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Scenic Corridor and Trail-Oriented Development Plan for Charles City County, Virginia

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SCENIC CORRIDOR & TRAIL-ORIENTED DEVELOPMENT

A PLAN FOR CHARLES CITY COUNTY

Client
Charles City County Department of Community Development

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Table of Contents

Tables & Figures

SECTION 1: INTRODUCTION

Plan Purpose

Virginia Route 5 is the main east-west road through Charles City County and is designated as a scenic byway by the Virginia Department of Transportation (Moran, Stahl & Boyer, 2015). The Virginia Capital Trail, a cycling and pedestrian shared-use path from Richmond to Jamestown, largely runs parallel to Route 5. The county believes that the Capital Trail and the rural characteristics of Route 5 can be utilized to stimulate economic growth. Charles City is a rural county within the greater Richmond Metropolitan Statistical Area. The county is bordered by New Kent County to the north, James City County to the east, Henrico County to the west, and the James River to the south.

The surrounding area of the scenic byway is home to numerous historic plantations, but plantation tourism has been in decline (Moran, Stahl & Boyer, 2015). Furthermore, there are few amenities along the Charles City County portion of the Capital Trail beyond a restaurant and a few scattered bed-and-breakfast inns.

The county has a Courthouse Area Plan which contains development guidelines for the area ("Courthouse Area Plan," 2013), and it has adopted an Economic Development Strategic Plan (Moran, Stahl & Boyer, 2015) that provides goals and a broader strategy for the county. However, none of these address specific development guidelines for other sections of the Route 5 / Capital Trail corridor in Charles City County.

Furthermore, although the county has a comprehensive plan and economic development strategic plan, neither provides detail on the form that tourism development should take. Nor do the plans provide specific tools preserving the rural landscape of the scenic byway. For the county to successfully maintain rural character and spur development from tourism, it must shape how and where development will occur.

This plan offers suggestions on where Charles City County can achieve the desired commercial growth along the Route 5 corridor, and the plan provides rural design guidelines to maintain rural character while accommodating growth. The plan uses a basic market analysis of specific nodes along the corridor, and it looks at case studies that provide examples for the county.

Client Description

The client for this plan is the Charles City County Department of Community Development, which handles the economic development and planning for the county. The Department of Community Development serves the county in the areas of economic development, planning, zoning administration, and environmental compliance.

Plan Implementation

This plan serves as a corridor plan to be used as an addition to the county's current comprehensive plan, economic development plan, and small areas plans. The Department of Community Development can use this plan in a similar manner to its existing Courthouse Area Plan or Route 106 Industrial Area Plan. For ultimate implementation, the local government may need to adopt new ordinances or modify existing ones.

Plan Outline

The plan contains the following main components: broad market analysis for the recommended node(s) of development with a specific focus on the potential location of development on Route 5, rural design options for the corridor, and rural design recommendations.

INTRODUCTION

BACKGROUND & LITERATURE REVIEW

METHODOLOGY

RESEARCH

RECOMMENDATIONS

IMPLEMENTATION

SECTION 2: BACKGROUND & LITERATURE REVIEW

Plan Context

Virginia Route 5 is the major east-west corridor through Charles City County (Figure 1). The Virginia Capital Trail, a multi-use path running from the City of Richmond to Jamestown, runs along Route 5. About 27 miles of both Route 5 and the Virginia Capital Trail pass through Charles City County (Virginia Capital Trail Foundation, 2018). An existing Economic Strategic Development Plan cites diversification and expansion of tourism as one of the county's key initiatives (Moran, Stahl & Boyer, 2015). The report refers to the Virginia Capital Trail, agricultural tourism, nature-based tourism, and historic plantations and colonial history as potential drivers to the county; it notes that those drivers are each found along the Route 5 Corridor. Beyond potential existing development drivers, factors that influence development include demographics, employment, and environmental constraints.

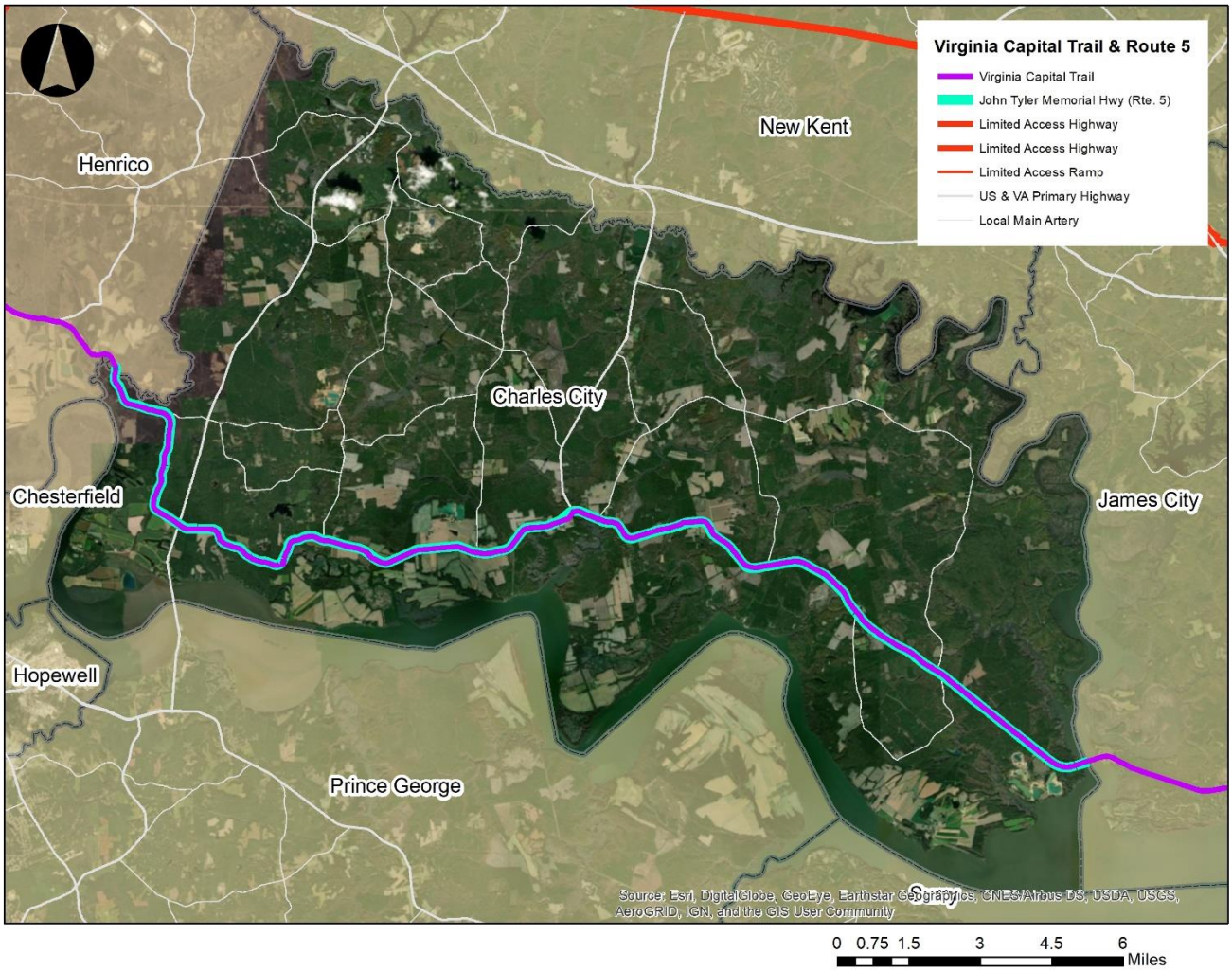


Figure 1. Virginia Capital Trail, Charles City County

Existing and Upcoming Plans, Guides, and Surveys

Beyond the Economic Strategic Development Plan, the county has an existing Courthouse Area Plan that lays out examples of nodal/village development as well as scenarios for water and sewer service areas. The plan's purpose is for the Courthouse area to be a "welcoming, bicycle and pedestrian-friendly center for activity surrounding the Capital Trail and supportive to life in the County," (Charles City County, 2013).

The Richmond Regional Planning District Commission (RRPDC) issued Capitalizing on the Capital Trail, a guide for development related to the trail. The document is short and broad in scope, but it makes a few recommendations on zoning, buffers, setbacks, and cluster development (RRPDC, 2012). The plan came out prior to the completion of the Capital Trail. This plan expands upon many of the concepts from the RRPDC plan.

The RRPDC also completed the 2040 Rural Long Range Plan (2040 RLRP) in June, 2018. The plan lays out transportation network goals for the rural areas around Richmond and includes a matrix that list funding opportunities for trail-side amenities and infrastructure such as sidewalks.

Several plans or surveys in progress for 2019 (Busching, 2019). The RRPDC is in the process of partnering with Smart Growth America to develop a complete streets toolkit for localities in the region. In late spring of 2019, the Virginia Department of Transportation (VDOT) was conducting a trail-user survey for the Virginia Capital Trail Charles City County Improvement Project. The survey was collecting user suggestions for trail amenities and insight into current safety issues. Finally, Charles City County will update its comprehensive plan in 2019, providing an opportunity to address and implement strategies suggested from these other plans.

Population

The county has a 2018 estimated population of 7,017 (Weldon Cooper Center, 2018). Population projections from the Weldon Cooper Center (2018) predict a growing population based on exponential growth, linear extrapolation, and the Hamilton-Perry method. They estimate that the county will gain around 300 people by 2020, nearly 500 by 2030 and an additional 350 by 2040 (Table 1).

While recognizing that projections will change, the takeaway is that Charles City County is unlikely to experience a population boom. However, the distribution of growth within the county and in surrounding counties has the potential to reshape certain areas. If the population shifts to the western side of the county, then development opportunities will be different compared to a population distribution spread evenly throughout the county. Stagnant or slow population growth has several implications for corridor planning. If the county is desperate for growth, it may be tempted to not actively manage it, for fear of excluding potential opportunities. The county may become complacent and feel no need for a corridor plan until more pressure is felt.

Table 1. Population Projections to 2040

Charles City County	**Census**	**Estimate**		**Projection**	
	2010	**2018**	**2020**	**2030**	**2040**
Population	7256	7017	7386	7602	7710
percentage change		*-3.3%*	*0.053*	*0.029*	*0.014*

(Weldon Cooper Center, 2018)

Employment

As of 2016, 55 percent of the county's civilian labor force was employed, four percent was unemployed, while 41 percent of the population was not in the labor force at all (Table 2). The percentage of those not in the labor force increased from 26 percent to 41 percent between 2012 and 2016. The implications for the county and a possible corridor plan are several. A retired or aging population may not want the community to change at all, they may want to see their community provide more amenities for aging in place, or they may want a corridor that brings in new employment generating activities.

If people are not working, then they may be on low, fixed incomes. U.S. Census poverty data shows that nearly 11 percent of all families and nearly 15 percent of the total population lived below the poverty level in 2016 (US Census Bureau, 2017c). Of the population over age 65, 11 percent lived below the poverty level. Those living below the poverty level may be more likely to feel impacted by new development if it raises land values or property taxes.

Table 2. Employment Status, 16 Years and Older

EMPLOYMENT STATUS	2012			2016		
	Number	%	error	Number	%	error
Total	6,081	100%	0.01	6,088	100%	0.00
In Labor Force	3,686	61%	0.04	3,599	59%	0.04
Civilian Labor Force	3,681	61%	0.04	3,582	59%	0.04
Employed	3,363	55%	0.05	3,321	55%	0.05
Unemployed	318	5%	0.23	261	4%	0.21
Armed Forces	5	0%	1.20	17	0%	1.00
Not in Labor Force	2,395	39%	0.06	2,489	41%	0.06

(US Census Bureau, 2013, 2017b)

Commuting

Only 21 percent of Charles City's population works within the county (Table 3). Of those commuting elsewhere, 13 percent worked in Richmond City, 65 percent worked in one of the counties of the Richmond Metropolitan Statistical Area (MSA), and 20 percent worked in a different MSA (Table 4). In 2016, 1,516 people were employed within the county (US Census Bureau, 2016). This number is higher than the 693 Charles City residents who work within the county. This indicates people not only commute away from Charles City for work, but some commute to Charles City for work, and it may reveal an opportunity to bring those commuters into the county to live closer to where they work.

The dominance of commuting can indicate several things. There is currently more labor within the county than there are employment opportunities. Despite some level of in-commuting, at this time most people choosing to reside in Charles City County will have to commute elsewhere for work. Residents already living in the county may leave if they decide employment opportunities are too few.

Table 3. Place of Work by County & State

	Estimate	%
Total	3,253	100%
Worked in state of residence	3,217	99%
Worked in county of residence	693	21%
Worked outside county of residence	2,524	78%
Worked outside state of residence	36	1%

(US Census Bureau, 2017a)

Table 4. Place of Work in Relation to Metropolitan Statistical Area

	Estimate	%
Total	3,253	100%
Worked in Richmond Metropolitan Statistical Area:	2,538	78%
Worked in a principal city	408	13%
Worked outside a principal city	2,130	65%
Worked in a different Metropolitan Statistical Area:	671	21%
Worked in a principal city	128	4%
Worked outside a principal city	543	17%
Worked outside any Metropolitan or Micropolitan Statistical Area	44	1%

(US Census Bureau, 2017c)

The top places of work for Charles City County residents are Henrico, Richmond city, Chesterfield, and James City County.

Similarly, the top places of residence for commuters into Charles City County are Henrico, Chesterfield, and James City.

These counties border the western and eastern edges of Charles City. Furthermore, Virginia Department of Transportation traffic patterns show that the heaviest traffic within Charles City flows along Route 5 at the borders with Henrico and James City, along Roxbury Road, and a few other spots near the New Kent border (Appendix A). These last hot spots along New Kent may mean that commuters drop down from I-65 or Route 60 through New Kent County when commuting into Charles City.

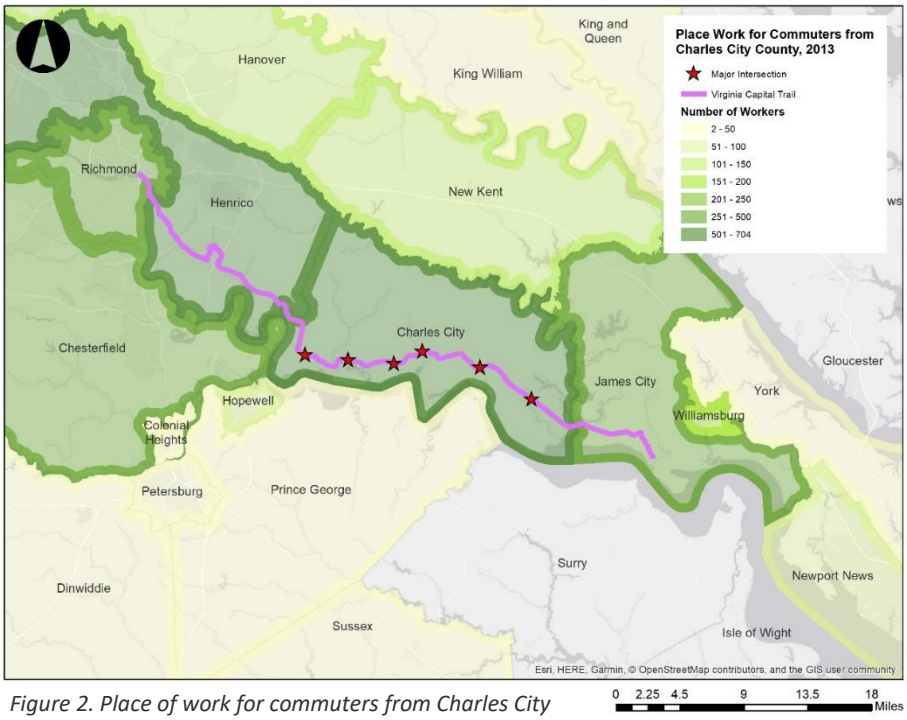


Figure 2. Place of work for commuters from Charles City (U.S. Census, 2013).

