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**November 2017**

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REPORT DOCUMENTATION

TITLE

Moving the Economy-
How Well the Hampton Roads Transportation System
Serves Three Key Economic Sectors:
Port, Military, and Hospitality

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REPORT DATE   November 2017

ABSTRACT

HRTPO staff prepared this study to inform the HRTPO Board how well the transportation system of Hampton Roads serves three key economic sectors—port, military, and hospitality.

TABLE OF CONTENTS

INTRODUCTION

The economic vitality of the Hampton Roads region is tied to the performance of its three main sectors:

1. Port
2. Military
3. Hospitality

HRTPO staff prepared this study to inform the HRTPO Board how well the transportation system of Hampton Roads serves three key economic sectors—port, military, and hospitality.

For decades, to improve the local economy, HRTPO staff has been measuring how well our transportation system serves the work trip (via peak period analyses), military (via military transportation studies), and freight movement (via intermodal studies). In this study HRTPO staff examines how well the Hampton Roads transportation system serves all three of the region's key economic sectors: port, military, and hospitality.

To do so, HRTPO staff compares how local transportation serves a given economic facility/area in Hampton Roads (e.g. the NIT port facility) to how local transportation serves other similar facilities/areas on the east coast.

Required steps:

a. choosing entities *by economic sector* (e.g. large ports on the East Coast), and
b. choosing transportation measures *for each economic sector* (e.g. population within four hours of ports)

PORTS

To inform the HRTPO Board how well the transportation system serves the Port of Virginia, HRTPO staff compared the transportation serving the port to the transportation serving other ports on the East Coast. Steps:

- choosing port regions for comparison of supporting transportation, and
- choosing and calculating measures of effectiveness

Port Regions for Comparison of Supporting Transportation

To identify port regions for comparison of supporting transportation, HRTPO staff chose the four largest ports (by container volume) on the east coast:

TABLE P1 Most-Active Container Ports on East Coast

Port	TEUs*, millions, 2016
Port of New York and New Jersey	6.25
Georgia Ports Authority	3.64
Port of Virginia	2.66
South Carolina Ports	2.00
* "TEUs": twenty-foot container equivalent units	

Source of data: Subject port authorities; subject ports.xlsx
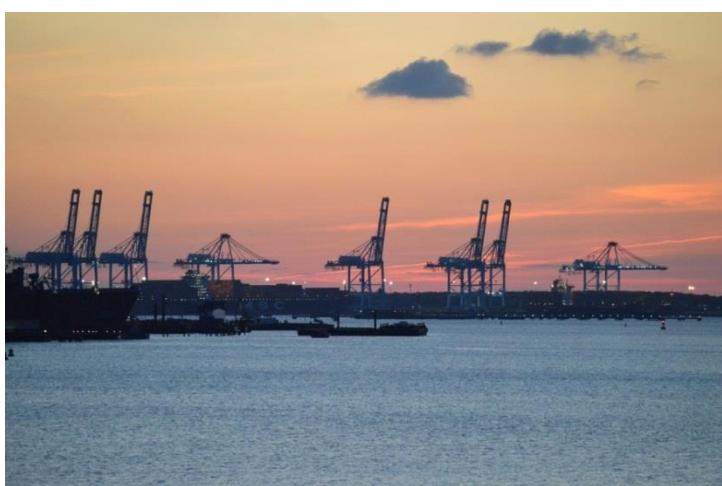
Virginia International Gateway
Source: HRTPO staff (VIG – small.jpg)
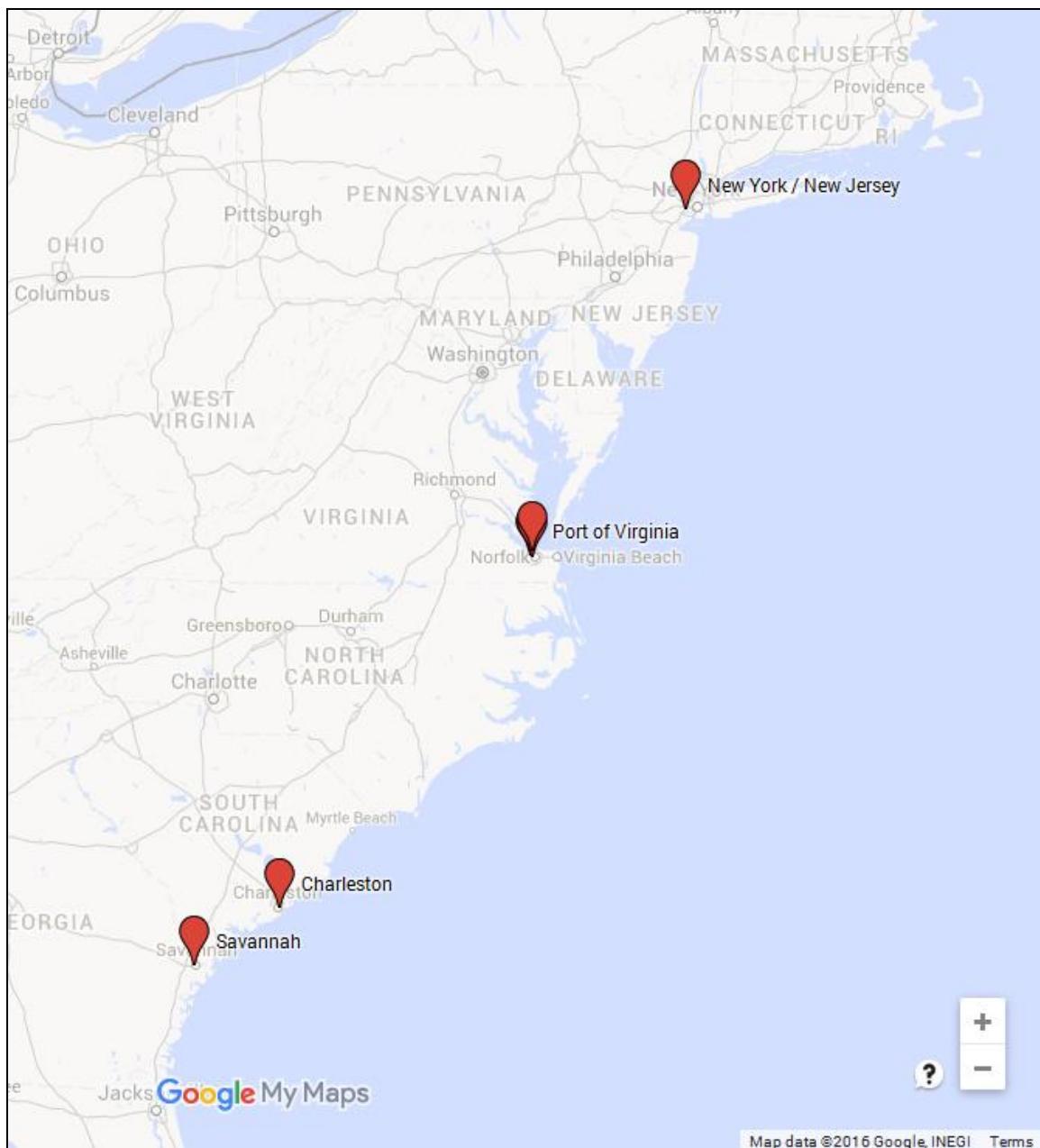
FIGURE P1 Most-Active Container Ports on East Coast
Source: Google My Maps by HRTPO

Measuring the Effectiveness of Transportation Serving the Port of Virginia

HRTPO staff compared how transportation serves the port to how local transportation serves other East Coast ports using the following measures of effectiveness (MOEs):

1. Size of Service Areas Provided by Highways Serving the Port
2. Time Necessary to Travel First 30 Highway Miles From Port
3. Class I Railroads Serving the Port
4. Channel Depth and Bridge Restriction from Ocean to Port

MOE#1: Size of Service Areas Provided by Highways Serving the Port

In order to determine how well the highway network (local and beyond) serves the Port of Virginia, HRTPO staff calculated the number of persons living within 2, 4, and 8 hours[1] of the local port and the other major East Coast ports. Truck costs (and therefore port competiveness) are a function of both distance (e.g. wear on tires) and time (e.g. number of turnarounds possible in one day). Because congestion on highways lowers average speed and thereby increases travel time, HRTPO staff used time to define service area size. Using travel time (2, 4, 8 hours) and estimated network speeds (NAVTEZ 2014) for noon on a weekday (6-28-16, a Tuesday) to define the service areas enables this MOE to reflect the impact of investing in high-speed, high-capacity highways such as interstates. HRTPO staff calculated the number of persons (ESRI 2014 population, by Census Tract) living within 2, 4, and 8 hours of the subject ports using GIS.
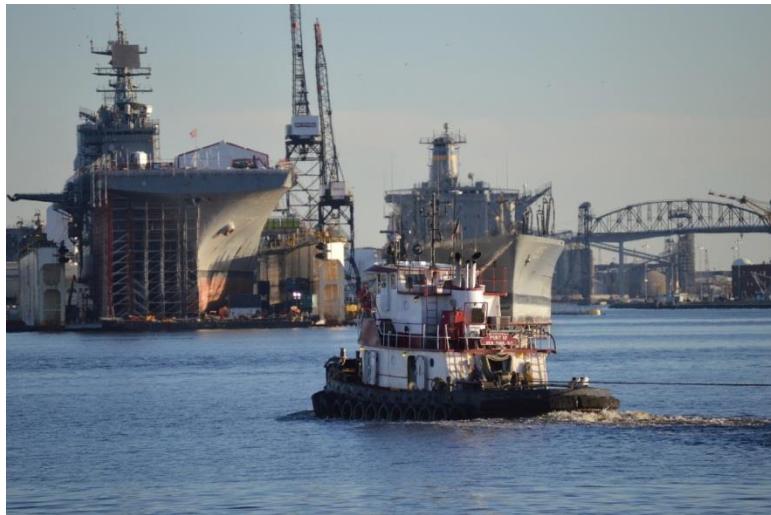
Tug in Elizabeth River
Source: HRTPO staff (tug – small.jpg)

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[1] Note that, due to federal requirements for driver rest, 8 hours is a longer trip than most drivers can make, and therefore represents a maximum.
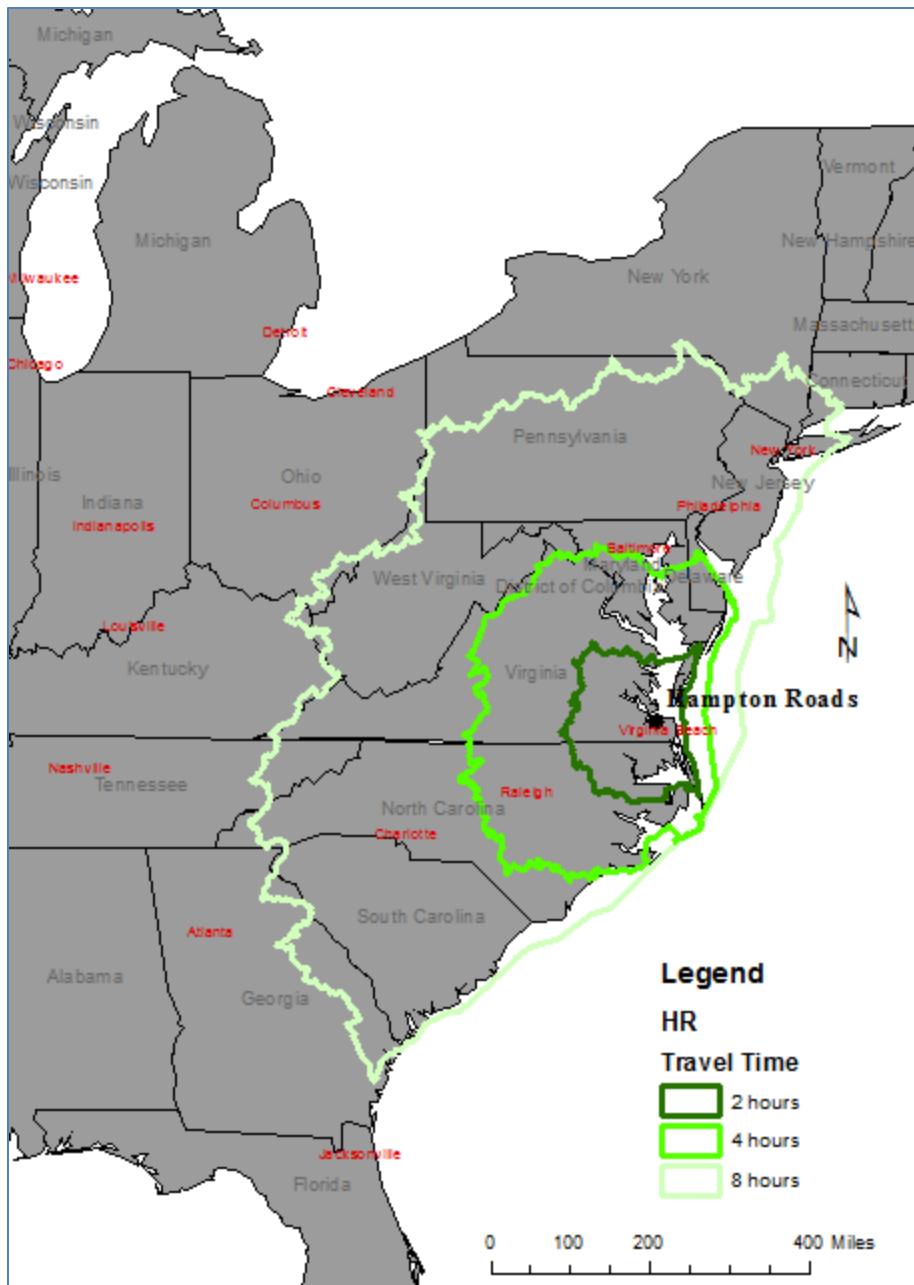
FIGURE P2 Highway Service Areas for Ports in Hampton Roads

Source: HRTPO staff calculation using ESRI (service areas for ports- take2.mxd)

Note that, due to the location of competing ports, although the ports in Hampton Roads may be competitive in the western portion of the 8-hour service area[2], it is likely not competitive in the northern portion and southern portion, those areas being proximate to the New York port and the Savannah port.

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[2] Note that, due to federal requirements for driver rest, 8 hours is a longer trip than most drivers can make, and therefore represents a maximum.

TABLE P2 Size of Service Areas Provided by Highways Serving the Port[3]

Port Location	2014 Population within 2 Hwy Hours of Port	2014 Population within 4 Hwy Hours of Port	2014 Population within 8 Hwy Hours of Port
Hampton Roads, VA	3,385,495	16,231,772	69,903,010
Savannah, GA	1,889,738	13,595,569	58,302,351
New York, NY	28,840,878	49,214,398	77,377,162
Charleston, SC	2,194,148	10,533,866	49,190,229

Source: HRTPO staff calculation using NAVTEQ network (2014) and ESRI population estimates (2014); east_coast_port_pop_bubbles.xlsx
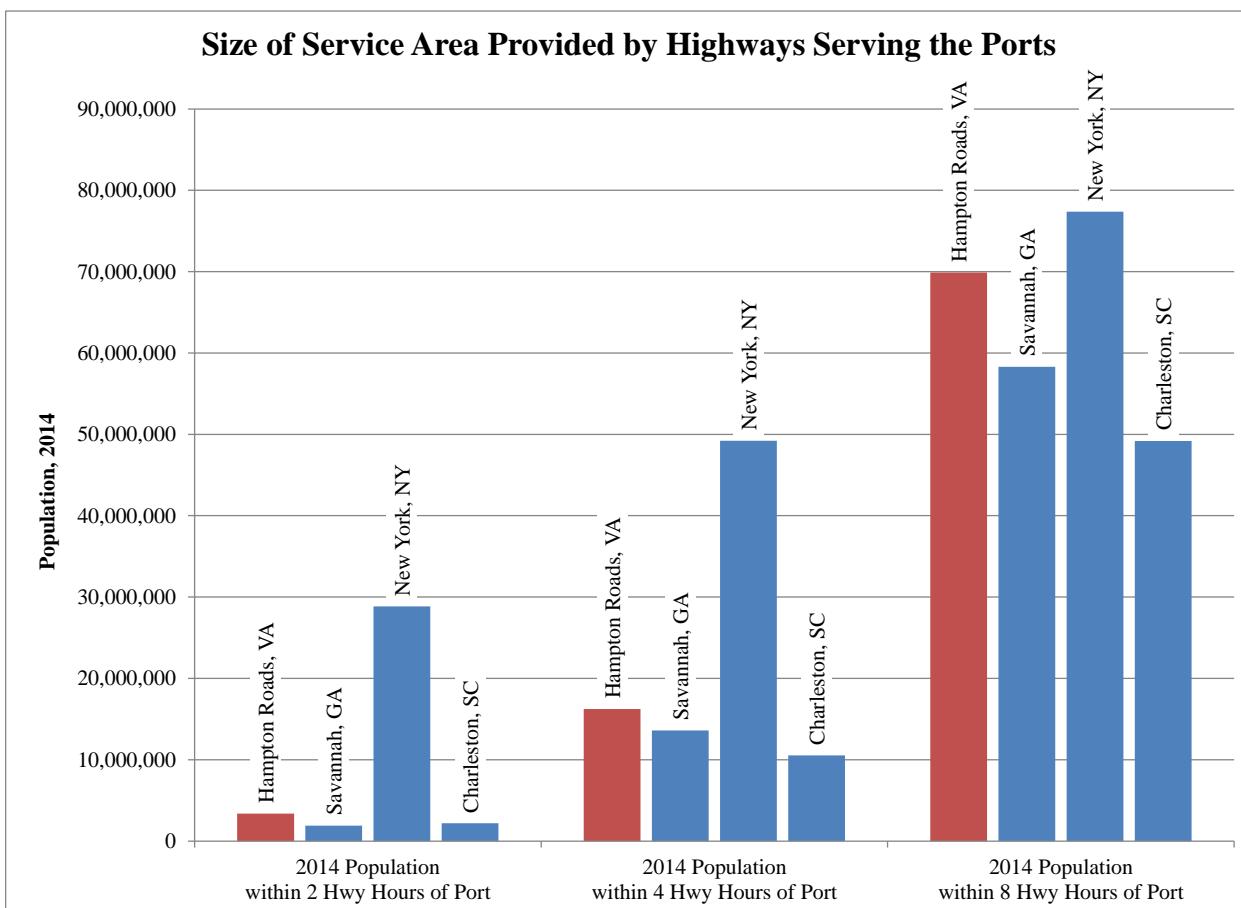
FIGURE P3

Source: HRTPO staff calculation using NAVTEQ network (2014 Q1) and ESRI population estimates (2014) (east_coast_port_pop_bubbles.xlsx)

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[3] Note that, due to federal requirements for driver rest, 8 hours is a longer trip than most drivers can make, and therefore represents a maximum.

Based on the above analysis HRTPO staff reports the following **findings** (1,2)[4]:

- Highways and land-use provide the ports in Hampton Roads with 2 and 4 hour service areas **greater than** those of the ports of Charleston and Savannah, but **significantly less than** that of the port of New York.

- Highways and land-use provide the ports in Hampton Roads with an 8-hour highway-based service area[5] population higher than that of Savannah and Charleston and **almost as high as that of New York**.

World Trade Center, Norfolk
Source: HRTPO staff (World Trade Center.jpg)

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[4] (1,2): 1st and 2nd findings in the port section.
[5] Note that, due to federal requirements for driver rest, 8 hours is a longer trip than most drivers can make, and therefore represents a maximum.

Consideration of Inland and River Ports The Port of Virginia offers two inland ports linked to Hampton Roads, increasing the effective service area of the ports in Hampton Roads:

- Richmond (via barge)
- Front Royal (via train)

Two of the other three subject ocean ports also have inland ports:

- Savannah: inland port at Cordele GA
- Charleston: inland port at Greer SC[6]
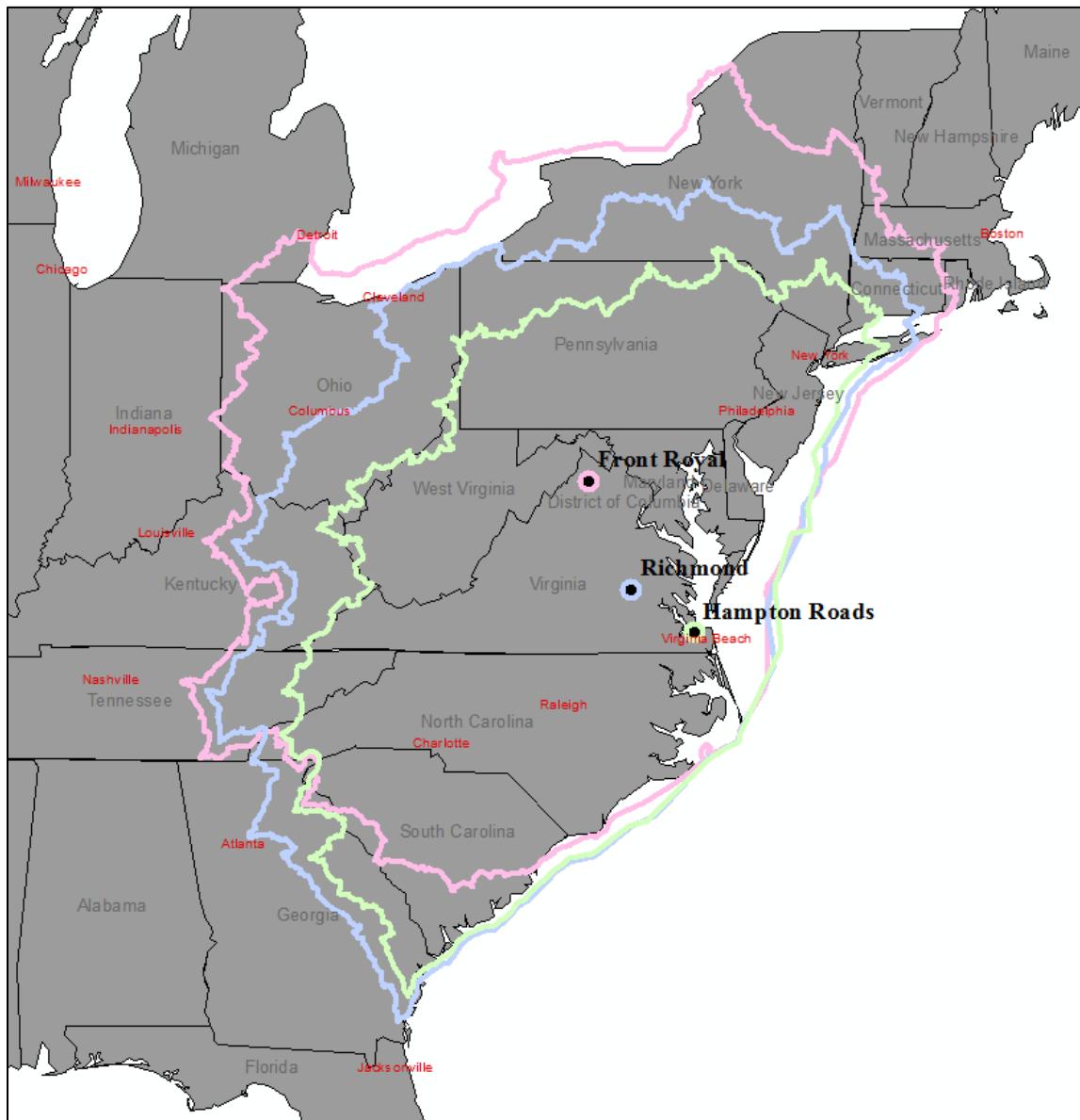
FIGURE P4 8- hour Highway Service Areas for Port of Virginia

Source: HRTPO staff calculation using ESRI (service areas for ports- take2.mxd)

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[6] By the end of 2017, Charleston will reportedly have a new inland port at Dillon SC.
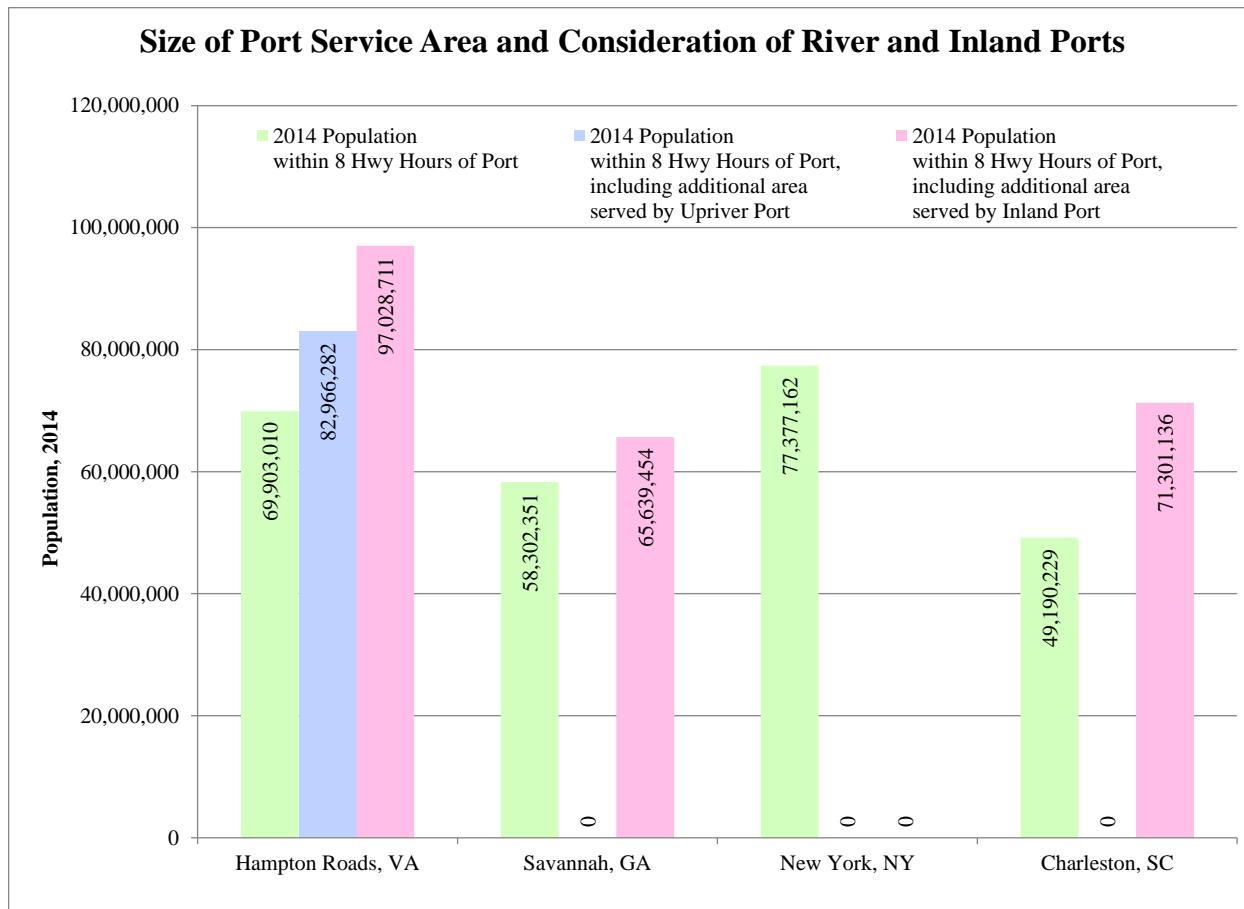
FIGURE P5

Source: HRTPO staff calculation using NAVTEQ network (2014 Q1) and ESRI population estimates (2014) (east_coast_port_pop_bubbles.xlsx)

As shown above, when considering a) the *upriver port* of Richmond that is served via barge from the ports in Hampton Roads, and b) the *inland ports* that serve three of the subject ocean ports, the ports in Hampton Roads **compare more favorably** to its competitors than when considering the locations of the four subject ocean ports alone.

Based on this analysis, HRTPO staff reports the following **finding** (3):

- When considering ports and their companion inland ports (where applicable), the Port of Virginia serves **more population within 8 highway hours**[7] than any other east coast port.

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[7] Note that, due to federal requirements for driver rest, 8 hours is a longer trip than most drivers can make, and therefore represents a maximum.

Increasing the Service Area Ports in Hampton Roads In order for transportation agencies such as the HRTPO to increase the size of the port service area, it must reduce *travel times* along the preferred truck routes between the port facilities and key gateways at the edge of the region. Truck travel times can be safely decreased in several ways: 1) widening an existing road throttled by congestion, 2) building a new high-speed alignment, 3) improving the signalization of an arterial highway, 4) converting an arterial highway into a limited-access highway, 5) dedicating a lane to trucks, and 6) lowering traffic volumes, e.g. via tolling.

In 2013, the HRTPO Board addressed congestion hotspots that affect many of these preferred truck routes when it recommended (10-17-2013) the application of HRTF funds to 5 projects:

1. I-64 Peninsula   (a widening)
2. I-64 Southside   (a widening)
3. I-64/I-264 Interchange   (a widening)
4. Hampton Roads Third Crossing   (new highways and a widening)
5. US 13/58/460 Connector   (conversion to limited-access)

On 20 Oct 2016, the HRTPO Board modified the 2013 set of 5 projects by recommending "Alternative A of the Hampton Roads Crossing Study SEIS to the Commonwealth Transportation Board" improving the HRBT, one of the key freight gateways. Although this set of 5 projects includes the US13/58/460 Connector which serves both the US 58 and US 460 freight gateways, **the increasing number of vehicles and traffic signals** along the portion of **US 58 west of the Suffolk Bypass** is increasing travel times on that freight gateway. In 2016, the HRTPO Chair signed memoranda of agreement with Southampton County and the City of Franklin including the commitment "to the completion of a **Rt. 58 Corridor Study** extending to the Greensville County line".

Based on this research, HRTPO staff reports the following **finding** (4):

• The current **Rt. 58 Corridor Study** is an important step in maintaining or even increasing the size of the service area of the ports in Hampton Roads.

According to HRTPO's *Hampton Roads Regional Freight Study* (2012), **I-64 on the Peninsula is the primary truck gateway** in Hampton Roads as shown below.
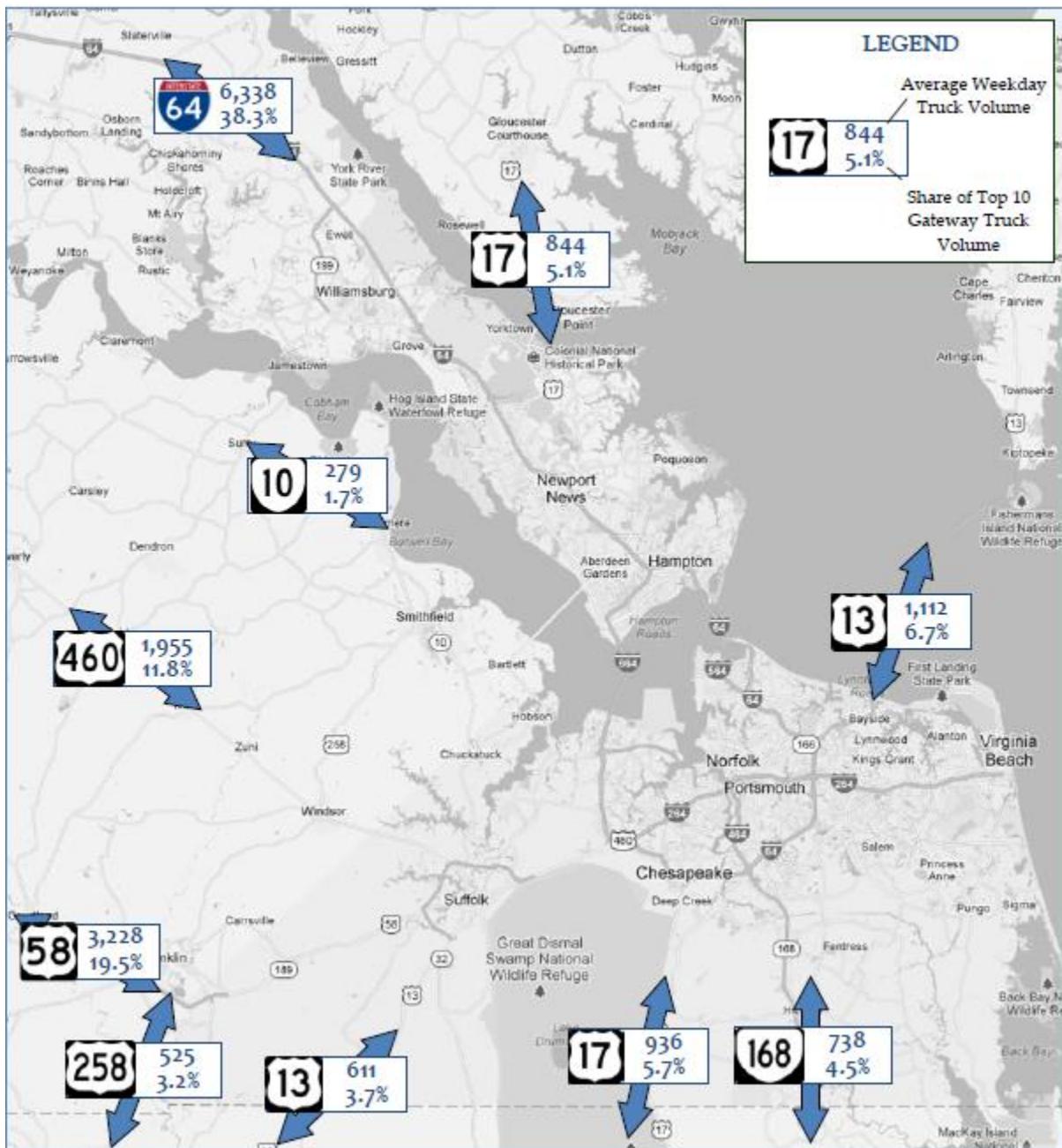

FIGURE P6 Top 10 Regional Truck Gateways, 2011
Source: *Hampton Roads Regional Freight Study*, HRTPO, 2012, p. 89.

Although a) the improvement of I-64 from Interstate I-295 (exit 200) to Bottoms Bridge (exit 205)—in the Richmond Metropolitan Planning Area (MPA)—received full funding from Smart Scale in 2016, and b) the Hampton Roads TPO's 2040 long-range transportation plan (LRTP) includes $891m for the entire improvement of I-64 from Lightfoot (exit 234) to Jefferson Ave (exit 255)[8], the 29-mile section between these two projects (i.e. exit 205 to exit 234) is not in the LRTP of either region. VDOT's *Traffic/Transportation Technical Memorandum* (Dec. 2013, p. 47)—a portion of the Final Environment Impact Statement (FEIS) for I-64 on the Peninsula— forecasts the future level-of-service (LOS) along this 29-mile gap as follows:

TABLE P3 2040 No-Build LOS, 29 Mile I-64 Gap (non-summer weekday peak)

From Exit	To Exit	County	EB, AM	EB, PM	WB, AM	WB, PM
205	211	New Kent	C	D	C	C
211	rest area	New Kent	C	D	C	C
rest area	214	New Kent	C	D	C	C
214	220	New Kent	C	D	C	C
220	227	NK/JCC	C	C	B	C
227	231	James City	D	D	C	D
231	234	JCC/York	E	D	C	E

Source: HRTPO reproduction of VDOT data (I-64 Peninsula EIS.xlsx)

Note that New Kent county is a member of the Richmond TPO.

Although the section in New Kent county is expected to operate mostly at LOS C (at worst, LOS D), the 7-mile section in James City County—Rte30/Stonehouse (exit 227) to Rte199/Lightfoot (exit 234)—is expected to operate mostly at LOS D (at worst, LOS E), i.e. significantly more congested than the New Kent section.

Based on this research, HRTPO staff reports the following **findings** (5,6):

- The 29-mile section of I-64 between exit 205 (Bottoms Bridge) and exit 234 (Lightfoot) is not in the LRTP of either region.

- VDOT's FEIS indicates that the **7-mile Rte30/Stonehouse (exit 227) to Rte199/ Lightfoot (exit 234)** section of I-64—in the HRTPO planning area just west of the fully-funded widening of I-64—will have **LOS C-E in 2040** but is **not in the 2040 LRTP**.

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[8] *Hampton Roads 2040 Long-Range Transportation Plan: Funding Plan and Fiscally-Constrained List of Projects* (HRTPO, June 2016), p. 17.

MOE#2: Time Necessary to Travel First 30 Highway Miles From Port

In order to determine how well the highway network in the Hampton Roads region serves the ports in Hampton Roads, HRTPO staff calculated the time necessary to travel the first 30 highway miles from the local port and the other major East Coast ports. Unlike the prior MOE (Size of Service Areas Provided by Highways Serving the Port) which reflects highway investments near to and *far from the port* (i.e. outside the purview of the HRTPO), examining travel time over a 30 mile distance enables this MOE to reflect the impact of *HRTPO planning and investment* in high-speed, high-capacity highways (such as interstates).

HRTPO staff used Google Maps to calculate the time necessary to travel the first 30 highway miles to/from the subject ports, under various travel conditions. On the charts on the following pages, HRTPO staff reports the average of three runs (from three different days, i.e. one run per day).
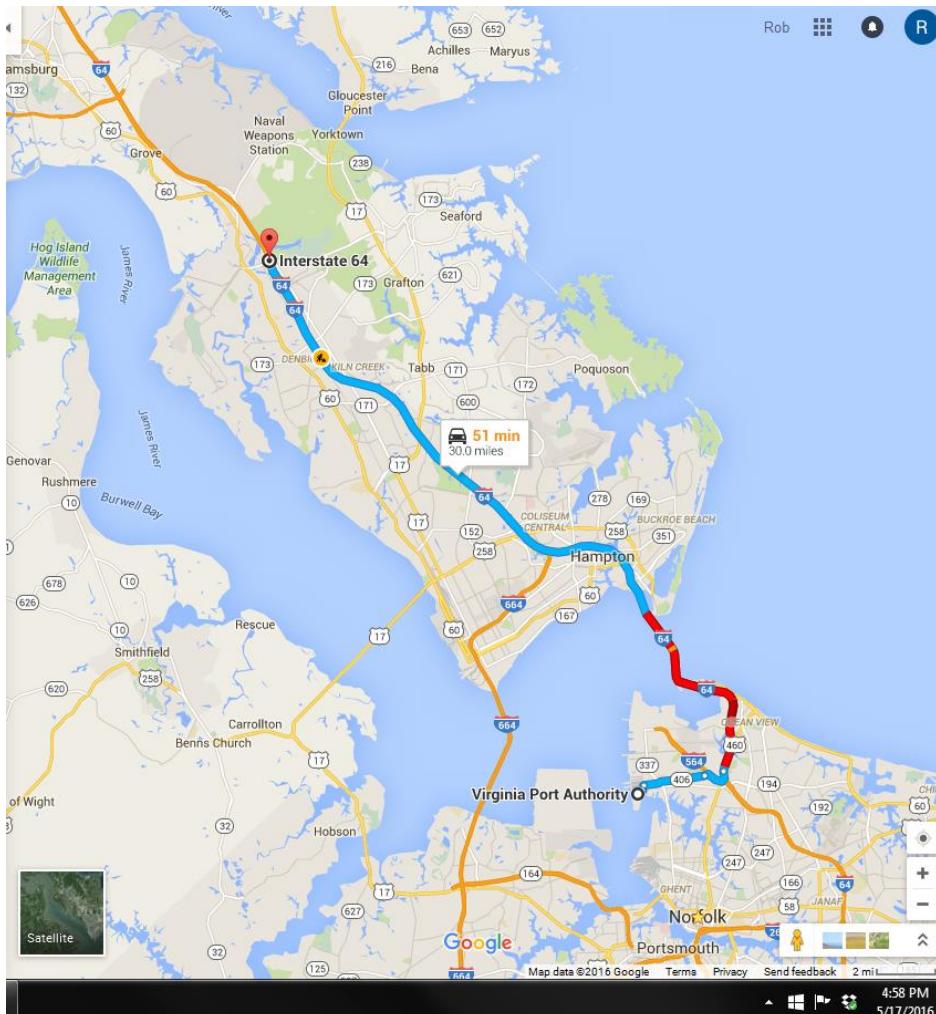
FIGURE P7 Example of First 30 Miles Outbound from NIT During PM Peak
Source: Google Maps by HRTPO

The chart below shows weekday travel time during the PM Peak (4pm-6pm).

Time Necessary to Travel First 30 Miles- <u>Weekday, PM Peak</u>
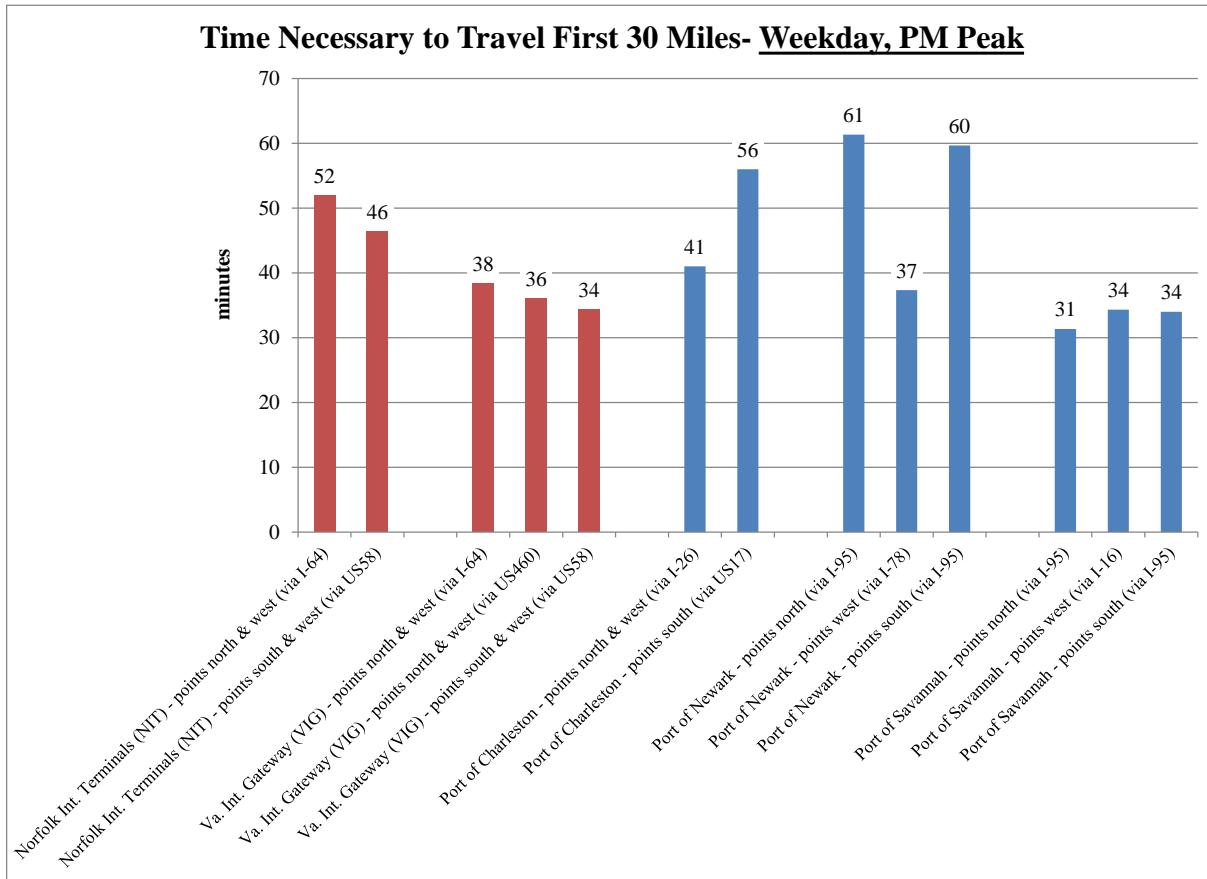
FIGURE P8

Source: HRTPO staff calculation using Google Maps (travel time data for ports.xlsx)

The data in the above figure (and background data included in Appendix A) indicate that limited-access highways—and low congestion on them—**give the Virginia International Gateway (VIG) a PM peak time advantage** over the ports of Charleston and Newark, whereas the moderately congested signalized arterials (International Terminal Blvd. and Hampton Blvd.) and **congested HRBT** serving the Norfolk International Terminals make the first 30 miles from NIT slower than that of VIG and Savannah. **Construction of the following projects** recommended by the HRTPO Board will improve port access to points north and west via I-64:

- HRBT (HRCS Alt A) serves NIT
- I-64 Peninsula serves all HR ports

Note also that, per MOU approved 3-16-17 by HRTAC, HRTPO will manage "Additional Feasibility Studies" for:

- Rte 164
- 164 Connector (serving Craney Island)
- I-564/I-664 Connectors ("Patriots Crossing"), and
- I-664 (including MMMBT)

using HRTF dollars not to exceed $3m.

Because access to points south and west via US 58—from all ports in Hampton Roads—are slowed by the traffic signals and lower speed limits along US 58 west of the Suffolk Bypass, the **current Rt. 58 Corridor Study** (mentioned above) is an important step in maintaining or even increasing the size of the service area of the ports in Hampton Roads.

Based on the above research, HRTPO staff reports the following **finding** (7):

- The HRTPO Board's recommendation to HRTAC of applying HRTF funding to the widening of I-64 on the Peninsula and the HRCS Alt A (HRBT) will reduce the congestion experienced by port trucks using HRBT/I-64, the primary truck gateway in Hampton Roads.

Travel Time Benchmark for I-64 In order to provide "before" data for projects that will improve travel times for port-related trucks—e.g. I-64 Peninsula widening and HRBT widening—HRTPO staff measured travel times from the port to I-295:

- from Norfolk International Terminals (NIT) to I-295 at I-64
- from Virginia International Gateway (VIG) to I-295 at US 460

using Google Maps on five (5) weekdays during the PM Peak (4pm-6pm).
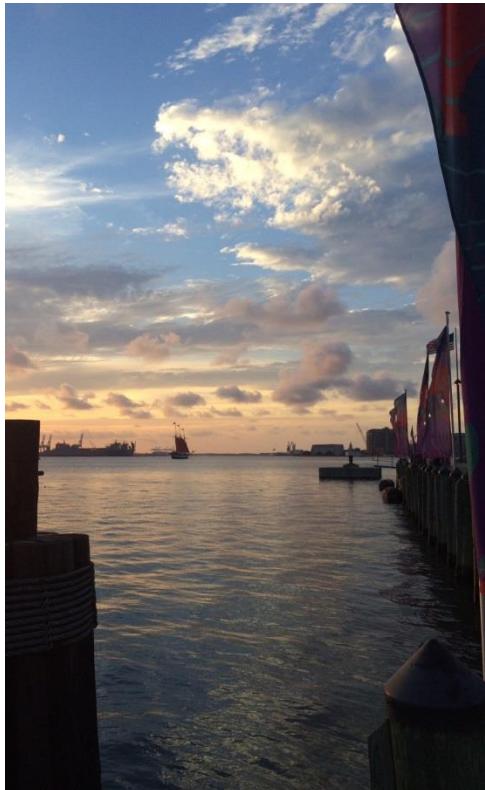
Elizabeth River
Source: HRTPO staff (down-river.jpg)
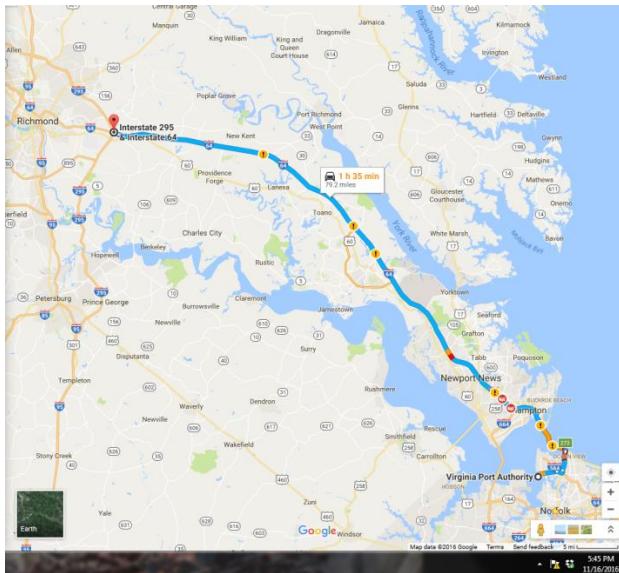
FIGURE P9 Example Travel Time from NIT to I-295 at I-64

Source: HRTPO staff calculation using Google Maps (ports.pptx)
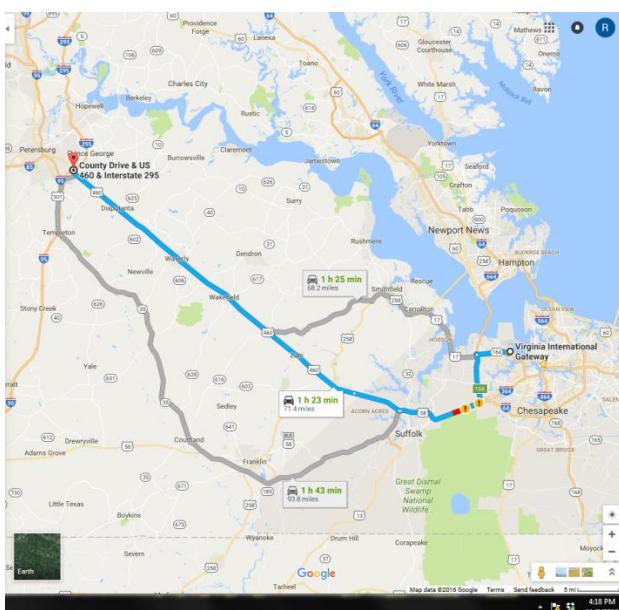
FIGURE P10 Example Travel Time from VIG to I-295 at US 460

Source: HRTPO staff calculation using Google Maps (ports.pptx)
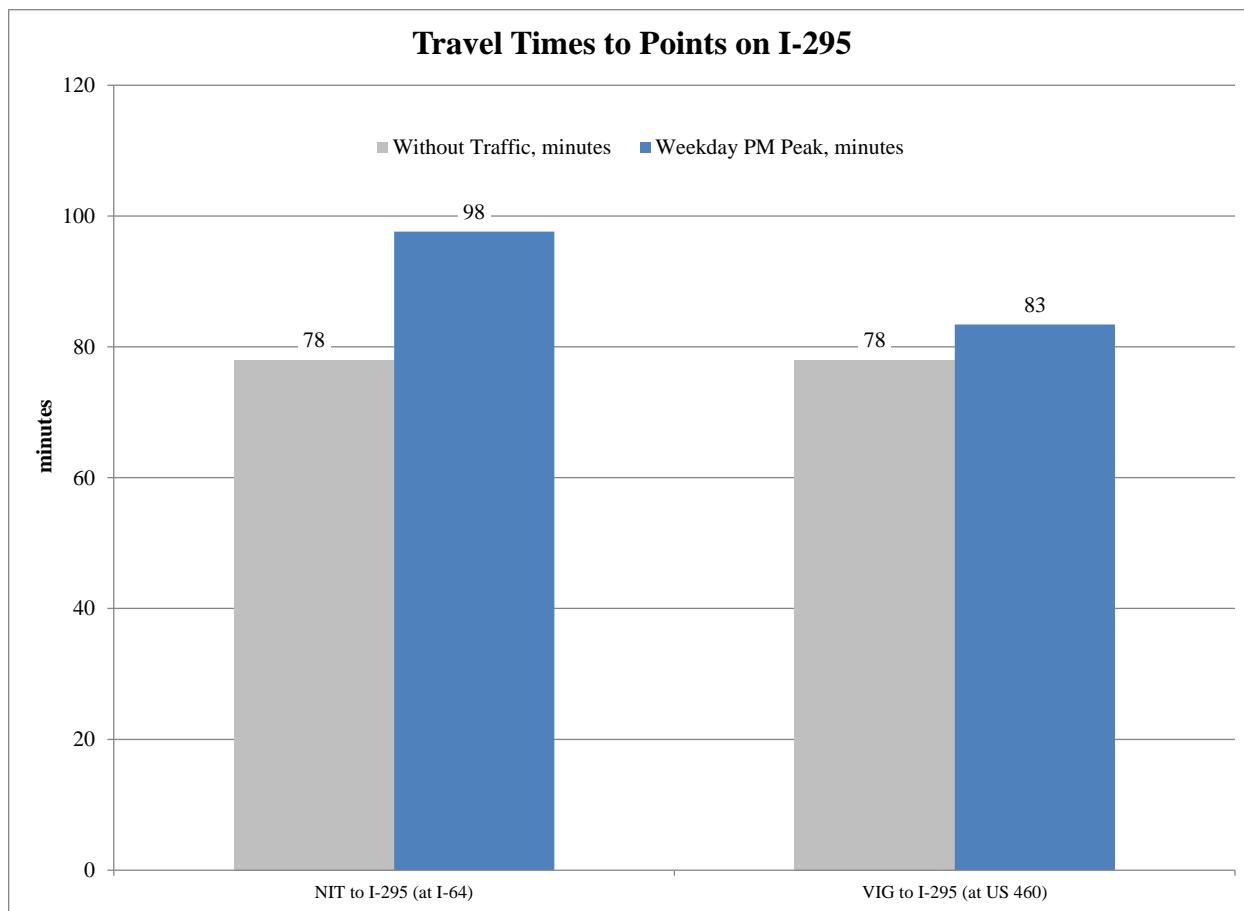
FIGURE P11

Source: HRTPO staff calculation using Google Maps (travel time data for ports.xlsx)

The above data shows that the current, pre-improvement, weekday PM peak travel times are as follows:

- NIT to I-295 at I-64   98 minutes (including 20 minutes of delay)
- VIG to I-295 at US 460   83 minutes (including 5 minutes of delay)

MOE#3: Class I Railroads Serving the Port

In order to determine how well the railroad network serves the ports in Hampton Roads, HRTPO staff gathered the number of Class I railroads serving the local port and the other major East Coast ports.

TABLE P4 Class I Railroads Serving the Port

Port	CSX	Norfolk Southern	Conrail	total
Ports of Hampton Roads (NIT, NNMT, VIG, PMT)	yes	yes	no	2
Port of Charleston	yes	yes	no	2
Port of New York & New Jersey (Newark)	yes	yes	yes	3
Port of Savannah	yes	yes	no	2

Source: gwrr.com, pnaynj.gov, scspa.com (railroads serving ports.xlsx)
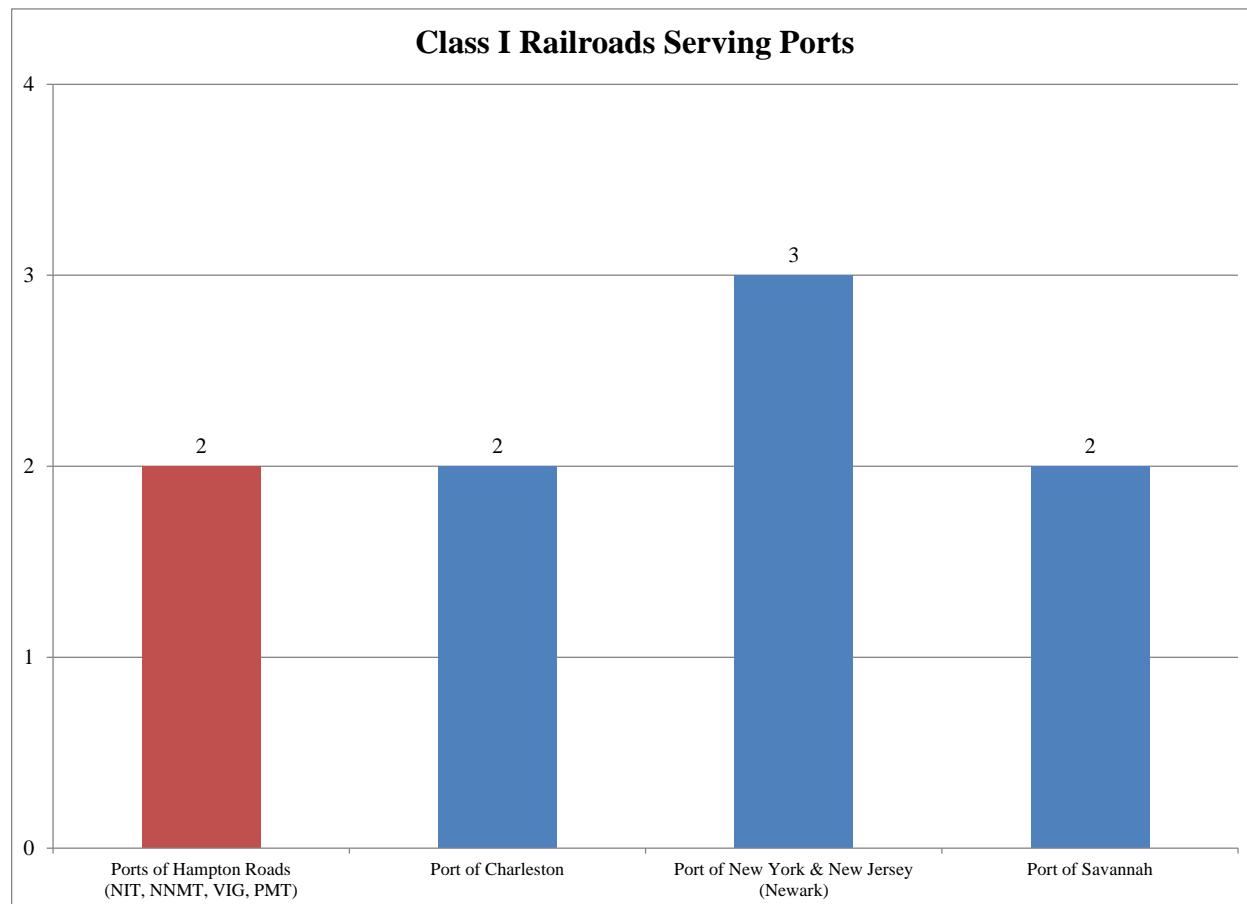
FIGURE P12

Source: gwrr.com, pnaynj.gov, scspa.com (railroads serving ports.xlsx)

Hampton Roads, like most of its competitors, is served by two Class I railroads.

