Richmond Regional Planning District
Land Use Assessment
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Land Use Assessment

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Spring 2011

Cover Page Map Data Source:
Acknowledgements

First we would like to thank Jacqueline Stewart, Barbara Jacocks, Sarah Stewart, and Leigh Medford of the Richmond Regional Planning District Commission for providing data and assistance in this study.

Secondly, we would like to acknowledge the guiding role of our professor, Dr. Ivan Suen, who has helped in enumerable ways to bring this report to where it is today.

Finally, we would like to thank all of the metro-Richmond area jurisdictions that provided key data that was the central crux of our report, including: City of Richmond, Hanover County, Henrico County, Charles City County, Powhatan County, Goochland County, and Chesterfield County.
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1 | Introduction

This plan was developed to serve the needs of the Richmond Regional Planning District Commission and for the advancement of the Richmond Metropolitan Region. The plan analyzes inter and intra–jurisdictional development patterns and their compatibility with land use plans and environmentally sensitive areas.

The Richmond Regional Planning District Commission (RRPDC) is a regional planning agency with major emphasis in the areas of transportation, water resources and solid waste planning; local technical assistance; and information services including demographic, economic and geographic information systems.

The Commission was formed in 1969 under the authority of the Virginia Area Development Act and is comprised of elected officials and citizens who address mutual problems and work out solutions for the local governments which benefit from intergovernmental cooperation.

The RRPDC’s major objectives are to:
1. Identify issues and opportunities of an inter-jurisdictional nature
2. Establish plans and policies for addressing those regional issues
3. Identify ways and means for state, local governments and the private sectors to implement programs
4. Help promote cooperation among state and local governments in issue resolution
5. Provide technical assistance and information services to its member jurisdictions.¹

Purpose Statement

This report for the RRPDC should be used to help inform all key stakeholders in Richmond Metropolitan Region about the condition of current development when analyzed with building footprint, land use, environmental topics, and other unique situations.

The three major uses of this report:
1. Identify hotspots,
2. Improve assessment outcomes by utilizing GIS technology,
3. And establish a framework and strategy for further analysis.

A hotspot is defined as an area in which a building or parcel was found to be incompatible through an analysis. All jurisdictions conducted two analyses: general development patterns and development compatibility with environmentally sensitive land. Additionally, some jurisdictions conducted further analysis catered to their circumstances, such as development compatibility with zoning, current land use plans, or future land use plans. Any incompatibilities found are deemed hotspots. After conducting the hotspots analysis, each jurisdiction evaluated overall development and concluded with a list of opportunities and threats.

The second major use for this plan is to improve assessment outcomes by combining GIS technology, current jurisdictional plans, and state level environmental data. The technology of GIS keeps complex data organized and allows users to spatially evaluate the
data. By using GIS, this report was able to determine hotspots that would be difficult to see without the software.

Finally, this report could be used as the initial step to performing a larger and more in-depth study of regional incompatibilities on a wide array of inter-jurisdictional issues. The hotspots found in this report could be analysed further to determine the location of development when compared to the intended plan and to understand what might be done to correct or prevent future incompatibilities.

**Description of the Study Area**

The district covers 2,165 square miles, with a July 2005 population estimate of 961,353. The nine incorporated governments include the counties of Charles City, Chesterfield, Goochland, Hanover, Henrico, New Kent, Powhatan, the City of Richmond and the Town of Ashland, as shown in Figure 1.

The Richmond Region is one that is rich in historical and natural resources. The most dominant force on the topography and history of the region is the mighty James River which splits the district through the middle. Currently, this river provides opportunities for eco-tourism, trade, and a variety of parks. Also, because of the high amount of land that is tied to the river, certain areas of development are limited due to the sensitive nature of the land.

The largest man-made effect on the land use in the Richmond Metropolitan area is the establishment of Interstates 64 and 95, which bisects the north-south and east-west of the region. These major thoroughfares place Richmond on a key Atlantic Coast pipeline for industrial and commuter traffic and trade. Further expansion of state route 288, the Powhite Parkway, and Interstate 295 around Richmond has contributed to the expansion of development, especially single family residential.

In order to utilize GIS technology for the hotspot analysis, certain data at the jurisdictional level was needed. During this process it was found that many of the area jurisdictions had different classifications of land use categories, thus comprising an overall common area categories was unable to be obtained. Furthermore, certain jurisdictions did not provide access to land use data, and were not included in the study. Therefore, only eight of the nine member jurisdictions were able to be included in this report, New Kent County as the only exception.

**Goals and Objectives**

The main goals and objectives of this report are to:
- Spatially understand development patterns in each jurisdiction,
- Evaluate the location of buildings or parcels with environmentally sensitive areas to determine hotspots,
- Conduct further evaluation of development specific to the jurisdiction’s needs and available data, especially with land use,
- Identify areas for infill development in certain jurisdictions,
- Assess and review the analysis of each jurisdiction to establish opportunities and threats,
- Synthesize jurisdictional evaluation for an overall regional assessment of development,
- And formulate suggestions for the region based on the regional development.
Fig. 1: Study Area: Richmond Metropolitan Area
Sources


(2) Ibid.
2 | Methodology

There are four main categories of analyses performed; building footprint, environmental, land use, and other, with each category employing its own analysis methodologies. All jurisdictions assessed the building footprint and environmental categories and additional analysis were performed depending on each county’s conditions.

Building Footprint Analysis

The building footprint analysis, based on the year the building was constructed, was conducted by all jurisdictions and followed this methodology. The year built was categorized into four ranges of years and color-coded by these categories. The colored building easily demonstrates spatially the direction of development as growth has occur throughout the years.

All the data used in the building footprint analysis was obtained from the RRPDC. The RRPDC had digitized all of the building footprints into a GIS shapefile. The approximate year built was information attached to the building footprint shapefile. The RRPDC had collected this information through an impervious surface study which took aerial photos of the region during the years of 1994, 2002, 2007 and 2009. If the building existed on the parcel of land in the photograph, the year was marked with a “yes” in the building footprint information. With this information, the study could approximate the year the building was built in one of these four categories: 1994 and earlier, 1995—2002, 2003—2007, 2008—2009.

Environmental Analysis

The environmental analysis was conducted by all jurisdictions and followed the methodology stated here. The environmental analysis contains three sub-analyses: wetlands, ecological integrity, and environmental rating.

Wetlands

The wetlands analysis uses building footprints or parcel data, and wetland data from the U.S. Fish and Wildlife Service to identify the location of wetlands. These GIS shapefiles were obtained from the 2011 National Wetlands Report. The building footprints, or parcels, were overlaid with the wetlands to determine if the structure or parcels were located within or partially encroaching on the wetlands. Structures or parcels that were located within or partially within a wetland were designated in red and are deemed hotspots.

Ecological Integrity

The ecological integrity analysis was conducted similarly to the wetlands analysis. The ecological integrity data is a GIS shapefile obtained from the Virginia Department of Conservation and Recreation website through their 2007 Virginia Conservation Land Needs Assessment. The GIS shapefile places digitized locations for areas of ecological integrity. Additionally, these areas were classified into five categories by the level of ecological integrity into five categories by the level of ecological integrity within the following ranges: C1—outstanding, C2—very high, C3—high, C4—moderate, and C5—general. Any classification above C3 should not be built upon due to
the ecological value of the area. The ecological integrity C4 and C5 should be noted and considered, but does not necessarily need to be preserved from development.

The building footprints or parcels were overlaid with the areas of ecologically integrity to determine if the structure or parcel is located within or partially encroaching on an area of ecological integrity. Any structure or building within or partially encroaching on a C1, C2, or C3 node of ecological integrity is deemed a hotspot.

**Environmental Rating**

The environmental rating analysis is a combination of the wetlands and ecological integrity analysis. A rating system was devised to rate each structure or parcel based on whether or not it was located within or partially encroaching upon a wetland or node of ecological integrity. The scoring of each building or parcel is shown in Figure 1.

The environmental rating system for the location of structures or parcels ranges from 0 to 100, with 0 being the best and 100 being the worst. The environmental rating is the wetlands score and ecological integrity score added together. If a building or parcel is located within or partially encroaching on a wetland, then it receives a score of 60. If not, the building or parcel is penalized 0 points. The ecological integrity scoring is more complex to properly rate each classification of ecological integrity. If a structure or parcel is located within or partially encroaching upon a location of C1 ecological integrity it is penalized 40 points, C2 is penalized 30 points, C3 is 20 points, C4 is 10, and C5 is 5 points. If the structure or parcel is not located on or partially upon a node of ecological integrity, it is penalized 0 points.

\[
\text{wetlands} + \text{ecological integrity} = \text{environmental rating}
\]

The score of the wetlands and ecological integrity are added together for each individual structure or parcel. Any environmental rating of 30 or more is deemed a hotspot.

**Land Use Analysis**

The land use analysis was not conducted for all of the jurisdictions. Furthermore, the land use analyses that were conducted were unique to each jurisdiction based on their circumstances and data availabilities. The methodology for each sub-analysis under the land use analysis category is explained with the jurisdiction’s section. The following jurisdictions conducted land use analysis and the specific sub-analyses are listed.
*Charles City*
- Conducted a visual assessment of the current zoning and future land use with respect to current areas of development.

*Chesterfield*
- Assessed the current zoning with density levels allotted to each parcels capacity for development.

*City of Richmond*
- Zoning and future land use were form based and therefore could be analysed for density.

*Hanover*
- Conducted land use analysis using current zoning and future land use plans as pertains to the allotted density levels for each.

*Henrico*
- Conducted land use analysis using current zoning and future land use plans as pertains to the allotted density levels for each.

*Powhatan*
- Performed a land use analysis comparing growth patterns with the conceptual future land use.

**Unique Analysis**

The Unique Analysis category captures any analyses conducted by the jurisdiction for their circumstance and data availability but cannot be categorized under building footprint, environmental, or land use. The methodology for each of these unique analyses are explained within the jurisdiction’s section. The following jurisdictions conducted unique analyses.

