



TRANSPORTATION

TECHNICAL REPORT

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1. Introduction

Transportation provides individual mobility, modifies behavior, and shapes activity patterns. It affects the sense of community, the environment, the economic base, and the manner in which visitors perceive the community. Taking these factors into account, transportation planning addresses the needs of a community by managing supply/capacity, travel demand, and land uses.

In terms of supply, transportation facilities include interstate highways, state primary roads (principal arterials which are designed to move traffic rather than to provide access to property), state secondary roads (roadways designed to serve local traffic and residential streets), private neighborhood streets (such as those in gated communities), public transportation services, and intra- and inter-regional facilities such as air, rail, bus, and trucking (freight) services, as well as sidewalk, bicycle, and greenway facilities. At the same time transportation planning efforts seek to increase or optimize the capacity of these facilities, it also strives to manage the demand on these systems so as to reduce or defer the need for new facilities. Strategies such as carpooling, telecommuting, providing complete streets, and utilizing access management make more efficient use of the existing transportation system.

There is also distinct relationship between transportation and land use that underscores the need to manage land uses. Transportation patterns are a result of human activities in the community; the arrangement of human activity is dependent on the land use development pattern for the County. The types and level of transportation opportunities provided to serve these activities are often dependent not only on the needs of the community, but also on the resources available. The level of transportation services which can be provided will affect subsequent human activities and interactions. While land use plans are based on governmental boundaries, these activities and subsequent transportation needs consistently cross those lines. These relationships result in the need to carefully coordinate transportation planning at the state, regional, and local level to create a sustainable infrastructure for all modes of travel as the County continues to develop.

2. Roles in Local Transportation Planning

Transportation planning analysis often focuses on mobility (the ease at which people or goods can be moved about), although over time, more consideration is being given to accessibility (the ease with which desired activities can be reached from any or all destinations)¹. The term "sustainable mobility," as defined by the World Business Council for Sustainable Development is "the ability to meet the needs of society, to move freely, gain access, communicate, trade, and establish relationships without sacrificing other essential human or ecological values today or in the future."

¹ Timothy J. Lomax, *Quantifying Congestion*, Texas Transportation Institute

To help the County meet these objectives, the County, region, and state plan based on projected future socioeconomic and population conditions. A major role of the County government is to create a multi-modal vision for the transportation network and adopt goals, strategies, and actions as part of the Comprehensive Plan to guide the County in its implementation. The local government then acts to coordinate with federal, state, regional, and private entities to implement the vision. A description of many of the processes and funding sources the County utilizes to implement the vision for all modes are described below.

2a. Federal: Federal Highway Administration and SAFETEA-LU

The Safe, Accountable, Flexible, Efficient Transportation Equity Act (SAFETEA-LU) is the umbrella congressional act under which all federal funding for transportation falls. The \$286.4 billion measure contains a host of provisions intended to improve and maintain the surface transportation infrastructure in the United States, including the interstate highway system, transit, rail, bicycling and pedestrian facilities. Funds allocated from the act trickle down from the federal government to fund many local projects. The bill was signed into law in August 2005 and expires September 2009. Both the Federal Highway Administration (FHWA) and Federal Transit Administration (FTA) implement programs and authorize funding on behalf of SAFETEA-LU.

2b. State Transportation Agencies

The Commonwealth Transportation Board (CTB) establishes the administrative policies for Virginia's transportation system and allocates highway funding for projects and provides funding for airports, seaports, and public transportation. The state agencies responsible to the CTB are the Virginia Department of Transportation (VDOT), the Department of Rail and Public Transit (DRPT), the Department of Aviation (DOA) and the Virginia Port Authority (VPA). These agencies develop plans for the transportation facilities and services offered by the state. VDOT is responsible for building, maintaining and operating the state's roads, bridges, and tunnels. The DOA develops individual airport master plans and the Virginia Air Transportation System Plan. The VPA is responsible for developing public port and waterway plans. The DRPT is responsible for planning and delivering rail, public transportation, and commuter assistance services.

2c. Region: Hampton Roads Transportation Planning Organization (HRTPO)

A Metropolitan Planning Organization (MPO) is a transportation policy-making body comprised of representatives from local government and transportation agencies and acts as the gatekeeper for federal transportation funds. Federal legislation passed in the early 1970s required the formation of an MPO for any urbanized area (UA) with a population greater than 50,000 people. MPOs were created in order to ensure that existing and future expenditures for transportation projects and programs were based on a continuing, cooperative, and comprehensive planning process. All federal funding for transportation projects and programs is channeled through the MPO.

There are five core functions of an MPO:

1. **Establish a setting:** Establish and manage a fair and impartial setting for effective regional decision making in the metropolitan area.
2. **Identify and evaluate alternative transportation improvement options:** Use data and planning methods to generate and evaluate alternatives (multimodal or road alignment). Planning studies and evaluations are included in the MPOs Unified Planning Work Program.
3. **Prepare and maintain a Long Range Transportation Plan (LRP):** Develop and update a long-range transportation plan for the metropolitan area covering a planning horizon of at least twenty years that fosters mobility and access for people and goods, efficient system performance and preservation, and good quality of life.
4. **Develop a Transportation Improvement Program (TIP):** Develop a short-range program of transportation improvements based on the long-range transportation plan; the TIP should be designed to achieve the area's goals, using spending, regulating, operating, management, and financial tools.
5. **Involve the public:** Involve the general public and other affected constituencies in the four essential functions listed above.

The thirteen local governments of the Peninsula and Southside (Norfolk, Virginia Beach, etc.) comprise the Hampton Roads Transportation Planning Organization (HRTPO) (formerly the Hampton Roads MPO) which was formed in response to this requirement. Representatives appointed by the governing bodies represent each locality in this process. Three committees of the HRTPO, the Transportation Technical Committee, the Citizen Transportation Advisory Committee, and the Freight Transportation Advisory Committee are responsible for ensuring that the planning process is carried out in a cooperative and ongoing fashion, and in conformance with applicable federal and state guidelines.

The HRTPO has access to five different funding sources: the Surface Transportation Program (STP), the Regional Surface Transportation Program (RSTP), Congestion Mitigation and Air Quality (CMAQ), and Interstate Maintenance (IMAIN). In conjunction with state and local funding, the HRTPO allocates money from these sources to fund transportation projects.

Projects that receive funding must be included in the LRP, which is updated every few years. To begin funding a project, the HRTPO prioritizes the region's short range priorities in the TIP derived from the goals of the LRP. The TIP is then forwarded to the state with the TIPs from other MPOs to create the State Transportation Improvement Program (STIP). The STIP is then adopted by the CTB and is forwarded to the FHWA for funding.

The latest Hampton Roads Regional Transportation Plan, the 2030 LRP, was adopted by the HRTPO in 2008. It is a comprehensive approach to the region's transportation system. It addresses all modes of travel, including highways, public transportation, pedestrian and bicycle access. By using inventories, data, and analysis, the study makes recommendations for providing and maintaining an adequate transportation system over a 20-year time horizon. The 2030 LRP is used as a general guide for planning future transportation improvements in the County. By federal law, the 2030 LRP contains those projects that can be reasonably funded using existing or potential future funding sources (also known as fiscally constrained). This requirement helps to ensure that revenues identified in the LRP can reasonably be expected to be available to implement projects in the LRP while providing for the operation and maintenance of the existing transportation network. Projects must be included in the LRP to receive federal or state funding. Since the plan is financially constrained, not all transportation needs can be met through the LRP.

2d. County Transportation Planning and Funding

The principal components of the County transportation planning efforts are its Comprehensive Plan, annual primary and secondary road funding priority requests in the Six Year Improvement Plan (SYIP), the Regional Bicycle Facilities Plan, sidewalk plan, unpaved roads plan, and cooperative efforts with the state and the HRTPO.

In James City County, the state has overall responsibility for the construction, operation, and maintenance of all streets and highways (except private roads). To facilitate the prioritization of state transportation spending in the County, the Board of Supervisors annually requests the CTB fund certain primary road projects through the SYIP for primary and secondary roads. Funds for primary road projects are allocated at a regional or statewide level and are not designated specifically for any particular county. Due to the enormous cost of most of these primary road improvements, it is not uncommon for these roadways to remain on the SYIP for ten or more years before undergoing construction. The County has in the past been successful in acquiring funding for most County primary road projects.

The County's SYIP is reviewed and updated each year by the Board of Supervisors. The County receives an annual allocation from the CTB to fund secondary road improvements on the SYIP. Unlike the primary roads allocation, this allocation is designated specifically to the County with the amount based on a formula of population and land area.

The County also participates in VDOT's Revenue Sharing Program, which provides a state dollar for each County dollar that is contributed toward road projects up to a maximum of \$1 million. This money is often used to fund small projects or fill budget shortfalls in the SYIP.

Due to state budget constraints, it is likely that secondary road shortfalls will occur as the cost to maintain the ever-expanding highway system is growing more rapidly than highway funding. These potential shortfalls will have a significant impact on

the County's ability to acquire funding for road improvements, especially for roads that are borderline in terms of needing improvements. It is important for the County to establish clear prioritization of road improvements to ensure that the most important projects are receiving funding, and to concentrate funding where it is most needed. Emphasis should be placed on roads within the Primary Service Area (PSA), with efforts outside the PSA focused on safety projects rather than projects that add capacity. The County should aggressively pursue any funding opportunity available for transportation projects. As funds for new roads and widening are limited, less expensive projects like additional bike lanes, multipurpose trails and sidewalks that could help alleviate congestion on road segments where money for widening is unavailable should also receive priority.

