the heartbeat of HAMPTON ROADS TPO
TRANSPORTATION PLANNING ORGANIZATION

REGIONAL CONNECTORS STUDY

WORKING GROUP MEETING

May 25, 2021

Michael Baker INTERNATIONAL

Meeting Purpose

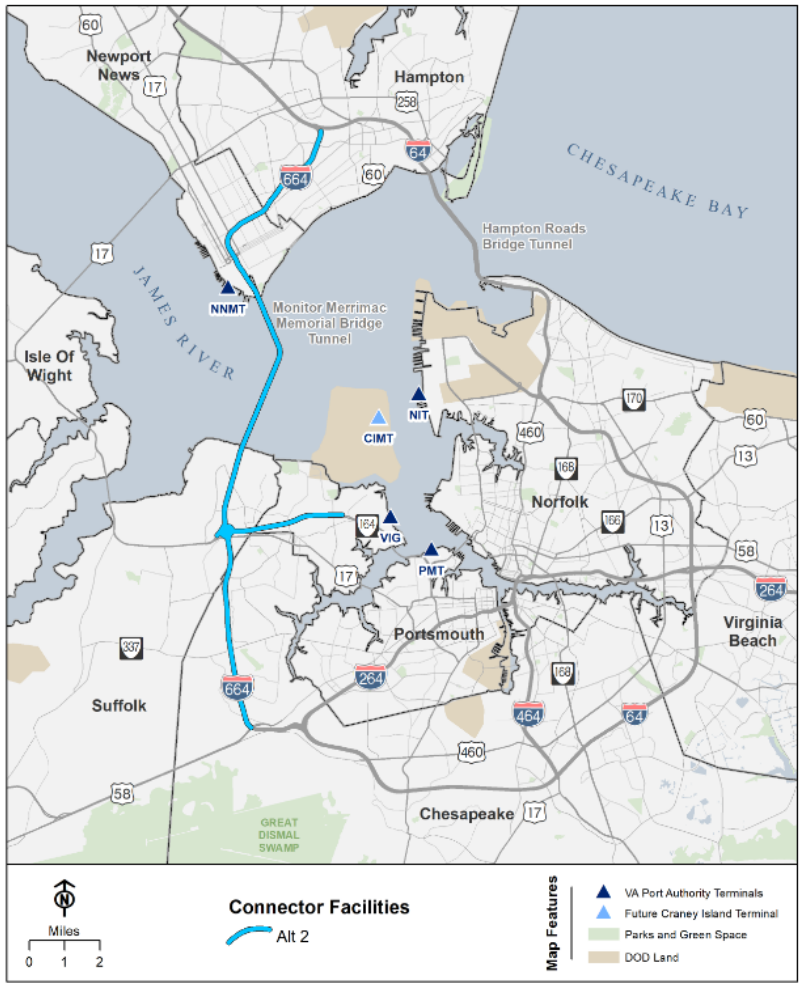
- Convey work activity since April 8, 2021 meeting
- Get final decision on preliminary alternatives (alignments and design features)

ACTION NEEDED

Activity Since April 8, 2021 Working Group Meet

- Addressed Existing Conditions Analysis Report – final report and responses to comments distributed this week
- Initiated work on final Technical Guide for Scenario Evaluation and responses to draft report
- Investigated horizontal and vertical geometry for Alternative 7 to provide require changes to modeling team
- Developed typical sections for 6+2 and 4+4 design options (from I-664 Connector to Powhatan Parkway interchange)
- Conducted revised model runs for 2045 Baseline and Alternatives 2A, 2B, 3A, 3 7B, 8A, and 8B

Alternatives 2A and 2B

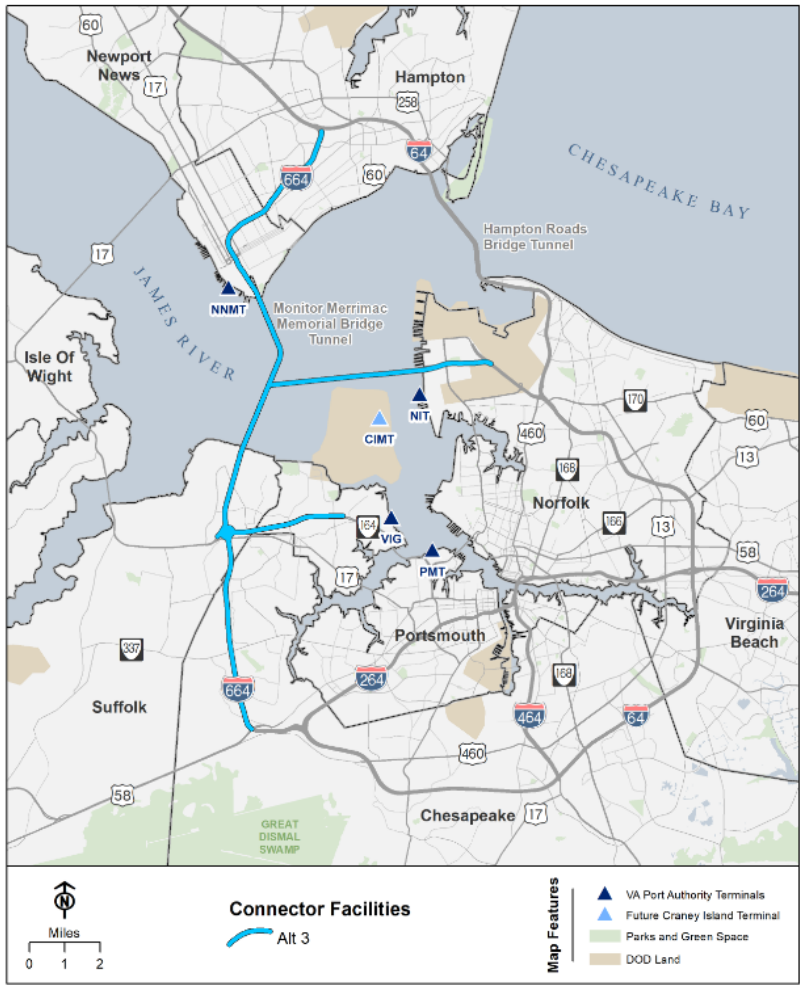


Note:

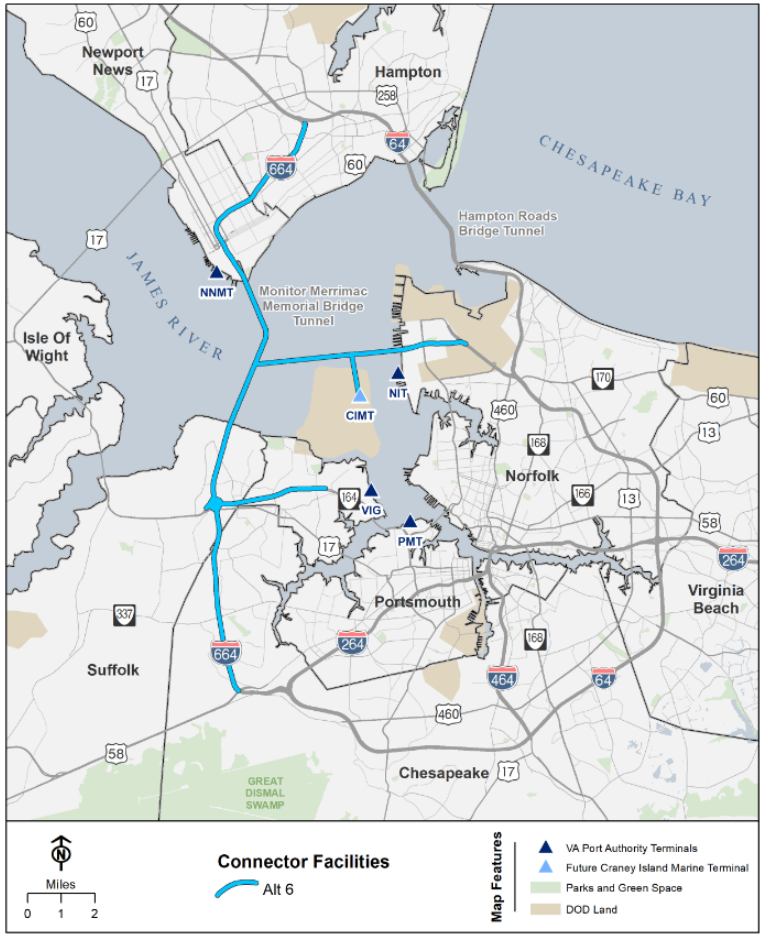
A – 6+2

B – 4+4

Alternatives 3A and 3B



Alternatives 6A and 6B

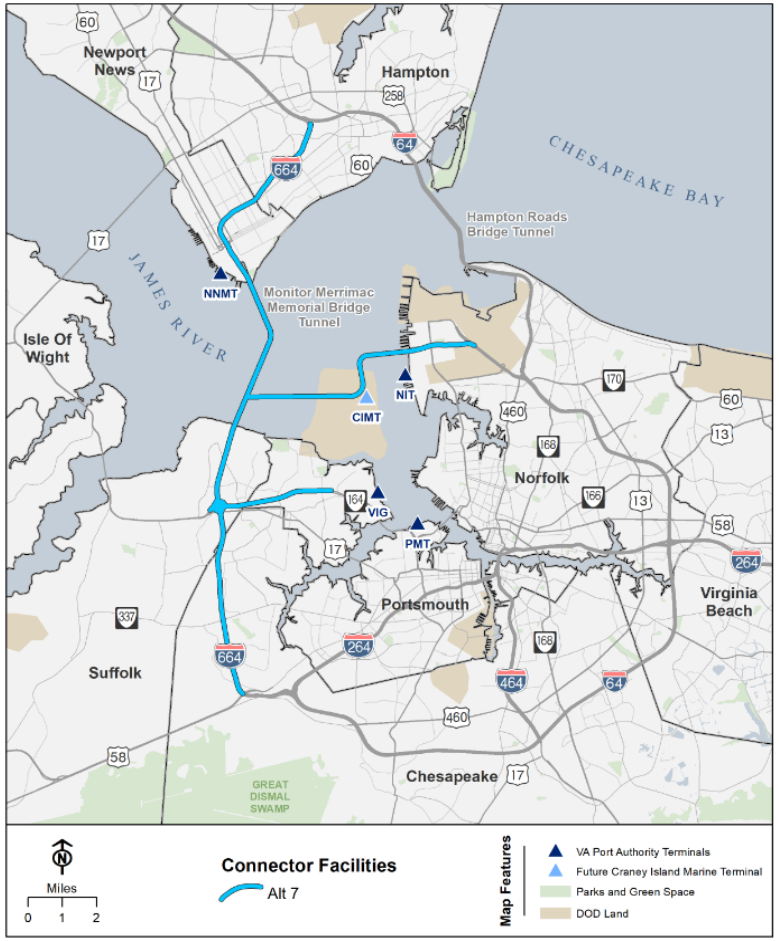


Note:

