Portsmouth Master Transportation Plan

PART II: Recommendations

January 26, 2010

Mount Vernon Street Conceptual Redesign

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CHAPTER 1

INTRODUCTION

Part I of the Master Transportation Plan outlines the existing conditions and trends of the transportation system in Portsmouth and places them in a regional, national, and international context.

Part II of the Master Transportation Plan describes the recommended policies, programs, and elements of the transportation system, and outlines a methodology for prioritizing actions and investments and implementing the plan.

A. Purpose of the Master Transportation Plan

The purpose of the Master Transportation Plan (MTP) is to coordinate City transportation policy, describe investment priorities, map potential future projects, and ensure that the transportation system supports City goals for land use, economic development, and quality of life.

The MTP will provide the framework for making decisions about transportation policies and investments in the coming years. It responds to goals that citizens have identified for the future of their city and supports parallel efforts to improve neighborhoods and commercial areas to make Portsmouth an even more attractive place to live.

The MTP is the first plan in the city's history to address all transportation modes – motor vehicles, freight carriers, railroads, transit, bicycles, and pedestrians. This plan addresses these modes as a networked, intermodal system.

The MTP identifies policies, projects, and design guidelines needed to implement the vision for Portsmouth's future transportation system. However, it is not an engineering document or construction plan. The document provides a bridge between planning and engineering. Specific actions and recommendations in the plan will require further prioritization and review to move forward with funding, final design, and implementation.

B. Plan Objectives

The transportation system must support other city goals, such as fostering great neighborhoods, encouraging economic development, and improving the environment.

The Portsmouth Transportation Master Plan (MTP) is intended to:

- Create a plan for the Portsmouth transportation system that is embraced by the community and meets future transportation needs.
- Focus on moving people, goods, and information, not just automobile traffic.
- Accommodate urban development and growth without increasing vehicle miles traveled and congestion.
- Facilitate regional transportation and freight traffic without negatively impacting city residents and businesses.
- Create an integrated multimodal transportation network that offers convenience and choice to users.
- Support the development of walkable, mixed-use urban centers and vibrant residential neighborhoods.
- Improve the urban design of the City by creating complete streets that effectively serve all travel modes.
- Create a sound methodology for evaluating projects and prioritizing city resources to carry out the plan.
- Create a plan that complies with all applicable government regulations and standards and is coordinated with regional planning.
- Design a transportation system that will help improve air quality, reduce pollution (including greenhouse gases), and increase public health.

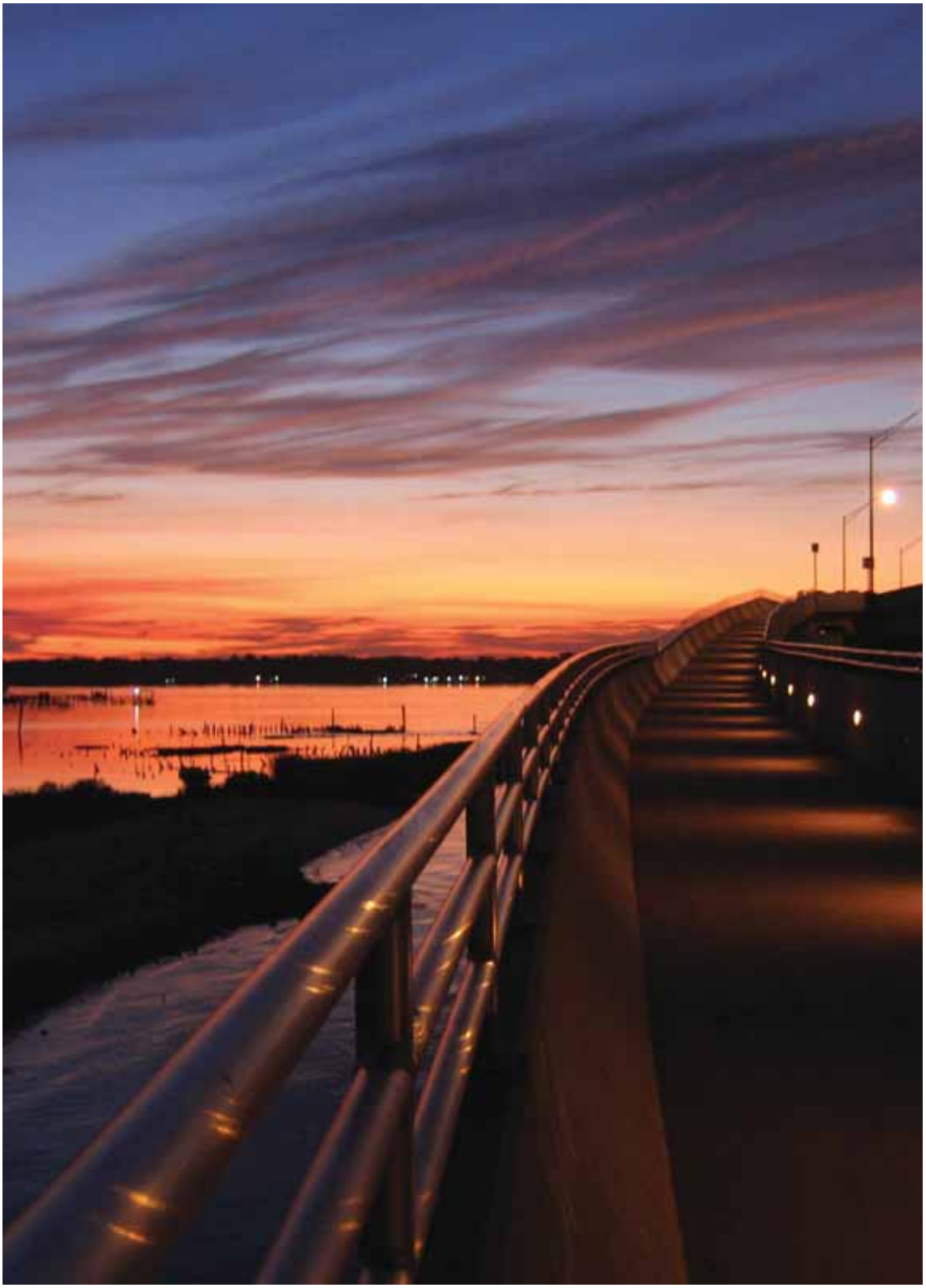
Relationship to the Comprehensive Plan

The Master Transportation Plan is an evolution from the city's comprehensive plan, Destination 2025. That plan sets out the following policies for transportation:

- Enhance the existing roadway network to optimize operational efficiency.
- Support implementation of regional facilities needed to address regional transportation impacts on the City of Portsmouth.
- Promote pedestrian and bicycle facilities and usage throughout the City.
- Enhance transit service (bus, ferry, and future light rail) and usage throughout the City by increasing ridership opportunities to activity centers and special event attractions.
- Provide for parking adequate to meet needs within the context of Portsmouth's roadway network and urban/historic character.
- Coordinate land use strategies with the existing and future multimodal transportation system.
- Enhance communication with the public regarding the transportation system.

An additional goal was added for the MTP in order to reinforce the connection to land use and economic development:

- Incorporate the highest standards of urban design and community appearance into the transportation system.



Portsmouth, VA. Pinners Point/Western Freeway Bridge bicycle and pedestrian ramp.

C. Planning Process

The city's Comprehensive Plan identified the need for a more in-depth plan to guide city transportation policy. Based on the Comprehensive Plan recommendations, the city opted to create a Master Transportation Plan that would coordinate all transportation modes and ensure that the transportation system supports other goals, such as developing regional activity centers, enhancing the vitality of the downtown, and fostering a high quality of life for citizens.

Consultant Team

To help prepare the plan, the city retained a consultant team led by Wallace Roberts & Todd (WRT), LLC, a nationally known planning and design firm and the lead consultant for the comprehensive plan. WRT was joined by Kimley Horn Associates, a national transportation engineering firm with offices in the Hampton Roads region, and ETC Inc., a firm that specializes in public surveys and opinion research for transportation projects.

Phase I of the planning process addressed the transportation system as it exists today and the major trends that may shape future conditions, providing the foundation for the recommendations provided in Phase II. Part I, Existing Conditions summarizes the results of the following steps:

Stakeholder interviews were conducted to solicit concerns and ideas for the plan, and collect available data. The team interviewed representatives from the ports, railroads, trucking companies, school district, bicycle commuters, city agencies, Navy facilities, the Virginia Department of Transportation (VDOT), Hampton Roads Transportation Planning Organization (HRTPO), Hampton Roads Transit (HRT), and other stakeholders.

Data was analyzed to assess the condition of the transportation system. Data analyzed included traffic volumes, travel patterns, public transit routes and service characteristics, bicycle conditions, land uses, freight facilities, crashes, and demographics.

Public meetings were held in several locations in Portsmouth to provide residents with the results of the preliminary analysis of existing conditions and to solicit comments, concerns, and suggestions. An evening public workshop was conducted to identify the top concerns for each transportation mode in an interactive roundtable process.

A synthesis of existing conditions, trends, and issues brought together the results of the preceding steps. It led to crafting recommendations to improve and enhance the transportation system in Phase II.

Structure of Part II

Part II of the Master Transportation Plan is divided into the following sections:

Vision and Goals outlines the outcomes the City would like to see with regards to its future transportation system.

Scenarios describe how the transportation system might function in the year 2030 under different planning assumptions.

The Transportation Framework provides the overall structure for city transportation policy.

The Transportation System presents strategies and actions for each transportation mode: pedestrians; bicycles; public transportation and passenger rail; motor vehicles; freight, ports, and waterways; and aviation.

Implementation outlines a method used to prioritize projects, the resulting action plan, proposed (short-term) catalytic projects, and funding opportunities.

Design Guidelines provides recommendations for design of transportation infrastructure, especially complete streets.

CHAPTER 2

THE VISION FOR THE PORTSMOUTH TRANSPORTATION SYSTEM

The MTP is guided by a vision for Portsmouth's future transportation system that shapes the policies and recommendations. The vision is directly tied to the Destination 2025, the City's Comprehensive Plan. The overall mission statement is:

In the year 2030, Portsmouth will have a multimodal transportation network with enhanced features that support the City's quality of life and economic vitality.

Section 2.A below describes the vision in more detail at the local, regional, and national/international scales.

A. Vision

The Vision for Local Transportation

The Portsmouth transportation system allows for safe and convenient travel throughout the city on any mode of transportation. The street network is comprised of "complete streets" that are safe for vehicles, pedestrians, bicyclists, and other developing forms of transportation, and which also create an attractive setting for daily life. It is safe for children to bicycle and play in their neighborhoods and walk to school. It is easy to reach activity centers and employment centers by all modes of transportation, including mass transit. The transportation system is designed to support Destination 2025 Comprehensive Plan goals to create high quality walkable activity centers and attractive neighborhoods that are the region's most desirable places to live.

The Vision for Portsmouth's Role in Transportation

Portsmouth and the Hampton Roads Transportation Planning Organization will, in conjunction, have developed a transportation network that moves all forms of regional transportation through Portsmouth with a minimum impact on Portsmouth and its citizens. Portsmouth is the heart of Hampton Roads and the nexus of regional roadways and mass transit. Regional traffic flows through the City without creating spillover congestion onto city streets. Improvements to regional highways have created an interlinked network of water crossings that help to balance travel flows and reduce congestion at the Elizabeth River tunnels. Regional transportation infrastructure has been upgraded through equitable funding solutions to enhance overall prosperity and quality of life in the region. It is easy to travel from Portsmouth to destinations throughout Hampton Roads by automobile, mass transit, and other travel modes.

The Vision for Portsmouth's Role in National and International Transportation

Portsmouth, in cooperation with the Virginia Port Authority and other port interests in Southeastern Virginia, has become the leading East Coast port. Portsmouth is an international gateway for maritime transportation. The ports move 50% of landside freight by rail and have developed an efficient freight transportation system with a high level of service while maintaining local quality of life and protecting the environment. Local economic opportunities have been created through new development that takes advantage of the proximity to global trade networks.

Portsmouth is a national model for a "green" transportation system that produces few emissions and meets greenhouse gas reduction targets. Water pollution has been reduced through green design measures, and as a result the rivers and Chesapeake Bay are much cleaner. Portsmouth is well connected to Hampton Roads airports, offering accessibility to the rest of the nation and the world. High speed rail serves the south side of the Hampton Roads region with a Portsmouth station supporting a thriving downtown. It is possible to quickly travel to destinations throughout the eastern half of the United States via the rail system. Upgrades to rail lines and interstate highway connections allow freight to freely move from Portsmouth to markets throughout the country. Portsmouth is known in maritime circles as "mile 0" of the intracoastal waterway, and is a hub for recreational and commercial boats that take advantage of the modern harbor facilities.

B. Goals

Goals set the direction needed to create policies and formulate actions. The following goals reflect public direction during the planning process and best practices in the field of transportation:

- To move individuals from origin to destination in the most effective and convenient means possible, Portsmouth will:
    - Develop a transportation system that, while serving the privately owned vehicle at a quality level, includes heavy rail, light rail, transit, bicycle, and pedestrian systems that provide a broad spectrum of transportation opportunities at a high level of performance.
    - Encourage development within the City that requires a minimum of transportation network time and resources to meet the needs of citizens.
    - Maintain a high level program that guides development and redevelopment so as to achieve a quality transportation network while providing the flexibility needed to meet the challenges of changing technology.
- To move freight while preserving quality of life, the transportation system will:
    - Mitigate freight traffic impacts on residents.
    - Enhance competitiveness and the flow of freight.
    - Encourage economic development.
- To improve the environment, the transportation system will:
    - Reduce greenhouse gas emissions.
    - Improve air and water quality through reduced vehicular and stormwater pollutants.

- To improve mobility, the transportation system will:
    - Increase travel choices.
    - Reduce congestion (versus the baseline forecast).
    - Improve non-motorized transportation.
    - Enhance public transportation.
- To support the land use and economic strategy in the Destination 2025 Comprehensive Plan, the transportation system will:
    - Support vital neighborhoods.
    - Create mixed-use activity centers.
    - Attract and retain businesses and employers.
- To enhance safety, the transportation system will:
    - Reduce the number of crashes in the City of Portsmouth through a combination of measures, including infrastructure improvements, education, and enforcement.
    - Provide safe access to city destinations by all transportation modes.

CHAPTER 3

TRAVEL FORECASTS AND SCENARIOS

What will the transportation system be like in 2030?

The Master Transportation Plan (MTP) looks forward 20 years into the future. The MTP uses scenarios to describe how transportation conditions could play out, and forecasts to estimate how change might affect transportation conditions. Scenarios are descriptions of how the future might develop based on consistent and plausible descriptions of forces and relationships over time.

The MTP considers two future scenarios:

1. The Baseline, "Trend" scenario.
2. The Preferred Scenario.

A. The Baseline Trend Scenario

The Hampton Roads Transportation Planning Organization (HRTPO) is responsible for long-range forecasting of transportation conditions. The MTP consulting team used the HRTPO transportation model to forecast traffic conditions in 2030 based on the projected land uses and transportation capacity provided by HRTPO.

The forecast shows relatively little growth of households or employment in Portsmouth while substantial growth occurs at the edges of the region in Suffolk, Chesapeake, etc. The effect of this suburban expansion on the transportation system is negative. Increased traffic from the edge areas overwhelms regional highways. For example, during the peak hour of travel, the Western Freeway will shift from today's Level of Service "B" (which is a free-flow condition) to Level of Service "F" (which is an over-capacity stop-and-go condition). In particular, the region's bridges and tunnels will be even more overloaded than today, leading to massive congestion and backups at on-ramps onto Portsmouth's local streets. It will take longer to travel around the region, creating a drag on the economy and degrading quality of life. The increased congestion will also weaken the port and the tourism industry which are pillars of the economy.

Under this scenario, most growth would essentially bypass Portsmouth, meaning the Destination 2025 Comprehensive Plan goal of creating mixed-use activity centers would not be realized. It would be relatively easy to move around Portsmouth on the City's arterial street system, but this capacity would be wasted because of the number of people who have to drive somewhere else on a daily basis. At the same time, the large flows onto the highway network (for example, at the Downtown Tunnel) would create long backups onto Portsmouth streets, creating the maximum impact on City residents and travelers with no community benefit.

The "trend" scenario is an unacceptable outcome. It will take sustained and strategic action to "bend the trend" to ensure that this scenario does not come to pass.

B. The Preferred Scenario

The Portsmouth MTP offers a revised scenario based on these changes:

- Portsmouth will direct new growth into activity centers, thus increasing population and employment in areas that will be walkable, bikable, and served by transit.
- The Portsmouth transportation system will become multimodal, meaning that travel shifts from predominantly single-occupant motor vehicles to a blend of walking, bicycling, transit, and driving.
- Investments in the regional transportation infrastructure will optimize the capacity and function of the regional highway network and create alternatives to driving.

The scenario is based on the following assumptions about investments, actions, and outcomes:

First, Portsmouth will facilitate development of walkable activity centers, as set out in the Destination 2025 Comprehensive Plan. This will include updates to zoning, development incentives, and investments in infrastructure to support new development. These centers will be mixed-use and walkable, meaning that residents can easily travel between home, work, and recreation on foot, bicycles, or transit thus decreasing the demand for automobile transportation. Also, a greater base of employment and retail in the City will decrease the need to drive to other parts of the region, thus reducing the load on the regional highway network. Not only will this action improve travel conditions as compared to the Trend Scenario, it will also improve the local economy.

Second, working with VDOT and other Hampton Roads partners, Portsmouth will build a network of "Complete Streets" that connect activity centers and City neighborhoods. A complete street is one that is safe and efficient for all transportation modes, including pedestrians, bicycles, and vehicles. The availability of complete streets will lead to greater numbers of people choosing to walk or bicycle as opposed to driving personal vehicles. Not only will this action reduce traffic congestion as compared to the trend scenario, it will benefit public health and quality of life in the city by encouraging fitness and social interaction.

Third, Portsmouth will dramatically improve the public transportation system. This will include greatly improved local bus service that operates on high-frequency corridors that connect activity centers. It will also include light rail transportation that connects to the rest of the region and fosters Transit Oriented Development (TOD) in Portsmouth. Express buses will connect transit centers and park-and-ride lots to regional employment centers via the regional highway network. Portsmouth will be served by commuter rail and intercity passenger rail, with a station in downtown Portsmouth that is also convenient to the nearby Navy facilities, thus integrating local transportation with the national passenger rail network.

Fourth, Portsmouth will work with regional partners to reduce travel demand. This includes programs to spread the peak hour (such as staggered start times) and financial incentives to avoid driving at peak hour or to use alternative transportation modes.

Fifth, Portsmouth and the region will work together to improve the regional highway network to operate more efficiently. This will include completing missing components of the network, such as the Martin Luther King Freeway connection and the Jordan Bridge Parkway, that will serve to balance traffic flows crossing the Elizabeth River. It will also include modifications to the highway network to support growth within Portsmouth, such as completing the I-264/Victory Boulevard interchange to allow full access to the City. These and other infrastructure upgrades will help to ensure that regional traffic does not back up onto the local street grid and that it remains possible to travel from one part of the region to another throughout the day.

Under this scenario, the combined effect of these actions blunts the impact of regional growth on mobility by offering a wide range of travel choices, reducing trip lengths, and optimizing the highway network to function as efficiently as possible. The quality of life in Portsmouth would be improved by offering more housing options, jobs, recreation, and commercial activity. The impact of congestion on the ports is reduced, because of upgrades to the regional highway network and reduced congestion. Likewise, regional tourism would increase due to the improved mobility, attractive activity centers, and national access by passenger rail.

CHAPTER 4

TRANSPORTATION FRAMEWORK

In past decades national, regional, and local transportation decisions focused on accommodating motor vehicles and efficient traffic flow, measured as Level of Service (LOS). These LOS rankings were used to determine the need to build new and wider roadways. Essentially, in the past, the thinking was that the only way to solve congestion was to build our way out of it. While it still has important roadway improvement and maintenance needs, Portsmouth, like many cities, has run up against the financial, environmental, and social costs of transportation planning focused primarily on moving automobiles. Transportation planning in the 21st Century will consider environmental and neighborhood impacts, affordability, accessibility, quality of life, and economic development in addition to traditional LOS measures. Portsmouth – working with its partners – will have to think more broadly and act more strategically if it is to achieve its transportation vision for 2030.

The Master Transportation Plan provides a framework to guide transportation decisions that support strategic investments and maximize benefits to the City and its residents. It aims to:

- **Coordinate transportation planning across scales.** Portsmouth is affected by forces at work at the local, regional, national, and international levels; transportation planning will have to consider and address all of these scales. Given the City's strategic location at the center of the larger Hampton Roads region, regional transportation investment decisions need to address impacts on Portsmouth and its goal to be a community of choice for residents and businesses.
- **Increase transportation choices and create streets for all users.** The City will need to look beyond vehicular traffic flow and recognize the benefits of providing transportation options that best serve the mobility of its residents.
- **Integrate land use and transportation planning.** Transportation and land use decisions must be made in concert in order to maximize return on investment and support the City's long-term vision for economic development and livability.
- **Establish a framework of multimodal corridors.** In order to achieve these goals quickly, the City should focus multimodal investments within important corridors that link city neighborhoods and destinations with each other and the regional transportation network.

A. Coordinate Transportation Planning Across Scales

With its deep water port, interstate highways, rail corridors, and airports, the Hampton Roads region is a place where local, regional, national, and international transportation systems intersect. These systems are critical to the economic health of the region. At the center of this activity, Portsmouth is home to two of the region's largest employers as well as major existing and future port facilities. Therefore, regional and local mobility are inextricably linked.

With travel patterns that carry residents throughout the region on a daily basis and freight movements dependent upon international flows, local transportation planning must involve regional coordination. Portsmouth must work with its regional partners to ensure that transportation investments address regional and local mobility needs and quality of life concerns in a mutually supporting manner. Given the realities of a challenging economic situation with constrained state and regional transportation budgets, Portsmouth needs a strategy for ensuring that limited transportation dollars are spent in a manner that supports its vision. It is critical that transportation decisions be considered not in isolation, but in concert with Portsmouth's goals for its local, finer-scale transportation infrastructure.

B. Increase Transportation Choices and Create Streets for All Users

Portsmouth is a typical American city in terms of its transportation system. With a few exceptions related largely to regional traffic, this system functions well for motor vehicles but has significant gaps and obstacles for most other roadway users. In the future, transportation decisions will need to be made on the basis of improved mobility and accessibility for all users, including the young, the elderly, those who can't afford to own and maintain an automobile, or those who simply choose not to.

A multimodal approach will mean consideration of solutions such as new transit systems and improving streets to support travel by foot and bicycle as well as by car and truck. Going forward, the City must shift its focus to the creation of a network of "complete streets" that accommodate all users – drivers, pedestrians, bicyclists, transit, and the disabled – in safety and comfort. Complete streets will provide a variety of motorized and non-motorized mobility options for all segments of society, including the young and the elderly. When well designed, complete streets will do more than merely accommodate all users – they will encourage people to try alternative modes of transportation.

Complete streets can also be great public places that encourage people to linger on foot, meet with neighbors, and engage in public life. They can yield a positive return on investment by creating a sense of place that attracts development and encourages local economic activity.

Complete Street, *Bellingham, WA*. A traditional four-lane highway without pedestrian or bicycle accommodations was reconstructed to include sidewalks, crosswalks, bike lanes, and transit shelters.

New Complete Street, *Portland, OR*. Bond Avenue in Portland's South Waterfront neighborhood is a newly constructed complete street with accommodations for all users and the environment. Features include two travel lanes, a streetcar route, bike lanes including left turn lanes, sidewalks and bumpouts for pedestrians, and stormwater infiltration swales.

Complete Streets

Complete streets are designed and operated to enable safe access for all users. Pedestrians, bicyclists, motorists and transit riders of all ages and abilities must be able to safely move along and across a complete street.

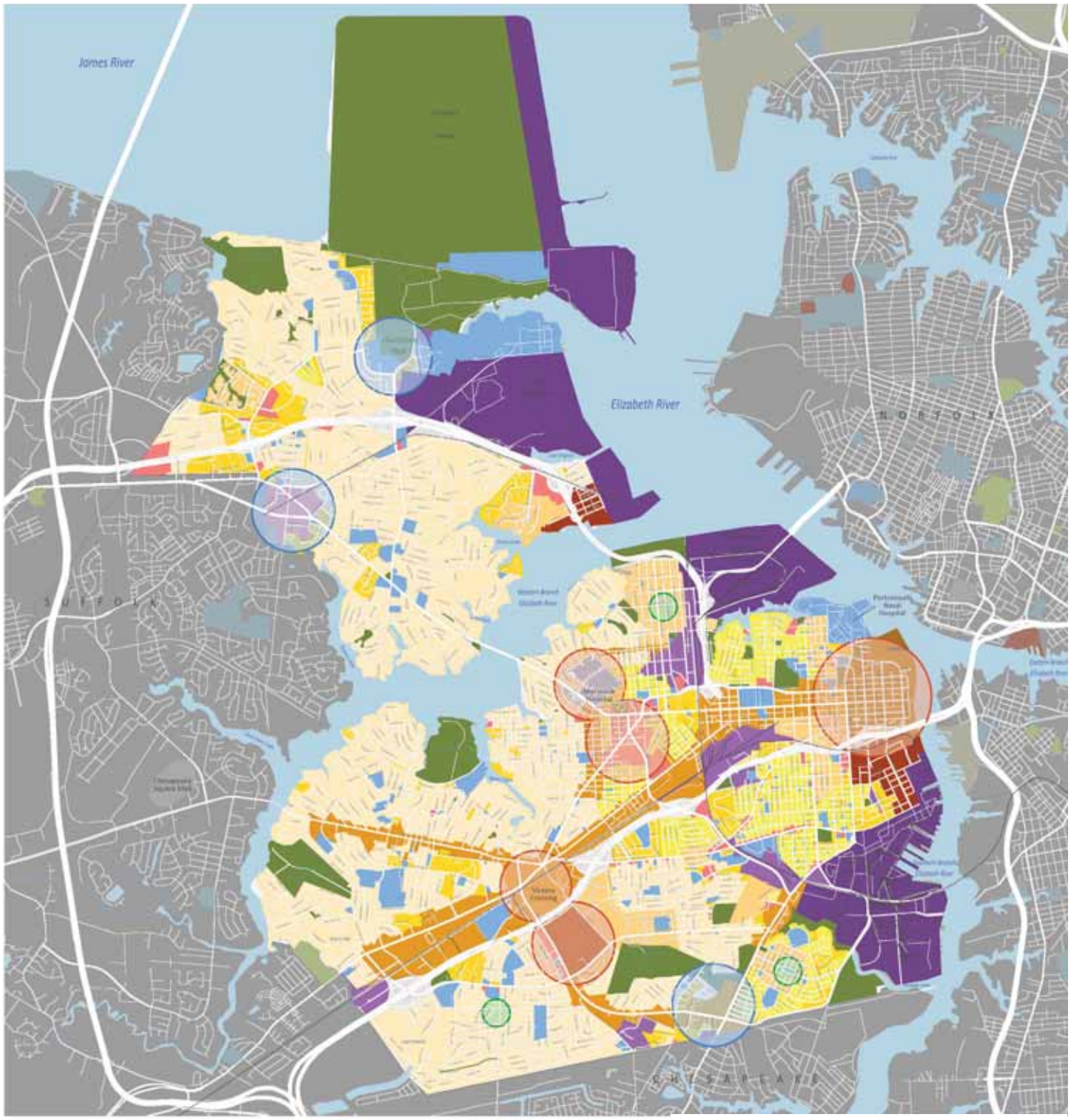
C. Integrate Land Use and Transportation Planning

The vision for Portsmouth's future as stated in the Destination 2025 Comprehensive Plan calls for outstanding learning environments, quality neighborhoods, a healthy economy, and a distinctive sense of place. Creating a quality, multimodal transportation system will be vital to achieving all elements of this vision.

There is a growing body of literature on the connection between land use and transportation in urban development. The key conclusion from this research is that land use and transportation are integrally linked, a central concept of both the Destination 2025 Comprehensive Plan and the Master Transportation Plan. While the relationship can be complex and dependent on many factors, the following should be considered in land use and transportation planning in Portsmouth:

- **Compact, mixed-use development reduces vehicle miles traveled and promotes walking and other alternative modes of transportation.** Bringing residents closer to key daily destinations such as employers, schools, stores, post offices and other service centers increases opportunities to leave the car at home and make more trips by bike and on foot. This can significantly reduce vehicle miles traveled (VMT), reducing congestion, energy use and greenhouse gas emissions.
- **The availability and quality of public transit and other transportation options can influence location decisions of employers and residents and commercial and residential developers.** Having a variety of safe and efficient ways to travel to other destinations can attract residents, employers, and visitors. It can also encourage people to choose alternatives to driving alone as comfort increases and travel time declines. By improving the efficiency, comfort, and safety of other modes, Portsmouth can support the livable, walkable communities envisioned in the Destination 2025 Comprehensive Plan.
- **Adequate access to highways and rail is key to accommodating new commercial and industrial development.** In considering what transportation projects to pursue, Portsmouth and its partners need to consider the type, location, and cost/benefit ratio of the development that would be supported by the projects. Evaluation of how new developments will connect to the existing transportation network, as well as their benefits and impacts, needs to be part of the planning and decision-making process.

In short, access creates value and balanced land use creates transportation options. By building on the Destination 2025 Comprehensive Plan, Portsmouth can make transportation investment decisions that support its land use goals.



Future Proposed Land Use

- Commercial
- Heavy Industrial
- Light Industrial
- Mixed Residential
- Mixed Use
- Mixed Use Corridor
- Mixed Use Downtown
- Mixed Use Employment
- Institutional/Public
- Preservation / Open Space / Park
- Multi Family Residential
- Single Family Residential - High Density
- Single Family Residential - Low/Medium Density
- Transportation
- Vacant

Activity Centers

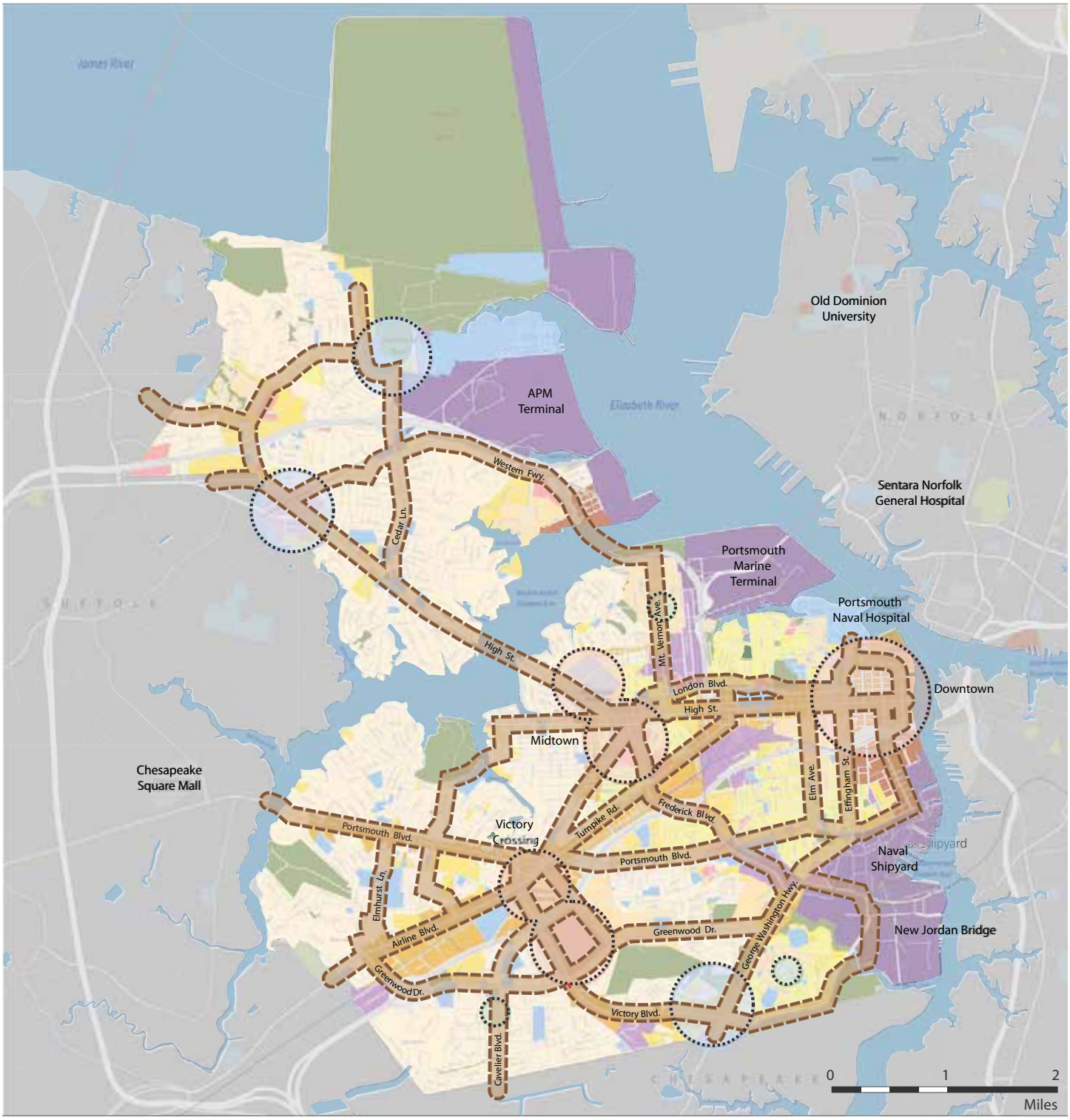
- Regional
- Community
- Neighborhood

0 1 2
Miles

Source: Portsmouth Comprehensive Plan (2005)

Figure 1: Land Use

Destination 2025 Comprehensive Plan



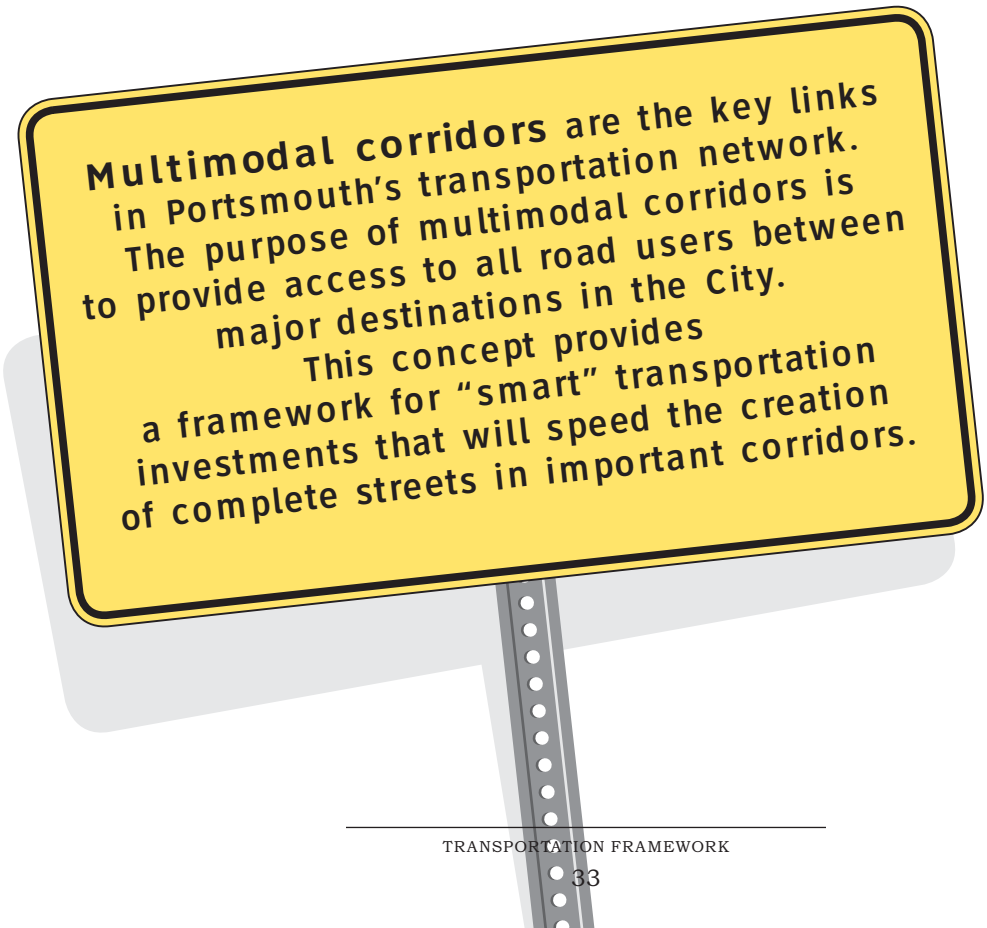
Multi-Modal Corridors

Activity Center

Figure 2: Multimodal Corridors

D. Establish a Framework of Multimodal Corridors

In order to achieve the long-term vision of a citywide network of complete streets that support land use goals, the City must work to ensure that all modes are accommodated safely on all roads as appropriate. However, resource and funding limitations make it impossible to implement the improvements needed to accommodate all users on all Portsmouth streets within the 20-year timeframe of the MTP. Therefore, the MTP proposes the concept of **multimodal corridors** to prioritize the implementation of a complete streets network.



The concept of multimodal corridors derives from the following policies from the Transportation Element of the Destination 2025 Comprehensive Plan:

- Enhance the existing roadway network to optimize operational efficiency.
- Promote pedestrian and bicycle facilities and usage throughout the City.
- Enhance transit service and usage throughout the City by increasing ridership opportunities to activity centers and special event attractions.
- Coordinate land use strategies with the existing and future multimodal transportation system.

Illustrated in Figure 2, the multimodal corridors create a framework for prioritizing capital investments and implementing complete street improvements in Portsmouth's most important corridors. By prioritizing investments within these corridors, the City can begin developing a network of complete streets that provide access for motor vehicles, pedestrians, bicyclists, and transit throughout Portsmouth.

While the MTP identifies projects outside of the multimodal corridors, location within a multimodal corridor will be a primary determinant in prioritizing a project for implementation. Additionally, completed multimodal corridors will provide precedents for development of additional complete streets throughout Portsmouth.

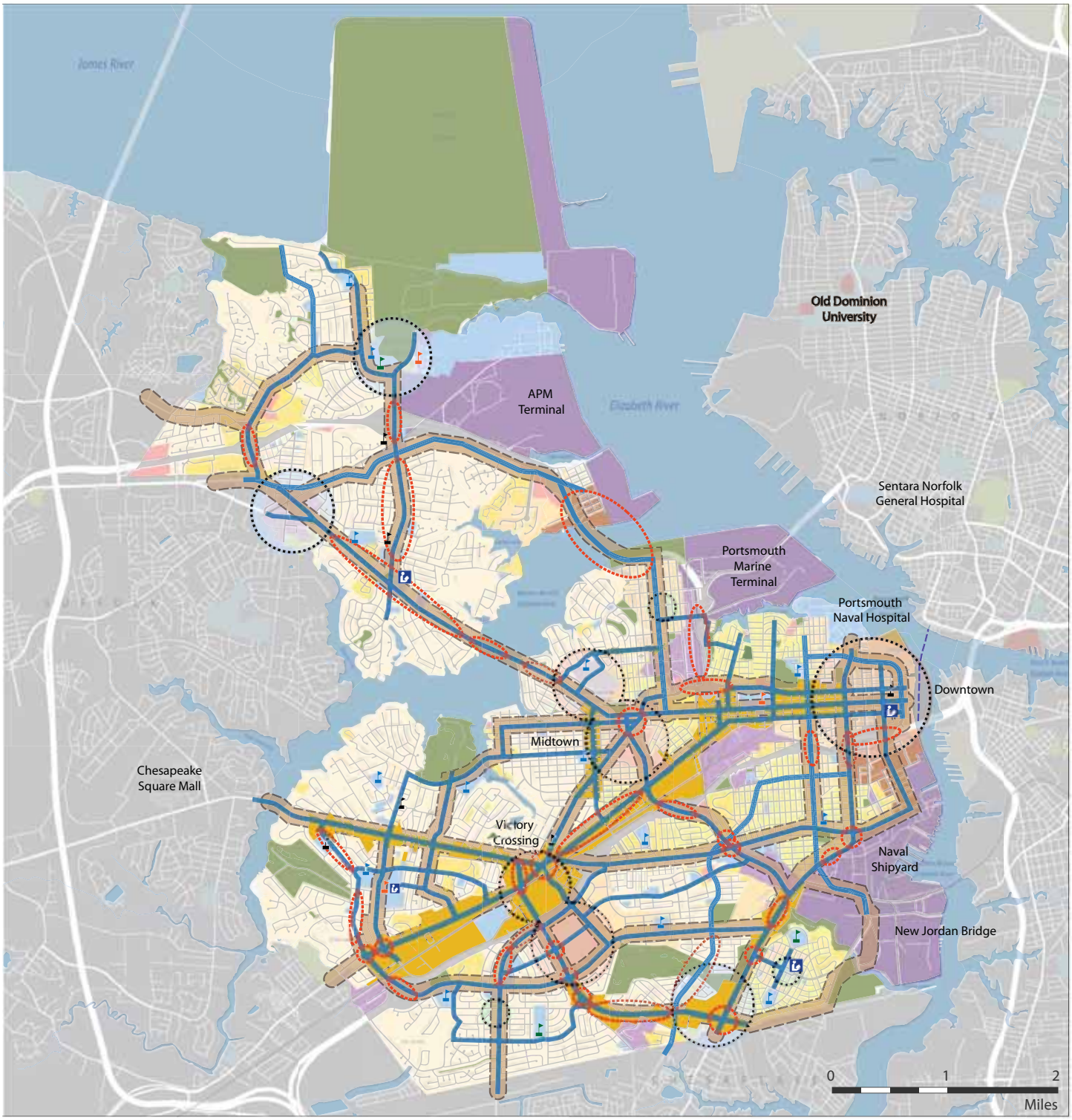
The multimodal corridors were chosen because they provide the most direct links between important destinations within the City as identified in the Destination 2025 Comprehensive Plan. They will form complete street connections from neighborhoods to activity centers, parks, schools, and employment areas. They will be designed with the transportation capacity to support mixed-use development and the activity centers proposed in the Comprehensive Plan. Many multimodal corridors bridge critical gaps, particularly in the pedestrian and bicycle networks. Closing these gaps will have the added benefit of improving access to public transit services.

Multimodal corridors will enhance the safety and comfort of pedestrian and bicycle travel, provide transit options, and improve the operational efficiency of the existing roadway system. The types of improvements recommended for the priority multimodal corridors vary depending on conditions. In general, vehicular improvements in multimodal corridors will improve roadway safety and reduce traffic congestion. Bicycle and pedestrian improvements will create a basic level of accommodation and improve safety. Transit improvements will increase the service speed and accessibility of buses, and preserve right-of-way for future transit operations (express bus and light rail).

The City will strive to provide safe and comfortable accommodations for all users within the multimodal corridors identified in the MTP. However, there may be situations where right-of-way limitations, roadway context, or other factors make it difficult or impossible to provide such accommodations within the identified roadway right-of-way specifically identified as a multimodal corridor. In such cases, the City will look to opportunities in parallel and adjacent corridors. For example, a continuous, low-traffic route next to a busy multimodal corridor roadway with high traffic speeds could be used to accommodate bicyclists and pedestrians.

CHAPTER 5

TRANSPORTATION SYSTEMS



Pedestrian Network

- Priority Pedestrian Network Corridor
- Gaps or Barriers in Priority Pedestrian Network

Priority Pedestrian Improvement Districts

- Activity Center
- Mixed-Use Multi-Modal Corridor
- Multi-Modal Corridors

Destinations

- Elementary School
- Middle School
- High School
- Private School
- Library

Figure 3: Pedestrian Element

A. Pedestrian System

Vision

The pedestrian system will enable residents and visitors to travel easily, safely, and enjoyably by foot throughout Portsmouth.

- The mobility needs of all pedestrians will be met—including the elderly, youth, and disabled residents.
- Portsmouth will be a city of walkable neighborhoods.
- Residents and visitors alike will be able to access and navigate activity centers by foot.
- Increased pedestrian activity will contribute to improved public health, increased vitality in mixed-use areas, and enhanced quality of life by allowing all residents to travel freely and independently.

Background

Walking is the most basic form of transportation. Whether for recreational or utilitarian purposes, it is healthy for the pedestrian and the environment and is the least expensive mode of travel available. As development patterns in the United States have grown increasingly dispersed over the last century, fewer of our daily trips are achieved by walking. Fewer people live within comfortable walking distance to key destinations such as work, food markets, and school. Still, 40% of all trips in the United States are less than two miles and 28% are less than one mile, showing that many trips could be made on foot.

Portsmouth can be a very walkable city. It is fairly compact, has a mild climate, and a number of older, pedestrian-friendly neighborhoods. In addition, there is an expressed desire among the City's population to walk more often to more places. "I live three minutes from work, but I can't walk there" was a typical comment made during the community input phase of the Master Transportation Plan.

It is important that Portsmouth maintain the relatively dense street grid pattern that exists throughout many of its neighborhoods. Short blocks and a well connected street grid will encourage walking and help foster the denser residential and mixed-use development proposed in the *Destination 2025 Comprehensive Plan*. This is consistent with the VDOT *Secondary Streets Acceptance Policy*, encouraging through streets that link neighborhoods, schools, shopping areas, etc. Designing the streets of Portsmouth's neighborhoods and activity centers to be safe, convenient, and comfortable for pedestrians is essential to creating a walkable city.

While many neighborhoods have sidewalks or wide, low-traffic streets that are conducive to walking, there are many barriers to reaching key destinations such as activity centers, shopping and schools. Beyond the neighborhood, residents encounter significant barriers such as wide streets with high traffic speeds; large, high-volume intersections; public safety issues such as poor street lighting; and a lack of pedestrian access across physical barriers such as highways and bodies of water. By filling gaps in the pedestrian network and bridging these barriers, Portsmouth can become a place where people choose to walk to work, to school, to play, to the bus, or for just about any short trip.

Portsmouth, VA

(Top and Bottom) Portsmouth has a high quality pedestrian environment in downtown, but there are many sidewalk gaps in other neighborhoods, such as this intersection at Turnpike Road and Frederick Boulevard.

Strategies

Strategy 1

Target policy, regulations and directives to support the development and improvement of a pedestrian network.

City policy should set clear direction for the implementation of desired pedestrian improvements. Additionally, regulatory requirements, guidelines, and incentives should be put in place to ensure the incorporation of pedestrian facilities into both public and private projects in Portsmouth.

Actions

A1.1 **Develop pedestrian-friendly design guidelines.** Guidelines should establish minimum clear width standards for sidewalks, as well as recommendations for design features to improve the quality of the pedestrian environment (e.g., trees and landscaping, materials, furnishings, and lighting). Architectural guidelines that address issues such as maximum building setbacks, facade treatment, and visible and accessible entrances can also enhance the pedestrian environment. By establishing guidelines, Portsmouth can articulate a vision for what it wants its pedestrian environment to be. Suggested design guidelines are presented in Chapter 7: Design Guidelines.

A1.2 **Require pedestrian facilities to be provided in road construction projects.** Every non-expressway street in Portsmouth should accommodate pedestrians. By implementing Complete Streets guidelines, the City will ensure that roadway projects make appropriate accommodations for pedestrians (See Chapter 7: Design Guidelines for a description of Complete Streets guidelines). All new construction and substantial repair projects should be required to adhere to the Complete Streets guidelines and the VDOT *Policy for Integrating Bicycle and Pedestrian Accommodations*.

A1.3 **Update zoning, subdivision, and site plan review to require adequate pedestrian accommodations and land use revisions that encourage mixed use development and reduced distances between residences and employers.** Provision of adequate pedestrian accommodations should be required for all land uses in the city. Portsmouth has an opportunity to do this as it is currently undertaking a revision of its zoning ordinance. As a part of this process, requirements for pedestrian facilities based on the design guidelines in Chapter 7: Design Guidelines should be added to the zoning ordinance.

Strategy 2

Explore potential funding sources for pedestrian improvements.

Promoting walking as part of an active lifestyle has emerged as a policy priority to improve public health and reduce congestion and air pollution in cities. Current federal policy sets targets of increasing non-motorized transportation to at least 15% of all trips and reducing the number of non-motorized users killed or injured in traffic crashes by at least 10%. As a result, there is a great deal of federal and state funding available for pedestrian safety enhancements and sidewalk construction.

Actions

A2.1 **Investigate various funding options available from SAFETEA-LU.** The Safe, Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users (SAFETEA-LU) is the federal law that sets goals and lays out federal funding for highways, highway safety, and public transportation. SAFETEA-LU provides funding to States and metropolitan areas to promote walking and provide safe pedestrian facilities. Funds from SAFETEA-LU are channeled through the state Department of Transportation or regional Metropolitan Planning Organization. In Portsmouth, SAFETEA-LU programs generally are administered by the Virginia Department of Transportation (VDOT). The VDOT Suffolk office has expressed interest in helping Portsmouth to identify potential Bicycle and Pedestrian Safety projects (see below) and prepare grant requests. Programs that are of particular relevance to pedestrian improvements and their VDOT equivalents are described in more detail in callouts below. The following sections of SAFETEA-LU contain provisions for pedestrians:

- Congestion Mitigation/Air Quality Program (CMAQ).
- Highway Safety Improvement Program (HSIP) (see callout on p.44).
- Safe Routes to School Program (SRTS) (see callout on p.48).
- State and Community Traffic Safety Program.
- Transportation Enhancement Activities (TEA).
- State/Metropolitan Planning Funds (PLA).
- Federal Transit Capital, Urban & Rural Funds (FTA).
- Transit Enhancements (TE).
- Recreational Trails Program (RTP).
- Scenic Byways (BYW).
- Surface Transportation Program (STP).
- Bridge (BRI).
- Federal Lands Highway Program.
- National Highway System (NHS).

The Highway Safety Improvement Program & Pedestrians in Virginia

The Highway Safety Improvement Program (HSIP) of SAFETEA-LU is structured and funded to make significant progress in reducing highway fatalities and injuries. Under SAFETEA-LU, States are required to develop and implement an effective, integrated and coordinated Strategic Highway Safety Plan (SHSP). In Virginia, the Virginia Department of Transportation (VDOT) has developed an HSIP that involves the identification of problem safety areas, an analysis of problems and countermeasures, and the prioritization and scheduling of improvement projects. VDOT's HSIP program consists of the following programs: Highway Safety Program (HSP), Bicycle and Pedestrian Safety Program (BPSP), High Risk Rural Road Program (HRRRP), and Highway-Rail Grade Crossing Safety Program (H-RGCSP).

The stated purpose of the BPSP program is to "implement safety projects addressing both bicycle and pedestrian crashes and the potential for crashes in Virginia." The program supports improvement projects "that address a known safety problem, are small in scale, and can be completed quickly." Hence, BPSP projects should not involve the acquisition of significant right-of-way nor extensive environmental documentation and mitigation.

The program is intended to address bicycle and pedestrian safety concerns in locations with the potential for risk that typically do not have sufficient crash numbers needed to rank well for project selection under the traditional crash reduction methods. Eligible improvements for the BPSP program include, but are not limited to, on-street facilities; shared-use paths; treatments for intersections, mid-block crossings, and crosswalks; signs and pavement markings; accessibility features; and traffic calming measures.

VDOT has an annual competitive application process for prioritizing and funding safety projects. Local governments, railroad companies, and VDOT Districts and Residencies can submit applications for locations they recommend for improvement. The applications are evaluated on a statewide rather than a local or district basis. For non-motorized and highway-rail grade crossing improvements, the candidate projects compete for funding based on risk assessments. BPSP program safety projects are federally financed at 90 percent with the state or locality providing a 10 percent match.

VDOT's HSIP has set aside funds for lower-cost improvements, termed Proactive Projects, that can be implemented quickly and which may be proposed throughout the year. Typical examples include traffic control devices and roadway upgrades within the existing right-of-way. The City of Portsmouth has contracted Kimley-Horn and Associates to conduct Roadway Safety Audits (RSAs) of top crash locations in Portsmouth to identify pedestrian, bicycle, and vehicular safety improvements that could be undertaken with Proactive HSIP funds.

Strategy 3

Promote walking through education, enforcement and encouragement programs.

In addition to physical and regulatory improvements, the City and its partners can promote walking through education, enforcement, and encouragement programs.

Actions

A3.1 **Promote walking as an alternative to driving alone through Transportation Demand Management (TDM) programs.** The following TDM programs can lead to more efficient use of transportation resources by encouraging walking:

- Walk-to-work campaigns and competitions.
- Walk-to-lunch programs in business districts.
- Themed or navigational wayfinding and signage for pedestrians.
- Tourist promotion materials highlighting walking.

A3.2 **Encourage public and private schools as well as community organizations to participate in the Safe Routes to School Program.** The Safe Routes to School Program (described below) is a way to encourage children to walk or bike to school, creating a culture of walking and encouraging healthy lifestyles that can last a lifetime. It is also a way to teach road safety to Portsmouth's youngest and most vulnerable users. While a project must be aimed at a particular school, other groups besides the school or school district can apply for funding for or implement the project.

A3.3 **Continue to support and promote the Safety Town program.** Safety Town is a program to teach elementary school children bicycle and pedestrian safety that has been operating in Portsmouth since 1975 (see callout below). The city should continue to support the Safety Town program and should explore possibilities of obtaining further funding for the program through the Safe Routes to School program (see action P7 and callout "Safe Routes to School").

Safety Town

A visit to Safety Town is a regular part of every public school student's education in Portsmouth. Students attend first in kindergarten and first grade for pedestrian, stranger and danger, and school bus safety; and then in third grade for bicycle safety. The main objective of Safety Town is to develop children's awareness of safety practices in order to help reduce pedestrian and bicycle accidents. At Safety Town, Uniformed Auxiliary Officers, under the auspices of the Portsmouth Police Department's Crime Prevention Unit, provide classroom instruction. Then, students visit a miniature city where they can practice safe bicycle and pedestrian behavior in a realistic, yet safe environment.

A3.4 **Provide training for planners and transportation engineers to increase local knowledge of best practices in designing for pedestrians.** Design of roadways and streetscapes has long been focused on the car and how to make driving and parking easier and more convenient. While there are some roads where cars will take priority, the majority of roads in Portsmouth should be designed such that walking is a comfortable and convenient option. In order to ensure that transportation planning and design incorporate the needs of pedestrians, designers and engineers responsible for roadway projects should receive training in best practices and new, innovative solutions. Training should include education on "complete streets" and should present pedestrian design guidelines adopted by the City.

A3.5 **Explore closure of streets on designated days.** Many cities have experimented with closing major streets to vehicular traffic for partial days, particularly in the summer, with great success in encouraging pedestrian and bicycle use. Such closures can be linked to street fairs, block parties, or other activities that encourage neighborhood or community-wide activity and make streets more inviting places. They can also involve regular closure of longer segments of roadways to draw people to the street, thus encouraging alternative means of transportation and promoting fitness and health. "Sunday Street Days" or similar events allow people to experience the joys and benefits of getting around on foot. They are fun for participants of all ages and can draw visitors from outside Portsmouth as well as residents to participate.

A3.6 **Install speed cameras and red light cameras to improve pedestrian safety in key locations.** Fixed cameras in strategic locations can be used to document and ticket cars for moving violations (i.e., speeding and running red lights). Locations for the installation of cameras should be prioritized using the following factors:

- High incidence of accidents involving pedestrians.
- High levels of pedestrian activity.
- Location on a residential street.
- Location near a school.
- Speed limit is 35 mph or less.

A3.7 **Increase fines for vehicular violations that are particularly dangerous to pedestrians.** In urban environments, moving violations such as speeding, failure to yield to a pedestrian, and running a red light pose serious risks to pedestrians. In order to call attention to this and deter drivers from these dangerous behaviors, fines for such violations should be increased.

