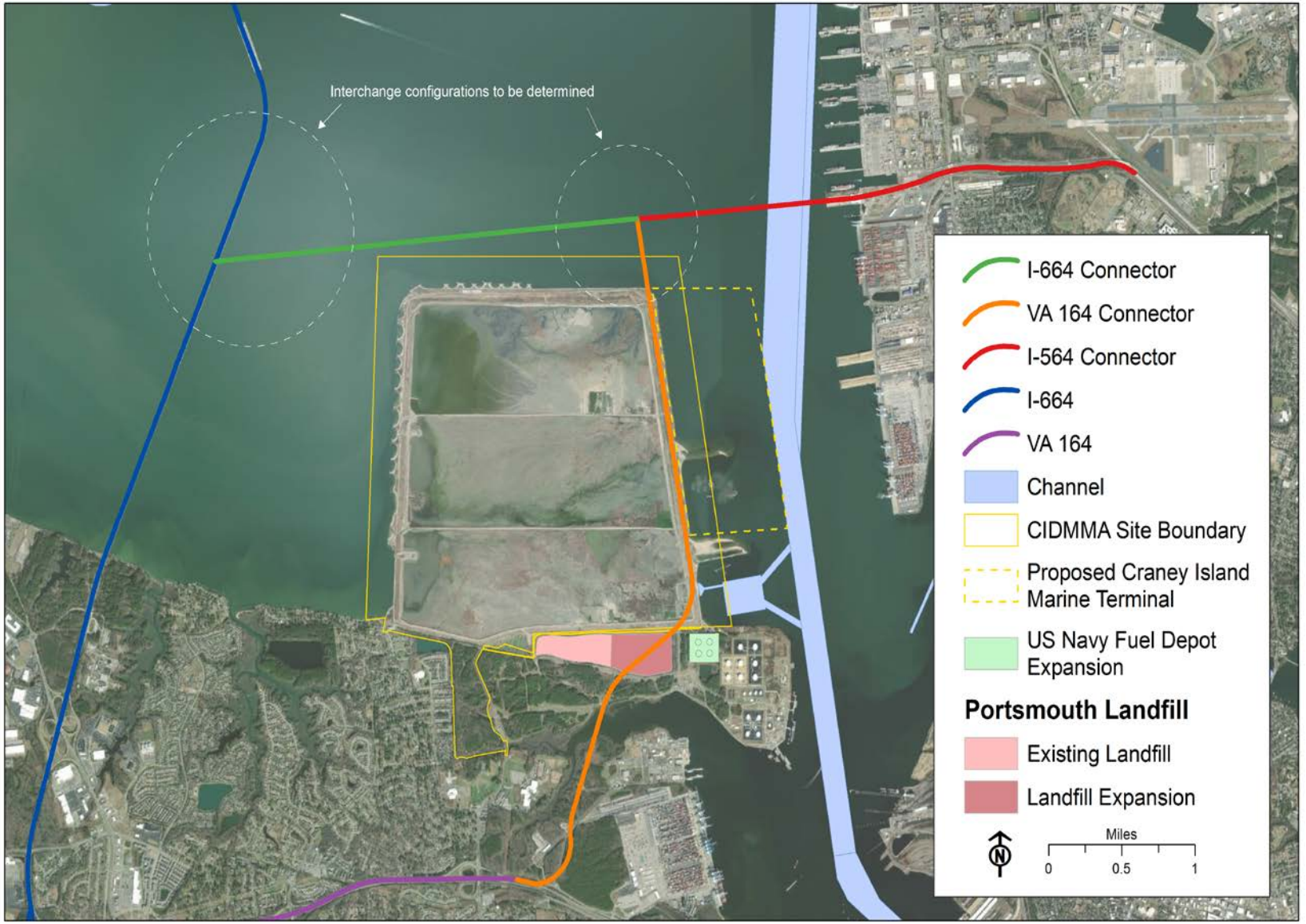
MANDATED SEGMENTS



CONSTRAINTS

Following field visits to Craney Island and the Navy Fuel Depot the following constraints were identified:

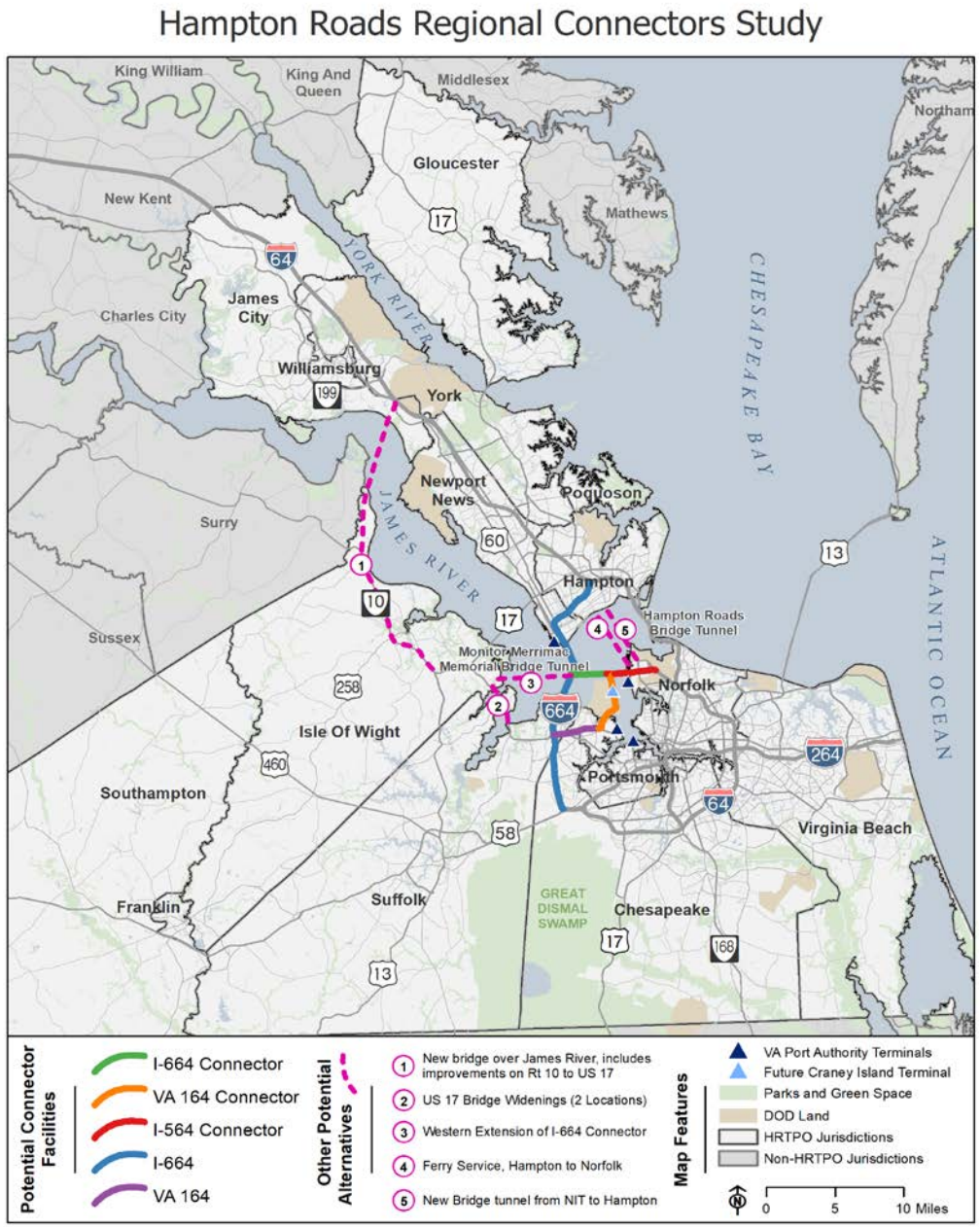
- Craney Island operations and shy distance requirements
- Navy Fuel Depot operations requirements and planned expansion
- City of Portsmouth land fill location and future expansion plans
- Proposed Craney Island Marine Terminal



