TRANSPORTATION OUTLOOK 2035

Creating a Blueprint for the Baltimore Region's Future

November 2007

BALTIMORE REGIONAL TRANSPORTATION PLAN

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Acronyms

Please find below the list of major acronyms used in this report

3-C	Continuing, Cooperative and Comprehensive
ADA	Americans with Disabilities Act
APG	Aberdeen Proving Ground
APU	Auxiliary Power Unit
ASCE	American Society of Civil Engineers
B&O	Baltimore and Ohio (Rail Line)
BMC	Baltimore Metropolitan Council
BRAC	Base Realignment and Closure
BRTB	Baltimore Regional Transportation Board
BRTP	Baltimore Regional Transportation Plan
BWI	Baltimore Washington Thurgood Marshall International Airport
CAAA	Clean Air Act Amendments of 1990
CAC	Citizens Advisory Committee
CEO	Cluster Exchange Option
CHART	Coordinated Highways Action Response Team
CLRT	Central Light Rail Transit
CMAQ	Congestion Mitigation/ Air Quality
CMP	Congestion Management Process
CMS	Congestion Management System
CO	Carbon Monoxide
COE	Unites States Army Corps of Engineers
CPA	Community Planning Areas
CPI-U	Consumer Price Index – for all Urban Consumers
CTP	Consolidated Transportation Program
CV	Commercial Vehicle
DEO	Density Exchange Option
DNR	Maryland Department of Natural Resources
DOD	United States Department of Defense
DOT	United States Department of Transportation
E&C	Existing & Committed

EPA	United States Environmental Protection Agency
ERS	Emission Reduction Strategy
EJ	Environmental Justice
ETL	Electronic Toll Lanes
FHWA	Federal Highway Administration
FMTF	Freight Movement Task Force
FTA	Federal Transit Administration
GDP	General Development Plan
GIS	Geographic Information Systems
GPS	Global Positioning Systems
HBW	Home-Based Work
HBNW	Home-Based Non-work
HOV	High Occupancy Vehicle
ICG	Interagency Consultation Group
ICTF	Intermodal Container Transfer Facility
ISTEA	Intermodal Surface Transportation Efficiency Act of 1991
JARC	Job Access and Reverse Commute
JFX	Jones Falls Expressway
LOTS	Locally Operated Transit System
MAA	Maryland Aviation Administration
MARC	Maryland Commuter Rail system
MDE	Maryland Department of the Environment
MDP	Maryland Department of Planning
MDOT	Maryland Department of Transportation
MdTA	Maryland Transportation Authority
MMID	Maryland Midland Railroad
MMTIS	Multimodal Traveler Information System
M&O	Management & Operations
MPA	Maryland Port Administration
MPO	Metropolitan Planning Organization
MTA	Maryland Transit Administration
MTN	Martin State Airport
MTP	Maryland Transportation Plan
MVA	Maryland Department of Transportation, Motor Vehicle Administration
NAAQS	National Ambient Air Quality Standards

NEPA	National Environmental Policy Act
NOx	Oxides of Nitrogen
NS	Norfolk Southern Railroad
PECAS	Production Exchange and Consumption Allocation System
PFA	Priority Funding Area
PM2.5	Fine Particulate Matter
PPP	Public Participation Plan
RAC	Regional Activity Centers
RC	Rural Conservation
RESI	Regional Economic Studies Institute (Towson University)
RFP	Request for Proposal
Ro-Ro	Roll On-Roll Off
RPD	Regional Planning District
RR	Rural Residential
SAFETEA-LU	Safe, Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users
SHA	Maryland State Highway Administration
SHSP	Strategic Highway Safety Plan
SIP	State Implementation Plan
SOV	Single Occupancy Vehicle
SRTS	Safe Routes to School
STIP	Maryland Statewide Transportation Improvement Program
T&PW	Transportation & Public Works
TAZ	Transportation Analysis Zone
TDM	Transportation Demand Management
TEA-21	Transportation Equity Act for the 21st Century
TIP	Transportation Improvement Program
TMA	Transportation Management Association
TOD	Transit Oriented Development
TRCC	Traffic Records Coordinating Committee
TTF	Transportation Trust Fund
UAWG	Urban Area (Homeland Security) Work Group
URDL	Urban/ Rural Demarcation Line
V/C	Volume to Capacity
VMT	Vehicle Miles of Travel
VOC	Volatile Organic Compounds
WBO	Work-Based Other
WMATA	Washington Metropolitan Area Transit Authority

Executive Summary

FIGURE ES-1
BALTIMORE REGION

Executive Summary

What is Transportation Outlook 2035?

TRANSPORTATION OUTLOOK 2035

Creating a Blueprint for the Baltimore Region's Future

Transportation Outlook 2035: Creating a Blueprint for the Baltimore Region's Future, called Outlook 2035, is the financially constrained long-range transportation plan for the Baltimore region. The plan, reviewed every four years, is an update to the region's 2004 transportation plan, Transportation 2030, and creates a framework that guides transportation investments for the Baltimore region from 2013 through the year 2035. The vision of Outlook 2035 was established over the last 20 years as local governments of the Baltimore region, assisted by state agencies, collectively assembled as the metropolitan planning organization (MPO), began to plan and implement actions for how the future transportation network of the Baltimore region would develop. Past long-range transportation plans included such major capital investments as the extension of the Baltimore Metro to Johns Hopkins Hospital, the Baltimore Central Light Rail, MD 100, MD 43 and numerous transportation investments that promote cost effective and efficient alternatives to single occupant automobile travel.

Outlook 2035 envisions a robust multi-modal transportation system that provides an array of transportation choices that efficiently and safely moves people and goods while accommodating the region's future growth and prosperity. Outlook 2035, like its predecessor Transportation 2030, addresses the relationship of transportation to land development, economic opportunity, environmental stewardship and Maryland's fiscal reality.

A distinct feature of Outlook 2035 is the principle of financial constraint. As required by federal legislation, financial constraint means that transportation investments outlined in a regional transportation plan must demonstrate that anticipated revenues will be available to support the cost of proposed infrastructure investments. The fiscal estimates utilized in the development of Outlook 2035 are based on the recent history of Maryland transportation spending, specifically in the Baltimore region. In other words, Outlook 2035 is not a "wish list" but reflects a listing of major capital transportation investments that at this time have been balanced against federal, state and funds forecasted to be available to underwrite the cost of implementing these strategic decisions.

Outlook 2035 is prepared by the Baltimore Regional Transportation Board (BRTB), the federally designated MPO for the Baltimore region. The BRTB is a 10 member policy board consisting of the cities of Annapolis and Baltimore, the counties of Anne Arundel, Baltimore, Carroll, Harford and Howard and the Maryland Departments of Transportation, Environment and Planning. The mission of the BRTB is to provide regional transportation planning and policy-making for the Baltimore region and to develop a multi-modal transportation investment plan that satisfies the federal mandates of Safe, Accountable, Efficient Transportation Equity Act: A Legacy for Users (SAFETEA-LU) and the 1990 amendments to the Clean Air Act.

Introduction, Section 1

PLANNING PROCESS FOR TRANSPORTATION OUTLOOK 2035

SETTING A COURSE

In keeping with recent federal requirements governing transportation policy, MPOs must develop a new long-range transportation plan every four years. Not only must this plan be financially constrained and meet air quality standards, but no transportation project can be eligible for federal aid unless the project is included in a federally endorsed long-range transportation plan. In creating a path for the completion of this effort, the BRTB identified a

set of goals and strategies to guide the direction of Outlook 2035. Current and future trends that affect our region's transportation needs were analyzed. Demographic changes in the age and location of our regional population and households coupled with economic growth and workforce demands (i.e., Base Realignment and Closure process), requires decision-makers to understand regional travel behavior to implement efficient and effective transportation solutions. A first rate transportation system does not only strive to address past mobility and access concerns, but must remain relevant and viable to address future challenges, such as the following:

- Creating Transportation Choices
- Socio-economic Growth
- New Military Employment Opportunities
- Aging Infrastructure
- Goods Movement Explosion
- Financing the Demand for New Capacity
- Environmental Stewardship
- Sustainable Communities and Urban Core

ADDRESSING CHALLENGES

Outlook 2035 addresses a number of challenges:

- Creating Transportation Choices
- Socioeconomic Growth
- New Military Employment Opportunities
- Aging Infrastructure
- Goods Movement Explosion
- Financing the Demand for New Capacity
- Environmental Stewardship
- Sustainable Communities and Urban Core

PRIORITIZING INVESTMENTS

Pivoting from Transportation 2030, the BRTB collaboratively developed criteria and a subsequent list of transportation improvements that were deemed "Regionally Significant" or of critical importance to all users of our transportation system. Six regionally significant projects were elevated to this status given regional travel needs and the project's anticipated completion by 2020. The second step in the project submittal process centered on local government BRTB members working cooperatively with the Maryland Department of Transportation to develop a list of potential transportation projects that were consistent with local jurisdiction priorities. In all, over 130 highway, transit, bicycle, pedestrian, and management and operations projects were submitted for inclusion in the new long-range plan.

A critical part of the planning process, called "prioritization," provided the BRTB with a tool to evaluate a wide range of individual transportation projects that collectively could be assembled to achieve the most efficient and cost effective solution to current and future transportation demands. The methodology used to prioritize projects al-

The BRTB analysis estimated that in 2007 dollars, $33.4 billion will be available through the TTF to operate, maintain and expand the region's transportation system through the year 2035.

lowed for an in-depth look at both the policy and technical attributes of each project compared against similar mode types. Policy criteria centered on such project components as consistency with local comprehensive plans and State Smart Growth policy, economic development and inter-jurisdictional cooperation. For state funded projects located outside of Priority Funding Areas, the state must address the projects' eligibility under the 1997 Act. Technical criteria focused on system mobility, congestion and safety. Transit oriented investments concentrated on ridership and congestion relief. Using this process to select projects ensured that these projects would advance regional goals and promote viable transportation solutions. While staff evaluated the mix of candidate transportation requests, the Maryland Department of Transportation, the Maryland State Highway Administration and the Maryland Transit Administration assembled project specific cost estimates.

FINANCING THE PLAN

The next big step in updating the previous plan was a forecast of revenues and expenditures expected in the next 25 years. The Maryland Transportation Trust Fund (TTF) is the source of all state transportation dollars and therefore became a controlling factor in developing Outlook 2035 investment strategies. The BRTB analysis estimated that in 2007 dollars, $33.4 billion will be available through the TTF to operate, maintain and expand the region's transportation system through the year 2035. Over the last 10 year period 45 percent of Maryland's total transportation operations budget has been spent on transit, covering such items as fixed-route service expansion and the replacement of buses and other transit facilities. Conversely, only 19 percent of the State's operations budget over this same period has been allocated to support the highway network.

While preserving and operating a multi-modal transportation system are prerequisites to a successful system, the focus of Outlook 2035 is the new capital expansion elements that are expected to be operational during the plan's horizon. After careful consideration of the basic costs to maintain and operate our first class transportation

system, the BRTB allocated 26 percent or $8.7 billion of the projected $33.4 billion budget to finance new capital transportation investments between 2013 and 2035.

CREATING AN ACTION AGENDA

Over the 2-year course of developing Outlook 2035, the BRTB has continued to proactively engage various stakeholders, bringing many points of interest into the planning process to frame the direction of this regional long-range plan. A restructured Citizens Advisory Committee has become a more effective conduit for public involvement and is now more representative of the diverse interests in different parts of the region. Based on project prioritization, available revenues, system performance and citizen input, the BRTB developed a multi-modal agenda of future transportation investments. This "Preferred Alternative" was released for extensive public review, incorporating best practices regarding public outreach and participation. At least one public outreach event was held in each of the BRTB member jurisdictions and the BRTB devoted greater attention to available technologies such as the Internet and electronic visualization to promote public awareness and engagement. Public comments received throughout the 3-month public participation process convinced decision-makers to reconfigure the initial allocation of available funds. The revised plan committed significant shares of fiscal resources to projects that address more than one mode and expand the menu of transportation choices.

The transportation investments and policies delineated in Outlook 2035 support the development of a balanced transportation system that promotes our region's diverse and vibrant economy and quality of life. The expenditure of $8.7 billion supports highway and rail expansion and seeks to reduce auto dependency by investing in alternative transportation services and promoting energy efficient and safe travel options. Coupled with a vast array of existing regional and local transportation initiatives, Outlook 2035 serves as a catalyst to the continued development of a comprehensive regional mobility system.

Introduction, Section 2

WILL TRANSPORTATION OUTLOOK 2035 BE SUCCESSFUL?

The true test for Outlook 2035 is whether it will actually improve regional mobility and safety, reduce time spent in congestion and enhance our quality of life. By constantly monitoring the performance of our regional transportation network; decision-makers can compare a select group of criteria that indicate the success in meeting the plan's goals. Since it is unlikely the BRTB will achieve all of the goals out-

lined in this document, the MPO is committed, if necessary, to explore opportunities to introduce new measures that, it is hoped, will move the region in the right direction.

SYSTEM PERFORMANCE

Mobility – A multi-modal transportation system's performance can be measured by its effect on roadway congestion. If transportation choices, trip reduction programs and system management projects are effective, vehicle miles traveled (VMT) and congestion will be reduced. However, economic and population growth are occurring faster than capacity improvements can be made.

In 2005, drivers in the Baltimore region traveled 56.5 million miles every day. Of all roadways, 11.2 percent were congested for at least one hour of the day. Every day, drivers spent a total of 70,500 hours sitting in traffic.

By 2035, the daily VMT is projected to increase by 34 percent, to 75.5 million miles.

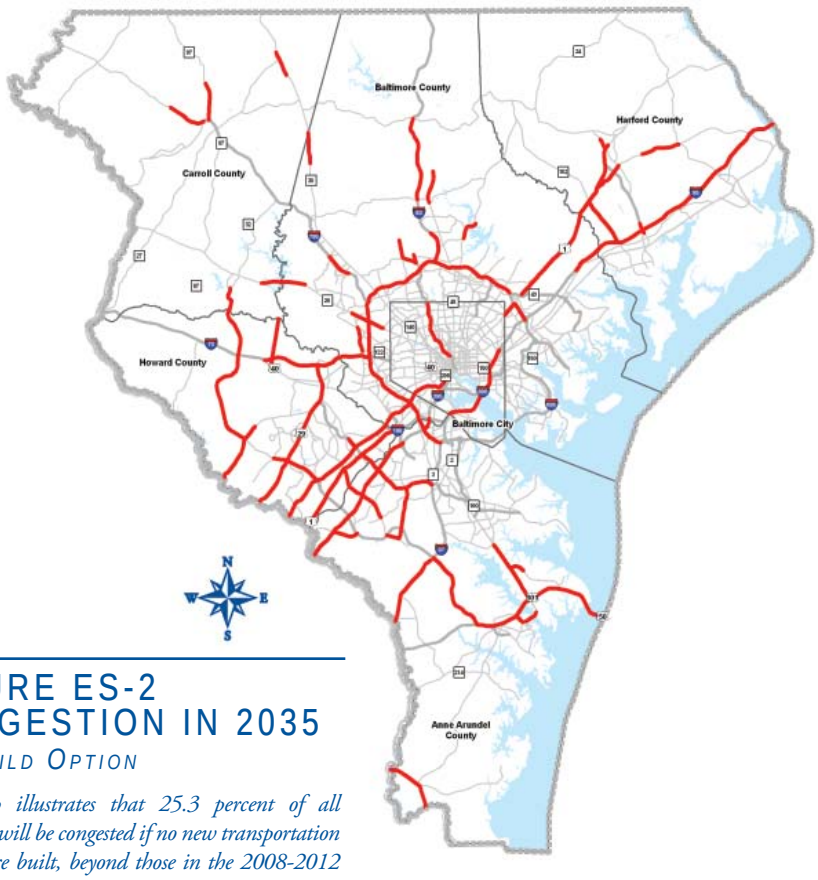


FIGURE ES-2 CONGESTION IN 2035

No Build Option

The map illustrates that 25.3 percent of all roadways will be congested if no new transportation projects are built, beyond those in the 2008-2012 Transportation Improvement Program. Compare this to the map on the next page.

More travel will occur during peak travel times, and congestion will more than double.

Although Outlook 2035 will help mitigate projected congestion, congestion will still be nearly twice what it is today. We simply do not have the resources to build our way out of it. Acknowledging this fact, we have included management and operations (M&O) as a separate category. The M&O projects help address congestion without construction of new capacity.

Air Quality – At a minimum, the transportation system must not result in emissions that would worsen air quality or delay the region from reaching timely attainment of federal standards. Because the Baltimore region is a nonattainment area for ground-level ozone and fine particulate matter, as well as a maintenance area for carbon monoxide, the plan was tested to ensure consistency

with stated goals. Improvements in air quality may be observed through reductions in mobile source emissions or maintenance of emissions despite increases in vehicle miles of travel.

In light of the importance of air quality, Outlook 2035 includes funding for transportation strategies to improve air quality, while simultaneously improving the efficiency of the system.

Three categories of projects to improve air quality are included: technological, behavioral, and capital improvements. Bicycle and pedestrian projects continue to be an important element in Outlook 2035.

Introduction, Section 3

ADDRESSING THE FUNDING SHORTFALL

As the BRTB embarked and continued upon the task of creating a new long-range transportation plan, it became clearer and clearer that projected revenues would not cover the region's transportation needs over the next 25-year period. As detailed in the 2003 Maryland Transportation Needs and Funding Report, fiscal resources to support system operations and new capital improvements/expansion have not kept pace with increasing materials and labor costs. Overall costs of transportation improvements have gone up 42 percent since 2004 and are projected to continue to increase due to the worldwide demand for materials such as concrete and steel products. Even with the General Assembly's enactment of a 2004 transportation revenue increase, dollars garnished from this package only allow the Maryland Department of Transportation to fund projects currently in the 2007 Consolidated Transportation Program.

What appears to be needed is a reliable funding source to minimize the potential for system deterioration and core service reductions.

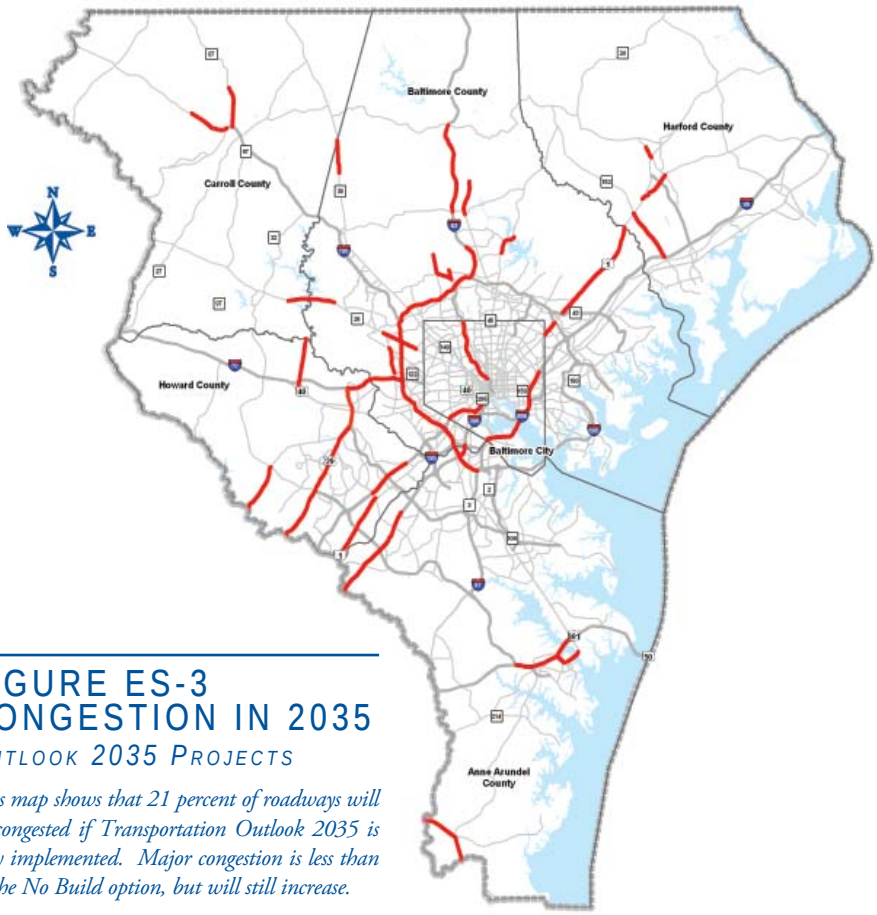


FIGURE ES-3 CONGESTION IN 2035

Outlook 2035 Projects

This map shows that 21 percent of roadways will be congested if Transportation Outlook 2035 is fully implemented. Major congestion is less than in the No Build option, but will still increase.

A revenue enhancement package recently outlined by Governor O'Malley is scheduled to provide an additional $400 million to $600 million annually to build $40 billion worth of transportation infrastructure over the next 20 years.

Rather than an increase in the State gas tax, the enhancement package includes the strategy of "indexing" the current gas tax to a national construction costs index.

This approach would allow the level of revenues flowing into the Transportation Trust Fund to keep pace with rising construction costs.

Without additional financial capacity, the BRTB has been forced to exclude the expansion of the region's rail network.

The region will face the results of placing regional mobility demands solely on an already overburdened roadway network.

Should the General Assembly approve a revenue enhancement strategy, the BRTB will reexamine the project mix of Outlook 2035.

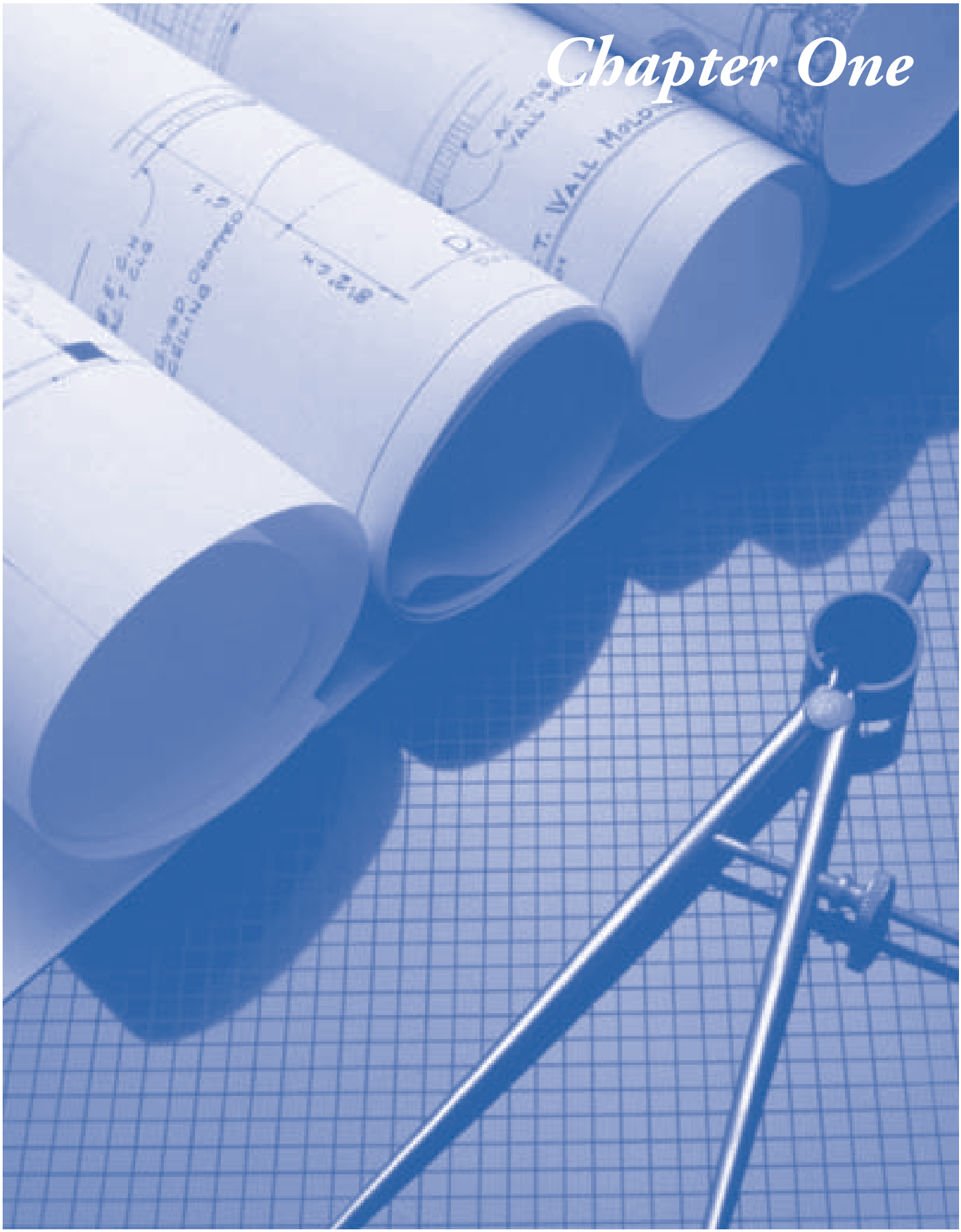
This plan update could potentially rebalance the highway and transit investments currently proposed in Outlook 2035.

Additional revenue could support a new segment of the region's 2002 rail plan, enhance and expand Maryland Rail Commuter Service (MARC) service and broaden the menu of transportation options that shift single occupant vehicle trips to other more efficient transportation modes.

Over the coming months, the BRTB will continue to monitor the actions of the Maryland General Assembly and work together to identify a list of key regional transportation priorities that create a balanced transportation agenda for the Baltimore region.

If the BRTB is to sustain the region's transportation system and meet the transportation challenges of the future, the region must come together and "grab the moment".

Chapter One



Transportation Planning in the Baltimore Region

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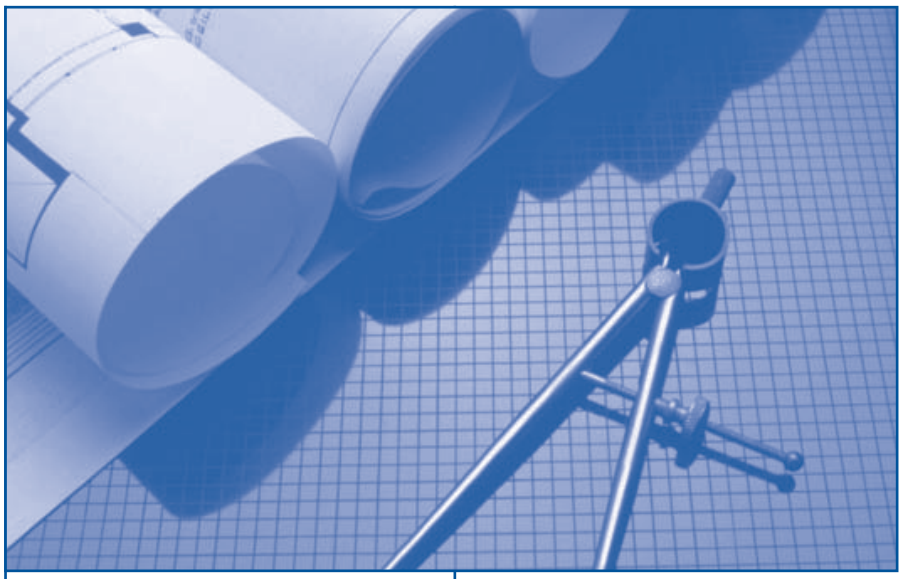
Chapter One

Transportation Planning in the Baltimore Region



Transportation Outlook 2035 (Outlook 2035) is a comprehensive, coordinated and multi-modal regional plan that addresses the Baltimore region's transportation needs for the years 2013 through 2035. Outlook 2035 covers all major modes of surface transportation from a regional perspective, including highways, public transit, bicycle and pedestrian facilities. Additionally, Outlook 2035 takes into consideration goods movement, special needs transportation and access to ports and airports. Key transportation related activities are addressed, such as transportation demand management, system management, safety, security and air quality conformity analysis. Outlook 2035 is prepared and adopted by the Baltimore Regional Transportation Board (BRTB), which is the Metropolitan Planning Organization (MPO) for the Baltimore region. Outlook 2035 includes an extensive community outreach and public involvement program.

A BLUEPRINT FOR THE FUTURE

Creating a Blueprint for the Baltimore Region's Future

Outlook 2035 is a long-range transportation plan for the Baltimore region. It serves as a multi-modal blueprint by identifying the ways the Baltimore region plans to invest in the transportation system over the next few decades.

Chapter 1, Section 1

THE BALTIMORE REGIONAL TRANSPORTATION BOARD

The BRTB is directly responsible for conducting the continuing, cooperative and comprehensive (3-C) transportation planning process for the Baltimore metropolitan region in accordance with the metropolitan planning requirements of 23 CFR Parts 450 and 500, Federal Highway Administration (FHWA) and 49 CFR Part 613, Federal Transit Administration (FTA). The BRTB is a 10-member policy board consisting of the cities of Annapolis and Baltimore, the counties of Anne Arundel, Baltimore, Carroll, Harford and Howard and the Maryland Departments of Transportation, Environment and Planning. Voting rights are extended to all members with the exception of the Maryland Department of the Environment and the Maryland Department of Planning both of which serve the BRTB in an advisory capacity. Outlook 2035 was developed under the direction of the 10-member BRTB with input from its many subcommittees.

Under the auspices of the BRTB exist a network of committees and subcommittees formulated to focus on specific technical and policy areas. Through this diverse group of committees, the BRTB is able to learn more about specific areas of interest, receive feedback and recommendations, and engage both professionals in related fields and the general public. The work of the committees also aids the BRTB as it works to ensure that transportation planning is integrated into the region's efforts to address economic development and quality of life issues.

BRTB COMMITTEES

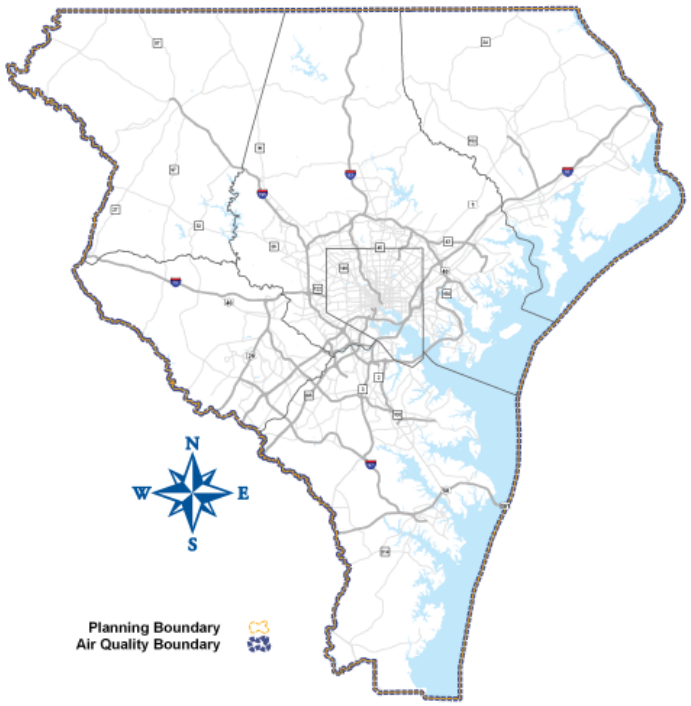
Current BRTB subcommittees and advisory groups include:

- BRTB Executive Committee
- Baltimore Regional Operations Coordinating Committee
- Bicycle & Pedestrian Advisory Group
- Budget Subcommittee
- Citizens Advisory Committee
- Cooperative Forecasting Group
- Freight Movement Task Force
- Interagency Consultation Group
- Transportation Management & Operations Partnership
- Technical Committee
- Traffic Signal Subcommittee
- Transportation & Public Works Subcommittee
- Travel Analysis Advisory Group

Chapter 1, Section 2

METROPOLITAN PLANNING AREA

The Baltimore metropolitan planning area consists of Anne Arundel, Baltimore, Carroll, Harford, and Howard counties, and Baltimore City. The planning area is part of the 2003 U.S. Office of Management & Budget's Baltimore-Towson Metropolitan Statistical Area (MSA), containing the Baltimore Urbanized Area, the Aberdeen-Havre De Grace-Bel Air Urbanized Area, the Westminster Urbanized area, and Queen Anne's County. Also included within the Baltimore region are thirteen smaller incorporated municipalities. The newly renamed Baltimore-Towson metropolitan area (excluding Queen Anne's County) is designated as a "moderate" non-attainment area for the 8-hour ozone standard and a nonattainment area for fine particulate matter (PM2.5) by the United States Environmental Protection Agency (U.S. EPA) with 2010 as the horizon year for attainment. The entire non-attainment area is in the northern portion of the new 2003 Office of management & Budget designated Washington-Baltimore-Northern Virginia, DC-MD-VA-WV Combined Statistical Area.



ABOUT THE BRTB

- The BRTB is a 10-member board representing the cities of Annapolis and Baltimore, the counties of Anne Arundel, Baltimore, Carroll, Harford, and Howard, and the Maryland Department of Transportation, the Maryland Department of the Environment, and the Maryland Department of Planning.
- As the Metropolitan Planning Organization (MPO) for the Baltimore region, the BRTB is directly responsible for ensuring that any federal money spent on existing and future transportation projects and programs is based on a continuing, cooperative, and comprehensive (3-C) planning process. All surface transportation projects and programs that receive federal funding in our region go through this planning process.
- The mission of the BRTB is to provide regional transportation planning and policy making for the Baltimore region. A key component is the development of a federally mandated long-range transportation plan.
- The Baltimore Metropolitan Council (BMC) is an organization established to identify regional interests and to develop collaborative strategies, plans, and programs that will improve the quality of life and economic vitality of the Baltimore region. The BMC employs a paid, professional planning staff which serves, in part, as technical staff to the BRTB.

Chapter 1, Section 3

SAFETEA-LU

In the early 1970s, the U.S. Congress recognized the importance of regional coordination and planning with legislation that required the formation of MPOs for metropolitan areas with a population greater than 50,000 people. In 1991 Congress passed The Intermodal Surface Transportation Efficiency Act (ISTEA) that posed a major change to transportation planning and policy, as the first U.S. federal legislation in the post-Interstate Highway System era. The legislation presented an overall intermodal approach to highway and transit funding with collaborative planning requirements, giving significant additional responsibilities to metropolitan planning organizations. ISTEA was followed by the Transportation Equity Act for the 21st Century (TEA-21) and most recently in 2005, the Safe, Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users (SAFETEA-LU). Along with identifying Federal funding for a range of transportation programs and other transportation related regulations, SAFETEA-LU updated requirements for metropolitan transportation planning. In order to reflect SAFETEA-LU in their administrative regulations, the FHWA and FTA jointly issued proposed rulemaking, with a final rule for metropolitan planning in "23 CFR Part 450" issued on February 14, 2007. Outlook 2035 fully complies with the requirements of the updated rule.

Federal Planning Factors & Key Requirements of a Metropolitan Plan

In the Final Rule for Metropolitan Planning, a series of eight planning factors are identified that need to be considered in the metropolitan transportation planning process. These planning factors are incorporated into the goals and strategies adopted by the BRTB and are embedded throughout the planning process, including the long-range plan, the Transportation Improvement Program and the Unified Planning Work Program.

This continuous, cooperative, and comprehensive (3-C) process provides for consideration and implementation of projects, strategies, and services that address eight planning factors (seen on Page 7, Section 3).

EIGHT PLANNING FACTORS

The continuous, cooperative, and comprehensive (3-C) process provides for consideration and implementation of projects, strategies, and services that address the following eight planning factors:

1. Support the economic vitality of the metropolitan area, especially by enabling global competitiveness, productivity, and efficiency;
2. Increase the safety of the transportation system for motorized and non-motorized users;
3. Increase the security of the transportation system for motorized and non-motorized users;
4. Increase accessibility and mobility of people and freight;
5. Protect and enhance the environment, promote energy conservation, improve the quality of life, and promote consistency between transportation improvements and State and local planned growth and economic development patterns;
6. Enhance the integration and connectivity of the transportation system, across and between modes, for people and freight;
7. Promote efficient system management and operation; and
8. Emphasize the preservation of the existing transportation system.

In addition to the planning factors that are threaded throughout all activities of the BRTB, there are specific federal requirements and activities that drive the development and content of the metropolitan transportation plan. These activities are summarized in the statements below:

- The transportation planning process shall address at least a 20-year planning horizon;
- The transportation plan shall include both long-range and short-range strategies that lead to an integrated multi-modal transportation system;
- The MPO shall review and update the transportation plan at least every four years in nonattainment areas;
- The MPO shall coordinate the development of the metropolitan transportation plan with development of transportation control measures in the State Implementation Plan;
- The MPO, the State, and public transit operators shall validate data utilized in preparing other modal plans that provide input into the transportation plan, and the MPO shall base inputs on the latest available estimates for population, land use, travel, employment, congestion, and economic activity;
- The transportation plan shall include:
  - » projected transportation demand of persons and goods in the planning area over the period of the transportation plan;

- » existing and proposed transportation facilities that function as an integrated system;
- » operational and management strategies to improve the performance of existing transportation facilities;
- » results of the congestion management process;
- » an assessment of capital investment and other strategies to preserve the existing system and provide for multi-modal capacity increases;
- » provide design concept and design scope descriptions of all existing and proposed facilities in sufficient detail for conformity determinations;
- » a discussion of types of potential environmental mitigation activities and potential areas to restore and maintain environmental functions affected by the transportation plan;
- » pedestrian walkway and bicycle transportation facilities;
- » transportation and transit enhancement activities; and
- » a financial plan demonstrating how the adopted plan can be implemented.

- The MPO shall consult with state and local agencies responsible for land use management, natural resources, environmental protection, conservation, and historic preservation regarding development of the transportation plan;
- The transportation plan should include a safety element relating to the Strategic Highway Safety Plan, emergency relief and disaster preparedness plans and strategies and policies that support homeland security and personal security;
- The MPO shall provide interested parties with a reasonable opportunity to comment on the transportation plan;
- The transportation plan shall be published or otherwise made readily available for public review, including in electronically accessible formats;
- The MPO shall not be required to select any project from the illustrative list of additional projects included in the financial plan; and
- The MPO must make a conformity determination on any updated or amended transportation plan according to transportation conformity regulations.

Chapter 1, Section 4

REGIONAL TRANSPORTATION PLANNING PROCESS

Outlook 2035 covers the time period from 2013 through 2035 and identifies future major transportation investments, including management and operations projects and strategies, and provides a financial plan for implementation of these key decisions. Additionally, Outlook 2035 was coordinated with the development of Maryland's air quality control measures, discusses potential environmental mitigation activities, and has been developed using an extensive public participation process.

Outlook 2035 is organized in seven chapters and is accompanied by appendices with more detailed information as appropriate. The chapters include: (1) an executive summary; (2) the regional transportation planning process; (3) the regional multi-modal system; (4) local land use; (5) regional trends and challenges; (6) building the regional transportation plan; and (7) next steps.

Outlook 2035 was developed over a two-year period and involved several local, state, and federal agency transportation professionals, area business leaders, community advocates, and many other interested stakeholders. This section provides a brief overview of the key steps in the regional transportation planning process undertaken by the BRTB to develop Outlook 2035. Later chapters take a more detailed look at some of the key steps.

1. GOALS, POLICIES, AND STRATEGIES DEVELOPMENT

The development of goals for Outlook 2035 provided the BRTB with a foundation for further development of the plan. BRTB members, the Technical Committee and the Citizens Advisory Committee started with a review of the goals, policies, and strategies from the previous regional transportation plan. Baltimore Metropolitan Council (BMC) staff compared existing goals with other MPO

8 STEPS TO OUTLOOK 2035

Outlook 2035 was developed over a two-year period and involved several local, state, and federal agency transportation professionals, area business leaders, community advocates, and many other interested stakeholders. Key steps of the planning process are:

1. Goals, Policies, and Strategies Development
2. Demographic and Socio-economic Projections
3. Project Submittal
4. Project Costs and Funding Availability
5. Project Review and Prioritization
6. Project Evaluation
7. Public Outreach and Engagement
8. BRTB Approval and Documentation

plans, as well as reviewed the goals to ensure they met new SAFETEA-LU requirements. New goals were then crafted, reviewed by several BRTB committees, and finally endorsed by the BRTB on January 23, 2007.

2. DEMOGRAPHIC AND SOCIO-ECONOMIC PROJECTIONS

Planning a transportation system for generations to come is a complex task. How many people will live here? Where will they work? What kind of transportation service will they want and need? Considerations like these are important to look at when putting together a long-range transportation plan. As a result, a lengthy analysis of the population, household, and employment forecasts was conducted for the years 2000-2035 referred to as dataset Round 7. Round 7 also accounts for the new military Base Realignment and Closure (BRAC) impacts on the Baltimore region.

3. PROJECT SUBMITTAL

The BRTB first collaboratively developed a list of projects that were "Regionally Significant" or of critical importance to all jurisdictions in the region. Criteria for choosing these projects were developed and a policy was set that all projects included on this list had to meet all the criteria for the appropriate mode.

The second phase of project submittal occurred several months later when local jurisdictions, in conjunction with MDOT, submitted a list of projects to be considered for Outlook 2035. This initial list was not constrained by costs and included over 130 highway, transit, bicycle, pedestrian, and management and operations projects.

4. PROJECT COSTS AND FUNDING AVAILABILITY

With assistance from MDOT, the BRTB completed a full review of all funding available through the year 2035 for system preservation, operations, and expansion projects. This review was key because Outlook 2035 is "financially constrained" and cannot exceed the amount of funding that is expected to be reasonably available.

5. PROJECT REVIEW AND PRIORITIZATION

As part of the planning process, the BRTB evaluated and ranked all of the projects submitted for consideration. This process, called "prioritization," assisted the BRTB in the evaluation of a wide range of individual transportation projects to assess which projects are best suited for Outlook 2035, given the region's future transportation needs and limited amount of funds available. Before prioritization of the projects was undertaken, a full evaluation of the prioritization methodologies was conducted and reviewed by the BRTB and its committees. The methodology used to prioritize projects allows for an in-depth look at both the policy and technical aspects of projects. The BRTB endorsed the updated policy and technical prioritization methodology early in 2007.

With the exception of projects deemed "regionally significant," most projects submitted for consideration in the long-range plan went through the prioritization process. Technical information for "regionally significant" projects was, however, collected for modeling and air quality purposes. Due to their importance related to the BRAC, a few projects are also included in Outlook 2035 that did not undergo the prioritization process.

6. PROJECT EVALUATION

In addition to a financial analysis, Outlook 2035 projects underwent an air quality conformity analysis. Mobile 6.2, the EPA's latest mobile emissions model, was used to perform a regional emissions analysis to determine how the mix of projects will impact the region's air quality. This analysis was conducted for the years 2008, 2009, 2015, 2025, and 2035 for daily emissions of: volatile organic compounds (VOCs), nitrogen oxides (NOx), and carbon monoxide (CO) as well as yearly emissions of direct fine particulate matter (PM2.5) and NOx. The mix of projects in Outlook 2035 is within the approved emissions limits and does not worsen the region's air quality or delay the timely attainment of National Ambient Air Quality Standards (NAAQS).

7. PUBLIC OUTREACH AND ENGAGEMENT

After analysis of all of the socio-economic forecasts, local and regional needs, and available funding, the BRTB developed a Draft Plan. This Draft Plan was released July 5, 2007 for an extensive public review, nearly twice as long as was required in the BRTB Public Participation Plan. This was done to ensure that the public had ample time to review and comment on the proposed plan. Public meetings were held in each jurisdiction as well as a regional meeting held at the BMC. In addition, the annual elected official BRTB meeting, held at the BMC, provided the public an opportunity to speak directly to the public officials on Outlook 2035. Based upon the public comments received, the BRTB worked to revise the Draft Plan and on October 12, 2007, a Revised Draft Plan was released for public review. View the public comments and BRTB responses in Appendix 1.

SAFETEA-LU requires that a Public Participation Plan (PPP) be developed by all MPOs with the involvement of all interested stakeholders. In response, the BRTB adopted the new Public Participation Plan in January 2007. SAFETEA-LU also requires the use of constructive visualization techniques and mandates that public involvement meetings be held at times convenient to local participants.

Working with the BRTB, BMC staff undertook extra efforts to enhance the Outlook 2035 public involvement process and adhere to the new SAFETEA-LU requirements. Coordination meetings and public involvement meetings were held throughout the two-year development of Outlook 2035.

Public involvement meetings occurred throughout the planning process. As part of the Baltimore PPP, the BRTB appointed a new and larger Citizens Advisory Committee (CAC). The main objective of the CAC is to provide advice to the BRTB on how to assist with outreach and generate interest in Outlook 2035. Presentations on the process were also made to this group and feedback was gathered.

Several additional activities were undertaken to enhance public involvement and visualization of the Outlook 2035:

- A logo and branding scheme was developed for Outlook 2035 in an effort to generate greater public interest and increase understanding of what Outlook 2035 provides. This logo and branding scheme was used in all publications and advertising. Promotional items also were distributed at public meetings and events.
- A section on the BMC Web Site was devoted to Outlook 2035 which was updated regularly. All documents available for public review as well as more in-depth information on Outlook 2035 were posted.
- Periodic updates detailing various steps in the process were sent out to hundreds of people over a series of months. These e-newsletters also highlighted public meetings and opportunities to submit public comment.
- A series of public meetings were held throughout the comment period for the draft plan. One meeting was held in each jurisdiction and a regional public meeting took place at the BMC offices. Each meeting was held in an accessible location and at a convenient time (most meetings were held over a 4-6 hour timeframe, with multiple presentations on Outlook 2035 during this time). The public was also offered the opportunity to speak directly to elected officials at the annual BRTB meeting held on August 28, 2007. Presentations from all meetings were also posted on the Web Site.
- Advertisements were published in the Baltimore Sun, the Afro-American and a number of local newspapers. An online advertisement was also published for two weeks on the BaltimoreSun.com Web Site. In addition, an advertisement was placed on over 100 Maryland Transit Administration buses throughout the region.
- Press releases were sent to all major newspapers throughout the region, as well as a number of TV and radio stations. During the Draft Plan public comment period, over 30 articles were published in local and regional newspapers.
- In an effort to meet new federal requirements, staff generated numerous maps to visually show projects, green spaces, etc. In addition, staff developed an online application using Google Maps technology that allows users to zoom in on projects in their jurisdiction or zoom out for a regional view. This service is provided on the BMC Web Site.

8. BRTB APPROVAL AND DOCUMENTATION

Following public review of the Draft Plan, the BRTB reassessed the project mix and released a Revised Draft Plan. This contains the projects that are the "Preferred Alternative" list contained in Outlook 2035. The BRTB voted on the final Outlook 2035 on November 27, 2007.

Chapter 1, Section 5

GOALS, STRATEGIES, AND SUPPORTING ACTIONS

For the Baltimore region, the BRTB envisions a transportation system that: (1) efficiently moves people and goods; (2) accommodates future growth; and (3) is environmentally friendly. The BRTB's purpose in crafting Outlook 2035 is to develop a long-range transportation plan that addresses the relationships between transportation and land use, the environment, and the citizenry of the Baltimore region. The BRTB's primary approach to address this purpose was to develop goals reflective of these relationships. On January 23, 2007, the BRTB reached consensus on seven goals for Outlook 2035.

These goals reflect the various relationships in transportation. For each goal, the BRTB reached consensus on a specific policy, and under each policy several strategies were developed to meet the Outlook 2035 goals. What follows is a sequence of each goal, policy, and related strategies and a description of some of the BRTB activities in line with that goal. In partnership with the project investments outlined in Outlook 2035, these actions will enhance the region's efforts to attain the goals.

GOAL #1: IMPROVE SAFETY

Policy: Improve safety for users of each mode of transportation.

STRATEGIES:

1. Adopt relevant state and local plans that seek to reduce transportation-related injuries and fatalities.
2. Collect and analyze safety data for use in transportation planning applications.
3. Increase public awareness of transportation safety issues through linkages to public health and congestion.

SUPPORTING ACTIONS:

In 2006, Maryland began the process recommended in SAFETEA-LU to develop a five-year statewide coordinated safety plan with a comprehensive framework to reduce highway fatalities and serious injuries on all public roads. BRTB members are actively involved in SHSP development and implementation for the Baltimore region.

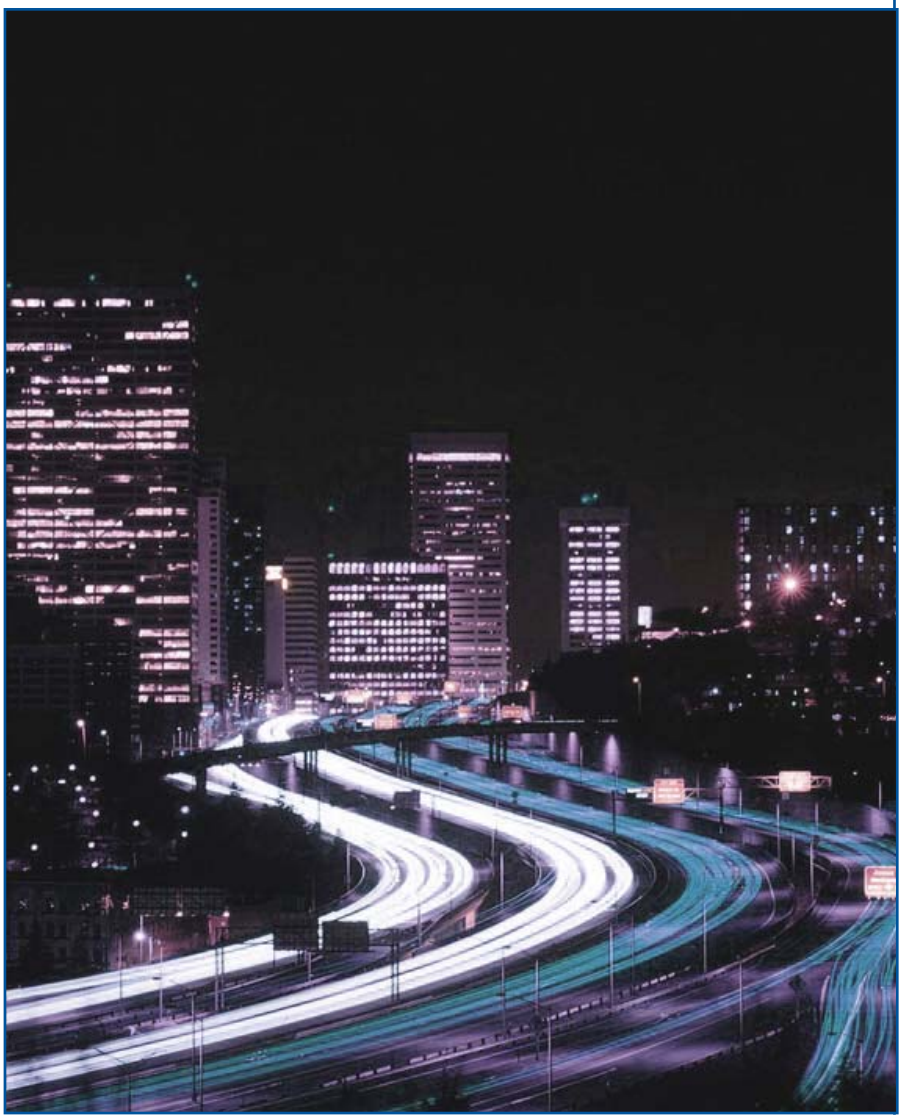
One emphasis area in the Strategic Highway Safety Plan is to improve information availability. Analysis of improved information will allow for better decision-making that will lead to reduced injuries and fatalities.

