Richmond Regional Transportation Planning Organization
SUPPORTED BY PlanRVA

Richmond Regional Park and Ride Investment Strategy

Final Report
Adopted December 5, 2019

Prepared By:

Kimley»Horn

ACKNOWLEDGMENTS This report was prepared by the Richmond Regional Planning District Commission (RRPDC) staff through a cooperative process involving the City of Richmond, Counties of Charles City, Chesterfield, Goochland, Hanover, Henrico, New Kent and Powhatan, the Town of Ashland, the Virginia Department of Transportation (VDOT), the Virginia Department of Rail and Public Transportation (DRPT), the Virginia Department of Aviation, the Capital Region Airport Commission, GRTC Transit System, the Richmond Metropolitan Transportation Authority, the Federal Highway Administration (FHWA), the Federal Transit Administration (FTA), the RRPDC and RideFinders, Inc., on behalf of the Richmond Regional Transportation Planning Organization (RRTPO). The contents of this work program reflect the views of the RRTPO. The RRPDC staff is responsible for the facts and accuracy of the data presented herein. The contents do not necessarily reflect the official views or policies of the FHWA, FTA, VDOT, DRPT or the RRPDC. This document does not constitute a standard, specification, or regulation. FHWA, FTA, VDOT, or DRPT acceptance of this document as evidence of fulfilment of the objectives of this work program does not constitute endorsement/approval of the need for any recommended improvements nor does it constitute approval of their location and design or a commitment to fund any such improvements. Additional project level environmental impact assessments and/or studies of alternatives may be necessary.

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Transportation Planning Organization

The Richmond Regional Transportation Planning Organization (RRTPO) is the federal and state designated regional transportation planning organization that serves as the forum for cooperative transportation decision-making in the Richmond area. The Richmond Regional Planning District Commission, or PlanRVA, is the contracting agent and staff for the Richmond Regional TPO.

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George F. Spagna*

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Floyd H. Miles
(Vacant)*

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James M. Holland
Christopher Winslow
Leslie Haley

Goochland County
Manuel Alvarez, Jr.
John L. Lumpkins, Jr.
Susan F. Lascolette
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Hanover County
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Wayne T. Hazzard
J. Michael Flagg*

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Frank J. Thornton
Thomas Branin*

New Kent County
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Patricia A. Paige*

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Michael J. Jones*
Kristen Nye Larsen*
Ellen F. Robertson*

CRAC
John B. Rutledge
(Vacant)

GRTC Transit System
Julie E. Timm
Sheryl Adams*

RMTA
Joy Taylor Dean

Secretary of Transportation Designee
Shane Mann
Mark E. Riblett*

NONVOTING MEMBERS:

CTAC
Herbert A. Richwine
Robert L. Basham*

FHWA
Thomas L. Nelson
Richard Duran*

FTA
(Vacant)

RideFinders, Inc.
Von S. Tisdale
Cherika Ruffin*

Va. Dept. of Aviation
P. Clifford Burnette, Jr.

Dept. of Rail and Public Transportation
Jennifer B. DeBruhl
Tiffany T. Dubinsky*

** Alternates*

Study Advisory Group

Town of Ashland
Nora Amos

Charles City County
Myles Busching

Chesterfield County
Barbara Smith

Goochland County
Thomas Coleman

Hanover County
Joe Vidunas

New Kent County
Kelli LeDuc

Henrico County
Todd Eure

Powhatan County
Andrew Pompei

City of Richmond
Dironna Clarke

Virginia Department of Transportation
Olivia Mobayed
Desmond Smallwood

Virginia Department of Transportation
Olivia Mobayed
Desmond Smallwood

Department of Rail and Public Transportation
Tiffany Dubinsky

GRTC Transit System
Adrienne Torres

RRTPO Staff
Chet Parsons
Barbara Jacocks
Dan Motta

RRTPO POLICY BOARD AGENDA 12/5/19; ITEM B.3.

PARK AND RIDE INVESTMENT STRATEGY STUDY – FINAL REPORT

Richmond Regional Transportation Planning Organization

On motion of Frank J. Thornton, seconded by Patricia S. O'Bannon, the Richmond Regional Transportation Planning Organization (RRTPO) policy board unanimously approved the following resolution:

RESOLVED, that the Richmond Regional Transportation Planning Organization adopts the *2019 Richmond Regional Park and Ride Investment Strategy Study* to be used as a comprehensive guide by participating entities to plan, design, fund and implement Park and Ride lots in the Richmond region.

****

This is to certify that the Richmond Regional Transportation Planning Organization policy board approved the above resolution at its meeting held December 5, 2019.

WITNESS:

Sharon E. Robeson
Program Assistant
PlanRVA

BY:

Chet Parsons
Secretary
Richmond Regional Transportation Planning Organization

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Introduction

The Richmond Regional Transportation Planning Organization (RRTPO) identified the opportunity in the FY19 Unified Planning Work Program (UPWP) to assess park and ride needs and develop an investment strategy to advance park and ride projects at a regional level. The development of a regional park and ride investment strategy was specifically called for in the UPWP under the focal area of "expanding access to transit through multimodal connectivity and park and ride projects" and is intended to inform the RRTPO's next Long-Range Transportation Plan.

The purpose of the resulting *Richmond Regional Park and Ride Investment Strategy* study is to form the foundation for leveraging park and ride lots in the Richmond region as part of a larger travel demand management strategy. This study assessed existing conditions and existing needs, identified potential future needs, developed project recommendations, and identified implementation strategies to advance and promote park and ride projects in the Richmond region.

Previous statewide efforts were conducted to identify and evaluate park and ride needs. This study adds a regional perspective and builds upon these statewide studies. Relevant previous statewide studies included:

- The *VDOT Statewide Park and Ride Study (2013)* - conducted a statewide inventory of existing park and ride lots; identified recommendations for new, expanded, or closed park and ride lots; conducted a statewide survey to understand characteristics of park and ride users; and assisted VDOT with public outreach and awareness of park and ride facilities.
- The *VDOT Park and Ride Investment Strategy (2016 and 2018 update)* - compiled park and ride project recommendations from each of the VDOT districts, developed a project prioritization process, and scored and ranked projects to develop an investment strategy for each district.

The types, sizes, and features of a park and ride lot vary depending on many factors including demographics, land use, and travel patterns. Since these factors differ throughout Virginia, regional park and ride priorities can be fine-tuned within the statewide framework. Previous statewide studies evaluated park and ride lots using a single methodology statewide. This statewide methodology prioritized projects based on population density, traffic volumes, traffic congestion, and proximity to existing park and ride facilities. The *Richmond Regional Park and Ride Investment Strategy* builds upon these previous studies by identifying and validating park and ride projects to align with regional needs. The study considers factors such as proximity to transit, demographics, land use, and travel patterns, in addition to factors considered in the statewide study. The result of this study was a regional strategy for park and ride in the Richmond area that provides jurisdictions with the foundation and support to advance park and ride projects locally.

A Study Advisory Group (SAG) was formed for this study to help inform the development of the regional strategy for park and ride in the Richmond area. SAG members provided regional perspectives, participated in project meetings, reviewed technical memorandums, and provided feedback to help identify park and ride needs and develop project recommendations. SAG members included representatives from the following jurisdictions and agencies:

- Town of Ashland
- Charles City County
- Chesterfield County
- Goochland County
- Hanover County
- Henrico County
- New Kent County
- Powhatan County
- City of Richmond
- Greater Richmond Transit Company (GRTC)
- RideFinders, Inc.
- Virginia Department of Rail and Public Transportation (DRPT)
- Virginia Department of Transportation (VDOT)

The effort for this study was completed in four stages, all of which included input from the RRTPO and SAG members. Technical memorandums were prepared at the end of each stage and covered the following topics:

- Technical Memo I – Existing Conditions and Existing Needs
- Technical Memo II – Future Needs
- Technical Memo III – Project Recommendations
- Technical Memo IV/V – Implementation Strategy and Funding

This final report is a compilation of the results presented in the four technical memorandums.

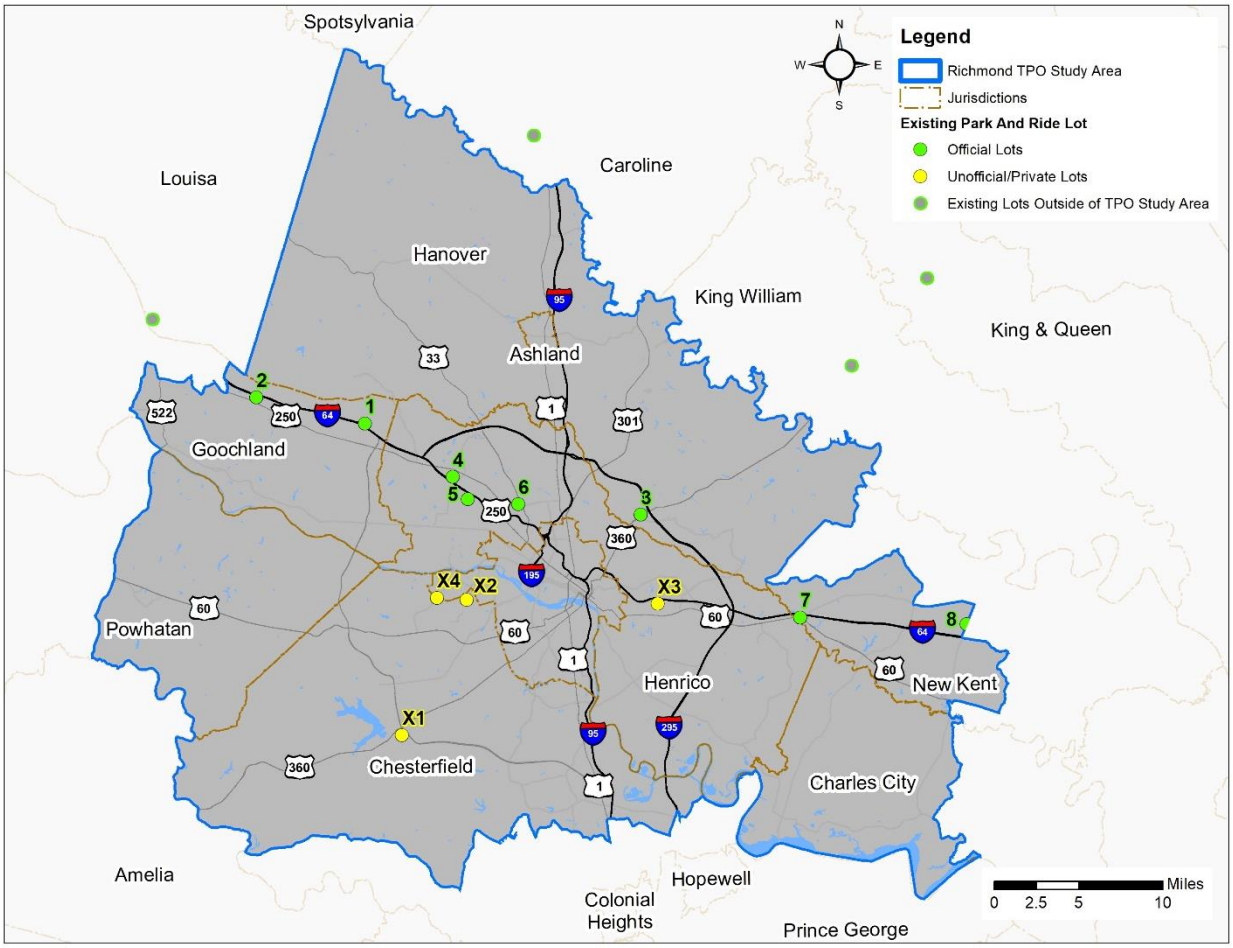
A story map accessible from the PlanRVA web site serves as an Executive Summary for this report.

Existing Conditions

Existing Park and Ride Inventory

As of November 2018, eight official, park and ride lots exist within the RRTPO study area boundary. In addition, four additional "unofficial" lots (private lots at which agreements are in place to allow commuter parking) are also present in the study area. While the official lots are primarily located along I-64 and northeast of the center of the City of Richmond, the unofficial lots are primarily found south of I-64. **Figure 1**, **Table 1**, and **Table 2** summarize the existing park and ride lots within the study area.

Figure 1: Existing Official and Unofficial Park and Ride Lots



Data on the number of parking spaces and weekday occupancy of the official lots and unofficial lots located at churches was gathered through an inventory and usage survey completed by VDOT for the Richmond region in the fall of 2018. The official lots in the Richmond region range in size from 34 spaces at the New Kent County Public Works lot to 534 spaces at the Gaskins Road lot in Henrico County. VDOT's survey found the occupancy of most of the official park and ride lots in the Richmond region to be about 50% full, with the exception of two lots that were at or close to capacity (Hickory Haven in Goochland County and Bottom's Bridge in New Kent County) and two lots that were less than 20% full (Parham Road in Henrico County and New Kent County Public Works lot). Space count and occupancy

data was not collected by VDOT for the other two unofficial lots since these lots share spaces with other private users.

Table 1: Official Park and Ride Lots

	Lot Name	Lot Location	Parking Spaces	2018 Occupancy (Spaces Filled)
Goochland County				
1	Hickory Haven	I-64 Exit 173 (Route 623)	109	91 (83%)
2	Oilville	I-64 Exit 167 (Route 617)	72	36 (50%)
Hanover County				
3	Mechanicsville	I-295 Exit 37 (US 360)	89	38 (43%)
Henrico County				
4	Gaskins Road	I-64 Exit 180 (Gaskins Road)	534	280 (52%)
5	Parham Road	I-64 Exit 181 (Parham Road)	313	55 (18%)
6	Glenside Drive - Dumbarton	I-64 Exit 183 (Glenside Drive) & Exit 185 (Staples Mill Road)	468	198 (42%)
New Kent County				
7	Bottoms Bridge	I-64 Exit 204 (US 60 & Route 33)	40	40 (100%)
8	New Kent County Public Works	I-64 Exit 214 (Route 604 & Route 155)	34	1 (3%)*

Source: VDOT Park and Ride Inventory and Usage Study (parking spaces and 2018 occupancy data collected Fall 2018).
*Lot 8 data based on inventory completed in January 2019.

Ownership and maintenance responsibilities vary between park and ride lots. Six of the official park and ride lots are owned and maintained by VDOT. The Gaskins Road lot is owned by VDOT but maintained by Henrico County, and the Glenside Drive-Dumbarton lot is owned and maintained by Henrico County.

Table 2: Unofficial/Private Park and Ride Lots

	Lot Name	Lot Location	Parking Spaces	2018 Occupancy (Spaces Filled)
Chesterfield County				
X1	Commonwealth 20	US 360 (Hull Street) & Route 288	N/A	N/A
X2	Bon Air Baptist Church	Forest Hill Avenue and Huguenot Road	72	41 (57%)
Henrico County				
X3	White Oak Village	I-64 Exit 195 (Laburnum Avenue)	N/A	N/A
City of Richmond				
X4	Huguenot United Methodist Church	Route 147 (W. Huguenot Road) & Old Gun Road	12	12 (100%)

Source: VDOT Park and Ride Inventory and Usage Study (parking spaces and 2018 occupancy data collected Spring 2019). Space count and occupancy data was not collected for Commonwealth 20 and White Oak Village lots since these lots share spaces with other private users.

Programmed Park and Ride Lots

Two additional lots in the RRTPO study area are programmed to be built in the future. For both lots, local jurisdictions applied for and were selected for SMART SCALE funding[1]. **Figure 2** and **Table 3** show these additional lots within the study area. Both programmed lots are located in Chesterfield County and together are planned to add approximately 250 park and ride spaces by 2028.

[1] The two programmed park and ride lots in Chesterfield County were funded during Round II of SMART SCALE. In Round III, awarded in June 2019, a park and ride lot with 10 spaces in Henrico County was funded, as were bike parking improvements at the existing Parham Road lot. Analysis for this study was performed prior to the approval of funding for these projects by the Commonwealth Transportation Board and, as a result, does not include the Round III funded projects.

Figure 2: Existing and Programmed Park and Ride Lots

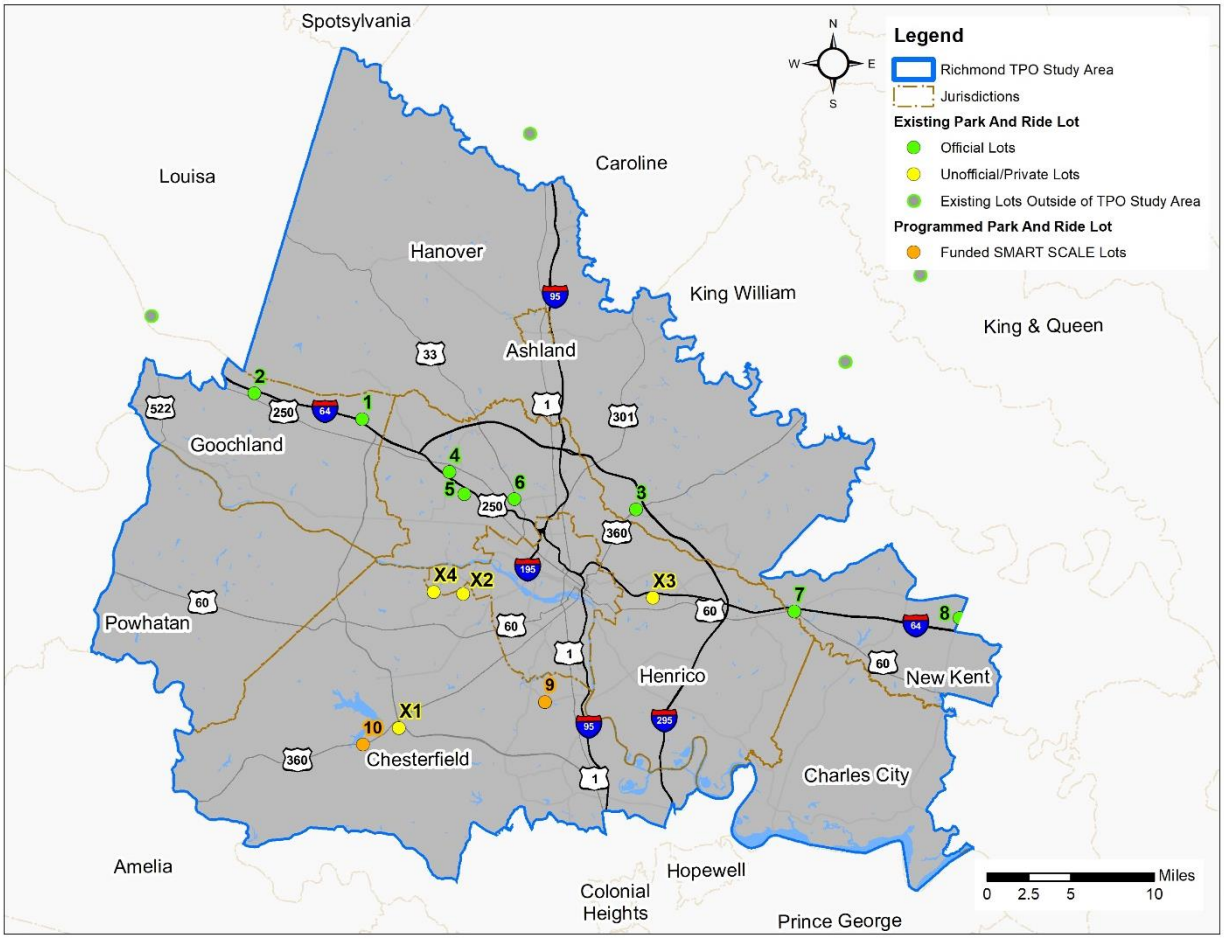


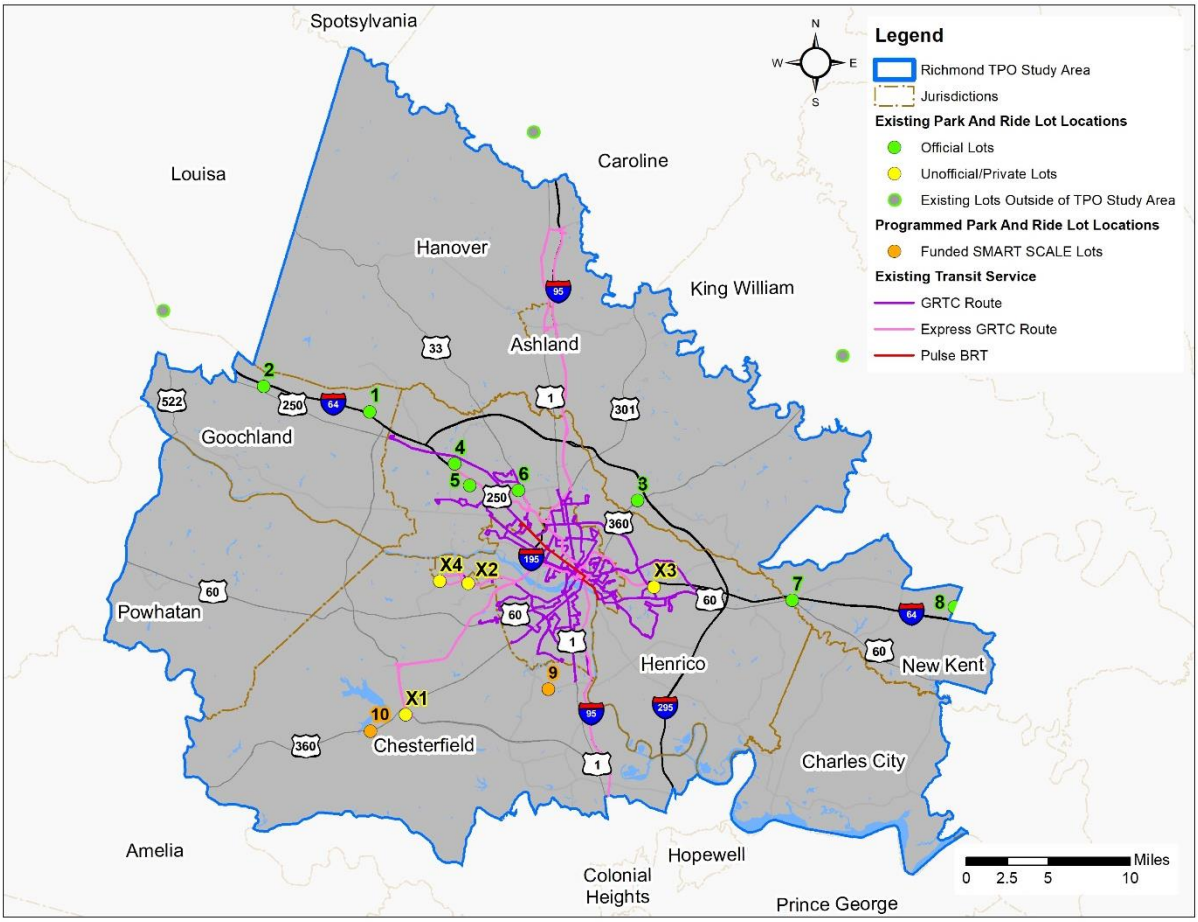
Table 3: Funded SMART SCALE Park and Ride Projects

	Project Name	Lot Location	Proposed Spaces	Anticipated Completion
Chesterfield County				
9	Cogbill/Hopkins/Chippenham – Park and Ride	Route 150 (Chippenham Parkway) & Route 637 (Hopkins Road)	118	2024
10	SB Route 288 to WB US 360 Off Ramp, US 360 Park and Ride	US 360 (Hull Street) at Chesterfield Career and Technical Center	128	2028

Existing Transit Service

The Greater Richmond Transit Company (GRTC) operates transit service in and around the City of Richmond[2]. Local bus routes are primarily concentrated within the City limits, operating routes throughout the weekday and some routes on weekends. Express routes extend into the surrounding counties and operate primarily during the weekday peak commute hours and in the commute direction (into Richmond during the morning and out of Richmond in the afternoon). The recently opened GRTC Pulse Bus Rapid Transit (BRT) operates frequent, limited-stop service along Broad Street and Main Street, from Rocketts Landing to Willow Lawn during weekdays and weekends. Existing transit service within the study area is shown in **Figure 3** and **Table 4**.