*Charles City*
- Examined the current development patterns and specified areas within the county that were prime for development.

*Chesterfield*
- Examined the current development patterns and specified areas within the county that were under capacity and prime for future development.

*City of Richmond*
- Developed unique performance based criteria to determine areas for infill or redevelopment.

*Hanover*
- Conducted an incompatibility analysis between the current zoning and future land use plan.

*Henrico*
- Conducted an incompatibility analysis between the current zoning and future land use plan.
3-A | Charles City County

Background and Demographics

Charles City, created by the Virginia Company in 1619, is a rural county located within the Richmond Metropolitan Region.¹ The county is to the east edge of the Richmond Metropolitan Region which is conveniently located between City of Richmond and Williamsburg. Charles City County has a population of approximately 7,000 residents and is rich in historical, archeological, and natural resources.²

The county is comprised of 183 square miles of land area and 20 square miles of surface water. It is bordered by the counties of New Kent to the north, James City to the east, and Henrico and Chesterfield counties to the west. The border of Charles City is delineated by two rivers, the James and the Chickahominy, which contribute to the large amount of environmentally sensitive areas. Furthermore, the center of the county is comprised of a vast amount of forest and agricultural lands. The community’s desire to preserve its rural character and enhance the large amount of historically significant sites is reflected in the comprehensive plan and development patterns.³

Charles City, nonetheless, would like to increase its limited commercial and service industries, as currently many residents must leave the county for services and employment.

Building Footprint Analysis

Development in Charles City is relatively scattered as seen in Figure 1 below. The majority of development is concentrated in the western half of the county, especially the northwest. The GIS analysis conducted to assess development patterns supports what is described in the comprehensive plan.

![Fig. 1: Building Footprint](image-url)
Land Use Analysis

According to the Charles City County’s Comprehensive Plan’s map for existing land use, as seen in Figure 2, the most prevalent land use is forest and wetlands, which cover three quarters of the land. The next major types of land use within the county are devoted to crops, animal pastures, and urban development. Therefore, due to the strong presence of environmentally sensitive areas and low density zoning, development has occurred in a mostly scattered pattern.

Commercial, industrial, and higher density residential land makes up less than two percent of the overall land uses. The main center of concentration of these areas for the future is along the Roxbury Industrial Center which is located along the west side of the district, as seen in Figure 3. This industrial hub is seen as a potential major job provider of the county. Current industry consists of both light use (manufacturing, trucking, and automobile salvage) and heavy use (sand and gravel mining, ports and the county landfill). The current development centers located throughout the county have a considerable amount of remaining open space, making expansion feasible. For example the Courthouse and Hideaway Development Centers, as represented in Figure 3 as the brown and green locations, have minimal utilization and could support a large amount of new devel-
Residential development within the county is categorized as roadside residential and neighborhood residential. The majority of this development is clustered along intersections, roads and rivers. The houses are typically situated on one to five acre plots with direct driveway access to roadways, while others are located in subdivisions as neighborhood residential houses. These lots are generally an acre in size and placed without direct access to major roads.

The citizens have expressed the desire to protect the county’s rural character by influencing future development to be adjacent to existing development. A subdivision ordinance has been adopted to promote clustered development that can also be actively used for agricultural and forest operations. The county has also promoted additional industrial development by touting its easy access to Interstate 64, low land prices, and proximity to the James River. Furthermore, the county would like to expand its commercial developments, particularly retail shopping.

Charles City County predicts that until the year 2030, upcoming residential development will consist of 15 percent rural development and 85 percent neighborhood residential development. The majority of the county is comprised of soils that are unsuitable for traditional on-site septic systems. In fact, only five percent of land within Charles City is suitable for septic systems, which adds constraints on future residents and businesses development.

According to a soil survey performed in Charles City County, 43,500 acres of the surface land has been determined to be prime agricultural land. The county is currently instituting “growth centers” that protect their crucial agricultural and forested land.

Environmental Analysis

Wetlands

Impressively, building development for a high majority of the county has avoided wetlands. As seen in Figure 4, there were only 120 structures located in wetlands. The main use for most of these structures was residential. The fact that there were a minor number of structures located in environmentally sensitive areas proves...
well for the county and future protection of land from development.

*Ecological Integrity*

The ecological integrity is based on a scale that rates the integrity of the land from outstanding to general, where C1 is equivalent to outstanding and C5 is considered general.

As seen in Figure 5, there was no presence of outstanding, or C1 integrity. The majority of land coverage within the county falls into an ecological integrity category ranging from a C2 to C5.

Areas considered as possible hotspots would be the eastern and northeast portions due to the high amount of C2 rated ecological land. Currently, these areas have low density development, comprised of scatter residential and light industrial use.

*Environmental Rating*

The environmental rating combined data from the wetlands and ecological integrity studies to show the overall impact of current development on the environment. According to Figure 6 seen above, the vast majority of the buildings (288) received a score of 30 or lower. These areas should be noted by planning staff as areas of environmental integrity, but development should not be as strongly
Charles City County

Discouraged as with the higher scoring areas. Therefore, the buildings that should be monitored for hotspots are those which have a rating of 60 or higher. Within this group, two buildings received a score of 90, and four received 60. Figure 6B displays one of the structures that scored a level of 90. Upon further analysis, this structure was found to be built previous to 1994. Figure 6C displays the other structure within the county that scored a rating of 90. Located off a tributary of the James River, this building was also constructed previous to 1994.

Unique Analysis

Capacity for Demand
As stated in the Charles City County Comprehensive Plan, “commercial development should continue to develop using methods consistent with preserving its environmentally sensitive areas.” To achieve this, the county has concentrated on locating new developments in specific growth areas, as seen in Figure 7A.

Within these areas of development, two were determined by the amount of current building densities as being most prime for development and infill. Section 7B displays the northernmost part of the Roxbury Industrial Center. This area is currently under capacity as pertains to the building density called for in the comprehensive plan. Therefore, this area is determined as a hotspot and should be concentrated upon to encourage further development.

Section 7C displays the Courthouse development area. This section of the county is currently the location for high commercial and residential density. Thus, classifying this area as a development hotspot will direct new development towards an economically and environmentally beneficial area.

Assessment and Review

Thus far, Charles City has done an exemplary job of protecting their ecologically sensitive land and preserving its rural character. The analysis shows that the development patterns are consistent with objectives identified in the current comprehensive plan. More emphasis on addressing the hotspot development centers and neighborhood service areas might simultaneously improve commercial opportunity and reduce the amount of scattered rural residential development. The majority of development within the three hotspot development centers has existed since 1994 with few new properties. Although there are a few structures located on wetlands, the majority of building development has occurred without disturbing environmentally sensitive areas.

Opportunities

- Large amount of open land and abundance of rivers and wetlands. Charles City County has a great opportunity to draw upon eco-tourism to expand the local economy. For example, development along the river fronts, including restaurants, boardwalks and amphitheaters, could supply entertainment to the local residents while attracting tourism.
- High amount of commercial and industrial areas under capacity. Charles City currently has a small amount of commercial and industrial development in current areas zoned for these uses.
Fig. 7: Capacity for Demand
Therefore, the County could support significant new development through incentives to area companies.

- Establishment of the Route 106 Roxbury Industrial Corridor. This district should support the current needs as well as provide a base for future opportunities. This corridor will help preserve local roads for area residents by providing stronger infrastructure for commuting industrial vehicles.

**Threats**

- Abundance of land that is classified environmentally sensitive or wetlands. Development may be inhibited by the existence of these areas and possibly move to other jurisdictions. Capacity for further development of the current uses within the county also may be limited on options for possible locations or expansion.

- Limited access to public utilities. The few amount of public water and sewer utilities at the current time cannot accommodate a greater number of residents and industries. An enhanced infrastructure would enable new residents, commercial businesses, and industries to easily locate within the county without the normal time delays that result from new construction.

- Lack of existing developed commercial sites. The lack of existing sites in the county may deter some who consider moving to the area. Also, the development of new sites needs to be met with caution as much of the county’s land is environmentally sensitive.

- Few local major employers exist locally. At the current time many of the residents have to travel long distances to work. Furthermore, future development may be inhibited by the high cost of travel forcing area residents to find work closer to home.

**Sources**

4. Ibid.
Background and Demographics

Chesterfield County is southern part of the Richmond Regional Planning District and has a total population of 259,023. Currently, the county is transitioning from a patchwork of 22 different locality plans to compiling one overall comprehensive plan. Each of these local plans has its own land use categories and color-coding, as seen in Figure 1.

As for the residential demographics within the county, nearly 80.9% of housing units were owner occupied and only 19.1% of housing units were renter occupied, as seen in Figure 2. The median household income was $58,357. Furthermore, Chesterfield is mostly known as a bedroom community to the City of Richmond. A majority of the community consists of suburban, single family residential housing.

Agricultural use within the district is mostly concentrated around the southwest region of the jurisdiction. Currently, as the new comprehensive plan is being composed, there is discussion on classifying this area as a rural conservation district to prohibit further development.

Industrial uses in the county are arranged along Interstate 95, which runs through the eastern section of the district, and the border with the City of Richmond, which is located along the northern section of the district. The main centers of commercial use is in the Midlothian area, which is located in the northwest section of the county.
Building Footprint Analysis

As illustrated in Figure 3, most development occurred before 1994 across the county. Since 2003, growth in Chesterfield County shifted away from the border shared with Richmond and spread into the southern parts of the county. This development has appeared to spread with little arrangement and without any definitive centers of growth. After close analysis of the building footprints, it was found that many of these newly developed residential areas are large subdivisions in areas zoned in lower density residential categories, R-25 through R-88. The specific zoned densities for these areas can be found in Figure 4.

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</tr>
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Fig. 4: Residential Zoning

Land Use Analysis

The Chesterfield land use analysis is based on the current zoning ordinance and parcel level data. The analysis examined land development and density to identify land use hotspots. Since Chesterfield's zoning is individualized to its 22 divisions, the land use analysis required generalizing and combining the sub-county areas' zoning for an overall cohesive zoning scheme.