2e. Private: Proffers and Road Impact Fees

Over the years, developers and landowners have played a significant role in the provision of transportation facilities in the County, primarily through proffers offered during the rezoning process. This has included both money for off-site road improvements and actual road construction. An example of a major road and bikeway improvement built by a developer that has had benefits beyond the immediate development is Greensprings Plantation Drive. Developers also made significant cash contributions toward the construction of Monticello Avenue. More recently, developers have contributed money toward the improvement of the Monticello Avenue/News Road/Ironbound Road corridor project. Other developers are obligated to make significant future off-site improvements such as those that will be made by the developers of Stonehouse.

As noted in the Renaissance Planning Group (RPG) report on current planning tools and topics for the Land Use section, a potential new source to fund road improvements is impact fees. An alternative to proffers, impact fees are fees charged by a local government to offset the costs of public improvements required to support new development. Impact fees are based on the premise that new development should pay its own way and that the developer proposing the project should pay all or part of the costs of improvements required to serve the project. Impact fees are typically mandatory and not subject to negotiation, and most are collected at the time of building permit approval so they can be collected regardless of whether a development is approved administratively or subject to legislative approvals like rezonings.

Based on RPG's review of the advantages and disadvantages of such a system, the consultant concluded that James City County could pursue road impact fees as an alternative to the current proffer system; however, it appeared that from a local government standpoint, the use of impact fees might not prove to be a better option, at this time.

3. Inventory of the County's Transportation System

Pedestrian and Bicycle

Pedestrian and bicycle access and mobility are important aspects of the County's overall transportation system. Sidewalks, bikeways, greenways, and multi-use (or shared use) paths provide safe and convenient pedestrian and bicycle travel while simultaneously improving the efficiency of the roadway system by reducing potential conflicts between motor vehicles, pedestrians, and cyclists. Shoulder bike lanes in particular provide multiple benefits. In addition to providing room for bicyclists, they offer wider roads and safer shoulders for motorists and reduce pavement edge maintenance. In areas with older drivers and frequent truck and trailer traffic they are a significant safety enhancement. Pedestrian improvements also help complete the County's transportation system by improving access to bus stops and centers of business activity. Multi-use paths are designed to serve a wider variety of users and are a complementary addition to the roadway network.

In all forms, bicycle and pedestrian facilities also play an important role in helping the region attain air quality conformity and by attracting visitors. Appropriate facilities are needed to create a safe and effective pedestrian and cyclist environment. Sidewalks, pathways, cross-walks (signalized and un-signalized), and bike paths are the most familiar examples of these facilities.

Sidewalks

James City County adopted its Comprehensive Sidewalk and Trail Plan in 1989 and last amended it in 1998. This plan helps meet pedestrian needs generated by current and future growth, while limiting the need for post-development remedial sidewalk projects constructed with public funds.

Sidewalks and multi-use paths in the County mainly have been provided through County initiatives or in agreement with private developers, either voluntarily or as required under development regulations. The current County sidewalk ordinance requires that all new developments which undergo site plan review meet the following conditions:

1. Sidewalks shall be built to VDOT standards and located within VDOT right-of-ways when they are to be publicly maintained. If sidewalks are to be privately maintained, they shall be built to standards acceptable to the County Engineer or the Planning Commission.
2. A sidewalk plan providing for internal pedestrian access between parking areas, building and public areas as well as access to abutting property shall be provided for multifamily residential development and for nonresidential development sites.
3. Sidewalks shall be provided along all existing public roads abutting property to be developed.
4. Sidewalks shall be provided for one block commencing at the entrance(s) on at least one side of all entrance roads serving residential developments which

shall or would be expected to serve more than 500 vehicles per day based on the application of the Institute of Transportation Engineer's traffic generation rates to a projected density assigned to undeveloped land remaining within a proposed subdivision. Sidewalks shall be provided on one side of all roads which shall serve or would be expected to serve more than 1,000 vehicles per day based on the method listed above.

Although a majority of the sidewalks in the County have been constructed by the private sector in conjunction with land development, many have been constructed through County efforts using state and federal grants. One of the actions in the Comprehensive Plan is to update the comprehensive sidewalk plan and amend the Zoning Ordinance to provide developers with more flexibility in addressing the needs of bicyclists and pedestrians and provide a facility that is compatible with surrounding land uses.

Bikeways

A bikeway is a facility where cycling is encouraged whether it be a shared roadway, shoulder bike lane, or multi-use path. In June 1993, the Board of Supervisors first adopted the Williamsburg, James City and York County Regional Bicycle Facilities Plan. Updated in 1998, this plan calls for the development of over 390 miles of bikeways in James City County. In support of this plan, the Board often approves allocation of matching local funds for federal transportation grants, which provide funding for the construction and extensions of existing bikeways in James City County.

The Regional Bicycle Facilities Plan was developed under the direction of the Regional Issues Committee in cooperation with citizens from all three jurisdictions. The Regional Bicycle Facilities Plan was approved by all three localities' Planning Commissions and governing bodies after several public hearings. The three governing bodies have also approved individual bikeway projects.

Since 2000, the three jurisdictions have received over \$3 million in state and federal funding for the construction of bikeways consistent with the Regional Bicycle Facilities Plan. The largest source of funding for the construction of bikeways comes from the Federal Transportation Enhancement Grant program and the Congestion Mitigation and Air Quality program (CMAQ) funded through SAFETEA-LU. Both of these grant programs provide localities up to 80% of the total cost of the transportation projects, with the remaining 20% being provided by state or local government funds. The Board of Supervisors has provided the County's local match in its annual budget. As these are federally funded, these projects must be approved by the HRTPO and included in the LRP.

The Regional Bicycle Facilities Plan consists of three different types of facilities. Descriptions and sample illustrations of these are listed below

1. Multi-Use Path – Constructed separate from the roadway. 8' - 12' wide.

2. Shoulder Bike Lane - Paved and striped shoulders on the side of the roadway. 4'-6' wide.
3. Shared Roadway - Share the existing roadway. No paved markings. Signs only.

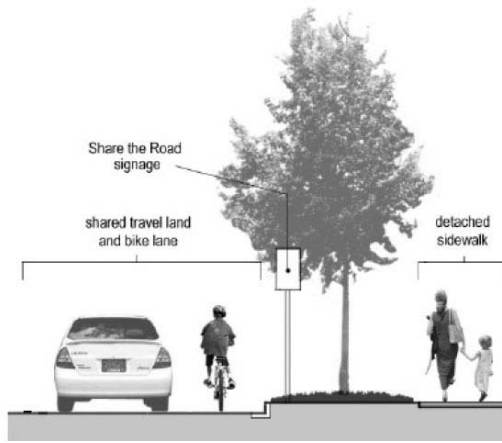


Figure 1: Example of Shared Roadway

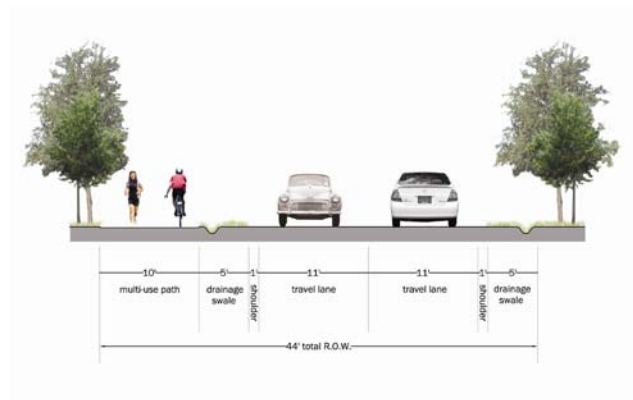


Figure 2: Example of a Multi-use path

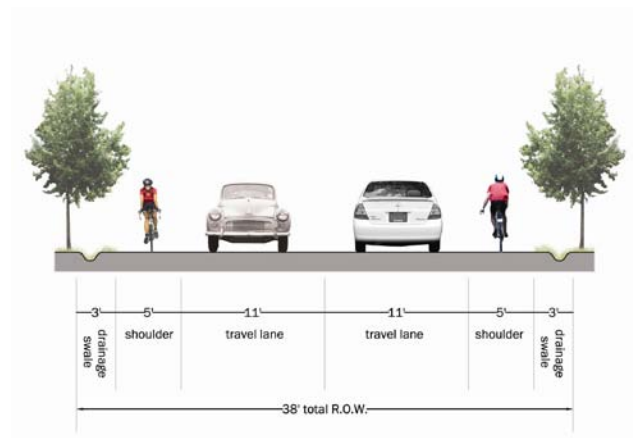


Figure 3: Diagram of shoulder bike lane

Federal regulations require bike lanes to be 6 feet wide. Because of the tremendous expense, VDOT and the County often utilize the two to four feet of paved shoulders on road projects as space to accommodate cyclists. Some bikeways are retrofitted to existing roads. In these cases, designs which have the least impact on surrounding properties will be selected. Additional right-of-way may be needed to allow for minor ditch and utility relocation and clearing. However, most of these retrofitted roads do not meet current VDOT guidelines because they lack a paved shoulder. The proposed bikeways serve a dual function as both a paved shoulder and pedestrian/bike travel lane, while providing no more impact than a routine road widening project to bring the roads up to state requirements.

The Safe, Accountable, Flexible, Efficient Transportation Equity Act (SAFETEA-LU) legislation provides money to local governments across the country to construct projects that promote alternative means of transportation as a way to improve air quality and ease congestion. The focus of these projects is for modes of transportation other than the single occupant motor vehicle. This legislation has provided the City of Williamsburg, York County, and James City County a unique opportunity to build millions of dollars worth of bikeways at relatively little cost to the localities. Most of this money is designated for improving the nation's transportation system in a way that also benefits air quality. Again, any federal funding for bike lanes must be approved by the HRTPO and be part of the LRP and TIP.

There are many benefits that come from the development of bikeway facilities in their various forms. Some of these benefits are listed below.