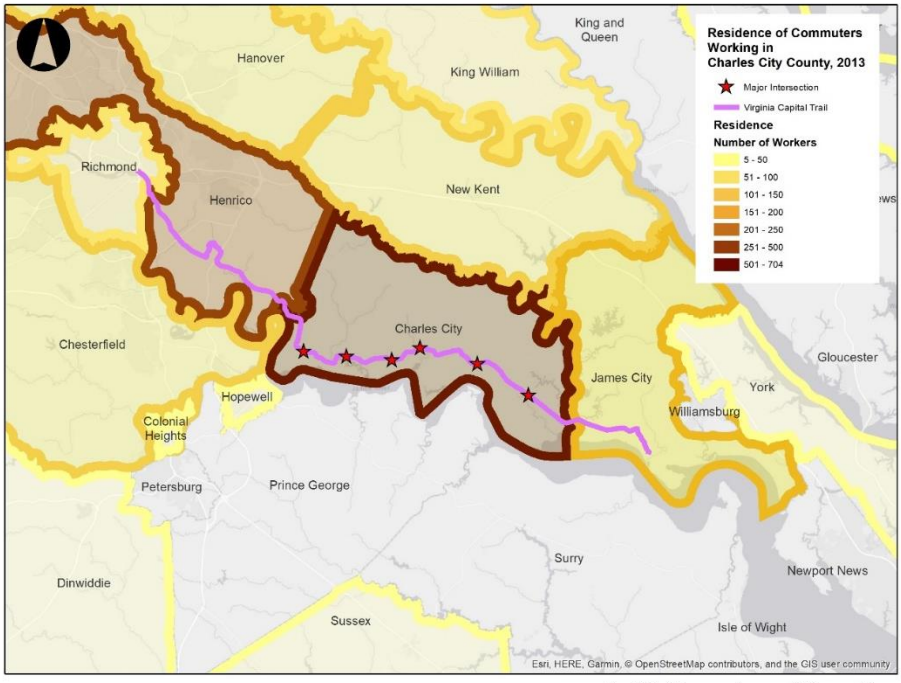


Figure 3. Residence of commuters working in Charles City (U.S. Census, 2013).

Economy

Most jobs in the county are in manufacturing, transportation and warehousing, and construction (Table 5). Of these, the Bureau of Labor Statistics predicts manufacturing employment to decrease, while construction, and transportation and warehousing, will increase (BLS, 2018)(Table 6, Appendix). With so few employment opportunities in the county, any ability to create new jobs by leveraging the county's scenery and recreational features would probably be welcome.

One critical takeaway is that although small, the recreation and tourism industry is part of the base economy of Charles City County. The base industries are those that bring wealth from outside the county. While the recreation and tourism sector is not as currently impactful as construction or manufacturing, creating a more robust recreation and tourism sector will make the overall local economy more balanced and resilient. This is especially important as the manufacturing industry is predicted to decline in the coming decade.

Table 5. Largest Sector by Absolute Number of Employees

NAICS Code	Description	Employees
	TOTAL	1435
23	Construction	370
48-49	Transportation and Warehousing	292
31-33	Manufacturing	286
81	Other Services (except Public Administration)	106
44-45	Retail Trade	97
56	Administrative and Support and Waste Management and Remediation Services	79
42	Wholesale Trade	70
71	Arts, Entertainment, and Recreation	43
72	Accommodation and Food Services	36
11	Agriculture, Forestry, Fishing and Hunting (tie)	28
62	Health Care and Social Assistance (tie)	28

(US Census Bureau, 2016)

Table 6. Base Industry & Export Employment and Projections

		Export Employment	Projected Export Employment								
NAICS Code	Description	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025
	Total	1,125	1,131	1,136	1,142	1,148	1,153	1,159	1,165	1,171	1,178
11	Agriculture, Forestry, Fishing and Hunting	28	28	28	28	28	28	27	27	27	27
23	Construction	370	374	379	383	388	393	397	402	407	412
31-33	Manufacturing	286	284	283	281	279	278	276	274	273	271
48-49	Transportation and Warehousing	292	294	296	298	300	302	304	307	309	311
71	Arts, Entertainment, and Recreation	43	43	44	44	44	45	45	45	45	46
81	Other Services (except Public Administration)	106	107	107	108	108	109	109	110	110	111
										Export Base Employment Multiplier	*2.00*
										New Basic Jobs Projected	53
										New Non-Basic Jobs Projected	105
										Total Employment Change	158

(BLS, 2018; US Census Bureau, 2016)

Literature Review

The Virginia Capital Trail running through Charles City County is unique in that it does not pass through an existing town and the scenic lands are mostly privately owned. Existing commercial development along Route 5 in the county is sparse. The existing literature offers a few considerations but very few prescriptions for how to proceed under these circumstances.

First, by looking at the likely users of a multi-use path, ideas begin to emerge. Bowker, Bergstrom, & Gill (2017) performed an economic analysis of the 34-mile rails-to-trails Virginia Creeper Trail which runs between Abingdon and Damascus, Virginia along a former railroad bed. For their analysis, they defined local users as people living within 25 miles of the nearest access point and non-local users as those living beyond 25 miles. The authors found that 47 percent of the surveyed users were local and would travel an average of 7.8 miles to access the trail. However, non-locals traveled an average of 250 miles to use the trail, ten percent of whom stayed overnight near the trail. Overnight users created five times the economic impact of other users (Bowker, Bergstrom, & Gill, 2007).

Lindsey et al. (2015) conducted a survey of shared-use trails users near Columbus, Ohio. While the trails are in urban and suburban areas as opposed to rural areas, several trends emerged similar to those found through the Virginia Creeper Trail study. The authors found that 45 percent of trail users traveled ten or more miles to access the trails, and 20 percent of them spent $17 dollars or more during their bicycle outing (Lindsey et al., 2015). Understanding that day-users who live nearby will have a different set of needs than overnight users can frame what types of development are desirable. Overnight or distant travelers may provide more opportunity for economic impact than local users alone.

After understanding the potential travel distance of users, the literature points to the value of understanding how trail users rely on the trail. For example, Lindsey et al. (2015) concluded that trailhead parking was a determining factor in attracting cyclists who drove to the access, as did the Iowa Department of Transportation fifteen years prior (Economics Research Associates, 2000). The implication for Charles City is that the Virginia Capital Trail provides the destination activity, but trailheads are collection points for the destination.

Once users are on the path, they need to feel safe. An Urban Land Institute study by MacCleery, McMahon, & Norris (2016) concludes that the fear of being hit by a motor vehicle is the greatest impediment to bicycle use. The study goes on to recommend communities consider bicycle plans as part of their overall community plan to address bicycle safety. For the economic benefits of the Capital Trail to come to fruition, Charles City County must understand bicyclist behavior and safety concerns.

Beyond visitors, the design of any new development along the trail affects the scenery and livability for existing and potential residents, and this can affect property values. For livability, Lindsey et al. (2015) found no relationship between

proximity to the trails and higher property values, but MacCleery, McMahon, & Norris (2016) came to a different conclusion; they determined that home values tend to rise near bike developments. However, the authors did not parse out the circumstances for rising home values (MacCleery, McMahon, & Norris, 2016). As the private market recognizes the economic value of trails, Charles City County must be prepared to assist landowners and developers in understanding that value in the context of Charles City County. Beyond land value, other researchers surveyed homeowners living near multi-use trails; they found that a connection to nature for themselves and their progeny was one of the most consistent motivating factors for living next to the trail (Corning, Mowatt, & Chancellor, 2012). How to preserve that nature while capitalizing on its existence is one of the key tensions of the situation.

Fortunately, the literature points to ways that communities can pursue economic development and scenic preservation concurrently. McMahon, & Norris discuss the concept of Trail-Oriented Development (TrOD). In their explanation, TrOD is like the more familiar concept of Transit-Oriented Development (TOD). Transit-Oriented Development calls for clustering commercial and residential uses close enough to transit stops for walkability (MacCleery et al., 2016). TrOD clusters land uses that cater to cyclists and pedestrian users. Examples include restaurants, gear stores, repair stations, accommodations, showers, shops with small goods, historic attractions, and museums, among others. A different study found that preserving areas for small working farms created opportunities for trail-based development (Rottle, 2006). Farms were able to sell goods nearby the trail to trail users. Clustering may create one type of opportunity for Charles City County, while preservation may open different opportunities. A multi-pronged approach is likely to be more successful than applying only one or two approaches.

For example, Rottle (2006) examines implementation tools and strategies that helped bolster economic development and preserve scenic views along the Mountains to Sound Greenway (MTSG) in western Washington. The author found that small towns that effectively preserved historic and landscape character drew tourists which in turn created opportunities to cater to those tourists with restaurants, shops, museums, and accommodations. Maintaining attractive scenic space lured like-minded new residents who saw the value in the scenery. Concentrating housing and subdivisions through clustering was a successful technique employed by several small towns; the technique allowed existing landholders to develop their land, meeting an increased demand for new housing, while protecting green space for aesthetic and environmental purposes. One example provided by Rottle (2016) was the case of a 600-acre development that concentrated all housing on 168 acres of smaller lots. The remainder of the acreage was conserved.

The literature points to several key points for the corridor plan. People travel hundreds of miles for great trail experiences. The folks who travel have different needs than local users. Design guidelines for any new development can serve to emphasize the experience of the cyclist. Scenic preservation maintains an attractive environment for residents and tourists alike. Above all, if the experience of the Virginia Capital Trail is no longer desirable, then potential economic development becomes less viable as well.

Theoretical Framework

This plan does not fit neatly into any one or two planning theories. Rather, it is influenced primarily by aspects of both advocacy planning and sustainability planning.

The plan relies upon community outreach and input that already occurred in preparing the 2014 Comprehensive Plan and the 2015 Economic Development Strategic Plan. The citizens had some input into past plans, but decision-making was in the hands of elected officials and paid county employees who advocate on behalf of their citizens. As an outsider providing a plan, the analysis and interpretation is specific enough for the community but broad enough that they can adapt and implement it themselves. Any analysis must consider the inherent biases and blind spots of the plan designer.

If planners tend to plan for people like themselves, then biases can be partially mitigated by providing multiple options or multiple analyses. The plan being delivered to Charles City County hopefully functions as a conversation. “Here is what you could do. Here is what others have done.” To be a functional conversation, as opposed to unsolicited advice, the plan avoids tone and content that dictates “Here is what you should do.” From this viewpoint, understanding the outcomes of the planning process is more important than the mechanisms of the process (Davidoff, 2016).

Sustainability planning is another theoretical framework that may apply. Sustainability planning holds three priorities: economic growth, environmental protection, and socio-economic justice and opportunity (Campbell, 2016). However, these priorities often conflict. For example, a property conflict arises when society commoditizes housing and land for private use, while both wanting and resisting public forces to affect private and public good (Campbell, 2016).

Aesthetically, the plan looks at ways to avoid rapid or rampant suburbanization of the landscape. Escaping from or avoiding suburbanization echoes the idea of the Garden City as a reaction to the perceived ills of urbanization (Fishman, 2016). In a Garden City, towns would emerge from undeveloped land, have a perpetual green belt, and hold a maximum of about 30,000 people. One of the ideas behind the Route 5 Corridor plan is how to create a commercial cluster of buildings without detriment to the rural landscape. One possible outcome is the eventual development of a village surrounded by the “greenbelt” of agriculture. One noticeable difference between the situation in Charles City County is that rather than being built predominantly by the public sector, development will likely involve a government effort that steers private development with public goals in mind.

Probably the most significant conflict for Charles City County is that between environmental protection and socio-economic opportunity. The county is home to an abundance of wetlands and woodlands. The Virginia Capital Trail runs along or through much of those environmental resources. The county values its rural character (Moran, Stahl & Boyer, 2015). However, if much of that rural character is due to large lot homes, farms, and old plantation estates, preservation of those lands at the cost of any economic growth may benefit those landholders more than others. Conversely, if an

anticipated potential economic driver for the county is rural-oriented tourism, then the prospect of unplanned development may inhibit economic opportunities for those whose prosperity would rely on rural character over sprawled development. It is a tension between benefits to private landowners or benefits to a wider community.

To summarize, the project is based on the understanding that the client advocates for its citizenry. Therefore, the planner is interpreting the citizens' needs and wants through the client. The planner attempts to mitigate this removal from direct citizen engagement by addressing the tensions and interdependence between socio-economic justice, environment, and economic growth. The plan seeks to ensure that economic development and population growth will not excessively change the rural landscape.

SECTION 3: METHODOLOGY

The methodology combines aspects of bicycle transportation planning, transit-oriented development, and cluster development to form a trail-oriented development plan. This approach holds the rural scenery and the cycling experience as the prominent influences on design guidelines. It also is aimed at providing additions to the current zoning codes rather than creating a new type of code.

Research Questions

The plan first determines several things. It identifies locations along Route 5 that have the most potential for suitable development. This determination balances the environmental constraints of the corridor with the potential market of the corridor. Suitable locations for development have been identified; these locations determine potential businesses that would be attracted to the location. The plan provides rural design guidelines and recommendations for a variety of types. The following questions led to the findings of the research:

How does the preservation of the rural character influence the design of any commercial development?

> Where are the rural and scenic assets along the corridor? What design guidelines and policies would best preserve the overall rural character?

How can Charles City County use existing population spatial and mobility patterns to focus economic development efforts? How do the existing spatial and mobility patterns affect design, and how might design shape the patterns?

> What nodes along Route 5 are most likely to have a broad market? How many people live within specified driving or cycling times from the nodes, both inside and outside of the county?

How can Charles City County leverage existing infrastructure to stimulate economic development?

> What tools or strategies help Charles City County create a sustainable rural development that meets its goals of economic opportunity and rural preservation?

> How can trail-oriented design create a destination for both residents and tourists?

Sources of Information

US Census Bureau: demographics, labor, commuting information. The plan looks at block level data to more precisely determine where within Charles City County and within peripheral counties, trends are occurring.

Bureau of Labor Statistics: industry trends. This data may help provide insight into market analysis by demonstrating existing and projected industry strengths in the county.

Codes That Support Smart Growth Development **by the Environmental Protection Agency**: provides examples of "unified development code, form-based code, transit-oriented development, design guidelines, street design standards, and zoning overlay" and helps frame the design recommendations.

Charles City County: existing comprehensive plan, economic development plan, and area plans. These provide the starting reference and provide the view of stakeholders.

Case Studies: James City County Community Character Corridors, Henrico County Route 5 Corridor Study, City of Chesapeake rural development guidelines, and others. These provide comparison and perspective on how localities attempt to deal with similar situations. Case studies such as New Kent County's development of Bottoms Bridge provide social and political context that may resonate with Charles City County as well.

Rural by Design **by Randall Arendt**: published by the American Planning Association. This book helps guide the plan toward long-term considerations for maintaining rural character.

Small Town and Rural Multimodal Networks **by the Federal Highway Administration**: This guide has a specific section on traffic safety and flow considerations around shared paths that parallel major roads such as the Virginia Capital Trail running along Route 5. The inclusion of specific safety and traffic considerations helps bolster any recommendations made.

Urban Land Institute provides business needs calculations for various types of business. These calculations support the broad market analysis.

Stakeholder Outreach Methods

The client's overall vision is to have a tool they can bring to the community or county supervisors; community outreach was not involved, but rather it is left to the client. This plan relies on themes put forth by the county's comprehensive plan. That plan received citizen input during meetings throughout the drafting process (Charles City County, 2014). During the creation of a subsequent corridor plan for Virginia Route 106, the Charles City County economic development department received feedback from county residents, businesses, and the planning commission. During those meetings "residents said that they like the rural aspects of the county but want to see a little more development, specifically retail" along the Route 106 corridor, which includes an intersection with Route 5 (Jones, 2018). These points were noted at the Route 106 corridor plan vote by county commissioners.

Analytical Methods

Several analytical methods were used in preparing this plan. GIS tools helped define the scope of the potential market including population within specified radii, walksheds, and bike-sheds. Case studies served as reference points for comparison of proposed guidelines. A strengths, weaknesses, and opportunities-type (SWO-type) analysis helped assess design options and develop recommendations. Rendering visualizations aided in spatial comparisons. The market analysis relied on calculations made from quantitative data.

Table 7. Methodology Summary

Research Question	**Source**	**Analytical Method**
Where can development be located, considering environmental constraints?	2106 US Census population by census block, population change, median household income; for Charles City and neighboring municipalities	ArcGIS Business Analyst
	Road centerlines and geographic points	ArcGIS Business Analyst
Which rural design practices are applicable to the corridor?	Case studies	Coding for similar contexts
	Rural by Design, EPA's Smart Growth Codes; National Endowment for the Arts Citizen's Institute on Rural Design	Coding for the context; SWO analysis or similar; modeling and/or other visualizations
What are the possible implementation steps to achieve the desired rural design?	*Rural by Design*, EPA's Smart Growth Codes; National Endowment for the Arts Citizen's Institute on Rural Design; current Charles City County plans	Coding for the context; SWO analysis or similar
What type of development defines "trail-oriented design"?	EPA's Smart Growth Codes; National Endowment for the Arts Citizen's Institute on Rural Design; Urban Land Institute's Active Transportation and Real Estate study	Coding for the context; SWO analysis or similar

SECTION 4: RESEARCH

Case Studies

As stated previously, Charles City is invested in the Route 5 corridor, and it has recognized the potential value of the Capital Trail by including it in the Economic Development Strategic Plan (Moran, Stahl & Boyer, 2015). In the Goals, Objectives and Strategies chapter of its comprehensive plan, Charles City lists one of the main objectives of development centers: to "promote areas of existing high public and private investment." To achieve this objective the county lists strategies such as devising specific area plans that guide infrastructure decisions, specify design guidelines, and allow mixed uses.