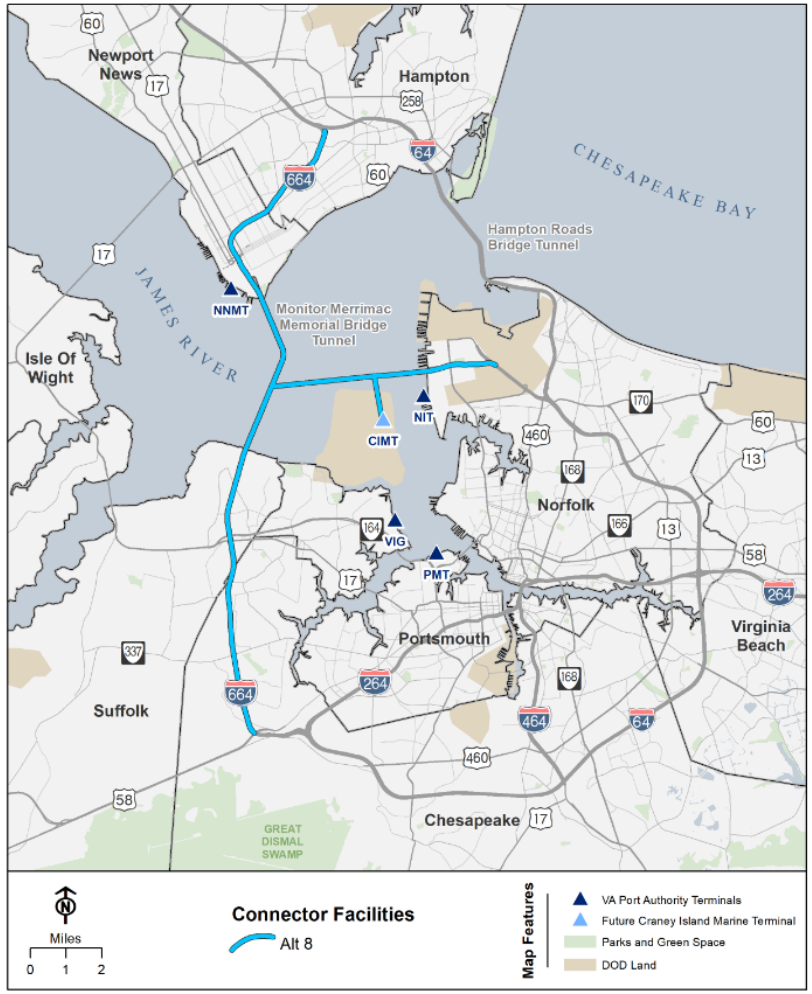
A – 6+2

B – 4+4

Alternatives 7A and 7B



Alternatives
8A and 8B

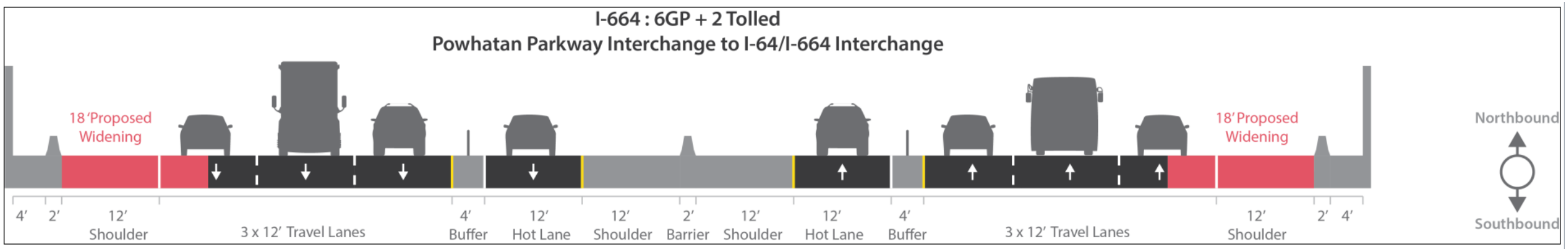


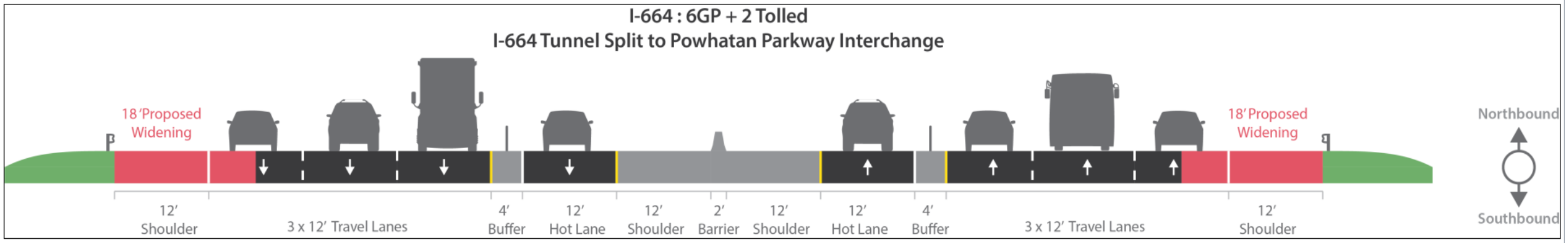
Note:

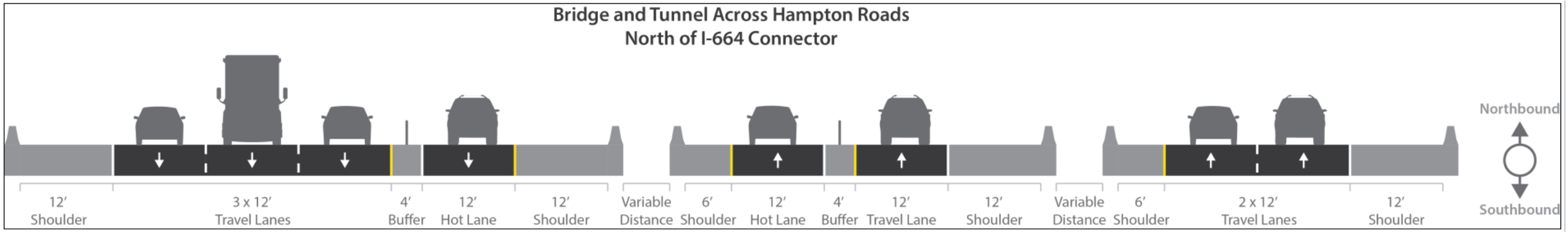
A - 6+2

B - 4+4

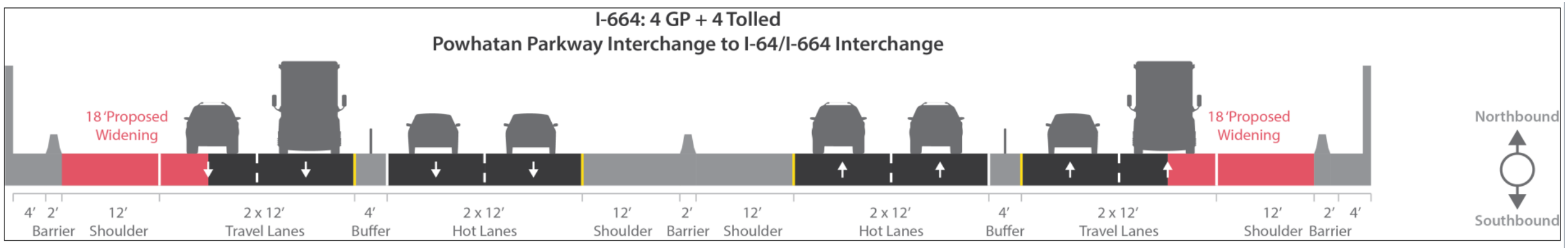
Typical Sections (MMMT 6+2 Design Option)