It should be noted that the Commonwealth Railway (CWRY) joins the Class I railroads to the Virginia International Gateway (VIG) port facility as shown below.
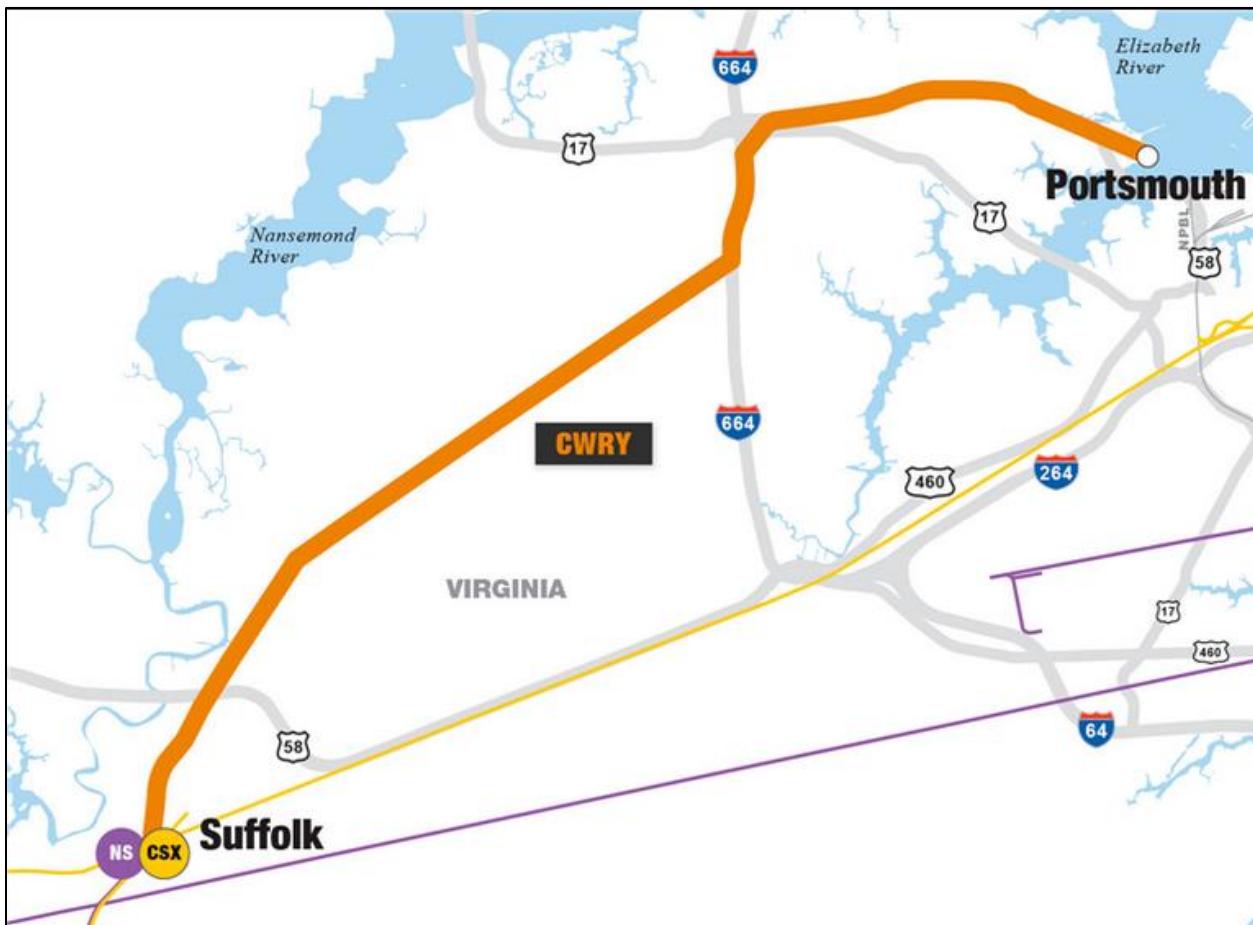
FIGURE P13 Commonwealth Railway (CWRY)
Source: https://www.gwrr.com/railroads/north_america/commonwealth_railway#m_tab-one-panel

The VIG is located on the Elizabeth River just north of the eastern end of the CWRY. As shown above, a portion of the CWRY was recently relocated in the median of I-664 and—east of I-664—in the median of Rte 164. West of I-664, however, the CWRY still has **fifteen (15) at-grade (AG) roadway crossings**: two (2) in Chesapeake and thirteen (13) in Suffolk as shown on the following pages.
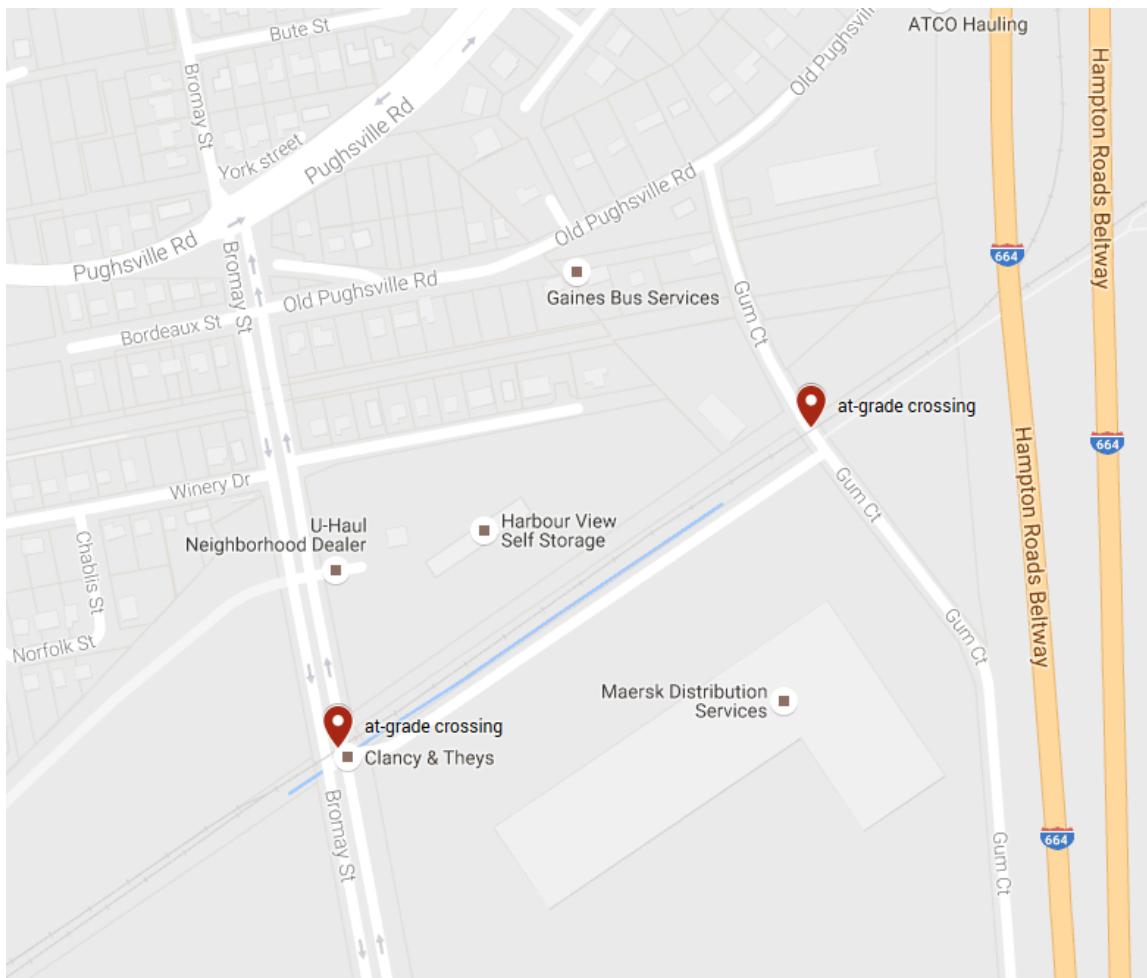
FIGURE P14 Two (2) CWRY Roadway-Rail Crossings in Chesapeake
Source: Google My Maps by HRTPO

TABLE P5 Thirteen (13) Roadway-Rail Crossings in Suffolk

ID No.	Street Name	RR	Xing Type *	Lanes	Tracks	Area	Pvmt Markings	Signs	Lights	Gates
Commonwealth Rail (Norfolk Southern to Chesapeake CL)										
15	N 5th Street/Saul Street	CWRY	AG	2	2	Res	X	X	X	X
16	Portsmouth Boulevard	CWRY	GS							
17	Saunders Drive	CWRY	AG	2	1	Res				
18	Suburban Drive	CWRY	AG	2	1	MU	X	X	X	X
19	Prospect Road	CWRY	AG	2	1					
20	Olde Mill Creek Road	CWRY	AG	2	1	Res		X	X	X
21	Suffolk Northern Bypass 1 (Wilroy)	CWRY	GS							
22	QVC Entrance	CWRY	AG	2	1	Ind			X	X
23	Progress Road	CWRY	AG	3	1	Res		X	X	X
24	Rodney Lane	CWRY	AG	2	1	Res				
25	Nansemond Parkway 2 (Wilroy)	CWRY	AG	2	1	Rur	X	X	X	X
26	Sportsman Boulevard	CWRY	AG	2	1	Res		X		
27	Day Farm Lane	CWRY	AG	2	1	Rur				
28	Nansemond Parkway 1	CWRY	AG	2	1	Res	X	X	X	X
29	Shoulders Hill Road	CWRY	AG	2	1	Res	X	X	X	X

Source: *Suffolk Rail Impact Study*, HRTPO, May 2007, p. 10

Crossing No.	Street Name	Crossing No.	Street Name
15	N 5th Street/Saul Street	30	Kingsale Rd
16	Portsmouth Boulevard	31	Indian Trail
17	Saunders Drive	32	Buckhorn Dr
18	Suburban Drive	33	Kenyon Rd
19	Prospect Road	34	Lake Cohoon Rd
20	Olde Mill Creek Road	35	W Constance Rd
21	Suffolk Northern Bypass 1 (Wilroy)	36	N Broad Street
22	QVC Entrance	37	Pine Street
23	Progress Road	38	N Main Street
24	Rodney Lane	39	Pinner Street
25	Nansemond Parkway 2 (Wilroy)	40	Liberty Street/Moore Ave
26	Sportsman Boulevard		
27	Day Farm Lane		
28	Nansemond Parkway 1		
29	Shoulders Hill Road		

FIGURE P15 Roadway-Rail Crossings in Suffolk

Source: *Suffolk Rail Impact Study*, HRTPO, May 2007, p. 3

Because autos must give way to trains at at-grade highway/rail crossings, those crossings tend to be more problematic for the motoring public than for the customers served by the railroad, in this case the Port of Virginia. If, however, the Port uses federal funds for improving VIG or building the proposed Craney Island terminal, those funds may come with the requirement of reducing auto/rail conflicts along railroads serving those facilities, e.g. Commonwealth Railway (CWRY).

Concerning the at-grade crossings along the CWRY, the Master Rail Plan for the Port of Virginia recommends:

> "Designate a lead individual or entity to explore programs to assist communities with coordination, planning, and **funding of improvements to mitigate rail impacts**, including quiet zones, crossing safety improvements, and grade-separated crossings, with short-term emphasis on the **Commonwealth Railway corridor**…."[9]

The City of Suffolk has developed a project to address rail-auto conflicts at one crossing of the CRWY:

> "The proposed project will provide for a grade separated crossing of the Commonwealth Railway at Nansemond Parkway and will realign the intersection of Wilroy Road and Nansemond Parkway to provide for better geometrics and to address a number of safety concerns and intersection capacity concerns at the intersection."[10]

Based on this research, HRTPO staff reports the following **finding** (8):

- The Commonwealth Railway serving the Virginia International Gateway has **fifteen (15) at-grade (AG) roadway crossings**: two (2) in Chesapeake and thirteen (13) in Suffolk, including Nansemond Parkway for which the City of Suffolk is pursuing a grade separation project.

According to port staff, the at-grade rail crossing of Hampton Blvd near Terminal Blvd just outside the gate of Norfolk International Terminals (NIT) carries even more rail traffic than the above CWRY.[11] This rail traffic combined with the 35,000 vehicles crossing these tracks each weekday[12] creates a considerable conflict.

Based on this research, HRTPO staff reports the following **finding** (9):

- The 35,000 vehicles of Hampton Blvd crossing the railroad tracks serving NIT near its gate creates a considerable conflict of modes.

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[9] *Master Rail Plan for the Port of Virginia*, Office of Intermodal Planning and Investment, 16 April 2015, p. 67.
[10] 21 Mar 2017 email from Sherry Earley (Suffolk) to Rob Case (HRTPO).
[11] Comments attached to 13 Feb 2017 letter from Cathie Vick (Port of Virginia) to Robert Crum (HRTPO).
[12] *Volumes, Speeds, and Congestion on Major Roadways in Hampton Roads*, HRTPO, Jan. 2017.

TABLE P6 Rail Hubs Served, by Port

Charleston	VIG	NIT	Savannah	New York/ New Jersey
via Norfolk Southern				
Austell, GA	Chicago, IL	Atlanta, GA	Austell, GA	Chicago, IL
Birmingham, AL	Cleveland, OH	Chicago, IL	Birmingham, AL	Kansas City, MO
Charlotte, NC	Columbus, OH	Cleveland, OH	Charlotte, NC	Pittsburgh, PA
Chicago, IL	Detroit, MI	Columbus, OH	Chicago, IL	Cleveland, OH
Cincinnati, OH	Front Royal, VA	Dallas, TX	Cincinnati, OH	Columbus, OH
Dallas, TX	Greensboro, NC	Detroit, MI	Dallas, TX	Detroit, MI
Greer, SC	HIG (1), WV	Front Royal, VA	Huntsville, AL	Harrisburg, PA
Huntsville, AL	Kansas City, MO	Greensboro, NC	St. Louis, MO	Sharonville, OH
Louisville KY	Louisville, KY	HIG (1), WV	Kansas City, MO	St. Louis, MO
Memphis, TN	St. Louis, MO	Kansas City, MO	Louisville, KY	
St. Louis, MO	Sharonville, OH	Louisville, KY	New Orleans, LA	
		St. Louis, MO	Memphis, TN	
		Sharonville, OH		
via CSX				
Atlanta, GA	Chicago, IL	Chicago, IL	Chicago, IL	Bedford Park, IL
Bessemer, AL	Cincinnati, OH	Cincinnati, OH	Cincinnati, OH	Buffalo, NY
Charlotte, NC	Cleveland, OH	Cleveland, OH	Cleveland, OH	Bessemer, AL
Chicago, IL	Columbus, OH	Columbus, OH	Columbus, OH	Cincinnati, OH
Cincinnati, OH	Detroit, MI	Detroit, MI	Detroit, MI	Cleveland, OH
Denver, CO	St. Louis, MO	St. Louis, MO	St. Louis, MO	Columbus, OH
Fairburn, GA	Evansville, IN	Evansville, IN	Evansville, IN	Detroit, MI
Jacksonville, FL	Kansas City, MO	Kansas City, MO	Kansas City, MO	St. Louis, MO
Laredo, TX	Louisville, KY	Louisville, KY	Louisville, KY	Evansville, IN
Las Vegas, NV	NW Ohio, OH	NW Ohio, OH	NW Ohio, OH	Kansas City, MO
Lathrop, CA	Valleyfield, QC	Valleyfield, QC	Valleyfield, QC	Louisville, KY
Los Angeles, CA				Nashville, TN
Louisville, KY				NW Ohio, OH
Memphis, TN				Stockbridge, MA
Miami, FL				Valleyfield, QC
Mobile, AL				
Nashville, TN				
New Orleans, LA				
Oakland, CA				
Phoenix, AZ				
Portland, OR				
Rio Valley, TX				
San Antonio, TX				
SPA (2), GA				
Salt Lake City, UT				
Sparks, NV				
Tacoma, WA				
Tampa, FL				
Tucson, AZ				

(1) HIG: Heartland International Gateway
(2) SPA: Savannah Port Authority

TABLE P7 On-Dock Rail and Double-Stack Capability

		On-Dock Rail	Double-Stack Capable
Port of Virginia			
	CSX	Yes	Yes
	Norfolk Southern	Yes	Yes
Port of Charleston			
	CSX	Yes	Yes
	Norfolk Southern	Yes	Yes
Port of New York & New Jersey			
	<u>Port Elizabeth</u>		
	CSX	Yes	Yes
	Norfolk Southern	Yes	Yes
	Conrail	Yes	Yes
	<u>Port Newark</u>		
	CSX	Yes	?
	Norfolk Southern	No	No
	Conrail	Yes	Yes
	<u>Staten Island</u>		
	CSX	Yes	?
	Norfolk Southern	Yes	?
	Conrail	No	?
Port of Savannah			
	CSX	Yes	Yes
	Norfolk Southern	Yes	Yes

Source: 30 Mar 2017 email from Jeff Florin (POV); data from POV.xlsx

Based on the above research, HRTPO staff reports the following **findings** (10,11):

- Based on the rail hubs table (previous page); the Port of Virginia, Port of Savannah, and Port of New York & New Jersey serve a similar number of rail hubs; and the Port of Charleston serves the most rail hubs.

- Based on table above, the Port of Virginia—like the Port of Charleston and the Port of Savannah—has on-dock rail and double-stack capability for two railroads, whereas the Port of New York & New Jersey's capabilities differ by individual port facility.

MOE#4: Channel Depth and Bridge Restriction from Ocean to Port

In order to determine how well federal and state government have provided the ports in Hampton Roads channel depths to accommodate today's massive container ships, HRTPO staff compared the current and planned depth of Hampton Roads' channels to those of competing ports.

TABLE P8 Channel Depth and Bridge Restriction

Port	Current Channel Depth, 2016, ft	Planned Channel Depth, 2016, ft	Timing	Current Ship Height Restriction (bridge clearance), 2016, ft
Ports of Hampton Roads (NIT, NNMT, VIG, PMT)	50 (10)	55	n.a. (1)	None (2)
Port of Charleston	45 (4)	52	2019 (12)	185 (5)
Port of New York & New Jersey (Newark)	50 (10)	n.a.	n.a. (8)	151 (3)
Port of Savannah	42 (10)	47	n.a. (11)	185 (7)

Sources
(1) "Panama Canal Expansion Study - Phase I Report", US Maritime Administration, Nov. 2013, p. 48.
(2) There are no bridges between the port and the ocean.
(3) http://www.panynj.gov/bridges-tunnels/bayonne-bridge-facts-info.html
(4) http://www.scspa.com/cargo/channel-specifications/
(5) Nautical Chart 11518, NOAA, May 2015
(6) [blank]
(5) Nautical Chart 11514, NOAA, Oct 2014
(8) deepened in 2016
(9) [blank]
(10) "The Port of Virginia Infrastructure Update - Norfolk", The Port of Virginia, 16 Feb 2012, p. 12
(11) http://www.sas.usace.army.mil/Missions/Civil-Works/Savannah-Harbor-Expansion/
(12) http://www.scspa.com/keeping-freight-moving/
(channel depth and bridge height.xlsx)

Based on the above research, HRTPO staff reports the following **finding** (12):

- Compared to its east coast competitors, the port of Hampton Roads:

  o currently has the deepest channel (along with Newark)
  o plans to still have the deepest channel in the future
  o is the only port having no bridge height restriction.

It should be noted that Bill Cofer, a Port Authority commissioner and president of the Virginia Pilot Association, has stated that the local **shipping channel also must be widened**:

> "As ships get bigger, however, so does the need to ensure adequate width, especially in the Thimble Shoal Channel, which needs to be 1,400 feet wide, Cofer said."[13]

Port Recap

Summary Map

A map summarizing transportation infrastructure discussed above serving the ports in Hampton Roads is provided below.
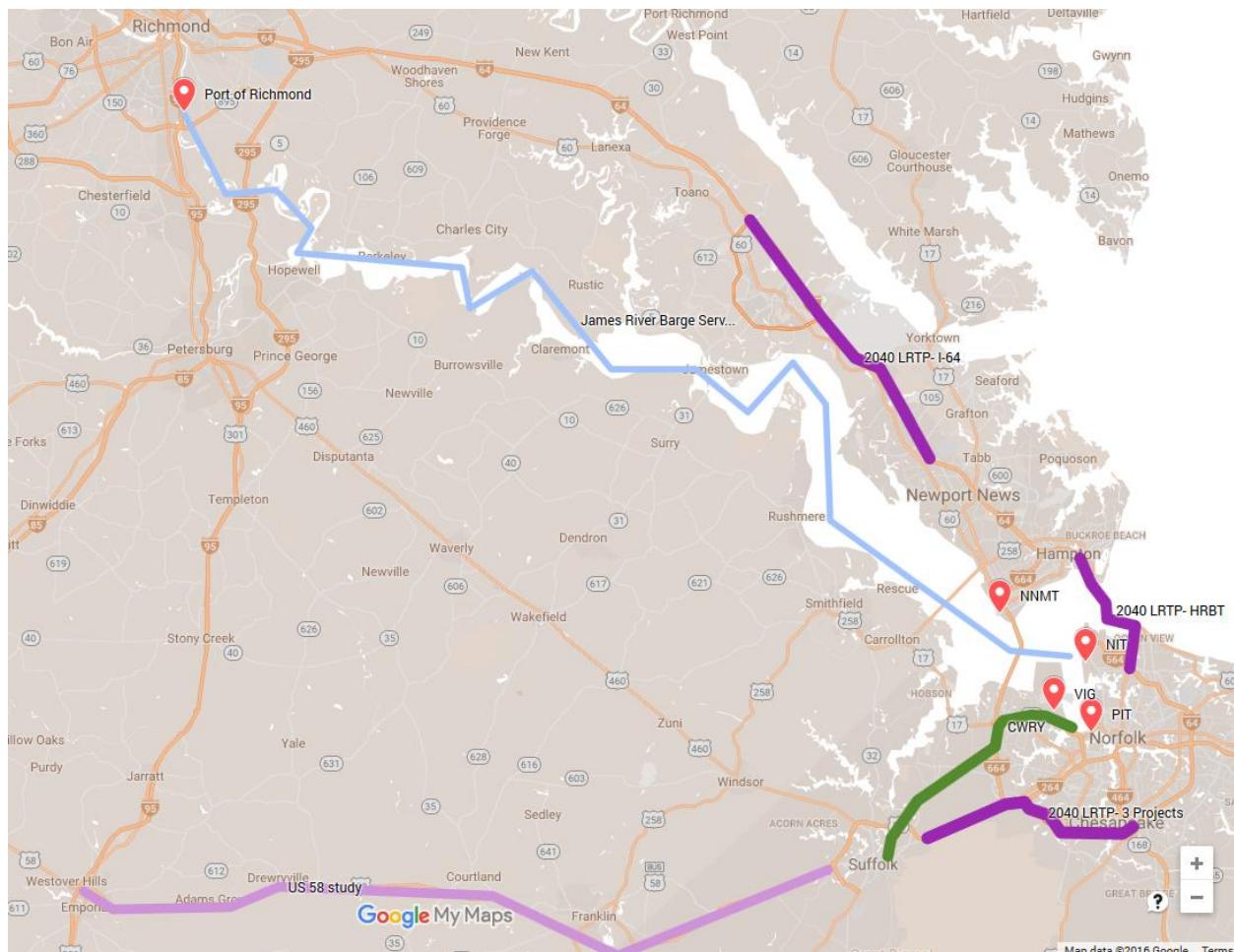
FIGURE P16 Subject Transportation Serving the Ports in Hampton Roads
Source: Google My Maps by HRTPO

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[13] http://pilotonline.com/business/ports-rail/shipping-leaders-want-hampton-roads-to-have-the-deepest-water/article_5636f1b6-70fc-5a30-9cf4-17ddd8e94c68.html

Recap of Key Findings for Serving the Port

The above report section contains 12 findings, 10 *key* findings of which are repeated below:

- Highways and land-use provide the ports in Hampton Roads with 2 and 4 hour service areas **greater than those of the ports of Charleston and Savannah**, but significantly less than that of the port of New York.

- When considering ports and their companion inland ports (where applicable), the Port of Virginia serves more population within 8 highway hours **than any other east coast port.**

- The current **Rt. 58 Corridor Study** is an important step in maintaining or even increasing the size of the service area of the ports in Hampton Roads.

- The **29-mile section of I-64** between exit 205 (Bottoms Bridge) and exit 234 (Lightfoot) is not in the LRTP of either region.

- VDOT's FEIS indicates that the **7-mile Rte30/Stonehouse (exit 227) to Rte199/ Lightfoot (exit 234)** section of I-64—**in the HRTPO planning area**—will have LOS C-E in 2040 but is **not in the 2040 LRTP**.

- The HRTPO Board's recommendation of applying HRTF $'s to the **widening of I-64 on the Peninsula and the HRCS Alt A (HRBT)** will reduce the congestion experienced by port trucks using HRBT/I-64, the primary truck gateway in Hampton Roads.

- The Commonwealth Railway serving VIG has **fifteen (15) at-grade (AG) roadway crossings**: two (2) in Chesapeake and thirteen (13) in Suffolk, including Nansemond Parkway for which the City of Suffolk is pursuing a grade separation project.

- The 35,000 vehicles of Hampton Blvd crossing the railroad tracks serving NIT near its gate creates a considerable conflict of modes.

- The Port of Virginia—like the Port of Charleston and the Port of Savannah—has on-dock rail and double-stack capability for two railroads, whereas the Port of New York & New Jersey's capabilities differ by individual port facility.

- Compared to its east coast competitors, the Hampton Roads ports:

    o currently has the **deepest channel** (along with Newark)
    o plans to still have the deepest channel in the future
    o is the only port having **no bridge height restriction**.

MILITARY

To determine how well the Hampton Roads transportation system serves the military, HRTPO staff used several measures of effectiveness (MOEs) to compare—from the point of view of military workers—the local transportation system to that of other Atlantic Coast military facilities.

Regions for Comparison of Transportation Supporting the Military

To find a set of regions on the East Coast with concentrations of military, HRTPO staff processed Census Transportation Planning Products (CTPP) data organized by location of work. Using this data HRTPO staff identified 14 military facilities in states on the Atlantic Coast that contained more than 5,000 armed forces industry workers (see Table M2 below for details). HRTPO staff then added six (6) additional facilities suggested by the Hampton Roads Military and Federal Facilities Alliance (HRMFFA). HRTPO staff also consulted representatives of the local Navy planning office who suggested adding two (2) additional facilities: Seymour Johnson Air Force Base and Naval Air Station Jacksonville.

In total, 22 military facilities in 14 regions were analyzed for this study (list on following page).

Navy Ships along Southern Branch of Elizabeth River
Source: HRTPO staff

TABLE M1 Subject Military Regions and Facilities

1   Augusta-Richmond County, GA-SC MSA
      1   Fort Gordon

2   Beaufort County, SC
      2   USMC Parris Island

3   Columbia, SC MSA
      3   Fort Jackson

4   Columbus, GA-AL MSA
      4   Fort Benning

5   Crestview-Fort Walton Beach-Destin, FL MSA
      5   Eglin Air Force Base

6   DC-Arlington-Alexandria MSA
      6   Joint Base Andrews
      7   Fort Belvoir
      8   MC Base Quantico
      9   Joint Base Anacostia-Bolling

7   Fayetteville, NC MSA
      10   Fort Bragg

8   Goldsboro, NC MSA
      11   Seymour Johnson Air Force Base

9   Jacksonville, FL MSA
      12   Naval Station Mayport
      13   Naval Air Station Jacksonville (FL)

10   New Bern, NC MSA
      14   MCAS Cherry Point

11   Jacksonville, NC MSA
      15   Camp Lejeune

12   Pensacola-Ferry Pass-Brent, FL MSA
      16   Naval Air Station Pensacola

13   Savannah-Hinesville-Statesboro, GA CSA
      17   Fort Stewart

14   Va Beach-Norfolk-Newport News MSA
      18   Fort Eustis
      19   Langley Air Force Base
      20   Naval Station Norfolk
      21   Joint Base Little Creek-Fort Story
      22   Naval Air Station Oceana

Note: "MSA": Metropolitan Statistical Area; "CSA": Consolidated Statistical Area.
Source: Census, HRMFFA, US Navy (subject military facilities list.xlsx)
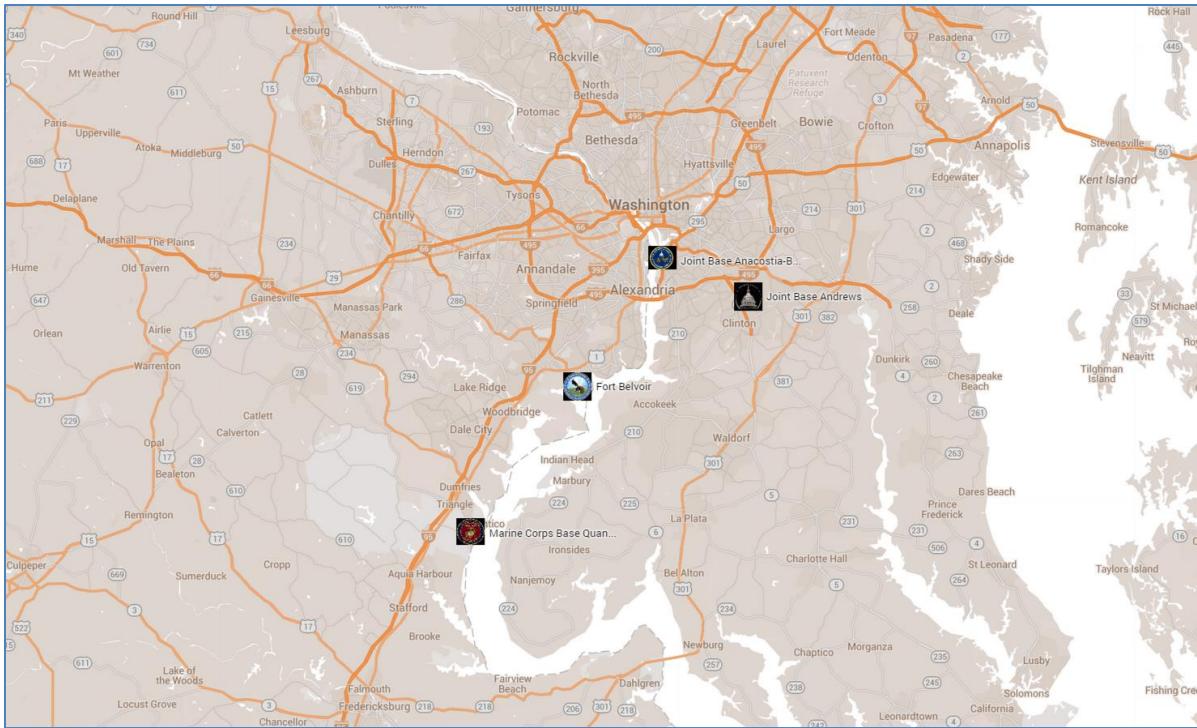
FIGURE M1 Military Facilities- Washington DC Metro Area
Source: Google Earth by HRTPO staff
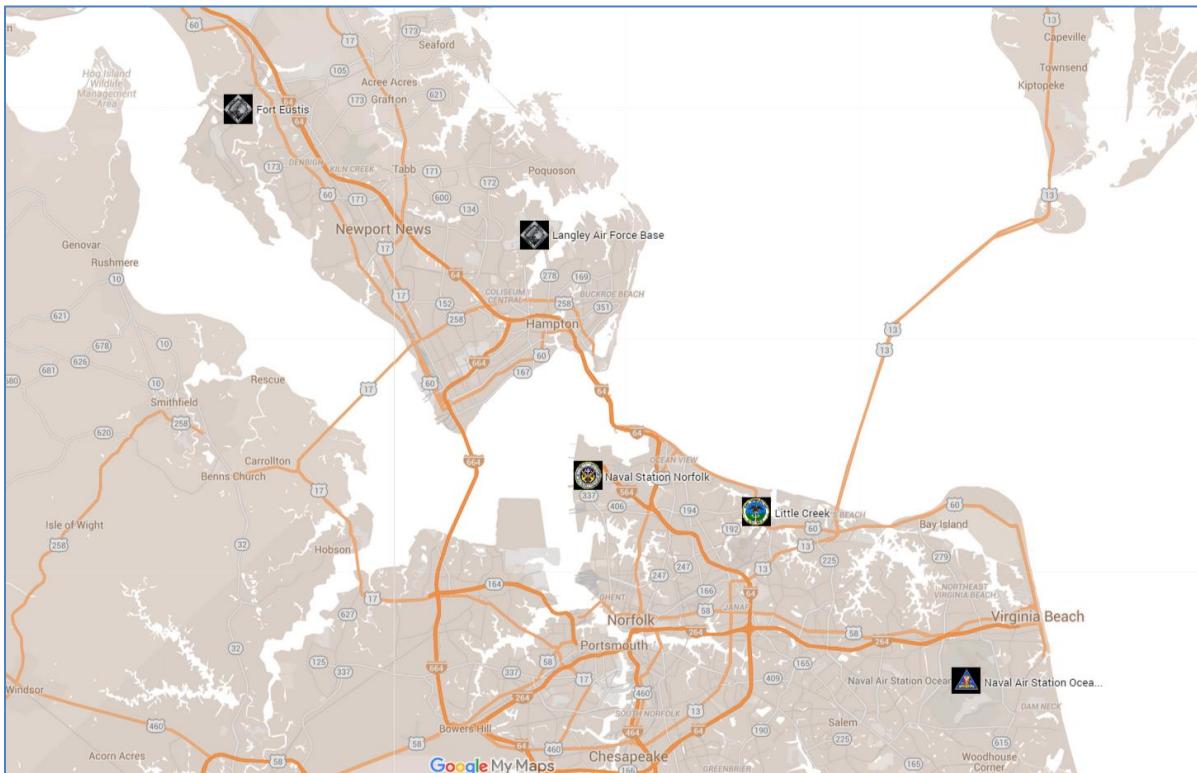
FIGURE M2 Military Facilities- Hampton Roads
Source: Google Earth by HRTPO staff
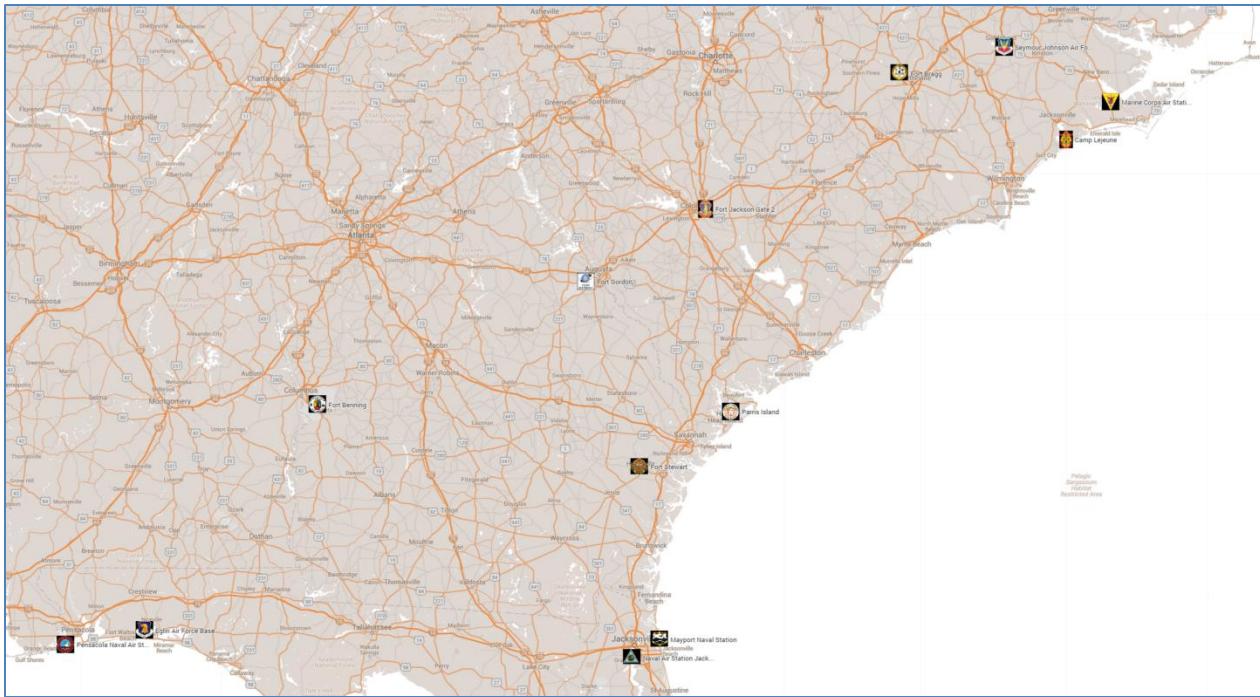
FIGURE M3 Military Facilities- NC, SC, GA, FL

Source: Google Earth by HRTPO staff

HRTPO staff gathered the quantity of workers and civilians for these facilities using various sources as shown on table below.

TABLE M2 Facility Populations

Branch	Facility	Workers in the Armed Forces Industry **Living** in Facility-Related Census Tracts (2)	Workers in the Armed Forces Industry **Working** in Facility-Related Census Tracts (1)	Total Workers **Working** in Facility-Related Census Tracts (1)	Active Duty Military (including Reserves) (3)	Military Family Members (est.) (3)	Total, Active Duty and Family (3)	Civilian Employees (3)	Total Personnel (3)	Additional Metric	Quantity	Source
Army	**Fort Belvoir**	1,076	2,875	14,964	n.a.	n.a.	n.a.	n.a.	n.a.	"workforce"	39,000	(5)
Army	**Fort Benning**	9,413	13,050	32,223	n.a.	n.a.	n.a.	n.a.	n.a.	"military personnel"	12,655	(9)
Army	**Fort Bragg**	10,416	31,985	53,443	n.a.	n.a.	n.a.	n.a.	n.a.	"military personnel & civilian contract employees & civilians"	57,500	(4)
Army	**Fort Eustis**	3,794	6,995	12,930	n.a.	n.a.	n.a.	n.a.	n.a.	"army"	6,349	(8)
Army	**Fort Gordon**	3,684	8,875	16,465	n.a.	n.a.	n.a.	n.a.	n.a.	"military and civilians"	23,000	(9)
Army	**Fort Jackson**	8,784	12,660	17,400	n.a.	n.a.	n.a.	n.a.	n.a.	"active duty, civilians"	9,200	(10)
Army	**Fort Stewart**	1,949	6,085	16,514	n.a.	n.a.	n.a.	n.a.	n.a.	"fort stewart & Hunter Army Airfield, soldiers"	21,000	(11)
Navy	**Joint Base Anacostia-Bolling**	1,138	1,950	12,080	n.a.	n.a.	n.a.	n.a.	n.a.	"military, civilian employees, and their families"	17,000	(12)
Navy	**Naval Air Station Jacksonville (FL)**	1,476	3,635	12,985	n.a.	n.a.	n.a.	n.a.	n.a.	"military, civilian, and contractor"	13,242	(7)
Navy	**Joint Base Little Creek-Fort Story**	n.a.	n.a.	n.a.	11,112	18,581	29,693	3,663	33,356	"JEB Little Creek-Ft. Story"	14,775	(6)
Navy	**Naval Station Mayport**	3,467	6,580	12,775	n.a.	n.a.	n.a.	n.a.	n.a.	"military, civilian, and contractor"	2,150	(7)
Navy	**Naval Station Norfolk**	13,460	28,310	53,408	43,928	51,358	95,286	20,429	115,715	"military", "civilian", and "contractors"	64,357	(6)
Navy	**Naval Air Station Oceana**	1,897	3,340	6,325	11,308	12,008	23,316	5,848	29,164	"NAS Oceans/Dam Neck Annex"	17,156	(6)
Navy	**Naval Air Station Pensacola**	5,712	8,175	15,235	n.a.	n.a.	n.a.	n.a.	n.a.	"military, civilian, and contractor"	14,083	(7)
Air Force	**Eglin Air Force Base**	3,248	10,350	20,449	n.a.	n.a.	n.a.	n.a.	n.a.	"military, civilian, and contractor"	12,804	(7)
Air Force	**Joint Base Andrews**	650	3,400	9,600	n.a.	n.a.	n.a.	n.a.	n.a.	"Active duty, guard, reserve, and civilians"	10,953	(13)
Air Force	**Langley Air Force Base**	923	4,760	14,415	n.a.	n.a.	n.a.	n.a.	n.a.	"airforce"	8,628	(8)
Air Force	**Seymour Johnson Air Force Base**	837	2,915	5,450	n.a.	n.a.	n.a.	n.a.	n.a.	"active duty personnel & civilian employee population"	4,800	(4)
Marines	**Camp Lejeune**	15,762	29,700	57,465	n.a.	n.a.	n.a.	n.a.	n.a.	"active duty military personnel & civilian contract employees"	36,500	(4)
Marines	**MC Base Quantico**	2,653	7,550	17,820	n.a.	n.a.	n.a.	n.a.	n.a.	"active duty, civilian employees"	8,792	(14)
Marines	**MCAS Cherry Point**	2,504	135	189	n.a.	n.a.	n.a.	n.a.	n.a.	"active duty military & civilian contract employees"	9,000	(4)
Marines	**USMC Parris Island**	2,746	5,165	7,640	n.a.	n.a.	n.a.	n.a.	n.a.	"marines, sailors, and civilians"	2,560	(15)

Sources:
(1) US Census, 2006-2010 Census Transportation Planning Package (CTPP)
(2) US Census, 2010-2014 American Community Survey (ACS), Table B08126
(3) *Navy Region Mid-Atlantic FY 2014 Economic Impact Report,* Navy Region Mid-Atlantic, FY14
(4) The Economic Impact of the Military on North Carolina, NC Dept of Commerce and NC Military Affairs Commisssion, 2015
(5) *Draft EIS for Short-Term Projects & Real Property Master Plan Update- Fort Belvoir, Vol. I*, US Army Garrison Fort Belvoir, Aug. 2014 , pg. 3-45
(6) http://www.cnic.navy.mil/content/dam/cnic/cnrma/pdfs/economic%20impact.pdf
(7) http://www.florida-aviation-database.com/library/filedownload.aspx?guid=e71a49e5-d08b-459d-b0e7-1498cb1cb1be
(8) http://www.jble.af.mil/shared/media/document/AFD-140827-071.pdf
(9) http://www.gordon.army.mil/media/pages/Super_Users/documents/TMP_DOCUMENTS/Fort_Gordon_Post_Guide_and_Telephone_Directory.pdf
(10) http://apps.militaryonesource.mil/MOS/f?p=MI:CONTENT:0:::P4_INST_ID,P4_CONTENT_TITLE,P4_CONTENT_EKMT_ID,P4_CONTENT_DIRECTORY:4210,Fast%20Facts,30.90.30.30.60.0.0.0.0,1
(11) http://apps.militaryonesource.mil/MOS/f?p=MI:CONTENT:0::NO::P4_INST_ID:1195
(12) http://www.militaryinstallations.dod.mil/MOS/f?p=MI:CONTENT:0:::P4_INST_ID,P4_CONTENT_TITLE,P4_CONTENT_EKMT_ID,P4_CONTENT_DIRECTORY:5140,Installation%20Overview,30.90.30.30.0.0.0.0,1
(13) http://www.militaryinstallations.dod.mil/MOS/f?p=132:CONTENT:0::NO::P4_INST_ID,P4_INST_TYPE:3055,INSTALLATION
(14) http://www.militaryinstallations.dod.mil/MOS/f?p=132:CONTENT:0::NO::P4_INST_ID,P4_INST_TYPE:4930,INSTALLATION
(15) http://www.militaryinstallations.dod.mil/MOS/f?p=132:CONTENT:0::NO::P4_INST_ID,P4_INST_TYPE:4225,INSTALLATION

Source: HRTPO processing of various military sources (Facility Populations from various sources.xlsx)

Measuring the Effectiveness of Transportation Serving Hampton Roads Military

HRTPO staff measured how well transportation organizations have prepared Hampton Roads' transportation system to serve the military using the following measures of effectiveness (MOEs):

1. Mode Share- by Metro Region
2. Mode Share- by Military Facility
3. Commuting Times to Military Facilities
4. Accessibility and Level-of-Service of Nearest Commercial Airport
5. Accessibility and Level-of-Service of Nearest Amtrak Station

HRTPO staff has placed that comparison in an internal performance memo reviewed by a technical panel.

HOSPITALITY

To determine how well Hampton Roads transportation system serves the hospitality industry, i.e. the tourism and convention business, HRTPO staff compared how local transportation serves the main hospitality areas of Hampton Roads to how local transportation serves other similar hospitality attractions on the East Coast. Steps:

- choosing hospitality regions for comparison of supporting transportation
- calculating measures of effectiveness

Hospitality Regions for Comparison of Supporting Transportation

Although it is assumed that Williamsburg and Virginia Beach are significant hospitality attractions, it is difficult to verify that assumption—and to find other similar hospitality destinations in the mid-Atlantic—with publically available numbers. The latest long-distance component (2001) of the National Household Travel Survey (NHTS) does not contain enough trips to identify individual hospitality destinations with statistical significance. And the Census does not count hotel rooms, instead examining where people permanently live. Consequently, HRTPO staff used regression to glean hospitality numbers from publically available data.

First, for a given metro area, HRTPO staff theorized a relationship between *hospitality activity* and the *number of workers* in the "arts, entertainment, recreation, accommodation and food services" (AERAF) industry. Secondly, to account for the fact that a portion of AERAF employment is driven by serving local persons/businesses (as opposed to visitors), HRTPO staff used regression to estimate the number of AERAF workers serving local residents and businesses for all 308 counties in MD, DC, DE, VA, NC, SC (see Appendix B for regression details). Lastly, HRTPO staff subtracted this estimate of "normal AERAF workers" from the "total AERAF workers", and assumed that this difference—i.e. "excess AERAF workers"— serve visitors and is therefore a *surrogate* for tourism and convention activity (see Appendix D for list, with data, for top 28 counties).

Taking the top performers from the list in Appendix D, consolidating them by combining adjacent counties (e.g. Williamsburg and James City County became "Williamsburg") and adding four other destinations (Richmond, Baltimore, Raleigh/Durham, and DC) suggested by the Greater Williamsburg Chamber & Tourism Alliance (GWCTA), HRTPO staff developed the set of 15 *hospitality locations* for comparison of supporting transportation, shown below.

TABLE H1 Subject Hospitality Destinations in Mid-Atlantic

Destinations	Counties in AERAF Model
Asheville	Buncombe County, NC
Baltimore	[suggested by GWCTA*]
Boone NC	Watauga County, NC
Charleston	Charleston County, SC
Charlotte	Mecklenburg County, NC
Hilton Head Island	Beaufort County, SC
Myrtle Beach	Horry County, SC
Ocean City	Worcester County, MD
Outer Banks	Dare County, NC
Raleigh/Durham	[suggested by GWCTA*]
Richmond	[suggested by GWCTA*]
Virginia Beach	Virginia Beach City, VA
Washington DC	[suggested by GWCTA*]
Williamsburg	Williamsburg City & James City County, VA
Wrightsville Beach	New Hanover County, NC

*GWCTA: Greater Williamsburg Chamber & Tourism Alliance

Source of data: HRTPO model and GWCTA (model for 5 states plus DC.xlsx)

Using this list of fifteen (15) locations, HRTPO staff compared how well the Hampton Roads transportation system serves local destinations—Williamsburg and Virginia Beach—to how well the transportation systems of other mid-Atlantic destinations serve those locations.

Source: HRTPO staff
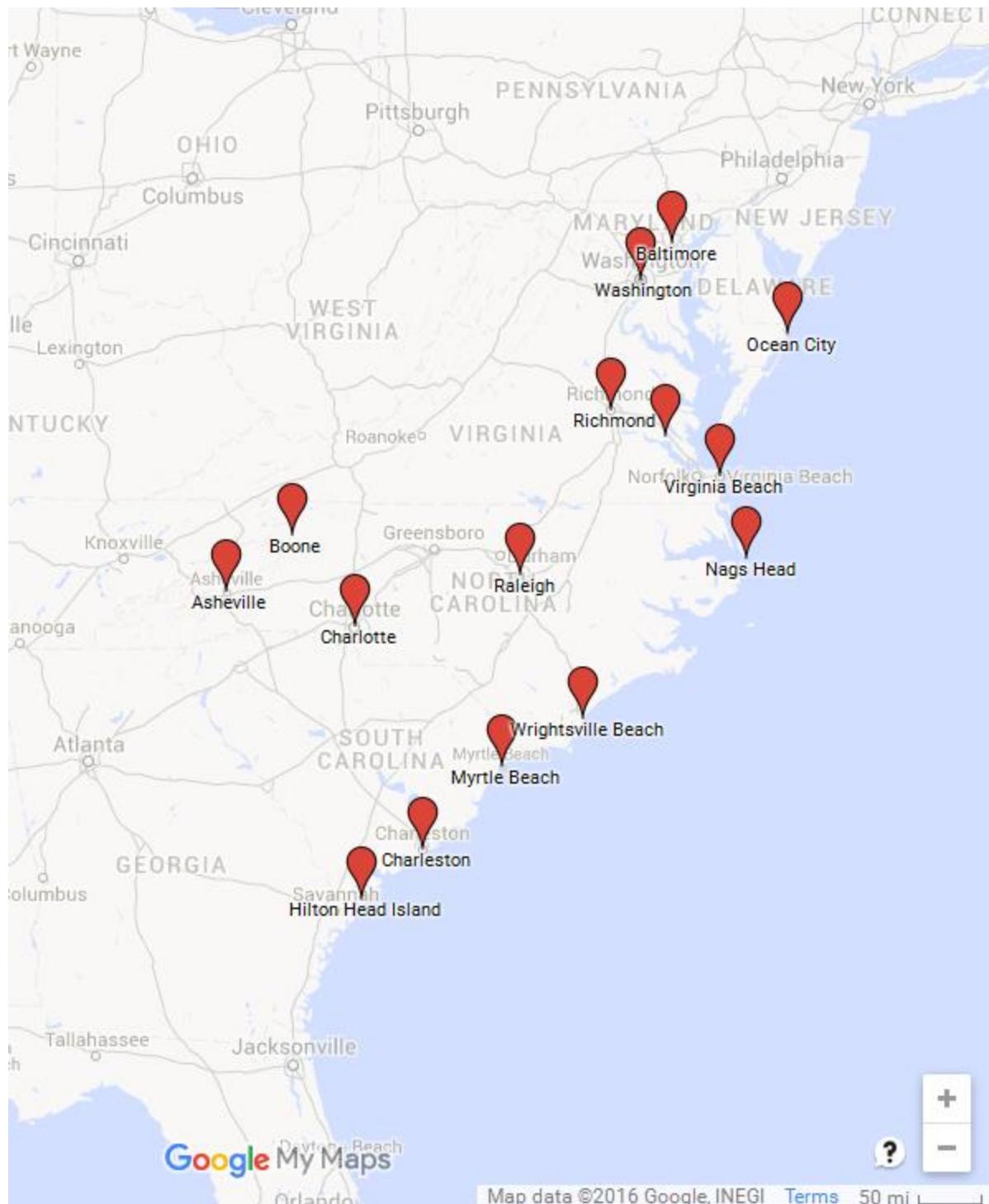
FIGURE H1 Subject Hospitality Destinations in the Mid-Atlantic

Source: Google My Maps (hospitality.pptx)

Measuring the Effectiveness of Transportation Serving HR Hospitality Destinations

HRTPO staff compared how local transportation serves the main hospitality destinations in Hampton Roads—Williamsburg and Virginia Beach—to how local transportation serves other destinations in the mid-Atlantic using several measures of effectiveness (MOEs):

1. Bike and Pedestrian Friendliness
2. Time Necessary to Travel First/Last 30 Hwy Miles To/From Hospitality Destination
3. Presence (or Absence) of Special Public Transit for Visitors
4. Accessibility and Level of Service of Commercial Airport
5. Accessibility and Level of Service of Amtrak
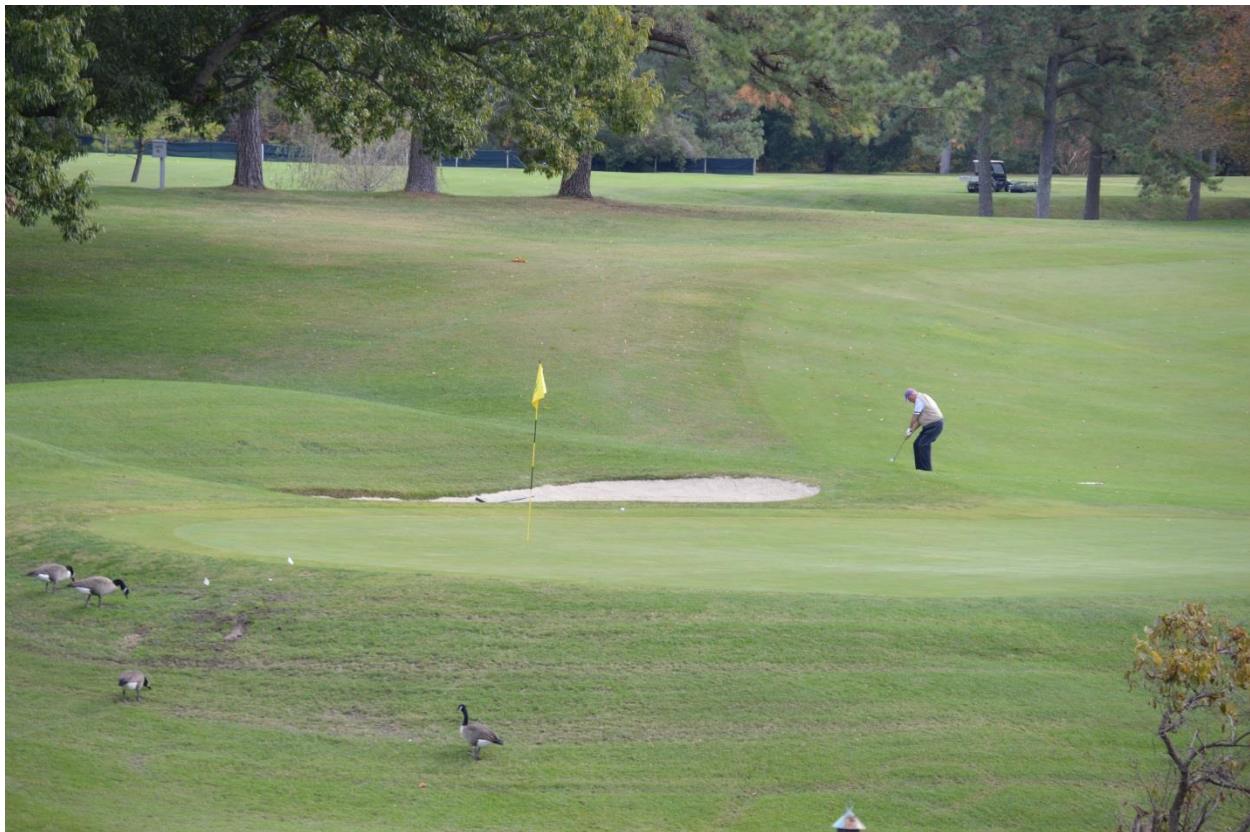
Williamsburg
Source: HRTPO staff

MOE#1: Bike and Pedestrian Friendliness

Bike and ped friendliness indices not being available for most of the subject 15 destinations, HRTPO staff gathered data on the *actual usage* of these modes from the Census—the only universal source of such information—to determine how well the transportation and land use system serves the hospitality industry in Hampton Roads. Although a) Census transportation data covers only the **work trip** (i.e. not the trips of visitors), and b) the tendency of using active transportation for the journey to work is a function of many variables (including income), Census work mode-split data may be a *surrogate* for the general bike/ped suitability of the combination of 1) local transportation infrastructure (low-speed streets, multi-use paths, and well-located sidewalks) and 2) local land use (density and proximity of uses).

For each hospitality destination, HRTPO staff gathered the latest available data (2010-2014) from the Census' American Community Survey (ACS)—bike to work, and walk to work—for census tracts thought to comprise the hospitality area for the subject destinations.