During the recent adoption of an industrial area plan, county staff remarked that one of the next priorities was ". . . developing the intersection of Route 106 (Roxbury Road) and Route 5 (John Tyler Memorial Highway). . . [to] make that the gateway to our county" (Jones, 2018). Another objective calls for rural areas to remain rural; these areas include farms, forests, conservation easements, hunting areas, and wetlands. A major strategy to pursue this objective calls for "Route 5 Scenic Standards . . . to ensure the scenic value of the undeveloped sections of Route 5 [are] maintained" (Charles City County, 2014). Charles City County can look to case studies from neighboring counties and beyond for precedence and guidance in planning practices. Learning from case studies is valuable for both what to do and what not to do.

New Kent County: Bottoms Bridge Cluster

The Bottoms Bridge area of New Kent County was once rural but is now a compact development area designed around water service infrastructure. It has a mix of residential and commercial uses. Like Charles City County, this is a rural county in Virginia and therefore may have cultural and political similarities. After a few experiences with undesirable planned growth, the county focused planning efforts on creating a service district at Bottoms Bridge.

Present growth patterns are the result of planning that occurred 10 to 15 years ago. At the time, residents wanted amenities but also did not want to lose rural character. Newspaper articles from 1972, 1975, 1983, 1994, 1997, 2000, and 2004 all depict a county and its residents attempting to deal with, fight, accept, and shape growth and development (Andersen, 1994; Boothe, 1997; Shawn Cox, 2000; Kelleher, 1983; McDowell, 1972; Robertson, 2004; Strafford, 1975). Nearly every article quotes people who seem caught off guard by that era's growth forecast. The growth finally came after years of planning and the installation of sewer infrastructure in the mid-2000s (Bottoms Bridge Service District, 2007).

Specific takeaways from the Bottoms Bridge case study include the following: designation of an area as a water and sewer service district guided businesses and developers to cluster in a certain area; the district was planned before the infrastructure was there, but a critical mass of development can make it feasible to provide infrastructure later. The area features mixed uses of commercial and residential and an array of housing types. There are sidewalk connections on more recently established house plots, but older plots have none; this creates a disjointed pedestrian experience. Similarly, frequency of driveway placement on one side of the divided highway chops up the pedestrian or cycling safety experience, while design guidelines create larger, uninterrupted blocks on the other side of the highway. Parking lots in the front of parcels create a strip mall feel (like Short Pump in toddler form); and despite the sidewalks, parcels are too wide, and buildings are too far apart to encourage walking between them. There is no infrastructure for cycling. Furthermore, the area is partially between Interstate 64 and US Route 60, the two main transportation corridors between Richmond and Williamsburg.

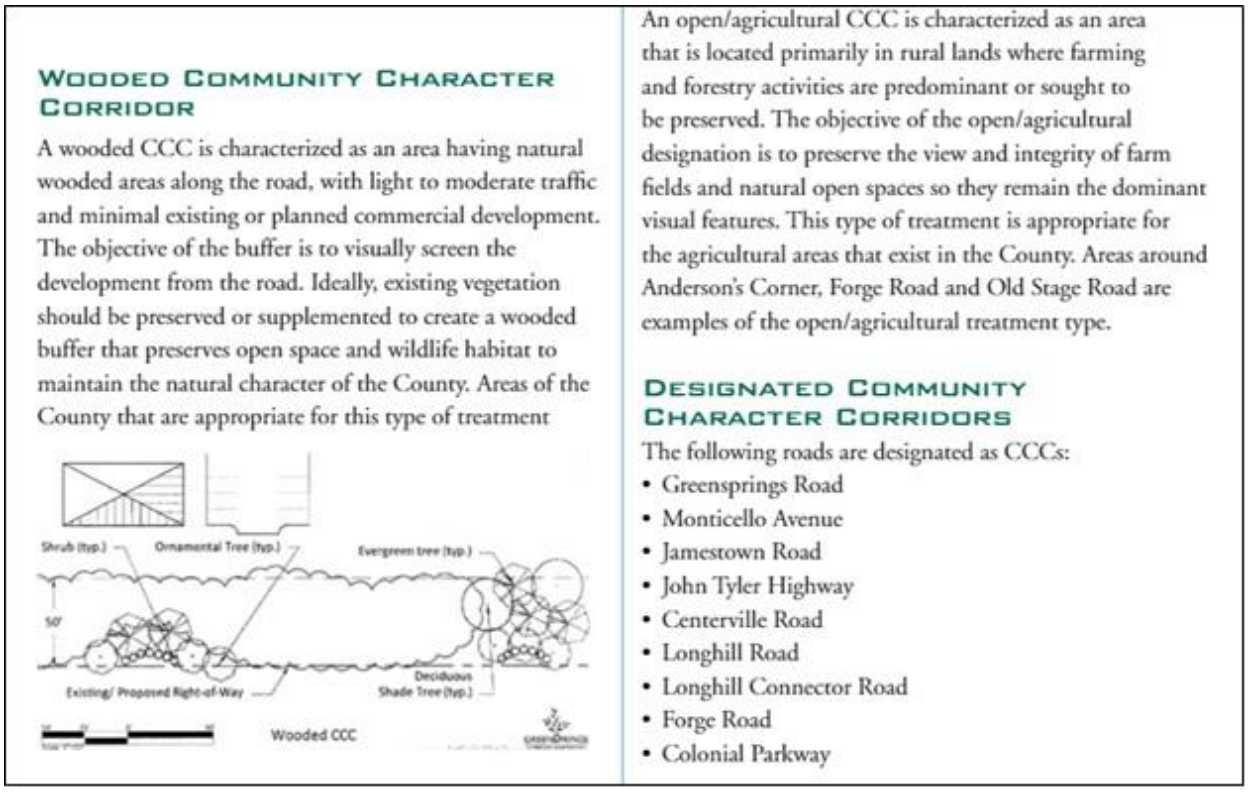
Figure 4. Aerial view of Bottoms Bridge showing driveway/side road frequency (Google Maps).

James City County: Character and Greenspace

James City County has identified key areas that convey community character. These are designated as Community Character Corridors; they are areas designated to preserve natural, cultural, and agricultural heritage (James City County, 2015). Like Charles City County, James City County has many rural areas, it has a colonial and agricultural heritage, and there are key gateways and roads that lead into the county.

The corridors are designated as "wooded character" corridors or "agricultural character" corridors; each has a unique buffer and landscape design requirements. The wooded character corridor serves as a guideline for low and high-density areas. James City County also has a greenway master plan which designates non-development areas for both environmental and character preservation purposes. The county also has a small fund to purchase property for greenspace designation. However, the fund is not a priority and may not have much money in a given year (James City County, 2015).

James City County corridor guidelines do not incorporate the Capital Trail into new development. The corridors offer vague boundaries for guidance and design guidelines that are used on a discretionary basis by the Board of Supervisors, mostly for planned unit development. The corridors do not address individual parcels.



Wooded Community Character Corridor

A wooded CCC is characterized as an area having natural wooded areas along the road, with light to moderate traffic and minimal existing or planned commercial development. The objective of the buffer is to visually screen the development from the road. Ideally, existing vegetation should be preserved or supplemented to create a wooded buffer that preserves open space and wildlife habitat to maintain the natural character of the County. Areas of the County that are appropriate for this type of treatment

An open/agricultural CCC is characterized as an area that is located primarily in rural lands where farming and forestry activities are predominant or sought to be preserved. The objective of the open/agricultural designation is to preserve the view and integrity of farm fields and natural open spaces so they remain the dominant visual features. This type of treatment is appropriate for the agricultural areas that exist in the County. Areas around Anderson's Corner, Forge Road and Old Stage Road are examples of the open/agricultural treatment type.

Designated Community Character Corridors

The following roads are designated as CCCs:

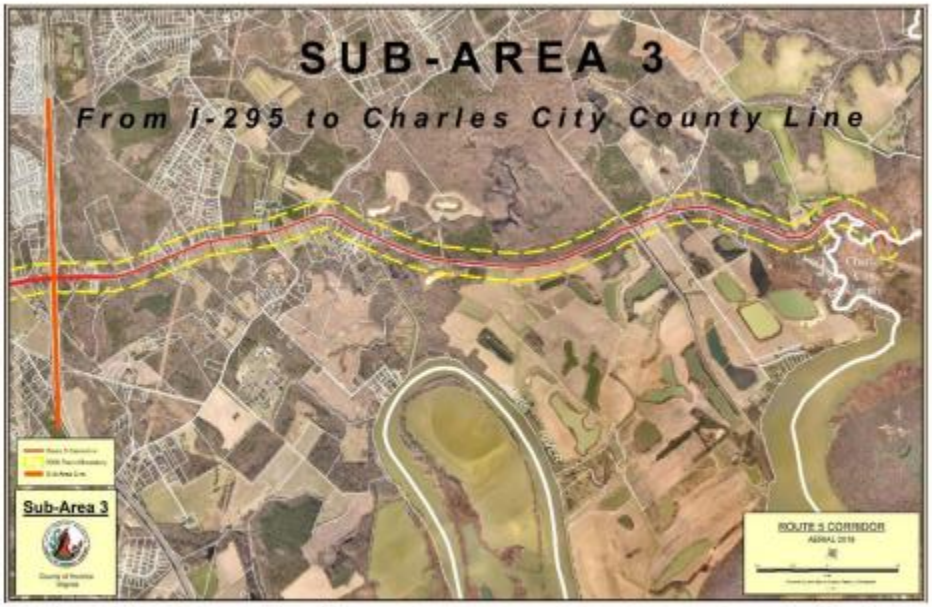
- Greensprings Road
- Monticello Avenue
- Jamestown Road
- John Tyler Highway
- Centerville Road
- Longhill Road
- Longhill Connector Road
- Forge Road
- Colonial Parkway

Figure 5. Excerpt from James City County Community Character Corridors guidelines (James City County, 2015).

Henrico County: Route 5 Corridor Study

Henrico County's Route 5 Corridor Study addresses how to involve VDOT (since Route 5 is a state road) in future development goals. It addresses issues around agricultural land development, rural character, and historical character. It subdivides the corridor into sections, each with unique design guidelines depending on the type and scale of development desired. In developing these guidelines, the county used an in-depth community engagement process to shape it. On December 11, 2018, the Henrico County Board of Supervisors adopted the goals, objectives, strategies and design guidelines from the study and integrated them into Henrico County's 2016 comprehensive plan.

The study looks at a "corridor overlay district" model to supplement the zoning ordinance; it addresses design guidelines for urban, suburban, and rural areas, and seeks to focus commercial development in existing nodes so that other areas are more easily preserved. The study considered building setbacks, building height, buffers/landscaping, signage, drive cuts and spacing, street layout and access, and lighting (Henrico County, 2018). The study recognizes that future attempts to widen Route 5 would counter attempts at character preservation. The study mentions the Virginia Capital Trail as an asset, but it does not address using the trail as a driver of development. The study focuses more on harnessing existing development and finding infill opportunities than on ways to encourage new development.



Residential development should use existing topography and vegetation to buffer the impact of new structures to the extent possible.

Figure 6. Excerpt from Henrico County Route 5 Corridor Study (Henrico County, 2018).

Galax, Virginia: Tourism Model

Galax is home to part of the New River State Park multi-use trail. In the past few decades, Galax has switched from a former manufacturing-based economy to a broad tourism-based economy. A Virginia Tech survey of local businesses showed that even when businesses were not directly related to trail tourism, they chose to move to the area in part because of the trail (Cox et al., 2011). Galax is a rural community that embraces not just trail-based tourism, but it also encourages heritage-tourism opportunities around music and crafts. In contrast to Charles City County, Galax is an independent city with compact boundaries and existing water and sewer infrastructure.

Washington County, Virginia: Comprehensive Plan

Washington County's comprehensive plan contains village, conservation/recreation, agricultural, and mixed-use districts that attempt to create economic opportunity through character preservation. Washington County contains the Virginia Creeper rails-to-trails multi-use path and the Appalachian Trail, both of which run through the town of Damascus. The county contains large rural tracts as well.

Its comprehensive plan attempts to prevent haphazard development by providing guidelines for crossroads development through village districts. The plan specifically recognizes the function of trails as economic and social enhancements for their community (Washington County, 2015).

However, the plan does not specifically address how development and design can impact the trails, though it does address the design of the broader landscape throughout the county. Unlike Charles City County, Washington County has an Interstate running through it, and it contains the towns of Abingdon and Damascus, which are much more developed than any part of Charles City.

City of Chesapeake: Avoiding the Low-Density Trap

To preserve rural character while allowing development, the independent city of Chesapeake designated specific land use, transportation circulation, and open space standards for rural areas (EDAW / AECOM, 2007). The city also created a review process for new development within those designated areas and a process for re-examining building density allowances in certain areas. Chesapeake determined that low density alone does not ensure the preservation of rural character. In addition to those areas of low density, Chesapeake promotes cluster development, which they define as allowing subdivisions with multiple small parcels if a certain percentage of the original parcel is conserved as open space (EDAW / AECOM, 2007). Chesapeake also specifies lighting and landscape buffer requirements for development, to help maintain rural character. These details help define what Chesapeake means when it refers to the rural character beyond the broader scope of density.

Summary: Case Studies

No municipality operates under the same circumstances, strengths, and opportunities. However, each case study offers ways to tackle issues related to Charles City. And each technique can be modified to meet the county's needs.

Cycling-Specific

Embraced Trail in Land Use and Development Guidelines

Prominent Trailheads, Amenities, and Facilities

Village/Nodal Development

Water/Sewer Infrastructure

Mix of Residential and Commercial

Mix of Housing Types

Small Lots

Increased Density

Rural/Scenic Corridor

Corridor Designation

Landscape Buffer

Setbacks

Conservation Easements

Shared Driveways

General

Corridor and Overlay Districts

Landscape Buffers

Setbacks

Design Practices

Many governmental and other organizations recommend techniques for maintaining rural character, preserving environmental and scenic features, and steering development. Examples include the Environmental Protection Agency guide to codes supporting smart growth, the Federal Highway Administration's *Small Town and Rural Multimodal Network*, the National Endowment of the Arts' Citizens Institute on Rural Design, and the American Planning Association. All offer guidelines and recommendations for the sustainable development of rural areas, scenic area, recreation areas, or a combination of these.

Challenges for Rural Communities

The Federal Highway Administration (FHWA) defines several common development challenges for rural communities. These include constrained terrain, highways serving as the "Main Street", public land access, agricultural uses and needs, predominantly auto-oriented roadways, infrastructure maintenance related to climate, lack of transportation options, and safety (Dickman et al., 2016). These uniquely apply to Charles City County in several ways. For example, any new development must include safe ways for cyclists and pedestrians to cross Route 5. Industrial trucking and agricultural transportation will be more prevalent than others. Sidewalks add cost to any development and may be minimally used if development is too spread out. As for transportation options, the Capital Trail is already in place, which is more than what many rural communities have. Route 5 is a two-lane Virginia state highway, and since Charles City may concentrate development along it, Route 5 will possibly become "Main Street".

The International City/County Management Association produce guidelines and considerations for rural communities in their publication, *Putting Smart Growth to Work in Rural Communities.* The suggested types of analysis for designating a specific node for growth includes traffic modeling, noting cultural and natural resources, and identifying key agricultural lands (Mishkovsky et al., 2010).

The main reason to plan for growth areas is that growth may be so slow initially that it slowly erodes an area's character before the community realizes it (Mishkovsky et al., 2010).

Defining the Circumstance: Shared-Use Trails

The Capital Trail is best described as a “sidepath”. The FHWA describes a sidepath as a shared-use path that is parallel or nearly parallel to the road. Sidepaths differ from other shared-use paths which may cross roadways but also meander away from roadways. An example would be a shared-use path that veers away from the road to wind deep into a property or park. The distinction is important because multi-modal protection of space and sharing space with automobiles impacts the safety and infrastructure concerns differently. Economically, development along a roadway with a sidepath may cater to multiple users in a way that would not be possible for a shared-use path that has a lonesome existence in a forest.