POTENTIAL SEGMENTS

Working Group has previously decided that the following potential segments be eliminated from consideration:

- Segment 1 – New bridge over James River, includes improvements to Rte 10 and US 17
- Segment 4 – Ferry service, Hampton to Norfolk
- Segment 5 – New bridge tunnel from NIT to Hampton



RECOMMENDED ACTION

- Agenda Item 6 – Steering (Policy) Committee selection of segments to be carried forward for evaluation in the Phase 3 Alternatives Development Task

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PHASE 3 – STUDY COMPLETION

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Phase 3 - Scope

- Public Engagement
- Alternatives Development
- Alternatives Assessment and Recommendation
- Summary Report

26-month schedule (Dec 2022)

Phase 3 Draft Schedule

Task No.	Task	2020 JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEPT	OCT	NOV	DEC	2021 JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	2022 JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
TASK 1	EXECUTE ENGAGEMENT PLAN																																				
1.1	Task Management																																				
1.2	Engagement Plan Review																																				
1.3a	Study Mailing List and Comment Database																																				
1.3b	Scenario Planning Virtual Meeting																																				
1.3c	Community Briefings and Presentations																																				
1.3d	Brochures, Factsheets, and Handouts																																				
1.3e	Public Meetings																																				
1.3f	Regional Connectivity Symposium																																				
1.3g	Community Events and Outreach																																				
1.3h	Social Media Engagement																																				
1.3i	Engagement Report																																				
1.4	Website Upgrades and Maintenance																																				
TASK 2	DEVELOPMENT OF PRELIMINARY ALTERNATIVES																																				
2.1a	Summarize Background Information																																				
2.1b	Conduct Unconstrained Travel Demand Model Analysis																																				
2.1c	Preliminary Alternatives Identification																																				
2.2	Develop/Refine Geometry of Preliminary Alternatives																																				
2.3	Hydraulics and Hydrology																																				
2.4	Structures																																				
2.5	Utilities and Railroad Crossings																																				
2.6	Planning Cost Estimates																																				
TASK 3	DETERMINATION OF CANDIDATE ALTERNATIVES																																				
3.1a	Conduct Congestion Relief Assessments																																				
3.1b	Performance Evaluation																																				
3.2	Conduct Permitability Assessments																																				
3.3	Conduct Constructability Assessments																																				
3.4	Identify Candidate Alternatives																																				
TASK 4	CONDUCT SCENARIO PLANNING																																				
4.8a	Confirmation/Network Coding of Candidate RCS projects for testing																																				
4.8b	Travel Demand Modeling for Baseline and 3 Greater Growth Scenarios (each Candidate Project)																																				
4.8c	Evaluate Performance of Candidate Projects under Baseline and 3 Greater Growth Scenarios																																				
4.8d	Evaluate Traffic Operating Conditions																																				
4.9a	Scenario Results Workshops																																				
4.9b	Recommendation Documentation																																				
TASK 5	PREPARE FOR AND ATTEND MEETINGS (WORKING GROUP AND STEERING COMMITTEE)																																				
5.1	Working Group Meetings																																				
5.2	Steering Committee Meetings																																				
TASK 6	MANAGE THE PROJECT																																				
6.1	Weekly Coordination with Study Leadership																																				
6.2	Schedule and Budget Oversight																																				
6.3	Quality Assurance of Deliverables																																				
TASK 7	PREPARE DOCUMENTATION																																				
7.1	Draft Study Report																																				
7.2	Final Study Report																																				

Steering Committee Meetings
Working Group Coordination Meeting
Public Meeting
Continuous Task
Task Schedule
Key Decision Point

Phase 3 - Deliverables

- Public Engagement Meeting Materials
- Roadway cross sections, alignment plans and costs
- Alternatives Evaluation Matrix
- Summary of Candidate Alternatives
- Scenario Planning Report
- Study Summary Report

Funding Status (Approved Nov 2019)

Description	Budget/Cost
Phase 1	$359,497
Phase 1 - Supplement	$3,784
Phase 2 - Interim	$779,199
Phase 2 - Supplement	$709,637
Phase 2 - Supplement Omission	$96,746
Phase 3	$4,062,710
Contract Subtotal (Consultant)	$6,011,573
Available Contingency (subsequently authorized)	$80,638
Total Amount (Consultant)	$6,092,211
RCS Project Coordinator	$322,000
HRTPO expenses	$535,756
Grand Total	**$6,949,967**

Funded by HRTAC, Administered by HRTPO

Next Steps

- Determine alternatives (combination of segments)
- Evaluate alternatives
- Recommend alternative

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REFERENCE SLIDES – IF NEEDED

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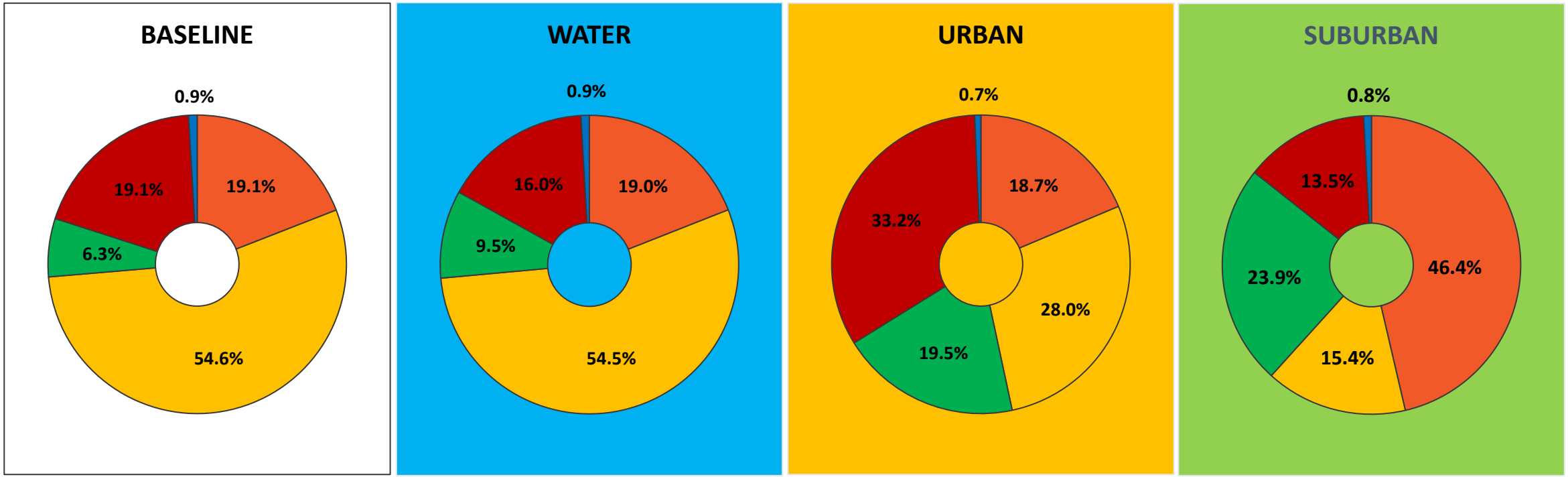
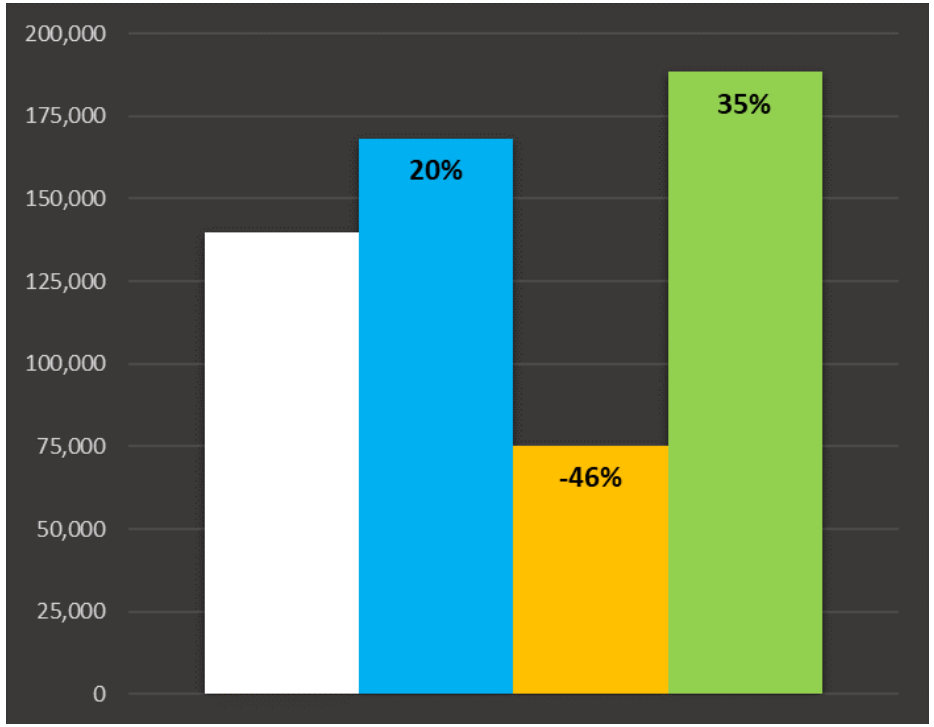
Mode Share