Virginia Beach
Source: HRTPO staff

Walk Friendliness HRTPO staff compiled mode-choice commuting data below as an indication of walk friendliness.
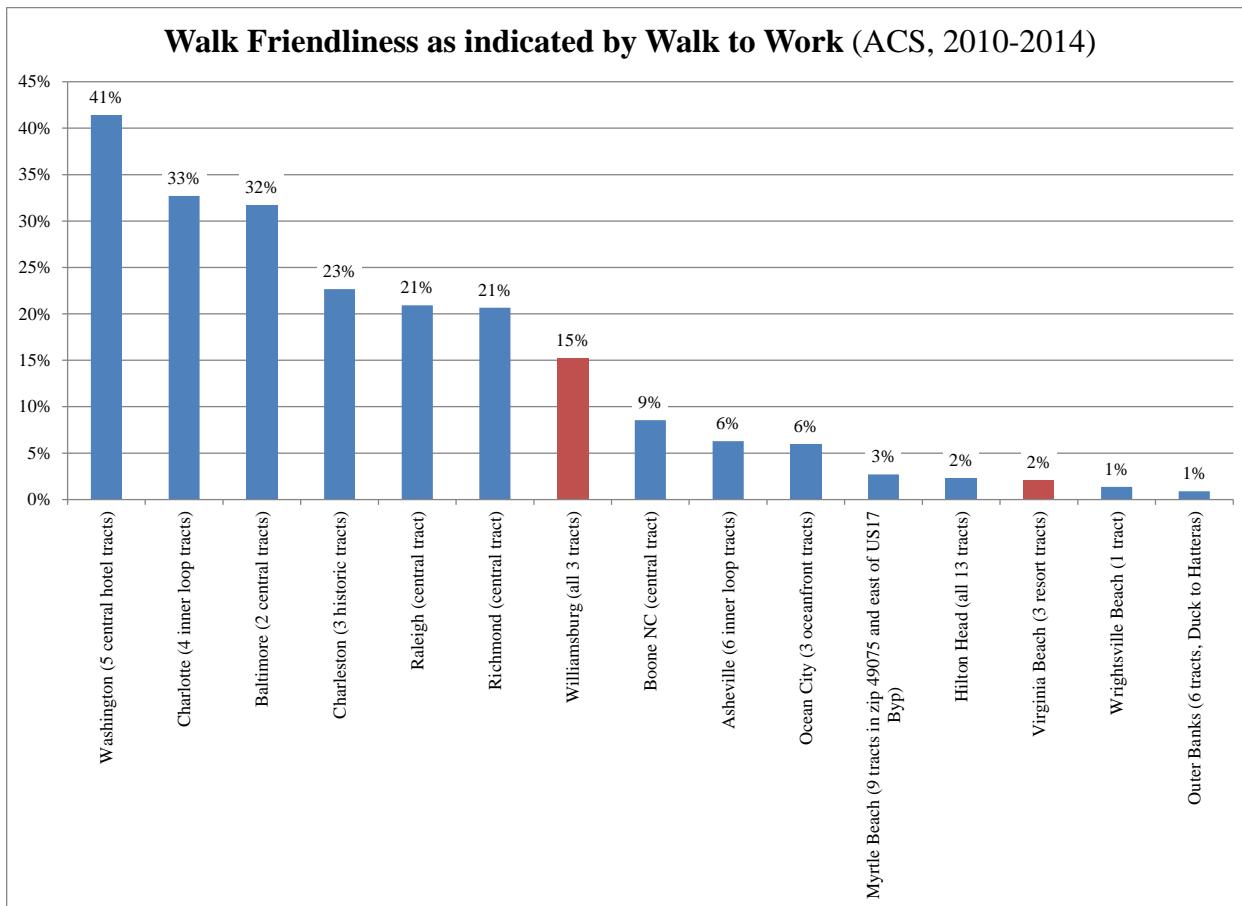
FIGURE H2
Source: HRTPO staff calculation using ACS table B08006 (ACS_14_5YR_B08006.xlsx)

Although the mode-to-work data above suggests that the resort area of Virginia Beach is served by a *relatively poor* walk/land-use system, because of the general walkability of the oceanfront area, HRPTO staff assumes that the low figure for the oceanfront tracts is due to factors other than infrastructure (e.g. lack of proximity of residences and employment).

Based on the above, HRTPO staff reports the following **finding** (1) [14]:

- The mode-to-work data above suggests that Williamsburg is served by an *excellent* walk/land-use system.

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[14] (1): 1st finding in hospitality section.

Bicycle Friendliness HRTPO staff compiled mode-choice commuting data below as an indication of bicycle friendliness.

Bicycle Friendliness as indicated by Bicycle to Work (ACS, 2010-2014)
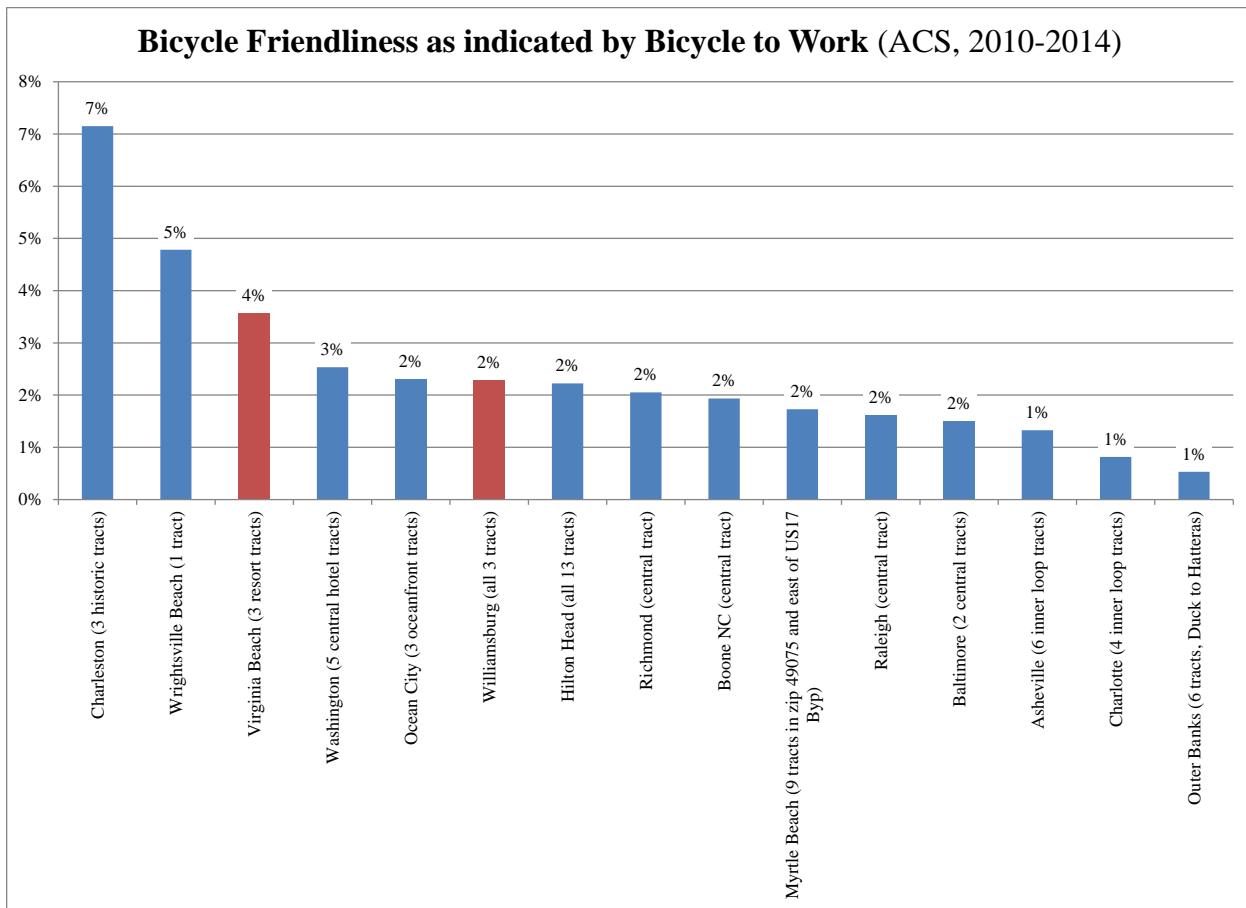
FIGURE H3
Source: HRTPO staff calculation using 2010-2014 ACS table B08006 (ACS_14_5YR_B08006.xlsx)

Based on the above, HRTPO staff reports the following **finding** (2):

- The mode-to-work data suggest that Williamsburg is served by a *fairly typical* bike/land-use system, and the resort area of Virginia Beach is served by an *above-average* system.

Strava-based Walk/Bike Findings Having measured bike and ped friendliness above, HRTPO staff sought to inform future improvements to local bike/ped friendliness by determining *what types* of bike/ped facilities are *most used*. To do so, HRTPO staff gathered maps from Strava, a "social network for **athletes**":

> "We're a global community of millions of runners, cyclists and triathletes, united by the camaraderie of sport. Our website and mobile apps bring **athletes** together from all walks of life and inspire them to unlock their potential – both as individuals and as communities."[15]

Via Strava, cyclists and runners can track their exercise geographically by linking the Strava app to a GPS devise (e.g. Fitbit). Strava has geographically compiled the millions of such 2015 trips into "heatmaps" which indicate level of activity using brightness "normalized to a value between 0 and 1":

> "The normalization is very local, taking into account the 8 neighboring tiles."[16]

Note: Because of this "local" effect (and because Strava maps reflect only Strava users), these maps cannot be used to compare total usage of active transportation by hospitality location.

To determine what type of bike facilities cyclists and walkers prefer, HRTPO staff compared Google bike facility maps to Strava heatmaps[17]. The maps and analysis for the two local hospitality destinations—Virginia Beach and Williamsburg—are included below. The maps and analysis for all 15 of the comparable hospitality locations are included as Appendix C.

Note: Strava likely mostly provides recreational usage, only one of the two types of bike/ped facility usage, the other being destination-driven usage.

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[15] https://www.strava.com/about
[16] http://labs.strava.com/blog/global-heatmap/
[17] Although Strava data only reflects usage by Strava-using athletes, this was the best information available. All maps are presented herein at the same zoom level (1 inch approx. equal to 1 mile) and settings (orange style, 100% path opacity, bike and run activity view).
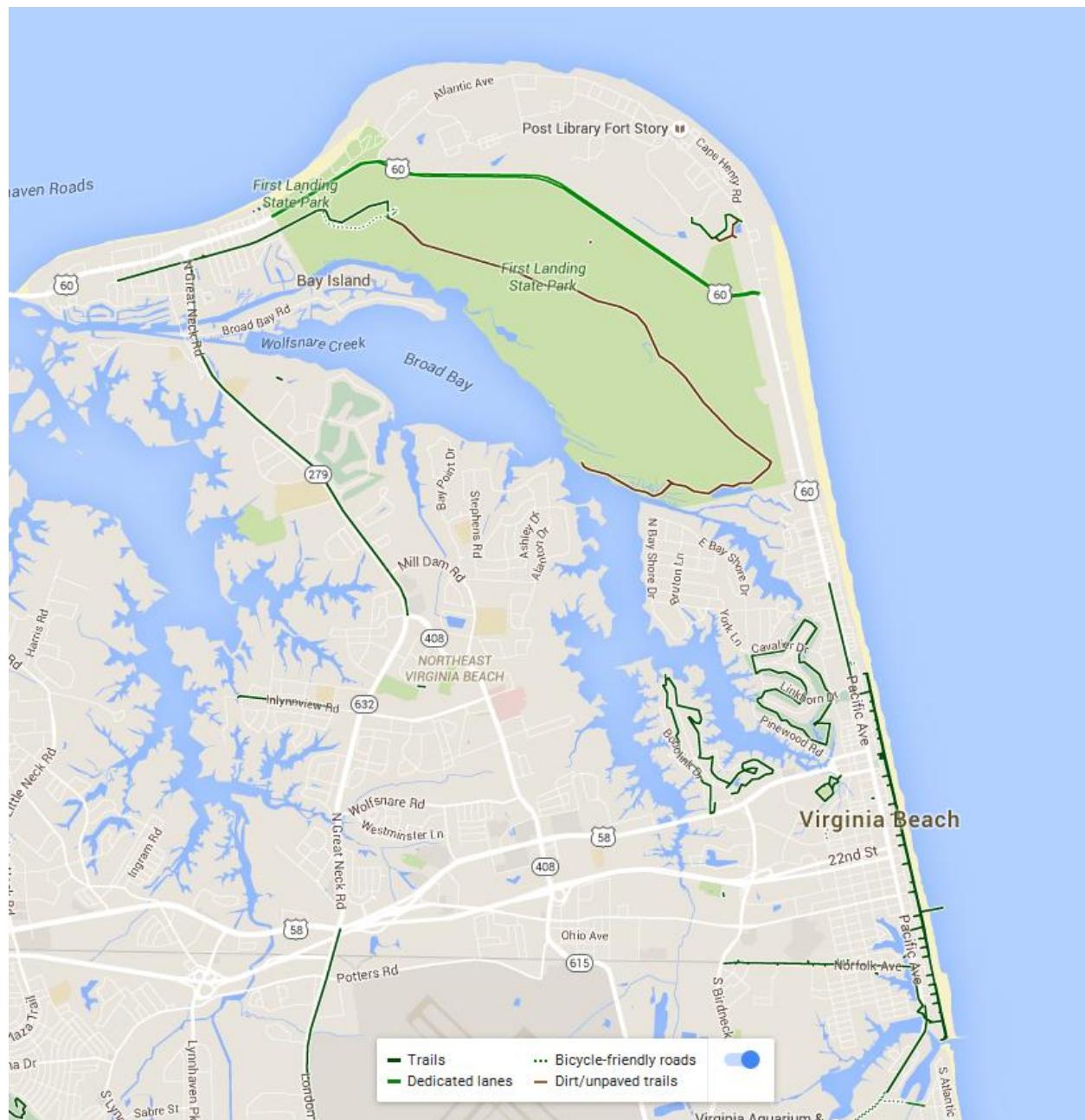
FIGURE H4 Google Maps Bike Facilities Map, 2015, Virginia Beach (Resort Area)

Source: HRTPO staff usage of google.com/maps
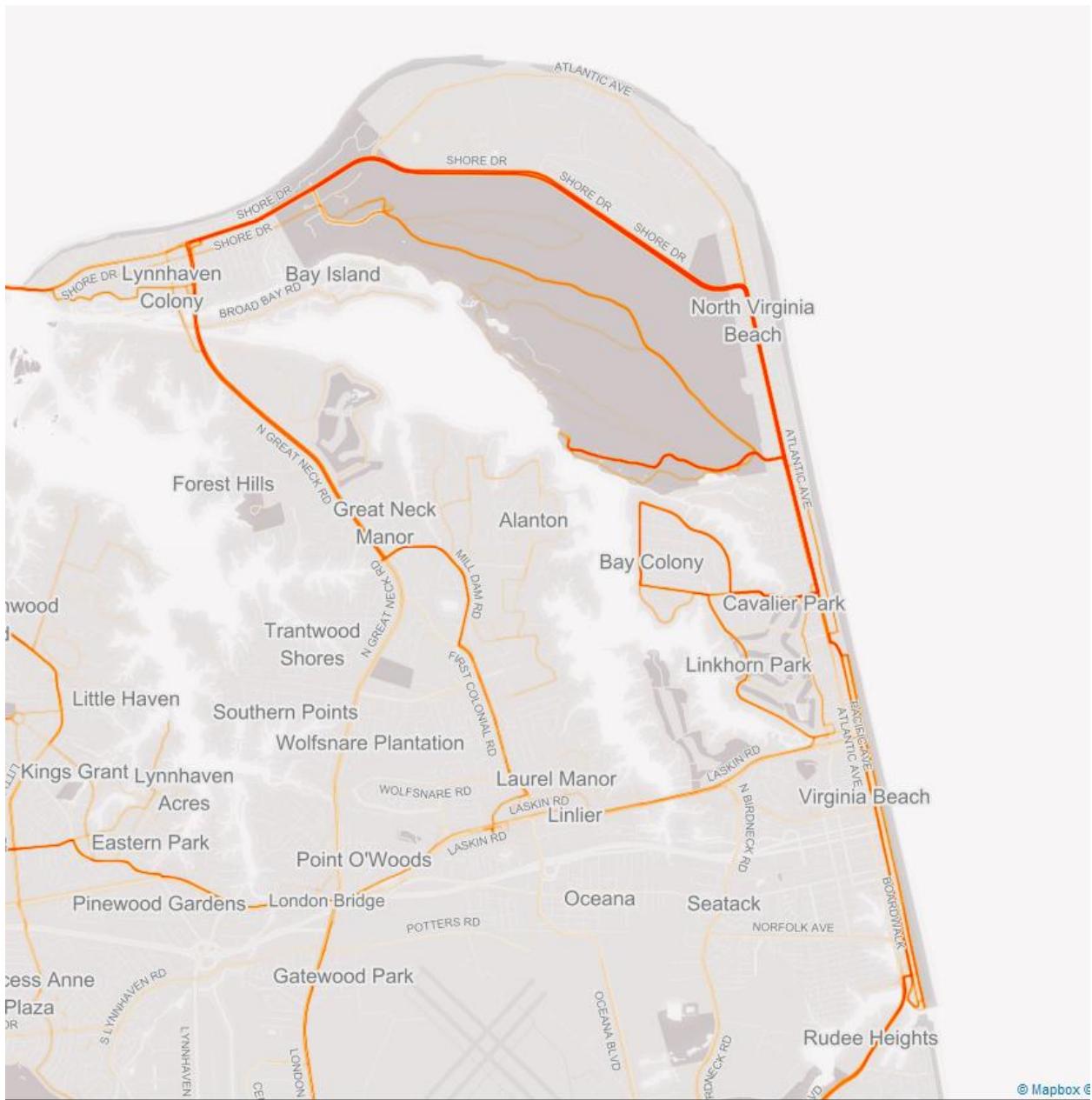
FIGURE H5 Strava Heatmap, Bike & Run, 2015, Virginia Beach (Resort Area)
Source: HRTPO staff usage of http://labs.strava.com/heatmap/#11/-76.29868/36.74796/orange/both

The Virginia Beach heatmap shows bike and run activity concentrated along the **oceanfront** and **First Landing State Park** (see "North Virginia Beach"). From comparison of the Strava map to the bike facilities map on previous page:

- It appears that athletes in Virginia Beach use the oceanfront boardwalk and the bike facilities in and near First Landing State Park.
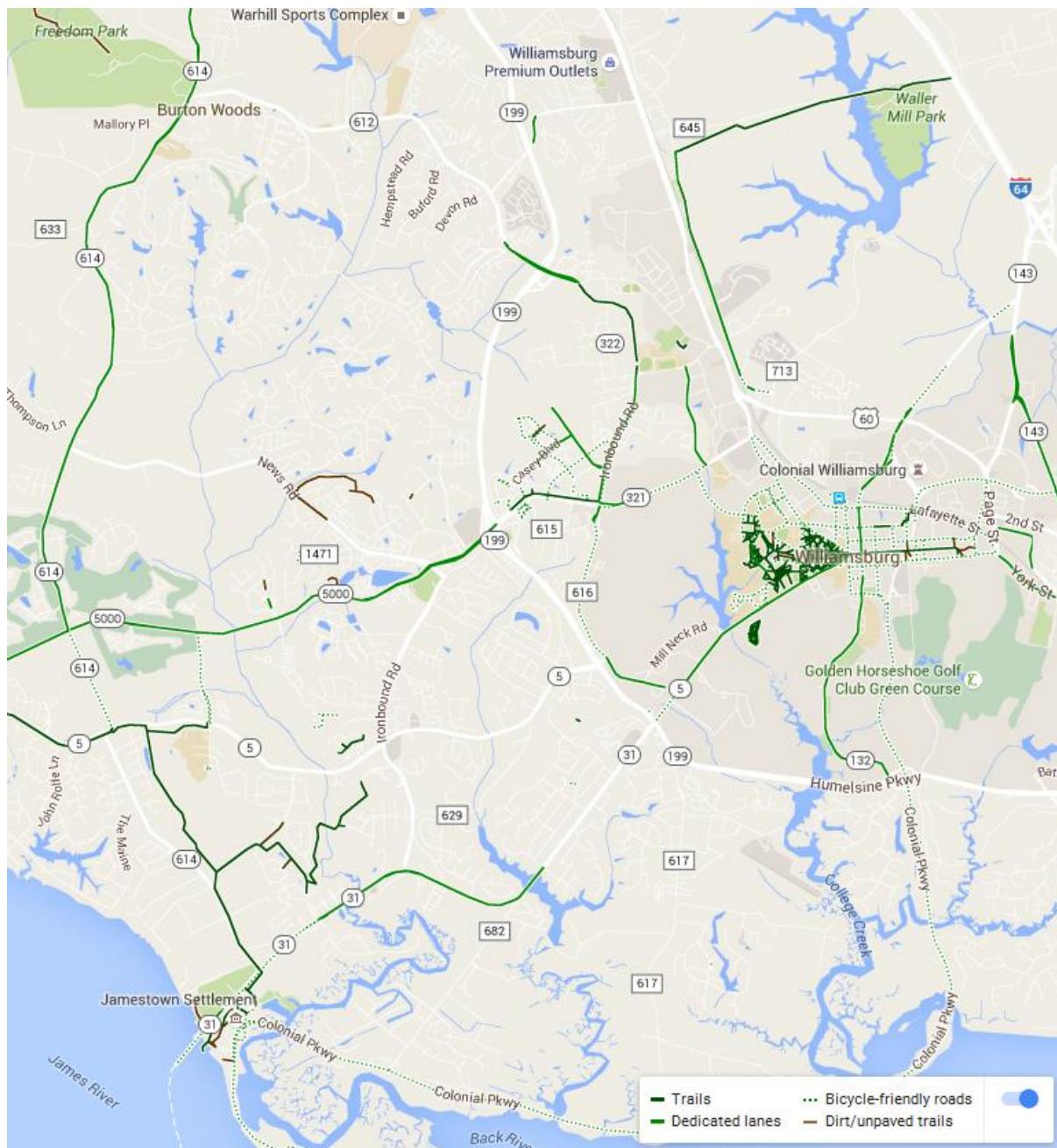
FIGURE H6 Google Maps Bike Facilities Map, 2015, Williamsburg

Source: HRTPO staff usage of google.com/maps
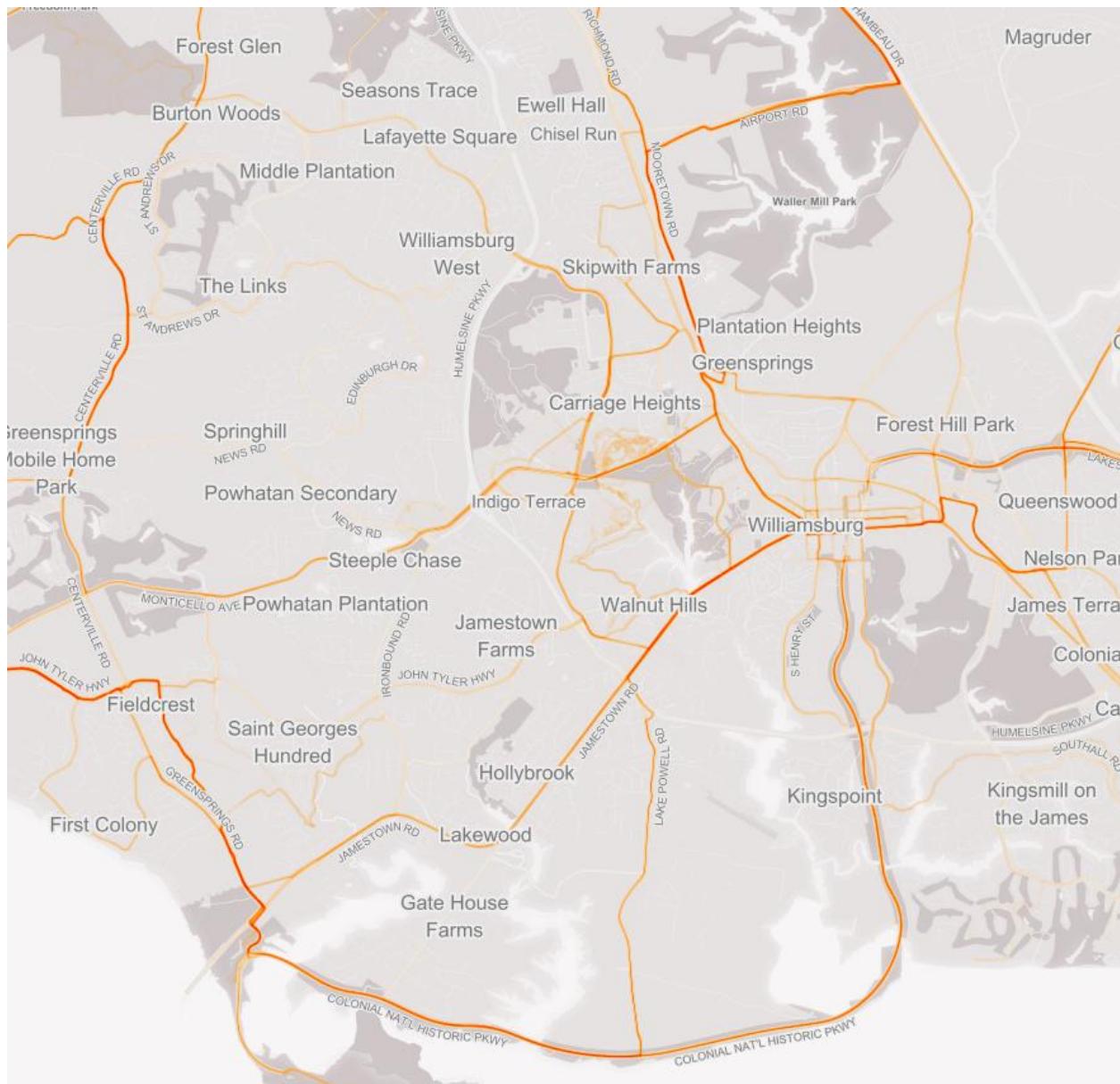
FIGURE H7 Strava Heatmap, Bike & Run, 2015, Williamsburg

Source: HRTPO staff usage of http://labs.strava.com/heatmap/

The Williamsburg heatmap shows bike and run activity concentrated along the **Virginia Capital Trail** (see "John Tyler Hwy" and "Greensprings Rd") and the **Colonial Parkway**, with usage in the **central area**, i.e. Colonial Williamsburg (see "Williamsburg") and William & Mary (gray area west of "Williamsburg"). From comparison of the Strava map to the bike facilities map on previous page:

- It appears that athletes in Williamsburg use the bike facilities that join distant points: e.g. the Virginia Capital Trail joins Jamestown and Richmond, and the lane along Jamestown Road joins the college/town and Jamestown.

The maps and analysis for all 15 of the comparable hospitality locations (included as Appendix C) are summarized below.

TABLE H2 Summary of Strava and Google Maps

Locations	What we learned
Asheville	Strava athletes in Asheville use bike facilities along the river more than those in town.
Baltimore	Strava athletes in Baltimore use bike facilities that provide access to parks and historic sites.
Boone	Strava athletes near Boone prefer roads to park-related bike facilities.
Charleston	Strava athletes in Charleston use the bike facilities joining the town to the beach.
Charlotte	Strava athletes in Charlotte use the bike facilities joining downtown to Queens University.
Hilton Head	Strava athletes in Hilton Head use the bike facilities along the main roadways.
Myrtle Beach	Strava athletes in Myrtle Beach use the bike facilities along the oceanfront and Grissom Pkwy.
Ocean City	Strava athletes in Ocean City use the boardwalk and the bike/bus lanes along the main highway.
Outer Banks	Strava athletes in the Outer Banks use the 8' path which runs parallel to the ocean road.
Raleigh	Strava athletes in Raleigh use the bike facilities which join distant points.
Richmond	Strava athletes in Richmond use the bike facilities along the river.
Virginia Beach	Strava athletes in Va Beach use the boardwalk and bike facilities in and near the State Park.
Washington	Strava athletes in Washington use the bike facilities along the river and the creek.
Williamsburg	Strava athletes in Williamsburg use the bike facilities that join distant points
Wrightsville Beach	Strava athletes in Wrightsville Beach use the bike facilities that join distant points.

Source: HRTPO analysis (strava.xlsx)

Based on review of the Strava maps for hospitality locations, HRTPO staff reports the following **finding** (3):

- Athletes use bike facilities that:
  - run along the water: rivers, creeks, the ocean
  - provide access to parks
  - run through parks
  - run along main highways
  - join distant points

Given that the above Strava analysis shows high usage of paths that run along the water, that run along main highways, and that join distant points, it appears that the hospitality sector of the Virginia Beach economy would benefit from **joining the resort area** to:
- the *interior of Virginia Beach*,
- the *other four Southside cities*, and
- *the interior of Virginia*
as discussed below.

Joining the Oceanfront to the Interior of Virginia Beach Just as Virginia Beach planned to build multi-use paths along either side of the proposed LRT, following the referendum on light-rail in November 2016, the City of Virginia Beach is considering a single path as one of several alternatives (including transit) for its inactive rail right-of-way running from the oceanfront to the VB/Norfolk city line at Newtown Road. **An active transportation path in the 12 mile Virginia Beach right-of-way** would join the oceanfront and the rest of Virginia Beach. This trail would link the excellent existing boardwalk paths to the interior of Virginia Beach, including the retail area of Town Center. The first 1.4 mile portion of this trail has **already been constructed** from the oceanfront to Birdneck Road along Norfolk Avenue, leaving the remaining 10.6 miles to be built—in right-of-way currently owned by Virginia Beach—from Birdneck Road to the Newtown LRT station at the Norfolk/VB city line at Newtown Road.

In 2016, HRTPO staff examined the benefits of converting this—and 13 other—inactive rail lines into shared-use paths in its report "Signature Paths in Hampton Roads" (March 2016).
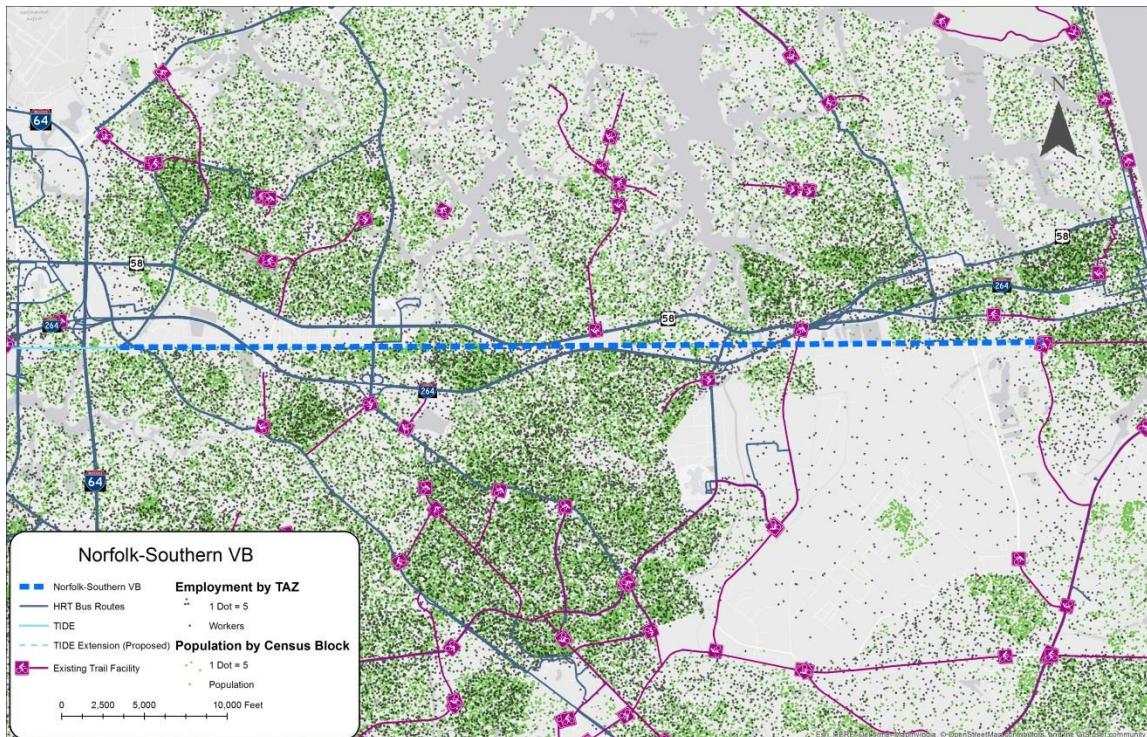
FIGURE H8 Proposed Virginia Beach Path
Source: Signature Paths in Hampton Roads (HRTPO, March 2016, pg. 70); Norfolk-Southern_VB_demnet.jpg

To see how the proposed VB path compared to the other 13 paths, the benefits of the 14 proposed paths—as measured in that study—are reproduced below.
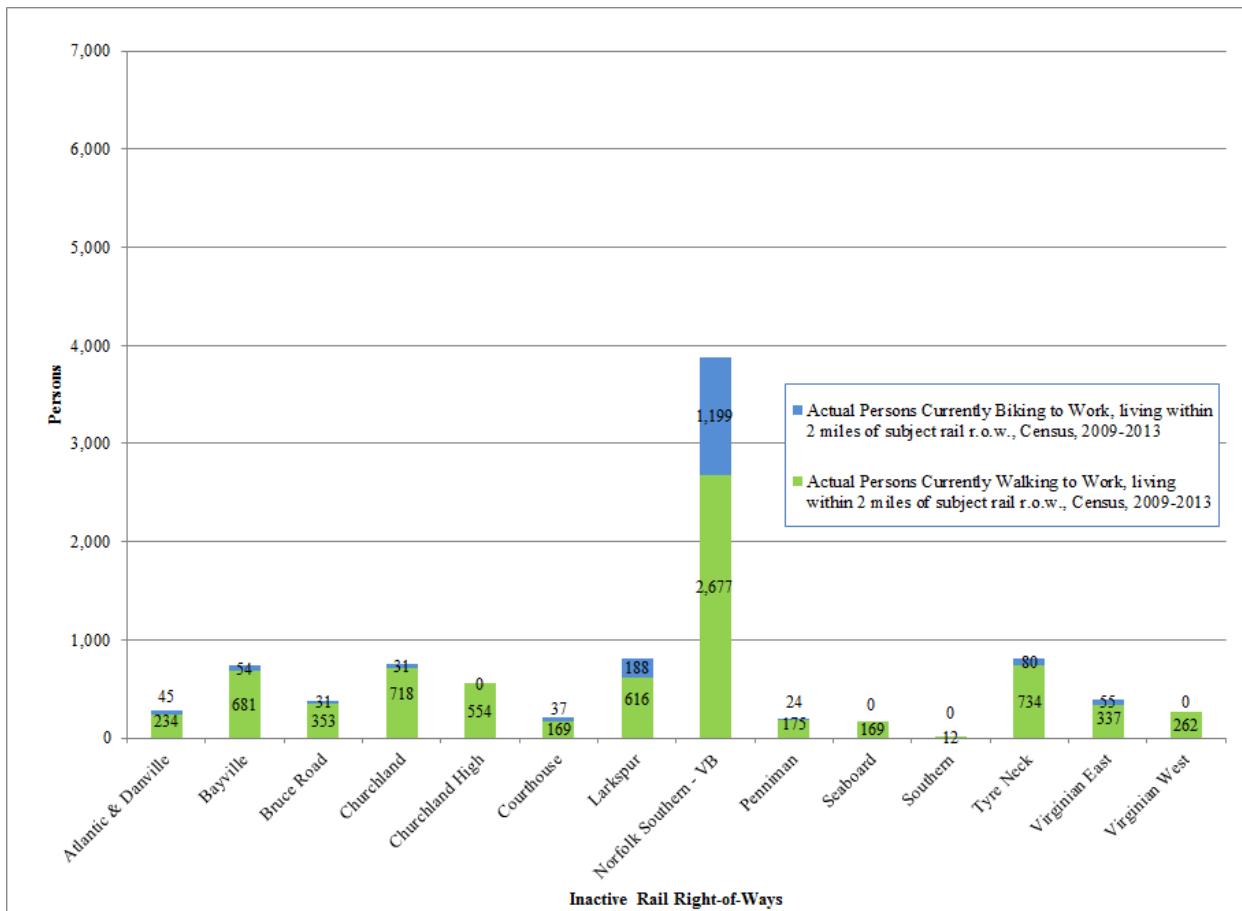
FIGURE H9 Actual Persons Currently using Active Transportation to Work, living within 2 miles of subject rail r.o.w., Census, 2009-2013

Source: *Signature Paths* (HRTPO, Mar. 2016); HRTPO analysis of Census data (Application of Model to HR CandidateTrails.xlsx)

Based on the above data, HRTPO staff reports the following **findings** (4, 5):

- For commuting, walking is more prevalent than biking.
- Approx. 4,000 persons living in the vicinity of the VB right-of-way currently bike or walk to work.
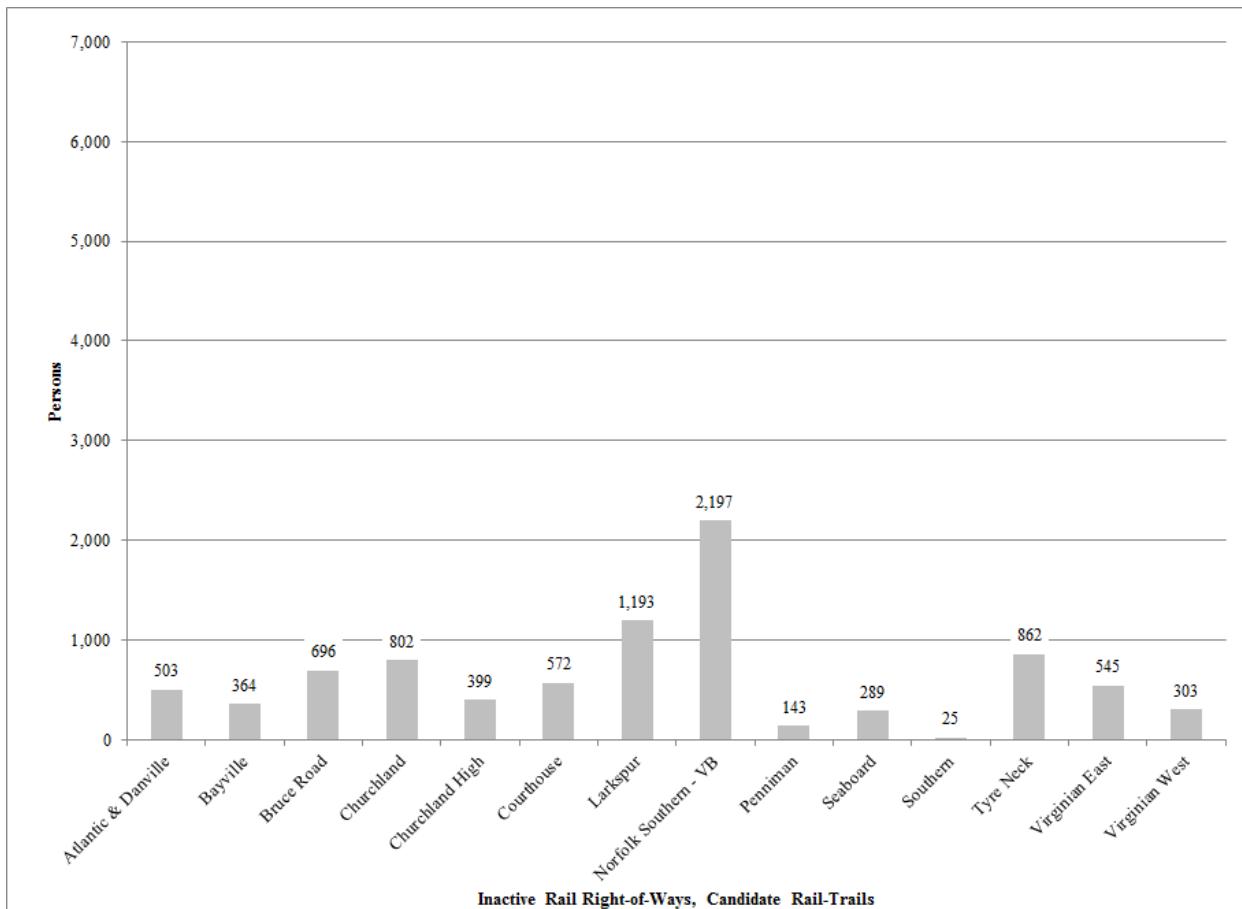
FIGURE H10 HRTPO Forecast of ADDITIONAL Active Transportation Commuters, living within 2 miles of subject rail r.o.w., Build Scenario, 2009-2013

Source: *Signature Paths* (HRTPO, Mar. 2016); HRTPO analysis of Census data (Application of Model to HR CandidateTrails.xlsx)

Based on the above data, HRTPO staff reports the following **finding** (6):

- Approximately 2,000 persons living near the proposed VB path—who do not currently walk or bike to work—would do so if that path were built.
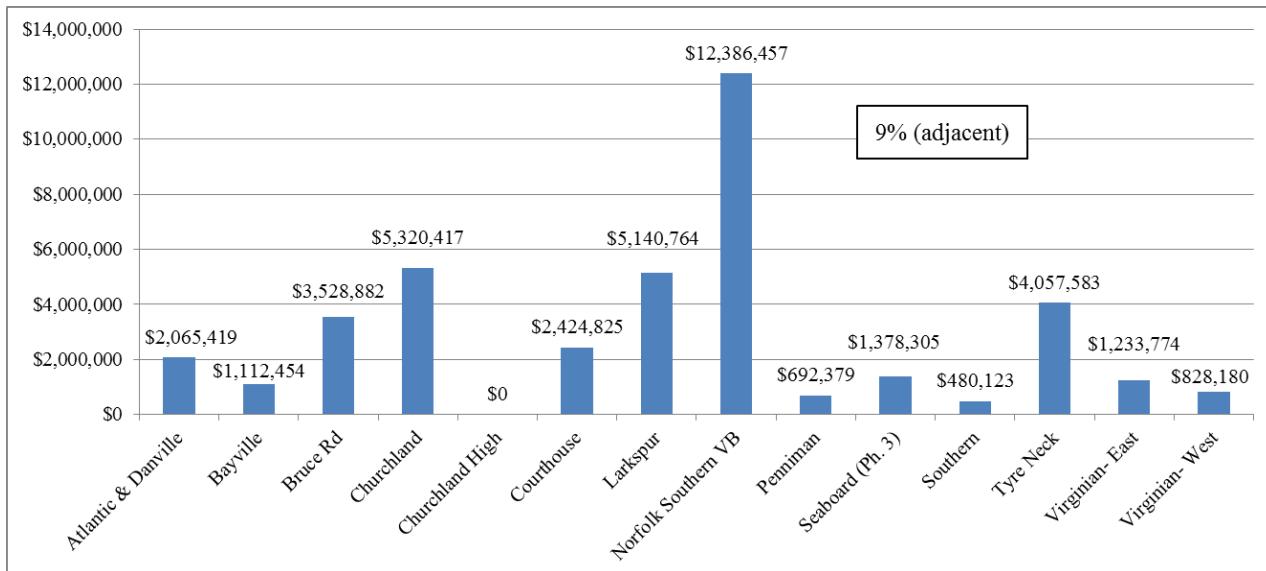
FIGURE H11 Potential Total Increase in Value of Homes Adjacent to Trail, Based on Austin Experience

Source: *Signature Paths* (HRTPO, Mar. 2016); HRTPO processing of 2015 HRPDC HAZMIT data (increase in property values.xlsx)
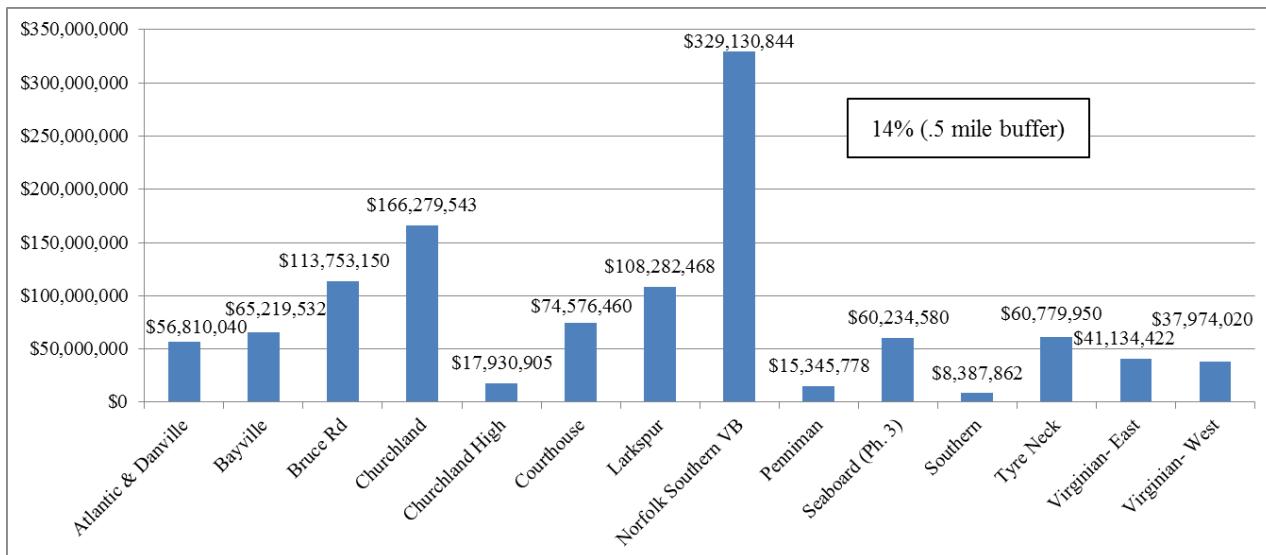
FIGURE H12 Potential Total Increase in Value of Homes within 0.5 mile of Trail, Based on Indianapolis Experience

Source: *Signature Paths* (HRTPO, Mar. 2016); HRTPO processing of 2015 HRPDC HAZMIT data (increase in property values.xlsx)

Based on the above data, HRTPO staff reports the following **finding** (7):

- Construction of the VB path may increase the value of nearby homes by $12 million to $329 million.

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Based on the recent Signature Paths report, HRTPO staff reports the following **finding** (8):

- The Virginia Beach path would have the greatest impact on local citizens of any of the fourteen paths studied in the Signature Paths report.

According to the Virginia Beach Convention & Visitors Bureau:

> "The CVB concurs with the recommendation that the inactive rail right-of-way running from the Virginia Beach oceanfront to Newtown Road can be successfully transformed into an "active transportation path" for both pedestrians and bicyclists, as this type of product development has been trending in the tourism industry for years nationwide. We also suggest that mass transit service be considered along the path, if feasible, and that possibly light rail be reconsidered in the distant future (if the voter and/or the political climate changes) with connectivity to the Amtrak station."[18]

Note that there exists no comprehensive estimate of the cost of this Virginia Beach path. The cost estimate in the *Light Rail Corridor Shared-Use Path Study* (prepared for City of Virginia Beach by Kimley-Horn, June 2015) is based on construction of LRT and is therefore for two paths (one on either side of tracks) and includes the cost of bridges over Independence Blvd, Rosemont Road, and Lynnhaven Pkwy—roads which would have been bridged by LRT but not necessarily by a shared-use path.

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[18] 15 Mar 2017 email from Tiffany Russell to Brian Solis and Rob Case

Joining the Oceanfront to the Rest of the Southside Local professionals and citizens have been planning for years a shared-use mega path joining the oceanfront and the rest of the Southside, called **the South Hampton Roads Trail (SHRT)**.
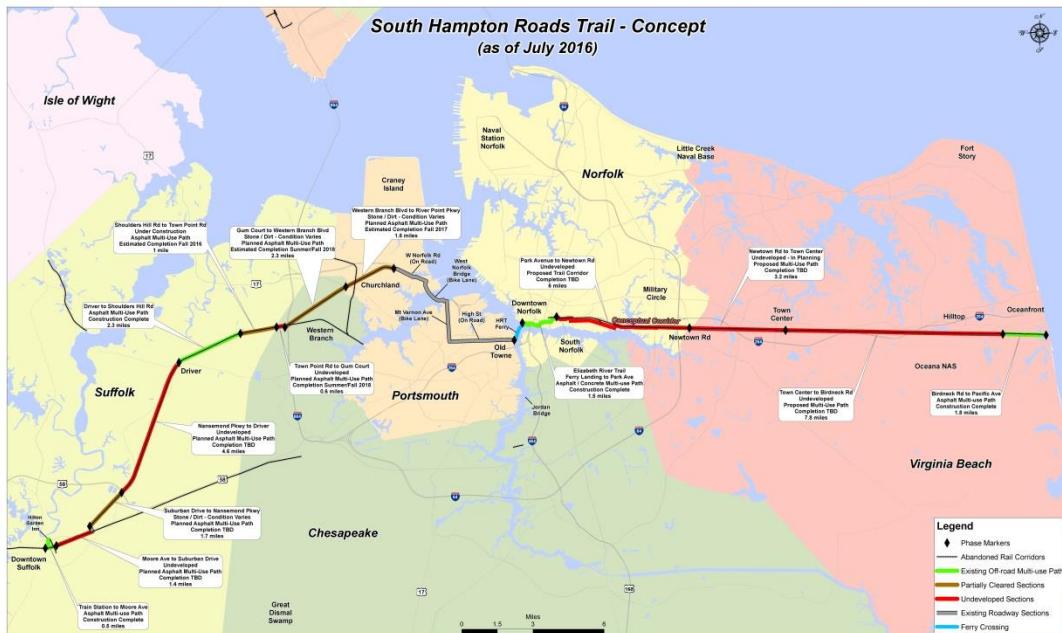
FIGURE H13 South Hampton Roads Trail (SHRT)- Concept
Source: 8-11-16 email from Bruce Drees of Tidewater Bicycle Association (SHRT_map_July_2016_36x60.jpg)

Taking advantage of *inactive rail lines* on the Southside, the SHRT concept runs through all five Southside cities. The SHRT would join—via the above-mentioned 12 mile right-of-way in Virginia Beach—the oceanfront to Norfolk, and—via the HRT ferry—to Portsmouth, and—via other rail trails—to Chesapeake and downtown Suffolk.

The green portions of the trail on the above map have been completed. For more details, see www.facebook.com/SouthHamptonRoadsTrail.

Based on the above SHRT work, HRTPO staff reports the following **finding** (9):

- The proposed VB trail—being part of the SHRT—would connect Virginia Beach to the rest of the Southside cities.

Joining the Oceanfront to the Interior of the State In order to take advantage of the recent opening of the 55-mile Virginia Capital Trail from Jamestown to Richmond, HRTPO's Transportation Technical Advisory Committee (TTAC) formed a committee for Paths Connecting to the Virginia Capital Trail (PCVCT) at the 6 April 2016 TTAC meeting. The new group approved the following goal at its 27 September 2016 meeting:

> "The ad-hoc TTAC committee seeks to achieve and develop the vision of **two 30-mile paths** connecting the **South Hampton Roads Trail** and **Ft. Monroe** to Jamestown and the Virginia Capital Trail."
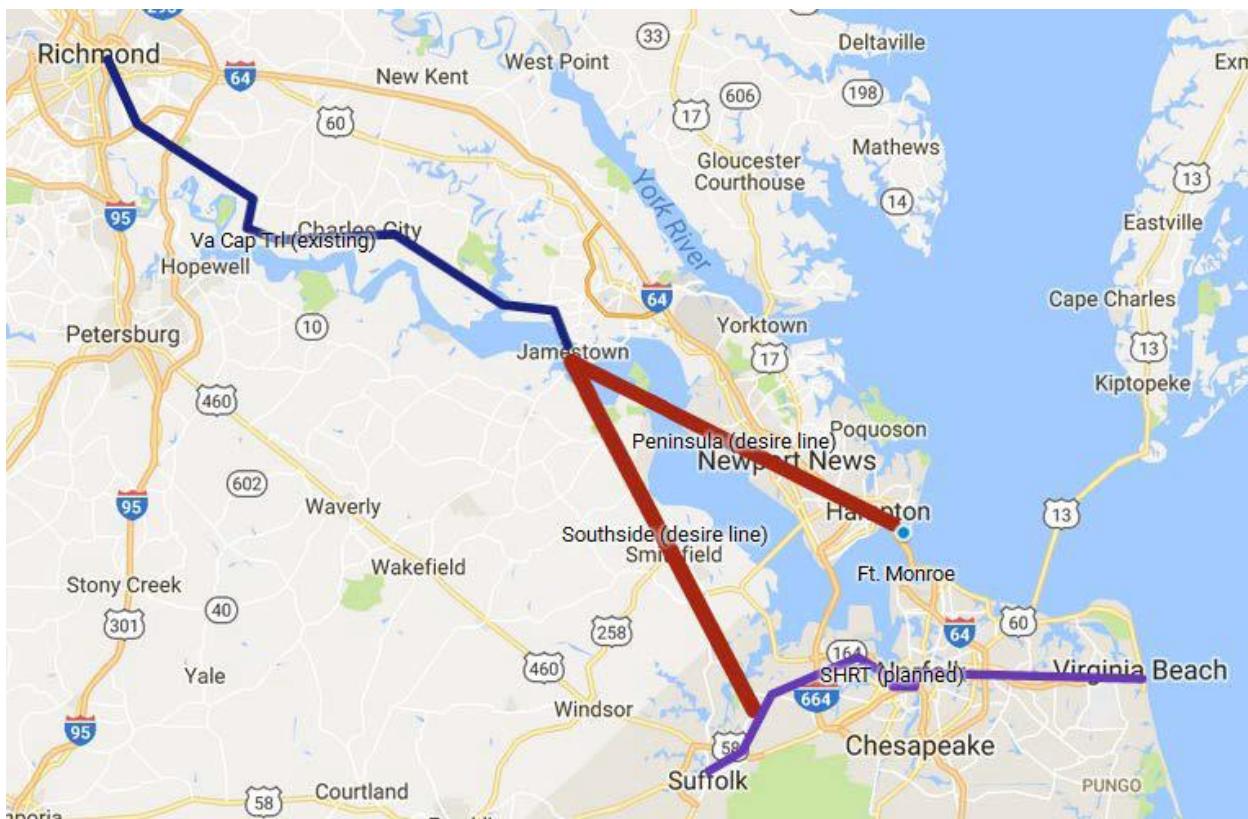
FIGURE H14 Paths Connecting to the Virginia Capital Trail
Source: HRTPO (re-presenting paths connecting to VCT idea.pdf)

To determine the best routes for the two paths—one on the Southside and one on the Peninsula—VDOT hired consultant Michael Baker, and HRTPO staff is conducting a survey.

Based on the above PCVCT work, HRTPO staff reports the following **finding** (10):

- Construction of the proposed 30-mile Southside PCVCT path, and completion of the proposed 45-mile SHRT, would connect the oceanfront and the interior of Virginia as far as Richmond.

MOE#2: Time Necessary to Travel First/Last 30 Hwy Miles To/From Hospitality Destination

In order to determine how well the highway network in the Hampton Roads region serves the main hospitality destinations in Hampton Roads (Virginia Beach and Williamsburg), HRTPO staff compared the time necessary to travel **the first/last 30 highway miles** to/from these local destinations to that of the competing locations. Examining travel time over a 30-mile distance enables this MOE to reflect the impact of highway investments planned/funded by the HRTPO in the Hampton Roads area.

HRTPO staff used Google Maps to calculate the time necessary to travel the first/last 30 highway miles to/from the subject locations, under three time periods:

      1) without congestion
      2) weekday midday (10am-4pm), and
      3) Friday PM Peak (4pm-6pm) (spring season).

For the latter two time periods (having varying conditions), HRTPO staff calculated the average time of three runs (three different days, one run per day).

For each destination, the assumed most likely entrance path was chosen, usually an interstate.

This chart shows weekday travel time during the PM Peak (4pm-6pm). (For PM Peak background data, and for "without congestion" and weekday midday data, see Appendix D.)