- ◆ Bikeways connect neighborhoods by providing safe travel path for bicyclists and pedestrians. This is especially useful for persons without driver's licenses or a car and younger citizens.
- ◆ Bikeways improve safety for motorists, pedestrians, and bicyclists. Bikeways allow bicyclists to share the road with vehicles without slowing the speed of traffic or causing traffic to move into the on-coming lane to pass cyclists. As auto traffic increases, the need for pedestrian and bikeway facilities also increases. They provide widened roads for trailers, trucks, RV's and senior citizens, and safer longer-lasting shoulders. "Share the Road" signs are an important safety component to these facilities, particularly in instances where bikeways are not designated with surface paint on the roadway.
- ◆ Bikeways promote tourism by providing an alternative method of travel which is safe, fun, inexpensive, and healthy. Bikeways also enhance the region as a tourist destination. Bicycle tours are popular in the area and generate business for motels, restaurants and other tourist attractions.

One of the recommendations in previous plans was to create a Historic Triangle Bikeways Advisory Committee (HTBAC). This committee consists of citizens from the City of Williamsburg, York County, James City County, and representatives from the National Park Service, the College of William and Mary, Colonial Williamsburg, and staff from each of the three jurisdictions. This group is responsible for

monitoring the construction of bike facilities and ensuring that all new facilities and future plans meet the public's desires and needs.

In addition to streets and sidewalks, bikeways in all forms are an important component of the County transportation system as the County enjoys more favorable weather and terrain than other localities where bicycling is extremely popular. There are several potential benefits of increased bicycle use. Cycling spurs energy conservation reduces air and noise pollution, and traffic, as well as having economic and health benefits. Bicycle use has become a viable means of transportation in addition to a recreational activity. However, increased ridership can only be achieved by the provision of a safe bikeway network with a high degree of connectivity and bicycle-friendly intersections. The County must plan to adequately accommodate bicycle traffic in new and revitalized roadways.

Most of the funded bikeways are shoulder facilities intended to serve primarily transportation as opposed to recreation purposes. HTBAC, in cooperation with the James City County Parks and Recreation Department during the 1998 Bicycle Facilities Plan amendment, updated the plan to address a broader range of trip purposes and user groups. This cooperative effort is expected to continue with future plan amendments.

Greenways

James City County has defined greenways as linear open spaces that are managed for conservation, recreation, and/or alternative transportation uses. Greenways often follow natural features such as ridgelines, stream valleys, and rivers; and cultural features (canals, utility corridors, abandoned rail lines, zoning buffers, roadways) and wherever there is a break in the land pattern. Although each greenway is unique, most greenways are networks of natural open space corridors that connect neighborhoods, parks, and schools to areas of natural, cultural, recreational, scenic, and historical significance. Blueways are aquatic greenways that provide water access opportunities for small watercraft such as canoes and kayaks. These passageways link people and places to nature for the enjoyment and enhancement of the community.

The Greenway Master Plan establishes a framework for a countywide system of interconnected greenways, blueways, and trails for the benefit of the community's quality of life. The Division of Parks and Recreation manages the Greenway Master Plan, whose main goal is to balance environmental protection with the need for recreational amenities. Beyond environmental protection and recreation, another important benefit of greenways is that they provide corridors that bicyclists, pedestrians, and others can use to get from one place to another, free from motor vehicle conflicts, as an alternative to motor vehicle use.

The Greenway Master Plan includes elements pertaining to greenway planning and design, maintenance and management, and implementation strategies and funding mechanisms. In order to implement the strategies outlined in the Greenway Master Plan, an action plan was developed. The action plan has a ten-year horizon and is to

be revised concurrently with the Parks and Recreation Master Plan. The action plan prioritizes trail development projects based on community input. Each proposal will detail corridor recommendations, land acquisition or easement strategies, capital expenditures, potential funding sources, and timelines for completion. An associated end product of the Greenway Master Plan is a map with an inventory of significant sites, parks and open spaces, pedestrian and bikeway trail corridors, technical information, and the action plan.

Two of James City County's most popular trails are the Greensprings Greenway Interpretive Trail and the Capital Trail. The Greensprings Trail is a three mile soft surface trail that loops through a landscape of ponds, wetlands, and forests. The trail is on wetlands adjacent to Mainland Farm, the oldest continuously cultivated farm in America. The trailhead at Jamestown High School provides convenient parking and access to the Virginia Capital Trail. The multi-use path of the Capital Trail will link Jamestown and Richmond upon completion. Though both trails are maintained by VDOT, the County will work in cooperation with the state and other local agencies to ensure its continued adequacy for its users.

The Comprehensive Sidewalks Plan, the Regional Bikeways System and the Greenways Master Plan all promote a shared goal of emphasizing alternative modes of transportation. As such, whenever possible shared facilities should be developed that combine the benefits of each in an effort to unify the effort of providing these types of facilities.

Multi-Use Paths

Paved multi-use paths complement the range of non-vehicular facilities by providing an option that can serve a wide range of users in one facility. Multi-use paths are typically paved and eight to ten feet wide, and are typically found in rural and suburban settings. When designing or retrofitting a road for cyclist and pedestrian accommodation, it is important to consider the context before deciding on the type of facility. In historic or more urban and compact settings, dedicated bike lanes and sidewalks may be a more appropriate and functional choice.

Roads

James City County has 189.81 lane miles of primary roads and 593.44 lane miles of secondary roads, all of which, as public roads, are maintained by VDOT. As described in the introduction, these roads serve various purposes and are classified according to their function, from local roads and collectors to arterials and freeways. New roads are constructed by either VDOT or private developers. Roads are added to the state system only if a developer constructs them to VDOT standards and the County petitions the state for acceptance in the maintenance system. Private roads exist in a number of areas throughout the County, in specific situations where ordinances permit them and private agreements are in place to ensure their continued maintenance. Long-range planning for the County's roadways is described at the end of the report.

4. Transit

4a. Public Transit

Williamsburg Area Transit Authority

Williamsburg Area Transit Authority (WATA), formerly known as Williamsburg Area Transit, began operation in 1977, providing a public transportation system to the citizens of James City County, the City of Williamsburg, and the Bruton District of York County. WATA's mission is to provide a public transit option for the Williamsburg region through a safe, efficient and accessible transit system that is user friendly, environmentally sensitive and supports the needs of the community.

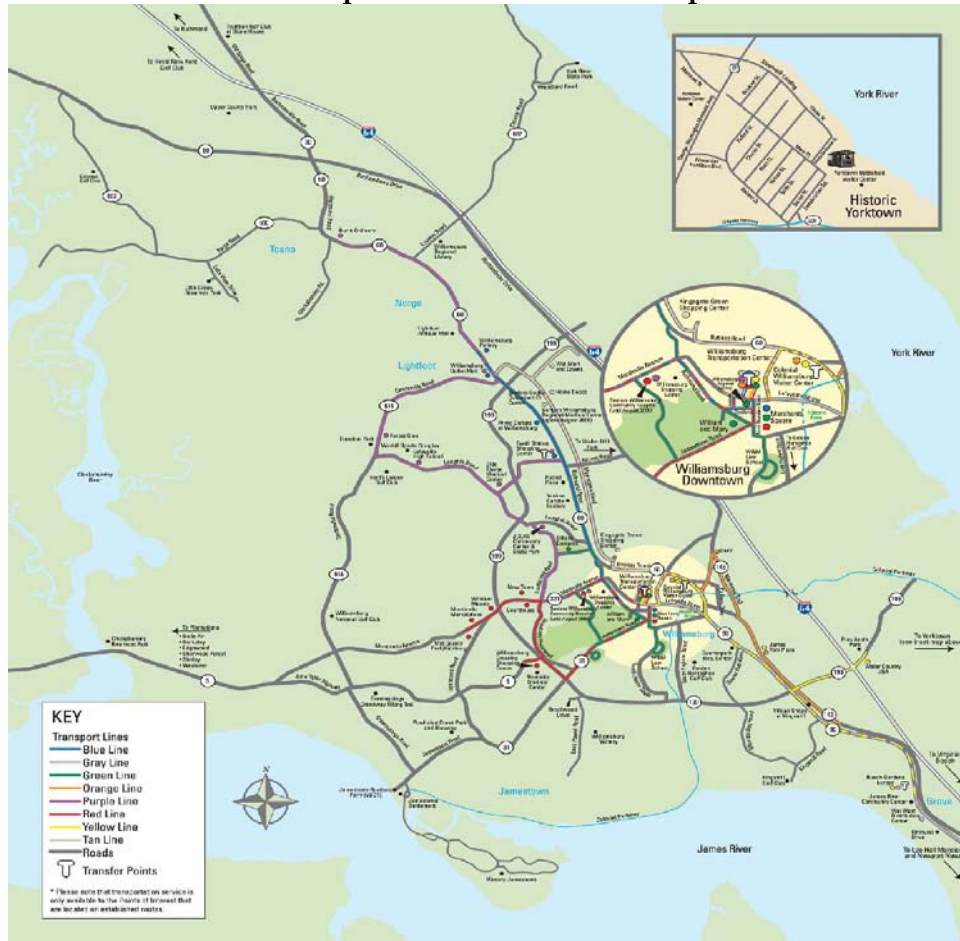
Improvements over the last five years include new routes, increased hours, Sunday service and regional connections to Surry County and Newport News. WATA has also established three Transportation Centers, one in downtown Williamsburg (serving as a regional hub where taxi, intercity, public transit and rail connect), one at Richmond Road/Centerville Road intersection which services the Stonehouse District, and one at the Colonial Williamsburg Visitor Center allowing seamless connections to Jamestown and Yorktown. These improvements have resulted in unprecedented use of services. From FY 2002 to FY 2008, ridership increased from 137,000 annual trips to 771,000 annual trips, an increase of over 400%. As a new association, WATA does not have an adopted long range plan. WATA is heavily funded by federal monies and by contributions made by the City of Williamsburg, James City County, and York County along with passenger fares.