GOALS OF OUTLOOK 2035

- Improve Safety
- Maximize Transportation System Management and Operations
- Increase Accessibility and Mobility
- Preserve the Environment
- Improve Transportation System Security
- Link Transportation Investment to Land Use and Economic Development
- Foster Inter-jurisdictional Participation and Cooperation

Staff are actively engaged in the Maryland Department of Transportation (MDOT) Traffic Records Coordinating Committee (TRCC). The TRCC's mission is to provide a strong and coordinated plan that will maximize the efficiency and effectiveness of traffic safety information collection and analysis, and provide the resources needed to support the resulting safety system. Staff periodically share jurisdictional crash data at the BRTB and its committee meetings.

With the support of the Baltimore region's elected officials, the BRTB has initiated the development of a regional transportation safety campaign to increase public awareness of the transportation safety issues in the region. The BRTB also conducts regional safety stakeholder forums to identify issues/challenges faced by the region and ways to tackle the safety problem.



GOAL #2: MAXIMIZE TRANSPORTATION SYSTEM MANAGEMENT AND OPERATIONS

Policy: Integrate management and operations strategies that improve the performance and reliability of existing transportation infrastructure to relieve congestion and reduce delay.

STRATEGIES:

1. Utilize traffic and transit management techniques to improve mobility, performance, and safety and to improve day-to-day operations and emergency response/recovery.
2. Improve transportation system reliability through broad based information distribution for both interstates and surface streets.

SUPPORTING ACTIONS:

Since the late 1990s, the BRTB has been incorporating management and operations

(M&O) strategies in its plans and programs as it works to improve the linkage between transportation planning and operations. The BRTB has built a robust structure of M&O committees that address incident management, signal operations, and public works operations. The M&O committees include representatives from local and state transportation (highway and transit), police, fire, emergency management, and other operations and emergency response agencies. These committees are overseen by the M&O Partnership which, as a direct subcommittee of the BRTB, provides it with guidance and project recommendations. Project recommendations from the M&O committees have been included in Transportation Improvement Programs (TIPs) and Outlook 2035. The M&O Partnership has been in discussions with MDOT to identify a fund source for regional M&O projects.

Over the last several years, the M&O committees have held several conferences to provide information to operators and to provide a forum for operators to share ideas. These events have addressed, for example, signal operations, incident management, and snow plow operations.

In 2006, the BRTB oversaw the development of the M&O Strategic Deployment Plan which provides a framework for expanded and enhanced regional M&O planning and project deployment for the next five to ten years. BRTB committees will refer to this Plan when moving forward with M&O planning.

The BRTB has commissioned a study to assess how travel in the region would be impacted by a long-term outage of critical portions of the transportation network. This work could be used to assist with planning alternate, or redundant, routes and modes in the event of a long term-outage.

Staff works with state and national organizations and agencies to pursue projects and share ideas on best practices. For example, staff has worked with MDOT to develop a traveler information system for the region.

GOAL #3: INCREASE ACCESSIBILITY AND MOBILITY

Policy: Plan for an integrated transportation system that is accessible, equitable, and reliable for all system users and that provides for enhanced connectivity between modes and destinations.

STRATEGIES:

1. Provide system accessibility and increase transportation alternatives for all segments of the population.

2. Improve inter-jurisdictional connectivity among all modes.
3. Provide cost-effective mobility options to and within major activity centers.

Supporting Actions:

SAFETEA-LU created the New Freedom program in an effort to assist people with disabilities to access transportation otherwise out of their reach. Under the New Freedom program funding was increased for programs that assist elderly individuals and rural transportation providers. Through participation with regional groups such as the Baltimore Transportation Workgroup, staff coordinates with transportation providers that concentrate on providing affordable transportation to the elderly, disabled, and specialized populations.

In addition to highways and rail transit, the BRTB promotes a complete menu of travel choices to provide an interconnected transportation network. Coordination between regional and local transit services is encouraged through the Local Transit Operators Workgroup and connections between modes are encouraged. For example, *Action Plan 2001: A Plan for Bicycling and Walking in the Baltimore Region*, was prepared to guide development of infrastructure to provide not just a safe and complete network of bicycle and pedestrian transportation facilities, but also connections with other transportation modes. Connections to the regional and local bus routes, through bike racks at transit hubs and bike carriers on buses, serve to increase both the amenities and the user-shed of the transit service. Also, RideShare and telecommuting have been developed to complement transportation infrastructure. RideShare is a free service designed to link commuters with similar origins and destinations in order to promote car and van-pooling. The program thus promotes reductions in traffic congestion and air pollution, as well as offers financial and health benefits.

For Outlook 2035, following the prioritization process, an environmental justice (EJ) transportation accessibility analysis was conducted. The EJ review considered whether low-income and minority populations bear disproportionate impacts resulting from governmental decisions. The

results of the EJ review are provided in Section 6.6.2.

The BRTB has a number of committees working to improve the reliability of the transportation system in the Baltimore region. These committees address topics including incident management (crashes, spilled loads, lane closures, etc), signal operations, and public works operations. The BRTB also commissioned a demonstration project called the Multimodal Traveler Information System (MMTIS) that uses vehicular probes to determine real-time travel speed on major freeways and arterials in the region.

The Baltimore region also has a robust travel monitoring program under its Congestion Management Process (CMP) that includes travel time runs using Global Positioning System (GPS) transponders, aerial surveys of congestion, traffic counts, activity center vehicle occupancy and classification counts, and other performance monitoring activities to continuously monitor the performance of the transportation system.

GOAL #4: PRESERVE THE ENVIRONMENT

Policy: Promote a sustainable environment by establishing policies that abate emissions from mobile sources, reduce energy consumption, reduce single occupant vehicles and the use of gasoline, and conserve and protect natural and cultural resources.

Strategies:

1. Ensure that the region conforms to the applicable state air quality plan by developing programs to reduce congestion, reduce single occupant vehicles, and encourage use of emission reduction technologies.
2. Promote efficient use of energy resources by supporting fuel efficient technologies, alternative fuels, and alternative fuel vehicles.
3. Preserve and protect environmentally sensitive areas and cultural resources from harm.

Supporting Actions:

The BRTB is promoting projects that manage travel demand and reduce emissions by setting aside funding in this plan for such strategies. Included in the plan is a description of possible strategies in three categories: technological, behavioral, and capital improvements. The BRTB also supports transit oriented development and smart growth efforts.

The BRTB has been provided authority to select Conges-

tion Mitigation Air Quality (CMAQ) projects in the amount of $1,000,000 in state fiscal year 2008 and another $1,000,000 in state fiscal year 2009. This money will be used to fund projects that reduce air pollution emissions from the transportation sector.

The BRTB is developing relationships with federal, state, and local agencies responsible for natural and historical resources. Coordination with these new partners is a requirement that has come as a result of SAFETEA-LU.

The BRTB carries out a regular process to ensure that transportation plans and programs in the Baltimore region conform to air quality plans and requirements. As the MPO for a region that does not reach the federal standards for ground-level ozone or fine particulate matter (and is in a "maintenance phase" for the carbon monoxide standard), the BRTB must go through a process to show that transportation plans and programs in the region will not worsen air quality or delay timely attainment of the federal air quality standards. The BRTB has conducted a conformity analysis and has concluded that implementation of the Preferred Alternative projects in Outlook 2035 and the 2008-2012 TIP does not worsen the region's air quality or delay the timely attainment of air quality standards known as the National Ambient Air Quality Standards (NAAQS).

A subcommittee of the BRTB, the Interagency Consultation Group, meets monthly to discuss and coordinate issues related to air quality and transportation, particularly focusing on air quality conformity and State Implementation Plans.

The BRTB promotes public awareness of the region's air quality issues by supporting such activities as Clean Air Partners, the Clean Cars for Clean Air Campaign, and the Clean Commute Month Initiative. The BRTB partners with stakeholders from both the private and public sectors to keep the people of the region informed about air quality. The BRTB promotes both awareness and use of alternative commuting options through the Metro Rideshare organization, the Clean Commute Month Initiative, and the Telework Partnership with Employers. Staff takes part in outreach opportunities throughout the year to talk with people about their transportation choices.

The BRTB coordinates within the Mid-Atlantic region to support efforts to achieve diesel emission reductions. Staff participates on the Mid-

Atlantic Diesel Collaborative. The BRTB is exploring options to work with EPA Region 3 on a collaborative diesel emission reduction effort in the Baltimore region.

A survey of truck fleet owners was conducted to determine their interest in strategies that reduce fuel use and emissions from heavy duty diesel trucks. This survey determined the level of current and planned use of emission reduction/fuel saving technologies on heavy duty diesel trucks and explored how the use of financial incentives could change planned use. Additionally, a report was created that reviewed strategies for reducing emissions from the transportation sector, including ranges of emission reduction benefits and cost effectiveness.

Staff members work with the Maryland Clean Cities Coalition to ensure that the latest information on alternative fuel technologies is provided to member jurisdictions.

Staff reaches out to inform the public on transportation and air quality issues, using information on the Web Site as well as an e-newsletter, the Environmental News Brief. This newsletter is distributed to nearly three hundred recipients to inform them about current news related to transportation and the environment, particularly air quality.

GOAL #5: IMPROVE TRANSPORTATION SYSTEM SECURITY

Policy: Support transportation improvements and programs that enhance the transportation system's capability to plan for and respond to natural and man-made security and emergency challenges.

STRATEGIES:

1. Continue to engage stakeholders from non-transportation response agencies in the transportation planning process to improve coordination of transportation security planning activities.
2. Continue to participate in security planning activities of non-transportation agencies to ensure transportation issues are addressed.
3. Leverage transportation and security funds to implement regional priorities for transportation security projects.
4. Work with local and state agencies to identify and implement tools and policies to secure critical transportation infrastructure, systems, and data.
5. Develop plans and capabilities to provide real-time information to system operators

and the public in the event of an emergency.

Supporting Activities:

The transportation network plays a significant role in the security of the region. Responders rely on it to access incidents, citizens rely on it to move away from incidents, and, due to its importance, the network itself could be a target of terrorism. Several of the BRTB's M&O subcommittees include members from non-transportation agencies because of the importance of including their expertise and addressing their issues in the transportation planning process. These representatives provide input on committees that address topics such as incident management, evacuation, and disaster debris management.

In addition, it is important for transportation representatives to participate in emergency and security planning activities led by non-transportation agencies. To this end, staff participates in local, regional, and state emergency preparedness exercises and training. Staff also participates on the committee that allocates homeland security funds to the transit agencies in the Baltimore and Washington regions.

One of the BRTB subcommittees, Transportation & Public Works (T&PW), also serves as a subcommittee to the Urban Area Work Group, on homeland security efforts. The T&PW subcommittee will be using both homeland security and transportation funds to support priority evacuation-related projects.

Securing critical transportation infrastructure was identified as a high priority in the recently completed M&O Strategic Deployment Plan. It is expected that, in the short-term, the appropriate BRTB committee will work with other stakeholders to address this need.

The BRTB continues to support development of analytical tools to assess the potential impact of system performance in response to a major catastrophic event and the ability of the network to function in the weeks after. Toward this end, a redundancy study is underway to assess how travel in the region would be impacted by a long-term outage of critical

portions of the transportation network. This work could be used to assist with planning alternate routes and modes in the event of a long-term outage.

GOAL #6: LINK TRANSPORTATION INVESTMENT TO LAND USE AND ECONOMIC DEVELOPMENT

Policy: Serve the region's development needs by promoting a balanced transportation system that provides links between the region's economic core, major regional growth and activity centers, communities and neighborhoods, and key national and international commerce locations.

STRATEGIES:

1. Coordinate transportation investments with state and local plans and policies regarding growth and development.
2. Concentrate transportation infrastructure/service upgrades and expansions in local and state-designated growth areas, such as Priority Funding Areas, where adequate critical infrastructure is in place.
3. Provide transportation infrastructure that supports existing communities and mixed-use development.
4. Encourage joint use of transportation facilities and rights-of-way to enhance the movement of people to, from, and within the region.
5. Provide freight friendly intermodal transportation facilities.

SUPPORTING ACTIVITIES:

It is important to the BRTB to ensure that state, regional, and local planning efforts address land use concerns and are integrated into the long-range transportation plan; therefore, the BRTB staff monitor local, regional, and state planning efforts, participate in sustainability conferences, etc. As part of the policy prioritization process, the BRTB staff worked with the Maryland Department of Planning (MDP) to evaluate each project to determine whether the project fell inside or outside a state-designated "Priority Funding Area" (PFA). The BRTB wants to encourage concentrated development that is mixed-use and within locales where adequate infrastructure is in place, and to maintain the nature of the outer and more rural communities.

Since the early 1990s, the BRTB has sought to fully integrate a land use model with the Baltimore Regional Travel Demand Model. In order to develop such a model, the BRTB has tested numerous

software packages and developed databases needed to implement an econometric land use model. The BRTB has chosen to work with the Production Exchange and Consumption Allocation System, or PECAS model, to investigate the link between transportation infrastructure development and the price and movement of commodities and floor-space in the region.

The BRTB continues to conduct research to link transportation with the communities and economic activities of the region. For example, BMC's Community Profiles detail population, employment, housing and development trends in 94 regional planning districts (RPDs). Analysis of commuting patterns between RPDs revealed Regional Activity Centers (RAC). Furthermore, BRTB has been involved in research to examine the implications of forecasted increases in population and employment at two RACs, Aberdeen Proving Ground and Fort Meade, on the regional transportation network. It is expected that many military and civilian personnel will choose to live in the Baltimore region as a result of BRAC actions to add jobs at Fort Meade in Anne Arundel County and Aberdeen Proving Ground in Harford County. The BRTB will monitor this activity to assess the land use and transportation impacts of this development plan.

BRTB facilitates information sharing through its committee structure as well as through additional coordination between local, regional and state agencies. Links with the region's land use and economic development experts are fostered through regular meeting of the region's Planning Directors, as well as participating in proceedings of the Greater Baltimore Economic Alliance.

As part of the TIP process, an evaluation of non-motorized use considers current conditions and latent demand for bicycling and walking on each project road segment as well as the road segment in relation to adopted local, regional, and state bicycle and pedestrian plans. Improvements to existing or planned shared use road segments are identified as opportunities to improve conditions for bicycling and walking in the region.

In order to further encourage efficient multi-modal facilities, the Freight Movement Task Force (FMTF) meets quarterly to discuss issues of concern to the public and private-sector freight communities. Each year the FMTF undertakes research to promote efficient freight flow; recent investigations have addressed inter-modal

movements through intersections analyses. These studies evaluate congested intersections from a truckers' perspective to ultimately improve the flow of goods through the region.

GOAL #7: FOSTER INTER-JURISDICTIONAL PARTICIPATION AND COOPERATION

Policy: Recognize the interdependence of the region's jurisdictions and foster inter-jurisdictional cooperation and cohesion for the benefit of the region's residents.

STRATEGIES:

1. Solicit interest and encourage stakeholder input into the transportation planning process. Foster communications with public and private interests, including media relationships and specialized interest groups to improve understanding of the regional transportation system.
2. Coordinate transportation planning and programs across all modes between jurisdictions, state, federal, and private partners.
3. Develop assessments of demographic, travel, land use, fiscal, and technology trends for use in all plans, programs, and projects.

SUPPORTING ACTIVITIES:

The BRTB has a long history of inter-jurisdictional cooperation through its monthly BRTB meetings, as well as a thorough structure of subcommittees. These subcommittees meet on a regular basis to discuss a wide variety of topics including bicycle and pedestrian issues, air quality, freight movement, emergency preparedness, congestion management, and socio-economic forecasts. Members of the committees include representatives from federal, state, and local government, private businesses, non-profit organizations, transportation agencies, other interested stakeholders, and citizens. Through these regular meetings and discussion, the groups are able to provide recommendations and to shape regional decision-making and policies, as well as to address relevant issues at the local and state level.

One subcommittee of particular importance is the Citizens Advisory Committee (CAC). The CAC is a group of citizens, representatives of community organizations and business professionals. Members are appointed by the BRTB to make sure that all geographic areas of the region and diverse points of view are equally represented. As an advisory body, the CAC provides independent, region-oriented citizen advice

on issues related to the development of Outlook 2035 and other planning activities. The group also promotes public awareness and participation in the regional transportation planning process. This is key to gathering wide input and involvement throughout the region.

In addition to the network of BRTB committees, staff attends, on behalf of the BRTB, a variety of local, state, and regional meetings and events. These include meetings with other MPO's (Metropolitan Washington Council of Governments, Delaware Valley Regional Planning Commission, Wilmington Area Planning Council, etc.), Association of Metropolitan Planning Organization's work groups, local forums, and symposiums, etc.

The BRTB also co-sponsors or hosts meetings that foster inter-jurisdictional cooperation. Examples include the Mid-Atlantic Regional Roundtable in December 2006, the Latinos and Planning Regional Dialogo in October 2006, and the Baltimore-Washington Regional Traffic Signal Forum, held bi-annually.

Public involvement is promoted through a variety of methods, including publications such as the BRTB Notes newsletter and a variety of e-newsletters. These e-newsletters cover topics such as transportation planning, community involvement, emergency preparedness, transit, freight, environmental stewardship, and bicycle and pedestrian access. The e-newsletters provide timely information regarding the BRTB's public review and comment periods as well. BMC staff also has developed a notification system to contact "interested parties," as required in SAFETEA-LU, regarding public review and comment opportunities. Members of this list are contacted via e-mail or mail for each new public review and comment opportunity. Press releases on public review and comment periods are also issued to area newspaper, TV, and radio stations, as well as to an e-news mailing list.

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Chapter Two

Snapshot of our multi-modal transportation system

FIGURE 2-1
TRANSPORTATION MODES

Various types of transportation in the Baltimore region

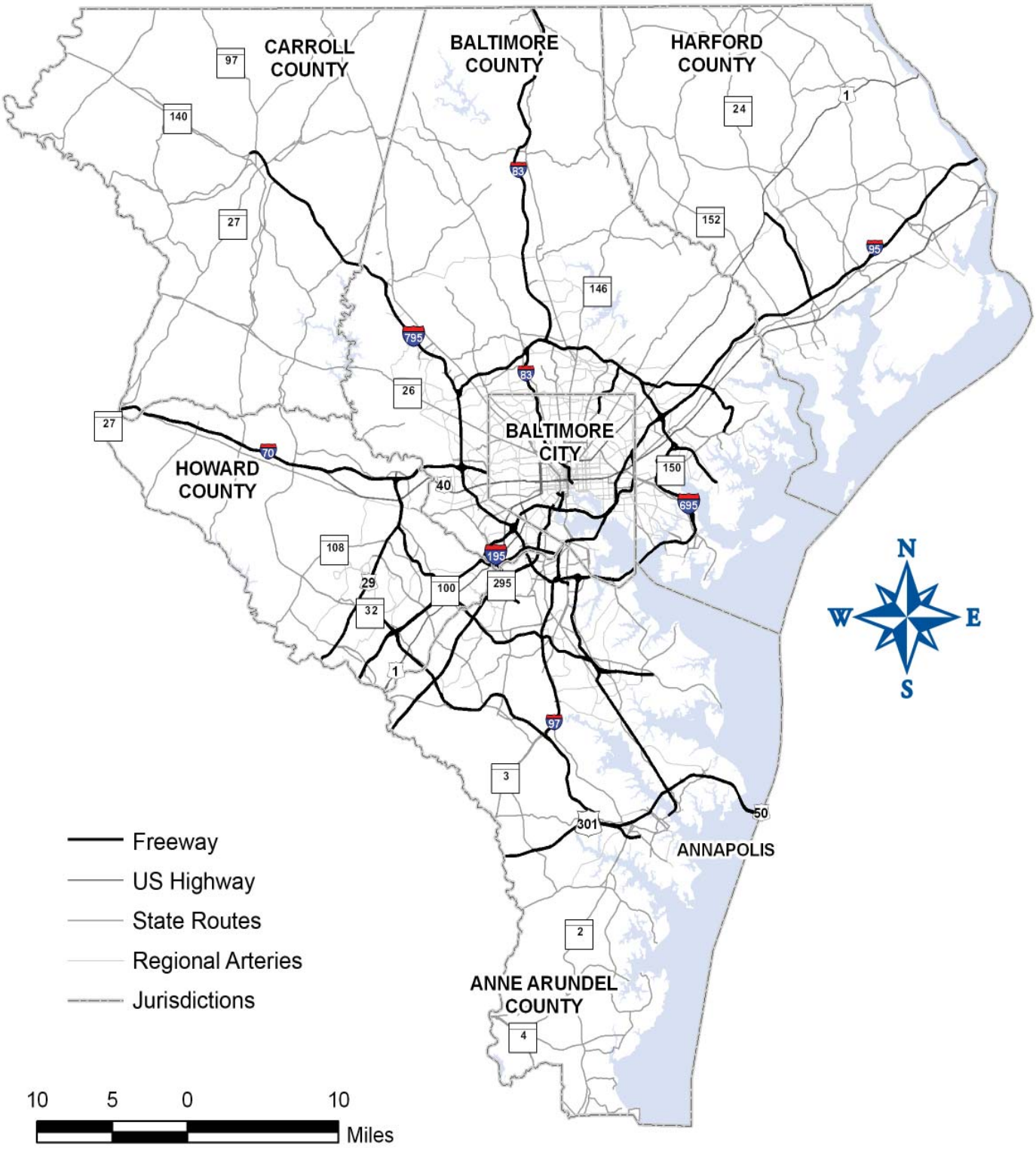
Chapter Two

Snapshot of our multi-modal transportation system

The Baltimore region's transportation system provides a wide range of choices for the movement of its citizens and goods. The ease of mobility for people and goods is essential to sustaining the region's economic vitality and quality of life. The Maryland Department of Transportation (MDOT), its five modal administrations (Transit, Port, Air, Highway, and Rail), and the Maryland Transportation Authority (MdTA) maintain and operate the majority of the transportation infrastructure within the Baltimore region. Additional systems are maintained and operated by the local jurisdictions. This section summarizes the basic components of the travel modes that make up the public and private transportation system in the Baltimore region. Figure 2-1 shows the Transportation Modes.

FIGURE 2-2
HIGHWAY SYSTEM

The state maintained highway network in the Baltimore region consists of approximately 24,832 lane miles, which comprises 37 percent of all lane miles in the state of Maryland.



Chapter 2, Section 1

HIGHWAY TRANSPORTATION SYSTEM

Of all the modes, the roadway network is the most developed transportation system in the region and the Maryland State Highway Administration (SHA) maintains and operates the most lane miles in the network. There are five different functional types of roadways—interstate/freeways, principal arterials, minor arterials, collectors, and local streets. The interstate network services all jurisdictions within the Baltimore region. Currently, 33 percent of the region's vehicle miles of travel (VMT) occur on the interstate/freeway system. The Baltimore region contains over 11,100 miles of streets and highways and more than 2,100 bridges. The state-maintained highway network in the Baltimore region consists of approximately 24,832 lane miles, which comprises 37 percent of all lane miles in the state of Maryland. Figure 2-2 displays the highway system of the Baltimore region.

SHA and the MdTA have jurisdiction over most interstate and state routes within the Baltimore region. Toll crossings at the Susquehanna River, Patapsco River, and Chesapeake Bay, along with I-95 in Baltimore City and I-95 from I-895 to the Delaware state line, are the MdTA's responsibility. Most remaining state highways and interstates are the responsibility of SHA. Baltimore City is responsible for the majority of highways within its city limits, including the portion of I-83 called the Jones Falls Expressway (JFX). Several highway features are described for each jurisdiction in the following sections.

Currently, 33 percent of the region's vehicle miles of travel (VMT) occur on the interstate/freeway system. The Baltimore region contains over 11,100 miles of streets and highways and more than 2,100 bridges.

ANNE ARUNDEL COUNTY

Anne Arundel County has approximately 3,600 lane miles under its Bureau of Highways.

This length is approximately equal to the driving distance between Key West, Florida, and Seattle, Washington.

Including state roads, the total highway lane mileage in the county is approximately 4,870 miles.

Major local street corridors include Waugh Chapel Road, College Parkway, and Benfield Road. Within the City of Annapolis, West Street, Rowe Boulevard, Forest Drive, and Taylor Avenue are some of the major corridors.

A number of state owned and operated freeway and arterial corridors run through the county such as I-97, US 50/US 301 (for both commuter and recreational traffic), MD 2, MD 4, and MD 100.

In 2006, the highway network in Anne Arundel County carried approximately 5,760 million vehicle miles of travel which translates to roughly 23 percent of all travel in the Baltimore region.

Anne Arundel County has approximately 3,600 lane miles under its Bureau of Highways. This length is approximately equal to the driving distance between Key West, Florida and Seattle, Washington.

BALTIMORE CITY

Baltimore City has over 2,000 miles of roadways, including seven miles of interstate highways and includes several major arterials such as Charles Street, York Road, Loch Raven Boulevard, Harford Road, and Belair Road.

Several freeway and primary arterials, some owned and operated by the MdTA, pass through the city. These include I-95, I-895, I-83, I-395, US 40, and the Baltimore-Washington Parkway (MD 295).

In 2006, the highway network in Baltimore City carried approximately 3,630 million vehicle miles of travel which is roughly 15 percent of all travel in the region.

BALTIMORE COUNTY

Baltimore County has more than 2,600 miles of the county road system that provide access to centers of economic activity, including Towson, Hunt Valley, Owings Mills, and White Marsh.

A number of gateways to Baltimore City pass through Baltimore County. These include the northwest gateway which traverses the Owings Mills area and includes I-795 and MD 140, the north gateway which traverses the Hunt Valley, Timonium, and Towson areas and includes I-83 and MD 45, and the northeast gateway, which traverses the White Marsh area, and includes I-95 and US 40.

In addition to these facilities, a major portion of the Baltimore Beltway (I-695) passes through Baltimore County. Some of the major county operated corridors include Old Court Road, Joppa Road, Timonium Road, and Windsor Mill Road.

In 2006, Baltimore County roads carried over 8,200 million vehicle miles of travel. This is approximately 33 percent of all travel in the Baltimore region.

In 2006, Baltimore County roads carried over 8,200 million vehicle miles of travel. This is approximately 33 percent of all travel in the Baltimore region.

CARROLL COUNTY

The Bureau of Road Operations maintains approximately 973 miles of roads and 139 bridges.

The total highway mileage, including state systems, is approximately 1,360 miles. Some of the major local highway corridors include Gorsuch Road, Wentz Road, and Hampstead Road. As in most of the other jurisdictions, the primary highways in Carroll County are state numbered routes, including MD 26, MD 27, MD 30, MD 31, MD 32, MD 97, and MD 140. Of particular importance are those that provide direct access to the Interstate System—for example, MD 140 ties directly to I-795 in Reisterstown.

Carroll County has experienced significant increases in housing and employment over the past decade and this is reflected in the growing congestion along several of the major corridors that pass through the county.

Carroll County roads carried approximately 1,300 million annual vehicle miles in 2006. This is roughly five percent of all travel in the Baltimore region.

HARFORD COUNTY

From a transportation perspective, Harford County is similar to Carroll County in a number of ways. Both have seen extensive recent development, in terms of residential and employment development and, for the most part, county maintained roadway networks are not as extensive as they are in the more developed jurisdictions.

Harford County maintains approximately 1,040 miles of county owned roadways. The total highway mileage including state owned facilities is roughly 1,460 miles. Some of the major local highway corridors include Tollgate, Ring Factory, and Briar Hill roads. Major corridors are interstate highways (I-95 maintained by the MdTA) and state roads such as US 1, MD 147, and MD 24.

In 2006, the Harford County roadway network carried approximately 2,300 million vehicle miles of travel. This is approximately nine percent of total travel in the Baltimore region.

HOWARD COUNTY

The Bureau of Highways, under the Department of Public Works, is responsible for over 970 miles of county roads.

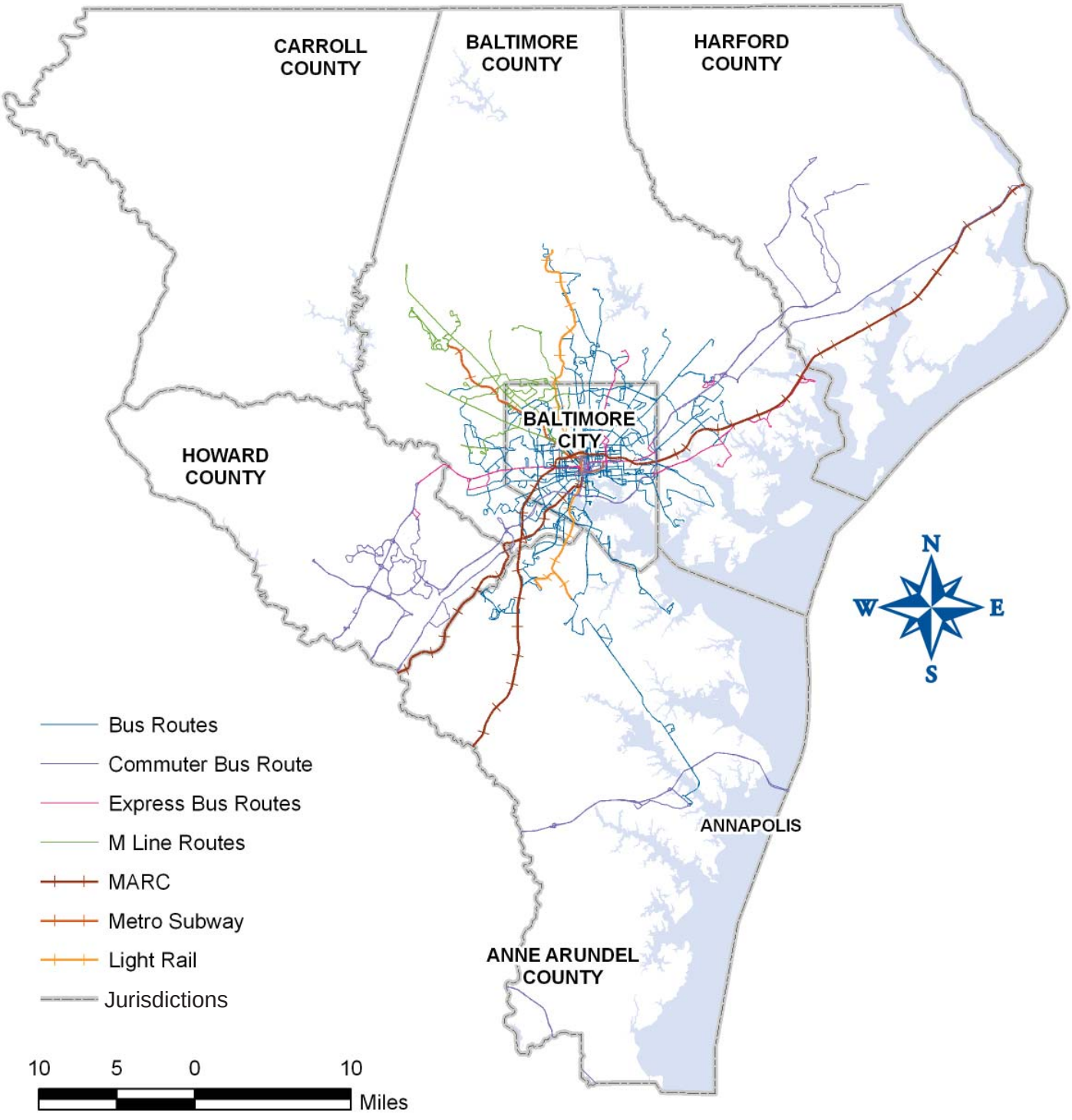
Including state owned facilities, the total highway mileage in Howard County is approximately 1,160 miles. Some of the major county corridors are Broken Land Parkway, Snowden River Parkway, Little Patuxent Parkway, and Governor Warfield Parkway. Major freeway and arterial corridors traversing Howard County include US 29, I-70, I-95, and US 40.

The highway infrastructure in Howard County carried roughly 3,800 million vehicle miles in 2006 that translates to approximately 15 percent of all travel in the region.

The highway infrastructure in Howard County carried roughly 3,800 million vehicle miles in 2006 that translates to approximately 15 percent of all travel in the region.

FIGURE 2-3
TRANSIT SYSTEMS

Rail and bus transit service includes Metro Subway, Light Rail, Maryland Rail Commuter train (MARC), as well as numerous bus services operated by the MD Transit Administration, Locally-Operated Transit Systems, and private companies.



Chapter 2, Section 2

PUBLIC TRANSPORTATION SYSTEM

The Maryland Transit Administration (MTA) provides the most transit service of all the current providers and covers public transportation within the Baltimore region. The MTA's responsibilities include the Metro Subway, Light Rail, Maryland Rail Commuter train (MARC), and MTA bus service (core bus, commuter bus, and Mobility). Other public transit in the Baltimore region include Locally-Operated Transit Systems, additional local transit services, and motorcoach bus terminals. Figure 2-3 shows existing rail and bus lines.

METRO SUBWAY

MTA's Metro Subway system provides high-speed, high-frequency rail transit service in a 15.5-mile corridor that extends from Owings Mills in northwestern Baltimore County through downtown Baltimore City to Johns Hopkins Hospital in the eastern part of the city. The Metro Subway system includes 14 stations. The service operates Monday through Friday from 5:00 A.M. to midnight and on Saturdays, Sundays, and holidays from 6:00 A.M. to midnight. Headways are eight-minutes during morning and afternoon peak periods, and ten to twenty minutes at other times. Free parking is available at Metro Subway stations between Owings Mills and Mondawmin.

LIGHT RAIL

MTA's Central Light Rail Line provides medium-speed, medium-frequency rail transit service in a 30-mile mostly double-tracked north-south corridor from Baltimore County through Baltimore City to Anne Arundel County. The main line runs between Hunt Valley and Glen Burnie, with short branch lines to Penn Station north of downtown Baltimore City and to Baltimore/Washington Thurgood Marshall International Airport (BWI) in Anne Arundel County. Light Rail serves the area by linking communities in the northern and southern suburbs with downtown Baltimore City, and provides Baltimore City residents access to suburban job centers, such as those located at BWI Airport, the BWI Business District, and the Hunt Valley office park.

Free parking is provided at 13 of the 33 Light Rail stations, while an additional two have pay lots. Parking is not provided at the remaining 18 stations. The full service operations are Monday through Friday from 6:00 A.M. to 11:00 P.M., Saturday 7:00 A.M. to 11:00 P.M., and Sundays and holidays from 11:00 A.M. to 7:00 P.M. Light Rail service has 10-minute peak and 15-minute off-peak headways in the core service area between Linthicum and Timonium stations. The remaining ends of the lines have 15-minute peak and 30-minute off-peak headways. Additionally, service is provided between Penn Station and Camden Station on a 20- to 30-minute headway.

MARYLAND RAIL COMMUTER (MARC)

MTA's Maryland Rail Commuter train (MARC) service provides high-speed, medium-frequency commuter rail service in the Baltimore region and beyond. The 187-mile system provides a longer-distance commuting option for residents of Central and Northeast Maryland, the Baltimore/Washington Corridor, and the Martinsburg, West Virginia/Washington corridor. MARC service is operated under contract with Amtrak and CSX Transportation. In the Baltimore region, MARC trains operate in two existing rail corridors totaling 77 miles, with stations in all jurisdictions except Carroll County. The Penn Line runs between Perryville in Cecil County and Union Station in Washington D.C., and stops at eight stations in the region. The Camden Line runs from Camden Station in Baltimore City to Union Station, and stops at six stations in the region. Between Baltimore and Washington D.C., two-way commuter rail service is provided Monday through Friday on the Camden Line and Penn Line. Penn Line commuter rail service is provided Monday through Friday between Perryville and Penn Station in Baltimore for southbound travel during the morning peak period and northbound travel during the evening peak period. Very limited Penn Line commuter rail service in the opposite direction is provided during peak periods with infrequent

stops at only the Edgewood and Aberdeen stations. The Camden Line also has infrequent commuter rail service in the opposite direction, and no northbound service midday. During commute hours, Camden Line trains are on a 25-minute headway. Parking is available at most MARC stations and some stations offer free parking.

MTA BUS SERVICE

MTA bus service operates approximately 767 buses to provide some type of transit service in all jurisdictions of the region except Carroll County. Currently, there are 46 core bus lines serving Baltimore City as well as Anne Arundel and Baltimore counties. The majority of these routes serve areas within the Baltimore Beltway, connecting suburbs to downtown, and neighborhoods within the downtown area. Almost all of the routes provide feeder bus service to one of the other modes: Metro Subway, Light Rail, or MARC. In addition, MTA operates two neighborhood shuttle routes in the Hampden and Mondawmin areas of Baltimore City.

The MTA operates peak period commuter bus routes in all jurisdictions except Carroll County. These commuter bus routes serve downtown Baltimore City and Washington, D.C. Private contract service providers participating in MTA's Maryland Private Commuter Bus program also provide peak period commuter bus services.

MTA also provides a paratransit service called Mobility to certified clients who live within three-quarters of a mile of regularly scheduled fixed-route bus and rail transit lines in Baltimore City, Anne Arundel County, and Baltimore County. The Mobility service, which is mandated by the 1990 Americans with Disabilities Act (ADA), is provided to serve the special travel needs of the elderly and disabled. In addition, MTA provides Taxi Access to eligible Mobility users. Taxi Access is a premium service that provides taxi rides at a reduced fare to anywhere within Mobility's service area.

LOCALLY-OPERATED TRANSIT SYSTEMS

There are four Locally-Oper-

ated Transit Systems (LOTS) in the Baltimore region. Annapolis Transit operates bus service in the Annapolis and Parole areas, and the Annapolis Trolley links satellite parking lots with downtown Annapolis. Carroll Transit System provides four deviated fixed-route shuttle services. Three of the routes are centered in Westminster and connect to either Eldersburg, Taneytown, or remain in Westminster. The fourth route runs between Sykesville and Eldersburg. In addition, Carroll Transit provides demand response paratransit service in other parts of Carroll County. The Harford County Transportation Service provides fixed-route, deviated fixed-route, and demand response bus service to the general public and the elderly and disabled populations of Harford County. The nine local bus routes connect the primary towns of Joppatowne, Havre de Grace, Bel Air, Edgewood, and Aberdeen, and provide local service for the Town of Bel Air and the City of Aberdeen. The deviated fixed-route service transports employees between Edgewood and the City of Baltimore. All of the routes connect directly or indirectly with MARC commuter trains and MTA commuter bus service to downtown Baltimore City. Howard Transit provides fixed route bus service for Howard County, as well as the HT Ride demand response paratransit service for elderly and disabled residents. Howard Transit provides nine fixed routes serving Columbia and surrounding areas including Clarksville, Ellicott City, Elkridge, Jessup, Laurel, and BWI Airport.

ADDITIONAL LOCAL BUS SERVICES

Connect-A-Ride is operated by Corridor Transportation Corporation, and provides fixed route bus service connecting Columbia, Glen Burnie, Odenton, and Laurel. Anne Arundel County contracts for some of the Connect-A-Ride and Annapolis Transit service provided within Anne Arundel County. The Link Shuttle which is managed by the BWI Business Partnership connects the BWI Business District Light Rail station and BWI MARC/ Amtrak Rail station with

Arundel Mills Mall and the National Security Agency.

RIDESHARE

Rideshare programs are a common component of Commute Trip Reduction programs intended to reduce urban traffic problems.

In the Baltimore region, the MTA funds programs in each of the six member jurisdictions. These programs offer free commuter services to both businesses and residents to provide information on and coordination of alternative commute services. All Baltimore region Rideshare programs offer computerized ridematching, as members of the Commuter Connections database, along with vanpool sponsorship, marketing programs, and incentives to reduce driving. In addition, Rideshare coordinators provide commuters with transit information, Commuter Choice coordination, guaranteed ride home information, and employer outreach services. In some jurisdictions, funding allows Rideshare programs to offer:

- Local transit coordination and scheduling
- Empty seat subsidies (temporarily paying a share of costs if a vanpool has less than six riders)
- Fare subsidies by employers or transit agencies
- Vanpools scheduled to transfer to transit service or other vanpools
- High Occupancy Vehicle (HOV) Priority and preferred parking spaces
- Bike/Pedestrian coordination
- Support to local Transportation Management Associations, transit agencies and community transportation organizations that often provide ridematching services

Rideshare activities throughout the region are implemented either through coordination with individual employers as part of the MTA Commute Trip Reduction program, by a Transportation Management Association, or a Campus Trip Management program. Rideshare coordinators also undertake public outreach at festivals and other public events.

RIDESHARE

Want To Help Make The Air Cleaner? **Join a carpool.**

Single occupant vehicles - where only the driver is in the vehicle - account for much of the emissions that create our region's air quality problems. Reducing the number of people who drive alone is a great way to clean our air.

The RideShare program of the Baltimore Metropolitan Council, sponsored by the Maryland Department of Transportation, can provide you with all of the information and resources needed to form a new carpool or join an existing one. Log onto *www.metrorideshare.com* for all the details.

MOTORCOACH BUS TERMINALS

The Baltimore region is served by three inter-city motorcoach terminals. The interim Haines Street Bus Terminal is located off Russell Street in southwest Baltimore; a permanent bus station is expected to replace the interim Haines Street Terminal. The Baltimore Travel Plaza Bus Terminal is located on O'Donnell Street at I-95 in southeast Baltimore. The third inter-city motorcoach terminal is located at the Transit Operations Facility in the City of Annapolis. The Baltimore region is served by inter-city carriers including Greyhound and Trailways.

SPECIALIZED TRANSPORTATION SERVICES

The ADA requires fixed-route transit service providers and transit facilities to be fully accessible to the elderly and persons with disabilities. Paratransit service must be provided within three-quarters of a mile of all regularly scheduled fixed-route transit. Facilities such as transit stations and bus stops must also be ADA accessible. These individuals are often unable to use conventional fixed-route transit. Some individuals need assistance boarding and alighting transit vehicles. Transit vehicles built and purchased (with federal funds) after August 1990 are required to be lift-equipped. As of January 1997, all MTA and local fixed-route transit service providers in the Baltimore region were in compliance with ADA requirements.

Many public agencies, non-profit organizations, and private-for-profit companies own and operate an array of paratransit vehicles and services. Statewide efforts under the auspices of the Maryland Human Service Transportation Coordinating Committee are underway to improve the coordination of paratransit services provided by human service organizations. The BRTB coordinates with MTA to administer the federal Elderly and Persons with Disabilities grant program which provides funding to private non-profit organizations for vehicles and vehicle-support equipment to serve the travel needs of elderly and disabled populations. The BRTB continues to provide assistance to paratransit users and service providers with the publica-

tion of the "Out and About" Travel Guide. This guide is an easy to use directory with over 90 paratransit providers that serve the region.

In response to the need for additional travel options to serve the rapidly growing, dispersed elderly population in the region, community organizations and faith-based groups are beginning to develop supplemental, community-based transportation services. The importance of this type of alternative transportation service is being increasingly recognized by local, regional, and state organizations. This new type of cost-effective travel service, which is intended to serve the growing ambulatory elderly population, provides flexible door-to-door transportation to the elderly using volunteer drivers that drive their own vehicles. There are currently two community-based transportation services in the Baltimore region—"Ride Partners" in Annapolis and Anne Arundel County, and "Neighbor Ride" in Howard County. The Senior Ride Demonstration Program legislation enacted by the 2004 Maryland General Assembly now provides funding to assist in the development of additional community-based transportation services for the ambulatory elderly.

In addition to supporting initiatives to provide enhanced travel options for the elderly and disabled, BRTB members are directly involved with federal and state efforts to provide improved transportation and related support services to assist low-income job seekers find and retain meaningful employment. The BRTB was a partner with the state in developing the "Baltimore Area Coordinated Public Transit—Human Services Transportation Plan." This Plan uses the "Regional Job Access and Reverse Commute Transportation Plan" as a starting point to incorporate the federal Job Access and Reverse Commute (JARC), New Freedom, and the Elderly and Persons with Disabilities Programs into a locally developed coordinated transportation plan. This Plan promotes seven

strategies to address locally developed unmet transportation needs for low-income, disabled, and senior populations. The strategies are: (1) continue to support capital needs; (2) build coordination among existing public transportation and human service transportation providers; (3) establish a centralized point of access for transportation information; (4) expand demand-response and specialized transportation; (5) provide flexible transportation options; (6) expand accessible transportation services; and (7) expand access to taxi and other private transportation

providers. Projects for JARC, New Freedom, and the Elderly and Persons with Disabilities Programs will need to be based on the adopted plan. The BRTB will review and make recommendations for grants to the MTA for these three federal programs.

Chapter 2, Section 3

OTHER TRANSPORTATION SERVICES

Taxicabs and van services are another form of transportation in the region. There are currently approximately 2,300 licensed taxicabs, though some vehicles may hold more than one license so they can pick up passengers in more than one jurisdiction. By one estimate, there may be twice as many vehicles operating without a license, a practice seen as especially prevalent in Baltimore City, where they are known as hacks, but there are no statistics.

These numbers do not include other transportation for hire services such as sedans, vans, limousines and charter buses. These differ from taxicabs in that the pick-up and destination sites are prearranged with the customer. Statewide, there are about 3,500 vehicles offering these kinds of services. See Appendix 2 for a table of Baltimore region Taxicab Licenses by Jurisdiction.

Although the water taxi system is privately-owned, it is a part of the region's transportation system. Baltimore City contracts with Harbor Boating Incorporated to provide an additional commuter choice. They offer a specific morning commuter service from 7:45 a.m. to 8:35 a.m. that runs prior to their regular business hours and serves several points between Fells Point, Locust Point, and the Inner Harbor. The regular water taxi stops at 12 different landings providing transportation options from Canton, Fells Point, and Locust Point to the Inner Harbor and places in between. The water taxis' regular business hours adjust with the seasons, running from 10 a.m. to between 6 p.m. and 11 p.m. with intervals of 15 to 20 minutes. The fleet is made up of 14 boats ranging in capacity from 26 to 84 passengers. Some new piers have been added to the landings to make boarding easier.

FIGURE 2-4
BICYCLE AND PEDESTRIAN FACILITIES

Bicycling and walking are permitted along most of the region's roadways, with interstate highways being the major exception. The map below shows existing area bicycle and pedestrian facilities.

Chapter 2, Section 4

BICYCLE AND PEDESTRIAN TRANSPORTATION

Bicycling and walking are permitted along most of the region's roadways, with interstate highways being the major exception. SHA is increasingly working to accommodate bicycle and pedestrian travel in the design of state roadway projects, although very few designated on-road bicycle facilities currently exist.

There are a number of popular multi-use trails in the region, including the Northern Central Rail Trail, Baltimore-Annapolis Trail, BWI Trail, Gwynns Falls Trail, and Jones Falls Trail. These trails are currently used mostly for recreational purposes. However, the proximity of many key origin and destination points to these trails indicates that they offer a significant commuting potential. While many of the denser parts of the region have comprehensive sidewalk networks, the more rural and recently developed suburban areas have been designed primarily for the automobile, as pedestrian facilities such as sidewalks and crosswalks are not consistently included in roadway projects and many intersection designs include free-flowing turn lanes. Even in areas with comprehensive sidewalk networks, there are still significant needs. For example, there are many gaps in meeting ADA requirements and many sidewalks are obstructed by utility poles or other structures.

The linkage of the bicycle and pedestrian modes to transit is improving. MTA and SHA are currently working to improve bicycle and pedestrian access in the areas surrounding rail stations in the region. MTA permits bicycles on Baltimore Metro Subway and Light Rail trains, and has installed bicycle racks on some of its buses. MTA also is reviewing ways to accommodate bicycles on MARC trains. A number of rail transit stations are equipped with bicycle lockers or racks, and there are plans to install additional ones. Among local transit providers, Annapolis Transit has installed racks on buses.