Figure 3: Existing and Programmed Park and Ride Lots with Existing Transit Services



Three official park and ride lots are within ¼-mile of existing transit routes, Gaskins Road, Parham Road, and Glenside Drive – Dumbarton. These lots (numbers 4, 5, and 6 on Figure 3) are all located in Henrico County in close proximity to I-64 and all serve express transit routes with connections to downtown Richmond. In addition, all four unofficial lots in the study area are also connected to transit. Potential opportunities to fill gaps in the existing park and ride network in relation to the transit network, include

[2] Full GRTC system map: http://ridegrtc.com/media/routes/F_GRT_Msys_32.75x65_180914_.pdf

route termini for the Pulse BRT (Willow Lawn and Rocketts Landing) and along local routes with frequent service.

Table 4: Existing Park and Ride Lots within 1/4-Mile of Existing Transit Routes

	Lot Name	Transit Route(s)
Henrico County		
4	Gaskins Road	GRTC 29x – Gaskins Express
5	Parham Road	GRTC 23x – Glenside/Parham Express GRTC 26x – Parham Express
6	Glenside Drive - Dumbarton	GRTC 23x – Glenside/Parham Express GRTC 27x – Glenside Express
X3	White Oak Village	GRTC 7B – Nine Mile Henrico GRTC 28x – White Oak Village Express GRTC 56 – South Laburnum GRTC 91 – Laburnum Connector
Chesterfield County		
X1	Commonwealth 20	GRTC 82x - Commonwealth 20 Express
X2	Bon Air Baptist Church	GRTC 64x – Stony Point Express
City of Richmond		
X4	Huguenot United Methodist Church	GRTC 64x – Stony Point Express

Existing Vanpool Service

Park and ride lots are a common place for vanpools to assemble. Based on data provided by RideFinders, as of October 2018, 81 vanpools originate in the RRTPO study area with approximately 595 participants. It should be noted the number of vanpools and participants varies depending on the day, week, and month. **Figure 4** shows the vanpool origin locations in the study area, many of which meet at an existing park and ride lot. Six of the seven official and two of the four unofficial lots serve as origins for at least one vanpool.

Many vanpools meet at origin points in the Richmond area and travel long distances north to Washington, DC and Northern Virginia while others are destined for locations in the Richmond region and other places in Virginia. **Table 5** shows the breakdown on RRTPO study area vanpools by their destination region. Approximately 14% of vanpools are destined to locations within RRTPO boundaries.

Figure 4: Existing and Programmed Park and Ride Lots with Existing Vanpool Origin Locations

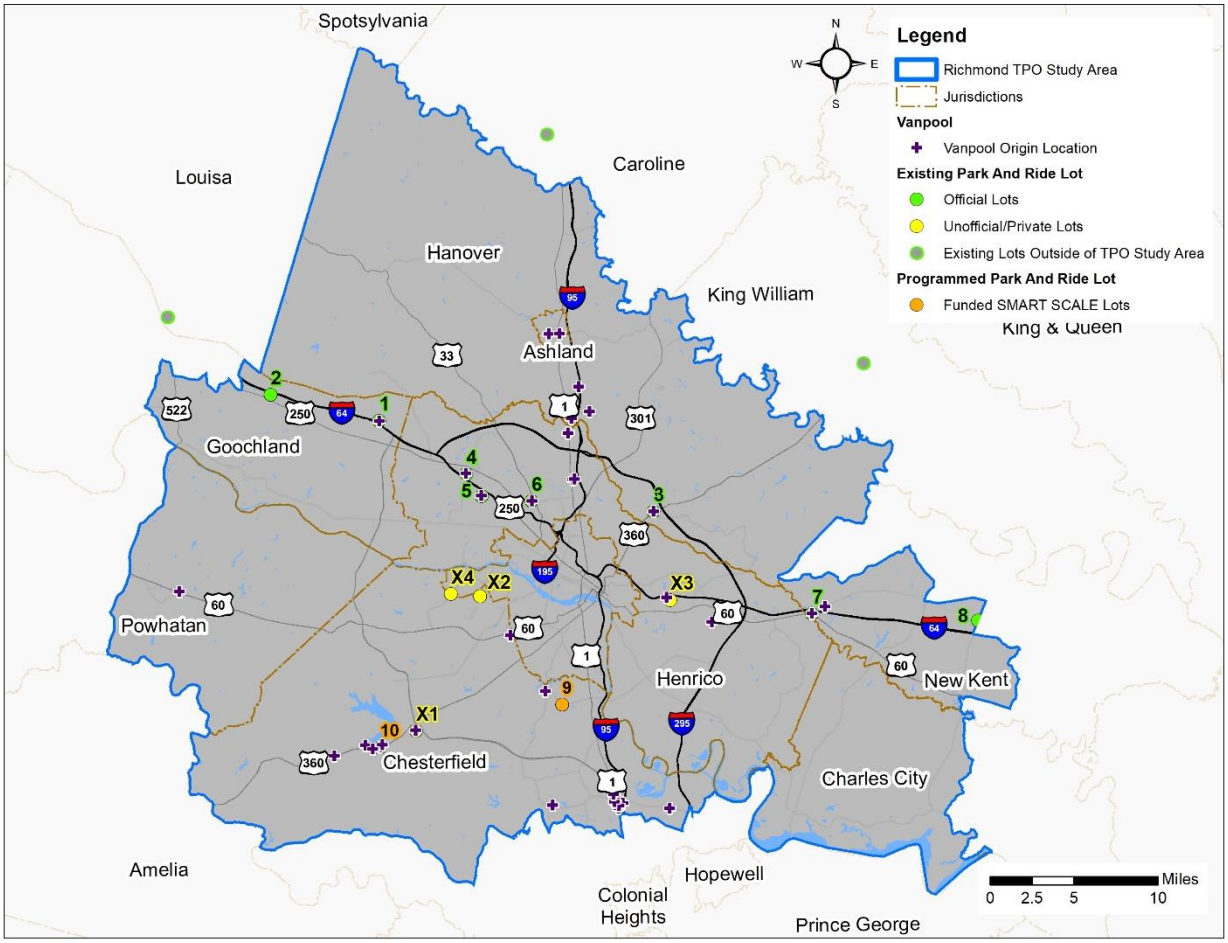


Table 5: Existing RRTPO Vanpool Destination Regions

Destination Region	Number of Vans	Number of Passengers
RRTPO	11	84
Northern Virginia	24	159
Washington D.C.	23	215
Other Virginia - North of RRTPO	13	74
Other Virginia - West of RRTPO	7	42
Other Virginia - East of RRTPO	3	21
Total	**81**	**595**

Source: RideFinders, October 2018

Locations at which clusters of vanpools originate may be potential indicators of a need for a park and ride lot. Three such locations include:

- Along US Route 360 in Chesterfield County
- Along I-95 corridor in the vicinity of Chester
- Along I-95 corridor between Richmond and Ashland

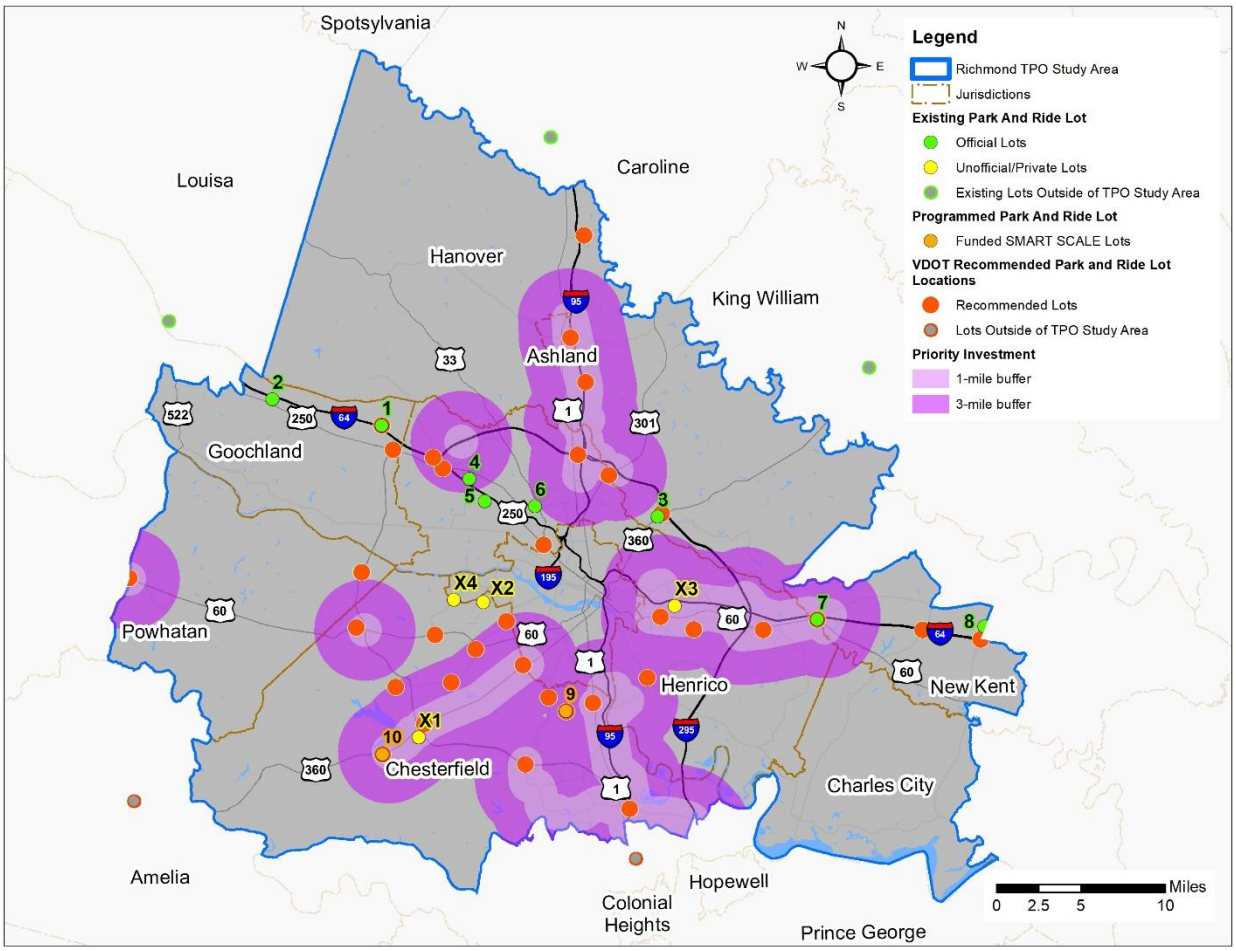
Existing Park and Ride Needs

Existing Park and Ride Project Recommendations

Previous planning efforts led by VDOT, and in coordination with regional partners, recommended new park and ride lots and improvements to existing lots within the study area. A total of 34 park and ride lot recommendations were identified in the study area as part of the *VDOT Park and Ride Investment Strategy*. These recommendations are shown in **Figure 5** and are listed in **Appendix A** and include lots located north of Richmond along I-95 and south of Richmond along Midlothian Turnpike (US 60), Hull Street Road (US 360), and Chippenham Parkway (Route 150). The two programmed lots that received SMART SCALE funding are included in this list of park and ride recommendations.

As part of the *VDOT Park and Ride Investment Strategy*, Priority Investment Areas (PIAs), geographic areas with a higher need for park and ride lots, were identified based on the convergence of population density, traffic volumes, and proximity to existing park and ride facilities. PIAs were developed to identify locations in each VDOT district where park and ride lots did not already exist that had the potential to serve greater numbers of people and have larger impacts on reducing congestion. As part of the ranking methodology employed in the *VDOT Park and Ride Investment Strategy*, park and ride recommendations within PIAs were given extra points that were not given to those located outside of the PIAs. As shown in **Figure 5**, 25 of 34 recommendations in the study area were located within 3 miles of the PIAs.

Figure 5: Existing, Programmed, and Recommended Park and Ride Lots

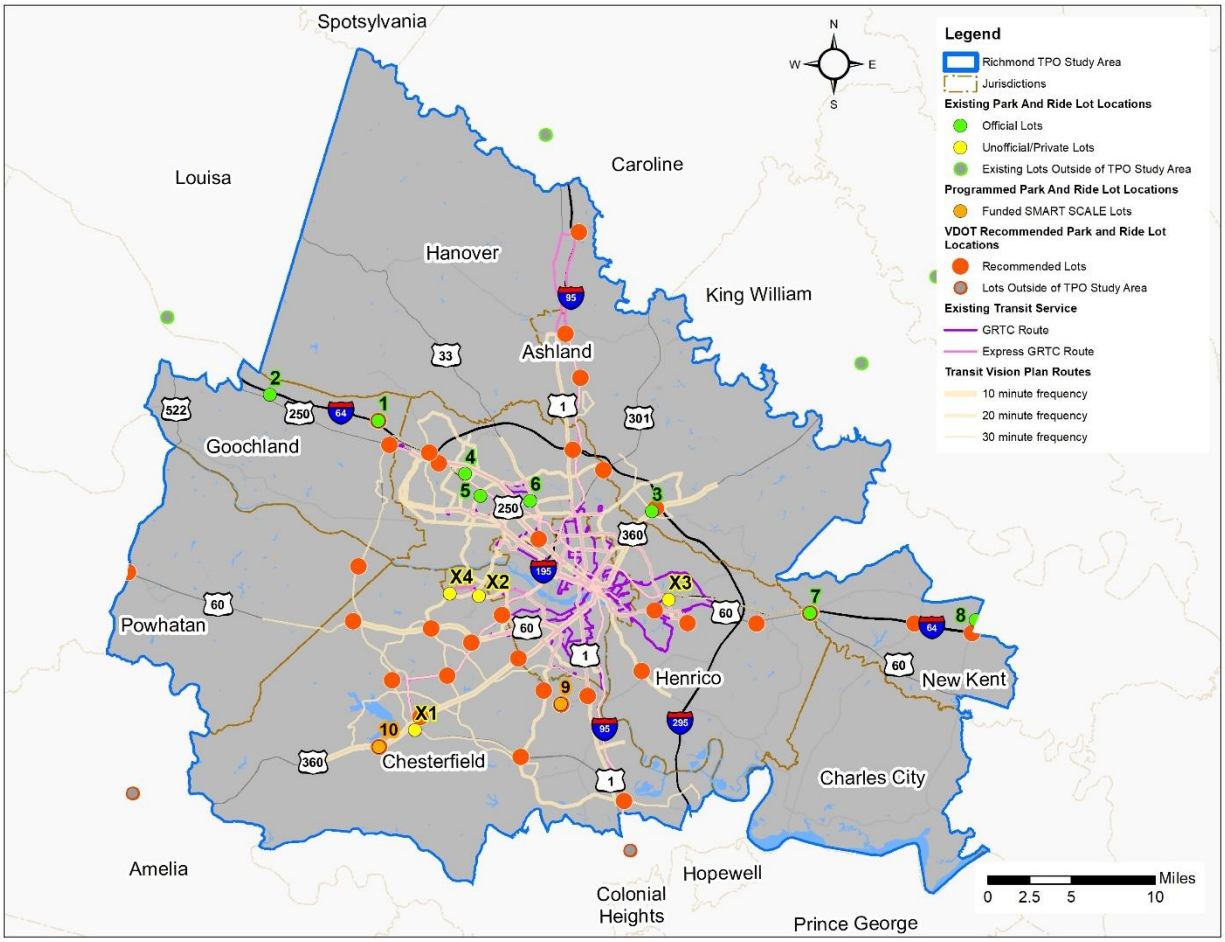


Planned Transit Service

Eleven of the recommended park and ride lots are located within ¼-mile of existing transit routes. Generally, these lots are located to the north of Richmond along I-95, west along Broad Street (US 250), south along Powhite Parkway (Route 76) and US 1, and east along Williamsburg Road (US 60).

The *Greater RVA Transit Vision Plan (transit2040)*, which identifies the future unconstrained regional transit network, proposes future transit routes that expand the existing network to provide greater geographic coverage and increased frequency. The implementation of *transit2040* would increase the number of recommended park and ride lots within a ¼-mile of transit to 27 out of a total 34 lots. This indicates that the recommended park and ride lots align geographically with the planned transit network, which allows for a high level of connectivity between both. The *transit2040* routes are shown in **Figure 6** with the thicker lines indicating the routes with the more frequent service.

Figure 6: Existing, Programmed, and Recommended Park and Ride Lots with Transit Vision Plan Routes

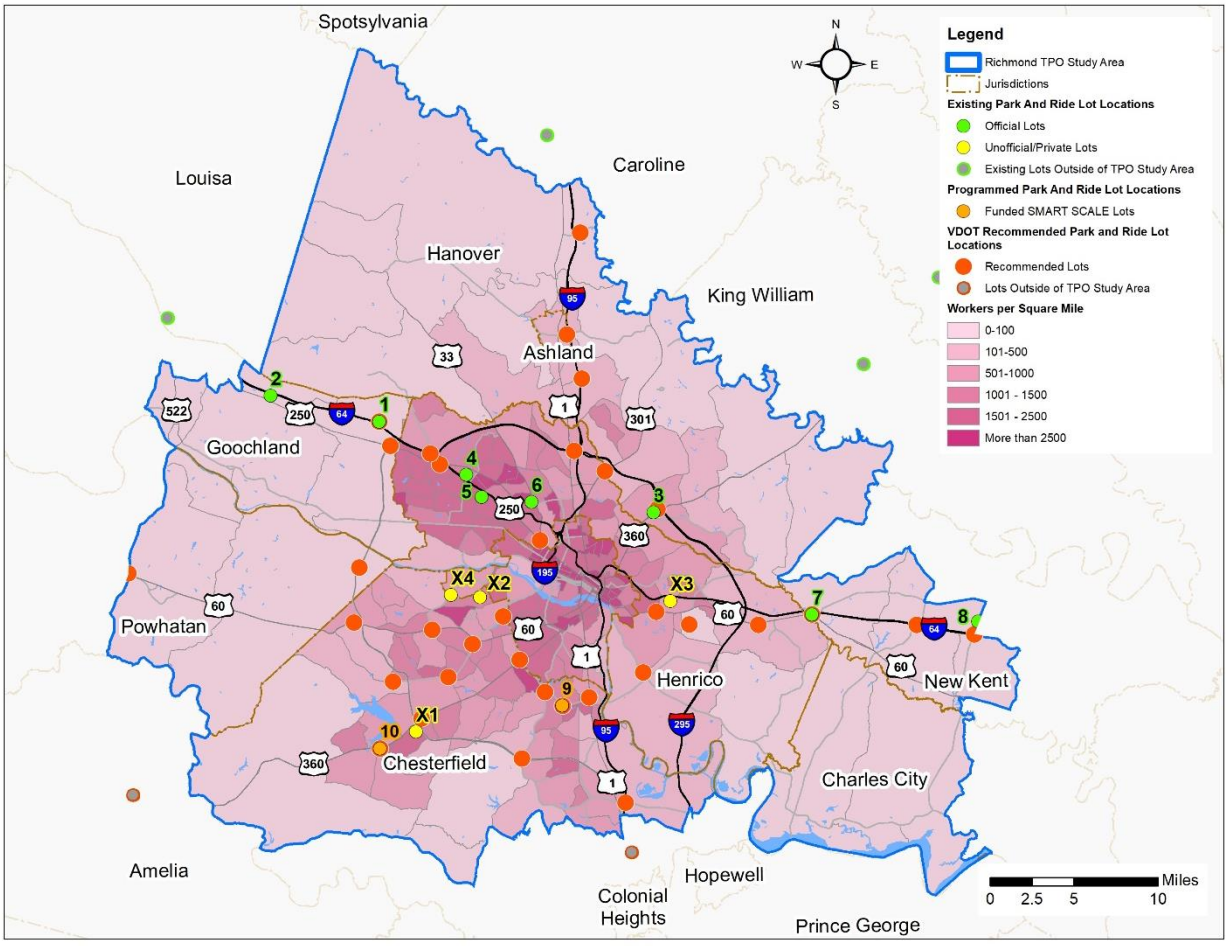


Regional Demographics

Worker Density

All existing, programmed, and recommended park and ride lots from the *VDOT Park and Ride Investment Strategy* are shown in **Figure 7** overlaid on a base map of worker density. Worker density corresponds to the number of employed people *living* in the area shown, rather than the number of people whose jobs are located in that area. Based on 2016 American Community Survey (ACS) 5-year estimate data, 32% of the working population is served by existing official and programmed park and ride lots[3]. When considering the existing, programmed, and recommended lots, 74% of the working population is served by park and ride lots. Generally, the census tracts with the highest density of working population are located along I-64 and southwest of Richmond, which aligns with the locations of many park and ride lot recommendations.

Figure 7: Existing, Programmed, and Recommended Park and Ride Lots with Worker Density



[3] For analysis purposes, the working population served by park and ride lots includes employed people who live within three miles of park and ride lots.

Environmental Justice Populations

All existing, programmed, and recommended park and ride lots from the *VDOT Park and Ride Investment Strategy* are shown in **Figure 8** overlaid on a base map of the concentration of environmental justice (EJ) populations. The EJ population concentration is based on an index considering individuals with disabilities, low-income households, elderly populations, limited English proficiency, non-white or Hispanic populations, and low vehicle ownership households. Concentrations are not weighted based on the number of people in a census tract and are compared to the study area average. The purpose of analyzing EJ concentrations is to provide fair treatment and meaningful involvement of all people regardless of race, color, national origin, or income, with respect to laws, regulations, and policies[4]. Using data from the 2016 ACS 5-year estimates, each census tract in the study area was compared to the average for the study area. **Table 6** summarizes the EJ analysis for the study area. Seven of ten existing or programmed lots are in areas with "highest" or "high" amounts of EJ populations. Recommended lot locations are more evenly distributed among the EJ densities while still having significant investment in higher EJ concentration areas.