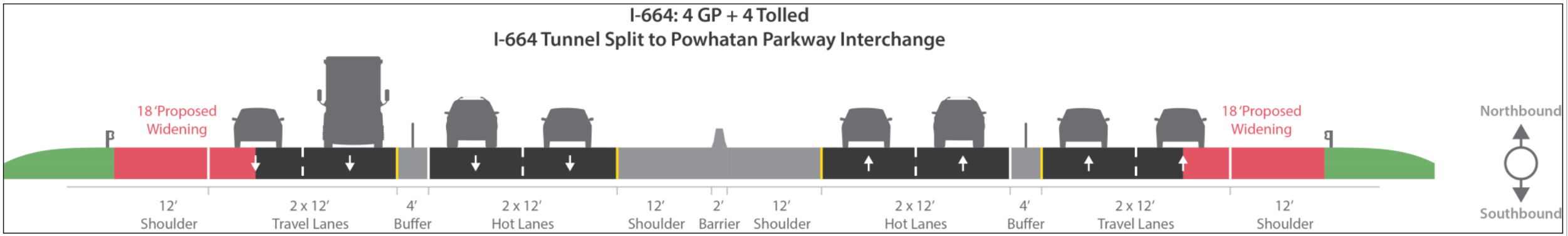


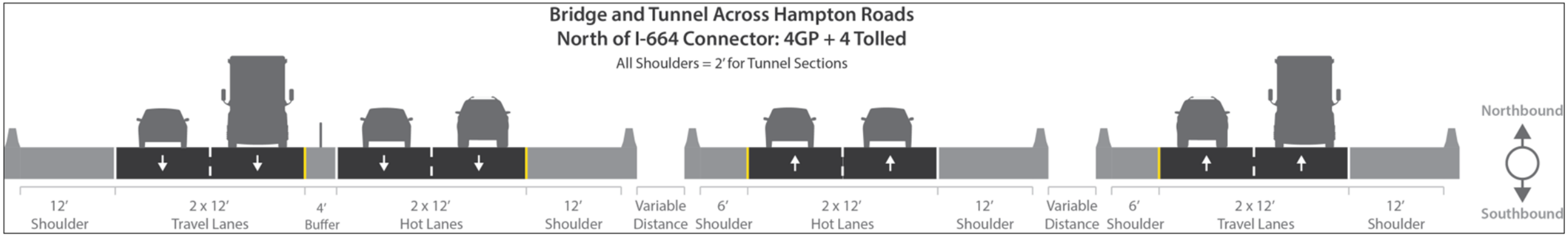




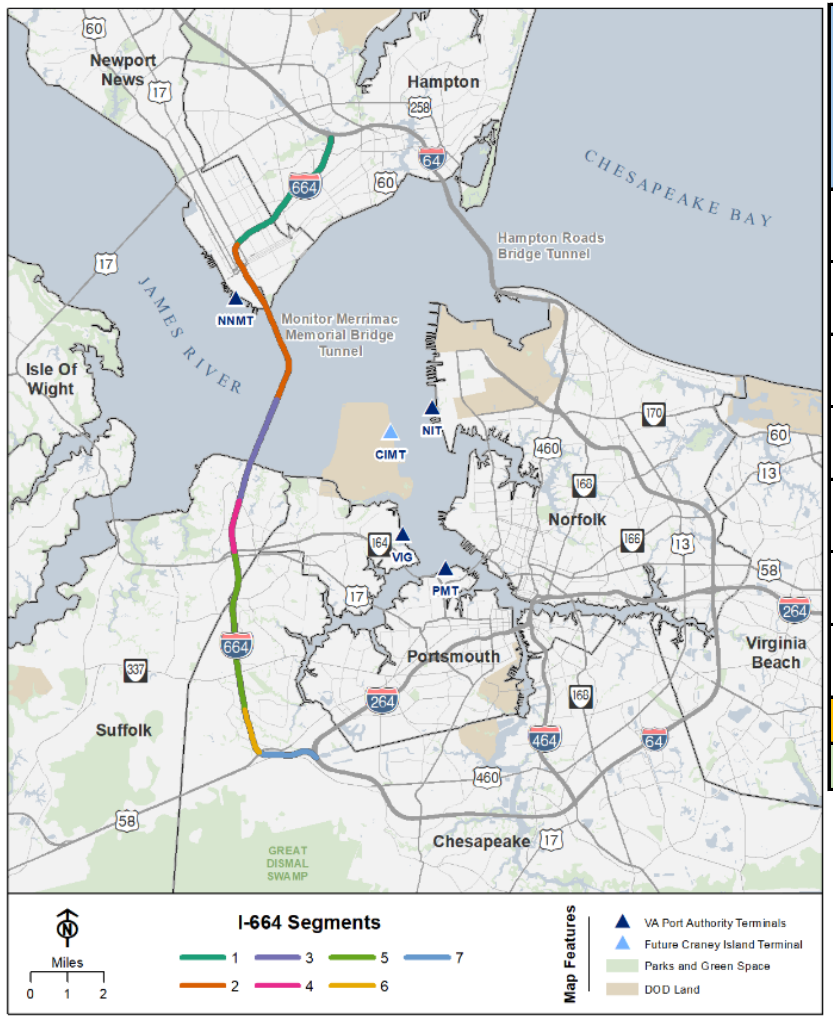
Typical Sections (MMMBT 4+4 Design Option)







Modeling Assumptions

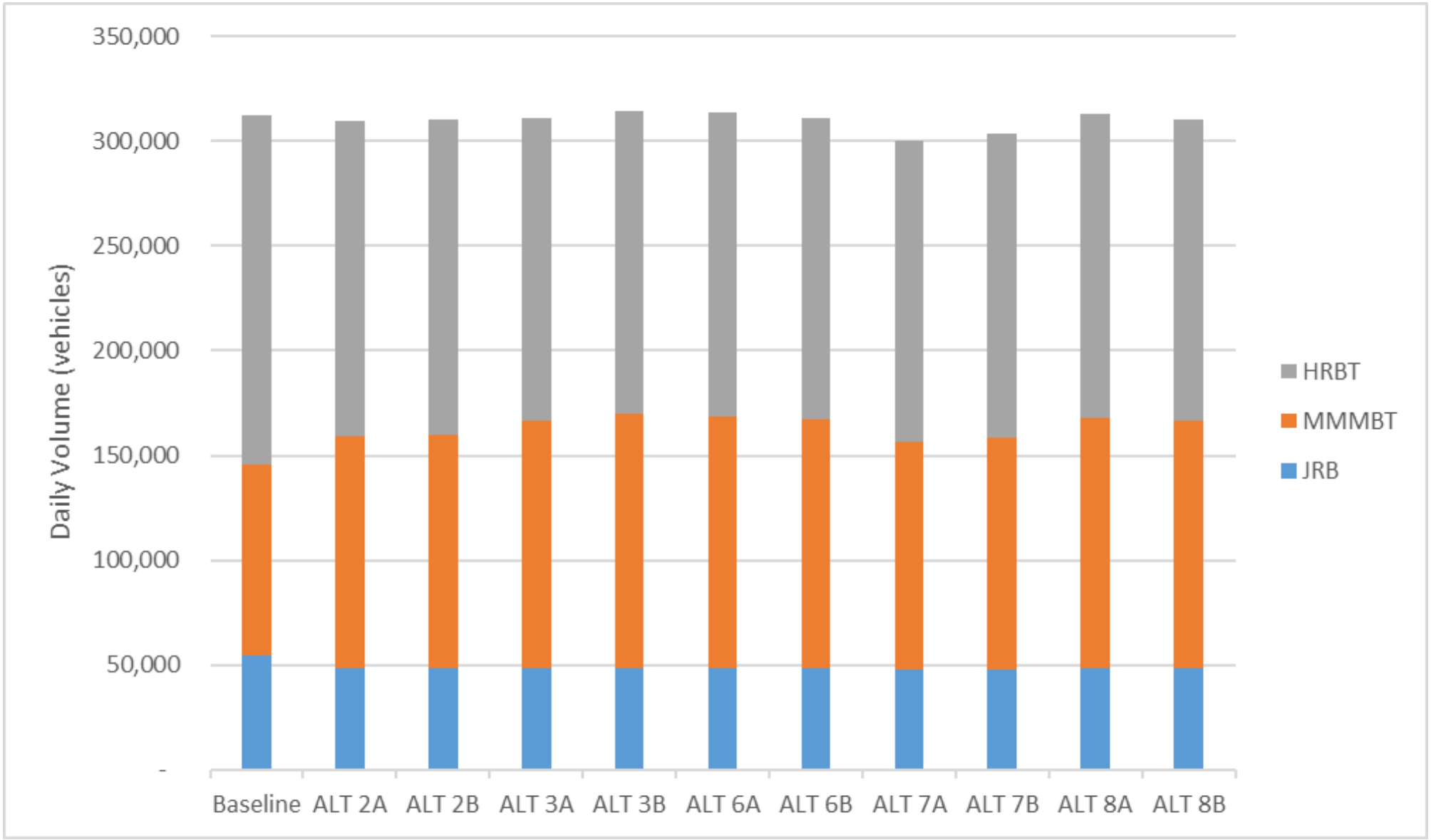


I-664 Roadway Segments	Actual Existing Lanes	MMMBT Design Option (6+2)	MMMBT Design Option (4+4)	Comments
I-64 to Terminal Avenue Interchange	6	6+2	6+4/2*	
Terminal Avenue Interchange to I-664 Connector	4	6+2	4+4	MMMBT
I-664 Connector to College Dr. (Exit 8)	4	6+2	4+4	
College Dr. (Exit 8) to VA 164**	6	6+4	6+4	Bowers Hill Study Area
VA 164 to Dock Landing Rd**	4	4+4	4+4	
Dock Landing Rd to US 58 (Bowers Hill)**	4	6+4	6+4	
US 58 (Bowers Hill) to I-264W**	8	8+4	8+4	
* Adds/drops second HOT lane at Powhatan Parkway				
**Per Bowers Hill Interchange Improvement Study				

Modeling Runs

- Ran travel demand model for the 2045 Baseline and 5 combinations of mandate two separate design options for MMMBT (6+2 and 4+4):
  - Alternatives 2A, 2B, 3A, 3B, 6A, 6B, 7A, 7B, 8A, and 8B
- Prepared matrix to illustrate volumes for 2017, 2045 Baseline, and the 10 combinations of segments and MMMBT design options

2045 Estimated Daily Volumes for Harbor Crossings



2045 Roadway Capacity Utilization Harbor Crossings
MMMBT 6+2 Design Option

Description	Baseline		Alternative 2A		Alternative 3A	
	Peak	Off-Peak	Peak	Off-Peak	Peak	Off-Peak
James River Bridge	131%	72%	111%	69%	111%	71%
Monitor Merrimac Memorial Bridge Tunnel (GP)	128%	95%	79%	58%	85%	60%
Monitor Merrimac Memorial Bridge Tunnel (Managed)	-	-	84%	50%	88%	65%
Hampton Roads Bridge Tunnel (GP)	161%	121%	138%	115%	130%	114%
Hampton Roads Bridge Tunnel (Managed)	134%	100%	103%	98%	107%	91%

Note: Values reflect peak direction of traffic for AM peak and Midday periods for selected alternatives only