2045 Baseline w/ Tech | Greater Growth Scenario – Water | Greater Growth Scenario – Urban | Greater Growth Scenario – Suburban

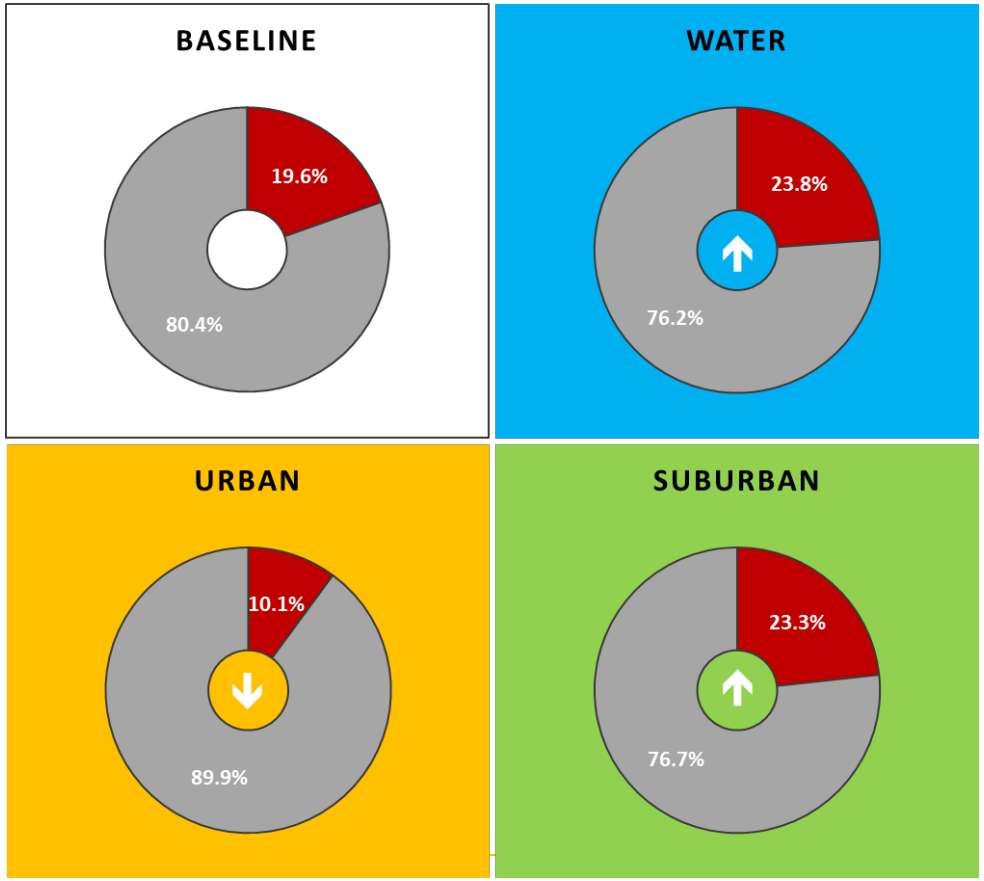
Performance of the Freight Network



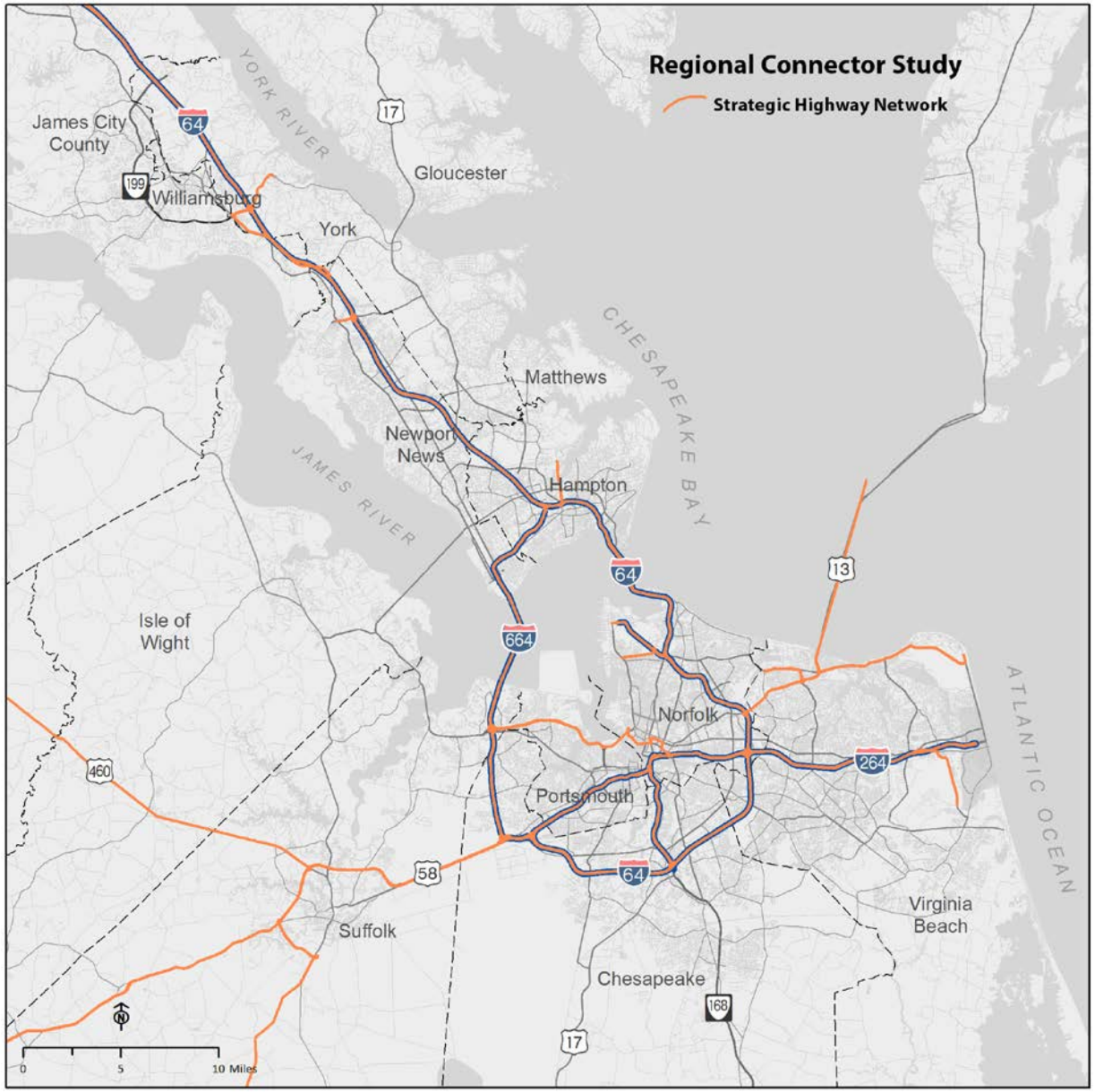
xx % – percent change in total delay compared with 2045 Baseline w/Tech
* units in hours