[4] https://www.epa.gov/environmentaljustice

Figure 8: Existing, Programmed, and Recommended Lots with Concentration of Environmental Justice (EJ) Population

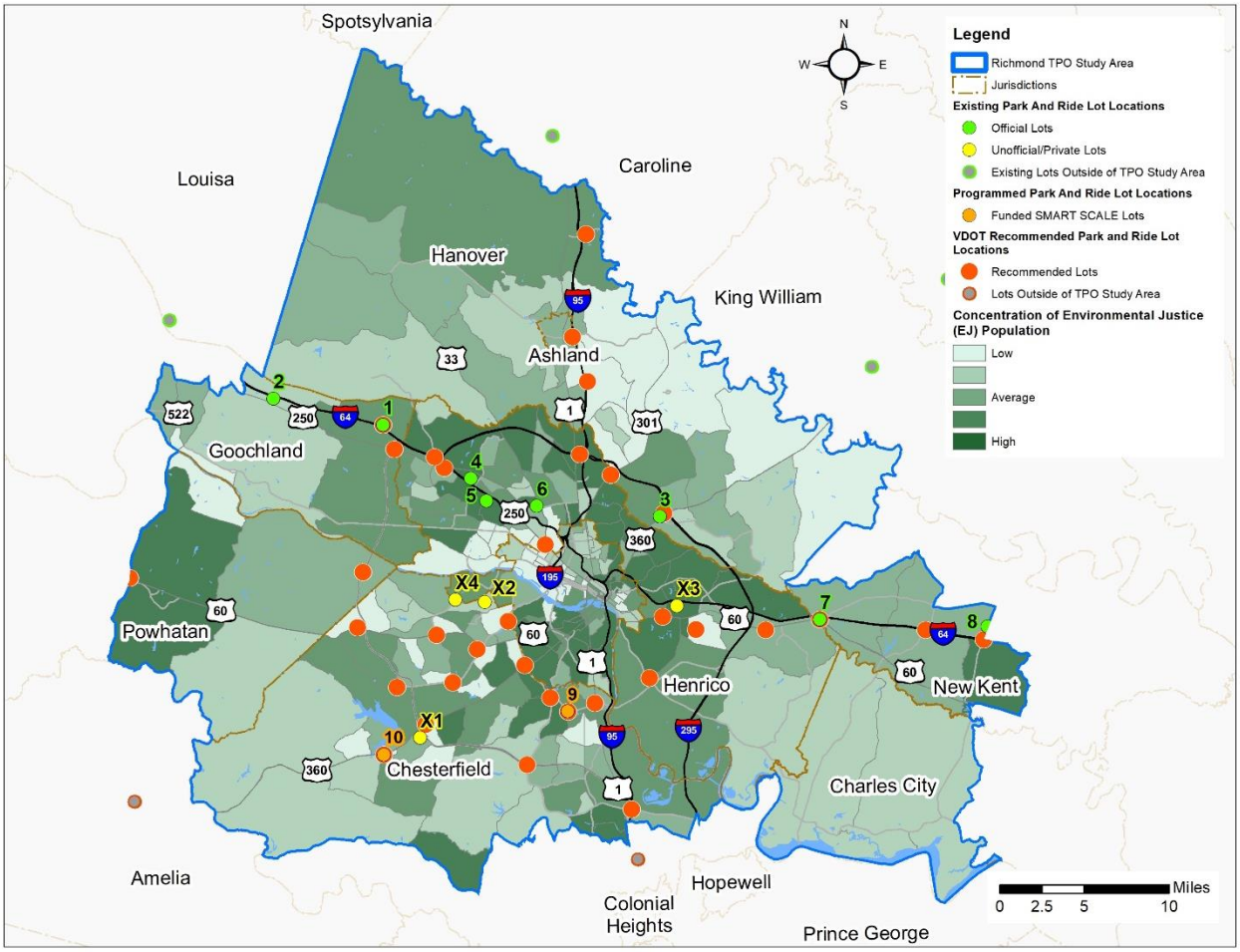


Table 6: Comparison of Park and Ride Lots to Concentration of EJ Populations

	EJ Population Concentration				
	Highest EJ Population	**High EJ Population**	**Average EJ Population**	**Low EJ Population**	**Lowest EJ Population**
Existing[5] and Programmed Lots	3	4	2	1	0
Recommended Lots	5	11	12	1	5
Total	**8**	**15**	**14**	**2**	**5**

[5] Does not included "unofficial" lots in analysis

Park and Ride Needs Evaluation Methodology

Purpose and Overview of Needs Evaluation

The purpose of the park and ride needs evaluation was to identify and evaluate potential locations for park and ride investments that align with regional needs. The methodology was highly data-driven but also allowed for adjustments to reflect the added value associated with certain locations that were not fully accounted for through the data analysis. This resulted in two primary phases of the needs evaluation methodology:

- **Phase I – Baseline Census Tract Scoring**
- **Phase II – Added-Value Adjustments**

In Phase I, scores were calculated for each census tract in the Richmond TPO for several data-driven evaluation factors. These factors and the specific evaluation methodologies are described in more detail in the following sections. The scores of all evaluation factors for a given census tract were combined into a single Phase I score and used to identify the initial high-priority park and ride investment areas.

In Phase II, additional high-priority park and ride investment areas were identified to account for added-value factors (factors that indicated a demonstrated need for park and ride in the area but may not have been fully accounted for through the data-driven methodology of Phase I). Added-value factors and additional high-priority locations were identified in collaboration with the SAG.

Needs Evaluation Goal Areas

For Phase I, park and ride needs were scored based on three goal areas. Each of these goal areas was comprised of two or more evaluation factors that could be measured using readily available data. A summary of the goal areas and factors in each goal area is provided below.

- **Goal 1: Multimodal Connectivity** – Provide an integrated multimodal network
  - Proximity to Existing Transit
  - Proximity to Proposed Transit
  - Proximity to Vanpool Origins
- **Goal 2: Access** – Serve the most people who can benefit from park and ride
  - Density of Working Population
  - Anticipated Population Growth
  - Single Occupancy Vehicle (SOV) Commuting Mode Split
- **Goal 3: Congestion Mitigation** – Reduce the demand on the roadway network
  - Commute Time
  - Priority Investment Area (PIA) as defined by the *VDOT Park and Ride Investment Strategy*

Each of the factors and the specific evaluation measurements are described in more detail in following sections.

Needs Evaluation Factor Scoring

In Phase I, each census tract in the study area was scored according to the evaluation factors described below. The following briefly summarizes the steps involved in the scoring process:

1. **Raw Score** – A raw score was calculated for each census tract for each factor (such as the working population density of a specific census tract).
2. **Factor Score** – Each census tract raw score was converted to a score out of 10 for each evaluation factor. The score out of 10 was based on a comparison of an individual census tract's raw score to the maximum raw score for all census tracts.
3. **Goal Area Score** – All the factor scores within a goal area were averaged together to get a score out of 10 for each goal area.
4. **Overall Score** – The three goal area scores were added together to get a total overall score out of 30 points.

Table 7 summarizes this scoring process. In this process each goal area was weighted equally in the overall score.

Table 7: Phase I Baseline Evaluation Scoring Summary (Census Tract Basis)

Goal Area	Factor	Max Factor Score	Max Goal Area Score	Max Overall Score
Multimodal Connectivity	Proximity to Existing Transit	10	10	30
	Proximity to Proposed Transit	10		
	Proximity to Vanpool Origins	10		
Access	Density of Working Population	10	10	
	Anticipated Population Growth	10		
	SOV Commuting Mode Split	10		
Congestion Mitigation	Commute Time	10	10	
	Priority Investment Area (PIA)	10		
		Factor scores averaged for each Goal Area	→	**Goal Area scores added to get Overall Score**

The maps in the following sections present the factor scores (step 2) for each of the evaluation factors as well as the overall score (step 4). These maps illustrate the census tracts scores, relative to each other, for individual factors and in aggregate for all goal areas.

Park and Ride Needs Evaluation Results

Phase I: Baseline Census Tract Scoring

The following sections describe each of the three goal areas and the associated evaluation factors. The tables in each section describe the factor, how it was measured, the data source, and also provide additional notes for clarification. The maps show the relative Phase I census tract scores for each of the evaluation factors.

Goal Area 1: Multimodal Connectivity

Park and ride lots are key elements in providing an integrated multimodal network. The three evaluation factors in this goal area aim to identify areas that would provide connections to existing transit, proposed transit routes, and locations at which vanpools originate. These represent potential ways that park and ride lots provide additional travel choices and support alternative modes of travel. **Table 8** summarizes the three multimodal connectivity evaluation factors.

Table 8: Multimodal Connectivity Evaluation Factors

Factor	Measurement	Data Source	Notes
Proximity to Existing Transit	Number of existing transit service termini	GRTC Existing Weekday/Saturday Route Termini (including Pulse BRT)	Score based on the number of routes that terminate in a given census tract.
Proximity to Proposed Transit	Number of proposed transit service termini	Proposed *transit2040* Route Termini	Score based on the number of routes that terminate in a given census tract.
Proximity to Vanpool Origins	Number of vanpool passengers originating	Vanpool Origin Location Data provided by RideFinders (October 2018).	Score based on the number of vanpool passengers originating in a given census tract to prioritize based on serving the most people. Note: The number of passengers is approximate and based on October 2018 data. Some (3 out of 81) vanpools did not have ridership data available.

For this goal area, census tracts received a higher score based on the number of connections (the number of transit route termini or the number of estimated vanpool passengers) in the census tract. A survey conducted in 2011 for the *VDOT Statewide Park and Ride Study* showed that approximately 90% of park and rider users in Central Virginia use park and ride lots as a location to park their vehicle and ride the bus or to carpool/vanpool. As a result, route termini were considered to identify potential lots at the “end-of-the-line”. **Figure 9**, **Figure 10**, and **Figure 11** illustrate the Phase I evaluation results for the multimodal connectivity evaluation factors.

Figure 9: Proximity to Existing Transit

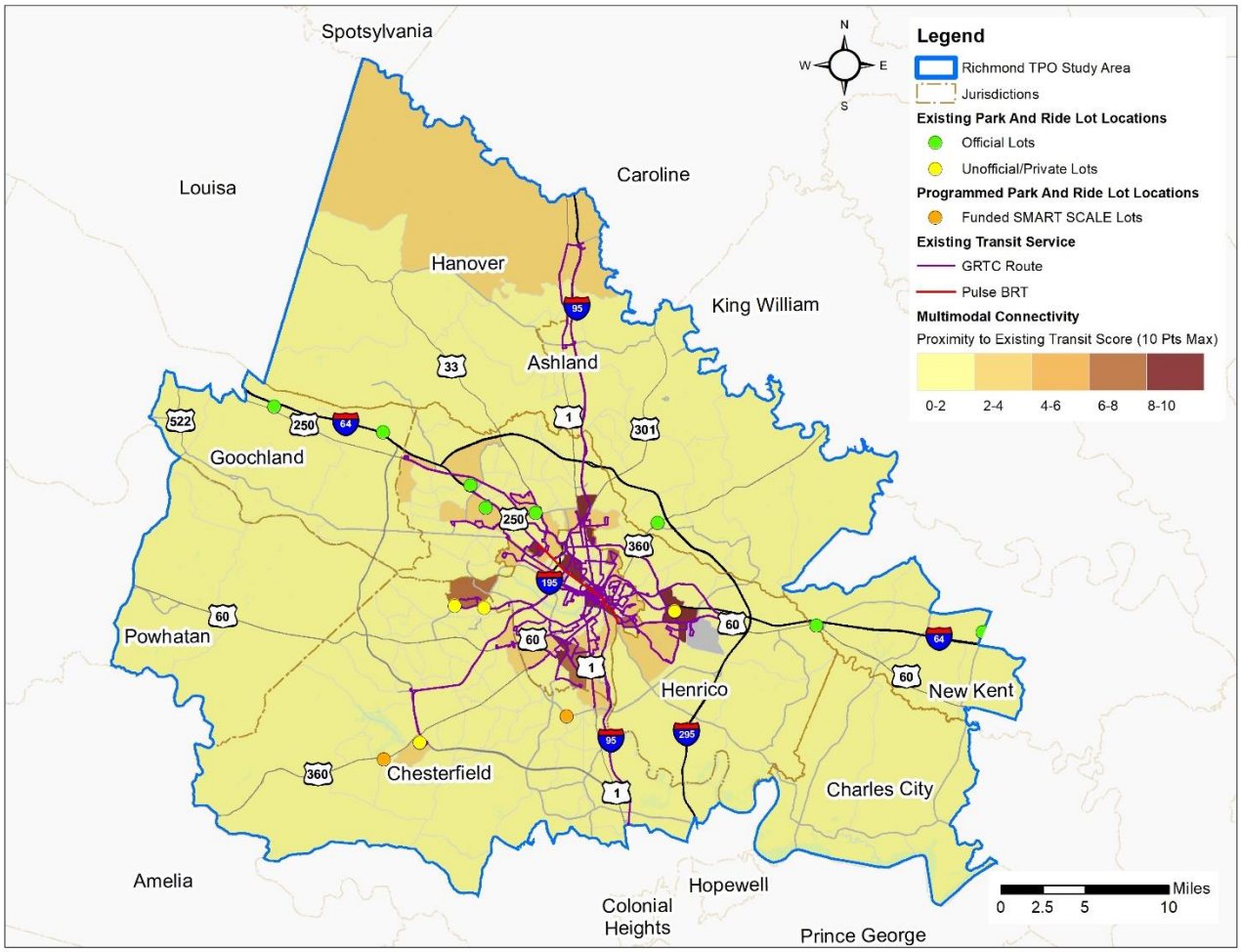


Figure 10: Proximity to Proposed Transit

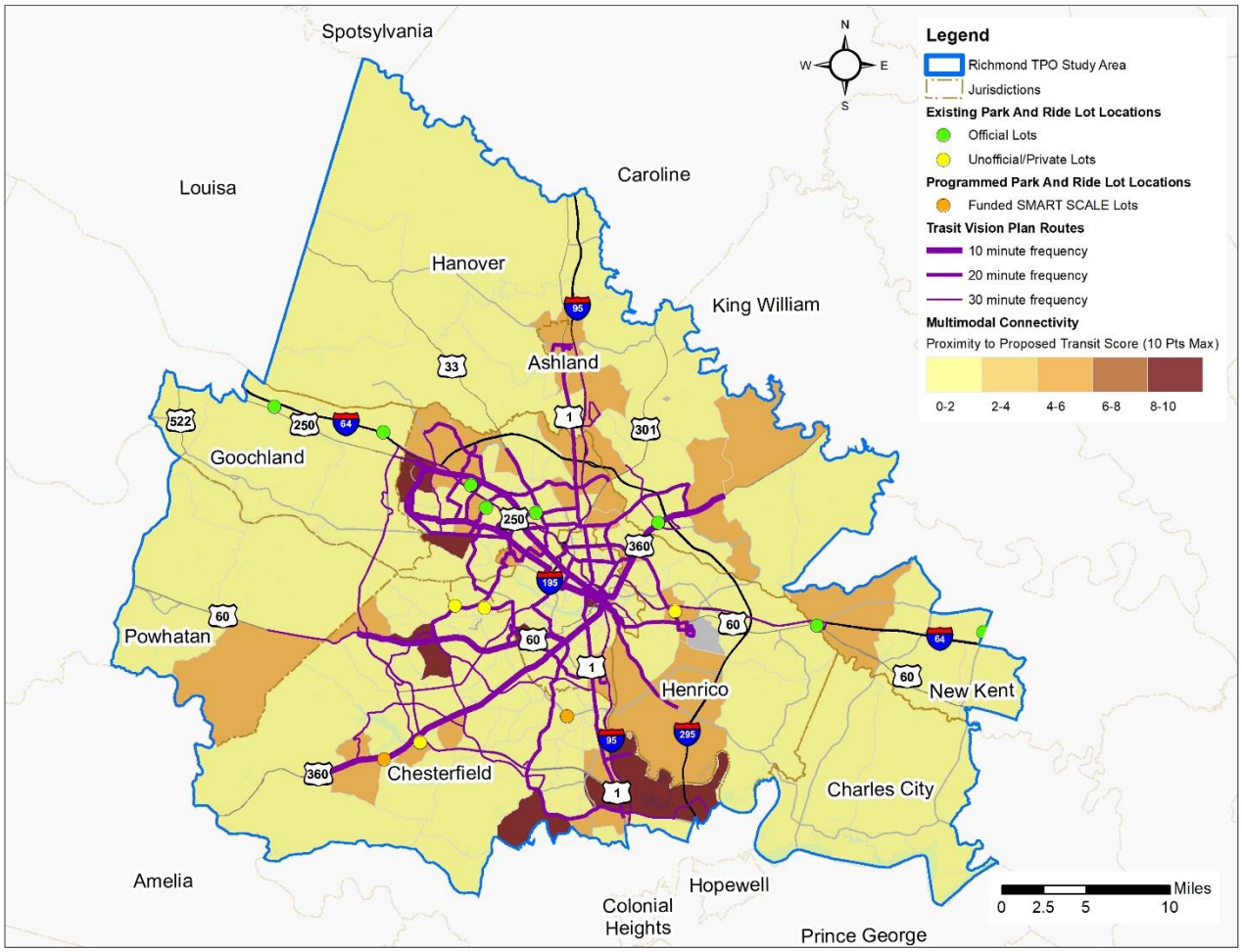
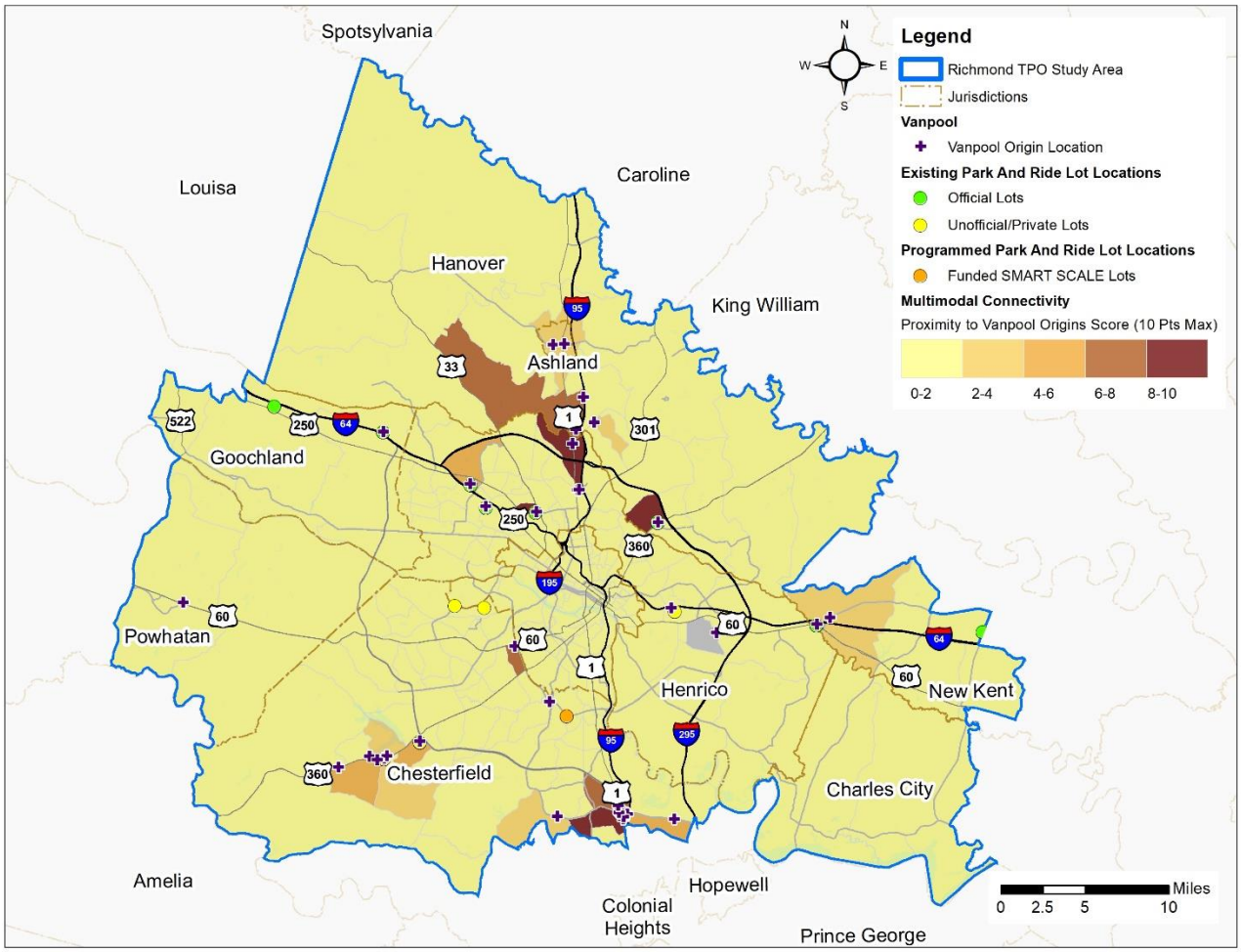


Figure 11: Proximity to Vanpool Origins



Goal Area 2: Access

The access goal area strives to identify areas in which park and ride investment would serve locations with the greatest number of people who need access to transportation options through park and ride lots. The three evaluation factors in this goal area identify the areas where the highest densities of workers live, the areas forecasted to experience significant population growth in the future, and the areas with the highest number of people who commute in single occupancy vehicles. **Table 9** summarizes the three evaluation factors included in the access goal area. **Figure 12**, **Figure 13**, and **Figure 14** illustrate the Phase I evaluation results for these factors.

Table 9: Access Evaluation Factors

Factor	Measurement	Data Source	Notes
Density of Working Population	Working population (all employed persons) per square mile (by census tract)	ACS: 2012-2016 5-Year Estimates (Table S2301)	Score based on existing conditions analysis. Same data shown in Figure 7. The average density in the study area is approximately 1,660 employed persons per square mile.
Anticipated Population Growth	Forecast residential growth percentage	RRTPO Population Forecasts by Traffic Analysis Zone (TAZ), 2012 and 2040 (October 2015)	Score based on forecast growth within a TAZ. The same score is applied to all census tracts within a TAZ. The average growth in the study area from 2012 to 2040 is approximately 37%. The darkest colored areas for this factor highlight areas that are forecast to grow at a rate more than double the average rate (on a percentage basis).
Single-Occupant Vehicle (SOV) Commuting Mode Split	Percentage of employed workers that drive alone to work	ACS: 2012-2016 5-Year Estimates (Table S0801)	Score based on percentage of people who drive alone to work. The average percentage in the study area is approximately 80%. This factor highlights areas where the largest percentage of workers drive alone to work. Areas with higher percentages of people who drive alone may represent potential target markets for travel behavior shift.