Density and Zoning

The first step was to isolate the different zoning categories for analysis, areas that were isolated were R-7, R-12, R-15, R-25, R-40, and R-88, as seen in Figure 4. The location of these uses were then mapped using GIS to display the spatial arrangement of the categories within the county. As seen in
Environmental Analysis

Wetlands
The County of Chesterfield is shaped by the location of two major water resources within the county, Swift Creek Reservoir, which is located on the western half, and the James River, which forms the eastern border of the jurisdiction. The wetlands analysis was conducted to find if any parcels are located on or partially on the wetlands.

According to Figure 6, the development that lies on or partially on wetlands is minimal. The only major area of concern is in the western portion of the county where some development has occurred along the Swift Creek Reservoir. Upon further analysis it was determined that most of these buildings were constructed prior to 1994.

Ecological Integrity
According to Figure 7 there were no areas of highest environmental integrity (C1) within the county. The concentration of the major areas of high integrity were along the southwest and central areas. Development should be limited in these areas to protect the ecological integrity of the land.

Environmental Rating
The environmental rating is based on wetlands and ecological integrity analysis and each parcel was appended with a specific score as described previously in the methodology section. Chesterfield’s environmental rating analysis is unique to the district in methodol-

Fig. 5: Density and Zoning

Figure 5, the zoning categories decrease in density the further away it is from the City of Richmond. The only major exception to this pattern in the area of concentrated R7, high density residential, that is clustered on the southeast section of the map. One possibility for this concentration of density is the adjacency to the population centers of Petersburg and City of Colonial Heights.

Another noted area within the residential density analysis map is the location of a lower density residential area in the center of the district. This area should be noted and further studies should be conducted to check the compatibility with future land use to assess the possibility of further development.
ogy due to the data constraints with obtaining building level data. As seen in Figure 8, the main center of high scoring parcels is located in the southwest area of the jurisdiction. Further analysis determined that this area is the location of Swift Creek Reservoir. Therefore, this area was not determined to be a hotspot because future development of this area would be legally protected or impossible to develop upon.

Fig. 6: Wetlands

Unique Analysis

Capacity for Development
The capacity for each zoning designation was identified by the current and zoned densities, as seen previously in Figure 5. The current density was divided by the zoned density and the capacity for each zoning designation. If the assigned number was less than zero the area was under capacity and still had room for growth. If the assigned number was zero the area was at capacity and had no more room for growth. If the assigned area was over one, the area was over capacity.
Fig. 8: Ecological Rating
As seen in Figure 9, most of the residential areas of Chesterfield County are at capacity. This is especially true for the areas in the northernmost region which are closest to the City of Richmond. The largest areas under capacity are in the center and western regions of the county. Further analysis has shown that the recent from 2005 to 2011 was concentrated in the northwest, central and southeast areas of the county.

Currently, there are many underdeveloped areas in Chesterfield County. While there has been residential growth in the county since 2000, many areas are still under capacity. As displayed in Figure 9 the hotspots for residential development are in the center of the county. These areas are the largest areas in the county that are undeveloped and prime for infill development.

Section A of Figure 9 was choose as a hotspot due to the fact that this area is zoned high density residential, but currently has developed at rates that are under capacity as compared to their classified levels. This area is also located near the border with the City of Richmond and a concentration of development and uses would be beneficial to the location.

Section B of Figure 9 was determined to be a hotspot due to the availability of under capacity land that is centrally located and accessible to county-wide transportation corridors.

Assessment and Review

Overall, Chesterfield has some areas that have been developed on environmentally sensitive land. The most noticeable areas are in the western areas of the county. Development should be limited in the southwest regions of the county, due to the high amount of land classified environmentally sensitive.

Special care needs to be taken when developing hotspot areas in the central part of the county because many of the areas identified as hot spots border areas with environmental integrity.
Chesterfield County

Chesterfield County has many areas that are promising for development and growth. The central areas of the county have the greatest remaining capacity for new development, while areas located in the north, which are adjacent to the city, have unmet capacity for infill development.

**Opportunities**

- Open areas of the county available for development. Location in the central and northern regions of the county are currently under their zoning capacity. These areas are prime for future development which would be economically and environmentally beneficial to the local areas in which they exist.
- Development of an overall comprehensive plan. This plan will guide development at the county level which will reduce redundancy and streamline the planning process.

**Threats**

- Current residential development trends. A majority of the recent residential development has been in the lowest density zones which are furthest from the urban areas of the county. If these trends hold, then high expenses of expanding public utilities, paying for new schools, and maintain the current infrastructure will come at a high cost.
- High amount of environmentally sensitive land. Due to the fact that high amounts of land are classified as having a high integrity or wetlands the jurisdiction may be limited towards areas of future development. Currently, the James River and Swift Creek Reservoir have parcels in which previous structures were built.

**Sources**

3-C | City of Richmond

This study was intended to determine a method to assess areas in the City of Richmond that would be most appropriate for urban infill development based on data provided by the City of Richmond and the Richmond Regional Planning District Commission. The locations determined the most appropriate and those determined to be least appropriate will be used to help analyze the impact of development patterns of the city on a regional level. The sites are picked based on criteria independent of those selected by the City of Richmond’s Master Plan, the eight accompanying district plans and neighborhood plans.¹

Background and Demographics

Richmond, Virginia was established in 1742 as a town and in 1782 incorporated as a city by the Virginia General Assembly. Early in Richmond’s history the city was regarded as a central point for industry and trade because of the James river, canal and railroad access. Architectural classicalism is heavily represented in all districts of the city, particularly in Downtown, the Fan, and the Museum District. The city has over 187 properties and districts listed on the National Register of Historic Places. In the 1950’s the addition of Interstate 95 established Richmond as a stakeholder of regional commerce and transportation, but also encouraged many uses in the land use patterns.

The City of Richmond is home to approximately 204,451 people living in over 94,000 households. For the first time since the 1970’s the population in the city has an increase as seen in Figure 1. The number of residents has increased 3.3% since the year 2000 according to 2009 Census data. This is a positive change from the trend of population loss that took place over the previous 20 years as citizens left the city for suburban areas such as the county of Henrico, Hanover and Chesterfield. Richmond has not yet reached the population peak in 1970 of 249,000 residents. Several areas of the city were annexed in the 20th century, including Manchester and the neighborhoods to the north of the city boundary.

The City of Richmond has a total land area of 62.5 square miles and is located in the Central Piedmont Region of the state. The James River bisects the city and is the basis for the boundaries for the north and south districts of the city. The flood wall in Shockoe Bottom has changed the flood plain pattern of the city and caused a positive impact for development along the canal and downtown areas adjacent to the James River. The Manchester and Shockoe Bottom areas experienced significant flood damage during the 2004 hurricane because of their location in the low lying area near the

Fig. 1: Population Trends
The city of Richmond had major transition because of development and redevelopment of key areas. For example, Manchester was originally developed as an industrial area because of the proximity to the James River, railroad access, and interstate 95. In recent years the Manchester zoning has been changed by market driven forces to be more flexible for mixed uses such as office space, retail, commercial properties, and residential.

**Future Planning Visions**

In the City of Richmond Comprehensive Master Plan, the Land Use Plan outlines a city-wide vision, goals, strategies and characteristics for the development of Richmond.² The City has categorized Housing Opportunity Areas, Commercial Areas, and Economic Activity Areas with specialized land use categories relevant to the city’s goals and objectives. Limited open areas for development means that adaptive reuse of buildings and rezoning efforts in the city drive strategies to redevelop and increase the density of established neighborhoods. The future vision of the city is to revitalize the blighted housing stock and increase commercial space in areas that are currently not in use such as stretches of Broad Street, Jefferson Davis Highway and urban pockets such as Hull Street and areas of the north side of the city.

The following analyses were used to help initially determine the methodology and scope for the entire study area analysis. It was discovered that through these studies that additional or alternative factors were needed to decide what exactly determined hotspots and how to find them within the urban area of the City of Richmond.

**Building Footprint Analysis**

The data, illustrated in Figure 2, is useful on the regional level analysis to determine building patterns; however, it is not as significant for the City of Richmond. The earliest date of aerial photo analysis was from the year 1994. From a visual architectural survey of the neighborhoods in the city it can be determined that a large percentage of the urban fabric was developed prior to 1994. The data confirms these findings.

The method of using aerial photos as a primary data source in the older central city raises several issues. Buildings have been demolished and redeveloped on these same compact lots and in many cases the same footprints, for over 100 years. Fortunately, the City of Richmond has more detailed information on building construction dates that we can analyze.

**Land Use Analysis**

**Zoning and Future Land Use**

Zoning analysis was not a relevant criteria for assessment of the city because Richmond uses form based zoning and has recently changed the code to remove the unit-per-acre calculations. Since Richmond is the urban center of the region, over-development of residential areas is not an issue as it may be for suburban areas and rural counties. Further study identified the issues outside of zoning and land use that affect development in the urban areas that have a higher impact on the city’s development.
Fig. 2: Building Footprint Analysis
Environmental Analysis

Using the study area wide methodology, the Richmond building footprint layer was assessed for the classification of wetlands, ecological integrity, and then a general environmental rating was created with the classifications of both. The wetlands and ecological integrity files were integrated with the building footprint GIS shape file of existing structures.

Wetlands
Only a small number, approximately 128 out of 107,000 structures are located within areas classified as wetlands. These structures, noted in Figure 3, are located primarily in the southern portion of the city. The building footprint data is varied on the date of construction for these structures. This may indicate that these areas have not had adverse effects such as flooding or soil instability where structures are located. More significantly, many of the areas located in wetlands do not have structures on them. These areas should be protected, and future development should be discouraged.