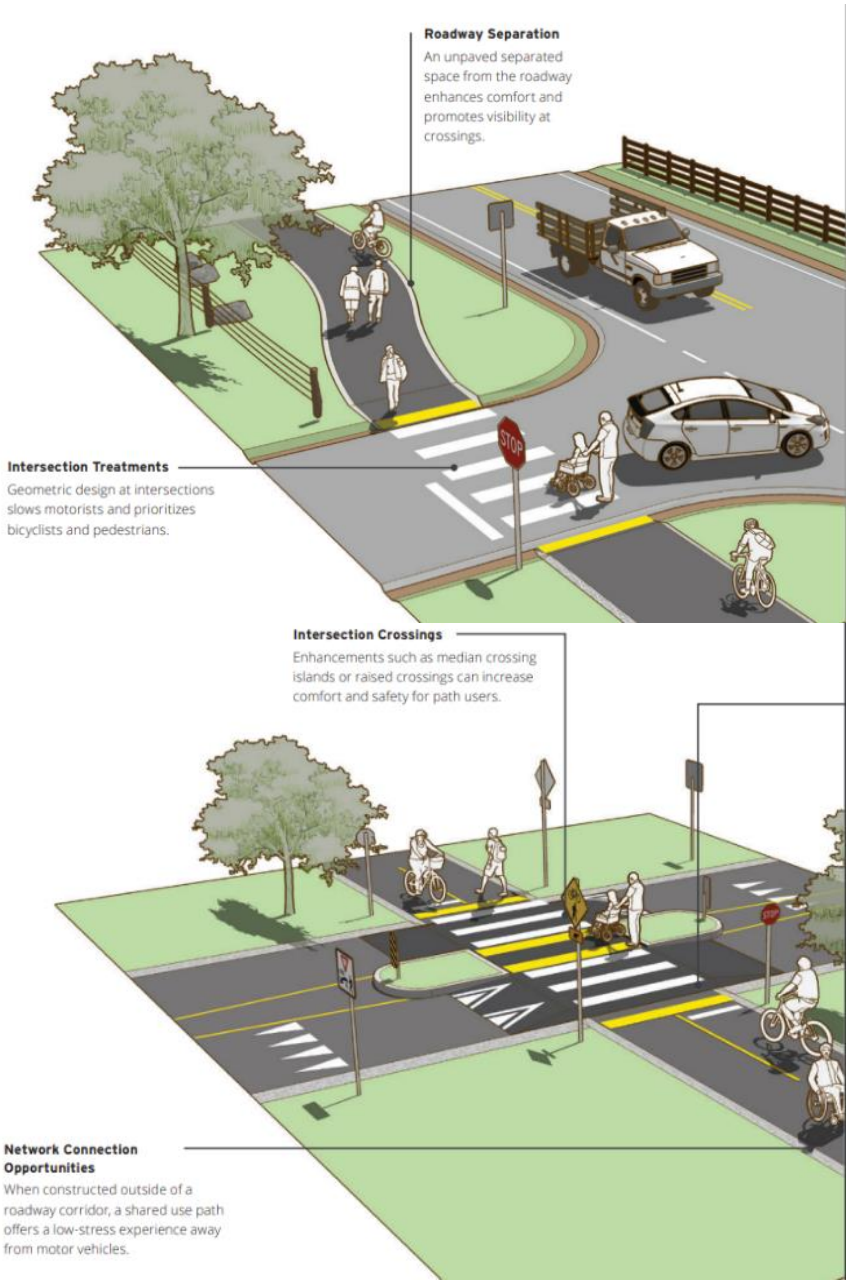


Figure 7. Comparison between a shared-use sidepath (top) and a general shared-use path (bottom) (FHWA, 2016).

Cycling-Safe Design

The AASHTO Bike Guide 2012 lists a variety of design strategies for enhancing sidepath crossings. These include reducing the frequency of driveways, designing intersections to reduce vehicle speed, design intersections to alert path users, and clearly delineating a right-of-way (AASHTO, 2012).

Mixed Use Buildings

This type of building allows people to live above or behind commercial uses in the same building (Arendt, 2015). It allows for more density in some areas which could alleviate sprawl into other areas, and it creates opportunities for a variety of housing types. However, it may also require changing zoning or other ordinances. Also, without buffers or landscape guidelines, a parcel can become a sea of surface parking.

Form-Based Codes or Form-Based Lite

Form-Based Codes (FBCs)--and their less-comprehensive, more flexible cousin Form-Based Lite (FBLs)--are design guidelines that can guide building and parking placement on a lot, size of lots, placement of new streets or alleys, block size, building shape (Arendt, 2015). If in place early enough, FBCs may create the desired character for development rather than haphazard sprawl. They can be applied to smaller, specific nodes of development rather than all areas, so FBC guidelines could be implemented on a trial basis in one area. FBCs may face resistance from developers who have their go-to site and building plans ready for any market. Citizens are more likely to buy into FBC guidelines if they participate in creating them.

Nodal Development

Nodal development (sometimes referred to as cluster development or pulse node development) creates multiple designated development districts across a community. This type of development may allow for more flexible development while still curbing a tendency to create strip development because there are multiple areas for concentrated growth without pushing all development in one area (Arendt, 2015). In order to concentrate development in areas to combat sprawl, the development allows smaller lots and different housing types to create density. Nodal development on its own may not prevent the disconnection of sprawl unless there are accompanying guides to street development.

Placemaking

This refers to creating desirable spots for people to congregate. Nothing attracts people like more people. Consideration can be given for safety, the purpose of congregating, use of space, and how welcoming it is for a variety of incomes, abilities, and ages. Signage and clear boundaries help people know how to get to a place and how to use it (Arendt, 2015).

One example of placemaking in Charles City County is the placement of picnic tables for Capital Trail Users behind the Charles City Courthouse. However, they are somewhat hidden from view. Users have found the location uninviting as it is not near other amenities and is unpleasantly on the backside of a building. A more visible location nearer to historic sites or commercial use may create more convenience and a better sense of safety or enjoyment (Anthony, 2018).

Beyond public placemaking, private businesses could be encouraged and supported in providing placemaking. For example, front porches or shaded patios on a business would allow for sweaty bikers to cool off while also being near businesses that may sell food, drink, first aid products, or some bike supplies.

Transfer of Development Rights

Transfer of Development Rights (TDR) is a mechanism that allows people with land in designated rural areas to sell their development rights to be used in designated growth areas. This can be used to preserve rural areas while also giving the incentive to develop more densely in desired areas (Arendt, 2015). TDR may provide more adaptability for buyers and sellers, so they do not have to time their transactions with the market, but only if there is a TDR "bank" to pay out for rights and hold on to them until someone wants to buy them. TDR does not work if there is no demand for development.

However, multiple municipalities working together may find a workable solution, though the pollical and logistical complexities of multi-governmental cooperation prove too difficult to undertake. One example of multi-governmental TDR collaboration come from Pennsylvania; three counties coordinated TDR so that two of them could maintain rural character (Arendt, 2015). Charles City might be able to work out something with Henrico County or James City County where they would preserve dwindling rural lands and development could be encouraged in desired areas of Charles City. This would need greater exploration beyond the scope of this plan.

Conservation Subdivisions

A conservation subdivision is a mechanism that encourages subdivisions that protect buffers and green space for greenway connections, forest connections, agricultural connections, or similar. Developers could connect a greenway to existing multi-use paths and subsequent developers could extend greenways further. Examples can be found in Fairfax, Virginia and Cary, North Carolina, among many other places (Arendt, 2015).

Conservation subdivisions provide guidance on increasing conservation and greenway network; they promote subdivisions with more, smaller lots on less land. The lots would be buffered from a major road (such as Route 5). However, this mechanism may work better in wooded areas or in open areas behind hills. Without firm requirements, greenway extension could become just as haphazard as other unregulated development.

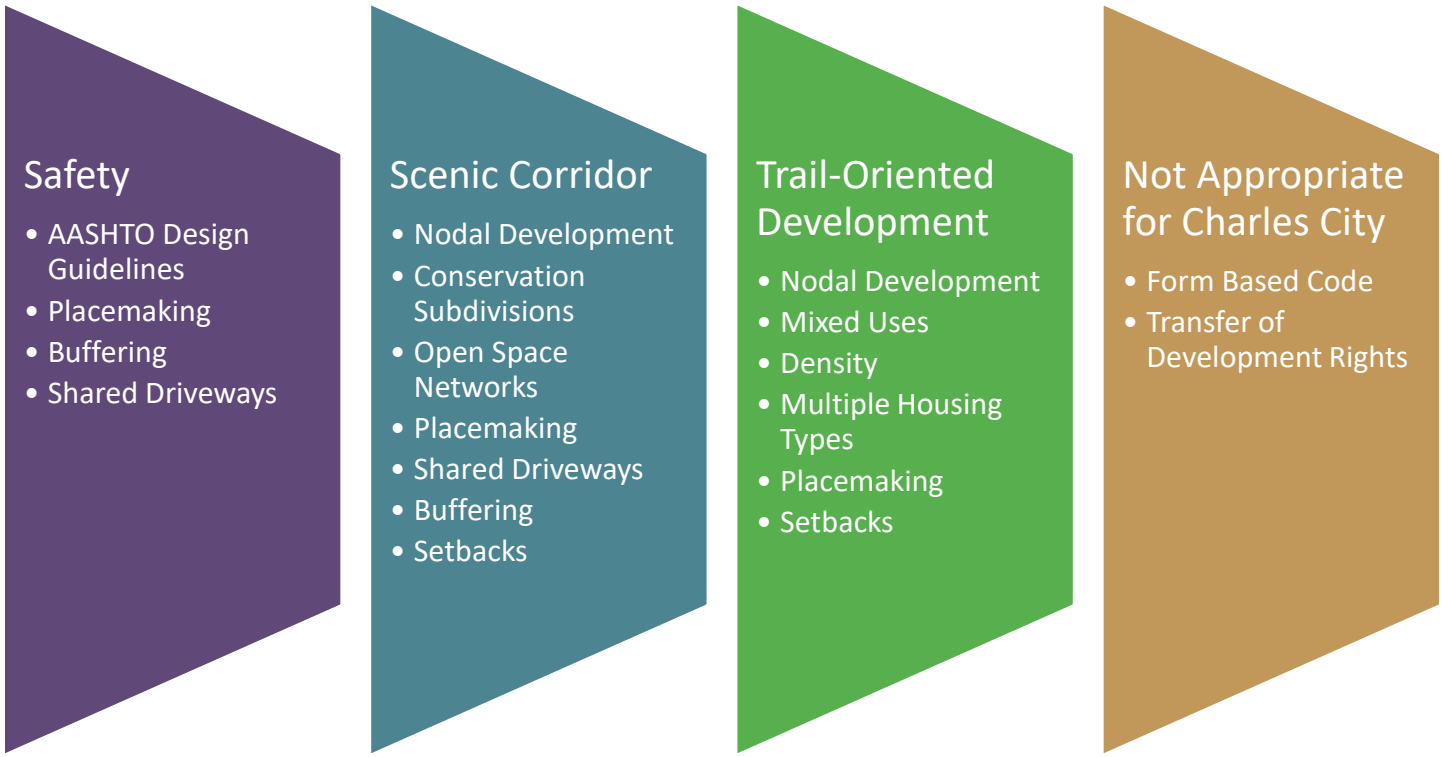
Open Space Networks

With open space networks planners focus not only on where development should go but also on comprehensive planning for conservation areas (Arendt, 2015). In other words, this mechanism helps to focus preservation of agricultural, woodland, and wetland areas into a single unified vision. The biggest impediment to this is that it requires landowner buy-in across a wide swath.

Summary: Design Practices

Many of these design practices are focused on controlling areas under pressure for growth, but they can still be implemented and in place before future development. By having guidelines or ordinances in place, Charles City has a unique opportunity to create development that addresses multiple concerns before any undesired development has occurred.

Some design mechanisms require more large-scale planning and community buy-in than others (e.g. TDR, Open Space Networks). Others, such as nodal development, placemaking, building typology, and small-lot allowances can be implemented incrementally, allowing more experimentation.



GIS Analysis of Possible Development Nodes

Route 5 presents several possibilities for preserving rural character and concentrating development. Using ArcGIS Business Analyst and Network Analyst tools provides insight into the benefits of each potential node. To begin, it is helpful to identify the areas where a population exists, where the population is growing, and where the population is already traveling. These basic indicators show where people are likely to interact and therefore point to an increased likelihood for a market for future development.

Nodal Existing Conditions

The six nodes chosen for the analysis are the intersections between Route 5 and Roxbury Road, Barnetts Road, Adkins Road, Courthouse Road, Sturgeon Point Road, and Wilcox Neck Road. Each road connects the northern part of the county to Route 5. Heading south, Roxbury continues across the James River into Prince George County near Hopewell, while Sturgeon Point and Wilcox Neck continue into the southern part of Charles City. Barnetts ends at Route 5, as does Courthouse. Adkins ends as well; however, it ends near Wilcox Wharf Road which leads to Lawrence Lewis, Jr. Park and Boat Ramp.

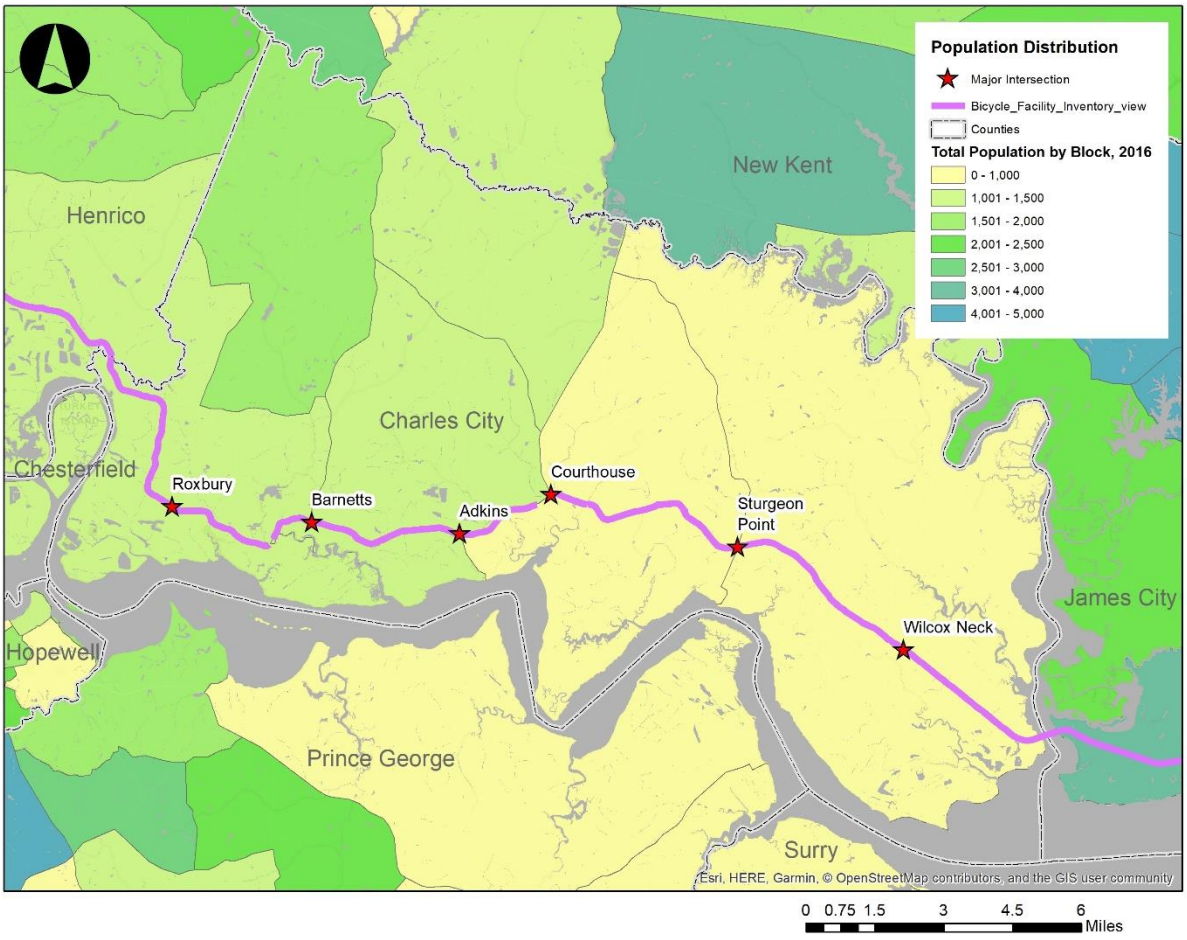


Figure 8. Total population by U.S. Census block (American Community Survey, 2016)

The Courthouse area has a restaurant, the new courthouse, the historic courthouse, the library, and the government building. This area is already designated for village type development, and the county has invested sewer and water infrastructure here. This is the only node with sewer and water infrastructure. The remaining nodes are designated by the county as *rural*, though Adkins and Wilcox Neck have—or previously had—minor commercial activity. Although Roxbury has no current development at the intersection, the northern part of the road is home to several businesses within the county's designated industrial corridor.

Drive Times

One method of market analysis used by ESRI's Business Analyst program is to capture the socio-economic and demographic data of a population found within a specified drive time. For this study, drive times of ten minutes and 30 minutes were used. Ten minutes can give a reasonable estimate for local travel time to a node. Thirty minutes can give an indication of a population within a certain commuting time from a node or within an easy drive for a visitor. Though these times are subjective, they do provide comparison points between the nodes.

The Business Analyst projections show a few interesting trends. Within ten minutes, Roxbury, Courthouse, and Wilcox Neck reach the greatest number of people, as highlighted in the table (right). This makes sense because Roxbury can reach into Henrico and Hopewell, Wilcox Neck can reach into James City County, and the Courthouse area is centrally located within Charles City. Of these, however, only Roxbury and Wilcox Neck are projected to see population growth.