Chapter 2, Section 5

FREIGHT MOVEMENT

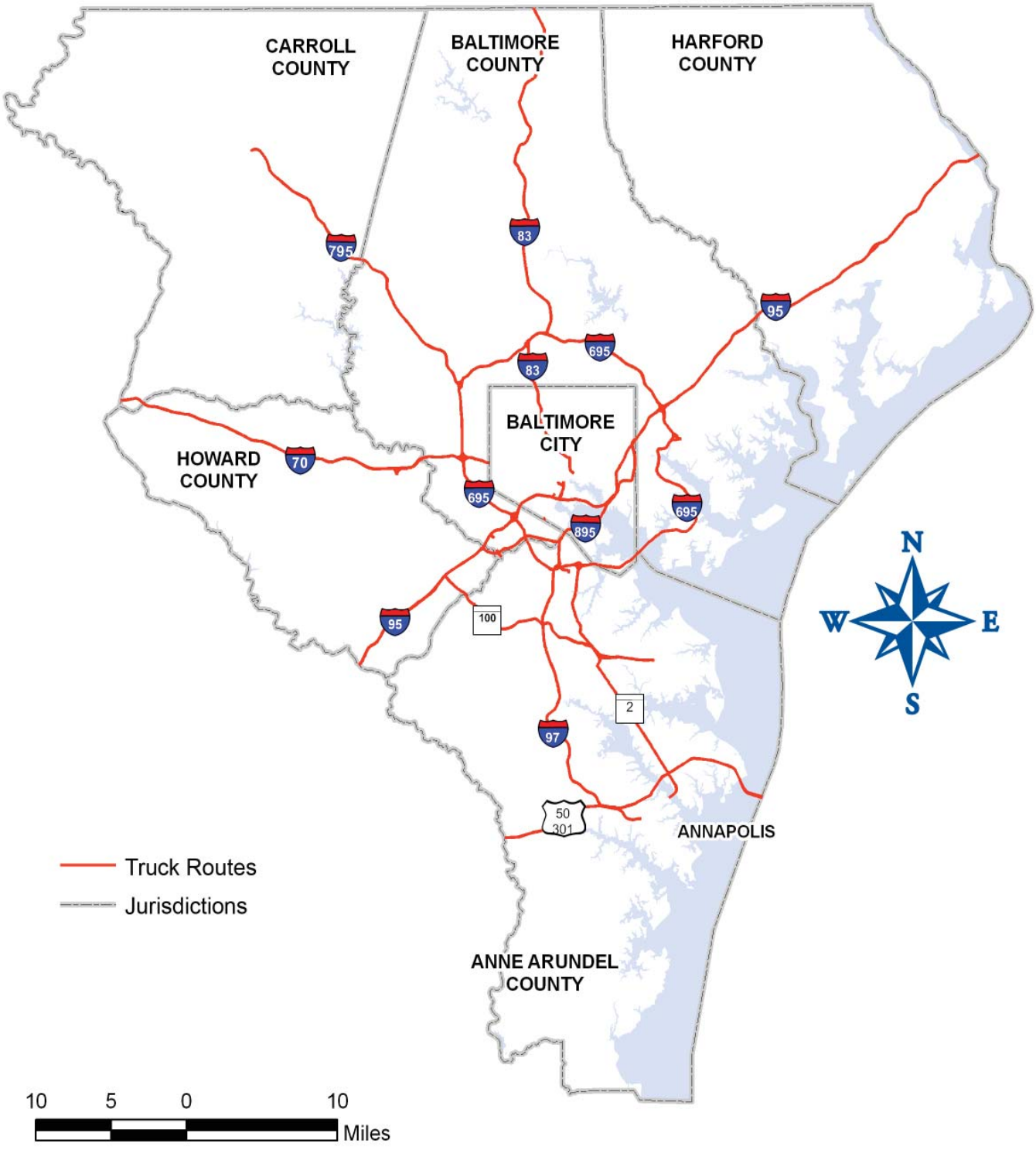
Freight transportation plays a significant role in the Baltimore region's economy. The delivery of packages and the availability of the goods we demand are all dependent on a reliable transportation network. Competitiveness for many Maryland industries depends on freight infrastructure and performance. Motor carrier and rail movements carry the most freight tonnage. The Freight Movement Task Force's recent study, the Baltimore Regional Freight Profile, showed that in the year 2003, 80 percent of total cargo weight (tons) was moved by truck, 13 percent by rail, 6 percent by water, and less than one percent by air. A look at mode shares by value (millions of dollars) for 2003 shows similar proportions with 81 percent truck, 12 percent rail, 6 percent water, and less than one percent air.

HIGHWAY MOTOR CARRIER MOVEMENT

Maryland is an ideal location to serve the largest consumer and industrial markets in North America. By truck, cargo leaving the Port of Baltimore is within an overnight drive to two-thirds of America's population. I-95, I-70, I-695, and I-83 are the principal freight transportation routes for motor carriers or trucks in the region. I-95 provides north/south access to Philadelphia and Washington D.C. markets. I-70 provides access to western Maryland and the Midwestern states. I-695 provides access to the many business and industrial areas around Baltimore, as well as connecting other major highways. I-83 provides access to the northern part of the region and central Pennsylvania. I-97, I-895, and US 50/US 301 are other major Baltimore region routes. These routes are important for freight movement by truck. See Figure 2-5 for Major Truck Routes in the Baltimore region.

Several factors can impact the effectiveness of goods movement by truck such as

FIGURE 2-5
MAJOR TRUCK ROUTES



problems associated with roadway construction, roadway deficiencies, and traffic congestion in and around metropolitan areas. The most problematic corridors include I-95, I-695, I-70, and US 50/US 301. Within these corridors there are particular chokepoints and congested sections, including the I-95 Fort McHenry Tunnel and Bay Bridge Toll Plazas. Trucks also must abide by height clearances, bridge and pavement weight limits, hours of service regulations, and parking restrictions. Intermodal connectors are local, county, or city streets that connect the National Highway System to major terminals. While intermodal connectors are typically shorter than two miles long, they carry heavy truck volumes, and they have less stringent design standards than the interstates. This added stress causes intermodal connectors to degrade faster than other roads. A Federal Highway Administration report states that problems with shoulders, inadequate turning radii, and road maintenance are commonly cited geometric and physical deficiencies on connectors. The connector road segments located in the Baltimore region are primarily located near port terminals.

FREIGHT RAILROADS

Railroads are vital links that provide long-haul connections between shippers and consignees within and outside the region. The Baltimore and Ohio (B&O) rail line is one of the oldest in the United States dating back to 1827. The B&O rail line originated at the Port of Baltimore and ended in Ohio linking 13 states. Many of the rail lines in the Baltimore region remain important historic links that originate from the Port of Baltimore.

The Baltimore region serves Class I, shortline, and switching and terminal rail lines. Class I railroad companies are defined as those with annual revenues in excess of $258.5 million. The CSX and Norfolk Southern Railroads (NS) are private companies that operate Class I railroads; shortline railroads include Maryland Midland Railroad; and two switching and terminal rail companies are the Canton Railroad and Patapsco and Back Rivers Railroad.

CSX owns and operates 450 route miles in Maryland, about 50 percent of the to-

tal freight rail lines. CSX also owns several facilities in the Baltimore region, including rail switching yards and rail-to-truck and auto distribution centers. In addition, CSX operates the publicly owned Intermodal Container Transfer Facility (ICTF) at the Seagirt Marine Terminal at the Port of Baltimore. Most of these facilities are in Baltimore City.

NS owns 89 route miles and operates another 90 miles through an agreement with Amtrak on its Northeast Corridor line. NS also owns a rail-to-truck facility and the Bayview ICTF and switching yard in Baltimore City.

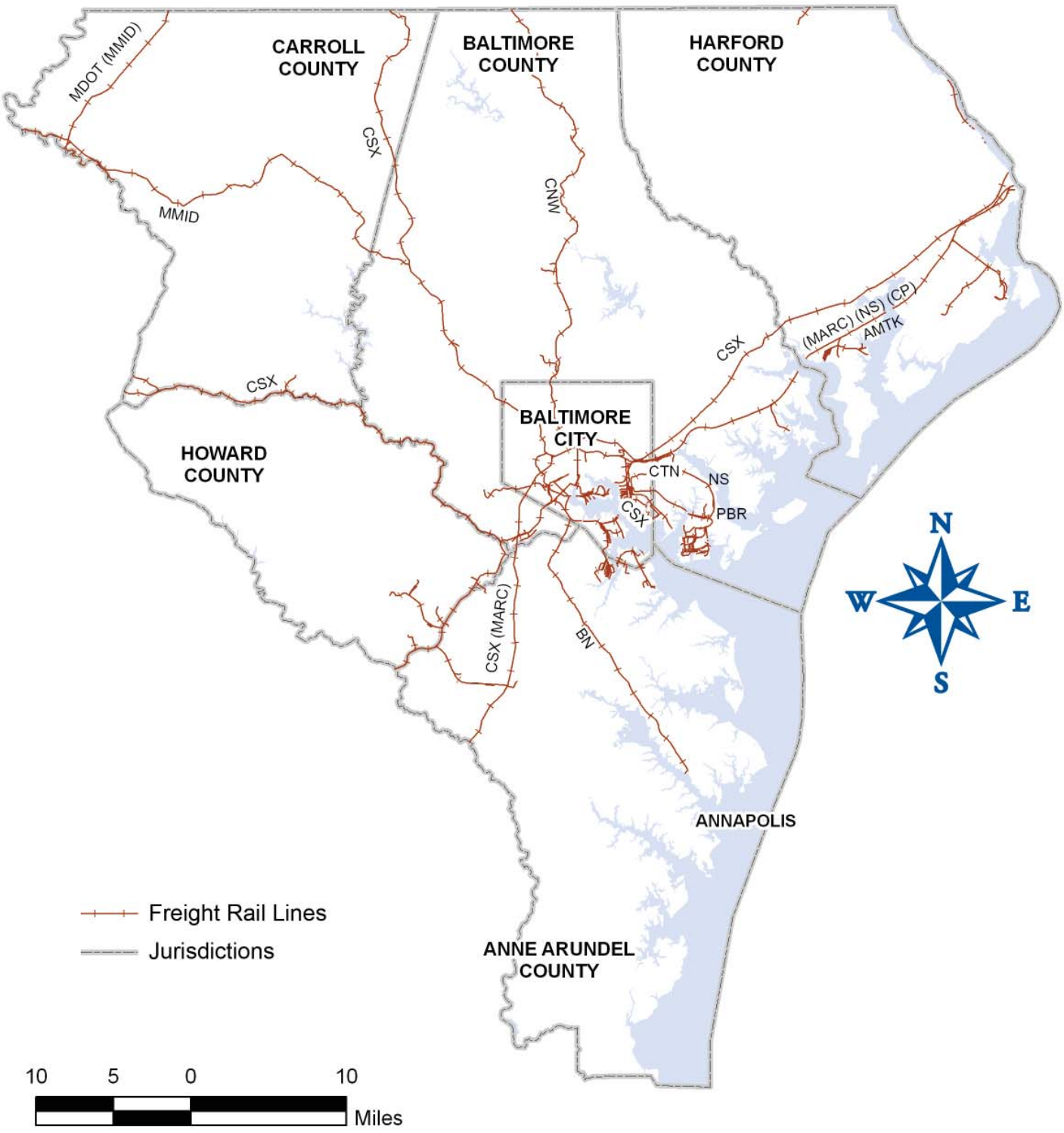
Maryland Midland Railroad (MMID) is a shortline railroad that operates in Carroll, Frederick, and western Baltimore counties on 67 miles of track. MMID primarily transports raw materials such as coal, cement, and lumber products. MMID's yard is in Union Bridge and the railroad interchanges with CSX.

Two switching and terminal railroads serve the Baltimore region. The Canton Railroad, owned by MdTA, operates on six miles of state-owned track in Baltimore City and Baltimore County from the Seagirt Marine Terminal to Eastpoint. The railroad interchanges traffic with CSX and NS. The privately owned Patapsco and Back Rivers Railroad primarily transports raw materials to and from the Bethlehem Steel plant at Sparrows Point along its ten miles of track.

Baltimore's older rail infrastructure has created some height, width, and weight limitations that can impede the flow of rail traffic. For example, new generation auto railcars and the ability to double-stack high-cube containers require higher clearances than are available in several locations. In the Baltimore region, several tunnel and bridge clearances are not high enough to accommodate the new 20'6" standard size. The CSX Howard Street tunnel in Baltimore City cannot handle high cube double-stack service. This makes Baltimore City one of a handful of East Coast ports without high-cube double-stack service in place or under consideration; however, low cube double-stack trains can be accommodated. There are many other clearance issues in and outside the Baltimore region.

Rail safety issues are primarily related to reducing the crashes that occur at grade crossings. There are 400 grade crossings in the region with 200 of them in Baltimore City. MTA and SHA work together to promote education and enforcement of grade crossing safety. SHA manages the federal funds used to improve signalization at crossings. Figure 2-6 shows the Freight Rail Lines in the Baltimore region.

FIGURE 2-6
FREIGHT RAIL LINES



WATER TRANSPORTATION

The Helen Delich Bentley Port of Baltimore celebrated its 300th anniversary in 2006. Beginning in the 1700's with grain and tobacco, and continuing today with heavy machinery, autos, farm equipment, containers, steel, paper products, aluminum, coal, sugar and salt.

This Port is the Baltimore region's major maritime facility and is one of only two ports on the East Coast that has a 50-foot deep channel.

The Maryland Port Administration (MPA) is responsible for the overall management, safety, operation, and marketing of the Port's facilities.

With a unique 150-mile inland location, the Port allows cargo travelling by train access to two Class I railroads that can reach any distant inland location.

The marine terminals at the Port of Baltimore include both 6 publicly and 30 privately owned and operated facilities on 45-miles of waterfront.

Dundalk Marine Terminal is the second largest terminal on the North Atlantic coast and the largest general cargo facility in the Port. Seagirt Marine Terminal, which opened in 1990, is the newest and most modern container terminal at the Port of Baltimore. Other public port facilities include North and South Locust Point and Masonville.

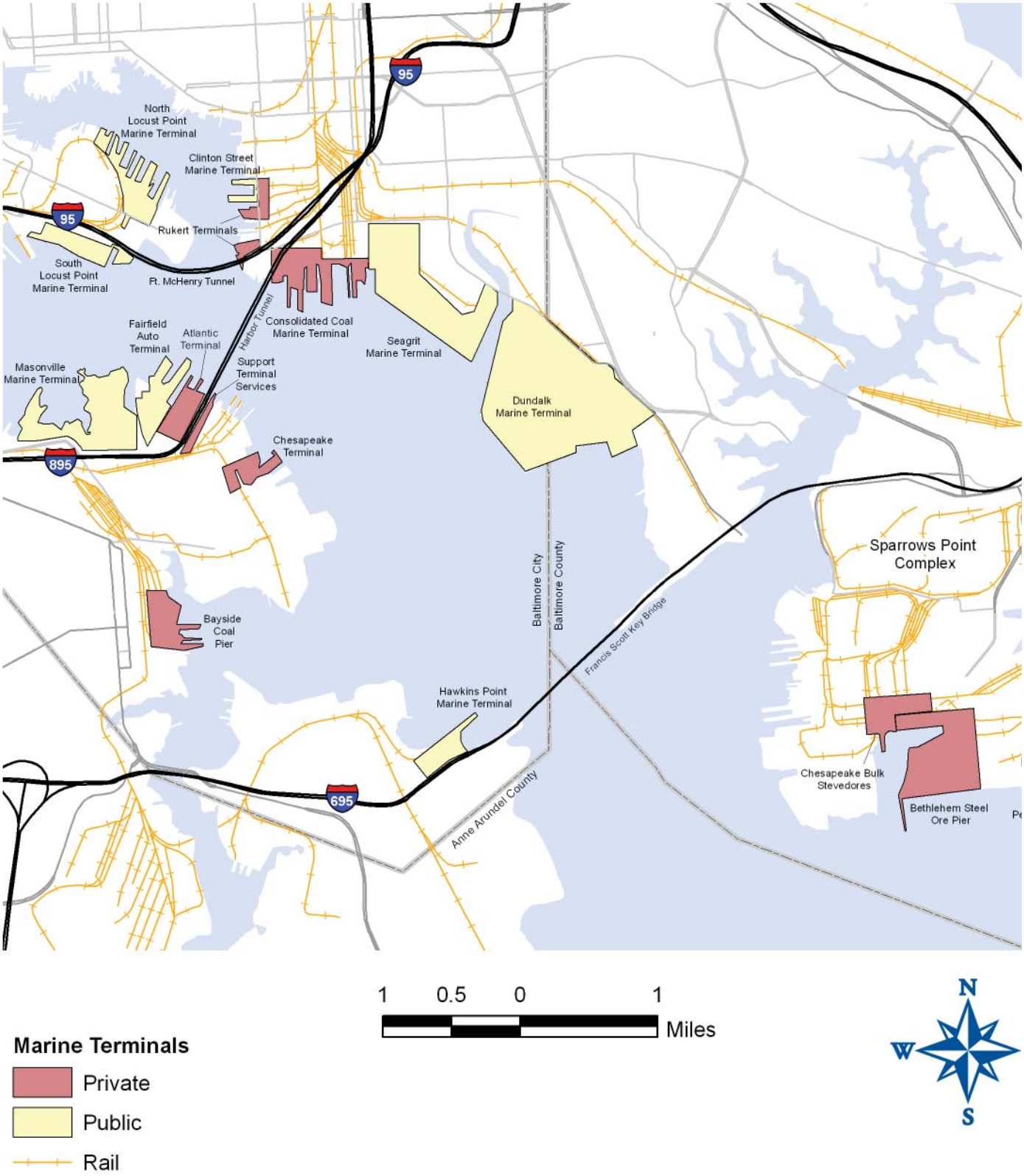
The Port of Baltimore competes heavily with other East Coast ports. It seeks to increase freight business in such areas as automobile imports, roll-on/roll-off (Ro-Ro) equipment, and forest product imports.

General cargo movement through MPA terminals outpaced record highs, reaching 8.24 million tons in Fiscal Year 2006.

Foreign cargo tonnage (bulk and general cargo) also exceeded prior year levels, reaching 32.4 million tons in 2005. The increase in tonnage of both general and foreign cargo represents a two percent increase from prior years.

Figure 2-7 depicts the Port of Baltimore.

FIGURE 2-7:
PORT OF BALTIMORE MARINE TERMINALS



AIR TRANSPORTATION

The passenger and freight air transportation needs of the Baltimore region are served by the Baltimore/Washington Thurgood Marshall International Airport (BWI), Martin State Airport (MTN), and by a system of private and municipal general aviation airports.

Both BWI and MTN are owned and operated by the Maryland Aviation Administration (MAA).

Figure 2-8 shows Existing Airport Facilities.

BWI has maintained a consistent one-third market share of passenger air travel in the Baltimore-Washington D.C. regional air travel market which also includes Dulles International Airport and Ronald Reagan National Airport. With over 20.6 million domestic and international passengers using BWI in 2006, BWI continues to recover from the passenger decrease experienced throughout the aviation industry following September 11, 2001.

MTN, located in Baltimore County, is the largest general aviation airport in the tate, primarily serving local businesses.

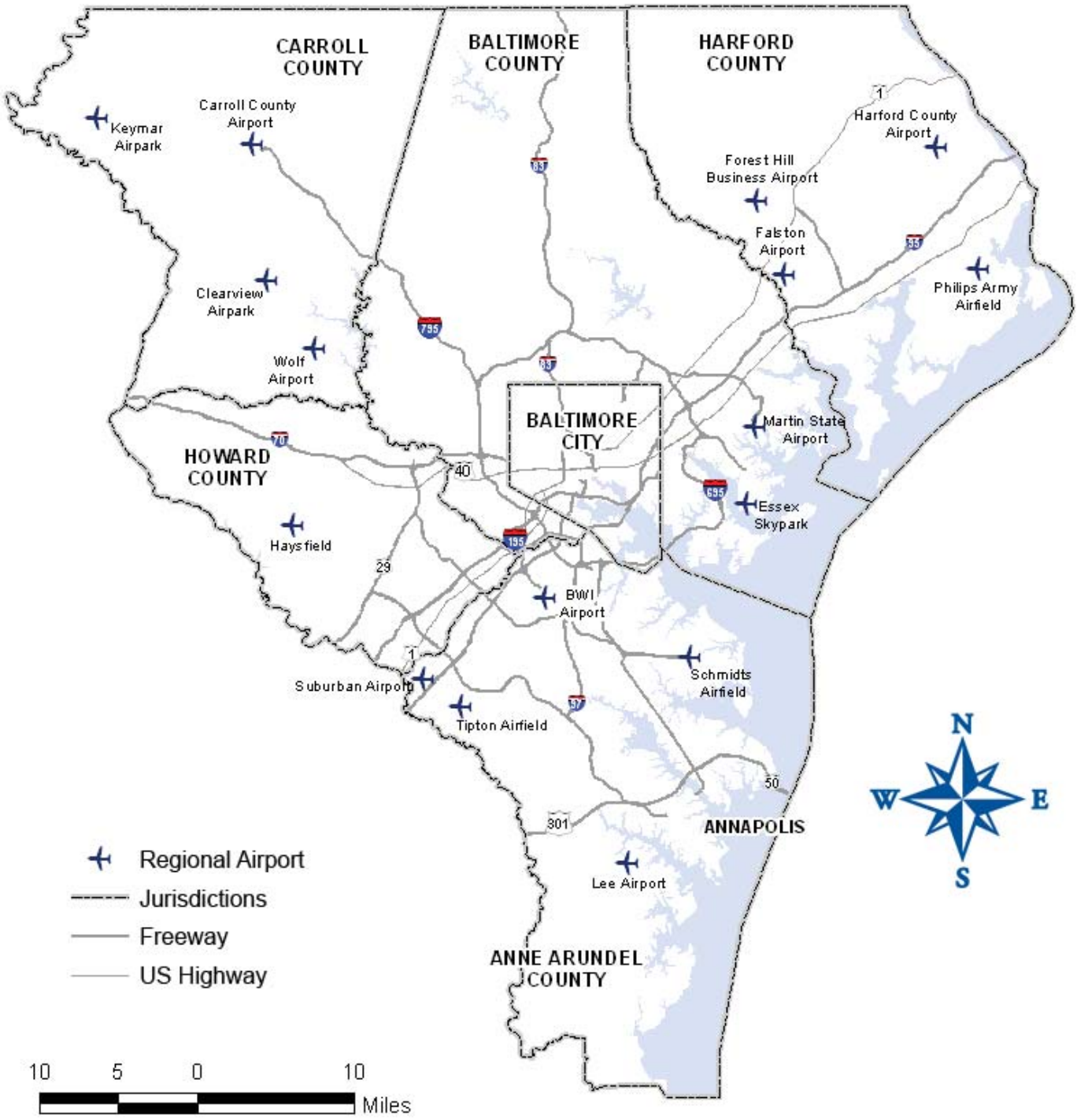
It also provides a base for the Maryland Air Guard, the aviation components of the Maryland State Police, and the Baltimore County and City Police Departments. MTN also serves as a reliever airport for BWI. Most other public use general aviation facilities are limited in scope, and serve smaller general aviation aircraft.

BWI also is the region's major air freight facility. Domestic and international companies handle specialized cargo, such as seafood, flowers, and other time-sensitive, high-value shipments.

BWI's new 60,000 square-foot cargo building is located separately from passenger traffic. Several all-cargo airlines serve BWI and many passenger airlines also provide freight movement services (belly-freight).

Air cargo shipments usually do not originate or terminate at an airport location. Goods are often trucked long dis-

FIGURE 2-8: EXISTING AIRPORT FACILITIES



FREIGHT FACTS

Our economy, jobs, and consumers rely on the efficient movement of freight through the transportation system. Here are a few facts about the region's freight system.

- Over 20.6 million domestic and international passengers traveled through BWI airport in 2006
- The Port of Baltimore is one of only two ports on the East Coast that has a 50-foot deep channel.
- The marine terminals at the Port of Baltimore include both 6 publicly and 30 privately owned and operated facilities on 45-miles of waterfront.
- The Baltimore and Ohio (B&O) rail line is one of the oldest in the United States dating back to 1827.
- A recent study by the BRTB's Freight Movement Task Force showed that in 2003, 80 percent of total cargo weight (tons) was moved by truck, 13 percent by rail, 6 percent by water, and less than one percent by air.

tances to connect with direct flight services particularly for international markets.

Often air cargo arrives at BWI and is trucked to New York's Kennedy Airport to meet the next day's international departures.

These trucks pick up freight along the way in Philadelphia, Newark, etc. and deliver local destination freight.

INTERMODAL FACILITIES

Intermodal facilities are major facilities such as the Port of Baltimore or the BWI Airport where goods are transferred from one mode to another.

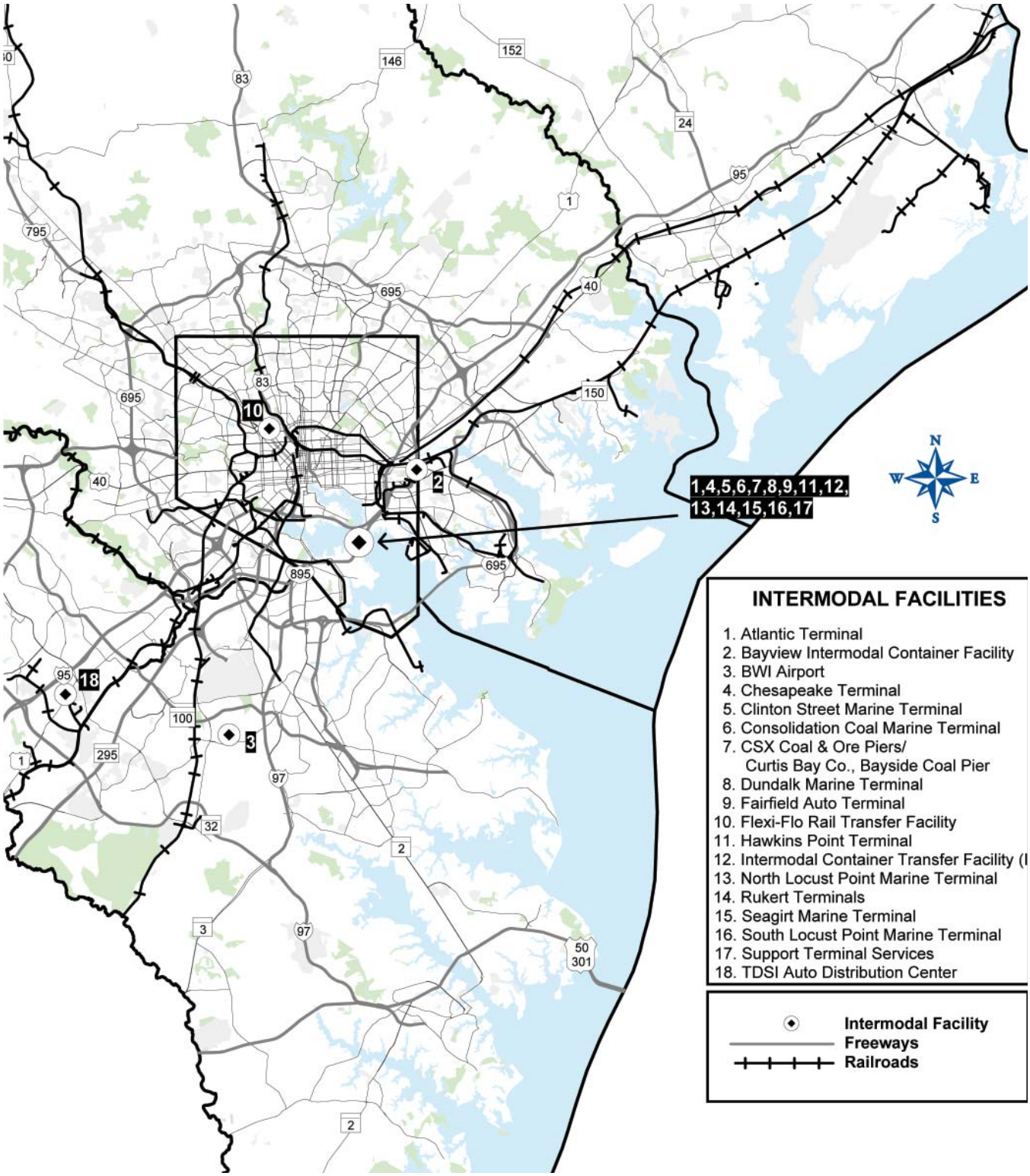
For example, at the Port of Baltimore containers and bulk cargo are transferred from ships to truck or rail modes of transportation.

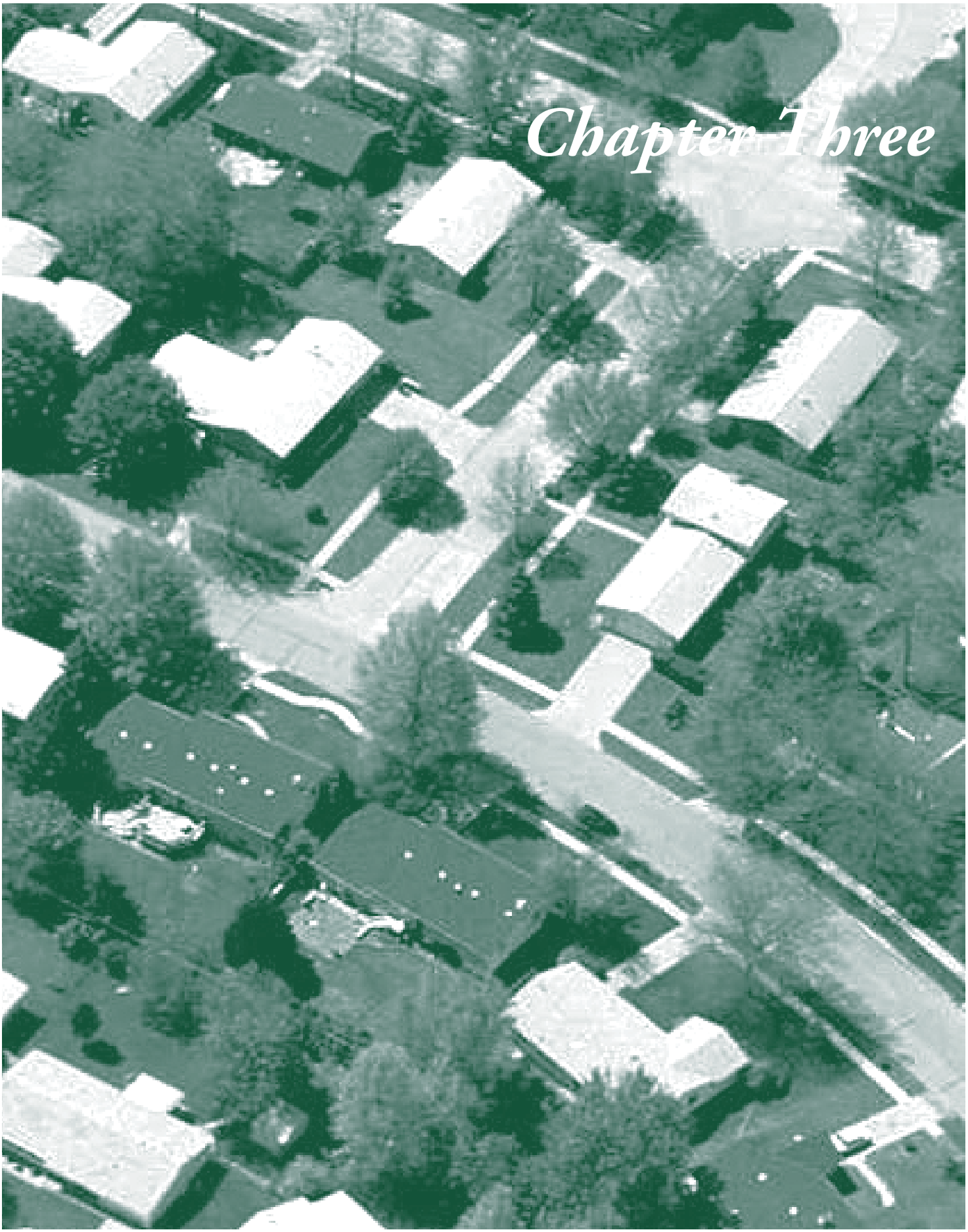
Trucks dominate short-haul movement whereas rail dominates long-haul with heavy or bulky cargo such as coal.

Air cargo tends to be time sensitive, high value goods such as flowers or pharmaceuticals.

Figure 2-9 identifies the major intermodal facilities in the Baltimore region.

FIGURE 2-9
INTERMODAL FREIGHT FACILITIES





Chapter Three

Connecting Growth Management and Transportation

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Chapter Three

Connecting Growth Management and Transportation

While land use planning is not within the purview of regional transportation planning, approaches to linking land use and transportation are underway.

A variety of effective transportation options are created by:

- Accommodating pedestrian and bike safety and mobility;
- Providing and enhancing public transportation service;
- Improving the connectivity of road networks;
- Taking a multi-modal approach to transportation with supportive land use development patterns.

The Federal-aid transportation planning program supports efforts to coordinate land use and transportation decision-making and to foster "smart growth."

Economic and community development plans rely heavily on transportation accessibility to realize their goals. Conversely, land use strongly dictates the type of transportation investment that will be most effective.

Thus, it is vitally important that transportation and land use planning are closely coordinated.

Chapter 3, Section 1

SMART GROWTH PRIORITY FUNDING AREAS ACT

Since 1997, the statutory guidance for land use planning and growth management in the state has been Maryland's Smart Growth Priority Funding Areas Act (Smart Growth Act) which follows the Economic Growth, Resource Protection, and Planning Act of 1992. The Smart Growth Act was a strong step toward managing urban sprawl while reinvesting in the state's existing urban areas.

A central feature of the Smart Growth Act was the establishment of Priority Funding Areas (PFAs) for each jurisdiction. PFAs delineate areas of urban character deemed appropriate to accept growth and development from the rural, agricultural, and environmentally sensitive areas where growth is restricted. This incentive-based law functions by limiting state infrastructure and economic development funding to PFAs. (See Appendix 3 for more PFA information).

Chapter 3, Section 2

REGIONAL COORDINATION WITH LOCAL LAND USE

Land use planning and zoning decisions are made at the local jurisdiction level, which are then reflected in the forecasts developed for population, households and employment. This information forms the basis for recommended transportation investments. The individual jurisdictions are correspondingly influenced by their own comprehensive

plans, which are influenced by local economic and community development priorities and by state or federal funding levels and requirements.

Outlook 2035 attempts to ensure that the decisions of the individual jurisdictions are compatible with the needs of the region as a whole, and that federal and state regulatory requirements are met.

Since it is often difficult to ensure that year-to-year plans and programs will lead to a satisfactory long-term outcome—even with a formal regional plan update every four years—the BRTB conducted a long-term visioning exercise between 2001 and 2003 to clarify its regional goals and aspirations for the next 25 years.

The Vision 2030 process was conducted to draw input from the community on the goals and priorities that would lead Baltimore to be a great region. The following is a summary of key Vision 2030 transportation related topics:

- Transit Oriented Development (TOD) / Mixed-Use Revitalization
- Access to Jobs
- Accessibility of Transportation Opportunities
- Air/Water Quality
- Transportation Funding
- Public Participation

Many of the recommendations from Vision 2030 drew a focus on the transportation and land use connection, and have since found their way into key planning and project activities across the region.

Each jurisdiction in the Baltimore region has created a vision as well as a land use and transportation plan. Table 3-1 outlines references to the various tools used by jurisdictions in the Baltimore region to create their local General Plans.

FIGURE 3-1
APPLICATIONS OF GROWTH MANAGEMENT TECHNIQUES

TECHNIQUE	ANNE ARUNDELCOUNTY	BALTIMORE CITY	BALTIMORE COUNTY	CARROLL COUNTY	HARFORD COUNTY	HOWARD COUNTY	CITY OF ANNAPOLIS
Growth Boundary	Y	N	Y	Y	Y	Y	N
Density Zoning	Y	Y	Y	Y	Y	Y	Y
Overlays and/or Floating Zones	Y	Y	Y	Y	Y	Y	Y
Transfer of Development Rights	Y	N	N	Y	Y	Y	N
Clustering	Y	N	Y[1]	Y[2]	Y	Y	Y
Agricultural Zoning	Y	N	Y[3]	Y	Y	Y	N
Adequate Public Facilities Ordinance	Y	N	Y	Y	Y	Y	Y
Planned Unit Development	Y	Y	Y	Y	Y	Y	Y
Sensitive Areas	Y	Y	Y	Y	Y	Y	Y
Other	Y[5]	Y[5]	Y[6]	Y[1]	Y[7]	Y[8]	Y[9]

Source: Adapted from *BMC Task Report 96-1: Local Land Use Techniques and Their Potential Impact on Travel Demand*, September 1995, Updated Fall 2007.

Y[1]: RC-2; Resource Conservation/Agricultural Preservation
Y[2]: RC-4; Resource Conservation/Watershed Protection
Y[3]: AG; Agricultural
Y[4]; Capital Improvement Program
Y[5]; Targeted Capital Investment, Urban Renewal Zones, Community Benefits Districts
Y[6]; Quadrennial Zoning, Streamlined Development Review Process, Community Revitalization
Y[7]; Commercial Revitalization Districts and Edgewood Neighborhood Overlay District
Y[8]: Mixed-Use Development Overlay, New Town Zoning
Y[9]; Mixed-Use Zoning, Revitalization Areas, Neighborhood Planning, Capital Improvement Program, Density Bonuses

Chapter 3, Section 3

LOCAL LAND USE PLANS

Chapter 3, Section 3.1

ANNE ARUNDEL COUNTY

The most recent update of Anne Arundel County's General Development Plan occurred in 1997 (1997 GDP). The 1997 GDP recommends measures to improve the way the county manages development and natural resources as well as enhance the quality of life for residents and businesses. It sets the stage to improve existing communities.

One of the key concepts put forth in the 1997 GDP is "Mixed-Use" development. Mixed-use areas are anticipated to include residential, retail, and employment uses as well as Light Rail and Commuter Rail Stations, major employment centers, or be located along major transportation corridors such as the Baltimore-Washington Parkway.

Since adoption of the 1997 GDP, four mixed use zones have been incorporated into the county's zoning ordinance, and five properties have been re-zoned for mixed-use development with additional areas planned for mixed-use.

Another important growth management concept is the "Town Center," which the county has designated in three locations: Odenton, Parole, and Glen Burnie. Each site projects a vision of a mixed-use center that combines higher-density residential, retail, and employment in a setting that is pedestrian and transit friendly.

These sites are intended to serve many of the travel demands of its residents internally, while also serving as an urban center for the surrounding community. Master plans have been developed for both Odenton (November 2003) and Parole (September 1994), while the Glen Burnie concept is detailed in a September 2004 Small Area Plan.

These are sites of substantial scale where the concepts call for imposition of a new growth model that would replace existing scattered and fragmented development with the densities, intensities

and building types that mark a cohesive, integrated, and vibrant town core. Located at the Odenton MARC station, Odenton Town Square, a TOD, will include a diverse mix of retail, restaurants, office, hotel and housing uses that will create a vibrant live/work community.

The county embarked on its Small Area Planning process in 1998 to refine the recommendations of the 1997 General Development Plan. Small Area Plans were used to provide more detailed guidance for planning in 16 different areas of the county. These Plans, which were completed between 2000 and 2004, include recommendations for land use, transportation, the environment, utilities, community design and community facilities. Comprehensive zoning changes have been implemented through this Small Area Planning process.

The Small Area Plans demonstrate support for such concepts as pedestrian accessibility and comprehensive transit service. These proposals are embodied in the county's endorsed Transit Development Plan (September 17, 2003).

The Brooklyn Park area anticipates an increase in housing density with the development of two significant residential projects, Patuxent Place and Cedar Hill. The community's easy accessibility to downtown Baltimore and BWI will make Brooklyn Park a highly desirable location and provide new opportunities for increased transit service.

The 1997 GDP makes a concerted effort to increase accessibility to employment centers in Anne Arundel County, but also to Baltimore City and Washington D.C. The 1997 GDP suggests the need to investigate the feasibility of additional commuter/transit corridors, particularly along the county's major road corridors, such as MD 2, MD 3, MD 214, US 50/301, and I-97.

Particular attention is given to the feasibility of an additional light rail stop in the Glen Burnie Town Center, as well as extension of light rail along the Route 2 corridor to Annapolis. Furthermore, one of the 1997 GDP stated policies is the encouragement of improved access and feeder bus service between rail stations and employment areas.

The 1997 GDP is scheduled to be updated in 2008 and will reflect recent and ongoing planning to accommodate the 2005 Department of Defense plan for federal Base Realignment and Closure actions – which will add more than 10,000 jobs and 4,000 households to the county.

Chapter 3, Section 3.2

BALTIMORE COUNTY

Baltimore County's 2000 Master Plan contained a number of elements that were already consistent with the recommendations of Vision 2030, including:

- Reinforcement of the Urban-Rural Demarcation Line (URDL), signifying the outer limits of the urbanized portion of the county within which the county expects to accommodate all projected population and employment growth. This is a key growth management strategy.
- A policy to direct new residential, service, and employment development into the Urban Centers, to encourage redevelopment in the Community Conservation Areas and Revitalization Districts, and to protect productive agricultural soil types from development in the Agricultural Preservation Areas.
- Continued emphasis of the Owings Mills and Perry Hall/White Marsh growth areas as the key locations for new development.

The current 2010 Master Plan retains and builds upon many of the key features of its predecessor. An important premise in updating the Master Plan was that traditional master plan issues—such as transportation, zoning, and recreation—have changed substantially, and a much more comprehensive approach would be necessary in order to ensure that the County Council has proper guidance when it acts to establish land use policy.

The county recognizes important shifts in the composition of its residents (more seniors and moderate income households) with important bearing on housing and transportation requirements. Moreover, it recognizes that continued growth pressures within the URDL will require significant reinvestment in its older urban areas.

This policy priority is further reinforced by passage of the County Executive's "Renaissance Redevelopment" legislation in April 2004, which makes a priority out of reinvesting in older communities. Its objectives are to revitalize established communities by redeveloping underused sites, and to utilize a cooperative

design process to create high quality, buildable redevelopment projects.

TOD is a strong theme in the Baltimore County Master Plan. The Plan cites a recently commissioned study led by the MDP of the benefits of an expanded or mixed-use/TOD plan for the Owings Mills growth district.

The Hunt Valley/Timonium Master Plan encourages land uses that support Light Rail, such as the promotion of mixed-use and pedestrian-friendly design in the West Aylesbury Road Area.

In the Perry Hall/White Marsh growth area, the recommended town center component of the Honeygo Plan calls for an integrated mix of uses, including an alternative to maximize the potential for transit usage such as access to the proposed White Marsh rail transit station.

Pedestrian-friendly design also surfaces on several fronts, most notably in the land use plan for the Red Run Employment Corridor in the Owings Mills Growth Area and through overlay regulations implemented at Honeygo.

TOD is also expected to factor prominently into planning discussions for the proposed Red Line, with four stations along the proposed alignment located in Baltimore County.

The latest Master Plan addresses job accessibility by encouraging strategies such as private partnerships to increase public transit ridership and job access, and by encouraging more suburb-to-suburb transit options that will help complement the county's radial road and transit network.

Both the Hunt Valley/Timonium Master Plan and the Towson Master Plan, for example, recommend the investigation of public/private partnerships to encourage employers to support transit passes for employees.

The effort to increase accessibility in the Hunt Valley/Timonium Plan is reflected in the suggestion that the Planning Office, in partnership with the Maryland Transit Administration, assess the feasibility of establishing a shuttle system in the York Road corridor.

Also, the Towson Plan speaks at length of the need for a transit center to coordinate services between MTA and other transit providers, as well as to provide a pedestrian-friendly gateway into the town center.

Over 40,000 acres of farmland have been protected under Carroll County's agricultural preservation program.

Chapter 3, Section 3.3

CARROLL COUNTY

The 2000 Carroll County Master Plan—*Carroll County Challenges and Choices: A Master Plan for the Future, November 2000*—had as its primary goal achieving a well-balanced, high-standard growth, consistent with the ability to provide essential community facilities and services and to protect basic natural resources.

To this end, the Carroll Plan pursued policies and programs which encourage the majority of new development to occur in designated Community Planning Areas (CPAs). Eight of the designated CPAs encompassed incorporated cities or towns: Hampstead, Manchester, Mt. Airy, New Windsor, Freedom (including the Town of Sykesville), Taneytown, Union Bridge, and Westminster.

To support the concentration of growth in these designated areas, the County took several important steps.

First, public water and sewage systems were systematically delineated to support focusing growth in CPAs while discouraging development outside the CPA.

Second, the County maintained an agricultural preservation program that has been able to protect over 40,000 acres of farmland to date.

Third, the County's Commis-

sioners enacted an Adequate Public Facilities and Concurrency Management Ordinance which aims to ensure that the rate of new residential growth proceeds at a rate that would not unduly strain critical public facilities and services—including schools, roads, water and sewer facilities, and police, fire, and emergency medical services.

The 2000 Master Plan also now encourages creation of mixed-use zoning districts within CPAs to allow for higher-density residential development, and to provide housing opportunities for all socio-economic elements of the population.

The Plan also supports the continuation of Main Street programs as a mechanism for stimulating redevelopment and revitalization of the traditional downtown areas of CPAs.

As part of the development of a new comprehensive plan, Pathways to Carroll's Future Landscape, the County is evaluating options for a transportation network to serve existing and planned residents and businesses.

Five key topics, or "Pathways," were identified in the work planning process as paramount. The Transportation Pathway will consider the needs of planned growth.

The land use directions chosen will drive the transportation planning. As a result, the Transportation Pathway development will be conducted once the other Pathways have moved forward.

The Carroll County Comprehensive Plan is expected to be completed and adopted in 2008.

Chapter 3, Section 3.4

HARFORD COUNTY

The 2004 Master Plan and Land Use Element Plan provides direction to address future growth, revitalization, the provision for adequate public facilities, economic development and the preservation and protection of natural resources, agriculture lands and historic resources.

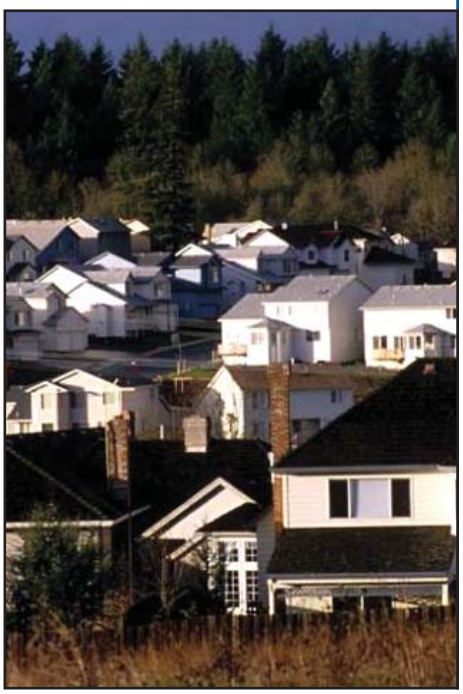
The 2004 Master Plan establishes the following Guiding Principles for development under the Land Use Element Plan and the individual Community Master Plans:

1. Quality-of-life;

2. Stewardship of resources;
3. Growth management;
4. Redevelopment and revitalization;
5. A sound, balanced, and diversified local economy;
6. Commitment to communities; and
7. Coordination among agencies.

The 2004 Master Plan reinforces the previously adopted strategy of a Development Envelope.

The 2004 Master Plan also establishes a goal of "promoting planned, balanced growth within the Development Envelope," which is defined as the area within I-95/US 40 corridors and the MD 24 corridor north to Bel Air.



The Development Envelope is a growth management tool designed to ensure that planned development is located in suitable areas that can be provided with necessary public services.

Since 1990, between 80 to 85 percent of new residential development in the county has occurred within the Development Envelope. As of 2004, the County had an estimated residential capacity of 22,272 units to last approximately 17 years within the Development Envelope.

In addition, there are three incorporated municipalities in Harford County: Bel Air, Havre de Grace, and Aberdeen, each exercising planning and zoning authority. However, the estimated residential capacity countywide includes capacity within the three municipalities.

Since 1990, between 80 to 85 percent of new residential development in Harford County has occurred within the Development Envelope.

Development activity in the Development Envelope is constantly monitored and is reported on annually as a measurement of the adequacy of public facilities (schools, water and sewer, and highways) through an Annual Growth Report. The zoning code provides for a range of housing densities, from one lot per 10 acres to urban densities approaching fourteen units per acre, and housing types, from single-family detached to high-rise apartment units.

To accommodate development in more flexible environments, the zoning code contains provisions for special development districts and flexible standards for development in residential, commercial, and redevelopment situations.

Two new special zoning approaches for redevelopment have been incorporated into the code—Mixed-Use Centers along the U.S. Route 40

Commercial Revitalization District and the Edgewood Neighborhood Overlay District. In each case, the theme is to provide opportunities and incentives for high quality mixed-use development.

In the area of transportation, the 2004 Land Use Element Plan calls for transportation facilities that serve the existing and future population and enhance employment opportunities within the county.

The transportation goal and objectives noted in the 2004 Land Use Element Plan identify the need for a transportation system capable of serving existing and future growth, providing for a multi-modal transportation system, and ensuring protection of the environment and community character while supporting the efficient and safe movement of people and goods.

These principles are carried into a separate Transportation Plan which provides detailed policies and priorities for identified transportation infrastructure needs to accomplish the objectives outlined in the Land Use Element Plan.

The Harford County 2000 Transportation Plan promotes a close coordination of efforts between providing transportation facilities and services to making decisions on land use.

The Transportation Plan supports the concept of a mixed-office designation at key interchanges along I-95, and industrial/employment uses on the Perryman Peninsula. To support these uses and development activities, the Transportation Plan recommends specific projects and services for highway, transit, and non-motorized transportation opportunities such as bicycle and pedestrian facilities.

Future activities related to the Land Use Element Plan and the Harford County Transportation Plan will reflect recent and ongoing planning to accommodate the 2005 Department of Defense plan for federal Base Realignment and Closure actions – which will add more than 12,000 jobs and 6,000 households to the county.

Photo Source: www.hclibrary.org

Chapter 3, Section 3.5

HOWARD COUNTY

Howard County's General Plan 2000 (adopted in 2000) focuses on the county's transition from a rapidly growing jurisdiction to a "maturing" county. The county no longer has the supply of raw land that supported the rapid growth rates of the past three decades. With the county's land use patterns largely set, the next twenty years are expected to see the build-out of this pattern and a shift toward renovation and redevelopment of older properties.

An important example of this shift in focus from new development to redevelopment is the US Route 1 Corridor Revitalization program. This corridor, which encompasses all land area in the county east of Interstate 95, is one of the oldest development areas in the county.