Figure 12: Density of Working Population

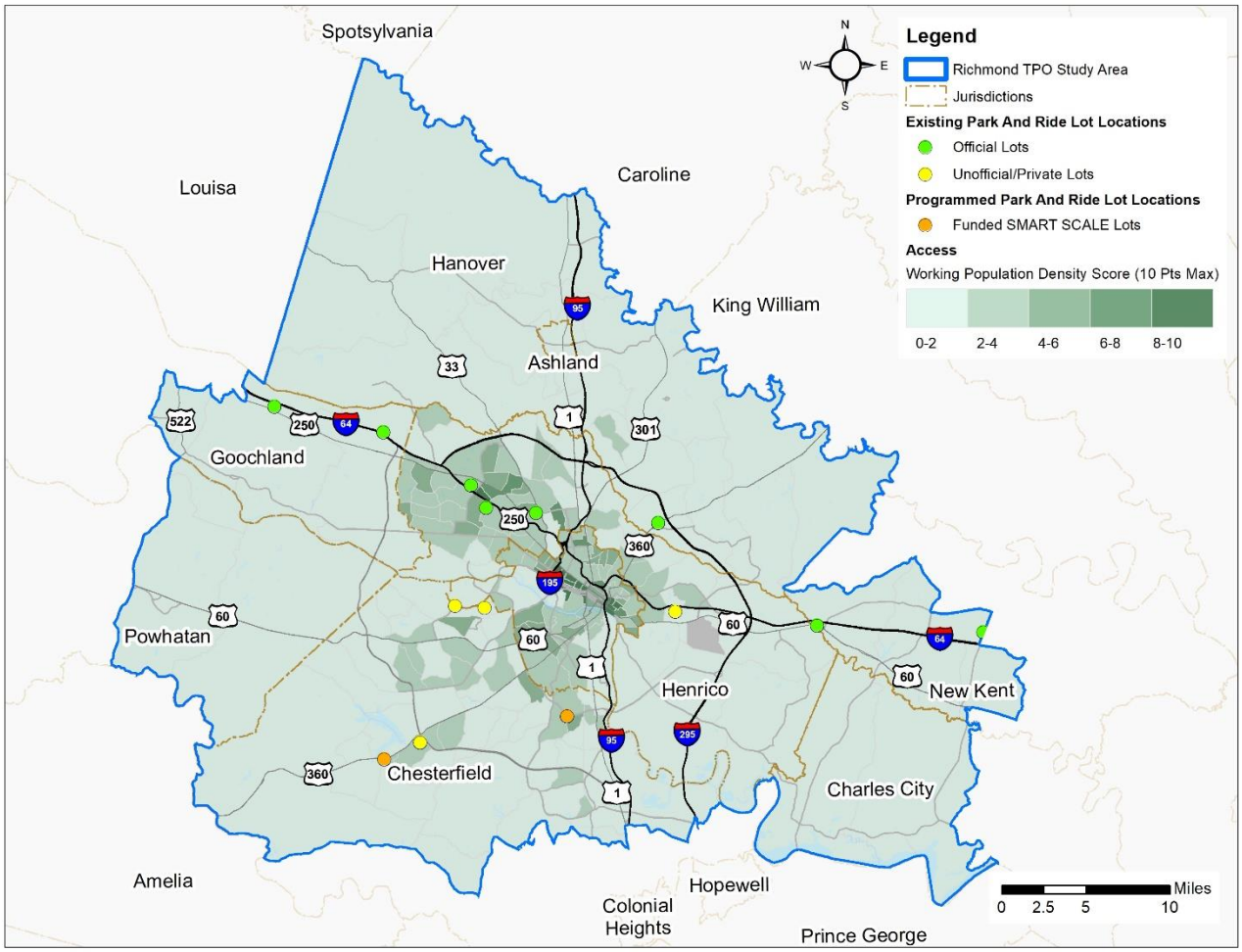


Figure 13: Anticipated Population Growth

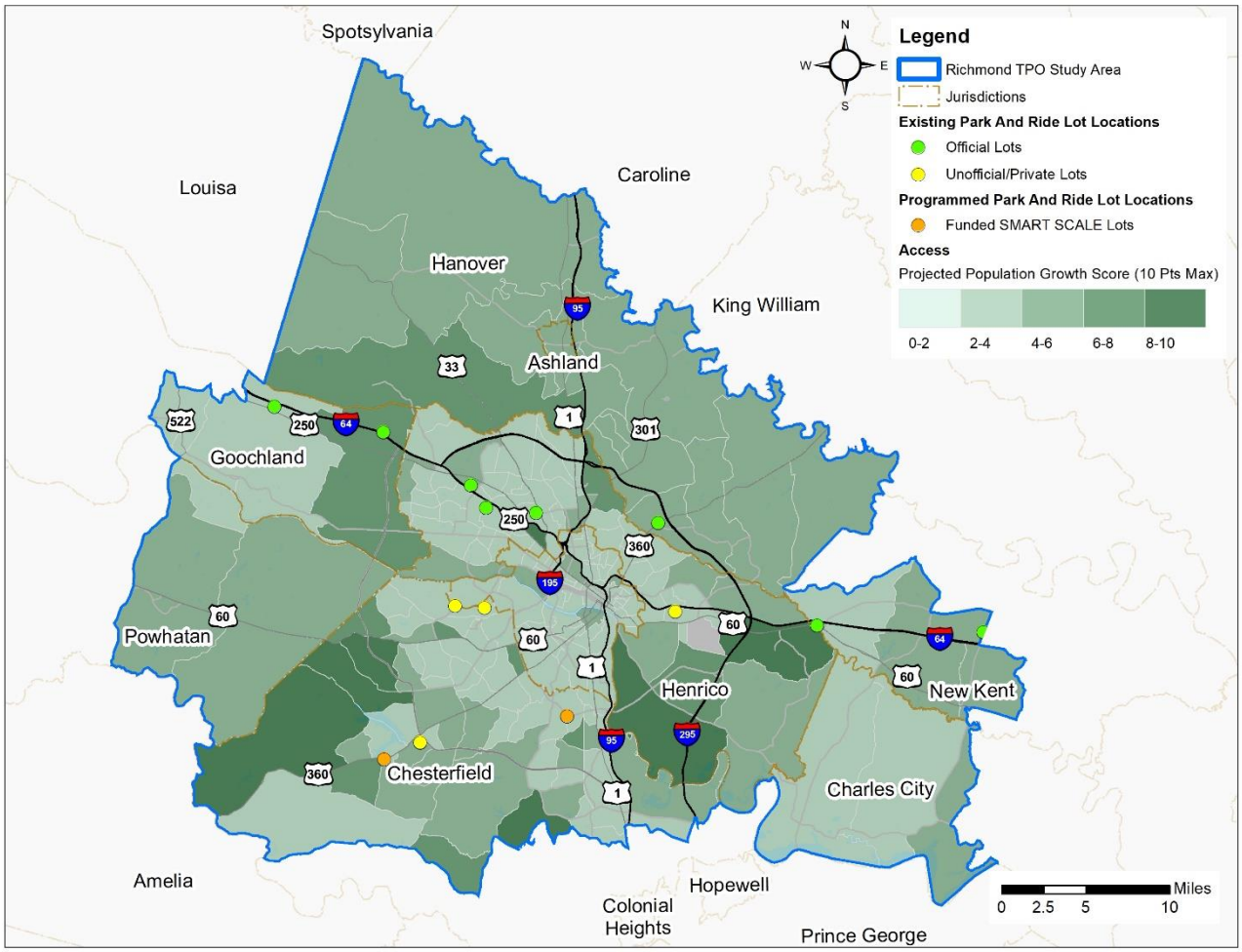
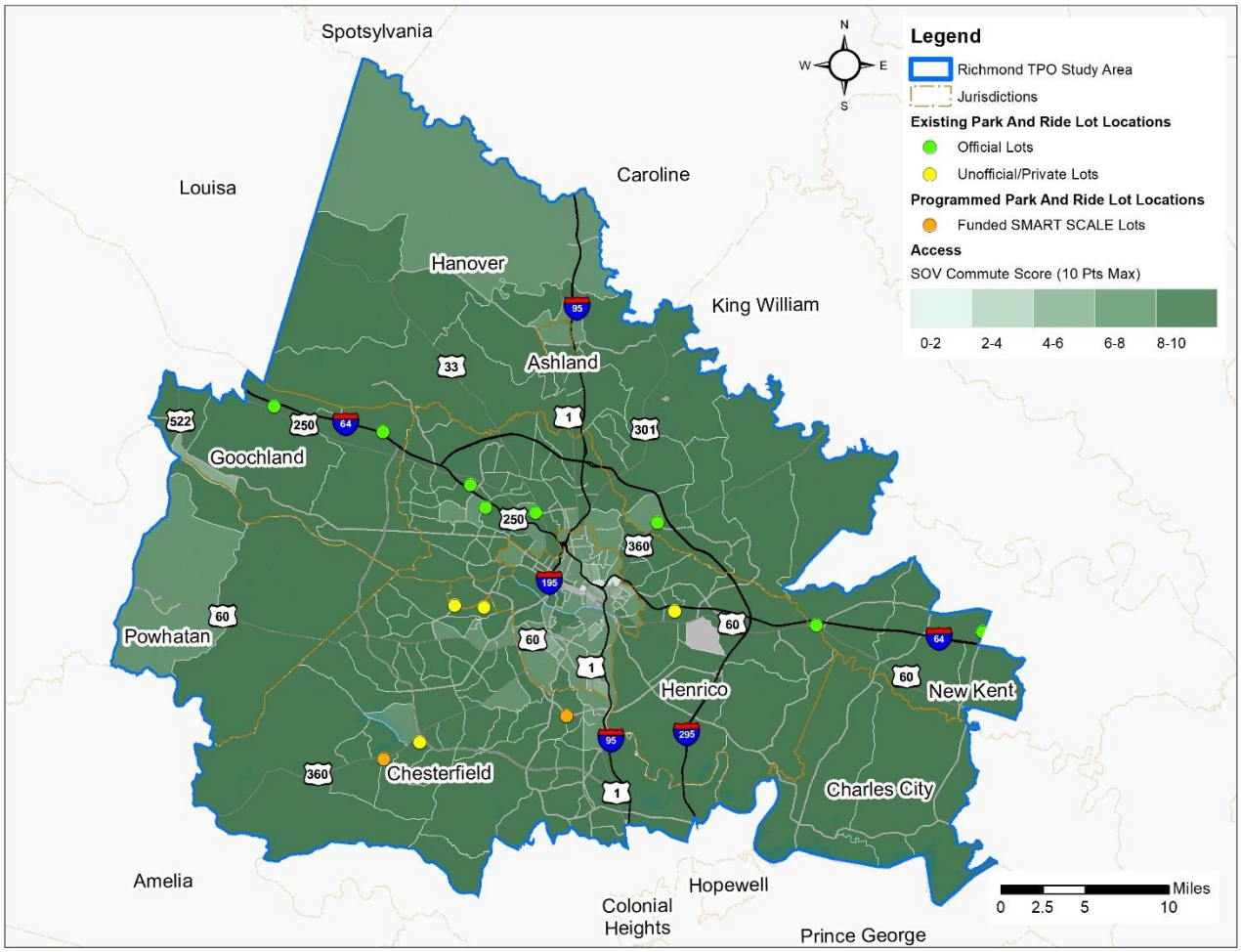


Figure 14: SOV Commuting Mode Split



Goal Area 3: Congestion Mitigation

The third goal area, congestion mitigation, focuses on reducing demand on the roadway network. The commute time evaluation factor identifies areas in which workers are traveling longer than average times to work. The Priority Investment Area (PIA) evaluation factor accounts for locations that were identified as part of the previous planning effort (VDOT Park and Ride Investment Strategy) based on the convergence of population density, traffic volumes, and proximity to existing park and ride facilities. PIAs were developed to identify locations in each VDOT district where park and ride lots did not already exist but offer the potential to serve greater numbers of people and have larger impacts on reducing congestion. **Table 10** summarizes the two congestion mitigation evaluation factors. **Figure 15** and **Figure 16** illustrate the Phase I evaluation results for these factors.

Table 10: Congestion Mitigation Evaluation Factors

Factor	Measurement	Data Source	Notes
Commute Time	Mean travel time to work (by census tract)	ACS: 2012-2016 5-Year Estimates (Table S0801)	Score based on mean travel time to work for a census tract. This factor helps to identify commuters with long commutes who would be more likely to use park-and-ride lots, including both commuters traveling long distances as well as commuters traveling shorter distances along congested routes. The mean commute time in the study area is approximately 24 minutes.
Priority Investment Area (PIA)	Percentage of census tract located within 3-mile buffer PIA	GIS analysis using the 3-mile buffer polygon created by previous VDOT efforts	Score based on 3-mile buffer PIAs developed for VDOT Park and Ride Investment Strategy. Scoring reflects the percentage of the census tract that overlaps with a 3-mile PIA buffer.

Figure 15: Commute Time

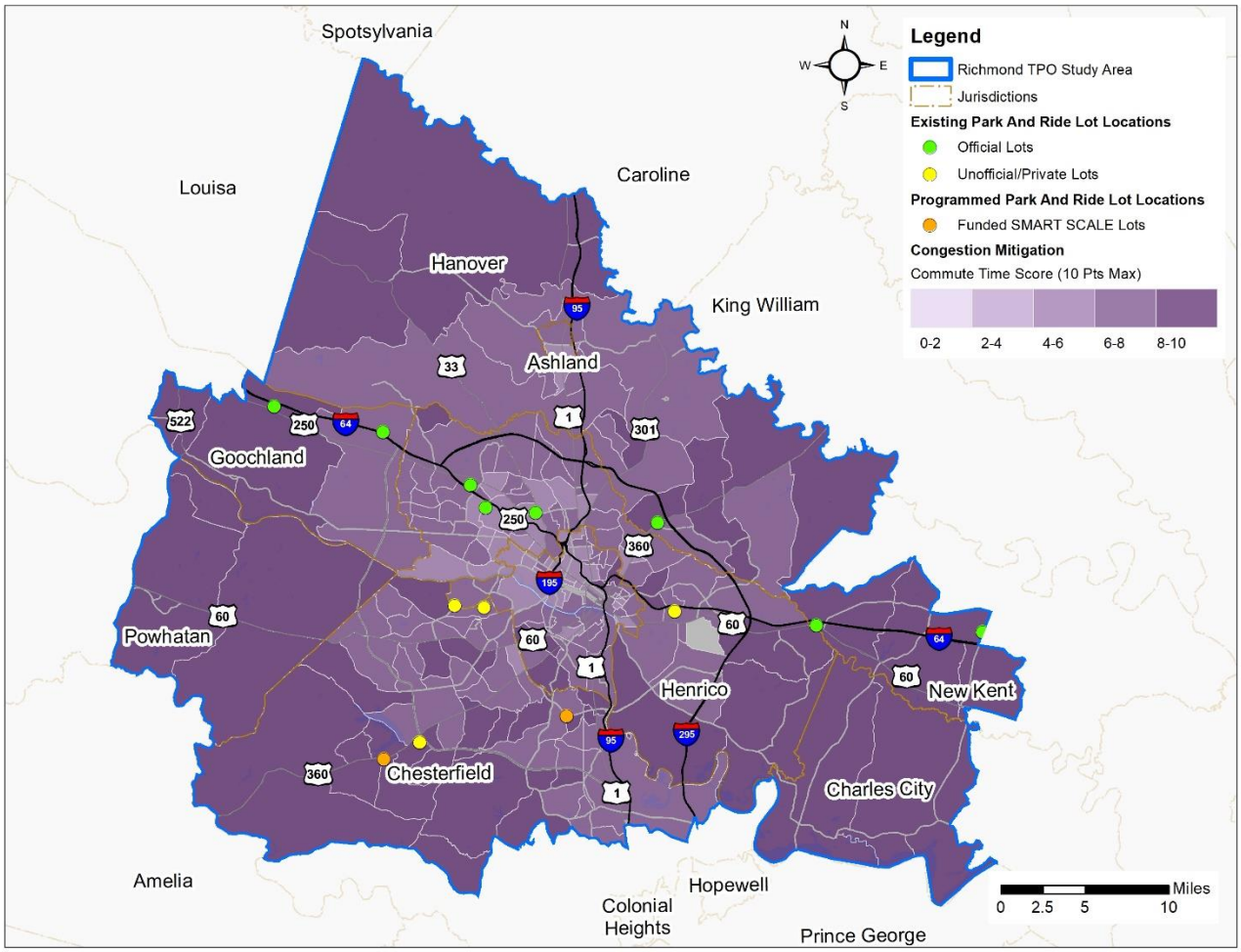
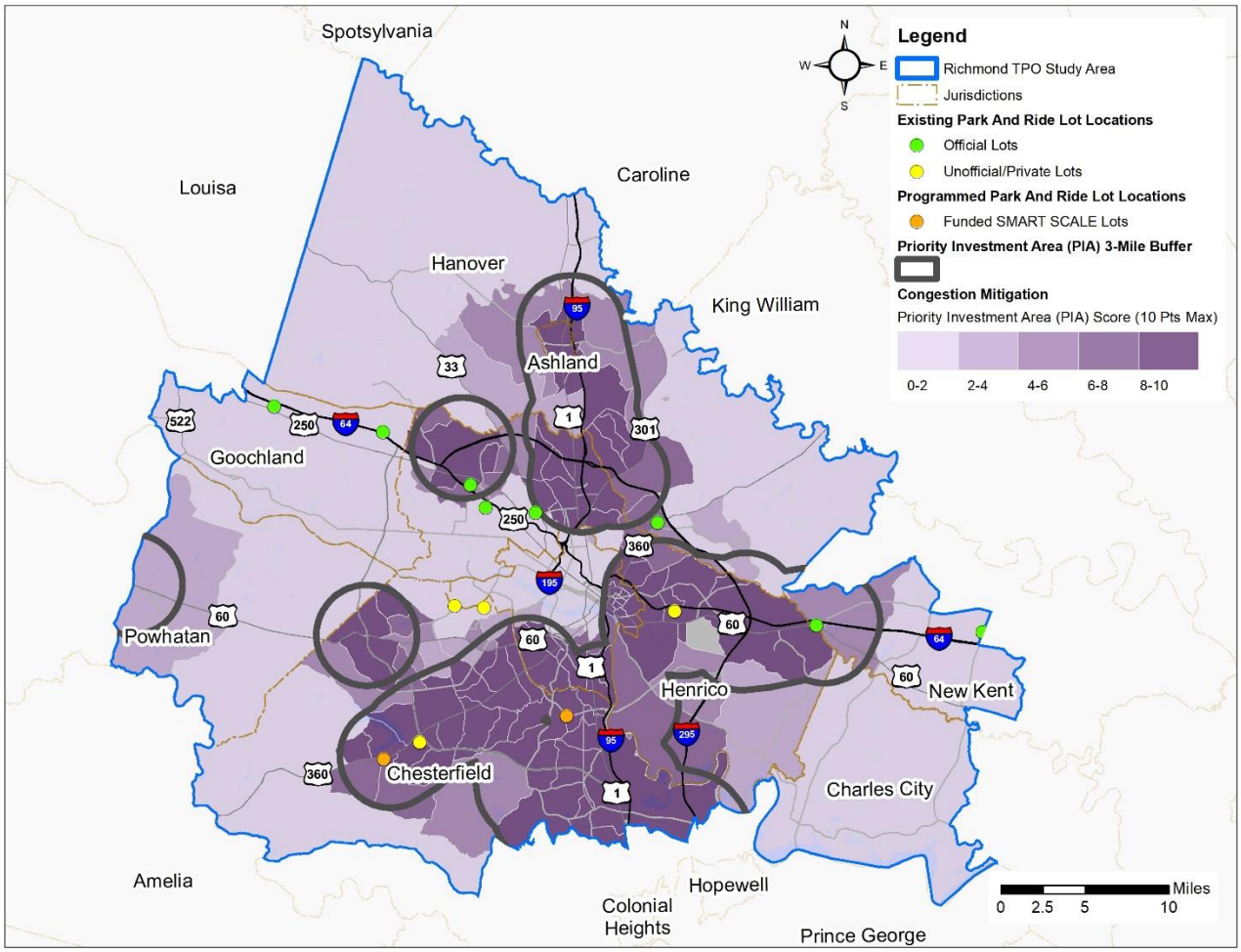


Figure 16: Priority Investment Areas



Overall Phase I Needs

As described in the scoring section, for each census tract, the three goal area scores (out of 10) were added together to get an overall score for Phase I (out of 30). The results of the Phase I evaluation are shown in **Figure 17** and the census tracts with the highest scores are highlighted in **Figure 18**.

Figure 17: Phase I Evaluation Baseline Scoring

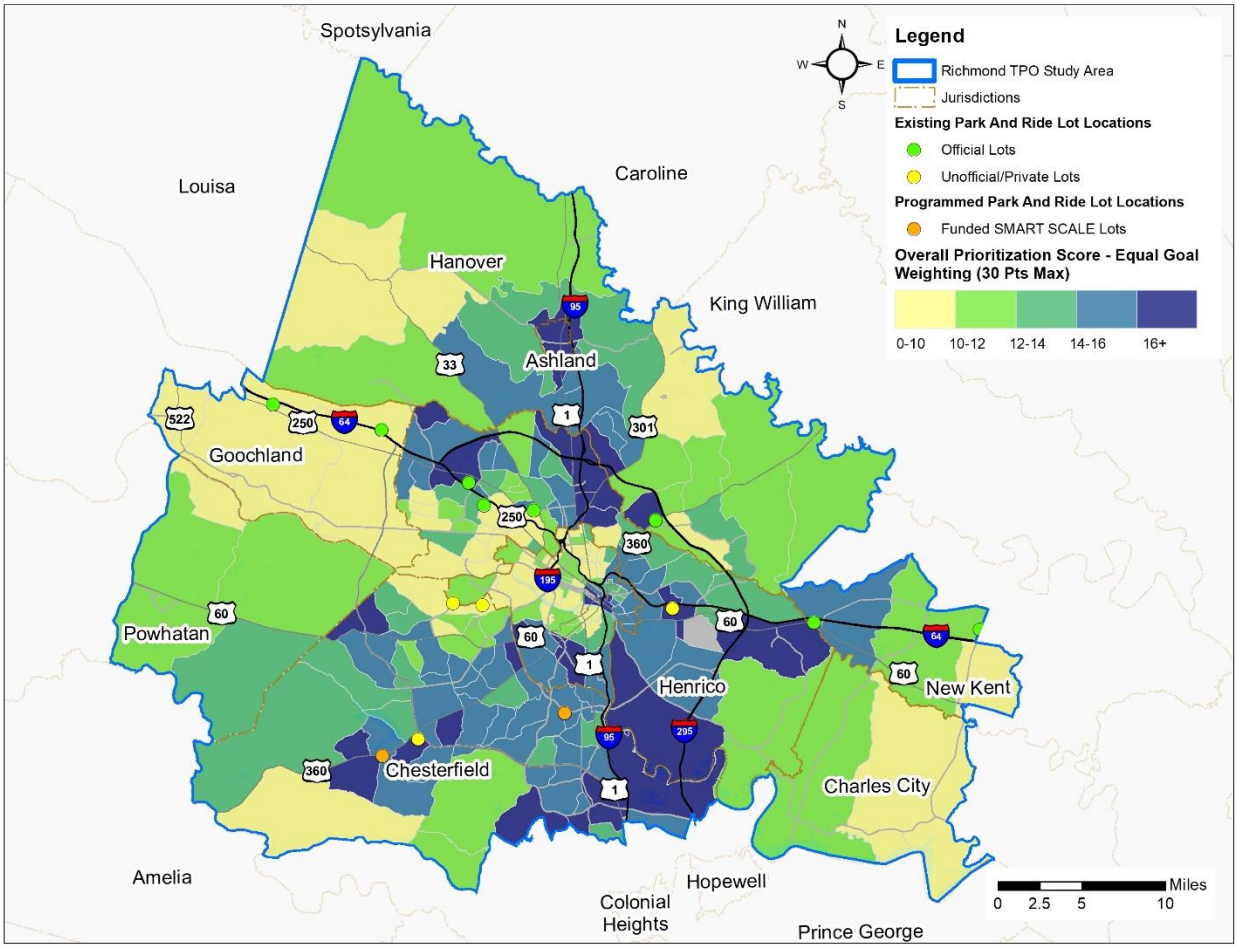
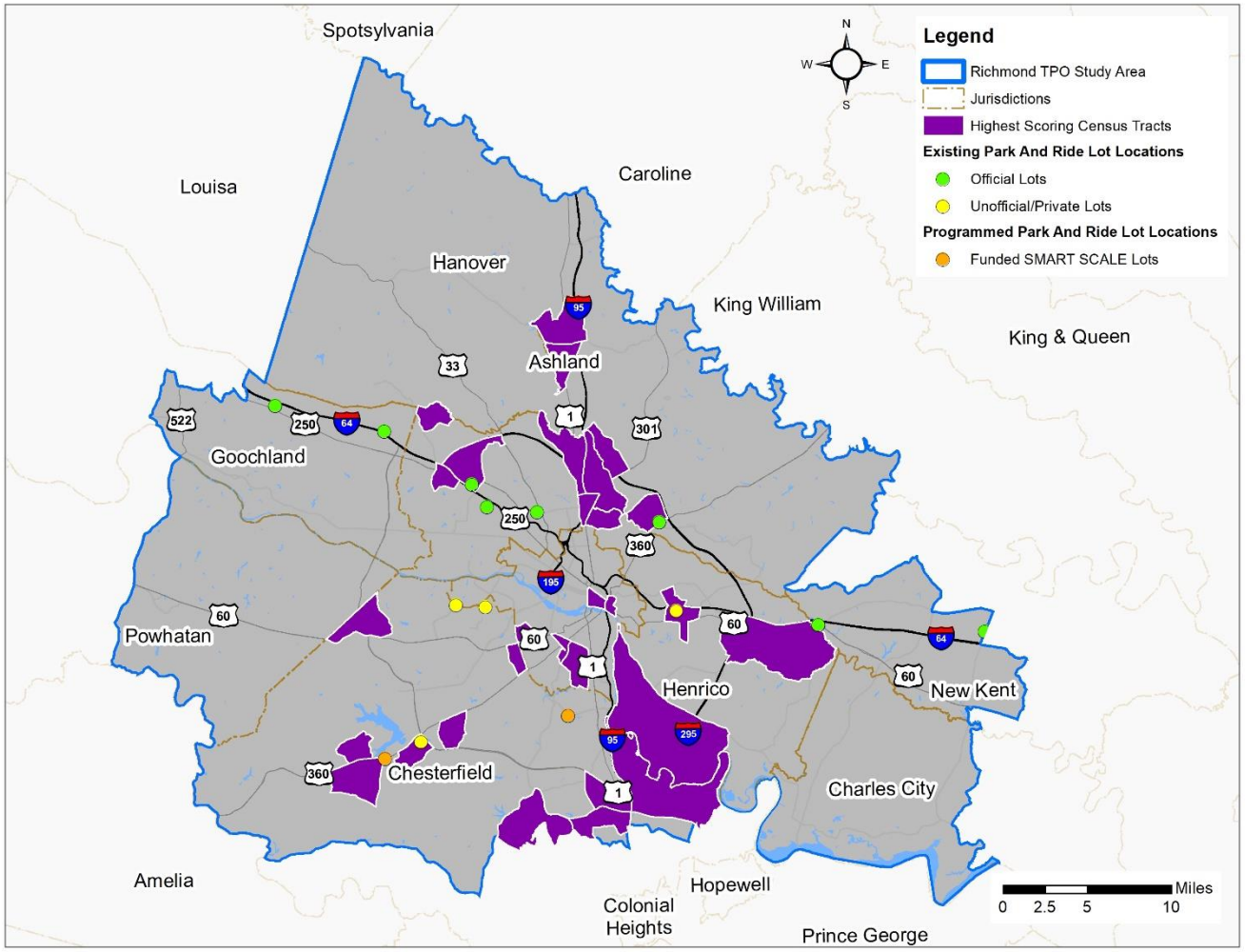


Figure 18: Phase I Highest Scoring Census Tracts



Phase II: Added-Value Adjustments

During the January 29, 2019 project meeting, the SAG identified a list of high-priority park and ride investment areas for consideration as added-value locations. Areas on this list included the following:

- Major commuter corridors and roadway interchanges
- Priority transit locations
- Locations near unofficial lots
- Locations near where vanpools had to be relocated
- Locations where existing park and ride lots are currently at or approaching capacity (>80% full)

This list was then compared to the identified Phase I needs to determine where gaps existed. High-priority locations that did not fall into or adjacent to a Phase I needs area were reviewed as potential

added-value locations. The following two areas were recognized as added-value locations because they demonstrated a need in areas that did not fall into or adjacent to a Phase I needs area:

- Area near Pulse BRT western termini
  - Pulse ridership shows a demonstrated need for an official park and ride lot in this area
- Area near unofficial park and ride lots at Bon Air Baptist Church and Huguenot United Methodist Church
  - Usage of the unofficial lots, liability concerns by private lot owners, and concerns about congestion from surrounding neighbors demonstrate need for official park and ride lot in this area

Overall Regional Park and Ride Needs Areas

The combined results of the Phase I and Phase II needs evaluation are shown in **Figure 19**. In many cases, several high-needs census tracts were clustered together in the same geographic area. For these areas, the multiple census tracts in close proximity were combined into one "needs area". **Table 11** presents the needs areas with their general location.