2045 Roadway Capacity Utilization Harbor Crossings
MMMBT 4+4 Design Option

Description	Baseline		Alternative 2B		Alternative 3B	
	Peak	Off-Peak	Peak	Off-Peak	Peak	Off-Peak
James River Bridge	131%	72%	111%	70%	112%	71%
Monitor Merrimac Memorial Bridge Tunnel (GP)	128%	95%	98%	83%	95%	83%
Monitor Merrimac Memorial Bridge Tunnel (Managed)	-	-	69%	28%	80%	38%
Hampton Roads Bridge Tunnel (GP)	161%	121%	137%	115%	131%	115%
Hampton Roads Bridge Tunnel (Managed)	134%	100%	100%	98%	107%	89%

Note: Values reflect peak direction of traffic for AM peak and Midday periods for selected alternatives only

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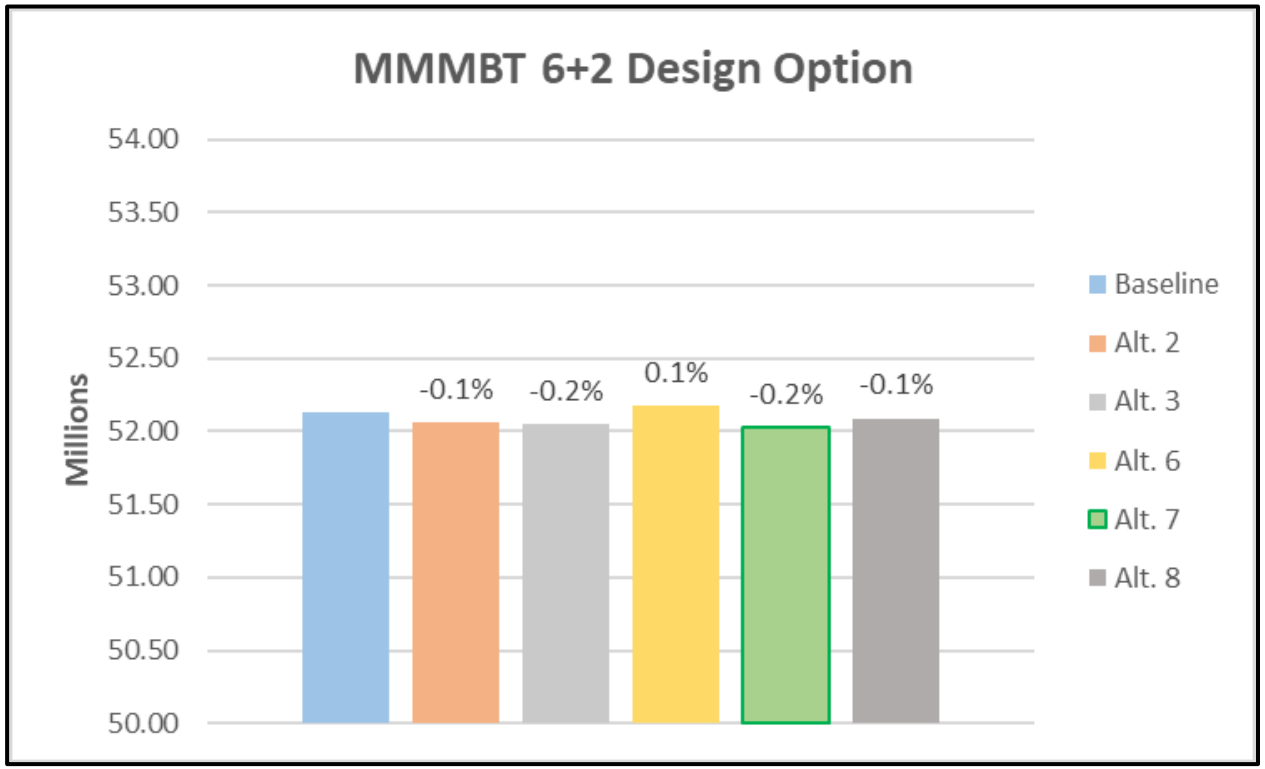
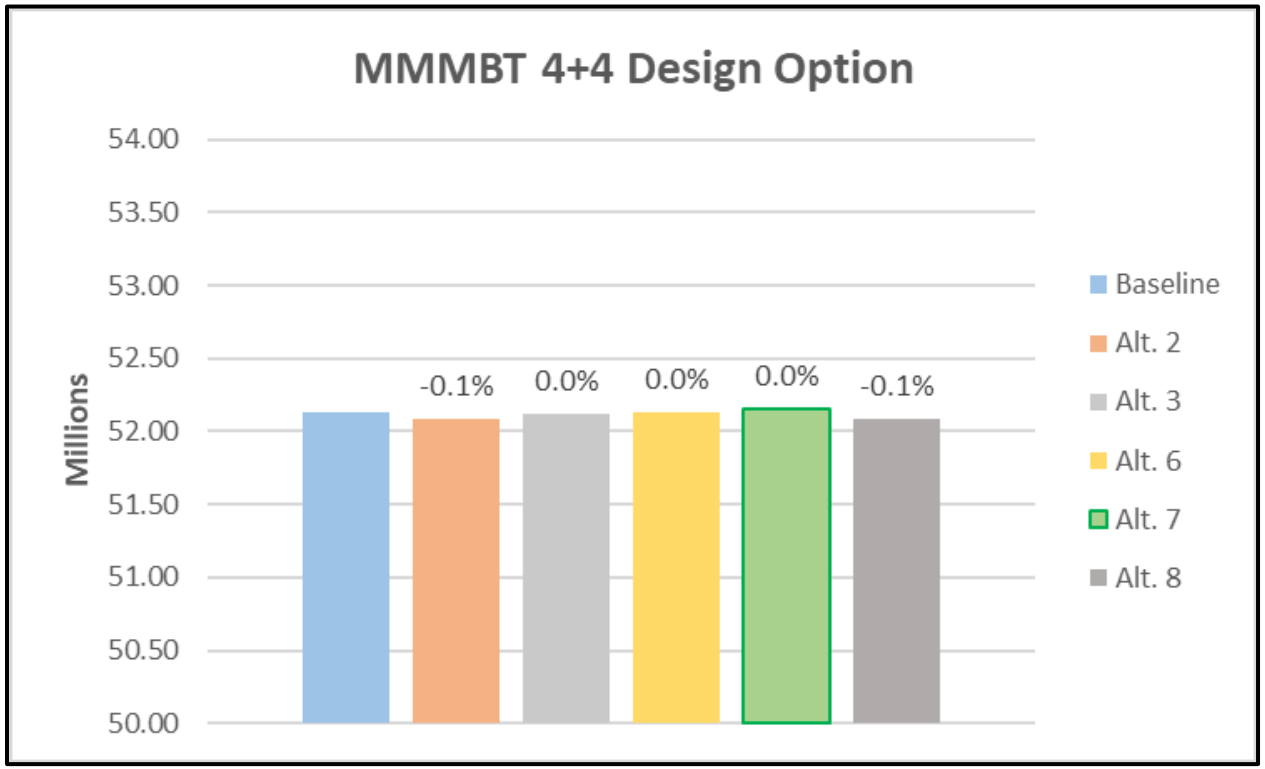
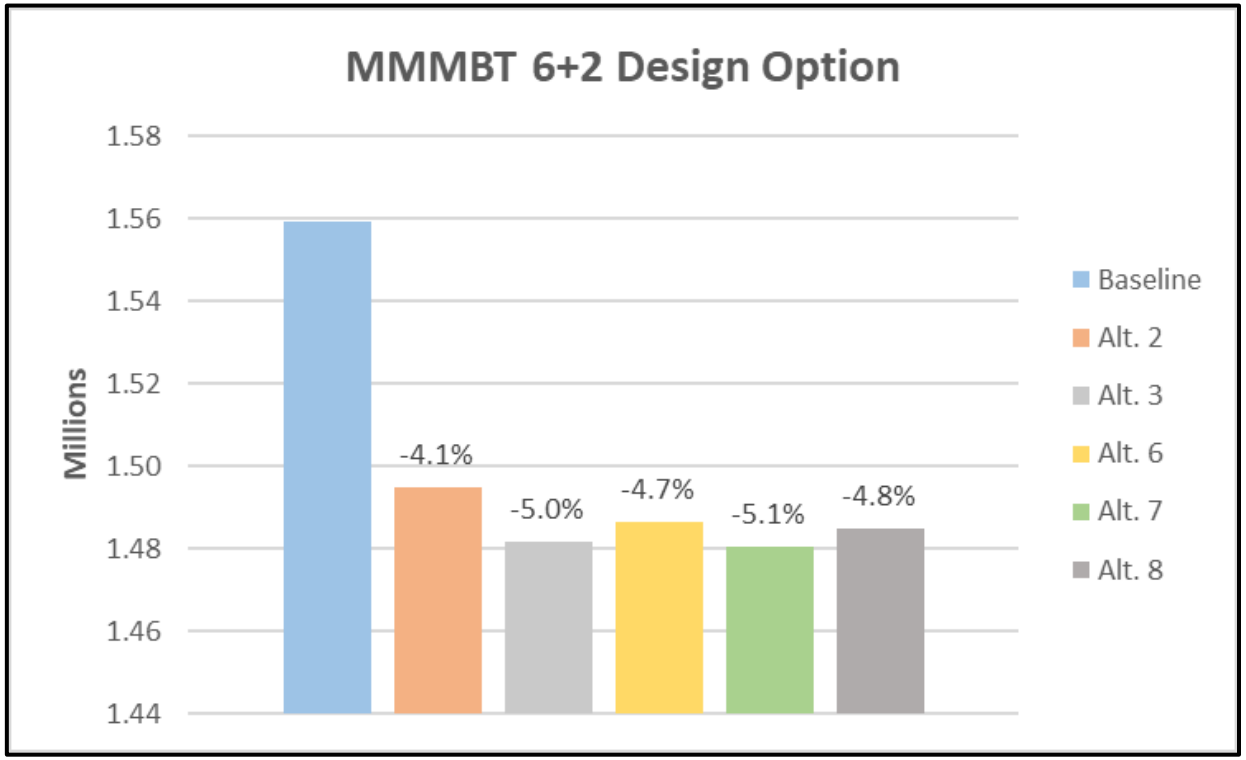
2045 Daily Vehicle Miles Traveled