2045 Baseline w/ Tech	Greater Growth Scenario – Water	Greater Growth Scenario – Urban	Greater Growth Scenario – Suburban

Bottlenecks on Military Routes

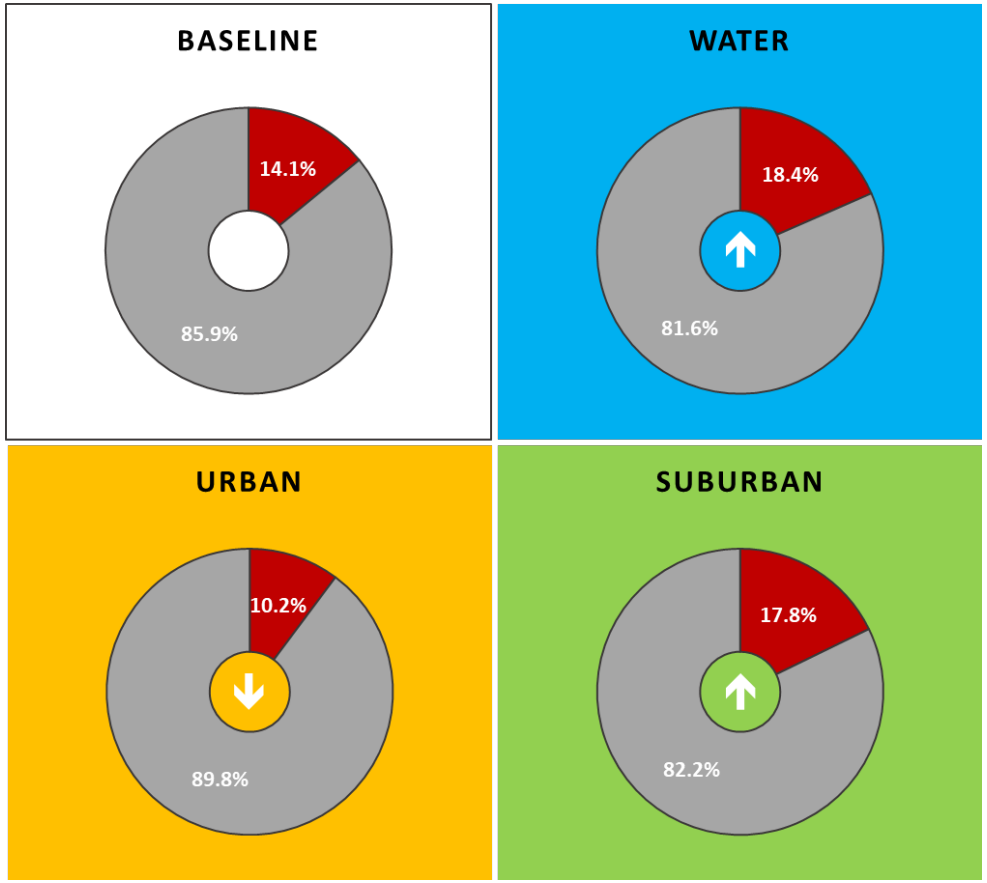


Percent of Military Route Lane Miles Congested
(PM Peak V/C > 0.90)