Table 8. Population Forecasts, 2018-2023, within 10- & 30-Minute Drive Times

	10 Minutes		30 Minutes	
	2018 Population	2023 Forecast Population Change %	2018 Population	2023 Forecast Population Change
Roxbury	**3,010**	**0.38**	**345,337**	0.91
Barnetts	975	0.00	**160,181**	0.97
Adkins	855	-0.24	**125,793**	1.27
Courthouse	**1,043**	-0.31	124,502	**1.41**
Sturgeon Point	512	-0.16	99,034	**1.48**
Wilcox Neck	**1,571**	**1.65**	108,491	**1.47**

(U.S. Census Bureau, 2010; ESRI, 2018)

Within 30 minutes, the nodes in the western part of the county (Roxbury, Barnetts, Adkins) can be reached by the greatest number of people. Roxbury can be reached by the more populated parts of Richmond, Chesterfield, and Henrico. However, the projected population growth is for the three eastern nodes (Courthouse, Sturgeon, Wilcox Neck).

The trends are similar for median household income as these are highest for those within a ten-minute drive of Roxbury and Barnetts in the west. However, Wilcox Neck has the highest median household income within both the ten- and 30-minute drivetimes, reaching into Williamsburg and James City County.

Table 9. Median Household Income Forecasts, 2018-2023, within 10- & 30-Minute Drive Times

	10 Minutes		30 Minutes	
	2018 Median Household Income	2023 Forecast Median Household Income Change	2018 Median Household Income	2023 Forecast Median Household Income Change %
Roxbury	**69,106**	2.83	51,456	2.03
Barnetts	**52,728**	3.42	57,369	2.61
Adkins	46,077	3.35	67,670	2.78
Courthouse	43,634	3.55	**69,796**	2.75
Sturgeon Point	46,126	3.70	**76,875**	2.79
Wilcox Neck	**96,629**	3.95	**78,023**	2.81

(U.S. Census Bureau, 2010; ESRI, 2018)

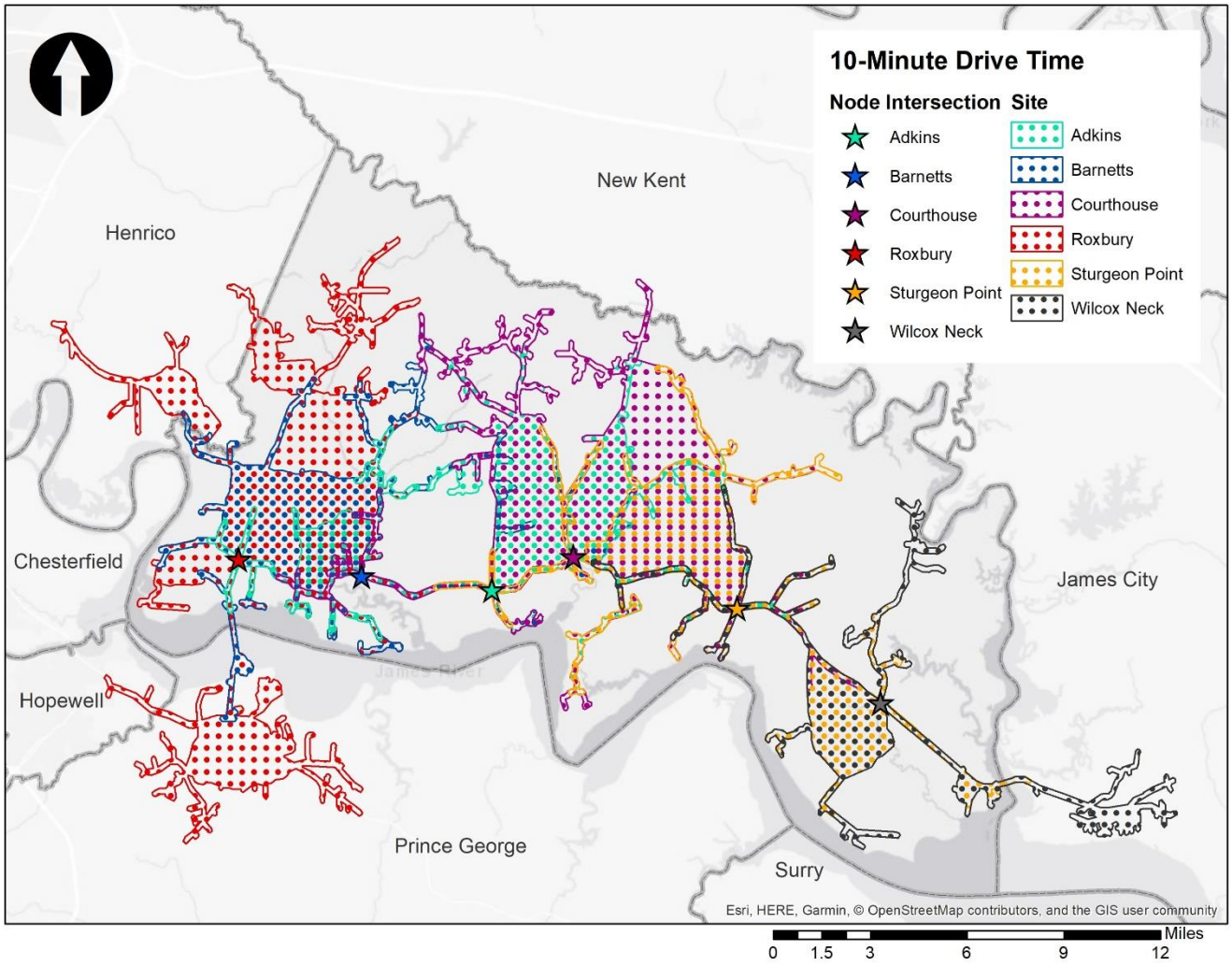


Figure 9. Ten-minute drive times from selected nodes (ESRI Business Analyst, 2019)

Greater population and median income projections may mean more people with potential disposable income to support businesses. Knowing where these numbers are forecast to increase will steer the decision on where to anticipate future development needs. Based on these projections, Roxbury will continue to be within the specified drive times for the greatest number of people, while Wilcox Neck will potentially see the most growth in population and median household income within the specified drive times.

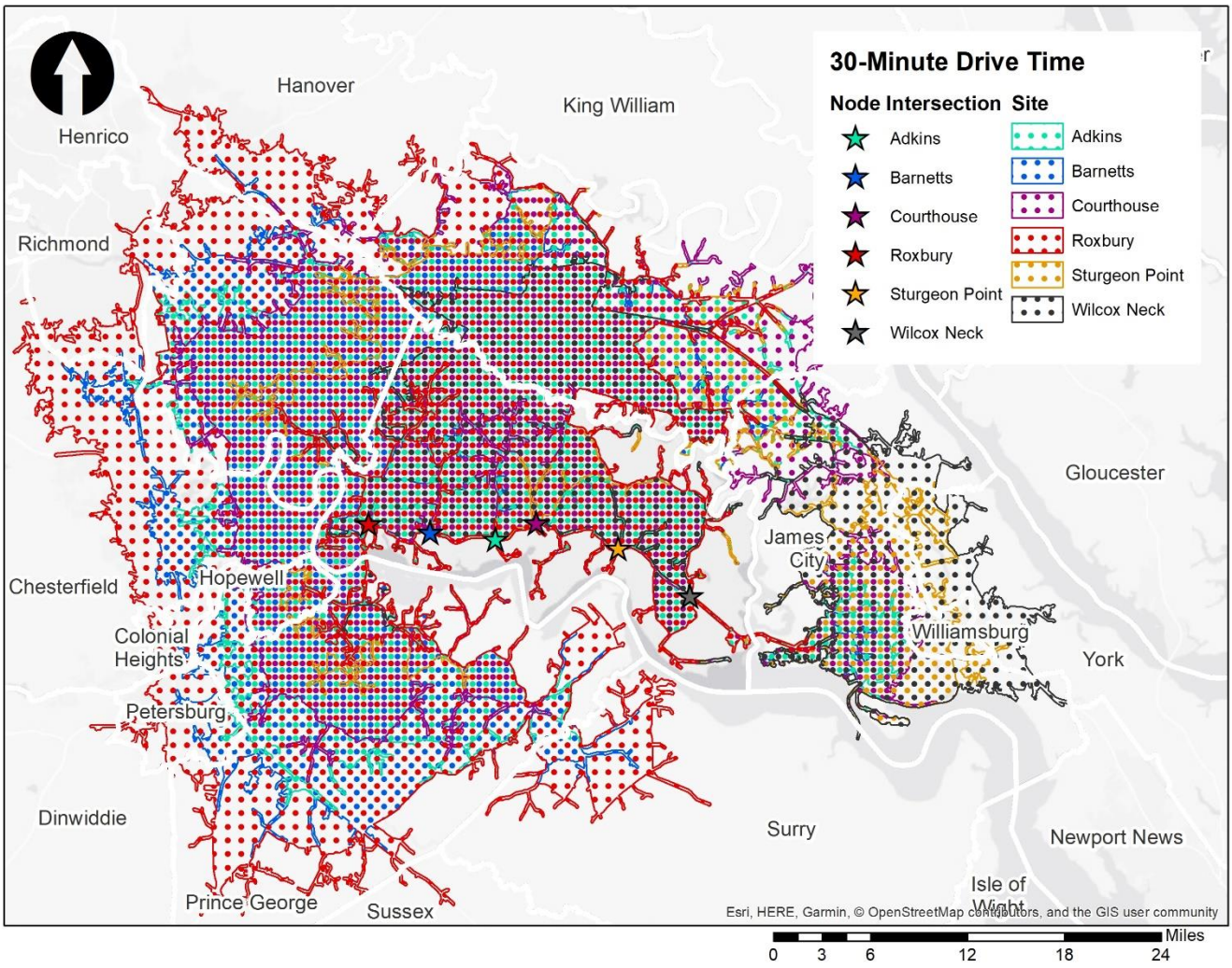


Figure 10. Thirty-minute drive time from selected nodes (ESRI Business Analyst, 2019).

Bike-shed

The bike-shed analysis shows how far a cyclist could travel in 30 minutes at an average speed of 12 miles per hour (a good estimate of speed for a non-professional, non-novice). The bike-shed demonstrates where cyclists might venture if they feel safe and have the supporting infrastructure to do so. For businesses and residents, it also provides an idea of how quickly one can travel to and from the Capital Trail via bicycle. The 30-minute reference point was used with the assumption that a half-hour one way or one-hour round-trip away from the Capital Trail would not be intimidating to a general user.

The map shows that the Roxbury, Courthouse, and Wilcox Neck 30-minute bike-sheds cover more of the county than what is accessible from the three remaining nodes. The bike-shed represents opportunities to connect Capital Trail riders to river access points, wildlife management areas, bed and breakfasts, and residential areas.

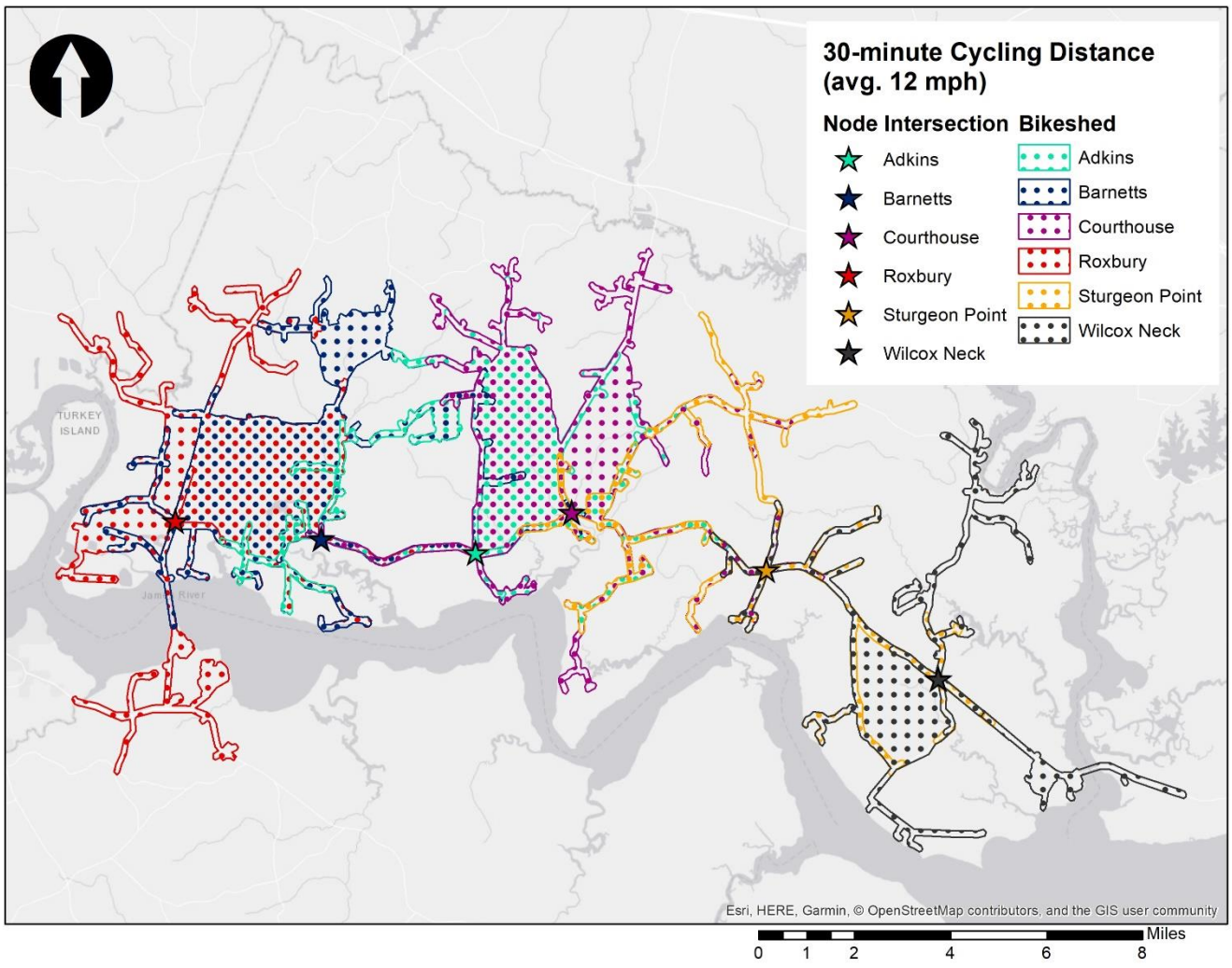


Figure 11. Thirty-minute cycling distance (ESRI Business Analyst, 2019).

Environmental Constraints

Charles City County has several environmental constraints to development. Lands that are ill-suited for septic systems, widespread wetlands, and flood hazard areas may present risks or issues for people, buildings, or infrastructure.

Wetlands

There are numerous wetlands throughout Charles City County (Map 1). The James River runs along the southern edge of the county, while the Chickahominy River flows along its northern and eastern boundary to its confluence with the James River. Much of the wetlands are found along the banks of the Chickahominy River and other streams feeding into both the Chickahominy River and James River, while shrubby or wooded wetlands are found throughout the interior of the county (USFWS Ecological Services, 2016). Wetlands play a key role in runoff storage, treatment, and infiltration; they are flood buffers, and they provide vibrant habitats (Marsh, 2010a). Development within wetland areas should be strictly limited.