Time Necessary to Travel Last 30 Miles Inbound- <u>Friday, PM Peak</u>
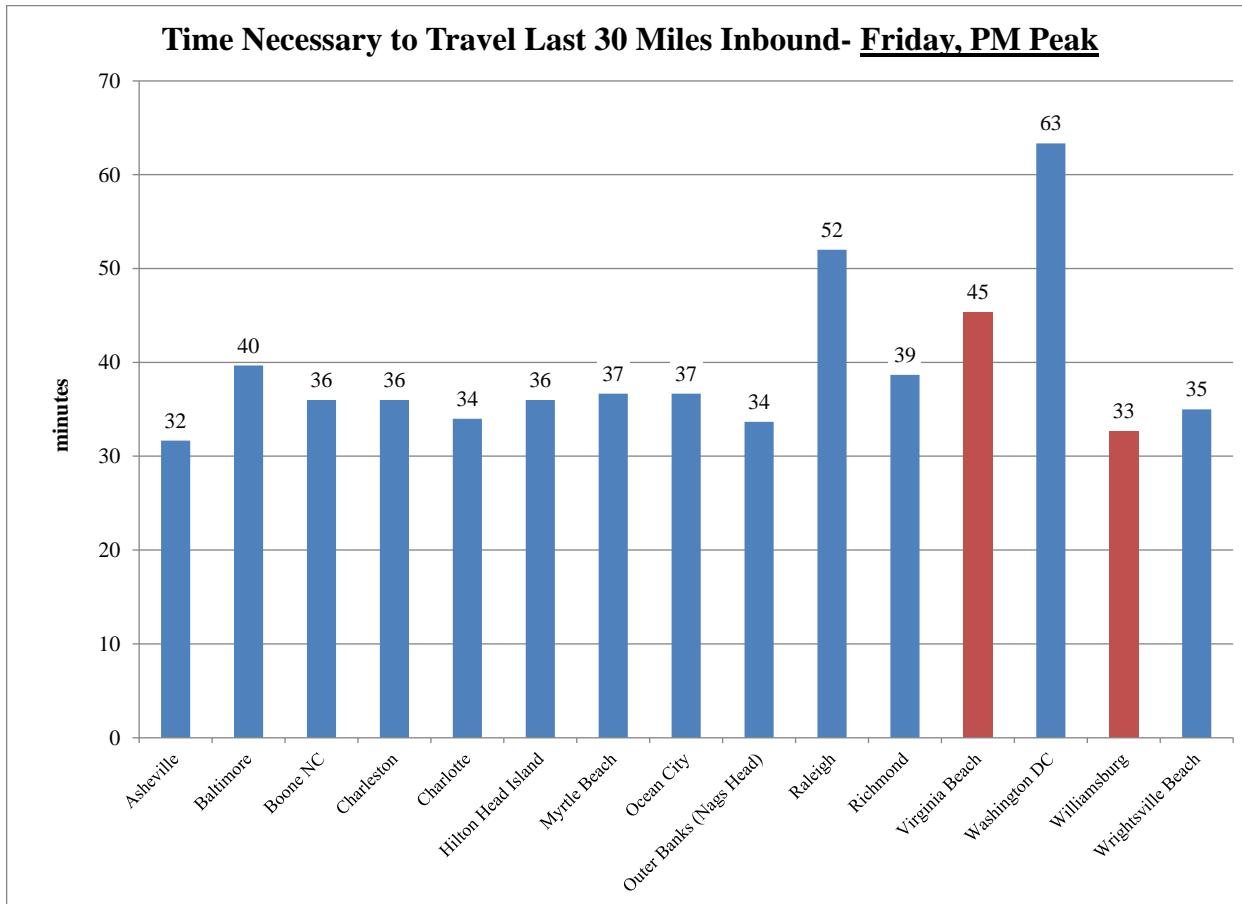
FIGURE H15

Source: HRTPO staff calculation using Google Maps (travel time hospitality 30 miles.xlsx)

An examination of the above figure indicates that Virginia Beach has higher Friday PM Peak Inbound travel times than most of the competing sites.

Given that the preferred route of most tourists visiting Virginia Beach is the HRBT[19], that route was used for measuring the 30 mile travel time, as shown in the following figure.

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[19] 67% of VB tourists use the HRBT (Virginian-Pilot, 5-27-2012, Business section, p. 1)
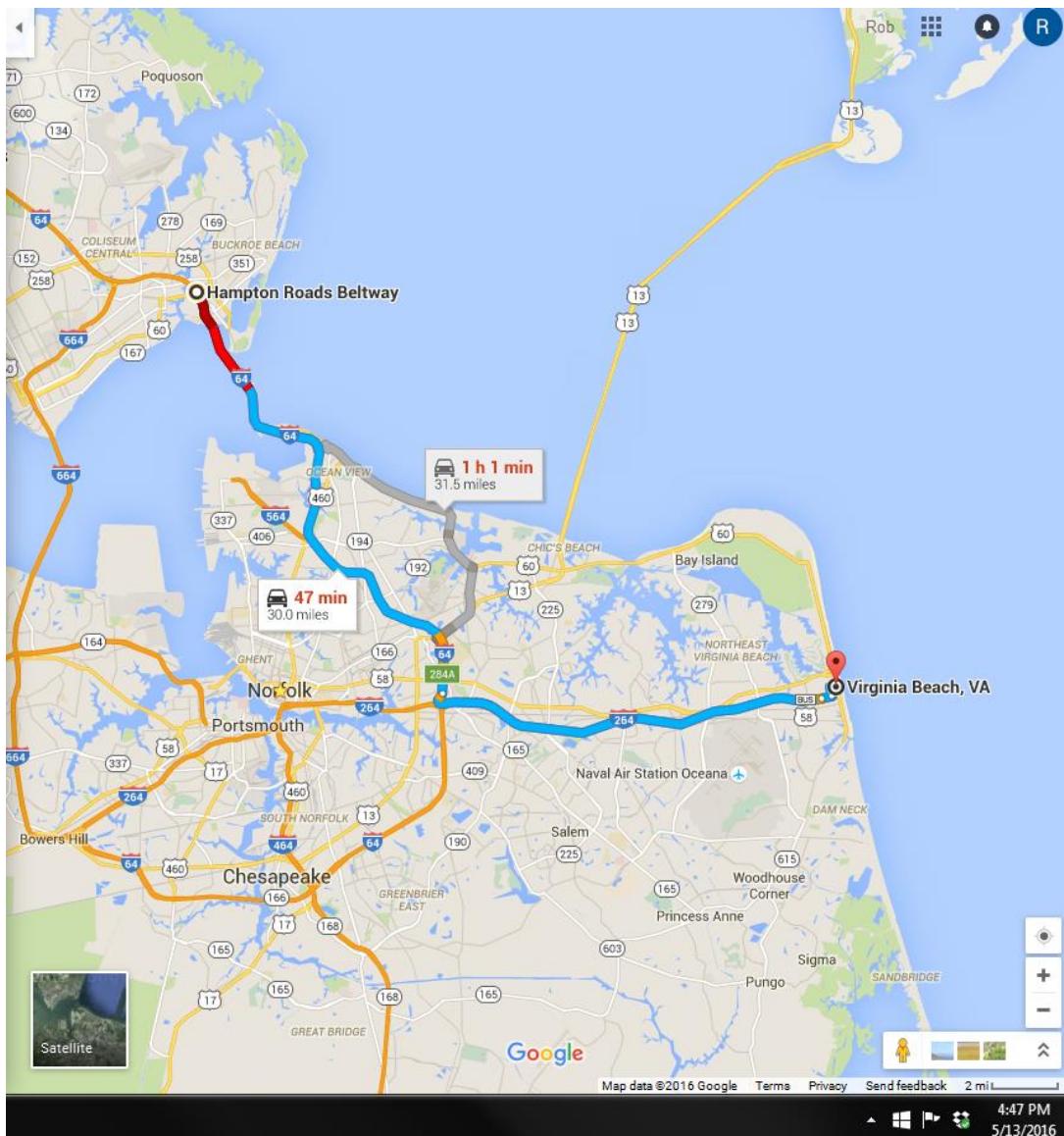
FIGURE H16 Last 30 Miles Inbound to Virginia Beach on a Friday, PM Peak- One Run
Source: Google Maps (hospitality.pptx)

As shown above, the primary source of congestion for the last 30 highway miles to VB is the HRBT.

Based on the above travel time analysis, HRTPO staff reports the following **finding** (11):

- Although the higher *Friday PM Peak* congestion experienced by VB visitors is caused by congestion at the HRBT, on 20 Oct 2016 the HRTPO Board recommended improving the HRBT (Alt A of the Hampton Roads Crossing Study's Supplemental Environmental Impact Statement).

Other End of Auto Non-Business Trips to/from Va. Beach and Williamsburg As a foundation for improving auto travel to the subject Hampton Roads hospitality destinations—Virginia Beach and Williamsburg—HRTPO staff examined the other end of trips (all trips, not necessarily overnight trips) to/from those cities using FHWA's 2008 estimate of trips >100 miles, the Traveler Analysis Framework (TAF). The TAF breaks down trips by the following types:

- Auto
    - Business
    - Non-business
- Air
- Bus
- Rail

Note that the TAF trip databases are mirrored, i.e. the origin-destination (OD) pair zoneA-zoneB has the same number of trips as the OD pair zoneB-zoneA (i.e. the opposite direction). Therefore, the TAF data does not identify where trips are produced (e.g. where tourists live) and where trips are attracted (e.g. where tourists visit). Therefore, for example, if the TAF shows 1,000 trips made from Charlotte to Virginia Beach, this 1,000 includes people who live in Charlotte and travel to VB *and* people who live in VB, traveled to Charlotte, and made the return trip to VB.

On the following pages HRTPO staff examines the other end of auto non-business trips to/from Virginia Beach (1.4 million trips) and Williamsburg (400 thousand trips).
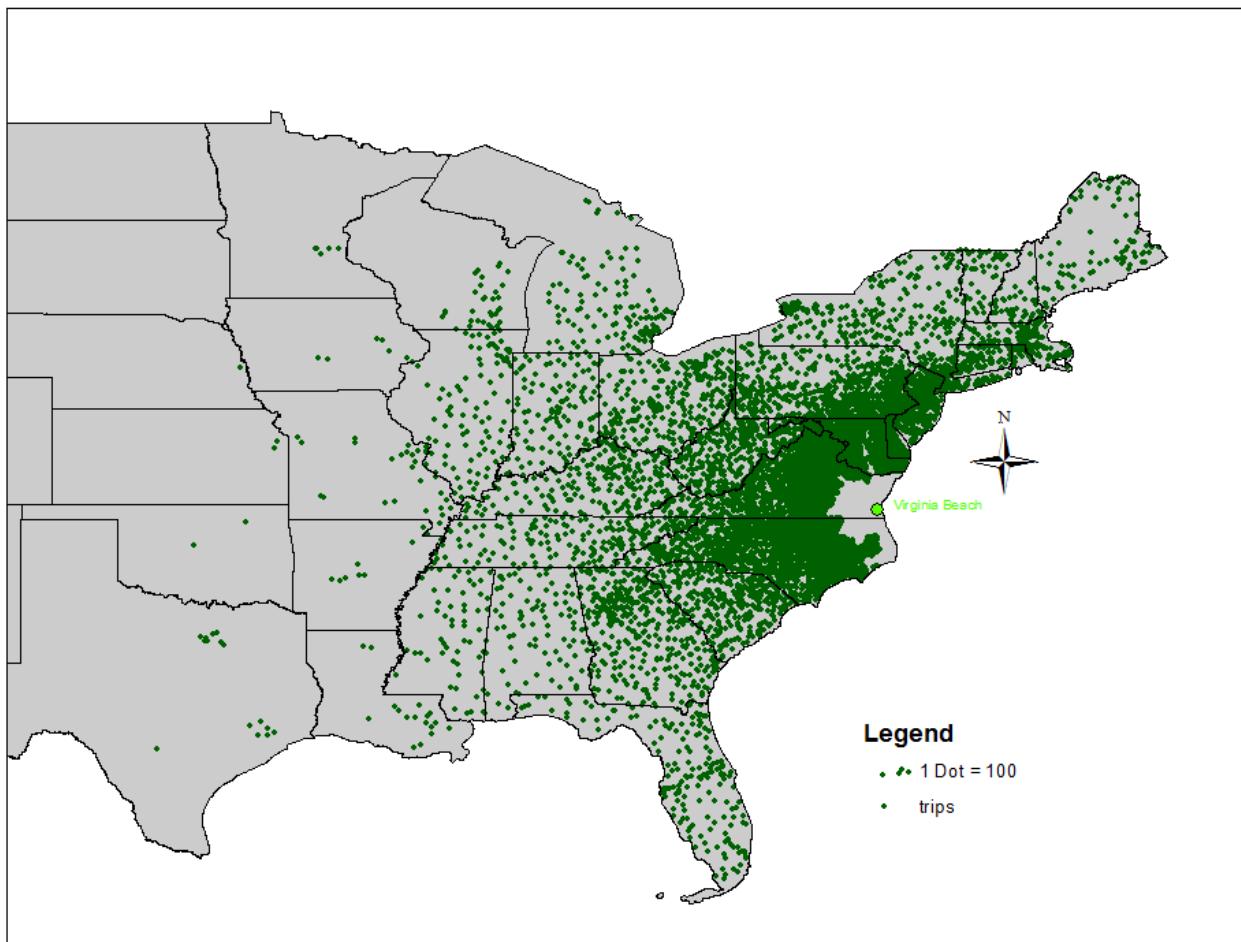
FIGURE H17 Other End of 2008 Auto Non-Business Trips >100 miles to/from Va. Beach

Source: HRTPO staff preparation using FHWA's 2008 Traveler Analysis Framework (traveler analysis framework 2008.mxd)

The number of trip ends drop off naturally with distance from Virginia Beach, however, the Appalachian Mountains appear to be a significant barrier beyond which trips are scarce. For example, many more trips start/end in eastern Pennsylvania as compared to western PA.

Given the mirrored nature of the TAF database used above, it is important to note, for example, that the above trips cover both:

- *VB residents* returning to VB after traveling more than 100 miles away, and
- *People living elsewhere* traveling more than 100 miles to VB (to return later).
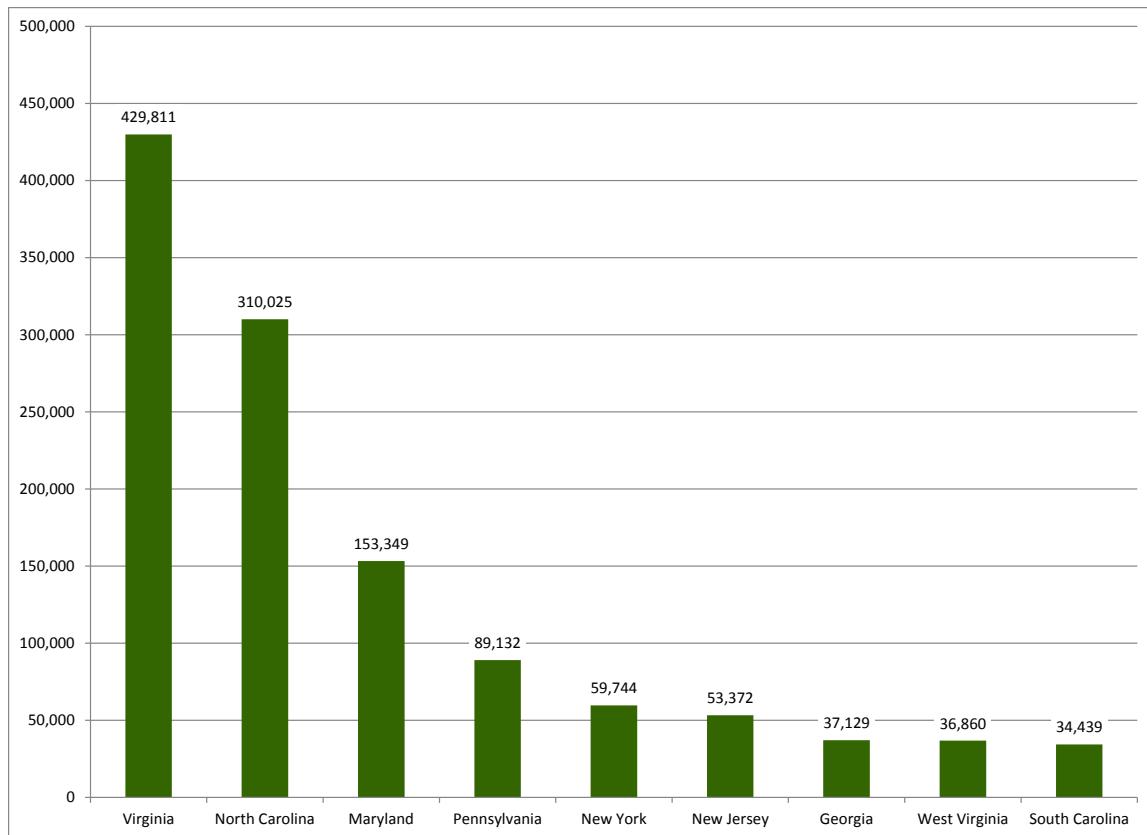
FIGURE H18 Other End of 2008 Auto Non-Business Trips >100 miles to/from Va. Beach
Source: HRTPO staff preparation using FHWA's 2008 Traveler Analysis Framework (2008AutoNonbiz-VB.xlsx)

Based on the above TAF analysis, HRTPO staff reports the following **finding** (12):

- With the exception of Pennsylvania and West Virginia, the top-10 states for auto non-business trips to/from VB are the mid-Atlantic coastal states from Georgia to New York.

As a check, data collected by Virginia Beach is included below.

TABLE H3 Origin of Tourism and Business Trips to Virginia Beach (VB), collected by VB

Virginia	32.1%
Pennsylvania	11.6%
Maryland	7.4%
North Carolina	6.1%
New York	5.6%
Ohio	5.4%
New Jersey	3.3%
West Virginia	3.2%
Quebec, Canada	2.4%
Connecticut	1.7%

Source: Ron Berkebile via 1-11-17 email (VB tourism and business trip origins.xlsx)

Concerning any differences between the FHWA and VB data, note that:
- whereas the FHWA data covers trips from VB (e.g. by VB residents) AND trips to VB (e.g. by visitors), the VB data covers only trips to VB
- whereas the FHWA data covers non-business trips, the VB data covers tourism AND business trips
- whereas the FHWA data covers only US trips, the VB data also covers trips from Canada.

To determine the main route for trips to/from Virginia Beach for auto non-business trips, on the following page HRTPO staff categorized the FHWA travel data above by likely entry corridor.
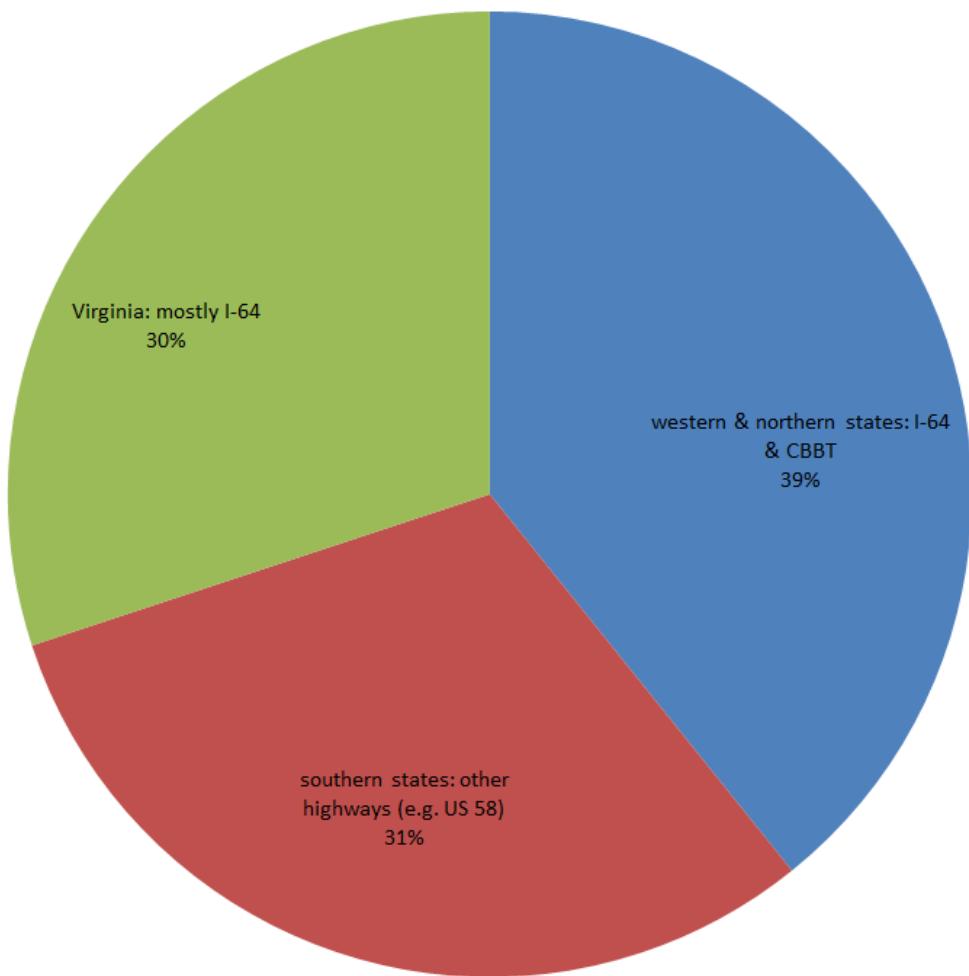
FIGURE H19 Other End of 2008 Auto Non-Business Trips >100 mi. to/from Va. Beach, by Assumed Highway

Source: HRTPO staff preparation using FHWA's 2008 Traveler Analysis Framework (2008AutoNonbiz-VB.xlsx)

Based on the above TAF analysis, HRTPO staff reports the following **finding** (13):

- In agreement with earlier VB-specific tourist survey data[20], I-64 is the main route for auto non-business trips to/from Virginia Beach.

On 20 Oct 2016 the HRTPO Board recommended improving the HRBT (Alt A of the Hampton Roads Crossing Study's Supplemental Environmental Impact Statement).

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[20] 67% of VB tourists use the HRBT (Virginian-Pilot, 5-27-2012, Business section, p. 1)
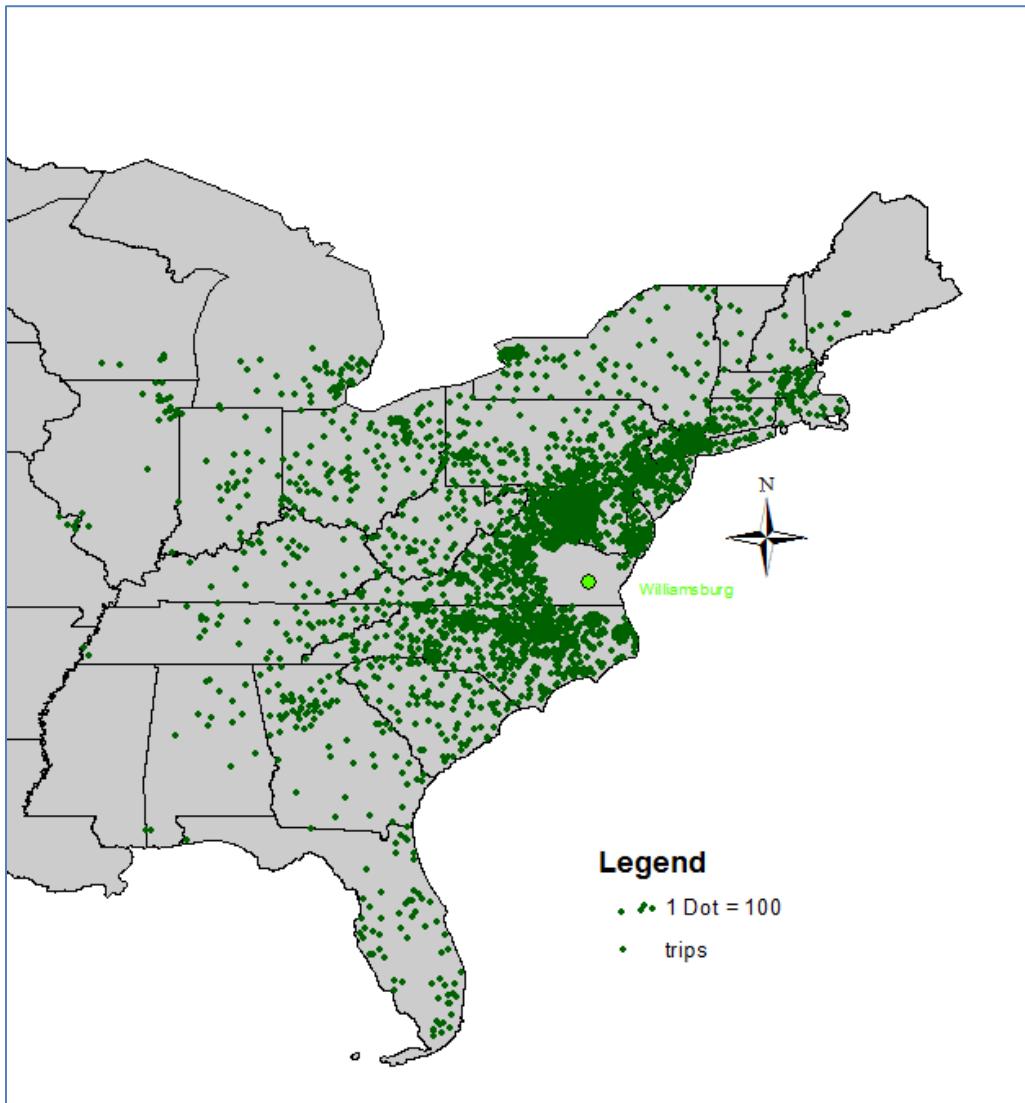
FIGURE H20 Other End of 2008 Auto Non-Business Trips >100 mi. to/from Williamsburg

Source: HRTPO staff preparation using FHWA's 2008 Traveler Analysis Framework (traveler analysis framework 2008.mxd)

As with Virginia Beach trips, the Appalachian Mountains appear to be the western limit of trips for Williamsburg.
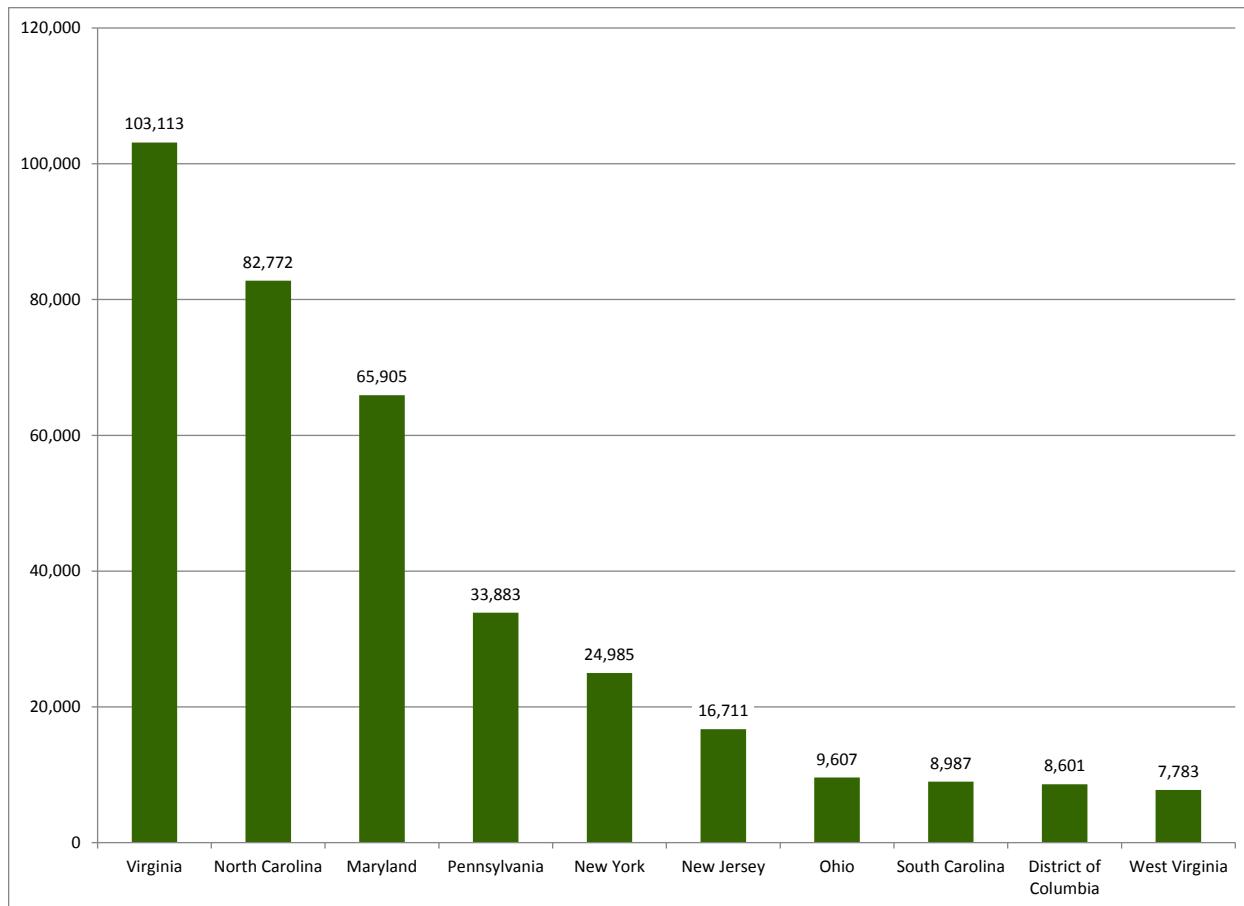
FIGURE H21 Other End of 2008 Auto Non-Business Trips >100 mi. to/from Williamsburg

Source: HRTPO staff preparation using FHWA's 2008 Traveler Analysis Framework (2008AutoNonbiz-Wlmbg.xlsx)

Based on the above TAF analysis, HRTPO staff reports the following **finding** (14):

- The top six states containing the other end of auto non-business trips to/from Williamsburg are the same as those to/from Virginia Beach.

MOE#3: Special Public Transit for Visitors

In order to determine how well the entire transportation system in the Hampton Roads region serves the main hospitality destinations in Hampton Roads (Virginia Beach and Williamsburg), HRTPO staff examined each destination for the presence (or absence) of public transportation specially designed for visitors, e.g. **trolley buses** owned by the subject city.

HRTPO staff conducted Google searches (using terms "trolley", "transportation", and "visit") to determine those destination cities that supply special public transit for visitors.

Hampton Roads Transit's VB Wave is an easy way to get around the Virginia Beach Oceanfront. Wave shuttles make stops along Atlantic Avenue, the Virginia Aquarium, Ocean Breeze Water Park, the Holiday Trav-L-Park, the KOA campgrounds on General Booth Boulevard and the Shops at Hilltop. These hybrid-electric shuttles are also a lot of fun. Kick back and let us do the driving.
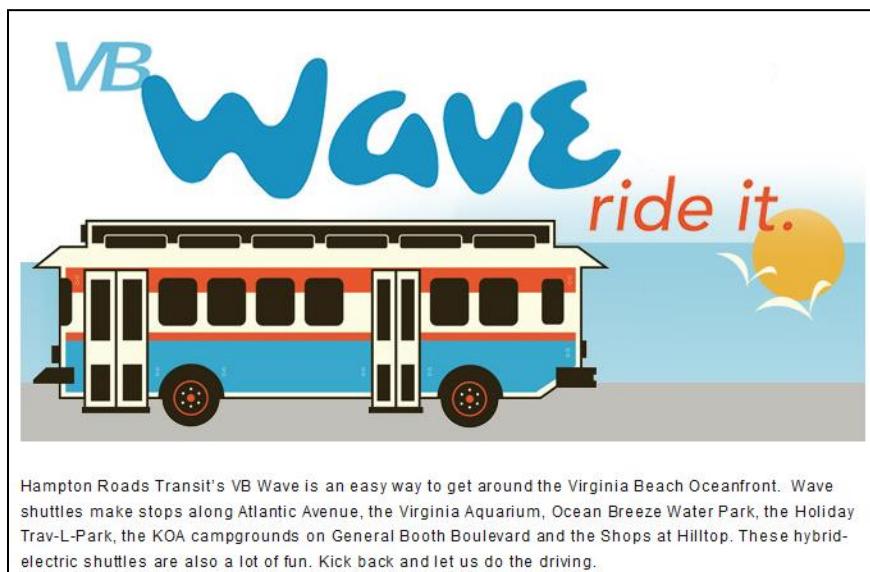
Source: Gohrt.com (hospitality.pptx)
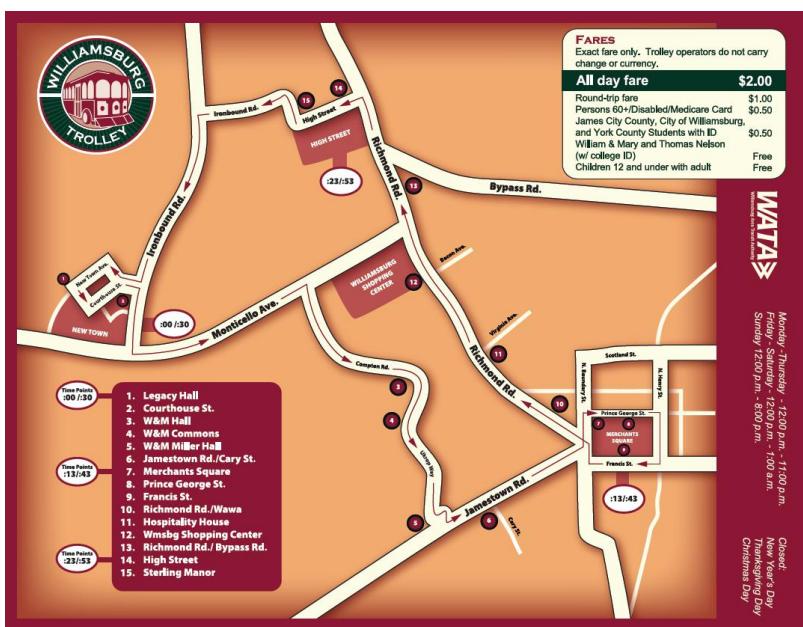
Source: Gowata.org (hospitality.pptx)
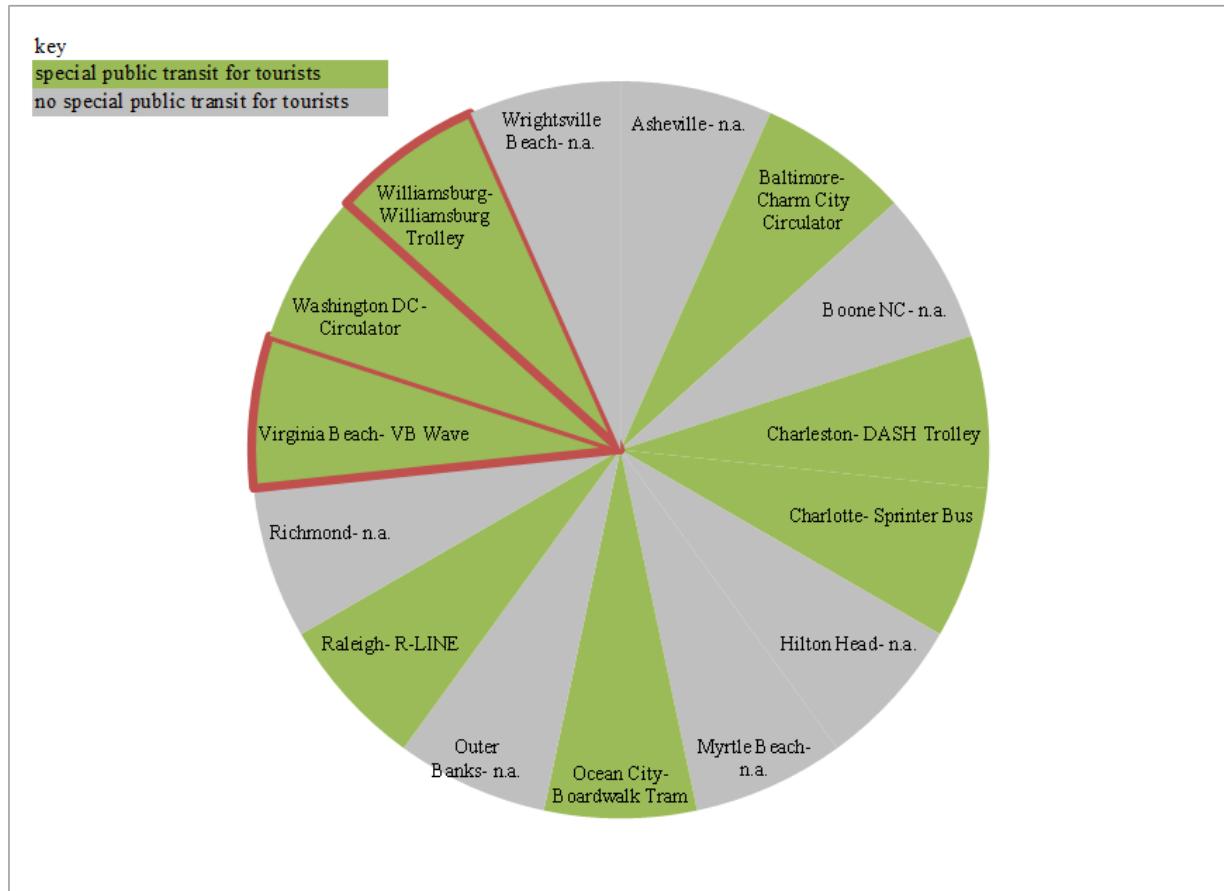
FIGURE H22 Presence of Special Public Transit for Visitors
Source: HRTPO staff calculation using Google Maps (hospitality.pptx)

Based on the above research, HRTPO staff reports the following **finding** (15):

- Although half of the destination cities do not, Virginia Beach (*VB Wave*) and Williamsburg (*Williamsburg Trolley*) do provide special public transit for visitors.

MOE#4: Accessibility and Level-of-Service of Commercial Airport

In order to determine how well the entire transportation system in the Hampton Roads region serves the main hospitality destinations in Hampton Roads (Virginia Beach and Williamsburg), HRTPO staff measured the travel time by highway from these and the other subject locations to the **nearest commercial airport**, and the level of service provided by that airport.

HRTPO staff used Google Maps to calculate the time necessary to travel from the center of the subject city/town to the airport on a weekday outbound during midday (10am-4pm). On the chart on the following page, HRTPO staff reports the average of three runs (from three different days, i.e. one run per day). An example run is shown below.
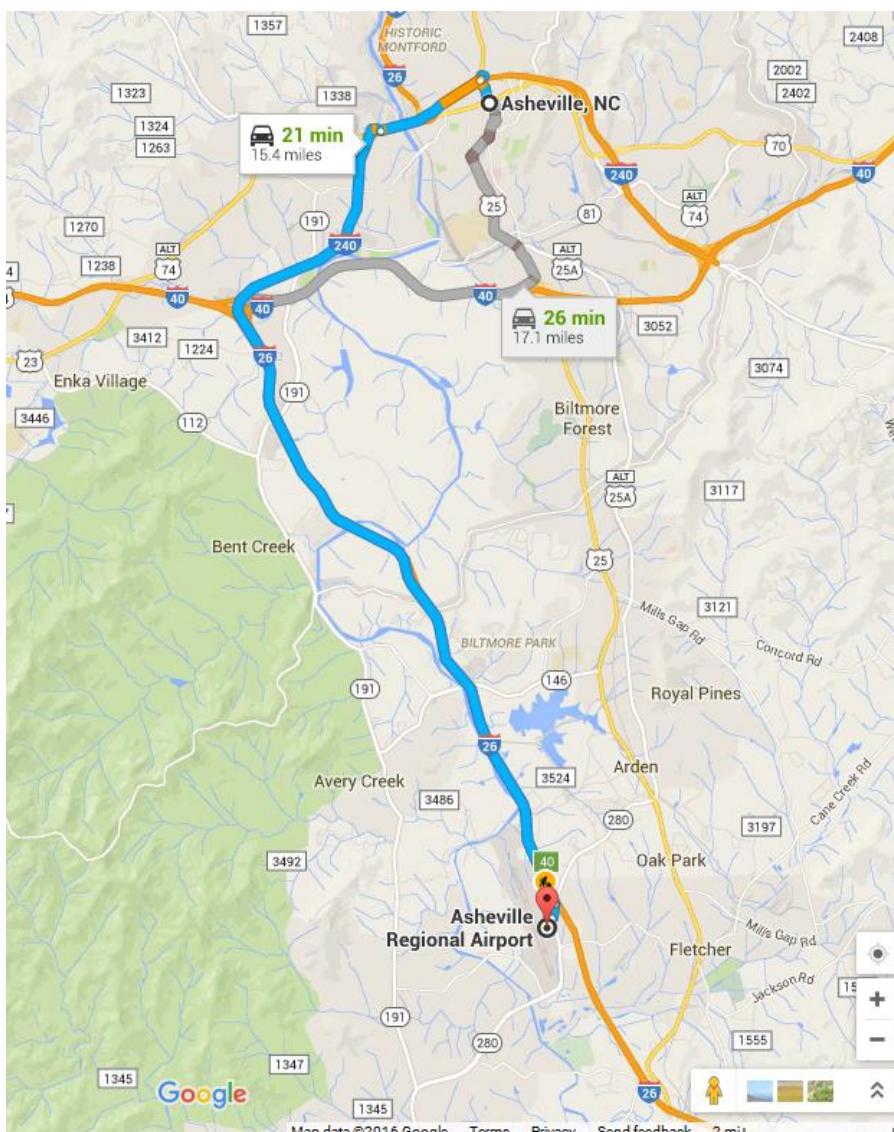
FIGURE H23 Example Measurement of Time to Travel to Commercial Airport
Source: Google Maps (hospitality.pptx)

This chart—showing weekday travel time during the midday (10am-4pm)—combines the effect of airport distance with the effect of road congestion during the midday (see Appendix D for details).

Hwy Travel Time to Nearest Commercial Airport, <u>Weekday, Midday</u>

Location	Minutes
Asheville	20
Baltimore	17
Boone NC	99
Charleston	24
Charlotte	15
Hilton Head Island	8
Myrtle Beach	9
Ocean City	35
Outer Banks (Nags Head)	103
Raleigh	20
Richmond	13
Virginia Beach	27
Washington	18
Williamsburg	30
Wrightsville Beach	20
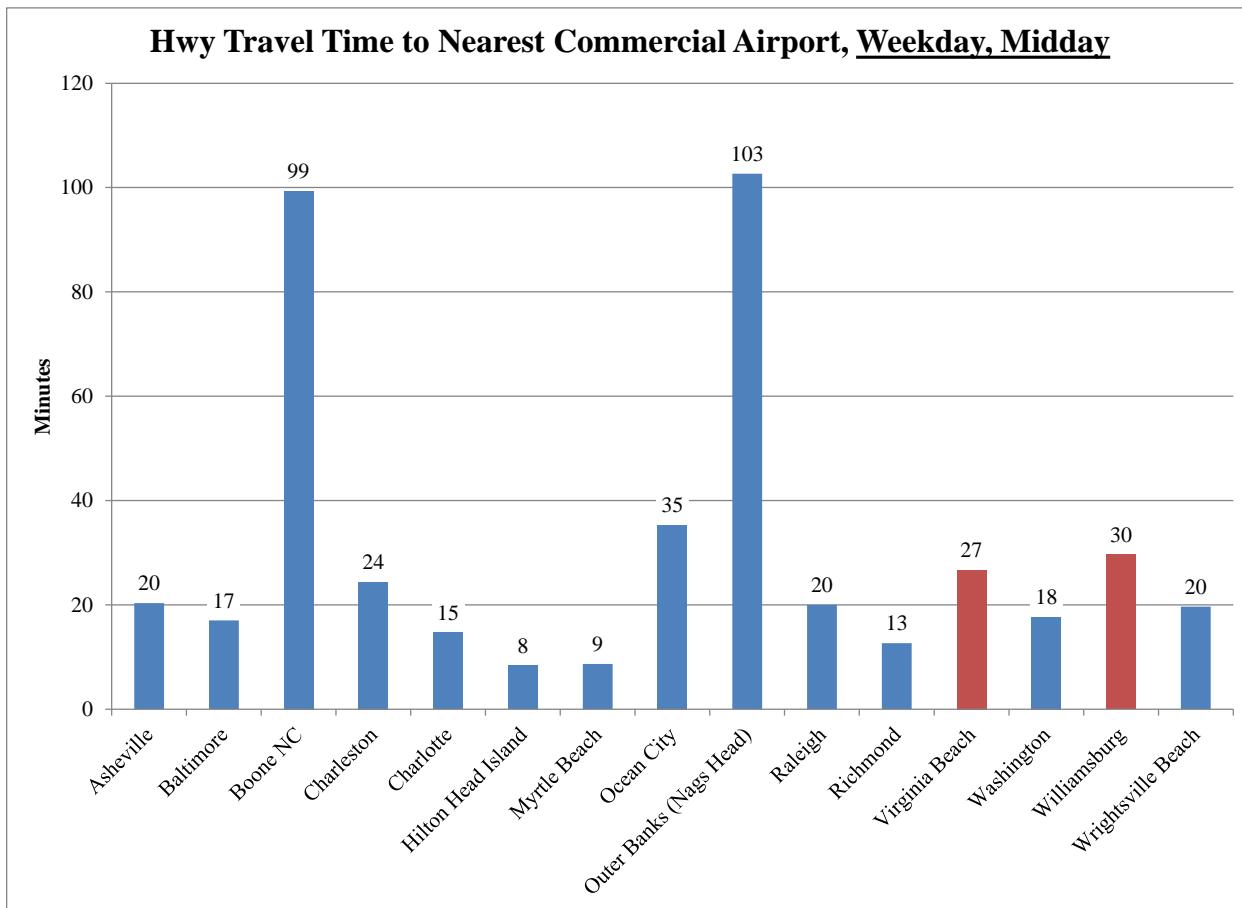
FIGURE H24

Source: HRTPO staff calculation using Google Maps (travel time to airport.xlsx)

As shown on the above chart, the location of commercial airports, and the congestion on highways leading to them, is such that the airport travel time from Virginia Beach and Williamsburg is higher than that of all but 3 of the subject locations.

70
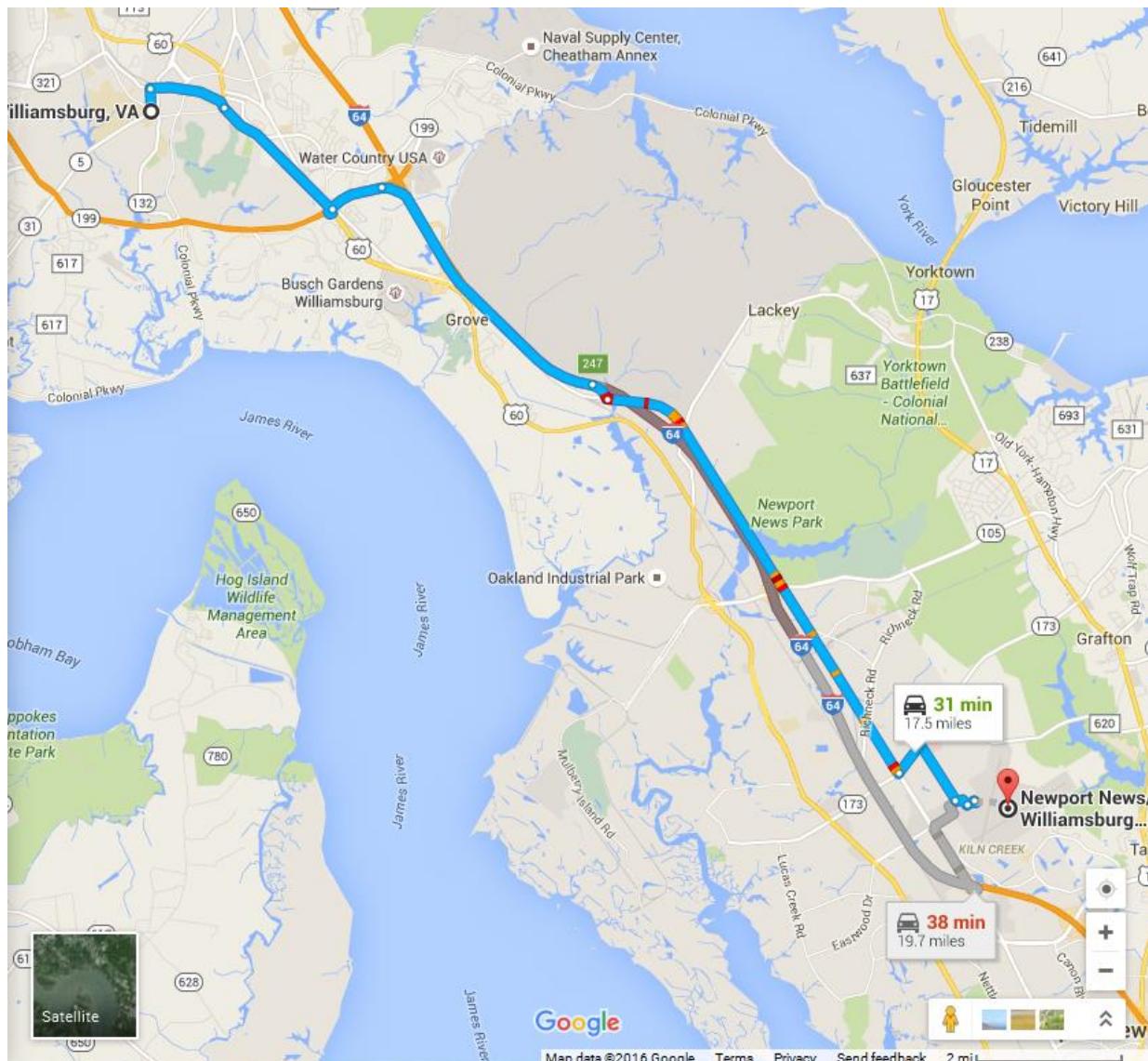
FIGURE H25 Williamsburg to NN/Williamsburg Airport- One Run
Source: Google Maps (hospitality.pptx)

Review of the above map (noting the re-routing from I-64 to Jefferson Ave.) indicates that the primary source of congestion for the Williamsburg to airport trip is I-64. Fortunately, the I-64 Peninsula widening project under construction will eliminate the I-64 congestion.

Based on the above research, HRTPO staff reports the following **finding** (16):

- Although the Williamsburg-to-airport trip takes longer than the airport trips of most of the subject hospitality locations, the current I-64 Peninsula widening project will reduce this travel time.

The two charts below—showing *number of flights* and *number of boardings*—indicates the *level of service* provided by the nearest commercial airport for all users including visitors.

Flights (Itinerant Operations), 2015
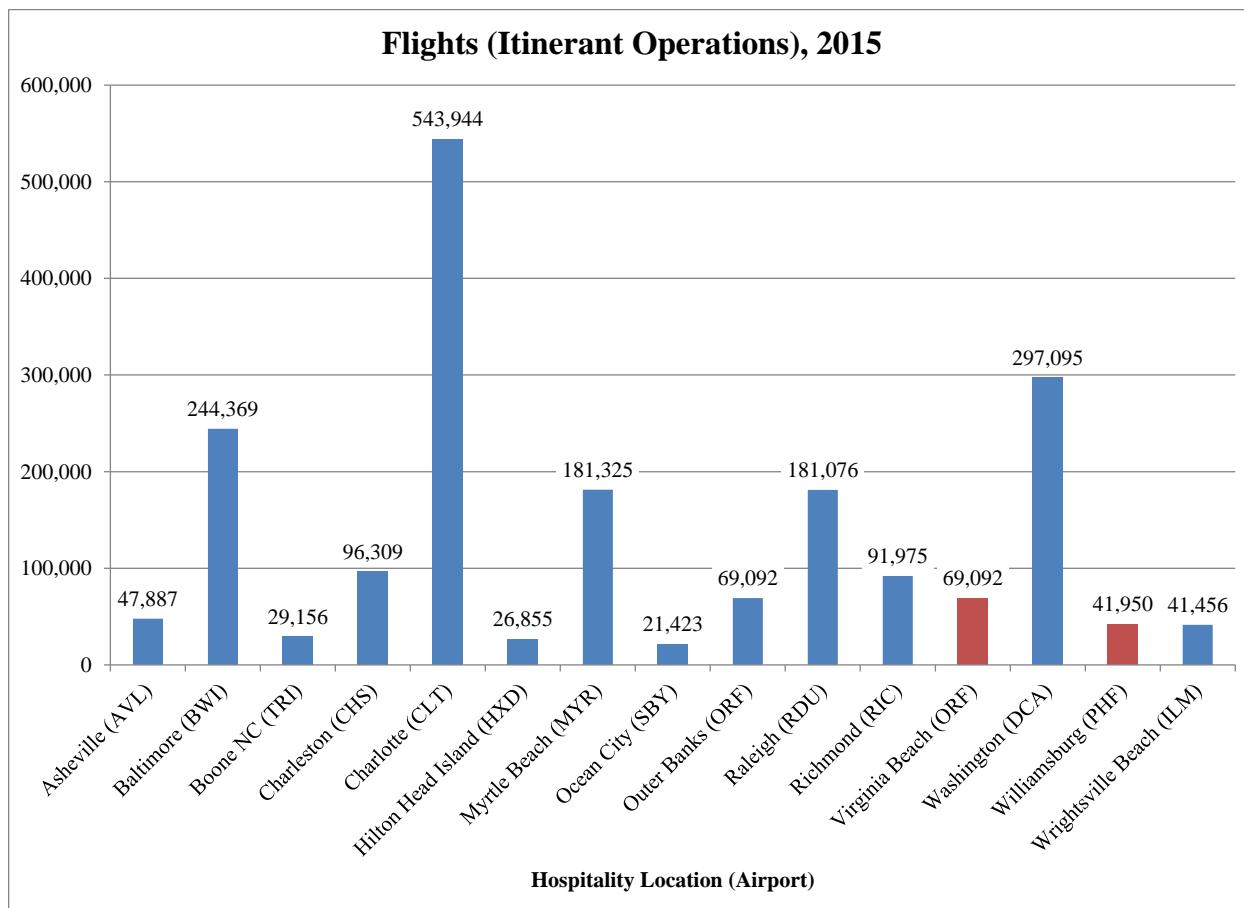
FIGURE H26 Flights at Nearest Commercial Airport
Source: HRTPO staff calculation using Google Maps (travel time to airport.xlsx)

Based on the above chart, the commercial airports serving the subject Hampton Roads hospitality locations (Norfolk International for Va. Beach, and NN-Williamsburg for Williamsburg) have a moderate number of flights.
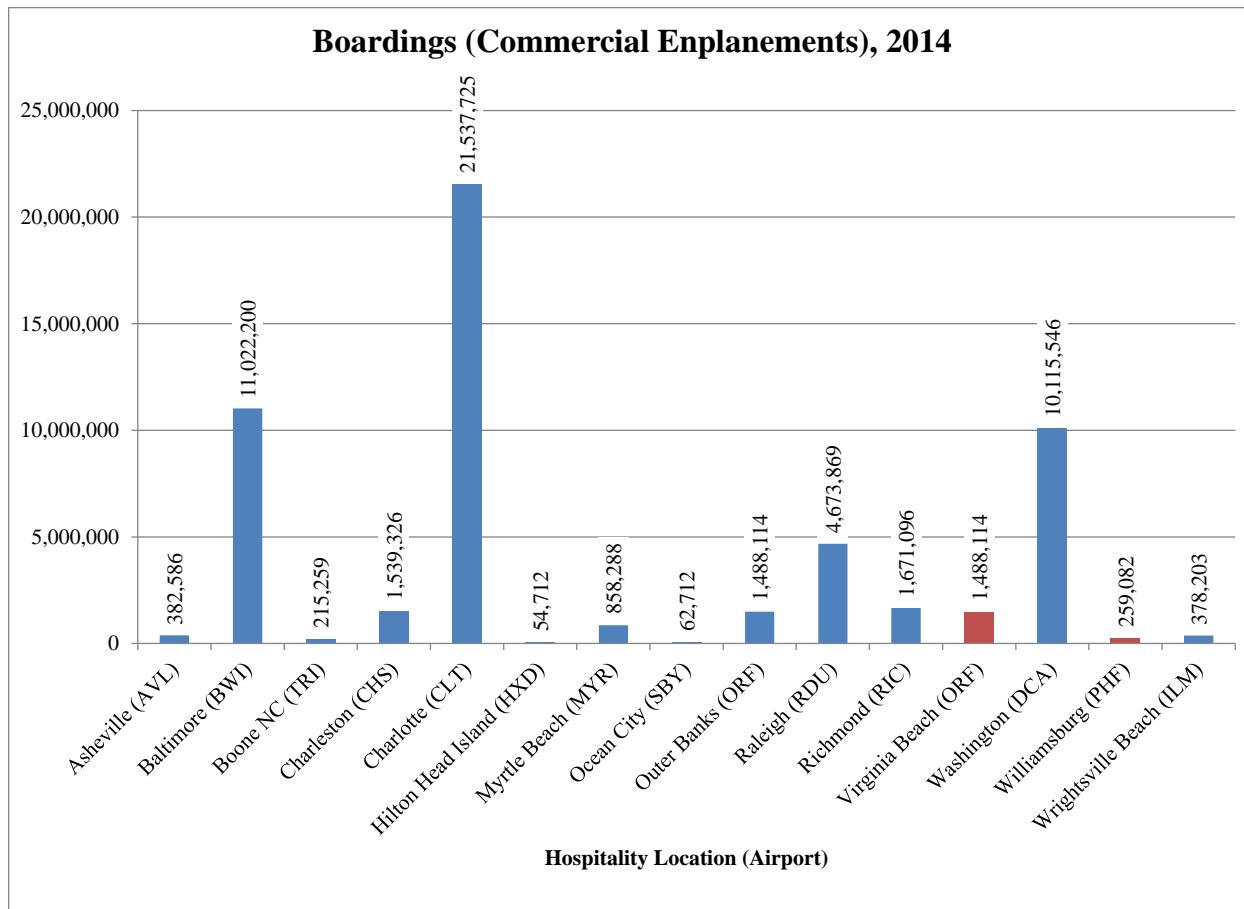
FIGURE H27 Boardings at Nearest Commercial Airport

Source: HRTPO staff calculation using Google Maps (travel time to airport.xlsx)

Likewise, the chart above shows that the commercial airports serving the subject Hampton Roads hospitality locations (Norfolk International for Virginia Beach, and NN-Williamsburg for Williamsburg) have a **moderate number of air boardings**.