Safety Town, *Portsmouth, VA*. Safety Town is a secure facility where Portsmouth school children can learn street smarts.

Philadelphia, PA. Street festivals and pedestrian-only events can help residents and visitors get to know the City on foot.

The Safe Routes to School Program

In 1970, approximately 50 percent of U.S. children walked or bicycled to school. By 2000, this rate had plummeted to 15 percent.

The Safe Routes to School (SRTS) program is a federally-funded program that involves schools, students, parents and advocacy organizations at a grassroots level in efforts to improve conditions for children in grades K-8 to arrive at school safely and under their own power. By helping children walk and bike rather than take a bus or be driven to school, the program aims to reduce traffic congestion and increase safety around schools, decrease school transportation operating costs, and help reduce the incidence of child obesity.

The SRTS program was created by Section 1404 of the 2005 Safe, Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users (SAFETEA-LU). The purpose of the SRTS program is:

1. To enable and encourage children, including those with disabilities, to walk and bicycle to school;
2. To make bicycling and walking to school a safer and more appealing transportation alternative, thereby encouraging a healthy and active lifestyle from an early age; and
3. To facilitate the planning, development, and implementation of projects and activities that will improve safety and reduce traffic, fuel consumption, and air pollution in the vicinity of schools.

In Virginia, a two-phased program is administered by the Virginia Department of Transportation. The Virginia program is designed to facilitate the development of partnerships among schools and local governments for the planning and implementation of successful SRTS initiatives.

Safe Routes to School Event, *Columbia, MO.* Children walk to school with teachers and parents during a Safe Routes To School event.

Phase I involves the creation of a School Travel Plan. Only those schools, projects, and activities included in an approved School Travel Plan are eligible for funding. Each plan must address the "5 Es" laid out by the Federal Highway Administration (FHWA):

> Education: Teach children about the broad range of transportation choices, instruct them in important lifelong bicycling and walking safety skills, and launch driver safety campaigns in the vicinity of schools.
>
> Enforcement: Partner with local law enforcement to ensure traffic laws are obeyed in the vicinity of schools (including enforcement of speeds, yielding to pedestrians in crossings, and proper walking and bicycling behaviors). Initiate community enforcement such as crossing guard programs.
>
> Encouragement: Use events and activities to promote walking and bicycling.
>
> Engineering: Create operational and physical improvements to the infrastructure surrounding schools to reduce speeds and potential conflicts with motor vehicle traffic, and to establish safer and fully accessible crossings, walkways, trails and bikeways.
>
> Evaluation: Monitor and document outcomes and trends through the collection of data before and after the improvement(s).

A worksheet and Reference Guide is available for schools and communities seeking to design a local Safe Routes to School program.

In **Phase II**, once a School Travel Plan has been approved by the SRTS Program, funding to implement non-infrastructure elements (related activities) and infrastructure projects identified in the plan is available through a competitive application process. There are two types of funding:

- Non-infrastructure program funding goes to start-up safety education, encouragement activities, improving an existing plan, and other activities that support a local SRTS program.
- Infrastructure project funding goes to improvements to bicycle and pedestrian facilities within two miles of participating K-8 schools.

Various entities can apply to the SRTS program as long as they are acting on behalf of schoolchildren in grades K-8. Eligible entities include:

- Non-Infrastructure Program Funding: Schools (public and private), school divisions, local governments (cities, counties, or towns), regional and state agencies working on behalf of a school or schools, non-profit 501(c)(3) organizations working on behalf of a school or schools.
- Infrastructure Funding: Local governments (cities, counties, or towns).

Strategy 4

Develop a well-connected pedestrian network.

Completing a well-connected pedestrian network throughout the City will enable more people to choose walking as a viable means of travel. Such a network should provide accessible, safe and well-maintained facilities for pedestrians of all abilities—including the elderly, youth, and disabled residents—along and across all major corridors. The pedestrian network should be coordinated with the desired land uses identified in Portsmouth's Destination 2025 Comprehensive Plan and thus should serve commercial and mixed-use districts, activity centers, schools, parks, and transit centers.

In the long term, all roadways in Portsmouth should be complete streets, providing safe and comfortable accommodations for pedestrians (e.g., sidewalks or parallel paths). While these improvements will need to be incorporated into the City's planning and budget for years to come, this plan identifies critical locations and corridors and lays out a strategy that will prioritize improvements in order to maximize the value of the City's investment.

Portsmouth, VA. The High Street Bridge over the Western Branch has narrow sidewalks that discourage pedestrians from crossing the bridge. Sidewalks leading to the bridge on High Street are discontinuous.

Actions

A4.1 **Provide pedestrian accommodations in the priority corridors identified in this plan.** Priority corridors in Portsmouth's proposed pedestrian network are shown in Figure 3. By ensuring that these routes have adequate pedestrian accommodations, Portsmouth can create continuous, walkable corridors that connect residential areas with activity centers. In most cases this will mean the construction or improvement of sidewalks, although pedestrian or shared use paths may be appropriate in some locations. All pedestrian accommodations should be constructed in compliance with the Americans with Disabilities Act (ADA) guidelines. Recommendations for specific pedestrian improvements in these corridors are described in Chapter 6: Implementation.

A4.2 **Address gaps and barriers in the pedestrian network as a high priority.** Having a continuous network that allows pedestrians to get from point A to point B is essential to encouraging walking as a viable mode of transportation. Gaps and barriers hinder connectivity and continuity in the pedestrian system and should be priority locations for improvements and repair. Improvements that create continuous corridors and connect the densest residential and employment centers will have the biggest impact on users. The following factors should be used to prioritize projects:

- It is in a priority corridor in the pedestrian network (see Figure 3).
- It fills a gap in the network.
- It provides access across a gap such as a waterway, highway, or railway that otherwise has few or no other crossings.
- It provides access to a transit center/station.
- It is within an identified activity center.
- It is in a high-density residential area.
- It is near a school.

Major gaps and barriers in the system are shown on Figure 3. Additionally, specific recommendations for pedestrian improvements in designated multimodal corridors are discussed in Chapter 6: Implementation. More generally, improvements could include:

- Sidewalk construction and repair.
- Crosswalk installation or improvement (see Pedestrian Strategy 5).
- Bus stop enhancement.
- Traffic calming measures (see Pedestrian Strategy 5).
- Pedestrian bridges/tunnels (to cross highways, railways or waterways).
- Pedestrian or shared-use paths between disconnected streets.

A4.3 **Establish pedestrian paths and trails.** The pedestrian network need not strictly follow the roadway network. Additional pedestrian facilities can be provided by creating off-road paths and trails. Portsmouth has a unique opportunity to create such trails in the abandoned rail right-of-ways that crisscross the City. These abandoned right-of-ways are prime locations for this purpose because they pass through residential neighborhoods and commercial centers, making access by large numbers of people for recreation, commuting, and shopping easy to provide. The City should explore acquiring these right-of-ways in order to construct a network of greenway trails to augment its on-street pedestrian system. These trails can be pedestrian walking trails, or shared-use paths that allow pedestrian, bicycle and other non-motorized transportation (also see Bicycle action B4.6). They can encourage recreational walking by providing a car-free environment for walking, biking, and jogging.

A4.4 **Identify opportunities to make new pedestrian connections.** The old railroad right-of-ways described above, in combination with street closures have created a number of dead-end streets throughout the City. Where feasible, previously closed streets should be reopened and short gaps between dead-end streets should be connected for non-motorized travel.

Beaten Path, *Portsmouth, VA.* Over time, pedestrians have beaten a path where an abandoned railroad right-of-way interrupts South Street between Caroline Avenue and Hanover Avenue. Constructing a sidewalk or multi-use trail connection would encourage more pedestrians and bicyclists to traverse this safe, low-traffic route through the neighborhood to schools and shopping.

Strategy 5

Improve the safety and comfort of pedestrian travel.

People will not travel by foot if they don't feel safe doing so. In many cases, people choose to travel by car because in order to walk to their destination they must travel along busy roadways or through areas where they feel unsafe or uncomfortable. In addition to creating a connected network for pedestrian travel, the City should implement improvements that increase personal and physical safety as well as enhance the walking experience in Portsmouth. The actions below can be utilized throughout the city to increase and enhance pedestrian travel. In addition to these citywide suggestions, specific projects within the multimodal corridor network are addressed in Chapter 6: Implementation.

Actions

A5.1 **Implement safety improvements at intersections with high incidences of crashes involving pedestrians.** Providing safe road crossings is imperative to a connected pedestrian network. The City should make improvements at intersections to enhance pedestrian safety, prioritizing those intersections with the highest incidences of crashes involving pedestrians. The City has contracted Kimley-Horn and Associates, Inc. to undertake a series of Roadway Safety Audits (RSAs) to identify specific intersection improvements that can mitigate specific crash types at 20 high-crash locations within the City. The purpose of the RSA is to identify locations that result in a high benefit to cost ratio such that they are eligible to compete on a district or statewide level for VDOT's Highway Safety Improvement Program (HSIP) funding. More generally, improvements could include:

- Painted crosswalks at all signalized intersections.
- Raised crosswalks at intersections or mid–block locations.
- Stop signs at cross walks.
- Vehicular and pedestrian signals at warranted unsignalized intersections.
- Pedestrian countdown signals at signalized intersections.
- Curb extensions or median refuge islands at wide intersections to minimize pedestrian crossing distance.

Improvements should be tailored to the pedestrian and vehicular volumes expected at the intersection. Signal improvements should provide ample crossing times for pedestrians, particularly near schools and in neighborhoods with large populations of seniors or young children.

A5.2 **Continue to conduct RSAs on an annual basis to identify projects eligible for further HSIP funding.** Conditions will change over time. It is important that the City monitor and reevaluate the safety of its streets and intersections on a regular basis. Such evaluation will provide the City with the information needed to prioritize safety improvements and address the most serious safety needs.

A5.3 **Employ traffic calming elements at key locations in the pedestrian network to limit speeding and increase pedestrian safety and comfort.** Traffic calming measures are engineering interventions aimed at changing driver behavior in order to reduce vehicle speeds, improve safety, and enhance quality of life. Employed correctly, they reduce pedestrian-vehicular conflicts. In Portsmouth, traffic calming should be implemented in the following types of locations:

- Near (within three blocks) of schools.
- Within activity centers.
- On local streets where speeding is deemed to be a risk.
- On local streets where freight truck traffic has been a problem.

Examples of Traffic Calming Measures

- **Raised speed reducers.** A raised area of a roadway that deflects both the wheels and frame of a traversing vehicle with the purpose of reducing vehicle speeds; these include speed humps, speed tables, and speed cushions.
- **Traffic Diverters.** Traffic calming treatments designed to slow, redirect or block through-motor vehicle traffic, usually while maintaining pedestrian or bicycle flow, primarily at intersections in residential neighborhoods.
- **Chicane.** The creation of a "slalom" effect along a relatively narrow road through the use of staggered curb extensions or a serpentine roadway alignment.
- **Raised crosswalks or raised intersections.** A marked pedestrian crosswalk or an entire intersection constructed at a higher elevation than the adjacent roadway.
- **Gateways.** A combination of traffic–calming and visual measures used at the entrance to a low–speed street to slow entering vehicles and discourage through–traffic. Gateways can employ roadway measures such as curb extensions or medians in addition to streetscaping such as planting, lighting, or signage to indicate a shift in street type.
- **Road Diets.** Narrower lanes often cause drivers to reduce speeds. Lane narrowing can be achieved through bump-outs, sidewalk widening, street plantings, parking, or bike lanes.

See Chapter 7: Design Guidelines for more information.

Traffic Calming Devices, *Charleston, SC.* A Speed Hump slows traffic in a residential neighborhood.

Traffic Calming Devices, *West Seattle, WA.* A Neighborhood Traffic Circle (bottom) slows traffic and reduce crashes at intersections.

A5.4 **Ensure adequate levels of street lighting on pedestrian corridors.** Sufficient lighting is important to making people feel safe traveling by foot at night. The priority pedestrian corridors identified in this plan are priorities for lighting improvements where needed to improve pedestrian safety (see Figure 3). Beyond these corridors, the City should establish an ongoing program to identify streets and activity centers with insufficient lighting. This program would allow residents to request street lighting where a demonstrated need exists in their neighborhoods.

A5.5 **Implement streetscape improvements that make the walking experience more enjoyable.** Even when the basic infrastructure of a pedestrian system is in place, walking can be an unpleasant experience in areas that have been designed for cars. Design interventions that enhance the pedestrian experience can encourage people to walk to more of their destinations. Focusing on the priority pedestrian corridors, improvements could include:

- Street trees.
- Benches or other seating.
- Wide sidewalks.
- Shade structures.
- High-quality paving materials.
- Trash receptacles.

A more detailed discussion of specific streetscape improvements and their design can be found in Chapter 7: Design Guidelines.

Street Lighting. Pedestrian-scale street lighting casts an even glow across the sidewalk, which improves personal safety and encourages pedestrian activity in the evening. Pedestrian lamps can cast enough light on the roadway to supplant traditional street lamps on narrow streets

Strategy 6

Develop and implement a maintenance plan for the pedestrian network.

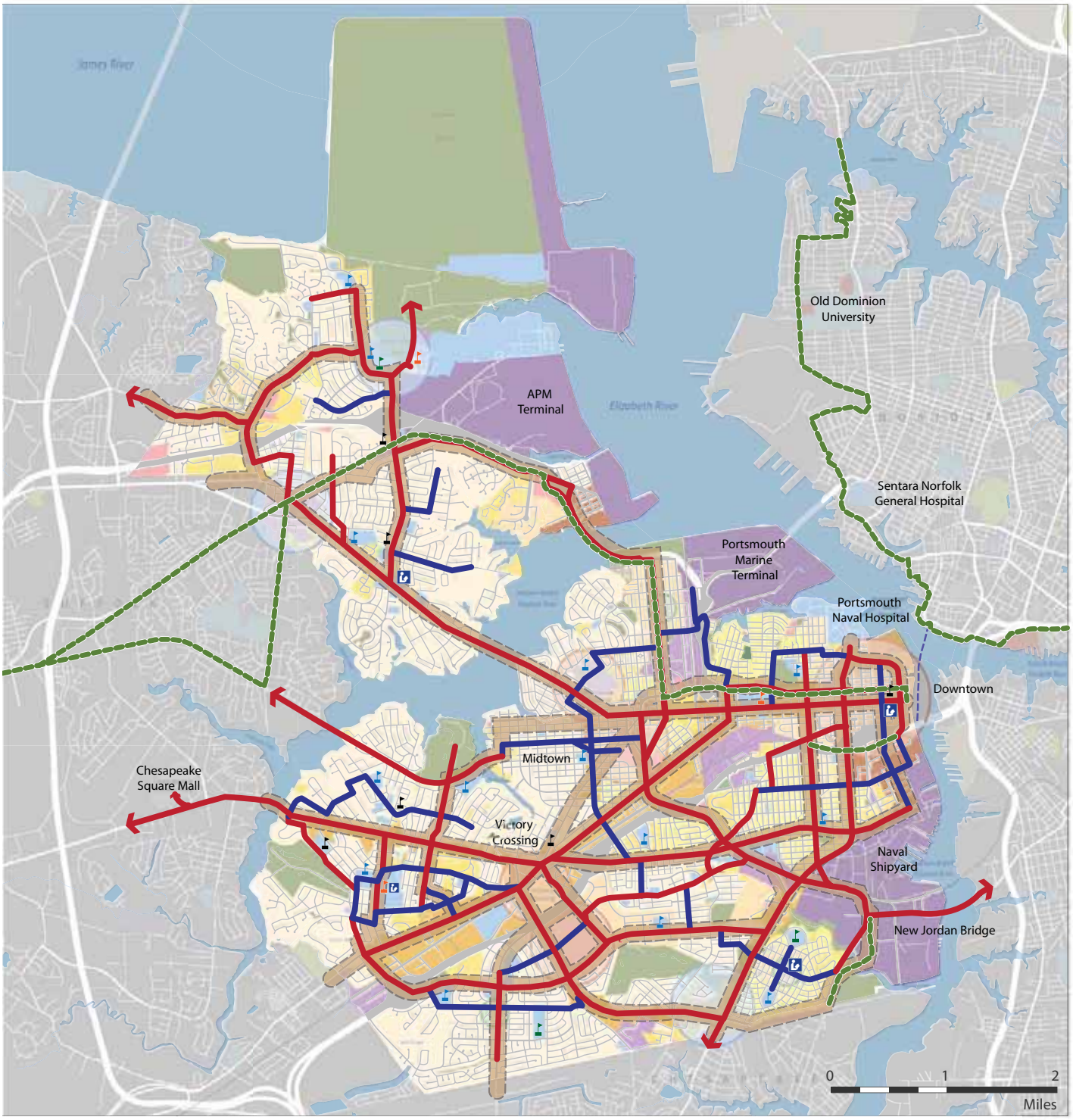
Pedestrian routes must be maintained in good condition if they are to remain safe and pleasant to use. Required maintenance activities include keeping sidewalks in good repair, crosswalks clearly marked, and all pedestrian routes free of blockages and debris. Sidewalks take wear and tear every day, and issues such as sidewalk heaving, root ruptures, erosion, and damage from construction can create situations that make them difficult or even impossible for pedestrians to navigate. The City should regularly monitor sidewalk and path conditions and make repairs as necessary.

Actions

A6.1 **Develop a maintenance plan for the pedestrian system.** The City should establish a system for inspecting sidewalks and other pedestrian infrastructure (including street lights), and identifying and cataloging needed repairs. The system should include a method for residents to make requests for specific locations in need of repair. Repairs should be prioritized based the following factors:

- Current walking conditions.
- Number of requests for maintenance.
- Need to meet ADA guidelines.
- Volume of pedestrian traffic.

In addition to capital repairs, regular clearing of trash and debris should be included in the maintenance plan.



Bicycle Routes

- Bicycle Boulevards
- Other Bikeways
- Proposed Regional Multi-Use Trail/Rail Trail
- Ferry Connection across Elizabeth River
- Multi-Modal Corridors

Destinations

- Elementary School
- Middle School
- High School
- Private School
- Library

Figure 4: Bicycle Element

This framework map indicates potential corridors for bicycle improvements. Proposed routes are conceptual and do not necessarily represent currently delineated bicycle routes.

B. Bicycle Network

Vision

The bicycle network will provide safe, attractive, and convenient access throughout Portsmouth for bicyclists of all ages and abilities.

- Portsmouth will be the most bikable city in the Hampton Roads region.
- Portsmouth residents will make more trips—particularly short trips—by bicycle.
- The bicycle network will connect residential neighborhoods with activity centers, schools, parks, and libraries.
- Commuters traveling within the City and across city boundaries will benefit from improved bicycle connections to employment destinations within Portsmouth and beyond.
- The bicycle network will draw tourists from the region and beyond as a premier bicycle destination.
- In recognition of its excellence, the bicycle network will be awarded gold status by the League of American Bicyclists.

Background

Bicycling is an affordable and environmentally-friendly mode of transportation that can lower household transportation costs, reduce petroleum consumption, and contribute to improved public health by integrating physical activity into daily travel. Beginning with ISTEA in 1991, federal surface transportation laws have included programs for roadway safety and alternative transportation modes. Many cities have been able to triple or even quadruple their percent of bicycle commuters since 2000 by taking advantage of these programs while others have left the money on the table.

According to the 2000 U.S. Census, Portsmouth has a very low percentage of bicycle commuters. In the past several years, as issues of traffic congestion, high oil prices, and a cooling economy have been prominent in the news, Portsmouth has seen a significant increase in the number of bicyclists. Today, there are cyclists everywhere you look in Portsmouth: riding to the Afton Square shops in Cradock for a snack, commuting across the Elizabeth River on the Paddlewheel Ferry, shopping at Victory Crossing, bypassing gridlock on George Washington Highway, or partaking in leisurely recreation on a beautiful evening. Some of these cyclists are on the road out of necessity while others prefer to get exercise or avoid traffic on the way to work. Regardless of why they ride, they have found that bicycles can be an enjoyable and viable way to get around Portsmouth.

Nevertheless, these cyclists represent only the small portion of the population that is willing to ride a bike in a transportation system primarily designed for motorized vehicles. Throughout the Master Transportation Plan process, Portsmouth residents expressed a desire to leave their car at home once in a while and go by bike, but the three short bike lanes in the City do not provide the sense of safety and level of comfort they require. By taking some simple steps to create a bicycle network and encourage alternative modes of transportation, the City of Portsmouth can unlock the potential to become a great city for bicyclists and do its part to reduce traffic congestion and air pollution.

Strategies

The following strategies outline an approach to establishing bicycling as a viable means of transportation for all trips in Portsmouth. The strategies and associated actions start with general policy and then move on to more specific physical infrastructure and corridor recommendations.

Strategy 1

Implement city-wide policies that support bicycling.

The city should implement a range of policies and regulations that encourage bicycling and the creation of a city-wide bicycle network. Several of the following actions are further elaborated on in subsequent strategies and actions.

Actions

B1.1 **Adopt a Complete Streets policy to accommodate all transportation modes in the public right of way.** Design guidelines for city streets should address all modes of travel, including bicycles. Guidelines should indicate appropriate of bicycle facilities by roadway type, minimum widths, and striping requirements for bike lanes, and standards for other street markings and signage. (See Chapter 7: Design Guidelines).

B1.2 **Require roadway improvement projects to include bikeways.** Any time a roadway is repaired or restriped, the road should be evaluated for the inclusion of bicycle facilities. By implementing complete streets guidelines, the City will ensure that roadway projects make appropriate accommodations for bicyclists. (See Chapter 7: Design Guidelines for a description of Complete Streets guidelines). All new construction and substantial repair projects should be required to adhere to the Complete Streets guidelines (See Action B4.5) as well as the VDOT *Policy for Integrating Bicycle and Pedestrian Accommodations*.

B1.3 **Develop "traffic calming" and "road diet" guidelines.** Traffic calming is the slowing or reduction of motor vehicle traffic through the use of physical or legal measures to improve safety for pedestrians and bicyclists and improve the environment for residents. Road diets reduce existing lane widths or the number of lanes on a road in order to accommodate more user types and calm traffic. Guidelines for traffic calming and road diets should address factors such as roadway width, traffic volumes, prevailing speed, neighborhood context, etc. They can be used to identify opportunities for the addition of bicycle facilities to existing streets through simple restriping. (See Action B4.6 and Chapter 7: Design Guidelines).

B1.4 **Amend the Zoning Ordinance to require bicycle parking.** Bicycle parking should be required in certain land uses, including office, retail, and high-density housing. (See Action B6.3).

B1.5 **Establish a city-wide position of Bicycle Coordinator.** Among other tasks, this position would be responsible for bicycle program planning, grant applications, and coordination with traffic engineers.

Strategy 2

Identify funding sources to implement bicycle improvements.

While bicycle infrastructure is much less costly than most transportation improvements, it will still require funding to implement. Given current federal and state policy direction to reduce CO_2 emissions, air pollution, congestion, and to improve physical fitness, there are many programs that provide funding to support alternative transportation, particularly human-powered alternatives like cycling.

Actions

B2.1 **Prepare a Bicycle Plan for Portsmouth.** Many programs that fund bicycle improvements require a bicycle plan before a city can apply for funding. The Virginia Department of Transportation (VDOT) Bicycle and Pedestrian Safety (BPS) Program, which provides funds for implementing short-term, low-cost bicycle and pedestrian safety projects in Virginia, requires that a locality or Metropolitan Planning Organization (MPO) have an adopted bicycle plan before VDOT will consider constructing bicycle facilities as part of their highway construction projects within that jurisdiction. Having a bicycle plan will help the City gain funding and services from VDOT and other agencies to implement the bicycle network. This section of the Master Transportation Plan will serve as Portsmouth's Bicycle Master Plan until a separate plan is established.

B2.2 **Investigate various funding options available from SAFTEA-LU.** The Safe, Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users (SAFETEA-LU) is the federal legislation that sets goals and lays out federal funding for highways, highway safety, and public transportation.[1] Federal transportation policy aims to increase non-motorized transportation to at least 15% of all trips and to reduce the number of non-motorized users killed or injured in traffic crashes by at least 10%. SAFETEA-LU establishes policy language, planning guidance, and funding opportunities through which states and metropolitan areas can achieve these goals. Sections of SAFETEA-LU containing provisions for bicycles include:

- Congestion Mitigation/Air Quality Program (CMAQ)
- Highway Safety Improvement Program (HSIP)
- Safe Routes to School Program (SRTS)
- State and Community Traffic Safety Program
- Transportation Enhancement Activities (TEA)
- State/Metropolitan Planning Funds (PLA)
- Access to Jobs/Reverse Commute Program (JOBS)

(1) SAFETEA-LU expired on September 30, 2009 and thus needs to be reauthorized by Congress. Congress passed a continuing resolution to keep SAFETEA-LU in effect until a new federal surface transportation bill is passed into law, which could happen in 2010. It is expected that many of the existing funding sources for bicycles will be included in the next federal surface transportation law.

- Federal Transit Capital, Urban & Rural Funds (FTA)
- Transit Enhancements (TE)
- Recreational Trails Program (RTP)
- Scenic Byways (BYW)
- Surface Transportation Program (STP)
- Bridge (BRI)
- Federal Lands Highway Program
- National Highway System (NHS)

Most of the funding for these programs is administered by the state DOT or the local MPO (i.e., VDOT and the Hampton Roads Transportation Planning Organization or HRPTO). The Safe Routes to School Program is one example of such opportunities. Administered by the Virginia Department of Transportation (VDOT), the Safe Routes to School program (SRTS) provides federal funding to local schools, school divisions, governments, agencies or non-profits for efforts to promote bicycling and walking to school by children in grades K-8. SRTS programs can include any combination of infrastructure improvements, education, encouragement, and enforcement projects. For a more detailed description of the SRTS program, see Pedestrian Strategy 3.

B1.1 **Investigate funding opportunities created by stimulus programs.** Funded by the American Recovery and Reinvestment Act of 2009 (ARRA), the Energy Efficiency and Conservation Block Grant (EECBG) Program provides funds to units of local and state government to develop and implement projects to improve energy efficiency and reduce energy use and fossil fuel emissions in their communities. Eligible projects include transportation programs to conserve energy, which could include bicycle improvements. The program is administered by the Department of Energy. Another funding opportunity created by ARRA is the Communities Putting Prevention to Work initiative administered by the Centers for Disease Control and Prevention (CDC). The initial $373 million grant allocation (which had an application deadline of December 1, 2009) will be used to fund, among other activities, strategies to combat obesity and promote physical activity. Bicycle (and pedestrian) planning, education, and improvements could potentially be funded through future grant allocations.

B1.2 **Identify other funding sources for bicycle network improvements.** There are growing efforts in the state and nationally to reduce vehicle emissions and congestion and to improve public health and fitness. There are both government programs and non-governmental organizations working to address these issues that provide funding for bicycle improvements and education. Continuing efforts should be made to identify and track such funding sources. Potential avenues for investigation include:

- Funding from or partnerships with local and national bicycle coalitions and organizations (e.g., League of American Bicyclists, Virginia Bicycle Federation, etc.).
- Funding opportunities from health-related organizations or agencies.

Strategy 3

Provide bicycle education, encouragement, and enforcement programs.

Education, encouragement, and enforcement programs can create a climate where bicycling becomes an accepted, and even preferred, mode of transportation. Such programs can maximize investment in the bicycle network by increasing awareness of bicycling as a viable means of transportation, thus increasing the number of users. Education and enforcement are also key to promoting bicycle safety throughout the City (e.g., by teaching cyclists the practices needed to bike safely in traffic as well as by teaching motorists how to share the road with cyclists).

Actions

B3.1 **Create and widely distribute a bicycle network map to introduce residents and visitors to the bicycle network.** Providing potential users with a map of the system will inform them about "the best of biking" in Portsmouth, allow them to choose the most suitable bike routes for their skill level, and encourage them to travel by bicycle in the future. The bicycle map should identify all existing bikeways by type, supporting facilities (e.g., bike parking, repair shops, and transit connections), proposed bikeways, and the dates of bicycle events and festivals. It should be updated annually to incorporate new bicycle network improvements and events. The map should be made available on the City's website and at schools, libraries and other public buildings. It should also be mailed to new residents to make them aware of bicycle opportunities in Portsmouth. Many communities use CMAQ grants to publish bicycle network maps.

Bicycle Network Maps, *Vancouver, BC*. Bicycle network maps inform residents and visitors where bicycle facilities are located and help them plan trips by bicycle. Additional information such as connections to transit, bicycle repair shops, and how to navigate tricky intersections can be included.

B3.2 **Create a Portsmouth Transportation Management Association (TMA) to promote bicycling as part of Transportation Demand Management (TDM) activities.** TDM activities can be used to promote bicycling as an alternative to driving alone by providing incentives or an improved environment for bicycling. Such programs could include:

- **Parking cash out:** In a parking cash out program, commuters who are offered subsidized parking are also offered the cash equivalent if they use alternative travel modes.
- **Bike to work day and bike to work "challenges":** A designated "Bike to Work" day once a year or more encourages employees to try biking to work as a group activity and can win over new bike commuters. Many communities also sponsor bike to work "challenges", which encourage companies to compete to see whose employees can bike the most miles in a week.
- **Bike commuter routes:** The lack of other cyclists on the road can discourage potential cyclists. By setting regular commuter and recreational routes and departure times, novice cyclists can meet and learn from experienced cyclists in a "safety in numbers" approach. The City could partner with local bike clubs to begin such a program.

(For more information on TMA/TDM, see Transit Action T1.1 and Motor Vehicles Strategy 5.)

B3.3 **Educate cyclists to ride safely in traffic.** Educating cyclists on safe cycling practices and state and city traffic laws will increase safety and help less experienced cyclists gain confidence in biking in traffic. Education should begin at a young age. The current Safety Town program administered by the Portsmouth Police Department is a program that teaches elementary school children bicycle and pedestrian safety (see callout on p.45). This program should be supported and expanded. Used in conjunction with projects implemented through the Safe Routes to School program, it can encourage active lifestyles and teach road safety to Portsmouth's youngest transportation system users (see Pedestrian Strategy 3). TMAs, local bike clubs, and advocacy organizations can offer classes and outreach programs to older children and adults as well.

Bicycle Education. Bicycle education can be targeted at all age groups and skill levels. Teaching children about safe bicycle riding behavior when they are young will give them personal freedom and prepare a generation of road users who understand share-the-road laws.

Bike Philly, *Philadelphia, PA*. This community bicycling event attracts thousands of cyclists every year and raise funds for non-profit organizations.

Five Boro Bike Tour, *New York City, NY*. Car-free community bicycle events encourage cyclists, regardless of skill level, to experience their city on two wheels and see how much ground they can cover under their own power.

B3.4 **Educate law enforcement officials on rights, responsibilities, and hazards to bicyclists on public roads.** FHWA or VDOT Transportation engineers should be invited to present best practices for accommodating cyclists on city streets. Presentations should target motorist behavior that is particularly dangerous to cyclists for increased enforcement.

B3.5 **Educate motorists to share the road with cyclists.** Motor vehicles are the cause of most bicycle accidents and almost all bicycle deaths. Educating motorists on bicyclists' rights and responsibilities and discouraging behaviors that commonly endanger cyclists, such as failure to yield, speeding, passing too closely, and opening car doors into a bicyclist's path, will increase safety. Targeting drivers of commercial vehicles (taxis, buses, and trucks) is particularly important due to their larger vehicle size and more frequent use.

B3.6 **Provide training for planners, transportation engineers, and other professionals to increase local knowledge of best practices in bicycle infrastructure.** In order to ensure that transportation planning and design incorporate the needs of cyclists, planning and design professionals should receive training in best practices and new, innovative solutions. Such training can be provided by VDOT or FHWA engineers or representatives from the League of American Bicyclists.

B3.7 **Explore closure of streets to vehicular traffic on designated days.** Many cities have experimented with closing major streets to vehicular traffic for partial days, particularly in the summer, with great success in encouraging bicycle and pedestrian use. Such closures can be linked to street fairs, block parties, or other events that encourage neighborhood or community-wide activity and make streets more inviting places. They can also involve regular closure of longer segments of roadways to draw people to the street, thus encouraging bicycle and pedestrian use and promoting fitness and health. Programs such as Summer Streets (New York City), Sunday Parkways (Portland, OR), Ciclovia (Bogotá, Colombia) and Paris Plage (Paris, France) are examples. Such events are opportunities to recruit new cyclists, let cyclists see that others are cycling, and disseminate information about cycling and the bicycle network. The events are fun for participants of all ages and can draw tourists as well as residents to participate.

B3.8 **Apply for a League of American Bicyclists Bicycle Friendly Community award.** The League of American Bicyclists' Bicycle Friendly Community Program provides incentives, hands-on assistance, and award recognition for municipalities that actively support bicycling. The award portion of the program looks at bicycle engineering, education, encouragement, enforcement, and evaluation (the "Five Es"). Successful municipalities receive platinum, gold, silver, or bronze designation for four years. Portsmouth should strive for gold status; such recognition will put the City "on the map" for cyclists around the country. Also, completing the application provides an opportunity to undertake an "audit" of opportunities and deficiencies in the bicycle network.

Strategy 4

Develop a citywide network of bikeways.

The City has a prime opportunity to establish a premier bicycle network. Portsmouth is flat and has a mild climate and relatively dense and compact neighborhoods, making bicycling a viable option for various types of trips. A safe, connected, and attractive bicycle network that links popular destinations is crucial to encouraging bicycling in Portsmouth.

Below are brief descriptions of the basic types of bikeways that should be included in a citywide network. More complete descriptions of these bikeway types, including suggested dimensions, can be found in Chapter 7: Design Guidelines.

- **Bike Lanes.** Bike lanes are lane markings on streets that identify a portion of the roadway for use by cyclists. Cyclists are allowed by law to travel in normal lanes with vehicular traffic, but bike lanes are reserved for cyclists only. Bike lanes can be striped, or as is becoming increasingly popular, painted a different color from the roadway.
- **Physically-Separated Bike Lanes.** Physically-separated bike lanes offer more substantial protection from motor vehicles than traditional bike lanes and are therefore useful for drawing new cyclists onto the bicycle network. Additionally, physical separation is desired where vehicles are traveling at higher speeds and there is high possibility of vehicle intrusion into a standard bike lane. Physically separated bike lanes should be used near schools, in mixed-use commercial corridors, and in other areas with high traffic volumes and/or high accident rates.

  Physical separation can be created in a number of ways, depending on the space available and the degree of separation from the roadway that is desired:

  - Landscaped median
  - Raised curb or narrow median
  - Sidewalk
  - Painted buffer that could include parking

Bike Lane Access, *Portsmouth, VA.* The bike lane on Clifford Street provides access to City Park.

Bike Lane Access, *Boulder, CO.* A contra-flow bike lane allows cyclists to travel in two directions on a street that is one-way for cars

Bike Lane Access, *New York City, NY.* The physically-separated bike lane on 9th Avenue in New York City provides protection from moving cars and has special traffic signals for bicycles and cars to prevent cars from turning left across the path of moving bicycles.

- **Bike/Shared Use Paths.** Bike paths and shared use paths are "off-road" bikeways. They encourage recreational cycling, long distance bicycle commuting, and provide an ideal venue for novice bicyclists to build confidence. Bike paths and shared use paths are most desirable when they connect activity centers, other popular destinations, and/or denser residential locations. Possible locations for such routes include, among others, parks, waterfronts, and abandoned railroad rights-of-way.
- **Bicycle Boulevards.** Not to be confused with traditional signed bicycle routes or the "Urban Boulevard" types within Portsmouth's roadway classification system (see below), bicycle boulevards are designated streets where bicycles have priority over motorized vehicles. They are low-traffic neighborhood streets that have been optimized for bicycling through various combinations of traffic-calming and traffic-reduction treatments. Bicycle boulevards provide direct, attractive routes for bikes and are extremely safe (many have had zero crashes over the last decade). Residents on bicycle boulevards in Portland, Oregon credit the conversion with creating quieter, more livable streets and there is some evidence that they can lead to increased property values.

Using this range of facility types in a context-sensitive manner, the bicycle network should meet the needs of different types of bicyclists. For example, confident and skilled cyclists can ride with vehicular traffic and use on-street bike lanes. Bicycle boulevards and shared use paths will attract less-confident cyclists by providing safe and comfortable opportunities for cycling on low traffic streets and off-street paths.

The bicycle network will consist of major routes that can be used to safely access all parts of the city and other parts of the transportation system. Bicycle network segments should have signs and pavement markings to indicate that special accommodations have been made for bicyclists (See Bicycle Strategy 5).

Schuylkill River Trail, *Philadelphia, PA*. Greenway trails and shared use paths provide a high quality experience for bicyclists, pedestrians, and other non-motorized users. Depending on the local context, shared use paths are used by varying amounts of recreational users and commuters.

Bicycle Boulevards, *Vancouver, BC*. Bicycle boulevards offer a traffic-calmed environment by prioritizing bicycles over cars. Bicycle boulevards are especially effective at attracting women and children, who are usually underrepresented among bicycle commuters.

What Type of Bikeway Should I Use?

The different bikeway types are not appropriate for all types of streets. Therefore, bicycle improvement projects must be context-sensitive – they must match the specific conditions in the street corridor. Factors to be considered include, among others: street right-of-way width, vehicular traffic volumes, and adjacent land uses and users (e.g., schools, retirement homes, etc.).

The Master Transportation Plan identifies four main non-expressway street types, each with its own characteristic function, traffic mix, operations and design elements (see Chapter 6: Design Guidelines). These types and the bikeways that are most appropriate to them are described below.

Arterials. Arterials support the heaviest vehicular traffic volumes of the four types. They generally have four lanes of traffic and are designed for vehicular travel speeds of 35 to 45 mph.

Appropriate Bikeway Types:

- Bike lanes on arterials with speed limits of 40 mph or lower
- Physically-separated bike lanes (e.g., separated by a raised curb or landscaped median)
- Bike paths/shared use paths
- In the near-term, some arterials may require the use of wide outside lanes with sharrows to accommodate cyclists until better facilities can be constructed.

Urban Boulevards. Urban boulevards are the signature streets of downtown Portsmouth. They typically have two to four lanes of traffic and are designed for vehicular speeds of 25 to 35 mph.

Appropriate Bikeway Types:

- Bike lanes
- Physically separated bike lanes (e.g., buffered with parking or separated by a raised curb or landscaped median)
- Shared use paths

Collector Streets. Collector streets primarily function to collect vehicular traffic from local land uses and funnel it to boulevards or other major arterials. They are typically 2 to 4 lanes wide and limit vehicular speeds to 30 mph or less.

Appropriate Bikeway Types:

- These streets vary the most of the four types and could accommodate a variety of bikeways depending on context.

Local Streets. Generally serving residential areas, local streets tend to be narrower and give greater priority to non-motorized uses. Currently, they limit vehicular travel speeds to 25 mph, but 20 mph speed limits should be considered.

Appropriate Bikeway Types:

- Bike Boulevards
- Sharrows

Using these general parameters as a guide, projects need to be evaluated on a case-by-case basis to determine the bikeway type that best matches the specific conditions of the corridor. Additionally, the Master Transportation Plan makes specific recommendations for bikeways in key corridors in the Multimodal Corridor Plan (see Chapter 3: Transportation Framework and Chapter 5: Implementation).

The actions below are designed to establish a citywide bike network in a rapid and cost-effective manner.

Actions

B4.1 **Starting with the routes identified in the Master Transportation Plan, develop a bicycle network plan that identifies priority bicycle routes in the City and the most suitable bikeway type for each route.** A bicycle network plan will provide the road map for achieving a complete and connected system. This plan establishes the framework for a more detailed bicycle network plan (see Figure 4: Bicycle Network). The plan should be revisited and adjusted as necessary.

B4.2 **Implement the bicycle network plan.** Many improvements will be needed to complete the bicycle network, but the benefit of each improvement can be maximized by implementing them in a planned, coordinated manner. Bicycle improvements that create continuous corridors and connect residential areas with activity centers will have the greatest beneficial impact for users. The following factors should be used to prioritize projects for implementation:

- The project is located in a priority corridor in the bicycle network (see Figure 4: Bicycle Network).
- The project connects two or more discontinuous bikeways (i.e., fills a gap in the existing bicycle network).
- The project provides bicycle access across a physical barrier (i.e., a waterway, highway, or railway that has no or few other crossings).
- The project provides access to a transit center/station.
- The project connects to priority uses, particularly activity centers, high-density residential areas, and/or schools.

B4.3 **Prioritize and implement specific bicycle improvements in key corridors.** This plan has identified priority corridors for multi-modal, complete street improvements. These corridors will set the framework for Portsmouth's future bicycle network (Figure 4: Bicycle Element). Establishing bikeways along these corridors will create a core bicycle network that connects activity centers, dense residential areas, and major employment centers.

Because they currently provide little or no accommodations for bicyclists, these corridors should be prioritized for implementation of bicycle improvements every two years and the top three priorities addressed in the next two-year period. The bicycle network plan should specify the appropriate bikeway type for each corridor. Descriptions of roadway types in Portsmouth and appropriate bikeway types for each are provided in Chapter 7: Design Guidelines.

B4.4 **Evaluate the potential to create bikeways in all roadway re-paving and re-striping projects.** All projects involving re-paving or re-striping of streets should be evaluated for the potential inclusion of bike lanes. A cost-effective way of rapidly increasing the mileage of bikeways in the City, this policy should extend to all street projects and not be limited to corridors identified as part of the citywide bicycle network. While the policy may result in some disconnected segments for a time, the cost savings derived from implementing bicycle improvements within already scheduled capital projects make it an important method of developing bikeways.

B4.5 **Establish bike lanes on existing streets.** Bike lanes can be installed on existing streets through "road diets," which reduce existing lane widths in order to accommodate more user types and calm traffic. Reducing the City's minimum travel lane width requirement within acceptable standards is an important step toward the use of road diets to establish bike lanes. Existing travel lanes can also be removed to accommodate bike lanes if allowed by vehicular travel volumes. Even without removing traffic lanes, bike lanes have a traffic calming effect because the bike lanes visually narrow the width of the roadway. Wherever possible, bike lanes should be established on streets with minimal curb cuts and access points to reduce conflicts with turning vehicles.

B4.6 **Establish off-road bike paths and shared-use paths.** Off-road bike paths or shared-use paths can provide long, uninterrupted routes for cycling. Traditionally used for recreation, they can also support commuting and other trips depending on location. Opportunities to locate bicycle trails in Portsmouth include:

- **Multi-City Bike Trails.** A multi-city bicycle trail in the Hampton Roads region is currently being planned to link with the Virginia Capital Trail and the East Coast Greenway.[2] This trail would connect Portsmouth with Suffolk, Norfolk, and Virginia Beach using the HRT Paddlewheel Ferry to help cyclists cross the Elizabeth River. The City should make every effort to identify a route for this corridor through Portsmouth. It has great potential not just to provide cycling opportunities for Portsmouth's residents, but also to draw regional and even national bicyclist tourists. Weekend service hours for the Paddlewheel Ferry start too late for many cyclists, so the City should work with Norfolk and HRT to begin ferry operations at sunrise on weekends.

(2) The East Coast Greenway is a trail system under development from the Maine/Canada border to Key West, Florida. When complete it will span nearly 3,000 miles and link all of the major cities of the eastern seaboard.

- **Rails to Trails.** Rails to trails involve the conversion of abandoned rail corridors to multi-use trails. The Churchland Branch Rail-Trail conversion is proposed along the railroad right-of-way segment to be abandoned as part of the Commonwealth Railway Relocation Project (see the Freight & Ports section of this chapter). This project should be incorporated into the citywide bicycle network.
- **Rails with Trails.** Rails with trails is a growing movement to construct bicycle and pedestrian paths adjacent to active rail corridors. While not every rail corridor in Portsmouth is appropriate for such conversion, this option should be explored as railway improvement projects arise.

Mount Vernon Road Proposed Improvements, *Portsmouth, VA*

Strategy 5

Use the most current and innovative markings and signal infrastructure.

A quality bicycle network requires not only designated bikeways, but also communicative devices (e.g., signage and pavement markings) and infrastructure (e.g., bicycle signals) similar to what is routinely provided for motorists. Special pavement markings and infrastructure can be used to improve circulation and safety at intersections and along streets.

Actions

B5.1 **Use colored pavement (typically green) for bikeways where a high degree of bicycle-vehicle conflict is anticipated.** By increasing the visibility of the bikeway, colored lanes alert motorists to the presence of cyclists and reduce potential conflicts between the two modes.

B5.2 **Use shared-lane markings or "Sharrows" where appropriate.** Sharrows are used to designate travel lanes shared by bicyclists and vehicles as well as to instruct cyclists about where to position themselves in a lane to remain visible to traffic and avoid hazards such as opening car doors. They are designated by pavement marking (standard bike lane icons with two chevrons) within the travel lane. Sharrows are not recommended for core segments of the bicycle network but may be required where bike lanes are not feasible.

Sharrows. Shared-lane markings, commonly referred to as "sharrows", serve two purposes on streets where there is not enough room to mark a separate bike lane. First, they reinforce to all road users that cyclists have a right to take a travel lane. Second, they indicate to cyclists where they should place themselves in the roadway to avoid the "door zone" of parked cars and other hazards.

B5.3 **Use bicycle signals and other devices at bicycle network intersections with major roadways.** Bicycle signals are traffic signals for bicycles. They are synchronized with vehicular traffic signals to provide coordinated and safe bicycle and vehicular flow through the intersection. Special devices such as advanced stop lines and bike boxes can be used at particularly difficult intersections, including railroad crossings.

Bike Boxes

The bike box is an intersection safety design specifically intended to prevent bicycle/car collisions, especially between drivers turning right and bicyclists going straight. It consists of a box painted on the roadway surface with a white bicycle symbol inside and green bicycle lanes approaching and leaving the box.

Bike Box. By allowing cyclists to take the entire lane in front of motor vehicles at a red light, bike boxes ensure that cyclists are visible to drivers. This helps prevent the number of crashes caused by cars that turn right into bicycles that are in their blind spot. Bike boxes also allow cyclists to position themselves to take a left turn at red lights.

B5.4 **Create a citywide bicycle network signage system.** Signage is necessary to inform people about the bicycle network and how to navigate it, including selection of the most appropriate routes for their cycling ability. Therefore, a signage system with consistent sign design, symbols, and language should be installed on all segments of the network. The system should identify routes as bicycle only, shared with vehicles, or shared with pedestrians and identify distances to popular destinations in Portsmouth and beyond. The system can include both vertical signs and on-street markings.

Directional signs for the bicycle network aid in navigation and encourage use of the bicycle network by identifying destinations it connects. Signs should mimic existing directional signage for cars to promote the idea that bicycles are one part of the entire transportation system.

Strategy 6

Provide supporting facilities at key locations in the bicycle network to serve cyclists.

Building a bicycle network is not in and of itself sufficient to induce people to bike. Destinations must have sufficient and secure bicycle parking and support amenities to accommodate users traveling by a means of transport more strenuous than driving. In addition to the bicycle network infrastructure described in Strategy 5 above, supporting facilities for bicycles should be made available through public and private investment. The type of facilities will depend on the location and surrounding land uses, but could include:

- Bike racks
- Secure bike parking (e.g., bike lockers)
- Restroom and shower facilities for cyclists
- Bicycle repair stations
- Bicycle route maps

The actions below address these facilities and their appropriate locations.

Actions

B6.1 **Establish a bicycle parking program and install bike racks throughout Portsmouth.** If people are to bike to key destinations, they need a convenient place to secure their bicycles once they get there. For most trips and destinations, simple bicycle racks will suffice. Bike racks should support bicycles at two points on the frame to prevent bikes from falling. "Staple" or "inverted-U" racks fulfill this requirement, are unobtrusive, and are relatively inexpensive. Bike racks should be installed in locations where cyclists will use them. A program encouraging residents to request bike racks can be used to identify such locations, thus helping to maximize the benefit of each installed rack. Many bicycle rack programs are funded through CMAQ or Transportation Enhancement funding under SAFETEA-LU.

B6.2 **Provide enhanced bicycle parking at transit stops and centers.** Providing connections between the bicycle and transit networks will make it easier for people to forgo private automobiles for daily commutes and other trips. If people are to leave their bike at a transit station for all or part of a day, they need to know it will be secure and protected from the elements. Facilities such as bike lockers and bike garages can be made available at transit stations and stops to provide this element of security.

B6.3 **Require the inclusion of bicycle parking in new development projects.** Requiring bicycle parking to be included in all new development provides benefits for residents – thus increasing the value of the development – at minimal cost to the City. Racks or other form of bicycle parking should be required in new commercial, office, multi-family residential, and institutional buildings, planned developments, and commercial parking lots or garages. In particular, residential bicycle parking should be provided in a secure, weatherproof location.

The "bikestation", *Union Square, Washington, DC*. Provides sheltered, secure bicycle parking as well as repair and rental facilities.

Bicycle Rack Programs

Installing bike racks in convenient locations for cyclists is a key step in encouraging and expanding bicycle use in a city. Cities throughout the United States have begun to implement such programs.

Chicago: The Chicago Department of Transportation's Bicycle Program installs and maintains bike racks in Chicago. The city has an online request form, where individuals can request bike racks for addresses throughout the city. Individuals can then track their request online. The website also allows people to search for bike racks by zip code, neighborhood or transit stop and provides information for how to report abandoned bikes.

New York City: The CITYRACKS program run by the New York City Department of Transportation provides sidewalk bicycle parking racks throughout New York City to encourage cycling for commuting, short trips and errands. CITYRACKS installs bike racks on city-owned sidewalks and has a series of criteria regarding sidewalk width, distance from other street furniture and paving material to determine if a rack can be installed. Racks can be requested online or by mail and if a site is deemed suitable, the bike rack will be installed and maintained by the city. The CITYRACKS program is funded through the Transportation Enhancement Program of SAFETEA-LU.

Philadelphia: Through the Adopt-A-Rack Program, the Streets Department installs bike racks requested by property owners. The City installs the racks on the condition that the property owner or a surrogate such as the Bicycle Coalition of Greater Philadelphia agrees to maintain the racks and remove abandoned bicycles. Philadelphia's first 1,500 adopt-a-rack structures were funded by a CMAQ grant.

Portland, OR. Sheltered bike racks provide some protection from the elements for bicyclists who commuter to neighborhood main streets.

Philadelphia, PA. Adopt-a-Rack program placed 1,500 bicycle racks on city streets in one year.

B6.4 **Encourage the inclusion of convenient and secure bicycle parking/storage in multi-family residential buildings.** Multi-family residential buildings often discourage bicycle use because of the difficulty of carrying bicycles up stairways, fitting them into elevators, and/or storing them in small apartments. Encouraging developers, building managers, landlords and condominium associations to include secure, easily-accessible space for residents to store bicycles will help increase bicycle use.

B6.5 **Provide secure bicycle parking and other support facilities at employment centers, including secure weatherproof storage, showers, changing facilities, and bicycle repair.** In order to encourage people to use bicycling as a means of commuting, proper facilities are needed to allow people to safely store their bicycle during the work day and shower at the end of a commute. Major employers in Portsmouth should all make such facilities available. Additionally, a centrally-located public "bicycle station" could be constructed by the City, HRT, or a future Transportation Management Association (see Public Transit Strategy 1, p.89).

Enhanced Bicycle Parking

A number of cities and metro regions around the United States have begun to develop enhanced bicycle parking facilities at transit stops and major attractions including employment centers. Such facilities can help bridge the gap between transit routes and travelers' final destinations. The approaches that different cities or even individual transit stations have taken to providing bicycle facilities can provide possible precedents for Portsmouth. These approaches include construction of facilities as well as policy changes.

Washington, D.C.: The new bike station in Washington is located at Union Station—a major transit hub for commuters and tourists. In addition to providing secure parking for over 100 bicycles, the facility provides a changing room, lockers, bike rental, bike repair and retail sales. The station was built by a private company, Mobis/Bikestation (http://www.bikestation.com/), with funding from District Department of Transportation and the U.S. Department of Transportation. A local bicycle rental company, Bike and Roll, is responsible for its day-to-day operations. Mobis/Bikestation has planned, designed, and operates bike stations in Seattle and a number of Californian cities as well.

San Francisco (Bay Area), CA: Bay Area Rapid Transit (BART) has incorporated a number of bike parking options into transit stations, including bike stations (at the Embarcadero in San Francisco and in Berkley), bike stations operated by local bike shops (at the Fruitvale station in Oakland), and bikelink bike lockers (http://www.bikelink.org/) at stations throughout the region. The system has been funded using regional and federal funds for improving air quality as well as regional funds from bridge tolls, sales taxes, and parking revenues.

Philadelphia, PA: The City of Philadelphia amended its Zoning Code in 2009 to require bicycle storage in new office, commercial, and multi-family residential construction. The City's Facilities Maintenance Code now requires existing buildings to include bicycle parking when undertaking major renovations.

New York City, NY: Indoor, secure bicycle parking is required in new developments, substantial enlargements, and residential conversions. The regulations apply to multi-family residential, community facility, and commercial buildings, including public parking garages, in all zoning districts.

Strategy 7

Maintain bikeways in excellent condition.

Regular maintenance is essential to maintain the quality of the bicycle network and the safety of its users. Without maintenance, pavement markings will fade and the pavement itself will become damaged. Uneven pavement surfaces and debris have a greater impact on cyclists than on motorists. Maintaining a continuous smooth pavement surface is imperative to providing an inviting and usable bicycle network.

Action

B7.1 **Develop and implement a maintenance plan for the bicycle network.** Regular maintenance activities should include replacing worn pavement markings and bike symbols, replacing damaged signs, sweeping away debris, repaving streets, and repairing pavement breaks and potholes. The City could prioritize street-sweeping on major bicycle routes after storms and other events. Additionally, crews should pay special attention to bicycle facilities when cleaning the roadway after vehicle crashes.

Street Sweeping. It is especially important on the bicycle network because small debris can cause tire punctures or injure cyclists.