Figure 19: Regional Park and Ride Needs Areas

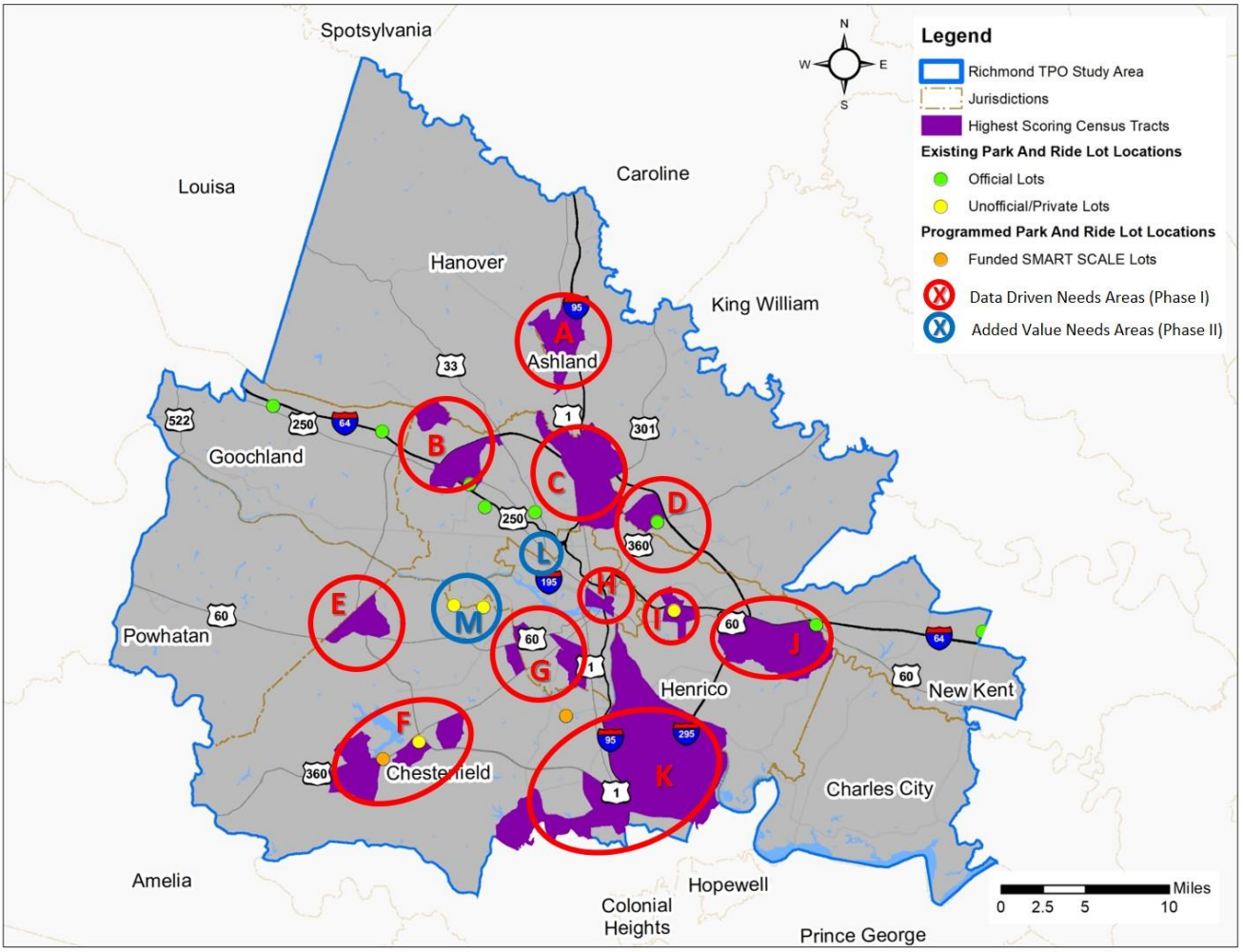


Table 11: Regional Park and Ride Needs Areas

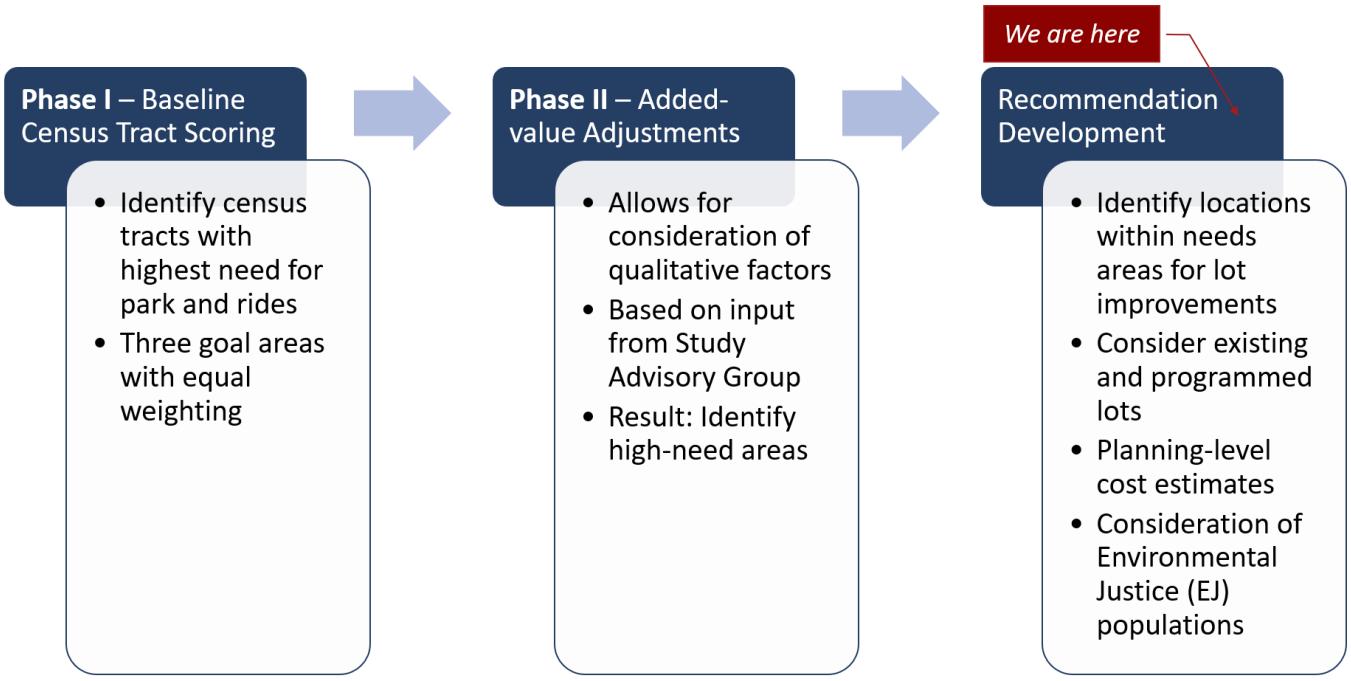
Phase	Map ID	Needs Area	Jurisdiction(s)
I - Data Driven Needs	A	Ashland	Hanover, Ashland
	B	I-64 at I-295	Henrico
	C	I-95 at I-295	Henrico, Hanover
	D	I-295 at US 360	Hanover, Henrico
	E	US 60 at Route 288	Chesterfield, Powhatan
	F	US 360 at Route 288	Chesterfield
	G	Chippenham Parkway	Chesterfield, Richmond
	H	East of Downtown	Richmond
	I	I-64/US 60 at S. Laburnum Road	Henrico
	J	I-295 at US 60	Henrico, New Kent
	K	Route 10/Route 288 at I-95/I-295	Chesterfield, Henrico
II - Added-Value	L	US 250 at Willow Lawn/Staples Mill	Henrico, Richmond
	M	Huguenot Road at Forest Hill Avenue	Chesterfield

Park and Ride Recommendation Development

Overview of Recommendation Development Process

Park and ride project recommendations were developed in collaboration with the SAG members for the park and ride needs areas identified in Phase I and II of the needs evaluation process (and shown in Figure 19). **Figure 20** provides an overview of the needs evaluation and recommendations development process.

Figure 20: Needs Evaluation and Recommendation Development Process



As a first step in the recommendations development process, the locations of existing and programmed park and ride lots and the existing occupancy at those lots was considered to determine if the identified need was already met. **Table 12** summarizes whether needs in the identified needs areas were met, only met in the short term, or not met.

Table 12: Summary of Existing Need Status

Needs Area	Reason Need Met/Not Met
Need Met	
D: I-295 at US 360	Met by existing Mechanicsville official lot
F: US 360 at Route 288	To be met by funded SMART SCALE park and ride project at US 360 at Chesterfield Career and Technical Center
Need Met in Short Term	
B: I-64 at I-295	Met in the short term by adjacent official lots at Gaskins Road and Hickory Haven
I: I-64/US 60 at S. Laburnum Avenue	Met in the short term by unofficial lot at White Oak Commons
M: Huguenot Road at Forest Hill Avenue	Met in the short term by unofficial lots at Bon Air Baptist Church and Huguenot United Methodist Church
Need Not Met	
A: Ashland	No existing official or unofficial lots in needs area
C: I-95 at I-295	No existing official or unofficial lots in needs area
E: US 60 at Route 288	No existing official or unofficial lots in needs area
G: Chippenham Parkway	No existing official or unofficial lots in needs area
H: East of Downtown	No existing official or unofficial lots in needs area
J: I-295 at US 60	Official lot at Bottom's Bridge at capacity
K: Route 10/Route 288 at I-95/I-295	No existing official or unofficial lots in needs area
L: US 250 at Willow Lawn/Staples Mill	No existing official or unofficial lots in needs area

For needs areas where the needs were not fully met, SAG feedback was used to identify more targeted "project recommendation areas" within the needs area. These project recommendation areas were focused on locations near interchanges and where intermodal travel could be facilitated by the presence of a park and ride lot. SAG members provided local knowledge of the areas to help identify recommended locations to meet the identified need, as well as provide input on potentially available publicly-owned land in the area. Continuing coordination with the localities will be important throughout the implementation of the regional park and ride investment strategy as specific parcels are identified.

The more targeted project recommendation areas are shown in **Figure 21** and described in **Table 13**. In some needs areas, more than one potential project location was recommended for further evaluation. It is intended that only one project per needs area would ultimately be implemented to meet the demand for a particular area. Monitoring and evaluation following implementation of the initial project will determine if there is demand for any additional lots within this needs area. If additional lots are needed, the other project recommended locations would be positioned for further feasibility.

Figure 21: Park and Ride Project Recommendation Areas

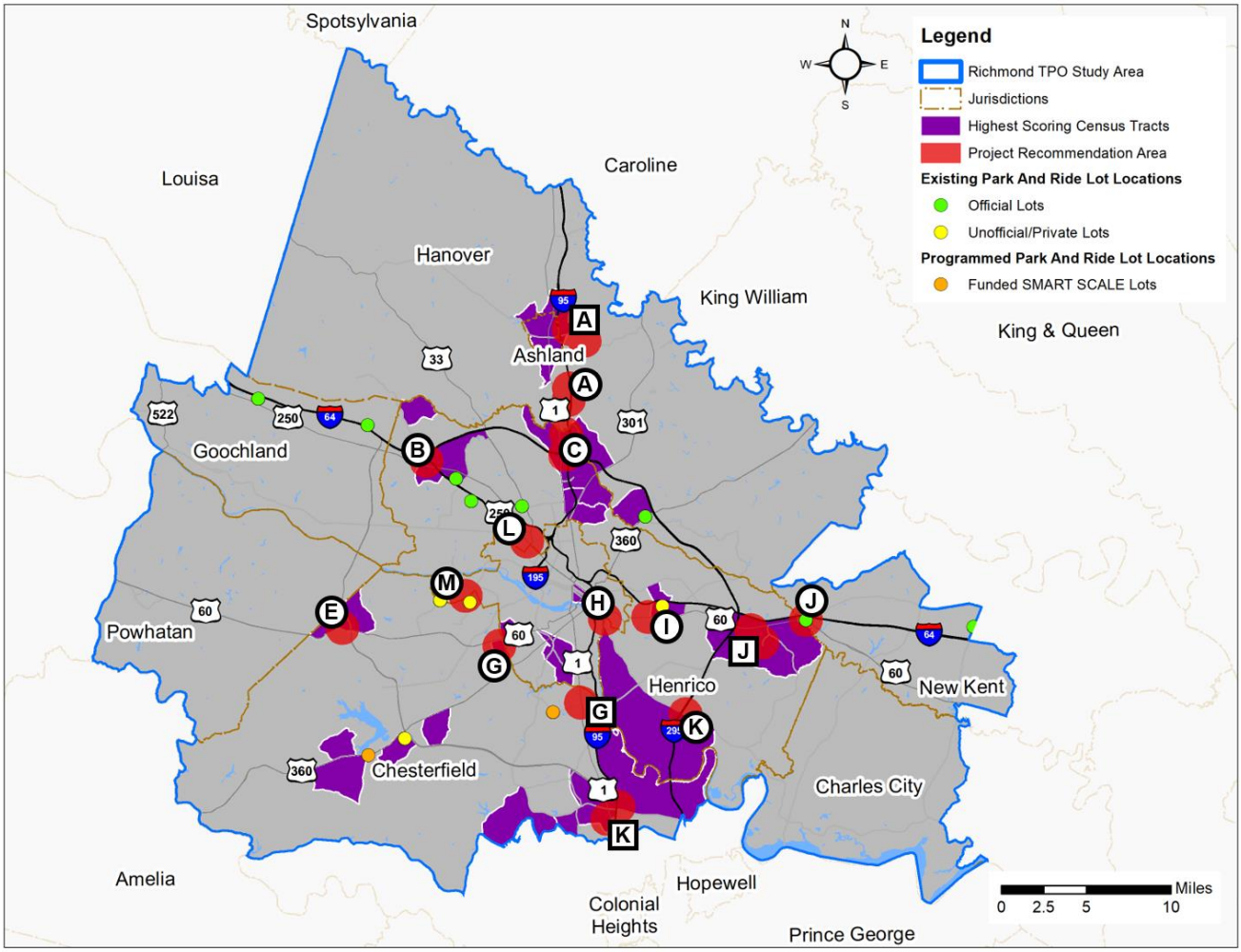


Table 13: Park and Ride Project Recommendation Area Descriptions

Needs Area	Project Recommendation Area Description	Map ID
A	I-95 at Lewistown Road near Lakeridge Parkway	Ⓐ
	I-95 at Route 54 east of interchange	🅰
B	I-64 at I-295 in Short Pump	Ⓑ
C	I-95 at I-295 near Virginia Center Commons	Ⓒ
E	US 60 at Route 288 near Westchester Commons	Ⓔ
G	Chippenham Parkway at Midlothian Turnpike	Ⓖ
	Chippenham Parkway at US 1/US 301	🅶
H	Eastern Pulse Terminus	Ⓗ
I	I-64 at S. Laburnum Avenue near US 60	Ⓘ
J	Bottoms Bridge	Ⓙ
	I-295 at US 60 near Technology Boulevard/Elko Road	🅹
K	I-95 at Route 10	🅺
	I-295 at Route 5	Ⓚ
L	Western Pulse Terminus	Ⓛ
M	Huguenot Road/Forest Hill Avenue/Chippenham Parkway	Ⓜ

The following sections provide additional details on the park and ride recommendations in each of the project areas, including recommended actions in each needs area, estimated demand, planning-level cost estimates, and recommended features and amenities.

Park and Ride Needs Area Recommendations

Park and ride recommendations for each needs area are summarized in **Table 14**. Establishing an official park and ride lot is recommended for each identified needs area where the need is not already met. Planning and design of these lots should begin as early as possible. Since the implementation timeframes for constructing these lots will vary by location depending on the availability of land and funding, additional recommendations help address or partially address park and ride needs in the interim. Some interim recommendations include: (1) establishing formal agreements or leases with private lot owners, (2) advertising nearby existing lots that are underutilized, and (3) continuing to monitor usage of existing lots.

Table 14: Summary of Needs Area Recommendations

Needs Area	Recommendations

A: Ashland	▪ Explore formal agreement or leasing opportunities at private lots in the vicinity of Route 54 and US 1
	▪ Identify site and construct new official park and ride lot near I-95 Exit 89 (Lewistown Road) or I-95 Exit 92 (Route 54). Potential locations include:
	  ▪ Publicly-owned parcels west of I-95 on Lakeridge Parkway (Exit 89)
	  ▪ Publicly-owned parcels east of I-95 on Route 54 (Exit 92)

B: I-64 at I-295	▪ Need met in the short-term from existing adjacent official lots (Gaskins Road and Hickory Haven)
	  ▪ Continue to monitor occupancy of existing lots and the need for expansion to add additional parking capacity
	▪ Identify site and construct new official park and ride lot near I-64 at I-295. Potential locations include:
	  ▪ Old I-64/I-295 loop ramp in Short Pump

C: I-95 at I-295	▪ Explore formal agreement or leasing opportunities at private lots in the vicinity of Virginia Center Commons ▪ Identify site and construct new official park and ride lot near I-95 at I-295. Potential locations include: ▪ Near Virginia Center Commons
D: I-295 at US 360	▪ Need met by existing official lot (Mechanicsville) ▪ Continue to monitor occupancy of existing lot and need for additional parking capacity in this area
E: US 60 at Route 288	▪ Explore formal agreement or leasing opportunities at private lots in the vicinity of Westchester Commons ▪ Identify site and construct new official park and ride lot near US 60 at Route 288. Potential locations include: ▪ Near Westchester Commons
F: US 360 at Route 288	▪ Need expected to be met by funded SMART SCALE lot at Chesterfield Career and Technical Center ▪ Monitor use of new lot and any additional needs in the vicinity of the US 360/Route 288 interchange

Needs Area	Recommendations

G: Chippenham Parkway	▪ Once constructed, monitor use of funded SMART SCALE lot at Chippenham and Hopkins to determine additional needs in this area
	▪ Identify site and construct new official park and ride lot near Chippenham Parkway at US 1/US 301. Potential locations include:
	  ▪ Near Food Lion on US 1/301 north of Chippenham Parkway
	▪ Identify site and construct new official park and ride lot near Chippenham Parkway and Midlothian Turnpike. Potential locations include:
	  ▪ Country-owned parcel at Stonebridge

H: East of Downtown	▪ Identify site and construct new official park and ride lot within 1/4-mile of Pulse eastern terminus at Rocketts Landing
I: I-64/US 60 at S. Laburnum Avenue	▪ Need met in the short-term from unofficial lot at White Oak Village. Explore formal agreement or leasing opportunities to establish greater permanence at this site. ▪ Identify site and construct new official park and ride lot near I-64 at S. Laburnum Avenue

J: I-295 at US 60	▪ Advertise the New Kent Public Works park and ride lot and monitor usage
	▪ Identify site and construct new or expand existing park and ride lot near I-64/US60/I-295. Potential locations include:
	  ▪ Expanding the existing Bottoms Bridge lot or building a second lot on the western side of the parcel
	  ▪ Commonwealth-owned parcel at VDOT residency

K: Route 10/Route 288 at I-95/I-295	▪ Explore formal agreement for park and ride use of Capital Trail parking area at the Four Mile Creek Trailhead near I-295 on Route 5
	▪ Identify site and construct new official park and ride lot near the I-95/Route 10 interchange. Potential locations include:
	  ▪ Northeast quadrant of I-95 at Route 10 interchange
	  ▪ West of I-95 on US 1/US 301
	  ▪ East of I-95 near John Tyler Community College

L: US 250 at Willow Lawn/ Staples Mill	▪ Promote use of City of Richmond Arthur Ashe shuttle ▪ Identify site and construct new official park and ride lot within 1/4-mile of Pulse western terminus in the Willow Lawn/Staples Mill area
M: Huguenot Road at Forest Hill Avenue	▪ Need met in the short term from unofficial lots at Bon Air Baptist Church and Huguenot Methodist Church. Explore formal agreements or leasing opportunities to establish greater permanence at these sites. ▪ Explore formal agreement or leasing opportunities at other private lots in this area if existing unofficial lots can no longer be used for park and ride ▪ Identify site and construct new official park and ride lot near Huguenot Road/ Forest Hill Avenue/Chippenham Parkway

Recommended Park and Ride Lot Size and Cost Estimates

For each project recommendation area, the parking demand was estimated to determine the recommended number of parking spaces for the construction of an official park and ride lot in the area. A sketch planning model derived from Florida Department of Transportation (FDOT) methodology for determining park and ride demand was used to estimate the number of parking spaces and associated lot acreage in each project recommendation area. The model used traffic volumes on the major roadways expected to feed into a park and ride lot in each project recommendation area to estimate the commuter demand. For validation, this methodology was tested on existing official park and ride lots in the Richmond region and found to be representative of the existing occupancy observed at those lots. Lot area was approximated using a planning-level estimate of 400 feet per parking space. The area required per parking spot will vary depending on the amenities and design elements included in the lot, such as drop-off/pick-up areas and bus loading areas.

Planning level cost estimates were developed for each project recommendation area using the estimated number of parking spaces needed and per space unit costs. Unit cost ranges were developed based on a review of proposed park and ride project cost estimates from FY20 SMART SCALE applications. Right-of-way costs were not included in the costs ranges as these will be contingent on available land, leasing and purchasing opportunities, and coordination with public and private entities. The low and high unit cost ranges are summarized in **Table 15**.