Based on the above research, HRTPO staff reports the following **finding** (17):

- The airports serving Virginia Beach (Norfolk International) and Williamsburg (NN-Williamsburg International) have a moderate number of flights and boardings.

MOE#5: Accessibility and Level-of-Service of Amtrak

In order to determine how well the entire transportation system in the Hampton Roads region serves the main hospitality destinations in Hampton Roads (Virginia Beach and Williamsburg), HRTPO staff measured both the **accessibility** of the **nearest Amtrak station** and the **level of service** provided by that station.

Access to an Amtrak station being only as valuable as the service provide at that station, HRTPO staff first examined the **level of service** provided at the subject stations using the number of trains (leaving the station) as the measure.
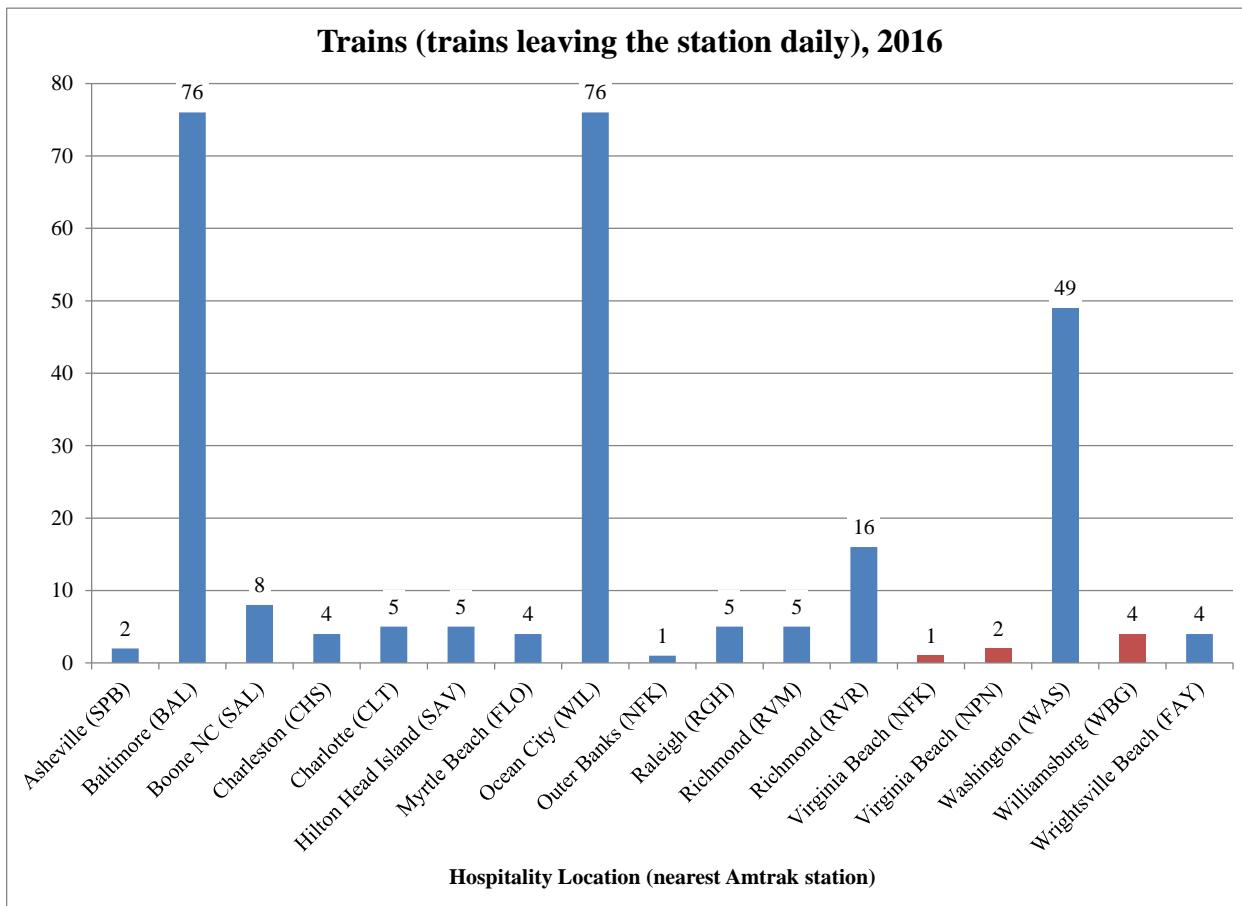
FIGURE H28

Source: HRTPO staff calculation using Google Maps (Amtrak data & charts for hospitality.xlsx)

Based on the above research, HRTPO staff reports the following **findings** (18, 19):

- Of all of the stations serving the subject hospitality destinations, the Norfolk station serving Virginia Beach is the only station with only one train per day.

- To improve rail service to Hampton Roads, the HRTPO Board has been pursuing funding for:
    - trains 2 and 3 for the Norfolk station[21], and
    - a Tier II EIS for the Hampton Roads – Richmond High Speed Rail Project (Southside: up to 90mph; Peninsula: enhanced passenger rail)[22].
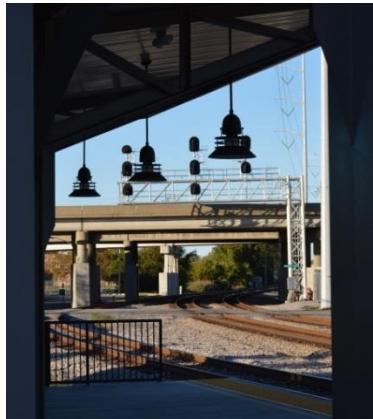
From Norfolk Amtrak Station
Source: HRTPO staff (from Norfolk Train Station – small.jpg)

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[21] Programmed in DRPT 6-year document.
[22] Richmond / Hampton Roads TIER I Final Environmental Impact Statement, approved by FRA Aug 2012; TIER 1 Record of Decision, approved by FRA Dec 2012.

Secondly, for measuring **accessibility**, HRTPO staff used Google Maps to calculate the time necessary to travel from the center of the subject city/town to the nearest Amtrak station using various modes of travel. On the chart on the following page, HRTPO staff reports the off-peak travel time from one run for each hospitality location, for both Amtrak rail stations and (where applicable) Amtrak bus stops. (For travel times under congested conditions to rail stations only, see Appendix D.)

An example run (for Charleston) is shown below.
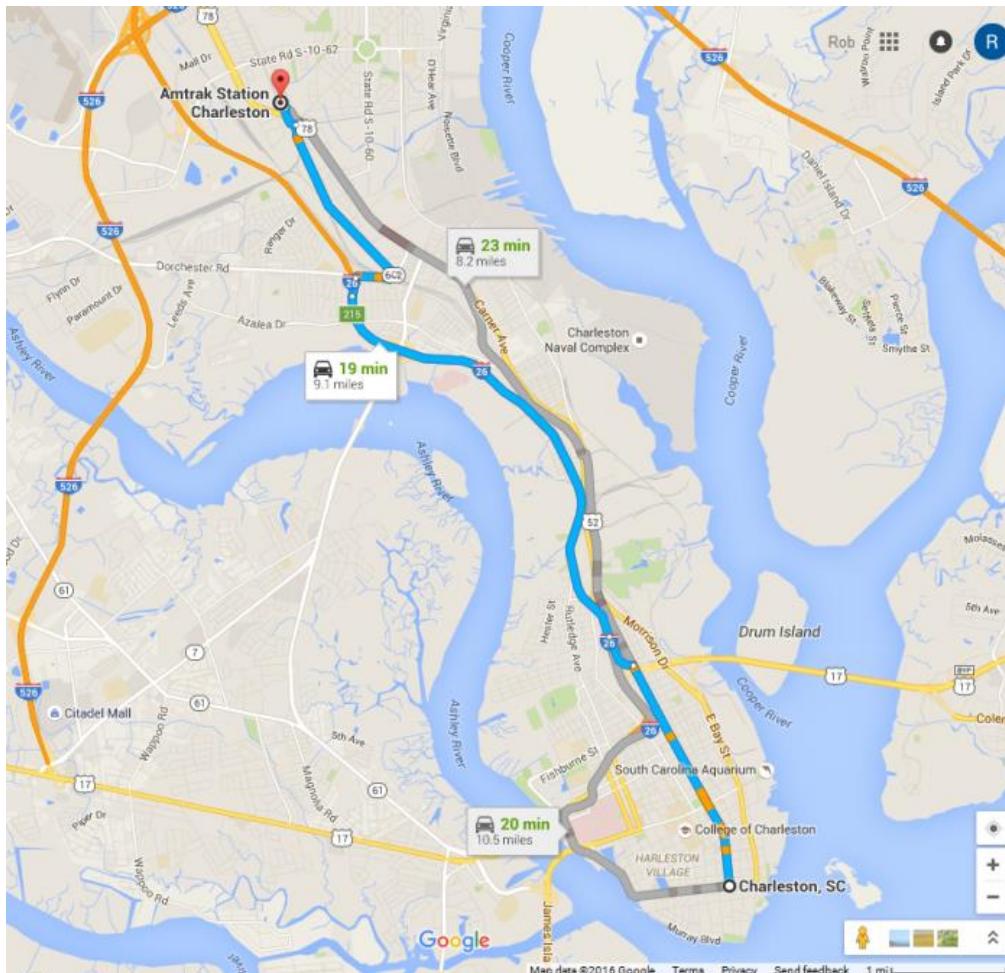
FIGURE H29 Example Measurement of Time to Travel to Amtrak Station
Source: Google Maps (hospitality.pptx)
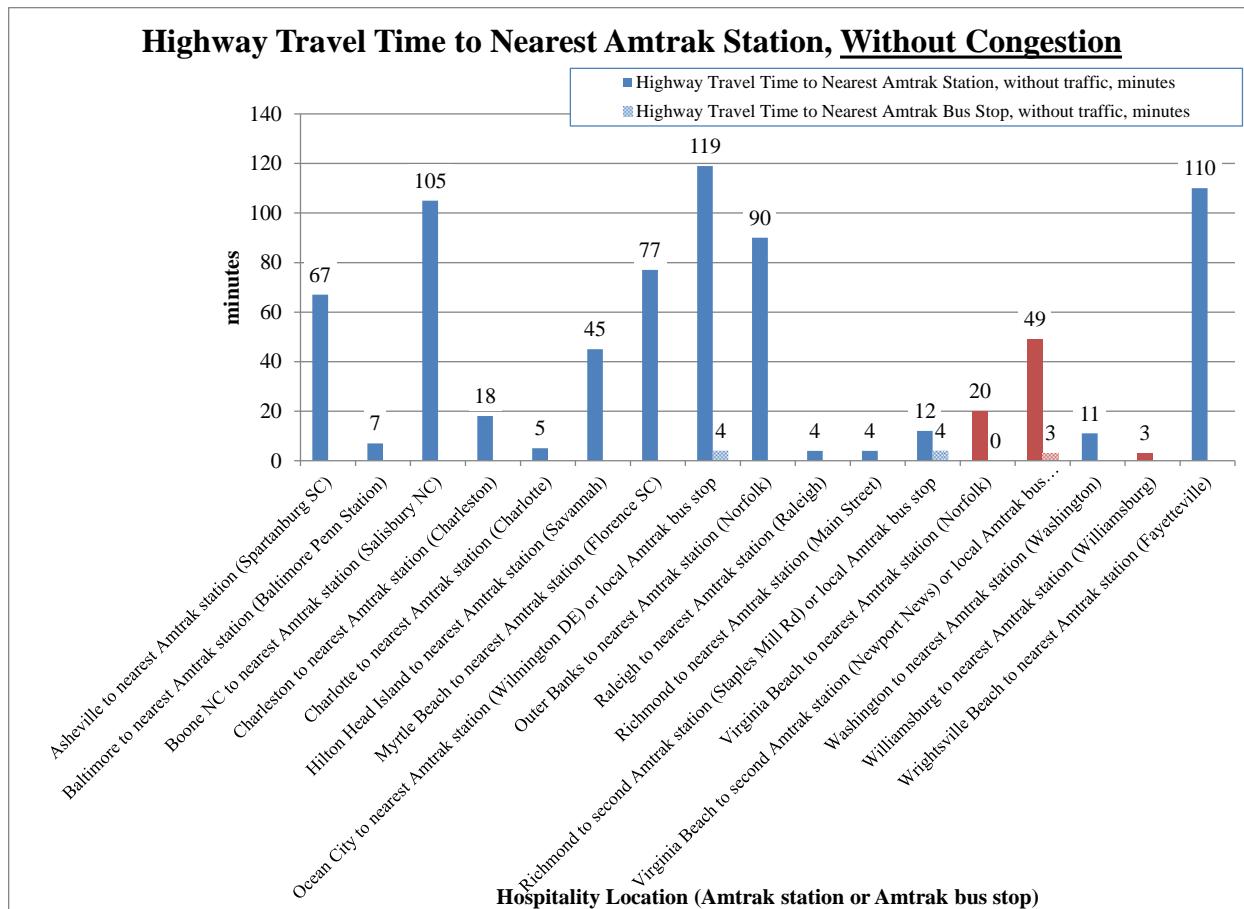
FIGURE H30

Source: HRTPO staff calculation using Google Maps (Amtrak data & charts for hospitality.xlsx)

Having a station (with two trains per day) near the historic district, Williamsburg has the shortest travel time. Although having no train station in the city boundary, Virginia Beach is well situated geographically:

- being moderately near two stations—Norfolk (served by only one train per day) and Newport News (served by two trains per day)—and
- having Amtrak bus service for Newport News trains.

Based on the above research, HRTPO staff reports the following **findings** (20, 21):

- The Hampton Roads hospitality locations have moderately good highway access to Amtrak stations.
- Virginia Beach has no Amtrak bus service for Norfolk trains.

Travel times to Amtrak via public transit are investigated below.
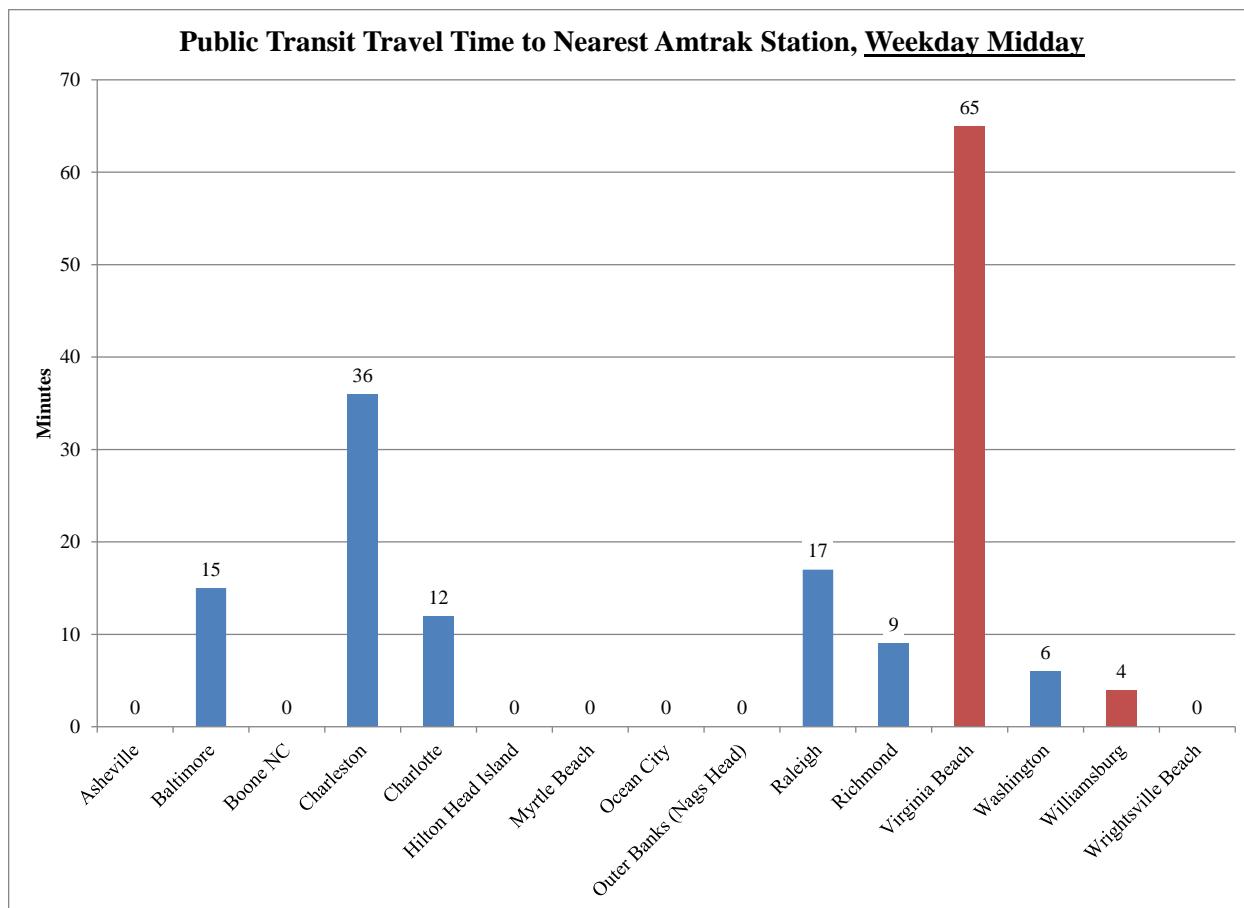
FIGURE H31

Source: HRTPO staff calculation using Google Maps (travel time to Amtrak.xlsx)

Based on the above research, HRTPO staff reports the following **findings** (22, 23):

- Although half the hospitality locations do not have such access, both Hampton Roads locations have public transit access to Amtrak.

- Williamsburg has shorter time for public transit access to Amtrak than any other competing destination.

Travel times to Amtrak via walking are investigated below.
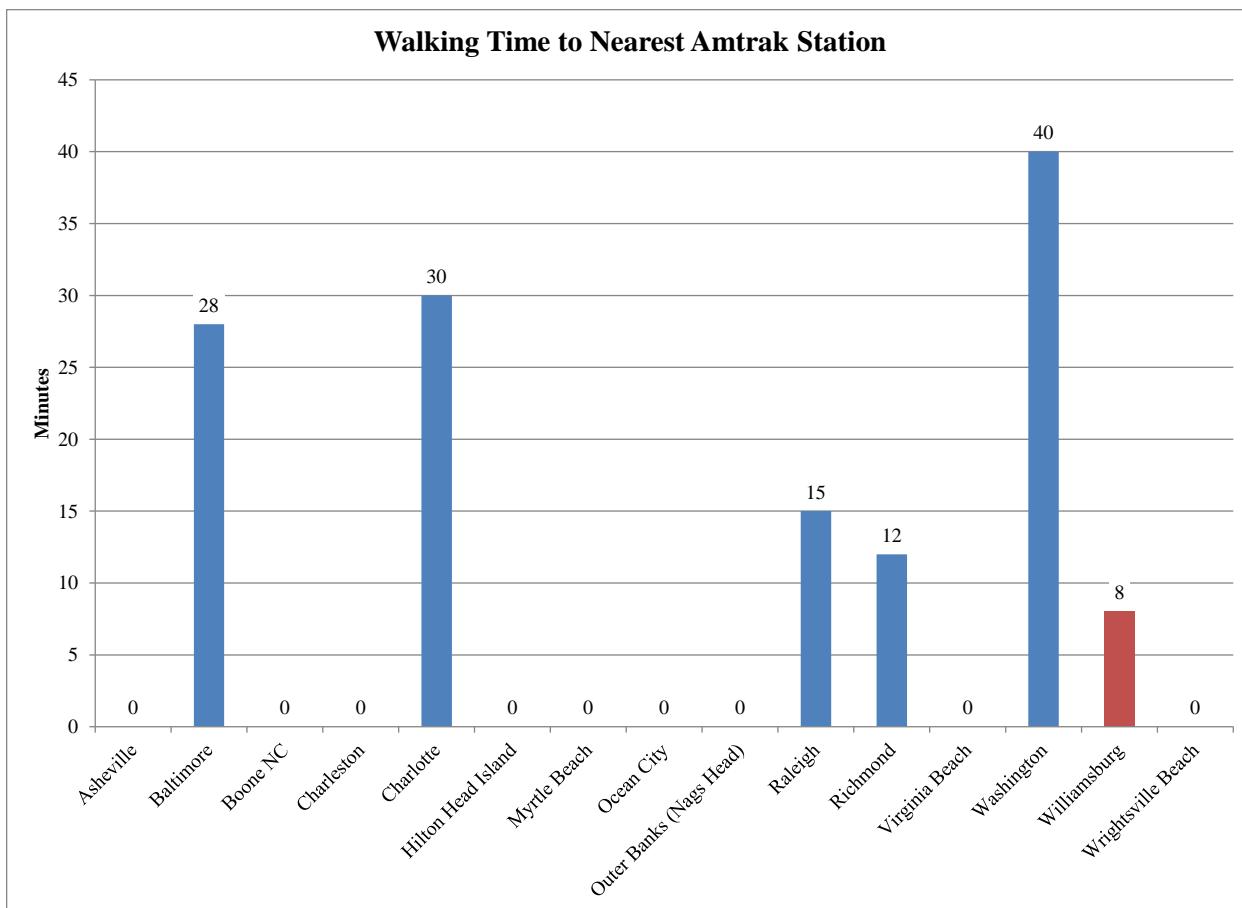
FIGURE H32

Source: HRTPO staff calculation using Google Maps (travel time to Amtrak.xlsx)

Based on the above research, HRTPO staff reports the following **finding** (24):

- Although most destinations, including Virginia Beach, are not within walking distance of an Amtrak rail station[23], Williamsburg has better walking access to Amtrak than any other destination.

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[23] The Amtrak bus stop in Va. Beach is within walking distance of the VB resort.

Other End of Rail Trips to/from Williamsburg As a foundation for improving rail service for Williamsburg, HRTPO staff examined the other end of 25 thousand annual rail trips to/from that city using FHWA's 2008 estimate of trips >100 miles, the Traveler Analysis Framework (TAF).
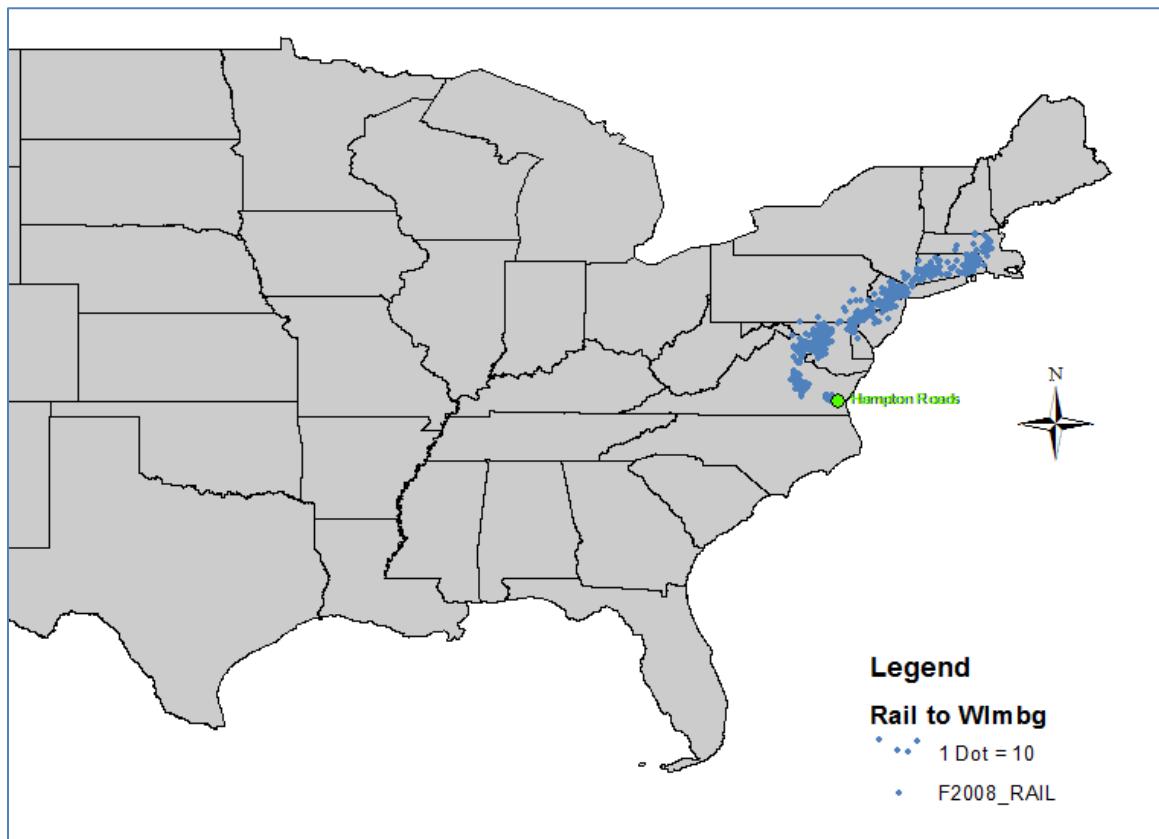

FIGURE H33 Other End of Closest Leg of 2008 Rail Trips to/from Williamsburg
Source: HRTPO staff preparation using FHWA's 2008 Traveler Analysis Framework (traveler analysis framework 2008.mxd)

Although it appears from the above TAF-based map that train trips to/from Williamsburg involve exclusively the Richmond-Boston corridor, the TAF rail data—having been developed[24] from Amtrak station-to-station data that *excluded* transfer information[25]—does not show the Williamsburg trips actually made from non-northeast-corridor locations. Therefore, a Charlotte to Williamsburg trip that involved a transfer in Richmond was treated as a Charlotte to Richmond trip *and* a Richmond to Williamsburg trip.

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[24] "The station to station OD data from Amtrak is used…and…the access/egress trip distribution models…were used to allow complete trips from origin to boarding station to destination station to trip destination…." ("Final Report to FHWA for Traffic Analysis Framework Part IIA", 8 Apr 2013 [bus revised 30 Jan 2015], p. 3-27)

[25] "Final Report to FHWA for Traffic Analysis Framework Part IIA", 8 Apr 2013 [bus revised 30 Jan 2015], p. 2-16.
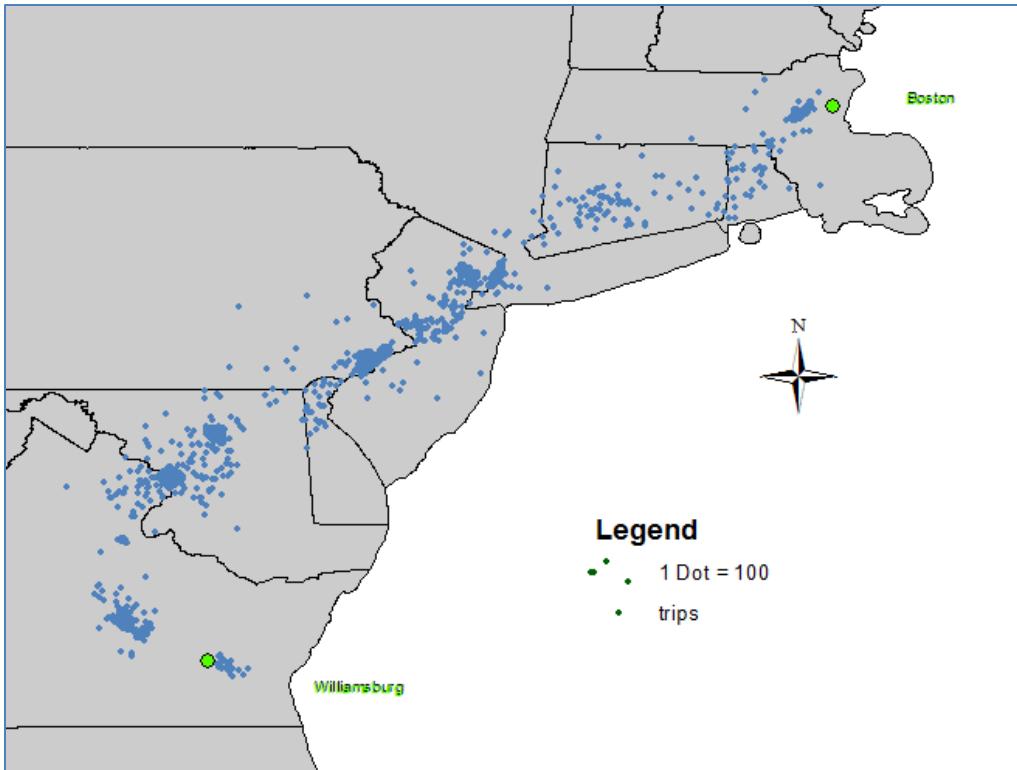
FIGURE H34 Other End of Closest Leg of 2008 Rail Trips to/from Williamsburg

Source: HRTPO staff preparation using FHWA's 2008 Traveler Analysis Framework (traveler analysis framework 2008.mxd)
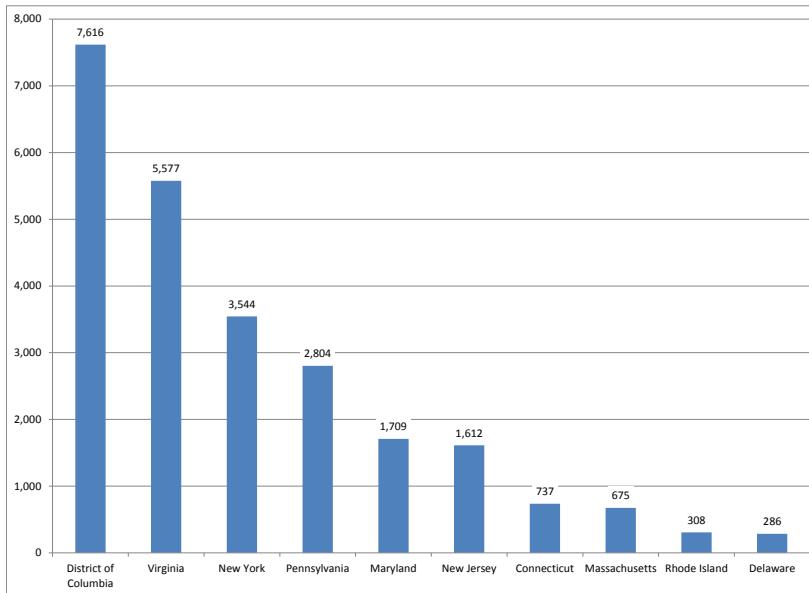
FIGURE H35 Other End of Closest Leg of 2008 Rail Trips to/from Williamsburg

Source: HRTPO staff preparation using FHWA's 2008 Traveler Analysis Framework (2008Rail-Wlmbg.xlsx)

Although the TAF data shows DC as the primary Williamsburg rail trip partner, due to the lack of transfer information in the TAF, it is likely that many of the DC trips shown above are transfers to/from other locations.
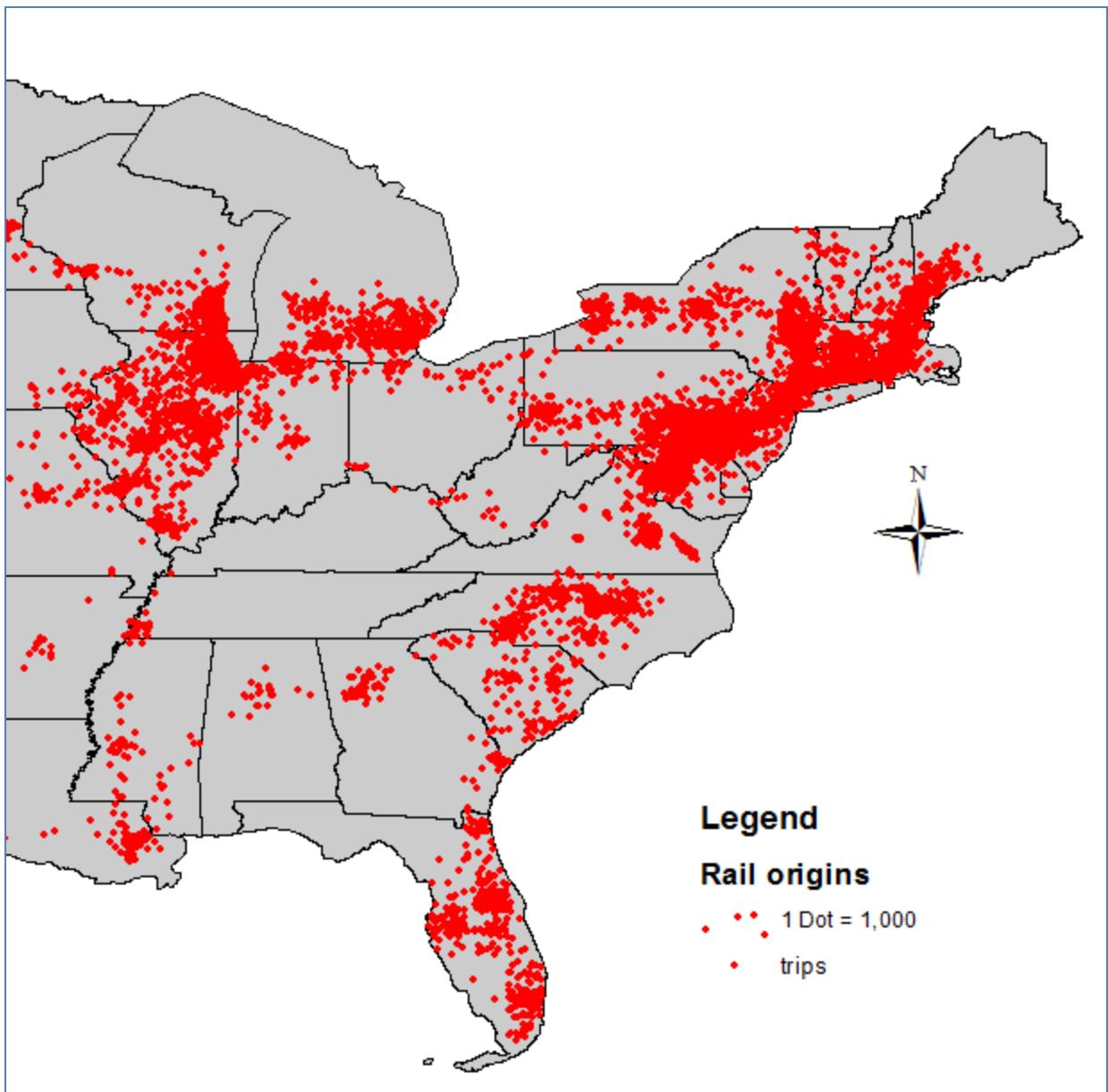
FIGURE H36 Origin of All 2008 Rail Trips, regardless of destination
Source: HRTPO staff preparation using FHWA's 2008 Traveler Analysis Framework (2008Rail-Wlmbg.xlsx)

The above map shows all rail trips regardless of destination. Given the large number of rail trips to/from the South and the Mid-West shown above, it is likely that some of the South and Mid-West trips came to/from Williamsburg but were not reported as such in the TAF because they involved a **transfer**.

Therefore, HRTPO staff examines below the process of **transferring** in Washington and Richmond for Williamsburg trips.
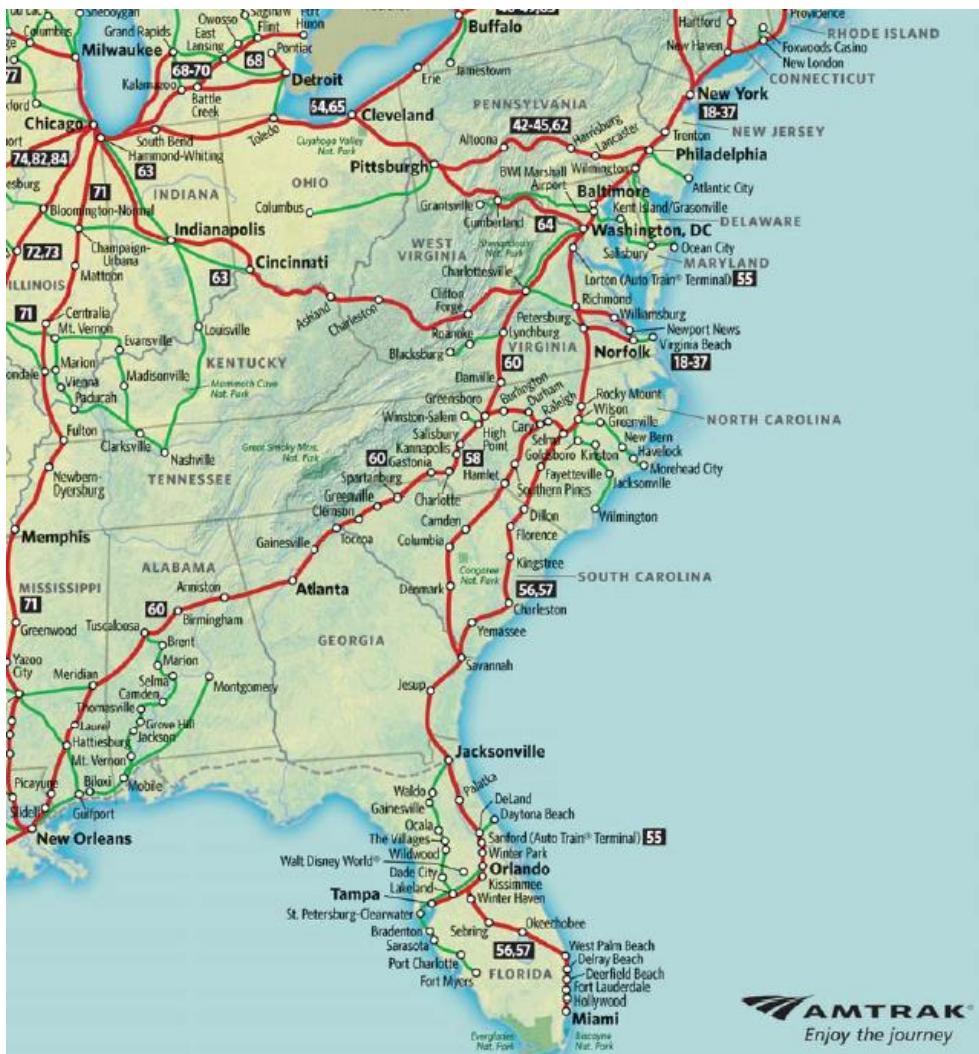
FIGURE H37 Amtrak System Map
Source: Amtrak.com (Mar. 2015; Amtrak bus routes shown in green)

As shown on the system map above, train travelers living along the New Orleans to Charlottesville corridor, must **transfer in DC** to reach Williamsburg, adding hundreds of miles to the trip. The one daily train serving this corridor arrives in DC at 9:53am, but the DC-Williamsburg trains leave DC at a) 7:30am—a missed connection—and b) 2:30pm—a four and a half hour layover. Consequently, a trip from Atlanta to Williamsburg—although a 9 hour auto trip—takes more than twice as long (22 hours) by train.

Likewise, train travelers living along the southern coast from Florida to North Carolina must **transfer in Richmond** to reach Williamsburg. Although Richmond is not a geographic detour for such trips, the transfers there are difficult. Trains from Amtrak's coastal routes (98, 92, and 90) arrive in Richmond at 4:22am, 12:07pm, and 5:04pm respectively; yet the two Richmond-Williamsburg trains leave Richmond at a) 9:44am—a 5+ hour layover for travelers on Route

98—and b) 4:48pm—a 4+ hour layover for travelers on Route 90, and a missed transfer (by only16 minutes) for Route 92.

Based on the above TAF and Amtrak schedule analysis, HRTPO staff reports the following **finding** (25):

- The lack of time coordination between a) Richmond trains serving Williamsburg, and b) Richmond trains serving the South makes it difficult for people to make rail trips between Williamsburg and the South.

Recap of Key Findings for Serving Hospitality

The above report section contains 25 findings, 10 *key* findings of which are repeated below:

- Approximately 4,000 persons living in the vicinity of the VB Norfolk-Southern right-of-way currently bike or walk to work.

- Approximately 2,000 persons living near the proposed VB path in the NS right-of-way—who do not currently walk or bike to work—would do so if that path were built.

- The Virginia Beach path would have the greatest impact on local citizens of any of the fourteen paths studied in the Signature Paths report.

- Construction of the proposed 30-mile Southside PCVCT path, and completion of the proposed 45-mile SHRT, would connect the oceanfront and the interior of Virginia as far as Richmond.

- Although half of the destination cities do not, Virginia Beach (*VB Wave*) and Williamsburg (*Williamsburg Trolley*) do provide special public transit for visitors.

- Of all of the stations serving the subject hospitality destinations, the Norfolk station serving Virginia Beach is the only station with only one train per day.

- To improve rail service, the HRTPO Board has been pursuing funding for:
    - trains 2 and 3 for the Norfolk station, and
    - a Tier II EIS for the Hampton Roads – Richmond High Speed Rail Project (Southside: up to 90mph; Peninsula: enhanced passenger rail)

- Although half the hospitality locations do not have such access, both Hampton Roads locations have public transit access to Amtrak.

- Virginia Beach has no Amtrak bus service for Norfolk trains.

- The lack of time coordination between Richmond trains a) serving Williamsburg, and b) serving the South makes it difficult for people to make rail trips between Williamsburg and the South.

KEY FINDINGS

The purpose of this study is to determine how well the transportation system of Hampton Roads serves three key economic sectors—port, military, and hospitality. Key findings by sector:

Port

- Highways and land-use provide the ports in Hampton Roads with 2 and 4 hour service areas **greater than those of the ports of Charleston and Savannah**, but significantly less than that of the port of New York.

- When considering ports and their companion inland ports (where applicable), the Port of Virginia serves more population within 8 highway hours **than any other east coast port.**

- The current **Rt. 58 Corridor Study** is an important step in maintaining or even increasing the size of the service area of the ports in Hampton Roads.

- The **29-mile section of I-64** between exit 205 (Bottoms Bridge) and exit 234 (Lightfoot) is not in the LRTP of either region.

- VDOT's FEIS indicates that the **7-mile Rte30/Stonehouse (exit 227) to Rte199/ Lightfoot (exit 234)** section of I-64—**in the HRTPO planning area**—will have LOS C-E in 2040 but is **not in the 2040 LRTP**.

- The HRTPO Board's recommendation of applying HRTF $'s to the **widening of I-64 on the Peninsula and the HRCS Alt A (HRBT)** will reduce the congestion experienced by port trucks using HRBT/I-64, the primary truck gateway in Hampton Roads.

- The Commonwealth Railway serving VIG has **fifteen (15) at-grade (AG) roadway crossings**: two (2) in Chesapeake and thirteen (13) in Suffolk, including Nansemond Parkway for which the City of Suffolk is pursuing a grade separation project.

- The 35,000 vehicles of Hampton Blvd crossing the railroad tracks serving NIT near its gate creates a considerable conflict of modes.

- The Port of Virginia—like the Port of Charleston and the Port of Savannah—has on-dock rail and double-stack capability for two railroads, whereas the Port of New York & New Jersey's capabilities differ by individual port facility.

- Compared to its east coast competitors, the Hampton Roads ports:
  - currently has the **deepest channel** (along with Newark)
  - plans to still have the deepest channel in the future
  - is the only port having **no bridge height restriction**.

Military

- A separate HRTPO document analyzing how well the transportation system of Hampton Roads serves the military is to be reviewed by a technical panel.

Hospitality

- Approximately 4,000 persons living in the vicinity of the VB Norfolk-Southern right-of-way currently bike or walk to work.

- Approximately 2,000 persons living near the proposed VB path in the NS right-of-way—who do not currently walk or bike to work—would do so if that path were built.

- The Virginia Beach path would have the greatest impact on local citizens of any of the fourteen paths studied in the Signature Paths report.

- Construction of the proposed 30-mile Southside PCVCT path, and completion of the proposed 45-mile SHRT, would connect the oceanfront and the interior of Virginia as far as Richmond.

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- Of all of the stations serving the subject hospitality destinations, the Norfolk station serving Virginia Beach is the only station with only one train per day.

- To improve rail service, the HRTPO Board has been pursuing funding for:
  - trains 2 and 3 for the Norfolk station, and
  - a Tier II EIS for the Hampton Roads – Richmond High Speed Rail Project (Southside: up to 90mph; Peninsula: enhanced passenger rail)

- Although half the hospitality locations do not have such access, both Hampton Roads locations have public transit access to Amtrak.

- Virginia Beach has no Amtrak bus service for Norfolk trains.

- The lack of time coordination between Richmond trains a) serving Williamsburg, and b) serving the South makes it difficult for people to make rail trips between Williamsburg and the South.

APPENDIX A- TRAVEL TIME DETAILS FOR PORTS

Travel time during the weekday PM peak over the first 30 miles from ports is measured in the MOE#2 portion of the ports section in the body of this report. Supplementary travel time data is included below.

Moe#2: Time Necessary to Travel First 30 Highway Miles From Port

The chart below, being based on 30-mile <u>travel times without congestion</u>, indicates the **type** of roads serving each port, whether of high-speed design (e.g. interstates) or medium-speed design (e.g. signalized arterials).

**Time Necessary to Travel First 30 Miles- <u>Without Congestion</u>**
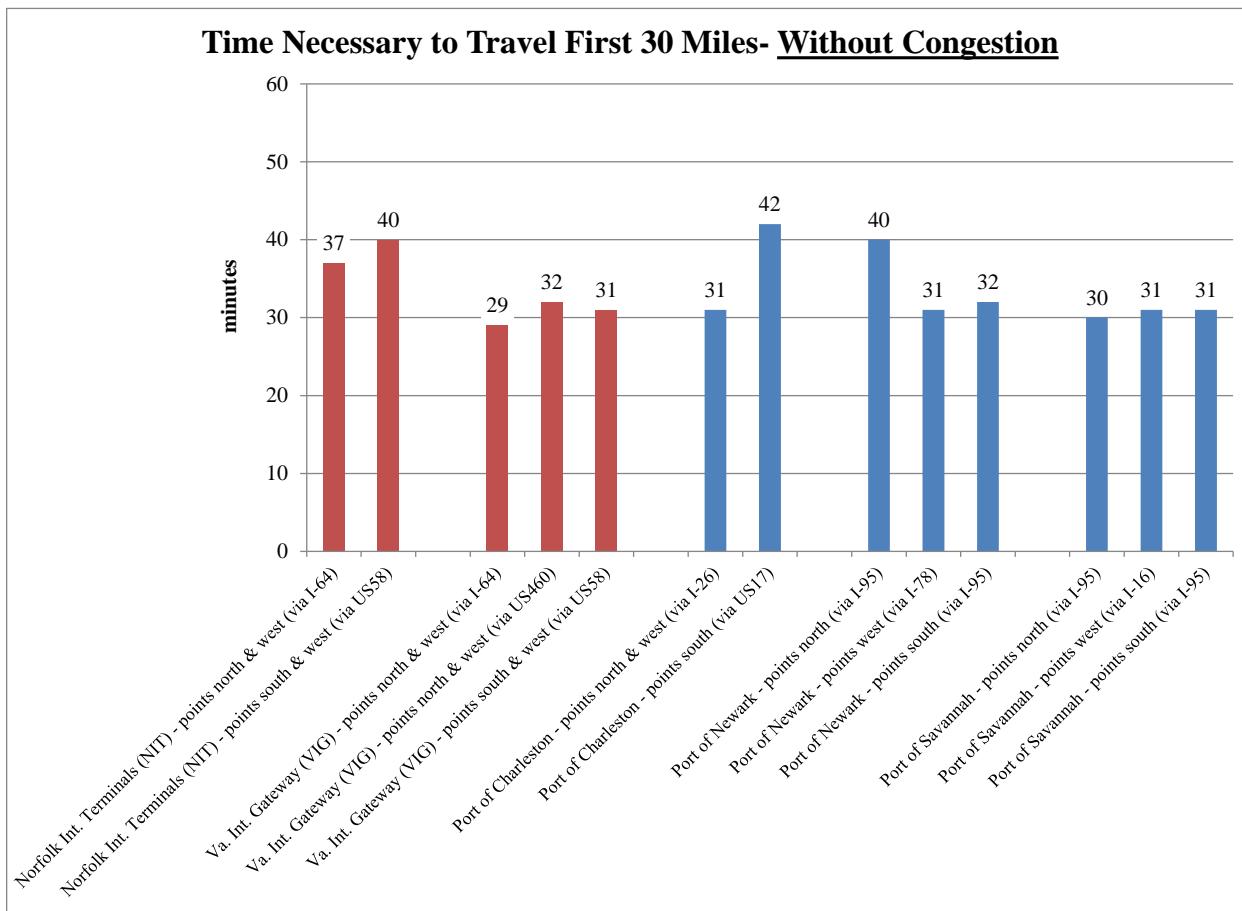
FIGURE A1
Source: HRTPO staff calculation using Google Maps (travel time data for ports.xlsx)

The chart above shows that—assuming no congestion—the *limited-access highways* serving the Virginia International Gateway (VIG) give it **a natural advantage** over the ports of Charleston and Newark, whereas the *signalized arterials* (International Terminal Blvd. and Hampton Blvd.)

serving the Norfolk International Terminals (NIT) make the first 30 miles to/from NIT **slower** than that of most of the other mid-Atlantic ports.

For the chart below, HRTPO staff calculated the degree of <u>congestion in the PM Peak</u> (4pm-6pm) by dividing the travel time of weekday runs made during the PM Peak (in report body) by the travel time without congestion (above).

Travel Time Index (peak/minimum), First 30 Mi- <u>Weekday, PM Peak</u>
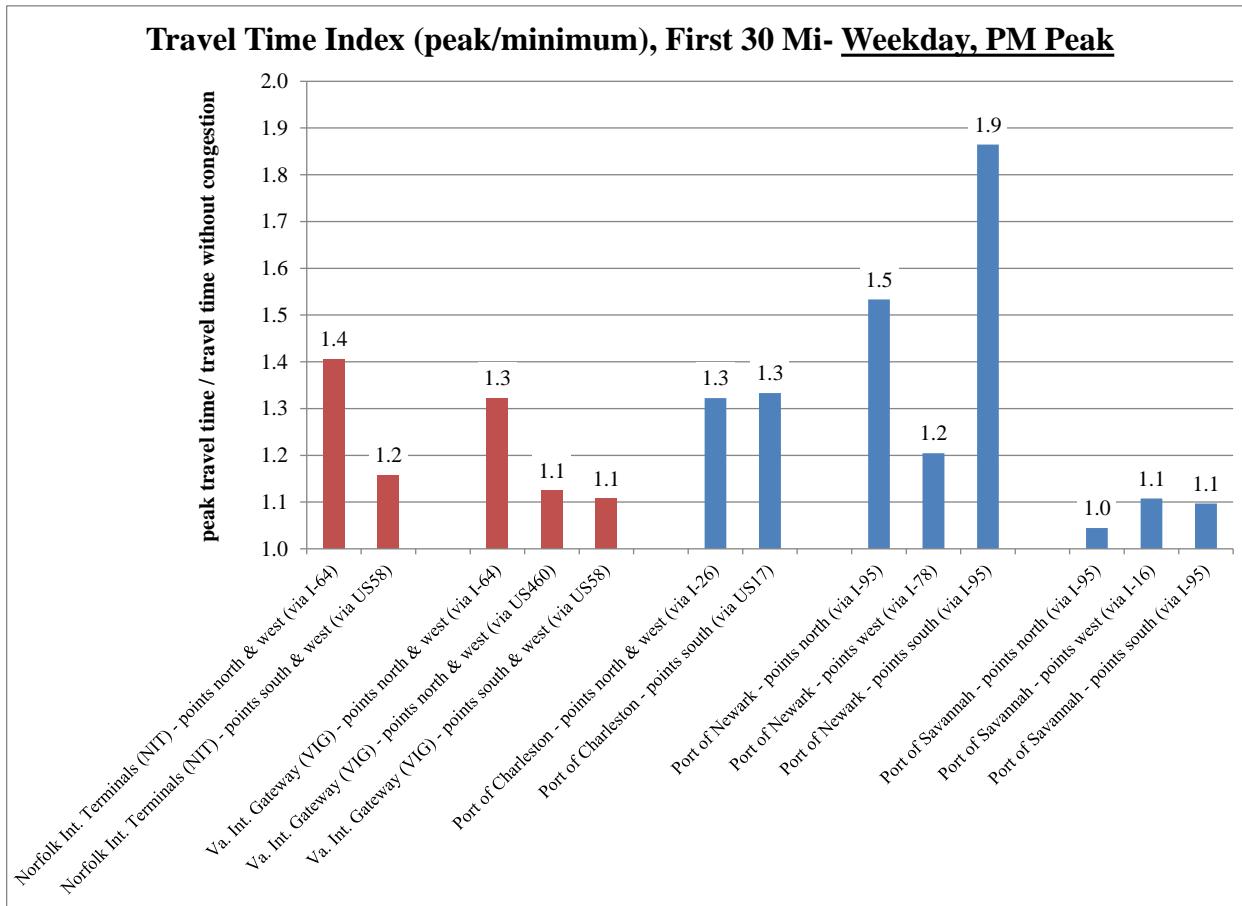
FIGURE A2
Source: HRTPO staff calculation using Google Maps (travel time data for ports.xlsx)

Not surprisingly, the chart above shows the highways serving the Hampton Roads ports have **moderate *PM Peak* congestion**, between the high congestion near the Newark port and the low congestion on the highways serving the Port of Savannah.

The daily congestion at the HRBT causes delays for north- and west-bound trips from NIT, and the daily congestion at the current narrowing (from 4 lanes to 2 lanes) of I-64 westbound near the Newport News − Williamsburg Airport causes delays for north- and west-bound trips from NIT and VIG. Concerning the former, on **20 Oct 2016 the HRTPO Board recommended improving the HRBT** (Alt A for the Hampton Roads Crossing Study's [HRCS] Supplemental

Environmental Impact Statement [SEIS]); concerning the latter, **widening of I-64 Peninsula is under construction**.

For the chart below, HRTPO staff calculated the level of <u>midday congestion</u> (known as "Travel Time Index") by dividing the travel time of runs made during weekdays 10am-4pm (Figure A4, below) by the travel time without congestion (Figure A1, above).

Travel Time Index (peak/minimum), First 30 Mi- <u>Weekday, Midday</u>
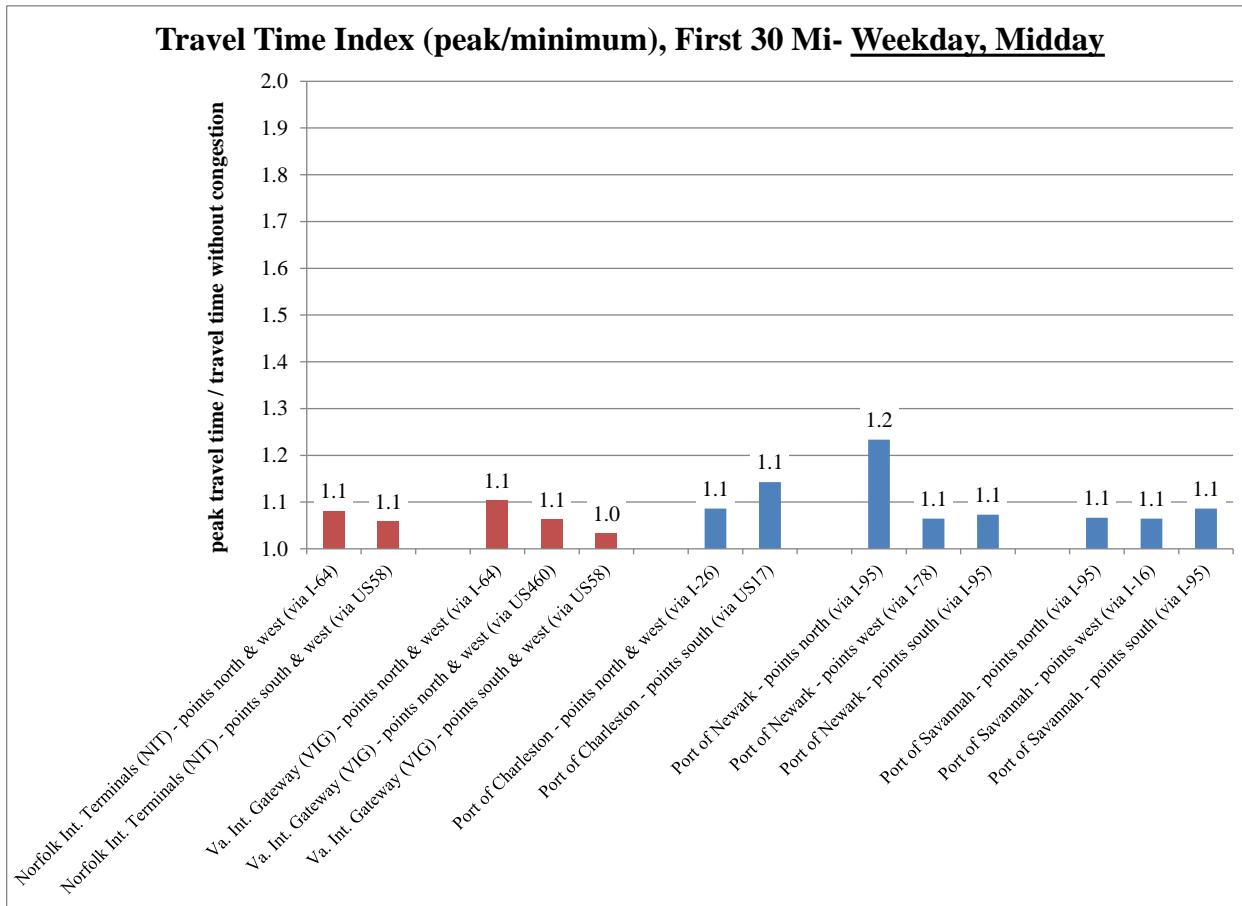
FIGURE A3

Source: HRTPO staff calculation using Google Maps (travel time data for ports.xlsx)

The chart above shows the highways serving all ports—other than Newark—have **low congestion during the *midday* period**.