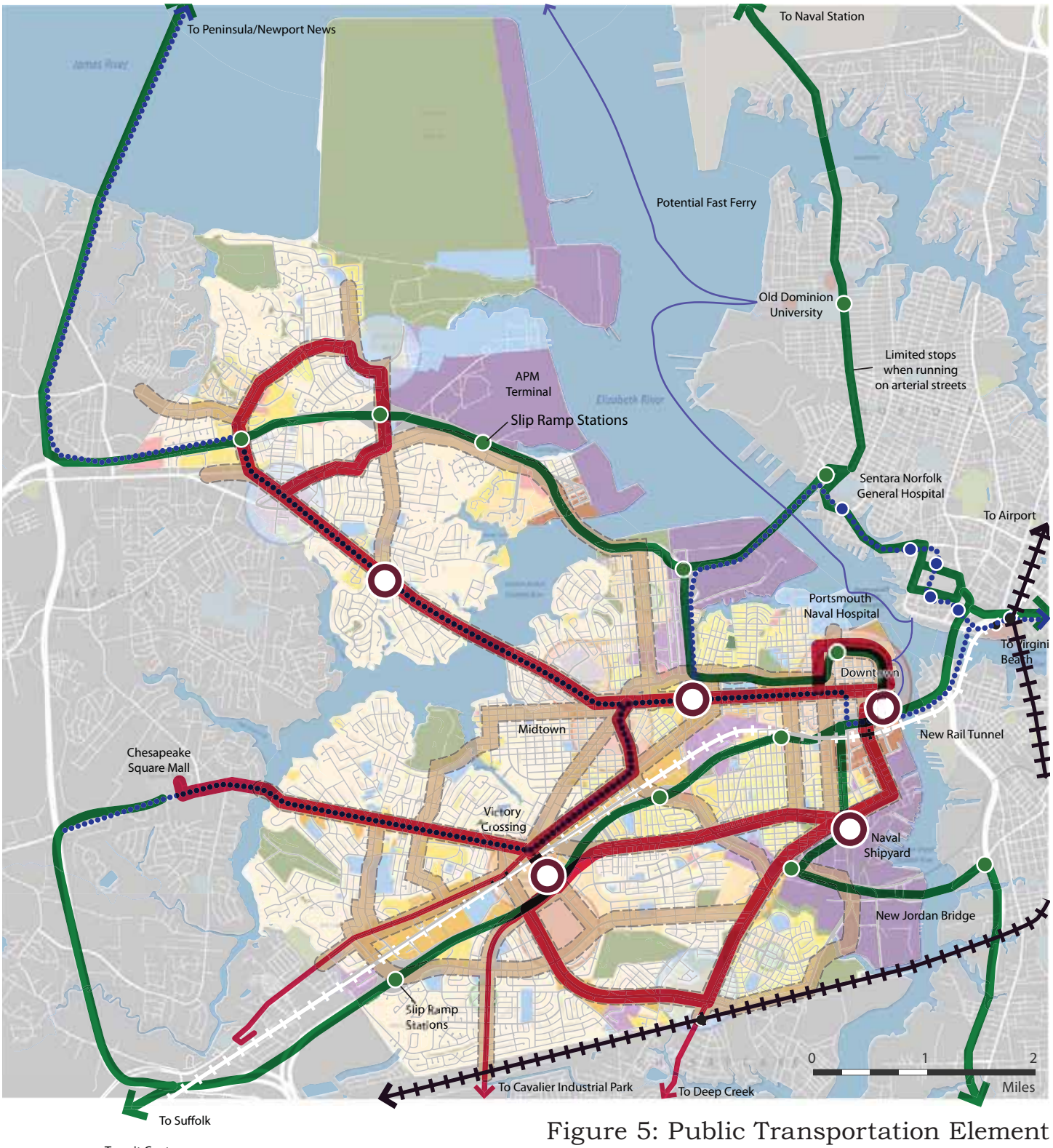


Figure 5: Public Transportation Element

- Transit Center
- High Frequency Transit Corridor
- Other Local Transit Route
- Regional Express Bus Service with Station/Stop
- Potential Passenger Rail/Commuter Rail with Station
- Ferry
- Potential Light Rail Routes
- Multi-Modal Corridors

C. Public Transit and Passenger Rail System

Vision

Public transportation will be a useful, reliable, and enjoyable way to travel throughout Portsmouth and the region.

- It will be possible to live in the city without relying on a car to complete daily tasks.
- People from all walks of life will find that the transit system can meet their mobility needs for many trips.
- The transit system will support the development of major mixed-use hubs, including downtown Portsmouth.
- Portsmouth will be connected to the larger region by an efficient rail network that will include a high speed rail line to Richmond and Washington DC, and light rail connections to Norfolk and Virginia Beach.
- Express bus connections will provide relatively fast connections to transit centers throughout the region. Local transit service will be coordinated with express bus lines.

Background

Public transportation plays a number of roles in a community, from meeting critical mobility needs of residents to improving the environment and contributing to economic development. The public transportation system must function as a convenient and useful service for residents and workers across the City of Portsmouth. It must support the development of major activity centers, including downtown Portsmouth, and lessen the overall dependence on automobiles for everyday life.

Existing bus service is provided by Hampton Roads Transit (HRT). There is no passenger rail or light rail service in Portsmouth, although light rail will soon open across the river in Norfolk. HRT's Paddlewheel Ferry service connects Portsmouth to Norfolk and provides an important alternative to the vehicle tunnels, which are often congested. There are two docks in Portsmouth: one at High Street and a "North Landing" at Harbor Court. The ferry is the only way for bicyclists to cross the river, since the vehicular tunnels do not allow bicycles. HRT carries approximately 1,000,000 riders each year in Portsmouth.

At the present time, transit operations are partially financed by local funding. Portsmouth contributes approximately $2.4 million towards local transit service each year. Even projects such as light rail are being partly financed by local jurisdictions. The lack of regional funding creates serious constraints for the effectiveness of the transit system.

Passenger rail includes commuter rail and intercity rail service that can operate on shared tracks with freight trains. This is distinct from light rail, which runs at high frequency and generally has its own tracks. At the present time, the only passenger rail station in the Hampton Roads region is in Newport News, which has Amtrak service. However, proposals exist to extend high speed rail to the region, possible to the south side. This may be an opportunity to consider commuter rail on the same line, including both intercity and local passenger rail service. The future passenger rail system could both reinforce activity centers in Portsmouth and the region and enhance regional mobility and connectivity by operating in a coordinated way with local transit.

Strategies

Strategy 1

Establish a Transportation Management Association to promote and coordinate transit (and other modes of transportation) and implement Transportation Demand Management techniques.

A Transportation Management Association (TMA) is an entity that works with government and businesses to solve transportation problems and improve transportation programs. A TMA can help to market transit to employees (thus increasing ridership) and also help to plan new services or transit enhancements. The TMA serves as a bridge between employers, government, and transit agencies, helping to improve communication and solve problems.

Actions

T1.1 **Establish a Transportation Management Association in Portsmouth.** TRAFFIX is a regional Transportation Management Association (TMA) staffed by HRT and designed to promote transportation alternatives in Hampton Roads (for more information see the call-out on page 128). The City should consider working with HRT, HRTPO, and local employers, such as the Navy, to establish a local TMA focusing specifically on promoting transit use and other transportation alternatives in Portsmouth consistent with the direction set by the MTP. The TMA will require at least two staff (a Director and a Program Manager) and can be co-located with another entity, such as a chamber of commerce or economic development corporation. The TMA can be funded initially through grant funding as well as contributions from employers and governments. Its mission should be to help the City to promote its transportation programs and convene stakeholders to plan transportation solutions.

MAX Bus Rapid Transit, *Kansas City, MO*. An attractive, modern bus stop contains many important elements with a highly-effective brand identity. This stop includes a large shelter, a highly-visible pylon to advertise the service, a printed schedule with service information, a local area map for pedestrians, and a countdown timer indicating when the next bus will arrive.

Transportation Management Association Profile

Transportation Management Associations (TMAs) are nonprofit, member-controlled organizations that provide transportation services in a particular area, such as a county, municipality, commercial district, medical center, or industrial park. They are generally public-private partnerships, consisting of area businesses with local government support (definition based on TDM Encyclopedia, Victoria Transport Policy Institute, updated 26 July 2008 – see www.vtpi.org/tdm/tdm44.htm).

An example of a typical Transportation Management Association (TMA) is the Bucks County TMA, which serves portions of suburban Philadelphia. The TMA acts as a clearinghouse for local municipalities to address transportation issues, as well as a support network for employers to provide options for commuters.

The TMA represents the interests of dozens of major companies as well as the local municipalities, and helps to form policy statements and advocate for transportation improvements. The TMA provides an employer shuttle system that connects suburban rail stations to job sites to allow reverse commuting. The TMA has also contracted for several studies for possible commuter rail expansion on behalf of its constituents.

In addition to its transportation functions, the TMA is active in the community, providing college scholarships for students interested in careers in transportation and sponsoring safety clinics at local schools.

TRAFFIX, *Portsmouth, VA*. Employees board a TRAFFIX rideshare van outside City Hall for the commute home.

T1.2 **Improve the marketing of the transit system.** A newly created Portsmouth TMA would work with HRT to tailor the marketing program for transit in Portsmouth. This could include collateral materials such as maps and brochures; outreach to employers, schools, and agencies; and design of new services and programs. An integrated approach developed with partner agencies and major employers would be developed to provide incentives to use the transit system.

T1.3 **Establish a network of Employee Transportation Coordinators (ETCs).** ETCs serve as liaisons between employers and transportation providers, providing a conduit for distributing information to transit customers. ETCs generally meet as a group with TMA staff on a monthly or quarterly basis to discuss transportation issues at their companies, review current programs, and network with each other. The TMA and HRT would provide materials for ETCs to use to promote transit options within their companies.

T1.4 **Implement an Eco Pass Program.** An "Eco Pass" is similar to an employer health insurance program. Companies purchase annual photo-ID transit passes in bulk for all employees at deep discounts. This allows all employees (or students at educational institutions such as colleges) to use transit for free with their passes. The program is designed to be revenue neutral to the transit agency, so that ridership increases without increasing costs or decreasing revenue. The Eco Pass program would support other initiatives to improve the transit service by increasing the number of riders and the overall revenue base for transit.

Eco Pass Program

An Eco Pass Program allows employers to purchase transit passes for all employees at a discounted rate. The program is structured to provide a pass to all employees, even if they do not regularly use transit. This greatly reduces the price of each pass. Normally, a transit pass is priced assuming the holder will use it frequently. Under the Eco Pass model, the passes are priced at an average rate of usage, thus lowering the cost of each pass since some holders will use the pass less often. For example:

A hypothetical company with 100 employees currently has 10 employees who commute by transit. An annual transit pass costs $500 for each of those employees. Therefore, to provide 10 passes to those employees who currently ride transit would cost the company $5,000, just to maintain the status quo.

Now assume that an Eco Pass program would double the average transit ridership at the same company. On an average day, 20 employees would take transit, although it might be different people on any given day. The transit agency therefore charges the employer about $10,000 (for the average ridership) to cover the entire firm. Thus, all employees have the freedom to use transit whenever they like, whereas under the traditional model, only the employees already using transit had passes.

Although Eco Passes cost employers money, they can sometimes save money overall by reducing employee parking requirements. A typical employee parking space costs many hundreds of dollars per year to maintain, and the land value is usually thousands of dollars.

The rationale for the program is as follows:

- Employers often provide parking to employees at no direct cost to the employee (the employer pays for the parking facility). The Eco Pass "levels the playing field" for transit.
- Providing the pass serves as an employer benefit program that can improve morale, retention, and attraction of staff.
- Covering all employees increases transit ridership by attracting more riders to transit service. This increase in transit ridership tends to reduce parking requirements and improves the economics of transit.
- The program makes it much more convenient to ride transit. Employees are given a photo-ID that is typically good for a calendar year.
- The pricing model for Eco Pass is similar to health insurance—the cost structure is based on the number of employees covered, not on individual profiles of employees.

Strategy 2

Advocate for regional transit funding

To improve the transit network will require funding. At the present time, service levels are heavily dependent on individual local government contributions, and local jurisdictions have considerable influence over route design and performance. Creating a regional funding source would provide a more stable and equitable way to fund transit, allowing for system expansion and improvements.

Actions

T2.1 **Work to create a regional coalition to address transit funding.** Portsmouth should advocate establishment of a working group comprised of Hampton Roads jurisdictions and the Hampton Roads Transportation Planning Organization (HRTPO) to push for regional transit funding. The intended outcome of this action is to create a legal mechanism for a dedicated funding stream for transit at the regional level, thus replacing the need for local funding of transit operations and improvements. As part of this action, regional leadership could be engaged in fact-finding missions to share ideas with successful transit systems around the country.

Regional Transit Funding

Public transportation usually began as a private enterprise. For example, streetcar companies were often owned by conglomerates that generated electricity or sold real estate. Over time, public transit operation became unprofitable due to a wide range of factors such as rising costs, falling ridership, and government regulation. Generally, local or state governments stepped in to buy out ailing private transit companies in order to maintain essential transportation service.

Around the country, publicly owned transit companies are funded in many different ways. Generally, most operations are funded by the state or another unit of government, with the federal government also making a contribution. The usual funding strategies for mass transit include:

- State funding from the general fund.
- State funding from a dedicated account or "trust fund." This may be collected through a specific tax or taxes or a regular transfer from general funds.
- Local funds, such as the general funds of counties or municipalities.
- Funds collected by special purpose local taxing districts.

Generally, if a special tax is collected that is dedicated to transit it consists of:

- Various fees on motor vehicles — most typically, a registration fee, a tax on rental cars, or other feeds or taxes associated with owning or using an automobile.
- Sales tax (for example, 1%).
- Property tax.
- Fuel tax.
- Payroll taxes.

Regional Transportation Authorities

The Virginia legislature established the Hampton Roads Transportation Authority (HRTA) and the Northern Virginia Transportation Authority (NVTA) to collect new taxes and fees dedicated to transportation. The NVTA would have used some of the money collected to fund specific transit projects and programs, while HRTA would have constructed major road projects in the Hampton Roads region, such as the Third Crossing.

The creation of regional authorities to fund mass transit is common throughout the United States. However, the proposed regional transportation tax was blocked by the Virginia Supreme Court, which ruled that the arrangement was unconstitutional under Virginia's constitution. One possible way to address the ruling would be to have the legislature create the taxes and fees, rather than a regional authority, and then pass the funds through to the authority to implement transportation projects. If such an arrangement were pursued, it would be an ideal source of funding for transit in the Hampton Roads region.

Congestion Mitigation and Air Quality

In 1990, Congress created the Congestion Mitigation and Air Quality Program (CMAQ, pronounced "See-Mac"). This funding program has been reauthorized in subsequent transportation bills, including the 2005 Safe, Accountable, Flexible, and Efficient Transportation Equity Act: A Legacy for Users (SAFETEA-LU).

CMAQ provides funds to areas that do not meet federal air quality standards (non-attainment areas) and to areas that formerly did not meet standards (maintenance areas). These funds are used for projects that reduce emissions, including transit programs. The Portsmouth Loop shuttle was created using CMAQ funds. Projects must demonstrate effectiveness in reducing emissions.

Many areas have used CMAQ funding to launch transit operations. It could be a potential funding source for new high-frequency bus corridors in Portsmouth, or other transit upgrades that could demonstrate reductions in emissions. Permanent funding would need to be identified to continue successful routes.

DRAFT

The FTA "New Starts" and "Small Starts" Process

The Federal Transit Administration (FTA) administers the "New Starts" program, which funds construction of new fixed-guideway (i.e., rail) transit. This program is currently funding the Norfolk light rail project. SAFETEA-LU authorized $8.0 billion in Section 5309 New Starts funding for fiscal years 2005 through 2009 for the construction of new transit projects. Competition for the funding has been extremely competitive, and the majority of proposed projects are not funded. The FTA uses a cost effectiveness analysis to prioritize projects for funding.

Under New Starts, FTA requires a series of steps before it determines whether it will sign a Full Funding Grant Agreement (FFGA). The agreement essentially serves as a contract that FTA will fund its portion of the project cost, allowing the project to proceed into construction. The major steps include:

- Alternatives Analysis: where a range of options are considered, the "Locally Preferred Alternative" is selected, and initial feasibility is determined.
- Preliminary Engineering: where the environmental studies are completed, the financial plan is created, and the preliminary engineering (design) is conducted.
- Final Design: where right of way is secured, local funding is committed, and construction plans are created.
- Full Funding Grant Agreement: when FTA commits to carry out the project.
- Construction

FTA has been requiring most projects to have a local funding match of 50 percent. According to the *Virginian-Pilot*, the FTA is contributing $128 million towards the light rail project in Norfolk. The City of Norfolk is contributing approximately $56 million, the state is contributing $67 million, and $39.2 million comes from other federal sources.

Some rail projects are funded at the Congressional level as line items in the transportation bill (aka "earmarks"). These projects do not need to compete for federal funding with other projects, but they must still complete the required environmental studies.

FTA also administers the "Small Starts" process, which can fund smaller programs such as Bus Rapid Transit and streetcars. Competition for these smaller grants is also very competitive.

Strategy 3

Work with HRT to implement the Transit Vision Plan for the Hampton Roads Region.

HRT, Hampton Roads Transportation Planning Organization (HRTPO), and the Virginia Department of Rail and Public Transportation (VDRPT) have collaborated to produce a **Vision Plan** for the Hampton Roads transit system. This plan outlines strategies to improve marketing, operations, and funding for the transit network. The plan also identifies several corridors for transit improvements in Portsmouth and the region, including new express bus corridors, bus rapid transit, and rail corridors.

Actions

T3.1 **Work with HRT and others to establish an implementation committee.** Portsmouth should participate in an implementation committee to carry out the Transit Vision Plan.

T3.2 **Refine and implement Portsmouth transit corridors and concepts identified in the Vision Plan.** While the Vision Plan is a starting point for transit corridor planning, refinement is needed. In particular, a rail route through Portsmouth should be selected and designed (see Transit Strategy 4). This plan presents a conceptual map for reorganizing bus service (see Figure 5). Portsmouth should take a leadership role on implementing the Portsmouth portions of the Vision Plan and reorganizing bus service, as well as aligning transit-supportive land use policies in transit corridors.

Strategy 4

Build light rail transit in Portsmouth.

Light rail transit will help to shape the land use patterns of the City to create walkable centers, while offering a high capacity, high quality transportation option for city residents and visitors. Light rail transit is a "big idea" that can help to focus the discussion on transit in Portsmouth. Currently light rail in Norfolk is nearly complete, and Virginia Beach is studying an extension of the initial line. HRT has identified light rail in Portsmouth in the long range Vision Plan¸ but no other planning has been completed.

A particularly important issue is the potential for light rail to cross the Elizabeth River, which will require construction of a new rail tunnel. This would provide high capacity transit as an alternative to congested vehicular tunnels. One of the concerns is that plans to expand the Midtown tunnel do not include light rail service.

The coordination of light rail investments with other transit modes is also an issue. The light rail system should be designed to anticipate the construction of intercity high speed rail line to Portsmouth and/or Norfolk.

Actions

T4.1 **Engage HRT and HRTPO to plan for future light rail in Portsmouth.** This would include potentially following the FTA "New Starts" process, similar to the experience in Norfolk and Virginia Beach. Alternatively, Portsmouth could attempt to plan and build a system with regional funding, provided that the regional transit funding situation is improved.

T4.2 **Preserve options for rail access across the Elizabeth River.** Due to the proposed expansion of vehicular tunnels under the Elizabeth River it is critical to plan a corridor for future rail service (both light rail and intercity rail) through Portsmouth to Norfolk under the river. The City should use all available channels to advocate reservation of an adequate corridor for this purpose.

Light Rail

The term "light rail" was invented by the United States Government in the 1970s to describe the transformation of traditional streetcar systems into a new form of mass transit. The name "light" refers to the fact that these railways are intended to carry a lower passenger volume than a "heavy rail" system such as the Metro in Washington, DC.

Light rail systems employ aspects of streetcars, subways, and railroads. Like a streetcar, light rail can operate in city streets, but systems are also designed with private right of way, including subway tunnels and viaducts. Typically, they offer greatly increased speed and capacity as compared to traditional streetcar systems, and can be implemented at less cost than a traditional heavy rail (metro) system.

By the 1970s, only a small number of electric streetcar networks were still in operation in the United States (including Philadelphia, Boston, Cleveland, and San Francisco). However, at that time United States transit agencies began to plan and design rail systems that followed European precedents — especially Germany. San Diego is generally considered to have the first modern generation light rail system in the United States, opening in 1981 with imported German trains.

Entirely new light rail systems have opened in:

1981	San Diego, CA
1985	Buffalo, NY
1986	Portland, OR
1987	Sacramento, CA
1987	San Jose, CA
1990	Los Angeles, CA
1992	Baltimore, MD
1993	Saint Louis, MO
1994	Denver, CO
1996	Dallas, TX
1999	Salt Lake City, UT
2000	Jersey City, NJ
2004	Minneapolis, MN
2004	Houston, TX
2004	Camden, NJ
2007	Charlotte, NC
2008	Phoenix, AZ
2008	Oceanside, CA
2009	Seattle, WA
2010	Norfolk, VA

In addition to its function as a people-mover, light rail also serves as a way to stimulate Transit Oriented Development. For example, $1.8 billion in new development was proposed along the new Charlotte light rail line within the first year of its opening. In Dallas, estimated of development attributed to light rail are over $4 billion. The impact on development patterns is generally attributed to the permanence and visibility of the investment in light rail and the attractiveness for both residents and employers to locate near light rail stops.

Norfolk and HRT will inaugurate light rail service in 2010.

Strategy 5

Create high frequency transit corridors.

A high frequency transit corridor is one where service operates so often that passengers do not need a schedule to ride. Long headways (more time between buses) are a disincentive for passengers using the service, as is inadequate span of service. Standard suburban headways are usually 30 minutes. (Generally, corridors that are considered "high-frequency" have service every 12 minutes or less.)

Sometimes, higher frequencies can be achieved by "bundling" multiple routes onto one corridor. For example, if three routes run along a street, and each route runs every 30 minutes, there would be six buses per hour. If schedules were staggered, then this corridor would have service every ten minutes. However, this approach is not always possible due to the need to schedule buses to "pulse" at transit centers.

Successful corridor service requires superior branding and marketing. Therefore, the corridors should have vehicles that are distinguished from normal transit service. They should be colorful, with bold graphics, and a higher level of passenger amenity. Bus stops should be upgraded with information, graphics, schedules, shelters, lighting, and other infrastructure. Successful case studies from other cities, such as Boulder, Colorado, should be used as models.

HRT is currently completing a Comprehensive Operations Analysis that will provide data about existing service and recommend modifications to improve efficiency and utility of the transit system. This report should be extremely useful as a foundation for modifications to the transit network.

Actions

T5.1 Implement high-frequency transit routes on key multimodal corridors. The MTP identifies candidate corridors for high-frequency bus service, mostly coordinated to run along the multimodal corridors. The City should work with HRT to initiate a pilot project to test the concept on the corridor most likely to be successful. Stakeholders from the destinations along the route should be included on a design committee.

T5.2 Make transit improvements along multimodal corridors. These improvements can include improved bus stops with shelters, customer information, improved infrastructure, and transit priority or improved traffic signals at key intersections.

Kansas City, MO. It is important to provide service information such as schedules and maps at all shelters. These examples are very informative, but may not fit at all stops.

Designing a new transit route

To create a successful high frequency route, the City should follow best practices from other cities that have launched new bus services. The following points are an outline for steps to plan and deploy a new high-frequency transit corridor.

- A design committee should be created with representatives from key constituencies, including transit staff (operations, planning, maintenance), as well as constituents and stakeholders such as major employers, user groups, and local representatives. The committee should be involved in all aspects of decision making about the route.
- The bus livery (paint scheme) should be instantly recognizable and distinct from other routes and should reflect a high level of graphic design.
- The bus interior should reflect a high level of comfort and superior design.
- The marketing plan for the route should be created in coordination with outreach experts. The goal should be to have everyone along the route know about the new service and how to use it.
- The City and HRT should work to get transit passes in the hands of as many people as possible along the route. This could include annual passes provided through employers (similar to health insurance programs). Pass programs have been shown to increase ridership by removing barriers to riding.

High Frequency Transit Corridor Case Study

In the early 1990s, Boulder, Colorado, was attempting to increase transit ridership in order to prevent increases in congestion. The City began to design "community shuttle" services that would be more attractive than traditional bus service.

Key concepts were the use of special buses with more comfortable seats, specialized paint schemes, onboard music, improved routes, and other passenger-suggested design concepts.

The first shuttle to open was the "Hop" in 1994. Partly funded with Congestion Mitigation Air Quality (CMAQ) funding, small buses with plush seating connected downtown, the University of Colorado, and the local shopping mall every 10 minutes for 25 cents (introductory fare). Ridership quickly exceeded 4,000 trips per day.

Next, the City worked with the transit agency to apply the concept an existing transit route. The Route 202 had operated every half hour, with an average daily ridership of 3,700 passengers per day. The new route, called the "Skip," was a more direct version of the old route with new special buses operating every six to ten minutes. Ridership quickly grew to over 5,000 passengers per day, and was over 7,000 passengers per day within five years.

Portsmouth, VA. The Downtown Loop provides service around downtown Portsmouth every 30 minutes throughout the day.

Washington, DC. The DC Circulator began as one route connecting Georgetown and Union Station. There are now five Circulator routes operating with frequencies as little as every 10 minutes. Passengers can purchase tickets at on-street parking meters and board through any door, reducing the amount of time buses stop to pick up and discharge passengers.

Strategy 6

Build new and improve existing transit centers and pulse hubs.

Transit centers are locations where people make transfers among services. They are usually incorporated into major activity centers such as downtown or Victory Crossing.

A "pulse hub" is a place where bus connections are timed in a "pulse" that allows riders to connect between several lines in a short amount of time.

Both transit centers and pulse hubs should include the following amenities and infrastructure:

- Benches and seating.
- Climate protection and shelter.
- Adequate lighting.
- Passive surveillance for security (e.g., from adjacent buildings).
- Bicycle racks and storage.
- System maps.
- Bus schedule board.
- Adequate infrastructure for the bus to stop.
- A relatively direct and efficient bus circulation pattern.
- PA system tied to control center.
- Closed circuit television with recording ability.

Red Rose Transit Authority, *Lancaster, PA.* The Red Rose Transit Authority constructed the Queen Street Bus Station with eleven bays to provide a pleasant place for all of its bus lines to meet in downtown Lancaster, PA without blocking city streets. Buses from key urban and regional routes meet and leave the station at the same time so that passengers can quickly and easily transfer to other routes.

Actions

T6.1 **Construct transit centers in Portsmouth.** The priority locations are downtown (in close proximity to the High Street ferry landing), Victory Crossing (within walking distance of Tidewater Community College), and Churchland. A potential location for a downtown transit center would be the parking lot at the High Street boat basin.

T6.2 **Create "pulse hubs" among bus routes to allow connections.** For routes that operate relatively infrequently, it is important to coordinate schedules to allow for transfers. Schedules should be synchronized. For example, buses to downtown Portsmouth should be coordinated with the ferry schedule.

T6.3 **Plan for a downtown "Intermodal Station."** An intermodal station would connect passenger rail, light rail, ferry service, and bus service. As such, it would represent a major investment that would be coordinated with significant new private development. It should be planned to offer a highly efficient exchange between through services (such as express buses and future intercity rail service) and local transit services. The station should be accessible on foot from downtown Portsmouth. A potential location might be near the downtown tunnel.

T6.4 **Upgrade local bus stops.** Bus stops should have a direct sidewalk connection that allows for universal access (including by the physically disabled), a place to sit, shelter, schedule information, and system maps. It will take time to make improvements to all bus stops, so the busiest stops should receive priority. It may be possible to work with partners to sponsor bus stop improvements. It may also be possible to derive funding from commercial advertising at bus shelters.

Bus Bulbout, *Seattle, WA*. This bus bulbout allows buses to pull to the curb to pick up passengers without having to merge back into traffic on this busy commercial corridor, saving precious minutes in the schedule.

Strategy 7

Improve Regional Express Bus Service

HRT has implemented "MAX" service, which is express bus service on area highways. This service could be expanded to provide better regional connectivity to Portsmouth. One of the key factors for express bus service is to have efficient stations that allow for quick access to and from the highway.

Actions

T7.1 Work with HRT to expand and improve regional express bus service. New routes should be evaluated and existing routes should be refined. The MTP includes a conceptual plan for an express bus network (Figure 5). Riders should be surveyed to determine ways to improve the existing service and routing. Consideration should be given to using over the road coaches that are more comfortable and appropriate for long trips with few stops. A key consideration is that highway interchanges should be designed to allow efficient loading of express routes without circuitous routing or undue delays.

Strategy 8

Implement passenger rail and commuter rail through Portsmouth.

Virginia is planning new passenger rail service, including High Speed Rail. A corridor is proposed to connect the Hampton Roads region to Richmond and beyond. None of the corridors currently proposed would directly serve Portsmouth. Between Suffolk and Portsmouth, the CSX corridor would provide an ideal route for passenger rail—including both intercity rail and commuter rail. However, the Norfolk Southern corridor that skirts the southern border of Portsmouth and would terminate at Harbor Park in Norfolk is being advanced through the federal permitting process.

Actions

T8.1 **Advocate for passenger rail that directly serves Portsmouth.** The City should work with HRTPO and the Virginia Department of Rail and Public Transportation (VADRPT) to support a route that uses the Norfolk Southern corridor between Suffolk and Norfolk. A rail and bus station adjacent to downtown Norfolk (and the Navy Yard and Naval Hospital) is needed. This corridor would accommodate high speed rail and local commuter rail. A Portsmouth station could be located near George Washington Highway and Victory Boulevard.

Commuter Rail, *Seattle, WA*. A "Sounder" commuter rail train heads north out of Seattle, WA with evening commuters on their way to Everett, WA. Weekday, peak-hour commuter rail service such is now operated by nearly a dozen regional transit agencies, including Albuquerque, NM, Minneapolis, MN, and Nashville, TN. Salt Lake City's "FrontRunner" commuter rail line has the most service of any new commuter rail service with trains every 30 minutes from 5 am until midnight on weekdays and hourly on Saturdays between Provo and Salt Lake City.

Strategy 9

Improve ferry service and offer high speed ferry service.

The Hampton Roads region is one of the most prominent harbors in the world, yet it has very little ferry service relative to the size of the regional market. The existing ferry service is a critical link, providing an alternative to the congested vehicle tunnels and a strong connection between downtown Portsmouth and Norfolk. However, as a comparison, cities such as Brisbane and Sydney, Australia, have extensive ferry boat networks for both commuters and tourists. Increased ferry service can help to provide an alternative to congested road crossings of the water, and also offer the potential to directly serve some job centers along the waterfront.

Actions

T9.1 **Implement early morning ferry service.** Earlier runs of the existing Paddlewheel Ferry will allow for commuters working early shifts to use transit.

T9.2 **Coordinate buses with ferry schedules.** Such coordination will increase efficiency and usage of both bus and ferry service. A downtown transfer point could be created that connects buses to ferries, increasing ridership on both modes.

T9.3 **Improve ferry signage.** New signs in downtown Portsmouth and Norfolk should be installed to direct travelers to the ferry landings. These should be installed at intersections radiating out from the ferry landing for approximately a quarter mile. Ferry maps should be installed at the landings showing the route (and special services such as baseball game ferries). A picture of the actual ferry should be installed at the dock so that people walking by can learn about the ferry even when it is not docked at the landing.

T9.4 **Work with HRT and HRTPO to study the potential for increased ferry service.** A study should be undertaken to document successful ferry operations in regions similar to Hampton Roads. If the study results in recommendations or strategies for improved or increased ferry service, the City should work with HRT and the partners to carry out the recommendations.

Paddlewheel Ferry, *Portsmouth, VA*. The Paddlewheel Ferry operated by HRT carries passengers and bicycles across the Elizabeth River from downtown Portsmouth to downtown Norfolk.

Fast Ferries

Around the country and the world, high speed ferry services operate in metropolitan areas similar to the Hampton Roads. Generally, these ferries utilize catamaran designs (two hulls), which allow for greater speed and stability. Examples include:

- MBTA Harbor Express (commuter ferries) in Boston, MA.
- Salem Ferry from Salem to Boston, Massachusetts.
- Several fast ferries operate in the Great Lakes region.
- Seabus in Vancouver, British Columbia, Canada.
- CityCat in Brisbane, Queensland, Australia

The Old Bay Line

Until 1962 it was possible to take an overnight cruise between the Hampton Roads region and Baltimore (and previously to Washington DC). For 122 Years the Baltimore Steam Packet Company, affectionately known as the "Old Bay Line," operated scheduled service on the Chesapeake Bay, transporting passengers, cargo, and automobiles to the Hampton Roads region. The service was an overnight trip, with elegant dining, entertainment, and comfortable staterooms provided for passengers. The journey from Baltimore to Norfolk took 12 hours, but passengers were offered many diversions and comfortable beds, in addition to the romantic atmosphere of a night cruise on the Chesapeake Bay.

The name "Steam Packet" was a universal term for scheduled steam ship service derived from the "packets" of mail that were carried. With the rise of better roads, airplane service, and the demise of mail and freight contracts, the service shut down. The steamship company was owned and managed for much of its existence by railroads, which coordinated the line with passenger rail operations.

Market conditions for Chesapeake Bay service have changed since service was discontinued in 1962. While automobiles and airplanes remain dominant modes of transportation, the overall market for transportation has increased considerably because of population growth. Also, increasing congestion has made driving less attractive than it once was. However, labor costs and other expenses have also increased since the Old Bay Line was in operation. However, despite these obstacles, it is worth exploring the potential for increased passenger traffic on ships in the Chesapeake Bay region. Increasing use of Portsmouth harbor for passenger transportation could have economic and mobility benefits for the City and its residents.

582 *Schedule figures on this page are Eastern "DAYLIGHT SAVING" time.*

BALTIMORE STEAM PACKET COMPANY

(OLD BAY LINE)

Passenger and Freight Service

BALTIMORE, OLD POINT COMFORT AND NORFOLK, VA.

STEAMERS

"City of Norfolk," "City of Richmond" and "District of Columbia"

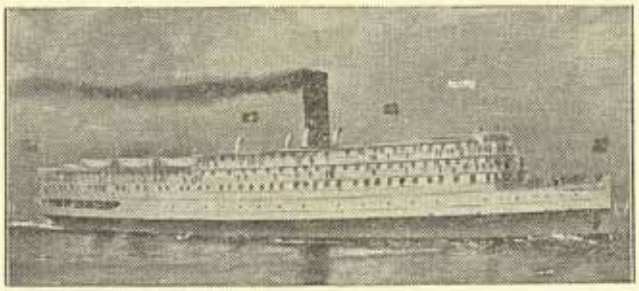
BED AND BERTH ROOMS with Private Tub Baths, Shower Baths and Toilets, and Toilet Conveniences only.

Staterooms from $2.00 to $6.75

Bedrooms, with Double Beds, also Two Beds, $3.75 to $6.75

Berthrooms (upper and lower berth), $2.00 to $4.50

Running Water in all Rooms.



Dinner from $2.00

Breakfast $1.25

Also A la Carte Service

Fares shown below apply between Baltimore, Old Point Comfort and Norfolk.

FARE $5.80 (EACH WAY) (Plus tax)

AUTOMOBILES $8.50 (Plus tax)

When accompanied by passenger.

Reservations must be made in advance and acceptance subject to conditions at time requested.

Baltimore - Old Point Comfort - Norfolk

Between Baltimore and Norfolk Steamers of this Company operate daily, including SUNDAYS, leaving Baltimore and Norfolk 6 30 p.m. (All Schedules shown are EASTERN "DAYLIGHT SAVING" TIME.)

GOING SOUTH.			GOING NORTH.		
Lve. Baltimore (*Pier 3, Pratt Street*)	6 30 P M	.....	Lve. Norfolk (*Foot of West Main Street*)	6 30 P M	.....
Arr. Old Point Comfort (*Fortress Monroe*)	5 30 A M	.....	Lve. Old Point Comfort (*Fortress Monroe*)	7 30 P M	.....
Arr. Norfolk (*Foot of West Main Street*)	6 30 A M	.....	Arr. Baltimore (*Pier 3, Pratt Street*)	6 30 A M	.....

All sailing dates and schedules shown above subject to change without notice.

Through differential freight rates and service between the East and the South and West, via all carriers serving Baltimore, Maryland and Norfolk, Portsmouth and Old Point Comfort, Virginia.

General Offices and Piers—Pratt and Gay Streets, Baltimore 2, Md.
Norfolk 10, Va.—Foot of West Main Street

R. E. DUNN, President, Baltimore 2, Md.

R. P. JONES, Vice-President, Seaboard R.R. Bldg, Norfolk 10, Va.
C. E. CLUBB, Secretary-Treasurer, Baltimore 2, Md.
W. MASON KING, Vice-Prest., Southern Ry. Bldg, Washington 5, D. C.
G. S. JENKINS, Auditor, Baltimore 2, Md.

PASSENGER TRAFFIC DEPARTMENT

R. L. JONES, Passenger Traffic Manager, Baltimore 2, Md.
F. A. MATTERN, General Passenger Agent, "
C. S. KIRWAN, Assistant General Passenger Agent, "
J. C. GRAUER, Chief Clerk and Agent, "
W. H. COX, Traffic Representative, Norfolk 10, Va.

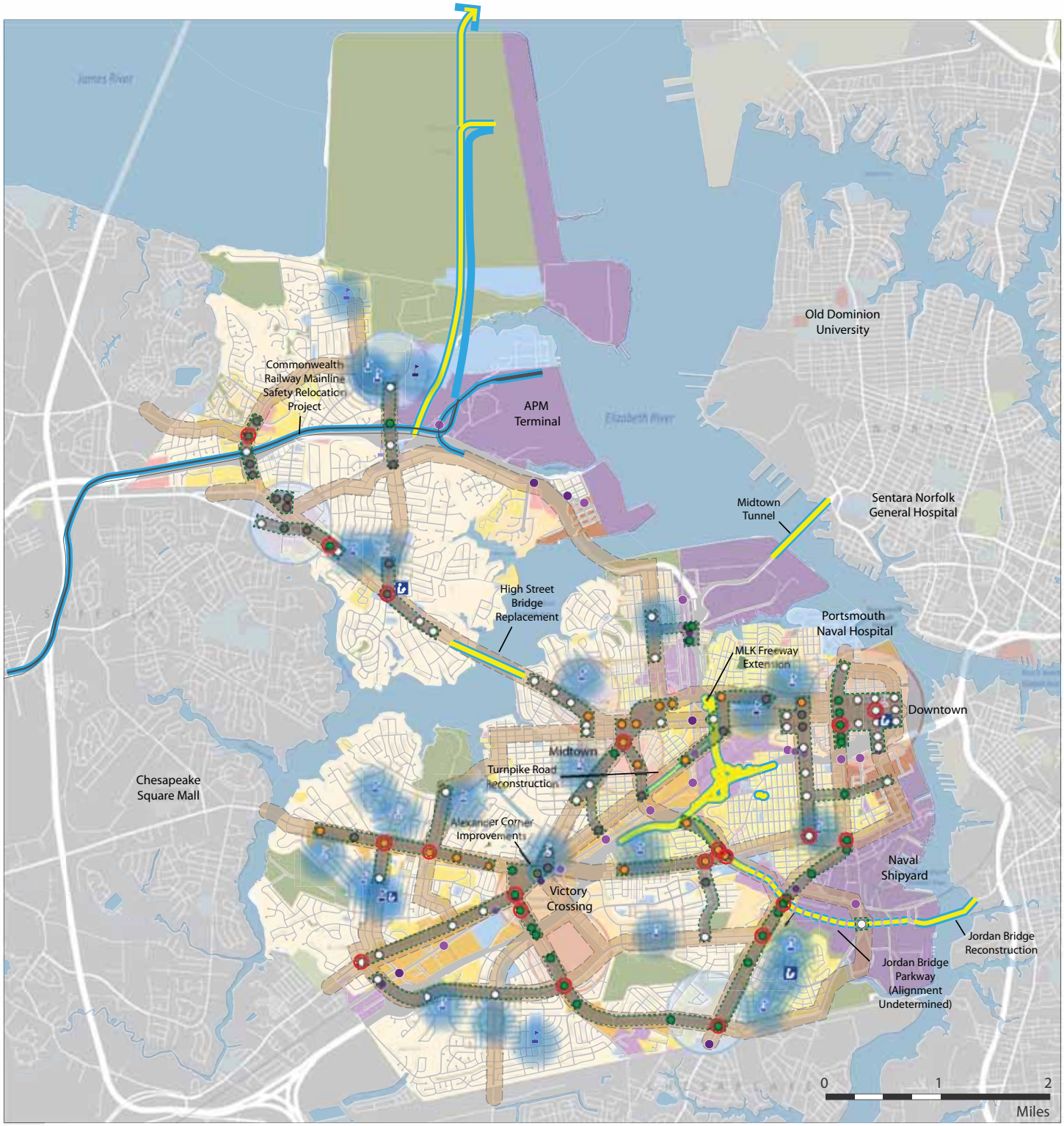
FREIGHT TRAFFIC DEPARTMENT

C. M. SMYRK, Freight Traffic Manager, Baltimore 2, Md.
GEO. L. STERN, Assistant Freight Traffic Manager, "
A. H. BETTIEN, Assistant General Freight Agent, "

H. J. SCHAFER, General Agent, Baltimore 2, Md.
W. A. MILLER, Port Engineer, "
G. WM. SCHUNCKE, Jr., Purchasing Agent, "
R. E. DUNN, Jr., General Freight Agent—Claims, "

J. B. GALLAGHER, General Agent, Norfolk 10, Va.
R. F. IRWIN, Agent, "
Miss R. E. SAUNDERS, Agent, Old Point Comfort, Va.

Old Bay Line schedule from *The Official Guide of the Railways*, May 1958.



Traffic Signals

- Signal upgrades (phase 1)
- Signal upgrades (phase 2)
- Existing Signal- On Central System
- Existing Signal - Not on Central System

Traffic Signal Synchronization Zones

- Traffic Signal Synchronization Corridor

Traffic Calming

- Priority Traffic Calming Zones

Roadway Improvement Projects

- Major Roadway Projects
- HSIP Intersection Improvements

Railroad Grade Crossings

- Unprotected (Crossbucks or Flashers Only)
- Protected (Flashers and Crossing Gates)

- Multi-Modal Corridors

Figure 6: Motor Vehicles and Parking Element

D. Motor Vehicles and Parking

Vision

The vehicular system will allow efficient flow of traffic in and through Portsmouth without compromising movement by other transportation modes or quality of life for Portsmouth residents.

- Roadways will be safe for motorists and all other users.
- Increases in traffic congestion will be minimized to ensure smooth and efficient flows. Where possible, traffic congestion will be reduced over present levels.
- The needs of regional, commuter and local travelers will be balanced through enhanced multimodal opportunities, complete streets, clear signage, and optimized system operations.
- Air quality will be equal or better than it is today by reducing emissions through a greater use of alternative transportation options and optimized system operations.
- Public and private parking will be safe, of sufficient supply, aesthetically pleasing, and minimally harmful to the environment.
- The roadway system will facilitate realization of the Destination 2025 Comprehensive Plan Vision and Future Land Use Concept, including establishment of walkable activity centers and a vibrant downtown.

Figure 7: Level of Service 2000 Forecast

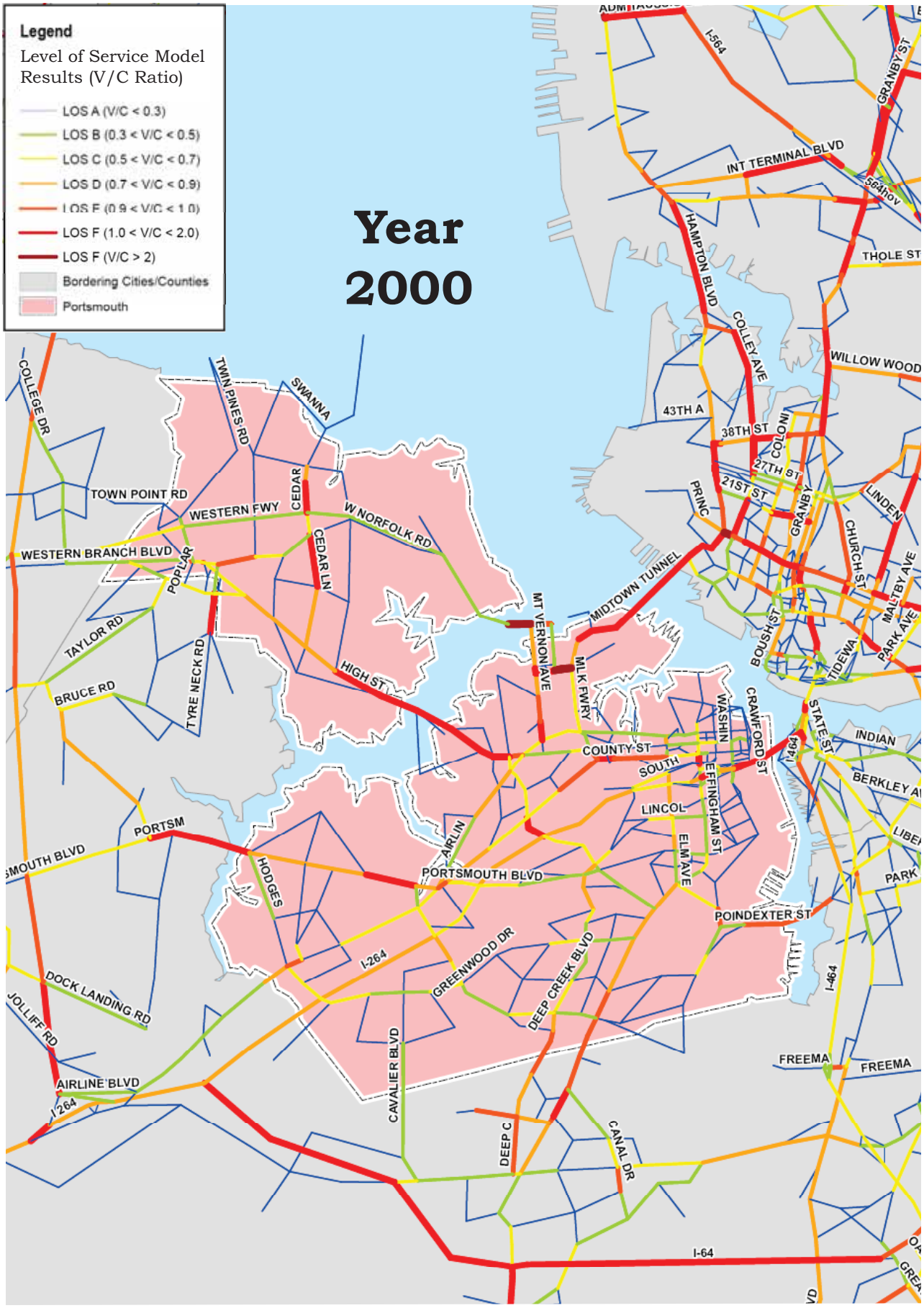
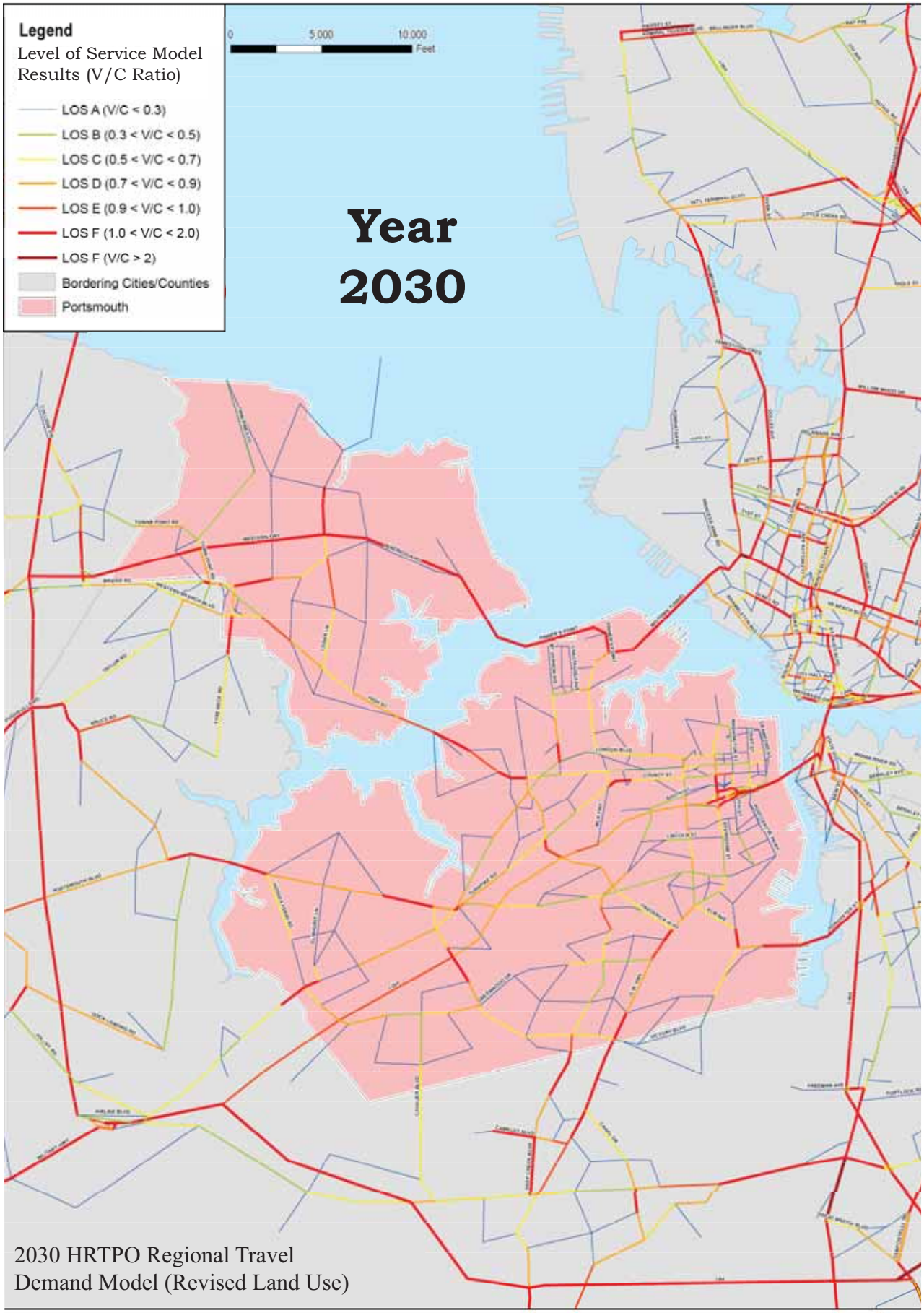


Figure 8: Level of Service 2030 Forecast



Background

Automobiles are the dominant mode of transportation in Portsmouth. Most roadways in the City were designed with a focus on moving motor vehicles quickly and efficiently. As a result, drivers can cross the entire city in around twenty minutes at almost any time of day. However, few accommodations have been made for pedestrians or other roadway users outside of downtown and older neighborhoods. Because much of the existing and projected funding for transportation projects in Portsmouth is targeted for motor vehicles, the City will seek to include accommodations and safety improvements for all users when improving the motor vehicle network.

There are some areas that experience heavy traffic congestion during peak travel times today. Most of these trouble spots are related to interchanges within the regional highway network – primarily I-264, the MLK Freeway, and the Downtown and Midtown tunnels. Aside from regional highways, major intersections such as Alexander's Corner and George Washington Highway at Victory Boulevard are the most significant congestion points. Figure 7 and 8 illustrates the 2000 and anticipated 2030 Levels of Service (LOS) for Portsmouth roadways. LOS A through D are generally considered acceptable while LOS E represents at-capacity conditions and LOS F represents over-capacity conditions with severe congestion. This scenario assumes growth and redevelopment within the City's activity centers but does not account for any significant increases in multimodal transportation. In addition to the regional highways, this forecast projects significant congestion on portions of the Western Freeway, Cedar Lane, High Street, Portsmouth Boulevard, Deep Creek Boulevard, Frederick Boulevard, Victory Boulevard, George Washington Highway, and Elm Avenue.

In response to this forecast of increasing congestion, key projects and improvements to the vehicular system have been identified and are described in the text below and illustrated in Figure 6 (p.112). These projects range from lower cost, operational improvements which improve traffic flow to regionally significant construction projects which will create additional linkages to provide commuters and freight carriers with alternative routes through and around Portsmouth. Combined with recommendations from other components of the Master Transportation Plan to create additional opportunities for walking, bicycling, and transit, these projects will help to minimize and reduce congestion and improve vehicular traffic flow while expanding access to all road users.

This chapter also addresses the issues of supply and design that relate to parking for motor vehicles.

Strategies

Strategy 1

Improve roadway safety through infrastructure design.

Roadway design contributes directly to driver behavior and roadway safety. Substandard design and maintenance can exacerbate reckless driving habits and poor decision making, which may result in crashes with property damage or personal injuries. In addition, the absence of multimodal accommodations for pedestrians, bicyclists, and other road users contributes to unsafe roadway conditions. The City should identify high-crash locations and other unsafe roadway corridors for implementation of safety measures for all users.

Actions

V1.1 **Construct the improvements identified as part of the Roadway Safety Audits (RSA) program and funded through the Highway Safety Improvement Program (HSIP).** The City has undertaken a series of Roadway Safety Audits (RSAs) to identify specific intersection improvements that can mitigate specific crash types at 20 high-crash locations within the City. The purpose of the RSA program is to identify locations where improvements will yield a high benefit to cost ratio, such that they are eligible to compete on a district or statewide level for VDOT's Highway Safety Improvement Program (HSIP) funding. At the majority of intersections receiving HSIP funding, bicycle and pedestrian improvements (sidewalks, crosswalks, pedestrian signal heads) will be funded and constructed along with vehicular improvements in accordance with VDOT's "Policy for Integrating Bicycle and Pedestrian Accommodations."

Dangerous Intersection, *Portsmouth, VA*. The intersection of George Washington Highway and Victory Boulevard had the most crashes in Portsmouth between 2005 and 2007.

V1.2 **Continue to conduct RSAs on an annual basis using proactive HSIP funding.** Proactive HSIP (PHSIP) funding has been set aside for each of the localities within the Hampton Roads Transportation Planning Organization (HRTPO). The City of Portsmouth can use this funding to conduct additional RSAs in order to apply for future HSIP funding for roadway, bicycle and pedestrian, and rail crossing improvements.

V1.3 **Conduct additional RSAs to explore the need for safety improvements beyond the limits of specific intersections.** While most crashes occur at roadway intersections, safety issues can also arise along corridors between intersections. For example, driveways and other access points can create conflicts between motor vehicles, pedestrians, and bicyclists. In addition, future RSAs are likely to identify missing portions of sidewalks and bikeways as safety issues eligible for HSIP funding.

V1.4 **Construct mast arm installations and pedestrian amenities at signalized intersections throughout the city.** The City is converting existing span wire signals to mast arm installations to provide higher visibility for all users and to enhance communication for motorists. (All new mast arms and supporting infrastructure will be dark green or black in color.) Pedestrian accommodations, including crosswalks, push buttons, and countdown signal heads, will be deployed at all signalized intersections within the City. At intersections where signal timing will not allow for a full pedestrian crossing phase, a median refuge with a pedestrian push button will be installed to allow pedestrians to cross one half of the roadway during each signal cycle. These elements will be connected to adjacent pedestrian facilities.

V1.5 **Implement traffic calming techniques.** The City will prioritize traffic calming efforts on local and collector streets near schools, parks, and activity centers where cut-through traffic is observed or travel speeds are not compatible with adjacent land uses or character of the roadway. (See Pedestrian System Strategy 5: Improve the Comfort and Safety of Pedestrian Travel for additional information on traffic calming and safety measures.)

Wire Span Signal, *Portsmouth, VA*. Many traffic signals in Portsmouth are mounted on wire spans. These signals will be replaced with mast arm signals.

Mast Arm Signal, *Portsmouth, VA*. Mast arm signals provide higher visibility than span wire signals and can accommodate camera installation.

Four Quadrant Gate. Four quadrant gates prevent cars from entering an active railroad crossing via the oncoming traffic lane. Such gates are one type of Supplemental Safety Measure to achieve FRA Quiet Zone status.

London Boulevard, *Portsmouth, VA*. With six lanes of traffic, London Boulevard is difficult to cross on foot.

V1.6 **Eliminate or reduce the danger of at-grade railroad crossings.** By law, trains are required to sound their horns at all at-grade road crossings that lack approved supplemental safety measures. The noise generated by this activity can become a quality of life issue, particularly for nearby residential neighborhoods. In response to this issue, the Federal Railroad Administration has created the "Quiet Zone" program, under which trains are not required to sound their horns at intersections where approved supplemental safety measures, such as four-quadrant gates, have been implemented. The City should support grade-separation projects where feasible, crossing gate improvements, and the implementation of a Quiet Zone throughout the City of Portsmouth. (See Chapter 4.F. Ports and Freight for more discussion.)

V1.7 **Reduce the speed of traffic on London Boulevard to fit its urban context while improving safety and reconnecting neighborhood destinations for all users.** London Boulevard is an important street connecting downtown and midtown Portsmouth and is lined by commercial uses, residential neighborhoods, and I.C. Norcum High School. However, the roadway design creates an artificial barrier between neighborhoods and presents many safety issues due to its current configuration as a high speed roadway with ramp interchanges to the MLK Freeway. The City should focus future investment on projects to slow and calm traffic while improving pedestrian connections across the street—especially near I.C. Norcum High School. The City will work with VDOT to remove the existing limited access highway designation from London Boulevard.