General Plan 2000 established the need for revitalization of the county's older communities and articulated policies and actions for community conservation and enhancement, and for balanced and phased growth that affects the corridor. The revitalization means improving opportunities for new and expanding corridor businesses, plus expanding housing opportunities in specific locations in the corridor and allowing housing in mixed-use districts.

To implement this plan, three new zoning districts have been created: Corridor Employment-Continuing Light Industrial; Corridor Activity Center-Continuing Light Industrial; and Transit Oriented Development (TOD).

Several techniques have been implemented to control/manage Howard County's pace of growth until build-out is reached. The Adequate Public Facilities Act, passed in 1992, was designed to ensure that public schools and roads are adequate to accommodate new development in the county.

The eastern 40 percent of the county, which includes Columbia, is a designated MDP "Priority Funding Area" (PFA) for state-funded projects. The boundary, which also conforms to the public water and sewer service area,

encourages more compact development patterns in eastern Howard County, allowing more efficient provision of public services and facilities.

The PFA is planned to accommodate 85 percent of the county's future growth, while allowing it to continue to preserve 30,000 acres of agricultural and environmentally sensitive land in the Rural West.

To encourage and accommodate growth in the PFA, various tools are available such as density zoning to permit a variety of development options, adequate public facility requirements to synchronize new development with the availability of services, planned unit developments to permit a range of housing types with flexibility in design requirements, and mixed-use and TOD opportunities to accommodate housing, employment, public facilities, and services.

Preservation of the Rural West has been an important principle in the county's growth management effort. Landowners have been offered two options to transfer development density as a means of focusing and managing rural residential growth: a Density Exchange Option (DEO) and a Cluster Exchange Option (CEO).

In the DEO option, landowners are allowed to send all or part of the density (dwelling unit rights) from an eligible sending parcel in the Rural Conservation (RC) District to an eligible receiving parcel in the RC district or to any parcel in the Rural Residential (RR) District that is six acres or greater. The CEO is similar to the DEO except that it is used to transfer density among parcels in the RC zone. Because the transaction occurs within the RC zone, no density incentive is provided for the receiving parcel (receiving incentives applies only to the RR zone).

In order to ensure sufficient tax revenue growth in the county, the General Plan 2000 seeks an appropriate balance between housing and job growth. This allows for more diversification of tax

The eastern 40 percent of Howard County, which includes Columbia, is a designated MDP "Priority Funding Area" (PFA) for state-funded projects. This PFA is planned to accommodate 85 percent of the County's future growth, while allowing it to continue to preserve 30,000 acres of agricultural and environmentally sensitive land in the Rural West.

revenues, dampening negative impacts of a decline in the residential or employment markets.

For housing, build-out is expected to occur in about 2025 in the east and after 2020 in the Rural West. The growth rate will average 1,750 new units per year.

These projections assume no changes to the PFA boundary and no zoning map amendments. For the Rural West, a limit of 250 housing allocations has been set. In the East, an average of 1,500 allocations per year may be granted, of which 250 must be for senior housing and 250 for mixed-use development as part of the US 1 Corridor Redevelopment Plan.

Average annual employment growth over 20 years is expected to reach 3,500 jobs per year, totaling 70,000 new jobs. Though residential development is capped, the county does not impose any limitations on job growth.

Transportation facilities and services are an important part of the General Plan 2000's approach to creating balanced and phased growth. The county seeks to provide transportation facilities that sustain and encourage the redevelopment of existing communities, and create ways to make facilities and opportunities more efficient.

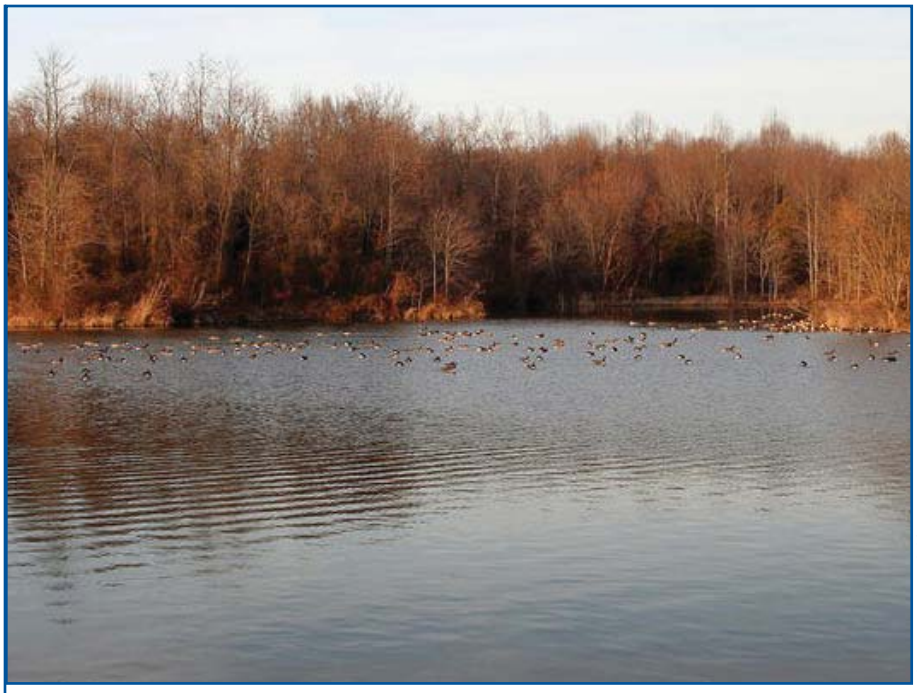


Photo Source: www.hclibrary.org

The Plan addresses needs for highways, transit, and pedestrian/bicycle facilities, from a local and regional perspective, through a series of comprehensive policies.

To focus on implementation efforts, the General Plan's final chapter establishes priorities, associated Implementation Indicators and Trends Indicators, and a process for monitoring implementation. A citizens' Monitoring Committee evaluates progress and works with the Department of Planning and Zoning to prepare periodic reports, the most recent of which was undertaken in 2005.

Howard County is committed to the evaluation and implementation of environmentally responsible highway strategies such as the potential addition of high occupancy vehicle (HOV) lanes on major commuter routes like I-95.

Chapter 3, Section 3.6

CITY OF ANNAPOLIS

The Annapolis Comprehensive Plan of 1998 has established long-range goals and policy directions for the city.

It identified the special characteristics of Annapolis as a waterfront city, a historic colonial port, a center for pleasure-boating, a major institutional center, a focus for new development, and a city of neighborhoods.

The Plan established a basic strategy of conservation combined with directed growth and redevelopment, and seeks to establish a framework for cooperation between Annapolis and its region in the areas of growth, development, and transportation.

It is "a plan for conservation and enhancement of the physical environment and social values of the existing city."

The current Comprehensive Plan of 1998 is currently being updated and is projected to be complete in 2008.

Funds have been budgeted to complete the process.

The transportation element of the 1998 Plan discusses the importance of an interconnected transportation system where all modes, vehicle circulation/parking, transit, and bicycle/pedestrian activities work together.

The 1998 Plan addresses access to jobs and accessibility of transportation opportunities through policies that promote the management of growth in traffic on key roadways leading into and around the City, providing parking solutions that deal with peak and long-term demands, and further enhancing the transit system now serving the city and areas in Anne Arundel County.

Improving the transit system will provide stronger links between neighborhoods, employment locations, shopping destinations, schools, and city services.

Improving local bus service is critical to providing opportunities for the physically disabled, senior citizens, and citizens with special economic needs.

Bicycle and pedestrian link-

ages are also given attention in the plan in the form of supporting bicycle racks on city buses, secured bicycle parking in city garages, and the development of an improvement plan for sidewalks to encourage walking to local destinations.

As part of improving the long-range transportation planning efforts, the city, in conjunction with Anne Arundel County, Maryland Department of Transportation, and the Naval Academy launched the Annapolis Regional Transportation Vision and Master Plan study in 2006.

The purpose of the plan is to establish a unified vision of mobility in the Annapolis area and develop a strategy for implementing the vision.

This Plan will provide the Annapolis region with a guide to address its existing and future transportation needs to improve the quality of life for its citizens, business community, and visitors.

Transit oriented and mixed-use centers, promoted extensively by the city, provide opportunities for a mix of uses, urban design amenities, convenient vehicular and pedestrian/bicycle access from surrounding neighborhoods, and transit services.

The 2006 Master Plan establishes nine mixed-use centers including sections along West Street, West Annapolis, the historic district, Forrest Drive, Bay Ridge, and Eastport. To support this form of development, the Plan calls for coordinated regulations, policies, and programs to encourage and sustain mixed-use centers.

Through the promotion of strategies that support integrating land use with planned transportation services and facilities, the City of Annapolis is reducing local negative impacts on air and water quality.

Mixed-use developments and emphasis on transit assist in reducing vehicular travel and increased use of transit.

The city has just completed its inner West Street revitalization project. The project involved the replacement of sewer and water pipes, relocation of all above-ground utilities underground, and construction of sidewalks with granite curbing and brick

The result of Annapolis' comprehensive revitalization efforts over the last fifteen years is the redevelopment of the corridor into a downtown, mixed-use area that will ultimately have 300 new residential units in addition to office, retail, and convenience uses.

roadway from Church Circle to Cathedral Street.

The result of Annapolis' comprehensive revitalization efforts over the last fifteen years is the redevelopment of the corridor into a downtown, mixed-use area that will ultimately have 300 new residential units in addition to office, retail, and convenience uses.

Inner West Street has become a model for downtown corridor revitalization incorporating mixed-use, quality urban design, and public infrastructure investment.

Additionally, in June 2004, the City passed an Affordable Housing Ordinance.

The purpose of the Ordinance is to increase the affordable housing opportunities to rent or buy to Annapolis residents of low and moderate income by creating an inclusionary housing requirement for new developments in the city.

Chapter 3, Section 3.7

BALTIMORE CITY

Adopted June 15, 2006, LIVE EARN PLAY LEARN, Baltimore City's Comprehensive Master Plan is presented in a business plan format. The title describes the four areas of focus for the plan. Each focus area contains goals that link transportation to land use, some of which are highlighted below.

Throughout the document, mention is made of implementing the Bicycle Master Plan, creating a Pedestrian Master Plan, and re-zoning when needed to improve access to/from neighborhoods as well as to services and jobs.

The LIVE section focuses on strengthening/building neighborhood centers. The second goal set forth in the section is to promote TOD. A 2004 joint investigation with MTA and the Maryland Department of Planning (MDP) yielded three TOD priorities – State Center and Reisterstown Metro as well as West Baltimore MARC stations. Recent and ongoing cooperative activities have focused on the State Center, where a detailed planning charrette

was undertaken, and a Request for Proposals (RFP) to select a developer is expected soon. Other existing stations under consideration include Westport, Shot Tower, and Penn North, and all proposed Red Line station areas have/will be investigated for TOD opportunities. General objectives include funding and re-zoning strategies to facilitate TOD. The third goal set forth in the section is to improve transportation access and choice. Objectives include improving non-motorized, motorized, and transit infrastructure.

The EARN section focuses on creating economic opportunities in the city. The third goal set forth in the section is to improve access to jobs and transportation linkages between businesses. Objectives illustrate an emphasis on transportation choice in job access – like implementing of the Red and Green lines as detailed in the Baltimore Regional Rail Plan, the Baltimore City Bicycle Master Plan, and Transportation Demand Management (TDM) practices. In addition, objectives consider enhancing components of the transportation system to facilitate business growth through parking strategies and TOD, to freight movement.

The PLAY section focuses on cultural, entertainment, and natural amenities. All goals in the section consider access to these amenities, from Baltimore City Bicycle Master Plan improvements (which in some cases will themselves be recreational amenities) to trolley line and "Shuttle Bug" implementation.

The LEARN section focuses on education. In addition to school infrastructure and programmatic considerations, the goals set forth in the section consider transportation and access to educational facilitates—from site-specific "safe routes to school" (SRTS) improvements to city-wide improvements like transit coordination to serve students. Baltimore City was awarded federal SRTS funding in both grant years (2006 and 2007) to develop engineering solutions as well as education and enforcement programs to encourage Baltimore's kids to walk to school.

In addition, the Baltimore City Master Plan seeks to improve connections to learning institutions across the City; for example, the "College Town" bike lanes were identified for immediate implementation in order to serve the cluster of higher education facilities proximate to the Johns Hopkins campus.

Chapter 3, Section 4

CONSISTENCY WITH STATE AND LOCAL GROWTH PATTERNS

The regional transportation planning process maintains consistency with state and local planned growth patterns by incorporating them into the socio-economic forecasting process, which provides the basis for travel demand modeling. Through the socio-economic forecasts, state and local land use is accounted for directly and indirectly in subregional and corridor transportation studies.

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Chapter Four

Regional Trends and Challenges

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Chapter Four

Regional Trends and Challenges

Outlook 2035 builds upon the current assets of the region's transportation system. The Plan recognizes the current system's performance and the trends and challenges that will impact our future transportation network.

It is essential that decision-makers understand the patterns of the past as well as anticipated transportation demands in order to develop a systematic approach to infrastructure investments.

SOCIO-ECONOMIC, TRANSPORTATION, AND AIR QUALITY TRENDS

Regional trends were a critical consideration when developing Outlook 2035.

In order to assess what is, and what will be needed, for the future of our transportation system, staff analyzed current and expected socio-economic changes, growth patterns, travel behavior and economic conditions.

Understanding and forecasting the behavior of our transportation system users has a profound effect on the functioning of the transportation network.

This trends analysis enhances transportation professionals' efforts to establish priorities for the transportation system needed by 2035.

Chapter 4, Section 1

SOCIO-ECONOMIC TRENDS

The Baltimore region experienced robust growth in the past three decades. During that time period, the region gained more than 400,000 new residents, added over 300,000 new households, and gained over a half million new jobs.

The respective growth rates for population, household, and employment for the 1970 to 2000 period were 22 percent, 54 percent, and 60 percent.

As demonstrated in the difference in growth rates between population and households (where the household growth rate is twice that of the population), the region's household sizes plummeted during the last thirty years from 3.22 persons per household to 2.55 persons per household by 2000.

This rapid drop in household size and significant increase in household formation were fueled by a number of factors. First, divorce rates increased for people in the leading edge of the "Baby Boom" during the 1970s and 1980s which contributed to increased household formation based on family dissolution.

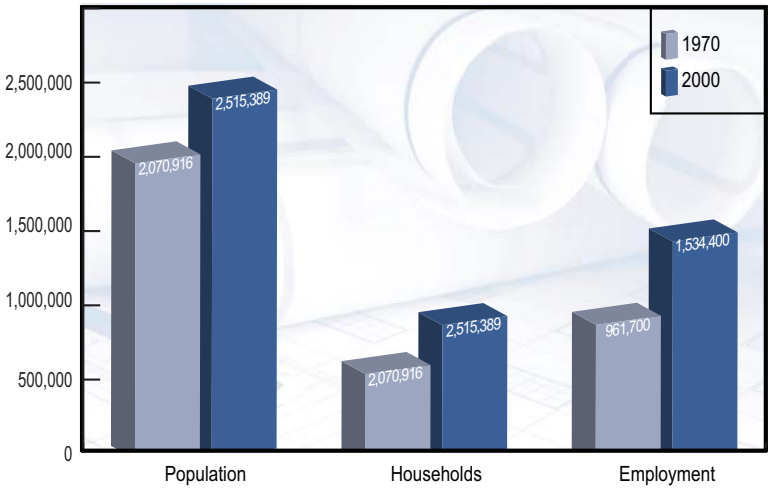
By 2000, although divorce rates had dropped significantly, the duration of first marriages had shrunk, thereby still contributing to additional household formation.

Along with the high divorce rates of the 1970s and 1980s, the age of first marriage for both women and men was consistently rising which allowed for smaller household sizes and an increase in single person and non-family households. Increases in the number of households especially in the suburban areas of our region have generated an even greater need for private vehicles for work and other trips.

Another major demographic trend that affected transportation significantly was the growth in the female labor force participation rate.

In 1970, the female work force participation rate in the Baltimore region was 43.8 percent. By 2000, the percentage of women participating in the work force had grown to 61.2 percent. This

FIGURE 4-1
BALTIMORE REGION SOCIO-ECONOMIC GROWTH



large increase of women entering the work force placed a huge number of additional drivers in the morning and evening peak hour work trip pattern.

In addition to increased workforce participation, women also continued with traditional roles such as grocery shopping and providing children's trips for school and sports. This impacted the region's highways leading to greater traffic volumes, more congestion, and higher VMT.

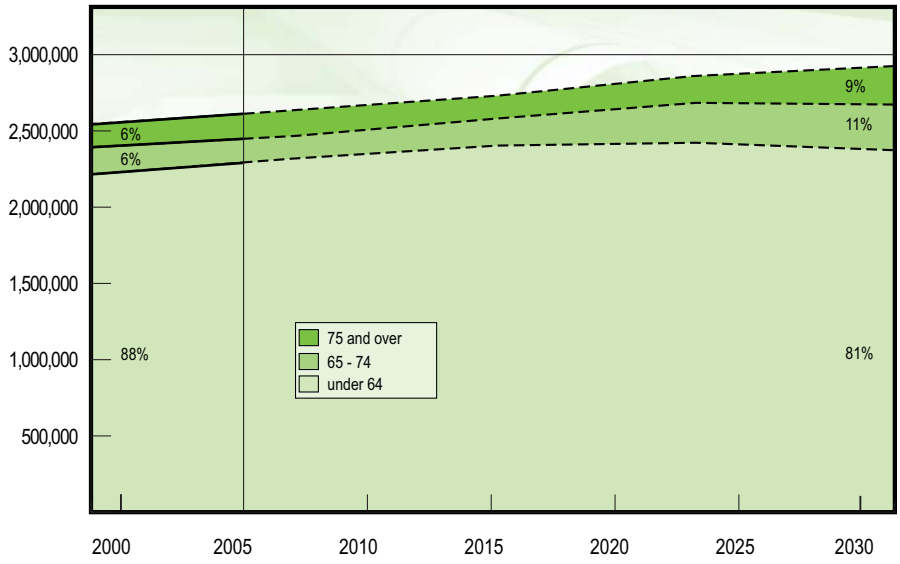
Chapter 4, Section 1.1

THE "BABY BOOM" IMPACT

A population characteristic that is profoundly altering the demographic composition of the region is the aging of the "Baby Boom" population. In 2000, the senior population (65 years old and older) comprised 12 percent of the Baltimore region's population.

In this region, the number of senior citizens will increase by more than a quarter of a million people between 2000 and 2035.

FIGURE 4-2
BALTIMORE REGION AGE DISTRIBUTION, 2000-2030



On October 16, 2007, the first "post World War II Baby Boomer" (a New Jersey grandmother) became the first "baby boomer" to file for Social Security benefits as she approached her 60th birthday.

From this point on, about 80 million people in the "Baby Boom" generation will begin to swell the ranks of senior citizens.

By 2035, the youngest "Baby Boomer" will have entered the ranks of the "elderly" and the oldest "Baby Boomer" will be age 89. Our region will experience this multi-decade shift in population and age composition.

One of the least understood aspects of the aging process in the region is the in-place retirement phenomenon ("aging in place").

This phenomenon has and will continue to cause major changes in the distribution of the senior population in the region.

Before 1980, more elderly lived in Baltimore City than in the suburbs. In-place retirement, however, not el-

By 2035, the elderly population will grow in size to 20% of the regional population and will make up 25% of the region's driving age population.

derly migration from the city to suburbs, will likely result in 81 percent of the region's elderly population living in dispersed, low intensity suburban areas by 2035 where travel options (other than automobile) are limited or non-existent.

The phenomenal growth in the senior citizen population will have a profound impact on the growth of the regional workforce and our region's ability to provide needed workers for the expected increase in jobs.

The Baltimore region labor force is projected to grow by about 198,000 workers.

The labor force increase expected between 2000 and 2035 is only 45 percent of the expected population growth and represents 44 percent of the expected job growth.

"Baby boomers" will leave the regional workforce and will increasingly be replaced by commuters who live outside the central Baltimore region if our employment forecasts are to be realized.

Chapter 4, Section 1.2

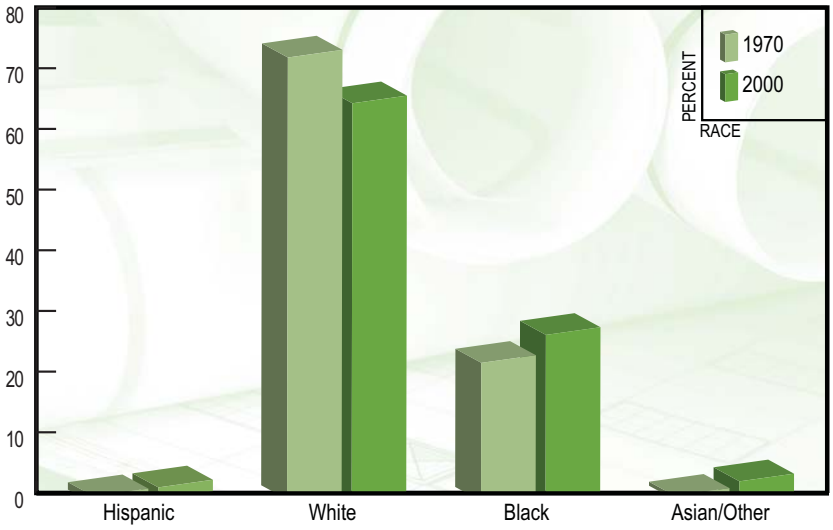
RACIAL/ETHNIC TRENDS

Another demographic characteristic that will emerge during the forecast period is change in the racial/ethnic makeup of the Baltimore region.

In 1970, the Baltimore region's racial composition was 76 percent white and 24 percent minority or non-white.

By 2000, this ratio had moved to 68 percent white and 32 percent minority or non-white.

FIGURE 4-3
BALTIMORE REGION'S CHANGING ETHNIC COMPOSITION



The quality of life, the presence of excellent school systems, renowned higher education institutions, and the existence of established racial and ethnic communities have made Maryland and the Baltimore region a magnet for foreign immigration with an expectation that this trend will continue.

Figure 4-3 illustrates the changing ethnic composition in the Baltimore region from 1970 to 2000.

Chapter 4, Section 1.3

NEIGHBORING INFLUENCES

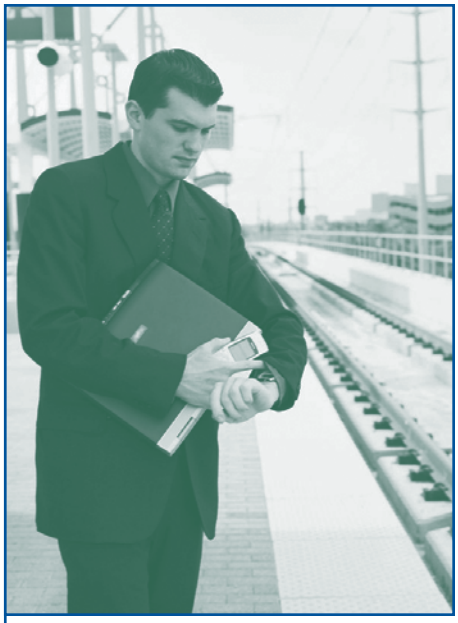
An important demographic characteristic is the commute by Baltimore region workers. The Baltimore region has long been an exporter of workers especially to Washington D.C. suburbs in Maryland and Northern Virginia.

According to 2000 census figures, the Baltimore region sent more than 125,000 workers to Washington D.C. suburbs in Maryland, the District of Columbia, and the northernmost Virginia counties. However, this same census data shows that the Baltimore region draws more than 20,000 workers each day from Maryland border counties in Pennsylvania and adjacent counties in Delaware.

Any evaluation of growth and development in the Baltimore region must take into account the actions and expectations of our regional neighbors. Other metropolitan areas along the I-95 corridor and its vicinity are expanding outward in a manner such that outer county growth in these areas is bumping up against other expanding areas.

The BMC model region stretches from the Pennsylvania-Maryland state boundary to the Potomac River. The BMC conducted an analysis of the commuting patterns and projected population and employment growth of the 71 counties in six different states that surround our modeling area.

This expanded area that stretches from Maryland to Washington D.C., Virginia, West Virginia, Pennsylvania, Delaware, and New Jersey is expected to increase between 25 to 30 percent for population, households, and employment by 2030.



Each day, more than 125,000 workers leave the Baltimore region to work in the Washington, D.C. area, while over 20,000 enter from Pennsylvania and Delaware.

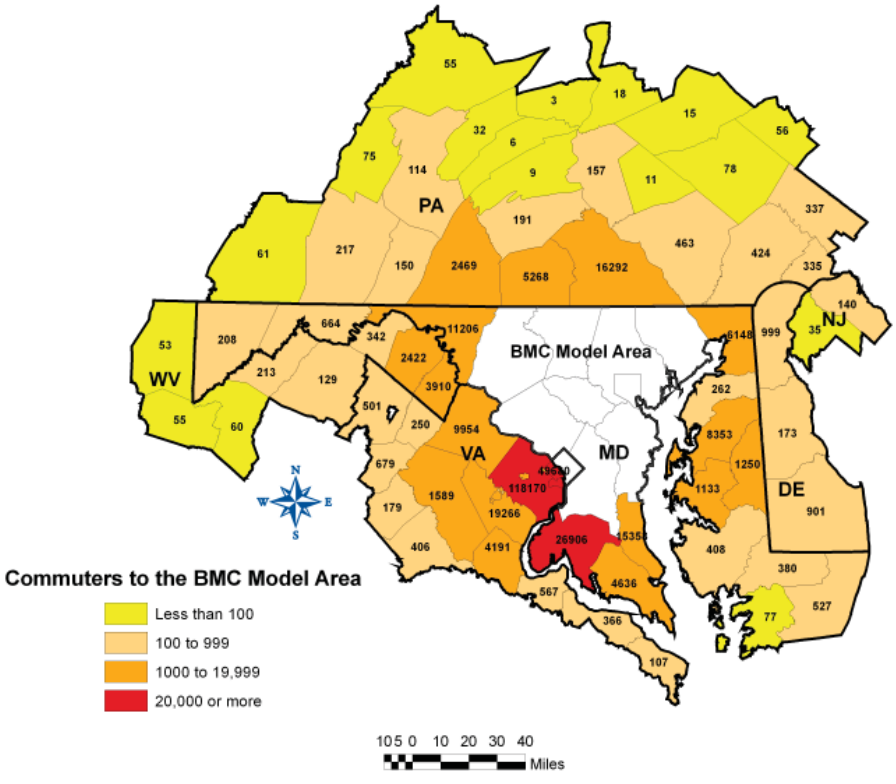
Projections of rapid economic and demographic growth in the "outer areas" of this large commute shed suggest that the number of commuters from these areas to the Baltimore region will increase even if the commutation rate remains unchanged.

Figure 4-4 shows in more detail where commuters in 2000 were driving from to access employment in the Baltimore region.

Strong employment growth in these "outer areas" suggests that these areas will be locked in a labor force availability battle with the Baltimore region. Additional employment growth in areas to the north (Delaware, Pennsylvania, and New Jersey), south (Washington suburbs in Maryland, District of Columbia, and Northern Virginia) and west (West Virginia) of the Baltimore region could generate a substantial increase in "through trips" for both personal and freight purposes.

These prospects taken together will increase traffic volumes and congestion, extend average commute times, increase the amount of funding needed to maintain these roads, and may contribute to air pollution.

FIGURE 4-4
COMMUTERS TO THE BALTIMORE REGION, 2000



A CHANGING REGION

- By 2035, the region's population will grow about 18% - reaching a total of nearly 3 million people.
- The region can expect job growth of 29% (an increase of 451,600 jobs), totaling nearly 2 million jobs in 2035.
- By 2035, the region's labor force is expected to grow by about 198,000. Yet the number of jobs in the region will reach 451,600. The reason for this huge gap? Baby boomers. Starting in 2010, baby boomers will start turning 65. By 2035, over half a million people in the region will reach retirement age and many of them will leave the workforce.

  The expected jobs/labor force imbalance will increase the distance people will travel for work, as well as produce longer commute times and more congested roadways.
- Population, household and employment growth have been slowing down in the Baltimore region relative to past trends: 1990-2005 and 2005-2020 growth is higher than projected 2020-2035 growth.
- Household growth is almost double that for population growth indicating smaller average household sizes.
- The Vehicle Miles of Travel (VMT) growth rate will still outpace population, household, and employment rates

Chapter 4, Section 2

TRANSPORTATION TRENDS

Chapter 4, Section 2.1

KEY INDICATORS OF TRAVEL DEMAND

Changing socio-economic factors have been the force behind the increase in travel-related activity.

Several socio-economic factors influence person travel in the region: the distribution of population and households and the number and location of jobs.

Figure 4-5 displays some of the key indicators of travel demand for the 1990 to 2035 time period.

Between 1990 and 2005, as regional population grew from 2.35 million to 2.63 million (a growth of approximately 12 percent), VMT increased by almost 37 percent from 49.9 million miles per day to 68.6 million miles per day.

During this period, increases in highway capacity were modest. Total lane mileage in the region increased approximately 10 percent from 22,500 miles to 24,800 miles. This means that regional VMT has increased at a rate almost 4 times the growth in highway lane mileage.

However, between 2000 and

FIGURE 4-5
KEY INDICATORS OF TRAVEL DEMAND

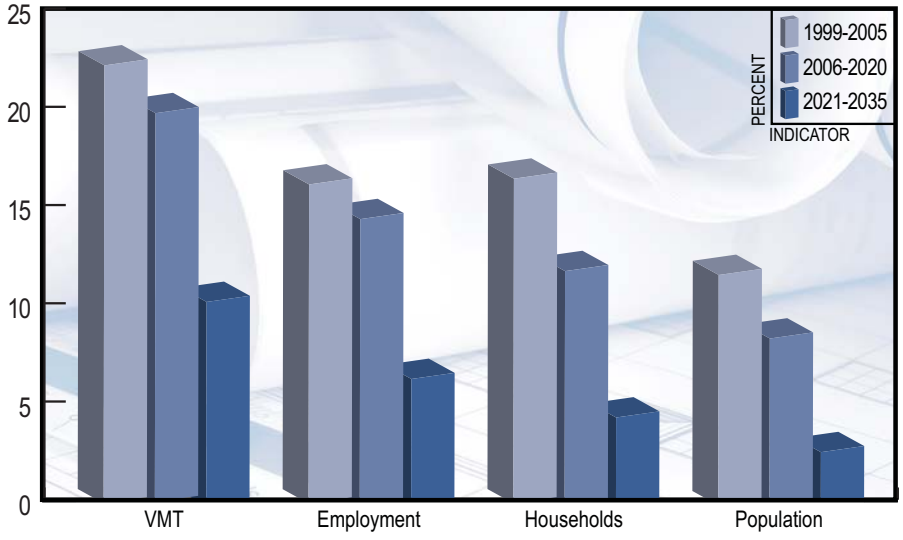
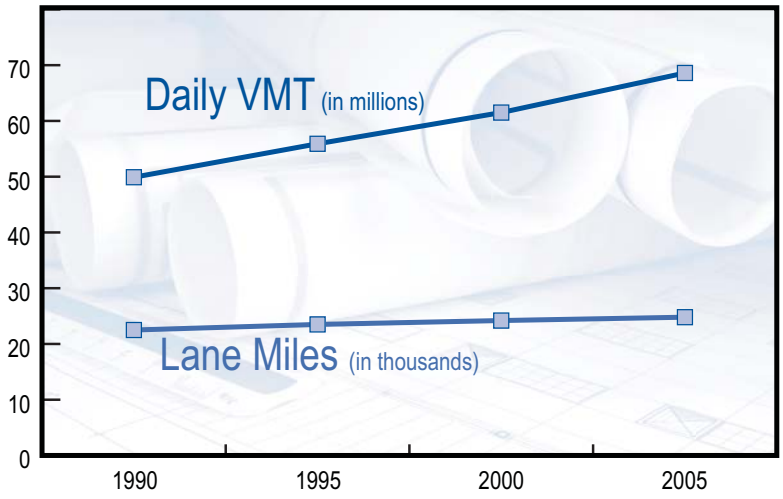


FIGURE 4-6
VEHICLE MILES OF TRAVEL VS. LANE MILES



2005, the daily VMT in the Baltimore region increased at a much slower pace, about two percent per year.

Figure 4-6 shows the growth in VMT and lane miles for 1990 to 2005 in the Baltimore region.

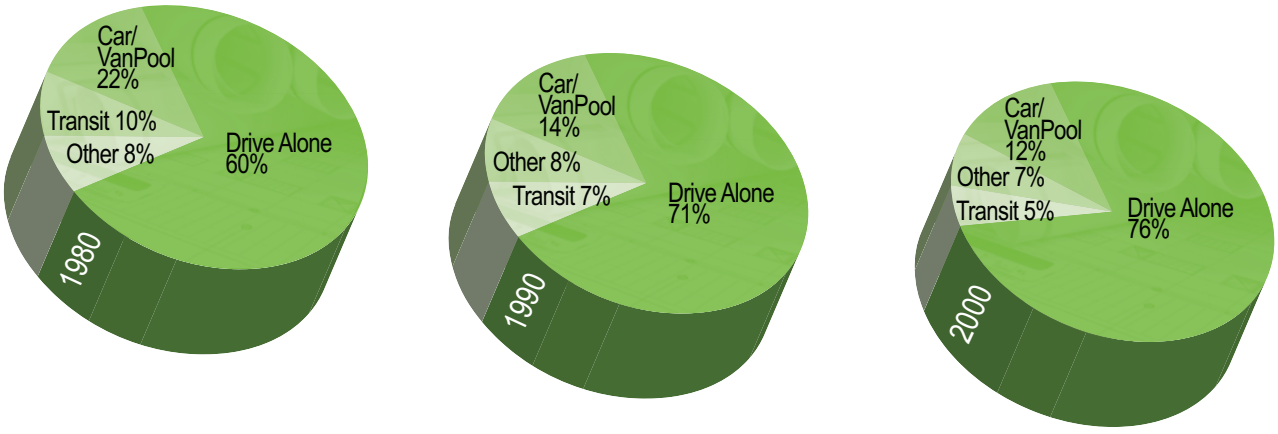
Chapter 4, Section 2.2

OTHER TRAVEL TRENDS

The private automobile dominates travel in the Baltimore region, while the transit and carpooling shares continue to decrease over time. One of the best sources of trend information is the census data, even though only work trips can be evaluated. The total number of workers in the Baltimore region in 2000 was 1,153,200.

Figure 4-7 shows the mode of travel to work for 1980, 1990, and 2000. The single occupant driver proportion increases from a 60 percent share in 1980 to a 76 percent share in 2000 while the transit share drops from 10 percent in 1980 to 5 percent in 2000. Carpooling also decreases its share from 22 percent in 1980 to 12 percent in 2000. These downward trends appear to be continuing according to survey sampling in the region.

FIGURE 4-7
MODE OF TRAVEL TO WORK IN THE BALTIMORE REGION



Chapter 4, Section 2.3

FREIGHT TRENDS

As a region with a major port, air cargo facility, historic rail network, and extensive roadway network, the Baltimore region is Maryland's leading goods movement center.

The Baltimore region's demographic data forecast that population, households, jobs, and economic growth are projected to rise. Congestion on transportation facilities will increasingly be a challenge as personal vehicle and truck traffic grows. All goods movement, such as the stock on store shelves, is impacted by the effectiveness and reliability of all the transportation modal networks.

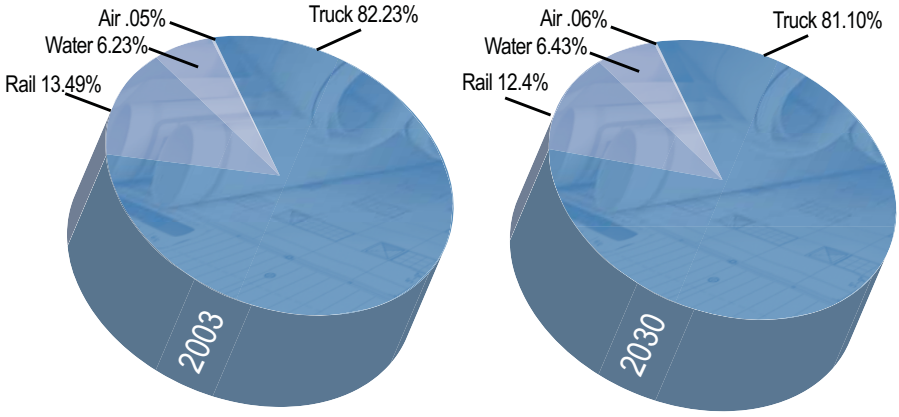
The BRTB Freight Movement Task Force (FMTF) is an advisory group of public and private sector Baltimore region freight stakeholders that meets quarterly. The FMTF discusses freight issues and the members jointly select freight topics to study.

A recent FMTF study, the Baltimore Regional Freight Profile, provided multi-modal tonnage, value, directional, and economic data on freight movements and trends in the region. Numbers for 2003 reveal that a total of 307 million tons valued at $966 billion moved through the Baltimore region's highway, rail, port, and airport facilities serving domestic and international demand. The Baltimore region's total freight generating output in 2000 comprised nearly 56 percent of Maryland's total and is projected to increase.

Through-freight flows (movements with origins and destinations outside the Baltimore region) make up the largest proportion of freight movement in the Baltimore region, accounting for nearly 42 percent of total freight tonnage. Tonnage growth rates are expected to nearly double for truck and rail movement in the Baltimore region between 2003 and 2030.

As shown in Figure 4-8, truck movements are the highest tonnage mode of freight

FIGURE 4-8
PERCENT MODE SPLIT BY WEIGHT (TONS)



movement in Maryland with roughly 80 percent of total tonnage in 2003 and forecasted for 2030.

The top three commodities by tonnage for all modes between 2003 and 2030 are: (1) secondary traffic (traffic to and from distribution centers); (2) nonmetallic minerals; and; (3) clay, concrete, glass, or stone. The Baltimore region's top trading partner by tonnage in 2003 was Pennsylvania and, in 2030, Maryland is projected to become the region's top trading partner.

Through-freight flows account for nearly half of the total value of freight moving across the region's transportation infrastructure. The value of outbound freight (29 percent of the total) is significantly higher than the value of inbound freight and internal freight flows make up only four percent of the total freight value flowing within the Baltimore region. As with total freight tonnage, truck movement is the highest value mode of freight movement in Maryland with 81 percent of the total value. This is shown in Figure 4-9.

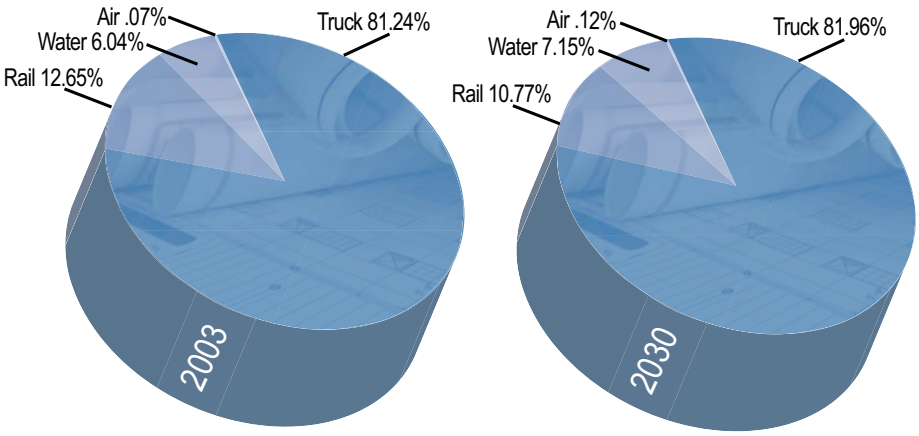
The Baltimore region's top trading partner by value, the Great Lakes States (IN, IL, MI, WI, OH), is projected to remain the same in 2030 as it was in 2003. The top three commodities, by value, shipped to, from, or within the Baltimore region projected for 2030 are: (1) primary metal products, (2) clay, concrete, glass, or stone, and (3) transportation equipment.

The industries that generate the top real output numbers for the state are manufacturing, merchant wholesaling, transportation, mining, and electric power generation with the Baltimore region being the major manufacturing center for the state of Maryland.

While employment in this large group of industries is projected to decline by 6.4 percent statewide between 2000 and 2030, their real output is projected to grow by 119.7 percent with Montgomery County standing out with the highest real output growth by a wide margin of any county in Maryland.

Of the six Baltimore region jurisdictions, five are among the top ten in the state for real output in 2003, with Baltimore City at the top. All jurisdictions in the Baltimore region remain among

FIGURE 4-9
PERCENT MODE SPLIT BY VALUE (DOLLARS)



the top ten for the State of Maryland in 2030 for total freight generating industry real output. Real output in Maryland's transportation sector is expected to grow by 84.7 percent between the years 2003 and 2030. Figures 4-10 and 4-11 show growth to be uneven across the State with high growth in the jurisdictions that already have concentrations of transportation firms and slower growth or declines in other jurisdictions.

FIGURE 4-10
VALUE OF FREIGHT BY JURISDICTION, 2003

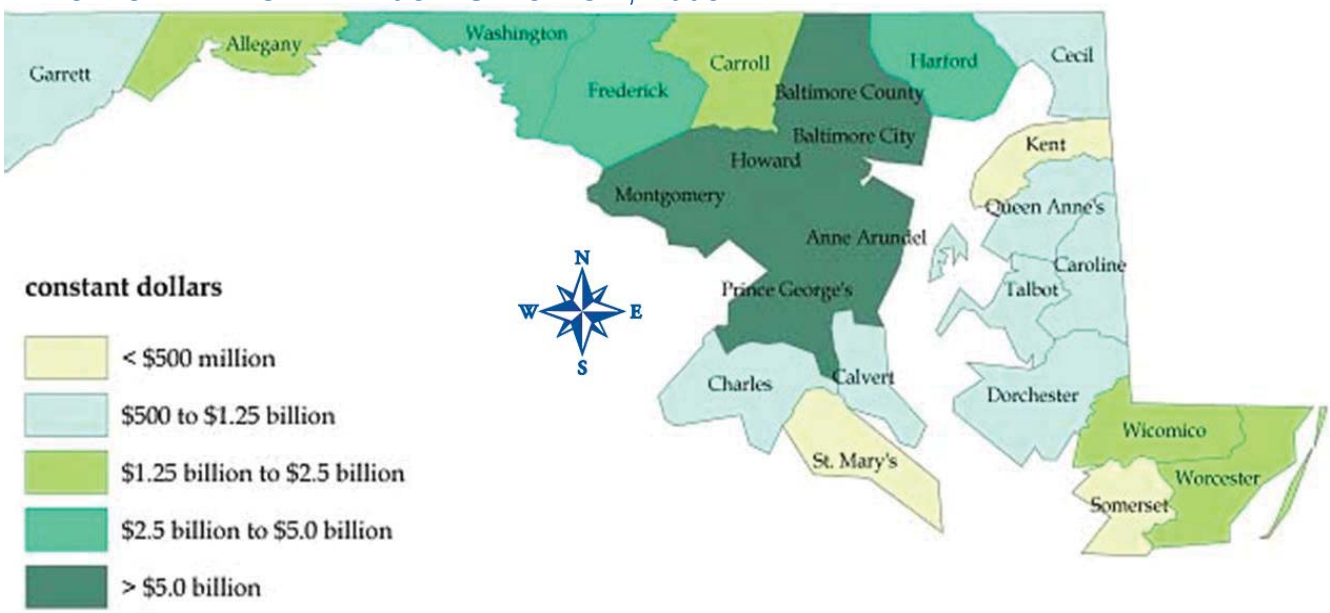
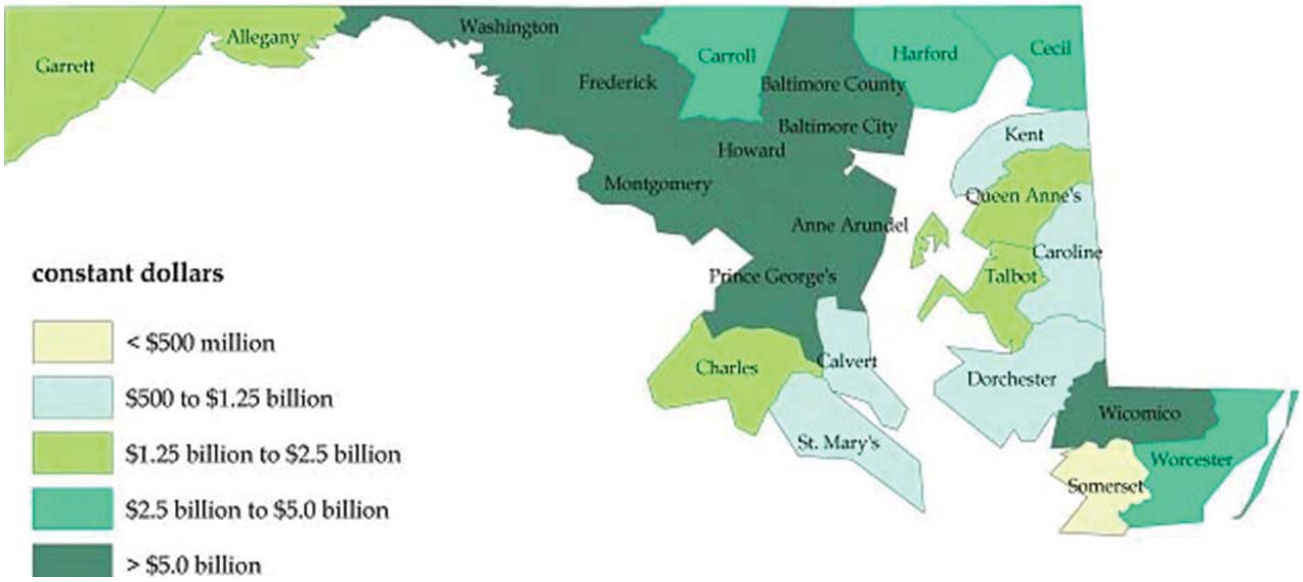


FIGURE 4-11
VALUE OF FREIGHT BY JURISDICTION, 2030



Chapter 4, Section 2.4

SAFETY TRENDS

Motor vehicle crashes are the leading cause of death in the United States for those between six months and 45 years of age.

In 2005, the Baltimore region accounted for approximately 36 percent of all statewide highway fatalities (222 of 614) and 47 percent of all statewide highway injuries (26,072 of 55,303).

These trends have remained nearly constant over the ten-year period between 1996 and 2005, as shown in Figure 4-12 and Figure 4-13.

In the Baltimore region, Baltimore County has had the greatest number of motor vehicle fatalities each year between 1996 and 2005, followed by Anne Arundel County and Baltimore City.

Carroll County has seen a significant increase in motor vehicle fatalities since 2000 (from 8 in 2000 to 21 in 2005) after a steady decline in the previous five years.

FIGURE 4-12
MOTOR VEHICLE FATALITIES

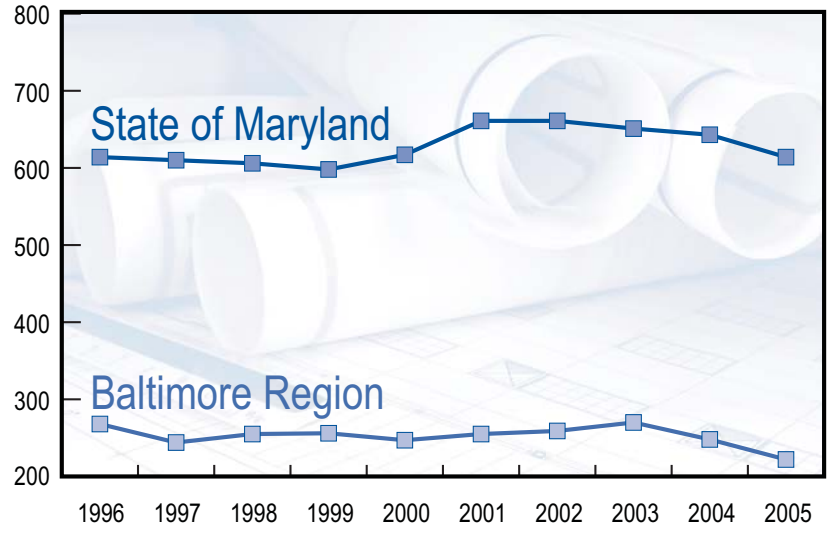


FIGURE 4-13
MOTOR VEHICLE INJURIES

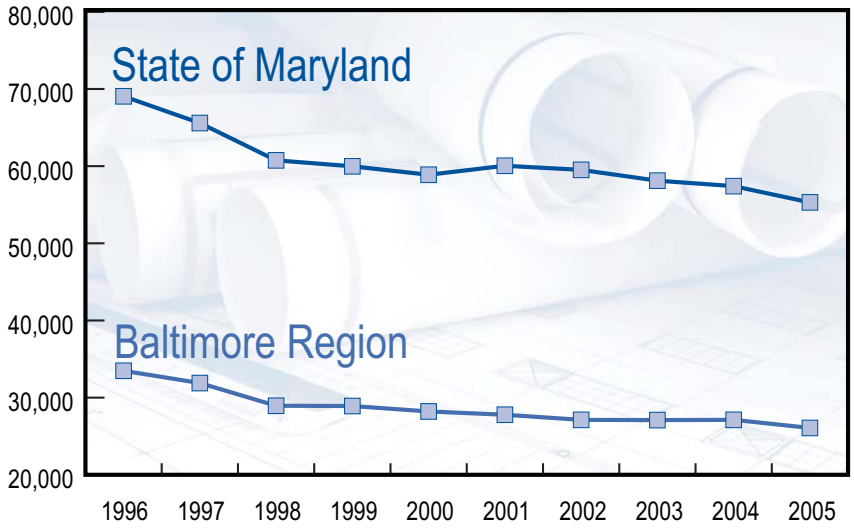
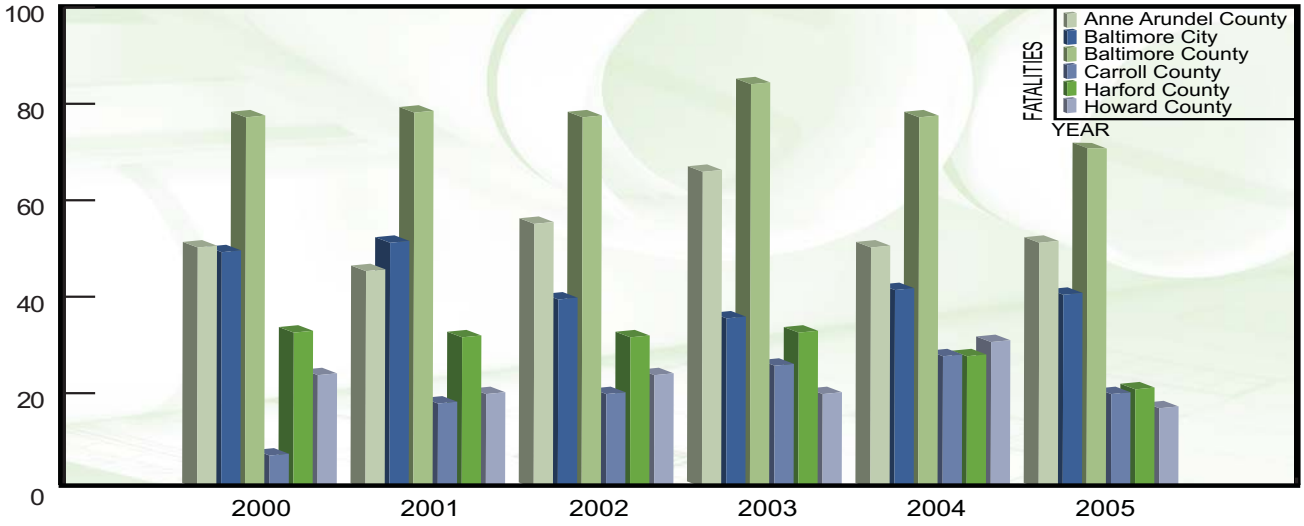


Figure 4-14 shows motor vehicle fatalities breakdown by jurisdiction over the past five years.