Table 15: Unit Cost Ranges for Park and Ride Projects

Low Unit Cost	High Unit Costs
Typical Features/Amenities at Park and Ride Lot	
▪ Lower-density lot ▪ Minimal earthwork required ▪ Minimal amenities ▪ No transit service	▪ Higher-density lot ▪ More significant earthwork required ▪ Greater number of amenities ▪ Transit service
Per Space Unit Cost	
$9,500	$21,000
Per space unit costs include PE, construction, lighting/landscaping, and earthwork	
Per Lot Unit Cost	
$180,000	$330,000
Per lot unit costs are in addition to per space costs and include stormwater management and electric charging	

Note: Costs reported in 2019 dollars.

Cost estimates at the high-end of the unit cost range reflect park and ride lot designs that incorporate a greater number of amenities and design elements, such as access roads, bus loading areas, bicycle parking, and sidewalks, as well as sites where more significant earthwork is required. Estimates at the low-end of the unit cost range are more representative of a park and ride lot design with minimal amenities, design elements, and earthwork. **Table 16** provides a summary of the recommended number of spaces and cost estimate ranges for park and ride lots in each of the project recommendation areas. The size and cost estimates presented should be used for site identification and planning purposes only.

When specific sites are identified in these areas for park and ride lots, a conceptual layout should be developed to determine a more accurate site-specific cost estimate.

Table 16: Park and Ride Project Recommended Lot Sizes and Cost Estimates

Project Recommendation Area		Recommended Spaces	Recommended Lot Area (Acres)	Cost Estimate	
				Low	High
Ⓐ	I-95 at Lewistown Road near Lakeridge Parkway	200	1.4	$2.06M	$4.53M
🅐	I-95 at Route 54 east of interchange	200	1.4	$2.06M	$4.53M
Ⓑ	I-64 at I-295 in Short Pump	320	2.2	$3.19M	$7.05M
Ⓒ	I-95 at I-295 near Virginia Center Commons	380	2.6	$3.76M	$8.31M
Ⓔ	US 60 at Route 288 near Westchester Commons	70	0.5	$0.84M	$1.80M
Ⓖ	Chippenham Parkway at Midlothian Turnpike	330	2.3	$3.29M	$7.26M
🅖	Chippenham Parkway at US 1/US 301	270	1.9	$2.72M	$6.00M
Ⓗ	Eastern Pulse Terminus	130	0.9	$1.40M	$3.06M
Ⓘ	I-64 at S. Laburnum Avenue near US 60	120	0.8	$1.31M	$2.85M
Ⓙ	Bottoms Bridge	90*	0.6	$1.03M	$2.22M
🅙	I-295 at US 60 near Technology Boulevard/Elko Road	120*	0.8	$1.31M	$2.85M
🅚	I-95 at Route 10	250	1.7	$2.54M	$5.58M
Ⓚ	I-295 at Route 5	50	0.3	$0.65M	$1.38M
Ⓛ	Western Pulse Terminus	290	2.0	$2.91M	$6.42M
Ⓜ	Huguenot Road/Forest Hill Avenue/ Chippenham Parkway	130	0.9	$1.40M	$3.06M

*Note: Park and ride demand at Need Area J is partially served by 40 spaces at the existing Bottoms Bridge lot. The recommended spaces for the project recommendation areas in Needs Area J are in addition to these existing spaces.

Recommended Park and Ride Lot Features and Amenities

In 2018, VDOT developed the *Park & Ride Design Guidelines* to provide localities with a resource on features and amenities to consider when designing park and ride lots. The guidelines incorporate perspectives from several Virginia agencies, including VDOT, DRPT, Department of Conservation and Recreation, and Department of Environmental Quality and include guidance on the following park and ride lot features and amenities:

- Parking layout
- Drop-off/pick-up areas
- Bus loading/unloading areas
- Access/egress points
- Vehicle circulation
- Carpooling/vanpooling
- Bike parking
- Bus stops and shelters
- Trash receptacles
- Safety features
- Lighting
- Signage
- Vegetation
- Stormwater management
- Solar energy generation
- Green technologies
- Integrated corridor management
- Electric vehicle charging

The recommended implementation of these features and amenities is dependent on the surrounding environment of the park and ride lot. The *Park and Ride Design Guidelines* defines three types of lot environments (high density, medium density, and low density) and provides guidance on elements that are required, preferred, and suggested for each type of location. High-density locations are typically located in urban or suburban areas and are generally accessible by foot, bicycle, or high-capacity transit. Medium-density locations are typically suburban lots found near highway interchanges and often are served by buses and carpooling/vanpooling. Low-density locations are typically found in rural locations near interstate highways or arterials and often have limited transit service.

Due to the differences in features and amenities at the three types of lots, construction costs will vary. The required and recommended park and ride lot elements at high-density locations address a comprehensive set of design concerns and, as a result, sites designed to meet the design guidelines for high-density lots are expected to have unit costs at the higher end of the cost estimate ranges.

Conversely, the design guidelines require far fewer elements to be implemented at low-density locations, so it may be possible to implement lots in these areas with unit costs in the lower end of the cost estimate ranges.

Using the *Park and Ride Design Guidelines* as a reference, each of the park and ride project recommendation areas was categorized as high, medium, or low density and these categories were used to inform the recommended features and amenities at the lot. **Table 17** summarizes the lot density types for each project recommendation area.

Table 17: Project Recommendation Area Density Type

Project Recommendation Area		Area Density Type
Ⓐ	I-95 at Lewistown Road near Lakeridge Parkway	Low
🅰	I-95 at Route 54 east of interchange	Low
Ⓑ	I-64 at I-295 in Short Pump	Medium
Ⓒ	I-95 at I-295 near Virginia Center Commons	Medium
Ⓔ	US 60 at Route 288 near Westchester Commons	Low
Ⓖ	Chippenham Parkway at Midlothian Turnpike	Medium
🅶	Chippenham Parkway at US 1/US 301	Medium
Ⓗ	Eastern Pulse Terminus	High
Ⓘ	I-64 at S. Laburnum Avenue near US 60	Medium
Ⓙ	Bottoms Bridge	Low
🅹	I-295 at US 60 near Technology Boulevard/Elko Road	Low
🅺	I-95 at Route 10	Medium
Ⓚ	I-295 at Route 5	Low
Ⓛ	Western Pulse Terminus	High
Ⓜ	Huguenot Road/Forest Hill Avenue/Chippenham Parkway	Medium

Park and ride lots can play an important role in multimodal connectivity and lot design should consider opportunities for these connections within the context of surrounding development. Existing and future transit routes, bicycle facilities, vanpools, and pedestrian facilities were reviewed to identify potential multimodal connections to inform lot design. Connections from park and ride lots to surrounding developments such as employment centers and residential neighborhoods should also be considered as these can reduce the need for redundant parking lots, encourage non-SOV modes of transportation, and reduce roadway congestion. A summary of the travel modes served in each of the park and ride project recommendation areas is provided in **Table 18**. The following sources were used to identify the potential multimodal connections:

- **Transit Service:** Existing transit service included existing GRTC routes and future transit service included routes in the *transit2040*. For locations where existing or future transit service travels on a nearby highway but does not stop in the area, the table designates the transit service as "Potential" to reflect the opportunity for route modifications to connect the park and ride lot to transit.
- **Bicycle Facilities:** Existing bicycle facilities included lanes, cycletracks, shared use paths, and designated biking routes identified through Bike Walk RVA's Bikeways Map and Open Street Map's Cycle Map. Bicycle facilities designated as "Potential" were identified as proposed bicycle touring routes in the *Richmond Regional Bicycle and Pedestrian Plan* (2004) and lot connections to proposed bicycle touring routes should be reevaluated during the upcoming update to this plan.
- **Vanpools:** Existing vanpool locations included those identified by RideFinders in the vicinity of a project recommendation area. Due to the changing nature of vanpool locations and the attractiveness of park and ride lots to serve as vanpool origins, all other park and ride project recommendation areas were listed as "Potential". Lot design that includes supportive features for vanpool and carpool, such as drop-off/pick-up areas, should be considered for all recommended lot areas.
- **Pedestrian Facilities:** Existing pedestrian facilities included the presence of sidewalks and paths determined through aerial imagery and included areas where either an adequate sidewalk network or trail system, such as the Virginia Capital Trail, is present. Pedestrian facilities designated as "Potential" were identified as proposed pedestrian corridors in the *Richmond Regional Bicycle and Pedestrian Plan* (2004) and lot connections to proposed pedestrian corridors should be reevaluated during the upcoming update to this plan. While pedestrian facilities would be beneficial for internal circulation at all recommended lot areas, construction of external sidewalk facilities may not be necessary where an existing network to link to is not available.

Table 18: Travel Modes Served at Park and Ride Project Recommendation Areas

Project Recommendation Area		Transit Service		Bicycle Facilities	Vanpool	Pedestrian Facilities
		Existing	Future			
Ⓐ	I-95 at Lewistown Road near Lakeridge Parkway	Potential	Potential		Yes	Yes
🅐	I-95 at Route 54 east of interchange	Potential	Potential		Yes	Potential
Ⓑ	I-64 at I-295 in Short Pump	Yes	Yes	Potential	Potential	Yes
Ⓒ	I-95 at I-295 near Virginia Center Commons	Potential	Yes		Yes	Yes
Ⓔ	US 60 at Route 288 near Westchester Commons		Yes		Potential	Yes
Ⓖ	Chippenham Parkway at Midlothian Turnpike	Yes	Yes		Yes	Yes
🅖	Chippenham Parkway at US 1/US 301	Yes	Yes		Potential	Potential
Ⓗ	Eastern Pulse Terminus	Yes	Yes	Yes	Potential	Yes
Ⓘ	I-64 at S. Laburnum Avenue near US 60	Yes	Yes		Yes	Potential
Ⓙ	Bottoms Bridge		Yes	Potential	Yes	Potential
🅙	I-295 at US 60 near Technology Boulevard/Elko Road		Potential	Potential	Potential	
🅚	I-95 at Route 10	Potential	Yes		Yes	Yes
Ⓚ	I-295 at Route 5		Potential	Yes	Potential	Yes
Ⓛ	Western Pulse Terminus	Yes	Yes		Potential	Yes
Ⓜ	Huguenot Road/Forest Hill Avenue/Chippenham Parkway	Yes	Yes	Yes	Potential	Potential

The *Park and Ride Design Guidelines* identify features and amenities that are required, preferred, and suggested for each lot density type based on federal and state regulations and guidelines, as well as characteristics of the surrounding area. These features and amenities are summarized in **Table 19**.

After specific sites are identified in the project recommendation areas, the inclusion of features and amenities in the lot design should be further evaluated for the specific location. Lot design should consider and be flexible to accommodate the potential for future multimodal connections, including new transit routes and adjacent development where employees or residents could take advantage of a park and ride lot if bicycle/pedestrian accommodations were provided. Additional amenities, features, and design standards may be recommended or required by the locality. Some features may also require

coordination with other parties, including localities, VDOT, and private land owners or may be constrained by property ownership and formal usage or leasing agreements.

Table 19: Park and Ride Design Guidelines Features and Amenities

Feature/Amenity	Low Density	Medium Density	High Density
Parking layout	Angled spaces required, where possible	Perpendicular spaces required	Perpendicular spaces required
Drop-off/pick-up areas	Kiss & Ride area suggested	Kiss & Ride area preferred	Kiss & Ride area required
Bus loading/ unloading areas	Boarding lanes and adequate queuing space required if served by transit	Boarding lanes and adequate queuing space required if served by transit	Boarding lanes and adequate queuing space required if served by transit
Access/egress points	None specified	Two entrances preferred	Two entrances preferred
Vehicle circulation	One-way traffic required, where possible	Two-way traffic required	Two-way traffic required
Non-vehicle circulation	Internal walkways preferred	Internal walkways required; External connections preferred	Internal walkways required; External connections preferred
Bike parking	2-3 bike racks preferred	1 space for every 10 to 20 vehicle spaces required; covered bike parking preferred	1 space for every 10 to 20 vehicle spaces required; covered bike parking preferred
Bus stops and shelters	Shelters preferred if served by transit	Shelters required if served by transit	Shelters required if served by transit
Trash receptacles	Preferred	Required at all boarding areas	Required at all boarding areas
Security	Emergency assistance phones preferred	Emergency assistance phones preferred	Emergency assistance phones preferred
Lighting	LED lighting with shielding fixtures preferred	LED lighting with shielding fixtures required	LED lighting with shielding fixtures required
Signage	Traffic control preferred; bus route signage suggested if served by transit	Traffic control and bus route signage (if served by transit) required; Integrated corridor management technologies, like real-time information, preferred	Traffic control and bus route signage (if served by transit) required; Integrated corridor management technologies, like real-time information, preferred
Vegetation	Native, context sensitive plants required; 10-20% of lot area suggested	Native, context sensitive plants required; 10-20% of lot area suggested	Native, context sensitive plants required; 10-20% of lot area suggested
Stormwater management	Green retention infrastructure required	Green retention infrastructure required; porous asphalt mix preferred for lot surfacing	Green retention infrastructure required; porous asphalt mix preferred for lot surfacing
Solar energy generation	Panels in high-sun areas preferred	Panels in high-sun areas preferred; solar canopies over parking spaces suggested	Panels in high-sun areas preferred; solar canopies over parking spaces suggested
EV Charging	Stations for 2% of all spaces suggested	Stations for 2% of all spaces preferred	Stations for 2% of all spaces preferred

Environmental Justice Evaluation

Concentrations of environmental justice (EJ) populations (as described in the Environmental Justice Populations section on Page 15) were evaluated in the project recommendation areas to ensure an equitable distribution of improvements. During the design of park and ride lots, accessibility for EJ populations should be considered, including connections to other travel modes and appropriate lot features/amenities. **Figure 22** shows existing and programmed park and ride lots, as well as park and ride project recommendation areas, overlaid on a base map of the concentration of EJ populations and **Table 20** summarizes the EJ analysis for the study area. Areas designated as "highest" had the greatest concentration of EJ populations when compared to other census tracts in the study area. Since specific recommendation locations were not identified as part of this study and the project recommendation areas extend across multiple census tracts, the EJ population concentration for the recommendations was taken as the weighted average of the EJ population concentrations in all the census tracts within the project recommendation area. Park and ride project recommendation areas were found to be distributed among the EJ densities with the majority of the recommendation areas in locations with "high" and "average" EJ concentrations.

Figure 22: Recommended Lot Areas with Concentration of Environmental Justice (EJ) Population

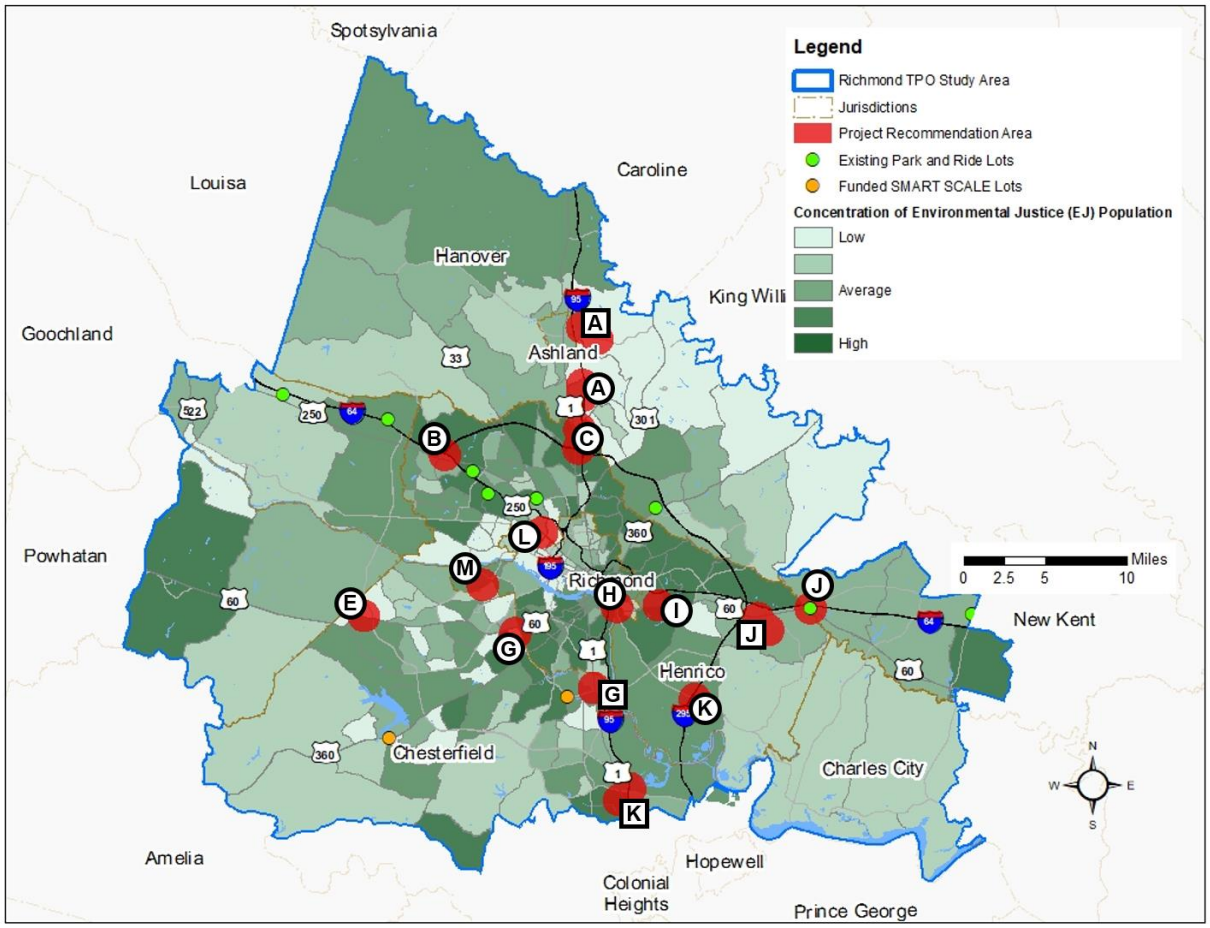


Table 20: Comparison of Park and Ride Lots to Concentration of EJ Populations

	EJ Population Concentration				
	Highest EJ Population	High EJ Population	Average EJ Population	Low EJ Population	Lowest EJ Population
Existing* and Programmed Lots	3 (33%)	4 (44%)	1 (11%)	1 (11%)	0
Project Recommendation Areas	1 (7%)	5 (33%)	5 (33%)	2 (13%)	2 (13%)
Total	**4 (17%)**	**9 (38%)**	**6 (25%)**	**3 (13%)**	**2 (8%)**

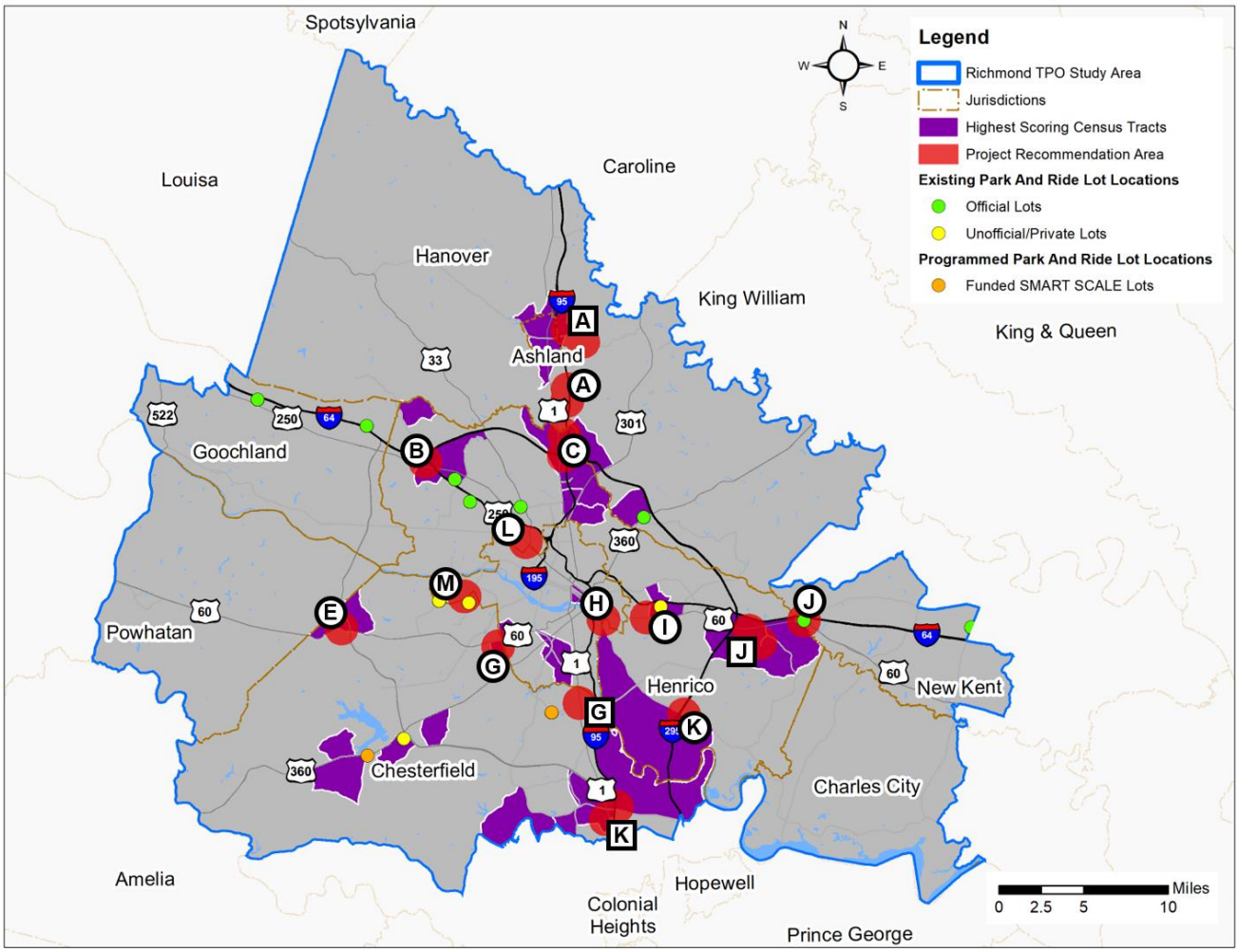
* Does not included “unofficial” lots in analysis

Implementation Strategy

Overview of Recommendations

The Park and Ride Recommendation Development section summarized park and ride project recommendations for the Richmond region developed through data-driven analysis of needs and collaboration with the SAG members. To implement these recommendations, further action is needed. The purpose of the implementation strategy is to identify the necessary steps, timeframes, and roles/responsibilities of stakeholders to advance the recommendations. The locations of the identified project recommendation areas are shown in **Figure 23.**

Figure 23: Park and Ride Project Recommendation Areas



For each of the recommendations, specific implementation activities fall into four generalized categories:

- **Agreements** – Includes options to move toward more formal agreements or leasing opportunities with existing non-publicly owned parking lots in the area
- **Planning, Design & Construction** – Includes steps to identify site locations, plan, design, and construct new park and ride lots or to provide additional capacity through expansion of existing lots
- **Monitoring** – Includes observing and documenting the use and condition of existing park and ride lots to identify additional needs for the facility
- **Marketing** – Includes advertising and promoting the use of park and ride lots as well as amenities and multimodal connections available at the lots

In most of the recommendations, more than one of the implementation activities is needed for completion and ongoing success of a park and ride facility. Details on the specific implementation steps associated with each implementation activity are described in the next section. In addition, roles and responsibilities of stakeholders and potential funding sources that can be used for these implementation activities are discussed in later section.

Implementation Activities

The implementation of each type of park and ride recommendation can generally be broken down into a set of activities. The activities will vary due to different existing and anticipated circumstances in each needs area but will have similar considerations and follow similar steps. Details on the implementation activities for the four categories are provided in the following sections.