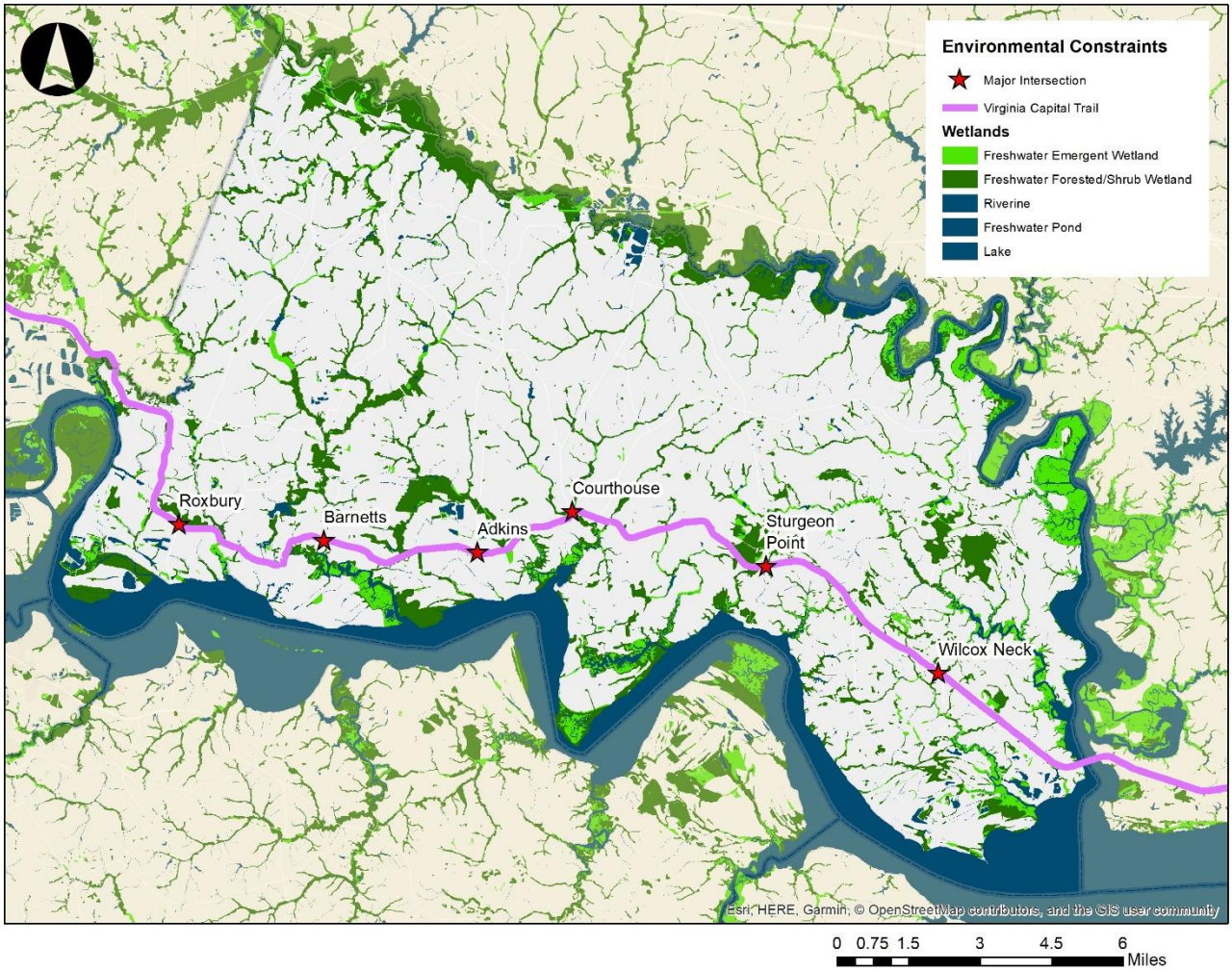


Figure 12. Wetlands (USFWS Ecological Services, 2016; VDCR, 2018).

Charles City County falls under the purview of the Chesapeake Bay Preservation Act (CPBA), which requires municipalities within the Chesapeake Bay watershed to enact ordinances that promote the protection of wetlands and other key components of the watershed (VDCR, 2017). Ordinances adopted by Charles City County to fulfill the mandate of the CPBA call for Resource Protection Areas (RPA) that exclude most development within 100 feet of wetlands, perennial streams, and locations where surface runoff connects non-tidal wetlands to perennial streams (Chesapeake Bay Preservation, 2014). Charles City County also has adopted a Resource Management Area (RMA) that has fewer restrictions than the RPA; the RMA extends beyond RPA boundaries an additional 25 feet and encompasses the 100-year floodplain (Chesapeake Bay Preservation, 2014). The existence of the RPA and RMA designations do not prohibit all development within the areas, but they do put restrictions on the types of development that can occur there.

Septic Suitability

Soils suitable for septic system installation are very limited throughout the county (Figure 3). Soils with "somewhat limited" suitability are found mostly in the southern third of the county, closer to the James River. Septic suitability depends on the soil's ability to absorb septic effluent, the depth of the water table, the depth to bedrock, the area's likelihood of flooding, and excessive slope (NRCS, 2018). The total area of the county considered very limited for septic use is an estimated 83.8 percent (NRCS, 2018). Given that an estimated 10.7 percent of the county area is water-covered, only 5.5 percent of the remaining county area is either rated as being of somewhat limited suitability or has not been rated for suitability (NRCS, 2018).

Fortunately, these soil ratings are for conventional septic systems. Many of the new homes in Charles City County use alternative septic systems designed to work in poorer soils using an effluent pre-treatment process. In the county's wetland areas, there may be an opportunity for small-flow wetland wastewater disposal systems. This could be a viable option for small-scale residential use, with wetlands providing filtration of solids and absorption of nutrients by colloids and plants (Marsh, 2010b). However, technological costs may prohibit community-scale wetland systems, and as the scale increases, so does the complexity in assessing wetland capacity for treatment systems (Marsh, 2010b).

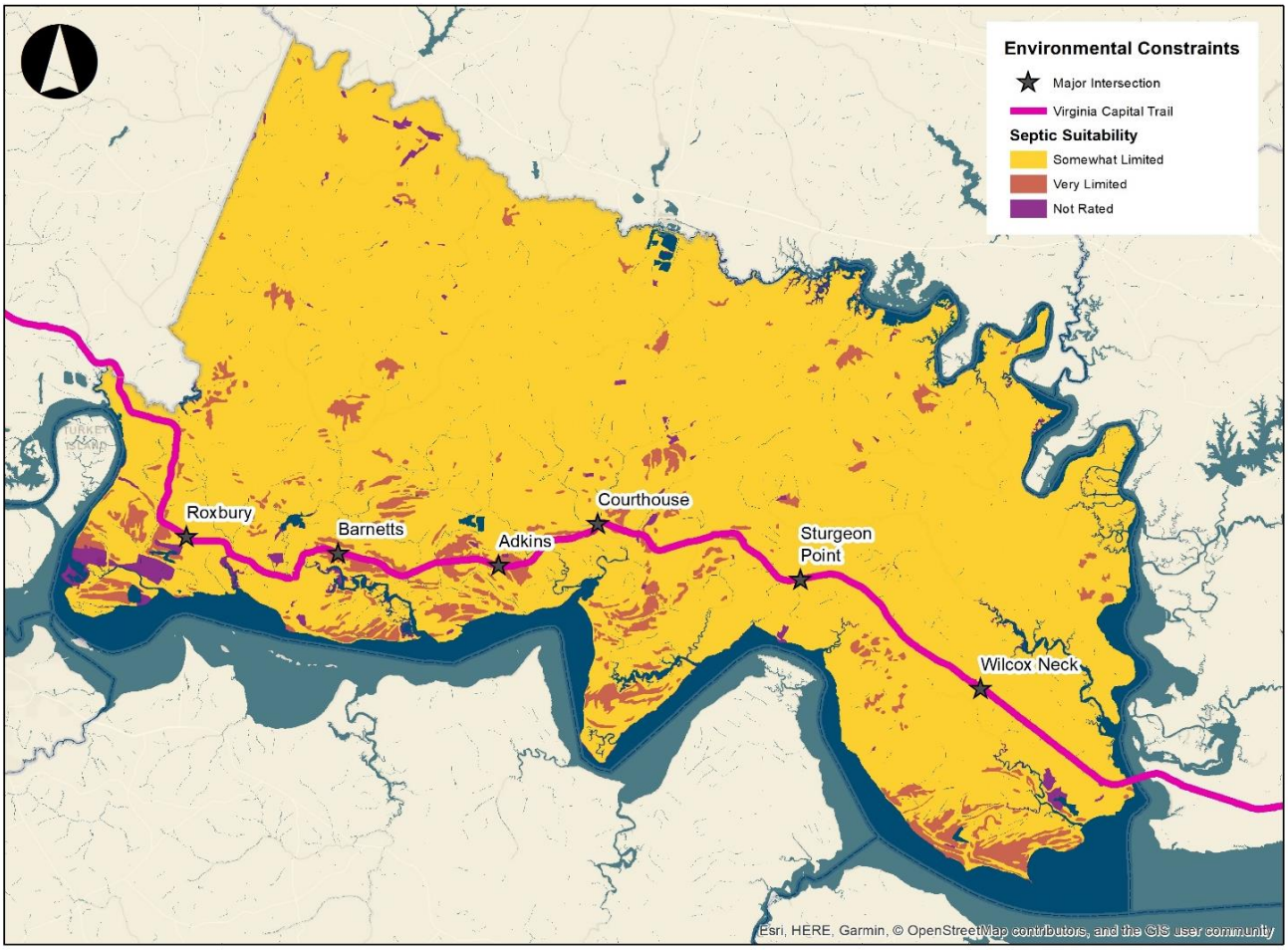


Figure 13. Soil suitability for conventional septic systems (NRCS, 2018; VDCR, 2018).

Flood Hazard Area

Flooding is the major risk factor to people and infrastructure in the area (Map 2). The valley of the Chickahominy River is broad and flat and contains a wide floodplain. Several other wetland areas and feeder streams are also designated by the Federal Emergency Management Agency (FEMA, 2018a) as posing a flood risk. The southern portion of the county has less terrain within catchment flood hazard areas, but it does contain areas affected by tidal flooding, especially along the banks of the James River (FEMA, 2018a).

The designations in Charles City County all fall within the 100-year, high-risk category (FEMA, 2018b). These designations mean that some uses will be allowed within floodway fringes but not within the floodway (Marsh, 2010c). Beyond site-specific regulations on development within the high-risk flood hazard areas, planning must account for evacuation and emergency response needs within those flood zones (Marsh, 2010c).

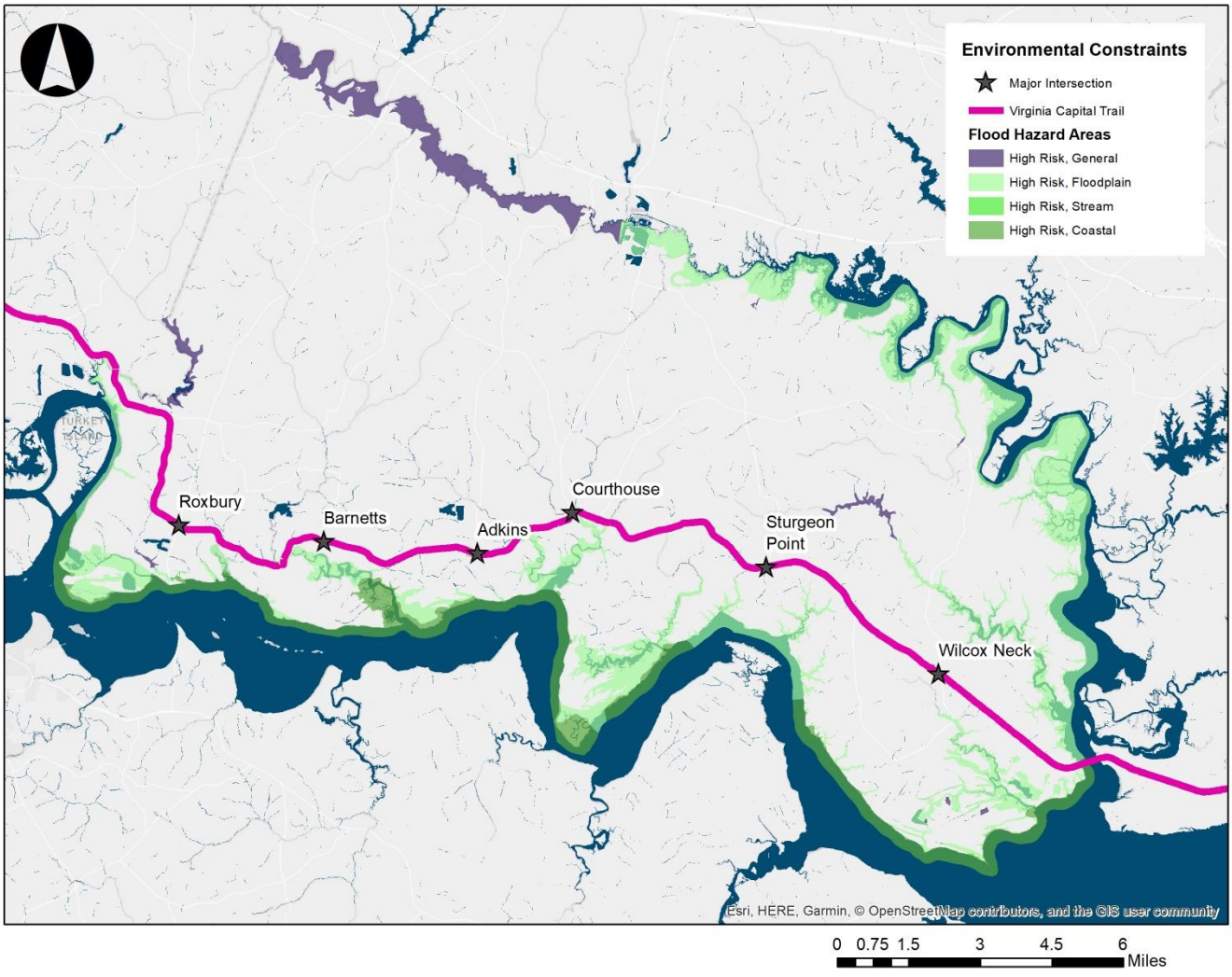


Figure 14. Flood hazards (FEMA, 2018a).

Land Cover

Looking at land cover and current conservation areas helps distinguish between areas of the corridor more suitable for preservation or development. From the Henrico County line to the Roxbury intersection, several conservation easements are in place and there are consistent stretches of evergreen forest and agricultural land. Another long stretch of agricultural land occurs between the Barnetts and Adkins intersections. The Courthouse area has a mix of land covers. The eastern part of the corridor features longer stretches of wetlands.

With land cover as a basis, much of the area in either direction of Roxbury seems ripe for character and scenic preservation. The eastern part of the county becomes more difficult to develop due to wetlands and offers a different rural character to the corridor from other sections of the corridor. The Courthouse area contains a mix of developed land and different land covers, and it is already designated by the county as a village node for development.

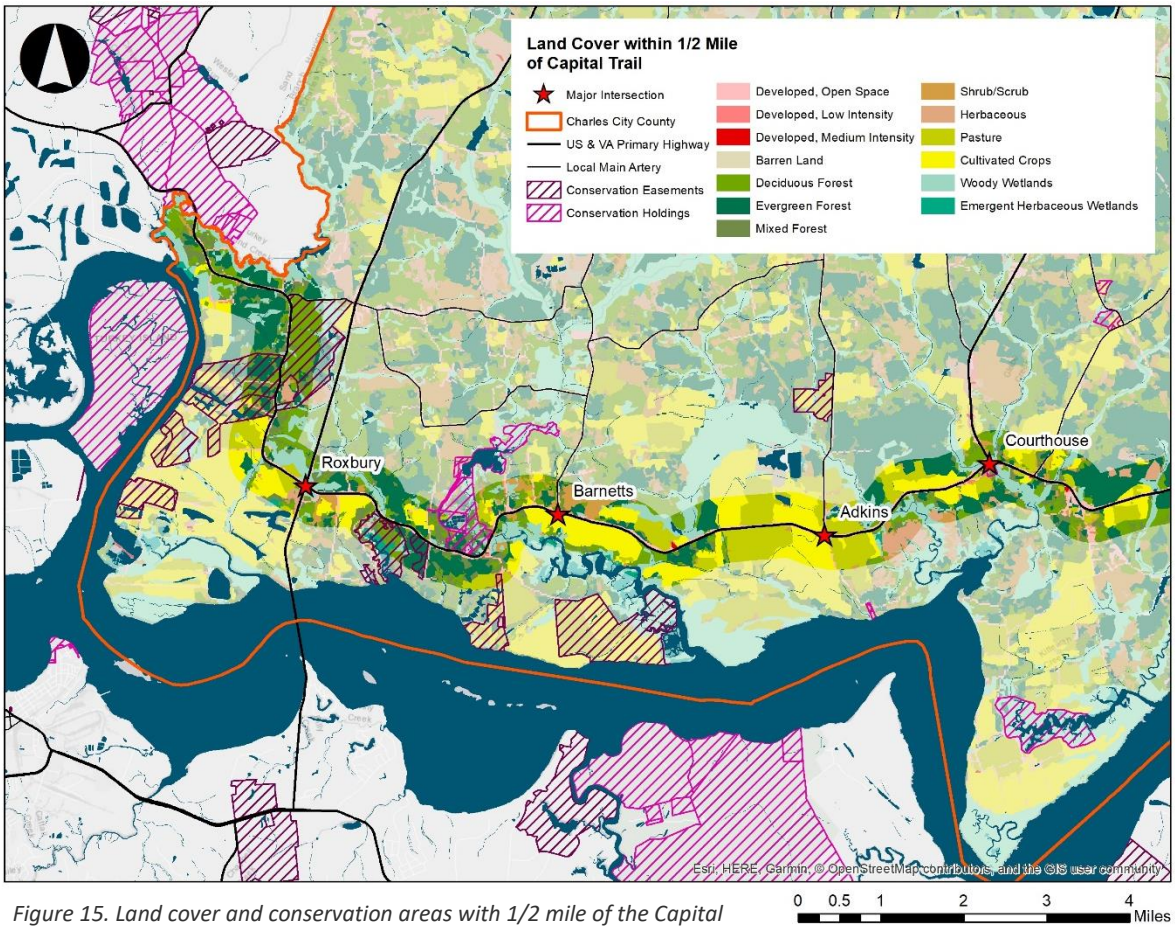


Figure 15. Land cover and conservation areas with 1/2 mile of the Capital Trail in western Charles City County (VGIN, 2019).