Strategy 2

Improve traffic safety through education and enforcement.

In addition to safer roadway engineering, the City can help to improve traffic safety for all users through a combination of outreach campaigns, driver education, and law enforcement activities.

Actions

V2.1 **Develop safe driving campaigns.** The City should work with the Police Department and other partners on campaigns stressing the importance of safe driving. School zones, residential areas, and mixed-use commercial corridors with high levels of pedestrian and bicycle activity should be priorities. Working with law enforcement agencies (including police and the Commonwealth's Attorney's office) and other entities, the City should promote awareness of laws regarding cell phone use, yielding to pedestrians in crosswalks, and passing bicyclists at a safe distance.

V2.2 **Increase enforcement of speeding, reckless driving, and red light running.** Efforts should include both broad-based and targeted enforcement, using techniques such as red-light enforcement at high-crash locations and portable speed limit signs in residential areas.

Access Management. *Portsmouth, VA.* Frequent curb cuts and driveways create many conflicts on streets throughout Portsmouth, such as here on High Street near Virginia Avenue.

Strategy 3

Implement local roadway projects that relieve congestion.

In addition to improving safety, local roadway projects should focus on providing congestion relief, which in turn will improve air quality. The City should evaluate opportunities to remediate chronic congestion patterns through a combination of operational countermeasures and physical improvements. Given that Portsmouth is a built-out community undergoing redevelopment in strategic areas, additional capacity improvements should only be considered at critical locations (e.g., heavily-traveled commuter routes). Adding pavement increases the cost of maintaining roads and should only be done when absolutely necessary.

Actions

V3.1 **Develop access management regulations in coordination with VDOT policy.** By limiting the number of curb cuts on a roadway, access management maintains road capacity and improves safety, providing two major benefits for the transportation system. VDOT has developed Access Management Regulations and Standards based on roadway functional classifications that describe minimum spacing requirements for commercial entrances, intersections, and crossovers. Regulations for principal arterials took effect on July 1, 2008. Regulations for minor arterials, collectors, and local streets are in final draft form and will take effect on October 14, 2009. Although the City's roadways do not fall under VDOT jurisdiction, the City should consider adopting the VDOT regulations as a City standard (perhaps with some modifications). (See Chapter 7: Design Guidelines for VDOT's Access Management requirements as they pertain to Portsmouth Streets.)

In addition to intersection spacing, median crossover width is an important roadway feature that can significantly affect roadway access. Narrow medians separate oncoming traffic but do not provide adequate shelter for turning vehicles or pedestrians. The physical conditions and the impact on traffic operations can be observed at multiple locations throughout the City on a daily basis. The ideal width of the median depends on the presence of turn-lanes in the median and the composition and queuing needs of vehicles attempting to perform a left-turn or U-turn from the median or trying to cross the highway from a side street. The lack of turn-lanes along several corridors further fuels the need not only to introduce turning lanes, but also to consider the widening of median crossovers as part of future improvements.

In addition, the City should be proactive about installing new median treatments where appropriate or closing and removing existing curb cuts which are either unused or present safety problems or conflicts. Motorists on city streets are forced to slow down for vehicles entering existing driveways, decreasing the capacity of the roadway. By relocating, removing, and combining driveways along arterials, the City can achieve an increase in safety and efficiency on its major roadways.

Safety studies and planned construction projects can provide good opportunities to close existing driveways or implement other access management strategies. The City is currently seeking funding through the HSIP and RSTP programs to provide access management solutions at specific locations that have experienced high crash frequency or major congestion due to an excessive numbers of curb cuts. While access management strategies should be strongly considered on all multimodal corridors, the following corridors should be considered priorities:

- George Washington Highway
- Victory Boulevard between I-264 and Airline Boulevard
- Airline Boulevard between the city limits and Frederick Boulevard

V3.2 **Implement signal system upgrades and optimize signal timing plans.** Enhancements to the existing traffic signal system are recommended to improve traffic operations along signalized corridors within the City. Currently, the City controls 71 of the total 119 signalized intersections (approximately 60%) from a central system. However, the current system is over a decade old and no longer supported by the vendor; therefore, as equipment failure occurs it will become impossible to repair and maintain the system.

Even with limited staffing resources, operating the signals on a citywide basis will allow the City to coordinate the signals so that traffic can progress through multiple signalized intersections along key corridors. Without such coordination, vehicles randomly arrive and stop at intersections, which increases congestion, travel time, and air quality impacts caused by idling engines.

The City of Portsmouth is using its portion of the American Recovery and Revitalization Act (ARRA) funds to implement the first of three phases to upgrade the entire citywide signal system. This first phase will include the installation of approximately four miles of fiber communications, 31 new signal controllers, 15 new Ethernet wireless radios, and central system software and hardware. In order to achieve full system build-out, the City is seeking additional funding through the Congestion Mitigation and Air Quality (CMAQ) program for equipment to include approximately 20 miles of additional fiber, 88 signal controllers, 100 signal cabinets, and all other peripherals such as closed-circuit TV (CCTV) and dynamic message signs (DMS) to enhance the overall traffic operation capabilities within the city and region. The future phases are anticipated to occur over the next three years. The entire system upgrade will account for over $8 million in investment by the City to maximize the use of their existing infrastructure.

With an upgraded central signal system, the City plans to undertake a more consistent cycle of implementing optimized signal timing plans. This will allow the City to provide specific timing plans that vary throughout the day and address specific needs along each corridor. Examples include the non-standard peak hours of the Naval Shipyard, special events at the Ntelos Wireless Pavilion, and pedestrian timings in the Downtown, activity centers, and near schools and parks. Implementing signal system improvements with optimized signal timing plans will result in reduced vehicle delays, queuing, and stops.

The City of Portsmouth is currently working to obtain funding for initial citywide signal timing optimization in 2010 through Department of Energy grants. Furthermore, the City has applied for funding as part of the Congestion Mitigation and Air Quality (CMAQ) program to retime approximately 30 signals every year so that every corridor in the City will have updated signal timing plans every four years.

V3.3 **Reconstruct the Alexander's Corner intersection.** The City is currently working to improve the area in which Airline Boulevard, Portsmouth Boulevard, Turnpike Road, Victory Boulevard converge. Located at the crossroads of several of the City's most important corridors and adjacent to the Victory Crossing activity center, the five-legged Alexander Corner intersection and the adjacent Portsmouth Boulevard/Turnpike Road intersection operate off of a single signal controller. The current roadway geometry and signal phasing often lead to driver confusion, which can cause congestion as well as crashes. Recommendations will address roadway lanes, vehicular queuing lengths, and optimal phasing sequence for the intersections in order to maximize capacity and optimize operations. Bicycle and pedestrian accommodations and safety improvements will also be addressed at this critical intersection. Federal CMAQ funding will be used to design and construct the improvements.

Portsmouth, VA. Alexander's Corner is a five-way intersection of major roads that is currently being redesigned.

Strategy 4

Anticipate and prepare for future capacity deficiencies.

Portsmouth is a mature city that is mostly developed and has extensive land areas owned by various governmental entities. Nevertheless, there are a few large parcels remaining that could be developed, as well as extensive redevelopment opportunities. As the City reviews future development or redevelopment proposals, capacity and access improvements will be required to accommodate the traffic demand generated by the proposed developments. VDOT recently implemented a formal set of "Chapter 527" Traffic Impact Analysis Regulations, which require traffic impact analyses to be performed for developments within 3,000' feet of VDOT maintained roadways that will generate a certain amount of traffic. Although the majority of the parcels contained within the City of Portsmouth are not subject to these regulations, the City has adopted a policy requiring that traffic impact analyses be performed according to VDOT's technical guidelines for developments that meet the traffic generation thresholds.

Actions

V4.1 **Provide adequate capacity for proposed land use changes and future traffic demand.** As development proposals are submitted, the City should work with the developers using traffic impact analyses to identify roadway improvements needed to support them. Proffers will be required to support the construction of such improvements prior to full development of the parcels.

The City is aware of at least two vacant tracts that have attracted development interest that would trigger Chapter 527 review. One property is a 73-acre tract of land on Hatton Point Road and the second is a 21-acre parcel located along Harper Avenue adjacent to Scotts Creek. The Hatton Point Road development is anticipated to be residential in nature and, given current market trends and zoning, could accommodate approximately 270 housing units. All future development traffic (as well as traffic from the existing homes in the area) must access Hatton Point Road via its intersection with Cedar Lane. Both the roadway and the intersection currently have limited capacity. The second property is adjacent to the Portsmouth Marine Terminal on the Scotts Creek side of Harper Avenue and could accommodate a sizable mixed-use development that supports maritime activities. Harper Avenue does not have direct access to the MLK Freeway, and vehicles must follow a circuitous route via Lee Avenue and/or Cleveland Street and Railroad Avenue to access this facility.

Strategy 5

Implement a Portsmouth Travel Demand Management (TDM) Program.

TDM programs are public outreach programs designed to promote alternatives to Single Occupancy Vehicle (SOV) travel and peak-hour congestion by educating residents, employees, and employers about the advantages and availability of alternative modes or ride-sharing opportunities. TDM programs can be managed by several entities, including cities, Transportation Management Associations, and employers. Funding for such programs will come primarily from CMAQ grants.

Actions

V5.1 **Create a Portsmouth Transportation Management Association (TMA) to coordinate with TRAFFIX and conduct local TDM activities.** TMAs are non-profit, member-controlled organizations that provide transportation services in a particular area (see Transit Strategy 1 and callout on p.90.) TMAs provide an institutional framework for implementing TDM programs and services. They are usually more cost effective than programs managed by individual businesses and allow small employers to provide commute trip reduction services comparable to those offered by large companies.

V5.2 **Continue to support the TRAFFIX program.** The City, through a new TMA, should continue to coordinate efforts with TRAFFIX to provide incentives for large and small employers alike (see callout on p.128).

V5.3 **Provide facilities that support TDM measures.** The City, through a new TMA, should coordinate with HRT and TRAFFIX to identify future locations for park and ride lots and reserved parking at employment centers that will enhance the use of TDM programs.

TRAFFIX

Hampton Roads TMA

TRAFFIX is a cooperative public service designed to promote transportation alternatives. TRAFFIX Staff reports to an advisory board comprised of representatives from each of the area's transportation planning groups: Hampton Roads Transportation Planning Organization (HRTPO); Hampton Roads Transit (HRT); the Virginia Department of Transportation (VDOT); the Federal Highway Administration (FHWA); the Virginia Department of Rail and Public Transportation (VDRPT); and localities Chesapeake, Hampton, Newport News, Norfolk, Portsmouth, Suffolk, and Virginia Beach. TRAFFIX staff are employees of HRT; however, the program has its own funding source.

TRAFFIX was established in 1995 and since its inception has helped hundreds of people with and without cars to meet their transportation needs. TRAFFIX has assisted in the development of dedicated park & ride lots such as the Park & Sail lot in Portsmouth, obtaining funding to establish express bus service to Naval Station Norfolk.

It is TRAFFIX's mission to assist in the continued efforts to decrease traffic congestion in Southeastern Virginia by reducing the number of Single Occupancy Vehicles (SOVs) commuting to work. Strategies include encouraging the use of HOV lanes through ridesharing and encouraging the use of alternatives to driving such as public transportation and bicycling.

Strategy 6

Implement regionally significant roadway projects in Portsmouth to relieve congestion while mitigating the impact of regional traffic.

Portsmouth is at the center of a vibrant region with significant traffic volumes and congestion issues. Many important regional transportation corridors run through Portsmouth, profoundly influencing traffic conditions within the City. Portsmouth bears a large share of the region's traffic and associated environmental burdens, yet it does not have the capability to address regionally significant roadway projects on its own.

Although the City cannot directly control regional traffic issues, it has a voice as part of the Hampton Roads Transportation Planning Organization (HRTPO). Within the HRTPO, Portsmouth can recommend and support projects for inclusion in the region's Long-Range Transportation Plan (LRTP). Portsmouth should recommend a range of projects for inclusion in the 2034 LRTP. Moreover, the City should seek to ensure that regionally significant roadway projects are constructed in a manner that minimizes the impact of regional traffic on the City.

The following actions will help Portsmouth and its regional partners work to address the local impacts of regional traffic within the City:

Actions

V6.1 **Support the MLK Freeway Extension.** By extending the existing MLK Freeway (US Route 58) beyond its current intersection with London Boulevard to an interchange with I-264, local commuter traffic and a significant amount of truck traffic can be removed from local streets. However, a large amount of truck traffic destined for the proposed CSX transloading facility at Constitution Avenue will use the MLK Freeway exit at High Street, which will have a major impact on local streets. The City must work with CSX and its affiliates to mitigate the impact of truck traffic on local neighborhoods. This may require further evaluation and a comprehensive review of all access points along the proposed extension. (For further discussion, see Action V9.1.)

V6.2 **Support the Jordan Bridge replacement and recommend a "Jordan Bridge Parkway" connector for inclusion in the LRTP.** The former Jordan Bridge provided an important regional transportation connection between Portsmouth and communities east of the Southern Branch of the Elizabeth River. That connection was severed when the former lift bridge was permanently closed in 2008 and large volumes of traffic were redirected to the overburdened Downtown Tunnel to the north and other bridges to the south.

Shortly after the old bridge was closed, FIGG Bridge Developers submitted a proposal to construct a new, privately-funded span that will be tolled. Scheduled for completion in July 2010, the first phase of the new bridge will have one vehicle travel lane in each direction, shoulders with bicycle accommodations, and a physically-separated pedestrian walkway. The new bridge will be critically important to relieving traffic congestion at the Downtown Tunnel, which is the major cause of congestion in downtown Portsmouth. In addition, the new bridge will be built to current standards, encouraging additional freight traffic that could not use the former bridge due to weight restrictions. The bridge will be built to accommodate two additional travel lanes should they be needed in the future, which would further assist in the long-term strategy to shift traffic away from the tunnels.

With the bridge replacement project, the opportunity exists to further relieve pressure on the Downtown Tunnel by providing an alternative connection between I-264 in Portsmouth and I-464 in Chesapeake. To take advantage of this opportunity, the City should pursue the development of a "Jordan Bridge Parkway." This landscaped parkway would follow an approximate alignment along Frederick Boulevard and the railroad tracks from the proposed MLK Freeway interchange at I-264 to the new bridge at Elm Avenue and Burtons Point Road. As a gateway to Portsmouth, the Jordan Bridge Parkway should be designed with high quality landscaping and multimodal accommodations consistent with the City's complete streets policy.

Traffic, *Portsmouth, VA.* Traffic backs up on Effingham Street as commuters wait to enter I-264 and the Downtown Tunnel. Traffic that is not using Effingham Street to reach I-264 has a clear lane ahead.

V6.3 **Consider and address the impact that nearby regional roadway projects will have on downtown Portsmouth.** Local projects intended to improve traffic flow in downtown Portsmouth—primarily on Effingham Street—will be ineffective as long as I-264 and the Downtown Tunnel continue to operate at or above capacity because tunnel congestion will continue to cause traffic to back up onto Portsmouth's local streets. A viable alternative to the Downtown Tunnel must be created in order to relieve the congestion on Effingham Street and other downtown streets caused by regional traffic. The Jordan Bridge replacement has the potential to relieve pressure on the Downtown Tunnel, but ultimately, demand for Single Occupancy Vehicle (SOV) travel across the Elizabeth River must be reduced in order to improve traffic flow in key parts of downtown Portsmouth. In the near term, tolling and improved transit connections across the Elizabeth River will be required. Longer term, the complete streets approach proposed by the MTP will play a large role in the effort to reduce demand by providing viable alternatives to SOV travel. If Downtown Tunnel congestion is reduced, the City can again evaluate local improvements such as those proposed as part of the High and Effingham Corridor Study.

V6.4 **Recommend I-264 interchange improvements at Victory Boulevard, Portsmouth Boulevard, and Frederick Boulevard for inclusion in the LRTP.** Today the Portsmouth Boulevard interchange does not provide full-movement access between the local streets and I-264. Approximately one mile to the west, the Victory Boulevard interchange provides full-movement access to I-264 as well as to local streets (Cavalier Boulevard and Belmont Avenue).

Victory Crossing, one of the regional activity centers identified in the Destination 2025 Comprehensive Plan, is located between these two interchanges. Development is moving forward in and near this activity center, including Victory Village Business Park, New Port, and the new Tidewater Community College campus. During the planning stages of these developments, traffic impact analyses have indicated that the Victory Boulevard interchange is reaching capacity. Given the limited available right-of-way at the Victory Boulevard interchange, development strategies should look at enhancing the local street connections between Victory Boulevard and Portsmouth Boulevard and seek to provide full-movement access at the Portsmouth Boulevard interchange. The Portsmouth Boulevard interchange has a larger footprint than the one at Victory Boulevard, and interchange alternatives should seek not only to provide full access but also to provide enhanced connections to the local street network.

The I-264 interchange with Frederick Boulevard suffers from serious congestion problems. Due to the design of the surrounding roadway network, this interchange is prone to flooding during periods of heavy rains. This causes significant delays for vehicles that must seek alternative access routes, requiring a minimum 2-mile detour. The geometry and traffic control of this interchange should be reevaluated to determine a design that will most efficiently and safely accommodate existing and future traffic.

V6.5 **Recommend roadway improvements to George Washington Highway between Victory Boulevard and the Chesapeake boundary for inclusion in the LRTP.** This segment of George Washington Highway serves as a key connection between Chesapeake and Portsmouth. It experiences major congestion during peak commuter periods, suffers from a lack of access management and limited right-of-way, and is close to an active at-grade rail crossing. Because the portion of George Washington Highway within Portsmouth is relatively short, the City should work with the City of Chesapeake to coordinate with similar improvements to the south in order to maximize benefits for motorists.

Strategy 7

Identify funding issues and sources for roadway improvements and ongoing maintenance.

The City has limited funds to spend on transportation projects. However, significant funding for roadway capacity, maintenance, and safety projects is available from state and federal programs.

If given $100 to spend on transportation projects, Portsmouth residents responding to the statistically valid citizen survey conducted for the MTP indicated that they would spend 19 dollars on increasing roadway maintenance and 22 dollars on building or improving highways and streets.

Actions

V7.1 **Take full advantage of state and federal funding programs for roadway safety, maintenance, congestion mitigation, and air quality.** Funding available from state and federal programs is often left on the table because the City is either unaware of opportunities or unable to provide the staff time necessary to leverage these sources. The City should ensure that sufficient staff resources are available to investigate and apply for potential funding.

Highway Safety Improvement Program (HSIP)

The Virginia Department of Transportation's (VDOT) Highway Safety Improvement Program (HSIP) was developed to assist in the identification of problem safety areas, the analysis of problems and countermeasures, and the prioritization and scheduling of improvement projects. VDOT allocates HSIP funding on a statewide and district level on an annual basis. Municipalities within each district can compete for this funding by submitting applications for qualified projects at both the state and district levels.

The Highway Safety Program under HSIP includes both highway intersection and section (corridor) projects. For fiscal year 2010-2011, approximately $33 million has been allocated statewide. Individual projects are limited to a maximum allocation of $1 million. A benefit to cost (B/C) ratio is used to prioritize projects for potential HSIP funding. In addition to B/C ratios, other criteria are also considered when awarding HSIP funds. These factors include the frequency of severe crashes, direct correlation between crashes and proposed countermeasures, community support, project cost, and the time frame to complete the project.

The Highway-Rail Grade Crossing Safety Program strives to improve safety conditions at highway-rail grade crossings. For fiscal year 2010-2011, approximately $4.5 million has been allocated statewide. Individual projects are limited to $500,000. Candidate projects may include the addition of gates or warning signs or the conversion to a four-quadrant gate system. Candidate projects are selected based on exposure of trains to vehicles.

In addition to the annual application process for HSIP funding, VDOT allocates proactive HSIP funding to each district for lower cost improvements such as signing, pavement marking, signals, shoulders, and non-motorized accommodations within the public right of way. This proactive funding is available to municipalities within each district on a first come, first serve basis. Over the past several years, a significant portion of the proactive HSIP funding has not been utilized by municipalities. As a result, VDOT has earmarked additional proactive HSIP funding for the 20 municipalities with the most severe crashes across the state. Approximately $500,000 was earmarked specifically for the City of Portsmouth to use at its discretion. The City has already used some of this funding to conduct roadway safety assessments (RSAs) that will be used to pursue additional funding for implementation. The remainder of the proactive HSIP funding can be used to implement lower cost improvements or to complete additional RSAs on an intersection or roadway section basis.

Congestion Mitigation and Air Quality (CMAQ) Program

The Congestion Mitigation and Air Quality (CMAQ) program provides federal funding to states and localities for transportation projects and programs that help improve air quality and reduce traffic congestion. This funding is intended for areas not meeting the National Ambient Air Quality Standards (NAAQS), referred to as nonattainment areas, and for areas that previously did not meet the standards, but now do, referred to as maintenance areas. The Hampton Roads region, including the City of Portsmouth, has been designated as a maintenance area for ozone. For fiscal year 2011, the total CMAQ funding available for the region is $6.5 million.

CMAQ funding can be awarded to any of the municipalities in Hampton Roads, as well as to regional transportation organizations such as Hampton Roads Transit (HRT), VDOT, and the Virginia Port Authority (VPA). In order to qualify for CMAQ funding, a project must be consistent with the region's Long-Range Transportation Plan (LRTP). The projects are selected through a competitive process administered by the Hampton Roads Transportation Planning Organization (HRTPO). Municipalities must submit applications for each of their projects. The project applications are then reviewed and ranked based on predetermined evaluation criteria endorsed by the HRTPO. From these rankings, funding allocations are recommended and reviewed by the HRTPO Board before final authorization.

To qualify for CMAQ funding, projects must demonstrate improvement in air quality. Benefits are measured in the reduction of emissions of hydrocarbons, carbon monoxide, and nitrous oxides. Typical candidate projects include the following:

- Highway projects (e.g., intersection improvements, coordinated signal system improvements, citywide signal system improvements)
- Transit projects (e.g., new/expanded service, bus shelters/facilities, light rail transit)
- Planning studies
- Transportation demand management projects (e.g., regional rideshare, HOV express bus service, park-and-ride lots)
- Intelligent transportation system projects
- Bikeway/pedestrian facilities

Regional Surface Transportation Program (RSTP)

The Surface Transportation Program (STP) provides federal funding that may be used by states and localities for a wide variety of highway and transit projects. Regional Surface Transportation Program (RSTP) funds are STP funds that are apportioned to specific regions within the state. For fiscal year 2011, the total RSTP funding available for the Hampton Roads region is $22.1 million.

Similar to CMAQ funding, RSTP funding is awarded through a competitive process overseen by the HRTPO, but candidate RSTP projects must provide a regional benefit to the area. Benefits are measured using various evaluation criteria that vary depending on the type of project. The criteria, among others, include cost-effectiveness, project readiness, congestion level, and average daily traffic (ADT) volumes on the roadway. Typical RSTP projects include the following:

- Highway improvements
- Transit improvements
- Planning studies
- Transportation demand management
- Intelligent transportation systems
- Bikeway/pedestrian facilities

Strategy 8

Develop and implement a maintenance plan for local streets.

Most of the cost of roadway maintenance on local streets in Portsmouth is borne by the City. The City receives some funding from the state via VDOT's Urban Allocation funds, which are formula-driven funds for roadway repair and construction. However, this money is not sufficient to maintain standard intervals between repaving and basic repairs on all of the City's roads. Portsmouth's limited transportation budget must be taken into account in developing capital projects and maintenance programs.

Actions

V8.1 **Reduce the interval of the roadway paving cycle.** The cost of repaving varies widely because asphalt is tied to the price of oil. At the record prices of 2008, the City's paving cycle – currently around 30-40 years – would have stretched to around 60 years. The City should attempt to reduce the paving cycle to as close to the accepted standard of every 10 to 15 years as possible. The City also needs to prioritize pothole repair, sweeping, and re-striping programs based on safety implications. For example, multimodal corridors should receive extra priority because debris and potholes in bikeways can puncture tires and cause crashes. Because VDOT urban allocation funds are based on lane miles, the City should consider whether the loss of urban allocation funds due to reduced lane mileage (caused by road diets that eliminate vehicular lanes to accommodate alternative modes) is justified by the traffic and safety benefits of such efforts.

V8.2 **Develop and promote a proactive re-striping program to improve roadway safety, implement road diets, and expedite completion of the bicycle lane network.** In addition to re-striping efforts performed as part of the regular repaving cycle or reconstruction projects, the City should develop a proactive re-striping program to implement the bicycle lane network and to achieve road diets where appropriate in the multimodal corridors. Utilizing annual maintenance dollars and HSIP funds, the City could budget enough money for the program to stripe several miles of bike lanes every year.

V8.3 **Work with VDOT to retire debt that Portsmouth owes for the Western Freeway Bridge/Pinner's Point Connector.** The City paid the majority of the cost for the construction of the Pinner's Point Bridge, a regionally significant road project. As a result, the City spends most of its urban allocation funds to service debt on the bridge. Given the tremendous value that the Pinner's Point Bridge offers for the regional transportation network, the City should explore with VDOT the possibility of retiring the debt on the project so that Portsmouth's urban allocation funds can be spent on maintenance projects. However, urban allocation funds are currently unavailable due to VDOT budget concerns.

Strategy 9

Establish a clear policy articulating the City's interests in the Elizabeth River Crossings and the Martin Luther King (MLK) Freeway as well as implications for funding such projects.

The proposed MLK Freeway connection between the Western Freeway and I-264 is a critical link in the regional transportation network. This freeway segment will help to 1) balance traffic between the Midtown and Downtown Tunnels and 2) keep truck traffic on the highway and off of local Portsmouth streets. However, the proposed one-way design of the interchange at High Street will do little to improve access for residents or visitors to Portsmouth. With those concerns in mind, the City continues to support the construction of the MLK Freeway. Currently, the MLK extension is proposed to be constructed as part of a large public-private project to add a second tube to the Midtown Tunnel. The tunnel expansion would be financed through tolls, but the exact nature of the tolling system has not been formally determined.

Actions

V9.1 **Adopt a formal policy statement regarding the MLK Freeway and the Second Tube of the Midtown Tunnel.** The policy should include the following:

Tolling Policy:

- Travel within Portsmouth or travel from the west of the Elizabeth River and the Southern Branch to Portsmouth should not be tolled. The tolling is to provide funds to construct the second tube of the Midtown Tunnel and should not impose tolls on Portsmouth traffic that does not use the tunnel.
- Toll implementation should not cause the diversion of vehicles from highways and interstates onto local streets and arterial roads.
- Toll prices should be kept at affordable levels to avoid damaging the economy of the City or the region. A "safety valve" policy should be in place with regards to toll escalations that limits the amount of increases over a set period of time.
- Transit and high occupancy modes should not be tolled to maximize tunnel capacity and promote alternatives to use of single occupancy vehicles.
- Tolling funds should be used to improve transportation alternatives across the river, including transit service such as ferries and light rail.

MLK Freeway:

- The MLK Freeway extension should be completed so as to remove truck traffic from local streets.
- The interchange at High Street should be a full interchange to increase the utility of the freeway. The interchange should be a Single-Point Urban Interchange in order to reduce the number of potential conflict points for all users.
- The interchange design at High Street must provide safe accommodations for pedestrians and bicyclists.
- The design of the MLK Freeway should minimize the impact on local property and development potential within Portsmouth. In particular, the design of the freeway at High Street should respect the important role that High Street plays as an important gateway street linking downtown and midtown Portsmouth. Context-sensitive design principles require that the freeway structure incorporate visually interesting architecture and other measures to limit its potential to act as a barrier that divides the City.
- The design of the MLK Freeway extension should ensure good local street connectivity, including connections across the freeway where appropriate.

Transit:

- The river crossing project should be designed to allow for improved bus service, including express regional bus service that serves stations in Portsmouth along the freeway network.
- The project should provide for long-term transit system capacity.
- The project should anticipate and enable connecting Portsmouth to Norfolk by light rail.

Tunnel Capacity:

- The project should maximize the capacity to move people and goods under the Elizabeth River. Transit and high occupancy vehicles should be part of the strategy.
- The project should ensure the longevity and sustainability of the Elizabeth River crossings and address the need for maintenance on assets that reach their expected service life.
- The project should anticipate future modes of travel such as rail and high speed rail.

Strategy 10

Utilize a new roadway classification system and design standards to guide roadway improvements.

By classifying roadways, the City can establish a set of roadway design standards that address specific needs for different users based on the roadway's functionality. A roadway classification system will aid in the development of a complete street network. At the same time, it should recognize that while all modes will be considered within the network, certain modes may not be encouraged to use certain network segments in order to optimize efficiency and safety for all users. The goal is to eventually accommodate all modes of travel throughout the City with a focus on a system of multimodal corridors as outlined in the Transportation Framework. Given the cost of infrastructure improvements that require relocating an existing curb and gutter, developing the multimodal corridor system will entail both near-term actions and more sustained, long-term efforts that may include possible ROW acquisition.

Actions

V10.1 **Develop roadway classifications.** The City should use the classification system shown in the callout box on page 140 in planning near-term and long-term improvements that will lead to the creation of a multimodal street network. The four classifications are Urban Arterials, Urban Boulevards, Collectors, and Local Streets. Design guidelines and typical cross-sections for these roadway types are presented in Chapter 7.

V10.2 **Tailor design recommendations to support the Destination 2025 Future Land Use Plan.** In particular, design recommendations for roadways should fit the context of multimodal mixed use corridors, activity centers, school zones, and parks.

V10.3 **Evaluate the appropriate design speeds for roads depending on their urban context.** In some cases, posted speed limits or roadway designs may increase vehicular travel speeds to levels that are unsafe or undesirable for surrounding land uses. Particularly in residential areas, school zones, and activity centers, the City should examine the suitability of existing speed limits and roadway designs.

Major Roadway Classifications

Portsmouth's roadway network consists of a hierarchical system of street types, ranging from local streets in front of individual homes to the interstates and freeways that carry regional traffic across the City and regional water bodies. Each roadway in the typology has its own characteristic function, traffic mix, operational characteristics, and design elements. The major roadway types, excluding the regional freeways (I-264, VA 164 or Western Freeway, and MLK Expressway) are described below.

Urban Arterials

Urban arterials are the backbone of Portsmouth's transportation system, linking every part of the City: the waterfront and ports, military facilities, commercial areas, and neighborhoods. Most urban arterials within the City are four lanes and are designed for automobile travel speeds of 35 to 55 miles per hour (mph). Current cross-sections include a mix of landscaped medians, small concrete median islands, two-way left-turn lanes, and undivided roads. Urban arterials fall under the major arterial or minor arterial standard functional classification.

Portsmouth's urban arterials of the future should be multimodal corridors that serve all roadway users. In addition to providing four (and in specific instances six—based on traffic volumes) lanes for vehicular traffic, these corridors should include bicycle facilities (ranging from striped lanes to multi-use paths) as well as improved bus facilities (e.g., far-side pull-outs or near-side bump-outs) along local and regional transit routes. Wide sidewalks are preferred on both sides of the street in activity centers and along mixed-use corridors. However, five-foot sidewalks on both sides of the street are acceptable in areas with less intensive land uses. In addition, street trees in the median and along both sides of the street provide shade and help soften the built environment. Placing trees in a planting strip between the roadway and sidewalk visually narrows the roadway, encouraging slower driving.

Urban Boulevards

Urban boulevards are the signature streets in the Downtown area and are designed for automobile travel speeds of 25 to 45 mph. They typically provide two to four

travel lanes and sometimes striped bike lanes. Street trees along both sides of the street provide shade. Wide sidewalks are preferred for both sides of the street to accommodate increased pedestrian activity, outdoor seating or commercial vendors, planters, and other streetscape elements. Medians may be landscaped or paved as a two-way left-turn lane depending on the development context. In addition, intersections should include enhanced pedestrian elements and a balance between pavement width and pedestrian crossings. Urban boulevards would be classified as either major or minor arterials

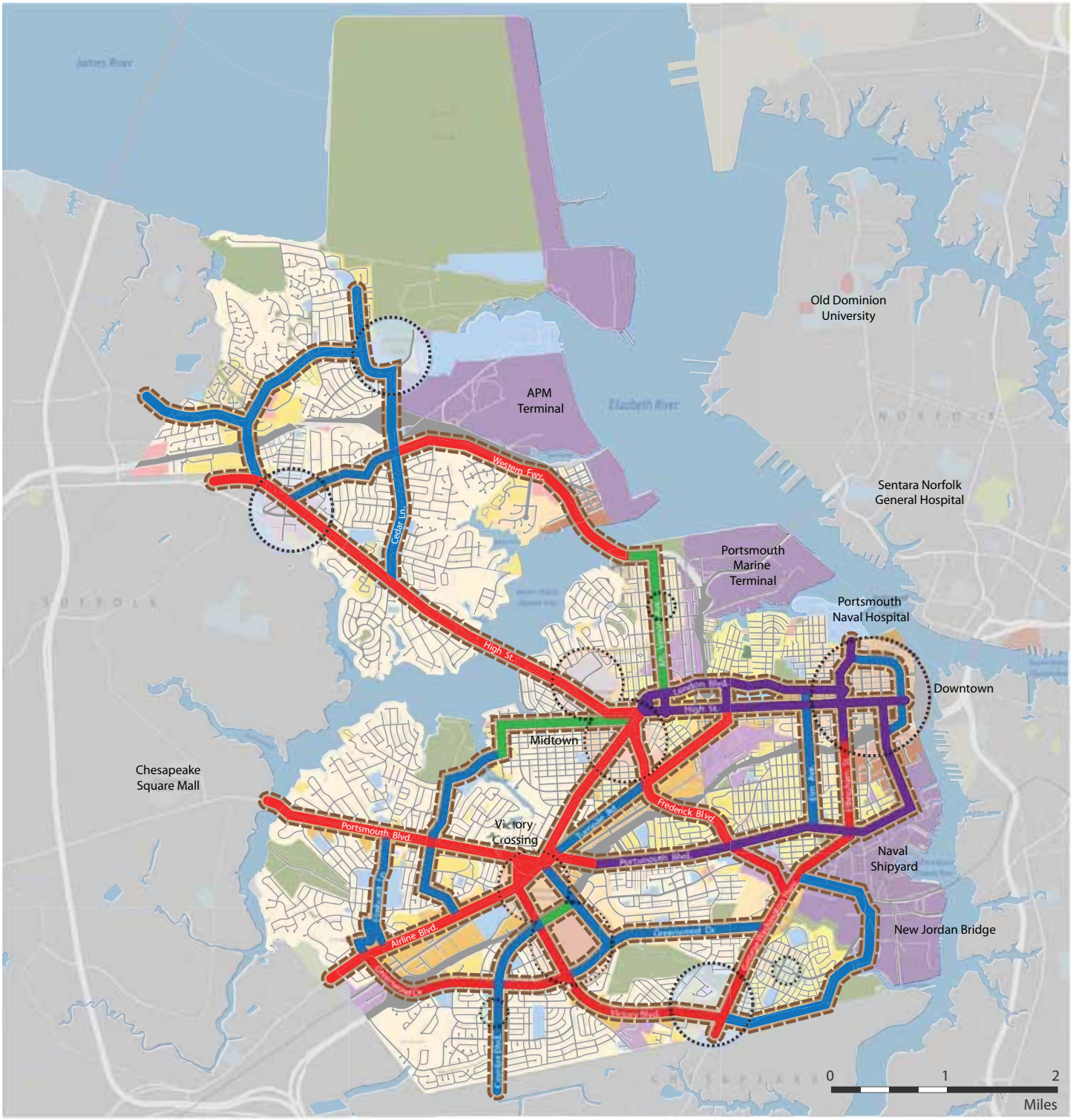
Several key corridors in the Portsmouth core area could be improved to support higher percentages of non-motorized users and public transportation. These include urban boulevards that connect medium and high density residential neighborhoods to commercial and office uses in Downtown or to major employers such as the Norfolk Naval Shipyard, Maryview Medical Center, and the Naval Hospital.

Collector Streets

Collector streets primarily serve to collect traffic from intersecting streets and funnel it to boulevards or other types of major arterials. Collector streets are designed for automobile travel speeds of 35 mph or less. They provide two to four travel lanes and should include striped bike lanes or parallel multi-use paths. Street trees and landscaping of adjacent development serve to buffer adjacent land uses. Sidewalks are recommended for both sides of the street. Curb cuts are frequent but should be limited to the greatest extent possible with one driveway per single-family residential parcel and no more than two driveways per other developed parcels.

Local Streets

Local streets are designed to limit automobile travel speeds to 25 mph or less. They provide the greatest degree of vehicular access and the least degree of vehicular mobility. They are generally associated with residential areas, allowing direct access to abutting land. Different types of local streets include alleys, cul-de-sacs, loop streets, residential local streets, and non-residential local streets.



Multi-Modal Corridors

Activity Center

Urban Arterials

Urban Boulevards

Collector Streets

Local Streets

Figure 9: Multimodal Corridors with Roadway Classification

Strategy 11

Prioritize investments in multimodal priority corridors.

To promote development of a network of complete streets that will allow all users to move safely and comfortably through Portsmouth, the MTP recommends a network of priority multimodal corridors identified in Chapter 3: Transportation Framework. These multimodal corridors have been chosen because they link activity centers, parks, schools, and other important destinations.

Actions

V11.1 **Prioritize improvements within multimodal priority corridors.** These corridors are the critical links to support a multimodal transportation network in Portsmouth. Many improvements in these corridors can be achieved quickly and affordably by painting crosswalks and bike lanes, filling in minor gaps in sidewalks, or similar measures. Other corridors will require significant, longer-term planning and investment, including right-of-way acquisition in order to accommodate all modes. Therefore, the City should prioritize projects in multimodal priority corridors as near-term and long-term improvements. (See recommendations for key near-term and long-term projects in specific multimodal corridors in Section 6.F.)

Strategy 12

Ensure adequate and appropriate parking supply.

The City needs to realistically assess parking needs and avoid encouraging artificially high parking requirements. In doing so, parking requirements should be tailored to the associated land uses and specific areas of Portsmouth, given that the parking needs in Downtown will be different than those in the activity centers or more suburban environments. Equally as important to parking supply is parking location. Given the cost associated with this important asset, ensuring that parking facilities are properly located will maximize the benefits of the City's investments.

Actions

V12.1 **Identify opportunities to reduce parking requirements, including use of maximum instead of minimum requirements.** Most zoning codes require provision of a minimum number of parking spaces tied to peak usage. This approach encourages vehicle use and creates large areas of empty parking lots at off-peak times. Setting a maximum number of parking spaces can reduce development costs, limit the amount of urban land consumed, and encourage residents, tenants, and visitors to consider alternative modes of transportation.

V12.2 **Encourage shared parking.** Parking requirements for mixed-use developments should allow for shared parking. For example, most office-related parking takes place during the day, while residential parking peaks at night. Rather than constructing separate parking spaces for every use in a project, shared parking recognizes that one space can serve two users because the demand exists at different times of day.

V12.3 **Encourage "park-once" environments through improved planning and urban design.** The City should encourage development that encourages drivers to park once and walk to several destinations rather than driving between them for errands. Zoning changes that promote "retrofitting" of existing "strip" development and create dense, walkable activity centers with pedestrian connections between individual parcels can help achieve "park-once" environments, which support the land use goals of the Destination 2025 Comprehensive Plan.

V12.4 **Improve access to and use of existing parking capacity.** The City should work with the owners of private parking lots to develop improved, uniform directional signage that will guide drivers to on-street and off-street parking facilities. Long-term leases for parking spaces in existing municipal garages—particularly those that are operating at only about 50-60% of capacity—should be encouraged for new development in lieu of constructing on-site parking spaces. Agreements should be structured to maximize the use of existing facilities; therefore, individual space assignments should be discouraged in order to maximize the use of every space in a given facility.

V12.5 **Consider having the Parking Authority acquire all downtown parking lots and require new developments to obtain spaces in city-owned facilities.** The City could use funds generated by this action to establish a parking shuttle service (or expand the existing downtown Loop service) similar to Norfolk's NET service.

V12.6 **Outside of downtown, consider reduced parking requirements in lieu of transit support payments.** Having large developments contribute to transit operations would help to stabilize transit funding in Portsmouth by giving HRT a more broad-based funding stream.

V12.7 **Continue to support and implement parking program recommendations outlined in the Downtown Parking Master Plan.** The Downtown Parking Master Plan was prepared in 2006 by Kimley-Horn Associates. The City has already implemented several recommendations outlined in the document, such as increased parking enforcement. The City is also seeking to deploy automated pay stations to further increase parking efficiency and collect revenues to support the overall operations.

Portsmouth, VA. The top deck of the Middle Street parking garage completely empty at 1:30 PM on a Wednesday. The City should promote the use of excess parking capacity before allowing the construction of new parking.

Strategy 13

Improve the design quality of parking infrastructure.

Parking lots and garages shall be designed such that they are attractive to the user, secure, well-maintained, and easily accessible from the buildings they serve without detracting from the character of public streets. Moreover, parking facilities should enhance urban character and contribute to the design of high-quality streetscapes. Recently, the City applied for a Department of Energy grant, a portion of which will be used to upgrade the lighting in parking facilities to provide a more secure environment.

Actions

V13.1 **Secure funding for upgrading and maintaining existing parking facilities.** As parking program recommendations from the Downtown Parking Master Plan are implemented and the City is able to generate additional revenue from downtown parking enforcement efforts and efficiencies gained in revenue collection, the City should earmark a certain percentage of that revenue to support a program to upgrade and maintain existing parking facilities.

V13.2 **Require new parking garages to be "wrapped" where they face public streets other than alleys.** Parking garages can have a negative impact on the urban design quality and pedestrian-friendliness of public streets. To address these impacts, the City should require "wrapped" parking garages with retail, office, and residential uses that face public streets while concealing parking structures. This technique requires improved directional signage per Action V12.4 in order to alert users to the available parking.

V13.3 **Require landscaping for surface parking lots to screen vehicles and reduce stormwater runoff.** Landscaping should also be designed and located such that it does not impact sight distances for vehicles, pedestrians, or bicycles entering or existing the facility.

V13.4 **Create parking design guidelines to place parking behind buildings where possible.** Pulling buildings to the street with surface parking behind helps to create pedestrian-friendly streetscapes. With this approach, enhanced directional signage may be needed to direct users to the parking.

V13.5 **Ensure safe and pleasant pedestrian and bicycle connections through parking lots to commercial entrances and transit stops.** The City should modify the Zoning Ordinance to implement this action. All permits for new construction that require parking should be tied to this requirement.

Boulder, CO. The Pearl Street municipal parking garage in Boulder, CO is "wrapped" by a liner building containing retail and office space as well as a police precinct office. To make up for the narrow footprint of the liner building, the ground floor retail space has a high ceiling allowing tenants to construct loft space for added sales area.

Narberth, PA. Visitors are led to parking located behind retail buildings.

Portland, OR. This parking lot in Portland's South Waterfront neighborhood was constructed with pervious asphalt and stormwater retention swales to limit the amount of polluted runoff to the Willamette River.

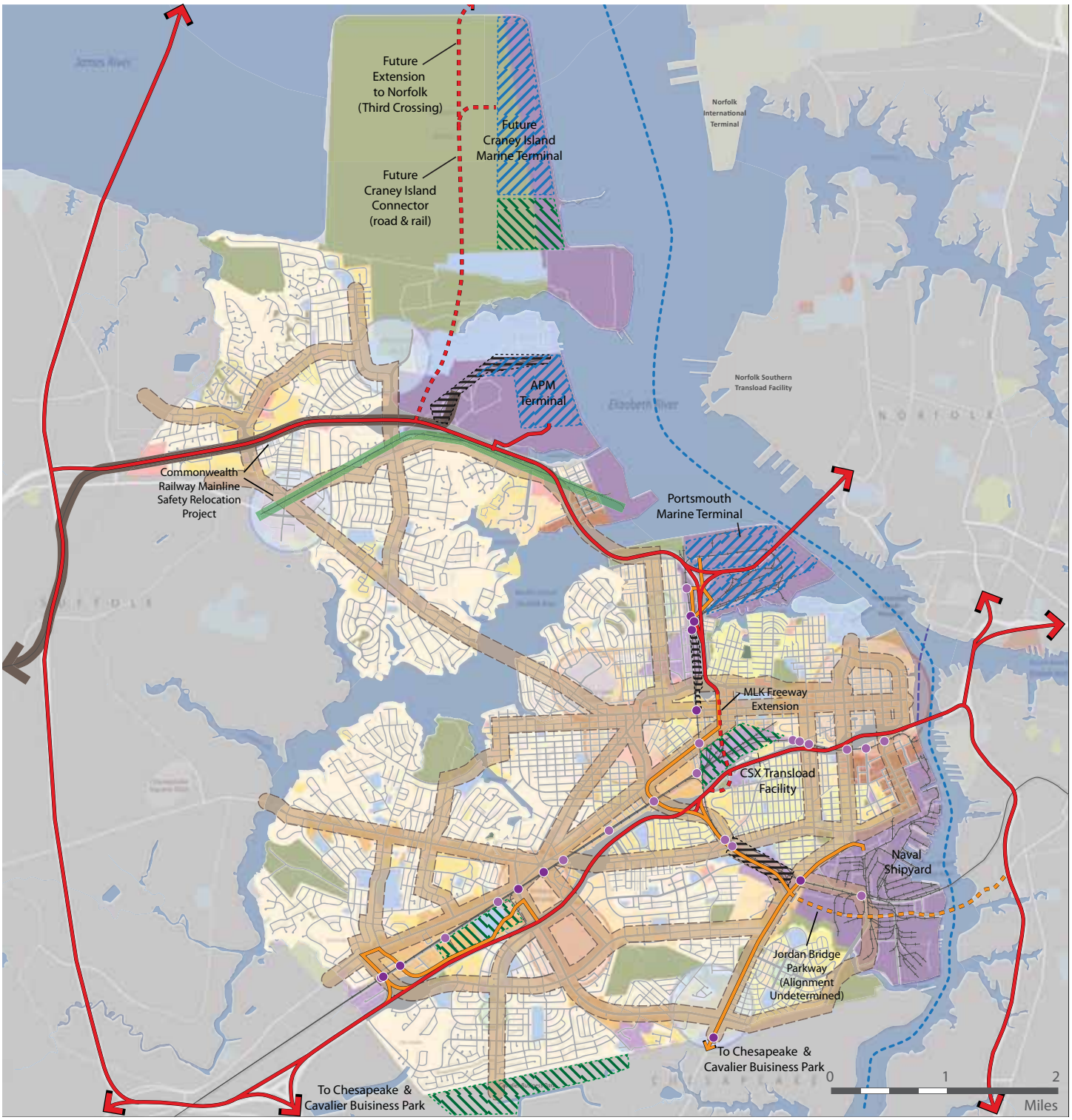


Figure 10: Freight and Ports Element

Existing Truck Routes
- Limited Access Highway
- Other Roadway

Future Planned Truck Routes
- Limited Access Highway
- Other Roadway

Rail Routes
- Rail Corridor (existing or under construction)
- Rail Corridor (proposed)
- Rail Corridor to be Abandoned

Freight Facilities
- Existing or Potential Port Facility
- Existing or Potential Rail Yard
- Transloading or Logistics Facility
- Multi-Modal Corridors

Railroad Grade Crossings
- Unprotected (crossbucks or flashers only)
- Protected (flashers and crossing gates)

Waterway Network
- Atlantic Intracoastal Waterway

E. Freight, Ports, and the Maritime Transportation System

The Vision for the Freight and Maritime Transportation System

The freight system will accommodate the continued growth of maritime trade and maximize its economic benefits for Portsmouth without sacrificing quality of life for city residents.

- Economic benefits will be maximized by providing port capacity to meet demand and promoting port-related businesses and employment.
- Congestion will be minimized by moving freight efficiently through Portsmouth, using the most appropriate mode.
- Negative impacts on the City's neighborhoods and environment will be minimized.
- The majority of freight moving over land through Portsmouth will be handled by the railroad network.

Background

As the center of the Hampton Roads port complex, Portsmouth contains some of the largest port facilities in North America and serves as an entry and export point for global flows of goods. Despite the impacts of the current recession, the role of the Hampton Roads ports is expected to grow over the coming years due to modern terminal facilities, a deep harbor, high capacity, strong rail and highway connections, labor productivity, and excellent ocean access. Three principal freight transportation systems exist within the City of Portsmouth: marine, highway, and rail. These systems move freight into, out of, and within the City and connect Portsmouth to the North American freight network.

The largest generator of freight traffic is the transfer between the maritime system and either the rail or highway system. This section of the Master Transportation Plan focuses on the movement of freight after it has been prepared for highway and rail movement in and out of the City.

The freight system relies on a partnership among federal, state, and regional authorities, as well as the City and private industry partners. Only by working in concert can the necessary infrastructure to handle growing freight traffic be developed and maintained.

The Virginia Port Authority (VPA) is the primary controller of the receiving, discharging, and preparing of freight for movement by highway, rail, or ship. Portsmouth must partner with and support VPA to expand and modernize existing ports and develop new facilities. Similarly, the City must partner with the Virginia Department of Transportation (VDOT) and the Hampton Roads Transportation Planning Organization (HRTPO) to ensure that highway networks adequately convey freight to and from the shipping terminals. The City must take responsibility for ensuring that freight connections are robust, efficient, and logical and do not impinge on the quality of life for residents. In some cases, freight moves along local streets in Portsmouth, and the City must take steps to create the necessary linkages to direct these flows more efficiently and with less impact to residents and local businesses.

The City must also develop industry relationships and support programs to guide freight and industrial development to locations that have appropriate access to the highway and rail network. This section describes ways to enhance positive relationships with both the port and rail industry to increase the use of rail transportation of freight.

Strategies

Strategy 1

Increase fluency in port-related issues and policy.

It is imperative that the City of Portsmouth keep abreast not only with what is happening at the Port of Virginia, but also with issues and trends at ports around the world. Portsmouth's economy is tied to global trade and without understanding the larger forces that are impacting freight movement at the local level, the City cannot adequately plan for its transportation future.

Actions

E1.1 **Foster communication and coordination between the City of Portsmouth, the Port Authority of Virginia, and APM/Maersk Marine Terminal.** The Portsmouth Marine Terminal, recently developed APM Marine Terminal, and planned Craney Island Marine Terminal will have major implications for Portsmouth's economy and quality of life, particularly when all are developed and operating at capacity in the future. The City should continue to work with the Port Authority and APM to maximize positive benefits such as jobs and tax revenues while minimizing negative impacts on Portsmouth's environment and transportation system caused by the movement of freight.

E1.2 **Attend national and global port conferences and seminars.** Membership in port organizations and attendance at conferences and seminars will help city officials understand current issues and trends impacting port cities. Examples of such organizations include the American Association of Port Authorities, the Federal Highway Administration's Freight Management and Operations Division, the U.S. Environmental Protection Agency's Sector Strategies Program on Ports, and the International Association of Ports and Harbors.

Portsmouth, VA. Container ships are loaded and unloaded at the Portsmouth Marine Terminal.

Portsmouth, VA. Container ships call at the Portsmouth Marine Terminal.

Port Impacts on Portsmouth's Economy

The Port of Virginia is a key player in Portsmouth's economy. In 2006, the Port Authority's four major Hampton Roads facilities handled 16.3 million tons of cargo valued at $36.1 billion. It is also a major employer, supporting 35,665 jobs paying $1.6 billion in compensation in the state in 2006. In addition to the port itself, associated industries such as shipping, logistics, warehousing, and support businesses make up an important sector of the economy. In 2008, 141,400 people in the Hampton Roads metropolitan statistical area (18.1% of the non-farm employed population) were employed in the Trade, Transportation, and Utility sectors.

Port-Related Organizations

- American Association of Port Authorities (AAPA): Headquartered in Alexandria, VA, AAPA represents more than 160 public port authorities in the United States, Canada, the Caribbean and Latin America. AAPA's membership also includes more than 335 sustaining and associate members (individuals, firms, and others with an interest in the seaports of the Western Hemisphere). The organization promotes port interests and provides leadership on issues related to port development and operations.
- Federal Highway Administration (FHA), Freight Management and Operations Division: FHA's Office of Freight Management and Operations promotes efficient, seamless, and secure freight flows within the U.S. and across U.S. borders. Through its various programs it provides research and analysis and disseminates information regarding freight transportation movement, technology, and infrastructure in the United States.
- U.S. Environmental Protection Agency (EPA), Sector Strategies Program on Ports: The EPA's Sector Strategies Program works with port representatives and other stakeholders to assess opportunities to improve environmental performance while reducing regulatory burdens. The EPA offers publications, seminars, and incentive programs such as "SmartWay" and "CleanPorts" (see Freight & Ports Strategy 7) to assist ports in achieving greater sustainability.
- International Association of Ports and Harbors (IAPH): The IAPH is a non-profit, non-governmental organization headquartered in Tokyo that represents and promotes port interests to global organizations, including a number of UN agencies.

Strategy 2

Explore opportunities for generating revenue from port and freight activity in Portsmouth to fund local transportation costs.

While the port is an important contributor to Portsmouth's economy, it has costs for the City and its residents as well. Much of the freight that enters and exits the port must travel through Portsmouth, using local streets and impacting local air quality. With much of the increased freight predicted to move by truck, truck traffic in Portsmouth could more than double when the port terminals reach capacity. While the economic recession has temporarily reduced international freight traffic, the City must anticipate future increases by developing strategies to fund needed transportation system improvements, as well as the increased costs of maintaining infrastructure and addressing environmental impacts. Given Portsmouth's limited resources, the disproportionate impacts that will be borne at the local level, and the benefits that will accrue to the region and Commonwealth of Virginia as a whole, state and regional agencies should be actively involved in developing these strategies.

Actions

E2.1 **Work with state and regional agencies to investigate ways to finance local transportation improvements and maintenance needed to accommodate the movement of freight through Portsmouth.** Local funding mechanisms subject to Virginia statute and authorization by the General Assembly include special assessments, transportation improvement districts, and proffers (see discussion of Local Funding Opportunities in Chapter 6, pp.216-219). However, given the regional, state, and even national significance of freight traffic in Portsmouth, broader funding sources (e.g., revenue-sharing agreements) are needed to ensure that freight moves efficiently with minimal impacts on the local community. The CRMSRP relocation of rail line to the median of the Western Freeway is a good model (see Freight Action F3.2). Research could be conducted to investigate strategies used by other port cities (e.g., Long Beach, CA) to generate revenues for port-related transportation costs.

Strategy 3

Support implementation of regional port and freight transportation-related infrastructure improvements.

A number of transportation improvements are currently planned by the Virginia Port Authority or are included in the Hampton Roads 2030 Long Range Transportation Plan (2030 LRTP) that will dramatically improve the efficiency of freight movement through Portsmouth while reducing its impacts on residents. In addition, there are further projects that have been identified in recent city planning efforts. These projects will add capacity to and increase speed on rail freight corridors and improve the connectivity of regional highway corridors from port terminals through Portsmouth. Implementing these projects will help achieve the environmental, freight movement, and safety goals of the MTP. They will reduce emissions by increasing the competitiveness of rail for moving freight, improve freight flow by increasing capacity and connectivity, and mitigate traffic impacts and improve safety by separating freight from local traffic.

Actions

E3.1 **Build the Craney Island Access Road.** This project will create a new limited access road from the Western Freeway to the planned Craney Island Marine Terminal. This project is included in the 2030 LRTP. As a part of this project, the connection to the existing APM/Maersk Terminal will have to be modified to allow for connection to the Craney Island Access Road.