This next chart combines the effect of the type of roads serving each port (Figure A1, above) with the effect of congestion on those roads during the midday (Figure A3, above), showing weekday travel time during the midday (10am-4pm).

Time Necessary to Travel First 30 Miles- Weekday, Midday
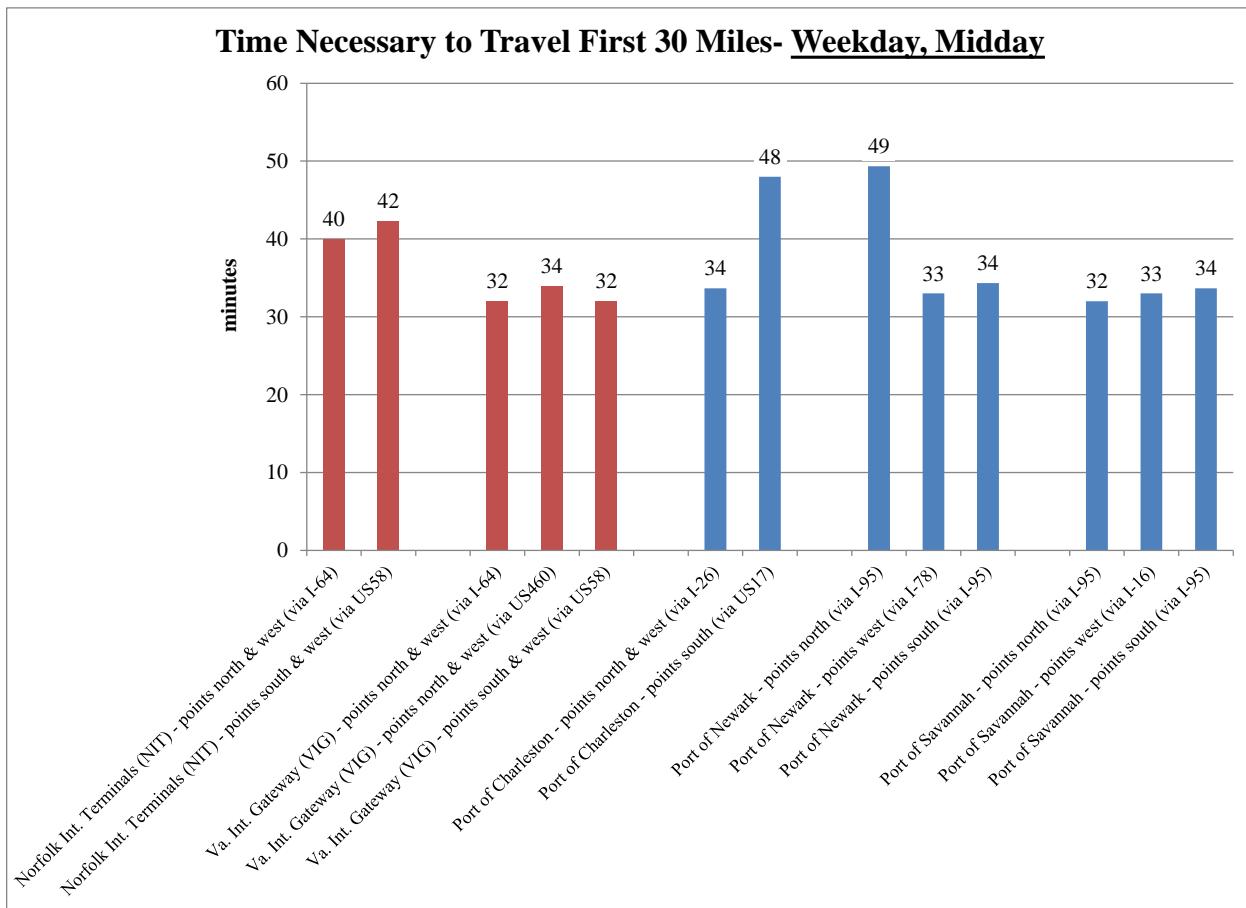
FIGURE A4

Source: HRTPO staff calculation using Google Maps (travel time data for ports.xlsx)

The chart above indicates that *limited-access highways*—and low congestion on them—give the Virginia International Gateway (VIG) a *midday* **time advantage** over the ports of Charleston and Newark, whereas the *signalized arterials* (International Terminal Blvd., Hampton Blvd., and US 58) and congested HRBT serving the Norfolk International Terminals (NIT) make the time to cover the first 30 miles **from NIT longer than most** of the travel times for the other ports.

APPENDIX B- REGRESSION FOR ESTIMATING HOSPITALITY ACTIVITY

First, for a given metro area, HRTPO staff theorized a relationship between hospitality activity and the number of workers in the "arts, entertainment, recreation, accommodation and food services" (AERAF) industry.

Secondly, HRTPO staff used regression to develop a model for estimating the number of AERAF workers serving *local* residents and businesses for all 308 counties in MD, DC, DE, VA, NC, and SC. Data: 2006-2010 CTPP table A202104 (workers by workplace and industry) and table A101100 (population).

Thirdly, finding that the resulting regression equation—AERAF = 179 + 0.071 * Workers + 0.0055 * Population—has an Adjusted R^2 value of 0.95, HRTPO staff used the equation to estimate the number of AERAF workers serving *local* residents and businesses for all 308 counties in MD, DC, DE, VA, NC, and SC. See regression results below.

Lastly, HRTPO staff subtracted this estimate of "normal AERAF workers" from the "total AERAF workers", and assumed that this difference—i.e. "excess AERAF workers"—serve people from out of town and is therefore a surrogate for tourism and convention activity.

TABLE B1 Regression Results

Workers in Industry "Arts, entertainment, recreation, accommodation and food services", by place of work

Regression Statistics	
Multiple R	0.97
R Square	0.95
Adjusted R Square	**0.95**
Standard Error	1,550
Observations	308

ANOVA

	df	SS	MS	F	Significance F
Regression	2	13,617,798,676	6,808,899,338	2,834	9.5253E-198
Residual	305	732,698,249	2,402,289		
Total	307	14,350,496,925			

	Coefficients	Standard Error	t Stat	P-value	Lower 95%	Upper 95%
Intercept	**179**	106	**1.7**	0.092	-29	388
Workers in Other Industries, by place of work	**0.0713**	0.0031	**23.1**	0.000	0.0652	0.0774
Population, by place of living	**0.00556**	0.00168	**3.3**	0.001	0.00225	0.00886

Data: 2006-2010 CTPP table A202104 (workers by workplace and industry) and table A101100 (population); model for 5 states plus DC.xlsx

APPENDIX C- STRAVA HEATMAPS FOR HOSPITALITY LOCATIONS

After measuring bike/ped effectiveness (the first hospitality MOE in report body), HRTPO staff sought to inform future improvements to local bike/ped friendliness by determining *what types* of bike/ped facilities are *most used*. To do so, HRTPO staff compared Google bike facility maps to Strava bike/ped heatmaps[26]. Via Strava, cyclists and runners can track their exercise geographically by linking the Strava app to a GPS devise (e.g. Fitbit). Strava has geographically compiled the millions of such 2015 trips into "heatmaps" which indicate level of activity using brightness "normalized to a value between 0 and 1":

> "The normalization is very local, taking into account the 8 neighboring tiles."[27]

Because of this "local" effect (and because Strava maps reflect only Strava users), these maps cannot be used to compare total usage of active transportation by hospitality location.

The maps and analysis for all 15 of the comparable hospitality locations are included below.

To determine what types of bike/ped facilities are most used, this information is summarized in the Hospitality section of the report body.

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[26] Although Strava data only reflects usage by Strava-using athletes, this was the best information available. All maps are presented herein at the same zoom level (1 inch approx. equal to 1 mile) and settings (orange style, 100% path opacity, bike and run activity view).
[27] http://labs.strava.com/blog/global-heatmap/
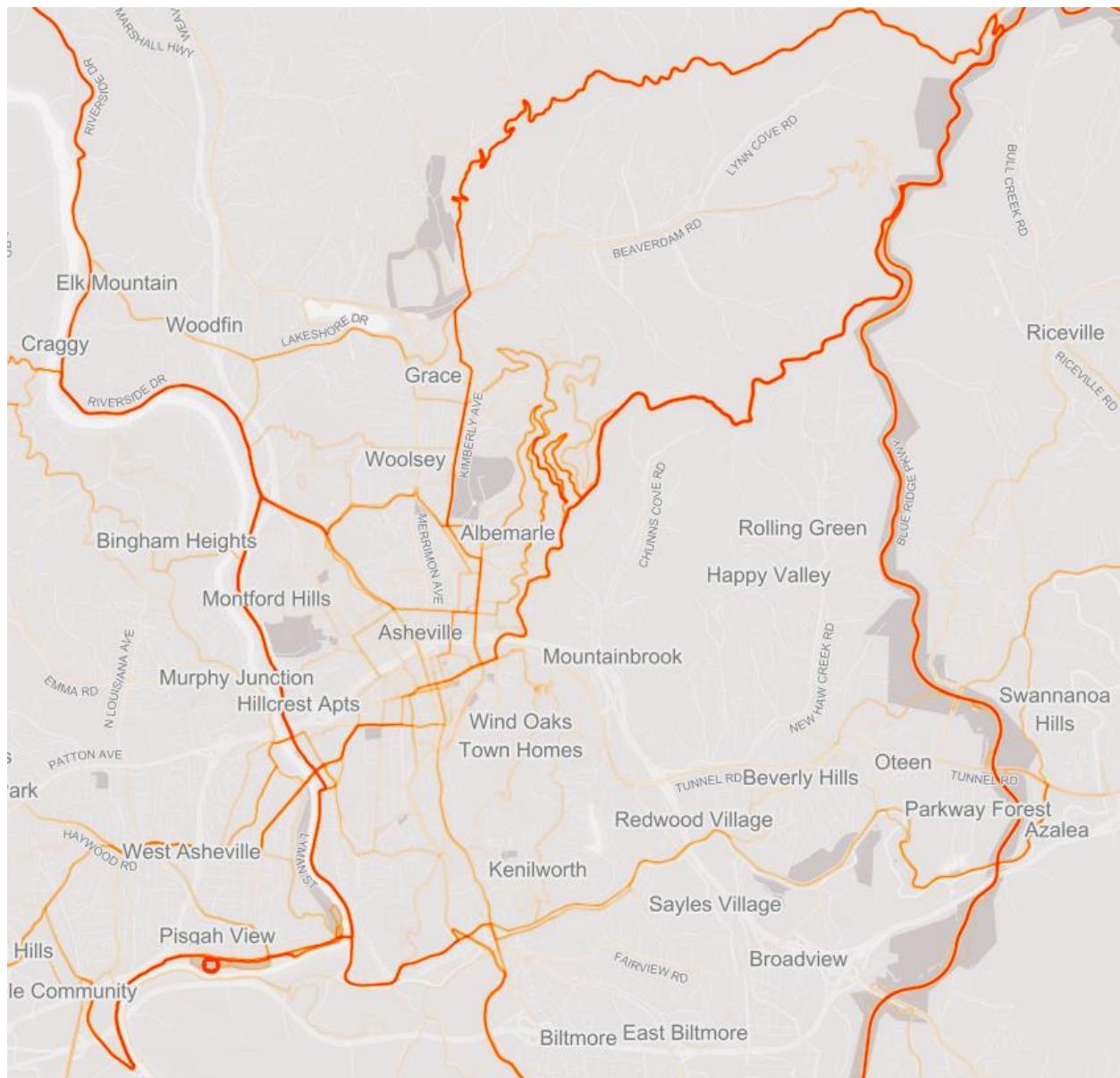
FIGURE C1 Strava Heatmap, Bike & Run, 2015, Asheville
Source: HRTPO staff usage of http://labs.strava.com/heatmap/

This heatmap shows bike and run activity widely spread, with relatively little in the downtown area of Asheville.
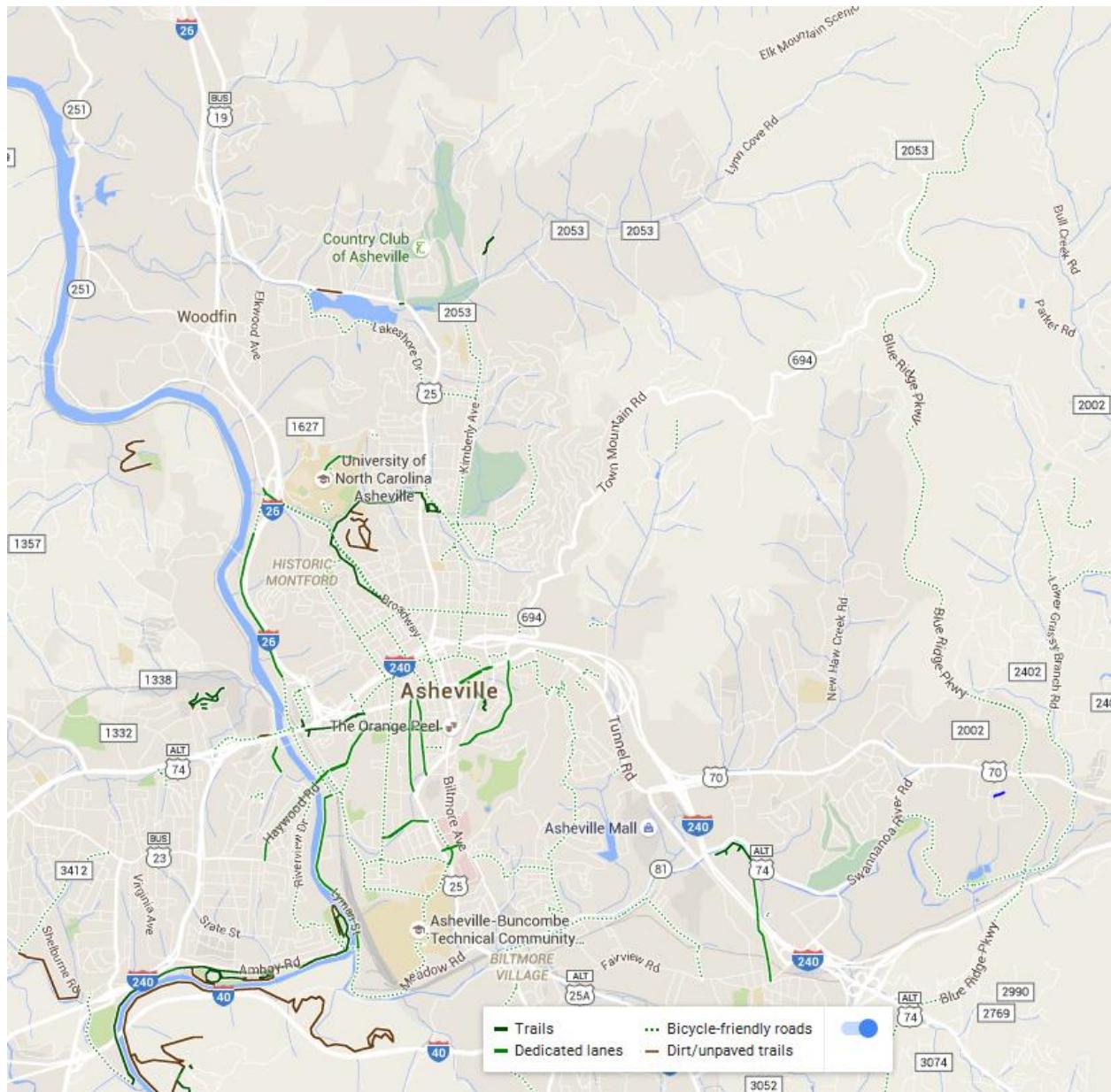
FIGURE C2 Google Maps Bike Facilities Map, 2015, Asheville

Source: HRTPO staff usage of google.com/maps

From comparison of the above bike facilities map to the Strava activity map on previous page, it appears that athletes in Asheville use the bike **facilities along the river more** than those in town.
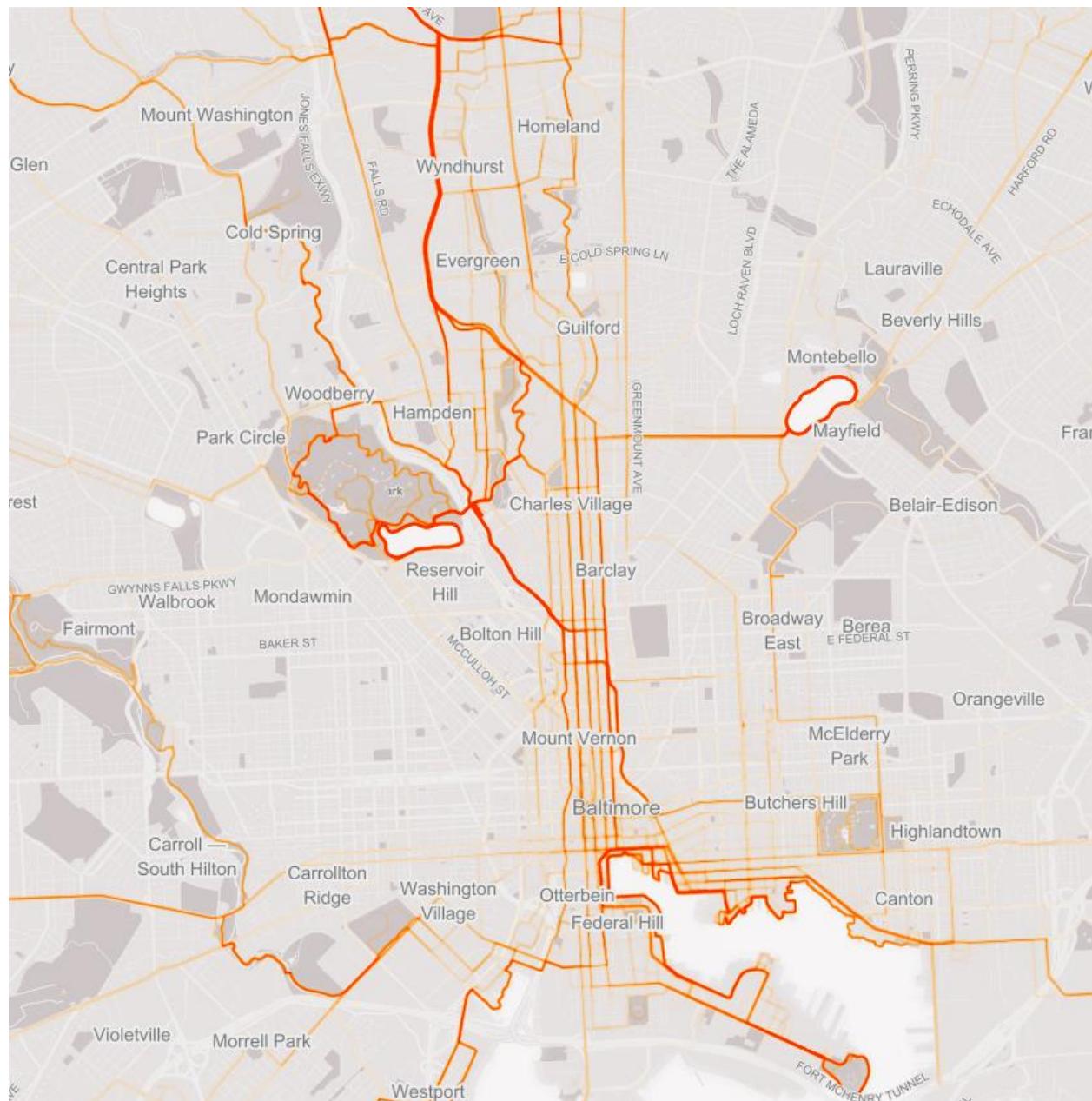
FIGURE C3 Strava Heatmap, Bike & Run, 2015, Baltimore

Source: HRTPO staff usage of http://labs.strava.com/heatmap/

The Baltimore heatmap shows bike and run activity **concentrated around the Inner Harbor** (see "Federal Hill"), Druid Hill Park (gray area above "Reservoir Hill"), and many north-south streets connecting the two.
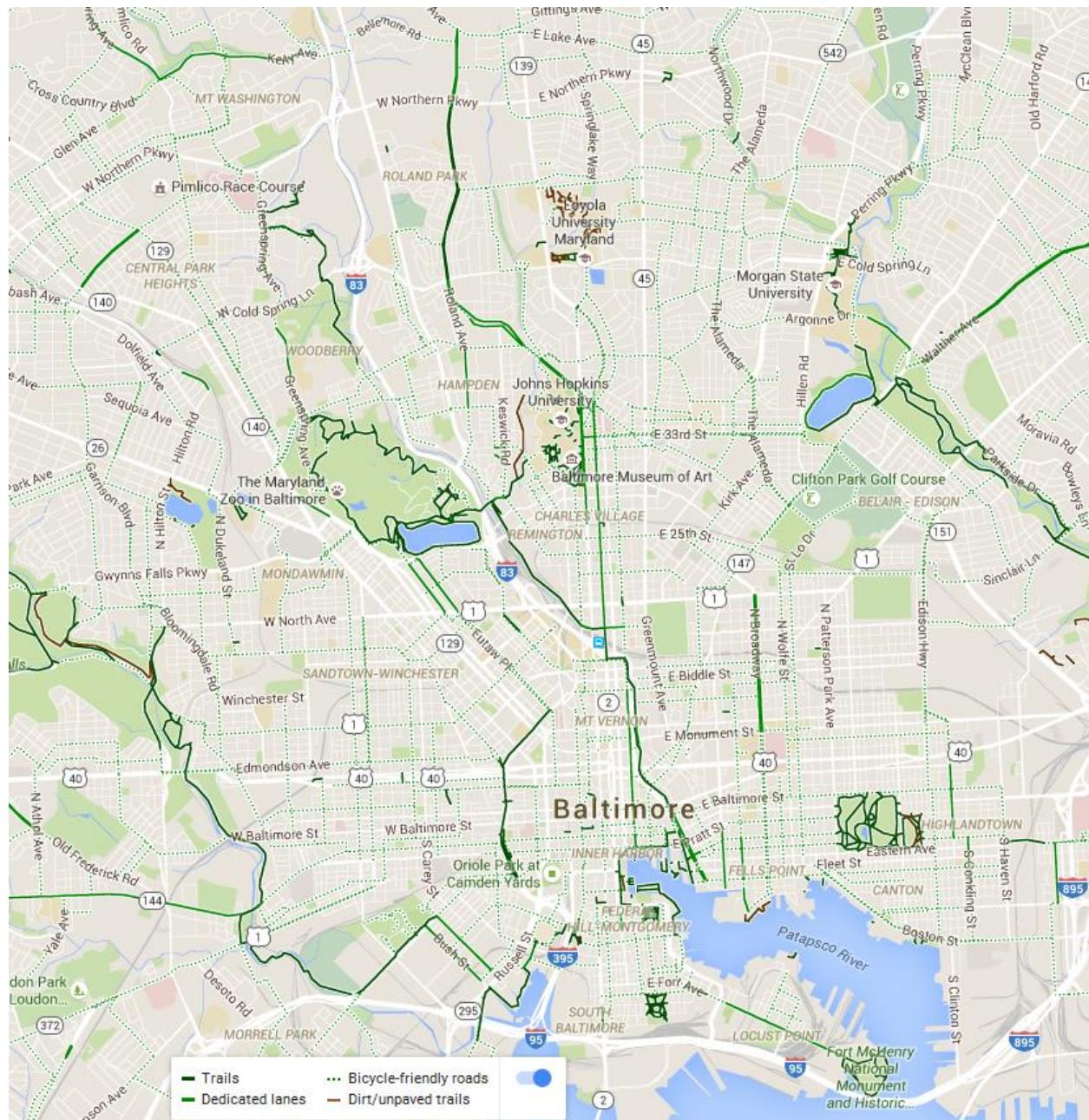
FIGURE C4 Google Maps Bike Facilities Map, 2015, Baltimore

Source: HRTPO staff usage of google.com/maps

From comparison of the above bike facilities map to the Strava activity map on previous page, it appears that athletes in Baltimore use bike facilities that **loop and those that provide access to parks and historic sites**.

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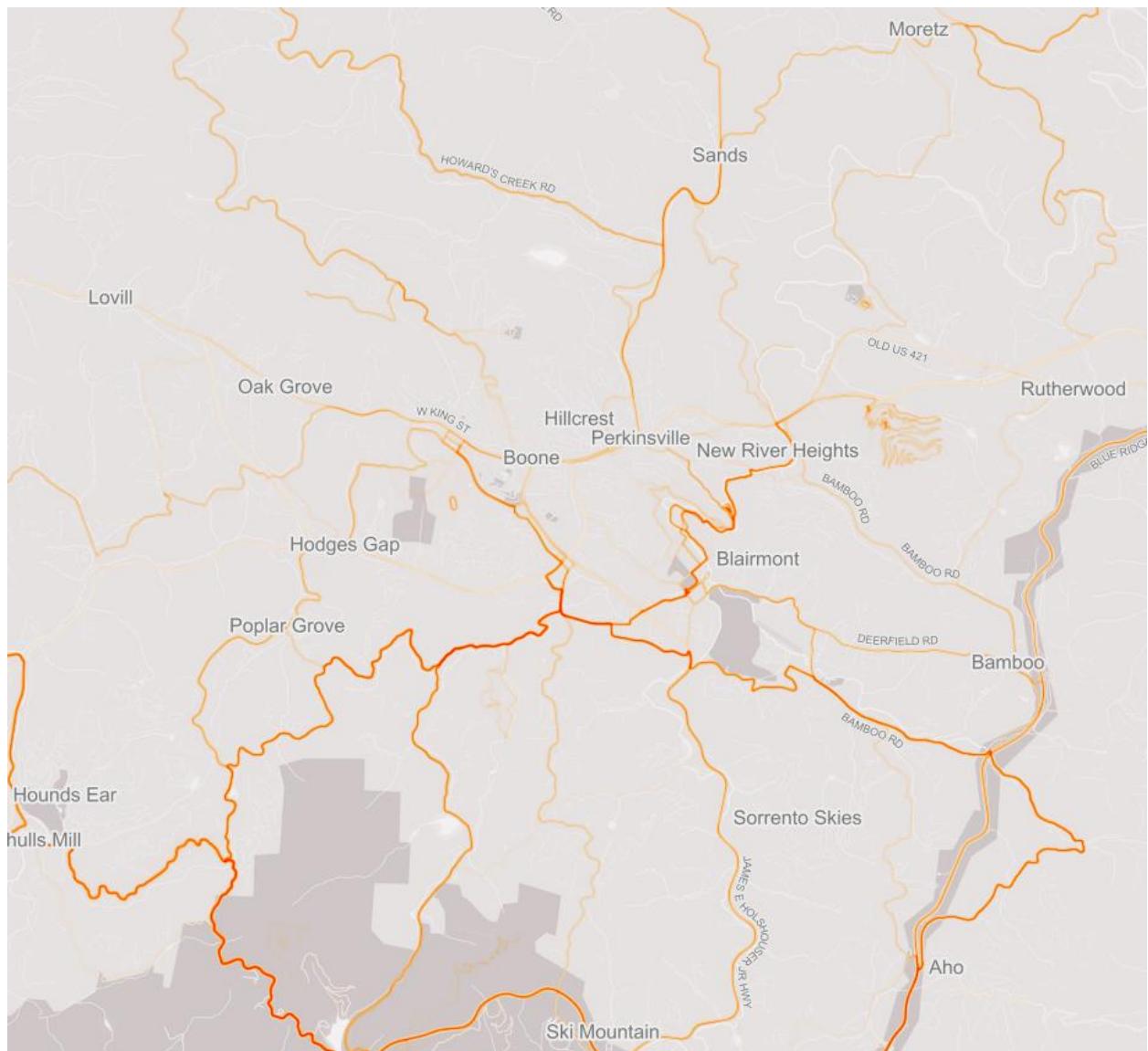
FIGURE C5 Strava Heatmap, Bike & Run, 2015, Boone NC
Source: HRTPO staff usage of http://labs.strava.com/heatmap/

The Boone heatmap shows bike and run activity **widely spread and outside the city of Boone**.
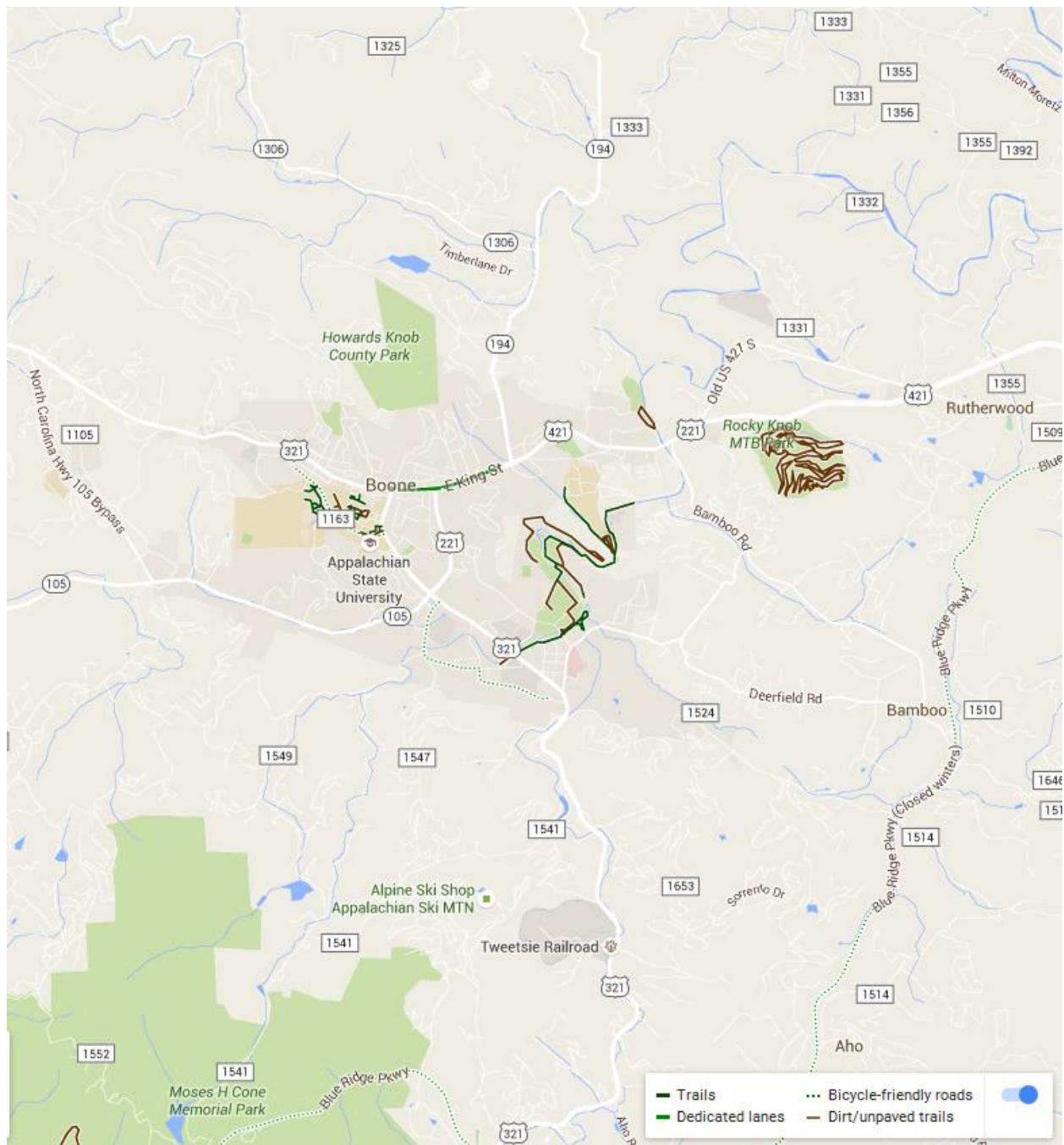
FIGURE C6 Google Maps Bike Facilities Map, 2015, Boone

Source: HRTPO staff usage of google.com/maps

From comparison of the above bike facilities map to the Strava activity map on previous page, it appears that athletes near Boone **prefer roads to park-related bike facilities**.

FIGURE C7 Strava Heatmap, Bike & Run, 2015, Charleston
Source: HRTPO staff usage of http://labs.strava.com/heatmap/

The Charleston heatmap shows bike and run activity **concentrated linearly** between the Battery (southern tip of Charleston peninsula) and Sullivans Island, via the signature Ravenel Bridge and Mount Pleasant.
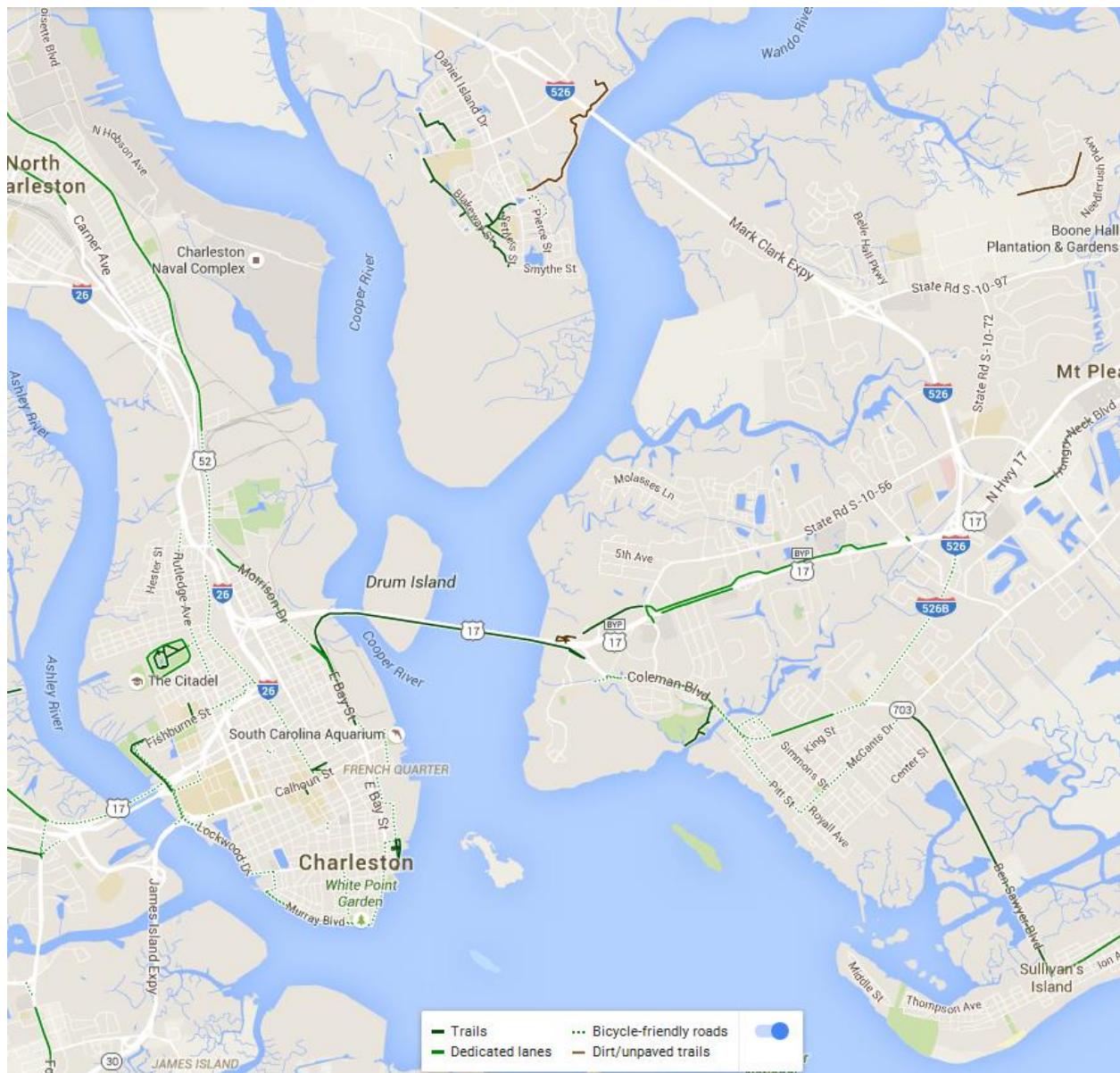
FIGURE C8 Google Maps Bike Facilities Map, 2015, Charleston
Source: HRTPO staff usage of google.com/maps

From comparison of the above bike facilities map to the Strava activity map on previous page, it appears that athletes in Charleston use the bike **facilities joining the town to the beach**.
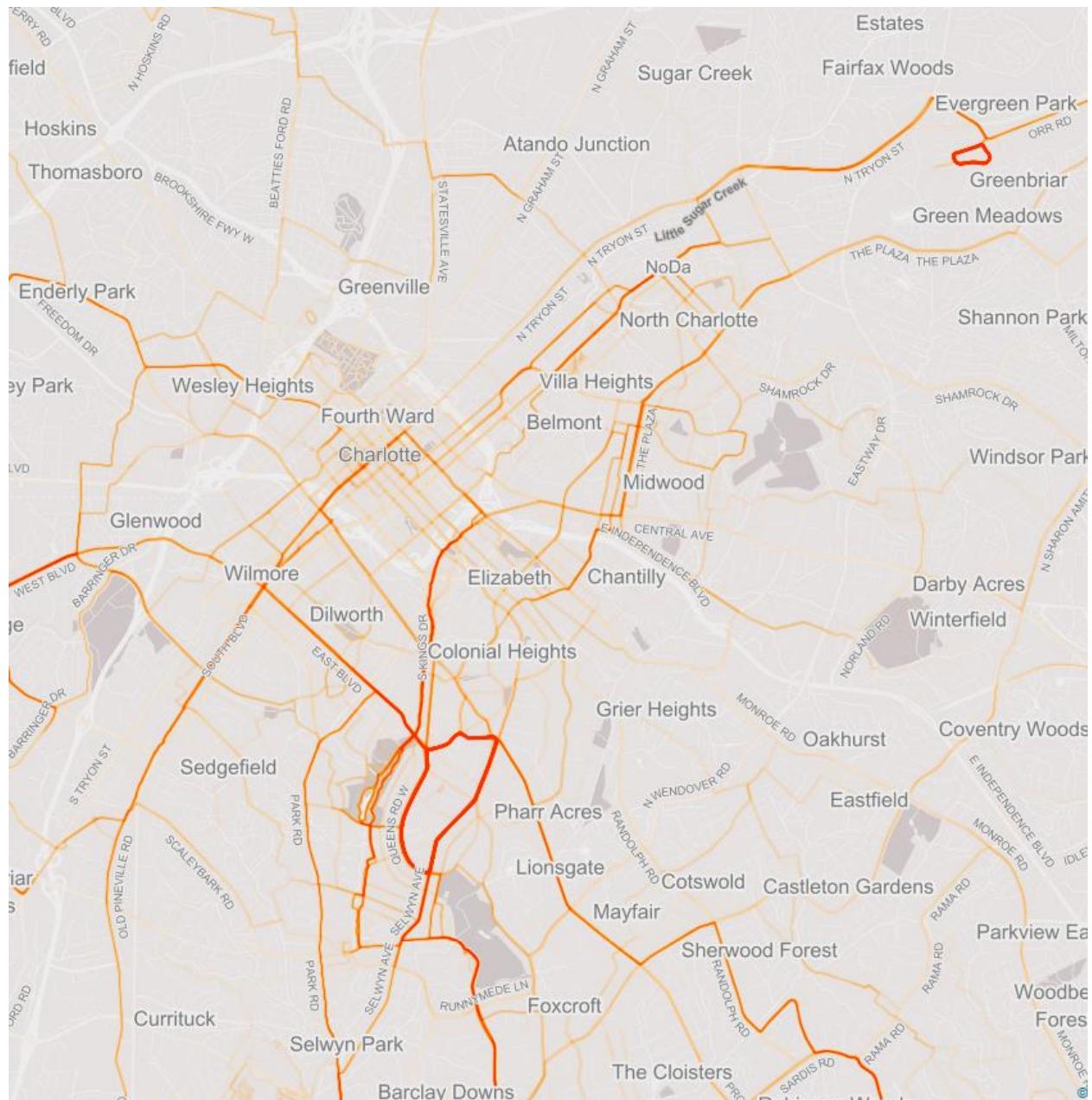
FIGURE C9 Strava Heatmap, Bike & Run, 2015, Charlotte
Source: HRTPO staff usage of http://labs.strava.com/heatmap/

The Charlotte heatmap shows bike and run activity concentrated around Queens University (see "Queens Rd W"), with relatively little activity downtown.
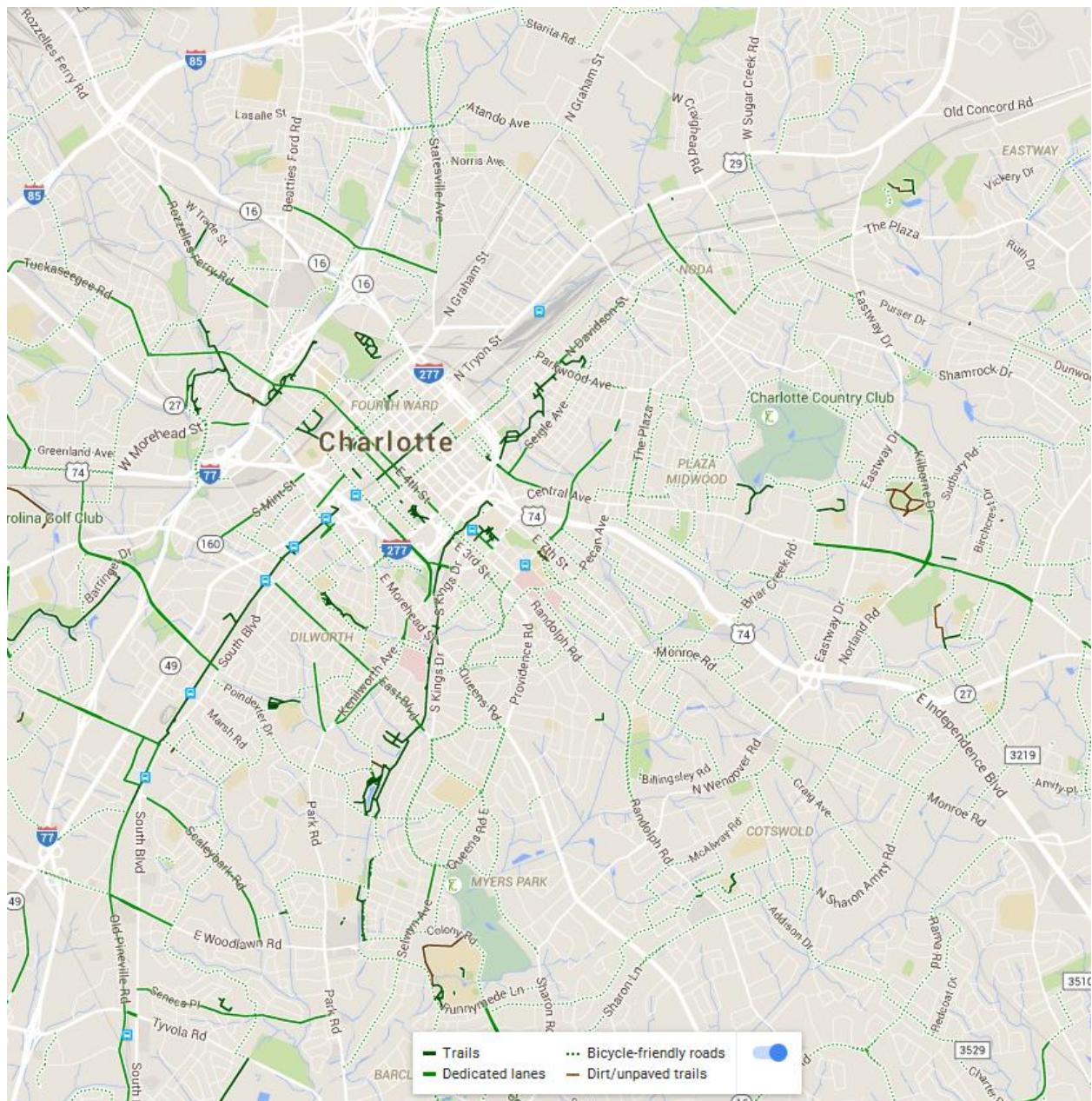
FIGURE C10 Google Maps Bike Facilities Map, 2015, Charlotte
Source: HRTPO staff usage of google.com/maps

From comparison of the above bike facilities map to the Strava activity map on previous page, it appears that athletes in Charlotte use the bike **facilities joining downtown to Queens University**.

FIGURE C11 Strava Heatmap, Bike & Run, 2015, Hilton Head
Source: HRTPO staff usage of http://labs.strava.com/heatmap/

The Hilton Head heatmap shows bike and run activity spread around the island (which has no central place).
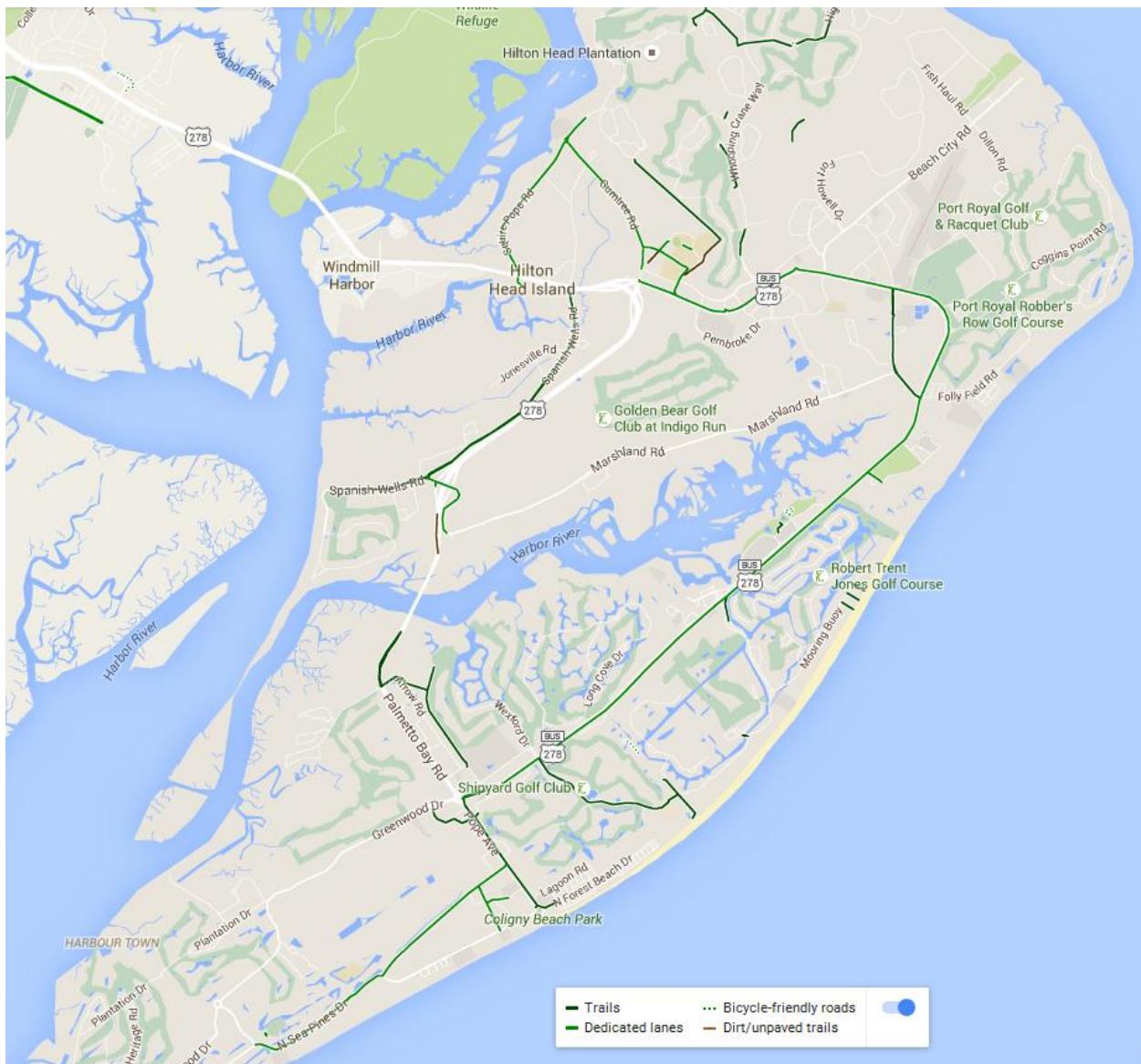
FIGURE C12 Google Maps Bike Facilities Map, 2015, Hilton Head
Source: HRTPO staff usage of google.com/maps

From comparison of the above bike facilities map to the Strava activity map on previous page, it appears that athletes in Hilton Head use the bike **facilities along the main roadways,** perhaps to reach the shops and restaurants located there.
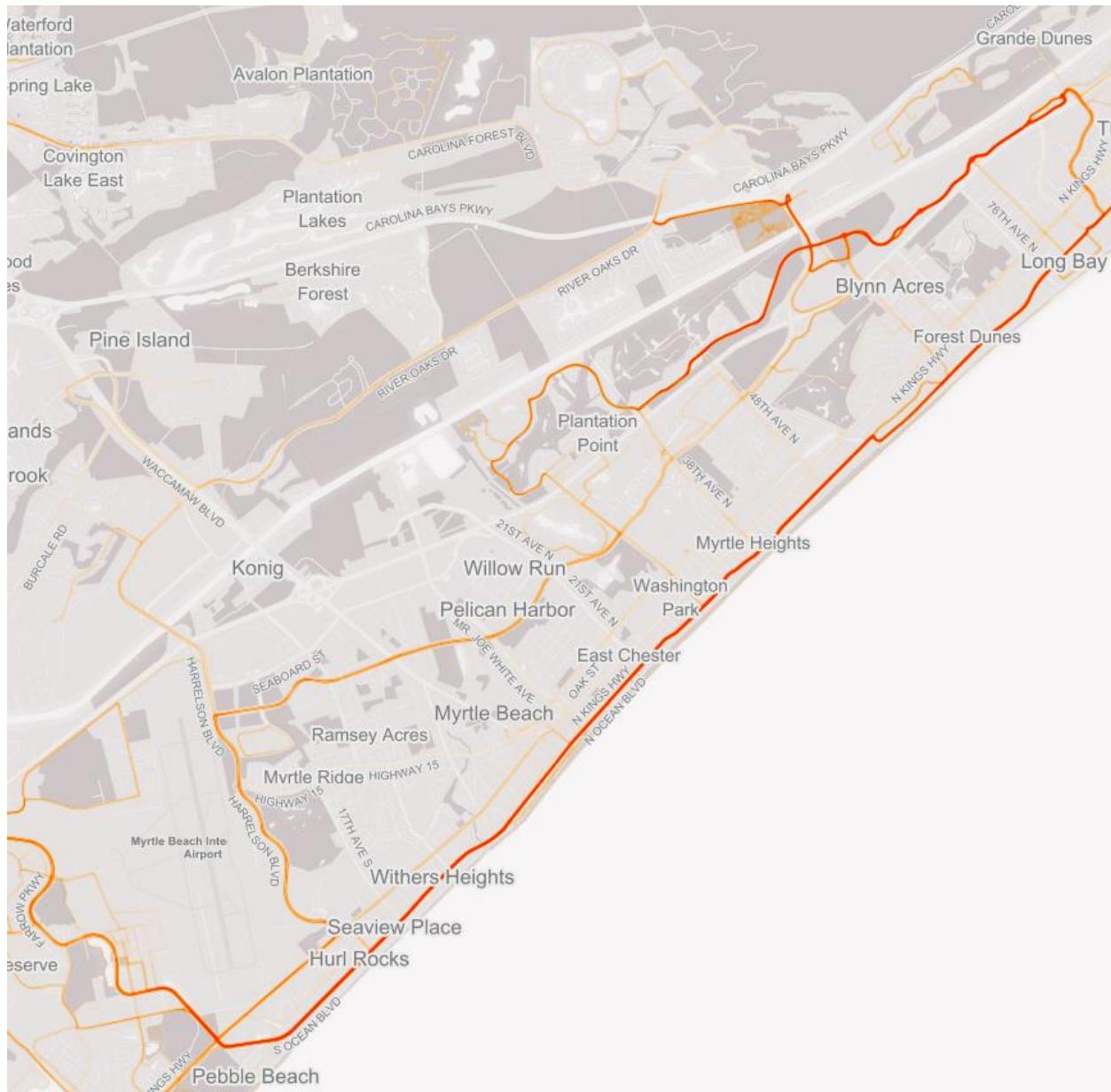
FIGURE C13 Strava Heatmap, Bike & Run, 2015, Myrtle Beach
Source: HRTPO staff usage of http://labs.strava.com/heatmap/

The Myrtle Beach heatmap shows bike and run activity concentrated along the oceanfront and along the Intracoastal Waterway (see "Plantation Point").
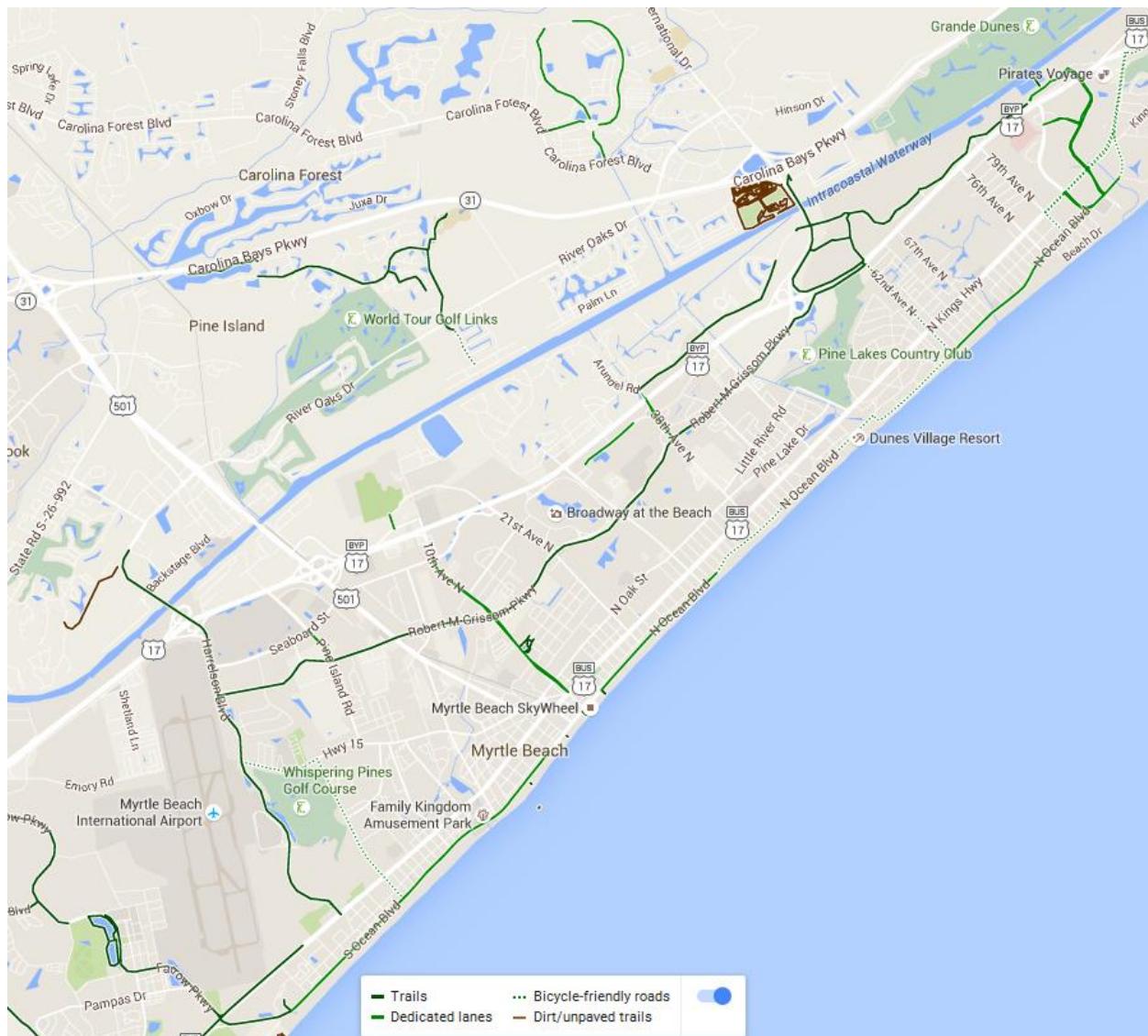
FIGURE C14 Google Maps Bike Facilities Map, 2015, Myrtle Beach

Source: HRTPO staff usage of google.com/maps

From comparison of the above bike facilities map to the Strava activity map on previous page, it appears that athletes in Myrtle Beach use the bike **facilities along the oceanfront and the path** that runs along Marina Parkway parallel to Bypass 17.