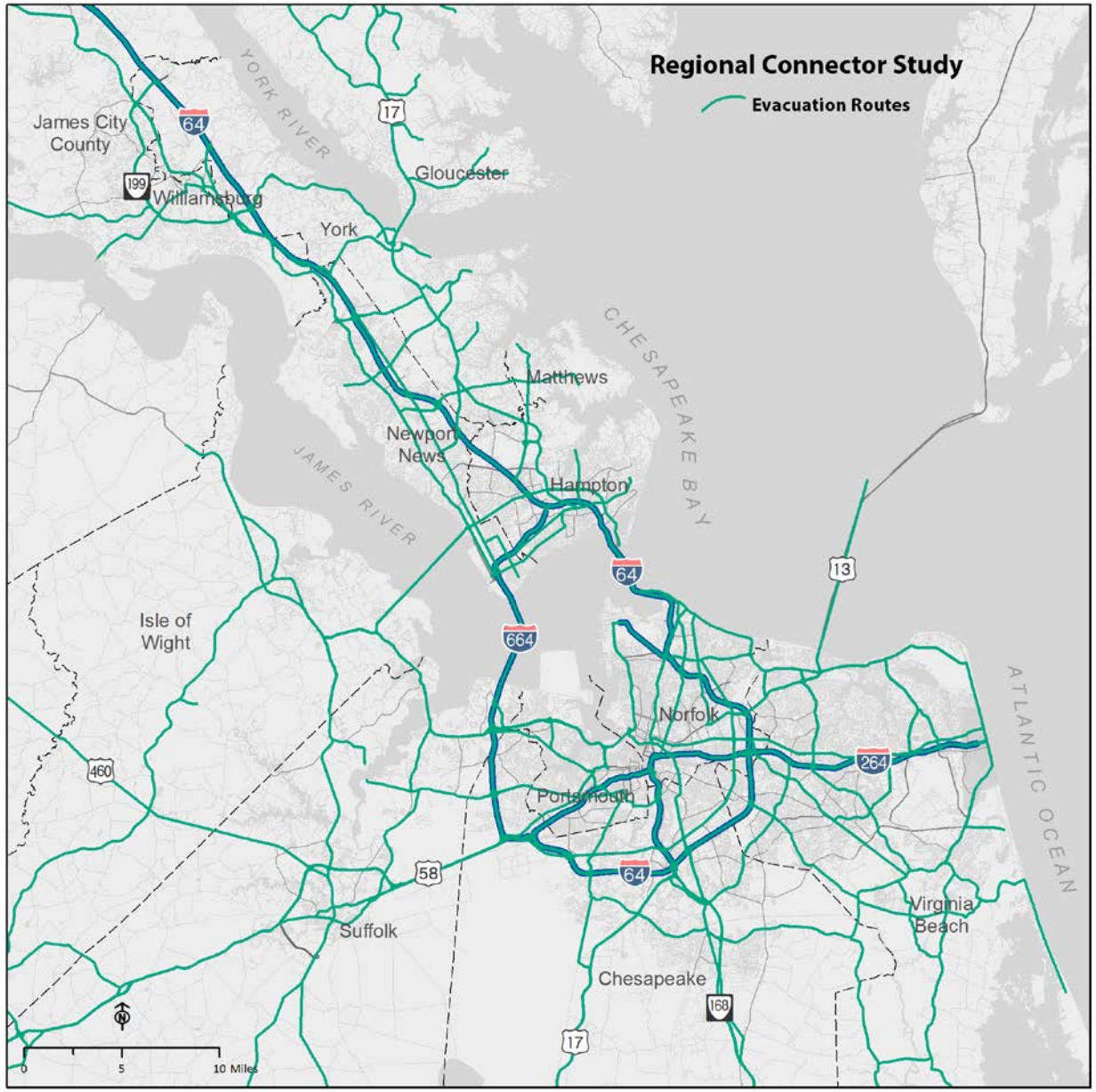


2045 Baseline w/ Tech	Greater Growth Scenario – Water	Greater Growth Scenario – Urban	Greater Growth Scenario – Suburban

Bottlenecks on Evacuation Routes

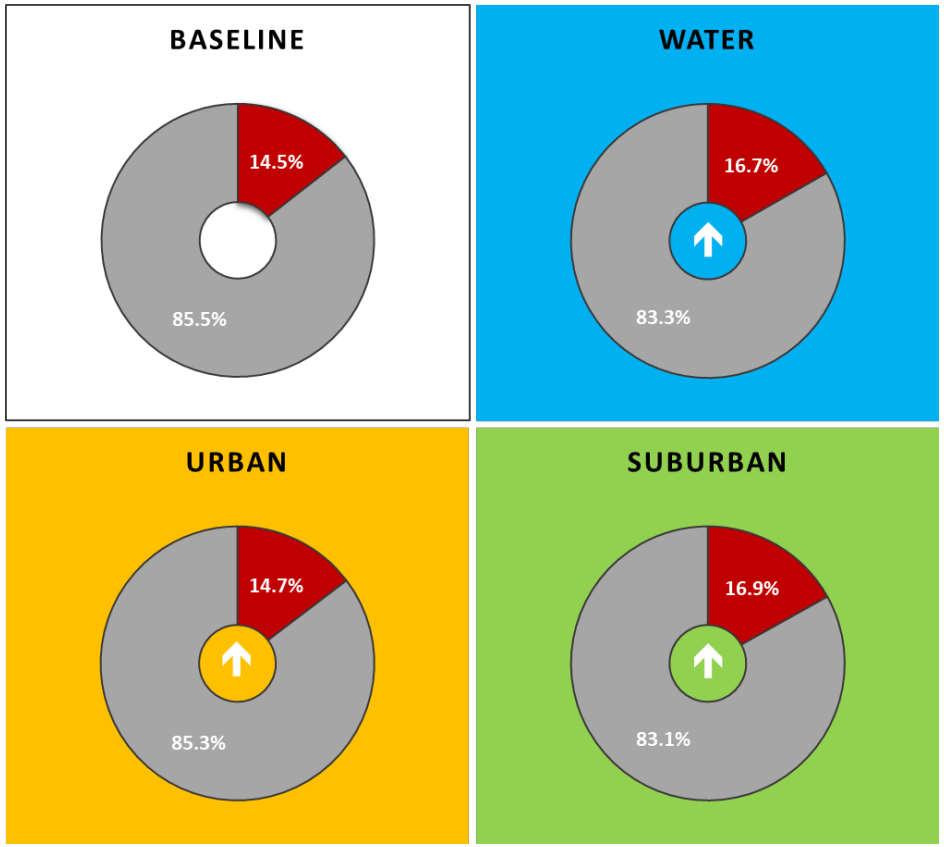


Percent of Evacuation Route Lane Miles Congested
(PM Peak V/C > 0.90)



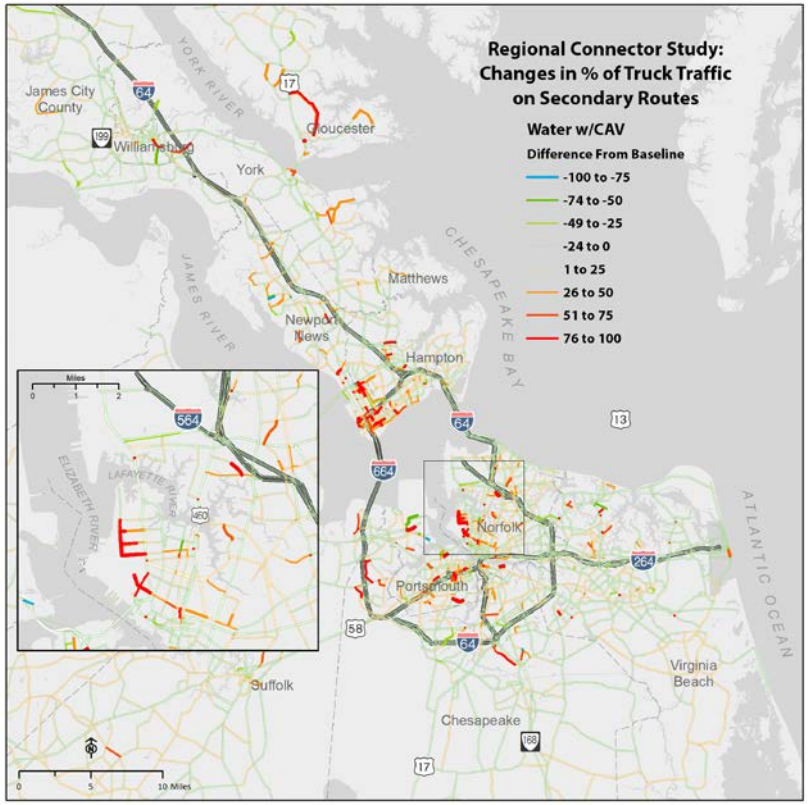
2045 Baseline w/ Tech	Greater Growth Scenario – Water	Greater Growth Scenario – Urban	Greater Growth Scenario – Suburban

Freight Truck Traffic on Secondary Streets

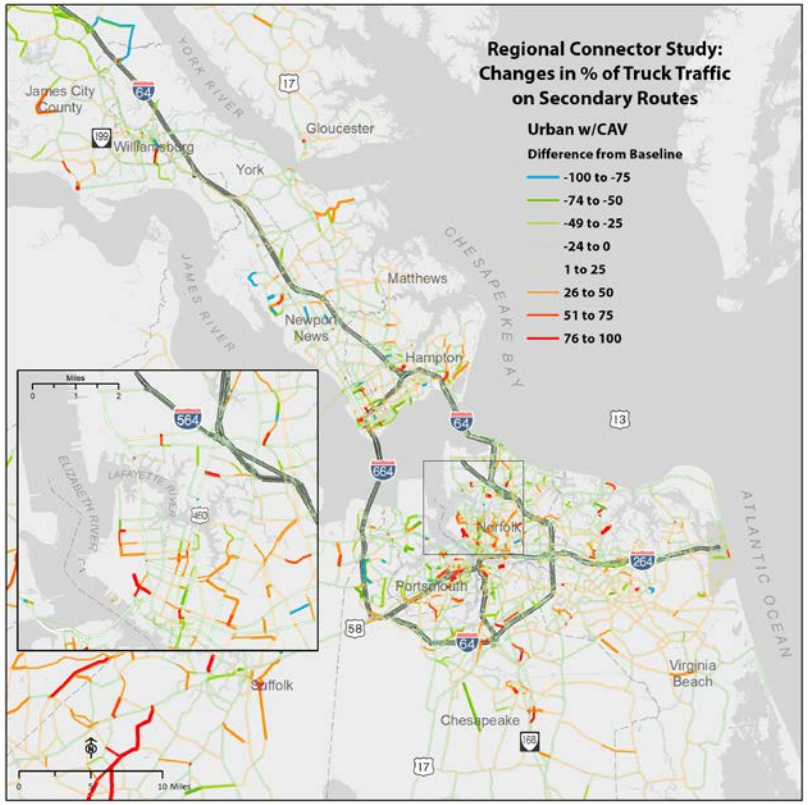


2045 Baseline w/ Tech	Greater Growth Scenario – Water	Greater Growth Scenario – Urban	Greater Growth Scenario – Suburban

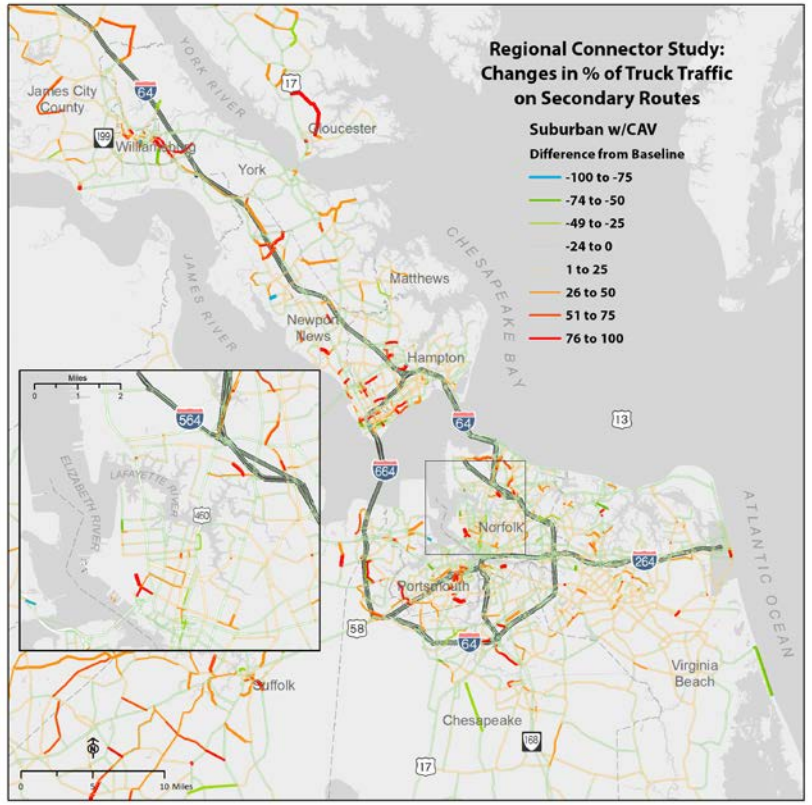
Freight Truck Traffic on Secondary Streets