Ecological Integrity
Very few areas of Richmond fall within the ecological integrity zones identified in this layer as seen in Figure 4. The

Fig. 3: Wetland Identification

Fig. 4: Ecological Integrity
only buildings located on sites with ecological integrity fall on the shores of a reservoir on Richmond’s southern border. The area is developed with single family detached homes. The lack of data within the Richmond city limits may be an issue with the survey. The Virginia Department of Conservation may have selected to not survey in the city limits, leaving only several buildings on the fringe to be included.

Environmental Rating
The data, shown in Figure 5, is a combination of the previous two data sets and therefore the conclusion is very similar, very little can be determined from this data alone. The assumption that can be reached is that other criteria is needed to evaluate the environment in the urban area. More significant environmental factors in the urbanized area may be tree canopy surveys, flood zones and water quality. These factors could also be important in the more developed counties.

Unique Hotspot Analysis

Methodology
To determine the best sites for development in a regional context, a system of performance criteria was established to locate hot spots in the city based on attributes that are most appropriate for urban infill development and/or redevelopment. In this analysis, the findings reveal that development would be primarily residential and commercial mixed use, and at least medium density for future developments. The criteria was developed through class discussion, current planning best practices and local trends and expectations. The City of Richmond’s development and redevelop-ment needs are specific to an urban area within a regional context.

After the determining factors of a hotspot were established, there were very different concepts of a hotspot for the urban area of the region. The data sources available examined the areas and best planning practices were measured from the data sources. For example, a development located within a half mile of an existing commercial, downtown, or mixed use zone could potentially allow residents to be less auto-dependent, therefore, sites meeting this criteria should be considered prior to a site further from the commercial zone. Some of these themes and the effects
they have on development appropriateness could be subjective. Others may have a different perspective on what these different criteria mean to development, but the exercise of evaluating sites based on a set of fixed criteria rather than political or market driven reasons may be vital to determining a regional impact.

**FEMA Flood Zones**
The Federal Emergency Management Agency (FEMA) identifies flood hazard zones. These are illustrated in Figure 6. In Richmond the risk of serious flood hazards has been greatly reduced with the addition of the flood wall in 1994 to protect low lying areas such as Shockoe Bottom and Manchester. Unfortunately the areas were seriously affected by poor drainage during the hurricane of 2003.

**Commercial Land Use Proximity**
The properties within one half (0.5) mile of an area determined to be commercial, mixed use, or an urban core land use category in the Master Plan Land Use layer from the city of Richmond are locations that were determined more desirable for development. The closer residents are to commercial nodes with stores, restaurants and other amenities the less car trips required. This is the most desirable condition in an urbanized area. These areas can be seen in Figure 7.

**Historic Resources**
Adaptive reuse of historic properties and revitalization of older communities is the most sustainable option when possible. It was taken into consideration to look at areas designated as historic, areas with structures built before 1955 and structures built after 1955 and buildings not designated by the National Registry of Historic Places. The areas designated are in the central Fan area, and North Amendment areas. Structures built before 1955 are more scattered outward from the city center.

For the purpose of the hotspot analysis, it was determined that the goal would be to add residential density to the city. This would make areas of historic integrity less ideal then
City of Richmond

Fig. 7: Commercial Zone Connectivity
Fig. 8: Historic Structures
areas with larger parcels and less architectural context. For example, in a historic neighborhood, height issues may be more prevalent and lot sizes in developable areas may be more constrained. Historically designated structures are illustrated in Figure 8.

Industrial Proximity

Industrial zoned sites are valuable because industry brings jobs, and jobs in turn bring tax revenue and keep a city and region thriving. Residential and commercial land uses are a threat and at times completely incompatible. The rent and prices per square foot are also higher for these uses, which may price out industry. The properties within 1,000 feet of an industrial zone were analyzed. An important, but unknown, factor in this analysis is the condition and appropriateness of the property noted as industrial use in the Master Plan, Land Use layer. The locations are illustrated in Figure 9.

Transit Connectivity

Transportation infrastructure is a decisive factor for development in Richmond. As in most urban areas, the goal is to minimize single occupancy automobile trips as discussed in the commercial connectivity analysis. Currently the Richmond region is not served by any fixed methods of public transportation, such as a subway or commuter rail line, therefore any dependence on bus stops as a basis for development should be viewed cautiously. Close connections to arterial streets and interstates may provide additional commercial amenities and require fewer trips through neighborhoods for everyday trips. Figure 10 shows the proximity of structures to roads, existing bus lines and stops.

Assessment and Review

The methodology to determine the hotspots for development in the city of Richmond was based on the development of a set of performance criteria which were then quantified and tallied for each building footprint. This method created a map of building footprints with values; these values were then quantified and given an appropriate hue. The darkest green structures are the most appropriate locations for new infill development and the brightest reds are the least desirable locations for mixed-use residential development.
Fig. 10: Transit Connectivity
The previous nine topics of importance to urban development as determined by the criteria have given an overall view of infill possibilities in the City of Richmond. The markers used to quantify variations of each topic, or criteria, have specified weight for the areas of interest to the region and illustrated best practices for development with respect for urban growth. Weighted markers for each criteria was to create a hierarchy out of the topics based on what we determined to be the most important are noted in the GIS map layers. The GIS analysis tools to intersect and connect the appropriate data layers to the building footprint layers gave an overall illustration of the expanse of areas appropriate for hotspot analysis.

What are hotspots in the City of Richmond?
Through the previous nine criteria it was determined that hotspots in the City of Richmond are areas of land that are within proximity to commercial and transit nodes, but will not destroy environmental integrity, structures in flood zones, negatively impact historic properties or impede into industrial zones. Figure 11 outlines the values given to sites meeting the criteria, and Figure 12 on the next page outlines what these criteria are illustrated, or mapped, for the City of Richmond.

The lowest scoring areas are along the Jefferson Davis Highway (route 1) corridor in the south east portion of the city. Many properties in this area are zoned for industrial use or are within 1000 feet of a industrial property and is low scoring because of connectivity to transit and the existence of older and industrial structures. Many low income residents live along this corridor, and revitalization is a priority of the city. These properties are located near the Port of Richmond and located along a rail corridor. Residential and indus-

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<th>Value</th>
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<tr>
<td>3</td>
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<tr>
<td>1</td>
<td>Environmental: Middle Integrity</td>
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<tr>
<td>0</td>
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FEMA Flood Rating

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<tr>
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Proximity to Industry

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<tr>
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<td>1</td>
<td>Site with in 1000 Ft of an Industrial Parcel</td>
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<td>0</td>
<td>Site Zoned Industrial</td>
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Transit Connection

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Commercial Proximity

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<td>No existing Commercial</td>
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Historic and Architectural Resources

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</tr>
<tr>
<td>2</td>
<td>Possible Historic Resources</td>
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<tr>
<td>1</td>
<td>Historically Designated Structures and/or Archeology Sites</td>
</tr>
</tbody>
</table>

Auto Connection

<table>
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<th>Value</th>
<th>Category &amp; Description</th>
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</thead>
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<tr>
<td>2</td>
<td>With in.5 Miles of a Major Auto Route</td>
</tr>
<tr>
<td>0</td>
<td>Not within the .5 Mile Buffer of a Major Route</td>
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</table>

22 Total Possible Points

Fig. 11: Value of Criterion
Fig. 12: Hotspots in the City of Richmond
trial uses have been in co-existence here for a while.

Opportunities

♦ Density. The City of Richmond as an urban area has the opportunity to encourage more density in specific nodes of the city. While many neighborhoods in the city are primarily comprised of single family structures, there are opportunities for mixed-use development of a higher density in some, and areas of a pre-existing mixed use nature, such as downtown and some commercial areas in older communities. This type of development could be less politically challenging then in some of the surrounding counties where residential and commercial areas are not as accustomed to mixed uses. Vacant units of the historic structures including those located in downtown and vacant industrial structures can continue to be redeveloped to accommodate commercial and residential needs. The previously mentioned structures can be particularly suitable for the transitory population such as students and employees who require smaller renting units in the city.

♦ Industry and Transit Connections. Industry and manufacturing bring jobs to the region. The locations of these sites within the city are well connected to transit lines. This includes rail, highway and water access. These sites should continue to be preserved and marketed on a regional level.

♦ Urban Character. The character of an urban area, including historic areas, cannot be replicated in the suburban areas. Such urban character of the Richmond’s distinctive neighborhoods can further improve their livability and vibrancy with creative use of historical structures, provision of missing neighborhood amenities. Preserving and enhancing such urban characters should remain as one of the city’s planning goals.

Threats

♦ Lack of a Regional Transportation System. Despite the small land area the city covers, many sections of the city lost points in the analysis for a lack of connectivity to transit lines, bus stops or major arterial roads.

♦ Environmental Issues. While areas of the city may not have the highest environmental integrity ratings, as they are restored they should be added to the survey data distributed by the state of Virginia. This data should include areas categorized as wetland and flood zones where appropriate.

♦ Lack of Open Areas for Development. There are very few available areas in the city that have not been developed in one capacity or another. Most parcels have existing structures that need to be rehabilitated or have to be demolished to accommodate new structures.
Sources

(2) City of Richmond Master Plan; Land Use Plan http://www.richmondgov.com/PlanningAndDevelopmentReview/documents/masterplan/10LandUse.pdf
(3) Ibid, chart listed in appendix 1.
(4) Department of Environmental Quality for the State of Virginia, contact: Meade Anderson, Brownfield’s Manager, j.meade.anderson@deq.virginia.gov
(5) Environmental Protection Agency (EPA) www.epa.gov and http://www.epa.gov/lawsregs/policy/sgd/bytopic.html
(6) City of Richmond Master Plan; Land Use Plan page 2 http://www.richmondgov.com/PlanningAndDevelopmentReview/documents/masterplan/10LandUse.pdf
(7) Henrico County Virginia, Regional Cooperative 2011, http://www.co.henrico.va.us/departments/manager/regional-cooperation/
Background and Demographics

Goochland is a county in the Commonwealth of Virginia, located between Richmond and Charlottesville. The county is outlined to the north with Interstate-64 and to the south by the James River. Goochland County is mostly rural land with a great majority dedicated to forested, natural open space, and agriculture. Throughout Goochland, much of the development can be seen off of the main roads, Interstate 64 and Route 288.¹ There are 690 Dairy Farms that can also be found within Goochland County.² Goochland contains 8 villages: Centerville, Crozier Village, George’s Tavern-Fife Village, Goochland Court House Village, Hadensville Village, Manakin Village, Oilville Village, and Sandy Hook Village.