See Appendix 4 for Motor Vehicle Fatality Data.

FIGURE 4-14
MOTOR VEHICLE FATALITIES BY JURISDICTION



Chapter 4, Section 2.5

AIR QUALITY TRENDS

Although the Baltimore region has shown increased miles of travel since 1980, the air is actually getting cleaner in terms of ground-level ozone pollution. Overall, between 1980 and 2005, the number of days that the region exceeded the 8-hour ozone standard has decreased.

Tightened controls on cars and trucks, reformulated gasoline, along with the Maryland Vehicle Emissions Inspection Program, all help reduce emissions from travel despite increases in congestion and miles traveled on the region's roadways.

While the air is getting cleaner, and is predicted to get even cleaner in the future, it is important for the region to continue to make efforts to lessen the impact of demand for travel and mobility on the air we breathe.

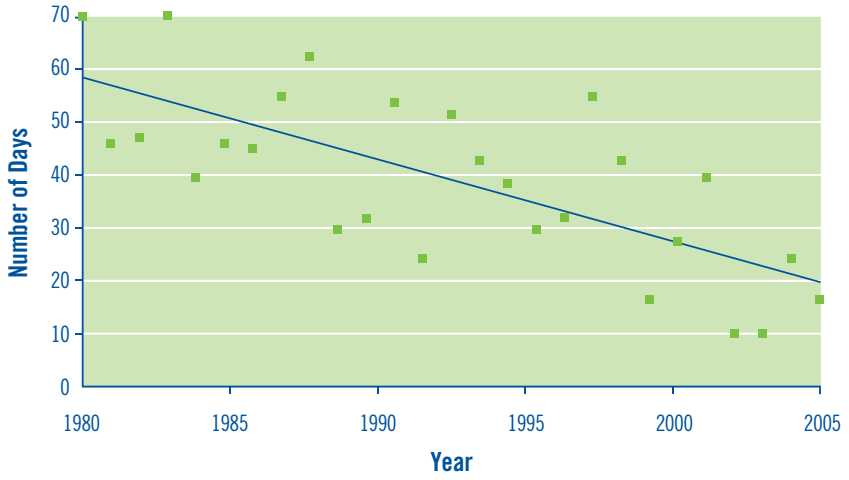
When you take a snapshot of the region and compare it to the rest of the country, it is easy to see that we are not yet where we should be. The Baltimore region is currently not meeting federal standards for ground-level ozone or fine particulate matter.

According to the American Lung Association's State of the Air: 2007 report, the Washington D.C./Baltimore/Northern Virginia area ranks as the 11th most polluted area for ozone pollution, and 11th most polluted metropolitan area for short-term particle pollution.

The area ties with Charleston, West Virginia, as the 20th most polluted metropolitan area for year-round particle pollution.

Baltimore City is ranked 14th for short-term particle pollu-

FIGURE 4-15
8-HOUR OZONE EXCEEDENCE DAYS FOR THE BALTIMORE NONATTAINMENT AREA



tion; and, 24th for year-round particle pollution, tied with two jurisdictions in West Virginia. And, Harford County ranks in the top 25 in the country for ozone pollution.

Figure 4-15 shows the number of days the region has exceeded the 8-hour ozone standard between 1980 and 2005.

Although the Baltimore region has shown increased miles of travel since 1980, the air is actually getting cleaner in terms of ground-level ozone pollution.

Chapter 4, Section 3

REGIONAL CHALLENGES

Decision makers must understand regional travel behavior to implement efficient and effective transportation solutions.

Several combined demographic, economic, and travel demand analyses support transportation planners' determination of project priorities. Despite these analyses, several challenges remain as the Baltimore region strives to develop its transportation system. The following are some of the key challenges.

Chapter 4, Section 3.1

TRANSPORTATION CHOICES

Challenge: *Managing investment tradeoffs among transportation modes to achieve policy objectives, performance goals, and balance between geographic regions and market segments to meet the needs of diverse users.*

Competition is tight among state modal agencies and local jurisdictions for project funding.

Through Outlook 2035, the BRTB developed a financially constrained list of federally funded transportation projects and priorities for the Baltimore region that strive to offer a range of transportation choices, including highways, transit, and bicycling or walking.

Highways form the backbone of America's transportation system. They connect all parts of the Baltimore region to one another and beyond. They are critical to operate efficient transportation services, facilitate freight move-

ment, and provide personal mobility.

Transit provides basic mobility and expanded opportunities to people without the use of a car, provides broader transportation choices to people with cars, and reduces travel times and road congestion in major transportation corridors. Transit also facilitates economic development and supports environmentally sustainable communities.

Likewise, bicycling and walking provide opportunities for short trips and for extending highway and transit trips.

Chapter 4, Section 3.2

AGING INFRASTRUCTURE

Challenge: *Devoting a sufficient level of funding to maintain the region's highways, bridges, rail systems and tunnels, while developing new transportation projects that will require funds for operations and maintenance in the future.*

During the 1960s and 1970s, the emphasis was on building the interstate highway system to facilitate the movement of cars and trucks across the continent. That system has aged and is in need of rehabilitation. Other aging infrastructure also needs to be replaced. While adding capacity in targeted areas is important, we must also improve the performance and operation of the existing transportation system and the way that system is repaired and replaced.

According to a 2005 report card on Maryland's infrastructure released by the American Society of Civil Engineers (ASCE), 45 percent of Maryland's major roads are in poor or mediocre condition. Driving on roads in need of repair costs Maryland motorists $1.4 billion a year in extra vehicle repairs and operating costs. This translates to approximately $402 per motorist. The infrastructure report card also estimates that congestion in the Baltimore region costs commuters $866 per person in excess fuel and lost time. In comparison, the Washington, DC metropolitan area congestion costs commuters $1,212 per person per year in excess fuel and lost time.

The 2005 ASCE report card estimated that roughly 29 percent of Maryland's bridges are structurally deficient or functionally obsolete. The structurally deficient rating is an

early warning for engineers to prioritize funding and to initiate repairs or to begin the process to replace the bridge. The percentage of State Highway Administration bridges that are 50 years old or older has increased to 31 percent of all bridges. Both the US 40 Thomas Hatem and the US 301 Harry Nice bridges are both approaching 70 years of age. Among the local jurisdictions, Baltimore City has approximately 128 structurally deficient bridge structures, Baltimore County has 92, and Carroll County has 14, while Howard County has none and data is not available for Anne Arundel and Harford Counties.

Chapter 4, Section 3.3

SOCIO-ECONOMIC GROWTH

Challenge: *Forecasting how growth will affect small geographic areas twenty years from now, and then planning to meet changing travel demands.*

Transportation planning and analysis require a wealth of statistics on population, commuting patterns, housing, and travel behavior. Variables such as age composition, household size and family type, labor force participation, and income levels impact land use development and transportation needs.

Earlier mentioned trend forecasts predict that an 18 percent increase in population and a 29 percent increase in employment will be added to the Baltimore region between 2000 and 2035.

By 2035, the Baltimore region will contain nearly three million people and nearly two million jobs. Strong population growth also means that a substantial number of new households will be formed in the Baltimore region, many of them new senior citizen households.

These kinds of population and employment trends will impact the need for workers expected to fill the growth in jobs.

This kind of transportation forecast data and analyses help planners to prioritize projects. Socio-economic forecasts are created around small geographic areas and are used as inputs in travel demand modeling.

Accurate estimates and forecasts strengthen the entire transportation planning process.

Chapter 4, Section 3.4

NEW MILITARY EMPLOYMENT

Challenge: *Understanding how many workers and households are likely to move into the region because of the Base Realignment and Closure (BRAC) process, and how to accommodate that growth in ways that will create the least amount of sprawl and additional congestion.*

A nine-member United States Department of Defense (DoD) BRAC Commission developed recommendations, which became law in November 2005, to reshape or transform the DoD force structure.

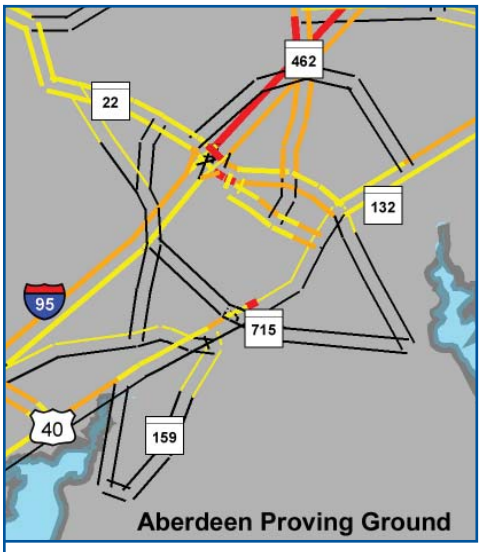
All told, the 2005 BRAC recommendations represent the most aggressive base realignment plan ever proposed, affecting more than 800 installations, according to the American Forces Press Service.

Several changes are to take place at Fort George G. Meade, Aberdeen Proving Ground (APG), Bethesda National Naval Hospital, and Andrews Air Force Base as a result of BRAC actions. The State of Maryland and the Baltimore region will see a significant increase in population, employment, and households over the next 15 years.

With this in mind, the Maryland Department of Business and Economic Development (DBED) utilized a portion of a United States Department of Labor grant to commission four separate studies in 2006/2007 to address the implications of BRAC on Maryland.

The Maryland Department of Planning (MDP) was contracted to investigate the statewide implications of BRAC on education, housing, utilities, and transportation.

The BRTB was engaged through the Baltimore Metropolitan Council (BMC), which served as a sub-contractor to MDP, to assess the regional transportation implications of BRAC.



An example of projected Level of Service (LOS) on the regional reoad network in 2020

The area of focus for BMC work activities included the Baltimore region and the immediate jurisdictions to the south and north of Fort Meade and APG. This work completed under contract for MDP also helped inform Outlook 2035 discussions. A detailed description of the work completed under subcontract to MDP is provided in the boxed section on the following pages.

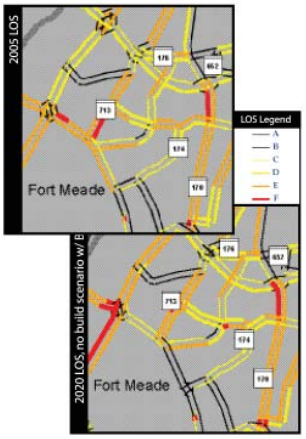
According to the BRAC Commission's Final Report to the President George W. Bush, Maryland will see the largest increase in employment associated with BRAC of all impacted states.

UNDERSTANDING THE IMPACT OF BRAC ON

The deployment of BRAC positions and the associated household increase will occur in phases. DoD military personnel will be deployed first, and will be followed and/or in some cases accompanied by civilian DoD counterparts and some on-base contractors. Following these initial deployments, a larger "wave" of deployments will occur that would primarily include contractors of all types.

The most significant movement of personnel at both of the facilities in the Baltimore region (APG and Fort Meade) would begin around 2009.

According to the Regional Economic Studies Institute (RESI) of Towson University and the MDP, BRAC actions will add more than 32,000 new jobs to the region—including new military and civilian DoD jobs, on-base contractor jobs, off-base contractor jobs, as well as "induced" jobs to serve the influx of new households. New jobs associated with BRAC will be spread throughout the region.



The macro-level analysis conducted by BMC utilized the Baltimore Region Travel Demand Model Version 3.3. This analysis included the region's transportation network, planned network improvements—as programmed in the 2006-2011 Maryland Consolidated Transportation Program (CTP) and as scheduled for operation by 2015 and 2020 in the 2004 Baltimore Region Transportation Plan (BRTP)—and existing regional socio-economic projections, as a basis for investigation.

In order to assess the impact of BRAC on the transportation network, revised regional socio-economic projections for jobs and households are needed. A BRTB BRAC Subcommittee was convened to develop projections based on the jurisdiction-level employment forecasts developed for MDP by RESI, and the small-area household projections developed by MDP.

The Subcommittee considered phased deployment of a varied workforce, as well as the capacities of small areas in the region to accept jobs and households to allocate the jurisdiction-level employment projections to small areas and revised small area household allocations in order to generate the socio-economic information needed to run the regional Travel Demand Model.

For comparison purposes, 2005 base condition networks were developed to reflect existing conditions and modeled with BRTB-approved Round 6-C socio-economic forecasts for the year 2005.

For the years 2015 and 2020, BMC staff evaluated potential benefits of accelerating the year of operation from 2004 BRTP projects to help alleviate anticipated congestion due to BRAC-related growth. These scenarios served as the foundation of BMC's recommendations.

The analyses were conducted in May 2006 and performed again in December 2006 with the most current tools and information, and culminated with recommendations to meet the transportation needs associated with BRAC-related growth. If accelerated implementation of a 2004 BRTP project reduced forecasted

THE REGION'S TRANSPORTATION SYSTEM

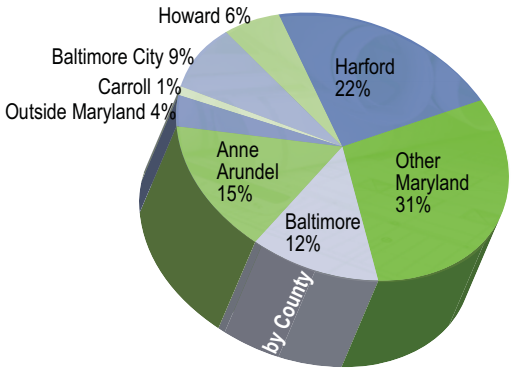
congestion to an acceptable level, a capital investment was recommended. If no such project was included in the 2004 BRTP, a planning study was recommended.

In all, the BRTB, MDP, and the research team investigations of BRAC on the highway network yielded recommendations for four capital investments and 13 planning studies. In addition, seven recommendations were set forth to improve regional and local transit service—including improved pedestrian and bicycle access to transit. The recommendations were developed to both address expected congestion associated with BRAC, and to offer a menu of transportation options for a new and varied workforce.

With respect to regional commuter rail service, the BRTB recognized MARC service as both a tremendous opportunity and a tremendous challenge; upgrades to both infrastructure and operational characteristics were recommended. Subsequent BRTB actions yielded a detailed scope of work for MARC upgrades which was shared with Governor Martin O'Malley. The scope identified a detailed corridor assessment, including plans for improving existing stations as well as locating new stations, as vital to accommodate recent ridership increases as well as expected increases due to BRAC-related demand. The final scope of work, resulting from a collaboration between the agencies and jurisdictions of the Wilmington Area Planning Council, the Metropolitan Washington Council of Governments, and the BRTB served as the basis for a federal Office of Economic Adjustment grant to fund a detailed MARC corridor master plan to upgrade service between Washington, DC and Wilmington, Delaware.

BRTB members are working with MDOT to accommodate BRAC through implementation of the CTP, and through short and long-range transportation planning efforts. BRTB members continue to cooperate across jurisdiction lines to address BRAC issues of transportation as well as economic development, housing, utilities, education, etc. For example, the Howard County Transportation Subcommittee of the BRAC Task Force engaged Baltimore City, and Anne Arundel, Baltimore, and Harford counties in the Baltimore region, and reached further to Cecil, Frederick, Montgomery, and Prince George's counties and Laurel in order to develop joint recommendations to the Maryland BRAC Subcommittee. As a result of such cooperation, local and regional planning documents offer a congruent approach to planning to accommodate the regional needs of BRAC.

FIGURE 4-16 TOTAL BRAC HOUSEHOLDS



In addition to the Department of Labor studies, Anne Arundel and Harford counties are conducting grant funded studies through DoD's Office of Economic Adjustment. The grants are designed "to assist communities that are adversely impacted by Defense program changes." The BRTB, through BMC participation, has been a partner in both of these studies.

Chapter 4, Section 3.5

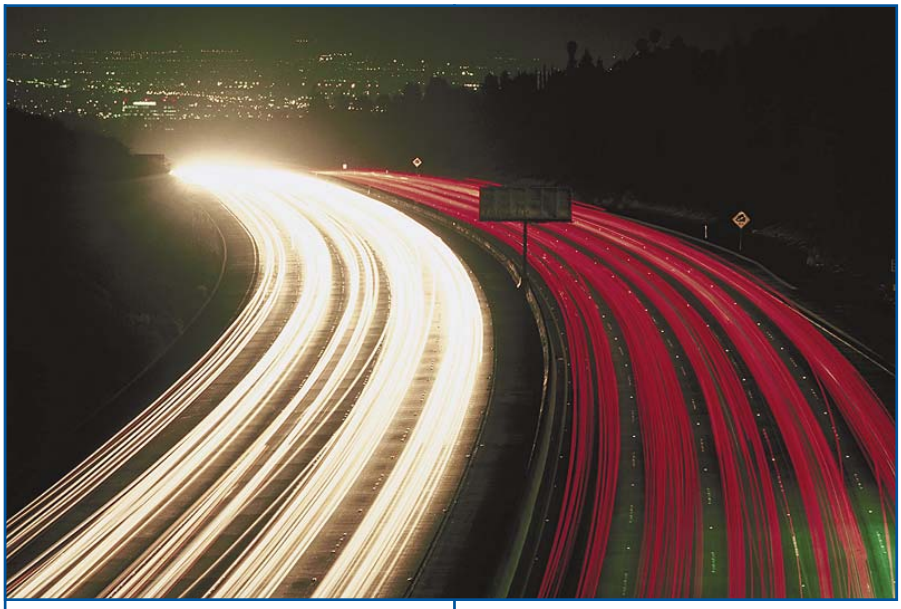
DEMAND FOR NEW CAPACITY

Challenge: *Making the best use of limited financial resources to provide targeted capacity improvements and travel choices to meet current and projected demand.*

Due to the rising cost of materials important to construction of transportation infrastructure such as steel and concrete, and inflation's impact on buying power, all available revenue is already dedicated to projects currently in the state Consolidated Transportation Program; the ability for the state to add more projects is limited.

The Baltimore region contains over 11,100 miles of streets and highways and more than 2,100 bridges. The state-maintained highway network in the Baltimore region consists of approximately 24,832 lane miles, which comprise 37 percent of all lane miles in the state of Maryland.

The rate of lane miles traveled is projected to increase 34 percent in 2035 as compared to 2005.



Total vehicle miles traveled is climbing at a faster rate than capacity can match.

Similar struggles between demand and funding for new capacity are experienced by the transit, port, and airport agencies.

Chapter 4, Section 3.6

GOODS MOVEMENT EXPLOSION

Challenge: *Creating additional transportation choices, such as improving the rail network, could result in a better balance in freight movement.*

Transportation forecasts of increased population for the Baltimore region point toward a greater demand for consumer and manufactured goods.

As the economy grows, more truck and rail companies will haul demanded products into and through the Baltimore region. In fact, the Federal Highway Administration forecasts a doubling of freight by 2020.

Maintaining the highway and rail infrastructure is essential to managing the congestion on the transportation networks.

The Baltimore region is a

major multi-modal freight hub. The Port of Baltimore is one of two East Coast ports with a 50-foot channel, making it a gateway for general cargo such as containers and vehicles, and bulk cargo such as gypsum and iron ore. Once these goods leave the maritime network, they become rail and truck cargo.

The region's rail network includes tunnels that cannot accommodate the double-stacking of containers. Therefore, most containers leaving the port move by truck.

According to a consultant's report, in 2030 trucks are projected to carry more than 81 percent of total freight both by tonnage and by value in the Baltimore region.

Chapter 4, Section 3.7

ENVIRONMENTAL STEWARDSHIP

Challenge: *Meeting federal, state, and local environmental goals in the face of projected growth.*

This planning process involved new partnerships with state and federal regulatory agencies, and considered the relationship between the plan as a whole and the region's natural and historic resources.

An issue garnering significant attention is climate change related to greenhouse gases.

While there are no established Federal standards for greenhouse gases, and Outlook 2035 does not directly address the issue of climate change, Outlook 2035's overall goals for reducing vehicle emissions should have a positive effect on the Baltimore region's inventory of greenhouse gases.

Examples of specific strategies in the Baltimore region that reduce greenhouse gas emissions from the transportation sector include truck stop electrification, park-&-ride lot improvements, ride-share coordination, incident management programs, telework promotion, alternative fuel vehicle purchases such as hybrid transit buses, and devices which allow buses to start remotely, saving idling time.

See Appendix 4 for more on Green Gas Emissions from the Transportation Sector.

Chapter 4, Section 3.8

SUSTAINABLE COMMUNITIES

Challenge: *Developing a comprehensive planning process which integrates economic, social, and environmental systems.*

Sustainable communities meet the needs of the present without compromising the ability of future generations to meet their own needs. Applying this concept to transportation requires a more comprehensive planning process than what is currently in place inside or outside of the MPO process. However, doing so is essential to reduce pollution and protect the environment, encourage economic development, and improve community health. The BRTB is committed to integrating sustainability into the transportation planning process over time. This will require considerable coordination with local jurisdictions and state agencies since the responsibility for these related aspects lie outside the MPO purview.

The BRTB recognizes that transportation planning investments impact community health and lifestyles. The sedentary lifestyle of many Americans—caused in part by auto-dependency and a lack of adequate bicycle and pedestrian facilities—has contributed to increased rates of obesity, diabetes, and heart disease.

The BRTB helps to address these issues by advancing projects that improve and/or increase bicycle or walking options. Ultimately, the BRTB would like to see a network of interconnected sidewalks, trails, and bike lanes throughout the Baltimore region. These types of transportation options would give residents more opportunities to pursue an active, healthier lifestyle, because it would give them more options to walk, bicycle, or use transit to places of employment, retail, recreation, etc.

Various BRTB committees and subcommittees, such as the Bicycle and Pedestrian Advisory Group, provide ideal forums for public health officials to contribute to the transportation planning process. Input from these professionals will help to integrate aspects that would promote active and healthy lifestyles.

WHAT IS TRANSIT-ORIENTED DEVELOPMENT?

Transit-oriented development (TOD) is becoming one means to address a variety of issues ranging from traffic congestion to affordable housing, air pollution, and sprawl by creating compact, walkable communities centered around high quality transit services. This concept also has a direct benefit to transit operations by making it more useful to those who live and work along the system. It also offers residents a convenient commute to jobs, shopping and entertainment in the region.

Maryland has great TOD potential, with more than 75 rail, light rail and subway stations, and dozens more proposed in the next 20 years. The state will support its investment in transit by attracting new homes and businesses to the station areas. Taking advantage of opportunities to create higher density transit destinations along our transit systems allows the state to put the land around the transit stations to a higher and better use, facilitating the return of these lands to local tax roles. Transit station areas also make excellent opportunities for public private partnerships and enhance state-owned or leased transit stations and parking areas, while enabling a private developer to create transit-oriented development.

TOD sites typically share certain characteristics.

- TOD is pedestrian-friendly. The development often sits within a connected grid of streets that are easy to navigate. Pedestrians are made to feel safe with wide sidewalks, well-marked crosswalks, good lighting and narrow streets to slow car traffic. The street scene is made inviting with landscaping, attractive public spaces and interesting architecture.
- The tallest buildings are clustered immediately around the transit station, with the density of development tapering off as you get farther out.
- Parking is carefully managed. The goal is to limit the number of parking spaces and encourage shared parking between different land uses that need it at different times of day or at different times of the week. Offices, for example, typically need parking during weekdays, while retail and entertainment venues more likely need it evenings or on weekends.
- Transit-oriented development has high-quality transit service that includes, wherever possible, access to buses and rail. Many Maryland neighborhoods in the Washington metro area, for example, link residents to Metro stations with Ride-On buses.

There is no one-size-fits-all mold, and TOD will look different depending on where you find it. The mix of development, density and design will differ based on location.

FTA defines Joint Development as projects that are commercial, residential, industrial, or mixed-use developments that are undertaken in concert with transit facilities. They may include private and non-profit development activities usually associated with fixed guideway (Rail or Busway) transit systems that are new or being modernized or extended. Joint development projects may also be associated with bus facilities, intermodal transfer facilities (e.g., bus to rail), transit malls, and federal, state or local investments in local facilities (such as a bus terminal and tourist facility). FTA funds may be used to facilitate development that enhances transit; they may not be used for purely private development such as construction and permanent financing costs related to the design or construction of purely retail, residential, or other commercial public and private revenue-producing

WHAT IS TRANSIT-ORIENTED DEVELOPMENT?

facilities.

To be eligible for consideration as a transit-oriented joint development project under the Federal Transit Administration policy, the project:

- must include a transit element;
- must enhance the urban economic development or incorporate private investment including office, commercial, or residential development; and
- must enhance the effectiveness of a mass transit project, and the non-transit element must be physically or functionally related to the mass transit project; or it creates new or enhanced coordination between public transit and other forms of transportation; or it includes non-vehicular capital improvements that result in increased transit usage, in corridors supporting fixed guideway systems.

There are currently 4 TOD's underway in the Baltimore region:

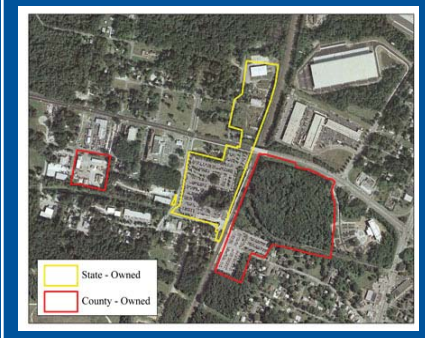
1. SAVAGE (ANNAPOLIS JUNCTION) MARC STATION

The Savage MARC Station is a 12 +/- acre site, located along Dorsey Run Road, near both MD 32 and US 1 in Howard County, Maryland. The Savage MARC Station is located along the MARC Camden Line, connecting the Baltimore Camden Station with the Washington, DC Union Station, which handles 4,300 average daily trips. There is an average of 540 trips per day at the Savage MARC Station, which currently provides 914 surface parking spaces.

The Savage MARC Station is located within the designated TOD zone of the US 1 Corridor Revitalization Plan designed by Howard County, and is in close proximity to the growth anticipated at both Fort Meade and the National Security Agency (NSA).

2. ODENTON MARC STATION

The Odenton MARC Station is a conglomeration of several sites totaling 24 +/- acres, located along MD 175 and Morgan Road, situated just west of MD 170 in Anne Arundel County, Maryland. The Odenton MARC Station is located along the MARC



Penn Line, connecting the Baltimore Penn Station with the Washington, DC Union Station, which handles 19,000 average daily trips. There is an average of 2,100 trips per day at the Odenton MARC Station, which currently provides 2,000 surface parking spaces.

The Odenton MARC Station is located within the Odenton Town Center Master Plan, designated as one of Anne Arundel County's Growth Areas since 1968. In addition, the Odenton MARC Station is located in close proximity to the growth anticipated at both Fort Meade and the National Security Agency (NSA).

3. STATE CENTER

"State Center" refers to an area in mid-town Baltimore City generally bordering Preston Street that includes four buildings which house a large number of state agencies and employees. The State Center complex is the largest concentration

of state government offices in Maryland, and it is comprised of approximately 25 acres of land around the State Center/Cultural Center Metro Station and across the street from the Cultural Center Light Rail Station. The site is surrounded by Martin Luther King, Jr. Boulevard, Howard Street, Hoffman Street and Madison Avenue. The complex has 4 mid-to-high rise state office buildings including: 201 West Preston Street; 300 West Preston Street; 301 West Preston Street; and, 1100 North Eutaw Street.

A 650-space parking structure, a chiller plant, and three surface parking areas occupy 5 of the 25 acres. In addition, the State is interested in the redevelopment of the historic 5th Regiment Armory building at the corner of Howard and Preston Streets, after it is vacated by the National Guard, its current occupant. The 5th Regiment Armory is listed on the National Registry of Historic Places.

The area has been the subject of a cooperative effort between the state and the City of Baltimore to assess opportunities to revitalize the state's office complex through greater use of transit oriented development (TOD). These TOD principles include: development that is physically and functionally integrated with transit; reduction of auto dependency; an increase in pedestrian/bicycle trips; safer station areas; enhanced walkable connections to transit stations; provision of mixed-use development, including housing and convenience goods and services; attractive public spaces; promotion and enhancement of ridership; and encouragement of revitalization and sound growth.

4. METRO CENTRE AT OWINGS MILLS

Metro Centre at Owings Mills is a Class A, mixed-use, TOD project under construction adjacent to the existing Owings Mills Metro Station. The design integrates a dynamic mix of residences, offices, retail establishments, restaurants, a new public library, and a community college building, all within a pedestrian-friendly live-work-play environment that encourages the use of public transportation and existing infrastructure.

Five structured parking garages will serve the entire Metro Centre project adjacent to the office, retail, residential and public buildings to provide ease of access for employees, residents and visitors. The first garage was delivered in Summer 2007. Target delivery date for the first commercial tenants is 2009.

The first Class A single or multi-tenant office building on the south side of the Metro Station is designed for a total of 300,000 square feet in ten stories with high visibility adjacent to I-795 and the Metro. Another 280,000 square feet of loft style office space will be developed along Main Street over first floor retail space.

The north side of the Metro Station will be developed with four Class A office buildings in a corporate campus setting. The north campus office park will support a total of 68,000 square feet of office space with adjacent garage parking and 13,500 square feet of supporting retail space.

Chapter 4, Section 3.9

IMPACT OF MARYLAND'S STRUCTURAL DEFICIT

Challenge: *The challenge to maintain a high quality transportation system has become more complex as construction costs soar globally and state and local governments struggle to raise sufficient revenues for much needed transportation improvements. Regional leaders must address the possibility of perennial funding shortfalls.*

The structural deficit is the gap between the estimate of revenues from current sources and the baseline expenditures projected to be incurred by the state. A structural deficit relates to the state general fund that accounts for approximately half of the total budget. General funds are primarily revenues from broad-based taxes not dedicated to a specific purpose. The other half of the budget is comprised of three other funds: special funds dedicated to a specific purpose (such as transportation), higher education funds, and federal funds for specific programs.

The structural deficit projected for the next year is real, as compared to previous years. In recent years, structural deficits have been projected for the budget each year. These structural deficits were resolved by a range of measures. For the upcoming budget, the structural deficit is significant higher than in recent years, estimated at $1.456 billion, so will be more difficult to resolve.

Revenues from the Transportation Trust Fund have been used to resolve past deficits. However, based on transportation capital needs, diverting declining transportation funds to offset part of the general fund structural deficit seems unlikely.

Chapter Five

Building the Regional Transportation Plan

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Chapter Five

Building the Regional Transportation Plan

Safe, Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users (SAFETEA-LU) requires that all new regional long range plans, such as Outlook 2035, include a list of transportation investments that are planned over the next 20 years. The federal legislation also mandates that the long range plan be financially constrained, requiring the MPO to identify all sources of revenue that are expected to be available in support of the implementation of these investment decisions. Simply put, the amount of funding projected to be available over the horizon of Outlook 2035 will determine how much and, thus, which projects will be implemented to improve the region's transportation system by 2035. Despite the large sums of funds generated by existing funding streams, not enough revenue will be available to build all the projects identified as desirable and needed to serve future regional growth and mobility challenges. The following chapter includes a detailed explanation of the revenue stream projected to be available by 2035 and a listing of the projects and programs – the Preferred Alternative – to be funded. Also identified is a list of additional infrastructure investments that will be considered for implementation if additional revenue resources become available through the plan period.

Chapter 5, Section 1

THE SOCIO-ECONOMIC FORECAST

Projections show the Baltimore region as a continuing magnet for families and jobs. The forecasts for the Baltimore region, based upon the latest regionally endorsed Cooperative Forecast, termed Round 7 (see Appendix 5), predict that as many as 443,000 people and 451,000 jobs will be added to the Baltimore region between 2000 and 2035.

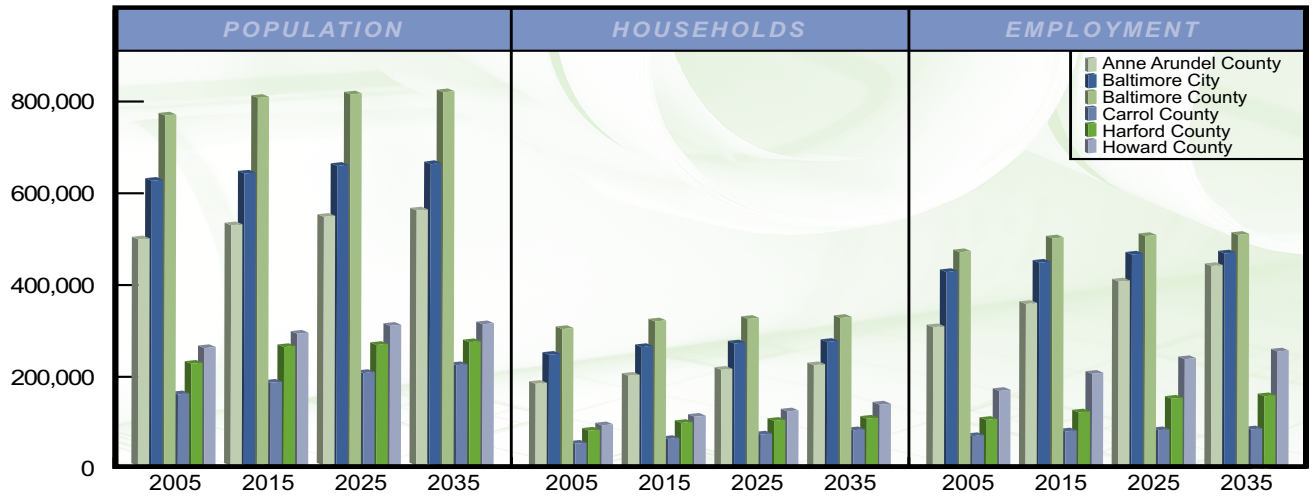
This represents an 18 percent increase in population and a 29 percent increase in employment. By 2035, the Baltimore region will contain nearly three million people and nearly two million jobs.

When comparing populations between 2000 and 2035, Carroll County will experience the fastest population growth with a 55 percent increase; however, the largest absolute growth will occur in Baltimore County. According to the 2000 census, Baltimore County had the largest population of all Baltimore region jurisdictions and is expected to add almost another 100,000 people to its 2000 base by 2035. Harford and Howard counties are projected to add nearly one-third of their 2000 population by 2035.

Robust population growth also means that a substantial number of new households will be formed in the Baltimore region. Sometime during the first quarter of 2004, the one-millionth household was added to the Baltimore region.

The Baltimore region is expected to experience a one-quarter increase between 2000 and 2035 by adding over 241,000 new households. The addition of these new households to our region

FIGURE 5-1
POPULATION, HOUSEHOLD, AND EMPLOYMENT BY JURISDICTION, 2000-2035



The Baltimore region can expect job growth of 451,600 jobs by 2035, a 29 percent growth above employment totals in 2000. By 2035, the total employment in the region will be slightly less than two million jobs.

is the equivalent of adding all of the households located in Harford County in 2005. Anne Arundel County is expected to add the most new households with 55,000. However, Baltimore, and Howard counties will both add in excess of 40,000 new households during the 2000 to 2035 period. Carroll County, while adding only 37,000 new households, will have added a figure equal to 70 percent of their 2000 household base. Anne Arundel, Harford, and Baltimore counties household growth is particularly affected by the prolonged impact of the Base Realignment and Closure (BRAC) activity which will occur from 2006 to 2020. Baltimore City is expected to reverse its decades-long trend of household and population losses and add just over 27,000 new households to the heart of the region by 2035.

By 2035, seniors will account for one out of every five citizens in the Baltimore region and more than one-half of a million people in our region will have reached retirement age.

By 2035, the Baltimore region senior population will have nearly doubled in size. By the end of the forecast period, senior citizens will account for 25 percent of the region's driving age population.

The growth in the senior population will continue unabated throughout the forecast period, and residual effects of this population phenomenon will last until about mid-century when the last of the "Baby Boom" generation will age out of the life cycle.

The Baltimore region can expect job growth of 451,600 jobs by 2035, a 29 percent growth above employment totals in 2000. By 2035, the total employment in the region will be slightly less than two million jobs.

All jurisdictions in the region

are expected to experience job growth of 20,000 or greater, but Anne Arundel County will singularly account for 35 percent of the region's employment during the forecast period. While BRAC jobs will account for an employment surge in Anne Arundel County during the early part of the forecast period, it will account for less than 10 percent of the growth that the county experiences during the entire 2000 to 2035 period. Howard County is expected to add nearly 105,000 new jobs for a 65 percent increase.

Taken together, Anne Arundel and Howard counties will account for 58 percent of the region's employment growth between 2000 and 2035.

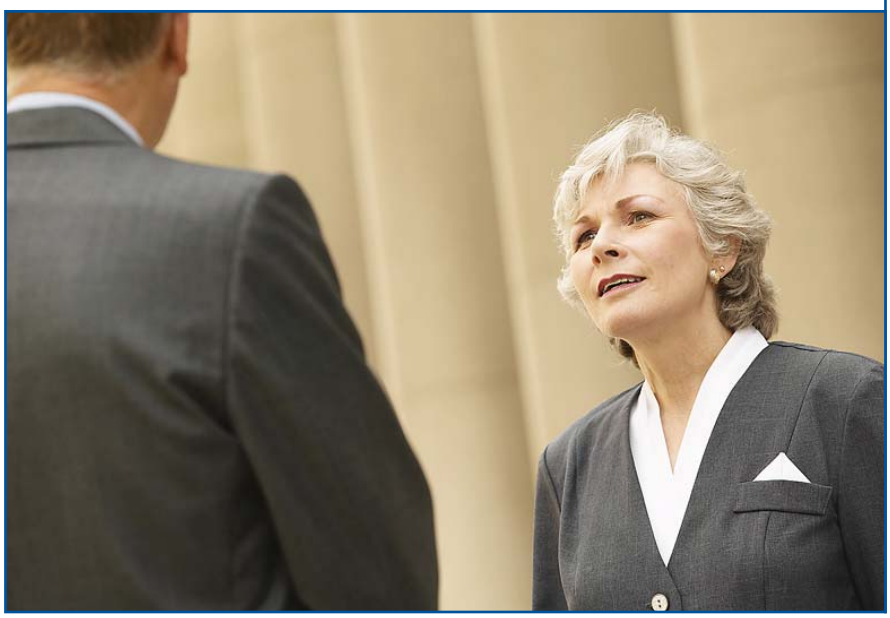
Harford County will grow by 72 percent or 69,000 jobs during the forecast period. New BRAC-related jobs will constitute a larger share of Harford County's employment growth (25 percent) than BRAC jobs in Anne Arundel County.

Baltimore County will add 75,000 jobs to its employment base and Baltimore City, after a large decline during the first five years of the forecast period, will experience a 22,000 job increase by 2035.

Other federal government personnel redeployments and general federal government job growth, added to the expansion of already thriving industries such as finance, business, services, education, health care, and research will fuel the largest share of employment growth in the region between 2000 and 2035.

Our employment forecasts for 2000 to 2035 recognize this continuing trend throughout the period.

Based on current population projections, assumptions about slower labor force growth, and projections of overall employment, the Baltimore region by 2035 will have to import (commutation in from outside of our region) more than 100,000 workers to meet our employment expectations.



Chapter 5, Section 1.1

SIGNIFICANT DEMOGRAPHIC CHARACTERISTICS OF THE BALTIMORE REGION

The Baltimore region includes only six of Maryland's 24 jurisdictions. However, in

2005, households in the Baltimore region had a median income nearly equal to the state $66,000 average.

Additionally, the region is home to 47 percent of the state's 5.6 million residents, 48 percent of the state's 3.3 million jobs, 44 percent of the state's 860 thousand public school students, 36 percent of the state's new housing and generates 45 percent of the state's $60 billion in retail sales. (Maryland State Data Center, 2006 Maryland Statistical Handbook)

Outside of Maryland, the region ranks highly among a sample of twenty of the nation's metro areas. A 2005 report produced by the Greater Baltimore Committee and the Economic Alliance of Greater Baltimore noted that the Baltimore region ranked:

- 8th for population with more than 36,000 residents and households earning $75,000+ annually living within a 1-mile radius from the city center,
- 10th for average annual employment growth from 2002 to 2004,

- 9th for population having completed a bachelor's degree or more (29.7%),
- 9th for air traffic passengers in 2004 (20.8 million),
- 6th for mass transit use with more than 640 million passenger miles and 113 million passenger trips, and
- 5th in transit ridership per capita.

Chapter 5, Section 2

FINANCIAL FOUNDATION

For Outlook 2035 to be a sound, long-term investment strategy for the region, the first question that must be answered is, how much money will we have to invest?

The amount of funding projected to be available determines how much we can invest to maintain, operate and improve the region's transportation system over the planning period.

A broad range of financial resources are devoted to implementing Outlook 2035. These resources are considered to be reasonably available throughout the planning period, having had a long history of providing funding for regional transportation plans. Federal, state, local and private sector revenue sources are included in the analysis.

Chapter 5, Section 2.1

FINANCING MARYLAND'S TRANSPORTATION PROJECTS

The Maryland Transportation Trust Fund (TTF) is the primary state source of transportation funding. It was created in 1971 as a dedicated fund to support the Maryland Department of Transportation (MDOT). It funds the State Highway Administration, Motor Vehicle Administration, Maryland Aviation Administration, Maryland Transit Administration, Maryland Port Administration, Washington Metropolitan Area Transit Authority, local governments and debt payments obligations.

To support all activities, MDOT receives funding through the integrated TTF, which is a dedicated revenue source supported by Federal aid, operating revenues, registration fees, taxes, and bond sales. Since 1985, MDOT has partnered with the Maryland Transportation Authority (MdTA) to provide funding assistance and/or access to the revenue bond market for joint development and delivery of approximately $1.2 billion in capital construction projects.

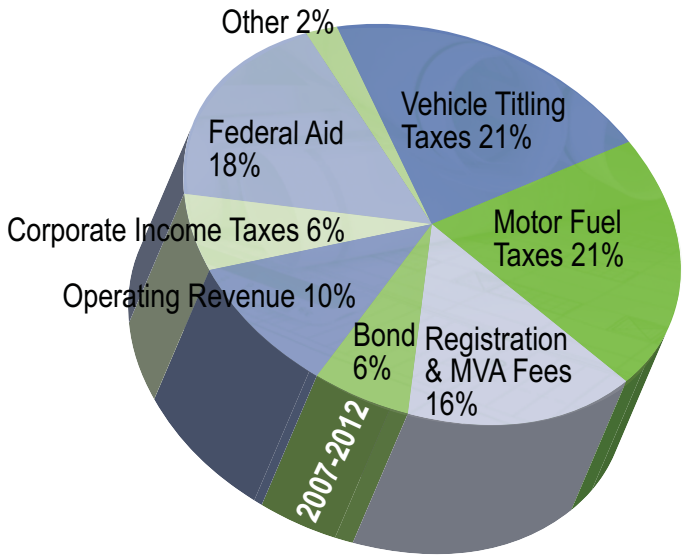
Chapter 5, Section 2.2

SOURCES OF TRANSPORTATION TRUST FUND MONIES

TTF monies include vehicle titling taxes, registration and MVA fees, corporate income taxes, operating revenue, bonds, Federal-aid, motor fuel taxes, and other sources. While federal-aid provides nearly 18 percent of trust fund revenues, the motor fuel and vehicle titling taxes have historically provided the largest portion, at 21 percent each. Registration and MVA fees contribute 16 percent and operating revenue contributes 10 percent.

Federal funding, primarily collected through the federal gas tax, is programmed through the Maryland Consolidated Transportation Program (CTP). It is a fiscally constrained six-year prioritized program of regionally significant transportation

FIGURE 5-2
SOURCE OF TRANSPORTATION TRUST FUND MONIES, 2007-2012



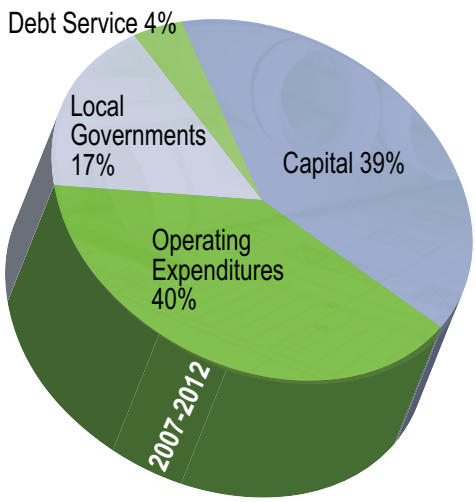
projects in the State of Maryland. It lists and describes all of the projects addressing Maryland's surface transportation system that are funded with federal funds.

Chapter 5, Section 2.3

HOW MONIES IN THE TRUST FUND ARE ALLOCATED

TTF allocations have historically maintained the same proportions as reflected in the most recent time period 2007-2012. The largest portion of TTF dollars, 40 percent, is held by MDOT for its operating expenditures. While salary and wages are substantive operating charges, the bulk of operating expenses go to maintenance and preservation of transportation facilities. A nearly equal share of TTF dollars, 39 percent, goes to capital expenditures. This category is limited to projects that are new facilities and/or expansion of existing facilities. Local governments receive 17 percent of TTF dollars for local projects and the remaining 4 percent covers debt service.

FIGURE 5-3 ALLOCATION OF TRANSPORTATION TRUST FUND MONIES, 2007-2012



Chapter 5, Section 2.4

NEAR TERM REVENUE ASSUMPTIONS FOR THE STATE TRANSPORTATION TRUST FUND

TTF fund sources are projected to increase moderately and are pegged to total $18.3 billion for the 2007-2012 time period. Inflation does not push transportation revenues up. On the contrary, it pushes the buying power of transportation dollars down. While the cost of motor fuel has increased significantly since Fiscal Year 1993, the gas tax has remained the same at 23.5 cents per gallon. Significant growth in TTF revenues is dependent upon statutory increases to the gas tax, vehicle titling tax and/or registration fees. Using the recent history of Trust Fund revenues as a guide, there is more confidence about the next five years than the years beyond. Specific revenue projections and assumptions MDOT developed for 2007-2012 follow below.

- Fund Balance: since the inflow of Trust Fund revenues is periodic rather than annual due to user fees/taxes, MDOT maintains a $100 million annual fund balance to accommodate its working cash flow requirements.
- Motor Fuel Taxes: revenue from this source is projected to reach $3.2 billion. At current rates, receipts are expected to grow between 1 percent and 2 percent per year.
- Vehicle Titling Taxes: revenue from this source is projected

For the period beyond 2012, projections of state funds use an historical annual average growth rate of 3.75 percent.

Federal fund projections for the same period are based on an average growth rate of 4.7 percent for both highway and transit program funds.

to yield $3.7 billion. This tax is heavily dependent on the sale of new and used motor vehicles; revenues are not projected to rise above their historic annual rate of 4 percent.

- Registration and MVA Fees: revenue from this source is projected to generate $2.7 billion. Primarily tied to population growth, reduced growth in registered vehicles and a heavier vehicle mix will hold revenue growth at an average of 3 percent every two-year cycle.
- Corporate Income Taxes: revenue from this source is estimated to reach $845 million. While the Corporate Income Tax is 7 percent, only 24 percent of collections are tapped for transportation funding. Revenues will not rise significantly above current levels.
- Operating Revenues: this source is projected to contribute $2.5 billion. Monies from rail and bus fees, terminal and other port related revenues, flight activities, rent and user fees, parking, airport concessions and other aviation related fees constitute ongoing operating revenues. These revenues will experience significant increases above prior years. Growth and expansion of the Helen Delich Bentley Port of Baltimore and Baltimore/Washington International Thurgood Marshall Airport (BWI) will push them up steadily each year.
- Federal Aid: revenue from this source is marked at $3.7 billion. This is a capital authorization; only $427 million is appropriated for operating. The Washington Metropolitan Area Transit Authority will receive a direct allocation of $534.8 million apart from the Maryland total. These federal dollars flow through SAFETEA-LU, the reauthorization of federal surface transportation funding, which provides overall structure for federal highway and transit programs through federal Fiscal Years 2005- 2009. The reauthorization is about $720 million per year, an increase of $180 million over the previous authorization. However, the majority of these funds are not available for new projects. MDOT plans to direct increased funding to unfunded but committed projects listed in the Consolidated Transportation Program.