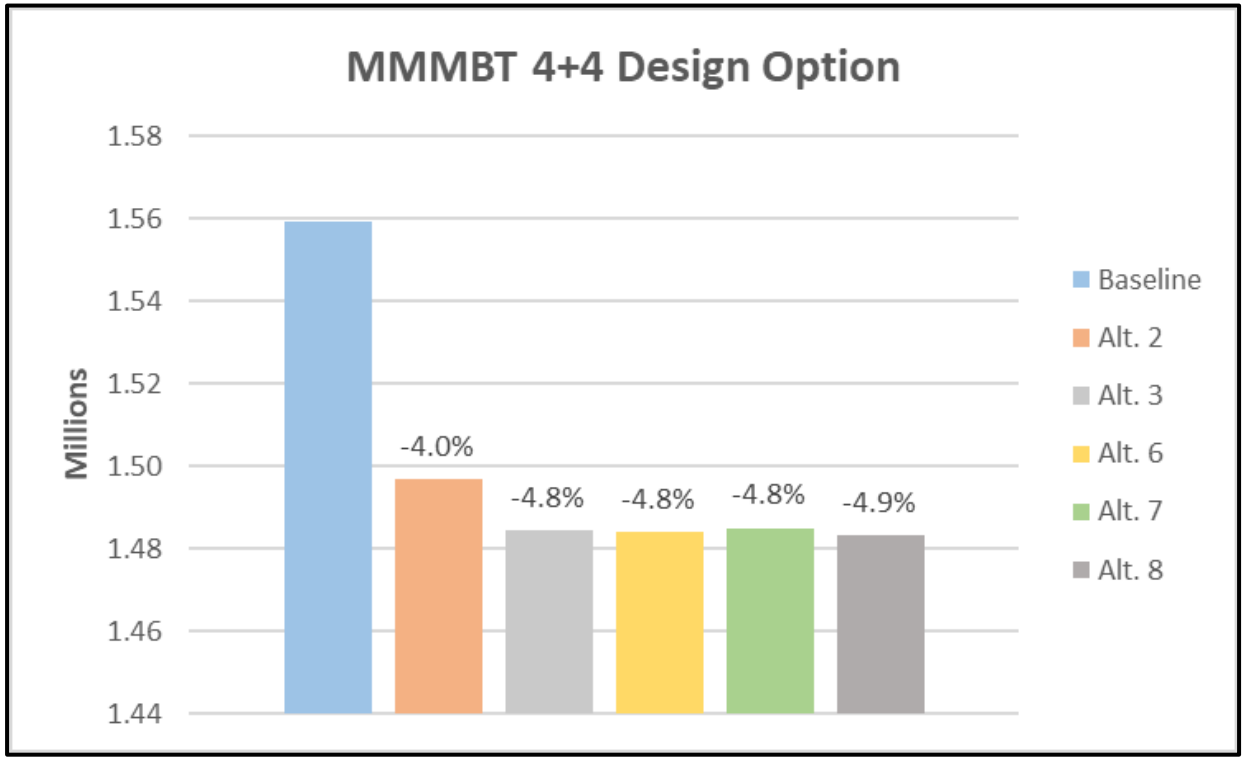




Note% change compared with 2045 Baseline

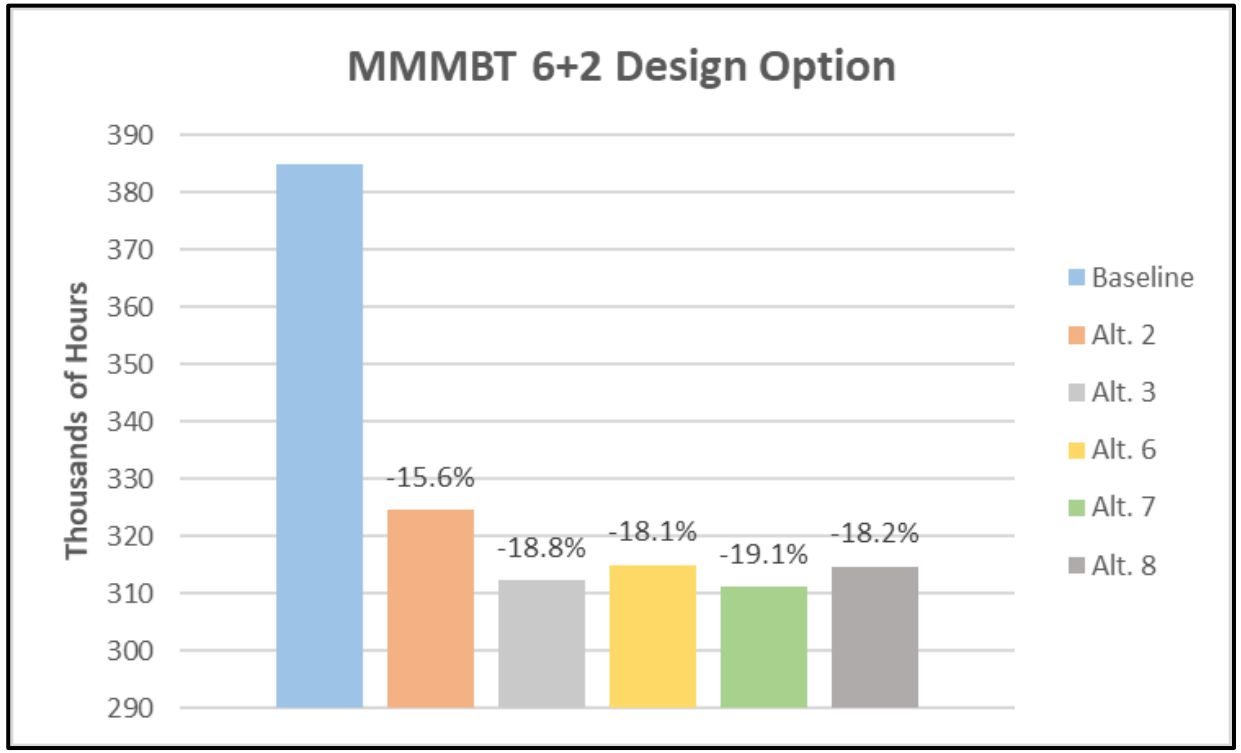
2045 Daily Vehicle Hours Traveled

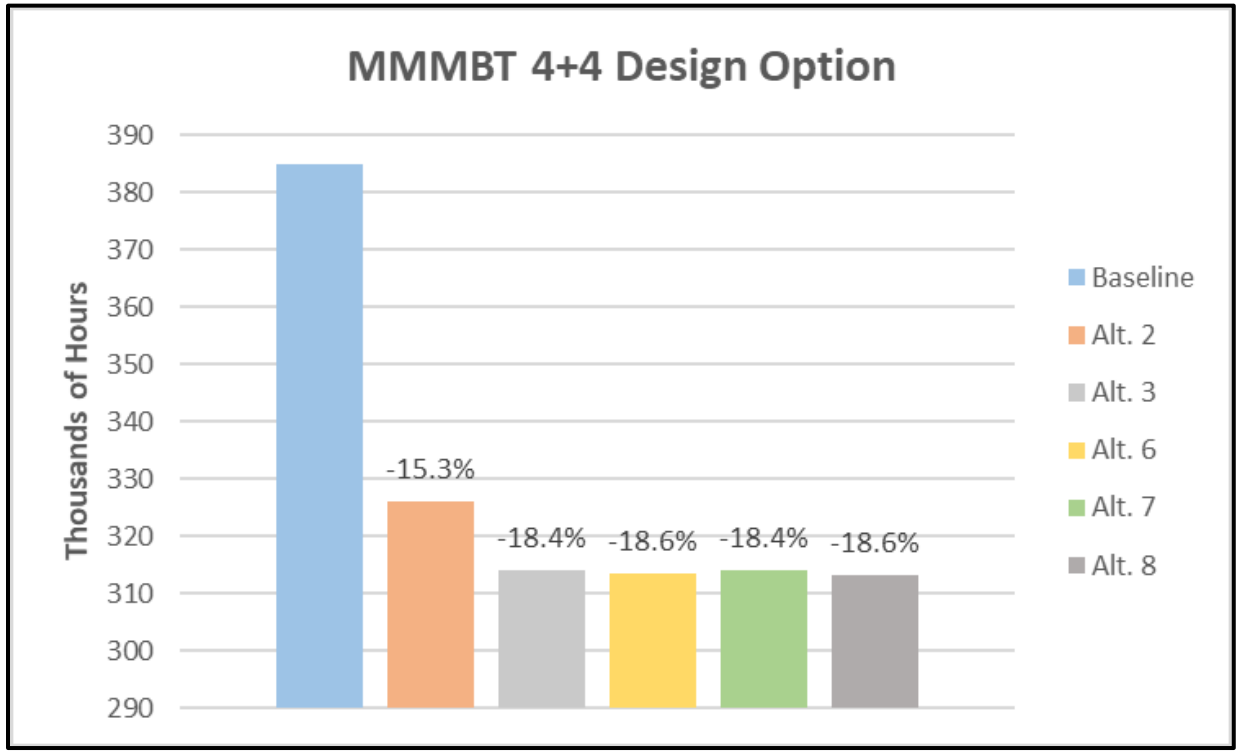




Note% change compared with 2045 Baseline

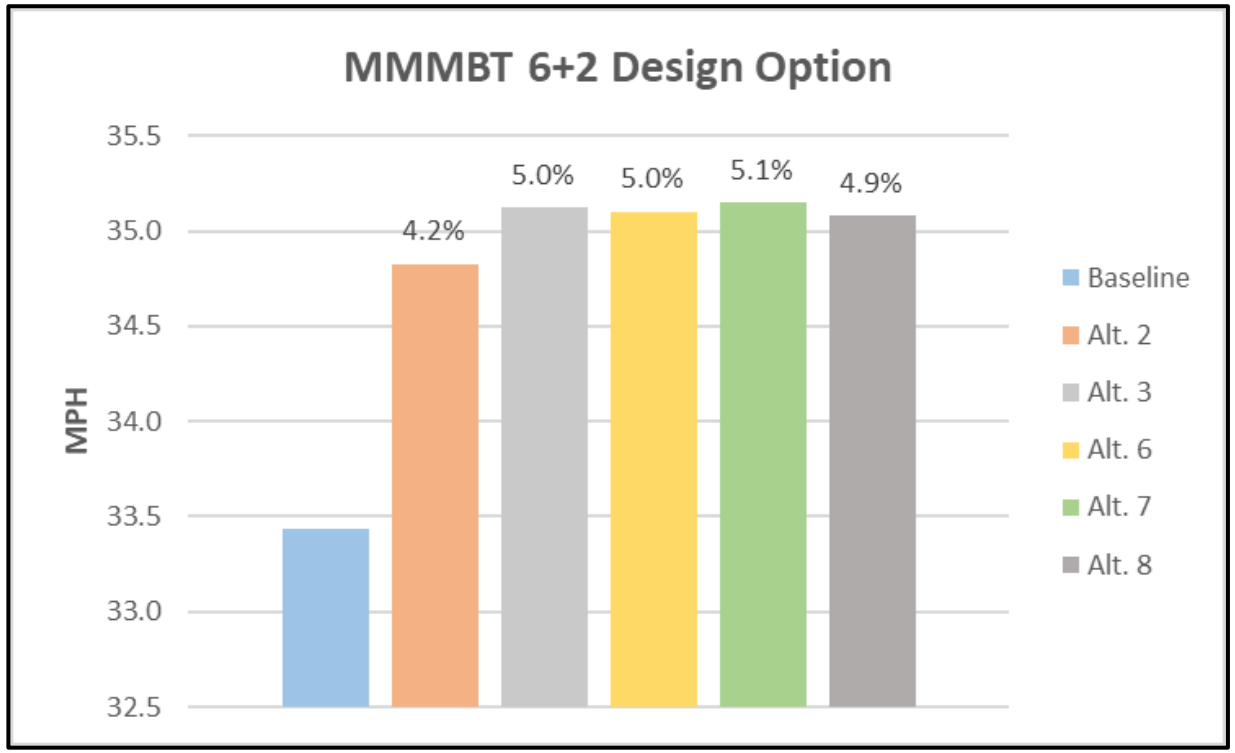