Goochland’s population has risen from 16,483 in 2000 to 20,429 in 2009, with the average age being 43. There are 990 (4.8%) residents under the age of 5 and 2,635 (12.9%) above the general retirement age of 65. With the average age being 43, the majority of the county could retire in 22 years. Goochland County is 67% white, 30% African American, and 1% Hispanic. 93% of houses are owned rather than rented and the average household size consists of 2.4 people. There are 2.8% of families and 8.4% individuals that fall under the poverty line.³

While Goochland County is rural and not as dense of some of the other jurisdictions in the region, there are major planning issues that must be identified and solved. Growth in the region, in particular from Henrico County, is projected to soon sprawl into Goochland County. Much of the land in Goochland is undevelopable land due to steep slopes and wetlands. Goochland does have adequate free land for the new growth but planning for the expected is key. Goochland does have “Designated Growth Areas,” typically located outside of the Rural Enhancement Areas, where new development is desirable and utility services may already exist or be provided by in the 20 year planning horizon.

While Goochland has available land, other planning issues are present. Throughout the county, there is limited public sewer and public water capacity. In fact, most of the county is not served by public sewer or public water. The lack of these utilities limits the options for residential development and does not encourage growth in desired areas. Along with lack of utilities, Goochland County also lack mass transit, multimodal forms of transportaton, or other alternatives to motor vehicles.

Housing is another key concern with the current county and with the expected future more populous county. Goochland County does not have adequate age restricted, and assisted living housing. The demand for this type of development will increase as the county ages. As stated earlier, the median age of the county is 43 and thus soon a large population of retired residents may become a reality. Goochland County also lacks multi-family housing such as townhomes, apartments, and condominiums. This is a result of the lack of public utilities throughout the county.
Fig. 1: Building Footprint Analysis
A few of the visions for Goochland involve economic development, environmental stewardship, farm preservation, housing, and land use. Goochland would like to expand and diversify its tax base by supporting locally owned and existing businesses while also allowing for new economic opportunities to become successful. Goochland would like to practice environmental stewardship by protecting the environment and promoting policies which will reduce the impact to the environment. To practice farm conservation, Goochland County would like to preserve the existing farms which reflect the rural character and to encourage county self-sufficiency. Goochland understands that housing that meets the needs of the current and future residents is important to a healthy county. The land use vision is to manage the growth and land use while minimizing the impacts on the environment, aesthetic, and traffic.

Building Footprint Analysis

The building footprint analysis, Figure 1, shows the progression of growth within Goochland County. It is quite difficult to see the newest structures because they are so far and few in between and are not necessarily clustered together. There is definitely more growth in the east which is closer to Richmond City and Hanover County. Figure 2 shows the progression of new developments ending with the newest developments in 2009 being 375, which in comparison to the previous years is miniscule.

Environmental Analysis

Wetlands
As shown in Figure 3, the buildings that intersect the wetlands have been found and highlighted in red. The data in Figure 4 shows there are only 32 buildings that have been built within the wetlands. Although this is generally bad, the amount of wetlands that exist in Goochland County in compared to the few buildings that intersect
with them is not that bad in comparison to what could have been. With the majority of the buildings existing earlier in this study, it shows that this is not a growing problem that necessarily needs to be addressed.

**Ecological Integrity (see Figure 5)**
Within the Ecological Integrity Analysis there are five classifications ranging from C1 being extremely high ecological integrity and C5 equaling a general integrity. Any classification C3 and above should not be built upon. C4 and C5 are the classifications that are more preferential to build upon. There are 115 buildings that are found within the Ecological Integrity Class 2 and 511 are found in the Ecological Class 3.

**Environmental Rating**
Figure 6 depicts most of the development in Goochland County has occurred outside of sensitive ecological areas or in the least sensitive areas, which are represented in the Environmental Ratings as being below 60. The red scheme of buildings represents those that have a score of 80 and higher. Within the Goochland County there are two buildings that have an ecological integrity score of 90 and two that received a score of 80, representing that the buildings are located in the wetland and a ecological class of either C2 or C3. Out of these four buildings, one was built in 1994 or earlier, and the other three were built in 2007. Two buildings received a score of 70, which means the buildings fell in a wetland and an ecological class of C4. Twenty-one buildings fell into a wetland but not an ecological class.

---

**Fig. 4: Wetlands Table**

<table>
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<tr>
<th>Year Built</th>
<th>Number of Building in Wetlands</th>
</tr>
</thead>
<tbody>
<tr>
<td>1994 and earlier</td>
<td>16</td>
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<tr>
<td>1995 - 2002</td>
<td>2</td>
</tr>
<tr>
<td>2003 - 2007</td>
<td>13</td>
</tr>
<tr>
<td>2008 - 2009</td>
<td>1</td>
</tr>
<tr>
<td>Total</td>
<td>32</td>
</tr>
</tbody>
</table>

**Fig. 5: Ecological Integrity**

![Ecological Integrity Map](image)

**Rating**
- C2
- C3
- C4
- C5
- Boundary

![Distance Scale](image)
Fig. 6: Environmental Rating
Assessment and Review

Goochland County does not have many hotspots that should be of the concern for the region. There are a total of four houses that fall into the hotspot category as they were given the highest rating on the environmental analysis scale. This does not represent a threat to Goochland as none of the structures were apart of new development.

Opportunities

✦ Expand public sewer and public water capacity to further allow for the future growth.
✦ Expand housing options by analyzing the current trends and estimate the future needs.
✦ Expand housing options by developing different housing types, this is to include multi-family and age assisted living facilities.
✦ Expand the mass transit throughout Goochland County
✦ Encourage growth in the Designated Growth Areas to ensure the most adequate land is used for the new developments.

Threats

✦ Goochland must adequately handle the encroaching suburban development from Henrico while also maintaining the rural integrity strived for in the comprehensive plan.

Sources

3-E | Hanover County & Town of Ashland

Background and Demographics

Hanover County occupies the northernmost section of the Richmond Regional Planning District. Traditionally an agrarian area, over the past 30 years the county has experienced a steady population growth with the development of interstate 295. According to a Hanover County Economic Development’s Community Profile Report, the 2005 population was 99,174, which makes it the third most populated county in the Richmond Regional Planning District.¹

According to Figure 1, Hanover’s population has a older and more wealthy population as compared to the City of Richmond. Also, the unemployment rate is less than half that of the City. This may be due to the fact that major industrial, health care, and entertainment employers exist within the county.² In the face of rising energy costs and global climate change, the county has set out six major goals in their 2007 Comprehensive Plan,³ they are as follows:

- **Recognize relationship between rural and suburban area.** Develop within concentrated areas of already existing infrastructure by encouraging a 70% new residential in planned suburban areas, and limit to 30% new development in rural.
- **Provide orderly development of residential areas.** Organize residential areas to accommodate variety of types, prevent encroachment of inappropriate uses. Plan for residential areas that permit a full range of safe public and private services.
- **Provide orderly development of commercial areas.** Encourage density in existing commercial locations to discourage linear spread of commercial activities. Require design standards for commercial areas and allow neighbourhood commercial establishments where applicable.
- **Promote compatible industrial development into appropriate areas.** Guide industrial growth into areas with adequate public facilities. Establish a program of public facilities and historic tourism. Implement strategies for supporting small businesses and all types of compatible industrial development.
- **Protect forestall/agricultural areas.** Preserve important areas through restriction of inappropriate development. Encourage long term preservation through zoning. Encourage clustering of residential development.
- **Protect cultural resources.** Identify protected areas through soil and forestall surveys. Evaluate the benefits of protecting these areas, and prohibit development of fragile natural features.

### Fig. 1. Demographics

<table>
<thead>
<tr>
<th></th>
<th>Hanover County</th>
<th>City of Richmond</th>
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<tbody>
<tr>
<td>Per Capita Income</td>
<td>$36,455</td>
<td>$20,337</td>
</tr>
<tr>
<td>Median Age</td>
<td>37.4</td>
<td>35</td>
</tr>
<tr>
<td>Unemployment Rate</td>
<td>2.7%</td>
<td>7.6%</td>
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</table>
Building Footprint Analysis

Much of the development in Hanover County was established before 1994. According to Figure 2, the building trends within the county are concentrated along the major transportation corridors that run through the center and along the southeast section. This is compatible with the comprehensive plan which calls for increased development along these areas. The western area of Hanover which is in location to high amounts of agricultural use and environmentally sensitive land, has been the location of recent development since 2008. Future interest should be paid to new developments in this stated area.

Land Use Analysis

As described in the methodology section, the data layers analysed for the land use hotspots are comprised of the future land use, current zoning, and the impervious surface building footprints. Using this data three different models were conducted to ascertain whether the actual development of the land was developing according to the plans.

The different models were determined by the available data provided by Hanover County and the Regional Planning District Commission District, and they are as follows: actual density vs. zoning, actual density vs. future land use, and incompatibilities between the zoning and future land use layers.

Density and Zoning

For the density and zoning analysis model only land zoned residential and agricultural was chosen because these were the only two uses that had specific density levels called for in the Comprehensive Plan. As seen in Figure 3, there were few areas that fell within the over capacity range and most of the land use was under, or at capacity levels.

When examining these areas of over capacity, it became apparent that two major types of zoning were being overdeveloped, these being agricultural (A-1) and low density residential (R-1). An example of each of these incompatibilities can be found in Figure 3, Sections A and B.

Section A displays land that is zoned agricultural, but is
clearly apart of a development. Section B is an example of two parcels of land that are zoned low density residential, but actual develop has overreached the allotted levels.