Greater Growth Scenario – Water

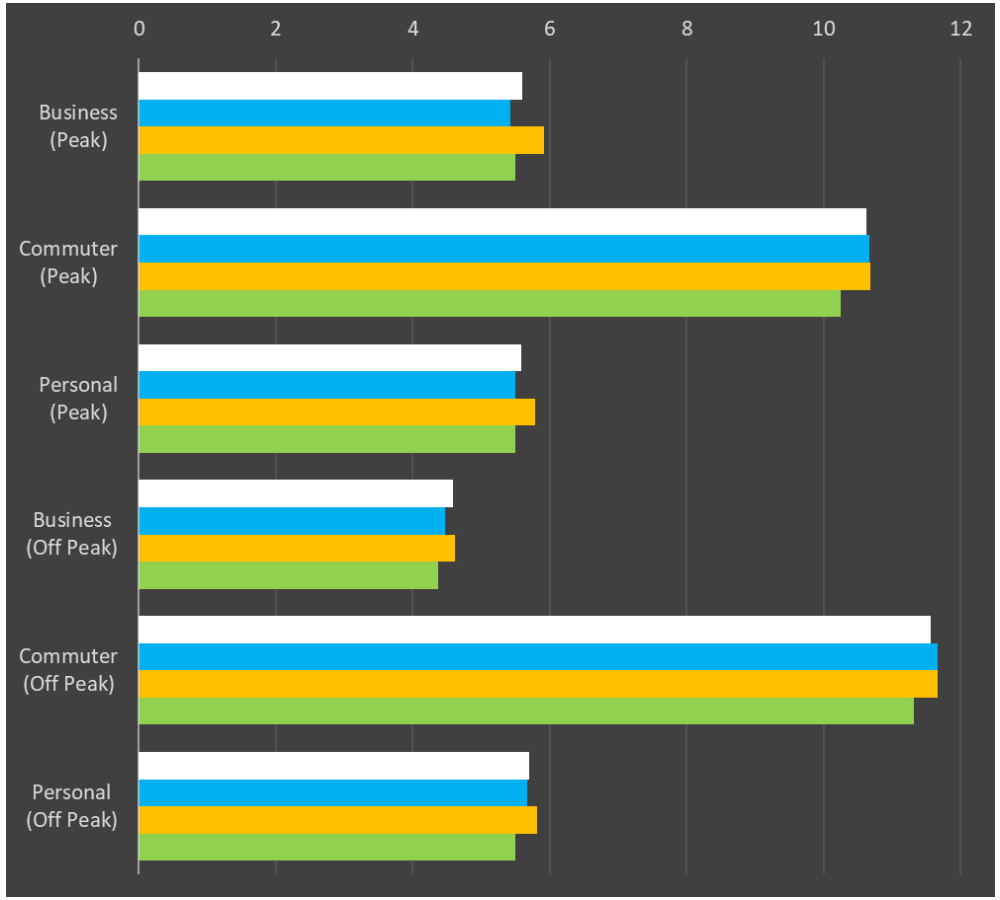


Greater Growth Scenario – Urban



Greater Growth Scenario – Suburban

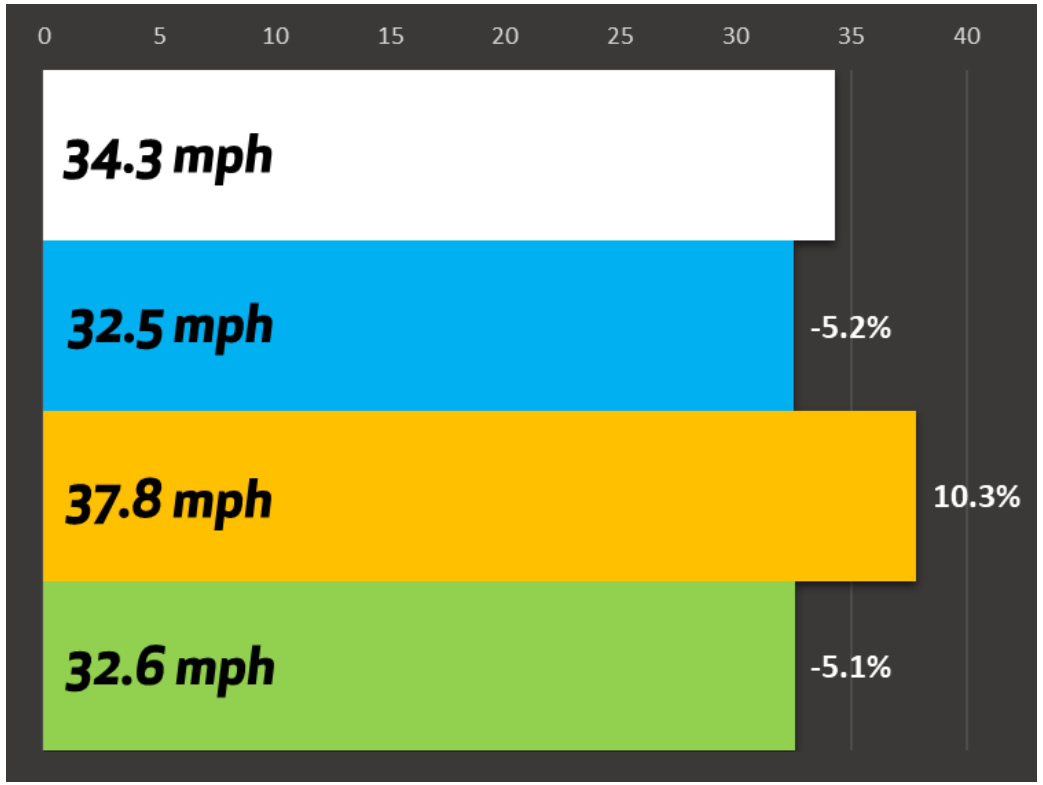
Average Trip Length



* units in miles

2045 Baseline w/ Tech	Greater Growth Scenario – Water	Greater Growth Scenario – Urban	Greater Growth Scenario – Suburban

Performance of the Transit-Serving Roadway Network

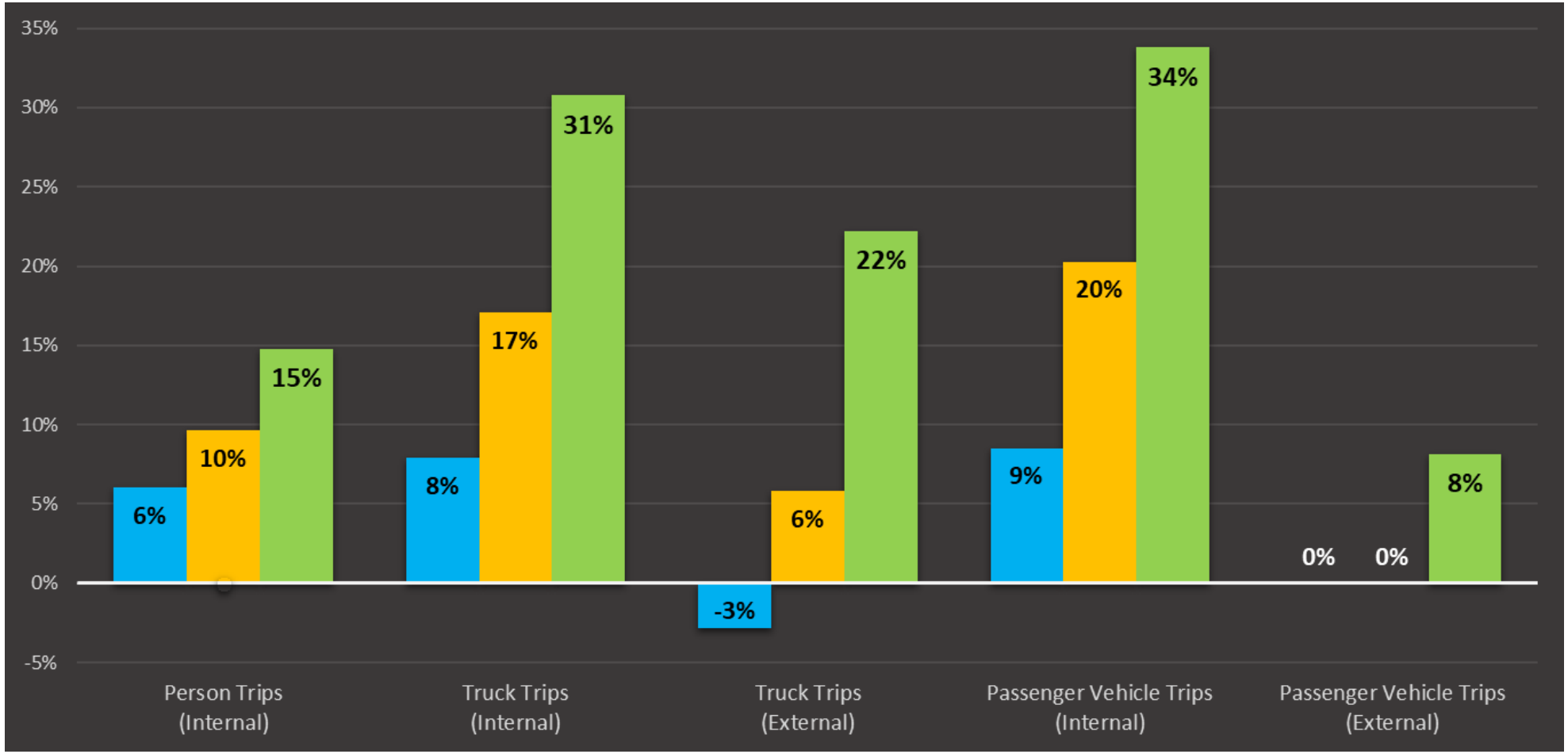