WATA has ten routes meeting various community needs such as commuter, recreational, and tourism travel by providing a coordinated system through fixed routes and transportation for the disabled. The current routes are:

1. ***Gray Line*** - serves Route 60 East between the Williamsburg Transportation Center and Lee Hall in Newport News where a connection is made to Hampton Roads Transit. This line serves Greenmount Industrial Park, James River Commerce Park, Busch Gardens and the Grove Community.
2. ***Blue Line*** - serves Richmond Road (Route 60 West) between the Williamsburg Transportation Center and the Williamsburg Outlet Mall (Richmond Road/Centerville intersection). Serving this corridor provides access to motels, restaurants and retail centers in the City of Williamsburg and James City County.
3. ***Green Line*** - provides access to students on-campus and near-by shopping areas such as Monticello Shopping Center and New Town during the College year.
4. ***Yellow Line*** - provides seasonal service (Labor Day through Memorial Day) from the Williamsburg Transportation Center to Busch Gardens and Water Country U.S.A.

5. *Purple Line 1* - provides service between New Town and Williamsburg Outlet Mall, primarily along Ironbound Road, Longhill Road, and Centerville Road serving the James City-Williamsburg Community Center, Human Services Center, Olde Towne Medical Center, two high schools, and several retail centers.
6. *Purple Line 2* - provides service between Williamsburg Outlet Mall and Stonehouse Industrial Park along Richmond Road (Route 60 West) and Chickahominy Road serving retail, schools, and employment centers.
7. *Orange Line* - provides service between the Williamsburg Transportation Center, Colonial Williamsburg Visitors Center, Colonial Community Services Board, and the Marquis Retail Center along Merrimac Trail (Route 143) from Capitol Landing Road to Route 199.
8. *Tan Line* - provides service between Williamsburg Transportation Center and Williamsburg Outlet Mall, primarily along Route 60 Bypass and Mooretown Road serving Sentara Williamsburg Regional Hospital, medical complexes, and retail establishments.
9. *Red Line* - provides service between Williamsburg Transportation Center, New Town, Monticello Market Place, Williamsburg-James City Courthouse, and Williamsburg Crossing serving retail and shopping.
10. *Surry Connection* - provides service between Williamsburg Transportation Center, Surry County Community Center and Government Center, and the VDOT Park & Ride Lot at Route 31/637 via Route 31 and Scotland Ferry offering commuting options for employment and shopping.

Map 1: WATA Bus Route Map



WATA operates seven days a week, from 6:00 a.m. to 8:00 p.m., Monday through Saturday, and from 8:00 a.m. to 6:00 p.m. on Sundays during the off peak months and extended to 10:00 p.m. during the peak summer months. Fares are \$1.00 per one-way trip, plus \$0.25 to transfer from another line, with a maximum one-way trip cost of \$1.25. Much of the year WATA offers a \$1.50 all-day pass and is planning to offer weekly and monthly passes to improve customer convenience.

Children under six who do not occupy a seat and are accompanied by an adult ride for free, as do middle and high school students with a school student’s ID who reside in James City County, the City of Williamsburg, and Bruton District of York County. Persons who are elderly (60 and over) and/or disabled with a Medicare card can ride the fixed route at a half fare of \$0.50. WATA operates a specialized service within the regular transit bus area for disabled persons. College of William and Mary students and faculty and staff members have access to on and off campus on all routes by showing their William and Mary identification.

TRAFFIX

TRAFFIX is a cooperative public service that promotes transportation alternatives by working with employers in the region to provide alternatives to driving to work.

TRAFFIX programs include Commuter Checks (tax-free vouchers for transit passes, tickets, or vanpool fares), the Guaranteed Ride Program, NuRide Reward Program (a reward-based ridesharing system), vanpooling, van leasing, park and ride locations, and assistance with telecommuting or variable work schedules. It reports to an advisory board comprised of representatives from each of the transportation planning groups: HRPDC), Hampton Roads Transit (HRT), VDOT and the Virginia Department of Rail and Public Transportation (VDRPT). WATA has applied for state and federal funding through the DRPT grant application process to bring TRAFFIX services to Williamsburg.

Regional Transit Vision Plan

The HRTPO is currently undertaking an effort to develop a regional vision of public transportation corridors and districts, indicating the combination of transit services and land use intensity best suited for each corridor. The underlying premise of this study is that public transportation provides a mobility option valuable to the individuals who use it and beneficial to the whole community as part of its economic infrastructure. It is understood, however, that route-based public transportation services are generally only financially feasible where they connect high activity locations. The intent of the plan is to identify those regional corridors and areas where transit services are most likely to be successfully implemented. The plan will include recommendations for the levels of usage that are necessary to support high capacity transit corridors. The plan will then make recommendations on changes to land use development patterns that will support transit. Once finalized and financially-constrained, selected improvements will be included in the region's 2034 LRP and a statewide transit plan for 2035.

Under the draft plan released in April 2009, entitled *A Transit Vision Plan for Hampton Roads*, the Peninsula CSX Corridor from Lightfoot to downtown Newport News is described as a potential commuter rail service corridor. The plan states that based on densities, the southern half is well-suited to light rail transit while the northern half is more suited to express bus and commuter rail service; however, commuter rail for the entire corridor may be more feasible due to compatibility with CSX operations. Furthermore, it identifies Lightfoot as a potential commuter rail station location and recommends focusing development, particularly mixed use centers, within designated activity centers along the corridor. Finally, in regards to planning decisions, the draft plan concludes that the complexity of the corridor requires additional planning. Near-term (2010-2025) implementation includes continued express bus service and increased Amtrak service between Newport News and Richmond, plus evaluation of light rail transit and commuter rail. Any construction, if funded, would begin in the long-range (2026-2035) timeframe.

4b. Other Transit Services

Williamsburg/James City County Community Action Agency

This agency provides specialized transportation services to senior citizens, low-income residents, and persons with mobility limitations. It serves clientele under

federal regulations and through contract with the Peninsula Agency for Aging. It operates a demand-responsive type of service with the Williamsburg and James City County jurisdictions.

Colonial Williamsburg

Colonial Williamsburg operates a fixed-route service for visitors to the historic area as part of the general admissions fee. Buses run between the Visitor's Center and various locations throughout Colonial Williamsburg. The Colonial Williamsburg service is also available to Greater Williamsburg residents possessing a resident pass.

Historic Triangle Senior Center

The Historic Triangle Senior Center provides transportation to and from doctor appointments five days per week to seniors in James City County, the City of Williamsburg, and the Bruton District of York County.

5. Rail Travel

A main line of the CSX Railroad runs north to south through James City County. This line connects in Richmond with the broader network of the CSX transportation system. The CSX transportation system includes American Commercial Barge Line, Sea Land Shipping, CSX Intermodal Terminals, and Customized Transportation Inc. The rail line connects with the ports of Hampton Roads in Newport News and to the Southside ports in Portsmouth.

Rail travel plays an important role in moving freight and passengers to and from James City County. It also has the potential to play an even larger role in the future. This will not come without challenges. Meeting rail needs within this one corridor will be particularly complex, as will be reducing conflicts with other modes of transportation due to numerous at-grade crossings.

5a. Passenger Transportation

Conventional passenger rail service is available in James City County from the National Railroad Passenger Corporation (AMTRAK). There are two trains that operate between Newport News and the cities of Boston, New York, and Washington, D.C - the Acela Regional and the Twilight Shoreliner. These trains can be boarded at the Williamsburg Transportation Center. Amtrak is currently examining the possibility of increasing service to the Hampton Roads region and examining the possibility of new alignments to avoid delays from CSX freight trains.

Though there are rail lines and possible additional rail alignment scenarios, the current lines are privately owned. Amtrak is subservient to the private owners of the line and cannot increase service without permission of the owners. It is unlikely that any major increase in rail transit will occur unless the tracks owned by the entity that provides the passenger service are expanded.

5b. Light Rail

Light Rail Transit (LRT) is a modern form of public transportation. LRT is a one, two or three car train that runs on tracks in city streets or on a separate right-of-way. The length of the train is never longer than a city block so that stopped vehicles do not impact cross streets. LRT stations can be spaced as close as one-quarter mile in downtown areas but are typically spaced between one-half to one mile apart in most areas. LRT serves commuters, shoppers, and visitors.

The potential for light rail has been studied for over a decade in the Hampton Roads region; James City County does not currently have the density to support light rail, and as evidenced in the draft Vision Transit Plan, is more suited for express bus and commuter rail service. In order to support light rail in the future, James City County would need to make an effort to cultivate transit-oriented developments by locating new medium- and high-density development along and in close proximity to proposed station locations. Also, a high priority is the development of effective feeder bus and vanpool services as well as park-and-ride lots and bicycle lockers to provide better access to rail transit for those persons not living within close proximity of the rail corridor.

5c. High Speed Rail

In contrast to LRT, high speed rail primarily serves inter-city travel similar to service now provided by Amtrak. According to the Federal Railroad Administration (FRA), High Speed Rail, sometimes called High Speed Ground Transportation, refers to a series of technologies involving trains traveling at top speeds of 90 to 300 mph. A report to Congress concluded that each of these technologies has potential to solve passenger transportation problems in some of our nation's most well traveled intercity corridors. FRA administers programs to help develop high speed rail systems in such corridors.

The DRPT is investigating improved passenger rail service between Richmond and Hampton Roads to ultimately connect to the Southeast, Northeast and Mid-Atlantic regions as an extension of the Southeast High Speed Rail Corridor (SEHSR). This could include improvements to existing service or the development of new rail service to accommodate more frequent passenger trains.