Upon further review of these areas, their location is within the county’s zones where future concentration of residential or commercial development is encouraged, and therefore these might not be labelled as hotspots. On the noted areas the building footprints were created previous to 1994, therefore it is not an example of a newly developed area.

**Density and Future Land Use**

For this analysis only land zoned residential and agricultural was chosen because these were the only uses that had specific density levels called for in the comprehensive plan. According to Figure 4, areas that are over capacity as compared to the future land use plan were non-existent. There were areas apparent within the zoning that were not compatible with the future land use studies such as the omission of overcapacity in the future land use study compared to the identified areas in zoning analysis. This may be an incompatibility between the current zoning and future land use layers, which will be studied later. Another explanation might be that the future land use plan requires a reduction in the density of agricultural land from 6 units per 10 acres,

**Fig. 3. Density and Current Zoning**

**Fig. 4. Density and Future Land Use**
Hanover County & Town of Ashland

5 This may account for the fact that density at the current levels may be over capacity, but in the long term is on track with desired levels.

Finally, this map illustrates an interesting point that even though development throughout the county was thought to be widespread and unarranged by some, in actuality much of the agricultural land is still at capacity or under capacity as compared to the future land use plan.

Zoning and Future Land Use

The first step in conducting the zoning and future land use analysis model was to generalize the categories in the zoning data to match the more general categories in the future land use plan. Therefore, certain zoning categories had to be combined, such as all residential zones (R-1 through R-5) were combined into one residential classification for comparison. The full breakdown and generalization of these categories can be seen here in Figure 5.

Once the categories were matched and analyzed, no discernible incompatibilities were able to be made because the range of zoning classes matched to multiple land use categories. Therefore, an analysis of only the most delicate land, agriculture, was chosen to ascertain if current zoning was in line with future land use type.

According to Figure 6, there were incompatibilities throughout the county that existed between the current zoning and future land use of agriculture. Many of these outlying areas were currently zoned as the lowest level residential or areas such as parks, historical, or other specific environmental zones. Two areas of significance did stand out though as being hotspots due to the fact that they had other more intense current uses, but were planned agricultural land in the future. In Figure 6, Section A is an example of multiple parcels that are zoned medium density residential and light industrial. In Section B, there are multiple parcels that are zoned for commercial and medium density residential uses. These areas should be further analysed to determine the reasons behind the incompatibility.

<table>
<thead>
<tr>
<th>Land Use Type</th>
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<tr>
<td>AGR</td>
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<tr>
<td>ASH</td>
<td>HE/PMH/POB/PSC</td>
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<tr>
<td>BUSP</td>
<td>R4</td>
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<tr>
<td>COM</td>
<td>B-1/B-2/B-3/B-4/B-0</td>
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<td>R-2/R-6</td>
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<td>R-3</td>
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<td>R-5</td>
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Fig. 6. Land Use and Zoning
Environmental Analysis

Wetlands
When overlaying the building footprints with the wetlands layer it is easily illustrated where buildings are built upon or partially on a wetland, as shown in Figure 7. Overall there is an estimated 150 buildings in Hanover County in which their building footprints are located in a wetlands. Upon further inspection it was found that many of these buildings were built previous to 1994, and therefore would not constitute the development of a new hotspot. Two hotspots did arise in the wetlands analysis due to the existence of a concentration of buildings (A) and development post-2002 (B).

The cluster of wetlands buildings located in section A of Figure 7 is located around the Town of Ashland in Hanover County. This is an area that has been developed mostly all previous to 1994 and is planned for a future area of concentrated commercial and residential development. In areas such as this, most of the development has already occurred and deconstructing these buildings may cost a high amount to the individual and county. Therefore, future interests should be made aware of the current wetlands areas and growth shifted accordingly.

Section B in Figure 7 is located around Mechanicsville and was determined to be a hotspot due to it being a cluster of recent development of buildings on wetlands. Over the past ten years this area has seen considerable expansion due to access of two major thoroughfares, state route 360 and Interstate 295. Of the buildings pictured in section B, all but 2 of the buildings were constructed previous to 2002. To obtain the actual use of these buildings further studies should be conducted. Overall, development such as this should be identified and discouraged by the county. Even though this area may fall within the desired centers of commercial concentration, development of this land should not be to the detriment of the environment.

Ecological Integrity
The Ecological Integrity analysis intersects building footprints with nodes of ecological integrity, as shown in Figure 8. The nodes are organized in five classifications ranging from C1 which has extremely high ecological integrity and C5 equaling general integrity.
Any classification C3 and above should not be built upon. C4 and C5 are classifications that are more preferential to be built upon. Hanover has no areas of C1, or extremely high ecological integrity.

Environmental Rating

As described in the methodology section, the data layers that determine the environmental assessment are comprised of the wetlands data layer, ecological integrity layer, and the impervious surface building footprints. Once the model was conducted all the building within the county were ranked on a scale from 0 - 100. To constitute a hotspot, a concentration of higher scoring building, 60 and above, would have to exist.

Fig. 8. Ecological Integrity

Fig. 9. Environmental Assessment

According to the environmental assessment conducted, as seen in Figure 9, there were 10 buildings that were determined to be in the highest scoring range, 80-100, and 133 buildings which were in the 60-79 range. Further analysis shows that many of these buildings existed previous to 1994 which development was discouraged due to the high environmental score. Therefore, it was determined that since there was no hotspot due to the fact that there was no major convergence of higher scored buildings around a certain point, and that much of these buildings were older construction.
**Assessment and Review**

Overall, Hanover County is moving in the correct direction towards a policy that holds sustainable development as a priority in its goals. Balancing the needs of the environment with the want to continue residential and commercial development can be met with the concentration or designation of certain areas within the County where this should be encouraged.

According to the Hanover County Economic Development Strategic Plan of 2009, this policy is in motion. In this plan six major areas are designated as economic development zones where a concentration and mix of uses (industrial, commercial, and high density residential) is encouraged.

When applying these standards the following is a list of opportunities and threats derived from the analysis of future development as compared to the future land use and area conservation integrity.

**Opportunities**

- Mixed use nodes exist along the central transit corridors. As the cost of supplying new development in the county with access to public services and transportation, Hanover should encourage development concentrations around the existing commercial and residential land uses.
- Strong stock of environmental, cultural, and historical areas of significance. As listed in the main land use goals for Hanover County, the protection of fragile land such as wetlands and floodplains is imperative to the future protection of the quality of life for area residents. Strong protection of these areas would send a message to new developers that Hanover is a place that welcomes all, but wants to protect it history and resources.
- Prime location within the regional transportation corridor. By using this plan as a tool to assess the regional land use, incompatibilities between jurisdictions can be recognized and assessed. Once areas are identified through the methodology in this plan, then adjacent counties will have the opportunity to work with each other to develop comprehensive systems. This would serve the greatest interest in areas where land uses that are the least compatible, such as industrial-residential, could be corrected.

**Threats**

- Continued conversion of rural land into new residential development. According to the “Land Use and Zoning Incompatibility” analysis conducted in the study, there are certain areas within the county whose current use would have to be “downzoned” to obtain the desired future land use type. High attention should be directed towards desired future agricultural land, so that inconsistencies in the plans are non-existent.
- Wide spread location of development. If the current zones of commercial development are conformed with as called for in the Economic Strategic Plan, then Hanover will deal with many of the current problems associated with sprawl, which are occurring at the present time.
- High amount of non-developable land. According to the data obtained from the Virginia Department of Conservation and Recreation, there are major parts of the county that are classified wetlands. Within these areas it was found that development had already occurred on some of the noted areas. Developing on wetlands is not only an immediate threat to the environ-
Hanover County & Town of Ashland

...ment, but can also harm the individual resident and county character.

Sources
3-F | Henrico County

Background and Demographics

Henrico County has experienced considerable growth in the past 20 years. According to the U.S. Census, the County had a population of 217,881. In 2000, the population of Henrico was 262,300 and by 2010 the population had increased to 306,935. This represents a 17% county growth over this time. According to the Henrico County 2026 Comprehensive Plan, the percentage of land used for commercial purposes doubled between 1990 and 2000. The percentage of single-family residential use grew from 18% to 24% of the total county area. The percentage of vacant land in the county dropped from 61% to 51% over this time. Overall, the highest rate of growth came from the commercial land use, however single-family land use also grew significantly and represents the largest portion of developed land in the county.

Building Footprint Analysis

The Building Footprint Analysis, shown in Figure 1, identifies the growth patterns in Henrico. Most of western Henrico was built out by the mid-1990s. By the mid-2000s, most of far northwestern Henrico had been developed. With the exception of scattered development in eastern Henrico, most of the built environment has not changed since 1994.

Fig. 1: Building Footprint

Land Use Analysis

Density and Zoning

The zoning analysis was accomplished through a comparison of existing density with existing zoning. Parcel data was used that identified the zone and lot size of each parcel in the county. Those parcels that had lot sizes that were lower than the minimum allowable under the zoning were identified as potential hotspots as shown in Figure 2.

The Zoning Analysis identified three main hotspots. In Figure 3, the Glen Allen area in western Henrico is being built out at higher densities than required from an R2 zoning designation. This overuse could signal development pres-
Fig 2: Zoning Analysis
sures on the area and expanding suburban development north of the county line into Hanover County.

The developments in Figure 4 along Patterson Road in western Henrico have been subdivided at higher densities than the R2 zoning designation will allow. As with Glen Allen, the overuse could signal pressure to expand residential development westward into Goochland and Powhatan Counties.

The identified development located in Varina in Figure 5 adjoins agricultural land. Clustering of residential use is encouraged, however if development is occurring at a higher density than planned it could have unintended impacts on surrounding farmland.