Chapter 5, Section 2.5

LONG TERM REVENUE ASSUMPTIONS FOR THE STATE TRANSPORTATION TRUST FUND

For the period beyond 2012, projections of state funds use an historical annual average growth rate of 3.75 percent. Federal fund projections for the same period are based on an average growth rate of 4.7 percent for both highway and transit program funds.

Regarding future operating expenditures, projections are derived by inflating the previous year with an estimate for the percentage change in Consumer Price Index-for all Urban Consumers (CPI-U) plus 1 percent. The Consumer Price Index is a generally accepted measure of inflation. The projected annual change in index figures is based on information received from two economic forecasting firms. One percent is added to the forecasted rate to account for the additional operating costs associated with new capital expansions. For system preservation expenditures, an annual growth rate of 2.5 percent is assumed for the planning period.

Chapter 5, Section 2.6

SYSTEM PRESERVATION AND OPERATING NEEDS

The competition among transportation modes for capital funding to support improvements and new projects is fierce. Transportation needs far outweigh state resources. The State Highway Administration maintains over 5,000 roadway miles and 2,500 bridges. The Maryland Transit Administration operates Metro, Light Rail, bus and commuter rail service. The Washington Metropolitan Area Transit Authority supports the Washington Metro as well as transit programs in Montgomery and Prince George's counties. The Maryland Aviation Administration owns and operates BWI and Martin State Airport. The Maryland Port Administration owns and operates several major maritime terminals that include acres of land, warehouse and berth space.

Operating costs continue to climb. The FY 2008 operating program increased by 7.5 percent or about $100 million above the FY 2007 budget. The largest changes are attrib-

uted to the Maryland Transit Administration (MTA) at $46 million, the Washington Metropolitan Area Transit Authority (WMATA) at $16.7 million and the Maryland Port Administration (MPA) at $8.6 million.

Rising fuel costs and increases in transit service contracts such as for the paratransit service Mobility, Maryland Rail Commuter (MARC), and commuter bus services pushed MTA operating costs up. Likewise, personnel and fuel cost increases are growing faster than revenues at WMATA. Increased stevedoring costs, additional security, and debt service payment for Certificates of Participation (COPs) are driving MPA operating costs up.

Chapter 5, Section 2.7

FINANCIAL RESTRAINTS GUIDING THE 2035 PLAN

A lasting contribution of ISTEA and subsequent federal legislation to the transportation planning process is the mandate that Metropolitan Planning Organizations (MPOs) base their long-range metropolitan transportation plans on a standard of "financial reasonableness." The capital costs for expansion of the regional transportation system, as well as system preservation and operations costs incurred, must equal the level of funding that the MPO reasonably determines to be available.

The requirement that plans be financially constrained forced planners to prioritize and program projects based on verifiable revenue projections. As a result, many projects were pushed back into later years while others failed to be identified in this planning period.

Chapter 5, Section 2.8

THE METHODOLOGY EMPLOYED TO DEVELOP THE REVENUE FORECAST FOR THE BALTIMORE REGION

MDOT forecasted state funding for capital and operating expenditures for the 2013 - 2035 planning period based on historical spending patterns. Operating expenditures were projected to grow by one percent per year to cover costs required for the maintenance/operation of planned expansions to the regional transportation system. Local contributions were estimated

based on historical trends in transportation funds that jurisdictions receive from the state. Since private sector contributions generally vary by project, this funding source was accounted for by using a conservative assumption of projected revenues. (Examples of private sector contributions include: a private developer paid for the parking garage for the Owings Mills TOD and another developer paid for infrastructure on the Savage TOD project.) All of these estimates were aggregated to produce the total for the Baltimore region.

To account for the effects of inflation over the 20-year plan, MDOT generated revenue estimates in both current and constant dollars. In this plan, dollars that include the effects of inflation are known as "current," "nominal" or "data year" dollars. New metropolitan planning regulations call for revenue and cost estimates that support the metropolitan transportation plan use an inflation rate to reflect "year of expenditure" dollars. Dollars from which the inflation component has been removed are known as "constant" or "base year" dollars. The Discount Rate for 2035, converting current dollars to constant dollars, is 2.4 percent.

Detailed information on revenue and project cost estimates for both "year of expenditure" and constant dollars are found in Appendix 5.

Current methods for forecasting future transportation revenues, while technically proficient, are not completely reliable. Over the planning period, political pressures can change the tax rates that drive revenue calculations. Additionally, historic economic conditions, the base for projections, rarely stay true in future years. As a result, revenue projections are not certain but fall within a range of rational acceptability. As such, they serve as the best tool available for guiding regional transportation plans.

Identifying the necessary funding to meet anticipated project costs is a more difficult task. A number of revenue sources were investigated and the cooperation of key stakeholders was essential. The MPO collects estimated statewide transportation funding from MDOT. Maryland jurisdictions provide their revenue projections based on revenue from sources such as excise tax, excise tax leveraged bonds or development impact fees. Estimates of revenues contributed by non-governmental sources are also identified. Historic funding levels, in the context of current policy priorities, are examined to determine future revenue trends.

FIGURE 5-4 COMPONENTS OF THE CPI-U

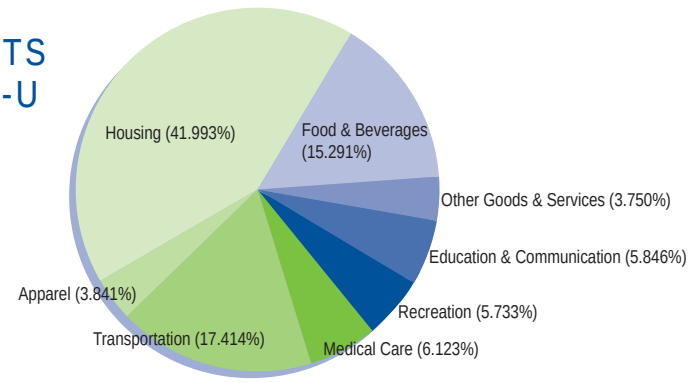
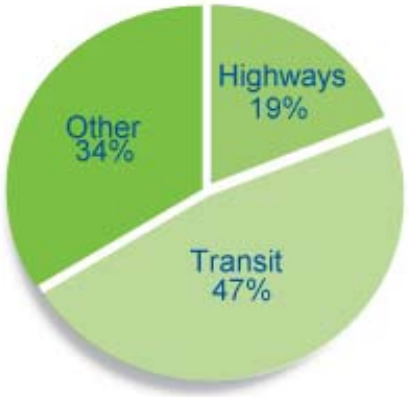


FIGURE 5-5
MDOT OPERATING PROGRAM, FY 1997-2006

Operating expenses over the last 10 years have been distributed as follows: 47% Transit (MTA and WMATA), 19% SHA, 12% MVA, 9% MAA, 8% MPA, and 5% TSO.



According to the Maryland Department of Transportation (MDOT), between fiscal years 1997 and 2006, 47 percent of its operating budget was spent on transit, while 55 percent of its capital budget was devoted to highway projects and 28 percent to transit. Overall, highways accounted for 39 percent of the combined operating and capital budget, and transit accounted for 35 percent.

FIGURE 5-6
COMBINED OPERATING & CAPITAL EXPENDITURES, FY 1997-2006

A breakdown of combined operating and capital expenditures show that over the last 10 years, 39% of funding went to highways, 35% to transit (MTA and WMATA), 11% to airports, 6% to seaports, 6% to motor vehicles, and 3% to MDOT Headquarters.

Chapter 5, Section 2.9

REVENUES ANTICIPATED FOR THE BALTIMORE REGION

MDOT reports that for the thirty year period from 1981 – 2012, surface enhancement projects have been about 87.3 percent of statewide expansion funds. The Baltimore region's share of surface enhancement dollars for this period is about 41.6 percent.

During the FY 2013 to FY 2035 planning period, expansion funds available for the Baltimore region are projected to total $8.7 billion constant 2007 dollars. Approximately $2.1 billion is programmed for FY 2006 to FY 2011 in the State Report on Transportation (SRT).

This report, a transportation vision and implementation plan, has two sections, the Maryland Transportation Plan (MTP) and the Consolidated Transportation Program (CTP).

The MTP, updated every fifth year, sets the goals and policies that guide the state's transportation decision making. The next update will occur in 2009.

The CTP, developed each year in concert with the leadership from state jurisdictions, is the spending plan for ongoing and new capital projects the department will fund during the next six years.

After broad based review and comment, the approved CTP is incorporated into the Governor's annual budget submittal to the Maryland General Assembly.

This, in turn, provides state direction on spending from state and federal funds sources in developing the long-range plan and subsequent short-term Transportation Improvement Program.

EXPANSION FUNDING *$8.7 BILLION*

Expansion includes funding for all capacity improvements. The MDOT Office of Finance provided the figures for state revenues dedicated for expansion projects. MDOT indicated that they used their records of expen-

ditsures from two time periods; FY 1981 to FY 2005 and FY 2006 to FY 2011 to determine the historic split between systems preservation and expansion.

MDOT assumed an annual growth rate of 2.5% for systems preservation for the FY 2012-FY 2035 period.

Expenditures for capital expansion were derived by subtracting both operating and systems preservation expenditures from the total program expenditures for each year.

For the Baltimore region allocation, total capital figures from FY 1981 to present were split into surface and nonsurface and combined with system preservation/expansion data. It was then analyzed and evaluated to produce estimates of the percentage of Maryland expansion associated with surface transportation for the various time periods.

Surface capital for the Balti-

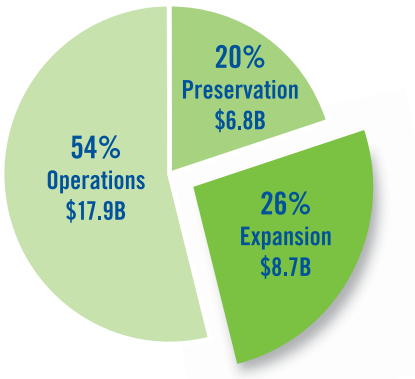


FIGURE 5-7 OVERALL

The total amount of funding available through the year 2035 was assessed at approximately $33.4 billion dollars, in constant 2007 dollars. This amount covers three areas: Operations, Preservation, and Expansion.

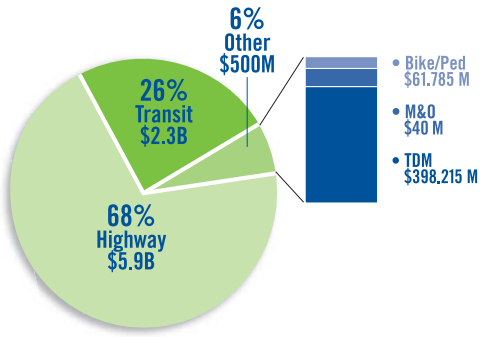


FIGURE 5-8 EXPANSION

$8.7 billion has been set aside for Expansion Projects. These projects fall under three categories: Transit, Highway and Transportation Demand Management (TDM).

FIGURE 5-9
BREAKDOWN OF ALL COSTS IDENTIFIED IN OUTLOOK 2035

OPERATIONS
$17.9 BILLION

Funding covers the day-to-day operations of the transportation system. For transit, this includes the cost of running buses and trains, and for highway, it may include maintenance projects that are of a smaller scale than preservation projects (i.e., filling potholes, clearing debris, etc.).

PRESERVATION
$6.8 BILLION

System preservation is essential to keeping a safe and well-run transportation system. This includes activities such as resurfacing roads, repairing bridges, maintaining buses and transit tracks, etc.

EXPANSION $8.7 BILLION

This is funding for all capacity improvements. These include projects such as building a new transit line, increasing lanes on a highway, or adding a new bicycle and pedestrian trail.

HIGHWAY & INTERCHANGE
$6 BILLION

Projects funded include federal aid eligible highways and roadways maintained by the State Highway Administration, as well as each local jurisdiction.

TRANSIT
$2.2 BILLION

Transit projects in this category include a new rail service and MARC improvements operated by the Maryland Transit Administration.

OTHER STRATEGIES
$0.5 BILLION

This category includes: capital improvements, technical enhancements, and commuter assistance. Capital improvements include the purchase of alternative fuel buses, bicycle and pedestrian enhancements, and strategies to optimize system performance.

more region was derived by adding the expenditures for all MTA, 50% of MARC and the portion of SHA that pertained to the region.

The BRTB staff then took the Baltimore region total from MDOT for years 2013 through 2035 ($8.3 billion) as calculated and added contributions pledged by local jurisdiction ($400 million) for the same period to arrive at $8.7 billion in revenues for expansion projects. Additional documentation is available in Appendix 5.

Once the expansion portion was determined, staff used state historical figures to calculate the percent share of operations, system preservation and expansion within the overall budget. Using the $8.7 billion as the basis, the historic percentage shares were applied.

The projected revenues available to the Baltimore region from FY 2013 through FY 2035 total $8.7 billion, an amount generally equivalent to the estimated cost of the projects included in Outlook 2035.

As a result, implementation should be able to be completed for all projects selected for the Outlook 2035 Preferred Alternative, therefore meeting SAFETEA-LU's required standard of financial reasonableness.

See Appendix 5 - Letters of Financial Commitment.

The forecast reflects overall dollars available for the transportation program. The following process is used to calculate the Baltimore region portion of state funds for capital expansion.

- Total capital figures from FY 1981 to the present were split into surface and non-surface. Surface included highway (SHA) and transit (MTA, MARC, & WMATA) costs. Non-surface included port, aviation, and motor vehicle administrations, and the Secretary's Office expenses.
- The surface / non-surface data and the system preservation / expansion data were combined, analyzed, and evaluated to produce estimates of the percentage of Maryland expansion associated with surface transportation for the various time periods.
- Surface capital in the Baltimore region was derived by adding the expenditures for all of MTA, one-half of MARC and that portion of SHA that pertained to the region (Anne Arundel, Baltimore, Carroll, Harford, and Howard counties).

- These Baltimore specific figures were used to derive estimates of Baltimore surface expansion. These figures, when used with the above-mentioned projections, produce the estimates shown for Baltimore as a percent of Total Surface Expansion.

Chapter 5, Section 3

DEVELOPING PROJECT COSTS

Estimating project costs was a joint effort that included the aid and assistance of staff from state agencies, local jurisdictions, transportation consultants and BMC.

The State Highway Administration (SHA) provided cost estimates for state facilities. Cost estimates for local facilities, as well as bicycle and pedestrian projects, were supplied by sponsoring jurisdictions.

The Maryland Transit Administration developed capital cost estimates for transit projects. Staff, with the assistance of appropriate modal administrations, estimated the cost of ancillary projects (commuter assistance, park-&-ride, bicycle and pedestrian projects, alternative fuels and growth management initiatives).

By far the most important component of the cost methodology for Outlook 2035 was SHA's "2006 Highway Construction Cost Estimating Manual" that is an internally created program with a supporting database.

The manual is intended to provide uniform and consistent guidelines for the preparation of engineering cost estimates on highway construction projects.

Since every project is made up of a unique combination of factors which may affect overall costs, because prices on many items tend to fluctuate over time, and because the contractors' bid prices are often based on many variable external factors, there are no magic formulas which will ensure precise estimates.

As a matter of practice, there are at least two rounds of cost development. The first estimate is less intensive and developed for use in documents such as Outlook 2035, the second, more detailed, estimate is developed as the project moves to project planning and is reviewed at least

once a year to reflect updates to fields in the cost estimating program.

When developing a cost estimate, there are, however, some basic principles and factors which can and should be identified early in the process to minimize cost increases throughout the design process. Some of these considerations are:

- Identify all potential impacts before a project gets initial funding and provide reasonable costs with contingencies to cover those impacts.
- Make sure that all specifications clearly define the scope of work.
- Use standard pay items from the category code book whenever possible.

The critical need to update costs annually is reflected in the rising cost of construction materials. Between the years 2004 to 2007, the cost of steel increased 60 percent, cement by 40 percent, asphalt by 25-30 percent, and aggregate rose by 29 percent.

Chapter 5, Section 4

PROJECT PRIORITIZATION

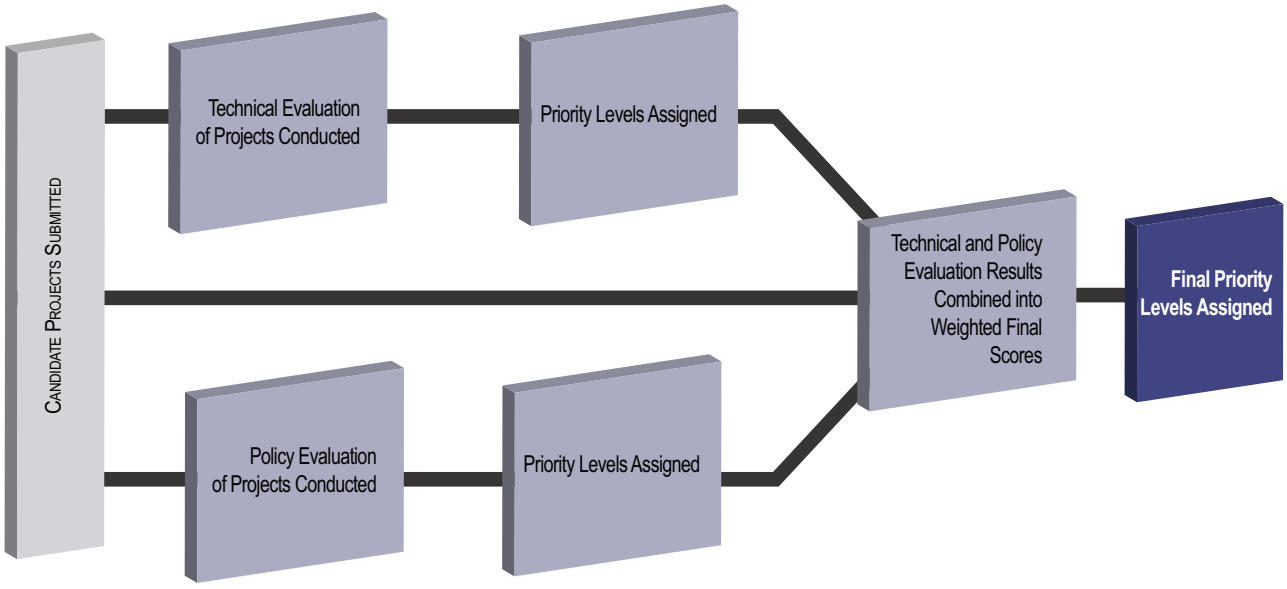
The Preferred Alternative projects were selected by the Baltimore Regional Transportation Board (BRTB) after a larger candidate list of projects underwent an extensive evaluation process called project prioritization.

Project prioritization is the process for evaluating and ranking individual transportation projects.

The projects were initially compiled by the BRTB members and submitted as candidate projects for Outlook 2035.

Then a prioritization process was applied that served as a tool that helped decision-makers decide which projects to fund with the limited amount of money available.

FIGURE 5-10
PRIORITIZATION PROCESS FOR OUTLOOK 2035



Most projects submitted to be included in Outlook 2035 went through this prioritization process.

Projects were evaluated based on their policy and technical merit. A project's final rank was based on the total policy and technical scores combined.

Chapter 5, Section 4.1

POLICY PRIORITIZATION METHODOLOGY

Identifying regional policy-based transportation priorities is a challenge. The intent is to ensure that jurisdictional and agency commitments receive due consideration in setting regional priorities.

Each time a new long-range transportation plan is developed, the BRTB considers the policy factors of previous plans and commits to new factors, criteria, and point ranges that reflect the goals and direction of the current plan.

Policy prioritization is a qualitative process and strongly follows the priorities of the local jurisdictions and state agency members of the BRTB. It is conducted by the BRTB member that submits the candidate project.

Policy prioritization accounts for 60 percent of the overall prioritization score. The total policy score is based on three factors:

1. Scores for each project based on seven policy evaluation criteria;
2. Rank of each project as High, Medium, or Low; and;
3. Maryland Department of Planning (MDP) analysis of each project in relation to a Priority Funding Area (PFA).

The seven policy evaluation criteria are:

1. Improve safety
2. Maximize transportation system management & operations
3. Increase accessibility & mobility
4. Preserve the environment
5. Improve transportation system security
6. Link transportation investments to land use & economic development
7. Foster inter-jurisdictional participation & cooperation

Each of these criteria contains a point range to support the evaluation.

Candidate projects also must be identified as High, Medium, or Low with a limit of five high priority projects,

four medium priority projects, and an unlimited number of low priority projects.

Baltimore City is the exception to this—the City may submit 15 high priority projects and an unlimited number of low priority projects.

Finally, the MDP reviews each project as to whether or not it falls within a PFA. PFA's are established by local jurisdictions and are certified by MDP based on specific criteria. Projects that fall outside a PFA lose five points from their High, Medium, or Low point score.

Chapter 5, Section 4.2

TECHNICAL PRIORITIZATION METHODOLOGY

The technical evaluation was a largely quantitative analysis and accounted for 40 percent of the overall prioritization score. The technical evaluation was conducted by BMC staff.

The process was designed to evaluate three categories of projects::

1. Highway and interchange projects;
2. Rail transit projects; and
3. Bicycle and pedestrian projects.

The first two categories of projects were assessed based on seven criteria.

The bicycle and pedestrian projects were assessed based on four criteria, three of which overlap with the seven criteria of the first two categories.

The seven criteria are:

- safety,
- congestion,
- demand,
- accessibility,
- cost effectiveness,
- connectivity, and
- environment.

Each criterion within a category was assigned a maximum number of points based on data inputs such as crash frequency, volume/capacity ratios, potential users for a trail, etc.

A project's total technical score was the sum of the points it received for all criteria.

Criteria such as cost-effectiveness, the congestion index, and peak demand (in the case of highway expansion projects) have the greatest influence on a project's total technical score.

Much of the technical evaluation was based on output from the regional travel demand model.

Chapter 5, Section 4.3

ASSESSING A FINAL SCORE

The final step of the project prioritization process was to combine the policy and technical evaluation scores for each project to come up with a combined score that deter-

mined the overall prioritization ranking.

The objective was to understand which projects clearly stand apart from others as the region's most important transportation system investment priorities. See Appendix 5 to view the policy and technical prioritization methodologies.

Chapter 5, Section 5

COMMITTED, REGIONALLY SIGNIFICANT, PREFERRED ALTERNATIVE AND ILLUSTRATIVE PROJECTS

In order to understand what projects to consider in a long-range plan, it is essential to identify all projects that are fully funded and open for service by the beginning of the plan period.

These projects, which will be completed by 2012, are termed "Committed." Then the members consider a select group of projects that are of great significance to all members of the region. These projects were termed "Regionally Significant."

The next stage was to select the projects that were evaluated through the prioritization process. The projects that became the investment package in Outlook 2035 are termed the "Preferred Alternative" and are based on reasonably available funds between 2013 and 2035.

In addition to projects, the BRTB also considers programs that support the physical network and make better use of existing capacity.

The last set of projects are termed "Illustrative" and they represent the next tier of projects that are needed but are unfunded and have not been included in an air quality determination.

Chapter 5, Section 5.1

COMMITTED PROJECTS

The BRTB identified a list of projects where funds are being spent or are committed to the project and the project has a completion date between 2008 and 2012. These projects are referred to as Committed projects, as shown in Figure 5-12.

These dates were chosen because they reflect the time period of the current Transportation Improvement Program.

These projects serve as the context upon which Outlook 2035 is crafted.

FIGURE 5-11
COMMITTED PROJECTS, 2008-2012

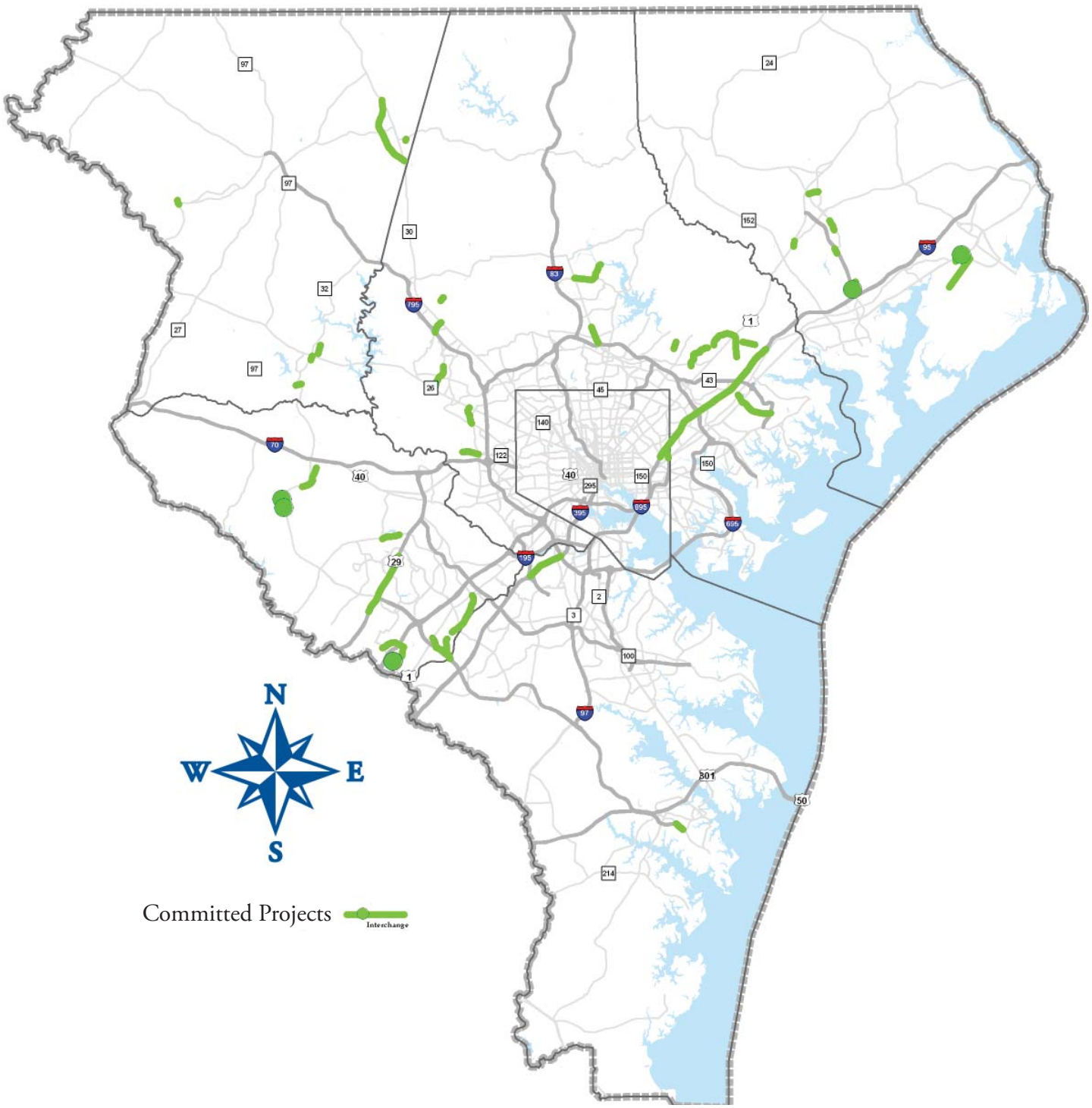


FIGURE 5-12
COMMITTED PROJECT LIST, 2008-2012

PROJECT	LIMITS	DESCRIPTION
	ANNE ARUNDEL COUNTY - NONE	
	BALTIMORE CITY	
Dundalk Truck Bypass	Keith Ave and Broening Hwy	change access to Fort Holabird Industrial Park
	BALTIMORE COUNTY	
Forge Rd	Cross Rd to Forge View Rd	widen from 2 to 4 lanes
Honeygo Blvd	Forge Rd to US 1	new 4 lane road
MD 122, Security Blvd	extension to Fairbrook Road	new 4 lane road
MD 140, Reisterstown Rd	St. Thomas Ln to Owings Mills Blvd	widen from 4 to 6 lanes
Campbell Blvd	MD 7 to US 40	new 4 lane road
Campbell Blvd	US 40 to Bird River Rd	new 4 lane road
Campbell Blvd	Bird River Rd to MD 43 extended	new 4 lane road
MD 45, York Rd	Ridgely Rd to Caven Dr	widen from 4 to 5 lanes
Old Harford Rd	Placid Ave to Cub Hill Rd	widen from 2 to 4 lanes
Owings Mills Blvd	Winands Rd to MD 26	new 2 lane road
Cherry Hill Rd	extension to Owings Mills Blvd	new 2 lane road
Rolling Rd	Windsor Mill Rd to MD 26	widen from 2 to 4 lanes
Owings Mills Blvd	Winands Rd to Lyons Mill Rd	new 4 lane road
Dolfield Blvd	I-795 to MD 140	new 4 lane road
Gunview Rd	Klausmier Rd to US 1	new 4 lane road
Perry Hall Blvd	Rossville Rd to Honeygo Blvd	widen from 2 to 4 lanes
Warren Rd	MD 45 to Loch Raven Reservoir	widen from 2 to 4 lanes
Walther Blvd	south of Joppa Rd to Joppa Rd	widen from 2 to 5 lanes
Walther Blvd	Joppa Rd to Seven Courts Dr	widen from 0/2 to 4 lanes
	CARROLL COUNTY	
MD 32, Sykesville Rd	MD 851, Main St to Cooper Dr	new intersection at Springfield property and realign connecting roads (Obrecht Rd and Springfield Ave)
MD 30, Hampstead Bypass	Wolf Hill Dr to Brodbeck Rd	new 2 lane road
MD 32, Sykesville Rd	MD 26 to Piney Ridge Pkwy/MacBeth Way	widen from 2/4 to 5 lanes
Boxwood Drive Extended	Dogwood Dr. north to MD 88	extend 2 lane road
Georgetown Blvd	Londontown Blvd north to Progress Way to Bennett Rd	extend 4 lane road

FIGURE 5-12 *(continued)*
COMMITTED PROJECTS, 2008-2012

PROJECT	LIMITS	DESCRIPTION
	HARFORD COUNTY	
North Ave	US 1 to MD 924	new 2 lane road
US 1, Bel Air Rd	Connolly Rd to MD 147/Business US 1	widen from 4 to 5 lanes; provide separate left turn lanes at each intersection
MD 24	MD 7 to Singer Rd	upgrade at MD 24 interchange and construct new interchange at MD 924/MD 24
Perryman East	MD 715 to Michaelsville Rd	new 2 lane road
MD 159	US 40 to existing facility	new 2 lane road; intersection improvement
MD 715	at US 40	upgrade to full interchange
MD 924, Emmorton Rd	Woodsdale Rd to Box Hill South Pkwy	widen from 3 to 5 lanes
Tollgate Rd	Plumtree Rd to Bel Air South Pkwy	new 2 lane road
	HOWARD COUNTY	
Dorsey Run Rd	North Montevideo Rd to MD 175	construct 1 lane each direction plus 1 center turn lane at intersections (5 lanes at MD 175 intersection)
Guilford Rd	Anne Arundel Co line to Dorsey Run Rd	widen from 2 to 5 lanes (includes bridge over CSX line)
Loop Rd (Stephens & Gorman Rds)	MD 216/Leishear Rd to All Saints Rd	new 4 lane road
Loop Rd (Stephens & Gorman Rds)	at MD 216 East	new interchange
Dorsey Run Rd North	MD 103 to Montevideo Rd	add 1 center turn lane at intersections and build 2 lanes plus 1 center turn lane at intersections for the new road
Dorsey Run Rd	CSX RR spur to Guilford Rd (new alignment from existing Dorsey Run Rd to Guilford Rd	new 2 lane road plus 1 center turn lane at intersections
Dorsey Run Rd	MD 175 to CSX RR spur crossing	add 1 center turn lane at intersections
US 29	South of MD 175 to Middle Patuxent River (south of MD 32)	widen northbound US 29 from 2 lanes to 3 lanes
Linden Church Rd	at MD 32	new interchange
MD 108, Clarksville Pk	Woodland Rd to W of Centennial Ln	widen from 2 to 4 lanes
Wellworth Way Access	adjacent to MD 32	extend roadway to provide access
	REGIONAL	
MD 295, BW Pkwy	I-695 to I-195	widen from 4 to 6 lanes
MdTA, Section 100	Baltimore City & Baltimore County; I-95 from south of the I-895(N) split to apx 2.7 miles north of MD 43	improve interchanges at I-895, I-695, and MD 43 and construct two express toll lanes in each direction

Chapter 5, Section 5.2

REGIONALLY SIGNIFICANT PROJECTS

Some projects did not go through the prioritization process. In advance of prioritizing candidate projects, the BRTB considered a special category of projects that was classified as critically important to all jurisdictions in the region. These projects, termed "Regionally Significant," met separate criteria and were not subject to the technical or policy prioritization process. On January 23, 2007, the BRTB voted to approve the criteria for Regionally Significant Projects as well as the policy and technical prioritization methodology.

For the highway network, the criteria are as follows: is a primary inter-state and regional freight link, is supported by anticipated federal funds, is scheduled to be open and operational by 2020, and connects to a major regional economic "engine;" e.g., Helen Delich Bentley Port of Baltimore, Baltimore/Washington International Thurgood Marshall Airport, downtown Baltimore. For the transit network, the criteria are as follows:

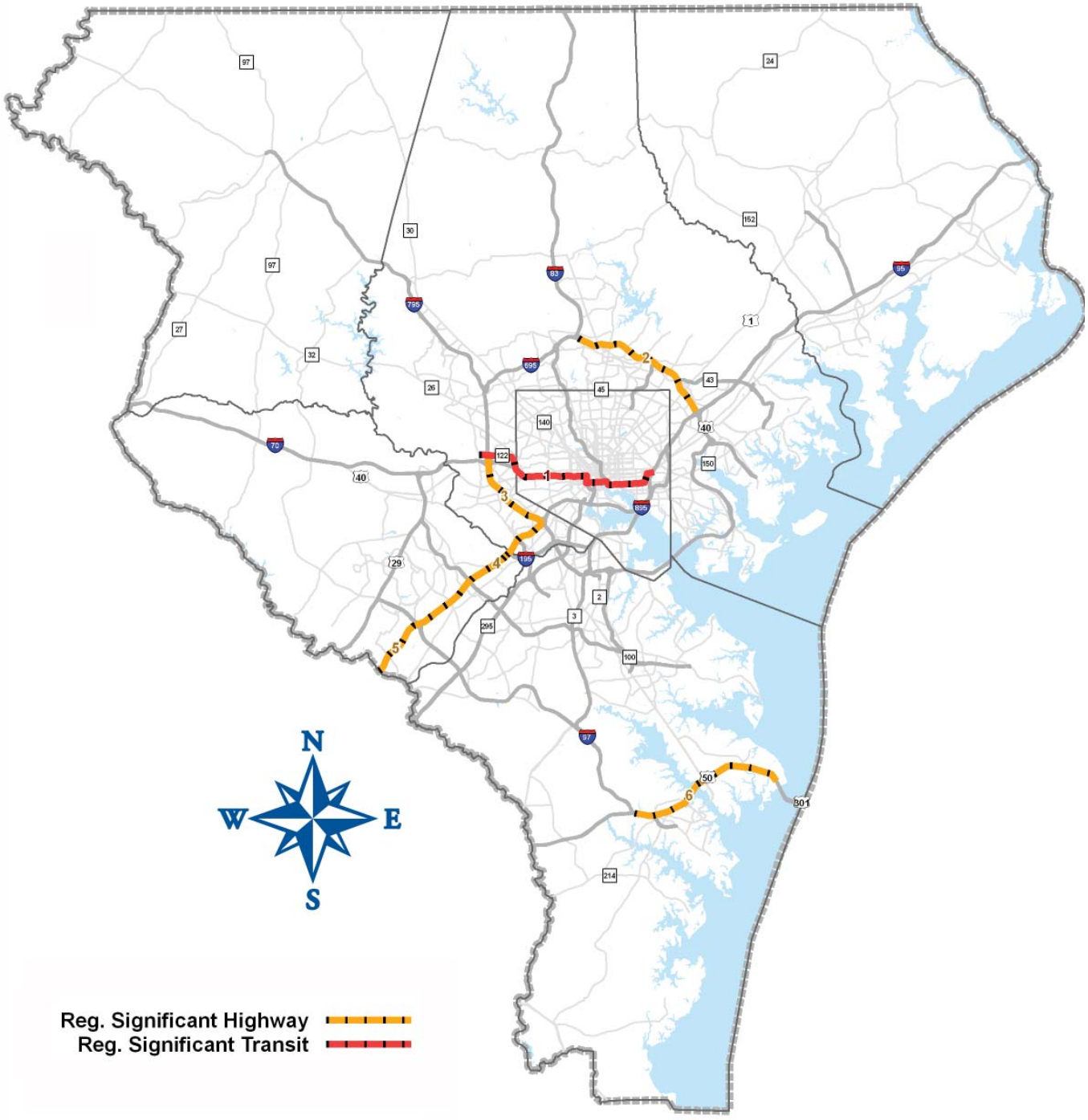
- Connects two or more activity centers which are existing or planned areas of concentrated growth in population and employment,
- Provides connectivity to intraregional transit system, is either rail or form of transit that operates within its own dedicated right-of-way or portion of right-of-way,
- Is supported by anticipated federal funds, and
- Is scheduled to be open and operational by 2020.

Projects must meet all criteria for the appropriate mode to be included. Regionally Significant projects do not count against jurisdictions submittals of High, Medium, and Low priority projects. Technical information was, however, collected for modeling and air quality purposes.

FIGURE 5-13
REGIONALLY SIGNIFICANT PROJECT LIST

# ON MAP	PROJECT	LIMITS
1	Red Line	Social Security area to Bayview Medical Center
2	I-695	I-83 Harrisburg to I-95 North
3	I-695	I-95 South to MD 122
4	I-95 South	I-695 (Arbutus) to Baltimore/Howard Co line
5	I-95 South	Baltimore/Howard Co line to Howard/PG Co line
6	US 50/301	I-97 to WPL Bay Bridge

FIGURE 5-14
REGIONALLY SIGNIFICANT PROJECTS



Chapter 5, Section 5.3

THE PREFERRED ALTERNATIVE INVESTMENTS

In compliance with federal law, the proposed projects and programs, representing a Preferred Alternative, are listed below and have been modeled and meet air quality conformity requirements.

These investments represent the conclusion of a process that crafted goals, developed cooperative socio-economic forecasts, gathered candidate project information, calculated project cost, developed a financial forecast, and conducted a policy and technical prioritization.

The draft Preferred Alternative projects were reviewed by the public for approximately 60 days and then modified due to comments and sent out for another 30-day review period. The results of all of these efforts are captured below.

The investments in the Preferred Alternative include: highway, transit, and bicycle and pedestrian projects, management and operations strategies, and travel demand management activities.

Additionally, there are other programs that support and augment the Preferred Alternative that are also included in this section.

Chapter 5, Section 5.3.1

PREFERRED ALTERNATIVE PROJECTS

Shown below are the Preferred Alternative investment maps and project lists, followed by a detailed description of projects.

FIGURE 5-15
PREFERRED ALTERNATIVE HIGHWAY PROJECTS

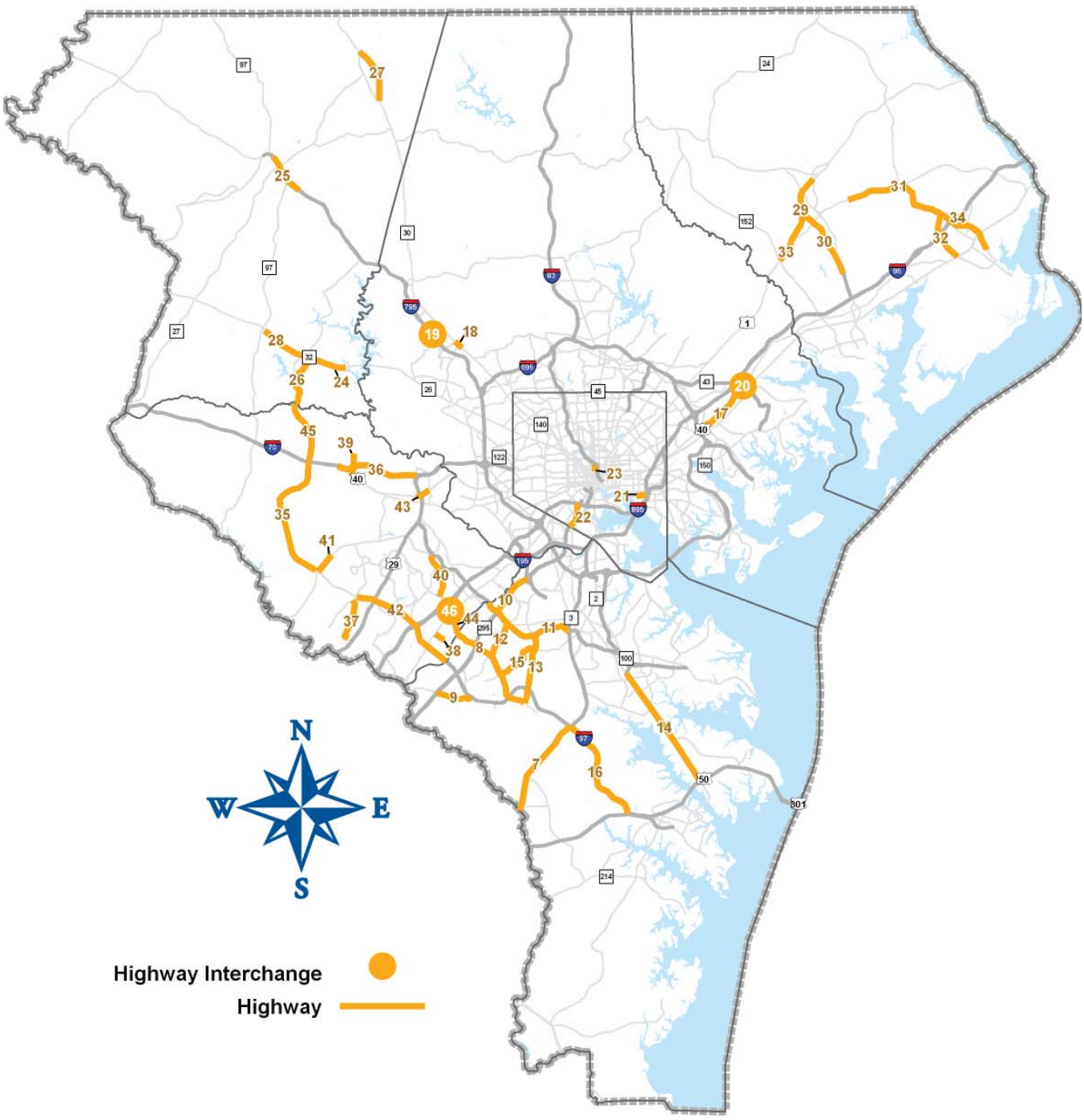


FIGURE 5-16
PREFERRED ALTERNATIVE HIGHWAY PROJECT LIST

# ON MAP	PROJECT	LIMITS
7	MD 3	AA/PG Co line to MD 32
8	MD 175	MD 295 to MD 170
9	MD 198	MD 295 to MD 32
10	MD 295	I-195 to MD 100
11	MD 100	AA/Howard Co line to I-97
12	MD 713	MD 175 to MD 176
13	MD 170	MD 175 to MD 100
14	MD 2	US 50 to MD 10
15	MD 174	MD 175 to MD 170
16	I-97	MD 32 to US 50/301
17	MD 7	Rossville Blvd. to Cowentown Ave
18	MD 140	Garrison View Rd to Owings Mills Blvd
19	I-795	Pleasant Hill Rd/Dolfield Rd.
20	MD 7	Intersection at MD 43
21	Boston Street	Conkling St to Ponca St
22	Russell Street	I-95 to City Line
23	MLK Blvd/I-83 Connector	at I-83
24	MD 26	MD 32 to Liberty Reservoir
25	MD 140	Market St to Sullivan Rd
26	MD 32	MD 26 to Carroll/Howard Co line
27	MD 30, Manchester Bypass	Brodbeck Rd to north of MD 86
28	MD 26	MD 32 to MD 97
29	US 1 Bypass	Hickory Bypass to MD 147/Business US 1
30	MD 24	Singer Rd to Business US 1
31	MD 22	MD 543 to I-95
32	MD 715	US 40 to MD 22
33	US 1	MD 147/Business US 1 to MD 152
34	MD 22	I-95 to APG Gate
35	MD 32	MD 108 to I-70
36	I-70	US 40 to US 29
37	Sanner Rd North	Johns Hopkins Rd to Pindell School Rd
38	Patuxent Range Rd	US 1 to Dorsey Run Rd
39	Marriottsville Rd	MD 99 to US 40
40	MD 108	MD 104 to MD 175
41	MD 108	Trotter Rd to MD 32
42	MD 32	Cedar Lane to Howard/AA Co line
43	US 40	St. Johns Lane to Rogers Ave
44	MD 175	US 1 to Howard/AA Co line
45	MD 32	I-70 to the Howard/Carroll Co line
46	US 1	at MD 175

FIGURE 5-17
PREFERRED ALTERNATIVE BICYCLE AND PEDESTRIAN PROJECTS

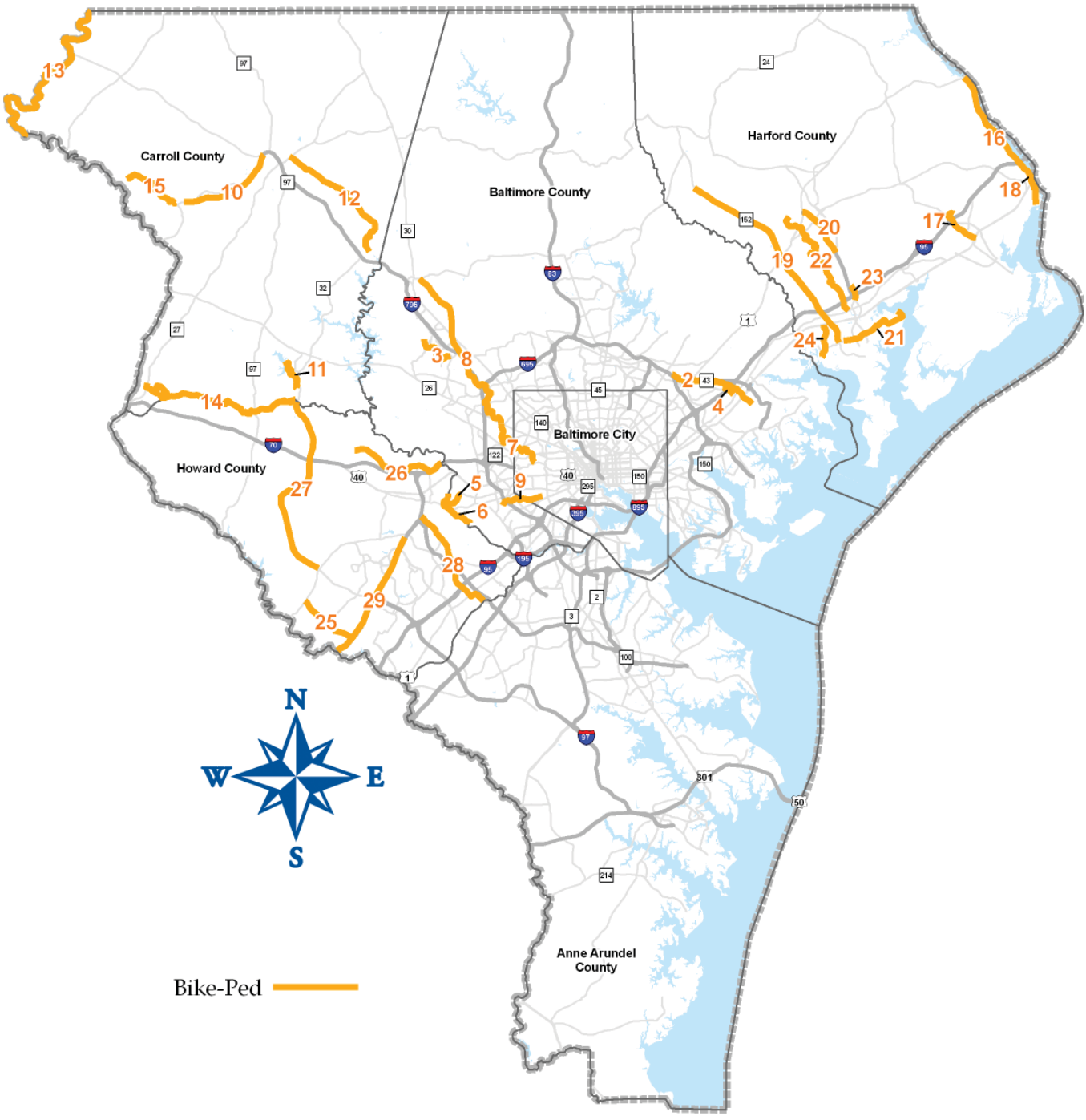


FIGURE 5-18
PREFERRED ALTERNATIVE BICYCLE AND PEDESTRIAN PROJECT LIST

# ON MAP	PROJECT	LIMITS
1*	Bicycle Network Strategy Implementation	Baltimore City, city-wide
2	White Marsh Run Trail	Avondale Rd to Bird River Rd
3	Red Run Trail	Gwynns Falls to Soldier's Delight
4	Campbell Blvd Trail	White Marsh Mall to MD 7
5	#8 Trolley Line	Edmondson Ave to Frederick Ave
6	Patapsco Greenway Connector	Oella to Ilchester Rd Bridge
7	Gwynns Fall Trail South	Owings Mills Town Center to Gwynns Falls
8	Gwynns Fall Trail North	Owings Mills Town Center to Gwynns Falls
9	Caton Loudon Trail	Loudon Cemetery to Spring Grove
10	Wakefield Valley Community Trail	New Windsor MD 31 (Church Street) to Westminster (Furnace Hills Trail)
11	Piney Run to Sykesville Trail	Piney Run Park (Martz Rd, east side of reservoir) to Sykesville (Millard Cooper Park)
12	North & West Branch Patapsco Trail	Liberty Reservoir to east of Westminster
13	Monocacy River Scenic Greenway	Confluence with Double Pipe Creek along Monocacy River
14	Patapsco Regional Trail	Mt. Airy (Watkins Park) to Sykesville (Main Street) along South Branch
15	Little Pipe Creek Trail	Union Bridge (Union Bridge Community Park) to New Windsor (New Windsor Middle School)
16	Lower Susquehanna Heritage Greenway Trail	Conowingo Dam along the Susquehanna River to Havre de Grace along the Susquehanna River
17	Aberdeen Area Bikeway (MD 132)	Ripken Stadium to Aberdeen MARC Station
18	Havre de Grace Bikeway	Juniata Street to Tydings Park
19	MD 152 Corridor Bikeway	Hess Road to Trimble Rd
20	MD 24 Bikeway	US 1 to Bel Air South Parkway
21	Trimble Road Bikeway	Edgewood Rec Park to Flying Point Park
22	Winters Run Greenway	Tollgate Road to Winters Run, Along Winters Run, under I-95 to MD 7
23	Woodsdale Rd/Waldon Rd Bikeway	Woodsdale Rd at MD 924 to Edgewood Rd at Waldon Rd
24	Colonial Joppa Greenway Trail	Foster Run Stream Valley Corridor - US 40 to Mariner Point Park
25	MD 216	US 29 to MD 108
26	MD 99 Pathway	From I-70 Bridge to Marriottsville Rd.
27	MD 32 Bike/ped Facilities	From MD 108 to Carroll Co line
28	MD 103 Bike/ped Improvement	Anne Arundel Co. line to US 29
29	US 29 Bike/ped Facilities	MD 108 to Mont. Co. line