FIGURE C15 Strava Heatmap, Bike & Run, 2015, Ocean City
Source: HRTPO staff usage of http://labs.strava.com/heatmap/

The Ocean City heatmap shows bike and run activity:
- spread along four north-south streets in the southern/downtown Ocean City area
- concentrated along Coastal Highway in the northern Ocean City area.
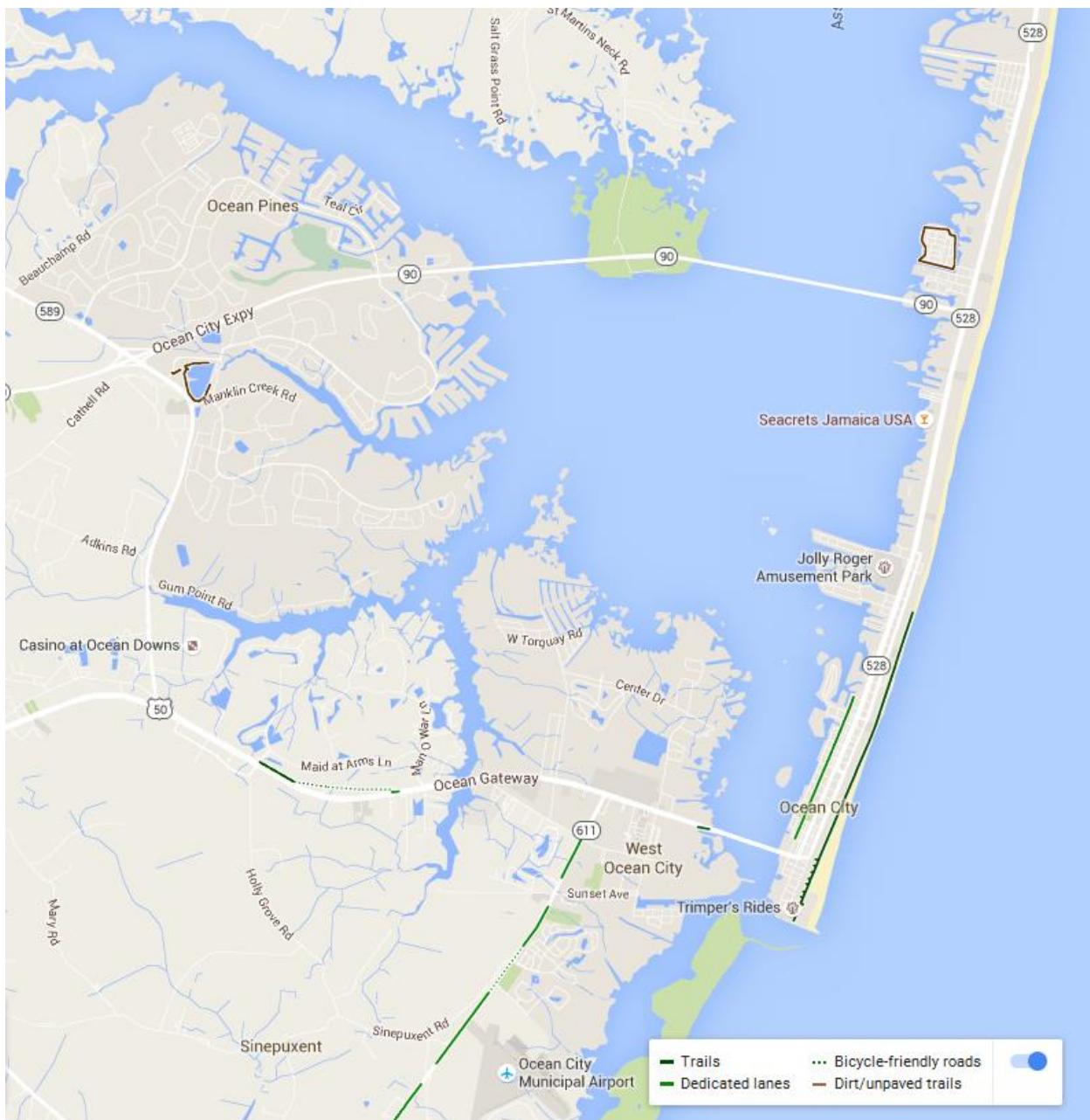
FIGURE C16 Google Maps Bike Facilities Map, 2015, Ocean City MD
Source: HRTPO staff usage of google.com/maps

Lower Ocean City: From comparison of the above bike facilities map to the Strava activity map on previous page, it appears that athletes in Ocean City use the bike **facility along the oceanfront (the Boardwalk).**

Upper Ocean City: From examination of the Strava activity map on previous page, it appears that athletes in Ocean City use the **Coastal Hwy's two bike/bus lanes** (one in either direction, existing but not shown on google map above).
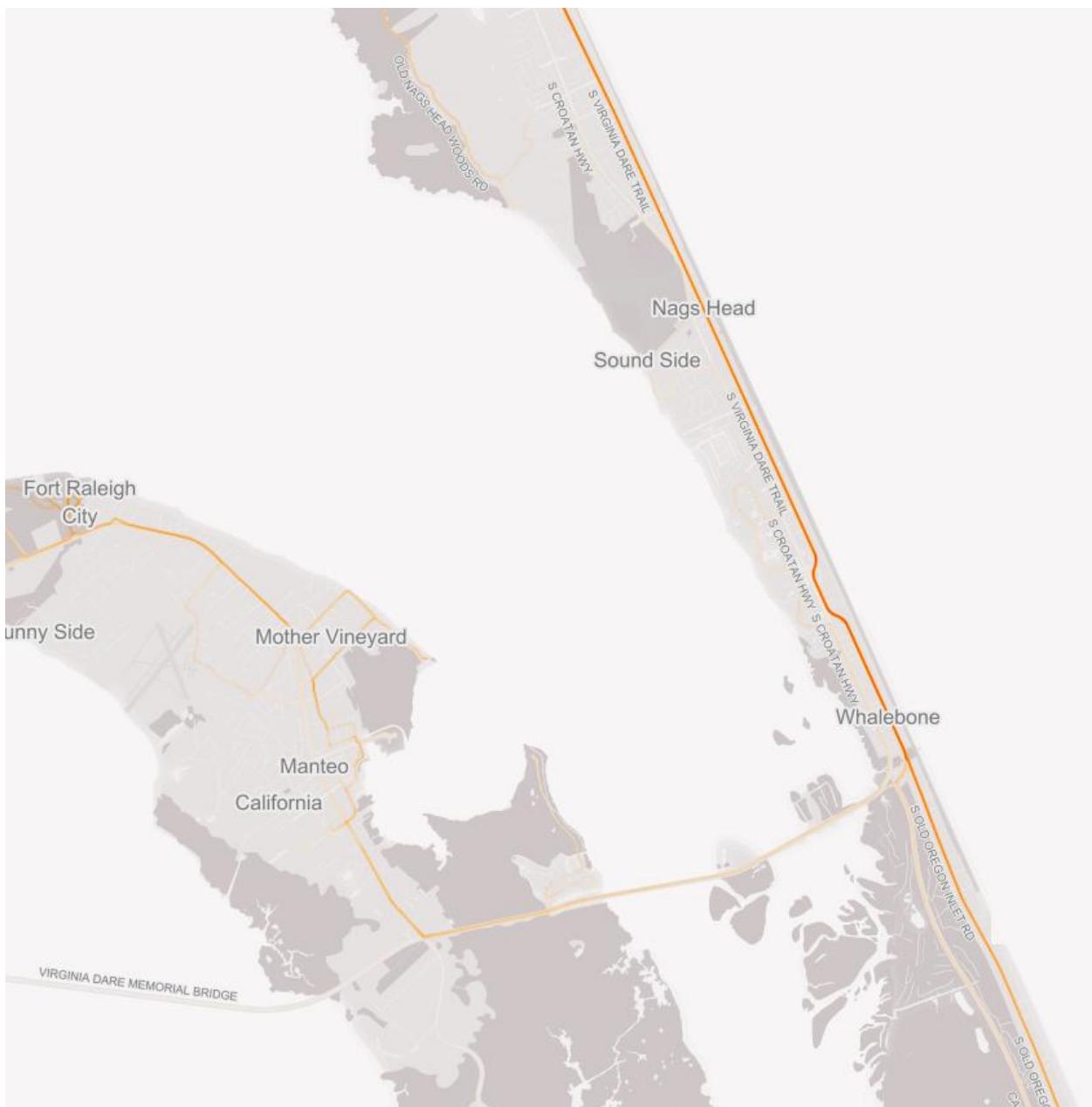
FIGURE C17 Strava Heatmap, Bike & Run, 2015, Outer Banks
Source: HRTPO staff usage of http://labs.strava.com/heatmap/

The Outer Banks heatmap shows bike and run activity concentrated along the old ocean road, the "Virginia Dare Trail", which has an 8' bike path running parallel.
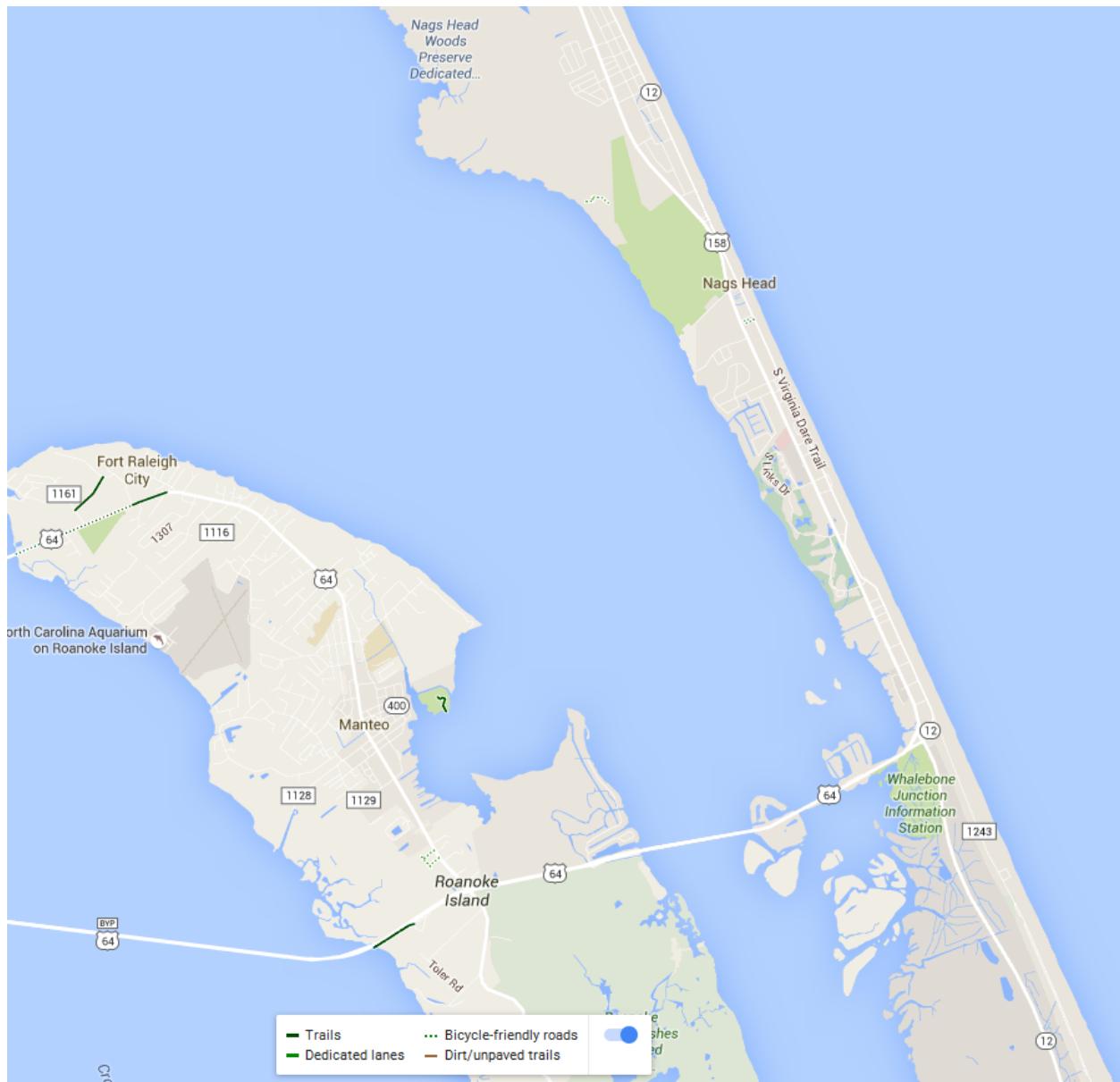
FIGURE C18 Google Maps Bike Facilities Map, 2015, Outer Banks

Source: HRTPO staff usage of google.com/maps

From comparison of the above bike facilities map to the Strava activity map on previous page, it appears that athletes in the Outer Banks use the **8' path which runs parallel to the ocean road**, the "Virginia Dare Trail".
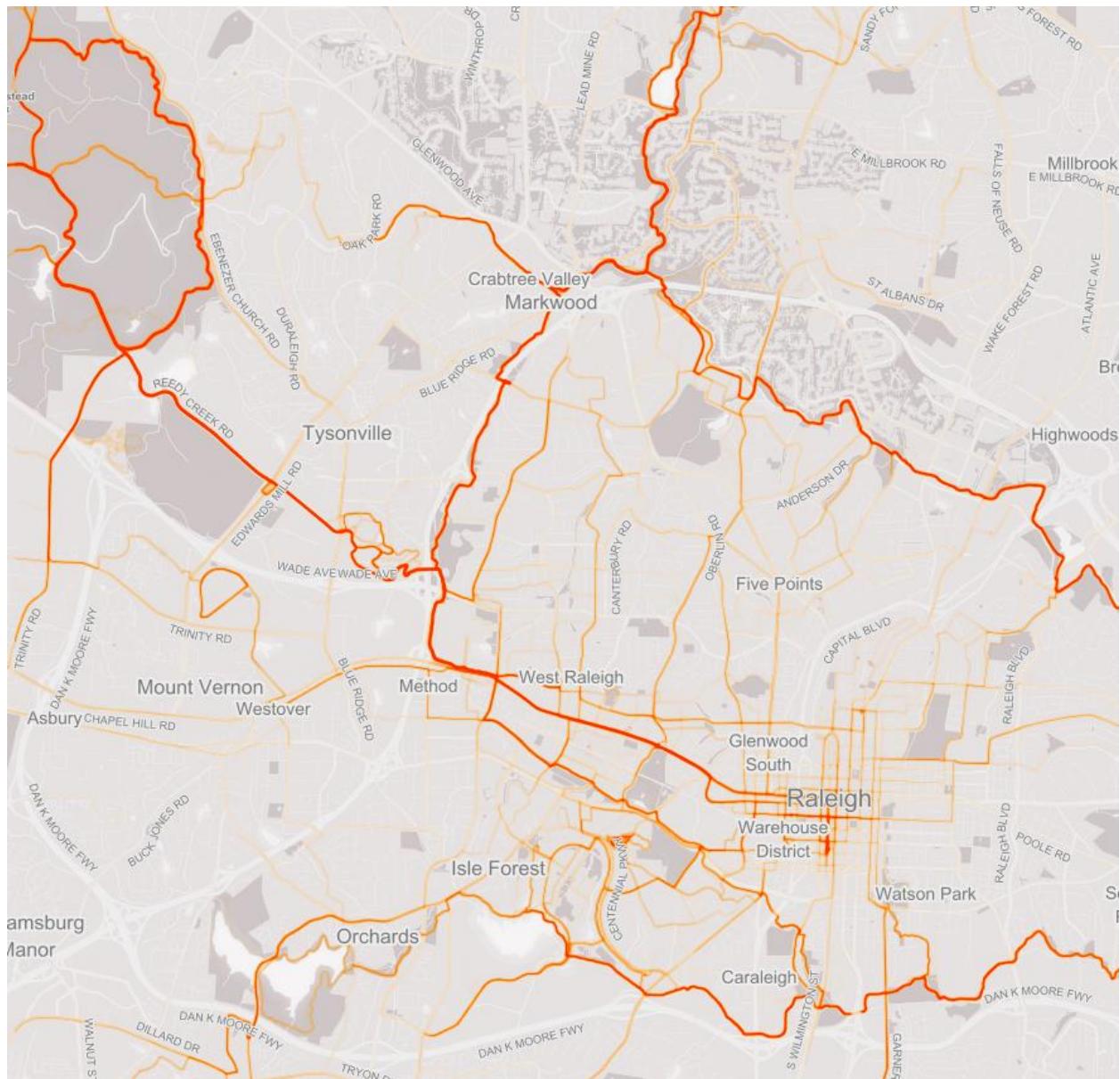
FIGURE C19 Strava Heatmap, Bike & Run, 2015, Raleigh

Source: HRTPO staff usage of http://labs.strava.com/heatmap/

The Raleigh heatmap shows bike and run activity concentrated in and between:

- Umstead State Park (upper left)
- Downtown (see "Warehouse District")
- Shelley Lake (white area at top)
- Highwoods (at right).
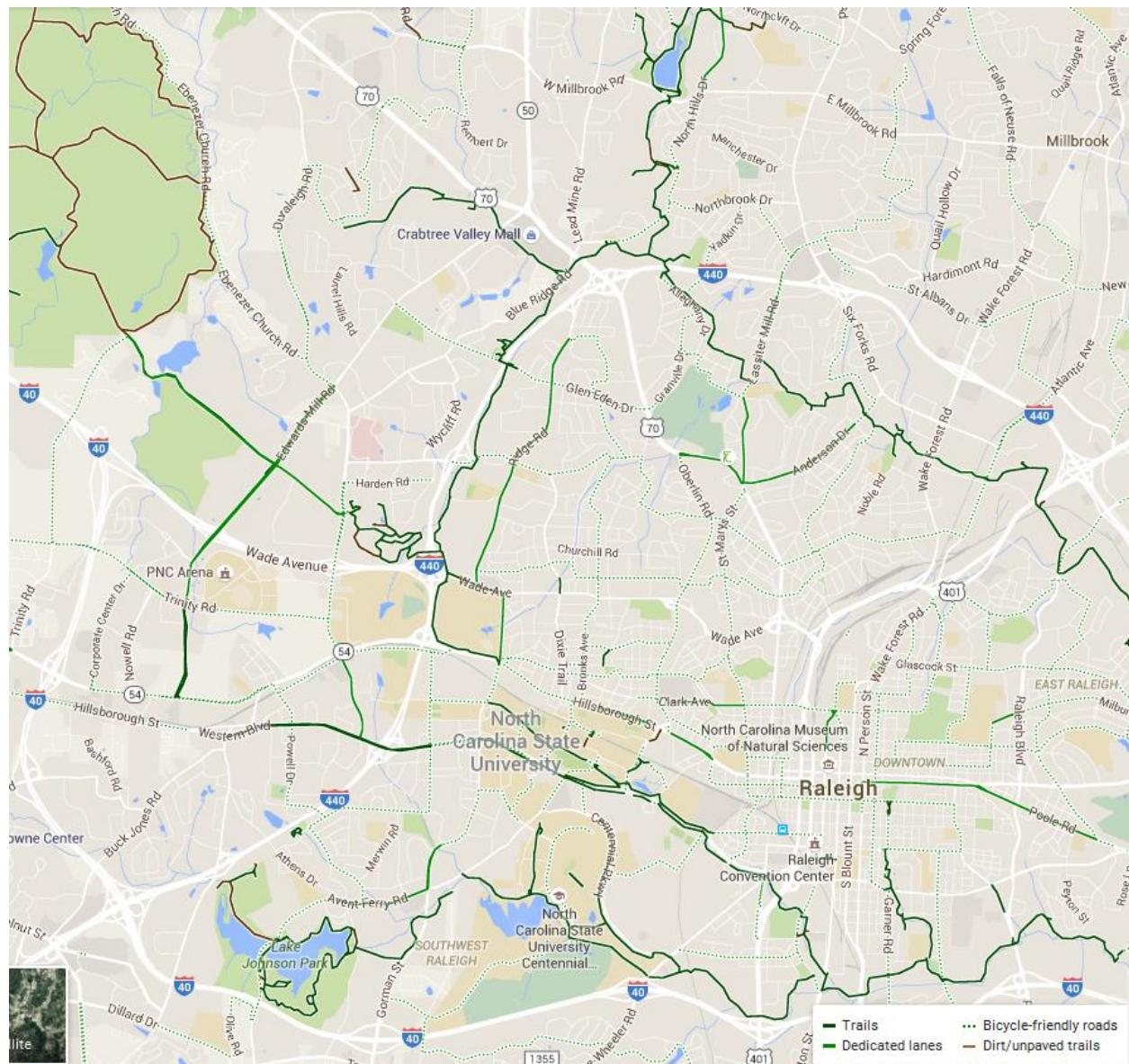
FIGURE C20 Google Maps Bike Facilities Map, 2015, Raleigh
Source: HRTPO staff usage of google.com/maps

From comparison of the above bike facilities map to the Strava activity map on previous page, it appears that athletes in Raleigh use the **bike facilities which join distant points.**
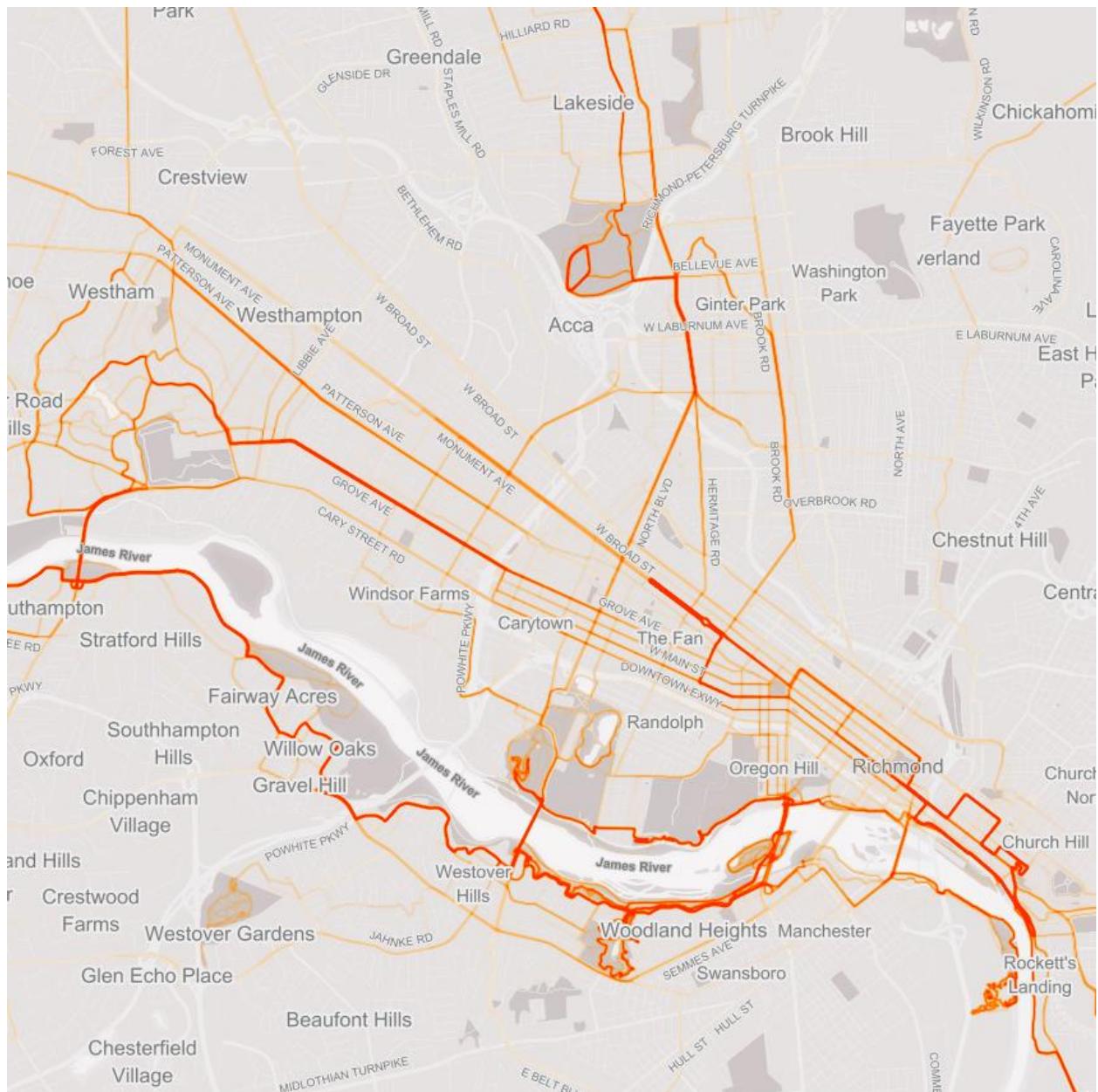
FIGURE C21 Strava Heatmap, Bike & Run, 2015, Richmond
Source: HRTPO staff usage of http://labs.strava.com/heatmap/

The Richmond heatmap shows bike and run activity concentrated along both sides of the James River and along the east-west streets joining the West End (see "Westham") and Church Hill.
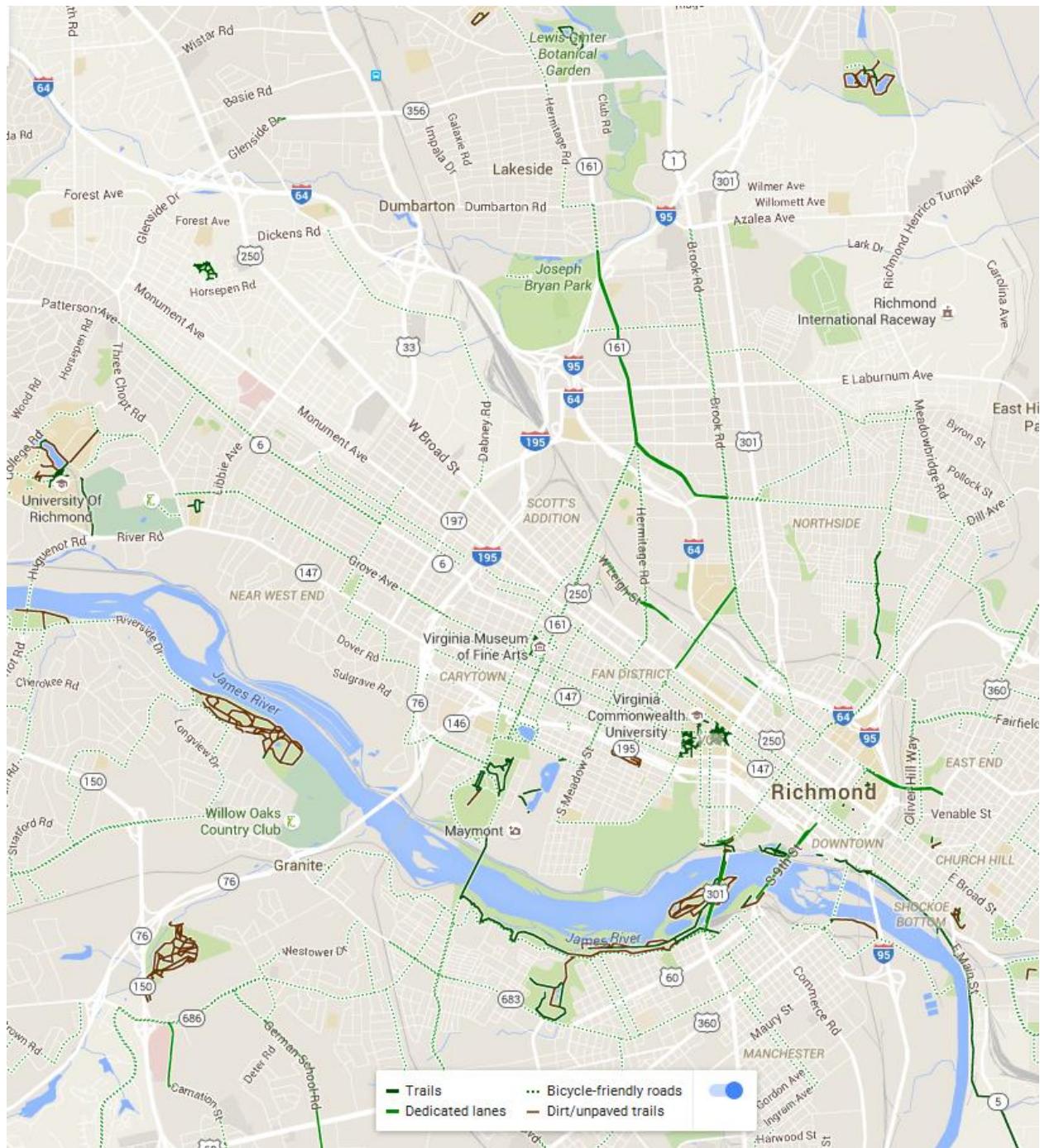
FIGURE C22 Google Maps Bike Facilities Map, 2015, Richmond
Source: HRTPO staff usage of google.com/maps

From comparison of the above bike facilities map to the Strava activity map on previous page, it appears that athletes in Richmond use the **bike facilities along the river.**

FIGURE C23 Strava Heatmap, Bike & Run, 2015, Virginia Beach
Source: HRTPO staff usage of http://labs.strava.com/heatmap/#11/-76.29868/36.74796/orange/both

The Virginia heatmap shows bike and run activity concentrated along the oceanfront and First Landing State Park (see "North Virginia Beach").
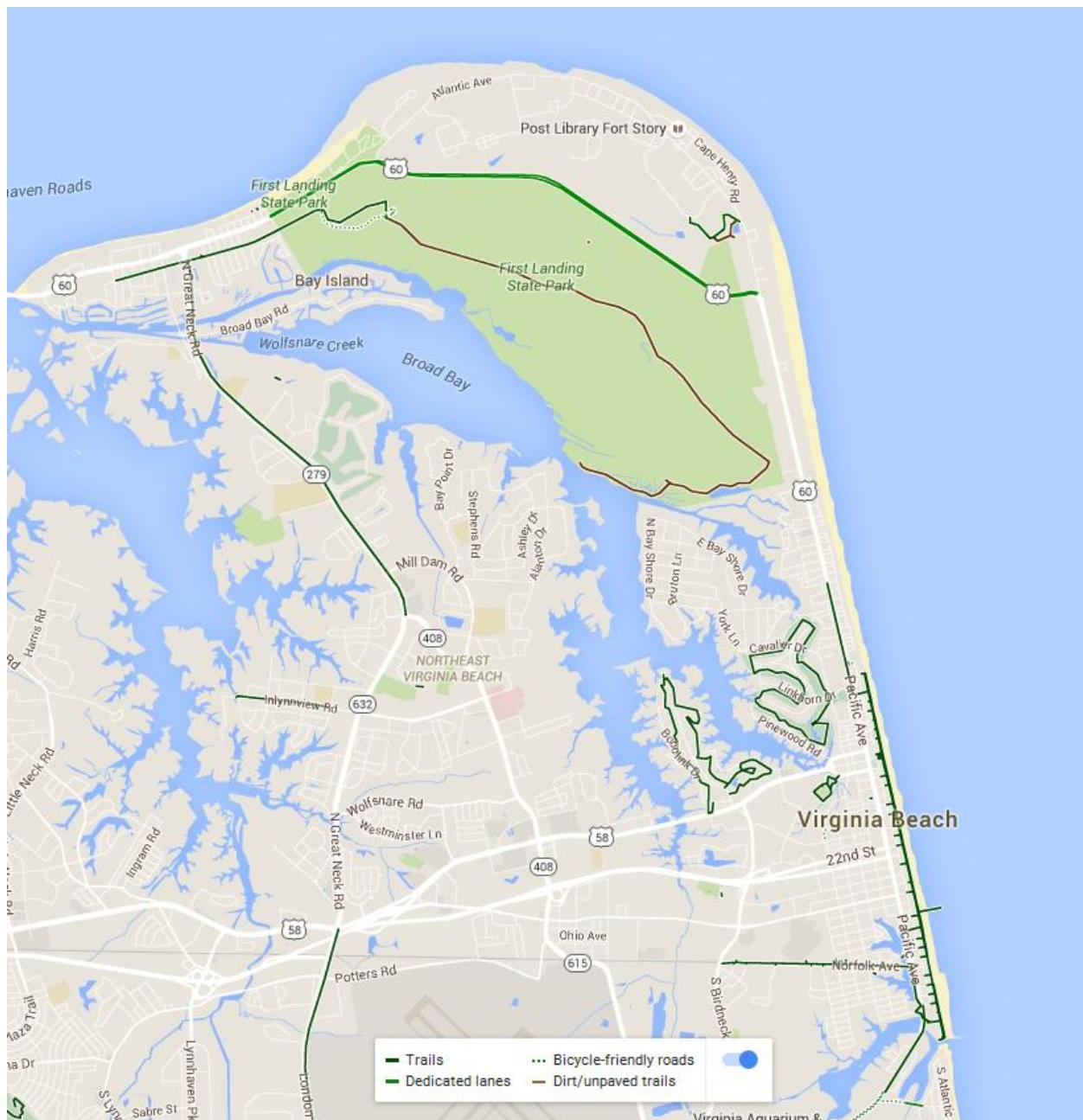
FIGURE C24 Google Maps Bike Facilities Map, 2015, Virginia Beach
Source: HRTPO staff usage of google.com/maps

From comparison of the above bike facilities map to the Strava activity map on previous page, it appears that athletes in Virginia Beach use the **oceanfront boardwalk** and the bike facilities in and near First Landing **State Park.**
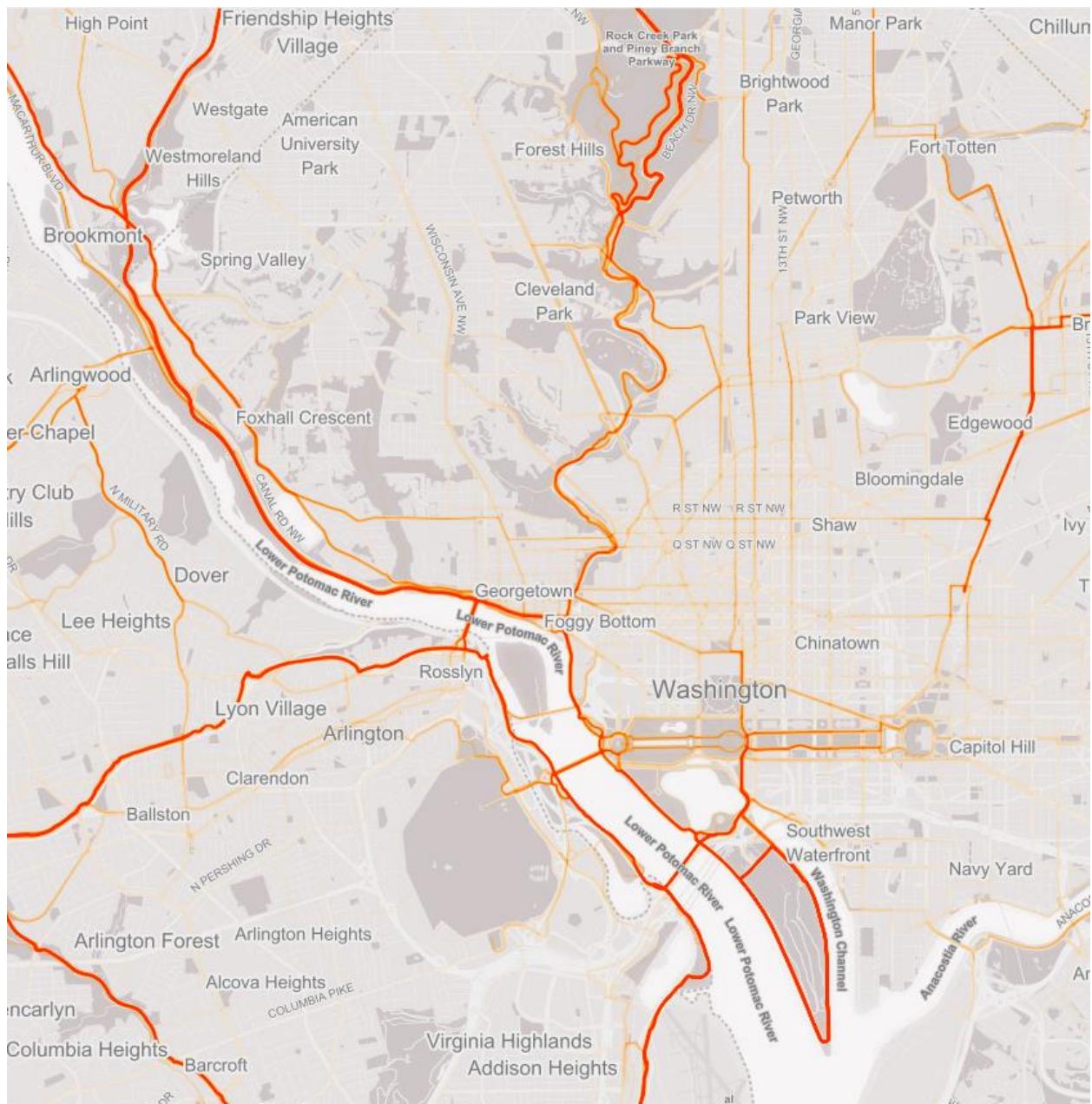
FIGURE C25 Strava Heatmap, Bike & Run, 2015, Washington DC

Source: HRTPO staff usage of http://labs.strava.com/heatmap/

The Washington heatmap shows bike and run activity concentrated along both sides of the Potomac River and along Rock Creek (see "Forest Hills"), and spread throughout the National Mall.
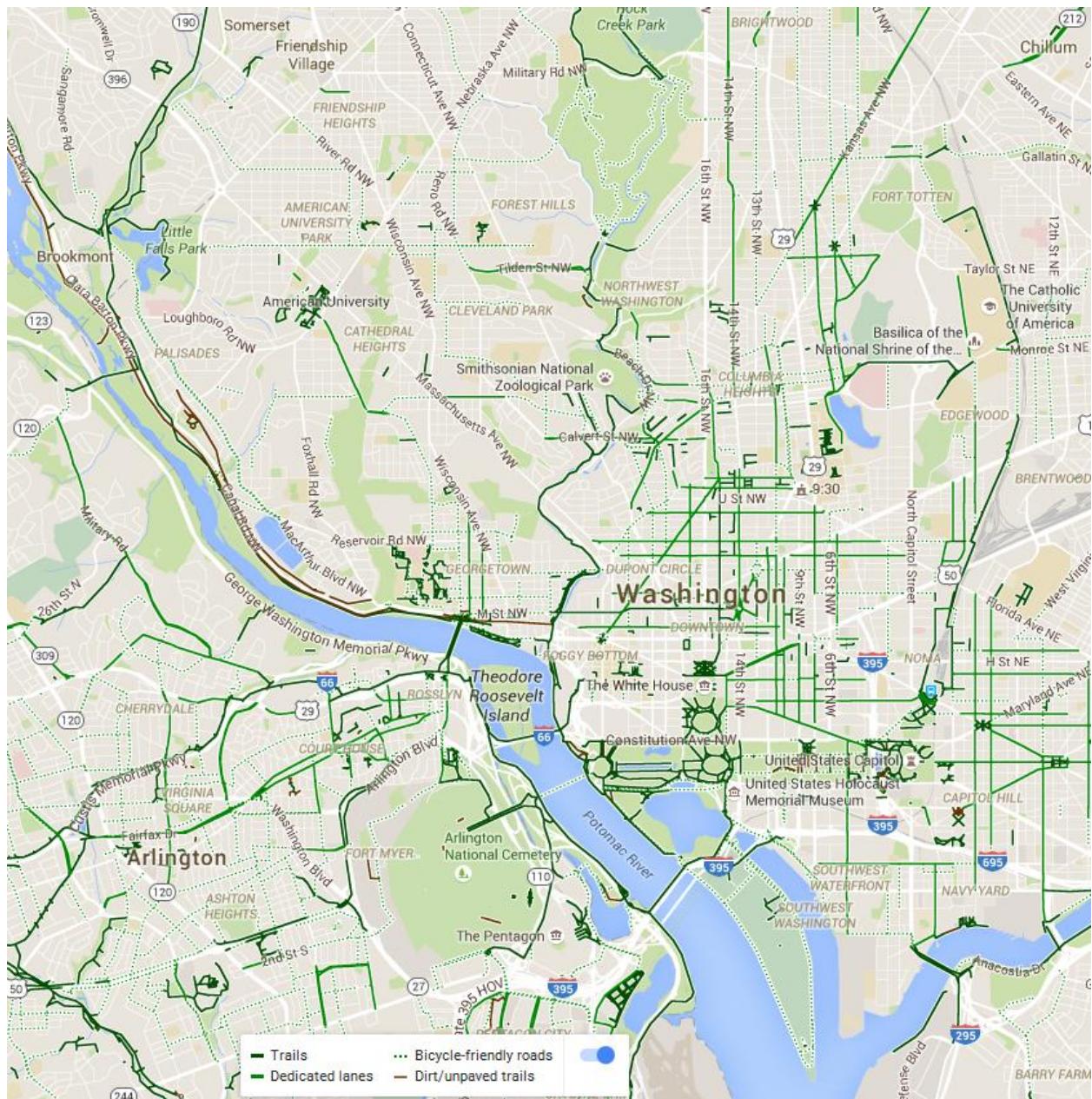
FIGURE C26 Google Maps Bike Facilities Map, 2015, Washington

Source: HRTPO staff usage of google.com/maps

From comparison of the above bike facilities map to the Strava activity map on previous page, it appears that athletes in Washington use the **bike facilities along the river (Potomac River) and the creek (Rock Creek).**
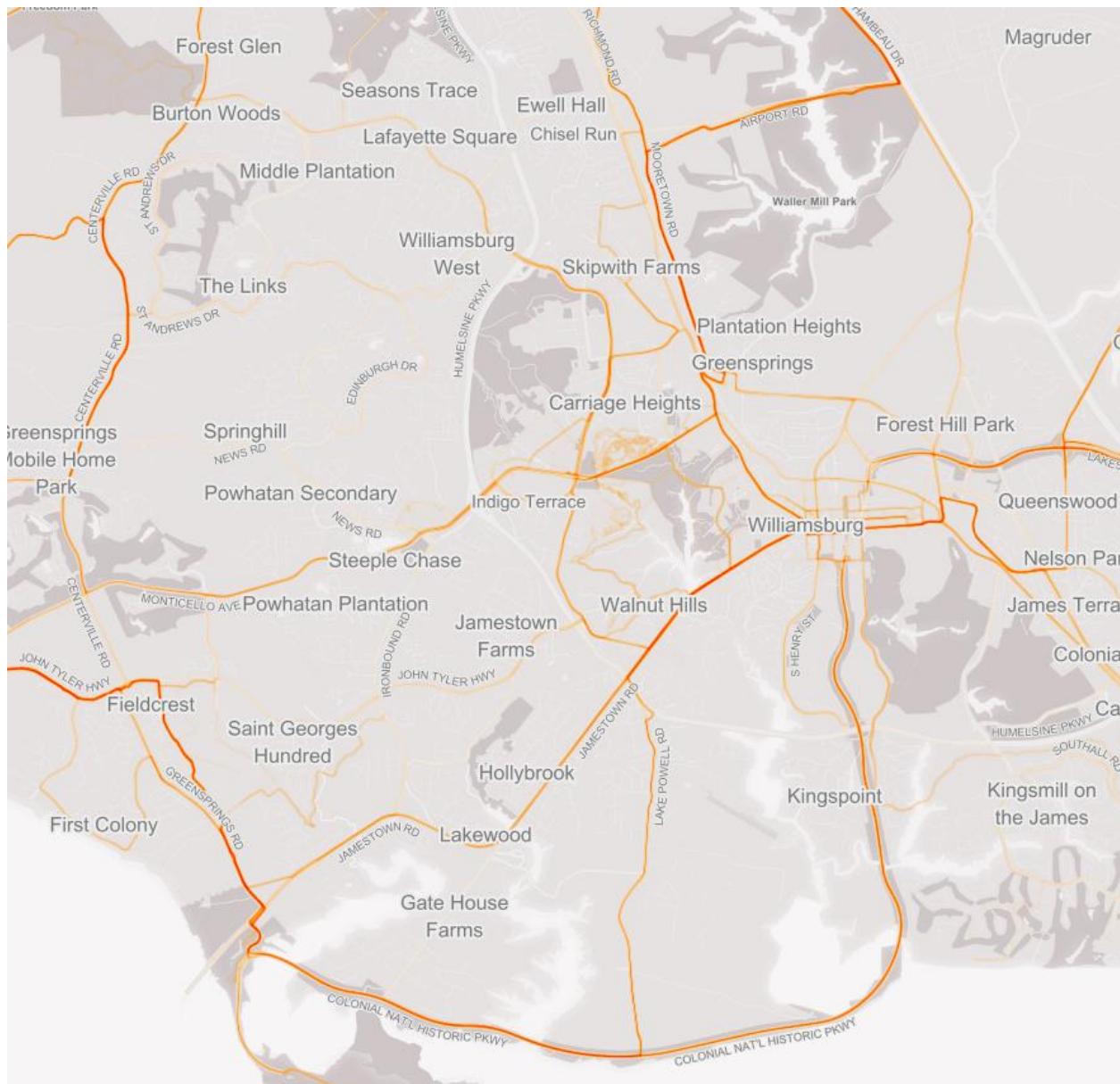
FIGURE C27 Strava Heatmap, Bike & Run, 2015, Williamsburg

Source: HRTPO staff usage of http://labs.strava.com/heatmap/

The Williamsburg heatmap shows bike and run activity concentrated along the Virginia Capital Trail (see "John Tyler Hwy" and "Greensprings Rd") and the Colonial Parkway, with usage spread around the central area, i.e. Colonial Williamsburg (see "Williamsburg") and William & Mary (gray area west of "Williamsburg").
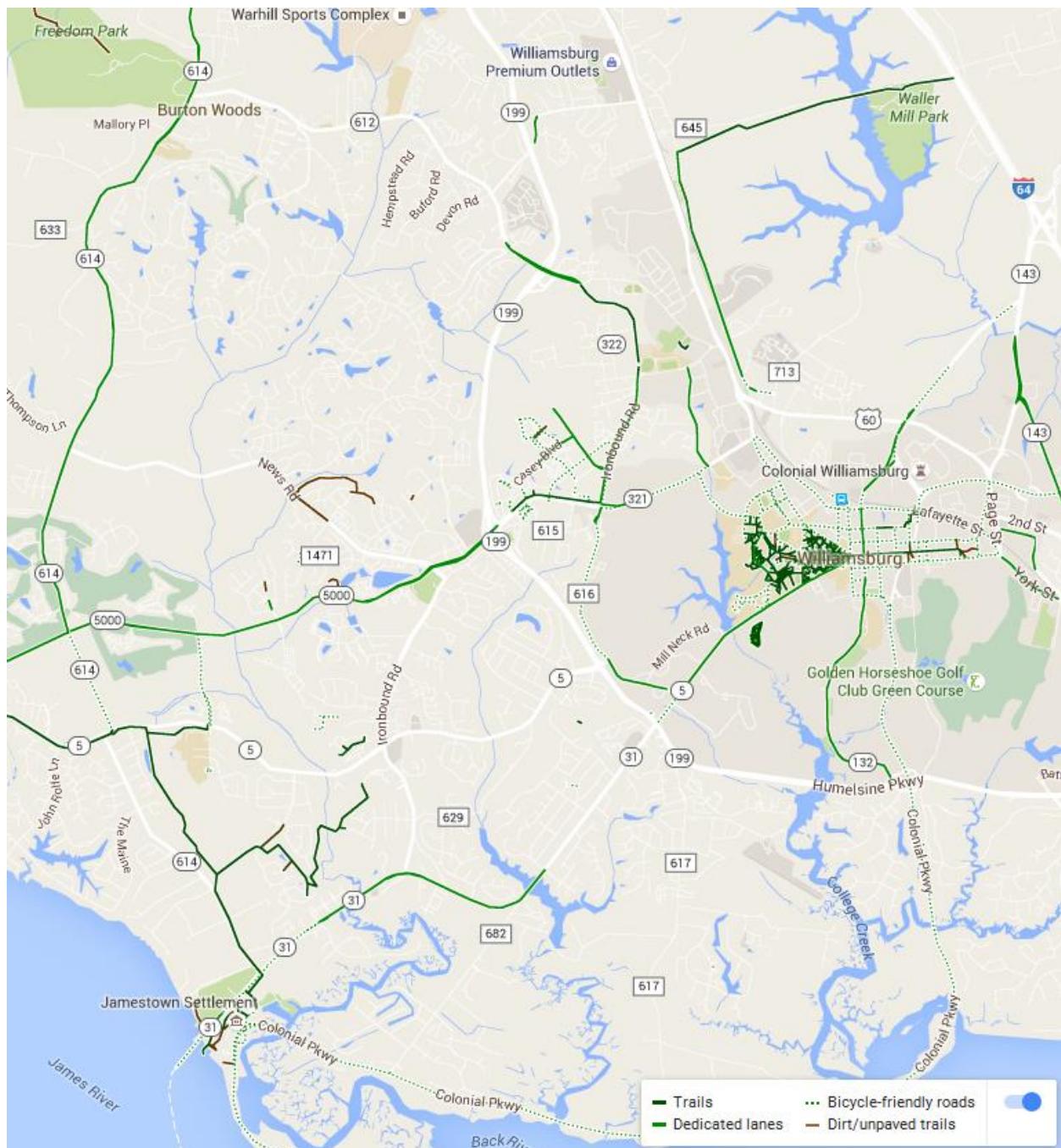
FIGURE C28 Google Maps Bike Facilities Map, 2015, Williamsburg
Source: HRTPO staff usage of google.com/maps

From comparison of the above bike facilities map to the Strava activity map on previous page, it appears that athletes in Williamsburg use the **bike facilities that join distant points**: e.g. the Virginia Capital Trail joins Jamestown and Richmond, and the lane along Jamestown Road joins the college/town and Jamestown.
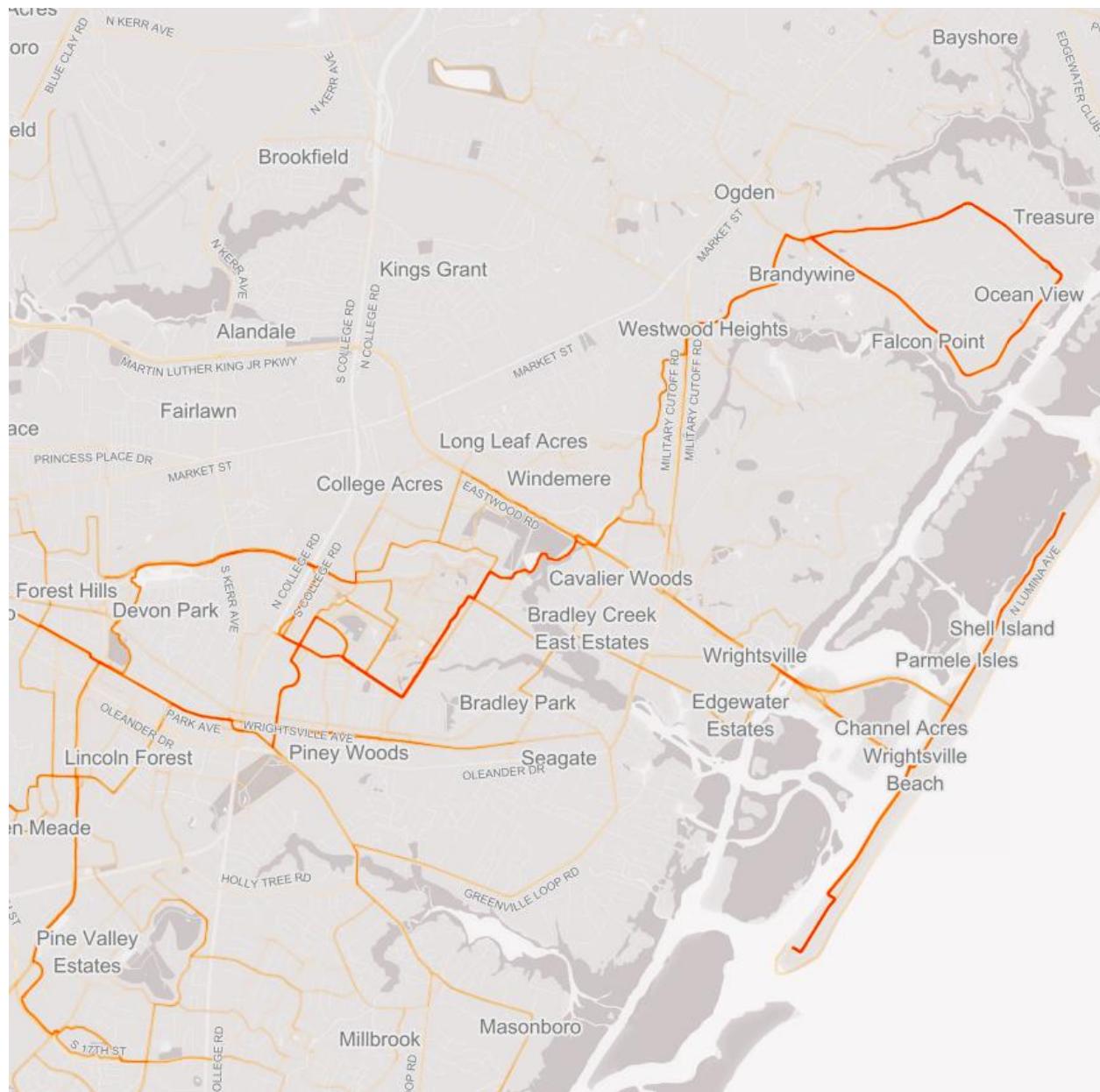
FIGURE C29 Strava Heatmap, Bike & Run, 2015, Wrightsville Beach
Source: HRTPO staff usage of http://labs.strava.com/heatmap/

The Wrightsville Beach heatmap shows bike and run activity concentrated along the oceanfront and spread throughout the area between Middle Sound Loop (upper right) and Forest Hills (at left).
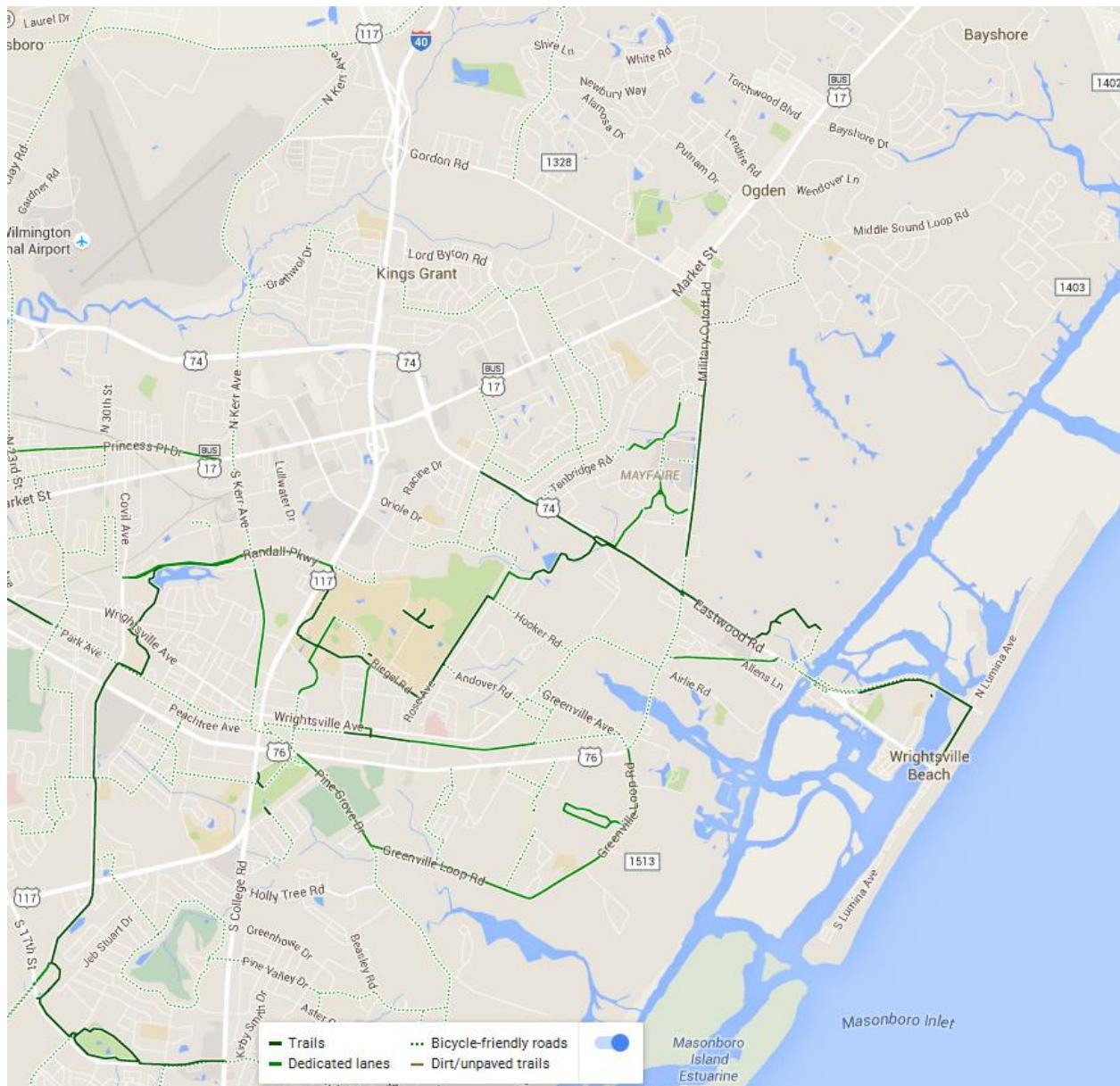
FIGURE C30 Google Maps Bike Facilities Map, 2015, Wrightsville Beach
Source: HRTPO staff usage of google.com/maps

From comparison of the above bike facilities map to the Strava activity map on previous page, it appears that athletes in Wrightsville Beach use the **bike facilities that join distant points**: e.g. Middle Sound, the beach, and Forest Hills.