Two previous studies of passenger rail service improvements between Richmond and Hampton Roads have been conducted. In 1999 VDOT completed the I-64 Major Investment Study, which included recommendations for enhanced intercity rail service on the Peninsula. In 2002, DRPT completed the South Hampton Roads High Speed Rail Feasibility Study which reviewed the feasibility of high-speed rail between Richmond and South Hampton Roads via Petersburg and the U.S. Route 460 Corridor. Recent federal stimulus legislation may expand the funding opportunities for high speed rail in this corridor.

5d. Freight

Important to the transportation system as well as the economy of the area is the commodity movement along the CSX lines. Coal trains pass through the County six to eight times per day. One train transports other materials, and serves various industries in James City County daily. Major users of the line are the Anheuser-Busch-InBev Brewery, Ball Metal, Jack L. Massie Contractors, Henry S. Branscome, and several other aggregate companies. The line has a medium-high density classification, which means it carries ten to twenty million gross tons annually. Industrial rail traffic is important because it ensures the line against abandonment. James City County can increase the viability of the railroad by encouraging new industries to locate along or near the line.

Although increased freight service is essential to the viability of the railroad, it may have an adverse effect on other modes of transportation. A potential problem may be the competition of freight traffic with passenger rail. Another concern could be the long delays at roadway crossings, and unsafe crossings throughout the transportation system. To address the competition of freight and passenger service, two separate rail lines in areas of possible congestion could provide a solution; however, this would be extremely expensive. In addition, there are seven railroad crossings within the County. Consideration should be given to improvements which would increase safety in these areas.

6. Water Travel

6a. Ferry Service across the James River

An important part of the transportation system in James City County is the Jamestown-Scotland ferry service on the James River. This is a heavily-used mode of travel that links Surry County with the James City County/Williamsburg area. Surry County has a large labor pool of workers who desire employment in the James City County area. These workers must often compete with tourists who ride the ferry for recreational purposes. The ferry is the only 24-hour state-run ferry operation in Virginia. VDOT took over operation of the ferry in 1945 and has more than 90 employees keeping it on schedule. Four ferry boats, the "Pocahontas," the "Williamsburg," the "Surry," and the "Virginia," carry passengers and vehicles across the river. In the early 1990s, there was an effort to replace the ferry with a high-rise bridge, however, this never materialized. More recently, VDOT considered cutting hours for the ferry in order to accomplish mandated budget cuts; however, Governor Kaine pledged to keep the ferry service available 24-hours a day, without tolls. He directed VDOT and the CTB to look elsewhere for budget cuts, with one option being to eliminate security checks at the ferry.

6b. Water Access for Industry and Business

The former BASF site in James City County was served by barge on the Wood Creek side until the 1980s. Both Wood Creek and Skiffe's Creek offer opportunity for barge access. Fort Eustis keeps the channel to its docks dredged to a depth of 23 feet.

Depth drops off past their docks to 18 feet and then gradually to 8 feet at Tarmac Landing.

The Army Corps of Engineers maintain the main shipping channel in the James River at a depth of 23 feet west to Richmond providing direct access to Port of Virginia (formerly the Port of Hampton Roads) to the east. The Port of Virginia is the busiest ice-free harbor in the world. It is comprised of three terminals operated by Virginia Port Authority: Norfolk International Terminals, Portsmouth Marine Terminal, and Newport News Marine Terminal. Another barge landing site exists on Skiffe's Creek in the Lee Hall section of Newport News.

7. Air Travel

The James City County area is served by three major commercial airports within one hour's driving distance: Newport News-Williamsburg International Airport in Newport News (20 minutes), Richmond International Airport (1 hour) and Norfolk International Airport (1 hour). The Williamsburg-Jamestown Airport is a small general aviation facility located within the County. It is a base for a flight school and small private planes. There is no scheduled commercial passenger service and the population served is confined to tourists and business clientele who travel by private plane. Its 3,200 feet of runway can handle most turbo-prop aircraft as well as light corporate jets.

In 2007, James City County was asked if it had interest in operating the airport. To aid in this determination, the County is currently conducting an airport feasibility study. The purpose of this study is to determine the demand for aviation services and the alternatives available to serve this demand in the James City County area. The goals of this study are to:

1. Determine aviation demand for a General Aviation-Community Airport (as defined by the Virginia Department of Aviation [DOAV]);
2. Identify and catalog all costs required to meet Federal Aviation Administration (FAA) standards for a community airport;
3. Determine the cost versus benefit of public ownership of the Williamsburg-Jamestown Airport;
4. Determine the economic cost versus benefit to the surrounding communities (James City County, York County, Williamsburg) of public ownership of a community airport;
5. Examine a Status Quo alternative (private owner), local acquisition of existing Williamsburg-Jamestown alternative, utilization of other existing facilities alternative, and a greenfield alternative.

The final comprehensive draft of the James City County Airport Feasibility Study was released in February 2009. The Board of Supervisors will consider the results of the study at its May 26, 2009, work session.

8. Relationship between Transportation & Land Use

Land use and transportation are often thought of as separate issues, but they are intrinsically linked and therefore important to transportation planning. The transportation system affects land use and in turn land use affects the transportation system. For example, the decision to improve an intersection can make that intersection more attractive to business and may spur development in that area, or the decision to extend a road or create a new road may encourage new economic and residential development on land area that previously had limited access. Conversely, approving a large residential development along a corridor will likely have a significant impact on the roadway by possibly necessitating turn lanes, stop signs and/or intersections where none previously existed, all affecting the flow of traffic. It is important to understand that the transportation system exists to provide a means to access various land uses, such as parkland, residential neighborhoods, and industrial development, provide mobility for longer trips, and in some cases serve both purposes. In order for the system to be effective, land use and transportation must be planned concurrently.

8a. Causes of Congestion and Methods of Mitigation

The underlying causes of congestion are far more complicated than the idea that there are simply too many cars in too small a space. Traffic congestion is a symptom of a much larger problem, a problem that includes:

- ◆ ***Lack of Affordable Housing:*** The lack of affordable and mixed-income housing near employment centers, and the imbalance between jobs and housing, creates longer commutes between home and work for many individuals.
- ◆ ***Sprawling Patterns of New Growth:*** Research by the United States Department of Transportation found that only 13% of the increase in driving is attributable to population growth. The remainder has been a result of a steady growth in the number of trips taken and the length of trips, both primarily products of low-density suburban development that requires ever greater levels of dependency on driving.
- ◆ ***Changes in Home to School Travel:*** Whereas more than half of all kids walked or bicycled to school in the 1950s, that number has now fallen below 10% as streets have become more dangerous due to traffic and lack of bicycle/pedestrian facilities. The resulting trend has been an overwhelming increase in parents driving their children to school and older children driving themselves, clogging local roadways during critical peak hours. An estimated 20-25% of rush hour traffic on local streets and roads is now attributable to the school commute.

- ◆ ***Lack of Alternatives:*** These days if a person does not have a car, it is very difficult to get around even if he or she is willing to walk, bike, or take mass transit. The typical suburban development model, characterized by non-connecting low-density cul-de-sacs, wide, high-speed arterials, and massive intersections, and few public facilities, makes it less cost-effective for transit to serve scattered destinations and makes walking or bicycling both inconvenient and dangerous.

- ◆ ***Continued Reliance on Rural Road Network:*** The County's primary and secondary road network was originally designed to serve large rural land parcels that generated very little traffic. As rural areas urbanize, road widening alone cannot handle the increased traffic. Additional interconnecting roads are needed to add network capacity and disperse traffic volumes. However, rather than providing this interconnectivity, new residential growth frequently occurs as isolated pods of development with one or two connections to an existing secondary or primary road. Large residential developments, especially those with private streets, compound the problem by providing few options to increase network capacity through interconnection. Commercial growth often becomes spread out along these existing roads, further reducing the already limited capacity of the once-rural roads.

Surmised from the causes of traffic congestion, possible solutions to the problem include:

- ◆ ***Increase Affordable Housing:*** Increasing the affordable housing stock in James City County will allow those persons employed in lower paying jobs, such as those jobs related to tourism, to live in the County instead of commuting from the surrounding areas.

- ◆ ***Promote Mixed Use Development:*** Mixed use development on a small or large scale allows residential and commercial development to be located in close proximity, therefore lowering dependency on automobiles for travel between home and work or general conveniences.

- ◆ ***Encourage Moderate and High Density Development:*** Higher density developments make mass public transit a more viable alternative to automobile use, and helps reduce sprawl. A typical rule of thumb for mass transit is six to eight units per acre for local bus service, and 12-18 units for bus rapid transit.

- ◆ ***Increase Safety for Pedestrians and Cyclists:*** Increasing safety can be accomplished by providing pedestrians and cyclists with facilities such as sidewalks, wider paved shoulders, greenways and multi-use paths. Short trips that may have required an automobile because they were too dangerous for pedestrians and/or cyclists to make, could be made safer, so that walking and/or cycling could become a practical alternative. In urban planning, the

concept of designing roadways to be usable and attractive for pedestrians, bicyclists and transit is called “complete streets.” A longer discussion on complete streets is found in the following sections.

- ◆ ***Increase Mass Transit Options:*** Providing greater numbers of people with the option to utilize the bus system or rail service will result in a less automobile dependent society.
- ◆ ***Increase Interconnectivity:*** This concept applies equally among neighborhoods and between residential and nonresidential areas. Recently, VDOT has been implementing new regulations to improve interconnectivity. These changes are described more fully in the sections below.
- ◆ ***Centralize Rather Than Spread Out Commercial Development:*** Along with concentrating non-residential development in nodes, access management along major arterials should be implemented. Access between nodes should be severely limited. This concept discussed in more detail below.
- ◆ ***Transportation Demand Management (TDM):*** TDM is the implementation of strategies to reduce automobile traffic at a given time. Tools available to manage traffic include HOV lanes, tolling, congestion pricing, charging fees for parking, flextime, telecommuting, and rideshare programs.
- ◆ ***Intelligent Transportation Systems (ITS):*** ITS refers to the effort to include communications technology to the transportation infrastructure. The most common examples include electronic signs on the Interstate system, EZ pass and photo enforcement.