2045 Daily Delay

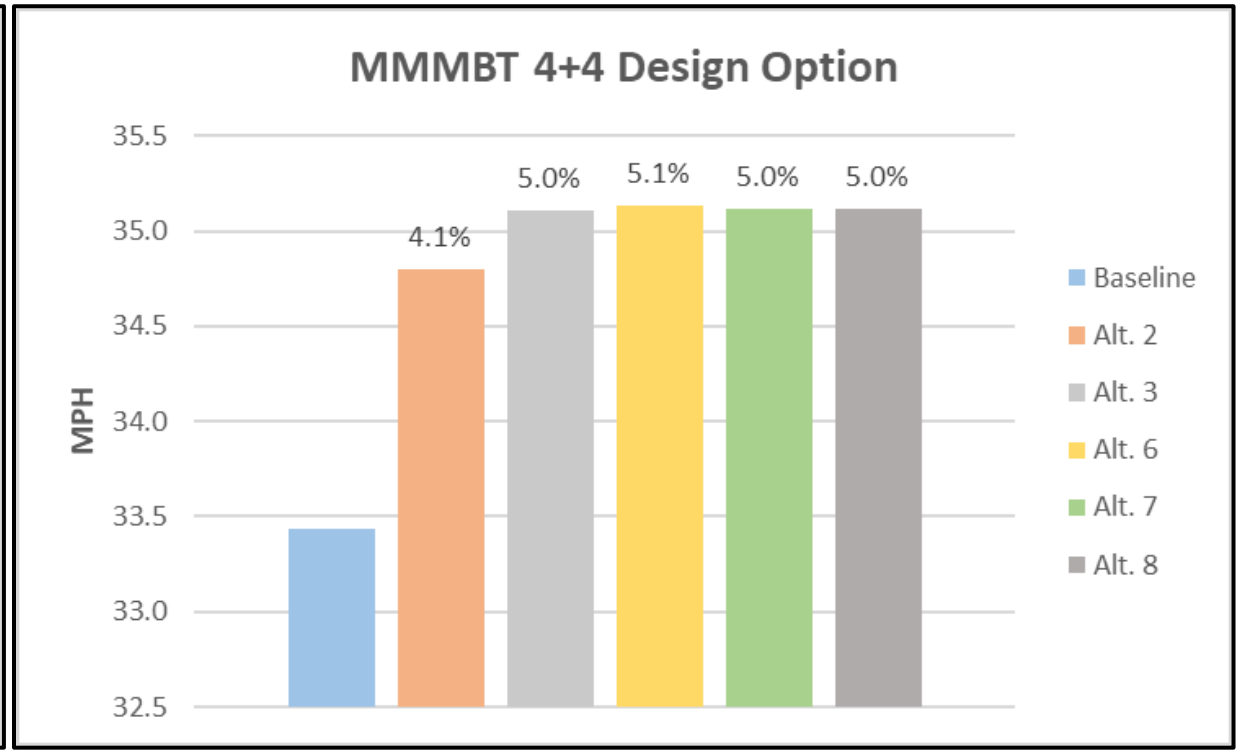




Note% change compared with 2045 Baseline

2045 Daily Average Congested Speed





Note% change compared with 2045 Baseline

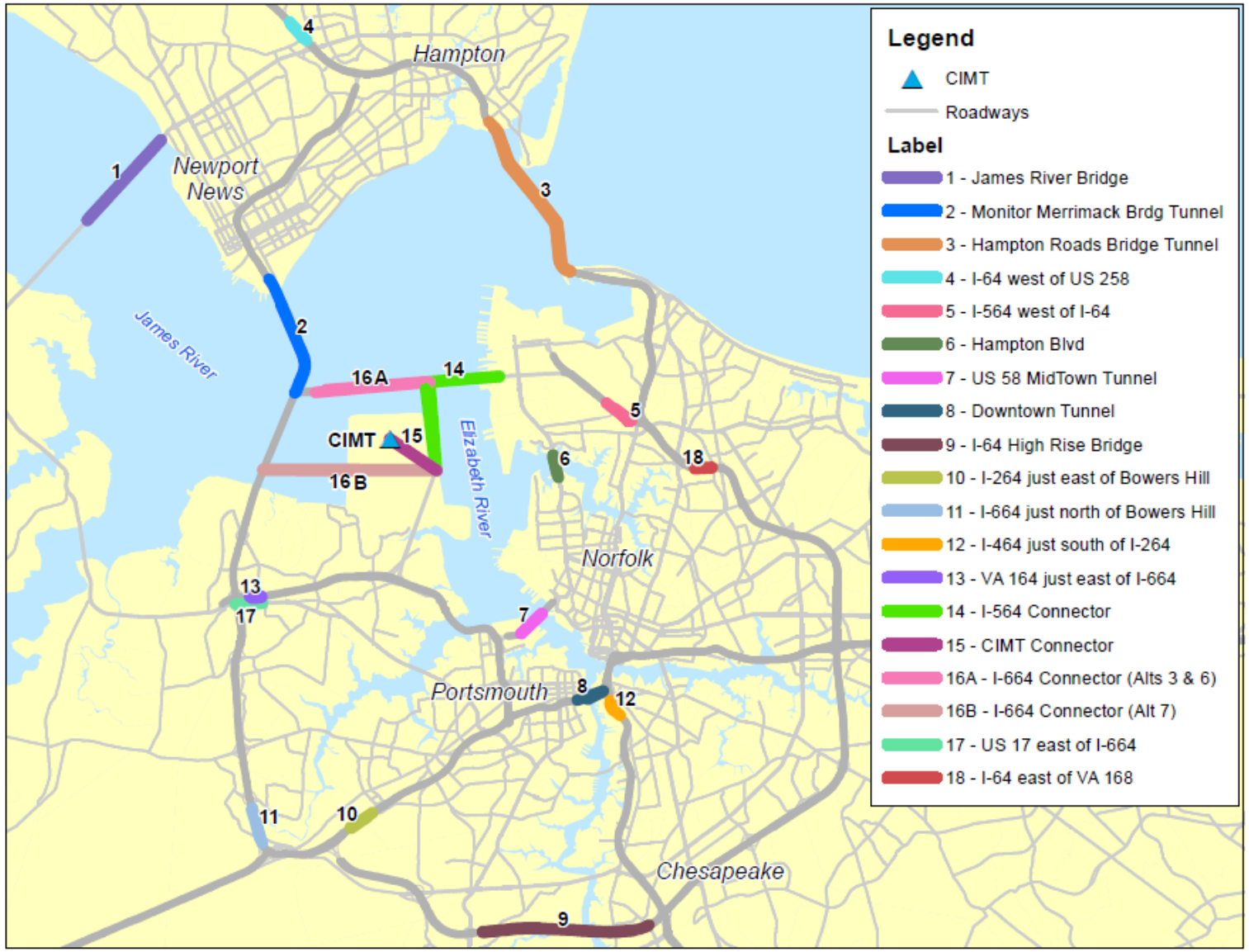
2045 Travel Times (in minutes)