xx % – percent change in average speed compared with 2045 Baseline w/Tech

* units in miles per hour

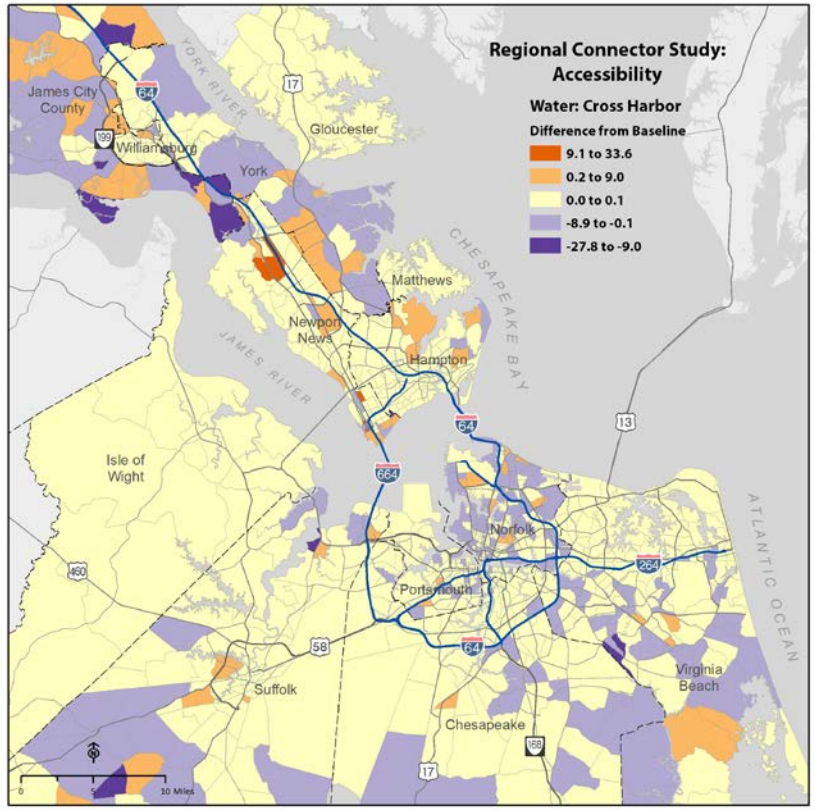
2045 Baseline w/ Tech	Greater Growth Scenario – Water	Greater Growth Scenario – Urban	Greater Growth Scenario – Suburban

Change in Demand of Trip Types

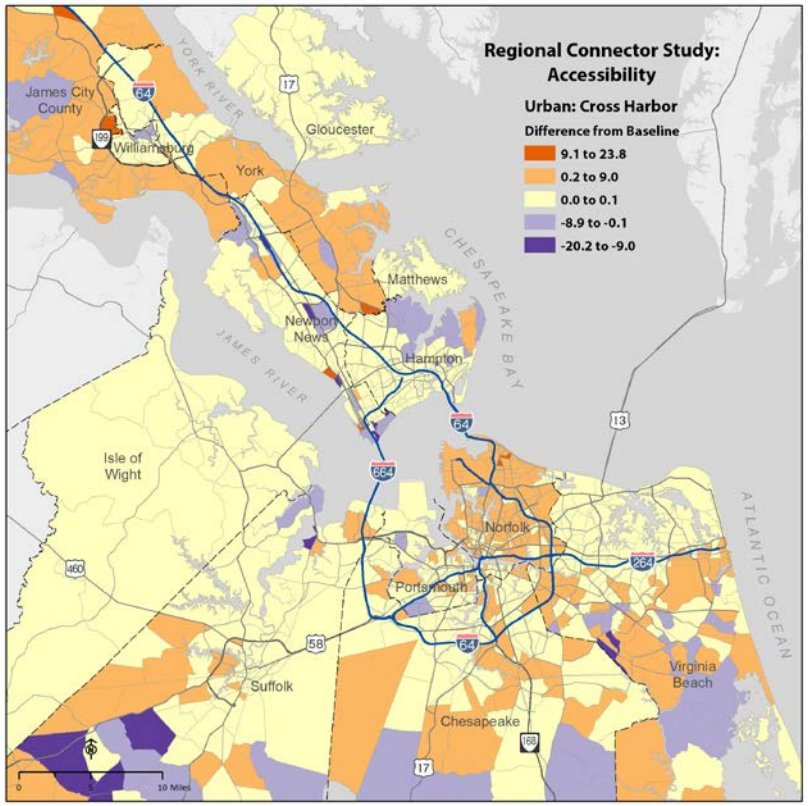


2045 Baseline w/ Tech | Greater Growth Scenario – Water | Greater Growth Scenario – Urban | Greater Growth Scenario – Suburban