Connectivity

Connectivity is a term used to describe interconnection between developments. This interconnection can refer to the interconnection of streets within a single development, the interconnection of streets within separate developments, or interconnection access for pedestrians and cyclists. Connectivity can be a sensitive issue for various reasons. One popular argument is that connectivity of a less expensive development to a more expensive development will drive down the property values of the more expensive development. Despite there being no statistical evidence to back up this claim, it is a commonly held view and is often used as an argument against connectivity.

The fact is the benefits of connectivity far outweigh the perceived drawbacks. Connectivity allows vehicular traffic to be better dispersed through residential neighborhoods rather than dumping all the traffic onto a single street. By dispersing traffic throughout the neighborhood, no single street carries the majority of the traffic so the streets become safer for vehicles, pedestrians and cyclists. In neighborhoods, often times these pedestrians and cyclists are children. Connectivity provides children with a safer environment to play outside and ride their bikes or walk to their friend’s house. In turn they are not reliant on parents to drive them

there. Connectivity also provides better access for rescue and emergency personnel in times of need. Connectivity provides more direct routes of travel in emergency situations and can lower response times. Connectivity can help alleviate traffic congestion by (1) dispersing traffic throughout the roadway network and (2) providing alternative routes of travel in case of accidents or other events that may impede the flow of traffic on a particular roadway. Carrying these benefits out further, connectivity can have an impact on the community's quality of life and health. People can more readily choose walking or biking as an alternative to driving, are not forced to sit in traffic because their only means to their destination is blocked off, and these connections will result in a more physically and socially connected community.

To promote this concept, the CTB has adopted new VDOT Secondary Street Acceptance Requirements that require interconnectivity. The Secondary Street Acceptance Requirements (SSAR) are the rules that govern the development of streets for acceptance by the VDOT for public maintenance. The regulations are a result of legislation introduced at the request of Governor Kaine and adopted by the General Assembly during the 2007 session. The most significant aspect of the regulation is that it introduces a change in public policy regarding the design and function a street must meet in order to be added to the state system. In essence, the regulation revises the public-private partnership between the state and the development community. The state agrees to maintain streets built by developers and accepted by counties to the benefit and marketability of their developments. In exchange, the developer must build streets that connect with the surrounding transportation network in a manner that enhances the capacity of the overall transportation network and accommodates pedestrians, while also minimizing the environmental impacts of stormwater runoff by reducing the street widths and allowing the use of low impact development techniques within VDOT's right-of-way. The Secondary Street Acceptance Requirements also have important requirements for connectivity and pedestrian accommodation. In certain circumstances, SSAR pedestrian requirements may be more stringent than County Ordinances. This has significant impacts on development approvals which the County will need to be mindful of during the development approval process.

Complete Streets

For decades roads have been designed solely for the accommodation of motor vehicles with little or no consideration for the needs of other types of users. To remedy this, some local governments are embracing the concept of a "complete street." This is a roadway designed to accommodate pedestrians, bicyclists, motorists and transit. There are a number of techniques used to design complete streets; however, many of them have the following characteristics:

- Lanes are reduced in width
- Sidewalks and multiuse paths
- Consolidated driveways
- Raised medians with pedestrian refuges

- Enhanced pedestrian crossings with zebra-style crosswalk markings and countdown timers
- On street parking
- Intersections with sharp turning radii (to reduce speed)
- Bike lanes, separated from travel lanes by physical barriers or striping

In addition to the increased attractiveness such facilities can have over a typical street cross section, this type of design encourages pedestrian and bicycle use, increases safety and can ease congestion. VDOT's 2005 Bicycle & Pedestrian policy on accommodating pedestrians and bicyclists and its new SSARs incorporate many elements of the complete streets concept, and the County can further coordinate with VDOT to implement the concept in new road designs and retrofits.

Access Management

Access management is the planning, design, and implementation of land use and transportation strategies in an effort to maintain a safe flow of traffic while accommodating the access needs of adjacent development. In particular, access management:

- reduces the number of crashes, injuries, and fatalities
- provides greater mobility that enhances the economic vitality of an area
- reduces the need for additional road capacity
- increases the traffic carrying capacity of existing roads

Access management works by regulating the amount and location of intersections, particularly those of development.

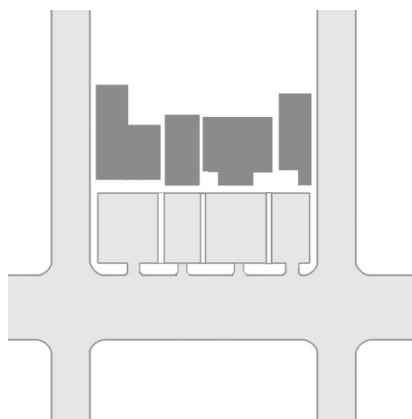


Figure 4: Unregulated access management

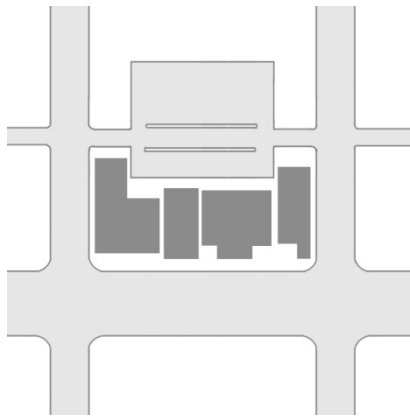


Figure 5: Regulated access management

Figure 4 represents a typical arterial street with four businesses each with its own parking lot. Note that ingress and egress into the center is done on the principal arterial. This design reduces the capacity of the roadway and increases the likelihood of vehicular collisions. However, Figure 5 represents what happens if access to the development is managed. In this case, access would no longer be from the principal arterial and parking is shared with multiple businesses. Also note that the storefronts are closer to the street. This increases store visibility, is more accommodating for pedestrians, and helps promote the feeling of place.

Parcel access from a state maintained road is guaranteed; however, through access management regulations, VDOT has the authority to regulate the number of entrances a new development may have and where they may be placed. VDOT can also require new development to attempt to gain access through a neighboring development's curb cut. Additionally, the County has the ability to regulate access by proffers and special use permit conditions.

Should new developments adhere to connectivity, complete streets, and access management principles, the County would move in a direction where commuting by bicycle or foot could become realistic alternatives since the facilities would become in place to accommodate this form of transportation.

8b. Functional Roadway Classification System

Another means for achieving a symbiotic balance between transportation and land use is through the development of a functional roadway classification system. Functional classification is the process by which streets and highways are grouped into classes, or systems, according to the character of service they intend to provide. Basic to this process is the recognition that individual roads and streets do not serve travel independently in any major way. Rather, most travel involves movement through a network of roads. It becomes necessary then to determine how this travel can be channeled within the network in a logical and efficient manner. Functional classification defines the nature of this channelization process by defining the part

² Figures courtesy of Renaissance Design Group

that any particular roadway or street should play in serving the flow of trips through a highway network.

Allied to the idea of traffic channelization is the dual role the highway network plays in providing (1) access to property and (2) travel mobility. The effort to balance both access and mobility is the central challenge in planning an effective transportation system. Limiting access off a roadway will increase traffic mobility, i.e. level of service, while providing additional access off a roadway will decrease traffic mobility. Functional roadway classification systems outline those corridors on which access is the primary function and those corridors on which mobility is the primary function.

In general the three major classifications are arterials, collectors, and local streets. Arterials provide service to major traffic movements and access to abutting land is very limited. Collectors, as their name implies, collect traffic from arterials and provide access to local streets and vice versa. The collectors provide a balance of both access and mobility. The roadway classification section of the appendix also details classification definitions and road design standards. Local streets provide access to properties and emphasis is placed on access rather than mobility. This function can also change over time; however, once a road's mobility is compromised in favor of access, it is very difficult and costly to regain mobility. Urban areas have a tendency to depend on new limited access roads such as interstates to provide mobility while allowing their arterials to become more access-oriented. Once the limited access facility reaches capacity, regaining mobility can prove difficult if not impossible. This scenario has plagued the lower Peninsula.

8c. Road (Lane) Capacity and Level of Service

Two terms which are often used to describe the performance of roads and intersections are capacity and Level of Service. Road capacity is the rate at which vehicles can reasonably be expected to traverse a section of roadway under ideal conditions. Ideal conditions include adequate roadway geometric design and the free flow of traffic. For arterial roadways, the ideal capacity is usually set at 1,900 vehicles per lane per hour. It is adjusted downward at intersections, where conflicts occur, and where roadway geometry reduces the speed at which vehicles can move safely. While capacity is a static metric independent of volumes, Level of Service (LOS) indicates the deterioration of the vehicle flow rates as increasing volumes approach the capacity of the roadway. With increasing volumes and decreasing maneuvering space, the ability of motorists to maintain free flow speeds is compromised, average vehicle speeds decline, and the flow rate along the arterial roadway decreases.

As an operational measurement, Level of Service is determined by the amount of delay at an intersection or by the density of vehicles on a road segment. A level of service can be determined at both a micro and macro level from individual turning movements to intersections and roadways. For example, a car attempting a left turn may have to wait 60 seconds to execute the movement, while the traffic in an adjacent thru lane passes by in free flow conditions. In this example, the LOS of the

left turn would be “E” or “F” while the LOS of the thru lane would be “A.” Depending on the volumes for each movement, the intersection as a whole may operate at a LOS “A,” masking the failure of the left turning movement. LOS can also be affected by traffic conditions at different times of day.