E3.2 **Complete the Commonwealth Railway Mainline Safety Relocation Project (CRMSRP).** Currently under construction by the Virginia Port Authority, the CRMSRP is part of the Heartland Corridor, a multi-state, public-private rail transportation improvement project. This project will raise tunnel clearances on the Norfolk Southern rail route between the Port of Virginia and Chicago and implement other improvements to allow for movement of freight in double-stacked container trains. In Portsmouth, it will relocate approximately 4.5 miles of rail that currently run through Portsmouth and Chesapeake neighborhoods to the median of the Western Freeway (Route 164/I-664) to allow for direct transfer of incoming freight by rail to the APM/Maersk Marine Terminal and the planned Craney Island Marine Terminal. The rail relocation project as a whole will vastly increase freight capacity and speed on this key route between the Port of Virginia and its western markets by creating a rail connection without at-grade crossings (see Freight & Ports Strategy 4 below). The City of Portsmouth will support VPA in ensuring that the Highway 164 portion of the route receives the necessary financing to double-track this section to improve efficiency and attract freight to move by rail.

E3.3 **Complete the Midtown Tunnel/Martin Luther King Freeway Extension.** The extension of the Martin Luther King Freeway south to I-264 will create a continuous, limited access connection between the Midtown Tunnel & Portsmouth's northern marine terminals and I-264. Proposed capacity improvements will allow this corridor to meet predicted increases in freight traffic flows. This project is included in the 2030 LRTP.

E3.4 **Connect the Martin Luther King Freeway extension to the new Jordan Bridge via the proposed "Jordan Bridge Parkway".** The reconstruction of the Jordan Bridge is scheduled for completion by July 2010. This restored crossing will provide additional access for freight trucks traveling between Portsmouth and Norfolk. While the project will improve connectivity in the freight system and enhance access from Portsmouth's ports to I-464, it is imperative that proper connections be made to Portsmouth's truck routes via the proposed Jordan Bridge Parkway (see Motor Vehicles and Parking Action V6.2). Without a new connection, trucks trying to reach the new Jordan Bridge will be forced to travel along local streets that are not capable of handling such traffic.

E3.5 **Explore grade separation at at-grade rail crossing.** There are a number of at-grade railroad crossings in Portsmouth that pose safety risks and contribute to traffic congestion. With expected increases in freight rail traffic, the problems caused by at-grade crossings are likely to worsen. Grade separations should be considered at such crossings based on:

- Potential for improvement in safety.
- Potential for improvements in rail and vehicular traffic flow.
- Physical and financial feasibility.

Portsmouth, VA. The Commonwealth Railway Mainline Safety Relocation Project is nearing completion. VPA and APM hope to eventually move half of the containers from the CIMT and APM docks by rail rather than truck (bottom) in the future.

Particularly problematic crossings where grade separation should be considered include:

- Frederick Boulevard at I-276 (A request has been made to include this project in the 2030 Long Range Transportation Plan (LRTP) because of its importance for regional mobility.)
- George Washington Highway at the Chesapeake city limits
- High Street near Virginia Avenue.

E3.6 **Complete all entrance and exit movements at the Portsmouth Boulevard/I-264 interchange.** The need for this project is described in Motor Vehicles and Parking Action V6.3. While aimed primarily at commuter traffic, it will, in combination with the Martin Luther King Freeway Extension, improve traffic flow on I-264, where a number of freight bottlenecks have been identified (see Intermodal Management System: Regional Freight Study" report by the HRTPO). Portsmouth will suggest that this project be included in the 2030 Long-Range Transportation Plan (LRTP).

E3.7 **Increase the capacity of the Victory Boulevard/I-264 interchange.** This project is also aimed primarily at commuter traffic, but will improve traffic flow on I-264. Portsmouth will suggest that this project be included in the 2030 LRTP.

E3.8 **Upgrade the Downtown Tunnel.** Due to capacity restrictions caused by the current tunnel configuration, rehabilitation or reconstruction is needed to relieve regional traffic congestion. While the primary aim of this project is to extend the longevity of the tunnel and increase traffic capacity for the region, the tunnel was identified as a regional freight bottleneck in the "Intermodal Management System: Regional Freight Study" report. Portsmouth will suggest that this project be included in the 2030 LRTP.

Portsmouth, VA. Port-related truck traffic on the Western Freeway.

Strategy 4

Shift port traffic from truck to rail.

The planned VPA improvements will provide the capacity to more than double present container volumes moving through the port, and a proportional increase in truck traffic can be expected. Congestion caused by trucks traveling to and from the terminals decreases the speed at which freight can be moved through Portsmouth, increases air pollution, and impacts local streets and neighborhoods. Shifting freight from trucks to rail will increase the speed of freight movement through the City, decrease emissions generated per ton-mile of freight, and reduce truck traffic on local streets.

Actions

E4.1 **Support improvements to the Belt Line Railroad.** The Norfolk Portsmouth Belt Line Rail Road, or "Belt Line", is a local switching railroad that is jointly owned by Norfolk Southern and CSX. Assisting the Belt Line in the development of rail sidings within Portsmouth will ensure that local rail facilities can handle longer unit trains, which will be key to accommodating increased freight movement from the port terminals via rail. Connecting the Portsmouth Marine Terminal, the Naval Shipyard, and other industrial areas in the City, the Belt Line reinforces the Destination 2025 Comprehensive Plan Future Land Use Plan and improving its efficiency and capacity will make its use to move freight more economically appealing to shippers. Specific projects that should be investigated include:

- Expand and enhance the existing yard east of Virginia Avenue and north of London Boulevard.
- Construct siding yards on the property located parallel to Frederick Turnpike south of Portsmouth Boulevard.
- Connect the Belt Line to Norfolk Southern's southern rail route through Portsmouth. Restore the connection between the NS line and the CSX line into Central Portsmouth and attempt to arrange for trackage rights to move as much interchange activity between railroads as possible out of central Portsmouth.

The expansion of rail infrastructure and freight handling facilities should be supported by the City under the condition that the freight traffic generated does not flow over local city streets. Plans and investments will be required to improve access and infrastructure as necessary to move freight between highways and the rail system. It is imperative that new freight facilities, which are integral to the City's economic development, be planned in a way that is compatible with residents' quality of life.

E4.2 **Support improvements to Norfolk Southern and CSX rail facilities in Portsmouth.** In addition to the jointly owned Belt Line Railroad, Norfolk Southern and CSX operate their own rail lines through Portsmouth. Improvements to these lines that increase capacity, speed, and connectivity to port terminals and distribution facilities will promote more freight movement via rail. Specific projects include:

- Complete the Heartland Corridor and the Commonwealth Railway Mainline Safety Relocation Project (CRMSRP) (see Freight & Ports Strategy 3).
- Extend rail service to the future Craney Island Marine Terminal (see Freight & Ports Strategy 3).
- Investigate grade separation where possible or improved crossing signals at highway-rail grade crossings (see Freight & Ports Strategy 6).
- Raise railroad clearances where needed to accommodate double stack container trains.

E4.3 **Increase rail yard space easily accessible from port terminals.** One reason for the use of trucks rather than rail to move freight is the lack of adequate facilities for the transfer of goods to rail. Today's trains are longer and taller than trains of the past. Facilities that provide adequate space and are equipped with the latest technology will make rail a viable economic option for carriers and shippers. For example, the capacity of the APM Terminal rail yard should be increased to keep pace with growth in container traffic.

E4.4 **Designate connections between port terminals and truck-to-rail transloading facilities.** Where terminals cannot be directly serviced by rail, improved routes between ports and transloading facilities—primarily using limited access highways—will minimize impacts on Portsmouth residents by keeping truck movements off local streets and encouraging use of rail for longer hauls. (Also see action F5.1.)

Designated truck route signs keep trucks off of local streets.

Portsmouth, VA. The Pinner's Point Bridge is an important element of the regional freight network

Strategy 5

Reduce the amount of truck traffic on local streets.

Freight volumes through the Port of Virginia are predicted to grow dramatically over the coming decades. The strategies and planned infrastructure improvements described under Freight & Ports Strategy 4 will help shift a significant portion of this traffic to rail, but the projected volume increases mean that there will still be a great deal of freight moving through the City by truck. Restricting this traffic to designated corridors and keeping it off local streets will help goods move more efficiently and reduce negative impacts on residents.

Actions

E5.1 **Establish designated truck routes.** Clearly designated truck routes will reduce congestion and conflicts with other vehicles by concentrating truck traffic on routes where it is most compatible with surrounding land uses and road capacity. In addition, a designated truck route system will reduce confusion and increase clarity for truck drivers. A map of the system should be made widely available, both in printed form and on the internet, to freight operators, truck drivers, and residents to improve knowledge and use of the system.

E5.2 **Implement a signage strategy for the designated freight route system.** Designated freight routes need to be clearly signed to make navigation of the system clear and simple for truck drivers. Signs need to identify roads that are restricted to freight truck traffic as well as designated routes.

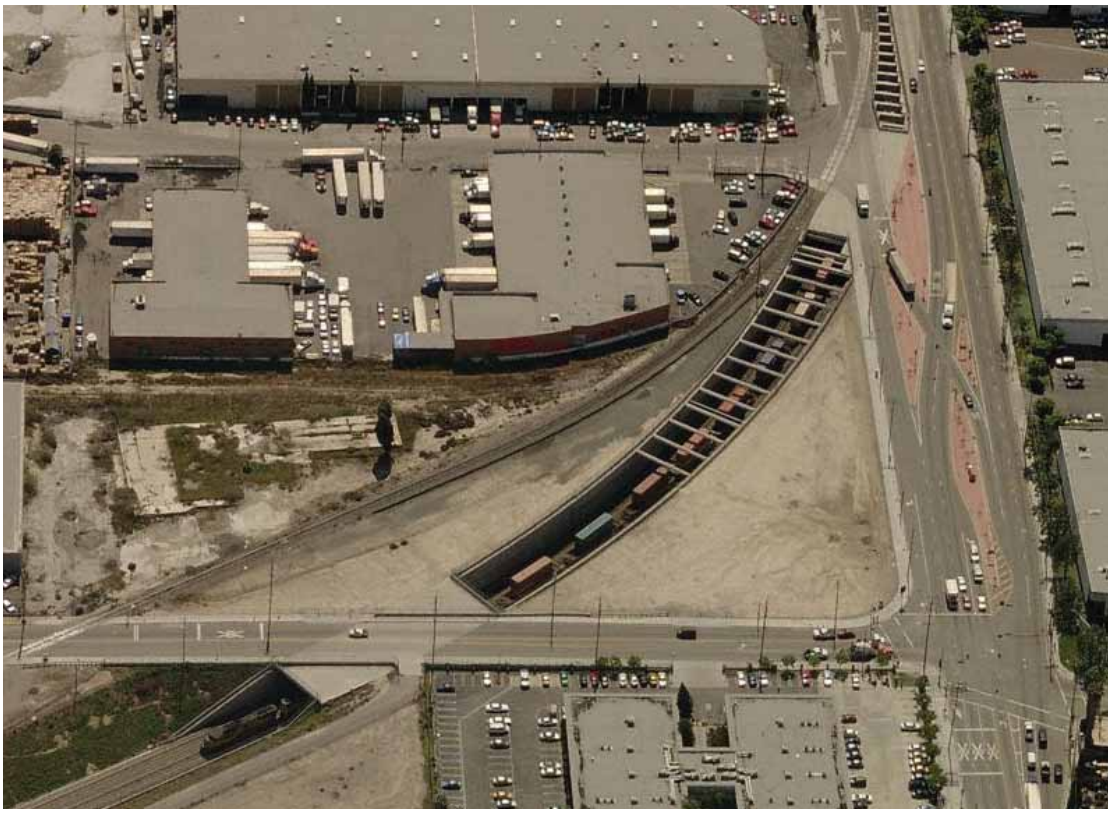
E5.3 **Develop an enforcement strategy for keeping trucks off restricted streets and on the designated truck routes.** The fine/penalty system for the misuse of streets designated 'no trucks' needs to have one clear enforcement body. Additionally, fines/penalty must be sufficient to create a true deterrent to truck travel on local streets.

E5.4 **Use traffic calming measures to discourage truck traffic from local streets.** Freight truck traffic needs to be considered in the design of other roadway improvements. For example, when implementing traffic calming measure on local streets, measures should be used to discourage truck traffic (e.g., street narrowing, bump-outs, chicanes).

E5.5 **Implement road improvements on defined truck routes.** Strategically placed improvements will enhance capacity and speed of movement for trucks and decrease traffic on local streets by creating continuous connections between existing and proposed port facilities and the regional interstate system. Key projects include the following (see Freight & Ports Strategy 3):

- Build the Craney Island Access Road.
- Build the Maersk Interchange.
- Complete the Commonwealth Railway Mainline Safety Relocation Project (CRMSRP).
- Complete the Midtown Tunnel/Martin Luther King Freeway Extension.
- Explore grade separation at the Frederick Boulevard/I-264 at-grade rail crossing.
- Complete all entrance and exit movements at the Portsmouth Boulevard/I-264 interchange.
- Increase the capacity of the Victory Boulevard/I-264 interchange.
- Upgrade the Downtown Tunnel, including possible widening.

E5.6 **Design connections between ports and truck-to-rail transloading facilities.** (See Freight & Ports Strategy 4 above.)



Los Angeles, CA. By reconstructing a freight line in a trench below street level, the Alameda Corridor Transportation Authority was able to eliminate all grade crossings between the Ports of Los Angeles/ Long Beach and downtown Los Angeles.

Strategy 6

Improve conditions at railroad grade crossings.

At-grade railroad crossings increase congestion by creating delays while cars and trucks wait for trains to pass. Many of these crossings in Portsmouth are unprotected, increasing the possibility of accidents and requiring freight trains to slow down at the crossings. Also, existing state laws and railroad rules require locomotives to sound a 96 to 110 db (A) horn one-quarter mile in advance of a railroad crossing and continue sounding the horn until the crossing is occupied by the locomotive, creating noise pollution.

Actions

E6.1 **Eliminate as many grade crossings as possible.** Eliminating at-grade crossings of rail and automobile traffic will reduce both congestion and accidents but is very expensive. The City should prioritize crossings with the greatest traffic and safety impacts and explore the possibility of grade separation with HRTPO, VDOT, and the railroads.

E6.2 **Add signals and gates at unprotected railroad grade crossings.** Controlled crossings will reduce the likelihood of accidents involving trains and cars, increasing transportation safety. In addition, the installation of gates could allow the Belt Line to increase speeds from 10 to 25 miles per hour, greatly increasing its efficiency of operation.

E6.3 **Establish a "Quiet Zone" in Portsmouth.** In 2006, the Federal Railroad Administration passed the Final Rule on Quiet Zones (49 U.S.C. 20153). This rule allows local public authorities to designate or request approval of quiet zones in which train horns are not routinely sounded. Establishment of a quiet zone requires the installation of crossing gates and may require additional "supplementary and alternative safety measures" (specific measures described in the rule). The public authority responsible for traffic control or law enforcement at the highway-rail grade crossing is the only entity that can designate or apply for quiet zone status.

Virginia Port Authority Environmental Goals

- Meet or exceed all applicable federal, state, and local environmental laws and regulations, and other requirements subscribed to by the organization.
- Employ management systems and procedures specifically designed to prevent activities and conditions that pose a threat to human health, safety, and the environment through proactive environmental leadership and compliance.
- Adhere to an established framework for setting objectives that demonstrate a commitment to continual improvement.
- Integrate environmental costs, risks, and impacts into port project development and facility improvements and continually evaluate and improve operational efficiencies and practices to achieve environmental and business objectives.
- Promote pollution prevention, response and recovery, and environmental awareness through communication with employees, customers, tenants, suppliers, contractors, other terminal users, regulatory agencies, neighboring communities, and environmental organizations.

Programs and projects in support of these goals include:

- Instituted the Green Operator's (GO) Program. This program provides rebates to retrofit older vehicles with more emission-efficient engines and recognizes partners, including carriers and shippers, for setting and achieving goals for reducing air pollution and greenhouse gases associated with the transport of goods.
- Switched to use of ultra low sulfur diesel (ULSD) fuel and hybrid locomotives (the latter at Norfolk International Terminals).
- Implemented stormwater treatment devices, structures and ponds to reduce discharges and improve the quality of stormwater runoff.
- Constructed an under-wharf stormwater detention basin (at Norfolk international Terminals).
- Created oyster reefs, non-tidal wetlands, and forested riparian buffers on the Elizabeth River.

Strategy 7

Develop a "sustainable ports" strategy to reduce the negative environmental impacts of the ports and freight facilities.

While the port is a major driver of Portsmouth's economy, port activities can also have major impacts on air and water quality and the health and quality of life of residents. Because these impacts will potentially increase with increased freight traffic through the region, it is imperative that strategies be employed to limit the environmental impacts of port and transportation development. Fortunately, the City's port operators have been proactive in addressing the environmental impacts of their operations.

Actions

E7.1 **Support the Port of Virginia in fulfilling its existing environmental strategies and programs and meeting mandated state and federal regulations.** The Port of Virginia has made a major commitment to becoming a sustainable port (see callout on p.165). It was the first large East Coast port to receive the ISO 14001:2004 Environmental Management System (EMS) certification for its terminal operations in June 2008. Development and implementation of this system is currently underway, targeting air and water quality improvements at the Newport News Marine Terminal, Norfolk International Terminals, and Portsmouth Marine Terminal. These improvements should be continued at the Portsmouth Marine Terminal and incorporated into the design and operations of the planned Craney Island Marine Terminal.

E7.2 **Encourage and incentivize participation in non-mandated EPA programs for ports and port-related industries.** The EPA has developed a sustainability strategy for ports and has a number of specific programs designed to improve environmental conditions at U.S. ports. Examples of these programs include SmartWaySM Transport and Clean Ports USA (see callout on p.168).

E7.3 **Support the Port of Virginia in adopting the latest sustainability strategies for ports.** As noted, the Port of Virginia is an established leader in several aspects of environmental port management. However, additional strategies for improving air and water quality should be considered, both by VPA and at the APM/Maersk Marine Terminal. These strategies are geared towards ports, but many can be utilized by other freight facilities and carriers throughout Portsmouth to make freight handling cleaner, safer, and less expensive.

Portsmouth, VA

Portsmouth, VA. Marinas and docking opportunities provide valuable services and attract boaters to stop in Portsmouth.

EPA Sustainability Programs

SmartWaySM Transport. SmartWaySM Transport is an innovative collaboration between EPA and the freight sector designed to improve energy efficiency, reduce greenhouse gas and air pollutant emissions, and improve energy security. Through this program, the EPA establishes standards and provides technical guidance, enabling participating companies to save money, reduce fuel consumption, and receive recognition for social responsibility and leadership. A component of the SmartWay program supports diesel emissions reductions through technology, financing, and grants.

Clean Ports USA. Clean Ports USA is an incentive-based, non-regulatory program designed to reduce emissions from diesel engines and other port equipment through comprehensive strategies and information for port operators. The Port of Virginia has already made strides in the area of cargo handling equipment by switching to ultra low sulfur diesel (ULSD) in 2007 (ahead of a federal mandate) and replacing older engines with cleaner burning models.

Water Quality Improvement Strategies

- **Increase pervious surface areas through landscaping.** Reducing paved surfaces reduces stormwater runoff, increasing water quality and decreasing erosion.
- **Restore wetland habitats.** Wetlands improve water quality, help protect coastlines from erosion, and provide valuable habitat for native species.
- **Plant riparian buffers along waterways.** Establishing planted buffer zones between waterways and industrial and transportation uses is a means of absorbing runoff and reducing waterway pollution.

Air Quality Improvement Strategies

- **Reduce idling times for trucks and vessels.** A great deal of fuel is burned and harmful emissions generated by trucks and vessels idling at ports. More efficient port access and layout, gate controls, and idling policies can cut down on vehicle idling times.
- **Use cleaner burning fuels.** The Port of Virginia is already using low sulfur diesel fuel, but other freight handling operations can make the switch as well. Other fuel options such as biodiesel and emulsified diesel can also be considered.
- **Reduce marine vessel speeds.** By reducing speed, less fuel is burned and emissions are reduced.
- **Retrofit existing diesel engines.** Retrofit (after treatment) technologies can reduce emissions by adding a new, cleaner technology to an older system. Technologies available for cargo handling equipment include Selective Catalytic Reduction (SCR), Diesel Particulate Filter (DPF), Closed Crankcase Ventilation (CCV), Exhaust Gas Recirculation (EGR), and Diesel Oxidation Catalyst (DOC). These devices do not improve fuel economy, but can be cost-effective means of reducing impacts on port workers, neighboring land uses, and ambient air quality.
- **Repair, rebuild, and repower equipment.** It can be more cost-effective to replace, rebuild, or repower a piece of cargo handling equipment than to purchase a new one. Repowering means modifying or replacing an existing engine with a cleaner, more efficient technology of the same type, or with an alternative-fuel engine. Rebuilding an engine involves taking it apart, cleaning and adjusting components, and replacing/upgrading components to new standards. Rebuilding an engine can significantly lower emissions and can be cost effective for equipment that is expensive to replace.
- **Shift to hybrid or electric freight handling equipment.** Given the stop and go nature of much freight handling activity, switching to hybrid or electric power can dramatically reduce fuel consumption and associated costs and emissions. Equipment for which hybrid or electric technologies are available includes tugboats, forklifts, reach stackers, yard hostlers, and cranes.
- **Shift to greater use of freight movement modes other than trucks.** (See Freight & Ports Strategy 4.)
- **Use shore-based power.** The purpose of shore-based power, often called "cold ironing" or "alternative marine power," is to provide vessels with a land-based alternative power source (usually electricity from the grid, but sometimes natural gas), allowing them to operate auxiliary systems at dock while their engines are turned off. Shore-based power can be used with a variety of vessel types, including container ships, cruise ships, fishing vessels, ferries, recreational boats, and tugs.

Portsmouth, VA. Large vessels contribute significantly to poor air quality in Hampton Roads.

Strategy 8

Enhance and promote recreational boating and improve marina facilities.

Portsmouth has great potential as a destination and stop-over point for recreational boaters. In addition to its port and naval facilities, Portsmouth's waterfront is home to public marinas at the nTelos Pavilion, High Street, Harbor Court, Craford Bay, Scott's Creek, the Western Branch of the Elizabeth River, and various other creeks and inlets. Building from these facilities and its prime location at Mile Marker Zero on the Intracoastal Waterway, Portsmouth is well-positioned to attract larger amounts of recreational boating activity and the economic benefits that come with it. The City should take action to enhance its public marina facilities, improve their connectivity to land-based transportation systems, and promote Portsmouth as a boater's destination.

Actions

E8.1 **Provide easy connections between the City's multimodal transportation network and marinas.** The City should encourage boaters to stop over and explore Portsmouth and attract more maritime visitors by making it an easily accessible destination from all of its marinas. The following facilities should be visible from and within an easy and safe walk of marinas to attract boaters into the City:

- Transit stops.
- Paths or sidewalks that connect to the City's pedestrian network.
- Bicycle facilities that connect to the City's bicycle network.
- Taxi stands or signs with information on how to contact a taxi service.

E8.2 **Provide information for visitors arriving by water at marinas.** In addition to making Portsmouth accessible to boaters, the City should provide on-dock information for travelers arriving by water. Providing information on service locations, places to eat, and sights to see in Portsmouth will encourage boaters to explore the City during their stay. Marinas should provide easily located, legible maps that include the following information:

- Locations of maritime service facilities and repair shops.
- Locations of nearby grocery stores, pharmacies, and other commercial resources.
- Locations of nearby restaurants.
- Transit routes and locations of nearby transit stops.
- A description of travel options for navigating the city and key locations for each mode.

E8.3 **Promote and market Portsmouth's identity as the gateway to the Intracoastal Waterway.** Located at Mile Marker Zero, Portsmouth has a prime location on the Intracoastal Waterway, which is used extensively by recreational boaters. Portsmouth should promote itself as the gateway to this resource. Possible promotional activities could include:

- Advertising Portsmouth and its marinas in boating and yachting magazines.
- Publishing maps showing Portsmouth's various maritime facilities and distances to other key destinations along the waterway.
- Creating a "brand" identity as Mile Marker Zero on the waterway (no trip would be complete without a trip to the start of the waterway).

E8.4 **Encourage marinas and other maritime facilities to adopt the latest sustainability strategies in order to make Portsmouth a "green" boating destination.** There are many new strategies to reduce environmental impacts caused by maritime activity, such as using cleaner fuel, reducing emissions, reducing waste discharges and stormwater runoff, and protecting or restoring surrounding ecosystems. Some maritime facilities in Portsmouth are already employing such techniques and can serve as examples to other public and private facilities. Such efforts will improve the environmental quality of Portsmouth's waterfront as well as making Portsmouth stand out among maritime destinations as a sustainability leader.

Portsmouth, VA. A pleasure sail on the Elizabeth River.

F. Aviation

Vision

The Hampton Roads Region will have a wide range of airline routes and carriers available. Travel to the airport will be reliable and affordable.

Background

Aviation is critical for commerce and quality of life as it connects the Hampton Roads region to the national and global economies and provides mobility to distant locations.

Portsmouth does not have a public or commercial airport. The primary airports in the region are the Norfolk International Airport and the Newport News-Williamsburg International Airport. Reaching both of these airports involve crossing water bodies. Hampton Roads Executive Airport, a smaller airport used mostly by private planes, is located a few miles southwest of Portsmouth in the City of Chesapeake and the Suffolk Executive Airport is located somewhat further away in the City of Suffolk.

Two key factors are influencing aviation transportation policy in Portsmouth and the City's larger regional context.

The region has a large number of airfields. Due to the presence of the military and accidents of geography, the Hampton Roads region has more airfields than most regions its size. In addition to the international and executive, there are several naval air stations and Air Force bases. Despite all these facilities, the region is not a major airline hub. Norfolk International has about 80 outbound flights each day. Several carriers operate flights to major hubs such as Charlotte, Philadelphia, New York, and Atlanta. Several low-cost carriers serve the region, helping to keep travel more affordable.

Dramatic changes are taking place in the commercial airline industry. Commercial aviation in the United States is struggling. Almost none of the major commercial airlines achieved a profit in 2009 and in recent years a number of airlines have gone bankrupt. Some have shut down while others have merged. Factors causing the economic turmoil include rising fuel prices, falling demand, increasing costs, downward pressure on fares, and delays at congested airports.

"Legacy carriers" are those large airlines that generally predate industry deregulation. In the past, these carriers offered a high level of service including complimentary meals, on-board entertainment, various classes of service, and other amenities. Carriers often enjoyed relative monopolies on certain routes, and charged accordingly. They competed on the basis of incentive programs and quality of service rather than strictly on price. Legacy carriers generally operate large hub and spoke networks of flights, with many feeder flights operated by "express" carriers using regional jets and turboprop planes. Many of the flights to the Hampton Roads region are operated by express carriers under contract to the major airlines. The hub and spoke system allows minor airports to have access to a national network offering a large array of destinations. However, this system is currently in contraction, with several airports losing their hub status.

"Low cost" carriers compete on the basis of price. They generally offer very limited amenities. Operations are focused on maximum efficiency, and services are generally oriented towards major travel corridors rather than a hub and spoke system. For routes where low-cost carriers operate, prices are very affordable, encouraging a high volume of travel. However, some routes are too minor to interest these carriers. Typically less profitable, these routes thus are left to legacy carriers, which may charge higher prices. At the same time, as the number of hubs decreases the level of service to smaller airports also tends to decrease. Some small airports have lost all commercial airline service. Some federal subsidy programs exist to preserve "Essential Air Service," but use and effectiveness of these subsidies is in decline.

Commercial airlines have dropped many amenities and starting charging for services that were formerly complimentary in order to compensate for reduced revenue due to downward pressure on prices, falling demand due to the weak economy, and increasing prices for fuel. Gone are galleys and hot meals on airliners (to save weight and reduce catering costs). Today, sandwiches can be purchased from in-flight "café service." Checked baggage, priority seat selection, and priority boarding all command fees. In short, "a la carte" fees are now standard practice in commercial aviation.

Rising fuel prices are straining airline finances. Just a few years ago oil was trading at $30 per barrel or less. Averages price per barrel of oil in the fourth quarter of 2009 are projected to be $70 per barrel. This is likely to continue to damage airline profits (and increase losses). The current aviation model may not be sustainable if fuel prices remain high.

The changes in the landscape of commercial aviation will have an unknown impact on Portsmouth and the Hampton Roads region, which does not have a hub airport. It will be important to try and attract low-cost carriers as legacy carriers close routes, but this could be a double-edged sword if downward price pressures reduce the overall level of service offered. However, these issues need to be addressed at the regional level in the context of national commercial airline strategies and Portsmouth will have limited influence on the ultimate outcome. Of more direct relevance for Portsmouth is the need to ensure strong connections to the region's airports, which also is a regional issue.

Newark, NJ. Airports around the world are being connected to passenger and commuter rail networks. The Port Authority of New York and New Jersey constructed the AirRail station at Newark Liberty International Airport to provide connections to Amtrak and New Jersey Transit trains.

Strategies

Strategy 1

Support high speed rail.

Supporting modern train service is related to aviation policy because in other countries with High Speed Rail (HSR – trains traveling at 200 miles per hour), trains can command the great majority of travel for trips under 500 miles long (a three hour rail trip). If HSR were built to the Hampton Roads region it would be possible to reach most major cities on the eastern seaboard and some Midwestern cities in a reasonable amount of time. Airplanes would remain the dominant form of travel for longer flights, but trains could replace "feeder flights" that connect to major airline hubs such as Atlanta, Washington DC, and Philadelphia. This is important because the short hop aviation flights are often unprofitable and cause disproportionate emissions as compared to long haul flights because more fuel is burned at takeoff and landing than during cruise.

Actions

A1.1 **Work with other Hampton Roads cities to support state proposals for high speed rail.** This will involve promoting high speed rail service for the Hampton Roads region through the Virginia congressional delegation and the state legislature.

Strategy 2

Ensure strong connections from Portsmouth to the commercial airports in Hampton Roads.

The travel time required to access the region's commercial airports—Newport News-Williamsburg International Airport and Norfolk International Airport—from Portsmouth can be significantly impacted by tunnel and road congestion. Transit and other measures can provide more reliable travel times.

Actions

A2.1 **Support rail transit connections to the regional airports.** As a long-term action this would provide a reliable and expedient travel option to access the airports.

A2.2 **Work with Portsmouth's hotels to develop and publicize economical shuttle options.** Such service would allow travelers to reach Portsmouth without having to rent a car or pay hefty taxi fares.

Strategy 3

Work with regional partners to retain existing commercial airline routes and add new destinations served from regional airports.

Hampton Road's business environment benefits from robust airline connections. While maintaining good commercial airline service is beyond the capability of Portsmouth to address by itself, the City can nonetheless support a coalition comprised of local governments, regional planning agencies, airport authorities, and private interests to promote airline routes to the region. Such service is a national security issue due to the strong military presence in the region.

Actions

A3.1 **Work with other local governments, regional planning agencies, airport authorities, and private interests to promote airline routes to the region.**

Chicago, IL. Many airlines have begun to use smaller aircraft such as these Canadair and Embraer Regional Jets to maintain frequent flights as demand for air travel has declined.

Strategy 4

Maintain executive airport options.

Smaller fields can allow for corporate jets and private aviation. Suffolk Executive Airport and Hampton Roads Executive Airport are much closer to Portsmouth than the major commercial airfields. Maintaining these airports as viable locations for executive jets will contribute to the region's business competitiveness.

Actions

A4.1 **Support efforts by Chesapeake and Suffolk to ensure the future of the executive airports and make upgrades over time.**

CHAPTER 6

IMPLEMENTATION

Overview

The Master Transportation Plan (MTP) provides a blueprint for intelligent and informed decision-making by the City and its partners to achieve the 2030 vision of Portsmouth's transportation system. In order to accomplish the vision, the numerous plan recommendations must be prioritized and implemented incrementally over time. Chapter 5: Transportation Systems presents a range of strategies and actions, organized by system element or mode (pedestrian, bicycles, transit, etc.). It also identifies priority corridors and project locations for system improvements. Proposed actions range from amending policies and regulations to creating coalitions to constructing specific infrastructure projects. While all are ultimately necessary to achieve the goals of this plan, they will need to be implemented in a strategic and coordinated fashion.

This chapter presents a guide for prioritizing, implementing, funding, and monitoring the effectiveness of the actions proposed in Chapter 5. It is organized into the following sections:

A. **Responsible Agencies & Partners and Related Plans:** identifies the agencies and organizations that are likely to be involved in the implementation of the MTP; lists related plans that impact or will be impacted by implementation of the MTP.

B. **Prioritization:** presents the overall approach and specific criteria used to determine priorities for implementation.

C. **Action Plan:** organizes the actions from Chapter 5 into timeframes and action types based on the prioritization methodology presented in Section 6.B.

D. **Funding Sources:** provides an overview of available funding sources for the action plan recommendations.

E. **Catalytic Projects:** presents additional information on infrastructure projects identified for implementation during the first two years following plan adoption.

F. **Summary of Phased Multimodal Corridor Improvements:** lists the near-term and long-term infrastructure improvements to be made to identified multimodal corridors.

G. **Monitoring and Evaluation:** outlines steps to be taken to track implementation progress and adjust the action plan to address changing circumstances.

A. Responsible Agencies & Partners and Related Plans

Responsible Agencies & Partners

Successful implementation of the MTP will require coordinated efforts among various city agencies and departments. In addition, many initiatives will require coordination with state and regional agencies or private businesses. The need for coordination will arise in part because some of the proposed transportation improvements affect right-of-ways that are owned by different public or private agencies. Most notably, projects involving state roads and interstate highways will require coordination with the Virginia Department of Transportation (VDOT) and the Federal Highway Administration (FHWA). Some improvements will occur as a result of development and redevelopment opportunities and will have to involve the developer or responsible agency. Furthermore, the strong presence of the Port of Virginia and associated shipping industries and their heavy utilization of the City's transportation system make them important partners in implementing the MTP. Finally, many proposed projects will be implemented using grant funding from regional, state, and federal agencies and thus must be consistent with program requirements.

With these factors in mind, the following agencies and organizations have been identified as playing key roles in implementation:

State Agencies

- Virginia Department of Transportation (VDOT)
- Virginia Department of Rail and Public Transportation (VRPT)
- Virginia Port Authority (VPA)

Regional Agencies/Organizations

- Hampton Roads Planning District Commission (HRPDC)
- Hampton Roads Transportation Planning Organization (HRTPO)
- Hampton Roads Transit (HRT)

City Agencies/Organizations

- Portsmouth Planning Department
- Portsmouth Engineering (Divisions of Engineering, Capital Projects, Traffic Engineering, and Parking)
- Portsmouth Public Schools
- Portsmouth Police Department
- Portsmouth Sheriffs Office

Private Sector

- Railroads: Norfolk Southern, CSX, Norfolk & Portsmouth Belt Line
- Trucking Companies

Related Plans

To be effectively implemented, the Master Transportation Plan must work in concert with a number of other city, regional, and state plans. First and foremost a plan for the City of Portsmouth, the MTP builds from the vision and policies laid out in the City's Destination 2025 Comprehensive Plan. However, it also addresses Portsmouth's role in the regional transportation system, establishing the City's transportation priorities and identifying projects recommended for inclusion in future regional plans. Key plans that must be considered in conjunction with the MTP include, but are not limited to:

City Plans

- Destination 2025 Comprehensive Plan
- Downtown Master Plan and Waterfront Strategy
- Downtown Parking Master Plan
- Downtown Master Utility Plan
- Downtown Design District Update
- Form-Based Codes
- Zoning Ordinance Update

Regional Plans

- Hampton Roads 2030 Long-Range Transportation Plan
- Hampton Roads Transit 2030 Regional Transit Plan

B. Prioritization

The following five criteria were used in prioritizing transportation projects for implementation:

- Degree of achievement and support of the MTP goals stated in Section 2.B of the plan
- Geographic priority (as determined by the MTP multimodal corridor and transportation system component concepts)
- Relative ease of implementation
- Ability to catalyze future implementation of other MTP projects
- Expressed support by residents, governmental officials or regional agencies

Each of these criteria is discussed below. They should continue to be used to prioritize transportation projects as the City implements the MTP.

Degree of achievement of stated MTP goals: The Goals of the Master Transportation Plan are presented in Chapter 2: Vision for the Portsmouth Transportation System. These goals drove the identification of MTP projects and actions, so that all of the proposed actions accomplish one or more of them. In general, projects that achieve multiple goals should receive a higher priority because they will have a greater overall impact in achieving the MTP vision. Similarly, projects projected to have a higher impact as measured by factors such air quality improvement, increased use of alternative travel modes, reduced vehicular congestion, and reduced crashes should have greater priority than projects with lesser impacts.

Geographic priority: The network concepts for the different components of Portsmouth's transportation system presented in Chapter 4 identify multimodal corridors and other locations for project improvements. While the long-term goal is to provide all residents with a full range of convenient transportation options (e.g., by developing as many roadways as possible into complete streets), these corridors and locations provide a geographic framework for prioritizing projects that will have the greatest impact in achieving the goals both of the MTP and the Destination 2025 Comprehensive Plan.

The proposed framework of multimodal corridors is an integrating concept that will connect the key activity centers identified in the Comprehensive Plan through pedestrian, bicycle, transit, and vehicular travel options. Thus projects that will help complete these corridors by filling existing gaps are considered to have the highest priority. Similarly, projects in key locations such as activity centers, schools, and heavily traveled corridors will have the most impact on factors such as reducing congestion, improving safety, and increasing walkability, and thus will have greater priority. In general, the following geographic factors should be used to prioritize projects for implementation:

- It is in a priority multimodal corridor.
- It is a component of one or more of the priority transportation networks identified in the MTP.
- It fills a gap in an otherwise largely complete segment of the system.
- It provides access across a barrier such as a waterway, highway, or railway that otherwise has few or no other crossings.
- It serves an activity center identified in the Destination 2025 Comprehensive Plan.
- It provides access to (i.e., is within one-quarter mile of) a school or large employment center.
- It improves access to a transit center/station.
- It connects a high-density residential area to an activity center, transit station, school, or employment center.
- It enhances the safety of pedestrian, cyclist, transit riders, or drivers in a high-crash area.
- It discourages truck and regional traffic on local streets (e.g., by providing an alternative route).

Relative ease of implementation: While every project proposed in the plan will improve Portsmouth's transportation system, various factors affect how rapidly and easily individual projects can be implemented. Funding is the largest hurdle that most transportation projects must overcome. The City has very limited internal funding available for transportation and thus will need to rely to the maximum extent possible on external sources. These sources exist, but as discussed later in Section 6.D, each has its own priorities and project selection criteria. Given Portsmouth's financial constraints, the following factors should increase a project's priority:

- The project is of both regional and local significance and meshes with local, area, and regional plans.
- There is an external (non-city) funding source(s) available for the project type.
- The project is highly compatible with the priorities of the identified funding source(s) and shows high probability of being funded by one or more of these sources.

In addition to funding constraints, many projects must overcome political or regulatory hurdles to be implemented. Thus projects that require minimal change in policy or regulation, and actions that set in place policy changes that will enable other projects to be implemented, should be prioritized for early implementation.

Ability to catalyze future implementation of other MTP projects: Given the City's limited financial resources available for transportation, it is critically important to maximize the benefits of each project. While the MTP contains a number of important stand-alone projects, projects that will enable future projects to move forward (e.g., by laying the necessary policy or infrastructural groundwork or building support for future projects) should be high priorities for early implementation. "Demonstration" projects that result in enhanced operational characteristics or illustrate the benefits of "complete streets" design can serve as precedents or examples for future projects and thus should be prioritized for early implementation.

Expressed support by residents, government agencies, or regional organizations: The MTP planning process yielded input on issues and ideas for Portsmouth's transportation system from a variety of sources. Stakeholder interviews were conducted with representatives from the Port Authority, railroads, trucking companies, school district, bicycle commuters, city agencies, Navy facilities, the Virginia Department of Transportation (VDOT), Hampton Roads Planning District Commission (HRPDC), and Hampton Roads Transit (HRT), among others. In addition, a statistically valid survey of Portsmouth citizens was undertaken and public meetings were held to solicit citizen input for the MTP. This input informed the prioritization of projects for the action plan. Another factor for project prioritization is the inclusion of projects identified in the plans of other agencies and organizations involved in transportation in Portsmouth. These organizations include:

- Hampton Roads Transportation Planning Organization (HRTPO)
- Hampton Roads Transit (HRT)
- The Port Authority of Virginia
- Virginia Department of Transportation (VDOT)

Priority projects within Portsmouth identified by these agencies are included in the MTP. Typically regional in scope, they tend to be larger, long-range projects and thus are not usually prioritized as early action items even though they are critical to achieving the MTP's 2030 vision.

C. Action Plan

Using the prioritization criteria and factors described above, the action plan identifies policies, programs, and projects to be implemented over the time horizon of the plan (through 2030) to achieve the vision for Portsmouth's future transportation system.

In order to provide guidance for implementation, the actions are classified by timeframe into five categories defined below: catalytic, near-term, mid-term, long-term, and ongoing. The catalytic actions include demonstration projects as well as policy and program actions that will lay the foundation for future project implementation over the life of the plan. In the later phases, actions focus on multimodal corridor improvements and regionally significant projects based on the recommendations for each transportation system element laid out in Chapter 5.

To help facilitate planning and funding, the actions are organized into the following six types:

- Policy & Ordinance Amendments
- Streets & Intersections
- Bicycles & Pedestrians
- Transit
- Parking
- Freight & Ports

Due to the multimodal focus of this plan, there is overlap and interdependence among the types; where overlap occurs, the actions have been cross referenced. For each action, a reference is provided to the relevant action(s) in Chapter 5 where a more in-depth discussion can be found. The implementing agency and necessary partners are also identified. Potential funding sources are provided where applicable and further information on the funding sources identified can be found in Section 6.D (Funding Sources).

Action Timeframes

Catalytic: Top priority actions on which work should begin immediately and be fully implemented within the next two years. These are:

- Projects, programs, and policies that generate a large return on minimal investment
- Urgent projects are those needed for safety reasons or to address severe operational constraints
- Early action items that need to be undertaken in the near future in order to lay the groundwork for accomplishing long-term, often multi-phase, projects and programs
- High priority projects, programs, and policies that are easy to implement
- Projects and programs that already have funding

Near-term: Projects to be implemented in 2–5 years. These are:

- High impact projects, programs, and policies that will generate a large return on investment but will take more than two years to plan and fund
- High priority projects, programs, and policies that require action in the first two years to set in motion
- Mid priority projects and programs that are easily implemented
- Projects that fill key gaps in transportation system component networks

Mid-term: Projects to be implemented in 5–10 years. These are:

- High impact projects and programs that will generate large return on investment but will take more than five years to plan and fund
- Projects that require action in the mid-term to set in motion
- Mid-priority projects that are less easily implemented
- Regionally significant projects that require coordination with other cities, the Port Authority, VDOT, or other state agencies, but most likely can be implemented within a ten-year timeframe

Long-term: Projects that will take require more than 10 years to plan and obtain funding for and/or have lower priority than the projects identified for the first 10 years of implementation. While planning for these projects should begin earlier, they will need to be reevaluated and prioritized in ten years. They include:

- Regionally significant projects that require coordination with other cities, the Port Authority, VDOT, and/or other state agencies and are on a long-term implementation plan
- Large scale projects often involving multiple phases of construction and investment
- Lower-priority projects and programs

Ongoing: Actions that require ongoing activity on a continuous or regular basis. These are:

- Actions to assess progress or needs that require annual or more frequent attention
- Programs that require ongoing activity
- Policies and ordinances that must be revisited periodically to ensure they are reflective of the City's transportation vision as well as responsive to and consistent with current legislative requirements and market demand

Action Types

- **Policy & Ordinance Amendments.** These actions involve amendments to existing policies and ordinances or the creation of new ones needed to facilitate implementation of the MTP. All of these actions fall within the Catalytic and Near-term timeframes as they lay the foundation for implementing other actions.
- **Streets & Intersections.** These actions focus on operational and safety improvements to the vehicular system (including facilitating the efficient movement of freight through the City). Roadway enhancements that will promote the transformation of identified streets into multimodal corridors are an important focus. Specific roadway improvement recommendations for multimodal corridors are provided later in this chapter.
- **Bicycles & Pedestrians.** These actions include both infrastructural and non-infrastructural projects that will enhance the bicycle and pedestrian environment in Portsmouth.
- **Transit.** These actions involve improvements to Portsmouth's transit systems. They include both physical improvement and operational projects that will enhance public transportation usage and perception in Portsmouth. Regional rail and access to regional airports are also addressed by this category.
- **Parking.** These actions involve improvements to both publicly and privately provided parking in Portsmouth.
- **Freight & Ports.** These actions will improve the movement of freight and the activities of ports and marinas in Portsmouth. They include both physical improvement and operational actions that impact roadways, railways, waterways, ports, and marinas.

Policy & Ordinance Amendments

Related Action	Related Action in Transportation System	Implementing Agency	Partners	Potential Funding Sources
Catalytic (0-2 years)				
Implement zoning ordinance revisions addressing the following: • complete street design guidelines • requirements for bicycle parking • reduced minimums and new maximum parking requirements • design and sighting requirements for new parking facilities	P1.3, B1.4, B6.2, B6.3, B6.4, B6.5, V12.1, V12.6, V12.7, V13.2, V13.3, V13.5	Planning	Engineering	N/A
Establish a policy requiring the inclusion of bicycle and pedestrian facilities in all new roadway projects. This is already a requirement for new road construction involving VDOT funding. (Also see Streets & Intersections, Bicycles & Pedestrians)	P1.2, B1.2, B4.4	Engineering	Planning	N/A
Create a Portsmouth Transportation Management Association to conduct TDM activities.	P3.1, B3.2, T1.1, T1.2, T1.3, T1.4, V5.1, V5.2	Planning	HRT, Traffix	CMAQ
Prepare a bicycle plan for Portsmouth. (Also see Bicycles & Pedestrians)	B2.1, B4.1	Planning	Engineering	CMAQ, TE
Recommend the following regionally significant projects for inclusion in the LRTP: • Jordan Bridge Parkway connector • I-264 interchange improvements at Portsmouth Boulevard, and Frederick Boulevard • Roadway Improvements to George Washington Highway between Victory Boulevard and the Chesapeake boundary • Turnpike Road improvements • High Street Bridge replacements (Also see Streets & Intersections)	V6.2, V6.4, V6.5	City Council	Planning, Engineering, HRTPO	N/A
Adopt a formal policy statement regarding the Martin Luther King Freeway and Second Tube of the Midtown tunnel.	V9.1	City Council	Planning	N/A
Near-term (2-5 years)				
Establish a program to install bike racks in Portsmouth.	B6.1	Engineering	Planning	CMAQ, TE
Establish a planning process for bringing light rail to Portsmouth.	T4.1, T4.2	Planning	HRT, HRTPO, VDOT (DRPT)	N/A
Establish a citywide railroad crossing safety program to identify and prioritize improvements at dangerous crossings.		Engineering	Railroads, VDOT (DRPT), FRA, Planning	HSIP, FRA
Develop access management regulations consistent with VDOT Policy.	V3.1	Engineering	VDOT	N/A
Work with VDOT to retire the debt that Portsmouth owes for the Western Freeway Bridge/Pinner's Point Connector.	V8.3	City Council	VDOT	

Streets & Intersections Implementation Plan

Related Action	Related Action in Transportation System	Implementing Agency	Partners	Potential Funding Sources
Catalytic (0-2 years)				
Implement zoning ordinance revisions addressing the following: • complete street design guidelines • requirements for bicycle parking • reduced minimums and new maximum parking requirements • design and siting requirements for new parking facilities (Also see Policy & Ordinance Amendments)	P1.3, B1.4, B6.2, B6.3, B6.4, B6.5, V12.1, V12.6, V12.7, V13.2, V13.3, V13.5	Planning	Engineering	N/A
Construct improvements identified as part of the Roadway Safety Assessment (RSA) program and funded through the Highway Safety Improvement Program (HSIP).	P5.1, B4.3, V1.1, V1.4	Engineering	VDOT	HSIP
Stripe crosswalks at all signalized intersections with existing sidewalk connections. (Also see Bicycles & Pedestrians)	P4.2, P5.1	Engineering	VDOT	HSIP
Implement signal system upgrades and optimized signal timing plans to enhance corridor traffic progression and system efficiency.	V3.2	Engineering	VDOT	ARRA, DOE grant, CMAQ
Implement a safe driving campaign.	V2.1	Police		FHWA
Increase enforcement of speeding, reckless driving, and red light running violations.	V2.2	Police Department	City Council	
Construct bike lanes, parking, and sidewalk repair on Portsmouth Boulevard east of I-264 using a road diet. (Also see Bicycles & Pedestrians)	P4.1, P4.2, B4.2, B4.3, B5.1, B4.5, V8.2, V11.1	Engineering	VDOT	TE, HSIP, SRTS
Implement a road diet and traffic calming through a Mt. Vernon Avenue Bike Boulevard and Complete Street Demonstration Project. (Also see Bicycles & Pedestrians)	P4.1, P4.2, P5.2, B4.3, B4.5, B5.1, V8.2, V11.1	Engineering	VDOT	TE, HSIP
Implement a road diet to add bike lanes on West Norfolk Blvd. (Also see Bicycles & Pedestrians)	B4.2, B4.3, B5.1, B4.5, V8.2, V11.1	Engineering	VDOT	TE, HSIP
Implement road diets to construct the Clifford/Bart/South Street Bike Boulevard. (Also see Bicycles & Pedestrians)	P4.1, P4.2, P5.2, B4.3, B4.5, B5.1, B5.2, B5.3, V8.2, V11.1	Engineering	VDOT	TE, HSIP, SRTS
Reconstruct the Alexander's Corner intersection, including associated bicycle and pedestrian improvements. (Also see Bicycles & Pedestrians)	P4.1, P4.2, P5.3, P5.4, P5.5, B4.2, B4.3, B4.5, B5.1, B5.3, V1.4, V1.5, V3.3, V11.1	Engineering	VDOT	ARRA

Related Action	Related Action in Transportation System	Implementing Agency	Partners	Potential Funding Sources
Near-term (2-5 years)				
Complete recommended roadway improvements on the following multimodal corridors. • Elm Avenue • Frederick Boulevard • Airline Blvd • Port Centre Parkway • High Street • Victory Boulevard • George Washington Highway from Greenwood Boulevard to Portsmouth Boulevard These improvements are summarized in Section 6.F. (Also see Bicycles & Pedestrians)	B4.2, B4.3, B4.5, B5.1, B5.2, B5.3, V8.2, V11.1	Engineering	Planning, VDOT	RSTP, Various
Implement traffic calming and restriping necessary to implement bicycle boulevard projects identified in the Bicycle System mapped in the MTP. (Also see Bicycles & Pedestrians)	B4.2, B4.3, B4.5, B5.1, B5.2, B5.3, V8.2	Engineering	Planning	TE, SRTS, HSIP
Implement multimodal improvements on collector and local streets within priority multimodal corridors with the exception of Turnpike Boulevard. (Also see Bicycles & Pedestrians)	P4.1, P4.2, P5.3, P5.4, P5.5, B4.2, B4.3, B4.5, B5.1, B5.2, B5.3, V8.2, V11.1, F5.3	Engineering	Planning	RSTP, Various
Identify intersections with high incidences of speeding and running of red lights and install speed and red light cameras.	P3.6, V2.2	Engineering	Police, City Council	N/A
Implement necessary railroad grade crossing improvements to establish a quiet zone in Portsmouth. (Also see Ports & Freight)	V1.6, F6.2, F6.3	Engineering	Railroads, VDOT (DRPT), FRA, Planning	Rail Enhancement Fund, Federal Railroad Signal Program
Mid-term (5-10 years)				
Reconstruct the High Street Bridge (including pedestrian and bicycle facilities). (Also see Bicycles & Pedestrians)	P4.1, P4.2, P4.4, P5.3, P5.4, P5.5, B4.2, B4.3, B4.5, B5.1, B5.3, V8.2, V11.1	Engineering	VDOT, Planning	RSTP, Various
Implement recommended roadway improvements and speed reductions on London Boulevard. (Also see Bicycles & Pedestrians)	P1.2, P4.1, P4.2, P5.3, P5.4, P5.5, B4.2, B4.3, B4.4, B4.5, B5.1, B5.3, V8.2, V11.1, V1.7	Engineering	VDOT	TE, HSIP, RSTP

Related Action	Related Action in Transportation System	Implementing Agency	Partners	Potential Funding Sources
Complete the reconstruction of Turnpike Boulevard, including recommended multimodal corridor improvements. These improvements are described in the summary of phased multimodal corridor improvements. (Also see Bicycles & Pedestrians)	P1.2, P4.1, P4.2, P5.3, P5.4, P5.5, B4.2, B4.3, B4.4, B4.5, B5.1, B5.3, V8.2, V11.1	VDOT	Engineering	RSTP, Various
Implement recommended multimodal corridor improvements within designated multimodal corridors not addressed in a previous phase. These improvements are summarized in Section 6.F. (Also see Bicycles & Pedestrians)	P1.2, P4.1, P4.2, P5.3, P5.4, P5.5, B4.2, B4.3, B4.4, B4.5, B5.1, B5.3, V8.2, V11.1			RSTP, Various
Build the MLK Freeway extension. (Also see Ports & Freight)	V6.1, F3.3, F4.4, F5.4, F5.5	VDOT	Engineering, FHWA	Industrial, Airport, and Rail Access Fund
Build the Craney Island access road and rail connection. (Also see Ports & Freight)	V6.6, F3.1, F4.2, F4.4, F5.5	VDOT	Engineering, FHWA, VPA	Industrial, Airport, and Rail Access Fund
Long-term (10 - 20 years)				
Complete the Jordan Bridge Parkway to provide a connection from the new MLK Freeway terminus to the new Jordan Bridge.	V6.2, F3.4	VDOT	Engineering, City of Chesapeake	RSTP, Various
Make improvements to the I-264 interchanges at Portsmouth Boulevard, and Frederick Boulevard.	V6.4, F3.6, F3.7	VDOT	Engineering, FHWA	RSTP, Various
Ongoing				
Portsmouth Multimodal Corridor Program: Plan, design and implement specific projects to retrofit the multimodal corridors identified in the MTP as complete streets.	P4.1, P4.2, P4.4, P5.3, P5.4, P5.5, B4.2, B4.3, B4.4, B4.5, B5.1, B5.2, B5.3, V4.1, V8.2, V11.1, F5.3	Engineering	Planning, VDOT	RSTP, HSIP, TE, Various
Portsmouth Traffic Calming Program: Plan, design and implement specific traffic calming projects in areas where problems have been identified, including: • near schools • near parks • in and around activity centers • on streets where undesired truck traffic has been observed as a problem • those areas indicated in Figure 6: Motor Vehicle and Parking Element	P5.3, V1.5, F5.3	Engineering	Planning	TE, SRTS
Continue to conduct Roadway Safety Assessments on an annual basis, and implement identified improvements. Include additional roadway sections beyond the limits of specific intersections.	P5.2, V1.2, V1.3	Engineering	VDOT	HSIP

Related Action	Related Action in Transportation System	Implementing Agency	Partners	Potential Funding Sources
Include mast-arm installations and multimodal amenities in all intersection improvement projects and in the construction of all new intersections.	V1.4	Engineering	VDOT	HSIP, CMAQ
Evaluate appropriate design speeds for roads depending on their urban context and adjust as deemed appropriate.	V10.3	Engineering	Planning	N/A
Construct facilities to support Travel Demand Management (TDM) Measures implemented by the Transportation Management Association (TMA) including park and ride locations. (See Transit and Bicycles & Pedestrians)	V5.3	Planning	Engineering, VDOT, HRT	CMAQ, TE
Reduce the interval of the roadway repaving cycle.	V8.1	Engineering	City Council	RSTP
Explore the possibility of further highway - railroad grade separations, establishment of quiet zones, and RR XX safety enhancements. (Also see Freight & Ports)		Engineering	Planning, FRA, VDOT	N/A