The remaining noncompliant parcels are scattered or are the result of zoning regulations applied after a neighborhood has been established, particularly in the inner west area of Henrico and Highland Springs in eastern Henrico.
Future Land Use

The Future Land Use Analysis was accomplished through a comparison of existing zoning with future land use designation. Parcel data was used that included the current zone and future land use designation. Every zoning designation was given a ranking based on intensity of use. Densities were then compared to the future land use designation for each parcel. Zoning designations that were a lower intensity than their future land use designation were labeled “under capacity”. Parcels with zones that were within the intensity range of the future land use were labeled “at capacity”. Finally, parcels with a zone that was a higher intensity than the future land use were labeled “over capacity”.

Fig. 5: Zoning Analysis, Varina

Fig. 6: Future Land Use Analysis, Western Henrico

Future Land Use Analysis identified seven primary hotspots. Future Land Use Analysis in Figure 6 identified several regions of that are already zoned at intensities higher than recommended by the Future Land Use Plan of the Henrico County 2026 Comprehensive Plan, which was adopted August 11, 2009. There are areas that have been designated for higher uses than the current zoning allows, specifically seen in eastern Henrico.

Many residential areas in far western Henrico, near western Henrico and near eastern Henrico have already been subdivided and developed under zoning regulations that permit greater densities than the Future Land Use Plan will allow.
Fig. 7: Future Land Use Analysis
Figure 7 shows these regions of residential development in red. Since these areas are already built out, their incompatibility could only be changed if the future land use was adjusted to more accurately describe the existing zoning classification. This change would match the actual density to the current zoning.

As shown in Figure 8, a large strip of land along the James River is currently zoned for industrial use, but has been classified as urban mixed-use for future use. These parcels should be rezoned to fit the future land use designation.

The land identified in Figure 9 is zoned urban mixed-use but has a future land use designation as an environmental protection area. If developed as a whole with adjoining parcels, this area could still remain undisturbed and be counted towards an open space requirement specified in the Henrico County Urban Mixed Use Zoning Ordinance. However, taken as a separate development, this hotspot is not appropriate for an urban mixed-use development given its designation, as an environmentally protected area.

The future land use shown in Figure 10 is identified as Rural Residential (RR) which allows for maximum of one unit/acre but is zoned for R-2A, which allows for densities of up to 3.2
Henrico County

The future land use in Figure 12 calls for a rural residential (RR) use. Current zoning is industrial (M1). Adjustment of either the future land use or the zoning to correlate with the other classification should be considered.

The future land use in Figure 13 calls for an office/service land use, but the area is currently zoned for light and heavy industrial. This area should be rezoned to better match the intention of the office/service land use category.⁷

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**Fig. 10: Future Land Use Analysis, Rural Residential**

It should be noted that the RR future land use does allow for clustering.⁵ Therefore, large lots and open space in this area should be retained in keeping with the future land use plan.

The future land use for the hotspot identified in Figure 11 calls for a suburban density of SR1 which allows for densities of 2.4 units per acre. Much of this land is zoned R2-AC and R3-AC which allows for densities of 3.2 – 4.5 units per acre.⁶ Portions of this area have not yet been subdivided and should be rezoned in keeping with the future land use plan.

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**Fig. 11: Future Land Use Analysis, East Henrico Residential**
Fig. 12: Future Land Use Analysis, Residential/Industrial

Fig. 13: Future Land Use Analysis, Office-Service/Industrial
Environmental Analysis

Wetlands
The wetlands analysis was conducted by overlaying the wetlands and building layers, and one can determine which structures are located within or partially encroach upon wetlands. While it may be possible to legally build upon wetlands by “banking” or preserving wetlands elsewhere, wetlands are generally considered sensitive areas that should be preserved for their biological and environmental qualities. Once they have removed, it is difficult to replace them in the same spot with the same qualities. Of Henrico County’s 171,916 structures, 1,624 were located within or partially within encroached upon designated wetlands, as shown in Figure 14.

Fig. 14: Wetlands

Ecological Integrity

In Henrico County, no land was classified as C1, meaning the outstanding ecological integrity rating. However, the county does contain the C2, C3, C4, and C5 nodes of ecological rating. Henrico contains only one node with the C2 rating and seven buildings were built on or partially within that node. On the C3 rating of ecological integrity, 110 buildings were built within or partially on those areas.

Fig. 15: Ecological Integrity
Fig. 16: Environmental Rating
Environmental Rating

As shown in Figure 16, 794 out of 171,916 structures scored 30 or higher on their environmental assessment. This is less than 1% of all structures in Henrico County. To date, the county appears to have a high rate of success in avoiding the most environmentally sensitive areas. There is a proliferation of structures that scored 30 or higher in western Henrico where development has concentrated, and this is due largely to wetlands encroachment. In the eastern side of the county, a structure within designated wetlands automatically receives a score of 60, well above the 30 point threshold needed to be considered poor environmentally. The East End has a large amount of environmentally sensitive areas, and this is a future hotspot for conflicts with environmentally sensitive areas.

Assessment and Review

Henrico is easily divided into two regions: Eastern and Western. Eastern Henrico is largely rural with low-lying topography and many environmentally sensitive areas. Western Henrico is almost completely built out with few areas for future growth or preservation. Many residential areas in far western Henrico have been zoned at densities higher than prescribed in the Future Land Use Plan. Since these areas have already been zoned, subdivided and developed, there is not much that can be done to avoid this conflict. However, the history and pattern of development in western Henrico should be studied to understand the factors that influenced its growth. These lessons should then be applied to eastern Henrico, which is largely undeveloped, but does contain many environmentally sensitive areas.

Henrico County

The analysis of development within ecological integrity areas and wetlands in Henrico indicates that as compared to the total number structures, a relatively low number of structures have been permitted to encroach on these areas. These structures are concentrated in the West End where urban development is greatest, and the number will increase as development occurs in the East End, where wetlands and ecological integrity areas are even more prevalent.

Opportunities

- Mixed-use and clustered development zoning designations in eastern Henrico can absorb development while maintaining the ecological integrity of the area.
- Some areas in near-eastern Henrico are currently zoned A1 agriculture, but have been designated for residential use. These areas represent opportunities for development that will take pressure off of agricultural lands in the far-western portion of the County.

Threats

- Hotspots in eastern Henrico have been identified. Many areas are currently zoned industrial, but have been identified for a mix of uses, including residential. Without a rezoning, these areas will continue to develop into industrial uses.
- Likewise, residential development is occurring at higher densities in some portions of the eastern County than is recommended in the Future Land Use Plan.
- The Varina magisterial district essentially encompasses the entire East End of the Henrico County. Within this area, the availability of developable land is higher, and land is relatively less expensive. This threatens areas that are designated C2 through...
Henrico County

C5 on the ecological integrity scale or that are designated as wetlands as development pressures shift from the West End where very little developable land exists and where land is at a premium price.

- Henrico County contains a large amount of environmentally sensitive lands which limits the area available for development.

Sources

(2) Henrico, Virginia, Comprehensive Plan 2026 (2006)
3-G | Powhatan County

Background and Demographics

Powhatan County is one of seven counties and two cities located within the Richmond Metropolitan Region. The county is located to the west of Richmond City and shares a boundary with Goochland and Chesterfield Counties.

Powhatan County is a primarily rural in character, especially in the western half. The prominent agriculture activity is raising broiler chickens; in 2007 the county contained 162,000 broilers. The eastern edge of the county has some suburban development which overflowed from Chesterfield County. The majority of the suburban development is located along the Highway 60, also known as the Anderson Highway. The northern border to the county is the James River, which separates Powhatan from Goochland County.

The total population of Powhatan County is 27,334. The median age of the population is 39 years old. Roughly five percent of the population is under the age of five, while ten percent of the population is over 65. The majority of the population is white, 20% African American, and less than two percent of other races. The poverty is relatively low with only 3.2% of families and 4.3% on individuals in poverty. The average household size is 2.53 persons. Two-thirds of the housing is owner-occupied while one-third is rented. A little over three and a half percent of households speak a foreign language at home.

In the comprehensive plan, Powhatan County identifies current and anticipatory planning challenges. Historically, Powhatan was a completely rural county with fairly established planning values and goals. As the Richmond Metropolitan Region continues to grow, the growth pressures have finally reached Powhatan County. New suburban development can already be seen on the county’s eastern side near the border of Chesterfield. The regional growth pressure requires Powhatan County to revise its long established planning values and goal to properly adjust to the new development. Powhatan specifically stated the process of agreeing on a new community vision as a major planning challenge.

Powhatan also states a few issues within economic sustainability and economic development. Like any jurisdiction, Powhatan faces limited financial and personal resources. The county’s public services and facilities require a more comprehensive and sustainable long-term fiscal plan. Drawing economic and business opportunities is difficult due to Powhatan’s distance from the economic core of Richmond Metropolitan Area. Furthermore, Powhatan lacks direct access to an interstate highway, further isolating the county from Richmond. Powhatan does recognize the potential to capture some economic growth due to regional growth pressures.

Powhatan County land use goals balances regional growth pressures while maintaining the rural character. Growth will occur within delineated nodes primarily along the Anderson Highway and Huguenot Trail east of the Highway 288 interchange. These nodes will be mixed-use to accommodate both commercial and residential growth, as well as addressing the county’s current housing needs by
Fig. 1: Building Footprint Analysis
offering a diversity of housing options. By keeping growth within these clusters, the county preserves the natural environment and open spaces to maintain the rural integrity of the county.

**Building Footprint Analysis**

The building footprint analysis organized and color coordinated the years the buildings were built, as seen in Figure 1. Powhatan County contains a total of 21,224 buildings. Of this number, 10,819 were built before 1994. By 2002, the county gained 3,137 buildings. In five years, the county gained another 6,186 buildings. Finally in 2009, the aerial photo shows 387 buildings have appear on Powhatan's land.

Powhatan County’s development is certainly not contained to one area, but certain areas exhibit a heavier concentration of new development. Concentrations of development that occurred after 2002 can be seen in the eastern corner of the County east of Highway 288 and in the central southern region of the county.