Agreements

Collaboration with the private sector to allow for the use of existing underutilized parking lots for park and ride and vanpools can be an effective low-cost solution to meet identified needs. However, without formal agreements or leases, there is no permanence to the arrangement and private lot owners can stop allowing the use of the lots for park and ride with little to no notice. This can leave park and ride or vanpool users scrambling to find a new location or entice them back to single occupancy vehicle commuting. Formal agreements and leases can secure spaces for park and ride use over a defined period of time. In addition, the agreements help to clearly define the responsibilities of both parties, which can help to lessen the uncertainty and ambiguity that can arise with this type of private partnership.

Steps to establishing formal agreements or leases with private lot owners include:

- **Site Identification** – Identify existing privately-owned lots with unused parking capacity and owners with interest in permitting park and ride use of the site. Potential sites may include:
  - *Churches* – Church parking lots are often underutilized during weekdays making them prime candidates for commuter park and ride lots.
  - *Shopping Centers* – Retail lot owners may benefit from additional visibility by potential customers using their lot.
  - *Large Corporate Employers* – Often the outer-reaches of large parking lots are not fully utilized, offering the potential for portions of these lots to be used for park and ride. If the corporate lot is located near a transit stop, single-occupancy vehicle use by employees may also be reduced, freeing up additional spaces for potential park and ride use.

- **Formal Agreements or Leases** – Negotiate and sign an agreement or lease with a private lot owner. Example agreements are provided in **Appendix B**. Terms of the agreement or lease should consider the following:
  - *Premises* – Identification of the location of the lot and spaces within the lot available for park and ride usage. The agreement may also include responsibilities to install signs or pavement markings to indicate which spaces can be used for park and ride.
  - *Length of Term* – Identification of the timeframe over which the agreement is valid. The agreement should include the effective dates as well as the renewal and termination processes. Renewals can require the signing of a new agreement at the end of every term or can be automatic unless written notice is provided within a certain number of days prior to the end of the current term. Restrictions on whether the agreement can be terminated mid-term or only at the end of the agreement term should also be indicated.
  - *Access and Use of Property* – Identification of when and how the property can be used. The agreement may specify ingress/egress points that must be used, times the lot can be used (such as 5 a.m. to 8 p.m., Monday through Friday), bus service access, and the ability to park vanpool vehicles overnight.
  - *Compensation and Payment Schedule* – Details on the payment amount (if any), due date, and method of payment. Payment amounts may be flat monthly or annual fees or may be based on the usage of the lot. If the payment is based on the usage of the lot, the agreement should also identify the methodology for determining lot usage, such as the timing and frequency of occupancy counts.
  - *Maintenance* – Identification of each party's responsibilities for maintaining the lot. Maintenance activities may include landscaping, pavement/sidewalks, lighting, utilities, trash pick-up, and snow/ice removal. Any responsibilities for one party to reimburse the other for maintenance activities should also be indicated in the agreement.
  - *Liability and Indemnification* – Identification of liability borne by each party. The agreement may also specify insurance coverage requirements.
  - *Site Alterations* – Identification of types of alterations (if any) that are permitted to be made to the lot and the approval processes. Alterations may include the installation of amenities such as signs, benches, bus shelters, and bike racks. Maintenance responsibility of any alterations should also be indicated.

Planning, Design & Construction

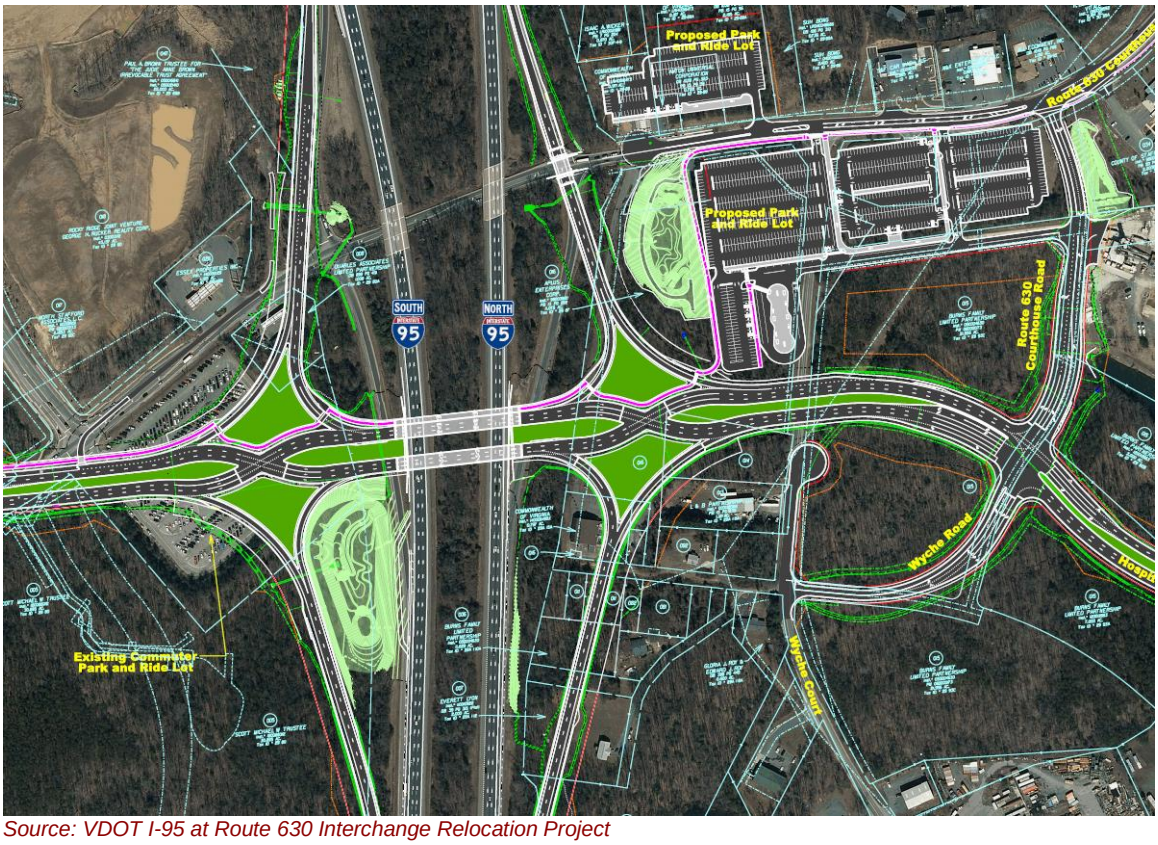
Building new lots and expanding existing publicly-owned lots provides permanent solutions to addressing park and ride needs. Park and ride lot construction requires identifying viable sites well in advance of the, planning and design, and final construction activities. Securing funding for property acquisition, engineering, and construction is an important step in building new or expanded lots and can take up to ten or more years, depending on the specific funding source. The funding phase will be discussed in more detail in the funding section of the report.

Steps to constructing park and ride lots may include:

- **Site Identification and Land Acquisition** – Identify and acquire available land suitable to meet the identified park and ride need. Candidate sites should be reviewed in coordination with local and state agencies to determine the viability of the site. Selection of a candidate park and ride site should consider right-of-way availability, cost, access to commuter roadways, density of

commuter populations, multimodal connections, and input from stakeholder and potential park and ride users. Ideally, park and ride lots should be located within ¾-mile of major commuter roadways, as individuals are more likely to use lots that do not require significant detours from their route. As a rule of thumb, park and ride lots should be located where the combined average daily traffic on surrounding roadways is greater than 35,000 vehicles per day for rural/suburban areas and greater than 50,000 vehicles per day for urban areas. Although many sites may be viable for park and ride facilities, sites where there may be greater potential for implementation at a lower cost or a shorter timeframe can include:

- *Publicly-Owned Land* – Unutilized or underutilized publicly-owned land make good cost-effective locations for park and ride lots. Using publicly-owned land eliminates the time consuming and potentially costly step of purchasing or acquiring land.
- *Interchange Construction Projects* – Incorporating park and ride lots into interchange construction projects can be a cost-effective strategy. The locations of these projects are typically good places for park and ride because they provide easy access to major corridors. In addition, combining the design of the park and ride with the larger interchange process can help to streamline the property acquisition, design, and construction processes for both the lot and the interchange. Successful implementation of this approach requires identifying the potential for inclusion of a park and ride lot early in the interchange planning and design process.



Source: VDOT I-95 at Route 630 Interchange Relocation Project

- *New Development* – In areas of new development particularly within existing or planned transit service areas, park and ride lots should be considered for voluntary proffer as part of a rezoning case. When appropriate, this approach can set the stage for a parcel donation or

contribution toward construction, reducing the development costs borne by the public sector. Proffer agreements can range from dedicating a certain number of spaces in a private development to constructing a new park and ride lot with dedication to a public stakeholder (locality or state). Proffer agreements can be challenging because Virginia law requires that proffers be voluntarily offered by the developer and does not allow localities to deny a rezoning application based on an applicant's refusal to agree to a proffer. Nonetheless, when possible, proffers can be a successful strategy.

- **Planning and Design** – Plan and develop conceptual and final design for the preferred park and ride lot location. Planning and design should consider lot size, layout, features, and amenities based on site location. The guidance provided in the Park and Ride Recommendation Development section, as well as the VDOT *Park & Ride Design Guidelines*, should be used as a starting point and refined as needed throughout the planning and design processes. Environmental and other impacts will need to be evaluated to determine any fatal flaws and permit requirements at the outset. Design must be completed in accordance with local, state, and federal requirements. Funding sources, availability, and competitiveness can also dictate some of the parameters of the particular site. Potential funding sources are described in more detail in the funding section of this report. Important considerations during planning and design include:
  - *Conceptual Design* – Demand for park and ride should be evaluated at the identified site to correctly size the lot. Preliminary lot size estimates for project recommendation areas are provided in Table 16. Lot design should consider the density of the surrounding area (Table 17) as well as multimodal connections to the site (Table 18) when determining appropriate features and amenities (Table 19). The VDOT *Park & Ride Design Guidelines* should be used as a resource during planning and design.
  - *Public Involvement* – The public should be engaged early in the planning process to allow for collaboration in the design and feedback from the community on amenities and features that are important to them. Getting buy-in from the community is an important factor in establishing a positive perception of the park and ride lot, leading to higher lot utilization. The public involvement processes may also be dictated by requirements of specific funding sources.
  - *Stakeholder Involvement* – Project stakeholders, including local and regional entities, transit operators, and funding partners should be engaged throughout planning and design. Regional collaboration is vital to successful implementation of the lot.
  - *Project Impacts* – Environmental, traffic, and economic impacts of the proposed park and ride lot should be evaluated. Fatal flaws should be identified, and impacts should be mitigated as appropriate.
  - *Adoption into Transportation Plans* – Identified park and ride projects should be incorporated into to local, regional, and statewide transportation plans.
  - *Secure Funding* – Funding commitments should be secured. Potential funding sources are discussed in detail in a later section but can include a variety of federal, state, local, and private sources.
  - *Final Design* – Construction documents including final plans, specifications, and estimates should be prepared.

- **Construction** – Construct the park and ride lot. Federal, state, and local requirements for construction activities should be followed as appropriate.

Monitoring

Once constructed, park and ride lots require ongoing monitoring to ensure the lots are meeting the needs of users. Monitoring should be used to assess both the lot conditions and lot usage. Through regular monitoring of lot conditions, maintenance issues can be identified and corrected, helping to maximize the life of the park and ride lot assets. Monitoring usage and user satisfaction can help to identify when additional capacity or amenities might be needed to accommodate changing needs of the lot users. In addition, monitoring helps to inform the marketing strategies for a particular lot.

Park and ride lot monitoring activities may include:

- **Monitoring and Operations Strategy**– Develop or refine a monitoring and operations strategy that identifies the necessary actions to ensure park and ride facilities continue to meet the needs of users. The strategy may be applicable to a group of park and ride lots or may be specific to one lot. Components of a monitoring and operations strategy can vary by lot and will depend on whether the lot is publicly or privately owned but may include:
  - *Maintenance* – Identification of the maintenance responsibilities for lot features and amenities including landscaping, pavement/sidewalks, lighting, utilities, trash pick-up, and snow/ice removal. Maintenance responsibilities and operations will vary between lots depending on the lot owner and the stakeholders involved.
  - *Security and Enforcement* – Coordination with state police, local police, or private security companies, depending on lot ownership, for regular monitoring of the lot. Signs should be placed, as needed, to prohibit commercial vehicle use or any other uses that would jeopardize the integrity of the lot and the comfort of the intended users. Incidents that occur on site should also be regularly reviewed to determine if any actions such be taken to improve safety at the lot.
  - *Transit Service* – Coordination with transit agencies on changes to routes, ingress/egress on site, and amenities such as bus shelters and benches.
- **Lot Condition Inspections** – Conduct regular on-site inspections to observe conditions, monitor the implementation of the operations plan, and identify issues that need to be addressed to maintain the safety and functionality of the lot. Lot inspections should assess and identify pavement/sidewalk deteriorations, drainage issues, lighting repairs, and other site features requiring maintenance or replacement. Special attention should be given to Americans with Disabilities Act (ADA) standards to ensure the park and ride lots are accessible to all users. The overall functionality of the site should also be observed and concerns regarding site circulation, transit vehicle access, and pedestrian safety should be noted.
- **Occupancy Evaluations** – Conduct regular occupancy counts of park and ride sites to understand the usage and identify lots approaching capacity. In addition to vehicles, any bicycles should also be counted. Any evidence of illegal parking should also be noted. Occupancy counts should be completed at times when park and ride lots are the most utilized. Highest usage times will vary by site but typically occur on Tuesdays, Wednesdays, and Thursdays during work hours. Trends in occupancy should be observed and used to help inform marketing strategies and identify when additional lot capacity may be needed. Lots with low occupancy may suggest

the need for greater marketing, improved facilities/amenities, or expanded multimodal connections. Lots with over 80% occupancy may suggest the need for additional capacity.

- **User Surveys** – Conduct outreach of park and ride lot users to identify opportunities to improve park and ride lots to better meet the needs of the users. User surveys can be conducted through a variety of methods including paper comment cards on site, online surveys, and user interview. Data gathered through user surveys can also help to inform the marketing approach. Topics to include in user surveys can include:
  - *User Characteristics* – Identification of the demographics of lot users. Understanding who is using the lot, how they get to the lot, and the reason for using the lot helps to ensure the appropriate amenities and informs the marketing strategy. At sites served by transit, transit usage should also be assessed and coordinated with the transit agency.
  - *User Satisfaction* – Assessment of user's satisfaction with the condition of the lot, feeling of safety on site, cleanliness of the site, and amenities available. User satisfaction surveys can be used to gather complaints, suggestions for lot improvements, and the need for additional amenities and features.

Marketing

Marketing and promotion are key factors in the successful implementation of park and ride lots as a TDM strategy. The goal of marketing is to provide the public with information on the locations of park and ride lots, lot amenities, and services such as transit connections and vanpools available at the lot. Potential users of park and ride lots will vary by location and promotional techniques should be tailored for specific lots.

Park and ride lot marketing activities may include:

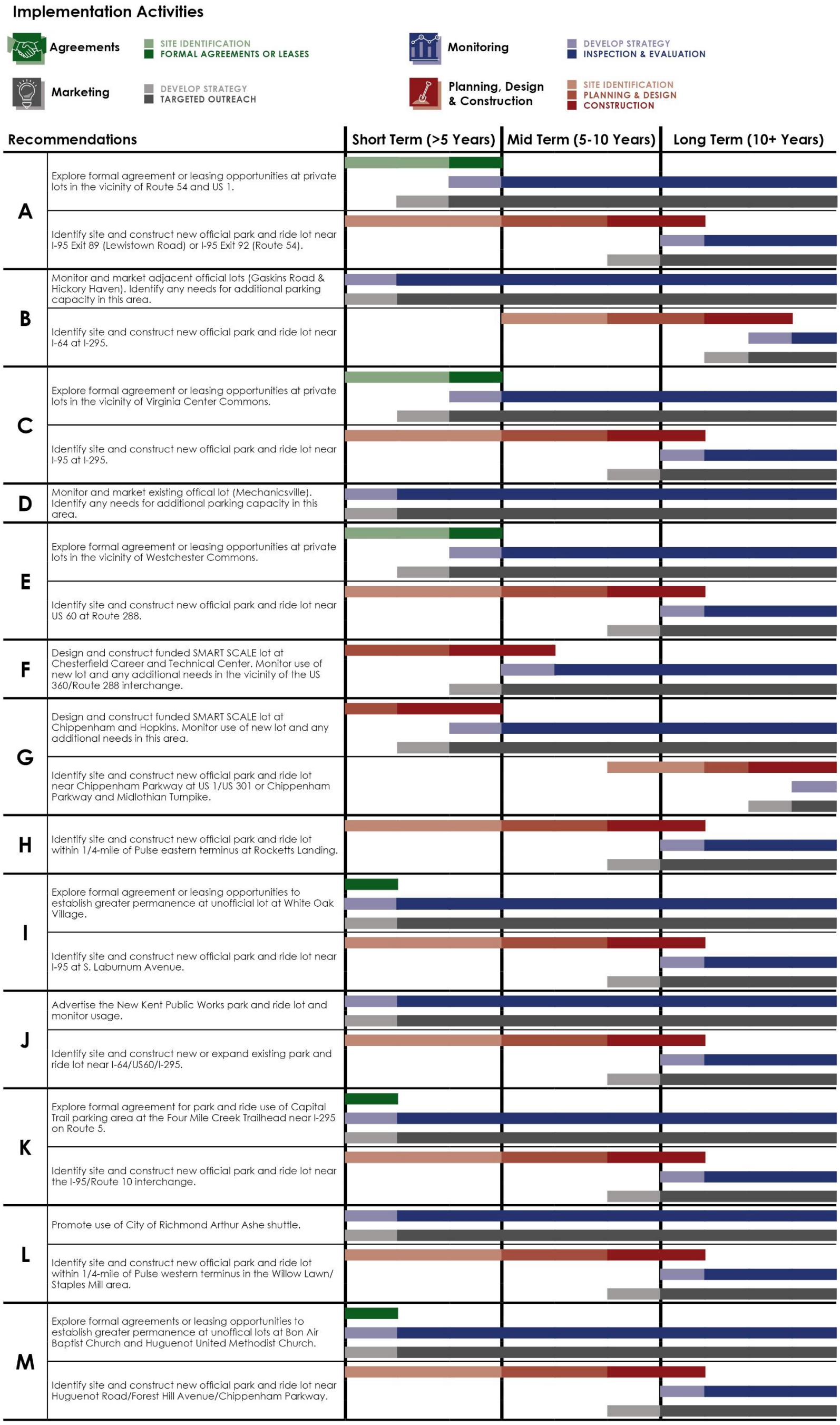
- **Marketing Strategy** – Develop or update a marketing strategy that identifies the target audiences for the services provided at the park and ride lot and the promotional strategies that will be employed to communicate the benefits of the lot to this audience. Promotional strategies can include signage and wayfinding, website, informational campaigns, sponsorships, and incentives. The marketing strategy considers both the marketing of the overall park and ride program as well as individual lots. Depending on the promotional techniques planned for a park and ride lot, a variety of public and private stakeholders can play a role in marketing and the marketing strategy should identify which stakeholders are responsible for executing the promotional elements. The marketing strategy should be regularly reviewed and updated to reflect observations from site monitoring and changing usage of the site.
- **Targeted Outreach** – Execute the marketing plan to reach the identified target audiences. Promotional strategies will vary by audience. Target audiences can include the following:
  - *Residents* – People living in the vicinity of the park and ride lot are primary users of park and ride lots. Direct mailing of brochures to households in the target service areas, media advertisements, and posters/billboards in the community are some ways to reach this target audience.
  - *Employers* – Employers can help to advertise and encourage the use of transit and park and ride facilities to employees. Employers can provide information to employees on the availability of transit service, park and ride, and coordinate vanpools/carpools. In addition,

employer sponsored incentives, such as free or reduced-cost transit passes or parking spaces designated for carpool users, can incentivize employees to use park and ride lots.

- *Transit & Carpool/Vanpool Users* – Collaboration and joint promotion of transit, carpool/vanpool, and park and ride lots can help to effectively reach this audience. Incentives such as reduced-cost transit passes for park and ride users can encourage greater usage of park and ride facilities.

A summary of the recommended actions for each need area, the associated implementation actions, and anticipated timeframes is provided in **Figure 24**. All timeframes are approximate and will be highly dependent on the availability of land and funding sources. In general, short-term activities are anticipated to be completed in the next five years, mid-term activities are anticipated to be completed in the next five to ten years, and long-term activities will likely take more than 10 years to complete. Recommended actions, especially those in the mid- and long-term timeframes, should be reevaluated to ensure the recommendations are meeting the needs of the community at the time of implementation.

Figure 24: Summary of Recommended Actions



Stakeholder Roles and Responsibilities

Successful implementation of park and ride recommendations will require collaboration between stakeholders. **Table 21** provides a summary of stakeholder roles and responsibilities for implementing the Richmond regional park and ride strategy. Additional details on the roles and responsibilities for each stakeholder are provided in the following sections.