Bicycle & Pedestrian Implementation Plan

Related Action	Related Action in Transportation System	Implementing Agency	Partners	Potential Funding Sources
Catalytic (0-2 years)				
Implement zoning ordinance revisions addressing the following: • complete street design guidelines • requirements for bicycle parking • reduced minimums and new maximum parking requirements • design and sighting requirements for new parking facilities (Also see Policy & Ordinance Amendments, Streets & Intersections, Parking)	P1.3, B1.4, B6.2, B6.3, B6.4, B6.5, V12.1, V12.6, V12.7, V13.2, V13.3, V13.5	Planning	Engineering, City Council	N/A
Establish City policy requiring the inclusion of bicycle and pedestrian facilities in all new roadway projects. (Also see Policy & Ordinance Amendments)	P1.2, B1.2, B4.4	Planning	City Council, Engineering	N/A
Stripe crosswalks at all signalized intersections with existing sidewalk connections. (Also see Streets & Intersections Actions)	P4.2, P5.1	Engineering	VDOT	HSIP
Install signage and street markings for bicycle and pedestrian facilities on the Western Freeway Bridge including improved connections at both ends of the facility.	P4.1, P4.1, B4.3	Engineering	VDOT	HSIP
Construct a "rail trail" on the abandoned Commonwealth Railway line ROW as a part of the Commonwealth Railway Mainline Safety Relocation Project (CRMSRP).	P4.3, B4.2, B4.3, B4.6, F3.2	Engineering	Planning, Parks and Recreation	Rails-to-Trails Conservancy, TE, Recreational Trails Program
Construct bike lanes, parking, and sidewalk repair on Portsmouth Boulevard East using a road diet. (Also see Streets & Intersections)	P4.1, P4.2, B4.2, B4.3, B5.1, B4.5, V8.2, V11.1	Engineering	Planning	HSIP, TE
Construct the Mt. Vernon Avenue Bike Boulevard and Complete Street Demonstration Project. (Also see Streets & Intersections)	P4.1, P4.2, P5.2, B4.3, B4.5, B5.1, V8.2, V11.1	Engineering	Planning	HSIP, TE
Add bike lanes on West Norfolk Boulevard. (Also see Streets & Intersections Actions)	B4.2, B4.3, B5.1, B4.5, V8.2, V11.1	Engineering	Planning	HSIP, TE
Construct the Clifford/Bart/South Street Bike Boulevard. (Also see Streets & Intersections)	P4.1, P4.2, P5.2, B4.3, B4.5, B5.1, B5.2, B5.3, V8.2, V11.1	Engineering	Planning	TE, HSIP, SRTS
Stripe bike lanes on Elm Avenue. (Also see Streets & Intersections)	P4.1, P4.2, P5.2, B4.3, B4.5, B5.1, V8.2, V11.1	Engineering	Planning	HSIP, TE
Establish a standard signage system for bicycle routes and implement on all existing and new bicycle facilities.	B5.4	Engineering	Planning	N/A

Related Action	Related Action in Transportation System	Implementing Agency	Partners	Potential Funding Sources
Increase enforcement of vehicular moving violations that are particularly dangerous to cyclists and pedestrians, i.e. speeding, reckless driving, running red lights, and failure to yield to a pedestrian. (Also see Streets & Intersections)	P3.7, V2.2	Portsmouth Police Department	City Council	N/A
Host street closure events on one or more of Portsmouth's multimodal corridors.	P3.5, B3.7	Parks and Recreation	Planning, TMA	N/A
Publish and distribute travel maps of Portsmouth including a bicycle map and boaters map.	B3.1, F8.2	TMA	Planning, Parks and Recreation	CMAQ
Near-term (2-5 years)				
Implement bicycle boulevard projects identified in the Bicycle System mapped in the MTP.	B4.2, B4.3, B4.5, B5.1, B5.2, B5.3, V8.2	Engineering	Planning	SRTS, TE, HSIP
Implement multimodal improvements on collector and local streets within priority multimodal corridors with the exception of Turnpike Boulevard (Also see Streets & Intersections).	P4.1, P4.2, P5.3, P5.4, P5.5, B4.2, B4.3, B4.5, B5.1, B5.2, B5.3, V8.2, V11.1, F5.3	Engineering	Planning, VDOT	RSTP, HSIP, TE, Various
Begin implementation of recommended bicycle and pedestrian improvements on the following Multimodal Corridors: • Elm Avenue • Frederick Boulevard • Airline Boulevard • Port Centre Parkway • High Street • Victory Boulevard • George Washington Highway from Greenwood Boulevard to Portsmouth Boulevard	B4.2, B4.3, B4.5, B5.1, B5.2, B5.3, V8.2, V11.1	Engineering	Planning, VDOT	RSTP, HSIP, TE, Various
Address gaps or barriers in the priority pedestrian network (see Figure 3: Pedestrian Element) that are within designated activity centers or less than one quarter mile from a school.	P4.1, P4.2, P4.3, P4.4	Planning	Engineering	Safe Routes to School Program
Complete remaining portions of the Commonwealth Railway line rail trail.	P4.3, B4.6	Engineering	Planning, Parks and Recreation	Recreational Trails Program
Encourage city schools to participate in the Safe Routes to School program (having completed their school travel plan).	P2.2, P3.2, P2.2, B3.3	Planning	Schools, TMA, Engineering	SRTS
Implement a safe cycling campaign.	B3.3	TMA	Planning, Police, Engineering, Schools, VDOT	TE, SRTS
Apply for a League of American Bicyclists Bicycle Friendly community award.	B3.8	Planning	Engineering	N/A

Related Action	Related Action in Transportation System	Implementing Agency	Partners	Potential Funding Sources
Mid-term (5-10 years)				
Install pedestrian and bicycle facilities as part of the High Street Bridge reconstruction. (Also see Streets & Intersections)	P4.1, P4.2, P4.4, P5.3, P5.4, P5.5, B4.2, B4.3, B4.5, B5.1, B5.3, V8.2, V11.1	Engineering	Planning, VDOT	TE, HSIP, RSTP
Complete implementation of all bicycle facilities identified in the bicycle network plan.	B4.2, B4.4, B4.6, B4.6	Engineering	Planning, VDOT	
Ongoing				
Portsmouth Bicycle Program: Refine and implement the bicycle facilities network proposed in the Master Transportation Plan. See Figure 4: Bicycle Element for proposed routes.		Planning	Engineering, TMA	CMAQ, TE
Include pedestrian accommodation and bicycle facilities in all new roadway projects, and where appropriate, in all repaving and restriping projects.	P1.2, B1.2, B4.4	Engineering	Planning	HSIP, RSTP
Implement an ongoing maintenance plan for bicycle and pedestrian facilities.	P6.1, B7.1	Engineering	Planning	CMAQ, TE
Update boater, bicycle, and other tourist maps for Portsmouth every two years to include new and planned transportation improvements.	B3.1, F8.2	TMA	Planning, Engineering	CMAQ
Install bike racks at activity centers, shopping centers, and schools.	B6.1, B6.2, B6.3, B6.4, B6.5	Engineering	Planning, Developers, Schools	TE, CMAQ
Implement Travel Demand Management (TDM) measures to encourage bicycling and walking.	P3.1, B3.2, V5.1, V5.2	TMA	Planning, Engineering, Schools, HRT	CMAQ, TE
Provide training for planners, transportation engineers, and other professionals to increase local knowledge of best practices for bicycles and pedestrians.	P3.4, B3.6	Planning	Engineering	N/A
Educate law enforcement officials on rights, responsibilities, and hazards to bicyclists on public roads.	B3.4	Police	Planning	N/A
Investigate funding opportunities for bicycle and pedestrian improvements.	P2.1, B2.2, B2.3, B2.4	Planning	Engineering, TMA	N/A

Transit Implementation Plan

Related Action	Related Action in Transportation System	Implementing Agency	Partners	Potential Funding Sources
Catalytic (0-2 years)				
Establish a network of Employee Transportation Coordinators as a part of the new Transportation Management Association (TMA).	T1.3	TMA	Planning, HRT, Traffix	N/A
Build the McLean Transit Transfer Center with pedestrian and bicycle access improvements to Victory Crossing and Tidewater Community College.	P4.1, P5.5, B4.2, B4.3, T6.1, T6.2	HRT	Engineering, Planning	TE, CMAQ
Implement an enhanced service prototype bus corridor.	T5.1, T5.2	HRT	Planning, Engineering	CMAQ, Small Starts
Implement early morning ferry service.	T9.1, T9.4	HRT	Planning	CMAQ, Regional Transit Funding
Establish a regional coalition to address transit funding.	T2.1	HRT	Planning, TMA, City Council	N/A
Near-term (2-5 years)				
Establish a committee to refine and begin implementation of Portsmouth elements of the Transit Vision Plan for the Hampton Roads Region.	T3.1, T3.2	HRT	Planning, Engineering	N/A
Implement an Eco-Pass program.	T1.4	HRT	TMA	CMAQ
Work with HRT to implement an improved marketing strategy for the transit system.	T1.2	HRT	TMA, Planning	CMAQ
Implement high-frequency transit routes all multimodal corridors.	T5.1	HRT	City Council	CMAQ, Regional Transit Funding
Create "pulse hubs" along non-high frequency bus routes.	T6.2	HRT	Planning, Engineering	TE
Implement transit improvements including sheltered bus stops, enhanced customer information, and improved transit infrastructure in conjunction with near-term multimodal corridor improvements.	T5.2, P5.3, P5.5, B6.2	HRT	Engineering, Planning	TE
Build the Churchland Transit Station, including bicycle and pedestrian connections.	T6.1, P4.1, P5.5	HRT	Engineering, Planning	TE
Improve ferry service by increasing its frequency, speed, and visibility.	T9.1, T9.3, T9.4	HRT	Planning, TMA	CMAQ, Regional Transit Funding
Improve coordination of ferry and bus schedules.	T9.2	HRT	Planning	N/A
Work with Portsmouth hotels to develop and publicize economical shuttle options to regional airports.	A2.2	TMA	Planning	N/A

Related Action	Related Action in Transportation System	Implementing Agency	Partners	Potential Funding Sources
Mid-term (5-10 years)				
Implement transit improvements including sheltered bus stops, enhanced customer information, and improved transit infrastructure in conjunction with mid-term multimodal corridor improvements.	T5.2, P5.3, P5.5, B6.2	HRT	Engineering, Planning	TE
Construct a downtown intermodal station.	T6.3	HRT	Planning, Engineering	TE
Construct slip ramp stations and begin express bus route on I-264 between Suffolk and Norfolk.	T3.2, T7.1	VDOT	HRT, FHWA, FTA, Engineering, Planning	RSTP, TE
Begin construction of light rail transit in Portsmouth.	T4.1, T.4.2, A2.1	Planning	FTA, Engineering, City Council	FTA New Starts
Long-term (10 - 20 years)				
Establish express bus service in corridors identified in the transit network concept.	T3.2, T7.1	HRT	Planning, Engineering	CMAQ
Implement passenger and commuter rail through Portsmouth.	T8.1	HRT	FTA, FRA, Planning	ARRA, FTA New Starts
Complete light rail transit in Portsmouth.	T4.1, T.4.2, A2.1	HRT	FTA, Planning, Engineering	FTA New Starts
Establish transit connections between Portsmouth and regional airports.	A2.1	HRT	HRTPO, Planning, FTA	CMAQ, Various
Ongoing				
Implement Travel Demand Management (TDM) measures to encourage transit use.		TMA	HRT, Planning, HRTPO	CMAQ
Advocate for a passenger rail plan that directly serves Portsmouth.	T8.1	Planning	City Council	N/A
Work with other Hampton Roads cities to support state proposals for high speed rail.	A1.1	City Council	Planning	N/A
Work with other local governments, regional planning agencies, airport authorities, and private interests to promote airline routes to the region.	A3.1	City Council		N/A
Support efforts by Chesapeake and Suffolk to ensure the future of the executive airports and make upgrades over time.	A4.1	City Council		N/A

Parking Implementation Plan

Related Action	Related Action in Transportation System	Implementing Agency	Partners	Potential Funding Sources
Catalytic (0-2 years)				
Implement zoning ordinance revisions addressing the following: • requirements for bicycle parking • reduced minimums parking requirements • explore the use of parking maximums • design and sighting requirements for new parking facilities • incentives for creating "park-once" environments	V12.1, 12.2, 12.3, 12.4	Planning	Engineering	N/A
Near-term (2-5 years)				
Establish safe and pleasant pedestrian and bicycle connections through parking lots to commercial building entrances and transit stops. (Also see Bicycles & Pedestrians)	V13.5	Planning	Engineering, Private Developers	N/A
Mid-term (5-10 years)				
Consider having the Parking Authority acquire all downtown parking lots and require new developments to obtain spaces in city-owned facilities.	V12.5	Parking Authority	Planning, Engineering, City Council	Future Parking Revenue
Long-term (10 - 20 years)				
Ongoing				
Secure funding to upgrade and maintain existing parking facilities.	V13.1	Parking Authority	Planning	Future Parking Revenue
Continue to support and implement Downtown Parking Master Plan recommendations.	V12.7	Planning	Engineering	CMAQ
Outside of downtown, consider reduced parking requirements in lieu of transit support.	V12.6	Planning	Private Developers	N/A

Freight & Port Implementation Plan

Related Action	Related Action in Transportation System	Implementing Agency	Partners	Potential Funding Sources
Catalytic (0-2 years)				
Complete the Commonwealth Mainline Safety Relocation Project.	F3.2	Common-wealth Railway	Railroads, APM, VDOT, FRA, Planning, Engineering	N/A
Provide information for visitors arriving by water at marinas.	F8.2	Planning	TMA	
Near-term (2-5 years)				
Implement necessary railroad grade crossing improvements to establish a quiet zone in Portsmouth. (Also see Roadways & Intersection Actions)	V1.6, F6.2, F6.3	Railroads	Engineering, FRA, VDOT, Planning	Rail Enhancement Fund, Federal Railroad Signal Program
Establish and sign designated truck routes.	F5.1, F5.2	Engineering	Planning, VPA, Trucking Companies	CMAQ
Add signals and gates at all unprotected railroad grade crossings.	V6.1	Railroads	Engineering, VDOT, FRA, Planning	Rail Enhancement Fund, HSIP
Provide easy connections between Portsmouth's multi-modal transportation network and the City's marinas.	F8.1	Planning	HRT, Engineering	N/A
Mid-term (5-10 years)				
Build the Craney Island Access Road. (Also see Roadway & Intersection Actions)	F3.1, V6.1	VPA	VDOT, Engineering	Industrial Access Railroad Tracks Program, Industrial, Airport, and Rail Access Fund
Complete the MLK freeway extension. (Also see Roadway & Intersection Actions)	F3.3, V6.1	VDOT	Engineering, Planning, VPA	RSTP and Various
Use traffic calming measures to discourage truck traffic on local streets where it is a problem. (Also see Streets & Intersections)	F5.3	Engineering	Planning, VDOT	TE
Implement roadway improvements on defined truck routes.	F5.4	Engineering	VDOT	TE
Long-term (10 - 20 years)				
Connect the Martin Luther King Freeway extension to the new Jordan Bridge via the proposed "Jordan Bridge Parkway." (Also see Roadway & Intersection Actions)	F3.4, V6.2	VDOT	FIGG Bridge Engineers, Engineering, Planning	Private Toll Agreements

Related Action	Related Action in Transportation System	Implementing Agency	Partners	Potential Funding Sources
Complete entrance and exit improvements at the Portsmouth Boulevard/I-264 interchange. (Also see Roadway & Intersection Actions)	F3.6, F3.7, V6.4	VDOT	Engineering, Planning	RSTP, CMAQ
Ongoing				
Maintain communication and coordination among the City of Portsmouth, Virginia Port Authority, and APM/ Maersk Marine Terminal.	F1.1	Planning	VPA, APM, VDOT	N/A
Attend national and global port conferences and seminars.	F1.2	Planning	VPA	N/A
Work with state & regional agencies to finance local transportation improvements and maintenance needed to accommodate the movement of freight through Portsmouth.	F2.1	Planning	Engineering, VDOT	N/A
Explore additional railroad grade separations.	F3.5	Planning	Railroads, Engineering	N/A
Support improvements to the Belt Line Railroad where possible.	F4.1	Planning	Engineering, City Council, VPA	Industrial Access Railroad Tracks Program, Rail Enhancement Fund
Support improvements to Norfolk Southern and CSX facilities.	F4.2	Planning	City Council, VPA	Industrial Access Railroad Tracks Program, Rail Enhancement Fund
Design connections between port terminals and new truck-to-rail facilities.	F5.5	VDOT	Engineering, Planning, Railroads	VPA Revenue, RSTP
Support the Port of Virginia in fulfilling its existing environmental strategies and programs and meeting mandated state and federal regulations.	F7.1	Planning	VPA, EPA	N/A
Encourage & Incentivize participation in non-mandated EPA programs for ports and port-related industries.	F7.2	VPA	Planning	N/A
Support the Port of Virginia in adopting the latest sustainability strategies for ports.	F7.3	Planning		N/A
Promote & market Portsmouth's identity as the gateway to the intracoastal waterway.	F8.3	Planning	City Council	N/A
Encourage marinas and other maritime facilities to adopt the latest sustainability strategies in order to make Portsmouth a “green” boating destination.	F8.4	Planning		N/A

D. Funding Sources

Federal

The Safe, Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users (SAFETEA-LU). SAFETEA-LU is the federal law which sets goals and lays out federal funding for highways, highway safety, and public transportation. Funds from SAFETEA-LU are channeled through the state Department of Transportation or regional Metropolitan Planning Organization. In Portsmouth, SAFETEA-LU programs generally are administered by the Virginia Department of Transportation (VDOT). Information on specific SAFETEA-LU programs that are relevant to the MTP is provided below. SAFETEA-LU was set to expire on September 30, 2009, but has been extended through a continuing resolution in Congress. It is likely that Congress will continue to pass continuing resolutions until a new federal surface transportation bill is passed into law, which could happen in 2010.

Recreational Trails Program (RTP): This program provides funds to the states to develop and maintain recreational trails and trail-related facilities for both non-motorized and motorized recreational trail uses. The RTP is an assistance program of the Department of Transportation's Federal Highway Administration (FHWA). Eligible recreational uses include hiking, bicycling, in-line skating, equestrian use, cross-country skiing, snowmobiling, off-road motorcycling, all-terrain vehicle riding, four-wheel driving, and other off-road motorized vehicle usage. The RTP funds come from the Federal Highway Trust Fund and represent a portion of the motor fuel excise tax collected from non-highway recreational uses (i.e., snowmobiles, all-terrain vehicles, off-highway motorcycles, and off-highway light trucks). The funds are distributed to the states by legislative formula: half of the funds are distributed equally among all states, and half are distributed in proportion to the estimated amount of non-highway recreational fuel use in each state. The state RTP Administrator should be contacted for guidance on State policies and project eligibility requirements.

Transportation and Community System Preservation Program (TCSP): The TCSP is a "comprehensive program to assist in planning, developing, and implementing strategies to integrate transportation, community, and system preservation plans and practices" available under Section 1117 of SAFETEA-LU. The grants require a 20 percent non-federal match. Planning studies and projects that improve transportation efficiency, environmental impacts, and accessibility are eligible. The 2002 Virginia awards show that most projects have a strong environmental component; they included implementing a park and ride facility, developing a master plan for U.S. Route 17 with an "environmental conservation" component, extending a trail system, and purchasing easements for the purposes of watershed preservation. Eligibility under this program is not restricted to states; metropolitan planning organizations (MPOs) and local governments are also able to compete for these grants.

State/Regional

Virginia Six-Year Improvement Program: The Virginia Six-Year Improvement Program is the traditional source of funds for transportation improvements in Virginia. Projects are allocated by district and roadway system (interstate, primary, secondary, or urban). The Code of Virginia (the Code) prescribes or implies steps that must be taken by the 16-member Commonwealth Transportation Board (CTB) to ratify the Six-Year Improvement Program when it is submitted to them by the Virginia Department of Transportation (VDOT) (§ 33.1-23.1-3 of the Code). These steps include:

- public hearings for projects involving the primary system,
- coordination with city governments for urban system projects, and
- approval by county boards of supervisors for secondary system projects.

The Commonwealth Transportation Board (CTB) adopted the Six-Year Improvement Program for Fiscal Years 2010-2015 on June 18, 2009. At $7.4 billion, the program is down from $8.9 billion in the revised FY 2009-2014 program approved in February. Further information is available at: http://virginiadot.org/projects/syp-default.asp.

Transportation Enhancement Funds: SAFETEA-LU Transportation Enhancement Funds are federal funds administered by Virginia's Commonwealth Transportation Board (CTB). The program reimburses up to 80% of the eligible costs for a project. Projects must show a clear relationship to surface in one or more of 12 qualifying enhancement activities:

1. Provision of Facilities for Bicycles and Pedestrians
2. Provision of Safety and Educational Activities for Pedestrians and Bicyclists
3. Acquisition of Scenic Easements and Scenic or Historic Sites
4. Scenic or Historic Highway Programs, including tourist and welcome center facilities
5. Landscaping and Scenic Beautification
6. Historic Preservation
7. Rehabilitation and Operation of Historic Transportation Buildings, Structures, or Facilities
8. Preservation of Abandoned Railway Corridors, including the conversion and use of corridors for pedestrian or bicycle trails
9. Inventory, Control, and Removal of Outdoor Advertising
10. Archaeological Planning and Research
11. Environmental Mitigation: Environmental Mitigation to address:
    a. Water pollution due to highway run-off; or
    b. Vehicle-caused wildlife mortality while maintaining habitat connectivity
12. Establishment of Transportation Museums

A 20% local match is required. Federal Transportation Enhancement funds have typically been awarded by the Commonwealth Transportation Board (CTB) in May or June of each year in conjunction with the Department's 6-Year Program. Further information is available at: http://www.virginiadot.org/business/prenhancegrants.asp.

Revenue Sharing Program: Section 33.1-75.1 of the *Code* authorizes this program, which establishes a 50/50 cost sharing program with counties for the maintenance, improvement, construction, or reconstruction of the primary or secondary road system. The *Code* establishes a $20 million program ($10 million state funds/$10 million local funds); however, the annual appropriations act has provided $30 million since 1999. If requests exceed the amount of funding available, actual allocations are prorated.

Initially, the program was open only to counties, with a maximum allocation of $500,000 per county; however, the 2005 Appropriations Act provided an expansion for FY 2006 for the program to include cities and towns. The funding limit was also increased to $50 million in state funds (to be matched with $50 million in local funds), with a maximum allocation of $1 million of state funds per eligible locality.

This program enables localities to contribute matching funds for the following purposes:

1. Finance a deficit on a completed program
2. Supplement funding on a construction project
3. Supplement funding for future projects in the six-year improvement program
4. Construct or improve a road not in the six-year improvement program
5. Improve subdivision streets to attain state street standards
6. Supplement VDOT maintenance (e.g., guardrail replacement)

Further information is available at: http://www.virginiadot.org/business/local-assistance-access-programs.asp#Revenue_Sharing.

Congestion Mitigation and Air Quality (CMAQ) Program: The Congestion Mitigation and Air Quality (CMAQ) program provides federal funding to states and localities for transportation projects and programs that help improve air quality and reduce traffic congestion. Further discussion of the individual CMAQ programs and how they can be utilized in implementing specific categories of projects in the MTP can be found in Section 5.D.

Highway Safety Improvement Program (HSIP): The Highway Safety Improvement Program (HSIP) was developed to assist in the identification of problem safety areas, the analysis of problems and countermeasures, and the prioritization and scheduling of improvement projects. VDOT allocates HSIP funding at the statewide and district level on an annual basis. Municipalities within each district can compete for this funding by submitting applications for qualified projects. Applications for fiscal year 2010-2011 were due to VDOT by September 25th, 2009; Portsmouth submitted a number of catalytic projects identified in the MTP. HSIP consists of four sub-programs, three of which apply directly to MTP project recommendations. These programs include:

- Highway Safety Program (HSP)
- Bicycle and Pedestrian Safety Program (BPSP)
- Highway-Rail Grade Crossing Safety Program (H-RGCP)
- High Risk Rural Road Program, which involves only projects in rural areas and therefore is not applicable or available to the City of Portsmouth

Further discussion of the individual HSIP programs and how they can be utilized in implementing specific categories of projects in the MTP can be found in Chapter 5: Transportation Systems. (See p. 44 for a discussion of the Bicycle and Pedestrian Safety Program and p. 133 for a discussion of the Highway Safety Program and the Highway-Rail Grade Crossing Safety Program.)

Transportation Partnership Opportunity Fund (PPTA): The Governor may award money from this fund as grants, interest-free loans, or other financial incentives to cities, counties and the private sector to encourage the design-build provisions of Section 33.1-12(2)(b), to encourage the use of the Public-Private Transportation Act of 1995 (PPTA), and to make transportation improvements that will support economic development. The funds may be used for roads, rail, and mass transportation and are administered by the Commonwealth Transportation Board (CTB). For further information see: http://virginiadot.org/projects/tpof.asp.

Additional Alternative Funding Sources Administered by VDOT

Industrial, Airport, and Rail Access Fund: This fund supports the provision of access to employment centers, publicly accessible airports, and rail facilities. While applications are funded from the same fund as industrial and airport grant applications, funding for rail facilities is administered by the Department of Rail and Public Transportation. "Access" may entail either providing improvements to an existing facility or providing a new facility, although in both cases emphasis is placed on providing access to a new or an expanding industrial site. Access funds may be used only for engineering and construction, not for right-of way acquisition, utility relocation, or environmental permitting. For road access projects, each locality is limited to $300,000 per year unless the city provides matching funds. VDOT can provide up to an additional $150,000 provided the amount is matched by the municipality. Airport access projects are subject to similar financial limits, with a maximum of $450,000 ($300,000 unmatched and $150,000 matched) awarded to an individual airport per year. For further information see: http://virginiadot.org/business/local-assistance-access-programs.asp.

Safe Routes to School (SRTS): The Safe Routes to School (SRTS) program is a federally-funded program that involves schools, students, parents and advocacy organizations at a grassroots level in an effort to improve conditions for children in grades K-8 to arrive at school safely and under their own power. In Virginia, a two-phased program is administered by the Virginia Department of Transportation. The Virginia program is designed to facilitate the development of partnerships among schools and local governments for the planning and implementation of successful SRTS initiatives. Further discussion of the SRTS program and how it can be utilized in implementing bicycle and pedestrian projects in the MTP can be found in Section 5.A.

Industrial Access Railroad Tracks Program: This program is administered by the Department of Rail and Public Transportation and is intended to "foster rail development for new or expanding industries." Eligible work under the program includes: track construction, reconstruction, improvement, engineering, environmental mitigation, and grading or drainage at a project site. Funding for each project is limited to $300,000 unless the city provides matching funds. VDOT can provide up to an additional $150,000 if the city can provide the matching amount. For further information see: http://www.drpt.virginia.gov/activities/railfunding.aspx.

Rail Enhancement Fund: The rail enhancement program is administered by the Department of Rail and Public Transportation and may be used for "acquiring, leasing, and/or improving railways or railroad equipment, rolling stock, rights-of-way or facilities, or assisting other appropriate entities to acquire, lease, or improve railways or railroad equipment, rolling stock, rights-of-way or facilities, for freight and/or passenger rail transportation purposes." In order for the funds to be used, the Commonwealth Transportation Board must determine that improvements will result in a public good of higher value than the investment. The program also requires a 30 percent cash or in-kind match from a private source or local government. For further information see: http://www.drpt.virginia.gov/projects/ref.aspx.

Local Funding Opportunities

Local Transportation Districts: Virginia allows for the creation of local transportation improvement districts in a single city or county or in two or more contiguous cities or counties. To create a district, the owners of at least 51 percent of either the land area or the assessed value of land that (1) is within the boundaries of the proposed district and (2) has been zoned for commercial or industrial use or is used for such purposes must petition the local governing body of each locality in which the proposed district is to be located (qualifying individuals taking part in this process are hereinafter referred to as "petitioners"). Once they have done so, the local governing body may consider a resolution creating the district (§ 33.1-410 of the *Code*). Each district must have a district advisory board with six members appointed by each of the member localities governing bodies. Once created, a district is governed by a commission composed of four members of the governing body of each locality in which the district is located, appointed by their respective local governing bodies, and the chair of the Commonwealth Transportation Board or his or her designee (§ 33.1-411 of the *Code*). The powers and duties of the commission are laid out in § 33.1-414 and § 33.1-416 of the *Code*. Upon the request of the commission and consent of the local governing bodies, each local government body may impose an annual special improvements tax on taxable real estate zoned for commercial or industrial use or used for such purposes and taxable leasehold interests in that portion of the improvement district within its jurisdiction (§ 33.1-415 of the *Code)*. The maximum amounts that can be taxed and how the proceeds must be handled are laid out in § 33.1-435 and § 33.1- 415 of the *Code.* For a more in depth discussion of local transportation districts, see the document "Alternative Transportation Funding Sources Available to Virginia Localities," published by the Virginia Transportation Research Council (March 2006) http://www.virginiadot.org/vtrc/main/online_reports/pdf/06-r17.pdf.

Pro-rata Reimbursement Provisions in the Subdivision Ordinance: Every locality in Virginia (through its governing body) is empowered and required to adopt an ordinance governing the subdivision and development of its land (see § 15.2-2240 of the *Code)*. In addition, certain localities are empowered to enact provisions in their subdivision ordinances for payment by a subdivider or developer of land of a *pro rata* share of the cost of "reasonable and necessary" road improvements, located outside the property limits of the land owned or controlled by the subdivider or developer, but serving an area having related traffic needs, to which the subdivision or development will contribute, and to reimburse an initial subdivider or developer who has advanced such costs or constructed such road improvements (see § 15.2-2242 of the *Code)*. For a more in depth discussion of pro-rata reimbursement provision, see the document "Alternative Transportation Funding Sources Available to Virginia Localities," published by the Virginia Transportation Research Council (March 2006) http://www.virginiadot.org/vtrc/main/online_reports/pdf/06-r17.pdf.

Proffers: Proffers are monetary payments from developers to localities. They fall into two categories: fees for improvement (or cash proffers) and conditional zoning (or non-cash proffers). With fees for improvement, if a county has a population growth of at least 10 percent according to the 2000 census, it can accept fees for road improvements or other public facilities when the developer submits a rezoning request. Additional restrictions are placed on the cash proffer and these can be found in § 15.2-2404 of the *Code*. Conditional zoning allows reasonable conditions, or proffers, to be offered during a rezoning process as a way of mitigating the impacts of the proposed rezoning. Proffers may include land, infrastructure, cash or other conditions/constraints on the use of the property. These proffers, if accepted by the governing body as part of the rezoning approval, become part of the zoning ordinance as it applies to that property. In regards to transportation, they are appropriate for improvements such as turn lanes, reconstruction or widening turn lanes, etc. (see § 15.2-2297 of the *Code*). The City should consult with VDOT to determine what road improvements should be required in this scenario. Since these improvements will be required by VDOT, the City may be able to obtain different or additional improvements with conditional zoning proffers. For further discussion of the use of proffers in Virginia, see: "Managing Growth and Development in Virginia: A Review of the Tools Available to Localities" published by The Virginia Chapter of The American Planning Association (October, 2008) and available online at http://apavirginia.org/documents/pdf/APA%20Virginia%20Growth%20Tools%202008.pdf.

Tax Increment Financing: In tax increment financing a jurisdiction sells bonds or receives loans and uses the revenue to make public improvements to an area, where such improvements may include "roads, water, sewer, safety services, parks, and schools." To the extent that the improvements increase property values and encourage development in the designated area, the increase in real estate taxes is used to pay back the interest and principal on the loan. For further discussion of the use of tax increment financing in Virginia, see: "Managing Growth and Development in Virginia: A Review of the Tools Available to Localities" published by The Virginia Chapter of The American Planning Association (October, 2008) and available online at http://apavirginia.org/documents/pdf/APA%20Virginia%20Growth%20Tools%202008.pdf.

E. Catalytic Projects

The following section provides descriptions of several transportation projects that could be implemented in the catalytic timeframe (i.e., within two years). Order-of-magnitude cost estimates are provided for each project in order to provide assistance in planning and implementing these key projects. The cost estimates are meant only to be approximate and more detailed estimates will need to be developed as part of MTP implementation. Potential funding opportunities are also given for each project; the various funding sources referenced are described in more detail in Section 6.D of this chapter. Improvements and facilities described in this section should be constructed in accordance with the design guidelines established in the MTP.

Construct improvements identified by the Roadway Safety Assessment Program and funded through the Highway Safety Improvement Program. The City has undertaken a series of Roadway Safety Audits (RSAs) to identify specific intersection improvements that can mitigate specific crash types at 20 high-crash locations within the City. The purpose of the RSA program is to identify locations where improvements will yield a high benefit to cost ratio, such that they are eligible to compete on a district or statewide level for VDOT's Highway Safety Improvement Program (HSIP) funding. At the majority of intersections receiving HSIP funding, bicycle and pedestrian improvements (sidewalks, crosswalks, pedestrian signal heads) will be funded and constructed along with vehicular improvements in accordance with VDOT's "Policy for Integrating Bicycle and Pedestrian Accommodations." The following table indicates the ranking of intersections as of September 22, 2009 and the anticipated the cost of improvements.

Intersection Group	Intersection Number	Intersection Name	EPDO Rank	B/C Ratio	Major Crash Related Improvement	Total Project Cost	Revised HSIP Ranking
2	4	Victory at Elmhurst	4	10.99	Mast Arm Upgrade	$453,800	1
3	10	Effingham at High	10	3.10	Mast Arm/Ped Signals	$395,700	2
2	9	Airline at Greenwood	9	2.31	Mast Arm/Ped Signals	$581,400	3
3	14	Elm at County	14	2.27	Mast Arm/Ped Signals	$396,400	4
2	5	High at Tyre Neck	5	1.95	Mast Arm Upgrade	$566,500	5
1	2	Ports at Elmhurst	2	1.78	Mast Arm Upgrade	$501,700	6
1	1	GW at Victory	1	20.16	Ped Signals/Sidewalk	$400,600	7
1	8	Frederick at Deep Creek	8	5.54	Install Turn Lanes/ Ped Signals	$448,200	8
1	11	Ports at Frederick	11	5.85	Install Turn Lanes	$483,800	9
1	3	GW at Frederick	3	6.52	Reconfigure Intersection	$575,300	10
4	19	GW at Greenwood	19	16.22	Signal Visibility/ Ped Signals	$145,000	11
4	20	Ports at Deep Creek	20	9.98	Signal Visibility/Retiming	$250,000	12
4	18	High at Cedar	18	8.18	Signal Visibility/Retiming	$244,000	13
2	7	Towne Point at Twin Pines	7	7.53	Signal Visibility/Retiming	$198,800	14
3	12	Points at City Park	12	6.42	Signal Visibility/Retiming	$203,200	15
3	15	Airline at Victory	15	5.09	Signal Visibility/Retiming	$249,900	16
4	16	Effingham at Ports	16	3.27	Signal Visibility/Retiming	$203,700	17
3	13	GW at Elm	13	2.14	Signal Visibility/Retiming	$206,400	18
2	6	Airline at Frederick	6	N/A	N/A	N/A	19
4	17	Victory at Greenwood	17	N/A	N/A	N/A	20

Implement signal system upgrades and optimized signal timing plans.

Enhancements to the existing traffic signal system are recommended to improve traffic flow along corridors within the City. Currently, the City controls 71 of the total 119 signalized intersections (approximately 60%) from a central system. However, the current system is over a decade old and no longer supported by the vendor; therefore as equipment failure occurs it will become impossible to repair and maintain the system. Even with limited staffing resources, operating the signals on a coordinated basis would allow traffic to progress through multiple signalized intersections along key corridors rather than randomly arriving and stopping at intersections, thus reducing congestion, travel time, and air quality impacts caused by idling vehicles. The proposed locations of signal system upgrades are shown in Figure 6: Motor Vehicles & Parking Element.

The first phase will include the installation of approximately four miles of fiber communications, 31 new signal controllers, 15 new Ethernet wireless radios, and central system software and hardware. Full system build-out will require equipment including approximately 20 miles of additional fiber, 88 signal controllers, 100 signal cabinets, and all other peripherals such as closed-circuit TV(CCTV) and dynamic message signs (DMS) to enhance the overall traffic operation capabilities within the city and region. The future phases are anticipated to occur over the next three years.

Transportation System Components Involved: Motor Vehicles.

Cost: The entire system upgrade will account for over $8 million in investment by the City to maximize the use of existing infrastructure.

Funding Opportunities: The City of Portsmouth is using its portion of the American Recovery and Revitalization Act (ARRA) funds to implement the first of three phases to upgrade the entire citywide signal system. In order to achieve full system build-out, the City is seeking additional funding through the Congestion Mitigation and Air Quality (CMAQ) program. The City of Portsmouth is currently working to obtain funding for initial citywide signal timing optimization in 2010 through Department of Energy grants. Furthermore, the City has applied for funding as part of the Congestion Mitigation and Air Quality (CMAQ) program to retime approximately 30 signals every year so that every corridor in the City will have updated signal timing plans every four years.

Stripe crosswalks at signalized intersections with existing sidewalk connections.

A simple and inexpensive project, striping crosswalks will enhance the safety of pedestrians throughout Portsmouth. This project should begin with crossings near schools and activity centers and move to all signalized intersections with existing crosswalk connections.

Transportation System Components Involved: Pedestrians

Cost: $15,000 to complete 5 intersections.

Assumptions: $500 per crosswalk, 4 crosswalks per intersection, $5000 per day for traffic control, 5 intersections completed per day.

Funding Opportunities: HSIP.

Improve signage and pavement markings for bicyclists and pedestrians on the Western Freeway Bridge.

While the Western Freeway Bridge currently provides access to bicyclists and pedestrians, there is virtually no signage and no pavement markings to indicate to either pedestrians or motorists that this is the case. Improving the visibility of this route would enhance the safety of cyclists and pedestrians and encourage more users. A focus of the project should be to construct improved signage and markings to guide bicyclists and pedestrians on and off of the bridge at the interchange with West Norfolk Road.

Transportation System Components Involved: Bicycles, Pedestrians

Cost: $23,000

Assumptions: $6,500 per mile to stripe bike lanes, $10,000 for signage; 2 miles of roadway on the bridge.

Funding Opportunities: HSIP, CMAQ, Transportation Enhancement Funds.

Initiate planning and a grant application to construct a "rail trail" on the rail lines being abandoned as part of the Commonwealth Railway Mainline Safety Relocation Project (CRMSRP).

The Commonwealth Railway owns and operates approximately 4.5 miles of rail that traverse neighborhoods in Portsmouth and Chesapeake. The CRMSRP will relocate this rail line to the Western Freeway (Route 164/I-664) median through Portsmouth, Chesapeake, and Suffolk. When the relocation is complete, the existing tracks will be deactivated. They run through residential neighborhoods, shopping areas, and employment centers, making the route a prime opportunity for a multi-use path that will accommodate bicyclists and pedestrians for commuting, running errands, and recreation activities. It is important that connections to adjacent neighborhoods and commercial centers be incorporated into the project.

Transportation System Components Involved: Pedestrians, Bicycles

Cost: $8.1 million.

Assumptions: $1,180,000 per mile to convert abandoned railroad to multi-use path, 4.5 miles of track converted to trail.

Funding opportunities: HSIP, CMAQ, Transportation Enhancements, Recreational Trails Program.

Implement bike lanes, parking, and sidewalk repairs on Portsmouth Boulevard East (between I-264 and Effingham Street) using a road diet.

Portsmouth Boulevard is a key multimodal corridor to link the Victory Crossing area to the Naval Shipyard and Downtown. While a number of long-term improvements are proposed in this corridor, simple and relatively inexpensive actions can be taken in the near term to enhance the safety and comfort of pedestrians and cyclists. By using a simple road diet that reduces the vehicular travel lanes from four to two, the corridor can be restriped to maintain lanes of traffic in each direction and accommodate 5' wide bike lanes and/or parking. Vehicle travel speeds should be reduced to 30 mph in conjunction with the restriping. All crosswalks on the street should be striped and any gaps in the sidewalk system should be filled. While the section of the road will vary along its course, improvements on Portsmouth Boulevard East should include provision of:

- Four-lane roadway with landscaped median and intermittent left-turn lanes
- Slower speed limits and five-foot striped bike lanes to accommodate cyclists between Victory Boulevard and shipyard
- Pedestrian and bicycle safety features at railroad crossings
- Wide sidewalks on both sides of the street
- Coordinated signal system

Transportation System Components Involved: Pedestrians, Bicycles, Motor Vehicles

Cost: $379,500

Assumptions: $165,000 per mile to implement road diet by removing pavement markings and restriping on 2.3 miles of roadway).

Funding Opportunities: HSIP, CMAQ, Transportation Enhancements.

Install bicycle facilities on the High Street East Corridor.

The segment of High Street between Airline Boulevard and Effingham Street is an important connector between Downtown and the one of several retail and commercial activity centers in Portsmouth. The addition of bicycle facilities and improvement of pedestrian facilities west of the Martin Luther King Freeway (Harbor Drive) will enhance the multimodal capacity of this corridor. Improvements should include:

- Striped bike lanes along High Street east of MLK Freeway.
- Sidewalks widened to a minimum 8' wide multi-use path on both sides of the street from MLK Freeway to Airline Boulevard.

> **Transportation System Components Involved:** Bicycles, Motor Vehicles, Pedestrians
>
> **Cost:** $118,450
>
> **Assumptions:** $6,500 per mile to stripe bike lanes (east of MLK only—1.3 miles), $220,000 per mile to widen sidewalk to 8' multi-use path and install ADA curb ramps and signage (.5 miles).
>
> **Funding Opportunities:** HSIP, CMAQ, Transportation Enhancements.

Construct the Mt. Vernon Avenue bike boulevard and complete street demonstration project.

Since the construction of the Pinner's Point Connector, Mount Vernon Boulevard has seen a significant drop in vehicular traffic. No longer a route for truck traffic, it is a neighborhood street that should accommodate all modes of travel. The street should be redesigned as a bike boulevard with complete street elements including bicycle and pedestrian facilities, traffic calming measures, and improved streetscape design that incorporates vegetated stormwater management techniques. The improvements would be installed on Mt. Vernon from Bayview to High Street, cross High Street, and continue southwest on Wool Avenue and across a roadway gap to the traffic signal at the Hamilton Avenue/ Frederick Boulevard entrance to the Wal-Mart. New commercial development on the currently vacant parcel to the north will be easily accessible via this route. This project will improve connectivity in the bicycle and pedestrian system due to its proximity to the Western Freeway crossing of the Western Branch of the Elizabeth River, currently the only bicycle and pedestrian access over this waterway.

> **Transportation System Components Involved:** Pedestrians, Bicycles, Motor Vehicles
>
> **Cost:** $469,800

Assumptions: $185,000 per mile to remove 10' of roadway for installation of stormwater management swales; $30,000 per intersection to install bumpouts; 8 intersections; 1.2 miles of road.

Funding opportunities: HSIP, CMAQ, Transportation Enhancements.

Construct the Clifford/Bart/South Street bike boulevard.

This bike boulevard takes advantage of traffic diversions created by old rail ROW and public property running from the Clifford Street bike lanes to the Midtown shopping area (Wal-Mart). The bike boulevard would be implemented through the creation of traffic calming, signed bike routes, shared lane markings (sharrows), bike lanes, and two stretches of multi-use path through currently vacant lots and unused railroad right-of-ways (see Figure 4: Bicycle Element). The specific improvements would include:

- The addition of stop signs, route signage, and pavement markings to establish bicycle boulevards on Powhatan Street from Clifford Street to South Street, continuing along South Street to vacant land at Louisa Avenue, via a multi-use path to Bart Street and on to the intersection at Airline Boulevard.
- The addition of a 10' wide asphalt shared-use path through the rail right-of-way connecting South Street at Fairfax Avenue and across city-owned land connecting South Street to Bart Street.

Transportation System Components Involved: Bicycles, Motor Vehicles

Cost: $65,000 for bike lane entirely on existing streets except for small stretch of shared use path near Powhatan Street. $270,500 for a shared use path across vacant land east of Fairfax Avenue.

Assumptions: $210,000 to construct 1000' of 10' wide multi-use path on Greenfield; $18,000 for stop sign adjustment and restriping; $5,000 to install 20 sharrows; $37,500 for a 10' long bridge to carry multi-use path across a small creek.

Funding Opportunities: TE, HSIP, Recreational Trails Program, Safe Routes To School.

Stripe bike lanes on Elm Avenue.

Striping bike lanes on Elm Avenue from Portsmouth Boulevard to London Boulevard would provide a north-south bicycle link between downtown Portsmouth and Cradock. These lanes would serve 3 schools and connect to other proposed bicycle lanes on London Boulevard, High Street, and Portsmouth Boulevard.

Transportation System Components Involved: Pedestrians

Cost: $9,750

Assumptions: $6,500 per mile to stripe bike lanes; 1.5 miles of road.

Funding Opportunities: HSIP, CMAQ, Transportation Enhancements.

Construct the McLean Transit Transfer Center with pedestrian and bicycle access improvements connecting to Victory Crossing and Tidewater Community College.

Improvements should include bus bays and shelters, restrooms and other passenger service facilities, as well as pedestrian and bike connections to the surrounding area.

Transportation System Components Involved: Pedestrians, Bicycles, Public Transportation

Cost: $1,016,500

Assumptions: $33 per linear foot to install 500' of 5-6' wide sidewalk; $1,000,000 for 10-bay transit transfer center.

Funding opportunities: FTA, CMAQ, Transportation Enhancements.

Initiate planning to secure start-up funding for an enhanced service prototype bus corridor.

The MTP identifies candidate corridors for high frequency bus service (see Figure 5: Public Transportation Element). A pilot project on the corridor most likely to be successful should be initiated to test the concept. Stakeholders from destinations along the route should be included on a design committee. If successful, the result of the pilot project should be used to refine planning for and move forward a program for a larger system of high frequency bus routes.

> **Transportation System Components Involved:** Transit
>
> **Capital Cost:** $24,000,000
>
> **Assumptions:** $4,000,000 per mile for bus rapid transit enhancements including peak-hour parking clearance, new bus shelters, enhanced customer information and real-time arrival displays; 6 miles from Churchland to Downtown.
>
> **Funding opportunities:** FTA Small Starts

Reconstruct the Alexander's Corner intersection, including associated bicycle and pedestrian improvements.

This area, at the convergence of Portsmouth Boulevard, Airline Boulevard, Turnpike Road, and McLean Street, is currently under study by the City for improvements. The current geometry and signal phasing often lead to driver confusion, creating congestion and safety hazards for pedestrians, cyclists, and drivers. Improvements will address roadway laneage, vehicular queuing length, optimal phasing sequences, pedestrian access, and bicycle facilities. It is important that the Alexander's Corner improvements address the needs of all users in anticipation of future multimodal improvements on surrounding corridors.

> **Transportation System Components Involved:** Pedestrians, Bicycles, Motor vehicles, Transit
>
> **Cost:** This project is currently in design and costs are to be determined.
>
> **Funding opportunities:** CMAQ funding will be used for the design and construction of these improvements.

F. Summary of Phased Multimodal Corridor Improvements

The following section provides a summary of the infrastructure improvements to be made in the multimodal corridors beyond the catalytic timeframe. Basic descriptions of the corridor improvements to be made within each timeframe are presented, including the desired future condition and general improvements recommended for each of these roadways. Specific plans and cost estimates must be developed to implement these improvements, following the design guidelines presented in Chapter 7. The recommended timeframes represent the prioritization of these projects at this time. It is understood that changing conditions and funding opportunities may require the phasing of these improvements to be reevaluated over the course of plan implementation.

Near-Term

Multimodal corridor improvements on Frederick Boulevard (from High Street to George Washington Highway):

- Four-lane roadway with landscaped median and intermittent left-turn lanes.
- Near-term bicycle facilities: If sufficient pavement width is available, provide bike lanes. Where there is not enough width for a bike lane and speed limits are less than 35 mph, use sharrows to accommodate bicyclists. Otherwise, post signage directing cyclists to alternative routes when such routes are created.
- Long-term bicycle facilities: Provide a multi-use path along this corridor using available ROW where possible.
- Minimum 5' sidewalks on both sides of the street with minimum 8' clear zone in activity centers and mixed-use corridors where sufficient right-of-way exists.
- Access management measures to consolidate and reduce curb cuts and access points.
- Coordinated signal system.
- Enhanced bus stops, including improved shelters, transit route and schedule information, and pedestrian access.

Stripe bike lanes on Turnpike Boulevard from Alexander's Corner to Frederick Boulevard. These bike lanes should be installed in conjunction with the Frederick Boulevard improvements and will provide near-term bicycle access on this corridor until full multimodal improvements are implemented.

Multimodal corridor improvements on Airline Boulevard (from Alexander's Corner area to High Street):

- Four-lane roadway with landscaped median and intermittent left-turn lanes.
- Near-term bicycle facilities: If sufficient pavement width is available, provide bike lanes. Where there is not enough width for a bike lane and speed limits are less than 35 mph, use sharrows to accommodate bicyclists. Otherwise, post signage directing cyclists to alternative routes when such routes are created.
- Long-term bicycle facilities: If other roadway widening is planned, provide 14-foot wide outside lanes.
- Minimum 5' sidewalks on both sides of the street with minimum 8' clear zone in activity centers and mixed-use corridors where sufficient right-of-way exists.
- Coordinated signal system.
- Enhanced bus stops, including improved shelters, transit route and schedule information, and pedestrian access.

Finish Multimodal corridor improvements on High Street east (from Frederick Boulevard to Elm Avenue):

- Four-lane roadway with landscaped median and intermittent left-turn lanes.
- Continue sidewalk improvements from MLK Freeway (Harbor Drive) to Elm Avenue on both sides of the street.
- Coordinated signal system.
- Enhanced bus stops, including improved shelters, transit route and schedule information, and pedestrian access.

Multimodal corridor improvements on High Street (from city limits to Frederick Boulevard):

- Four-lane roadway with landscaped median and intermittent left-turn lanes.
- Near-term bicycle facilities: If sufficient pavement width is available, provide bike lanes. Where there is not enough width for a bike lane and speed limits are less than 35 mph, use sharrows to accommodate bicyclists. Otherwise, post signage directing cyclists to alternative routes such as Pinner's Point/Western Freeway Bridge.
- Long-term bicycle facilities: Include improved bicycle accommodations on new bridge spans over the Western Branch. Widen additional street sections to provide either a multi-use path or 5-foot striped bike lanes to accompany the new spans.
- Minimum 5' sidewalks on both sides of the street with minimum 8' clear zone in activity centers and mixed-use corridors where sufficient right-of-way exists.
- Access management measures to consolidate and reduce curb cuts and access points.
- Coordinated signal system.
- Enhanced bus stops, including improved shelters, transit route and schedule information, and pedestrian access.

Multimodal corridor improvements on Victory Boulevard (from I-264 to George Washington Highway):

- Four-lane roadway with landscaped median and intermittent left-turn lanes.
- Provide a multi-use path along this corridor using available ROW where possible.
- Minimum 5' sidewalks on both sides of the street with minimum 8' clear zone in activity centers and mixed-use corridors where sufficient right-of-way exists.
- Access management measures to consolidate and reduce curb cuts and access points.
- Coordinated signal system.

- Enhanced bus stops, including improved shelters, transit route and schedule information, and pedestrian access.

Multimodal corridor improvements on Effingham Street/George Washington Highway from Portsmouth Boulevard to Frederick Boulevard:

- Four-lane roadway with landscaped median where possible and intermittent left-turn lanes.
- Near-term bicycle facilities: If sufficient pavement width is available, provide bike lanes. Where there is not enough width for a bike lane and speed limits are less than 35 mph, use sharrows to accommodate bicyclists. Otherwise, post signage directing cyclists to alternative routes when such routes are created.
- Long-term bicycle facilities: Provide bicycle facilities such as physically separated, protected bike lanes or a multi-use path if feasible in the existing ROW or if other roadway widening is planned. An alternative may be to develop two parallel corridors using Deep Creek Boulevard to Greenwood Drive and Victory Boulevard to Elm Avenue to provide more bicycle-friendly corridors outside a major automobile commuter route.
- Minimum 5' sidewalks on both sides of the street with minimum 8' clear zone in activity centers and mixed-use corridors where sufficient right-of-way exists.
- Access management measures to consolidate and reduce curb cuts and access points.
- Coordinated signal system.
- Enhanced bus stops, including improved shelters, transit route and schedule information, and pedestrian access.

Multimodal corridor improvements on George Washington Highway from Frederick Boulevard to Greenwood Drive:

- Four-lane roadway with landscaped median and intermittent left-turn lanes.

- Near-term bicycle facilities: If sufficient pavement width is available, provide bike lanes. Where there is not enough width for a bike lane and speed limits are less than 35 mph, use sharrows to accommodate bicyclists. Otherwise, post signage directing cyclists to alternative routes when such routes are created.
- Long-term bicycle facilities: Provide bicycle facilities such as physically separated, protected bike lanes or a multi-use path if feasible in the existing ROW or if other roadway widening is planned. An alternative may be to develop two parallel corridors using Deep Creek Boulevard to Greenwood Drive and Victory Boulevard to Elm Avenue to provide more bicycle-friendly corridors outside a major automobile commuter route.
- Minimum 5' sidewalks on both sides of the street with minimum 8' clear zone in activity centers and mixed-use corridors where sufficient right-of-way exists.
- Access management measures to consolidate and reduce curb cuts and access points.
- Coordinated signals to facilitate good progression due to traffic nearing four-lane capacity.
- Enhanced bus stops, including improved shelters, transit route and schedule information, and pedestrian access.

Multimodal corridor improvements on Elm Avenue (from London Boulevard to Portsmouth Boulevard):

- Four-lane roadway north of I-264; two-lane roadway south of I-264.
- Five-foot striped bike lanes to accommodate cyclists.
- Wide sidewalks on both sides of the street.
- On-street parking in residential neighborhoods.
- Enhanced bus stops, including improved shelters, transit route and schedule information, and pedestrian access.

Multimodal corridor improvements on Crawford Parkway (from Washington Street to Harbor Court):

- Road diet to create a two-lane, undivided roadway.

- Slower speed limits and five-foot striped bike lanes to accommodate cyclists along the water.
- Provide shared recreational trail with additional ROW.
- Enhanced bus stops, including improved shelters, transit route and schedule information, and pedestrian access.

Multimodal corridor improvements on Crawford Street (from Harbor Court to Crawford Circle):

- Four-lane roadway with on-street parking permitted in the outside lanes, landscaped median, and intermittent left-turn lanes.
- Slower speed limits and sharrows to accommodate cyclists.
- Wide sidewalks on both sides of the street.
- Coordinated signal system.
- Enhanced bus stops, including improved shelters, transit route and schedule information, and pedestrian access.

Multimodal corridor improvements on Cedar Lane (from VA 164 Western Freeway to High Street):

- Two-lane roadway with landscaped median and intermittent left-turn lanes.
- Five-foot striped bike lanes to accommodate cyclists.
- Wide sidewalks on both sides of the street.
- Enhanced bus stops, including improved shelters, transit route and schedule information, and pedestrian access.

Multimodal corridor improvements on Elmhurst Lane (from Portsmouth Boulevard to Airline Boulevard):

- Implement road diet to provide a two-lane undivided roadway with five-foot striped bike lanes to accommodate cyclists.
- Accommodate on-street parking in front of residences where space permits.
- Implement crosswalks at intersections near the high school.

- Extra wide sidewalks on both sides of the street or multi-use paths.
- Enhanced bus stops, including improved shelters, transit route and schedule information, and pedestrian access.