**Land Use Analysis**

**Future Land Use Analysis**

When overlaying the building footprint analysis with the conceptual future land use map, growth patterns can be directly compared to the county’s future intentions, as shown in Figure 2A. The majority of the new development concentrations are captured in areas other than rural preservation. As shown in Figure 2B, one concentration of new development does occur within a rural preservation area. This concentration is a possible area of incompatibility and thus a hot-spot, warranting further investigation. Additionally, the evenly dispersed new development throughout the rural preservation area should not be ignored, as shown in Figure 2C. Is the new development in these areas accommodated for in a more detailed future zoning map? A new aerial photography assessment should be completed within the next two years to ensure that none of the new development becomes an unwanted concentrated within the rural preservation area.
Fig. 2: Future Land Use Analysis
**Environmental Analysis**

**Wetlands**

When overlaying the building footprints with the wetlands layer, it is easy to see if any buildings are built upon or partially on a wetland, as shown in Figure 3. Of Powhatan’s 21,224 buildings, only 16 were built upon or partially on a wetland. All but two of these buildings were built before 1994. The two that did not exist before 1994 were built by 2002. Powhatan County successfully avoided building on wetlands and should continue this. Since not one single building since 2002 has been built on a wetland, wetland construction is not an issue for Powhatan.

**Fig. 3: Wetlands**

**Ecological Integrity**

The Ecological Integrity Analysis intersects building footprints with nodes of ecological integrity, as shown in Figure 4. The nodes are organized in five classifications ranging from C1 being extremely high ecological integrity and C5 equaling general integrity. Any classification C3 and above should not be built upon. C4 and C5 are classifications that are more preferential to be built upon. Powhatan has no areas of C1, or extremely high ecological integrity.

**Fig. 4: Ecological Integrity**
Fig. 5: Environmental Assessment
Environmental Rating (see Figures 5 and 6)

Only 1.05% of Powhatan County’s buildings received a poor environmental rating, as in a score of 30 and above. Of the 156 buildings in “poor” environmental scoring, only 12 rank between 60 – 70 of a “bad” score and exactly two ranked 80 and above for a “worst” environmental rating. A further assessment of the building to include the approximate year the building was built shows that no new development, or development built after 2002, contributed to Powhatan County’s buildings that received a poor environmental rating.

Overall, Powhatan County is successfully avoiding construction on areas with a significant environmental rating. Not only is this beneficial to the environmental, but also is in line with Powhatan’s comprehensive plan. The comprehensive plan strives to keep rural integrity intact and preserve natural resources areas and open spaces.

Assessment and Review

Opportunities

- As a formally primarily rural area, the county has sufficient land to accommodate for growth.
- Powhatan has an ample amount of land which is neither a wetland nor has high ecological integrity and thus is suitable for development.
- Due to planning foresight, Powhatan has the opportunity to control suburban sprawl with the current zoning which directs growth into delineated growth areas deemed mixed-use villages.
- Powhatan’s proximity to the Watkins Center, located just east of the county line in Chesterfield, may open up opportunities for Powhatan to capture regional growth.

Threats:

- A rapidly increasing number of developments in the western half of the county which conflicts with the future land use plan which deems the area agricultural zoning.
- Powhatan lacks access to the interstate highway, reducing the county’s ability to compete for regional businesses.
Sources


(4) Ibid, p 19
4 | Richmond Regional Analysis

Like many American cities, the Richmond region has grown from an urban core with rural surroundings into a rapidly expanding suburban metropolitan area. The expansion of the interstate system, cheap oil prices, favorable homeownership policies and available land has made this transformation possible. Such development has changed agricultural and natural land into residential, commercial, and industrial uses at low densities. As the Richmond Region continues to expand, how can the region accommodate growth while guiding development in an efficient and environmentally responsible manner?

This report has provided a general analysis template for development patterns and environmental integrity. Each jurisdiction identified hotspots based on development and environmental incompatibilities. Furthermore, some jurisdictions identified additional hotspots based on land use and unique analyses. In certain jurisdictions, hotspots represent incompatibilities between the future land use and current zoning maps (Henrico and Hanover). While others identified hotspot areas as plots of land under-capacity and therefore prime for future development and infill (Chesterfield, Richmond, and Charles City). Finally, two of the districts did not find any major current hotspots, but specified areas of concern for future development (Powhatan and Goochland).

When applying the Hotspot analysis to Richmond Region, the following list of opportunities and challenges was comprised.

**Opportunities**

- **Areas are under—capacity or prime for infill development.** Certain jurisdictions conducted a land use and zoning analysis which identified areas that were zoned for a higher density than what currently exists and thus are prime for future development. Other jurisdictions identified areas for potential infill development. The RRPDC should maintain data on these under-capacity and infill areas while strongly encouraging future development within these locations.

- **The Richmond Metropolitan Region has a wealth of historical and cultural resources.** All of the nine member districts in the Regional Planning District have either acknowledged in their comprehensive plan or specifically have areas zoned as ‘historical districts.’ The establishment of these said districts should be encouraged from a regional level to help travellers or residents easily navigate and take advantage of the diverse history and cultural resources that exist within the region.

- **The Richmond Metropolitan Region has a wealth of natural land and resources.** Rivers, wetlands, and areas of high ecological integrity provide wonderful opportunities for parks and preserved land. These areas can also be capitalized upon for research and eco-tourism. The RRPDC should provide a comprehensive approach to protecting these areas and encourage best development and conservation practices.
Extensive Industry and multi-modal transportation connections exist. Currently, Metropolitan Richmond is the hub for major transportation lines of various types. The complex crossing of trains, shipping ports, highways, and an airport benefits the area as it supports major industrial needs of the Richmond region. Furthermore, the jurisdictions connected to these transit lines find it easier to encourage industrial and commercial development to their locality. Only the counties of Charles City and Powhatan do not have direct access to interstate highways or major ports.

Challenges
- The amount of environmentally, historically, and culturally sensitive areas reduce the land available for development. The Richmond Region should set strict restrictions to protect these valued lands, which will limit the area available for development.

- The continuing rapid increase in low density single family residential development. Analysing building footprint data showed evidence of trends of scattered development. Rural counties located on the fringe of the metropolitan region must adequately handle the encroaching suburban development while maintaining the rural integrity called for in their comprehensive plans.

- Inter-jurisdictional land use discrepancies exist. Identify areas of contention between local jurisdictions. Jurisdictions must work together to adequately plan for the future and adjust the current zoning to match the desired future land use. The counties located on the edge of the Richmond metropolitan region must remain mindful of suburban encroachment in order to preserve rural integrity.

- Discrepancies exist between the current zoning and future land use master plans. The land use analysis conducted on the Counties of Henrico and Hanover found that discrepancies exist between the future land use and current zoning. These jurisdictions need to either amend their current zoning ordinance or change their intended future land uses so that zoning and future land use categories are compatible.

- Lack of regional public transportation and connectivity between residential, commercial, and industrial uses. Throughout the region, residential, commercial and industrial land uses exist, however many are not connected by public transportation. Most residential areas within the region lack adequate public transportation connection to employment centers.

Suggested Actions

Taking into account the individual jurisdictions and their opportunities and challenges, the following are the proposed actions for regional actors:
- Classify and establish zones that provide a high level of protection for natural, historical, and cultural resources on the regional level.
- Classify and establish zones of development to guide growth patterns.
Richmond Regional Analysis

James River Park System, City of Richmond

Farmland, Eastern Henrico County

Oregon Hill Neighborhood, City of Richmond

Source: Andrea Houseman 2011
Mitigate inter-jurisdictional land use discrepancies.

Identify areas for infill development and encourage development.

Evaluate the current economic development strategies around regional branding and business attraction. Identify ways to share benefits gained from commercial and industrial attraction and retention.

**Recommendations for Additional Studies**

Through the regional hotspot analysis, opportunities for further studies were found.

- **Conduct additional studies on inter-jurisdictional land use plans.** Once a region wide layer of generalized land uses is created, studies can be conducted on the compatibility of adjacent districts’ land uses. This will provide key information into any current incompatibilities so jurisdictions can note the issues and address them in the near term. Also, this information will be useful to the RRPDC to understanding the overall shape of land use.

- **Study where people are living and working in the counties.** By mapping the connections between where people reside and where they are employed, commuting patterns can be determined. Furthermore, the information can be used in understanding regional economics and where the greatest need for public transportation resides.

- **Map and conduct an assessment study on compatibility of regional systems.** Because of time constraints and data availability, this hotspot report was unable to cover many topics that are necessary in understanding regional land use. Further regional studies should analyse public utilities, infrastructure, and transportation (e.g. public transportation, road interconnectivity, and bicycle and pedestrian routes).

- **Conduct further in-depth studies on specified area hotspots.** Individual jurisdictions should be informed of their hotspots. These hotspots should be given further attention so that incompatibilities can be addressed and detrimental development patterns can be mitigated. Some of the hotspots, especially in land use, can be reconciled by reassessing zoning or future land use plans.

- **Conduct further studies on wetlands, Chesapeake Bay Watershed, floodplains, or other environmentally sensitive areas.** The RRPDC should assist jurisdictions in making a comprehensive regional plan to protect environmentally sensitive areas.

**Conclusion**

The Richmond Metropolitan region should continue to develop land use controls that support rational, incremental and environmentally sensitive development. Many of the suggested recommendations explained in this plan relate directly to the preservation of environmentally and culturally significant land. The preservation of these areas has consistently been supported in comprehensive plans throughout the metro region. This is accomplished primarily by encouraging infill development in the suburban counties, supporting
Richmond Regional Analysis

cluster development in rural counties, and generally discouraging
development that is inconsistent with future land use goals.

Each jurisdiction must look to its best interest by establishing land
use policies that support the needs and desires of its citizenry. How-
ever, each jurisdiction within the Richmond Metropolitan Re-
gion should also collaborate for the advancement of the region as a
whole. A regional approach to growth may require compromises
between neighboring jurisdictions, but a strong and cohesive region
will result in a net benefit for each locality.