- Blue – Path A
- Pink – Path B

Direction of Travel		2045 Baseline		MMMBT 6+2 Design Option				MMMBT 4+4 Design Option			
				Alternative 2A		Alternative 3A		Alternative 2B		Alternative 3B	
		GP	Managed	GP	Managed	GP	Managed	GP	Managed	GP	Managed
Path A (via I-664)	Peak (SB)	64.2	-	39.8	28.8	38.1	27.4	41.1	27.7	38.4	27.0
	Change	-	-	-38.1%	-	-40.8%	-	-36.0%	-	-40.3%	-
	Off-Peak (SB)	36.3	-	33.4	25.0	32.7	25.2	35.0	24.7	34.4	24.8
	Change	-	-	-7.9%	-	-9.8%	-	-3.4%	-	-5.2%	-
Path B (via I-64)	Peak (SB)	89.2	69.3	64.8	49.5	57.8	38.7	64.6	45.7	58.0	39.9
	Change	-	-	-27.3%	-28.5%	-35.2%	-44.1%	-27.5%	-34.0%	-35.0%	-42.4%
	Off-Peak (SB)	50.1	26.3	46.0	26.3	45.2	26.2	46.4	26.2	45.6	26.2
	Change	-	-	-8.3%	-0.2%	-9.9%	-0.5%	-7.5%	-0.2%	-9.0%	-0.5%

Note: - Travel times (in minutes) reflect direction of traffic for AM peak and Midday off-peak periods; % change compared with 2045 Baseline

Modeling Volume Locations



2045 Estimated Daily Traffic Volumes at Key Locations (MMMBT 6+2 Design Option)





5/21/2021

Daily Traffic Volumes at Key Locations *

				MMMBT 6+2 Design Option**				
ID	Location	2017 Existing	2045 Baseline ***	2045 Alternative 2A	2045 Alternative 3A	2045 Alternative 6A	2045 Alternative 7A	2045 Alternative 8A
1	James River Bridge	37,431	54,382	48,404	48,241	48,447	47,582	48,363
2	Monitor Merrimac Memorial Bridge Tunnel (GP)	74,994	91,474	82,376	84,528	85,454	79,846	85,588
102	Monitor Merrimac Memorial Bridge Tunnel (Managed Lanes)	-	-	28,583	33,695	34,902	28,830	34,151
3	Hampton Roads Bridge Tunnel (GP)	92,195	108,450	96,892	96,032	96,300	94,643	96,157
103	Hampton Roads Bridge Tunnel (Managed Lanes)	-	57,699	53,370	48,257	48,544	49,486	48,614
Harbor Crossing Totals		204,620	312,005	309,626	310,753	313,646	300,386	312,873
4	I-64 west of US 258 (Mercury Blvd) (GP)	119,617	151,888	149,478	146,626	147,734	146,827	147,466
104	I-64 west of US 258 (Mercury Blvd) (Managed Lanes)	13,802	29,372	30,136	31,101	31,800	30,538	31,445
5	I-564 west of I-64	96,455	78,189	77,752	81,059	81,479	79,655	81,850
6	Hampton Blvd over the Lafayette River	42,949	44,255	42,700	35,630	36,038	35,384	35,740
7	US 58 MidTown Tunnel	50,700	61,062	61,495	54,560	54,959	55,274	54,527
8	I-264 under the Elizabeth River (Downtown Tunnel)	76,479	84,455	84,039	82,767	82,819	82,938	82,812
9	I-64 High Rise Bridge (GP)	106,183	122,191	121,885	121,765	122,340	121,863	121,989
109	I-64 High Rise Bridge (Managed Lanes)	-	15,960	21,060	18,381	18,386	18,320	18,620
10	I-264 just east of Bowers Hill	64,611	82,428	80,139	78,261	78,272	78,596	78,662
11	I-664 just north of Bowers Hill (GP)	85,186	101,329	106,420	105,497	105,756	105,537	105,547
111	I-664 just north of Bowers Hill (Managed Lanes)	-	-	19,717	16,538	16,723	16,716	16,832
12	I-464 just south of I-264	88,248	97,722	97,121	98,103	97,729	97,692	97,557
13	VA 164 just east of I-664	50,087	49,412	58,329	52,447	52,937	52,825	47,051
14	I-564 Connector	-	-	-	39,569	40,146	30,596	40,021
15	CIMT Connector	-	-	-	-	715	776	727
16	I-664 Connector	-	-	-	39,569	40,494	31,000	40,373
17	US 17 east of I-664	22,206	27,176	24,802	23,714	23,688	23,867	25,696
18	I-64 east of VA 168 (GP)	113,334	114,433	109,575	110,864	110,909	110,612	110,912
118	I-64 east of VA 168 (Managed Lanes)	34,994	33,681	31,552	32,612	32,748	31,842	32,694

Notes:

* I-664 and I-64: $0.06/mile managed lanes only; I-564 and I-664 connectors: $1.00 all lanes; No toll on CIMT connector.

** MMMBT design option recommended by Working Group and reviewed by HRTPO staff, May 13, 2021

*** Baseline network is E+C and consistent with HREL

XXX - Reduction from 2045 Baseline

YYY - Increase from 2045 Baseline

2045 Estimated Daily Traffic Volumes at Key Locations (MMMBT 4+4 Design Option)





5/21/2021

Daily Traffic Volumes at Key Locations *

				MMMBT 4+4 Design Plan**				
ID	Location	2017 Existing	2045 Baseline ***	2045 Alternative 2B	2045 Alternative 3B	2045 Alternative 6B	2045 Alternative 7B	2045 Alternative 8B
1	James River Bridge	37,431	54,382	48,775	48,630	48,472	47,926	48,481
2	Monitor Merrimac Memorial Bridge Tunnel (GP)	74,994	91,474	72,511	72,375	71,852	71,025	71,564
102	Monitor Merrimac Memorial Bridge Tunnel (Managed Lanes)	-	-	38,565	48,689	47,158	39,458	46,754
3	Hampton Roads Bridge Tunnel (GP)	92,195	108,450	96,947	96,324	95,946	95,229	95,833
103	Hampton Roads Bridge Tunnel (Managed Lanes)	-	57,699	53,377	48,031	47,527	50,116	47,730
Harbor Crossing Totals		204,620	312,005	310,175	314,049	310,954	303,755	310,361
4	I-64 west of US 258 (Mercury Blvd) (GP)	119,617	151,888	149,101	147,449	147,284	147,184	146,693
104	I-64 west of US 258 (Mercury Blvd) (Managed Lanes)	13,802	29,372	30,753	31,586	31,771	31,244	31,587
5	I-564 west of I-64	96,455	78,189	78,002	81,271	81,419	79,842	81,296
6	Hampton Blvd over the Lafayette River	42,949	44,255	42,650	35,469	35,680	35,888	35,776
7	US 58 MidTown Tunnel	50,700	61,062	61,282	54,611	54,675	55,725	54,397
8	I-264 under the Elizabeth River (Downtown Tunnel)	76,479	84,455	83,989	82,619	82,747	83,076	82,663
9	I-64 High Rise Bridge (GP)	106,183	122,191	122,034	121,690	122,178	122,090	121,866
109	I-64 High Rise Bridge (Managed Lanes)	-	15,960	21,289	18,566	18,858	18,696	18,855
10	I-264 just east of Bowers Hill	64,611	82,428	80,313	78,106	78,301	78,473	78,995
11	I-664 just north of Bowers Hill (GP)	85,186	101,329	105,660	105,450	105,154	105,396	104,954
111	I-664 just north of Bowers Hill (Managed Lanes)	-	-	20,171	16,945	16,969	17,222	16,987
12	I-464 just south of I-264	88,248	97,722	97,138	97,606	98,007	97,913	98,013
13	VA 164 just east of I-664	50,087	49,412	58,650	53,644	52,999	53,557	47,333
14	I-564 Connector	-	-	-	39,932	39,752	31,135	39,915
15	CIMT Connector	-	-	-	-	723	780	734
16	I-664 Connector	-	-	-	39,932	40,110	31,542	40,278
17	US 17 east of I-664	22,206	27,176	24,968	23,823	23,826	23,922	25,738
18	I-64 east of VA 168 (GP)	113,334	114,433	109,986	111,335	111,285	110,904	111,064
118	I-64 east of VA 168 (Managed Lanes)	34,994	33,681	31,778	32,795	32,821	31,903	32,789

Notes:

* I-664 and I-64: $0.06/mile managed lanes only; I-564 and I-664 connectors: $1.00 all lanes; No toll on CIMT connector.

** MMMBT design option recommended by Working Group and reviewed by HRTPO staff, May 13, 2021

*** Baseline network is E+C and consistent with HREL

XXX - Reduction from 2045 Baseline

YYY - Increase from 2045 Baseline

- MMMBT 4+4 design option only pertains to I-664 from I-664 Connector to Powhatan Parkway interchange