Multimodal corridor improvements on Cavalier Boulevard (from Rapidan Street to city limits):

- Two- to four-lane roadway with landscaped median and median breaks.
- Five-foot striped bike lanes to accommodate all cyclists.
- Wide sidewalks on both sides of the street.
- On-street parking in residential neighborhoods to reduce four-lane segments to two lanes as a traffic calming measure.
- Enhanced bus stops, including improved shelters, transit route and schedule information, and pedestrian access.

Multimodal corridor improvements on Greenwood Drive (from Victory Boulevard to George Washington Highway):

- Two-lane, undivided roadway.
- Five-foot striped bike lanes to accommodate cyclists.
- Wide sidewalks on both sides of the street.
- Enhanced bus stops, including improved shelters, transit route and schedule information, and pedestrian access.

Multimodal corridor improvements on other local and collector streets (with the exception of Turnpike Boulevard) identified as multimodal corridors: These streets include collector streets identified in the MTP as multimodal corridors with the exception of Turnpike Boulevard, which will be improved in conjunction with highway improvements to be made in a later timeframe. Multimodal improvements should be implemented according to the recommendations made in the design guidelines for local and collector streets.

Mid-Term

Multimodal corridor improvements on London Boulevard (from MLK Expressway to Effingham Street):

- Four-lane roadway with landscaped median and intermittent left-turn lanes.
- Slower speed limits and five-foot striped bike lanes to accommodate cyclists between Downtown, Midtown, and area schools.
- Wide sidewalks on both sides of the street.
- Coordinated signal system.
- Enhanced bus stops, including improved shelters, transit route and schedule information, and pedestrian access.

Multimodal corridor improvements on Turnpike Road (from Alexander's Corner to Frederick Boulevard; Projected 2030 ADT of approximately 9,200 vehicles):

- Two-lane, undivided roadway.
- Five-foot striped bike lanes to accommodate cyclists.
- Wide sidewalks on both sides of the street.
- Enhanced bus stops, including improved shelters, transit route and schedule information, and pedestrian access.

Multimodal corridor improvements on Effingham Street (from Crawford Parkway to north of I-264):

- Four- to six-lane roadway with on-street parking permitted in the outside lanes during non-peak hours, landscaped median, and intermittent left-turn lanes.
- Slower speed limits and five-foot striped bike lanes or sharrows to accommodate cyclists north of County Street. South of County Street, cyclists traveling between Downtown and the shipyards should be encouraged to use Port Centre Parkway or Elm Street to cross I-264 in order to minimize conflicts with the Downtown Tunnel.
- Wide sidewalks on both sides of the street.
- Coordinated signal system.

- Enhanced bus stops, including improved shelters, transit route and schedule information, and pedestrian access.

Multimodal corridor improvements on Effingham Street (from south of I-264 to George Washington Highway):

- Six-lane roadway with on-street parking permitted in the outside lanes, landscaped median, and intermittent left-turn lanes.
- Near-term bicycle facilities: Stripe 5-foot bike lanes in existing ROW.
- Long-term bicycle facilities: Consider a parking-separated, protected bicycle lane south of I-264. Bicyclists should be routed around the interchange area on a parallel path to avoid major conflicts with vehicles in a heavily congested area.
- Minimum 5' sidewalks on both sides of the street with minimum 8' clear zone in activity centers and mixed-use corridors where sufficient right-of-way exists.
- Access management measures to consolidate and reduce curb cuts and access points.
- Coordinated signal system.
- Enhanced bus stops, including improved shelters, transit route and schedule information, and pedestrian access.

Multimodal corridor improvements on George Washington Highway (from Greenwood Drive to city limits):

- Four-lane roadway with landscaped median and intermittent left-turn lanes.
- Near-term bicycle facilities: If sufficient pavement width is available, provide bike lanes. Where there is not enough width for a bike lane and speed limits are less than 35 mph, use sharrows to accommodate bicyclists. Otherwise, post signage directing cyclists to alternative routes when such routes are created.
- Long-term bicycle facilities: Provide bicycle facilities such as physically separated, protected bike lanes or a multi-use path if feasible in the existing ROW or if other roadway widening is planned. An alternative may

be to develop two parallel corridors using Deep Creek Boulevard to Greenwood Drive and Victory Boulevard to Elm Avenue to provide more bicycle-friendly corridors outside a major automobile commuter route.

- Minimum 5' sidewalks on both sides of the street with minimum 8' clear zone in activity centers and mixed-use corridors where sufficient right-of-way exists.
- Access management measures to consolidate and reduce curb cuts and access points.
- Coordinated signals to facilitate good progression due to traffic nearing four-lane capacity.
- Enhanced bus stops, including improved shelters, transit route and schedule information, and pedestrian access.

Multimodal corridor improvements on Portsmouth Boulevard (from city limits to I-264):

- Four-lane roadway with landscaped median and intermittent left-turn lanes.
- Near-term bicycle facilities: If sufficient pavement width is available, provide bike lanes. Where there is not enough width for a bike lane and speed limits are less than 35 mph, use sharrows to accommodate bicyclists. Otherwise, post signage directing cyclists to alternative routes when such routes are created.
- Long-term bicycle facilities: If other roadway widening is planned, provide a multi-use path in the ROW. It may be possible to create extra roadway width by reducing the size of the center median.
- Minimum 5' sidewalks on both sides of the street with minimum 8' clear zone in activity centers and mixed-use corridors where sufficient right-of-way exists.
- Access management measures to consolidate and reduce curb cuts and access points.
- Coordinated signals to facilitate good progression due to traffic nearing four-lane capacity.
- Enhanced bus stops, including improved shelters, transit route and schedule information, and pedestrian access.

Multimodal corridor improvements on Airline Boulevard (from city limits to Alexander's Corner area):

- Four-lane roadway with landscaped median and intermittent left-turn lanes.
- Near-term bicycle facilities: If possible, provide 5-foot striped bike lanes from the city limits to Hodges Ferry Road/Greenwood Drive. Otherwise, post signage directing cyclists to alternative routes when such routes are created. From Hodges Ferry Road to Victory Boulevard, bicycle accommodations should accompany access management improvements and the construction of a median. Wide outside lanes may be appropriate with a possible parallel bike corridor near the rail corridor to the south or Ballard Drive.
- Long-term bicycle facilities: Provide 5-foot striped bike lanes west of Hodges Ferry Road and 14-foot wide outside lanes and a parallel multi-use path east of Hodges Ferry Road.
- Minimum 5' sidewalks on both sides of the street with minimum 8' clear zone in activity centers and mixed-use corridors where sufficient right-of-way exists.
- Access management measures to consolidate and reduce curb cuts and access points.
- Coordinated signal system.
- Enhanced bus stops, including improved shelters, transit route and schedule information, and pedestrian access.

Multimodal corridor improvements on Turnpike Road (from Frederick Boulevard to County Street):

- Four-lane roadway.
- Access management measures to consolidate and reduce curb cuts and access points.
- Near-term bicycle facilities: Provide a multi-use path along the length of this corridor consistent with current VDOT plans.
- Long-term bicycle facilities: Consider providing on-street bicycle accommodations only if truck traffic

is reduced after construction of the proposed MLK Connector.

- Minimum 5' sidewalks on both sides of the street with minimum 8' clear zone in activity centers and mixed-use corridors where sufficient right of way exists.
- Enhanced bus stops, including improved shelters, transit route and schedule information, and pedestrian access.

Multimodal corridor improvements on Greenwood Drive (from I-264 to Victory Boulevard):

- Four-lane roadway with landscaped median and intermittent left-turn lanes.
- Near-term bicycle facilities: Provide 5-foot striped bike lanes or 14-foot wide outside lanes with sharrows within the existing ROW by narrowing the existing wide medians and/or shoulders.
- Long-term bicycle facilities: Provide 5-foot striped bike lanes.
- Minimum 5' sidewalks on both sides of the street with minimum 8' clear zone in activity centers and mixed-use corridors where sufficient right-of-way exists.
- Access management measures to consolidate and reduce curb cuts and access points.
- Coordinated signal system.
- Enhanced bus stops, including improved shelters, transit route and schedule information, and pedestrian access.

G. Monitoring & Evaluation

In order to stay on track to achieving its transportation vision by 2030, Portsmouth will need to monitor and evaluate progress made toward accomplishing the prescribed action plan. Implementation of the MTP will be influenced by many factors. As the events of 2008-2009 demonstrated, the context in and assumptions under which transportation and other community systems operate can change dramatically in a short period of time. Ongoing monitoring and evaluation will allow the City to make adjustments and changes to the plan as necessary to stay true to its vision of Portsmouth's future transportation system. Additionally, as each five-year timeframe comes to a close, the City will need to assess accomplishments and reprioritize actions for the subsequent stage of plan implementation. Minimum requirements for plan monitoring and evaluation include:

- The City will monitor and report on implementation progress to the Planning Commission and City Council on an annual basis.
- Priorities set by each annual report will be coordinated with the city's capital budgeting process and with transportation funding program timeframes and requirements.
- As part of each annual review, city staff will assess progress on the MTP and select catalytic projects to pursue during the coming year. City staff has identified the following five catalytic projects to pursue in the first year of the MTP:
    - West Norfolk Road Bike Lane
    - Mt. Vernon Avenue Bike Boulevard and Complete Street Demonstration Project
    - Road Diet on Portsmouth Boulevard East of I-264
    - Clifford Street/Bart Street Bicycle Boulevard
    - Reconstruction of Alexander's Corner
- The City will prepare a complete plan update, including a new Action Plan, every five years.

CHAPTER 7

DESIGN GUIDELINES

The MTP Vision calls for a "multimodal transportation network with enhanced features that support the city of Portsmouth's quality of life and economic vitality." At the heart of this vision is the creation of a network of complete streets accessible to all users. This chapter builds on the transportation framework laid out in Chapter 4 by providing design guidance to support the strategies and actions laid out in the MTP for establishing complete streets. In Portsmouth, residents want livable streets, but also want to maintain mobility and acceptable travel times for motor vehicles. This chapter establishes a strategy to promote multimodal streets that provide both livability and mobility through:

- An approach to street classification that is sensitive to the street's context and the needs of all of users (including the access and mobility needs of motor vehicles).
- A set of design guidelines and tools that will help the City to achieve a balance between different travel modes.

This chapter includes the following sections:

A. **Background and Guiding Principles for Design and Implementation.** This section provides an overview of the current state of street design in the U.S. with a focus on the concepts of context-sensitive design and complete streets. Selected precedents from cities that are already implementing complete street guidelines are provided, with a focus on Virginia municipalities.

B. **Street Classification in Portsmouth.** This section discusses the street classifications proposed in the MTP and their land use contexts. It introduces the components of a complete street in relation to the public right-of-way.

C. **Street Design Guidelines.** This section presents recommendations for street component types and dimensions, including typical cross sections for different types of streets. This section describes in more detail guidelines for the individual components of a complete street, including:

- Pedestrians
- Bicycles
- Vehicles
- Multimodal intersections
- Traffic calming

A. Background and Guiding Principles for Design and Implementation

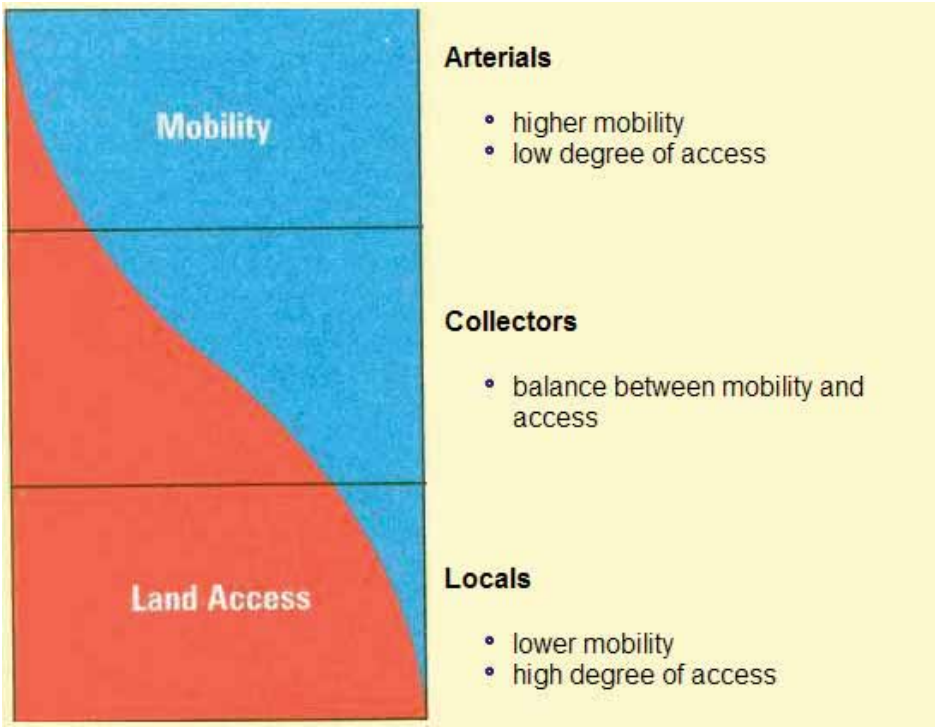
Street Classifications and Context Sensitive Design: *One Size Does Not Fit All*

In the United States, the federal government developed a street classification system based on the traffic functions of streets (reference: Code of Federal Regulations Title 23, Chapter I, Part 470, Subpart A). This system defines the street in terms of design and operational characteristics for the movement of vehicles. It aids in communication regarding streets among policy makers, planners, engineers, and citizens, and in the process of prioritizing expenditures of public funds on a street system. The functional classification system is laid out in the American Association of State Highway and Transportation Officials' (AASHTO) *A Policy on Geometric Design of Highways and Streets* (generally referred to as the "Green Book") and includes:

- Freeways
- Principal Arterial Streets
- Minor Arterial Streets
- Collector Streets
- Local Streets

This established approach to street functional classification is still used by nearly all municipal agencies in the United States. The MTP adopts a corresponding set of functional classifications for Portsmouth, but it does not include freeways or other controlled-access facilities. Further, the design guidelines provided in this chapter consider both functional classification and adjacent land uses in order to recommend street designs that are better tailored to local context.

According to AASHTO, the two major considerations for classifying streets are access and mobility. The primary function of local or neighborhood streets is to provide access. These streets are intended to serve localized areas or neighborhoods, including local commercial and mixed land uses, and are not intended for through traffic. The primary function of arterials is mobility; the intent is to carry more traffic than is generated by the land uses within the corridor. Mobility on arterials is enhanced by limiting access points (intersections and driveways). However, significant vehicular mobility at high speeds can limit access by pedestrians and bicyclists. Arterials serve a range of travel distances and traffic volumes. The relationship between access, mobility, and street classification is shown in the figure below, derived from the AASHTO "Green Book." As the emphasis shifts from land access toward mobility, traffic is channelized from lower (local) street to higher order (arterial) streets.



However, the use of land access and mobility as the primary elements that distinguish between higher- and lower order classifications disregards the broader functions of streets in defining urban form, providing critical public spaces, and accommodating human-powered (non-motorized) modes of travel. The functional classification approach lacks a framework for connecting roadway design criteria (e.g., maximum number of travel lanes and design speed) with urban design (e.g., levels of pedestrian activity, location of access driveways and intersections, or relationship of building to street). In many situations, this has resulted in streets that prioritize motor vehicles over other modes of travel and fall short of creating a coherent street network that serves the dynamic economic, social, and environmental needs of communities.

Recognizing that the designs that emerge from traditional functional classification are not sufficiently responsive to or supportive of the needs of non-drivers and surrounding urban environments, many communities and organizations responsible for street design have begun to address the problem that the traditional functional classification of street types in urban areas does not account for varying contexts, character, and the variety of modes that use urban streets.

Context Sensitive Solutions

At the heart of this rethinking of functional classification is the idea of "context sensitive solutions." This approach aims to incorporate context at various scales, address user and stakeholder needs and desires, and introduce flexibility into the planning and design of transportation facilities. The idea of Context Sensitive Solutions is critical to the Portsmouth MTP and is reflected in the transportation framework described in Chapter 4.

Context Sensitive Solutions: A History of the Literature

"Context Sensitive Solutions (CSS) is a collaborative, interdisciplinary approach that involves all stakeholders in providing a transportation facility that fits its setting. It is an approach that leads to preserving and enhancing scenic, aesthetic, historic, community, and environmental resources, while improving or maintaining safety, mobility, and infrastructure conditions."

Results of Joint AASHTO/FHWA Context Sensitive Solutions Strategic Planning Process Summary Report, (March 2007)

The documents below represent milestones in the development of the CSS concept. Many of the proposed classifications and design guidelines proposed in the MTP build from this literature. This is not an exhaustive list, but represents key documents that can provide additional resources and guidance on incorporating CSS into the planning and design of streets in Portsmouth.

The National Environmental Policy Act: This 1969 legislation, among other initiatives, requires transportation agencies to consider adverse impacts of road projects on the environment.

Flexibility in Highway Design: Published by the Federal Highway Administration (FHWA) in 1997, this document highlights degrees of flexibility which already existed in the AASHTO "Green Book." The aim was to debunk the notion that the Green Book is a prescriptive set of "shalls." It identifies the freedom in design already provided in the Green Book, emphasizing the importance of street design that recognizes intangibles such as character and atmosphere, and suggesting that project designers consider community character and desires in the design of roadways. The book did not, however, identify the characteristics that define community context.

Thinking Beyond the Pavement: This National Workshop on Integrating Highway Development with Communities and the Environment While Maintaining Safety and Performance was conducted by the Maryland Department of Transportation, State Highway Administration in May 1998. This workshop was co-sponsored by AASHTO and FHWA with the advice and support of the National Workshop Advisory Committee. A summary of the conference can be found at http://www.sha.maryland.gov/Index.aspx?PageId=335.

www.contextsensitivesolutions.org: Launched in 2004 by the FHWA and partners, the website is a resource promoting consideration of CSS core principles in planning and project development processes.

Context Sensitive Solutions in Designing Major Urban Thoroughfares for Walkable Communities: This document was produced by the Institute of Transportation Engineers in cooperation with the Federal Highway Administration, the Environmental Protection Agency, and in partnership with the Congress for the New Urbanism. It provides guidance and demonstrates for practitioners how CSS concepts and principles may be applied in roadway improvement projects that are consistent with their physical settings. The report focuses on applying the principles of CSS in transportation planning and in the design of roadway improvement projects in places where community objectives support walkable communities-compact development, mixed land uses and support for pedestrians and bicyclists, whether it already exists or is a goal for the future.

Complete Streets

Complete streets are streets that are designed and maintained to enable safe access for all users and are a fundamental component of the MTP's transportation framework (see Chapter 4). The fundamental idea is that streets must operate beyond functional classification and be designed to support the type and character of existing and planned adjacent land uses. In designing complete streets, it is important to think beyond the roadway itself to its context and potential users.

In the United States, 28 percent of all trips are less than one mile. The average adult can easily walk a mile in about 20 minutes and yet 65 percent of those short trips are taken by automobile. This is not simply because Americans are unwilling to walk short distances – in fact, many are more than willing. Unfortunately, there are few places in America where it is enjoyable—or even possible—to simply walk a mile in safety and comfort. Complete streets seek to remedy this situation by making it safe and inviting for all users to share public roads. Another compelling argument for complete streets is that one-third of Americans do not drive. They include the young, the elderly, those who can't afford to own and maintain an automobile, and those who simply choose not to. Complete streets create opportunities for a large portion of the population to lead active, independent lives.

Complete streets should do more than merely accommodate all users; well-designed complete streets encourage people to use alternative modes of transportation by providing a safe and attractive environment for all, whether they be on four wheels, on two wheels, or on foot. Complete streets can also be great streets – the public places that encourage people to linger on foot, meet with neighbors, and engage in public life.

As with any public infrastructure investment, well-designed complete streets can also spur private investment and urban development. Incorporating complete street policies and guidelines into the urban development process can promote high quality urban design in a city such as Portsmouth.

Complete Streets in Virginia:

Municipalities around the country have begun to adopt complete streets policies and design guidelines. The following cities in Virginia can provide potential precedents for complete streets in Portsmouth.

Arlington, VA

Richmond, VA

Roanoke, VA

Virginia Context

Funding for maintenance and improvements of many of Portsmouth's streets is provided by the Virginia Department of Transportation (VDOT). Because such work is generally required to abide by VDOT standards, Portsmouth will need to coordinate its efforts with VDOT as it develops a network of multimodal corridors and complete streets. Changes to the design and operation of streets will require staying abreast of best practices used throughout the state. Some of the key VDOT documents and standards for street design are noted below. References to VDOT and other important standards and guidelines are also provided in the design guidelines where relevant. It is also important that the City look to those Virginia municipalities that have already adopted complete street guidelines for precedence and guidance in developing complete streets in the Virginia context.

Virginia Department of Transportation Policies and Standards:

The following policies and documents provide an overview of VDOT standards which currently govern the design of streets in the Commonwealth.

- **VDOT Road Design Manual:** This manual was prepared to promote uniformity in design procedures for all designers and technicians involved in the development of plans for Virginia's highways. It is intended to serve as an informational and procedural guide and to be used in conjunction with specifications, standards, policy directives (State and Federal), and design policy manuals published by AASHTO. It is neither a textbook nor a substitute for engineering knowledge, experience or judgment. The appendices contain specific design guidelines, including guidelines for bicycle facilities and intersection design. Appendix A, which governs geometric design, states that "VDOT has formally adopted the AASHTO A Policy on Geometric Design of Highways and Streets, commonly referred to as the AASHTO "Green Book", as our minimum design standards. Therefore, all design criteria must meet AASHTO minimum standards." However, the manual also emphasizes the need for flexibility in using design standards. It provides a supplementary

memorandum, IIM-LD-235 (Context Sensitive Solutions), intended to "clarify and emphasize VDOT's commitment to project and program development processes that provide flexibility, innovative design and Context Sensitive Solutions (CSS) to transportation challenges." Flexible design guidelines are also being incorporated into the design guidelines provided in Appendix A. For more information, see: http://www.virginiadot.org/business/locdes/rdmanual-index.asp.

- **VDOT Pavement Design for Subdivision and Secondary Roads in Virginia:** This guide was prepared to aid professional personnel knowledgeable in the field of pavement design. The guide specifically addresses minimum flexible pavement design standards for those subdivision streets and/or secondary roads that are maintained by VDOT. It is intended to serve as an informational and procedural guide and to be used in conjunction with specifications, standards, policy directives (State and Federal), and design policy manuals published by VDOT and AASHTO. The guide states that where the subdivision ordinance of a locality has established a pavement design requirement that exceeds the pavement design obtained by these procedures, then that design process shall govern. Again the intent of the VDOT Pavement Design for Subdivision and Secondary Roads in Virginia is to provide a guide for flexible pavement design standards addressing those local subdivision streets and secondary roads constructed in local municipalities but maintained under VDOT jurisdiction.
- **Policy for Integrating Bicycle and Pedestrian Accommodations:** This policy provides the framework through which the Virginia Department of Transportation will accommodate bicyclists, pedestrians (including persons with disabilities), and motorized transportation modes in the planning, funding, design, construction, operation, and maintenance of Virginia's transportation network to achieve a safe, effective, and balanced multimodal transportation system. It recognizes that appropriate bicycle and pedestrian accommodations provide the public, including the disabled community, with access to the transportation network; connectivity with other modes of transportation; and independent mobility regardless of age, physical constraints, or income. For more information, see: http://www.virginiadot.org/programs/resources/bike_ped_policy.pdf.

B. Street Classifications in Portsmouth

The MTP recognizes the need for some level of street classification in Portsmouth, along with flexibility for context sensitive design. The MTP design guidelines focus on streets traditionally classified as arterials, collectors, and local streets and generally do not address freeways or other controlled-access facilities. The recommendations take into account the current dimensions and conditions of streets in Portsmouth with the goal of transitioning these streets to complete streets serving all users over the course of plan implementation. The four basic street classifications identified in the MTP are:

- Urban Arterials
- Urban Boulevards
- Collector Streets
- Local Streets

For descriptions of these classifications, see the call-out on pp. 140-141 of Section 5.D.

In order to enable these street types to be context sensitive and serve all users, the MTP establishes a set of land use "overlays." Understanding the land use context provides guidance on who will need to use the roadway and how. This understanding in turn influences the geometric design of the roadway and the types and dimensions of amenities provided in the right-of-way. The roadway design should reflect compatibility between roadway function and existing or planned land use context that reflects the community vision. In Portsmouth, the land use vision is described in its Destination 2025 Comprehensive Plan. Both the MTP and the Comprehensive Plan recognize the fundamental connection between land use and transportation. In describing the relationship between land use and the city's streets, the MTP has established four main land use contexts:

- **Residential context:** Includes high and low density single-family residential, mixed residential, and in some cases multi-family residential land uses. (Multi-family residential may more frequently take on the characteristics of mixed-use and commercial settings.)
- **Mixed-use & commercial context:** Includes activity centers as well as mixed-use residential, mixed-use employment, commercial, mixed-use corridor, and in some cases multi-family residential land uses.
- **Industrial context:** Includes light and heavy industrial as well as transportation land uses, excluding transit stops which should follow the mixed-use and commercial context.

Defining a Complete Street for Various Contexts

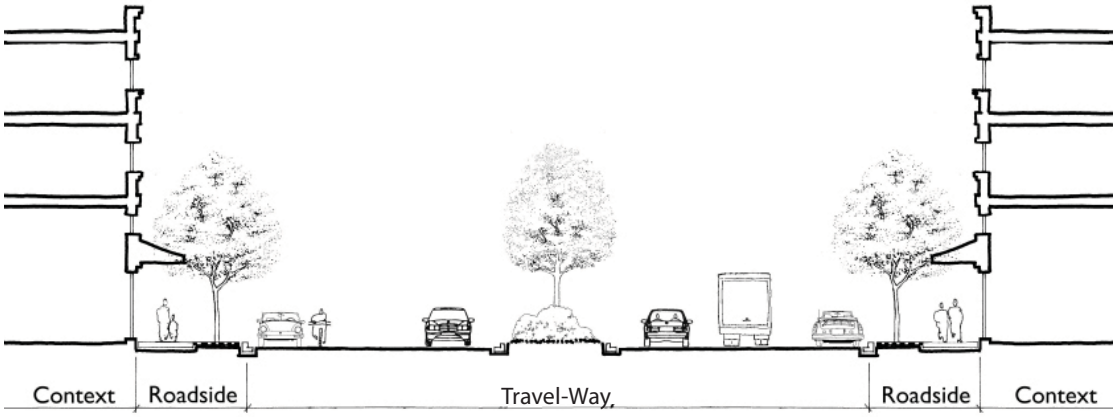
The Master Transportation Plan envisions a multimodal transportation system for Portsmouth where, eventually, all streets are complete streets. This means that all streets in the city should accommodate multiple modes of travel, including:

- Motor vehicles
- Bicycles
- Pedestrians
- Public transit (where appropriate)

In order to describe a complete street that will accommodate different types of users, it is necessary to relate those user needs to the physical spaces of the street. These spaces can be expressed as "realms" and "zones" of the street. In order to assist in planning and designing the various components of the street, the following four realms of the street have been defined:

- Context Realm
- Roadside Realm
- Travel-way Realm
- Intersection Realm

Street Realms



Source: Community, Design + Architecture

Three realms—context, roadside, and travel-way—make up the street section, while the fourth (the intersection) describes the confluence of streets. The travel-way and intersection realms exist entirely within the public right-of-way. The roadside realm can exist partially outside the public right-of-way. The context realm primarily exists outside of the public right-of-way, where land is usually privately owned and cannot be assumed to be available for street construction or improvement without acquiring the land through dedication or purchase.

Each of these realms contains various zones. Most of these components exist within only one realm of the street, but some, such as bicycle facilities, may be found in either the travel-way or the roadside depending on the street. (The following terms are drawn in part from the Institute of Transportation Engineers' *Context Sensitive Solutions in Designing Major Urban Thoroughfares for Walkable Communities*.)

- **Context Realm:** Physically, this is the area adjacent to (outside of) the public street/right-of-way. The context can be built or natural and can include buildings, landscaping, site access facilities, and public and semi-public open spaces, as well as features such as vegetation, water, or topography. Conceptually, "context" can contribute to the characteristics that define the street's environmental, economic, social, historical, or urban design context. A street often passes through a variety of context areas.
- **Roadside Realm:** This is the area between the curb or edge of the travel-way and the adjacent property line. The roadside can be further divided into zones that address different functions, mostly related to pedestrian use of the street (see descriptions of frontage, pedestrian travel-way, and furnishings zones below). The function of roadside realm zones and the level of pedestrian use of the roadside realm are directly related to the activities generated by the adjacent context. The following zones are contained within the roadside realm:
    - **Frontage Zone:** Part of the roadside realm, the frontage zone is the space between the pedestrian travel-way and building faces or private property. As with all of the street zones, its width and function vary with the street type and context, but the frontage zone generally provides a buffer distance between the pedestrian zone and building walls or property lines. The frontage zone allows people to access adjacent land uses without interfering with moving pedestrians. It may also accommodate activities associated with adjacent land uses, such as cafe tables or retail stalls in commercial districts.

- **Pedestrian Travel-way Zone:** This is the area within which pedestrians travel and is sometimes referred to as the pedestrian "through zone" or "clear zone." This zone must provide a minimum horizontal and vertical clear area, free of obstructions, in compliance with Americans with Disabilities Act (ADA) requirements. Generally, this zone refers to all or part of the sidewalk, although it can take the form of a pedestrian or shared-use path.

- **Furnishings Zone:** The furnishings zone is a multi-purpose area of the roadside. Sometimes referred to in documents as the "buffer zone," it serves as a buffer between the pedestrian zone and the vehicular area of the street. It may be planted or paved, and in urban areas is often part of the sidewalk. It provides space for roadside elements such as street trees, planting strips, street furniture, utility poles, sidewalk cafes, sign poles, signal and electrical cabinets, phone booths, fire hydrants, bicycle racks, and bus shelters. For the purpose of the MTP, the curb is included within the furnishings zone.

- **Travel-way Realm:** This is the area between curbs that accommodates wheeled travel and parking. It accommodates motor vehicles, transit vehicles, bicycles, and on-street parking, if present. The following zones are generally contained within the travel-way:

    - **Bikeway Zone:** The bikeway is the zone dedicated to bicycle travel. The bikeway is generally found in the travel-way realm in the form of a bike lane. However, the bikeway can exist in the roadside realm as a bicycle or shared-use path. In some instances, the bikeway can occupy overlapping or shared space with the vehicular travel-way.

    - **Parking Zone:** This is the zone that is reserved for parked vehicles. In addition to providing on-street parking and reducing the need for parking lots, this zone can provide an added buffer between motor vehicles and bicyclists or pedestrians.

    - **Vehicular Travel-way Zone:** This is the zone used for motor vehicle travel. It is made up of vehicular travel and turning lanes.

- **Intersection Realm:** This is the area where two or more public streets meet. Intersections are generally characterized by a high level of activity, shared uses, and complex movements that can result in multimodal conflicts.

C. Street Design Guidelines

The cross section of every street in Portsmouth should be optimized to meet the local land use context and the role of that particular street within the transportation network. Therefore, the tables and sections on the following pages provide guidance for designing the components of various street types in Portsmouth based on their land use context. Using a "kit of parts" for each street realm, the sections provide illustrative examples of preferred conditions that can be accommodated in various right-of-ways common to Portsmouth.

These guidelines and sections are meant to illustrate preferred solutions. They are not intended to be prescriptions for specific streets. Specific context and right-of-way constraints will vary and thus will require the development of site-specific designs for individual streets. As these are only guidelines, it is implied that there is flexibility in the design of transportation projects in Portsmouth. Within the overall framework set by the guidelines, variations in design are permitted and expected.

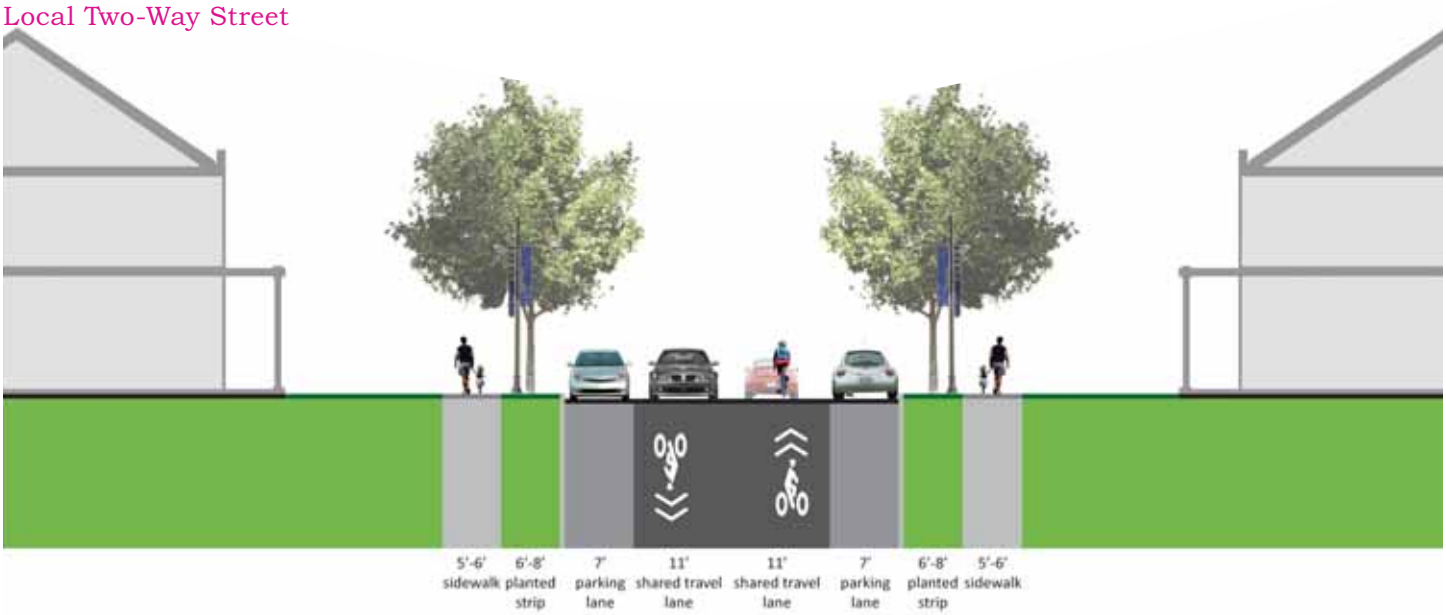
Further details and guidance on the design of these facilities, including cross sections with preferred dimensions, can be found in the design guidelines that follow. Please note that the cross sections do not include a 2' curb and gutter required on each side of the roadway. Also, the typical cross sections shown do not necessarily apply to roadways within Downtown Portsmouth because of their unique context and characteristics. (Please refer to the *City's Downtown Master Plan*, *Waterfront Strategy*, and the *Uptown D2 District Form-Based Code* for further design information for those streets).

Residential Context

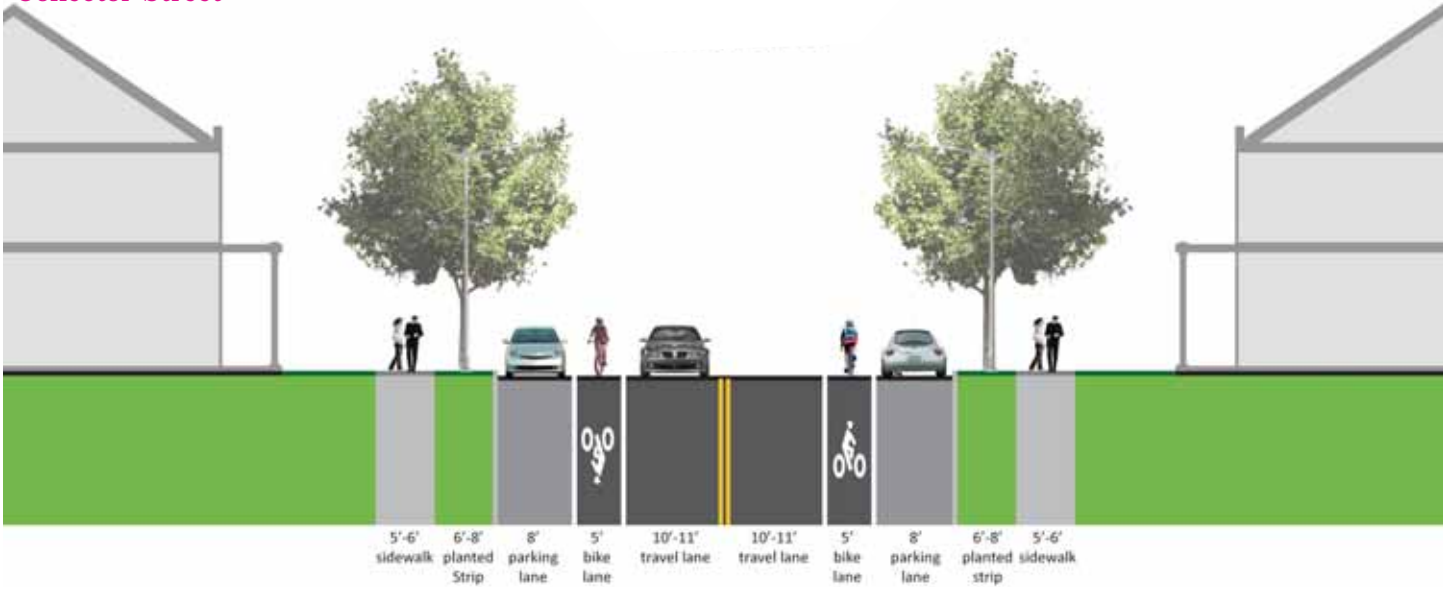
	Urban Arterial*	**Urban Boulevard**	**Collector**	**Local**
VDOT Classification	*Urban Principal Arterial*	*Urban Minor Arterial*	*Urban Collector*	*Urban Local*
Posted speed limit (preferred/max)	30/35	25/35	25/30	2/25
Number of vehicular travel lanes	2-5	2-5	2-4	1-2
Median treatments	All	Landscaped or TWLTL	TWLTL or undivided	Undivided
Parking	Discouraged			
	Encouraged	Encouraged	Encouraged	
Bikeways	Shared use path Wide outside lane with sharrows permitted	Bike lane Protected bike lane	Bike lane Protected bike lane	Bike boulevard Sharrows
Transit accommodations	Far-side pullouts or Near-side bumpouts Bus shelters, bike parking	Far-side pullouts or Near-Side bumpouts Bus shelters, bike parking, and pedestrian amenities	Bumpouts if parking is present	No special accommodations
Pedestrian travel-way zone (preferred/min)	Sidewalk, 6’/5’	Sidewalk, 8’/5”	Sidewalk, 6’/5’	Sidewalk, 6’/5’
Furnishing zone (preferred/min)	8’/6’	8’/6’	8’/6’	8’/4’
Frontage zone	Varies, may not be present	Varies, may not be present	Varies, may not be present	Varies, may not be present
Traffic calming	Permitted	Permitted	Encouraged	Encouraged

* Urban arterials in residential contexts should be avoided. Information is provided only to give guidance for retrofits where this condition already exists.

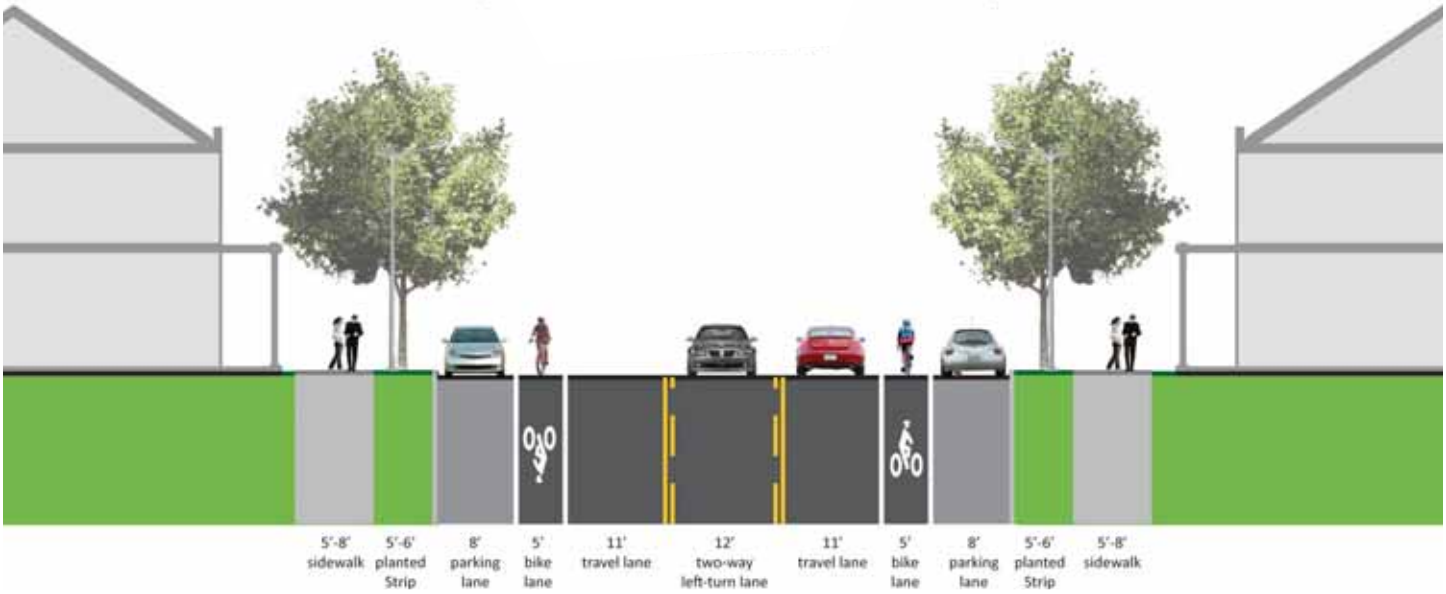
Local Two-Way Street



Collector Street



Urban Boulevard



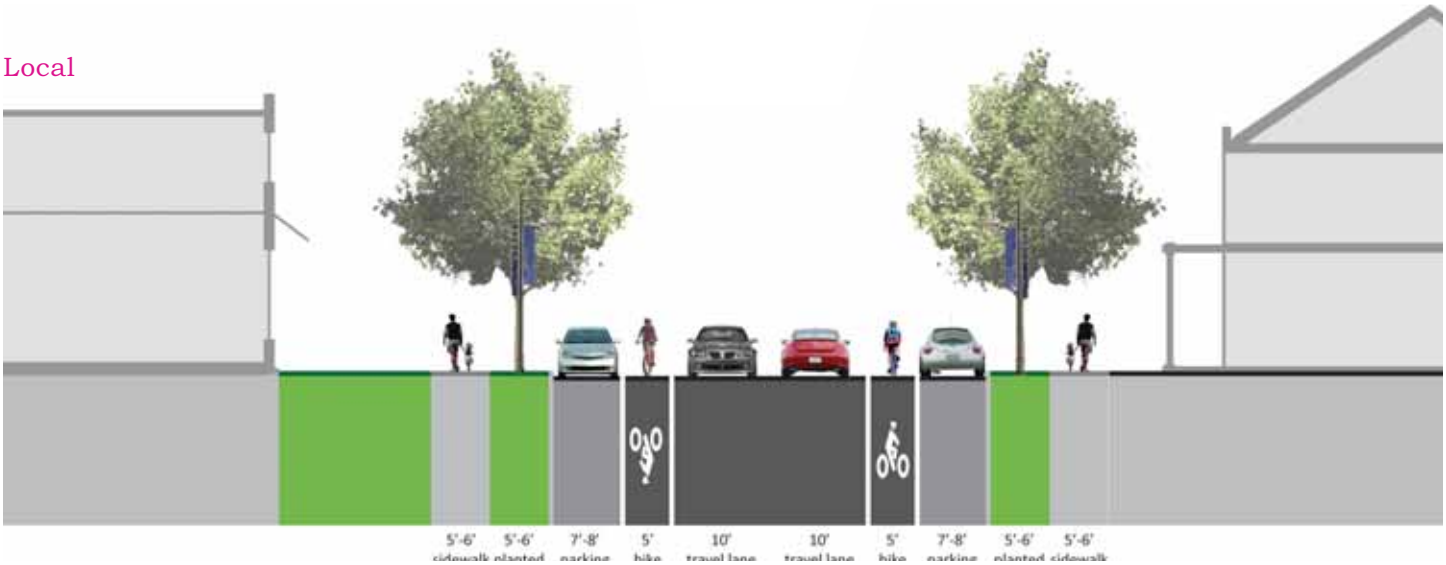
Urban Arterial

Mixed-Use & Commercial Context

	Urban Arterial*	**Urban Boulevard**	**Collector**	**Local**
VDOT Classification	*Urban Principal Arterial*	*Urban Minor Arterial*	*Urban Collector*	*Urban Local*
Posted speed limit (preferred/max)	30-35/45	25-30/35	25/30	20/25
Number of vehicular travel lanes	2-5	2-5	2-4	1-2
Median treatments	All	Landscaped or TWLTL	TWLTL or undivided	Undivided
Parking	Permitted	Encouraged	Encouraged	Encouraged
Bikeways	Shared use path Protected bike lane Bike lane	Protected bike lane Bike lane Shared use path	Bike lane Protected bike lane	Bike lane Protected bike lane
Transit accommodations	Far-side pullouts or Near-side bumpouts Bus shelters, bike parking	Far-side pullouts or Near-Side bumpouts Bus shelters, bike parking, and pedestrian amenities	Bumpouts if parking is present	No special accommodations
Pedestrian travel-way zone (preferred/min)	Sidewalk, 8'/6' or Shared use path, 12'/10'	Sidewalk, 8'-12'/5' or Shared use path, 12'/10'	Sidewalk, 6'-8'/5'	Sidewalk, 6'-8'/5'
Furnishing zone	6'/5'	8'-12'/6'	8'/6'	8'/6'
Frontage zone	Varies, preferred	Varies, encouraged	Varies, encouraged	Varies, encouraged
Traffic calming	Permitted	Encouraged	Encouraged	Encouraged

* Roads that are otherwise urban arterials should take on the design characteristics of urban boulevards when passing through activity centers.

Local



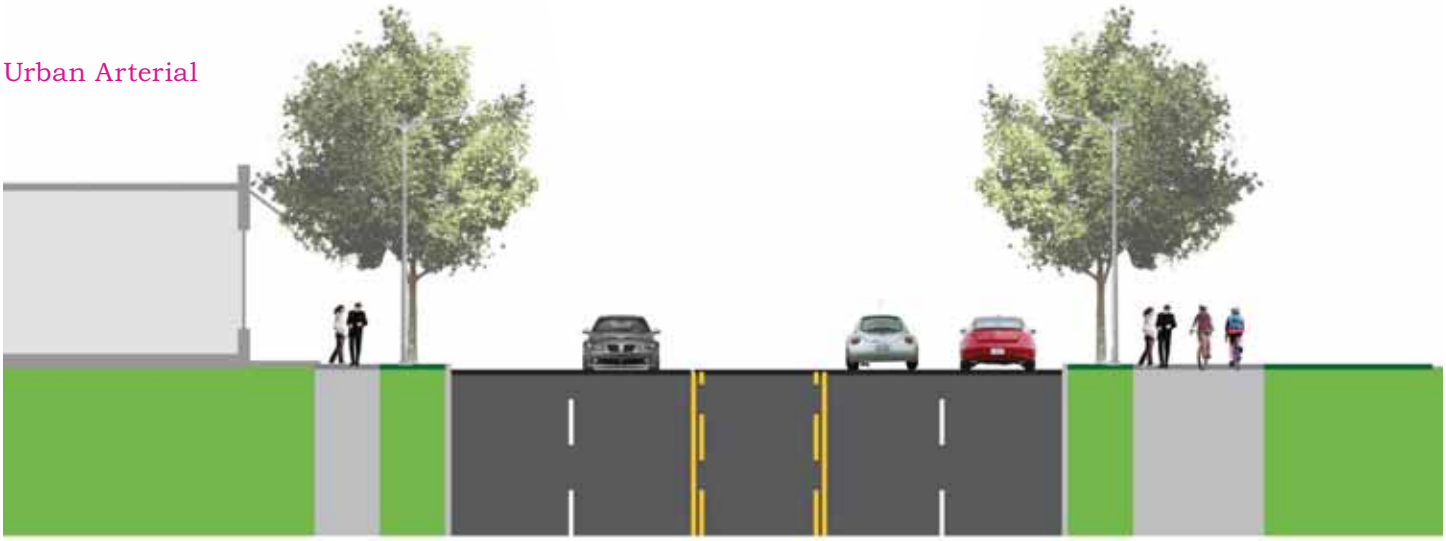
Collector

10' frontage zone | 6'-8' sidewalk | 5'-6' furnishing zone | 8' parking buffered bike lane | 8' parking lane | 11' travel lane | 12'-16' median | 11' travel lane | 8' parking lane | 8' parking buffered bike lane | 5'-6' furnishing zone | 6'-8' sidewalk | 10' frontage zone

Urban Boulevard

10' frontage zone | 6'-8' sidewalk | 5'-6' furnishing zone | 8' parking buffered bike lane | 8' parking lane | 11' travel lane | 12'-16' median | 11' travel lane | 8' parking lane | 8' parking buffered bike lane | 5'-6' furnishing zone | 6'-8' sidewalk | 10' frontage zone

Urban Arterial

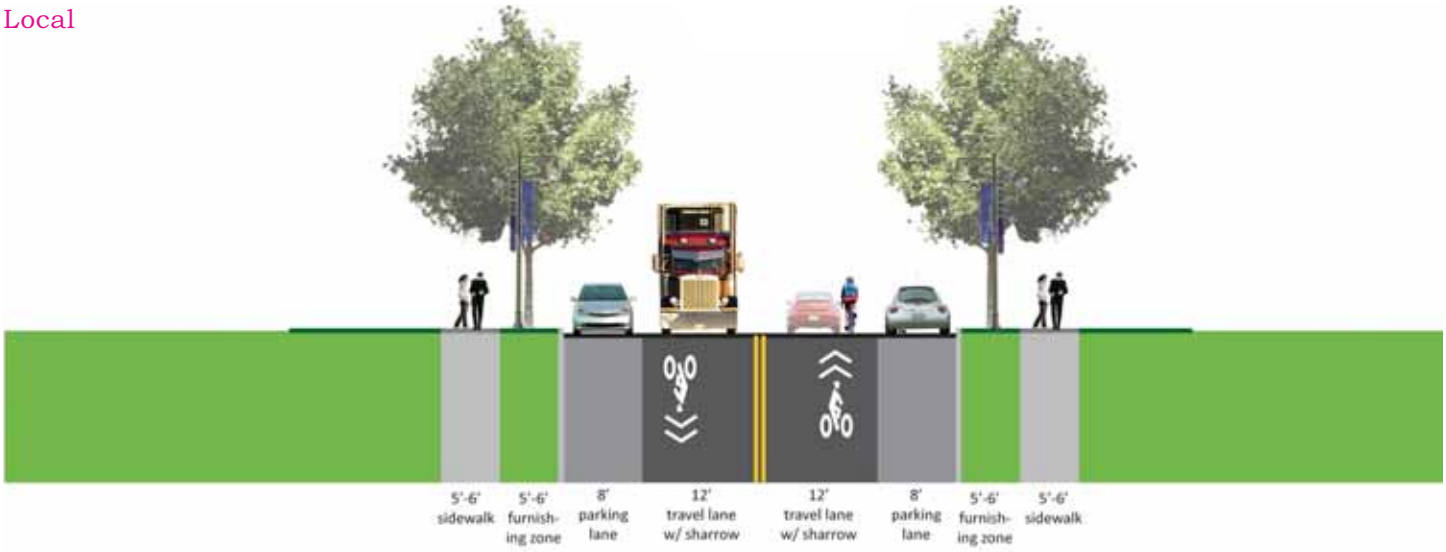


5' frontage zone | 5'-6' sidewalk | 5'-6' planted strip | 12' travel lane | 11' travel lane | 12' two way left turn lane | 11' travel lane | 12' travel lane | 5'-6' planted strip | 10'-12' shared use path | 10' frontage zone

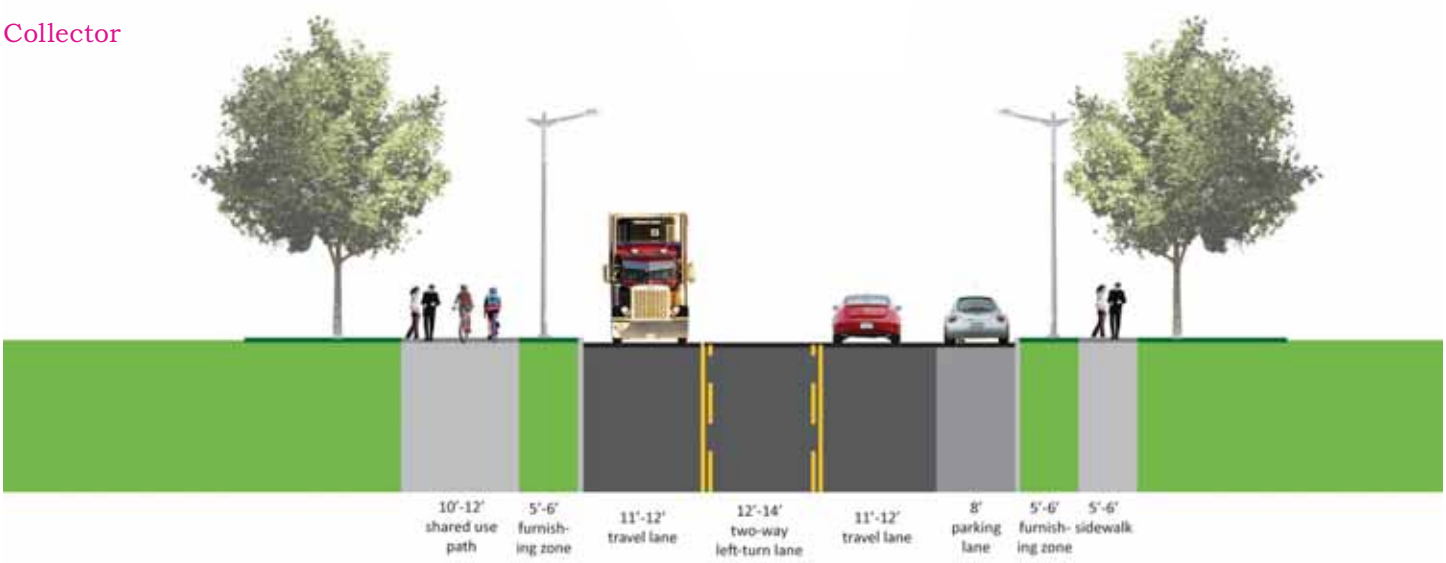
Industrial Context

	Urban Arterial*	**Urban Boulevard**	**Collector**	**Local**
VDOT Classification	*Urban Principal Arterial*	*Urban Minor Arterial*	*Urban Collector*	*Urban Local*
Posted speed limit (preferred/max)	35-45/55	30/40	25/35	25/25
Number of vehicular travel lanes	2-6	2-5	2-4	2
Median treatments	All	Landscaped or TWLTL	TWLTL or undivided	Undivided
Parking	Discouraged	Encouraged	Permitted	Permitted
Bikeways	Shared use path	Shared use path	Shared use path Bike lane (buffered)	Sharrows Protected bike lane
Transit accommodations	Far-side pullouts or Near-Side bumpouts Bus shelters, bike parking	Far-side pullouts or Near-Side bumpouts Bus shelters, bike parking, and pedestrian amenities	Bumpouts if parking is present	No special accommodations
Pedestrian travelway zone (preferred/min)	Sidewalk, 6'/5' Shared use path, 12'/10'	Sidewalk, 6'/5' Shared use path, 12'/10'	Sidewalk, 6'/5' Shared use path, 12'/10'	Sidewalk, 6'/5' Shared use path, 12'/10'
Furnishing zone	8'/6'	8'/6'	8'/5'	8'/5'
Frontage zone	Varies	Varies	Varies	Varies
Traffic calming	Discouraged	Discouraged	Discouraged	Discouraged

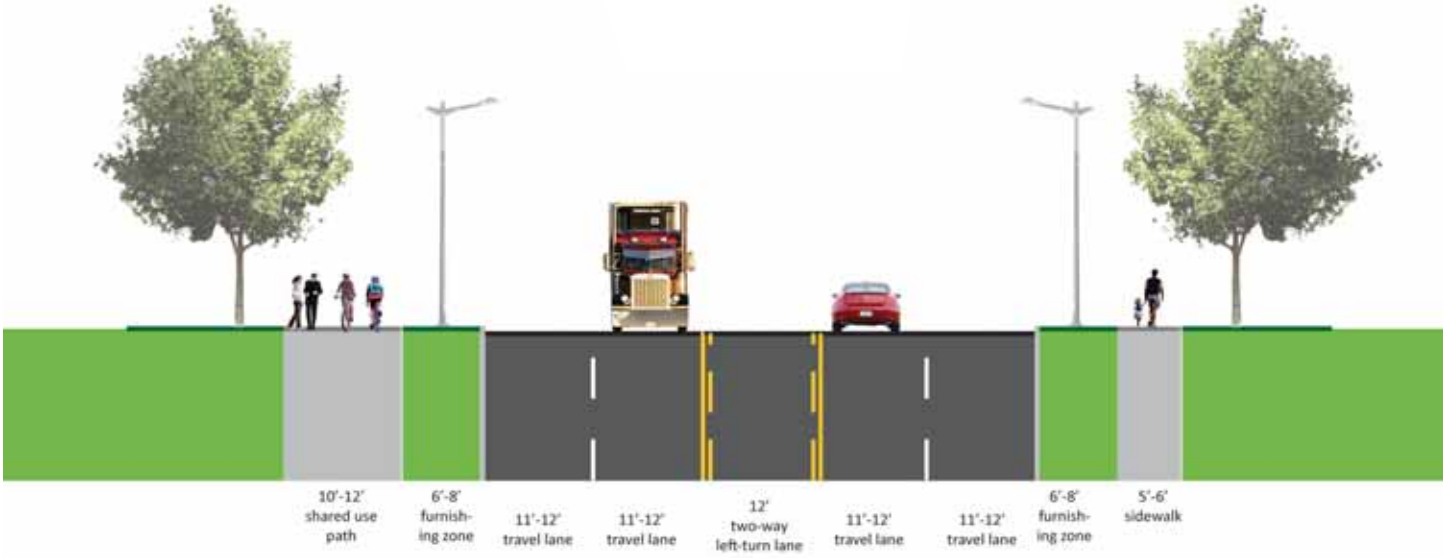
Local



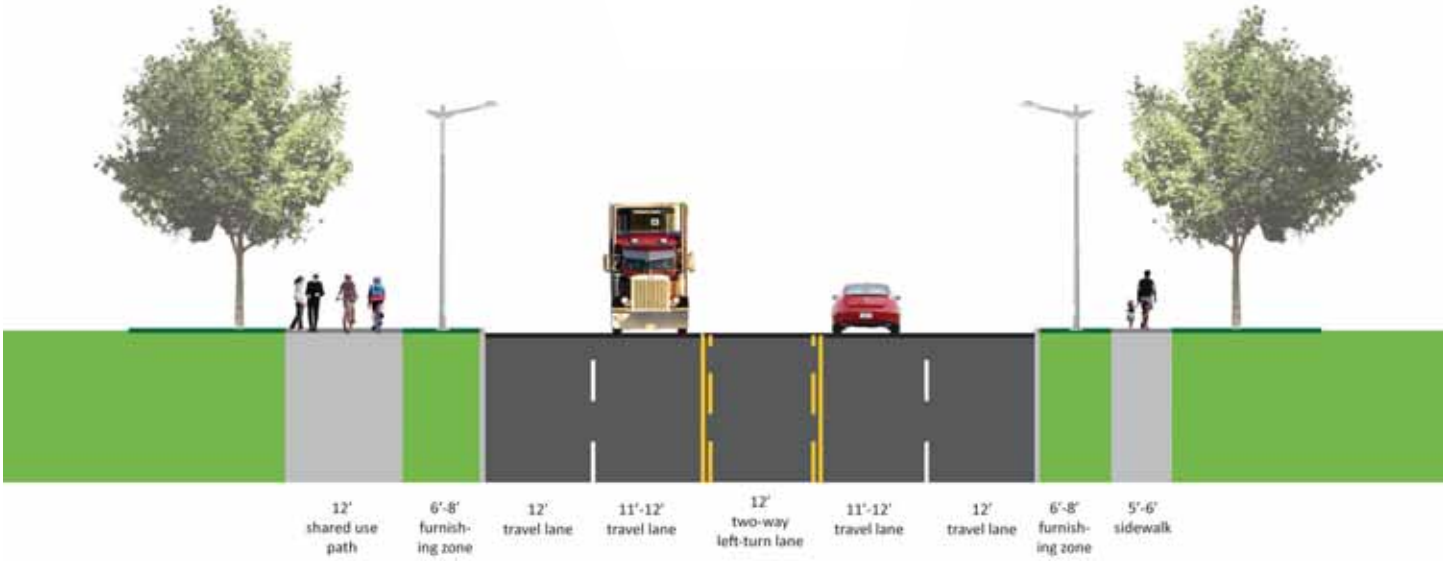
Collector



Urban Boulevard



Urban Arterial



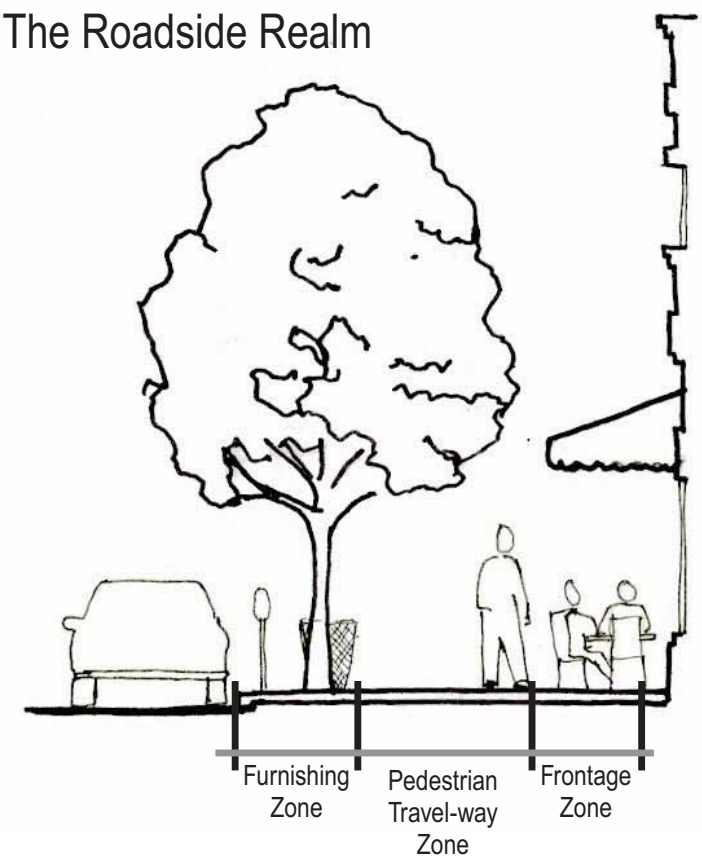
Pedestrian/Universal Access Design Guidelines

Walkability is key to a healthy community, and thus a safe, comfortable and accessible pedestrian environment is fundamental to Portsmouth's transportation network. Pedestrian accommodations should be provided on all streets in the city, where practicable, in the form of sidewalks or paths.