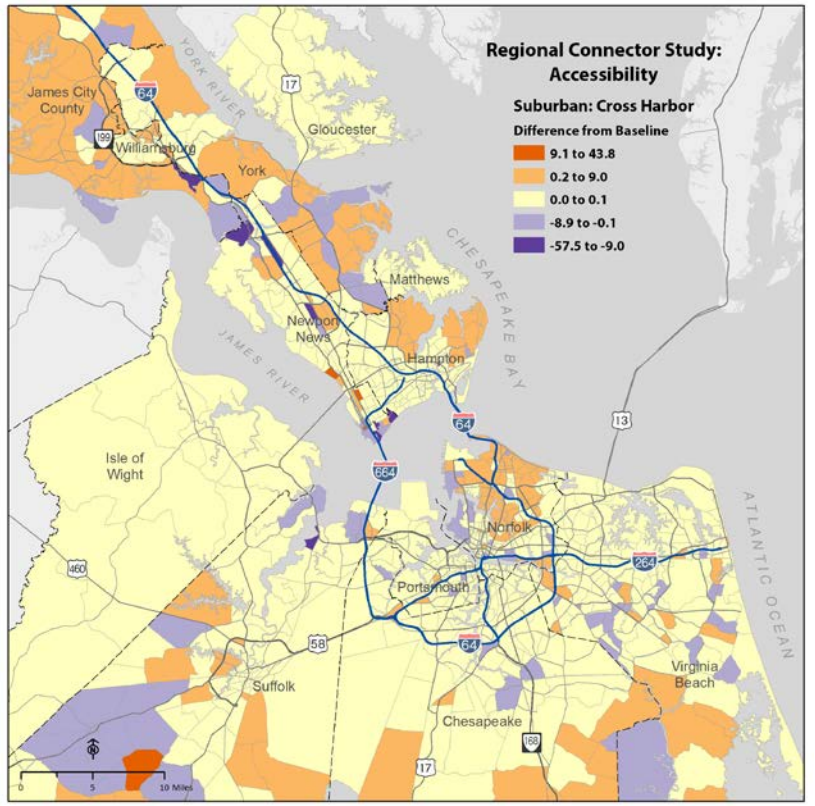
Cross-Harbor Accessibility



Greater Growth Scenario – Water

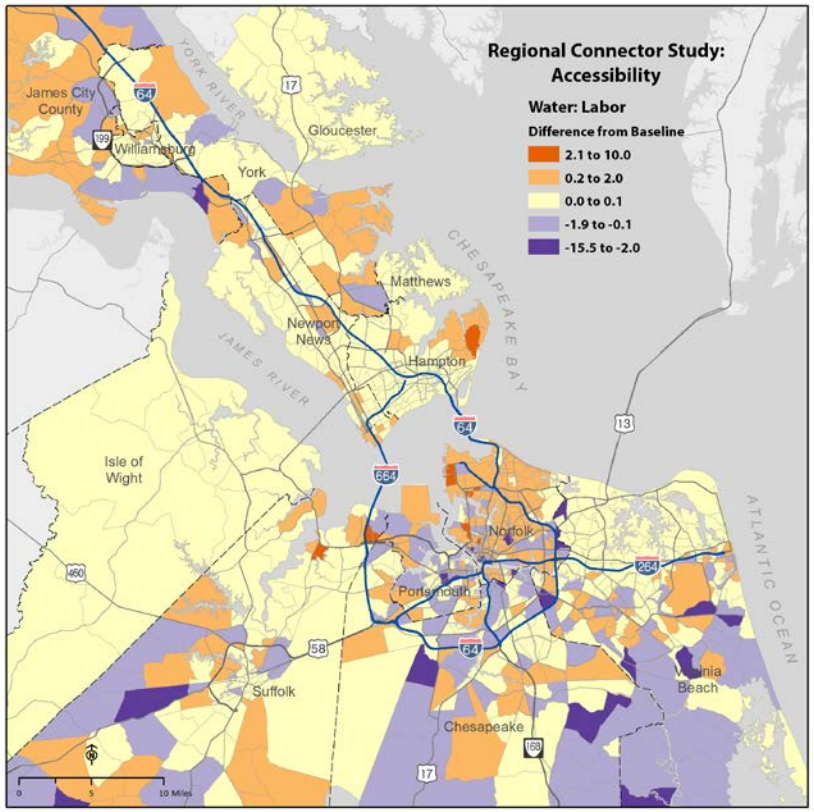


Greater Growth Scenario – Urban

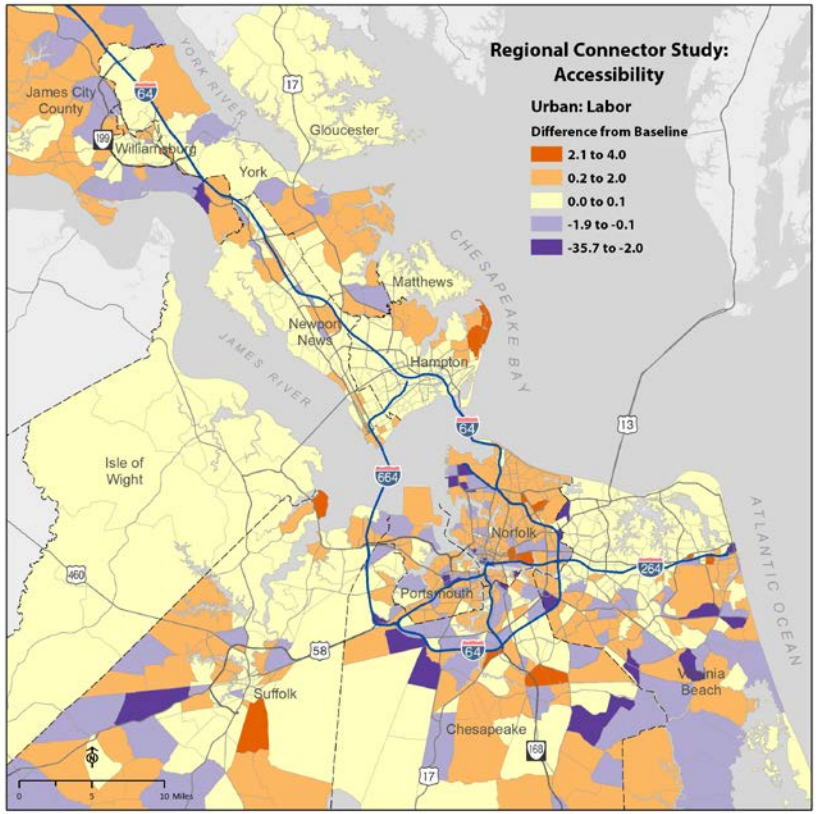


Greater Growth Scenario – Suburban

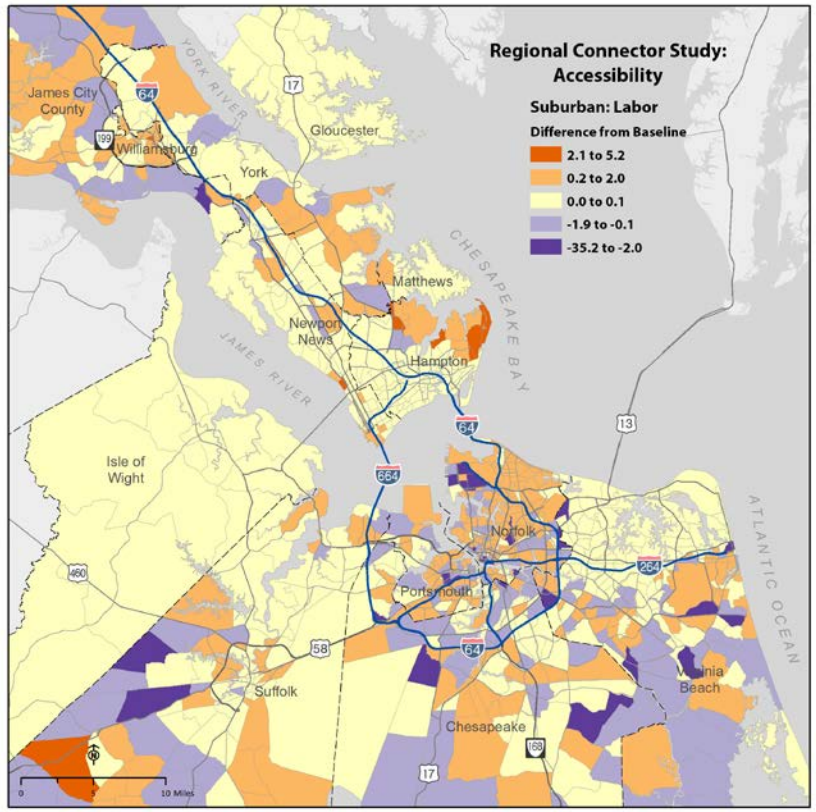
Labor Accessibility



Greater Growth Scenario – Water



Greater Growth Scenario – Urban



Greater Growth Scenario – Suburban