Table 21: Summary of Stakeholder Roles and Responsibilities

Implementation Actions	Localities	RRTPO and PlanRVA	GRTC	RideFinders	VDOT	DRPT	Private Sector Partners and Employers
Agreements							
Identification of sites for formal agreements and leases	Lead if agreement is between locality and private lot owner	Support through regional strategy	Lead if agreement is between GRTC and private lot owner		Lead if agreement is between VDOT and private lot owner		Support through coordination with public stakeholders
Negotiation of formal agreements and leases	Lead if agreement is between locality and private lot owner		Lead if agreement is between GRTC and private lot owner		Lead if agreement is between VDOT and private lot owner		Support through coordination with public stakeholders on agreement terms
Lot Construction							
Identification of sites for lot construction	Lead if lot will be locality owned or if site is on locality-owned land Support other stakeholder efforts to identify sites within locality	Support through development of regional strategy	Lead if lot will be GRTC owned Support other stakeholder efforts to identify sites along transit routes	Support other stakeholder efforts to identify sites at vanpool origins	Lead if lot will be VDOT owned or if site is on Commonwealth-owned land Support other stakeholder efforts to identify sites	Support in conjunction with transit and vanpool services	Support in accordance with development proffers
Planning, design, and construction of new or expanded lots	Lead if lot will be locality owned or if site is on locality-owned land Support other stakeholder efforts to design and construct lots within the locality	Support planning efforts	Lead if lot will be GRTC owned Support other stakeholder efforts to design and construct transit-accessible lots		Lead if lot will be VDOT owned or if site is on Commonwealth-owned land Support other stakeholder efforts to design and construct lots	Support planning efforts in conjunction with transit and vanpool services	Lead in accordance with development proffers
Marketing							
Development of marketing strategy	Lead for lots in locality Support development of regional marketing strategy	Lead development of regional marketing strategy	Lead for lots with transit connections and vanpool services Support development of regional marketing strategy	Support development of a regional marketing strategy	Lead development of statewide marketing strategy	Support development of statewide marketing strategy in conjunction with transit and vanpool services	Support in accordance with leases or agreements
Implementation of marketing strategy	Lead for lots in locality Support regional marketing strategies	Lead implementation of regional marketing strategy	Lead for lots with transit connections Support implementation of regional marketing strategy	Lead for lots that accommodate vanpool services Support implementation of regional marketing strategy	Lead implementation of statewide marketing strategy	Support implementation of statewide marketing strategy	Support stakeholders on promotion of lots Lead advertising and incentivizing employee use of lots
Monitoring							
Development of monitoring strategy	Lead if lot is locality owned Support development of regional monitoring strategy	Lead development of regional monitoring strategy	Lead if lots are GRTC owned Support other stakeholders if lots have transit connections	Support other stakeholders if lots accommodate vanpool services	Lead if lots are VDOT owned Lead development of statewide strategy for monitoring maintenance and usage		Support in accordance with leases or agreements
Inspection and evaluation	Lead if lot is locality owned	Lead regional evaluation efforts	Lead if lots are GRTC owned Support other stakeholders if lots have transit connections		Lead if lots are VDOT owned Lead statewide inspection and evaluation efforts		Support in accordance with leases or agreements

Localities (Cities, Counties, Towns)

Localities will be responsible for advancing the implementation of park and ride recommendations within their jurisdictions. Roles and responsibilities of localities include:

- Identifying private lots for formal agreements
- Negotiating and signing agreements or leases between the locality and private lot owners
- Identifying locality-owned or other available land for lot construction
- Developing zoning regulations and proffer agreements in support of park and ride
- Leading the planning, design, and construction of locality-owned park and ride lots
- Supporting the planning, design, and construction of non-locality-owned park and ride lots
- Applying for applicable funding sources in support of park and ride projects
- Providing funding towards the construction of locality-owned park and ride projects and supporting the funding of nonlocality owned park and ride projects
- Monitoring and maintaining locality-owned park and ride lots
- Collecting feedback from park and ride users
- Developing or refining a marketing strategy to promote the use of local park and ride lots
- Collaborating with other stakeholders on regional promotion of park and ride lots

RRTPO and PlanRVA

RRTPO and PlanRVA, as the region's metropolitan planning organization, will be responsible for providing regional support for park and ride projects and leading the collaboration between stakeholders. Roles and responsibilities of the RRTPO and PlanRVA include:

- Convening stakeholders in regional investment strategy and adoption of regional plans which provide impetus for project funding
- Providing direction on regional strategies for planning, funding and administering park and ride projects
- Supporting localities with planning efforts for park and ride
- Administering federal funds provided to the region
- Leading the collaboration of stakeholders on regional promotion of park and ride lots

GRTC

As public transportation providers, GRTC will be responsible for leading efforts to connect and promote park and ride lots with transit. There may also be opportunities for GRTC to enter into agreements with private lot owners or design and construct GRTC owned and operated park and ride lots. Roles and responsibilities of GRTC include:

- Identifying private lots along transit routes for formal agreements
- Negotiating and signing agreements or leases between GRTC and private lot owners

- Identifying available land and working with other stakeholders for lot construction along transit routes
- Leading the planning, design, and construction of GRTC-owned park and ride lots
- Supporting the planning and design of locality- or state-owned park and ride lots to insure lot design incorporates appropriate transit features and amenities and provides appropriate ingress/egress and site circulation for transit vehicles
- Providing funding towards the construction of GRTC-owned park and ride lots
- Collaborating with localities and the state for transit use of locality- and state-owned park and ride lots
- Applying for applicable funding sources in support of park and ride projects
- Monitoring and maintaining and GRTC-owned park and ride lots
- Collecting feedback from transit users on park and ride use
- Developing or refining a marketing strategy to jointly promote the use of park and ride lots in conjunction with transit services
- Collaborating with other stakeholders on regional promotion of park and ride lots

RideFinders

RideFinders will be responsible for leading efforts to connect and promote park and ride lots with vanpool services. Roles and responsibilities of RideFinders include:

- Identifying private lots at vanpool origins for formal agreements
- Collaborating with localities and the state for vanpool use of locality- and state-owned park and ride lots
- Collecting feedback from vanpool users on park and ride use
- Supporting the development or refinement of a marketing strategy to jointly promote the use of park and ride lots in conjunction with vanpool services
- Collaborating with other stakeholders on regional promotion of park and ride lots

VDOT

VDOT will be responsible for leading statewide park and ride efforts and serving as a resource to the region. VDOT will also play a role in programming and providing funding toward park and ride projects. Roles and responsibilities of VDOT include:

- Identifying private lots for formal agreements
- Negotiating and signing agreements or leases between the state and private lot owners or providing guidance on developing agreements.
- Identifying state-owned or other available land for lot construction
- Leading the planning, design, and construction of state-owned park and ride lots
- Supporting the planning, design, and construction of non-state-owned park and ride lots

- Programming park and ride projects in the VDOT Six Year Improvement Plan (SYIP)
- Providing dedicated funding for park and ride projects, including new lot construction, minor improvements, and maintenance activities
- Monitoring and maintaining state-owned park and ride lots
- Continuing to maintain an inventory of statewide park and ride lots and regularly collect occupancy data at the lots
- Collecting feedback from park and ride users
- Developing or refining a statewide marketing strategy and promoting the use of park and ride lots through the park and ride website as well as other initiatives
- Collaborating with other stakeholders on promotion of park and ride lots

DRPT

DRPT will serve as a resource to the region for promoting park and ride as part of an overall TDM strategy. Roles and responsibilities of DRPT include:

- Supporting other stakeholders in planning efforts for park and ride lots
- Programming capital transit improvements that support transit connections to park and ride lots, such as bus shelters or additional bus purchases for service to park and ride lots, in the DRPT SYIP
- Providing funding for capital transit improvements that support transit connections to park and ride lots
- Collaborating with other stakeholder and providing support in developing or refining a statewide marketing strategy and promoting the use of park and ride lots in conjunction with transit and vanpool services

Private Sector Partners & Employers

Private sector partners can play a role in park and ride through formal agreements, incorporating park and ride into new developments, and collaborating with other stakeholders throughout the implementation process. In addition, employers, both private and public sector, can help to promote and incentivize the use of park and ride facilities to employees. Roles and responsibilities of private sector partners and employers include:

- Coordinating with public stakeholders to enter into formal agreements or leases for the use of private lots for park and ride
- Assisting with monitoring and maintaining lots per the terms of any formal agreements or leases
- Leading the planning, design, and construction of park and ride lots included as part of development proffers
- Collaborating with other stakeholders on promotion of park and ride lots
- Advertising and incentivizing the use of transit and park and ride facilities to employees

Potential Funding Sources

Implementing park and ride recommendations will require a financial investment. A range of federal, state, and local funding sources can be used to fund park and ride projects. The use of specific funding sources will depend on the type of project and not all funding sources will be applicable to every project type. In many cases, using a mix of funding sources will benefit the project's ability to secure the full funding necessary for implementation, allowing a project to leverage local, state, and federal resources in concert with each other. This section summarizes potential funding sources that can be used for park and ride projects. **Table 22** and **Table 23** indicate the types of projects each source can be used to fund and the eligible funding recipients of the funding sources, respectively. Additional details on the specific funding sources is provided in the following sections.

Table 22: Eligible Park and Ride Uses of Funding Sources

Funding Sources		Planning	Design	Construction	Maintenance	Monitoring	Marketing	Minor Improvements	Transit Improvements	Leases
Federal	Regional Surface Transportation Block Grant (RSTBG) Program	✓	✓	✓	✓	✓	✓	✓	✓	
	Congestion Mitigation and Air Quality (CMAQ) Improvement Program	✓	✓	✓	✓	✓	✓	✓	✓	
	Better Utilizing Investments to Leverage Development (BUILD) Grants	✓	✓	✓					✓	
	Transportation Alternatives Set-Aside							✓	✓	
	FTA 5307 Urbanized Area Formula								✓	
	FTA 5309, Bus and Bus Related Equipment and Facilities								✓	
State	SMART SCALE	✓	✓	✓					✓	
	Revenue Sharing	✓	✓	✓					✓	
	VDOT District Maintenance Funds				✓					
	Secondary Six-Year Plan	✓	✓	✓				✓	✓	
Local	Local General Funds	✓	✓	✓	✓	✓	✓	✓	✓	✓
	Proffers	✓	✓	✓	✓	✓	✓	✓	✓	✓
	Transportation Service Districts	✓	✓	✓	✓	✓	✓	✓	✓	

Table 23: Eligible Funding Recipients

Funding Sources		Localities	GRTC	PlanRVA	VDOT	DRPT
Federal	Regional Surface Transportation Block Grant (RSTBG) Program	✓			✓	✓
	Congestion Mitigation and Air Quality (CMAQ) Improvement Program	✓			✓	✓
	Better Utilizing Investments to Leverage Development (BUILD) Grants	✓	✓	✓	✓	✓
	Transportation Alternatives Set-Aside	✓	✓	✓	✓	✓
	FTA 5307 Urbanized Area Formula		✓			
	FTA 5309, Bus and Bus Related Equipment and Facilities		✓			
State	SMART SCALE	✓	✓	✓		
	Revenue Sharing	✓			✓	
	VDOT District Maintenance Funds				✓	
	Secondary Six-Year Plan	✓				
Local	Local General Funds	✓				
	Proffers	✓				
	Transportation Service Districts	✓				

Federal

Regional Surface Transportation Block Grant (RSTBG) Program

Applicable park and ride uses of funds: Planning, Design, Construction, Maintenance, Monitoring, Marketing, Minor Improvements, Transit Improvements

Eligible funding recipients: Localities, VDOT, DRPT

The RSTBG program is the FAST Act update to the Regional Surface Transportation Program. This funding is a flexible federal highway grant that is allocated to states and localities. In urbanized areas over 200,000 residents like Richmond, RSTBG funds are apportioned by the MPO (PlanRVA) to be administered to various projects based on local priorities. RSTBG funds can be used for a wide variety of projects, including park and ride construction and maintenance. Proposed lots in all need areas will likely be eligible for federal funding through the RSTBG program but obtaining these funds will require coordination by localities with RRTPO and VDOT. Localities submit candidate projects to the RRTPO for consideration on an annual basis, typically in the autumn, and projects are reviewed by RRTPO staff, VDOT, and the region's Technical Advisory Committee for allocation, typically in the spring.

Congestion Mitigation and Air Quality (CMAQ) Improvement Program

Applicable park and ride uses of funds: Planning, Design, Construction, Maintenance, Monitoring, Marketing, Minor Improvements, Transit Improvements

Eligible funding recipients: Localities, VDOT, DRPT

The CMAQ program is a flexible source of funding for state and local governments to implement transportation projects that help reduce congestion and/or improve air quality to meet the National Ambient Air Quality Standards (NAAQS). Proposed lots in all need areas will likely be eligible for federal funding through the CMAQ program but obtaining these funds will require coordination by localities with RRTPO and VDOT. Funds are available to areas that are in nonattainment of the NAAQS or formerly were in nonattainment. The Richmond region is currently in compliance, but the RRTPO continues to qualify for CMAQ funding through an agreement with the Virginia Department of Environmental Compliance. CMAQ funds are apportioned by the MPO (PlanRVA) to be administered to various projects based on local and regional priorities. These funds can be used for planning, designing, and constructing park and ride facilities; providing amenities and services at the park and ride lots, including pedestrian and bicycle amenities and electric vehicle charging stations; implementing transit improvements; and administering and promoting carpooling and vanpooling programs. Monitoring and maintenance activities for new lots are eligible for CMAQ funding within the first three years of construction, but other funding sources will need to be identified for continued operational needs past the initial three years.

Better Utilizing Investments to Leverage Development (BUILD) Grants

Applicable park and ride uses of funds: Planning, Design, Construction, Transit Improvements

Eligible funding recipients: Localities, GRTC, PlanRVA, VDOT, DRPT

BUILD grants are funds awarded through the US Department of Transportation on a competitive basis for surface transportation infrastructure projects that will have a significant local or regional impact. Previously known as the TIGER grant program, BUILD grants are awarded annually, with applications due in July. Eligible projects include highway, public transit, rail, port, and intermodal investments in non-Federally-owned facilities and awards are limited to grants between $5 million and $25 million. Applicants

for BUILD grants can include state or local governments, transit agencies, MPOs, any other political subdivision of state or local governments, or any combination of these entities. Awards are primarily selected based on the project's impacts to safety, state of good repair, economic competitiveness, environmental sustainability, and quality of life. US DOT also considers how projects incorporate innovative technologies and financing and define public and private partnerships, as well as the project's overall readiness, in the evaluation of project competitiveness. Once awarded, BUILD grant funds can be used to finance planning and design activities, including environmental analysis and feasibility studies, along with construction.

Transportation Alternatives Set-Aside

Applicable park and ride uses of funds: Minor Improvements, Transit Improvements

Eligible funding recipients: Localities, GRTC, PlanRVA, VDOT, DRPT

Part of the Surface Transportation Block Grant program under the FAST Act, the set-aside for transportation alternatives (TA) replaced the previous Transportation Alternatives Program. Under the TA set-aside, a variety of smaller-scale projects can be funded, including pedestrian and bicycle amenities, vegetation management, landscaping, and stormwater mitigation. While the construction of park and ride facilities is not eligible for funding from this source, improvements associated with park and ride lots could be funded through this set-aside. Funding is administered through VDOT and applications for funding are accepted annually.

FTA 5307, Urbanized Area Formula Funding Program

Applicable park and ride uses of funds: Transit Improvements

Eligible funding recipients: GRTC

Typically for transit operators, funds from the Urbanized Area Formula Funding Program (49 U.S.C. 5307) can be dispensed to fund transit related improvements at park and ride lots. GRTC is the region's recipient of 5307 funds and can use these funds at park and ride lots that have connections to transit service. Proposed park and ride lots in need areas currently served by transit will be eligible for 5307 funds to construct associated transit improvements. Need areas where transit is planned for the future, or where existing express service could be diverted to serve a new lot, would require these changes to transit service to occur prior to or in coordination with the development of the proposed lot to qualify for 5307 funds.

FTA 5309, Bus and Bus Related Equipment and Facilities

Applicable park and ride uses of funds: Transit Improvements

Eligible funding recipients: GRTC

The transit capital investment program (49 U.S.C. 5309) provides capital assistance for three primary activities: new and replacement buses and facilities (Bus and Bus Related Equipment and Facilities program); modernization of existing rail systems (Fixed Guideway Modernization program); and new fixed guideway systems (New Starts program and Small Starts). Transfer facilities, park and ride lots, and amenities such as bus shelters and bus stop signs are eligible capital projects for this funding. Proposed park and ride lots in need areas currently served by transit will be eligible for 5309 funds to construct associated transit improvements. Need areas where transit is planned for the future, or where existing express service could be diverted to serve a new lot, would require these changes to transit

service to occur prior to or in coordination with the development of the proposed lot to qualify for 5309 funds.

State

SMART SCALE

Applicable park and ride uses of funds: Planning, Design, Construction, Transit Improvements

Eligible funding recipients: Localities, GRTC, PlanRVA

SMART SCALE is Virginia's method for prioritizing projects for the Commonwealth's SYIP. This funding includes state funds that are not governed by other programs, such as CMAQ, Revenue Sharing, TA, set-asides, region-specific funding, and State of Good Repair. Funds are divided into two pools: the District Grants Program, which prioritize projects against each other within a VDOT construction district, and the High-Priority Projects Program, which prioritizes projects against others across the Commonwealth. The prioritization process has been completed in three rounds since 2015 and will continue to occur every two years, with the next round beginning in 2020. Projects must meet needs identified in the Commonwealth's long-range transportation plan, VTrans2040, to be considered for prioritization. Prioritization scores for each project are calculated based on anticipated costs and benefits related to congestion mitigation, economic development, accessibility, safety, environmental quality, and land use. Proposed park and ride facilities in all need areas, as well as amenities and services at the park and rides, including pedestrian and bicycle amenities, transit improvements, and electric vehicle charging stations, are eligible for SMART SCALE funding and have been prioritized in the Richmond VDOT district in previous rounds.

Revenue Sharing

Applicable park and ride uses of funds: Planning, Design, Construction, Transit Improvements

Eligible funding recipients: Localities, VDOT

VDOT's Revenue Sharing Program provides additional funding to localities to construct, improve, or maintain highway systems. Funding under this program requires a dollar-for-dollar match with local funding. Projects can include those listed under the Six-Year Improvement Plan, for the purpose of accelerating the completion of the project. Alternatively, projects not included in the Six-Year Improvement Plan can be funded through Revenue Sharing, subject to availability of local funds and the concurrence of the designated local VDOT Manager. Proposed park and ride lots in all need areas would be eligible for this program.

VDOT District Maintenance Funds

Applicable park and ride uses of funds: Maintenance

Eligible funding recipients: VDOT

VDOT District Maintenance Funds can be used by VDOT Districts for the maintenance of assets, which could include VDOT-owned park and ride lots. Maintenance funds are managed by individual VDOT Districts and are administrated to meet District needs. This is the main source of funding maintenance at existing state-owned park and ride lots.

Secondary Six-Year Plan

Applicable park and ride uses of funds: Planning, Design, Construction, Minor Improvements, Transit Improvements

Eligible funding recipients: Localities

Secondary Six-Year Plans (SSYP) are a component of the SYIP. Funding under the SYIP is broken down into primary system, secondary system, and urban system components. Primary funds are allocated by VDOT construction districts, but secondary funds are allocated to individual localities for use on projects identified as priorities in a locality's SSYP. Local SSYPs are updated at least every two years and require concurrence from VDOT. Funds can be used for the construction or expansion of commuter parking lots but must connect to a secondary route.

Local

Local General Funds

Applicable park and ride uses of funds: Leases, Planning, Design, Construction, Maintenance, Monitoring, Marketing, Minor Improvements, Transit Improvements

Eligible funding recipients: Localities

Local general funds are typically the most flexible form of funding and can be used for all types of implementation activities for proposed lots in all need areas. General funds are revenue derived from local property, sales, and other taxes and fees, as well as revenue transfers from state and federal sources. The availability of general funds will be dependent on local revenues and budget priorities. Most state and federal funding sources include formulas that rely on the level of local investment; local general funds typically account for a large proportion of these local matching funds for state and federal grant programs.

Proffers

Applicable park and ride uses of funds: Leases, Planning, Design, Construction, Maintenance, Monitoring, Marketing, Minor Improvements, Transit Improvements

Eligible funding recipients: Localities

Proffers are conditions imposed on new developments as a means to mitigate impacts identified in the zoning process. Proffers can take the form of cash contributions, donations of land, or construction and dedication of planned public projects. In 2013, the Commission on Local Governments found that the largest share of proffered funds was spent on transportation improvements. Proffer agreements for park and ride could include dedication of spaces in a new development for park and ride use, construction of a new park and ride lot, expansion or improvement to an existing lot, dedication of land to be used for another stakeholder to construct a park and ride lot, or providing funding for lot amenities.

Transportation Service Districts

Applicable park and ride uses of funds: Planning, Design, Construction, Maintenance, Monitoring, Marketing, Minor Improvements, Transit Improvements

Eligible funding recipients: Localities

Transportation improvements can be directly funded through taxation of nearby properties through the creation of transportation service districts. In Virginia, the establishment of a transportation service district requires the proposed improvements and their benefits to surrounding land uses be identified and the creation of the district is agreed to by the governing body of the locality and the Commonwealth Transportation Board. In most cases, these service districts have been used to fund large roadway and transit projects, such as the Powhite Parkway-Charter Parkway Interchange in Chesterfield County. However, there may be an opportunity to fund the construction and maintenance of park and rides and related transit and transportation demand management improvements through a transportation district that is funded by the community it most directly serves. The most feasible use of transportation districts would be for proposed park and ride lots in need areas where existing or planned major transportation improvements, such as interchanges or bus rapid transit, may boost demand for park and ride facilities.

Conclusions

This study, the *Richmond Regional Park and Ride Investment Strategy*, identified regional needs for park and ride needs and developed recommendations for meeting those needs. Successful implementation of park and ride projects requires cooperation and collaboration of all regional stakeholders to push the projects forward.

Initial steps toward implementation can start immediately. These actions include initiating formal agreements with existing private lot owners where applicable, site identification for formal agreements and leases, site identification for new lot construction, monitoring use and conditions of existing lots, and developing and implementing marketing strategies for promoting existing lots. Some projects will progress faster than others. Factors influencing the timeframe over which projects are implemented will include availability of land, ability to secure funding, and local project support. Whenever possible, steps should be taken to secure funding early in the planning process.

The *Richmond Regional Park and Ride Investment Strategy* provides the foundation for park and ride lot recommendations in the region. The results from this study should be used to inform other regional and state planning efforts, such as the RRTPO's next Long Range Transportation Plan and VTrans, the statewide transportation plan.

Appendix A: *VDOT Park and Ride Investment Strategy* Recommended Lot Locations

Table A: *VDOT Park and Ride Investment Strategy* Recommended Park and Ride Locations

Jurisdiction	Lot Description and Location
Chesterfield County	New lot at Rte 150 / Chippenham Pkwy & Rte 1 / Jefferson Davis Hwy
Chesterfield County	New lot at I-95 & Rte 10 / W Hundred Rd; Exit 61
Chesterfield County	New lot at Rte 288 / WW II Veterans Memorial Hwy & Rte 60 / Midlothian Tpke, near Watkins Center Pkwy
Chesterfield County	New lot near Rte 360 / Hull Street Rd & Rte 621 / Winterpock Rd
Chesterfield County	New lot at Rte 288 / WW II Verterans Memorial Hwy & Rte 10 / Iron Bridge Rd
Chesterfield County	New lot at Rte 76 / Powhite Pkwy & Rte 686 / Jahnke Rd
Chesterfield County	New lot on Arboretum Pkwy, near Rte 76 / Powhite Pkwy & Rte 60 / Midlothian Tpke
Chesterfield County	New lot at Rte 76 / Powhite Pkwy & Courthouse Rd
Chesterfield County	New lot at Rte 652 / Old Hundred Rd & Rte 754 / Charter Colony Pkwy
Chesterfield County	New lot on Restingway Ln, near Rte 150 / Chippenham Pkwy & Rte 637 / Hopkins Rd
Chesterfield County	New lot near Rte 150 / Chippenham Pkwy & Rte 10 / Iron Bridge Rd
Chesterfield County	New lot at Rte 150 / Chippenham Pkwy & Rte 360 / Hulll Street Rd
Chesterfield County	New lot near Rte 360 / Hull Street Rd & Rte 288 / WW II Veterans Memorial Hwy, near Lonas Pkwy
Chesterfield County	New lot at Rte 60 / Midlotian Tpke & Rte 147 / Huguenot Rd
Goochland County	New lot at Rte 288 / WW II Veterans Memorial Hwy & Rte 250 / Broad Street Rd
Goochland County	Expansion to existing at NE lot at I-64 and Route 623/Ashland Rd; New lot at SW corner of interchange
Hanover County	New lot at I-295 & Rte 360 / Mechanicsville Tpke; Exit 37
Hanover County	New lot at I-95 & Rte 802 / Lewistown Rd; Exit 89
Hanover County	New lot near Rte 30 / Kings Dominion Blvd & Rte 688 / Doswell Rd, off of I-95; Exit 98
Henrico County	New lot at Rte 60 / Williamsburg Rd & Eastover Ave
Henrico County	New lot at Rte 895 / Pocahontas Pkwy & Rte 5 / New Market Rd
Henrico County	New lot& Rte at 250 / W Broad St & Gathering Pl, near I-64; Exit 178
Henrico County	New lot at Rte 60 / Williamsburg Rd & Technology Blvd, off of I-295; Exit 2
Henrico County	New lot at Rte 1/301 / Chamberlayne Rd & E Parham Rd
Henrico County	New lot at S Airport Dr & Federal Rd
Henrico County	New lot at I-295 & Rte 1 / Brook Rd; Exit 43
Henrico County	New lot at I-64 & Rte 271 / Pouncey Tract Rd
Henrico County/City of Richmond	New lot at Rte 250 / W Broad St & Rte 33 / Staples Mill Rd
New Kent County	New lot at I-64 & Rte 609 / Emmaus Church Rd; Exit 211
New Kent County	New lot at I-64 & Rte 155 / N Courthouse Rd; Exit 214
New Kent County	Expand lot on Rte 60 / E Williamsburg Rd, near Rte 33 / New Kent Hwy, off I-64; Exit 205
Powhatan County	New lot near Rte 288 / WW II Veterans Memorial Hwy & Rte 711 / Huguenot Trl
Powhatan County	New lot at Rte 522 / Maidens Rd & Rte 60 / Anderson Hwy
Town of Ashland	New lot at I-95 & Rte 54 / Thompson St; Exit 92

Appendix B: Example Park and Ride Agreements