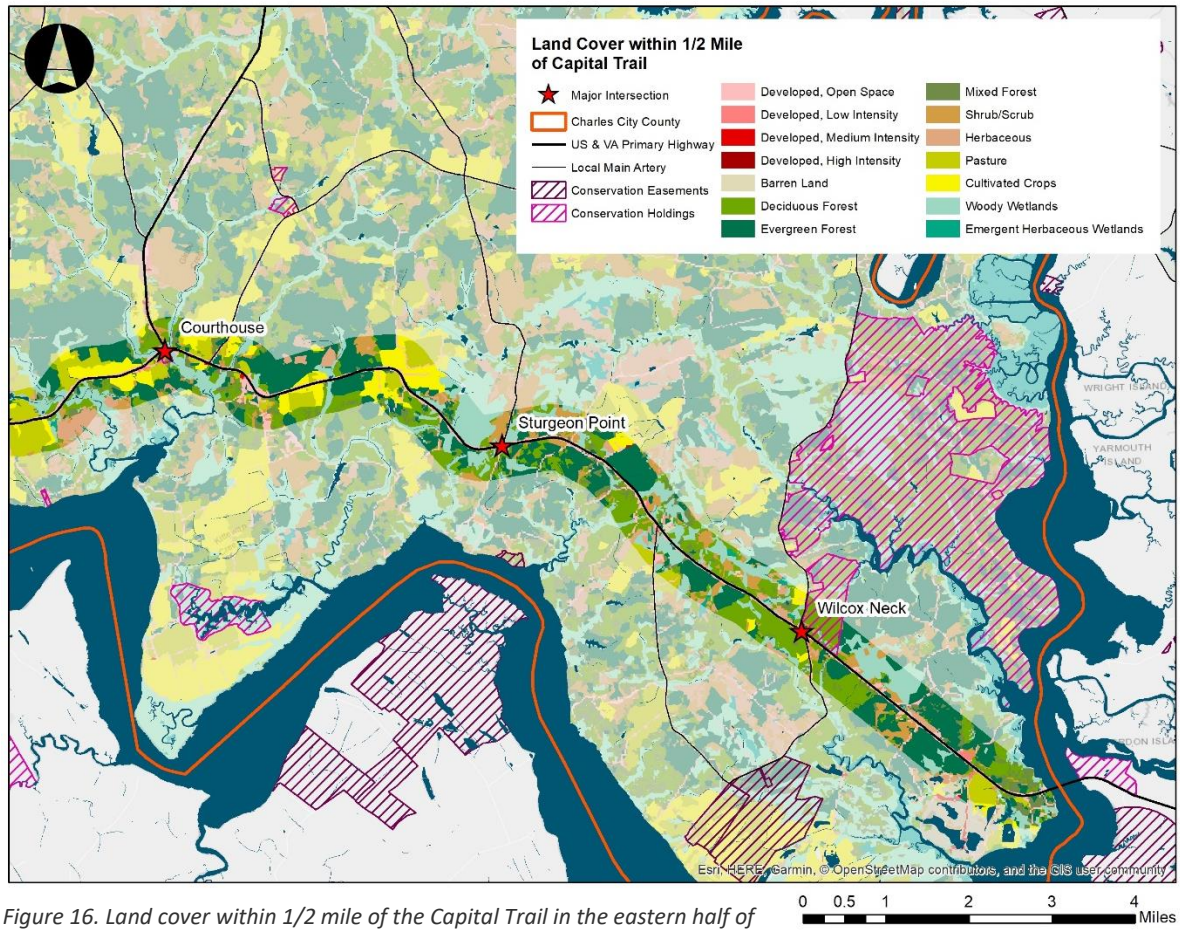


Figure 16. Land cover within 1/2 mile of the Capital Trail in the eastern half of Charles City County (VGIN, 2019).

Research Summary

Charles City County has recognized the Route 5 / Virginia Capital Trail Corridor as a potential and desirable location for economic development. Route 5 is a scenic byway, rural in character, and the main east-west road across the county. The Virginia Capital Trail parallels Route 5 and is viewed by the county as an attractive amenity for both residents and tourists. The central tension for the corridor is the conflict between maintaining its rural character and harnessing its economic potential through more development. In other words, Charles City County may have a golden egg, but they also have a golden goose to keep alive.

This plan balances the preservation of character with the need and desire for economic development. Using Charles City County's own goals, comparable case studies, current design guidelines, and a simple analysis, the plan provides a toolkit of options and recommendations to achieve that balance.

SECTION 5: RECOMMENDATIONS

The data and analysis lead to the following recommendations built around three main goals. The recommendations are based on common planning, economic development, and multi-modal transportation practices, and have been adapted to the specific context of Charles City County. These goals are to provide a safe and inviting cycling experience, to preserve the area's rural character, and to establish clear guidelines for the development nodes.

Goal 1 Provide a Safe & Inviting Cycling Experience

Objective 1.1 Provide safe cycling experience for locals and tourists.

- Action 1.1.1 Create countywide cycling infrastructure plan beyond Route 5.
- Action 1.1.2 Set minimum allowable distances between driveways fronting the Capital Trail.
- Action 1.1.3 Design cycling- and pedestrian-friendly intersections.

Objective 1.2 Create trail-oriented development that benefits current and future residents and visitors.

- Action 1.2.1 Install bike repair stations at strategic locations.
- Action 1.2.2 Diversify tourism by promoting cycling, historical, and agricultural tourism opportunities.

Goal 2 Preserve Rural Character

Objective 2.1 Implement lot requirements for building placement and landscape buffering.

- Action 2.1.1 Designate setback requirements for properties to be screened via topography or vegetation.
- Action 2.1.2 Adopt landscape buffering specific to the character corridor.
- Action 2.1.4 Keep existing mature trees.

Objective 2.2 Develop infrastructure that minimizes impacts on the rural landscape.

- Action 2.2.1 Encourage shared-use driveways for new subdivisions along the corridor.

Goal 3 Establish Clear Guidelines for Development Nodes

Objective 3.1 Promote a variety of uses within development nodes.

- Action 3.1.1 Designate village or node development zones along Route 5.
- Action 3.1.2 Change subdivision ordinance to reflect scenic corridor and development node needs.
- Action 3.1.3 Adopt nodal character corridor guidelines.
- Action 3.1.4 Allow higher density at development nodes to reduce likelihood of sprawl.
- Action 3.1.5 Allow and encourage small lot development in villages.
- Action 3.1.6 Allow mix of residential dwelling unit types--single family, multi-family, townhome, apartment, etc.--in development nodes.
- Action 3.1.7 Ensure that zoning allows mixed commercial and residential uses.

Objective 3.2 Develop infrastructure that encourages cycling and pedestrian access.

- Action 3.2.1 Designate maximum setback requirements in the development nodes to build close to the road frontage.
- Action 3.2.2 Require all new parking in development nodesto to be built behind buildings.

Objective 3.3 Create unique character for Route 5 through nodal design guidelines.

- Action 3.3.1 Resist special use exceptions for chain businesses.
- Action 3.3.2 Adopt landscape buffering for the development nodes.
- Action 3.3.3 Update landscape buffering requirements to include residential land uses, not just commercial and industrial.
- Action 3.3.4 Preserve existing trees via minimum tree coverage guidelines.
- Action 3.3.5 Use signage and promotional materials to distinguish these development nodes from other parts of the county.

Goal 1. Provide a Safe & Inviting Cycling Experience

Objective 1.1 Provide safe cycling experience for locals and tourists.

The cornerstone to creating trail-oriented development is providing an environment of safety for trail users. Safety affects the user experience more than any other factor. Other ways to create an inviting cycling experience include increasing access to the trail and adding amenities along the trail.

Action 1.1.1 Create a countywide cycling infrastructure plan beyond Route 5.

By creating a long-term cycling infrastructure plan, the county can create more opportunities for locals to access the trail. With a plan in place, future business owners or homeowners can better anticipate where to locate amenities on their properties. The plan can be implemented incrementally, since local funding may be an issue.

Action 1.1.2 Set minimum allowable distances between driveways.

This action helps ensure a safe cycling experience along the Capital Trail while preserving longer stretches of the scenic corridor.

Action 1.1.3 Design cycling- and pedestrian-friendly intersections.

Intersection design can be conducive to moving cyclists and pedestrians, not just automobile traffic. By adopting guidelines, the county can better work with VDOT for long-range infrastructure goals.

Objective 1.2 Create trail-oriented amenities to benefit current and future residents and visitors.

The new corridor overlay serves several purposes. The corridor will be part of an overall economic development strategy along with industrial development, agriculture and silviculture, and current history-based tourism. Another function is to serve as a social, recreational, and transportation benefit to the existing community.

Action 1.2.1 Install bike repair stations at strategic locations.

Repair stations could be located at trail access points such as public parking lots. They may also be located at partnering businesses. As repair stations are natural places for cyclists to congregate, locating stations next to businesses gives riders an incentive to patronize those businesses.

Action 1.2.2 Diversify tourism by promoting cycling, historical, and agricultural tourism opportunities.

The county has some links to recreation on its website, and there is a separate tourism site. However, neither really showcases the Capital Trail. The tourism site lists one bed and breakfast along the trail, and there is a link to the Virginia Capital Trail Foundation that goes into more detail about the trail and nearby amenities. More prominent links from the tourism site to the Capital Trail Foundation site and from the Charles City government site to the tourism site will create a more cohesive flow of information to the end user.

Goal 2. Preserve Rural Character

Objective 2.1 Implement lot requirements for building placement and landscape buffering.

Action 2.1.1 Designate setback requirements for properties to be screened via topography or vegetation.

This is one of the key components of rural character preservation. Moving buildings farther away from the right of way leaves emphasizes the scenery in front of the building. Setbacks for new buildings could be dependent on height.

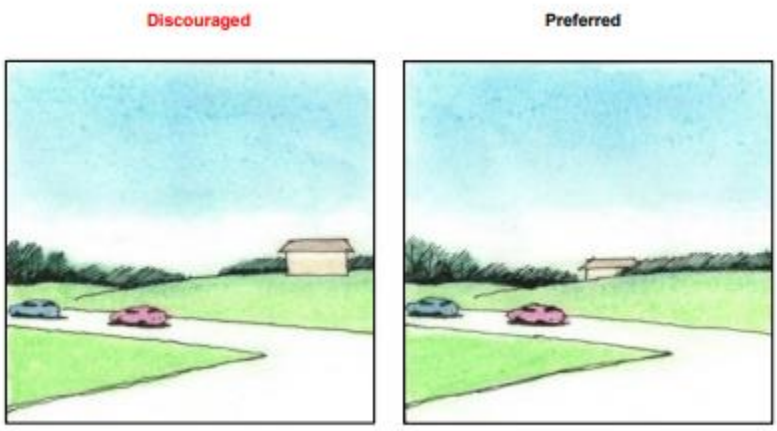


Figure 17. Structures are built behind trees or hillsides when possible.

Action 2.1.2 Adopt landscape buffering specific to the character corridor.

Buffering regulations exist, but to effectively preserve character, the corridor guidelines will need to be expanded to include residential buffering, not just commercial buffering.

Action 2.1.3 Keep existing mature trees.

Adopt a tree replacement requirement in cases where mature trees cannot be saved.

Objective 2.2 Develop infrastructure that minimizes the impact on the rural landscape.

Action 2.2.1 Encourage shared-use driveways for new subdivisions along the corridor.

Shared-use driveways can minimize interruptions to the scenic corridor as well as to the cycling experience.

Figure 18. A farm with a single driveway (left), is subdivided into lots each with frontage on the main road (middle). An alternative approach is to cluster lots around a shared access driveway, gradually develop multiple driveway entrances as the farmer sells frontage lots (right). (Source: Cheryl Doble, Natural Lands Trust)

Goal 3. Establish Clear Guidelines for Development Nodes

The Courthouse area is the only area of the county that currently has water and sewer. There is currently no plan for the county to provide water and sewer to any of the other nodes. Without water and sewer, other areas designated for development will rely on septic systems for the foreseeable future. However, reliance on septic systems impairs the ability to implement density standards. The following recommendations reflect long-range planning goals that therefore may be unfeasible to implement until water or sewer can be put in place.

Objective 3.1 Promote a variety of uses within development nodes.

Action 3.1.1 Designate village or node development zones along Route 5.

Based on the research and current conditions, the Courthouse area will continue serve as a designated development node. As mentioned, it is the only node with water and sewer infrastructure, and it is centrally located for the county's residents. However, for long-range planning, designate Roxbury and Wilcox Neck as future village nodes. Once there is a critical mass of development and funding for water and sewer in those two areas, develop the Roxbury and Wilcox as densely as conditions allow.

Roxbury currently offers the most access to the population outside of Charles City and is closest to metro areas where employment is commonly located, while Wilcox Neck will likely see future benefits from proximity to Williamsburg and James City County. Designating these two areas as the trail-oriented development nodes provides some flexibility while also limiting the possibility for sprawl, while keeping the remaining nodes within the scenic corridor serves the same purpose.

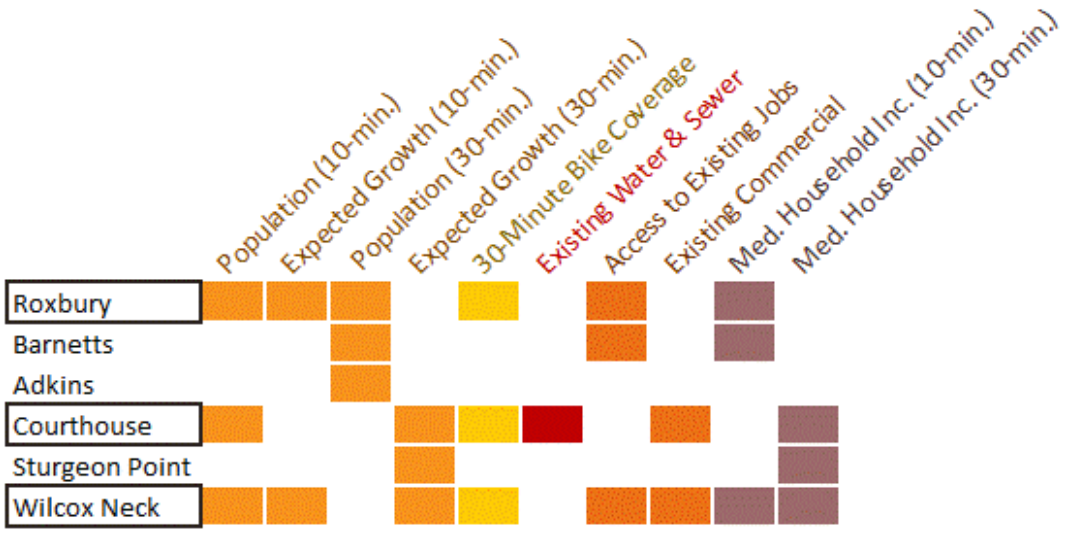


Figure 19. Strengths of each possible development node.

Action 3.1.2 Change subdivision ordinance to reflect scenic corridor and trail-oriented development node needs.

Modify existing subdivision language to allow for the scenic corridor and trail-oriented development node guidelines to supersede where applicable. Similarly, adopt nodal character guidelines to strengthen the existing comprehensive plan.

Figure 20. Subdivisions along the rural corridor can still maintain buffers. An undeveloped farm (above left) can be subdivided for maximum lot number and size (above right), or if encouraged or required, can provide the same number of lots by permitting smaller lot sizes (Source: Randall Arendt).

Action 3.1.3 Adopt nodal character corridor guidelines.

Action 3.1.4 Allow higher density at development nodes to reduce the likelihood of sprawl.

Action 3.1.5 Allow and encourage small lot development in villages.

Action 3.1.6 Allow a mix of residential types--single family, multi-family, townhome, apartment, etc.—in development nodes.

Action 3.1.7 Ensure that zoning allows mixed commercial and residential uses.

This series of actions allows for higher density and helps meet a variety of housing needs. More people equate to more potential customers in one area. Increased density allows for walkability and bike-ability due to the shorter distances people will need to travel. Density will also lessen long-term infrastructure construction and maintenance costs.