James City County uses both measurements during transportation planning and development review. For instance, per ordinance requirements, if a development proposal is projected to generate 100 or more peak hour vehicular trips as determined by the Institute of Transportation Engineers standards, the applicant must submit a traffic impact study (TIS) demonstrating the effect of development proposal on the road network. During consideration of a rezoning or special use permit application, the Board of Supervisors uses the results of the TIS as one factor in its decision-making process. Among other issues weighed in previous development proposals, the County is generally supportive of projects that do not degrade surrounding streets and intersections below a LOS “C.” In practical terms, this means that the signalized intersection providing access to the development can not cause more than 35 seconds of delay and development generated traffic does not destabilize the traffic flow on the surrounding streets.

The County does not have policy requiring a specific LOS be met; the expectations are often nuanced in terms of other factors at play such as the character of the road, the desire for high density development, or a focus on pedestrian and transit oriented development for example. Therefore, traffic impact has been used as one factor in the overall development review process. New Town is an example where the Board has accepted a LOS of less than “C” for lane groups to allow a more urban, pedestrian-friendly environment.

8d. Roads and Community Character

As described in previous sections, Community Character Corridors (CCCs) are roads that the County has determined significantly contribute to the rural, natural, and historic character of the County. For a list of CCCs and their guidelines refer to the Community Character section of the Comprehensive Plan.

To preserve the historic or aesthetic character, while acknowledging the growing capacity needs of roadways, the County works with VDOT to design road improvements that are the least detrimental to the experience of driving through a CCC. Standard highway design can remove overhanging tree canopies, expose above ground utilities, and replace natural areas with ditches, swales, and wide barren shoulders. Sometimes the County decides road enhancements are too detrimental to the character of the road and sacrifices level of service for community character. The County has deliberately decided to not pursue improvements to Jamestown Road, John Tyler Highway, Neck-O-Land Road, Greensprings Road, and Lake Powell Road for this reason. It will require careful growth management to ensure development does not overwhelm these roads or push them into improvement.

Traffic congestion also plays a significant role in a community's character. Minimal to no congestion coupled with attractive urban and rural road design creates a "small town" or "county" image or feeling. As the County has grown, rural two lane roads with small intersections have given way to large four to five lane arterials with wide intersections and clear zones. The retention of a small town or rural image along the roadway system is directly related to development decisions and associated traffic congestion.

James City County has operated under this traditional model of functional classification system focusing on the mobility and access functions of roads. Separately, the County has used the Community Character Corridor system to convey the individual characteristics and other functions of the roadways. These categorization systems have been blended in visions presented for the roads in the Comprehensive Plan. Recently, some localities have been developing alternative classification systems which recognize the full range of uses and characteristics of the road corridors. As James City County begins to designate various roadways for one type of Community Character Corridor or another, it may be beneficial to explore an alternative classification system to arrive more readily at context-sensitive road designs.



Figure 6: Suburban Style "Complete Street" Retrofit

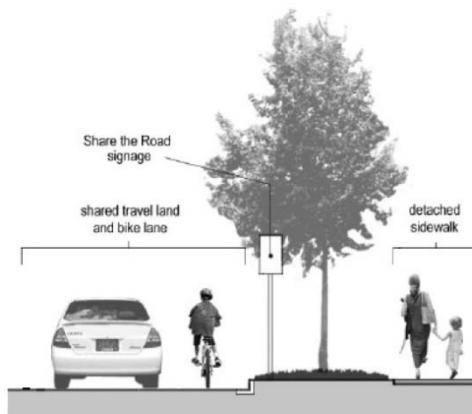


Figure 7: Subdivision Complete Street Design

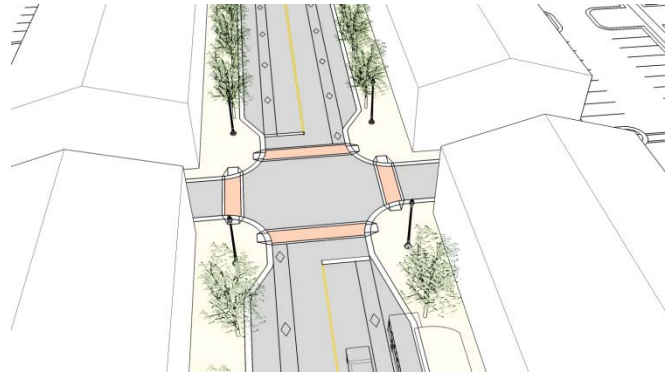


Figure 8: Urban Complete Street intersection design

9. Roadway Components of Transportation Planning

To monitor the ability of state maintained roads to continue meeting the needs of residents, businesses, and visitors, VDOT and the County regularly count traffic on most arterial and collector streets. As VDOT conducts counts every other year, the County conducts the counts on off years to avoid duplication. Traffic counts are generally used to evaluate growth trends and predict when and where capacity improvements should be focused. Attached is a copy of the County's latest traffic counts from 2007.

Beyond the immediate timeframe, HRPDC produces long-range transportation planning information for James City County. Using a computerized modeling tool, the HRPDC assigns projected future traffic to the regional transportation network and determines what transportation infrastructure will be needed to handle the future traffic. Currently HRPDC has published traffic predictions for James City County for 2030, which have been adopted by the HRTPO. The County uses the HRPDC results to plan for large scale improvements that may take many years to finance and construct. Attached is a copy of HRPDC's 2030 projections. Preparations are currently underway for the 2034 traffic projections.

In 2008, County staff contracted URS Corporation to develop a transportation demand model to examine the impact of various land use scenarios on the County's transportation system. The exercise looked at traffic conditions under the following County build-out scenarios: build-out based on current zoning designations, build-out based on the current comprehensive plan, and two different build-out based on selective changes to the existing comprehensive plan and development proposals. This model differed from HRPDC's model as it allowed the County to manipulate land uses to see its effect on the transportation network. It also estimates the costs associated with needed road improvements at build-out rather than 2030.

The total countywide forecasted build out population, retail employment, and total employment projections used to develop the forecasted volumes are shown in the

table below. For comparison purposes, estimates of year 2000 and 2007 population and employment levels are included, as are year 2030 forecasts from the HRPDC. The 2030 HRPDC forecasts were developed in cooperation with local jurisdictions.

Table 2: Build Out Analysis Forecast

Alternative	Population	Total employment	Retail employment
2000	48,102	25,517	4,757
2007	61,739	30,078	N/A
2030 HRPDC (not Build Out)	95,300	47,400	7,600
1. Build Out - Zoning	118,482	56,009	15,723
2. Build Out - Comp Plan	176,721	50,140	13,451
3. Build Out - Commerce Park Option	178,828	57,358	13,941
4. Build Out - Transit Oriented Option	187,228	62,450	14,977

The modeling exercise had the following results:

- ***Build Out by Zoning*** - This scenario showed a substantially lower population and employment than forecast by the other alternatives, and the cost of improvements to bring the entire transportation system to an acceptable level of service was estimated in current dollars at \$313.7 million.
- ***Build Out by the Current Comprehensive Plan*** - This scenario forecasts a much higher population and employment than the Build Out by Zoning alternative (offset somewhat by a lower employment forecast). The cost of improvements to bring the system to acceptable level of service was estimated to be \$399.5 million.
- ***Alternative #3 Build Out by Comprehensive Commerce Park Option*** - This scenario increases both population and employment (when compared with the current Comprehensive Plan alternative) forecasting a major commerce park in the northern part of the County. The cost of improvements was estimated at \$366.8 million.
- ***Alternative #4 Build Out by Comprehensive Plan Transit Oriented Option*** - This scenario uses a more compact land use pattern than the Commerce Park alternative for a major development in the northern part of the County. For this scenario, improvement costs are estimated at \$369.5 million.

A complete copy of the results is provided as an attached spreadsheet.

Predicting future traffic conditions is an inexact science. For the most part, no one way of producing traffic predictions is more accurate than another. The result is that

models using different methodologies produce different data. To make the most informed decisions, the County reviews multiple traffic models and identifies road segments that are consistently projected to require significant enhancements. Multiple studies stating that a road segment requires improvements significantly corroborate the argument that a road needs improvements, which may make it easier for the County to acquire funding. In conjunction with studies from URS, HRPDC, and past studies by Kimley-Horn, listed below are priority corridors that are continually recommended for enhancements, along with County commentary on future road visions.

10. Corridor Visions

Interstate 64

Current traffic volumes warrant the expansion of the interstate from Newport News to Richmond. As the interstate serves as the primary gateway to the Historic Triangle, the State needs to take great care to ensure the design of any expansion guarantees the highway will maintain its aesthetic character. The expansion should be built around the idea of corridor preservation and landscaping as the core design issue. It is recommended that in weighing various design proposals, VDOT explore the tradeoffs between widening the roadway within the median versus widening along the edge of the right-of-way in terms of preserving the natural topography and trees before any final plans are adopted.

Route 199

Route 199 will remain a very heavily traveled roadway. Currently, there are no scheduled road improvements; however, the addition of another travel lane in each direction from Jamestown Road to John Tyler Highway will likely be needed due to population growth. Given the projected traffic volumes, the County should avoid the addition of any curb cuts or intersections. Additionally, the County should pay particular attention to development along Jamestown Road as the west bound left turn storage is often near capacity and cannot be addressed cost effectively. As one of the gateways to the Historic Triangle, the road should continue to be well maintained and landscaped. Road widening projects should be engineered to minimize the reliance on the landscaped median. As bicycle and pedestrians are prohibited from the roadway, consideration needs to be given to parallel multi-use facilities. Within the past five years Route 199 has been widened to four lanes from Pocahontas Trail to Jamestown Road.

Jamestown Road

Projected traffic volumes would normally justify the widening of this road to a four-lane facility between Route 199/ City of Williamsburg and Ironbound Road. Noting that construction of such a facility would be disruptive to adjacent land uses and homeowners as well as to the visual character of the road, the Comprehensive Plan recommends that it be maintained as a two-lane facility with the addition of turn lanes and access controls. Residential or commercial development that adds significant traffic along this corridor is strongly discouraged. Recently, a shoulder

improvement project was constructed in 2007 which added benefit for cyclists between Lake Powell to Greensprings Road.