** This project is not site specific and therefore is not on the map.*

FIGURE 5-19
PREFERRED ALTERNATIVE TRANSIT PROJECTS

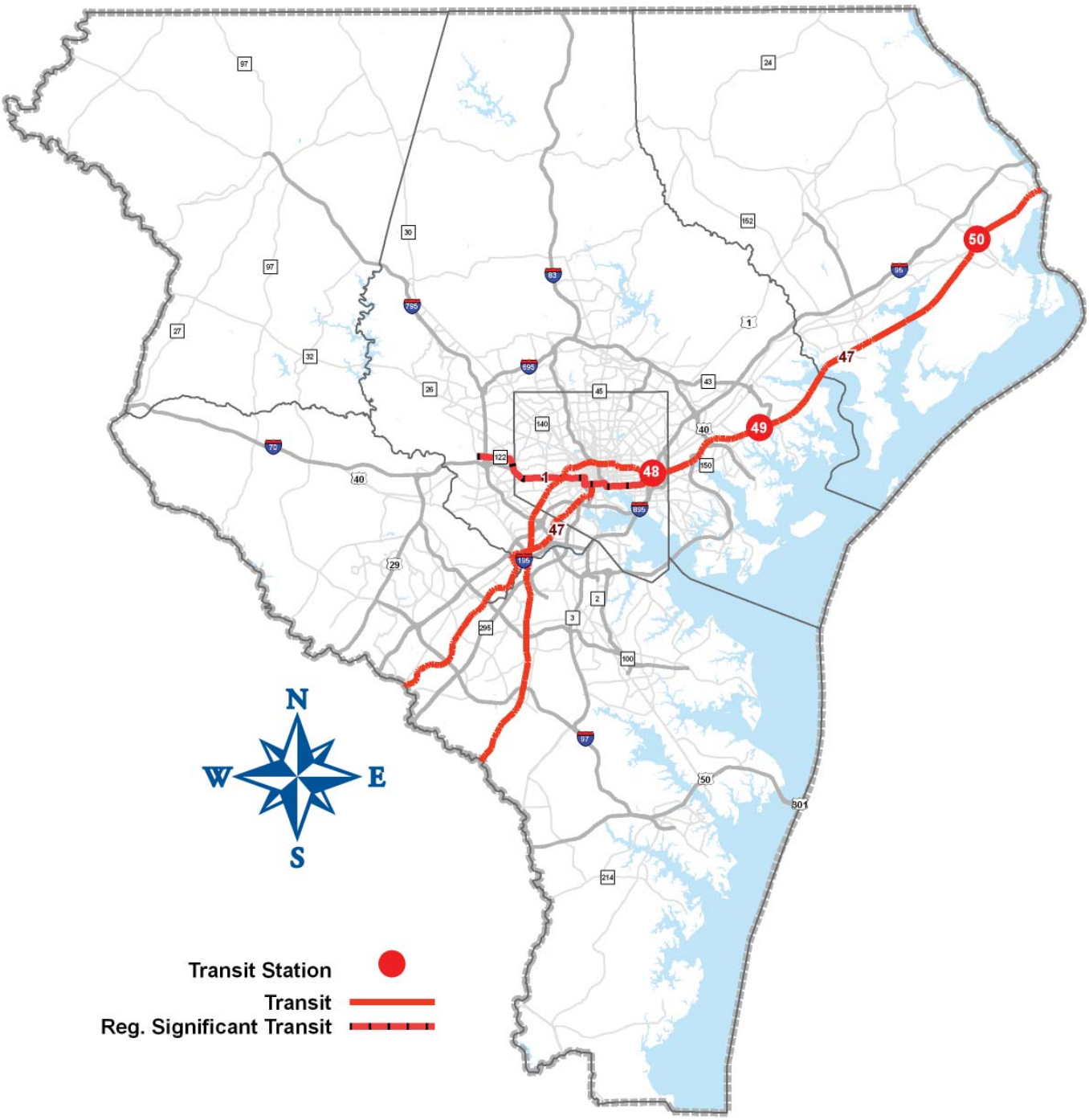


FIGURE 5-20
PREFERRED ALTERNATIVE TRANSIT PROJECTS

# ON MAP	PROJECT	LIMITS
1	Red Line	Social Security area to Bayview Medical Center
47	MARC: A. Penn Line Improvements B. Camden Line Improvements C. Growth & Investment Plan	A. Perryville, through Downtown Baltimore, to DC B. Downtown Baltimore toward DC C. Throughout system
48	MARC-East Baltimore	New station
49	MARC-Middle River	Relocate with station improvements
50	MARC-Aberdeen	Relocate with station improvements

FIGURE 5-22
DETAILED LIST OF PREFERRED ALTERNATIVE PROJECTS

PROJECT	LIMITS	DESCRIPTION	2007 COST ESTIMATE ($000)	YEAR OPEN
	REGIONALLY SIGNIFICANT PROJECTS			
Red Line-Regional	Social Security to Bayview	Construct an east-west rapid transit system	$1,538,750	2015
I-695-Baltimore Co	I-83 Harrisburg to I-95 North	Widen from 6 to 8 lanes	$373,200	2015
I-695-Baltimore Co	I-95 South to MD 122	Widen from 6 to 8 lanes	$375,300	2015
I-95 South-Baltimore Co	I-695 (Arbutus) to Baltimore/Howard Co line	Widen from 8 to 10 lanes	$461,900	2020
I-95 South-Howard Co	Baltimore/Howard Co line to Howard/PG Co line	Widen from 8 to 10 lanes	$629,900	2020
US 50/301-Anne Arundel Co	I-97 to WPL Bay Bridge	Add 2 lanes	$215,200	2020
SUBTOTAL	REGIONALLY SIGNIFICANT TRANSIT PROJECTS		**$1,538,750**	
	REGIONALLY SIGNIFICANT HIGHWAY PROJECTS		**$2,055,500**	
	HIGHWAY PROJECTS			
	Anne Arundel County			
MD 175	MD 295 to MD 170	AA County line to MD 295: widen from 2 to 3 lanes MD 295 to MD 170: widen from 4 to 6 lanes	$213,000	2015
MD 198	MD 295 to MD 32	Widen from 2 to 4 lanes	$50,000	2015
MD 295	I-195 to MD 100	Widen from 4 to 6 lanes, full interchange at Hanover Rd	$144,000	2015
MD 170	MD 175 to MD 100	Widen from 2 to 4 lanes	$76,000	2020
MD 100	AA/Howard Co line to I-97	Widen from 4 to 6 lanes	$317,000	2025
MD 713	MD 175 to MD 176	MD 175 to Arundel Mills Blvd.: widen from 2 to 4 lanes Arundel Mills Blvd. to MD 176: widen from 4 to 6 lanes	$55,300	2025
MD 174	MD 175 to MD 170	Capacity improvements	$50,000	2025
I-97	MD 32 to US 50/301	Widen from 4 to 6 lanes	$229,000	2025
MD 3	AA/PG Co line to MD 32	Widen from 4 to 6 lanes, new interchange at MD 450	$336,700	2030
MD 2	US 50 to MD 10	Widen from 4 to 6 lanes	$178,900	2030

FIGURE 5-22 *(continued)*
DETAILED LIST OF PREFERRED ALTERNATIVE PROJECTS

PROJECT	LIMITS	DESCRIPTION	2007 COST ESTIMATE ($000)	YEAR OPEN
	Baltimore City			
Boston Street	Conkling St. to Ponca St.	Widen from 2 to 4 lanes	$80,000	2013
Russell Street Project	I-95 to City Line	1) Add N/S lanes to ramp and intersection upgrades; 2) Add a lane from Russell Street Gateway I-95 to City line	$20,000	2013
MLK Blvd./I-83 Connector	At I-83	1/3 mile extension and partial interchange at I-83 N/B and S/B ramps	$25,000	2020
	Baltimore County			
MD 140	Garrison View Rd. to Owings Mills Blvd.	Widen from 4 to 6 lanes	$28,800	2013
MD 7	Rossville Blvd. to Cowentown Ave.	Widen from 2 to 4 lanes	$83,200	2014
I-795	Pleasant Hill Rd./ Dolfield Rd.	New interchange and improve ramps	$67,000	2015
MD 7	Intersection at MD 43	Partial to full interchange	$15,000	2015
	Carroll County			
MD 26 (E of MD 32)	MD 32 to Liberty Reservoir	Widen to provide continuous right turn lanes (6 lanes, 4 through plus 2 auxiliary)	$33,400	2015
MD 140	Market St. to Sullivan Rd.	Widen from 4/6 to 8 lanes. Full interchange at MD 97 south, Continuous flow intersections at Center and Englar	$212,000	2020
MD 32	MD 26 to Carroll/ Howard Co line	Widen from 2 to 4 lanes	$48,000	2020
MD 26 (W of MD 32)	MD 32 to MD 97	Widen from 2 to 4 lanes	$59,000	2025
MD 30, Manchester Bypass	Brodbeck Rd. to north of MD 86	New 2 lane road	$81,500	2030
	Harford County			
MD 24	Singer Rd. to Business US 1	Widen from 4 to 6 lanes	$239,700	2015
US 1 Bypass	Hickory Bypass to MD 147/Business US 1	Widen from 2 to 4 lanes with interchange improvement	$93,500	2020
MD 22	MD 543 to I-95	Widen from 2 to 4 lanes	$95,563	2020

FIGURE 5-22 *(continued)*
DETAILED LIST OF PREFERRED ALTERNATIVE PROJECTS

PROJECT	LIMITS	DESCRIPTION	2007 COST ESTIMATE ($000)	YEAR OPEN
MD 715	US 40 to MD 22	New 4 lane road	$55,800	2020
US 1	MD 147/Business US 1 to MD 152	Widen from 4 to 6 lanes	$88,800	2020
MD 22	I-95 to APG Gate	Widen from 4 to 6 lanes	$65,800	2030
	Howard County			
MD 32	MD 108 to I-70	Widen from 2 to 4 lanes, full interchanges at Dayton Shop, Rosemary Lane, MD 144 with ramps and upgrade I-70 interchange.	$219,000	2015
Sanner Rd North	Johns Hopkins Rd to Pindell School Rd	Widen from 2 to 4 lanes	$4,600	2015
Patuxent Range Rd	US 1 to Dorsey Run Rd	Widen from 2 to 4 lanes	$828	2015
Marriottsville Rd	MD 99 to US 40	Widen from 2 to 6 lanes	$3,106	2015
MD 32	Cedar Lane to Howard/ AA Co line	Widen from 6 to 8 lanes, expand capacity of the interchanges	$128,200	2015
US 1	US 1 at MD 175	New full interchange	$30,000	2015
MD 32	I-70 to the Howard/ Carroll Co line	Widen from 2 to 4 lanes	$96,000	2015
I-70	US 40 to US 29	Widen from 4 to 6 lanes, including upgrade to full interchange at Marriottsville Rd	$205,000	2020
MD 108	MD 104 to MD 175	Widen from 2 to 4 lanes	$44,800	2020
MD 175	US 1 to Howard/AA Co line	Widen from 2 to 5 lanes	$62,600	2020
MD 108	Trotter Rd to MD 32	Widen from 2 to 4 lanes	$7,660	2025
US 40	St. Johns Lane to Rogers Ave	Capacity, operational, and safety improvements along US 40 and surrounding local road network; ramp improvements at existing US 40/US 29 full interchange	$30,000	2025
SUBTOTAL	HIGHWAY PROJECTS		**$3,873,757**	
	TRANSIT PROJECTS			
MARC	A. Penn Line Improvements B. Camden Line Improvements C. Growth & Investment Plan	A. Perryville, through Downtown Baltimore, to DC B. Downtown Baltimore toward DC C. Throughout system	$616,114	2013 -2035

FIGURE 5-22 *(continued)*
DETAILED LIST OF PREFERRED ALTERNATIVE PROJECTS

PROJECT	LIMITS	DESCRIPTION	2007 COST ESTIMATE ($000)	YEAR OPEN
MARC	East Baltimore City	New station	$70,000	2015
MARC	Middle River-Baltimore County	Relocate with station improvements	$15,000	2015
MARC	Aberdeen-Harford County	Relocate with station improvements	$15,000	2015
SUBTOTAL	TRANSIT PROJECTS		**$716,114**	
	MANAGEMENT AND OPERATIONS PROJECTS (M&O)			
	Regional	Expand real-time surveillance	$20,000	2013
	Regional	Expand real-time information to travelers	$5,000	2013
	Regional	Enhance real-time signal operation	$5,000	2013
	Regional	Expand real-time transit information	$10,000	2013
SUBTOTAL	M&O PROJECTS		**$40,000**	
	BICYCLE/PEDESTRIAN PROJECTS			
	Baltimore City			
Bicycle Network Strategy Implementation	Citywide	Establish bicycle connections throughout Baltimore City as part of implementation of the Bicycle Master Plan	$5,000	2013-2020
	Baltimore County			
White Marsh Run Trail	Avondale Rd to Bird River Rd	Shared Use	$4,900	2014
Red Run Trail	Gwynns Falls to Soldier's Delight	Shared Use	$1,100	2014
Campbell Boulevard Trail	White Marsh Mall to MD 7	Parallels Campbell Blvd	$100	2014
#8 Trolley Line	Edmondson Ave to Frederick Ave	Pave existing trail	$40	2014
Patapsco Greenway Connector	Oella to Ilchester Road Bridge	Completes the connection from Ellicott City to BWI Trail	$100	2014
Gwynns Fall Trail South	Owings Mills Town Center to Gwynns Falls	Shared Use	$4,500	2020
Gwynns Fall Trail North	Owings Mills Town Center to Gwynns Falls	Shared Use	$2,950	2020
Caton Loudon Trail	Loudon Cemetery to Spring Grove	Rails to Trails	$1,800	2020

FIGURE 5-22 *(continued)*
DETAILED LIST OF PREFERRED ALTERNATIVE PROJECTS

PROJECT	LIMITS	DESCRIPTION	2007 COST ESTIMATE ($000)	YEAR OPEN
	Carroll County			
Wakefield Valley Community Trail	New Windsor MD 31 (Church Street) to Westminster (Furnace Hills Trail)	Trail along MD 31 linking New Windsor and Westminster	$1,483	2015
Piney Run to Sykesville Trail	Piney Run Park (Martz Road, east side of reservoir) to Sykesville (Millard Cooper Park)	Trail along Piney Run from Piney Run Reservoir to Millard Cooper Park	$2,752	2015
North & West Branch Patapsco Trail	Liberty Reservoir to east of Westminster	Trail along the north and west branch of the Patapsco River between Finksburg and Westminster linking to Bennett Cerf Park	$4,200	2020
Monocacy River Scenic Greenway	Confluence with Double Pipe Creek along Monocacy River	Trail in a greenway corridor along the Monocacy River that runs through Frederick and Carroll Counties	$3,900	2020
Patapsco Regional Trail	Mt. Airy (Watkins Park) to Sykesville (Main St) along South Branch	Trail in a greenway corridor along the South Branch of the Patapsco River, its branches and tributaries	$2,830	2020
Little Pipe Creek Trail	Union Bridge (Union Bridge Community Park) to New Windsor (New Windsor Middle School)	Trail linking New Windsor & Union Bridge along the Little Pipe Creek corridor	$2,080	2025
	Harford County			
Lower Susquehanna Heritage Greenway Trail	Conowingo Dam along the Susquehanna River to Havre de Grace along the Susquehanna River	Bike / pedestrian path	$1,200	2013
Aberdeen Area Bikeway (MD 132)	Ripken Stadium to Aberdeen MARC Station	Bike / pedestrian path	$200	2015
Havre de Grace Bikeway	Juniata St to Tydings Park	Bike / pedestrian path	$200	2015
MD 152 Corridor Bikeway	Hess Road to Trimble Road	Bike / pedestrian path	$500	2015
MD 24 Bikeway	US 1 to Bel Air Parkway	Bike / pedestrian path	$250	2015

FIGURE 5-22 *(continued)*
DETAILED LIST OF PREFERRED ALTERNATIVE PROJECTS

PROJECT	LIMITS	DESCRIPTION	2007 COST ESTIMATE ($000)	YEAR OPEN
Trimble Road Bikeway	Edgewood Park to Flying Point Park	Bike / pedestrian path	$250	2015
Winters Run Greenway	Tollgate Rd to Winters Run, Along Winters Run, under I-95 to MD 7	Bike / pedestrian path	$1,900	2015
Woodsdale Road/ Waldon Road Bikeway	Woodsdale Rd @ MD 924 to Edgewood Rd @ Waldon Rd	Bike / pedestrian path	$6,300	2016
Colonial Joppa Greenway Trail	Foster Run Stream Valley Corridor - US 40 to Mariner Point Park	Bike / pedestrian path	$3,000	2020
	Howard County			
MD 216	US 29 to MD 108	Bike/ped improvements	$1,600	2013
MD 99 Pathway	I-70 bridge to Marriotsville Rd	15,000 linear feet of pathway plus cross walk and signal improvements	$650	2015
MD 32 Bike/ped Facilities	MD 108 to Carroll County line	Hybrid Bike/ped facility, Off-road in right-of-way	$3,500	2015
MD 103 Bike/ped Improvement	Anne Arundel County line to US 29	Bike/ped improvement	$2,000	2015
US 29 Bike/ped Facilities	MD 108 to Montgomery County line	Hybrid Bike/ped facility, Off-road in right-of-way	$2,500	2020
SUBTOTAL	BICYCLE / PEDESTRIAN PROJECTS		**$61,785**	
	TRANSPORTATION DEMAND MANAGEMENT (TDM) / EMISSION REDUCTION STRATEGIES (ERS)			
TDM / ERS Improvements	Regional	TDM / ERS Improvements	$398,215	2013-2035
SUBTOTAL	TDM / ERS		**$398,215**	
	ALL PROJECTS			
SUBTOTAL	HIGHWAY PROJECTS		**$5,929,257**	
SUBTOTAL	TRANSIT		**$2,254,864**	
SUBTOTAL	BICYCLE / PEDESTRIAN, M&O, TDM / ERS		**$500,000**	
TOTAL	ALL		$8,684,121	

Chapter 5, Section 5.3.2

DEMAND MANAGEMENT PROGRAMS

Considerable funding is designated for travel demand management (TDM) and emission reducing strategies (ERS) due to the benefits they provide. The benefits are expanded transportation alternatives and improved air quality in a nonattainment area. The funding has been directed to programs/strategies in three categories, including: technologies, behavioral, and capital improvements. The three categories include the following strategies.

As strategies for reducing emissions from the transportation sector become more and more technologically advanced, the list of possible technologies for this region to adopt becomes longer. From alternative fuels and hybrid vehicles to diesel retrofits, more technologies are becoming known every year, and the technologies are becoming more widespread. The Maryland Transit Administration (MTA) has already added ten hybrid buses to its fleet. Hybrid buses burn less fuel, therefore producing lower emissions of pollutants like nitrogen oxides and carbon dioxide.

Behavioral strategies for reducing pollution typically promote the use of alternatives to single occupant commuting as well as the use of clean vehicles, or other behaviors that lessen the impact on the air we breathe. One of many behavioral strategies is clean commute marketing. This is a type of marketing that encourages people to try alternate commuting options such as bicycling, walking, transit, telecommuting, and carpooling. An example of clean commute marketing in the Baltimore region is the annual Clean Commute Month, which occurs each May and represents a partnership between the BRTB and Maryland Department of the Environment (MDE).

The third category, capital improvements, includes strategies in which funding is outlaid to projects such as bicycle and pedestrian improvements, park-and-ride lots, and signal systemization. Capital improvements typically involve the building of structures or

FIGURE 5-23
AIR POLLUTION REDUCTION STRATEGIES

TECHNOLOGIES	BEHAVIORIAL STRATEGIES	CAPITAL IMPROVEMENTS
Alternative fuel infrastructure	Car share programs	Bicycle and pedestrian improvements
Bus replacement (non-hybrid and hybrid)	Clean commute marketing (Clean Air Partners outreach - Air Quality Action Days; Commuter Challenge Program)	Bike racks on MARC cars and MTA/ LOTS buses
Clean fuel shuttles	Commuter Choice tax benefit program	Electronic toll collection
Clean fuel vehicles and hybrids	Emergency ride home	MARC enhancements: additional or replacement rail cars
Electrified parking for tour buses	Free parking for hybrid cars	Minor transit enhancements; new or expanded bus service
Encourage hybrid use in public fleets	Live Near Your Work	Neighborhood shuttles
Energy-efficient highway construction and maintenance practices	Parking cash out	Park and ride lots/ transit center parking
Enhanced enforcement of smoking vehicles	Preferential parking for carpools, vanpools	Signal systemization
Gas cap replacement program	Real-time bus schedules	Traffic flow enhancements (Coordinated Highway Action Response Team, roundabouts)
Low-NOx diesel fuel	Reduced idling marketing campaign	Truckstop electrification
Multi-model Traveler Information System	Rideshare	
Retrofit highway construction and maintenance equipment	School course on transportation-related air pollution	
Smart cards for transit modes	Sell Clean Air license plates	
Technologies to improve truck fleet efficiency (auxiliary power units (APU's), automatic tire inflation, single-wide tires, trailer fairings, plug-in cabin equipment)	Telecourses at col leges and universities	
Voluntary diesel retrofits	Telework Partnership with Employers	
	Transit fare reduction/episodic free transit programs	

the funding of equipment. Two examples of capital improvements that help to improve the region's air quality are the expansion of parking at the Halethorpe and Odenton MARC Station park-and-ride lots. The Odenton park-and-ride lot expansion included construction of a 700-space parking lot with pedestrian access under MD 175 to the station platform. Additionally, project planning for a 2,500-space structured parking (garage or parking deck) facility on MTA-owned property has begun. When more spaces are added to park-and-ride lots, this provides a greater opportunity for people to try commuting by transit or carpooling. When less people commute alone in their car, this reduces the amount of motor vehicle pollution being emitted in the region's air.

Chapter 5, Section 5.3.3

MANAGEMENT & OPERATIONS AND INTELLIGENT TRANSPORTATION SYSTEMS

Since the late 1990s, the BRTB has been incorporating management and operations (M&O) strategies in its plans and programs as it works to improve the linkage between transportation planning and operations to create a balanced transportation system.

As shown in the figure below, 40 percent of delay is caused by the need for more roads, which results in bottlenecks, and five percent is the result of poorly timed traffic signals.

These two causes are considered "recurring," meaning that they happen every day at the same time and place. The remaining 55 percent of delay is caused by non-recurring, unexpected events, such as incidents, bad weather, work zones, and special events.

Some recurring delay and a significant portion of non-recurring delay can be addressed through improved management and operation of the transportation system.

The focus on management and operation of the transportation system is a critical component of the overall approach to maintaining mobility, especially considering:

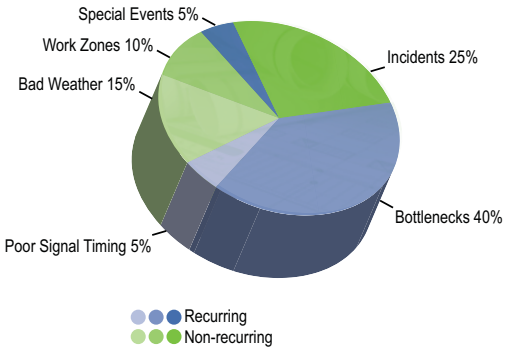
- funds and space for expansion are becoming ever more constrained;
- building roads does not address non-recurring congestion; and
- improved day-to-day operation of the transportation system will improve operations in the event of a major emergency (i.e., hurricane, terrorist attack, etc.).

In recognition of this, four M&O projects have been included in Outlook 2035 as a new category. These projects address the need to expand real-time monitoring of roadway and transit conditions, provide all travelers and system operators with robust real-time information, and improve signal operations. These projects address the non-recurring factors, as well as poor signal timing.

Over the last decade, the BRTB has built a robust structure of M&O committees that address topics including incident management, signal operations, and public works operations. The M&O committees include representatives from local and state transportation (highway and transit), police, fire, emergency management, and other operations and emergency response agencies.

These committees are overseen by the Management & Operations Partnership which, as a direct subcommittee of the BRTB, provides it with guidance and project recommendations.

FIGURE 5-24 NATIONWIDE CAUSES OF DELAY



Project recommendations from the M&O committees have been included in TIPs and long range plans.

The *Management and Operations Strategic Deployment Plan,* completed in 2007, provides a framework for continued expansion of regionally coordinated operations approaches. In coming years, the BRTB will continue to work with all stakeholders to enhance operations and coordination between operating agencies.

Successfully reducing the effects of congestion and unexpected delays requires three coordinated approaches—preservation, construction, and operation. We must operate the system in a way that maximizes the available roadway capacity and minimizes the impacts of unexpected events.

An operations approach to the transportation network is a viable and effective strategy to improve traffic flow and meet growing travel demands.

Chapter 5, Section 5.3.4

SAFETY AND THE STRATEGIC HIGHWAY SAFETY PLAN

Safety conscious planning was a major effort to integrate safety into long-range transportation planning under previous federal legislation. Under SAFETEA-LU, the next building block for safety is the Strategic Highway Safety Plan (SHSP). The focus of this program is to reduce highway fatalities. Of the total crashes in the Baltimore region in 2005, 38 percent occurred on local routes and this trend is similar nationwide; therefore, SAFETEA-LU requires a SHSP to include all roads. In 2006, MDOT began the process to develop a five-year statewide coordinated SHSP with a goal of reducing highway fatalities and serious injuries on all roads. The Maryland SHSP was approved September 30, 2006 and is a five-year program for the years 2006-2010. Three principles that guide Maryland's SHSP development efforts are—inclusion, ownership, and accountability. The embodiment of these principles was possible because MDOT worked to obtain buy-in and support from a wide variety of stakeholders, including the BRTB, to ensure the Maryland SHSP was data driven, based on

problem identification and countermeasure analysis, and addressed solutions involving engineering, education, enforcement, and emergency medical services components. The emphasis areas included in the SHSP are identified in Appendix 5.

Chapter 5, Section 5.3.5

SECURITY

The transportation network plays a significant role in the security of the region. Responders rely on it to access incidents, citizens rely on it to move away from incidents, and, due to its importance, the network itself could be a target of terrorism.

Several of the BRTB's committees address security issues as part of BRTB activities as well as input to other security planning efforts. In addition, securing critical transportation infrastructure was identified as a high priority in the recently completed Management & Operations Strategic Deployment Plan.

Over the last several years, BRTB staff and subcommittees have undertaken various security-related activities, such as:

- Developed and adopted the Regional Protective Action Coordination Guidelines to coordinate various planning and response activities for large-scale emergency events.
- Initiated a study to assess the long-term impacts on traffic patterns of the closure of a major portion of the transportation infrastructure (i.e., bridge or tunnel). This effort is termed "redundancy" planning and adds to the depth of operations for the network should a significant man-made or natural incident occur.
- Participated in the planning and execution of emergency preparedness training exercises held in the region and sponsored by local and state agencies.
- Assisted the efforts of the Regional Transit Working Group to determine appropriate use of Homeland Security funds directed to the major rail and transit facilities in the Washington, DC and Baltimore regions.
- Supported other regional emergency preparedness planning efforts; in many cases, this work was in collaboration with the Baltimore Urban Area Homeland Security Work Group (UAWG).
- Created the Transportation and Public Works Subcommittee which is under the auspices of the BRTB, while also acting in an advisory role to the UAWG.
- Worked with the region's

information technology professionals and emergency responders to identify and address regional emergency preparedness-related information technology issues. This group is a subcommittee of the UAWG.

Given the significance of the transportation system to the security of the region, and the potential that the transportation system itself could be a target, the BRTB will continue to support local, regional, and state preparedness efforts to improve security and to lead regional efforts as appropriate.

Chapter 5, Section 5.4

MARYLAND TRANSPORTATION AUTHORITY PROJECTS

MdTA is an independent agency responsible for managing, operating and improving the State's toll facilities. MdTA projects are privately-funded so are not included in the listing of projects to be supported with federal funds. These projects, are however,

important to mention due to the impact on travel demand and air quality.

See figures 5-25 and 5-26 for the MdTA project list and map.

MANAGED LANES

All roadways for projects in Outlook 2035 are general purpose lanes at this time. However, an approach to advancing projects when funding is tight is through the use of Express Toll Lanes. Consideration of managed lanes, which includes high occupancy lanes, high occupancy transit or express toll lanes may be applied on a case-by-case basis at the time of project planning.

Managed or Express Toll Lanes - Express toll lanes are being considered as a tool to help address congestion in some of the state's key transportation corridors. The Maryland Department of Transportation, State Highway Administration and Maryland Transportation Authority plan to consider this new initiative to provide Maryland's residents, employers, businesses, and visitors with an alternative to sitting idle in traffic wherever these lanes make sense - that is, for controlled access highways such as Interstates that experience chronic congestion, in particular during peak travel times (e.g., morning and evening rush hours).

Committed to Improvements - The Maryland Department of Transportation (MDOT) has made a promise to Maryland's residents and businesses to make tangible and near-term improvements to traffic flow throughout the state and to achieve their vision of a More Mobile Maryland. Significant near-term improvements, however, cannot be achieved without looking to new methods and new funding.

Express Toll Lanes (ETLs) - Express Toll Lanes could offer Maryland's drivers and transit users a choice of relatively congestion-free travel and reliable travel times whenever they need it most. An integrated system of Express Toll Lanes could help ease the impact of traffic congestion on Marylanders' lives and do so decades sooner than traditional approaches would allow.

FIGURE 5-25
MDTA PROJECTS

FIGURE 5-26
MDTA PROJECT LIST

PROJECT	LIMITS
Section 200	North of MD 43 to north of MD 22
Section 200: MD 24	MD 7 to Singer Rd
Section 300	North of MD 22 to Susquehanna River

Chapter 5, Section 5.5

ILLUSTRATIVE PROJECTS

Federal regulations for metropolitan transportation planning identify the concept of "illustrative projects" as an element of the planning process.

These are projects discussed in a metropolitan transportation plan for illustrative purposes, which would be included in the adopted transportation plan, if additional resources beyond the reasonable financial resources identified in the plan were available. Illustrative projects can be helpful in guiding transportation and land use planning efforts at both the regional and local level, even though funding for the projects has not yet been identified.

There is no requirement to select any project from an illustrative list of projects in a metropolitan plan at some future date, when funding might become available.

BRTB members have identified additional transportation projects needed to support travel demand in the region; however, funds are not currently forecast to be available.

Therefore, Outlook 2035 has created a category of illustrative projects, as described above, should funds become available.

These projects represent the BRTB's next transportation priorities that would be included in the Preferred Alternative investment list if funds were available.

If funds become available, the "Illustrative Projects" list is a resource from which the BRTB can select regional priorities.

ILLUSTRATIVE PROJECTS

- MARC
- Baltimore Regional Rail Plan
  - Green Line
  - Yellow Line
- Perryman West: US 40 at Mitchell Lane to Canning House Rd
- MD 2: MD 450 to north of South River Bridge
- US 29: I-70 to MD 100
- I-83: Ramp improvements at Northern Parkway
- MD 26: MD 97 to MD 27
- MD 145: MD 45 to Hunters Run Rd
- Green Line: Greenbelt Metro to BWI
- MD 140: new interchange at MD 91
- MD 100: maintain 6 lanes in vicinity of I-95
- New alignment and double-stack capability for freight rail
- Upgrade Howard Street Tunnel
- Chesapeake Bay Bridge Crossing
- I-83: new interchange at Thornton Mill Rd
- I-83: interchange reconstruction at Timonium Rd
- I-83: interchange reconstruction at Padonia Rd
- US 1: MD 43 to Harford County Line

Chapter 5, Section 5.6

SYSTEM PERFORMANCE OF OUTLOOK 2035

Once the Preferred Alternative was determined, projects were evaluated based on several areas of performance.

An analysis of travel demand model output included the use of quantitative data and statistical measures to determine progress toward Outlook 2035's defined goals, policies, and strategies.

An Environmental Justice (EJ) review of the Preferred Alternative was performed to comply with federal regulations regarding impacts to minority populations and low-income populations.

An air quality analysis was executed to assess the predicted effects of the Preferred Alternative investments on the quality of the air we breathe.

The BRTB also began to incorporate new environmental coordination considerations into the project planning process.

Chapter 5, Section 5.6.1

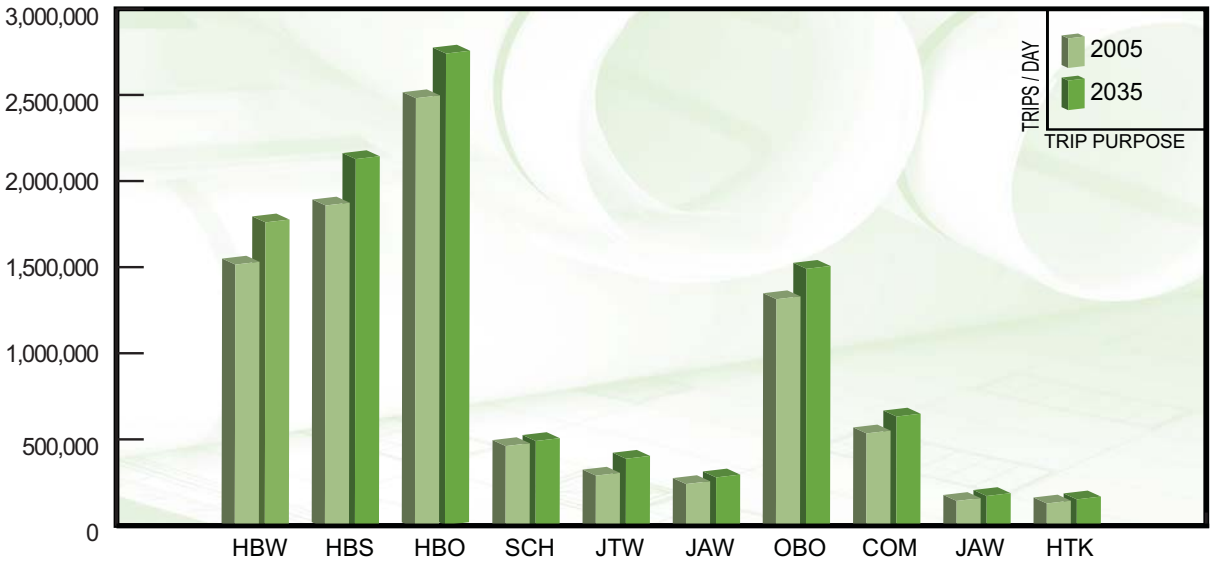
TRAVEL MODEL RESULTS

Performance measures were developed to quantify the effects of travel on the Baltimore region transportation network.

Numerical data collected to quantify Outlook 2035 performance measures came from the Baltimore Region Travel Demand Model.

The travel demand model was validated against present day conditions. The year 2005

FIGURE 5-27
SIMULATED PERSON TRIPS PRODUCED IN THE BALTIMORE REGION BY PURPOSE



was chosen as a base year for analysis.

The 2005 model includes nine trip purposes: Home-Based Work, Home-Based Shopping, Home-Based Other, Home-Based School, Journey to Work, Journey at Work, Other-Based Other, Commercial Vehicle, Medium Trucks, and Heavy Trucks.

Data from the Round 7 socio-economic forecasts was used to generate the trips in the model.

For the average weekday in the Baltimore region, output from the model for 2005 and 2035 conditions is illustrated in Figure 5-27. A 16 percent increase in person trips is projected from 2005 to 2035 to reach a total of 11.1 million person trips produced in 2035.

Trips for 2005 and 2035 are distributed throughout the region and the output vehicle trip tables from the mode choice module are assigned to the 2005 and 2035 highway networks, respectively. Performance measures have been developed to analyze simulation characteristics to show travel demand results.

Performance measures were calculated for three simulations: 2005, the 2035 Existing & Committed (E&C), and Outlook 2035 Preferred Alternative.

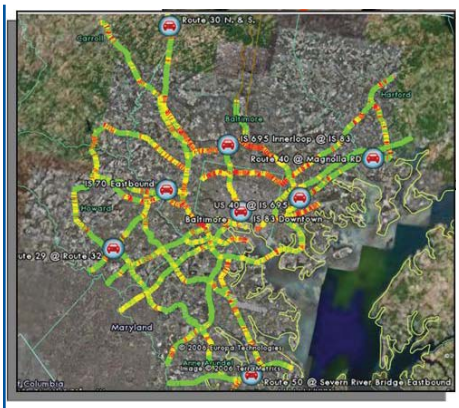
The E&C network illustrates what level of service would result if only the projects currently built, or the limited group scheduled for construction by calendar year 2012, were completed.

E&C, in this case, shows what is referred to as a "no-build" scenario, wherein all project planning terminates with the projects currently funded and scheduled.

Table 5-28 displays 2005, 2035 E&C and 2035 Preferred Alternative performance measures for the 24-hour period.

The measures include: vehicle miles of travel (VMT), transit ridership, vehicle hours of delay, and average speed.

The following are some significant observations:



- The Baltimore region on an average weekday is projected to have a 34 percent growth in VMT from a 2005 total of 56.5 million to a 2035 Preferred Alternative projection of 75.5 million.

- Congested VMT (Level of Service E & F) is projected to grow about 2.5 times from 6.3 million in 2005 to 16 million in the 2035 Preferred Alternative.

  The congested VMT in 2035 Preferred Alternative accounted for nearly 21 percent of total VMT in the region while the 2035 E&C showed a 25 percent level compared to the 2005 network at 11 percent.

- Transit ridership showed an increase of 20 percent from 2005 to 2035 but the transit mode share for

all trips remained approximately the same.

- Vehicle hours of delay for the 2035 Preferred Alternative, is more than double that of 2005 because of increased traffic congestion.

- However, vehicle hours of delay showed for the 2035 Preferred Alternative will decrease by 30 percent from 2035 E&C.

- Average speed for all roads under the Preferred Alternative showed a decrease of seven percent between 2005 and 2035 due to increased traffic congestion.

FIGURE 5-28
PERFORMANCE MEASURES FOR THE BALTIMORE REGION

		2005	2035 E&C	2035 E&C
	INDICATOR OF TRAVEL DEMAND			
Vehicle Miles Traveled (VMT)	Freeways	28,246,400	37,550,300	39,385,800
	Arterials	21,610,000	28,365,000	27,246,900
	Collector and Local Roads	6,665,900	9,121,000	8,875,400
	All Roads	**56,522,300**	**75,036,300**	**75,508,100**
Congested VMT (LOS E & F)	Freeways	4,642,100	13,033,600	11,630,700
	Arterials	1,426,300	4,882,800	3,458,600
	Collector and Local Roads	282,500	1,087,800	805,100
	All Roads	6,350,900	19,003,800	15,894,400
Percentage of Congested VMT (LOS E,F)	Freeways	16.4%	34.7%	29.5%
	Arterials	6.6%	34.7%	29.5%
	Collector and Local Roads	4.2%	11.9%	9.1%
	All Roads	**11.2%**	**25.3%**	**21.0%**
	Total Transit Ridership (Linked Trips)	195,500	234,300	236,500
	TRAVEL CHARACTERISTICS			
Auto Occ. Ratio	Work Trips	1.1	1.1	1.1
	Non-Work Trips	1.6	1.6	1.6
	All Trips	1.4	1.4	1.4
	Transit Mode Share	2.6%	2.7%	2.7%
	PERFORMANCE			
Congested Speed (mph) for AM Peak Period	Interstates	56.9	48.2	51.6
	Freeways	57.4	47.3	51.5
	Principal Arterials	35.3	32.8	33.8
	Minor Arterials	32.3	30.8	31.2
	Collectors	31.4	29.5	29.9
	All Roads	**42.8**	**37.8**	**40.1**
	Vehicle Hours of Delay (AM Peak Period)	**20,800**	**117,300**	**81,800**
	Vehicle Hours of Delay (24 Hour Period)	**70,501**	**388,100**	**256,000**

Chapter 5, Section 5.6.2

ENVIRONMENTAL JUSTICE RESULTS

The purpose of an environmental justice (EJ) review is to ascertain that federally-funded transportation projects do not adversely impact minority populations and low-income populations. Outlook 2035's EJ transportation review includes consideration of whether these two populations bear disproportionate impacts resulting from governmental decisions.

Historically, EJ was borne out of civil rights movement and environmental complaints from low-income and minority communities. Concerns were raised, claiming that these communities suffered disproportionately from exposure to toxic chemicals and the locating of industrial and waste facilities.

MPOs are responsible for assessing the benefits and burdens of transportation system investments for different socio-economic groups. This includes a data collection effort, and developing a process to engage minority, low-income, and disabled populations in public involvement activities.

Staff conducted analyses to estimate accessibility for the home-based work (HBW) and home-based non-work (HBNW) trip purposes. Transportation analysis zones (TAZ's) were grouped by their appropriate population concentration and compared. Comparisons were also made between the 2035 E&C network (no new projects beyond what is currently in place or in the TIP) and the Preferred Alternative. The methodology was similar to that employed for the 2004 long-range transportation plan update with some modifications.

Baltimore region zones were identified by the share of Asian, Black, Hispanic, Other Race, and White population, based on 2000 Census Data. For each of these racial/ethnic groups, five categories of zones were created based on the zonal share of the respective group. Breakpoints were set so that approximately one-fifth of the 2000 regional population would be in each category. Figure 5-29 shows the share breakpoints for the different categories. The shares for Black and White racial groups turned out to be different from the EJ review for the 2004 long-range transportation plan.

An analysis was then performed, examining transportation accessibility using

FIGURE 5-29
RACIAL CATAGORIZATION OF ZONES

Catagory	ASIAN	BLACK	HISPANIC	OTHER	WHITE
1 (lowest)	0-1	0-2	0-1	0-1	0-33
2	1-2	2-6	1-2	1-2	33-71
3	2-3	6-18	2-3	2-3	71-88
4	3-4	18-60	3-4	3-4	88-94
5 (highest)	4-100	60-100	4-100	4-100	94-100

a 30-minute highway time and a 60-minute transit time. HBW analysis is based on congested travel times used by the model; the HBNW review assumes uncongested travel times.

The non-income HBW analysis considers employment (jobs) and the competing labor force for those jobs. Within the given time radius of each zone, the number of jobs and the labor force are summed and the ratio taken. The time includes highway terminal time (for highway access), and walk and wait time (for transit access). Highway and transit accessibility are considered separately. For the income stratifications, HBW productions and HBW attractions were compared using a ratio.

Non-income HBNW trips were considered by summing the population and number of HBNW attractions within the given radius to get attractions per person; HBNW productions and attractions were used for the income stratifications. Since home-based school trips were not stratified by income, they were excluded from the income-based analysis.

In addition to producing labor force, job, population, and attraction statistics, the jobs per labor force, attractions/population, or attraction/production ratios were calculated. Also determined was the average (weighted by employment or attractions) travel time. Generally, the HBW analysis showed improvement in the jobs to labor force ratio. That is always true for the highways; in a few cases, transit shows a slightly lower ratio in the Preferred Alternative, although declines were negligible. A decline in the accessibility ratio does not necessarily mean a decrease in mobility.

Differences between the two scenarios for HBNW trips were virtually non-existent. Since HBNW trips utilize the uncongested travel times, it appears that the network changes in and of themselves had little effect on accessibility; it is the reduction in congestion that makes the difference, which showed up when the congested travel times were used for HBW trips.

Across all trip types and modes, it appeared that zones with high concentrations of black residents showed a lower accessibility index, which was particularly noticeable for transit trips. This may be due to a number of factors, such as a low number of jobs within the accessible area or a high number of competing workers for those jobs. It was not caused by the Outlook 2035 projects itself. High income trips, particularly HBW transit trips, also showed a better accessibility index but, again, this is not related to the Outlook 2035 projects.

Based on this analysis, Outlook 2035 meets the requirements for transportation equity and EJ with a Preferred Alternative that does not adversely impact minority populations and low-income populations. For more detailed information view EJ charts and maps in Appendix 5.

Chapter 5, Section 5.6.3

AIR QUALITY RESULTS

Assessing the predicted effects of the Preferred Alternative transportation system on the quality of the air we breathe is an important aspect of transportation planning in the Baltimore region.

The U.S. Environmental Protection Agency (EPA) has set standards for six criteria pollutants: particulate matter; ground-level ozone; carbon monoxide; nitrogen dioxide; sulfur dioxide; and lead. The Baltimore region has been classified by EPA as "nonattainment" for fine particulate matter and "moderate nonattainment" for ozone. In addition, the region is in a "maintenance phase" for the carbon monoxide standard. This means that the federal standard for carbon monoxide has already been reached and now must be maintained.

Ground-level ozone is formed by the combination of volatile organic compounds (VOCs), nitrogen oxides (NOx), and sunlight. VOCs and NOx are described as precursors to ozone pollution because they combine in the atmosphere to form ozone, as opposed to being directly emitted. VOCs originate from gasoline, paint, solvents, pesticides, and charcoal lighter fluid. They are also formed naturally.

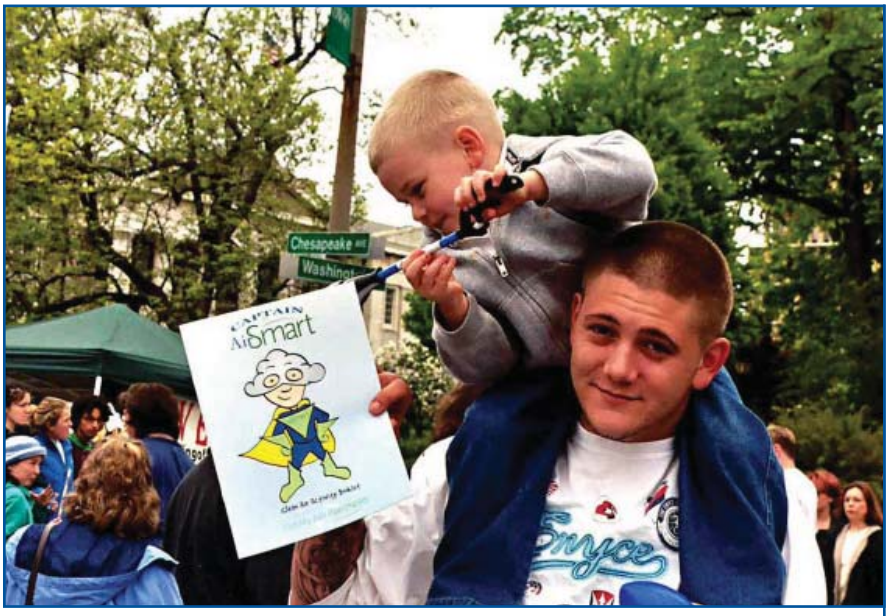
NOx comes from cars, trucks, and buses, as well as power plants, and coal-burning stoves.

Particulate matter is formed both directly and indirectly. It is formed directly by motor vehicle exhaust, fires, power plants, construction dust, and unpaved roads. It is formed indirectly when products of fuel combustion, sunlight, and water vapor react with each other to create particles.

On-road transportation (including automobiles, buses, and trucks) is one of the key contributors to the region's air pollution problems.

The eight-hour ozone State Implementation Plan (SIP) for the Baltimore nonattainment area shows cars, buses, and trucks together contributing the highest total amount of VOC pollution in 2009, compared with other sources.

It also shows cars, buses, and trucks together contributing the highest total amount of



Based on the conformity analysis, the BRTB, in its capacity as the MPO for the Baltimore region, has concluded that implementation of the Preferred Alternative projects in Outlook 2035 and the 2008-2012 TIP does not worsen the region's air quality or delay the timely attainment of National Ambient Air Quality Standards.

NOx pollution, with stationary sources coming in second. The MDE is currently producing an inventory of emission for fine particulate matter.

The issue of air pollution in the Baltimore region is a critical one because ozone and fine particulates can cause respiratory system and other serious health problems in sensitive populations.

In addition, fine particulates can increase rates of cardiovascular illness and may reduce life span.

As the MPO for a nonattainment region, the BRTB is required to complete the transportation conformity process.

Transportation conformity is the process that is used to review current transportation plans and programs in a region to make sure they conform to the state's air quality plan referred to as the SIP.

A SIP determines how a state will meet federal air quality standards. It establishes mobile emissions budgets, or limits, that are used in the conformity determination, to compare with estimated horizon year emissions resulting from the projects in Outlook 2035 and the short-range TIP, as well as the existing transportation network.