APPENDIX D- DETAILS FOR HOSPITALITY LOCATIONS

Most-Active Hospitality Locations in Mid-Atlantic

See Hospitality section in report body for the origin of this data.

TABLE D1 Most-Active Hospitality Locations in Mid-Atlantic

Workplace	Total "Arts, entertainment, recreation, accommodation and food services" (AERAF) Workers, by place of work	"Normal" AERAF Workers (serving local residents and businesses), model	Excess AERAF Workers, an Estimate of Convention & Tourism Activity, difference
Horry County, South Carolina	24,980	8,596	**16,384**
Charleston County, South Carolina	24,470	15,996	**8,474**
New Hanover County, North Carolina	13,545	8,415	**5,130**
Beaufort County, South Carolina	10,570	5,620	**4,950**
Worcester County, Maryland	6,175	1,900	**4,275**
Mecklenburg County, North Carolina	46,820	42,608	**4,212**
Virginia Beach city, Virginia	19,305	15,253	**4,052**
Buncombe County, North Carolina	13,495	9,447	**4,048**
Williamsburg city, Virginia	3,990	1,040	**2,950**
Cabarrus County, North Carolina	8,145	5,296	**2,849**
Watauga County, North Carolina	4,685	2,054	**2,631**
Dare County, North Carolina	4,010	1,471	**2,539**
James City County, Virginia	4,555	2,056	**2,499**
Greenville County, South Carolina	20,220	17,745	**2,475**
Jackson County, North Carolina	3,850	1,448	**2,402**
York County, South Carolina	9,185	6,919	**2,266**
Pitt County, North Carolina	8,155	5,977	**2,178**
Wake County, North Carolina	36,580	34,515	**2,065**
Guilford County, North Carolina	22,920	21,184	**1,736**
Moore County, North Carolina	4,480	2,751	**1,729**
Carteret County, North Carolina	3,775	2,121	**1,654**
Montgomery County, Virginia	5,340	3,704	**1,636**
Sussex County, Delaware	7,640	6,074	**1,566**
Iredell County, North Carolina	6,630	5,456	**1,174**
Georgetown County, South Carolina	3,005	1,892	**1,113**
York County, Virginia	3,165	2,063	**1,102**
Alamance County, North Carolina	6,010	4,910	**1,100**
Brunswick County, North Carolina	4,000	2,919	**1,081**

Source of data: HRTPO model based on 2006-2010 CTPP tables A202104 and A101100 (model for 5 states plus DC.xlsx)

Travel Time

MOE#2: Time Necessary to Travel First/Last 30 Hwy Miles To/From Hospitality Destination

Travel time during the weekday PM peak over the first 30 miles from ports is measured in the MOE#2 portion of the hospitality section in the body of this report. Supplementary travel time data for is included below.

The first chart, being based on <u>travel times without congestion</u>, indicates the *type* of roads serving each port, whether of high-speed design (e.g. interstates) or medium-speed design (e.g. signalized arterials).
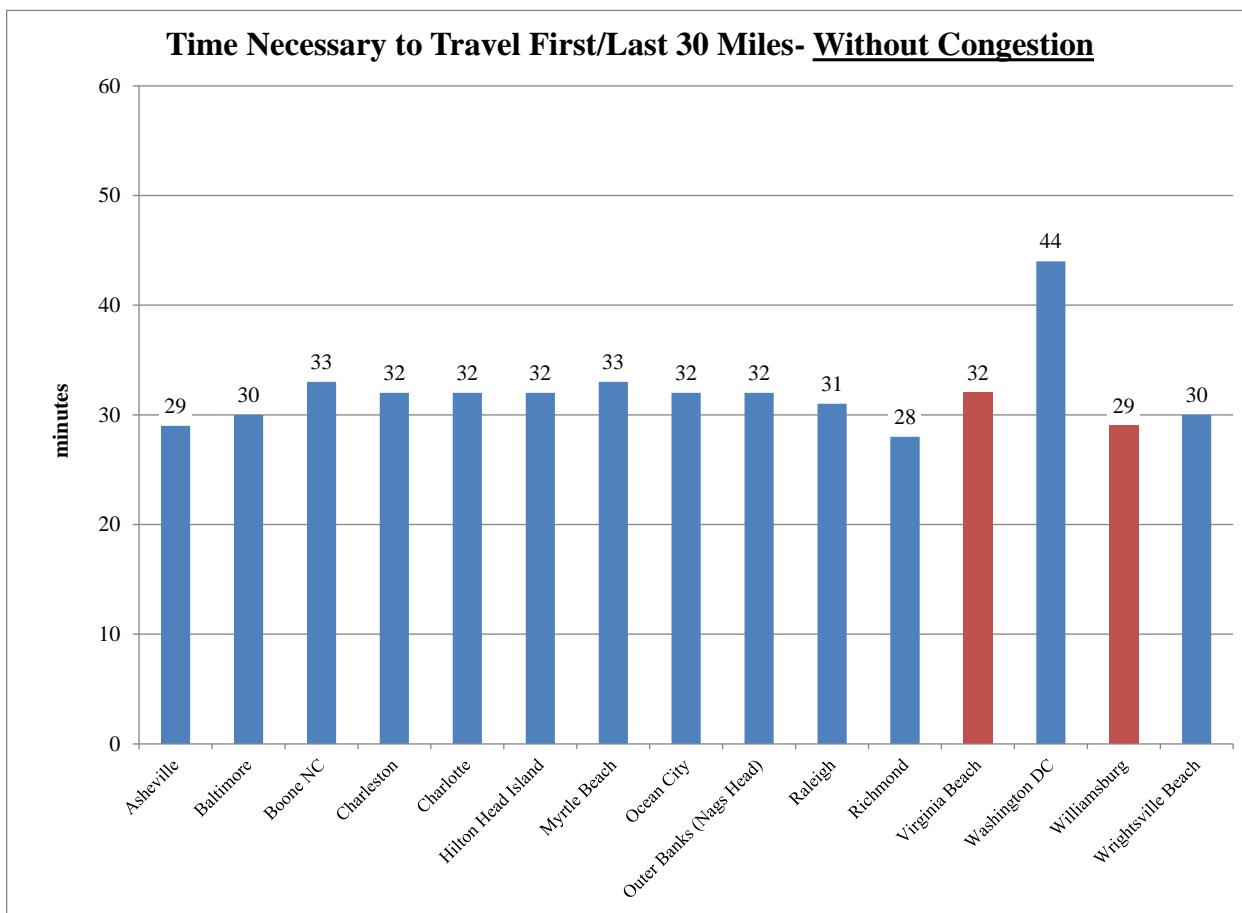

FIGURE D1

Source: HRTPO staff calculation using Google Maps (travel time hospitality 30 miles.xlsx)

The chart above shows that the highways serving most of the subject locations—including Virginia Beach and Williamsburg—allow travel at **approximately 60 mph** (i.e. 30 minutes for 30 miles) when there is no congestion. In other words, most destinations are served by Interstate (or interstate-like) highways.

For this second chart, HRTPO staff calculated the degree of <u>congestion during Friday PM Peak</u> (4pm-6pm) for inbound travel by dividing the travel time of Friday PM Peak runs (in report body) by the travel time "without congestion" (above).


Travel Time Index (peak/min.), Last 30 Mi Inbound- <u>Friday, PM Peak</u>
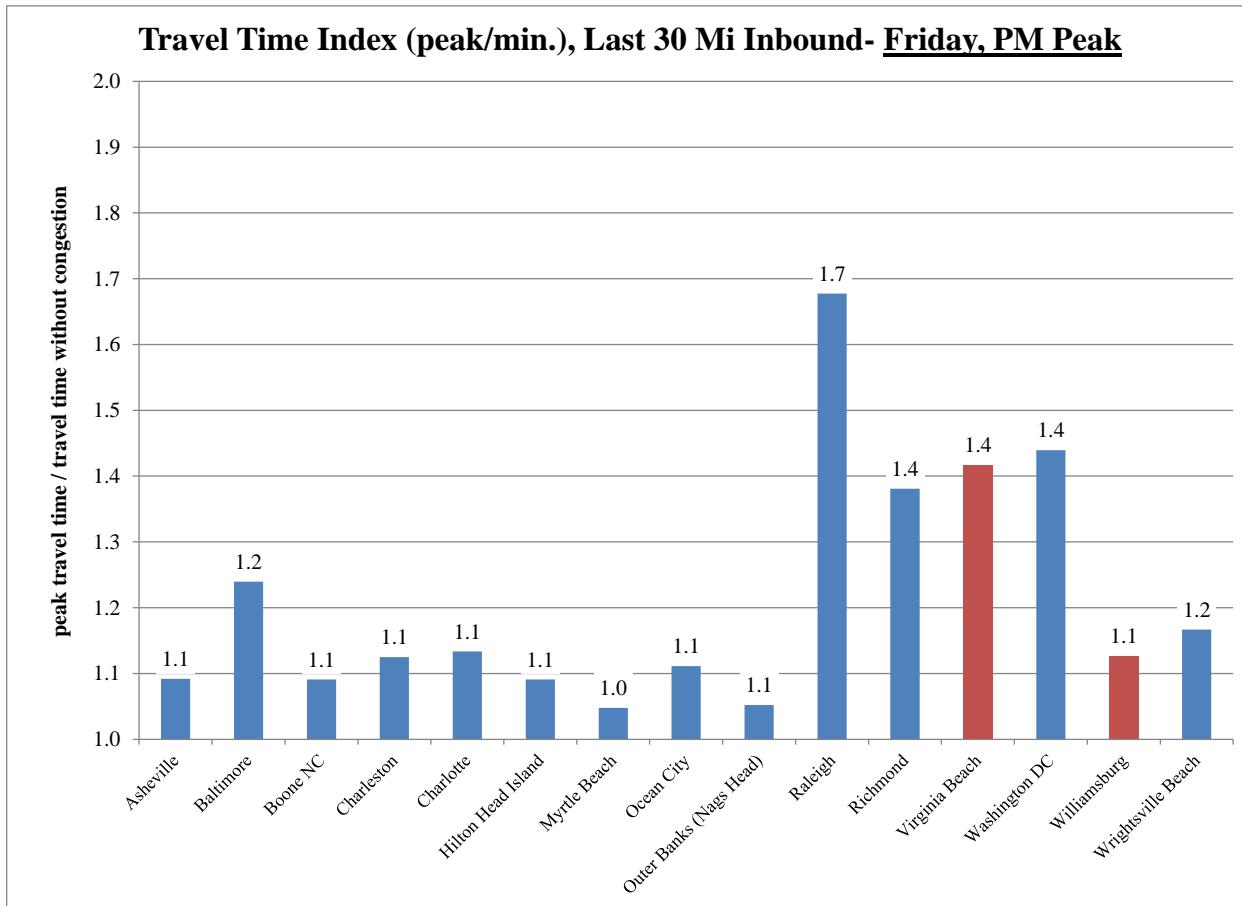
FIGURE D2 Friday PM Peak Congestion
Source: HRTPO staff calculation using Google Maps (travel time hospitality 30 miles.xlsx)

For this third chart, HRTPO staff calculated the level of <u>midday congestion</u> (known as "Travel Time Index") by dividing the travel time of runs made during weekdays 10am-4pm (Figure D4, below) by the travel time "without congestion" (Figure D1, above).
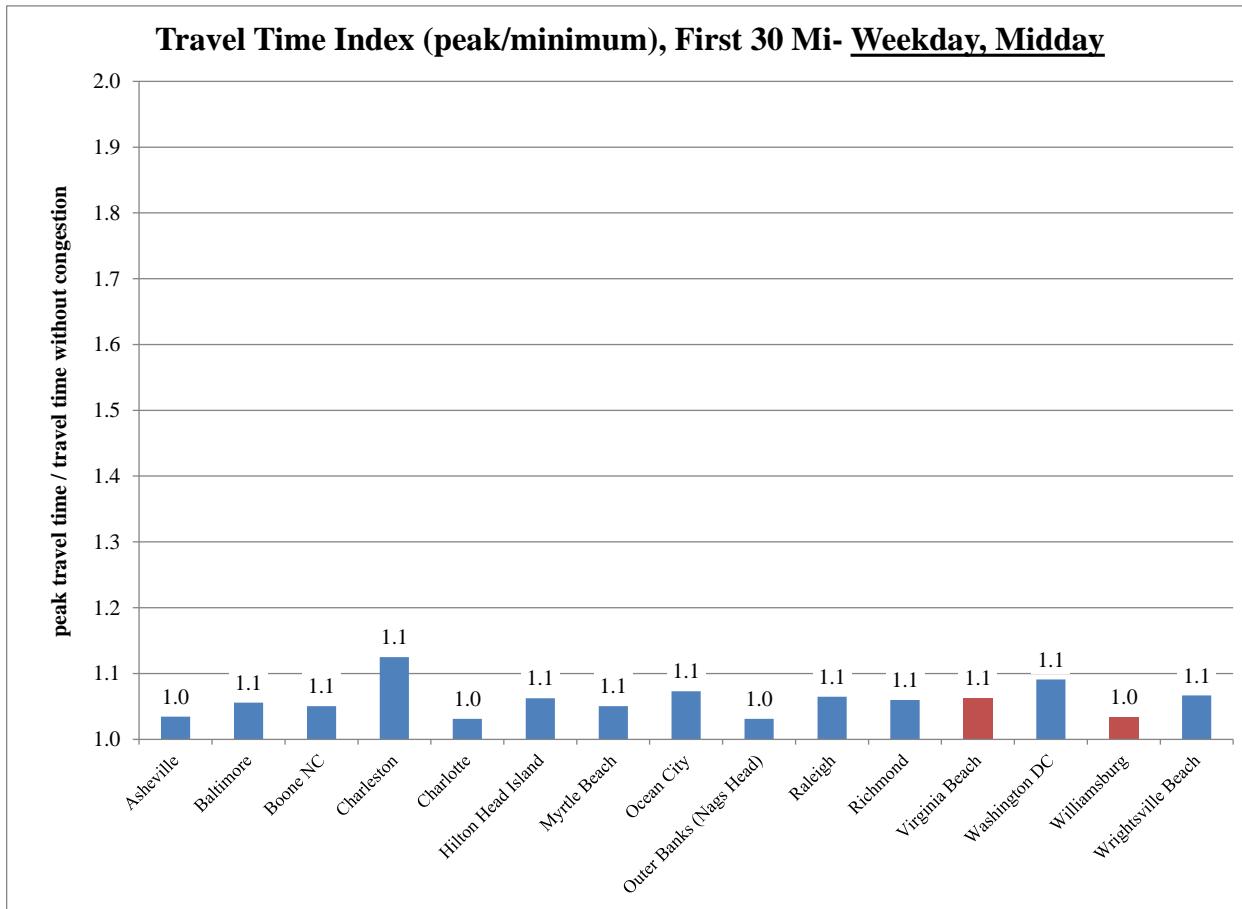

FIGURE D3 Weekday Midday Congestion

Source: HRTPO staff calculation using Google Maps (travel time hospitality 30 miles.xlsx)

The chart above shows the highways serving all subject hospitality locations have **low congestion during the *midday* period**.

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This fourth chart—showing weekday <u>travel time during the midday</u> (10am-4pm)—combines the effect of the type of roads serving each location (travel time "without congestion" in report body above) with the effect of congestion on those roads during the midday (Figure D3, above).

**Time Necessary to Travel First 30 Miles Outbound- <u>Weekday, Midday</u>**
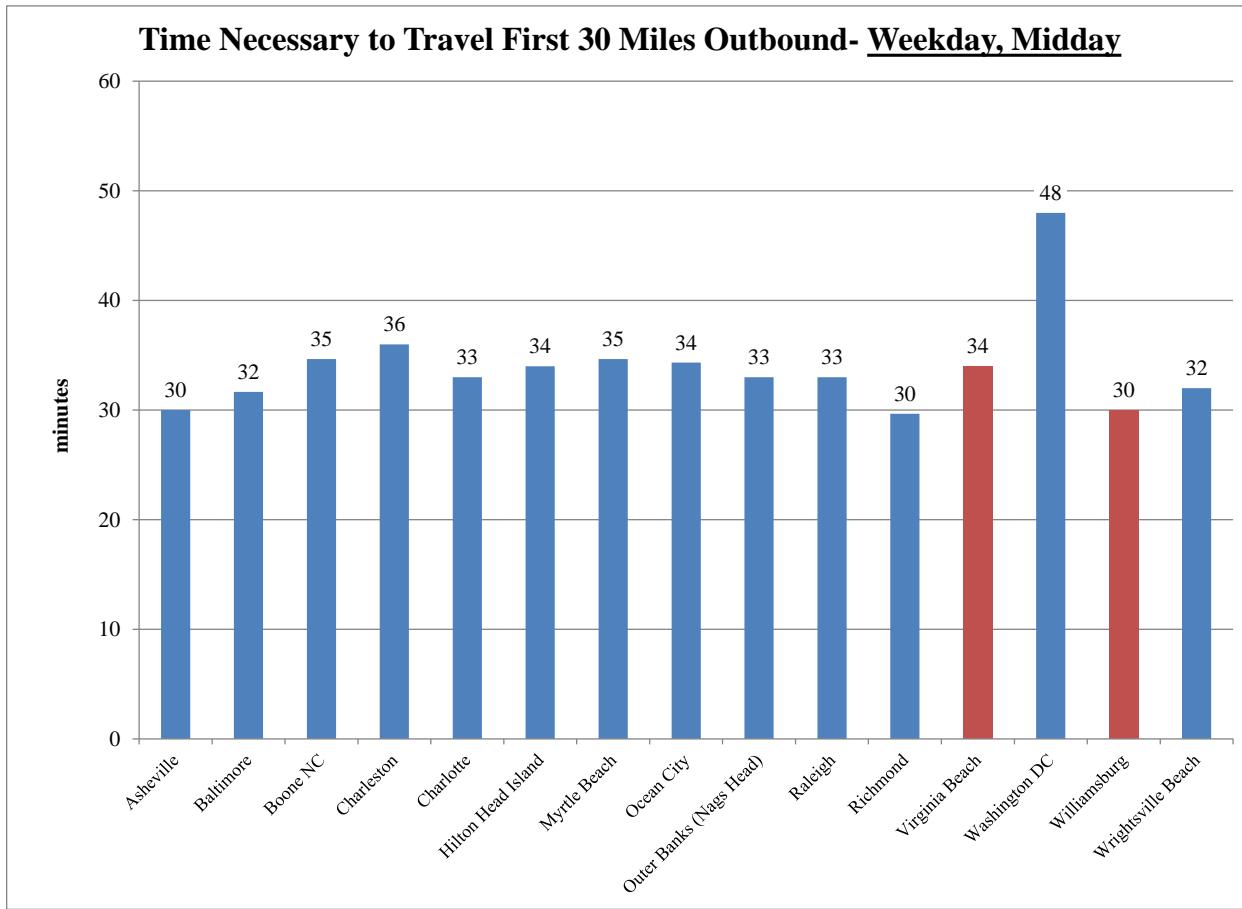
FIGURE D4

Source: HRTPO staff calculation using Google Maps (travel time hospitality 30 miles.xlsx)

The chart above shows that the highways serving most of the subject locations—including Virginia Beach and Williamsburg—allow tourists to cover the first 30 miles outbound—on a weekday, during the midday—in slightly over 30 minutes.

MOE#4: Accessibility and Level-of-Service of Commercial Airport

Travel time during the weekday midday by highway from the subject hospitality locations to the **nearest commercial airport** is measured in the MOE#4 portion of the hospitality section in the body of this report. Supplementary travel time data for is included below.

The first chart, being based on <u>travel times without congestion</u>, indicates the *type* of roads serving each destination—whether of high-speed design (e.g. interstates) or medium-speed design (e.g. signalized arterials)—and indicates the distance to the airport.
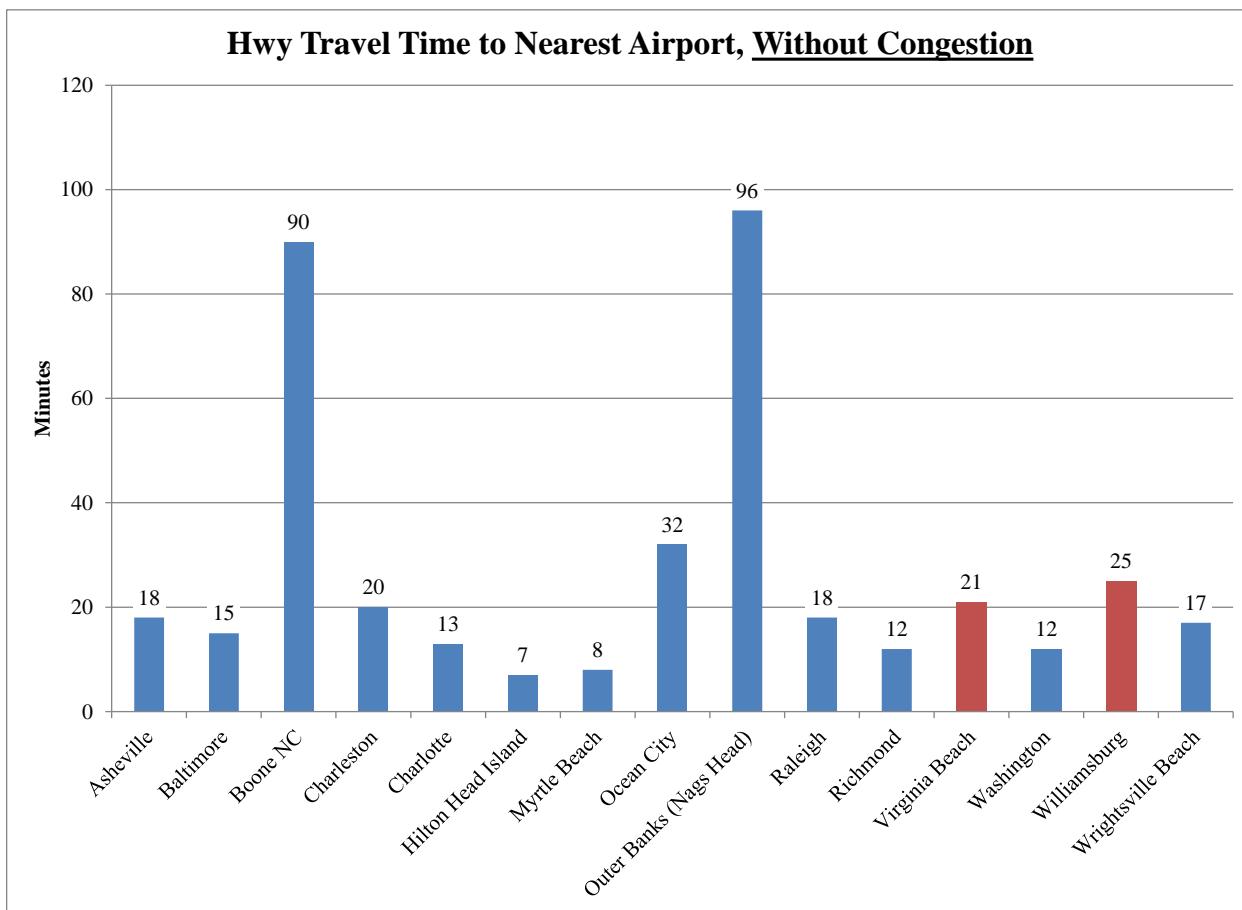

FIGURE D5

Source: HRTPO staff calculation using Google Maps (travel time to airport.xlsx)

As shown on the above chart for the *without congestion* condition—with the except of Boone NC, Ocean City MD, and the Outer Banks—the distances are short and/or the highway connections have high speed between the subject hospitality destinations and their associated commercial airports.

For this second chart, HRTPO staff calculated the level of midday congestion (known as "Travel Time Index") by dividing the travel time of runs made during weekdays 10am-4pm (see report body) by the travel time "without congestion" (above).

**Travel Time Index, Nearest Commercial Airport, Weekday, Midday**
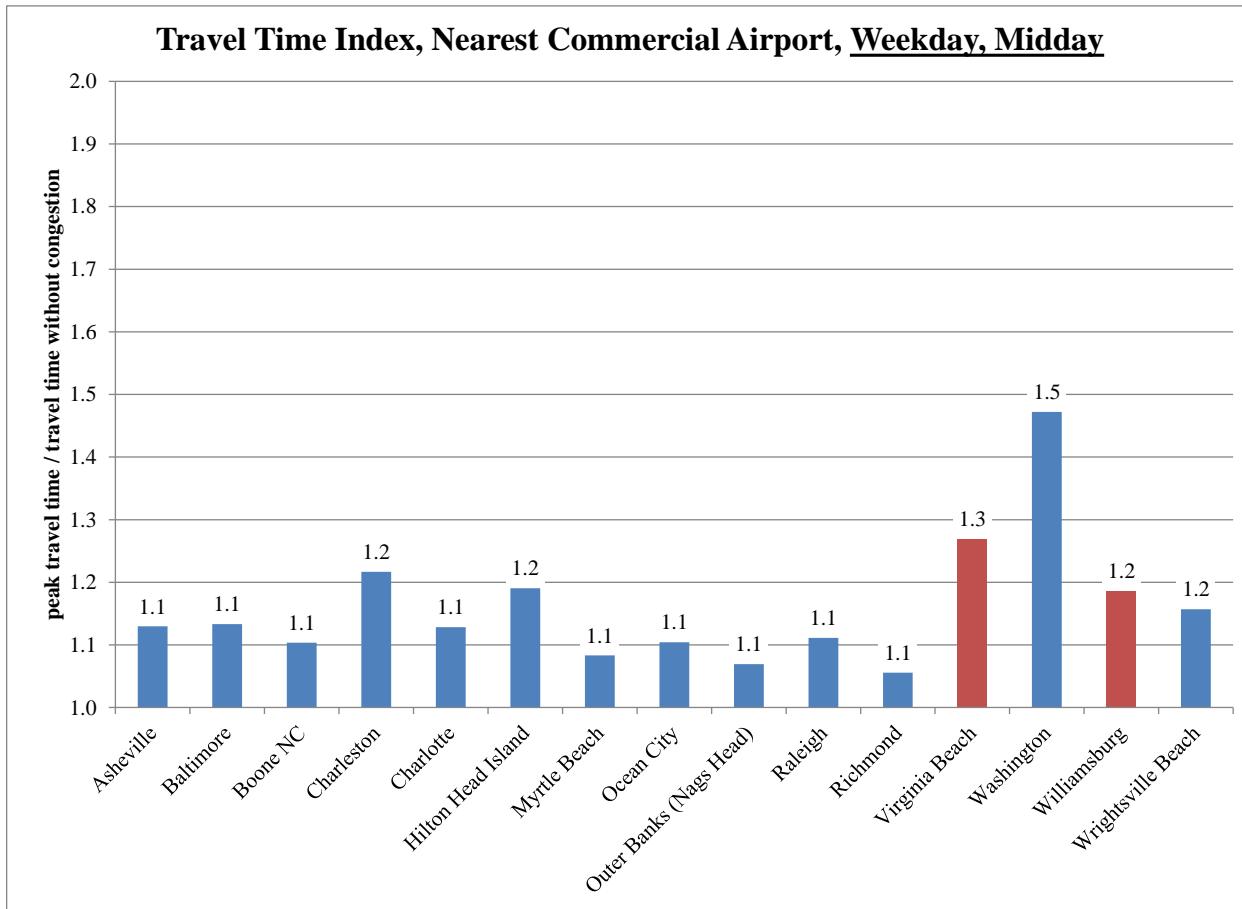
FIGURE D6 Weekday Midday Congestion

Source: HRTPO staff calculation using Google Maps (travel time to airport.xlsx)

The chart above shows that the highways joining the subject hospitality locations (including Virginia Beach and Williamsburg) to their airports have **low congestion during the *midday*** period, except for the Washington-to-DCA (Reagan International) trip.

*MOE#5: Accessibility and Level-of-Service of Amtrak*
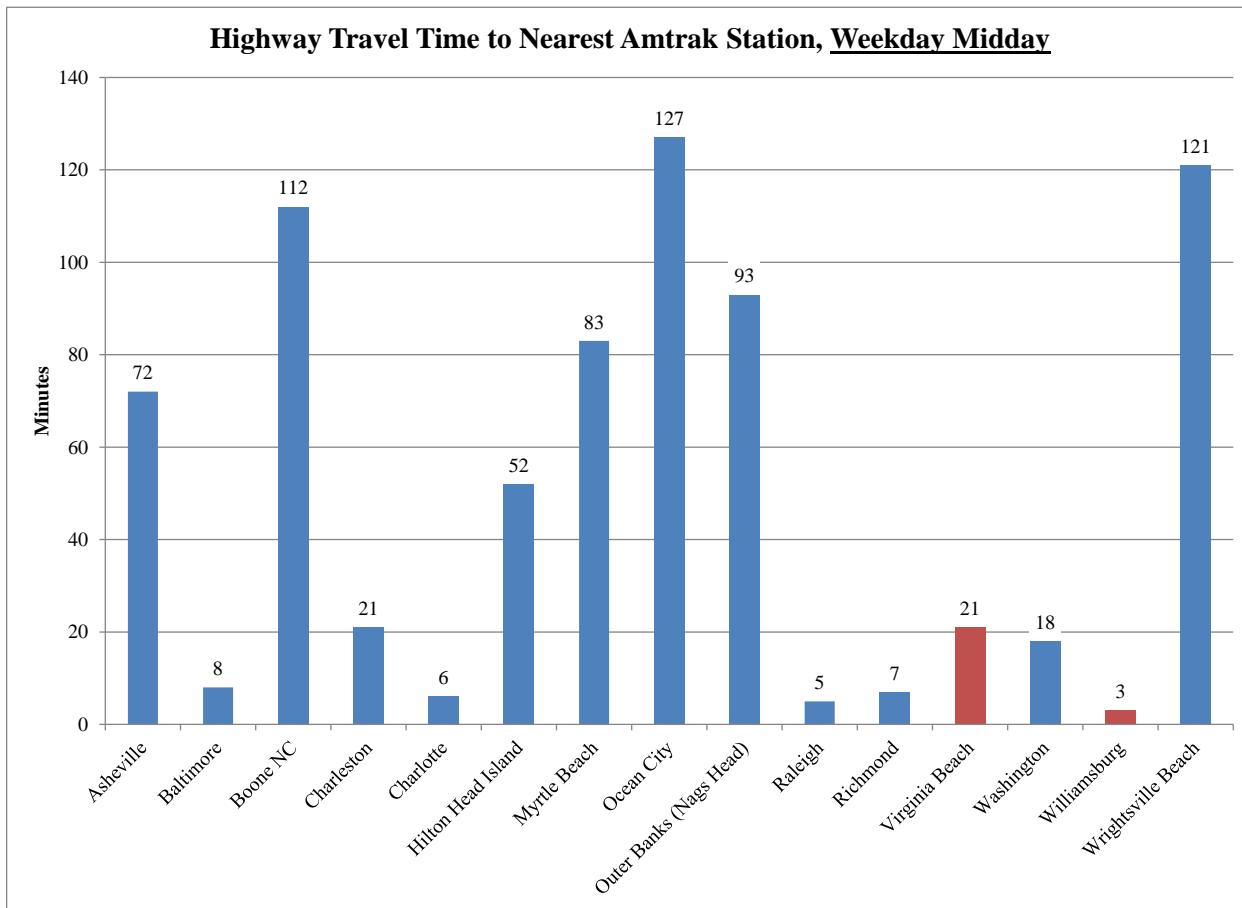
FIGURE D7

Source: HRTPO staff calculation using Google Maps (travel time to Amtrak.xlsx)

When using <u>weekday midday</u> (10am-4pm) travel times as the measure, the Hampton Roads destinations fare well.

APPENDIX E- PUBLIC COMMENTS

York County- Planning

Cross, Tim <tcross@yorkcounty.gov>
🛈 You replied to this message on 1/23/2017 1:30 PM.

Sent: Mon 1/23/2017 1:28 PM
To: Rob Case

Rob,

I know the deadline to comment on the "Moving the Economy" report was last Wednesday, so I may be too late with this minor correction. In Table P3 on Page 14, the segment of I-64 between Exits 231 and 234 should be described as JCC/York rather than just James City County. The Lightfoot interchange is in York, and the York/JCC line is a little over a mile to the north.

Take care,

Tim Cross

Response: HRTPO staff made the requested change.

Moving the Economy Draft Report Suggestions

Thank you for sharing the draft report. Below, I've made some suggestions pertaining to bicycle commuting, walk commuting, home valuations, travel destinations, and the workforce regression. Feel free to incorporate any of use...

Bicycling:

In 2015, the City of Virginia Beach (VB) applied for a federal TIGER grant (Grant). The project scope included the construction of a shared-use path between Newtown Rd and Town Center utilizing the Norfolk Southern Railroad (NSRR) right-of-way (ROW). While the application calculations allowed for benefit derivation flexibility, all formulas used in the VB application were recommended by the US Department of Transportation (DOT).

The draft version of "Moving the Economy" (Report) commendably uses innovative technologies for calculating usage. The STRAVA heat maps are interesting and informative.

For the VB Grant application, the current and new user bicycling commuters were derived for the area of interest. Consequently, the scope of the Grant was much smaller than the Report's scope, but I am wondering whether the growth rate VB calculated could be useful for deriving potential bicycle commutes for the path (Path) to the oceanfront? If it is useful, the derived growth rate would increase the number of new bicycle commuters. If interested in exploring the usage possibility, here's the formula:

- Sum the population within a one-mile radius of the proposed Path
    - For the Grant, 2010 Census block data was used.
    - To derive the current year population within the radius, Weldon Cooper population *estimates* were used between 2010 and 2015
    - Current radius population =
        - 2010 radius population x population growth rate

- Calculate the ratio of adult commuters citywide
    - The ratio is 60% of the population (80% ÷ 50%)
        - The ratio of adults nationally is 80.0%
        - The ratio of commuters nationally is 50.0%

- Calculate the number of commuters within the radius
    - Radius population x adult commuter ratio (60%)

- Calculate the number of **existing** daily bicycle commuters within the radius
  - Commuters x the ratio of VB bicycle commuters
    - VB used the American Community Survey (ACS) ratio of .0006

- Calculate the number of **new** daily bicycle commuters within the radius
  - Existing bicycle commuters within ¼ mile x 1.93
    - Likelihood rate is from NCHRP Report 552

  - Existing bicycle commuters within ½ mile x 1.11
    - Likelihood rate is from NCHRP Report 552

  - Existing bicycle commuters within 1 mile x 0.39
    - Likelihood rate is from NCHRP Report 552

- Derive the **new** bicycle commuter growth rate
  - **New** bicycle commuters ÷ **existing** bicycle commuters

Using this formula, VB anticipated bicycle commuter growth of 87.8%. Light rail had no effect on it. Based upon the Report's baseline calculation for bicycle commuters (1,199), new bicycle ridership at the derived rate of 87.8% would be 1,052. I'm not sure how this compares to the Report formulas outcome, because figure H10 does not separate the bicyclist and walk commuters. It's an aggregate number.

Response: See below, after walking section.

Walking:

For the Grant's walking commuter calculation, VB used the prescribed DOT formula. If interested in exploring a usage possibility, here's the formula:

- Calculate the ratio of **existing** *walk* commuters to **existing** *bicyclist* commuters
  - ACS VB data was used
  - 2.6% of commuters walk to work ÷ 0.6% of bicycle commuters = 4.3

- Calculate the **existing** number of walk commuters within the radius
  - **Existing** bicycle commuters x the walk/bicycle commuter ratio (4.3)

- Calculate the **new** walk commuter projection within the radius
  - **New** bicycle commuters x the walk/bicycle commuter ratio (4.3)

- Calculate the **new** walk commuter growth rate
  - **New** walk commuter growth ÷ **existing** walk commuter growth

3

Using this formula, VB anticipated bicycle commuter growth of 84.0%. Light rail had no effect on it. Based upon the Report's baseline calculation for walk commuters (2,677), new walk commuting at the derived rate of 84.0% would be 2,249.

Summing new bicycling commuters with walking commuters, the number of new commuters would be 3,876. This is 76% greater than the Report projection (2,197). Lastly, by using the federal methodology, it would seem to add another layer of legitimacy. If you'd like to see the Excel workbook, I can send it.

Response: Note that the baseline number of existing bike commuters in the vicinity of the proposed VB rail trail (Newtown Rd to Birdneck Rd) extracted by HRTPO staff from Census data—1,199 existing bike commuters—is based on a **2 mile buffer**, whereas the numbers you calculated using the NCHRP method are based on a **1 mile buffer**. Given this difference in miles, the difference between the growth rates calculated above based on the NCHRP method (88% for bike and 84% for walk) and the HRTPO growth rate (2197/3876= 57% growth for bike/ped) seems reasonable. Note that, due to its consideration of income, the HRTPO model— proposed and used in an earlier report (Signature Paths, HRTPO, March 2016)—may be a more accurate estimator of active commuting, such commuting being highly sensitive to income.

Response: As with the commuting impact model discussed above, HRTPO originally published the home value model in its Signature Paths report (March 2016). The HRTPO home value model is based on Austin and Indianapolis, the only two applicable data sets found.

Response: HRTPO staff has added the table from Virginia Beach staff to the report. Note that:
- whereas the FHWA data covers trips from VB (e.g. by VB residents) AND trips to VB (e.g. by visitors), the VB staff data covers only trips to VB
- whereas the FHWA data covers non-business trips, the VB staff data covers tourism AND business trips
- whereas the FHWA data covers only US trips, the VB staff data also covers trips from Canada.

Response: Whereas the USTA data covers "hospitality" employment, the Census data used by HRTPO staff covers "arts, entertainment, recreation, accommodation and food services".

Virginia Beach- Convention & Visitors Bureau
via 15 Mar 2017 email from Tiffany Russell to Brian Solis and Rob Case

RE: feedback: transportation study

Tiffany Russell <TMRussel@vbgov.com>

🛈 You replied to this message on 3/15/2017 2:43 PM.

Sent: Wed 3/15/2017 1:54 PM
To: Brian Solis; Rob Case

Hi Brian,
He told me it was Monday and I totally overlooked it (yikes!). My fault, I apologize. Here are the CVB comments to share externally:

The CVB concurs with the recommendation that the inactive rail right-of-way running from the Virginia Beach oceanfront to Newtown Road can be successfully transformed into an "active transportation path" for both pedestrians and bicyclists, as this type of product development has been trending in the tourism industry for years nationwide. We also suggest that mass transit service be considered along the path, if feasible, and that possibly light rail be reconsidered in the distant future (if the voter and/or the political climate changes) with connectivity to the Amtrak station. Finally, regarding the excellent Hospitality Section, we concur with the recap of the key findings (page 79) for serving Virginia Beach residents and our hospitality industry.

Again, thanks for the opportunity to quickly review the study.
Tiffany

Response: HRTPO staff gratefully acknowledges that CVB staff found the hospitality section of the subject report "excellent", and that "we concur with the recap of the key findings…for serving Virginia Beach residents and our hospitality industry".

HRTPO staff included the portion of this email that covers the rail right-of-way in the hospitality section of the report.

VDOT

COMMONWEALTH *of* VIRGINIA

DEPARTMENT OF TRANSPORTATION
HAMPTON ROADS DISTRICT
1700 NORTH MAIN STREET
SUFFOLK, VIRGINIA 23434

Charles A. Kilpatrick, P.E.
Commissioner

January 18, 2017

Camelia Ravanbakht, Ph.D.
Hampton Roads Transportation Planning Organization
723 Woodlake Drive
Chesapeake, Virginia 23320

Re: District Review of HRTPO Draft Transportation Studies -January 2017
- Hampton Roads Regional Transit Benchmarking Study (Draft)
- Moving the Economy-"How Well the Hampton Roads Transportation System…" (Draft)

Dear Dr. Ravanbakht,

The Hampton Roads District Transportation Planning Office has completed a formal review of the HRTPO's Transportation Studies *Hampton Roads Regional Transit Benchmarking Study* (Draft) and *Moving the Economy-How Well the Hampton Roads Transportation System Serves Three Key Economic Sectors* (Draft). The primary focus of this review is to ensure consistency with federal and state program requirements as identified in federal transportation code.

The *Hampton Roads Regional Transit Benchmarking Study* was developed by HRTPO staff in coordination with staff from Hampton Roads Transit (HRT), Williamsburg Area Transit Authority (WATA), and Suffolk Transit to show how the performance of the transit agencies in Hampton Roads compares to peer agencies nationwide and provides a baseline against which future performance could be measured. The *Moving the Economy-How Well the Hampton Roads Transportation System Serves Three Key Economic Sectors* is a study to inform the HRTPO Board how well the Transportation System of Hampton Roads serves three key economic sectors- port, military, and hospitality.

The Hampton Roads District has reviewed the documents and finds that it is consistent with state and federal MPO program requirements and will continue to coordinate and provide data with the HRTPO for subsequent updates. We do however have the following comments regarding the documents:

Response: HRTPO staff gratefully acknowledges that VDOT staff found the subject report "consistent with state and federal MPO program requirements."

Hampton Roads Regional Transit Benchmarking Study (Draft)

- Please note that there are 23 Park and Ride lots in the Hampton Roads District according to VDOT's Park & Ride Inventory. Twelve (12) lots are accessible by HRT, 4 by WATA (Surry Municipal Center, Jamestown Ferry, Jamestown Center and Lightfoot), and 2 by Suffolk Transit (Magnolia Lot, Route 58 lot). Please update the study accordingly (Page 35, 41, 47).

- Please re-evaluate Figure 24. Based on previous figures in the study, Hampton Roads Transit has one of the lowest operating expenses per rider and one of the highest fare box recovery ratios. Perhaps HRT should rank higher on the Peer Agency Rankings (Page 34).

- Please reconsider some of the peer agencies used for Suffolk Transit, many of these agencies have much higher ridership and received federal funding (which Suffolk currently does not).

- Recommend including a comparison of fares between the Hampton Roads Region and other peer agencies. It may also be helpful to compare the impact of peer agencies with dedicated funding sources versus the region's current funding sources.

- Recommend the future inclusion of light rail transit benchmark comparisons, since LRT is a meaningful portion of HRT network, as well as its peer agencies.

Moving the Economy- "How Well the Hampton Roads Transportation System…" (Draft)

- Additional I-64 improvements west of Segment III have been recommended in VDOT's latest I-64 FEIS but are outside of the Hampton Roads District. Improvements along this portion of I-64 will need to be approved by the Richmond Regional TPO and adopted into their next constrained long range plan update. As mentioned in your report, VDOT Richmond District is moving ahead with improvements to I-64 in Henrico and a portion of New Kent (Page 14).

- Is there a more accurate way of measuring freight movements than "highway hours" which can change based on speed and distance (Page 6-11)?

- Active transportation along the inactive 12-mile Virginia Beach right-of-way was developed in collaboration with light rail, not as an alternative to it. Therefore it's not necessary to include the "failed referendum on light rail" to justify a new trail since these projects complemented each other (Page 46).

Response: Bullets under "Moving the Economy":
- So noted. (No change requested.)
- Because "time is money", a key factor shippers use in choosing a port is length of time necessary to move the subject freight to or from the port by truck. Therefore, HRTPO staff used hours along the highway system to delineate port service areas.
- HRTPO staff reworded the subject text.

- It may not be appropriate to advertise or promote private consultants in this study when referencing the Paths Connecting to the Virginia Capital Trail (Page 51).

- Not sure why public transit times to the Amtrak Station in Norfolk from Virginia Beach is so high. HRT has an express bus between the Virginia Beach Oceanfront and Downtown Norfolk. Amtrak also offers coach bus service between Virginia Beach and Newport News Amtrak stations (Page 72).

The comments identified are preliminary in nature and provided for your review or revision as deemed appropriate. Please notify Mr. Carl Jackson at 757-925-2596, should you have any questions.

Sincerely,
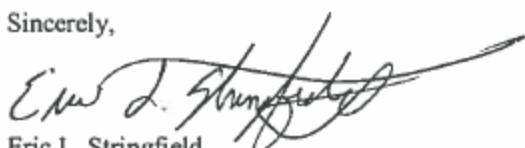
Eric L. Stringfield
Hampton Roads Transportation Planning Director

ELS/cej

Response: Bullets above:
- The name of the consultant was added to the report for identification.
- HRTPO staff used Google Maps for all transit travel times. That source indicates a 65 minute travel time from oceanfront to downtown Norfolk for express bus 960. The long time is apparently a function of stopping at Silverleaf Park and Ride along the way.

Port of Virginia

THE PORT OF **VIRGINIA**

John F. Reinhart
CEO/Executive Director

Virginia Port Authority
600 World Trade Center
Norfolk, VA 23510

HRPDC
ORIG COPY

February 13, 2017

Robert A. Crum, Jr., Executive Director
Hampton Roads Transportation Planning Organization
The Regional Building
723 Woodlake Drive
Chesapeake, Virginia 23320

Re: Moving the Economy Comments

Dear Mr. Crum:

Thank you for the opportunity to comment on the draft "Moving the Economy Study." The study will serve as a strong foundation to identify and develop transportation needs to move the Hampton Roads' economy toward its full potential.

The Port of Virginia strongly supports this effort as vital to the Region and recommends broad stakeholder engagement to identify and address the Region's transportation needs. As noted, the port is one of the Region's major economic pillars; reliant upon the transportation infrastructure to remain efficient and competitive. The Port is also the Commonwealth's gateway to global trade, producing 374,000 jobs and $30.5B in statewide economic impact.

Market forces at play in the global shipping industry have led to mergers, acquisitions and consolidations among the largest carriers. As a result, ultra large container vessels are being deployed across the globe, resulting in slightly fewer vessel calls, but with higher container volumes. To remain competitive, the port needs the ability to handle larger slugs of cargo swiftly, safely, and seamlessly not only on terminal, but across the transportation networks to inland markets.

The port's investment of more than $670M in our largest container terminals (Virginia International Gateway and Norfolk International Terminals) over the next three years will increase capacity by one million containers. We are also partnering with the Army Corps of Engineers to deepen the main navigation channel to 55 feet. These projects are being done proactively to handle global market demand through Virginia's port gateway. And, the railroads have invested hundreds of millions of dollars in their networks to provide double stack rail service between the port and inland markets.

This study's purpose is to identify how the transportation system moves the Region's economy. In the port's view, improvements are needed, but there is a solid foundation upon which to build – the new HRTF revenue source, a robust prioritization system, and three superb economic engines - strong attributes that any region would envy. The timing coincides with the largest capital expansion program in the Port's history and following recent monumental transportation decisions in the transportation network.

FEB 1 6 2017

HRPDC

THY: UPWP FY17 SS

ph (757) 683-8000 | toll-free (800) 446-8098 | portofvirginia.com

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We sincerely appreciate the opportunity to provide the enclosed comments along with recommendations for next steps and look forward to continued dialogue and engagement on this important effort. Thanks again for the opportunity to provide input.

Sincerely,
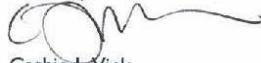
Cathie J. Vick
Chief Public Affairs Officer

Encl

Response: HRTPO staff gratefully acknowledges that port staff found the subject report "vital to the Region" and "a strong foundation to identify and develop transportation needs to move the Hampton Roads' economy toward its full potential."

[See responses to individual comments below.]

Port of Virginia" vs. "Port of Hampton Roads"
HRTPO staff used "Port of Virginia" except where measurements were made from Hampton Roads, in which case "ports in Hampton Roads" was used.

2016 Data
As requested, 2016 TEU data has been added to the report.

Comparison Ports
Due to the difficulty of gathering the subject data by port (particularly the GIS work required to calculate the service areas, and the multiple Google Map runs required to calculate average travel times), the draft list of four comparison ports was sent to port staff via 4-11-16 email for comments. Given the significant startup time and calculation time that would be necessary for gathering/calculating the data for two additional ports now—HRTPO staff is moving ahead with the data for the original set of four ports.

Service Area and Speeds
Truck costs (and therefore port competiveness) are a function of both distance (e.g. wear on tires) and time (e.g. number of turnarounds possible in one day). Because congestion on highways lowers average speed and thereby increases travel time, HRTPO staff used time to define service area size.

In response to port comments, HRTPO staff added the above paragraph, added the word "average" (i.e. "average truck speeds"), and mentioned safety.

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> *Next steps:* The study could benefit from broader Regional input and engagement. We recommend consideration of a 'blue ribbon panel' steering committee, due to the importance of the topic to regional decision makers. Recommended members include participation from 'regional bodies and regionalist experts'. We'd recommend consideration of the Chamber (Bryan Stevens, Barry Duval), Jim Oliver, Jim Spore, Joe Frank, VMA freight expert and perhaps ODU. The effort should also have a strong regional technical panel – not necessarily limited to TTAC reps.
>
> *Measures of Effectiveness:* The Measures of effectiveness are good. Their application needs some refinement to produce information that may be more useful for the Region's decision makers. Specific comments for the measures of effectiveness follow:
>
> *MOE#1* – Very good metric to help evaluate the effectiveness of the interstate and primary road system connecting Hampton Roads to the national freight network and markets served. The study looks at the local market by evaluating 2, 4, and 8 hour driving distances. The 2 and 4 hour data is useful. The port uses 250 miles to differentiate local and discretionary markets, as shown on the attached graphic (Encl 1).
>
> The conclusions about population served within an 8 hour highway drive is technically correct but may be misleading because of how the port serves the market between 4-8 hours. E.g. the port's truck market could stretch to almost 8 hours directly west from to the westernmost regions of North Carolina, Virginia and West Virginia. However, going south it would only go only as far as Morehead City, NC and north no further than the metro DC/Baltimore region. There is no commercially viable scenario where companies would bring containers to the Port of Virginia and truck them to NY or Atlanta.

Next Steps
HRTPO staff gratefully acknowledges the potential that port staff sees in this report, and—as requested—will consider port staff's recommendation of forming a "blue ribbon panel" steering committee and a "strong regional technical panel" in order to gained "broader Regional input and engagement."

MOE#1
HRTPO staff added text below Figure P2 to reflect port staff's point that the port is competitive in some parts of the 8-hour service area and not in others.

> *Next Steps*: The primary port needs are improved accessibility from the west and reliability of the primary freight gateways. The TPO staff has done good work identifying the key freight gateways and volumes of truck traffic through those gateways. It would be helpful to develop this MOE further to help identify improvements needed along the primary freight routes and primary freight gateways that could improve their performance serving the port.
>
> A recommended next step is to develop an inventory of short term, medium term and long needs to help improve each one of the gateways considering the strongest port market development potential. The study should also 1) look at port access to the west to consider the best route for access between the port and the proposed future I-87 to Raleigh, 2) identify the top segments of Route 58 that need to be improved over the short term, medium term, and long term (e.g. between the Port and I-95 and I-85). We would welcome the opportunity to assist.
>
> *MOE#2* - Time to travel the first 30 miles analysis is good and should take precedent over the 8 hour analysis. A good way of looking at the importance of the first 30 miles would be to focus on hotly contested discretionary markets to the north and south like Washington, DC and Raleigh.

Next Steps ("identify improvements needed along the primary freight routes")
The study attempts to identify improvements needed. It starts by listing the HRTF projects, all five of which serve the port. It continues by finding that the "current Rt. 58 Corridor Study is an important step". (HRTPO staff is currently working with VDOT and its consultant to complete that study.) And then it finishes by highlighting the 29-mile section of I-64 between current projects.

Source: wral.com

Concerning "the best route for access between the port and the proposed future I-87"—I-87 being a planned improvement of the existing US64 and US17 (as shown above)—I-87 would be accessed to/from the local ports via I-64 in Chesapeake, as US 17 is today.

Concerning identifying "the top segments of Route 58 that need to be improved", HRTPO staff expects that identification to be included in the current Route 58 feasibility study.

MOE#2
HRTPO staff gratefully acknowledges that port staff considers "Time to travel the first 30 miles analysis is good…".

> *Next Steps*: Improved direct connections to the Port's marine terminal are important needs to increase capacity and to improve reliability for the movement of freight to inland destinations and connection with the national freight network. A next step may be to develop an inventory of short term, medium term, and long needs for each marine terminal to improve access between them and the hinterland markets with the strongest potential for port related growth. A partial list of needs, not in any priority order, are improvements to SR164 (i.e. the 164 IMR indicates that SR164 does not have adequate capacity for projected traffic demand as a 4 lane facility to accommodate regional traffic growth), increased use of Hampton Blvd to the Downtown and Midtown Tunnels (e.g. potential to relax the truck curfew hours), Craney Island Road and Rail Connector, potential Western Connector, etc.
>
> *MOE #3* - While it is important that the Port is served by both Class 1 railroads, competitive factors for rail servings ports are:
>
> 1. Is the rail network double-stack capable from the port
> 2. Do the terminal facilities have on-dock rail with both railroads
> 3. Which rail hubs are served to/from that port on their INTERMODAL network
> 4. Transit time to/from those hubs
>
> These factors should be included and briefly discussed in the Report. The TPO has the most influence over item #4. One of the factors that can affect rail transit time is at-grade crossings, since they are potential chokepoints that can impact both the movement of goods and people.
>
> The study provides a good inventory of the highest priority Commonwealth Railway at-grade crossings, but lacks discussion on other regional at-grade crossings that may be equally

Next Steps ("inventory of…needs for each marine terminal")
As discussed above, HRTPO staff included projects affecting port service area (5 HRTF projects, US 58, and 29-mile section of I-64 Peninsula).

Concerning port staff's partial list of needs: per MOU approved 3-16-17 by HRTAC, HRTPO will manage "Additional Feasibility Studies" for:
- Rte 164
- 164 Connector (serving Craney Island)
- I-564/I-664 Connectors ("Patriots Crossing"), and
- I-664 (including MMMBT)
using HRTF dollars not to exceed $3m, mention of which HRTPO staff added to this report.

MOE#3
Via 30 Mar 2017 email port staff provide data for questions 1, 2, and 3. (Concerning data for questions 3 and 4, HRTPO staff sent 17 Mar 2017 and 27 Apr 2017 request emails to port staff.)

Although an analysis of all at-grade crossings affecting the port is beyond the scope of this study, HRTPO staff added a finding for the commented Hampton Blvd crossing to the report.

> significant. For example, the Terminal Blvd at-grade crossing across Hampton Boulevard carries more rail traffic and road traffic than any of the CWRY crossings and impacts two of the three study's economic drivers – the military and the port, and may have a larger impact on the region's economy.
>
> *Next steps* - The speed of trains into and out of the terminals and into and out of intermodal yards is also an important factor for port competitiveness. The study should provide a more complete inventory of rail related issues under the purview of the TPO so that near term, mid-term and long term needs can be evaluated. The study should reference SJ69 and the Port Rail Master Plan and include a broader range of rail related issues that are within the TPO's purview and affect "Moving the Economy". For example, the single tracked CWRY tracks may cause future congestion and is one of the higher priority rail projects identified under SJ69a and Port Rail Master Plan. Similarly, the future Craney Rail connector is a long term project. These projects are on a significant rail corridor that will move more than 50 percent of the Port's future rail volume.

Next Steps

Concerning the request that the "study should reference…the Port Rail Master Plan and include a broader range of rail related issues", although that plan's four recommendations and 26 sub-recommendations are beyond the scope of this study, HRTPO staff included the following recommendation (from the Plan) in this report:

> "Designate a lead individual or entity to explore programs to assist communities with coordination, planning, and funding of improvements to mitigate rail impacts, including quiet zones, crossing safety improvements, and grade-separated crossings, with short-term emphasis on the Commonwealth Railway corridor…."

Conrail

According to conrail.com:

> "NS and CSX took administrative control of Conrail on August 22, 1998. The approved merger plan restructured Conrail into a Switching and Terminal Railroad operating about 1,200 miles of track in three regional areas. On June 1, 1999, Conrail began operating as a Switching and Terminal Railroad for its owners, NS and CSX, in the three geographical areas of Northern New Jersey, Southern New Jersey/Philadelphia, and Detroit, Michigan."

Therefore, HRTPO staff left the Conrail reference in the report unchanged.

New Inland Port at Dillon SC

Notification of the planned new inland port has been added to the report.

MOE#4

Concerning the "need for increased capacity and improved reliability across the harbor/river", text concerning the widening of HRBT is included under MOE#2, and that text concerning MMMBT was added under that same MOE#2 in response to a previous port comment above.