Route 60 East Relocation/Pocahontas Trail

A relocation and upgrading project, this realignment will divert traffic from Pocahontas Trail, which experiences traffic congestion from industrial and tourist traffic. This proposed route parallels existing Pocahontas Trail adjacent to the CSX Railroad and then extends across the GreenMount property and Skiffe's Creek and into Newport News, where it will connect the Route 60 East/Fort Eustis Boulevard interchange. This four-lane facility is necessary to promote future industrial development in the Skiffe's Creek industrial area and to meet local traffic needs. The traffic modeling suggests that Pocahontas Trail needs to be a four-lane facility in both the section extending from the York County line to BASF Road and the section extending from BASF Road to the Newport News line. The project has been split into two phases, with the intent to widen or relocate the section from BASF Road to the Newport News city line first, and then assess the need for widening or relocating the upper section. If possible, the County would like to avoid widening the upper section. The projected cost of the two phases of relocating Route 60 is \$68 million. Careful coordination of transportation and development is extremely important along this road as, in the near term, funding for any improvements is unlikely. Also, the County should investigate connections between Pocahontas Trail, Merrimac Trail, and Interstate 64. The projected cost for the Skiffe's Creek Connector is \$35 million. The addition of left-turn lanes along Pocahontas Trail from the fire station to Newport News would be a cost-effective temporary solution until the new alignment is in place. Due to the high traffic volumes, pedestrian accommodation should be provided by an adjacent multi-use trail rather than sidewalks abutting the road. The projected cost for the total project is \$103 million.

Richmond Road

Although future volumes indicate the potential need for widening Richmond Road between Centerville Road and the City of Williamsburg and Rochambeau Road to Croaker Road, it is recommended that Richmond Road remain four lanes. Widening in these sections, which includes Norge, should be avoided or limited due to the physical limitations and the negative impacts on existing uses and the character of this historic community.

Future commercial and residential development proposals along Richmond Road should concentrate in planned areas, and will require careful analysis to determine the impacts such development would have on the surrounding road network. Minimizing the number of new signals and entrances and ensuring efficient signal placement and coordination is crucial. The HRPDC developed guidelines for signal placement on Richmond Road as part of its *Hampton Roads Access Management Model*. These guidelines should be followed by new developments. New developments should be permitted only if it is determined that the project can be served by the existing road while maintaining an acceptable level of service or if the impacts can be adequately addressed through road and signalization improvements. If public funds are not included in approved state road plans for such improvements, private funding is expected prior to development approval. Through the villages for Toano

and Norge, sidewalks should be encouraged for new development to preserve a traditional small village feel, however; outside of Toano and Norge, multi-use paths are recommended to separate pedestrians from heavy traffic flow.

John Tyler Highway (Route 5)

Monticello Avenue has supplemented capacity in the Route 5 corridor. John Tyler Highway is projected to need improvements between Greensprings Road and Route 199; however, four-laning is strongly discouraged. Turn lanes and minor intersections and pavement improvements will still be needed for this roadway. Such improvements should be consistent with the Community Character Corridor and Scenic Byway designation. Additional residential or commercial development along this corridor beyond that currently planned is strongly discouraged. Multiuse paths are encouraged for new development along the highway.

Monticello Avenue

Currently access is strictly limited onto this roadway. Given very limited funding, strong efforts should be taken to avoid widening Monticello Avenue to four lanes in any additional locations through coordinated development and continued access management. For the segment from Route 199 to News Road, efforts should be made to maximize capacity through geometric improvements and signal coordination. The addition of new traffic signals is discouraged.

Longhill Road

Based on current and projected volumes for Longhill Road from Route 199 to Olde Towne Road, an additional travel lane northbound is recommended. Projected 2030 volumes indicate the need to widen Longhill Road from Olde Towne Road to Centerville Road. The County's preference is to not widen Longhill Road in this segment until more detailed study demonstrates the need and provides an acceptable context-sensitive transportation solution. A location study for widening Longhill Road was planned to be conducted by VDOT to determine what options can realistically be implemented to increase capacity and improve safety for all users; however, this study has been put on hold due to state budget cuts. It is encouraged that future development accommodate a multi-use path along the corridor for pedestrian and bicycle accommodation.

Centerville Road

Presently a two-lane road, future traffic conditions predict the need to widen the section from Longhill Road to Richmond Road to four lanes. The County should continue to exploit current capacity of the road by adding turn lanes and discouraging suburban style residential development on the western side of the road. To preserve the rural character of the road, multiuse trails are recommended rather than sidewalks.

Croaker Road

The section of Croaker Road extending from Richmond Road to Rose Lane is projected to warrant road widening based on future traffic projections; however, due to the topography and the CSX Railroad Bridge along this corridor, road widening

would be very expensive. It is recommended, therefore, that careful land use, traffic coordination, and the addition of turn lanes be utilized.

News Road

News Road from Centerville Road to Monticello Avenue is a winding road with poor sight distance and sharp curves. As development pressure continues along the corridor, coordination with VDOT and future developers are essential to increase sight distances. Recommended road improvements include shoulder strengthening and the addition of reflectors along the side of the road. Rezoning and special use permit applications should provide means of mitigation that take these recommendations and other needed improvements into account. Any shoulder strengthening project should include the addition of a shoulder bike lane.

Olde Towne Road

Current conditions and future traffic modeling warrant widening Olde Towne Road from two lanes to four from Richmond Road to Longhill Road. Should Olde Towne Road be widened, the project phases should include widening Longhill Road from Olde Towne Road to Route 199 to avoid bottlenecks at the Longhill Road/Olde Towne Road intersection. A multipurpose path along the corridor is recommended.

Mooretown Road extension consideration

It has been recommended to extend Mooretown Road from its current terminus in York County to Rochambeau Drive. Development within the vicinity of the proposed Mooretown Road extended should be discouraged until master plans are approved and infrastructure is planned to handle intensive development that does not solely rely on Richmond Road. Private funding is expected, although public and private efforts may be beneficial to fund infrastructure improvements.

Ironbound Road

Ironbound Road between Monticello Avenue and John Tyler Highway is projected to require additional travel lanes in each direction. Recently, the Five Forks intersection was improved and a shoulder bike lane is anticipated in the near future. Any future improvements should occur in a context sensitive manner considering the Community Character Area of Five Forks. A multipurpose trail along the side of the road is encouraged.

11. Summary

The preceding technical transportation information gives an indication of the breadth of transportation planning in James City County. Transportation planning must be carefully coordinated with land use planning at a state, regional, and local level. The HRTPO is tasked with the responsibility of providing a comprehensive transportation planning process for the Peninsula and Southside, which encompasses James City County. In providing a comprehensive transportation system, careful consideration must be paid to all modes of travel, including interstate primary and secondary road projects for motor vehicle travel, as well as pedestrian and bicycle access, transit, rail travel, water travel and air travel.

Appendix A Citizen Commentary

James City County's Citizen Survey 2007 Input

- ◆ Nearly 60% of respondents rated the roads and ease of car travel in James City County as good or excellent; however, concerns were raised about increasing congestion.
- ◆ Seventy-eight percent of respondents thought bike paths and walking trails are important. However, residents gave less than favorable remarks for ease of walking and biking, with only half of respondents giving positive ratings.
- ◆ Comparing these results against national benchmarks, bus service and ease of walking are rated below average.

Community Conversation Input

- ◆ Many people felt that congestion is a problem on the County's major roads and thoroughfares. Congestion was one of the most frequently mentioned words with comments both pro and con regarding the construction of additional roads to relieve it.
- ◆ Residents expressed desire to see cumulative impact studies for traffic for new development.
- ◆ Many people thought expansion of WATA service would be a positive move. Mass transit frequently was mentioned but the true applicability to County traffic problems was blurred.
- ◆ Traffic calming and speed limit adjustments were seen as measures to keep traffic under control.
- ◆ Participants encouraged the development of bike paths, pedestrian paths, and greenways to connect neighborhoods. Completion of greenways trails and a sidewalk master plan were seen as favorable methods to accomplish this.
- ◆ Residents have noticed that mixed use areas can reduce the need for auto use and considered this an important concept for future development.
- ◆ Community Conversation discussions included concerns over increased congestion and traffic on roads. Some respondents felt that certain roads need to be widened and that stoplights should be coordinated. Respondents listed concerns specifically along Route 199, Route 60, and Interstate 64. The majority of respondents see controlled development in high traffic areas as an immediate solution.
- ◆ In the second round of Community Conversations, respondents stated that they either agreed or strongly agreed with the following statements (percentages of positive responses stated at the beginning of the question):
 - 86% "Have housing, employment, and shopping areas in closer proximity to each other."
 - 84% "Control development along high traffic corridors so as to retain their ability to move traffic."

- 76% “Only allow developments where the current roads can handle the additional vehicular traffic.”
- ◆ During community meetings, respondents agreed that following statements were ways in which the county should achieve bike and pedestrian needs:
 - “Create a sidewalk master plan and only require development proposals along the roads designated on the master plan to construct sidewalks when a property (re)develops.”
 - “Create a bikeway master plan and only require development proposals along the roads designated on the master plan to construct bikeways when a property (re)develops.”
 - “Require development along high traffic roads to have a multiuse trail along the road instead of a sidewalk to separate the pedestrians from the traffic and provide sidewalks along lower volume roads.”
- ◆ Participants felt that bus routes should be more affordable, more direct, and include stops closer to commercial and residential locations. Participants also suggested alternate means of transit be explored such as light rail, train, and carpool.
- ◆ Participants cited the need for more user-friendly bike paths and walkways. This included continued greenway path planning, more crosswalks with buttons and safer crosswalk connections to every area of the County such as neighborhoods, parks, and shopping centers.