Sidewalks

A connected network of sidewalks is at the heart of the City's pedestrian network and function as avenues for travel and gathering places for community. Sidewalks are generally synonymous with the pedestrian travel-way zone, but they can also extend into the furnishing and frontage zones of the roadside realm.

- Sidewalks should be provided on both sides of all streets in Portsmouth. If it is deemed that this is not feasible due to right-of-way constraints or safety, a pedestrian or shared use path should be constructed that provides access to all developable land uses accessible by the street.



Pedestrian Travel-way Zone

The pedestrian travel-way is the unobstructed right-of-way provided for pedestrians as all or part of the sidewalk.

- At a minimum, sidewalks need to provide a continuous, unobstructed line of clearance (the pedestrian travel-way) five feet wide to meet ADA requirements for wheelchairs.
- Where 4-foot sidewalks exist, they should be widened to five feet where possible. If sidewalks cannot be widened, paved passing areas should be placed every 200 feet to provide sufficient space for wheelchair users to pass each other as required by the ADA.
- Within Activity Centers and other mixed-use and commercial areas, the preferred minimum width of the pedestrian travel-way should be eight feet.
- A pedestrian travel-way of ten feet wide is preferred where businesses and residences are envisioned to generate large amounts of pedestrian traffic.

This sign is in the pedestrian travelway zone when it should be in the furnishing zone.

The Furnishing Zone

- Providing a buffer between the pedestrian travel-way and vehicular travel lanes is important for the comfort and safety of the pedestrian. The preferred width of this buffer is six to eight feet depending on the roadway context.
- The furnishing zone supplies a buffer in the form of a planting or utility strip or extension of the sidewalks with street furniture or other streetscaping. For the purpose of the MTP, this zone includes the curb and the area between the curb and the pedestrian travel-way.
- Where room does not exist to provide this separation between the street and a sidewalk (the furnishing zone is less than four feet in width), on-street parking and/or bike lanes should be provided if possible to serve as a buffer from vehicular traffic.
- Street trees are encouraged within the furnishing zone wherever space permits. As a part of the furnishing zone six to eight feet is preferred for the tree planting area.
- Where safety and space permit, amenities should be provided in the furnishings zone such as street lighting, seating, information kiosks, bike racks, trash receptacles, etc.
- The furnishings zone should accommodate curbside transit stops, including boarding areas, shelters, and passenger queuing areas.
- The installation of curb extensions (see traffic calming) is an effective way to increase space in the furnishings zone to provide transit stops or other furnishings adjacent to crosswalks where pedestrians will wait before crossing the roadway.
- All areas of the furnishing zone meant to be accessed by pedestrians should comply with ADA accessibility guidelines.
- The furnishing zone can also be can be used for stormwater management by providing detention, filtering, or infiltration of stormwater. Where such treatment is used adjacent to curb-side parking, accommodations should be provided for accessing parked vehicles from the roadside.

The Frontage Zone

- The frontage zone is the area between the pedestrian travel-way zone and context realm. This zone includes any area between the pedestrian travelway and a building facade, fence, or screened parking area.
- Sidewalk businesses or other business activities should generally be conducted in the frontage zone (outside the pedestrian travel-way) although in some cases these can operate in the furnishings zone.
- Private property permitted in the frontage zone may include seating and tables, portable signage, and merchandise displays. These furnishings may require permits from the city agency that owns or maintains the right-of-way.
- The width of this frontage zone will need to comply with local development codes. A minimum of four feet is generally recommended for the frontage zone; however, in locations where activities such as café seating are desired, a wider frontage zone should be provided when possible.
- Overhanging elements such as awnings, store signage, bay windows, etc. may occupy this zone and extend into the clear pedestrian travelway as long as they do not interfere with pedestrian circulation. These elements add vitality and visual interest to the street and are encouraged in commercial and mixed-use areas. They must comply with applicable city codes.
- A screening wall or buffer shall be used where parking lots abut sidewalks to keep vehicles from overhanging into the frontage zone and maintain an attractive street frontage.

Sidewalk Surface

- Sidewalks are generally constructed of concrete, although other materials such as brick, pavers, or slate are encouraged to improve the visual quality of the streetscape. Sidewalk material and aesthetic should be determined based on local context and desire and applicable city codes.
- The sidewalk should provide an ADA compliant walking surface and be maintained in such a state.

Driveway Crossings of Sidewalks

- Driveways are areas of potential conflict for pedestrians and vehicles and, like all complete street elements, need to be designed to safely serve all users.
- New and reconstructed driveway crossings shall provide a level crossing of the sidewalk that is at least five feet wide and where possible maintains the full width of the pedestrian travelway.
- Driveway aprons should not extend into the pedestrian travelway zone.
- Driveway cross slopes of the pedestrian travelway are limited to a maximum of two percent. Steeper driveway slopes are permitted in the frontage and furnishing zones of the roadside, with the preferred location of the apron being the furnishing zone.
- Appearance of the sidewalk (scoring pattern or paving material) should be maintained across the driveway to indicate that pedestrians have priority.
- The width of a driveway for two-way traffic should not exceed 24 feet unless a specific design vehicle that frequently uses the driveway requires a wider dimension. In this case, a median to separate the opposing lanes of traffic and provide pedestrian refuge should be used. For driveways with only one-way traffic, the maximum width should be 14 feet.
- Driveways should be consolidated where possible in order to limit pedestrian-vehicle conflicts. This is especially important in commercial and mixed-use areas and activity centers.
- Along urban arterials and urban boulevards, left turning movements into driveways should be minimized to the maximum extent possible. This can be accomplished with medians or other traffic calming devices that restrict left turns. For additional guidance, refer to Appendix F and G in Virginia's Road Design Manual: "Access Management Design Standards for Entrances and Intersections: Principal Arterials," and "Access Management Design Standards for Entrances and Intersections: Minor Arterials, Collectors, Local Streets" (http://virginiadot.org/projects/accessmgt/default.asp).

Shared-Use Paths

See Bicycle Design Guidelines below.

Crosswalks

- Crosswalks are locations where pedestrians are vulnerable to collisions with vehicles. It is of utmost importance that intersections and other crossing locations be designed to support the physical and perceived safety of pedestrians in order to establish a connected pedestrian network and encourage pedestrian travel.
- Crosswalks are marked areas on the roadway pavement that indicate where pedestrians should cross the street. For additional guidance on crosswalk design, refer to VDOT's G*uidelines For The Installation Of Marked Crosswalks* (http://virginiadot.org/business/resources/Marked_20Crosswalks_20Final_20Guidelines_2012-14-05.pdf).

Crosswalk Width

- Crosswalks should be at least as wide as the approaching pedestrian travel way.
- The standard crosswalk width is ten feet.
- The minimum width of a crosswalk is six feet, to be used only where circumstances pose design constraints or on low-speed, local streets.
- Wider crosswalks widths are appropriate for higher pedestrian volumes.

Crosswalk Pavement Markings

- Crosswalk pavement markings should be with paint striping that complies with the Manual on Uniform Traffic Control Devices (MUTCD) or a decorative paver or material as approved by the city.
- The default crosswalk pavement marking pattern should be the "Continental" style of marking, with white bars marking the crossing area.

Intersection Crosswalks

- Crosswalks should be marked at all signalized intersections on collectors and arterial streets.
- Crosswalks should be marked on approach routes to schools and parks, regardless of street classification.
- Crosswalks should be marked on a case-by-case basis on local streets.
- At intersections, crosswalks should align with sidewalks along approaching streets and likely crossing locations.

Midblock Crosswalks

- Crosswalks may be located at mid-block crossings depending on the context and established need. Mid-block crossings are desirable where demand is high, such as near schools and in commercial districts, or where blocks are unusually long.
- Typically, midblock crosswalks should not be installed within 300 feet of signalized intersections. However, on low-speed, two-lane roadways in urban contexts, particularly where there are high levels of pedestrian activity, mid-block crosswalks may be considered within 200 feet of signalized intersections.
- For midblock crossings, crosswalks should be used in conjunction with more substantial engineering treatments in order to raise the visibility of the pedestrian and to slow vehicular traffic. Measures include raised medians, pedestrian signals, and signs and markings. For further guidance on safely providing crosswalks at midblock crossings and unsignalized intersections, refer to FHWA's Safety Effects of Marked vs Unmarked Crosswalks at Uncontrolled Locations (http://www.tfhrc.gov/safety/pubs/04100/index.htm).

Curb Ramps at Crosswalks

- Pedestrian curb cut ramps shall be installed at crosswalks in order to ensure accessibility at all crossing locations.
- Curb ramps should be provided so that ramps are installed perpendicular to the face of the curb on axis with the direction of the crossing instead of a single ramp facing diagonally into the intersection.
- Design of curb ramps, including width, slope, and provision of detectable warning should follow ADA Accessibility Guidelines and VDOT's Instructional Memorandum: "Guidelines For The Placement Of Curb Ramps For Pedestrian Access Routes" (http://www.extranet.vdot.state.va.us/locdes/electronic%20pubs/iim/IIM55.pdf).

Midblock crosswalk in Seattle, WA.

"Sharks teeth" alert drivers to a mid-block crosswalk in Philadelphia, PA.

Raised Crosswalks

- Raised crosswalks are most appropriate in situations where motorists are expected to yield to pedestrians and engineering measures are required to promote compliance. Raised crosswalks bring the level of the pedestrian crossing up to the level of the sidewalk. The intent is to slow vehicle speeds, thus increasing the likelihood of motorists legally yielding the right-of-way to pedestrians.
- Raised crosswalks should be used at the location of channelized right turn lanes, where pedestrians have the right-of-way to cross to the safety island.
- MUTCD compliant pavement markings and signage should be used to mark the crosswalk and the yield point. In particular, use "sharks teeth" markings on the approach ramp to the crosswalk.

Raised Intersections

- Raised intersections bring the entire intersection area to the level of the crosswalk.
- Raised intersections are most appropriate in areas of high pedestrian traffic and where urban design conditions warrant their application.
- Raised intersections are generally paved with special materials to demarcate the intersection space.

Reducing Pedestrian Crossing Distances

- The hazards of wide crossings can be mitigated by the installation of traffic calming devices that reduce pedestrian crossing distances at an intersection.
- Reduced curb radii at intersections can decrease the crossing distance. (See Multimodal Intersections Guidelines below for a discussion of curb radii.)
- Medians and islands can provide mid-crossing refuges for pedestrians at wide crossings and act to calm traffic. (See "Traffic Calming" for further discussion.)
- Curb extensions of the sidewalk into the parking lane can minimize pedestrian crossing distances and increase pedestrian visibility in the crosswalk area. (See "Traffic Calming" for further discussion.)

Pedestrian refuge median in crosswalk in Asheville, NC.

Crossing Signs & Signals

- Signs or signals should be provided at pedestrian crossings to direct pedestrian movement, raise the visibility of pedestrians, and clarify which users have the right-of-way at intersections.
- Pedestrian crossing signals should be provided at all signalized intersections with pedestrian facilities.
- At signalized crossings within activity centers and along mixed-use corridors, pedestrian crossing signals should be incorporated into the signal phasing without requiring pedestrian actuation. Outside these areas, the need for pedestrian actuation of the signal should generally be avoided except in instances where the signal system must be actuated to trigger a phase change (for instance, where a minor street joins an arterial and the signal is tied to a vehicle detection system). This will need to be determined on a case-by-case basis.
- The pedestrian crossing phase at signalized intersections should have a leading pedestrian interval of three seconds (i.e., the pedestrian signal changes three seconds before the vehicular signal to increase pedestrian visibility in the crosswalk to right turning vehicles).
- Crosswalks should provide a pedestrian crossing sign or other approved signage to indicate that vehicles should yield to pedestrians in the intersection. Mid block crossings may require additional signage or pavement markings to further improve pedestrian visibility according to FHWA's Safety Effects of Marked vs Unmarked Crosswalks at Uncontrolled Location. (Refer to VDOT's "Guidelines For The Installation Of Marked Crosswalks" and the MUTCD for signage standards.)
- Pedestrian actuated signals (HAWK) should be provided at mid block crossings on streets with high ADT volumes (generally on all streets with four or more travel lanes and speeds over 35 miles per hour). For further guidance on the use of pedestrian actuated signals at crossings, see FHWA's Safety Effects of Marked vs Unmarked Crosswalks at Uncontrolled Locations.

Bicycle Design Guidelines

The Bicycle Design Guidelines section describes the design criteria for bicycle facilities in Portsmouth.

Shared Use Paths

Shared use paths are wide, physically separated facilities for bicyclists, as well as pedestrians, inline skaters, and other non-motorized users. They offer a high degree of physical protection from motor vehicles and can attract large numbers of new cyclists and other users. They are especially helpful at encouraging long-distance bicycle commuting and recreational bicycling.

- Shared use paths can be marked for all users to share the same space like a two-lane road. Alternately, designated spaces for pedestrians and bicyclists can be marked. The latter option usually requires the construction of a wider path.
- Separation of bicycles and pedestrians on separate paths or lanes should be used where high user volumes are expected, such as waterfronts and commercial districts.
- The minimum width for a shared use path is 10 feet, with 12 feet preferred in areas with high expected use.
- A shoulder area at least two feet wide should be provided on both sides of a shared use path when right-of-way is available.
- Signs and furnishings should be kept at a minimum of three feet from the edge of the pavement of the path.
- For further guidance, refer to AASHTO's *Guide for the Development of Bicycle Facilities* (1999) and AASHTO's *Guide for the Planning, Design and Operation of Pedestrian Facilities* (2004).

Shared use path in Philadelphia, PA.

Bike Lanes

Bike lanes are designated lanes in the roadway for bicycles.

Standard Bike Lanes

Standard painted bike lanes provide a dedicated space for bicyclists and are the most prevalent form of bicycle infrastructure in most cities. They are located within the street right-of-way but provide no physical protection from the intrusion of moving or illegally parked motor vehicles. They can be implemented at relatively little cost on many existing streets in Portsmouth where sufficient pavement width exists.

- The preferred width of a standard bike lane is six feet.
- The minimum width of a bike lane is four feet excluding the gutter pan, which is not considered to be part of the rideable surface.
- Where a bike lane is adjacent to a narrow travel lane (less than eleven feet wide), the bike lane should be at least five feet wide.
- Where bicycle lanes are adjacent to parking lanes, the bicycle lane should be at least five feet wide and a white stripe provided to mark the edge of the parking lane.
- For design recommendations at intersections, refer to AASHTO's Guide for the Development of Bicycle Facilities (1999) and Washington, D.C. District Department of Transportation's Bicycle Facility Design Guide (2007). (http://ddot.dc.gov/ddot/cwp/view,a,1245,q,640118,ddotNav_GID,1761,ddotNav,%7C34416%7C.asp)

Buffered Bike Lanes

Buffered bike lanes are similar to standard bike lanes but have a painted "buffer zone" to separate bicycles from motor vehicle traffic.

- Where space allows, buffered bike lanes should be used in order to provide greater separation and an improved sense of safety for cyclists.
- The bike lane buffer zone is a strip at least two feet wide bounded by six inch white lines and filled with hash stripes angled 45 degrees that occur every 10 to 20 feet apart.

Buffered bike lane in New York, NY.

Protected Bike Lanes

A protected bike lane is separated from motor vehicle traffic by a median or curb. This offers a greater degree of protection than standard or painted buffer bike lanes.

- Protected bike lanes are five to 12 feet wide.
- Protected bike lanes can be two-directional.
- The protection may be provided by a parking lane, a raised median, or other objects that buffer the bike lane from traffic.
- Where the parking lane is adjacent to the protected bike lane, a two to three foot buffer between the parked car and the bicycle lane should be provided for passengers to enter and exit the vehicle.
- Bike lanes buffered by parking require extra attention to design at intersections because cyclists riding on the opposite side of parked cars will be less visible than cyclists riding in a standard bike lane. The parking lane should end approximately 75' before the intersection so that vehicles can have an unobstructed view of the bike lane before making a right-turn movement. A combined right-turn lane/bike lane may be provided in such circumstances. Alternatively, a separate phase for right turns may be established in the signal phasing plan with a full stop for through cyclists to reduce the right-turn conflict.

Parking protected bike lane in New York, NY.

Median protected bike lane in New York, NY.

Median protected contra-flow bike lane in Denver, CO

Bicycle Boulevards

Bicycle boulevards are low-traffic volume streets that are designed to improve the comfort and safety of cyclists and other non-motorized users. They provide direct and logical connections to important bicycle destinations such as schools, employment, shopping, recreation, and the bicycle network. The intent of bicycle boulevards is to reduce the number of motor vehicles using the street while preserving access to properties. Bicycle boulevards are created using a variety of treatments intended to prioritize bicycles, calm and reduce traffic, and guide cyclists to important destinations. In particular, these design elements are intended to attract cyclists and other non-motorized users by discouraging non-local, cut-through traffic. Importantly, motor vehicle access to properties along the route must be maintained.

Bicycle Prioritization on Bicycle Boulevards

- Bicycles should be prioritized over motorized vehicles on bicycle boulevards in order to create a welcoming environment where cyclists of all skill levels feel comfortable.
- To the maximum extent feasible, bicycle boulevards should not have stop signs on the through direction for bicycles, so as to allow for energy efficient bicycling. Much of the energy expended in bicycling is expended starting from a stop.
- Neighborhood traffic circles can be used to slow traffic without requiring stop signs.
- Bicycle boulevards are designed as through routes for bicycles but not for cars. Using natural or engineered diverters, two dead-end streets can be linked via a multi-use path, or a median opening can be provided for bicycles on cross streets with forced right turns for cars (also known as a non-motorized crossing). Use of alternating one-way blocks on local streets while allowing two-way bicycle travel can also accomplish this objective.
- Bicycle left-turn lanes can be created to allow bicyclists to turn left to continue on bicycle boulevards where cars are not allowed to enter.

Bicycle left-turn lane.

Traffic Calming & Reduction on Bicycle Boulevards

- Bulbouts and other gateway treatments can be used to reduce turning radii and decrease the speed of vehicles turning and entering blocks.
- Chicanes can be used to slow vehicular traffic with horizontal deflection while allowing cyclists to continue on a relatively straight path.
- Diverters can be used to discourage cut-through traffic. Openings for bicycles and pedestrians can be preserved in order to provide continuous access for these modes.
- Medians can be used on cross streets to prohibit motor vehicles from continuing along the bicycle boulevard by creating forced right turns.

(Refer to the traffic calming section for further discussion of these measures and a more exhaustive list of potential traffic calming treatments for bicycle boulevards.)

Right-in, Right-out traffic diverter with bicycle channel.

Intersection Treatments on Bicycle Boulevards

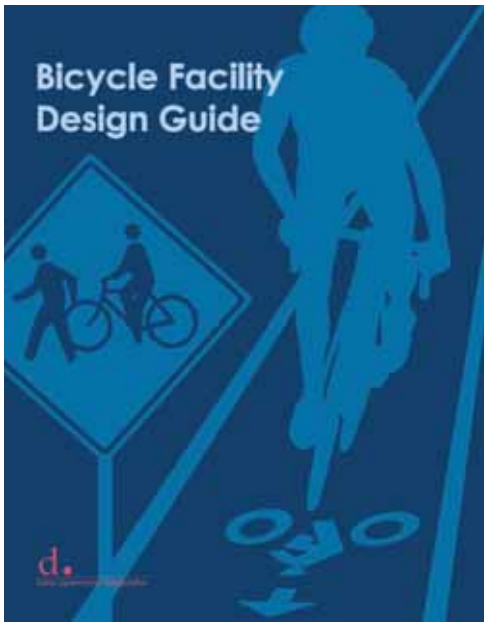
- Because many bicycle boulevards are located on secondary streets that typically do not have priority at intersections, special attention must be paid to prioritizing the movement and safety of bicycles at intersections.
- Bicycle and pedestrian-actuated signals, such as HAWK signals, can be used at intersections with busy, multiple lane roads to provide a safe crossing.
- Median refuge islands can be used to allow bicycles to cross two-lane roads.
- Small-scale neighborhood traffic circles can be used to slow cross traffic on minor cross streets as opposed to using stop signs.

Markings, Signage, and Wayfinding on Bicycle Boulevards

Signage and wayfinding are important components of bicycle boulevards and can help guide cyclists to bicycle boulevards as well as along indirect alignments to destinations.

- Identification signs can be used to "brand" the bicycle network and indicate where bicycle boulevards exist so that drivers and potential cyclists are aware of them.
- In-street markings such as small, but unique, directional arrows can be used to indicate upcoming turns and destinations.
- Street signs with unique graphics can be used to identify streets that are bicycle boulevards.
- Destination wayfinding signs can include the name of and directions to destinations.

(For further guidance, refer to the Initiative for Bicycle and Pedestrian Innovation's and ALTA Planning and Design's Fundamentals of Bicycle Boulevard Planning and Design from July 2009.)



Washington D.C. Bicycle Facility Design Guide.

Bicycle Lane Markings

- All bike lanes should be striped with a six-inch, solid white line in mid-block areas. Dashed lines can be used near intersections, bus pullouts and other situations where vehicles must cross the bike lane.
- Colored bike lanes are believed to be effective at conflict zones where cyclists and motorists cross paths, such as right-turn lanes and intersections, or in locations where it is desirable to visually narrow the roadway or prevent illegal parking in the bike lane. FHWA has allowed experiments with several colors, but a final ruling has not been made. Green appears to be a preferred color because of its high visibility and the fact that it is not primarily used for other purposes. It is important to select a marking material that is not slippery in wet conditions. Both paint and thermoplastic materials could be suitable materials, but it may be necessary to apply them with a fine-scale grit to provide extra traction. (For further guidance, refer to the City of Portland's *Blue Bike Lanes: Improved Safety through Enhanced Visibility* (1999) http://www.portlandonline.com/TRANSPORTATION/index.cfm?c=34826&a=58842.)
- "Sharrows," also known as shared-lane markings, are used to designate travel lanes shared by bicyclists and vehicles as well as to instruct cyclists about where to position themselves in a lane to remain visible to traffic and avoid hazards such as opening car doors. Sharrows are not intended as a substitute for bike lanes. Rather, they should be used on streets with potentially high levels of bicycle use where there is not enough right-of-way to implement bike lanes, shared use paths, or other separate bikeway designs. They can also be used to indicate locations where drivers should expect to find cyclists. For example, sharrows can be placed in the left lane of a multiple-lane roadway where bicycle left-turn movements are prevalent. The design of a sharrow is a standard bicycle lane icon below two chevrons.

A "sharrow" in Seattle, WA.

- Bike boxes are reserved spaces for bicycles to queue between the travel lane and the crosswalk when stopped for red lights at intersections. Bike boxes create two stop bars – one for vehicles and one for bicycles – allowing cyclists to move in front of vehicles on red signal indications. Each stop bar can be painted with "STOP HERE ON RED." Bike boxes primarily serve two purposes: to improve cyclist safety by reducing the risk of "right-hook" collisions where vehicles turn across the bike lane and to allow cyclists to position themselves for left-turn movements at wide, busy intersections. Bike boxes also improve the visibility of the bicycle network and discourage stopped bicycles and cars from encroaching onto crosswalks. They should be used at intersections with a high likelihood of right-turn conflicts with bike lanes and where it is difficult for cyclists to prepare for left-turns by merging with vehicular traffic.
- Bike boxes should begin at the crosswalk and extend ten to fourteen feet. They should be wide enough to encompass the bike lane and at least the outer traffic lane. At locations with frequent bicycle left-turns, they should extend across the width of all travel lanes. Optionally, they can be painted a solid color (green is common).
- For further guidance, refer to Portland Bureau of Transportation's *The Bike Box: Portland's New Green Space* (http://www.portlandonline.com/Transportation/index.cfm?c=46717&a=185112).
- Advanced Stop Bars are stop bars for bicycle lanes that are located 3'-5' in front of stop bars for motor vehicle lanes. By placing the bicycle stop bar ahead of motor vehicles, bicycles become more visible to motorists waiting at red signal indications. This arrangement improves cyclist safety by limiting the likelihood of "right-hook" conflicts (where a right-turning vehicle collides with a cyclist passing through the intersection). The location of advanced stop bars may affect signal design.
- Bicycle Traffic Signals may be necessary in locations where bikeways cross major streets. Bicycle traffic signals must be able to detect the presence of cyclists. Traditional in-pavement detection loops can detect bicycles when properly tuned but require a pavement marking indicating where the cyclist should wait to activate the signal. Another option is to use pushbuttons, which should be mounted at the curb so that cyclists can activate them without dismounting.
- The use of TOUCAN or HAWK (Pedestrian Hybrid) signals should be considered at locations where bicycles and pedestrians must cross busy roadways away from existing traffic signals.

Bike box specification from the Washington D.C. Bicycle Facility Design Guide.

Bicycle Parking

Bicycle parking is a critical component of a bicycle network. Most people will not consider riding a bicycle if they cannot find a safe place to store their bicycle at the end of a journey. There are several categories of bicycle parking, which are described below. For further guidance, refer to the Association of Pedestrian and Bicycle Professionals' *Bicycle Parking Guidelines: A set of recommendations from the Association of Pedestrian and Bicycle Professionals (*http://www.apbp.org/resource/resmgr/publications /bicycle_parking_guidelines.pdf).

Bike Racks

Bike racks must:

- Support the bicycle upright by its frame in two places.
- Prevent the front wheel of the bicycle from tipping over.
- Enable the frame and one or both wheels to be secured.
- Support bicycles without a diamond-shaped frame with a horizontal top tube.

Ganged U-rack bicycle racks.

The most common bike rack design that meets design requirements is the "Inverted U" rack, which is a metal U shape bolted or embedded into the pavement at two places. These racks can also be grouped together along common rails and are known as "Ganged U-racks." The "ribbon" or "wave" rack design is very popular for aesthetic reasons, but it does not support bicycles in two places or prevent the front wheel from tipping over.

- Bicycle racks should be placed where they are visible to bicyclists and to passersby so as to prevent theft. Bike racks placed in alleys and poorly lit locations shield potential thieves from view.
- Bicycle racks should also be located as close to the front door of commercial buildings as possible – preferably less than 50 feet away – and protected from the elements, if possible.
- On sidewalks in mixed-use areas, bike racks should be placed parallel to the street outside of the pedestrian travelway zone.

Bike Lockers

Bike lockers are secure bicycle storage structures that encompass an entire bicycle and protect it from the elements. They are often used at major transit stops and park and ride facilities. Often, cyclists store bicycles in bike lockers for several hours at a time or overnight. Many transit providers install bike lockers and charge a nominal monthly rental fee for bicyclists on a first-come, first-served basis.

Bicycle Garages

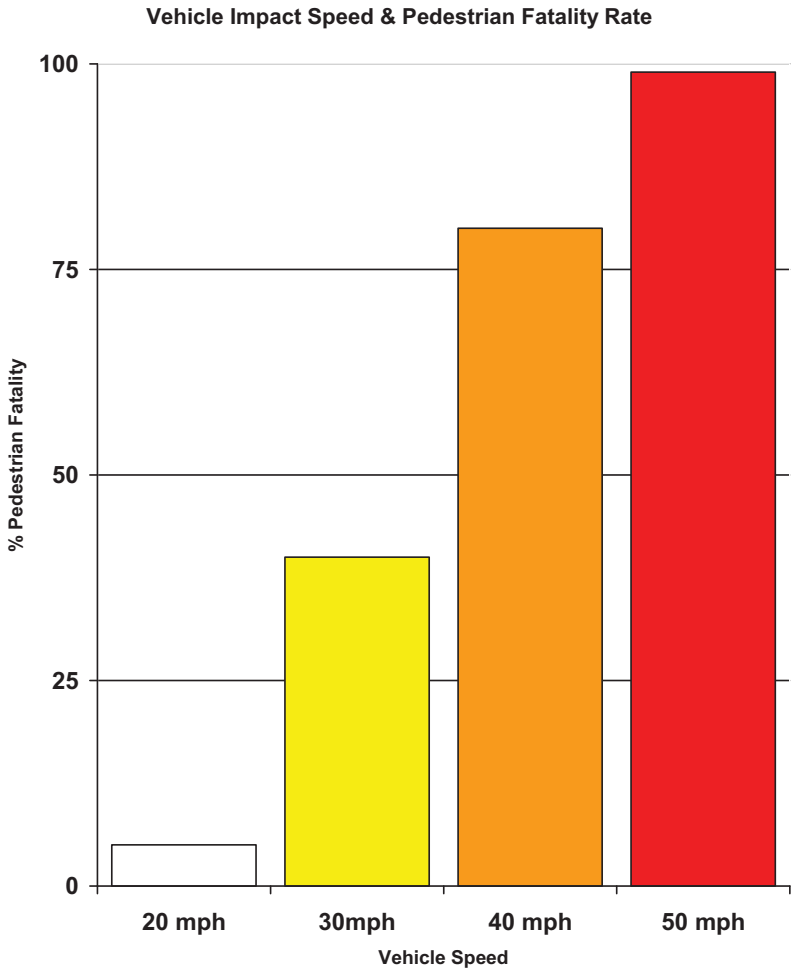
Bicycle garages or bike stations are large, secure facilities designed to hold large numbers of bicycles in an environment that is protected from the elements. They are usually located in office districts with a large number of bicycle commuters. Larger bike stations include lockers, showers, repair facilities, and bike rentals. Smaller bike stations lack these features but have an extra layer of security such as a locked gate that can only be opened by a pass card.

Bicycle Storage in Buildings

Bicycle storage in buildings ranges from basic accommodations to special bicycle locker rooms. Some buildings allow tenants to choose whether they will allow bicycles in their office space. Other buildings construct bicycle lockers. Many cities, including New York City, have passed bicycle access legislation requiring building owners to allow bicycles in their buildings.

Vehicular Facility Design Guidelines

The width and number of travel lanes is determined by the surrounding land use as well as the role of the road in the broader transportation network. Transit and freight requirements must also be considered.



Source: USDOT

The risk of a pedestrian dying from a collision rises rapidly with increasing speeds. Drivers should obey all speed limits and are encouraged to slow down in school zones and residential areas.

Lower speeds mean fewer pedestrian fatalities.

Travel Lanes

- In general, the range of lane widths in Portsmouth varies from 10–12 feet.
- Nine foot travel lanes can be found on some existing local streets where speeds are low.
- 12 foot travel lanes should be considered on designated truck routes.
- Lane width should be selected based on operating speed, traffic characteristics, land use context, and overall right-of-way balance. (For more detailed guidance, refer to the Institute of Transportation Engineers' Context Sensitive Solutions in Designing Major Urban Thoroughfares for Walkable Communities (2006), VDOT's Road Design Manual, and AASHTO guidelines.)
- AASHTO highlights the benefits of narrower travel lanes on lower-speed urban streets, including a reduction in pedestrian crossing distance, ability to provide more lanes in constrained rights-of-way, and economy of construction. Where practicable, the minimum recommendations for lane widths and other roadway design features should be applied in Portsmouth.
- A lane width of 10 feet should be considered on local and collector streets as well as turn lanes on arterials and boulevards where the operating speed is below 35 miles per hour.
- Lane widths of 10–11 feet are appropriate on lower speed (below 40mph) arterials and boulevards as well as some collector streets.
- Lane widths of 12 feet should only be considered for higher speed (above 40 mph) roadways, which are primarily urban boulevards and urban arterials.
- A one- to two-foot curb and gutter should be provided on either side of the road outside of the travel way. The curb and gutter can be included in the parking zone.
- For roads with frequent transit service or a high proportion of truck traffic, minimum travel lane widths of 11 feet are required where travel speeds exceed 30 miles per hour.
- The use of minimum recommended lane widths on adjacent lanes should be avoided where it may affect the safety of users. For example, a 10' roadway lane should not be used next to a 4' bike lane on roads with operating speeds above 30 mph.

Medians

Medians are the center portion of a street that separate opposing directions of travel. Medians vary in width and purpose and can be raised with curbs or painted and flush with the pavement. Medians on low-speed urban roads can be used for access management, accommodation of turning traffic, safety, pedestrian refuge, landscaping, lighting, and utilities. Operational and safety benefits of medians include providing storage for turning vehicles, enforcement of turn restrictions, and reduction of conflicts and certain types of crashes. Curbed medians can even be used to provide bio-infiltration and stormwater management functions.

Median on a commercial boulevard in Kansas City.

The following are basic guidelines for determining median widths in Portsmouth. (For more detailed guidance, refer to ITE's *Context Sensitive Solutions in Designing Major Urban Thoroughfares for Walkable Communities,* 2006.)

- The recommended width for a median used for access control is six feet. The minimum width is four feet.
- The recommended width for a median used as a pedestrian refuge is eight feet. The minimum width is six feet.
- The recommended width for a median containing street trees and lighting is 10–16 feet. The minimum width is six feet.
- The recommended width for a median containing a single left-turn lane on local and collector streets is 14 feet. The minimum width is 10 feet.
- The recommended width for a median containing a single left-turn lane on urban boulevards and urban arterials 18 feet. The minimum width is 12 feet for streets with speed limits over 30 miles per hour and 10 feet for streets with speed limits of 30 miles per hour or less.
- Wider medians are permissible if they do not limit the installation of other desired street elements.
- The use of medians as traffic calming elements is addressed in the traffic calming guidelines.

Transit Accommodations

Transit Stops

- Bus pull out bays for bus stops may be provided on the far side of intersections where right-of-way conditions permit.
- On Urban Arterials and Urban Boulevards with on-street parking, as well as selected Collector streets, bus bumpouts should be provided where there is not sufficient space for far-side bus pull outs. This will allow buses to remain in the travel lane so that they do not have to merge into traffic after a stop.
- Where heavy bus traffic exists on a street with bike lanes, a bus stop safety island should be provided so that the bike lane is routed between the safety island and the sidewalk so that buses need not cross the bike lane to load and unload passengers.
- Curb extensions at crosswalks can also serve as transit stops when designed with sufficient length and area to allow for passenger loading.

Right-of-Way Considerations

- On streets identified for improved bus or light rail (LRT) service, accommodation should be made for future ROW acquisition and special features, such as in-street boarding areas, signal preemption, and wide sidewalks near transit stops. The right-of-way width required for street-running LRT is 28 feet (wider at boarding stations).

Multimodal Intersection Guidelines

Intersections are the areas in the roadways with the greatest potential conflict among modes. Intersection design must take into account the objectives and priorities of the community in regards to vehicular capacity and efficiency, vehicle turning requirements, pedestrian and bicycle convenience, modal conflicts, and safety and efficiency of transit service. Intersections can also be highly visible and define places in the City, and as such, the aesthetic treatment of the intersection should be considered in the design.

Intersections, like street segments, should accommodate all modes of travel, with the appropriate level of service for pedestrians, bicyclists, vehicles, and transit given the surrounding land use, road type, recommended speed, and expected volume and mix of traffic. The elimination of any travel mode from an intersection due to design or right-of-way constraints should be avoided.

Intersections should be designed to minimize conflicts between modes. This entails providing adequate facilities for all modes, providing good visibility among modes within the intersection, and minimizing pedestrian exposure to moving traffic. When conflicts are unavoidable, intersections should be designed such that crashes will be less severe if they do occur.

For further guidance on intersection design, refer to AASHTO's A Policy on Geometric Design of Highways and Streets and ITE's Context Sensitive Solutions in Designing Major Urban Thoroughfares for Walkable Communities (2006).

Legibility & Visibility

- Intersections should provide good visibility and sight distance for all users. Therefore, intersection approaches should be as straight and flat as conditions permit.
- Clear "sight triangles" should be provided along drivers' approach to the intersections. Guidance on the determination of sight triangles is addressed by AASHTO.
- The provision of adequate lighting is key to maintaining user safety at all hours.
- Where possible, extreme intersection angles and intersections with more than four approaches should be avoided.
- Cross-streets should be kept as perpendicular as possible.

Pedestrian Crossing Distance

- Intersections should be designed to minimize pedestrian crossing distance, time, and exposure to traffic in order to increase safety and encourage pedestrian travel (see Pedestrian Guidelines Section for a discussion of pedestrian crossing considerations and see discussion of curb radii below).

Pedestrian Crossing Facilities

- Intersections should provide signs, signals, and pavement markings to help pedestrians safely navigate the intersection and make them visible to other travelers. (See Pedestrian Guidelines Section for a discussion of pedestrian crossing considerations.)

Bicycle Crossing Facilities

- Intersections should provide signs, signals, and pavement markings to help bicyclists safely navigate the intersection and make them visible to other travelers. (See Bicycle Design Guidelines Section for bicycle treatments at intersections.)

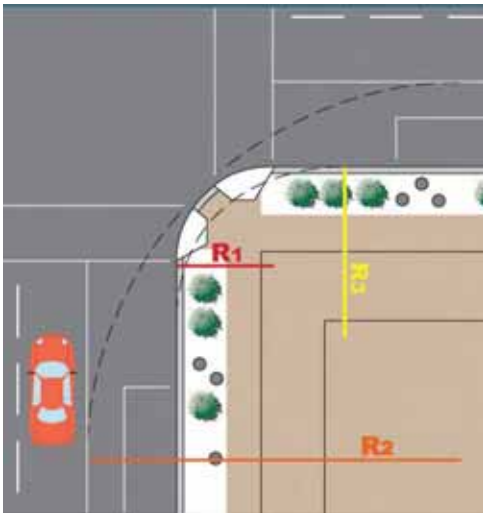
Traffic Calming

- Traffic calming measures should be considered at intersections where they can reduce conflicts among modes. (See Traffic Calming Guidelines Section below for further discussion of traffic calming measures.)

Curb Return Radii

Curb returns are the curved connections at the intersections corners.

- Curb radii must balance vehicular needs with pedestrian needs. The intent should be to provide the smallest radii feasible to accommodate the design vehicle.
- The design vehicle does not necessarily have to be the largest vehicle, particularly in local street design. On local streets, large vehicles can be permitted to go across the centerline of the street to turn. However, in areas where larger vehicles are regularly present, such as industrial zones, the port, distribution centers, or along designated truck routes, curb radii should be of sufficient size to accommodate them. Otherwise, large vehicles will frequently travel over the curb into the pedestrian realm, jeopardizing pedestrian safety and damaging the curb.
- Particularly in areas with both high pedestrian and vehicular traffic, strategies should be employed to reduce the curb radius while maintaining the necessary effective turning radius. This can be achieved by the inclusion of elements such as on-street parking and bike lanes in the roadway. In these conditions, parking and bicycle facilities should be designed and sufficient signage provided to avoid conflict with turning vehicles.



R1 = Actual Curb Radius
R2 = Effective Curb Radius
R3 = Curb radius needed without bike lane & parking

Curb Radii comparison. Source: *Main Street... When a Highway Runs Through it: A Handbook for Oregon Communities.*

Channelized Right Turns

Channelized right turn lanes are separated from thru-lanes by a raised median. They can provide refuge for pedestrians at wide intersections.

- Channelized right-turn lanes are appropriate where right-of-way is available.
- Channelized right-turn lanes should include a pedestrian refuge island and a raised crosswalk to the island with appropriate markings and signage.
- Channelized right-turn lanes should be considered at locations where shared use paths cross the street, so as to minimize the right-turn conflict.

Traffic Calming

Traffic calming measures are intended to cause traffic to flow at a safe speed and keep the volume of traffic to an appropriate level for the context. In general, traffic calming is about enhancing both the safety and the livability of the City. It is not about penalizing motor traffic and should be designed and deployed accordingly.

Signs & Markings

- **Arterial directional signs** guide motorists to major destinations and advise them how to reach these locations using arterial streets, thus reducing travel on local residential streets. This type of device is most effective where it can be used to divert through traffic from local and residential on to arterial streets. Arterial directional signs are informational rather than regulatory in nature and thus have no enforcement status. Sign design should follow the Manual on Uniform Traffic Control Devices (MUTCD).
- **Truck restriction signs** can be used where permitted by City and Virginia State law to restrict truck access. Their purpose is to prohibit the use of trucks (except for receiving loads or making deliveries) on streets where truck traffic is not deemed to be appropriate.
- **Roadway markings** give visual cues to drivers to moderate their speed by indicating the presence of intersections, changing traffic patterns, pedestrians, bicyclists or parked cars. Examples include crosswalks, stop bars at stop signs, and markings to delineate bicycle and parking lanes. Design of such markings should follow MUTCD guidelines and standards.

Raised Speed Reducers

Raised Speed Reducers are raised areas of the roadway that deflect the wheels and frame of a moving vehicle with the purpose of reducing the vehicle's speed. Raised speed reducers should have little effect on a vehicle driving the posted speed limit or slower, but can produce discomfort when traversed at higher speeds, thus encouraging drivers to drive within the posted speed limit. A variety of types of raised speed reducers are described below. Raised crosswalks and intersections can also function as raised speed reducers. These devices are described in the pedestrian crossing guidelines. Design of these facilities should follow VDOT's *Traffic Calming Guide for Local Residential Streets* (http://virginiadot.org/programs/resources/TrafficCalmingGuideOct2002.pdf).

- **Speed humps** are rounded humps that extend across the roadway to slow traffic. Designed for use on low-speed and low-volume streets, they are effective in reducing vehicular speeds as they are self-enforcing. Consideration should be given to possible impacts to emergency vehicle response times and jostling of emergency vehicle passengers. Speed humps can also cause difficulty for snow plows and generate additional street noise.
- **Speed tables,** also called flat-top speed humps, are short, raised platforms that extend across the roadway. Speed tables are designed to allow snow plows to traverse them, although warning should be provided. It is not necessary to prohibit parking on a speed table. Speed tables are effective in reducing vehicle travel speeds and are self-enforcing. Consideration should be given to possible impacts to emergency vehicle response times and jostling of emergency vehicle passengers.

Speed cushion in Seattle, WA.

Raised crosswalk in Richmond, VA.

- **Speed cushions** are similar to speed tables. However, there are three sections to the speed cushion, which allows vehicles with wide wheel bases (such as buses, trucks, and emergency vehicles) to drive through the center section without displacement. Speed cushions have all the advantages of speed tables without the possible impact on emergency vehicles.
- **Raised crosswalks** are marked pedestrian crosswalks at an intersection or mid-block which are at a higher elevation than the surrounding roadway. They are essentially flat-top speed tables which are installed across the roadway to prompt drivers to slow down in a recognized and designated pedestrian crossing area. They increase pedestrian safety by raising the visibility of the crosswalk and providing a self-enforcing speed reduction measure for vehicles. Raised crosswalks should be accompanied by appropriate warning signs and roadway markings. The use of high-visibility material can further enhance the visibility of the crossing.
- **Raised intersections** are entire intersections raised above the elevation of the surrounding roadway with ramps on all approaches. They usually rise to the sidewalk level or slightly below to provide a "lip" for the visually impaired. The slope of the entrance ramps for the motor vehicles can be steep or shallow depending on the desired speed. High-visibility materials can be used to enhance the visibility of a raised intersection. Raised intersections are particularly useful in dense urban areas, where the loss of on-street parking associated with other traffic calming measures is considered unacceptable.

Street Narrowing

Street narrowing may help to prevent speeding problems from arising and reduce speeding where it already exists inside residential neighborhoods. Narrow street cross sections create visible narrowing that typically results in vehicle speed reduction. The narrower street pavement will provide reduced pedestrian crossing distances and can increase space for sidewalks that will increase pedestrian safety as well as green space for landscaping that may also slow traffic and improve the neighborhood's appearance.

Curb Extensions/Chokers/Bulb Outs

Curb extensions/chokers/bulb outs are expansions of the curb line into the roadway adjacent to the curb (typically in the parking zone) for a portion of a block. They can be installed at intersections or mid-block locations. Curb extensions increase pedestrian safety by both reducing the crossing distance and improving the line-of-sight between pedestrians and drivers. Additionally, they create a visual narrowing of the roadway, which typically results in vehicle speed reductions. Curb extensions are encouraged on wide streets, particularly those with on-street parking. Curb extensions can be used to provide amenities and furnishings such as seating, bike racks, trees, plantings, trash cans, lighting, and newspaper racks. They are particularly useful in this capacity when the street has a narrow amenity zone. Landscaping in curb extensions can also be designed to provide stormwater management. Consideration should be given to reductions in parking and alterations in street drainage when installing curb extensions.

- **Chicanes** are staggered, triangular curb extensions that alter the traffic movement on a street from straight to curving, creating a "slalom" effect that slows travel speeds. Particularly when landscaped, the curb extensions also visually narrow the street, which typically results in slower speeds.

Curb extension.

Chicane in Seattle, WA.

Landscape

Landscape can influence traffic speeds. Closely spaced deciduous trees along the curb can visually narrow the roadway. Landscaped medians can create a parkway effect, while also reducing vehicle conflicts.

Medians

Medians can be considered on two-way multilane streets and are encouraged where possible on Urban Arterials and Boulevards. The use of a median to provide a pedestrian crossing refuge is particularly desirable on streets with four or more lanes of vehicular traffic or with high ADT volumes. Their width can range from 4 to 16 feet depending on traffic volumes, speed, and available right-of-way.

Medians with a pedestrian refuge enhance pedestrian safety by reducing crossing distances and allowing pedestrians to cross the street in stages. Medians with pedestrian refuge make pedestrian crossing points more visible to drivers. A minimum width of 6 feet should be provided if the median is intended to provide a pedestrian crossing refuge.

Traffic Circles

A neighborhood traffic circle is a small island, usually landscaped, placed in the middle of an intersection on a neighborhood street. It is most frequently used to address speeding on low-traffic neighborhood streets and is most effective when built in a series.

Neighborhood traffic circle in Seattle, WA.

A roundabout is an intersection with circular one-way (counter-clockwise) traffic around a central circle in which traffic entering the circle yields to traffic already in the circle. Roundabouts can vary in size and number of lanes and can be designed as signalized or unsignalized intersections depending on traffic flow, volume of non-motorized traffic, and the surrounding context.

Traffic Diverters

Traffic diverters are traffic calming devices that can be used to block, slow, or redirect motor vehicle traffic, primarily at intersections. They are typically used to reduce vehicle speeds and to reduce or eliminate unwanted short-cut and cut-through traffic (including trucks) on local streets. In addition to diverting and slowing traffic, they can reduce pedestrian crossing distances at intersections by effectively narrowing the intersection. As with many traffic calming devices, traffic diverters can be landscaped to improve the streetscape or provide stormwater management. Consideration should be given to the impact on street drainage and the location of catchbasins and other utilites. Emergency vehicle access should be accommodated using methods such as mountable curbs and removable bollards. Pedestrian and bicycle access should be maintained through traffic diverters.

- **Forced turns** are traffic islands, curb extensions, or other barriers at the approach to an intersection that prevent traffic from traveling through the intersecting street. Forced turns can be designed to allow through bicycle and pedestrian traffic while prohibiting vehicular through traffic. Similar to other traffic islands and sidewalk extensions, a forced turn can include landscaping or other design features.
- **Diagonal diverters** are barriers installed diagonally across an intersection to block motor vehicle through traffic. A diagonal diverter results in two tangent roadways for motor vehicles. Pedestrian and bicycle access can be maintained through the diverter using ramps or breaks in the curb, and emergency access can be provided by using removable barriers or mountable curbs.

Diagonal diverter.

- **Half closures**, also referred to as partial closures, are barriers that block traffic in one direction at an intersection to prevent traffic in one direction on an otherwise two-way street. Bicycle access can be maintained across the barrier.
- **Full closures** are barriers installed across a street to close off the street and eliminate through traffic. This type of barrier should only be used in areas that have extreme problems with cut-through traffic as it can decrease overall connectivity. Pedestrian and bicycle access can be maintained through use of curb cuts or other design elements, and emergency vehicles can be accommodated using removable barriers or mountable curbs.
- **Median barriers** are medians placed at an intersection to force right turns from the side street or prevent left turns from the through street.

Traffic diverter in New York, NY.

Gateway treatments

Gateway treatments combine traffic calming and visual measures at the entrance to a low-speed street or a neighborhood to slow entering vehicles and discourage excessive traffic. Gateways can also be designed spaces that provide a sense of neighborhood cohesion and pride. The design elements of a gateway may include a combination of traffic calming elements (curb extensions, raised crossings, medians), changes in street appearance (street width, paving materials), and landscaping (signage, plantings) to signal the demarcation between a major street and an adjacent residential area, or between areas of residential and commercial usage.

Gateway treatment in Portsmouth, VA.