Estimated emissions must remain within the mobile source emissions budgets for both short and long-range transportation plans to conform to the SIP. This process is coordinated through the Interagency Consultation Group, a subcommittee of the BRTB.

Outlook 2035 was reviewed to make sure that it had no adverse impact on the SIP. This was documented in the Conformity Determination of Transportation Outlook 2035 and the FY 2008-2012 TIP.

Upon completion of the travel demand modeling, MDE utilized the MOBILE 6.2 emissions model to estimate the

effects of the Preferred Alternative transportation network on air pollution emissions.

The Conformity Determination for Outlook 2035 includes analysis of five horizon year networks: 2008, 2009, 2015, 2025, and 2035. These networks are based on programmed projects in the 2008-2012 TIP and the Preferred Alternative.

Estimated mobile source emissions for all horizon years of analysis associated with Outlook 2035 and TIP implementation can be found in Figure 5-30 and 5-31. Horizon years of analysis are listed across the top of each table.

On Figure 5-30, the first three rows of numbers indicate emissions budgets. The first row shows the mobile source emissions budgets in tons per day from the 8-hour ozone SIP. The second row includes budgets in tons per day from the one-hour ozone SIP, which are included in the conformity analysis interim emissions budgets. The third row includes CO budgets in tons per day from the CO maintenance SIP.

The rate of progress budgets for 2008 and the attainment budgets for 2009 are both from the 8-hour ozone SIP (shown in first row).

Horizon years including 2009 and those following 2009 show the attainment budgets.

The row labeled "Implementation Total" displays the combination of emissions calculated from the transportation network-based analysis with emission reductions calculated outside of the network-based analysis.

This total is compared with the related budgets for each horizon year analyzed.

Figure 5-31 shows a similar layout, except with interim emissions test budgets for direct PM2.5 emissions and NOx emissions in tons per year.

Interim emissions test budgets are used because there are currently no approved or adequate SIP budgets for PM2.5.

MDE is currently in the process of developing the PM2.5 SIP.

The results of the conformity analysis indicate that projected mobile source emissions are below the established budgets for years 2008, 2009, 2015, 2025 and 2035.

Based on the conformity analysis, the BRTB, in its capacity as the MPO for the Baltimore region, has concluded that implementation of the Preferred Alternative projects in Outlook 2035 and the 2008-2012 TIP does not worsen the region's air quality or delay the timely attainment of National Ambient Air Quality Standards.

FIGURE 5-30
FINAL EMISSIONS RESULTS: OZONE AND CO STANDARD

OZONE & CO STANDARD			2008 Emissions			2009 Emissions			2015 Emissions			2025 Emissions			2035 Emissions		
			VOC	NOx	CO	VOC	NOx	CO	VOC	NOx	CO	VOC	NOx	CO	VOC	NOx	CO
Motor Vehicle Emissions Budgets from the 8-hour ozone SIP			41.2	106.8	--	38.7	97	--	38.7	97	--	38.7	97	--	38.7	97	--
Motor Vehicle Emissions Budgets from the Revised Phase II Attainment SIP for 1-hour ozone			55.3	146.9	--	55.3	146.9	--	55.3	146.9	--	55.3	146.9	--	55.3	146.9	--
Motor Vehicle Emissions Budget from the CO Maintenance Plan			--	--	1,689.80	--	--	1,689.80	--	--	1,689.80	--	--	1,689.80	--	--	1,689.80
NETWORK BASED ANALYSIS			39.35	99.49	846.42	36.82	90.25	808.74	25.41	41.32	696.12	18.4	18.54	670.4	18.35	15.94	675.11
Emission Reduction Strategies	IMPLEMENTED		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	PROGRAMMED - TIP, CTP, & CIP	Bus Replacement	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
		CHART (Areawide Congestion Management)															
		Pathways/Bicycle trails	0.00*	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
		Sidewalks/Pedestrian Improvements	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
		Park & Ride Programmed	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	OFF NETWORK ANALYSIS TOTAL		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
IMPLEMENTATION TOTAL			39.35	99.49	846.42	36.82	90.25	808.74	25.41	41.32	696.12	18.4	18.54	670.4	18.35	15.94	675.11
Eight-hour Ozone Budgets vs. Implementation			-1.85	-7.31	--	-1.88	-6.75	--	-13.29	-55.68	--	-20.3	-78.46	--	-20.35	-81.06	--
One-hour Ozone Budgets vs. Implementation			-15.95	-47.41	--	-18.48	-56.65	--	-29.89	-105.58	--	-36.9	-128.36	--	-36.95	-130.96	--
CO Maintenance Budgets vs. Implementation			--	--	-843.38	--	--	-881.06	--	--	-993.68	--	--	-1019.4	--	--	-1014.69

FIGURE 5-31
FINAL EMISSIONS RESULTS; PM2.5 STANDARD

PM2.5 STANDARD		2008 Emissions		2009 Emissions		2015 Emissions		2025 Emissions		2035 Emissions	
		Direct PM2.5	NO_x	Direct PM2.5	NO_x	Direct PM2.5	NO_x	Direct PM2.5	NO_x	Direct PM2.5	NO_x
2002 Baseline Year Emissions for the Interim Emissions Test		1,043.51	63,759.38	1,043.51	63,759.38	1,043.51	63,759.38	1,043.51	63,759.38	1,043.51	63,759.38
NETWORK BASED ANALYSIS		669.04	36,655.00	623.35	33,216.86	454.29	15,453.77	421.12	7,016.38	425.71	6,094.88
Emission Reduction Strategies	IMPLEMENTED		-0.19		-0.19		-0.15		-0.1		-0.01
	PROGRAMMED - TIP, CTP, AND CIP										
	Bus Replacement	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	CHART (Areawide Congestion Management)										
	Pathways/Bicycle trails	0.00*	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Sidewalks/Pedestrian Improvements	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Park-and-ride Programmed	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	OFF NETWORK ANALYSIS TOTAL	0.00	-0.19	0.00	-0.19	0.00	-0.15	0.00	-0.10	0.00	-0.01
IMPLEMENTATION TOTAL		669.04	36,654.81	623.35	33,216.67	454.29	15,453.62	421.12	7,016.28	425.71	6,094.87
2002 Baseline vs. Implementation		-374.47	-27,104.57	-420.16	-30,542.71	-589.22	-48,305.76	-622.39	-56,743.10	-617.8	-57,664.51

Chapter 5, Section 6.4

CONGESTION MANAGEMENT PROCESS

Traffic congestion continues to worsen in American cities of all sizes, creating a $78 billion annual drain on the U.S. economy in the form of 4.2 billion lost hours and 2.9 billion gallons of wasted fuel—that's 105 million weeks of vacation and 58 fully-loaded supertankers.

The 2007 Mobility Report (Texas Transportation Institute) notes that congestion causes the average peak period traveler to spend an extra 38 hours of travel time and consume an additional 26 gallons of fuel, amounting to a cost of $710 per traveler.

Traffic congestion used to be thought of as a fact of life in major cities such as Los Angeles, Houston, New York, and Chicago, but traffic congestion exists in almost every city in the country.

From Madison, Wisconsin, to Nashville, Tennessee, the traveling public is spending an increasing amount of time in traffic congestion.

Past approaches to addressing traffic congestion were simply to add more lanes to roadways to support Single Occupant Vehicles (SOV), but this approach has been shown to only temporarily address congestion, and actually increased traffic congestion in some locations as people changed their departure times, mode, or route to use the new, initially uncongested roadway.

For the reasons listed above, as well as a lack of right-of-way and environmental concerns, it is difficult to build our way out of congestion.

However, until we begin to look at the causes and proposed solutions for regional congestion on a systemwide basis, solutions to localized spot congestion problems may only cause the inherent problem to shift elsewhere in the network.

The BRTB Congestion Management Process (CMP) takes a systemwide approach to identifying, analyzing, and addressing congestion in the Baltimore region.

Chapter 5, Section 6.4.1

CONGESTION MANAGEMENT PROCESS FROM ISTEA TO SAFETEA-LU

The Intermodal Surface Transportation Efficiency Act (ISTEA) of 1991 (and later the Transportation Equity Act for the 21st Century (TEA-21) stated that in a Transportation Management Area (TMA) (urbanized area with a population greater than 200,000), a congestion management system must be developed and implemented as part of the regular Metropolitan Planning Organization (MPO) planning process.

Under the current federal legislation for surface transportation funding, the Safe, Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users (SAFETEA-LU), the provisions on metropolitan transportation planning for Transportation Management Areas (TMAs) refer to a "congestion management process (CMP)" rather than a "congestion management system (CMS)," as previous laws have.

In the final regulations governing transportation management systems, FHWA defines an effective CMP as "a systematic process for managing congestion that provides information on transportation system performance and on alternative strategies for alleviating congestion and enhancing mobility."

These regulations go on to state the following required elements of a CMP:

1. An ongoing method to monitor and evaluate the transportation system, identify the causes of congestion, identify and evaluate alternative actions, and evaluate the efficiency and effectiveness of implemented actions;
2. Definition of parameters for measuring the extent of congestion and for supporting the evaluation of the effectiveness of congestion reduction and mobility enhancing strategies;
3. Establishment of a program for data collection and system performance monitoring;
4. Identification and evaluation of the anticipated benefits of both traditional and non-traditional congestion management strategies;
5. Identification of an implementation schedule, implementation responsibilities, and possible funding sources for each strategy; and

6. Implementation of a process for periodic assessment of the efficiency and effectiveness of implemented strategies, in terms of the area's established performance measures.

Another important requirement for a CMP developed within a TMA that is in nonattainment for carbon monoxide and/or ozone (the Baltimore region is in nonattainment for ozone) is that, for all identified areas of congestion, all reasonable travel demand and operational management strategies must be evaluated and exhausted before a recommendation to add road capacity can be made.

The BRTB established a comprehensive Congestion Management System (CMS) in response to ISTEA (1991).

Over the course of the next 15 years, with changes in federal requirements and regional and local transportation policies, the CMS has evolved into an ongoing congestion management process that complies with the requirements of SAFETEA-LU.

CONGESTION MANAGEMENT PROCESS

The congestion Congestion Management Process consists of 4 main steps, outlined below.

Performance Measures
The CMP begins with an evaluation of the overall system performance. The Regional Travel Demand Model is used to initially identify existing and future congested corridors in the region. Projects are evaluated based on their current volume to capacity ratios (V/C) – a higher V/C ratio would result in a higher score. (See Appendix 5 for more information on performance measures)

Data Collection and System Monitoring
The BRTB has an ongoing program for data collection and system monitoring that includes periodic aerial surveys of congestion across the region, travel times and speeds, vehicle classification and occupancy rates, and traffic volumes. This information is used to assess current conditions and provide data to the regional travel demand model as well as to establish trends in transportation system performance.

Strategy Identification and Evaluation
To facilitate evaluation, a "toolbox" of congestion mitigation measures was assembled that includes all strategies that could be used to address congestion. This strategy "toolbox" was set-up in a hierarchy so that the first strategies take precedence over those below. The general categories for this toolbox are as follows:

- Eliminate person trips or reduce VMT during peak hours
- Shift trips from automobile to other modes
- Shift trips from SOV to HOV
- Improve roadway operations
- Add Capacity

The Regional Travel Demand Model is used to assess future levels of congestion in the transportation system and evaluate the potential future effectiveness of congestion management strategies.

Project Implementation
Transportation improvement projects from member jurisdictions, as well as state agencies are considered in the CMP. The projects in the long range plan are identified through a performance based evaluation of the regional system, producing a list of projects that address congestion and mobility issues in the Baltimore region. See Figure 5-32.

FIGURE 5-32
CONGESTION MANAGEMENT PROCESS

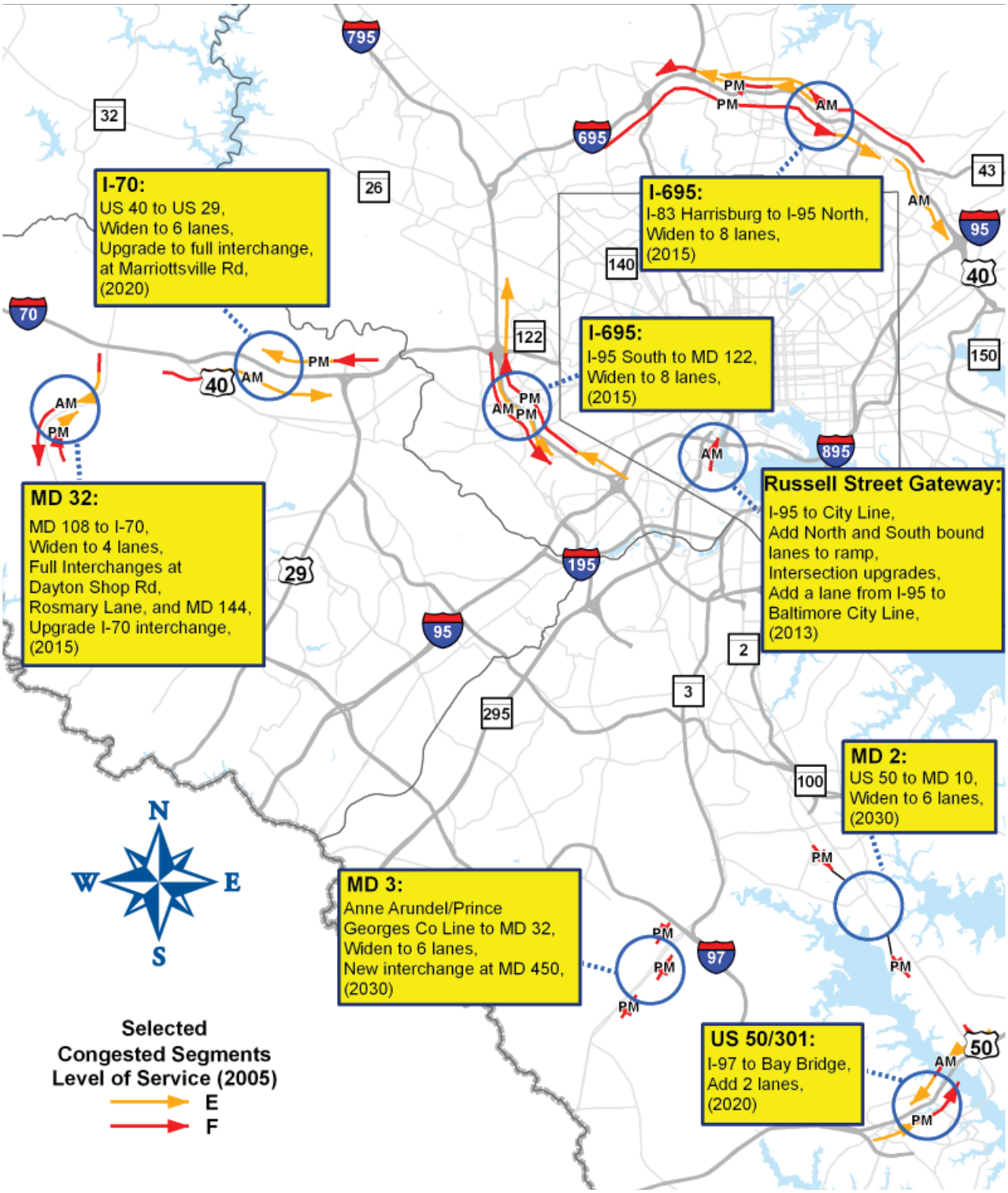
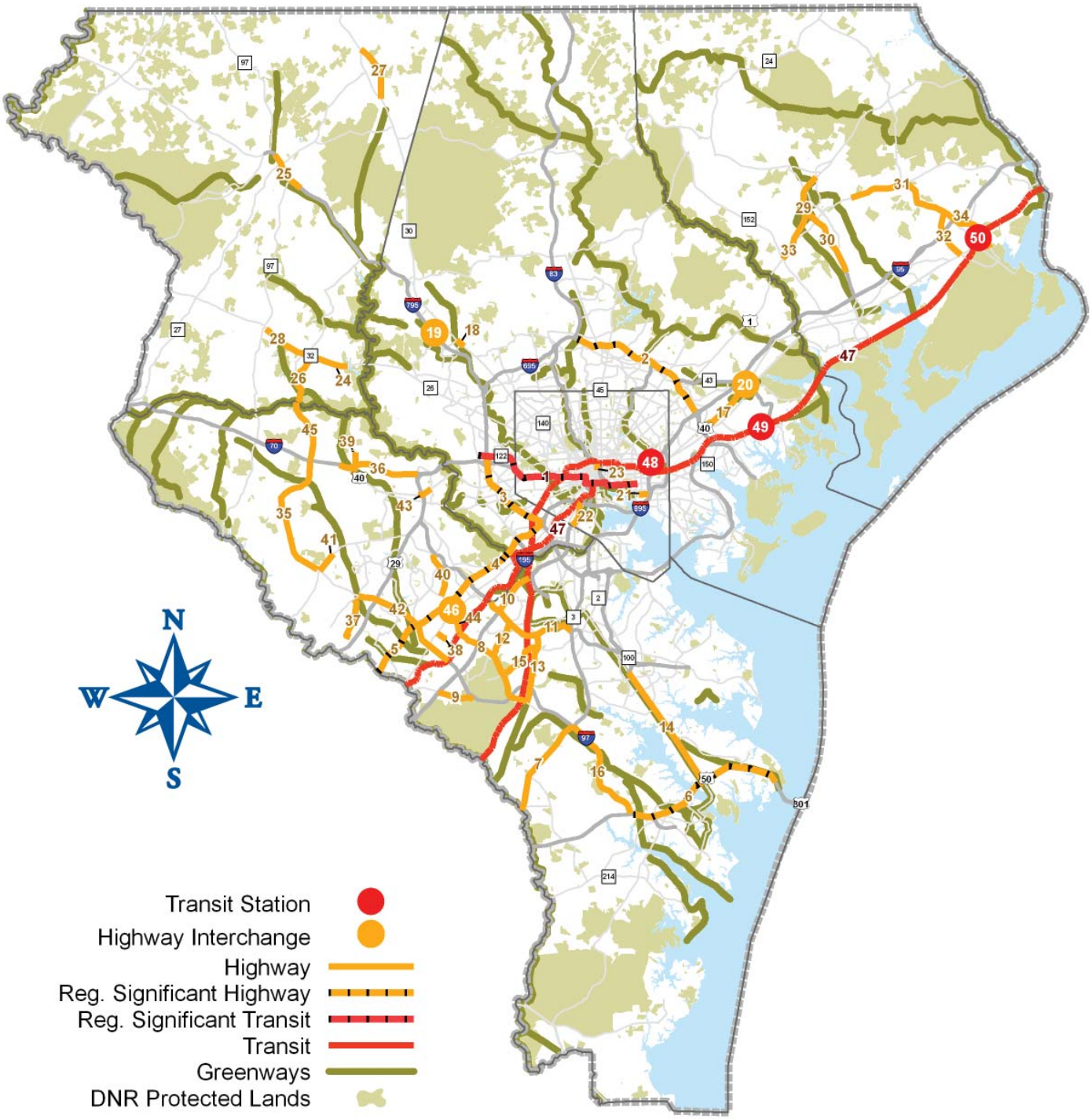


FIGURE 5-33
DEPARTMENT OF NATURAL RESOURCES PROTECTED LANDS AND GREENWAYS



Chapter 5, Section 6.5

ENVIRONMENTAL COORDINATION PROCESS

The process of developing transportation investments to meet the travel demands of a growing region, must address a variety of concerns related to resource conservation and environmental regulation. SAFETEA-LU includes requirements for environmental consultation and a mitigation discussion.

The BRTB approached coordination through the Maryland State Highway Administration (SHA) which is linked to federal, state, and local resource agencies to integrate regional effects and mitigation of proposed future projects. There have been meetings with these resource agencies along with SHA in addition to creating maps in order to conduct a broad analysis comparing proposed projects with resources in the region.

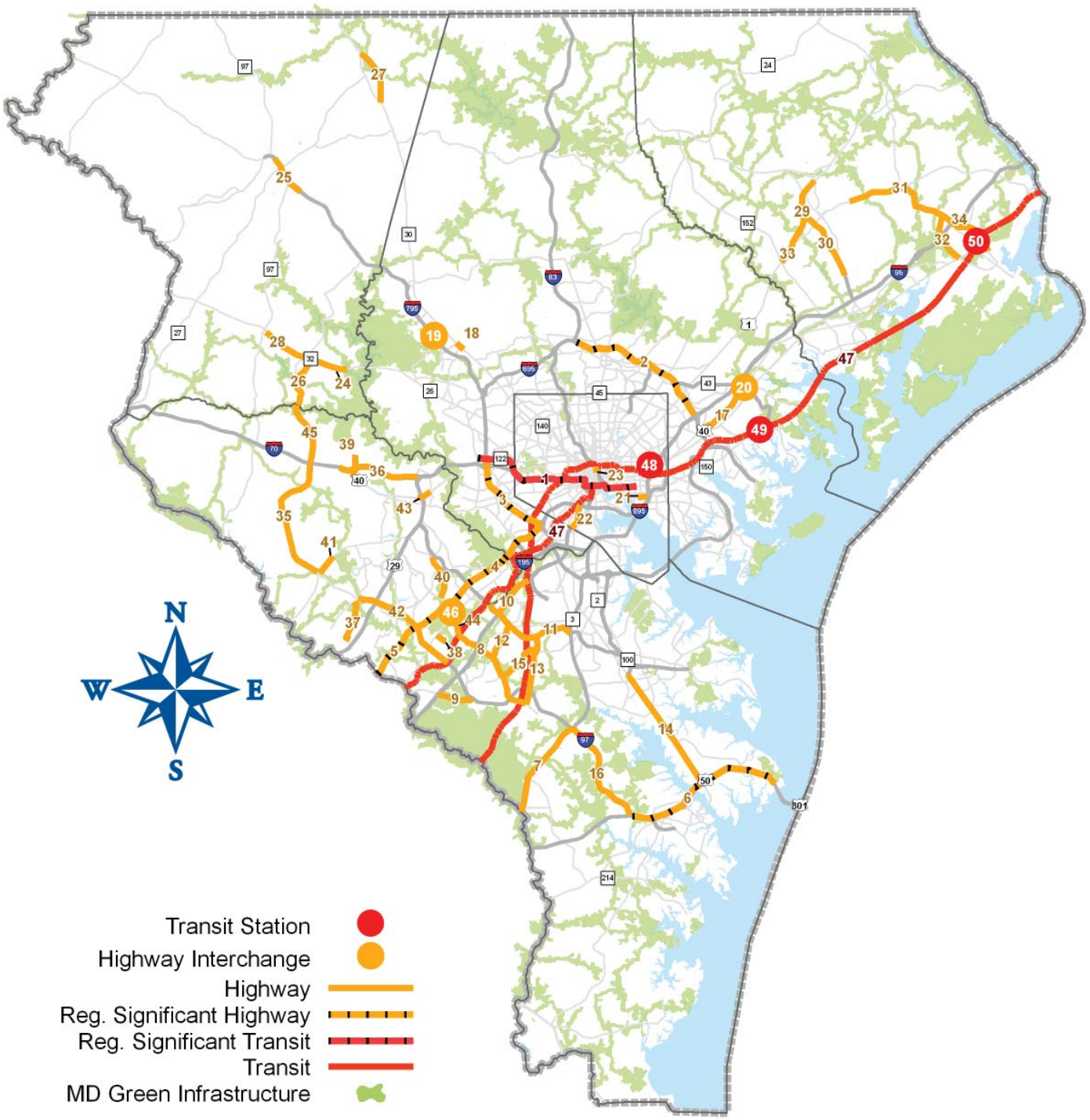
The BRTB has consulted with state and local agencies responsible for land use management, natural resources, environmental protection, conservation, and historic preservation concerning plan development.

During this consultation process, involved agencies were provided ongoing opportunity for coordination through meetings, phone calls, e-mails, the Internet, and through the use of maps comparing the transportation plan with state conservation plans and maps as well as natural and historic resource inventories and plans.

The following resources were mapped with the proposed projects. These maps have been posted on a web site to provide for coordination between agencies.

- Maryland Department of Natural Resources Protected Lands (Maryland Agricultural Land Preservation Foundation Districts, Rural Legacy Areas, Maryland Environmental Trust Easements, Forest Legacy Easements, DNR Lands, County Parks, Federal Lands, Private Conservation Properties)
- Greenways
- Maryland Green Infrastructure Network
- Chesapeake Bay Critical Area
- Reservoir Watersheds
- National Register of Historic Places
- Maryland Inventory of Historic Properties

FIGURE 5-34
MARYLAND GREEN INFRASTRUCTURE



- Maryland Department of Planning Land Use/Land Cover Data
- Sensitive Species Project Review Areas
- Wetlands of Special State Concern

Through these comparisons, and ongoing conversations with resource agencies, this environmental consultation process created an opportunity to bring issues to light in advance of project planning. Analysis of natural and historic resources becomes very detailed at the short-range project planning level, so it was important to provide an opportunity for broad-based discussions of resources during long-range transportation planning that considers all proposed projects.

Figure 5-33 and 5-34 displays two of the maps that were created for this analysis process. The remaining maps are included in Appendix 5.

The figures, as shown here, display a comparison of highway, and regionally significant projects. In addition, maps showing transit and bicycle/pedestrian projects were used in this coordination process.

Figure 5-33 shows Maryland Department of Natural Resources (DNR) Protected Lands as well as Greenways. DNR Protected Lands include Maryland Agricultural Land Preservation Foundation Districts, Rural Legacy Areas, Maryland Environmental Trust Easements, Forest Legacy Easements, DNR Lands, County Parks, Federal Lands, and Private Conservation Properties.

Greenways are natural corridors of land that connect open spaces. Maryland's Greenways consist of ecological as well as recreational greenways which are protected and managed to provide for certain functions such as natural resource conservation, recreation, alternative transportation, and habitat protection.

As part of its greenways system, Anne Arundel County manages approximately 42 miles of bicycle and natural trails, including the 12.5-mile BWI Trail.

Another greenway in the county is the planned 10.3-mile South Shore Trail recre-

FIGURE 5-35
GREEN INFRASTRUCTURE

According to the 2003 Maryland Green Infrastructure Assessment, each jurisdiction in the Baltimore region had the following amount of green infrastructure.

Jurisdiction	GREEN INFRASTRUCTURE LAND (ACRES)	PERCENT OF REGIONAL TOTAL
Anne Arundel County	68,929	23.5%
Baltimore City	1,429	0.5%
Baltimore County	83,144	28.4%
Carroll County	25,102	8.6%
Harford County	80,864	27.6%
Howard County	33,491	11.4%
Regional Total	292,959	100.0%

Almost three-fourths of the more than two million acres of green infrastructure in the state is unprotected from development pressures.

ational greenway. Examples of major greenways within Baltimore City include the Gwynns Falls and the Jones Falls Trails which are currently being developed.

These greenways extend into Baltimore County, where one of the major greenway systems includes the Gunpowder Falls, Little Gunpowder Falls and Beetree Run greenways.

The Little Gunpowder Falls Greenway lies between Baltimore County and Harford County. Some other greenways in Harford County are the Bynum Run/Winters Run Loop, which is an ecological greenway, and the Ma and Pa Heritage Trail which is a recreational greenway.

The Patapsco Regional Greenways system is an example of Carroll County's greenways, and is both ecological and recreational. There are a number of ecological greenways in Howard County, including the Little Patuxent and the Middle Patuxent.

Figure 5-35 shows the Green Infrastructure data layer which was created based on the GreenPrint program established in 2001 by the State of Maryland with the purpose of protecting the remaining ecologically-valuable land in the state.

Almost three-fourths of the more than two million acres of green infrastructure in the state is unprotected from development pressures.

Green infrastructure consists of hubs and corridors. Hubs contain ecologically-valuable lands, while corridors connect the hubs and provide important wildlife passages, help with seed and pollen transport, and protect stream valleys and wetlands.

According to the 2003 Maryland Green Infrastructure Assessment, each jurisdiction in the Baltimore region had the following amount of green infrastructure.

In the Baltimore region, around forty percent of the green infrastructure land is protected. Relatively large percentages of green infrastructure exist in Anne Arundel, Baltimore, and Harford Counties.

The project planning process, which involves National Evironmental Policy Act, is heavily detailed and time consuming. Performing coordination and discussing regional mitigation opportunities ahead of time is meant to improve process efficiency and identify any regional mitigation goals.

The environmental coordination process will continue through the partnerships that have been made during this analysis process. This process is just beginning and will be ongoing through monthly Interagency Review Meetings and through updates from SHA about the types of mitigation projects that are occurring.

Bringing together environmental concerns and regional mitigation planning into the long-range planning process is the ultimate goal.

MITIGATION

Discussing potential types and locations of mitigation activities for transportation projects is another new requirement for metropolitan transportation planning.

Building on the ongoing consultation process, an approach to broad or strategic environmental mitigation is possible.

The BRTB, along with SHA and the resource agencies will have the opportunity to take advantage of the ongoing Interagency Review meetings held at SHA to discuss projects that are early in the planning stages. As resource agencies are exposed to the location and magnitude of proposed projects, an appropriate strategy can be developed that provides benefits far beyond the impact of an individual activity.

The purpose of considering mitigation early in the long range planning process is to focus attention on regional level conservation and restoration needs.

This focus provides a context into which later decisions on specific mitigation concepts and strategies can be developed during the later project development process. Mitigation strategies include

avoidance and minimization of impacts, as well as compensation measures.

Table 5-36 displays resource types along with corresponding legislation that provides protection and possible mitigation strategies and measures that could be applied during later project development.

MITIGATION OF NATURAL RESOURCE IMPACTS

When SHA is issued authorizations from the Maryland Department of the Environment (MDE) and the US Army Corps of Engineers (COE) for activities which

FIGURE 5-36
EXAMPLES OF MITIGATION MEASURES

RESOURCE	EXAMPLES OF MITIGATION MEASURES	REGULATION
Parks and Recreation Areas	For publicly-owned parks, replace land with land of equivalent value and equivalent location; Replace impacted facilities; Restore and landscape disturbed area	Section 4(f) of the Department of Transportation Act
Wildlife and Waterfowl Refuges	For publicly-owned refuges, replace land with land of equivalent value and equivalent location; Incorporate habitat features	Section 4(f) of the Department of Transportation Act
Cultural Resources	Vegetative buffer screening; Measures to preserve a site's historic integrity; Project review/Memorandum of Agreement with Maryland's State Historic Preservation Office; Ensure compatibility with Certified Heritage Area management plans	Section 4(f) of the Department of Transportation Act; Section 106 of the National Historic Preservation Act
Water Resources and Wetlands	Mitigation for wetland and waterway impacts includes creation, restoration, preservation, enhancement, or monetary compensation. Site specific stormwater management plans; use low impact development stormwater design; Best Management Practices tracking; stormwater discharge monitoring; design of stormwater management capacity for new impervious surfaces, as well as existing; water quality banking program with MDE; sediment control during construction	Rivers and Harbors Act of 1899; Clean Water Act; COMAR Title 08.05, Water Resources Administration, Nontidal Wetlands; COMAR Title 9, Wetlands and Riparian Rights (Tidal Wetlands); 2000 Maryland Stormwater Design Manual
Endangered and Threatened Species	Mitigation may include placing conservation easements on properties occupied by the species, expanding/linking habitat areas through habitat creation areas, or enhancing low quality habitat	Endangered Species Act
Forests	Forest replacement on a 1:1 basis, for construction activities.	Maryland Reforestation Law
Chesapeake and Atlantic Coastal Bays Critical Area	Replace forests in the Critical Area on not less than an equal area basis. Mitigation typically includes installation of native shrub and tree species prioritizing on-site locations before moving off-site (within the same impacted watershed and county.)	Critical Area Act (1984); COMAR 27.01.02.04
Nontidal Wetlands of Special State Concern	Mitigation for wetland impacts includes creation, restoration, preservation, enhancement, or monetary compensation. Acreage replacement ratios vary depending on wetland and mitigation type.	COMAR 26.23.06.01-.02

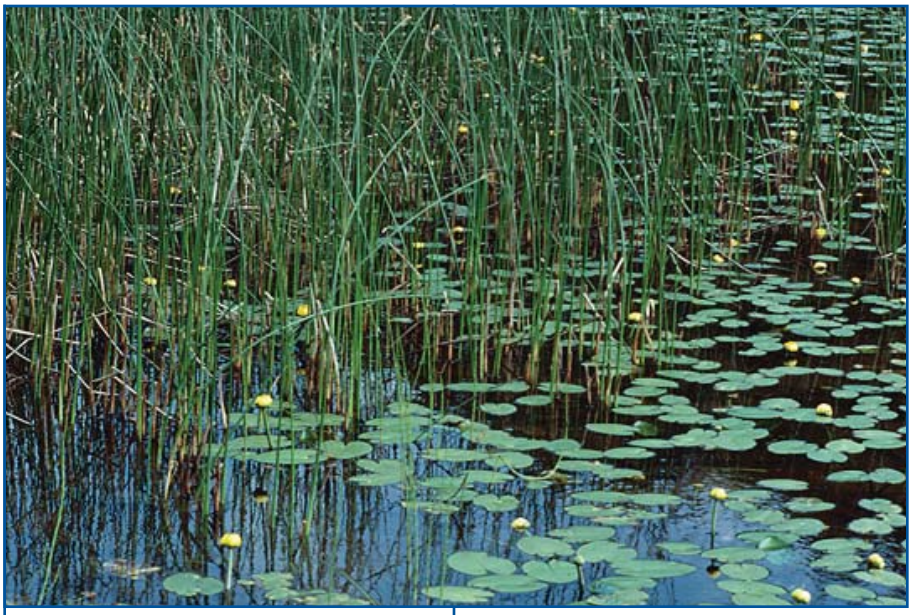
will cause unavoidable losses of nontidal wetlands, those impacts must be compensated for through wetland mitigation.

Nontidal wetland mitigation is the creation, restoration, or enhancement of nontidal wetlands that were lost due to regulated activities from highway construction projects. In order to meet the "no net loss" goals of MDE and the COE, SHA generally mitigates at a 2:1 ratio or greater for most impacts to wetlands impacted by highway projects.

The following describes SHA's current compensatory mitigation strategies:

Creation:

1. *On-Site (Project Area)*: In-kind replacement of impacted wetlands/functional replacement.
2. *On-Site (Project Area)*: Out-of-kind replacement of impacted wetlands.
3. *Off-Site (in sub-watershed)*: In-kind replacement of impacted wetlands/functional replacement.
4. *Off-Site (in watershed)*: In-kind replacement of impacted wetlands/functional replacement.



Other:

1. *Off-Site (Out-of-kind)*: Restoration, enhancement, creation, or preservation of existing wetlands
2. *MD Nontidal Wetland Compensation Fund:* The Nontidal Wetland Compensation Fund is designed to accept monies from applicants who may find mitigation technically infeasible or who are unable to locate a suitable mitigation site. Monetary compensation may not substitute for the requirement to avoid or minimize losses of nontidal wetlands.

ONGOING AND FUTURE SHA MITIGATION STRATEGIES

Moving forward, SHA is working closely with the state and federal review agencies, local planning groups, the business community, environmental organizations, the general public, and other stakeholders, engaging in several other wetland and stream mitigation strategies. The watershed approach, wetland banking, and advanced mitigation (mitigation constructed in advance of the highway improvements) are just a few examples of what is anticipated to be an ever-expanding list of mitigation opportunities.

The watershed approach is described below. Wetland banking and advanced mitigation may be considered.

The watershed approach to compensatory mitigation is a flexible approach that encourages various partnerships between all state and federal review agencies, local planning and regional planning organizations, as well as the general public.

This approach involves assessing the needs of the watershed in a comprehensive manner that allows planners and review agencies to determine the improvements that are most needed with a particular watershed and subwatersheds. Areas targeted for improvement may include water quality and quantity, stormwater runoff, riparian buffer, stream restoration, wetland creation and restoration, wildlife habitat creation and restoration, fish passage, reforestation, etc. The watershed approach balances the needs of the watershed by often using out-of-kind mitigation strategies that would be most beneficial based upon those identified needs.

By identifying the most needed improvements within a given watershed, SHA and its partners can create a prioritization of mitigation strategies that can serve as a long-term plan for the overall improvement to the watershed. SHA is currently using assessment tools, like the DNR's Green Infrastructure Program and FHWA's Eco-logical Approach to assess the improvement needs of the watersheds potentially impacted by highway projects.

Although not in the Baltimore region of Maryland, SHA is currently using the watershed approach on large and complex projects such as the Intercounty Connector (ICC) in Montgomery and Prince Georges counties (currently under construction) and the US 301 Transportation Study in Charles County. Similar watershed approaches to mitigation are also employed on smaller projects in SHA's design and construction program.

MITIGATION OF HISTORIC RESOURCE IMPACTS

Cultural resources typically encountered during the highway development process may include buildings, historic districts, roadway structures such as bridges, and terrestrial or underwater archeological sites dating to the prehistoric and historic time periods. Mitigation measures may take many forms depending on the re-

source itself, and the project's impact. Commonly used strategies include the recovery of significant information through the excavation of archeological sites, Historic American Buildings Survey and Historical American Engineering Record recordation, photo-documentation of buildings and building relocations, scholarly journal articles and "popular" historical reports for public enjoyment, as well as other outreach efforts designed to benefit school children and communities.

There are specific procedural requirements necessary for compliance with the National Historic Preservation Act and its implementing regulations found at 36CFR800, and the Maryland Historical Trust Act, that situate consideration of mitigation treatments to resolve adverse effects on National Register eligible or listed historic resources in the later stages of project planning. In general, mitigation strategies are context specific, are tailored to the specific resources and impacts after avoidance and minimization strategies are implemented, and developed in consultation with the Maryland Historical Trust, the Federal Highway Administration, and the Advisory Council on Historic Preservation. However, SHA does engage the agencies and stakeholders in discussions that explore opportunities for more programmatically-oriented treatments that are sensitive to local and regional priorities as strategies for environmental stewardship.

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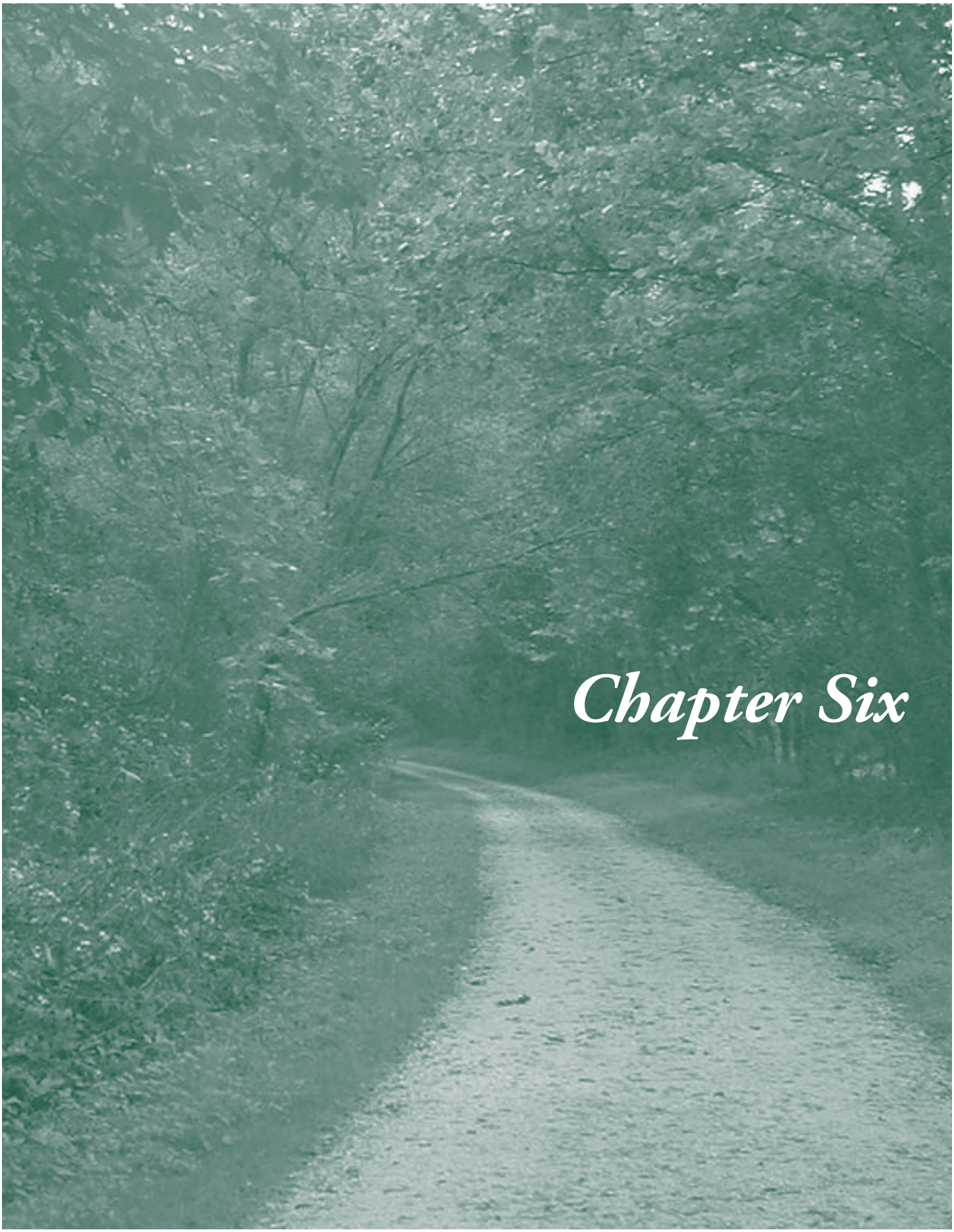

Chapter Six

What Comes Next?

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Chapter Six

What Comes Next?

The process of completing a long-range transportation plan such as Outlook 2035 is complex and requires considerable coordination among the Baltimore Regional Transportation Board (BRTB) members and stakeholders. BRTB activities that are underway and continuing through the Unified Planning Work Program represent the day-to-day work at reaching the goals set forth in Outlook 2035. These activities and the investments proposed for implementation will put the region on target to reach access and mobility goals.

Looking forward, BRTB members have identified two critical activities needed to meet these goals. The first is monitoring the outcome of a Special Session of the 2007 Maryland General Assembly to consider a budget deficit which will directly impact needed revenue to address un-met transportation needs. The second action is the timely, yet ongoing, monitoring of conditions on the transportation network for daily incident management and future congestion management strategies. Monitoring the regional, state, and federal budgets is a current issue across the country as funding needs grow. The BRTB is very concerned about transportation funding needs and is working with partners in the Baltimore region to get more out of their transportation investments through new transportation management and technology strategies.

Chapter 6, Section 1

TACKLING THE BUDGET DEFICIT TO ADDRESS UN-MET TRANSPORTATION NEEDS

The state is currently facing a serious fiscal challenge. State officials and outside experts agree that a major "gap" exists between the estimate of revenues from current sources and the baseline expenditures projected for future years. Baseline expenditures include funding mandated by statute, realistic estimates of caseloads in state programs, reasonable assumptions with respect to inflation or other cost adjustments, and continuation of prior commitments. Assuming the rates for taxes or fees remain unchanged, the general fund "structural deficit" for Fiscal Year (FY) 2009 is estimated at about $1.45 billion. To eliminate the deficit, Governor O'Malley has developed a package of revenue enhancements and expenditure reductions, and called a 30-day Special Session of the General Assembly that began on October 29, 2007 to adopt the package.

Where does transportation fit in the State deficit?

The Maryland Department of Transportation (MDOT) has indicated the need for $400 to $600 million in new FY 2008 revenue to keep the transportation spending program on track. The current spending program, the Consolidated Transportation Program (CTP), while sizable, is constrained. The 2007 legislative session of the Maryland General Assembly authorized $1.8 billion in capital spending for FY 2008 and $1.6 billion in FY 2009.

In addition, the later years of the CTP are even less robust. Funding programmed in the CTP declines to $1.1 billion by FY 2012. This drop is due to inflationary pressures and the increasing demands of operating programs. Additional transportation debt capacity is unavailable due to the revenue to debt-service coverage ratio required by state law.

What are the Economic Impacts of Increasing Spending on Transportation Projects?

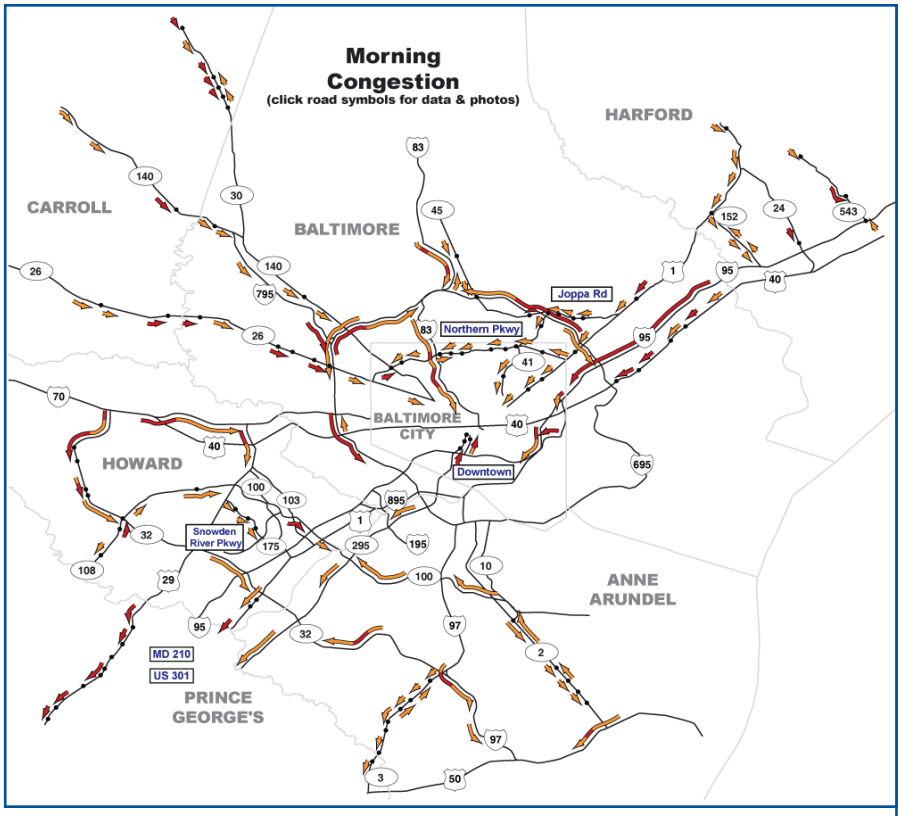
Transportation spending that annually exceeds $100 million is a powerful jolt to any state economy. Recently, the Greater Baltimore Committee, the Greater Washington Board of Trade, and the

Maryland Chamber of Commerce jointly sponsored a Texas Transportation Institute study, *Investing in Maryland's Transportation Infrastructure: The Costs and Benefits to Workforce and Family*, on the costs and benefits accruing to Maryland through its transportation investments.

The impacts of transportation investments are economy-wide. Primarily, they follow three paths. Direct impacts result from expenditures on labor, equipment, and materials. Secondary impacts result from consumer expenditures by transportation workers. At the tail end, there is the impact of expenditures by the consumer work force whose pay flows from construction workers. The report further states that new and improved transportation facilities reduce congestion travel time and total fuel consumed. An improved transportation infrastructure brings better mobility, and results in more efficient consumer and business operations transportation through reduced operating cost and travel times.

Should additional funding become available to support transportation needs, the BRTB will reconvene to assess the situation. In consultation with MDOT, it will be important to determine the amount of funding that would be available to system preservation, operations and expansion. If expansion funds become available in the timeframe prior to the next update of the regional long-range transportation plan, the BRTB will consider the Illustrative projects listed in Chapter 5 and engage the public in the process it plans to undertake as well as opportunities for public input.

An improved transportation infrastructure brings better mobility, and results in more efficient consumer and business operations transportation through reduced operating cost and travel times.



Transportation mobility directly affects our quality of life, impacts our ability to travel around the region, and transport goods and therefore impacts the economic productivity of our region.

Chapter 6, Section 2

MONITORING SYSTEM CONDITIONS

Transportation mobility directly affects our quality of life, impacts our ability to travel around the region, and transport goods and, therefore, impacts the economic productivity of our region. In today's environment, mobility is also important to safety and security. Increasingly, mobility is jeopardized by congestion and unexpected delays. It has been estimated that, nationwide, approximately 40 percent of delay happens virtually in the same location and at the same time every day—it is "recurring." Traffic demand exceeds the available capacity of the transportation infrastructure. Delay also results from unexpected events, such as crashes, weather events (e.g., fog or snow), and work zones.

The technologies themselves are not the answer, but the improved ability to operate the system, enabled by the technologies, is key to addressing congestion and delays. Applications such as freeway management, arterial management, incident and special event management, work zone mobility and safety management, and road weather management marry technology innovations with a desire to better serve customers through improved mobility. The Baltimore region has several well established and on-going operational programs such as the Coordinated Highways Action Response Team (CHART) for highway

incident management, traffic signal timing, and traveler information programs such as the Multi-modal Traveler Information System, that support mobility in the region.

The Congestion Management Process (CMP) is an important component under the Safe, Accountable, Flexible, and Efficient Transportation Equity Act: A Legacy for Users (SAFETEA-LU). The FHWA defines a CMP as a systematic process for managing congestion that provides information on transportation system performance and on alternative strategies for alleviating congestion and enhancing mobility. Under the CMP, a program for data collection and system monitoring must be established. Data collection is an important task to assess system performance and serves as a repository of historical, simulated, and observed data for the transportation system in the Baltimore region.

As part of this effort, the Baltimore region CMP consolidates data collection efforts related to system performance in an archive of historic and current performance datasets that can be used for future evaluation and analysis. The overall goal of the program is to communicate measures related to mobility and accessibility in the Baltimore region, and to provide the public with a better idea of how transportation systems perform.

Besides relying on traditional forms of data collection such as traffic counts, aerial surveys of congestion and travel time runs, the Baltimore region will look for new technologies, such as probe data, to provide more data and in real-time to assess the performance of the transportation system.

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