5/21/2021

Daily Traffic Volumes at Key Locations *










				MMMBT 6+2 Design Plan**					MMMBT 4+4 Design Plan**				
ID	Location	2017 Existing	2045 Baseline ***	2045 Alternative 2A	2045 Alternative 3A	2045 Alternative 6A	2045 Alternative 7A	2045 Alternative 8A	2045 Alternative 2B	2045 Alternative 3B	2045 Alternative 6B	2045 Alternative 7B	2045 Alternative 8B
1	James River Bridge	37,431	54,382	48,404	48,241	48,447	47,582	48,363	48,775	48,630	48,472	47,926	48,481
2	Monitor Merrimac Memorial Bridge Tunnel (GP)	74,994	91,474	82,376	84,528	85,454	79,846	85,588	72,511	72,375	71,852	71,025	71,564
102	Monitor Merrimac Memorial Bridge Tunnel (Managed Lanes)	-	-	28,583	33,695	34,902	28,830	34,151	38,565	48,689	47,158	39,458	46,754
3	Hampton Roads Bridge Tunnel (GP)	92,195	108,450	96,892	96,032	96,300	94,643	96,157	96,947	96,324	95,946	95,229	95,833
103	Hampton Roads Bridge Tunnel (Managed Lanes)	-	57,699	53,370	48,257	48,544	49,486	48,614	53,377	48,031	47,527	50,116	47,730
Harbor Crossing Totals		204,620	312,005	309,626	310,753	313,646	300,386	312,873	310,175	314,049	310,954	303,755	310,361
4	I-64 west of US 258 (Mercury Blvd) (GP)	119,617	151,888	149,478	146,626	147,734	146,827	147,466	149,101	147,449	147,284	147,184	146,693
104	I-64 west of US 258 (Mercury Blvd) (Managed Lanes)	13,802	29,372	30,136	31,101	31,800	30,538	31,445	30,753	31,586	31,771	31,244	31,587
5	I-564 west of I-64	96,455	78,189	77,752	81,059	81,479	79,655	81,850	78,002	81,271	81,419	79,842	81,296
6	Hampton Blvd over the Lafayette River	42,949	44,255	42,700	35,630	36,038	35,384	35,740	42,650	35,469	35,680	35,888	35,776
7	US 58 MidTown Tunnel	50,700	61,062	61,495	54,560	54,959	55,274	54,527	61,282	54,611	54,675	55,725	54,397
8	I-264 under the Elizabeth River (Downtown Tunnel)	76,479	84,455	84,039	82,767	82,819	82,938	82,812	83,989	82,619	82,747	83,076	82,663
9	I-64 High Rise Bridge (GP)	106,183	122,191	121,885	121,765	122,340	121,863	121,989	122,034	121,690	122,178	122,090	121,866
109	I-64 High Rise Bridge (Managed Lanes)	-	15,960	21,060	18,381	18,386	18,320	18,620	21,289	18,566	18,858	18,696	18,855
10	I-264 just east of Bowers Hill	64,611	82,428	80,139	78,261	78,272	78,596	78,662	80,313	78,106	78,301	78,473	78,995
11	I-664 just north of Bowers Hill (GP)	85,186	101,329	106,420	105,497	105,756	105,537	105,547	105,660	105,450	105,154	105,396	104,954
111	I-664 just north of Bowers Hill (Managed Lanes)	-	-	19,717	16,538	16,723	16,716	16,832	20,171	16,945	16,969	17,222	16,987
12	I-464 just south of I-264	88,248	97,722	97,121	98,103	97,729	97,692	97,557	97,138	97,606	98,007	97,913	98,013
13	VA 164 just east of I-664	50,087	49,412	58,329	52,447	52,937	52,825	47,051	58,650	53,644	52,999	53,557	47,333
14	I-564 Connector	-	-	-	39,569	40,146	30,596	40,021	-	39,932	39,752	31,135	39,915
15	CIMT Connector	-	-	-	-	715	776	727	-	-	723	780	734
16	I-664 Connector	-	-	-	39,569	40,494	31,000	40,373	-	39,932	40,110	31,542	40,278
17	US 17 east of I-664	22,206	27,176	24,802	23,714	23,688	23,867	25,696	24,968	23,823	23,826	23,922	25,738
18	I-64 east of VA 168 (GP)	113,334	114,433	109,575	110,864	110,909	110,612	110,912	109,986	111,335	111,285	110,904	111,064
118	I-64 east of VA 168 (Managed Lanes)	34,994	33,681	31,552	32,612	32,748	31,842	32,694	31,778	32,795	32,821	31,903	32,789

Notes:

* I-664 and I-64: $0.06/mile managed lanes only; I-564 and I-664 connectors: $1.00 all lanes; No toll on CIMT connector.

** MMMBT design option recommended by Working Group and reviewed by HRTPO staff, May 13, 2021

*** Baseline network is E+C and consistent with HREL

XXX - Reduction from 2045 Baseline

YYY - Increase from 2045 Baseline

- MMMBT 4+4 design option only pertains to I-664 from I-664 Connector to Powhatan Parkway interchange

Consulting Team Recommendations

- Eliminate Alts 7A and 7B
  - I-664 and I-564 Connectors cannot be constructed until Craney Island Dredged Material Mana concluded operations (currently projected to be 2050)

- Eliminate all 6+2 MMMBT design options (2A, 3A, 6A, 7A, and 8A)
  - Separation of managed lane and GP lane in one of the existing MMMBT tunnels will require separation barrier that may create safety issues

Group Discussion

Note:
A – 6+2
B – 4+4

2A and 2B

3A and 3B

6A and 6B

7A and 7B

8A and 8B

Recommended Actio

- Finalize preliminary alternatives including design features
- Recommend for Steering (Policy) Committee consideration and app

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TRANSPORTATION PLANNING ORGANIZATION

REGIONAL CONNECTORS STUDY

6-MONTH OUTLOOK

Michael Baker INTERNATIONAL

Tasks – Next 6 Months

- Determine Preliminary Alternatives (today)
- Complete Phase 2 documentation
- Development of Preliminary Alternatives (Task 2)
  - Develop/Refine Geometry of Preliminary Alternatives (Task 2.2 – end of Aug completion)
  - Hydraulics and Hydrology (Task 2.3 – end of Aug completion)
  - Structures (Task 2.4 – end of Aug completion)
  - Utilities and Railroad Crossings (Task 2.5 – end of Aug completion)
  - Planning Cost Estimates (Task 2.6 – end of Aug completion)
- Determination of Candidate Alternatives (Task 3)
  - Conduct Congestion Relief Assessments (Task 3.1 – June completion)
  - Performance Evaluation (Task 3.10 – Oct completion)
  - Conduct Permitability Assessments (Task 3.2 – completion)
  - Conduct Constructability Assessments (Task 3.3 – completion)

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REGIONAL CONNECTORS STUDY

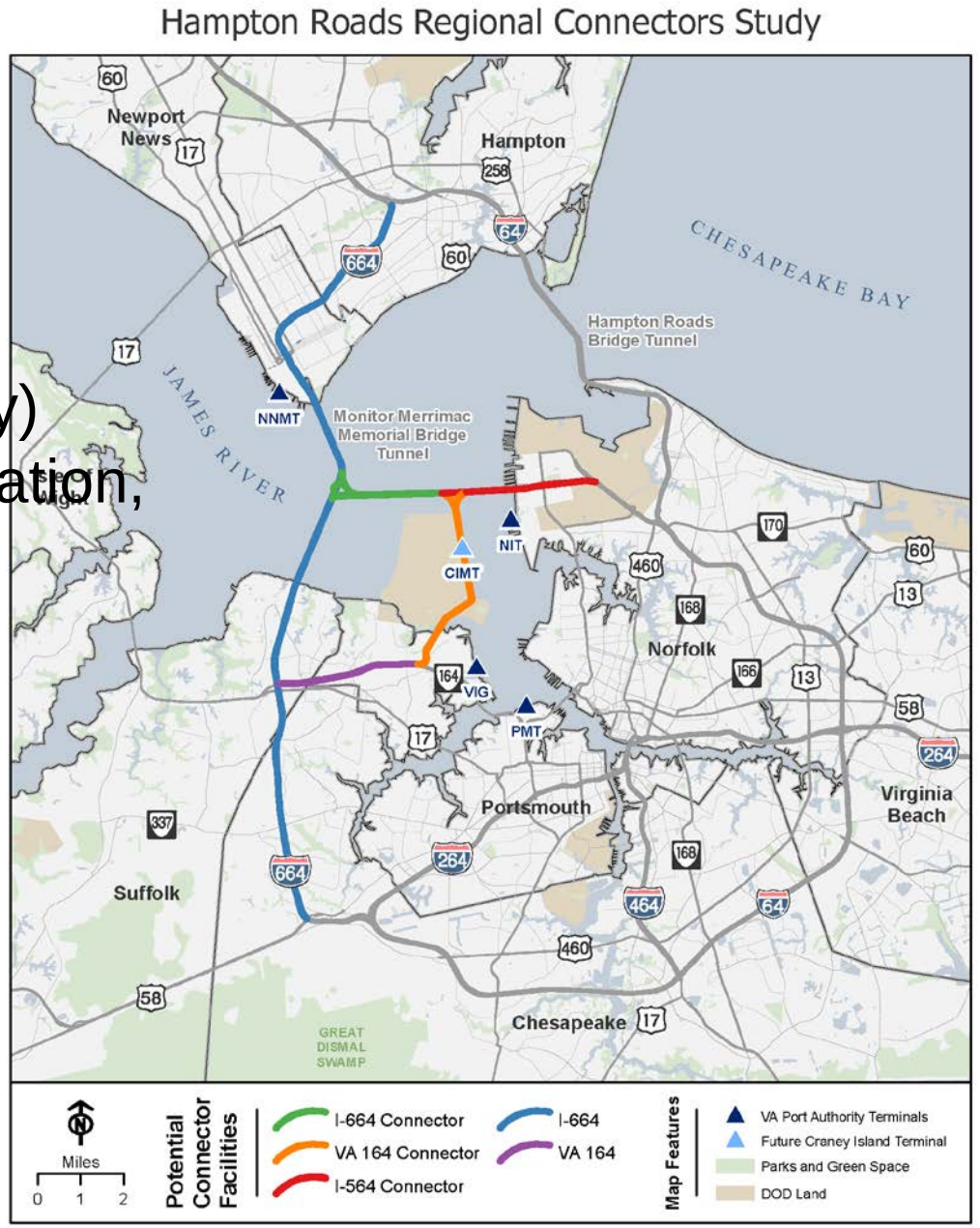
REFERENCE SLIDES – IF NEEDED

Michael Baker INTERNATIONAL

MANDATED SEGMEN

Previous Discussion

- As per October 27 Joint Steering (Policy) Committee/Working Group recommendation, Consultant team to investigate potential refinements of mandated segments



Phase 3 Schedule

REVISED - Regional Connectors Study - Phase 3 Schedule (April 19, 2021)

Task No.	Task	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	2023 JAN	FEB	MAR	APR	MAY
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																													

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

Study Purpose

- To evaluate the feasibility, permitability, and trans
  benefits (including congestion relief) of the followi
  segments not included in the CTB approved HRC
  Preferred Alternative (Alternative A)
  - VA 164
  - I-564 Connector
  - VA 164 Connector
  - I-664 Connector
  - I-664 from I-64 to US 460/58/123 in Chesapeake, not inclu
    Bowers Hill
- To establish a regional long-term vision that investigat
  century transportation options that connect the Pe
  and the Southside across the Hampton Roads Ha
  enhance economic vitality and improve the quality
  the region

Hampton Roads Regional Connectors Study