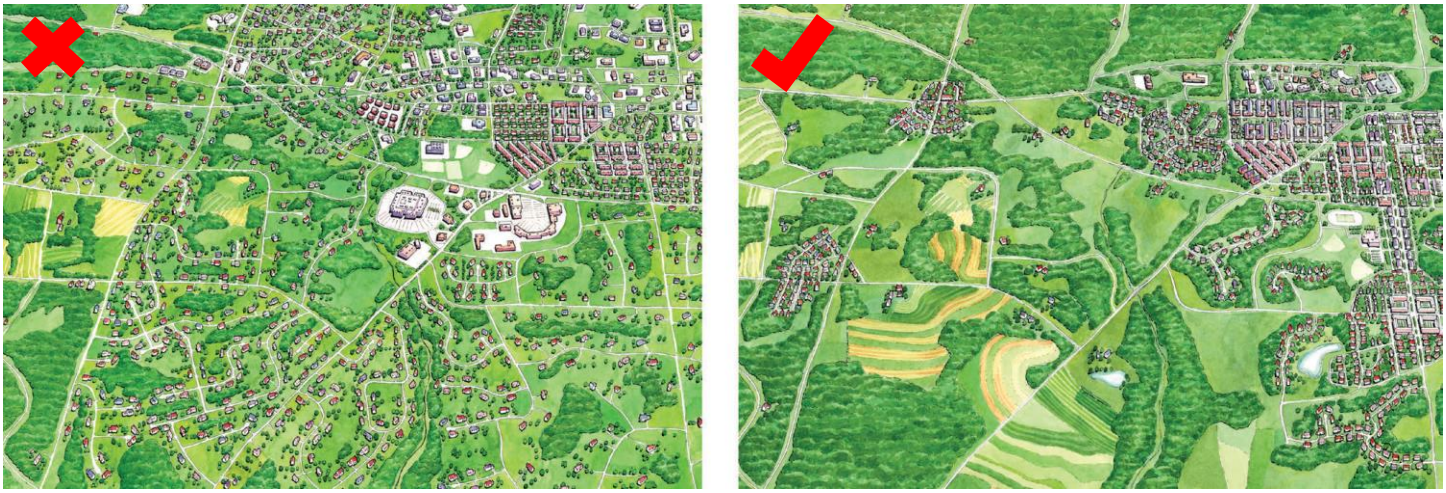


Figure 21. Denser development with mixed uses is shown on the right, while sprawled development on the left occurs without density incentives and open space preservation. (Source: Chester County, PA Planning Department, 1996)

Objective 3.2 Develop infrastructure that encourages cycling and pedestrian access.

Action 3.2.1 Designate setback requirements in the development nodes to build close to the road frontage.

Building close to the road creates not only a sense of the public realm, but it encourages cycling or walking because people can more easily move from one store to another rather than crossing multiple parking lots. This action is like actions under Objective 2.1. However, this action step is placed separately to emphasize it being part of the development node.

Action 3.2.2 Require all new parking in development nodes be built behind the building.

Objective 3.3 Create a unique character for Route 5 through nodal design guidelines.

Action 3.3.1 Resist special use exceptions for chain businesses.

There are numerous examples of chains throughout the country that adapt to design aesthetics. This includes new service stations, fast food, and pharmacies with drive-thru service. Buildings can be pushed to the front of lots while still providing ample parking in the rear.

Figure 22. Two stores along a major crossroads at a roundabout in Davidson, North Carolina. The service station on the right has a partial entrance road that could be extended later when the next parcel is developed (Source: Google Maps, 2019.)

Action 3.3.2 Adopt landscape buffering for the development nodes.

Action 3.3.3 Update landscape buffering requirements to include residential land uses, not just commercial and industrial.

Action 3.3.4 Preserve existing trees via minimum tree coverage guidelines.

As outlined in the rural preservation section, the development nodes have guidelines that will supersede regular buffering and landscape requirements. This will help bring about a consistent sense of place. Maintaining as much vegetated landscape and tree cover as possible offers cohesion with the scenic corridor. In contrast, stripping the trees and vegetation from a parcel can create a strip mall feel (like Midlothian or Short Pump).

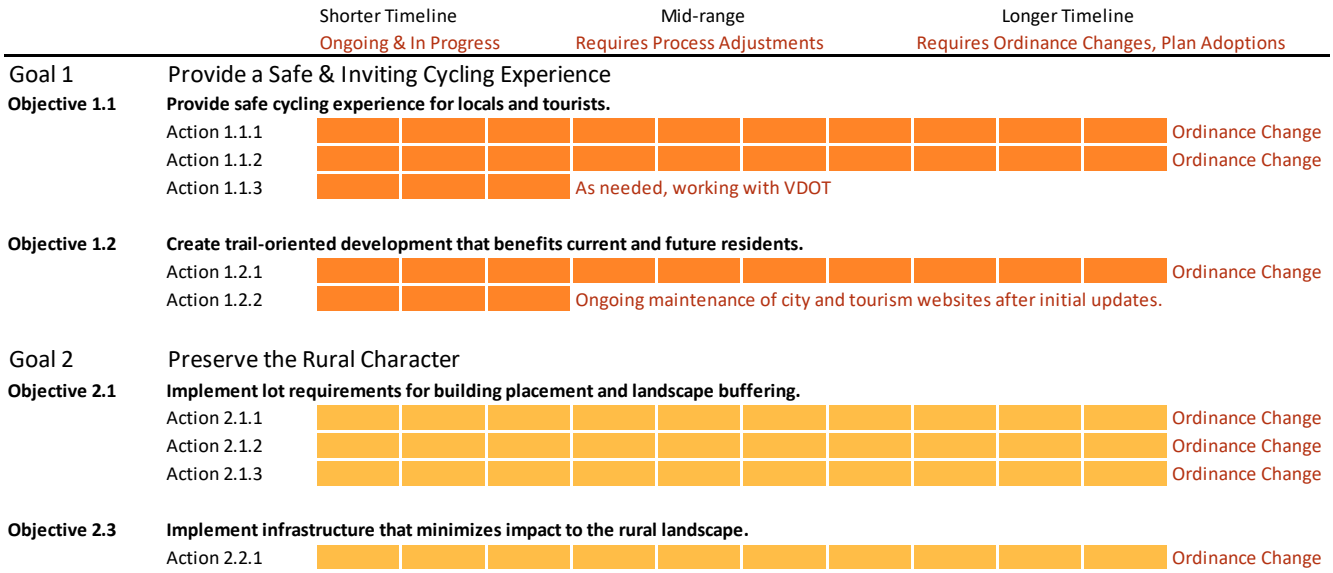
Action 3.3.5 Use unique signage to delineate the development nodes from other parts of the county.

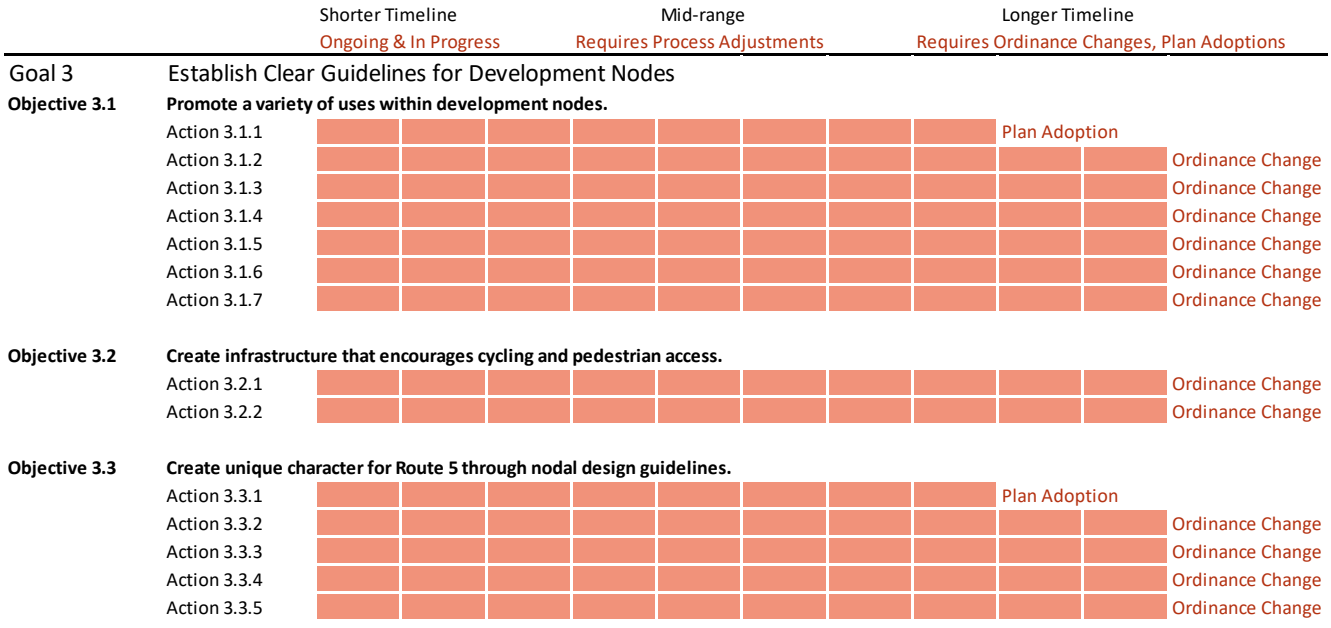
Development nodes along the Route 5 corridor could have more specific signage guidelines. Signage can create a more special sense of place, adding a specialness to a place. Signage guidelines could allow a modern feel while still respecting the historical nature of Charles City County.

Figure 23. Chain stores have adapted to design standards throughout the country and the world. This McDonald's in Biltmore Forest, North Carolina has signs to meet a low height maximum and requirements for external lighting. (Google Images)

SECTION 6: IMPLEMENTATION

Most of the recommendations will involve the approval process of the Board of Supervisors. Action steps presumed to take longer are likely to involve more community engagement. This includes the development of a greenway system and buy-in on community design guidelines around signage. The short timelines are things that either require little public feedback to enforce or are on an as-needed basis. Most items will require adoption of a corridor plan and appropriate ordinance changes.





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Appendix

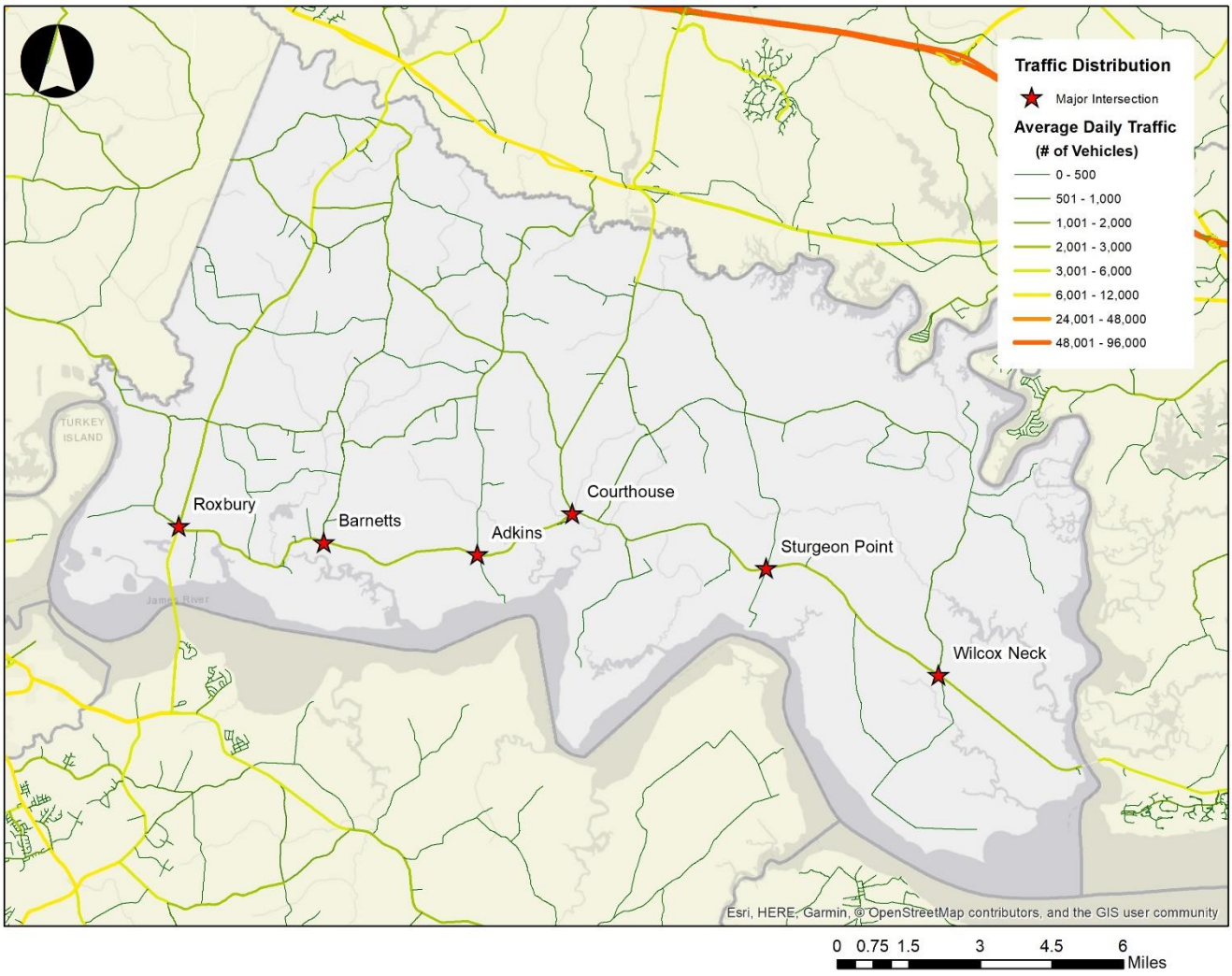

Figure 24. Average daily traffic volumes, 2017. (VDOT, 2017)

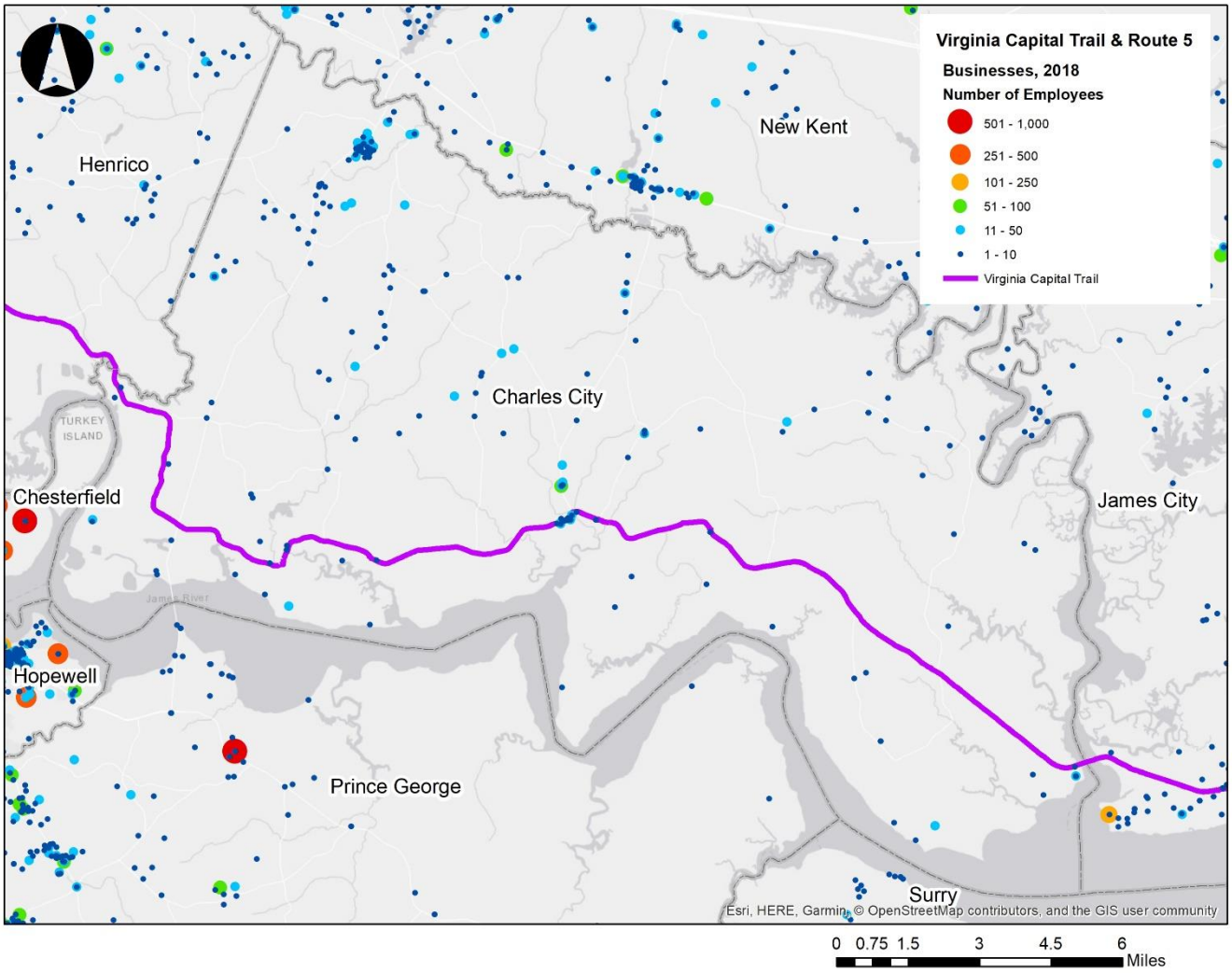

Figure 25. Business location and number of employees (ESRI, 2018).