



OLD COLONY METROPOLITAN
PLANNING ORGANIZATION (MPO)
FFY 2020 - 2040 LONG RANGE
TRANSPORTATION PLAN

Prepared by
Old Colony Planning Council
70 School Street
Brockton, MA. 02301

OLD COLONY METROPOLITAN PLANNING ORGANIZATION (MPO)

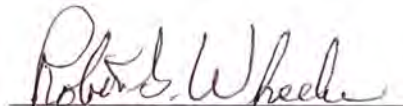
**ENDORSEMENT OF
2020-2040 OLD COLONY LONG RANGE TRANSPORTATION PLAN (LRTP)**

This is to certify that the Signatories of the Old Colony Metropolitan Planning Organization, at their Old Colony MPO meeting on July 16, 2019 hereby approve and endorse the 2020-2040 Old Colony Long Range Transportation Plan in its entirety for the Old Colony Region, in accordance with the certified 3C Transportation Planning Process.

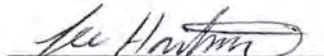

Stephanie Pollack, Secretary and CEO
Massachusetts Department of Transportation

7-16-19
Date

Mayor Moises Rodrigues
City of Brockton
Date



Jonathan Gulliver, Highway Administrator
Massachusetts Department of Transportation

7/16/19
Date


Kenneth Tavares, Chairman
Plymouth, Board of Selectmen
7/16/19
Date



Michael Lambert, Administrator
Brockton Area Transit Authority

7/16/19
Date


Eldon Moreira, Chairman
West Bridgewater, Board of Selectmen
7/16/19
Date


Christine Joy, President
Old Colony Planning Council

7-16-19
Date


Daniel Salvucci, Vice-Chairman
Whitman, Board of Selectmen
7/16/19
Date

Ex-Officio Non-Voting Members

Noreen O'Toole, Chairperson
Old Colony Joint Transportation Committee (JTC)

Jeff McEwen, Massachusetts Division Administrator
Federal Highway Administration (FHWA)

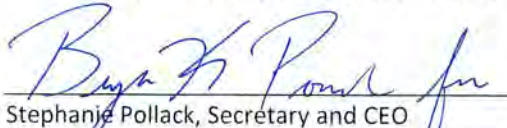
Peter Butler, Acting Region 1 Administrator
Federal Transit Administration (FTA)

Certification of the Old Colony MPO Transportation Planning Process

310 CMR 60.05: Global Warming Solutions Act Requirements for the Transportation Sector and the Massachusetts Department of Transportation

This will certify that the Transportation Improvement Program and Air Quality Conformity Determination for the Old Colony Long Range Transportation Plan is in compliance with all applicable requirements in the State Regulation 310 CMR 60.05: Global Warming Solutions Act Requirements for the Transportation Sector and the Massachusetts Department of Transportation. The regulation requires the MPO to:


1. 310 CMR 60.05, 5(a)(1): Evaluate and report the aggregate transportation GHG emissions and impacts of RTPs and TIPs;
2. 310 CMR 60.05, 5(a)(2): In consultation with MassDOT, develop and utilize procedures to prioritize and select projects in RTPs and TIPs based on factors that include aggregate transportation GHG emissions impacts;
3. 310 CMR 60.05, 5(a)(3): Quantify net transportation GHG emissions impacts resulting from the projects in RTPs and TIPs and certify in a statement included with RTPs and TIPs pursuant to 23 CFR Part 450 that the MPO has made efforts to minimize aggregate transportation GHG emissions impacts;
4. 310 CMR 60.05, 5(a)(4): Determine in consultation with the RPA that the appropriate planning assumptions used for transportation GHG emissions modeling are consistent with local land use policies, or that local authorities have made documented and credible commitments to establishing such consistency;
5. 310 CMR 60.05, 8(a)(2)(a): Develop RTPs and TIPs;
6. 310 CMR 60.05, 8(a)(2)(b): Ensure that RPAs are using appropriate planning assumptions;
7. 310 CMR 60.05, 8(a)(2)(c): Perform regional aggregate transportation GHG emissions analysis of RTPs and TIPs;
8. 310 CMR 60.05, 8(a)(2)(d): Calculate aggregate transportation GHG emissions for RTPs and TIPs;
9. 310 CMR 60.05, 8(a)(2)(e): Develop public consultation procedures for aggregate transportation GHG reporting and related GWSA requirements consistent with current and approved regional public participation plans;
10. 310 CMR 60.05, 8(c): Prior to making final endorsements on the RTPs, TIPs, STIPs, and projects included in these plans, MassDOT and the MPOs shall include the aggregate transportation GHG emission impact assessment in RTPs, TIPs, and STIPs and provide an opportunity for public review and comment on the RTPs, TIPs, and STIPs.
11. 310 CMR 60.05, 8(a)(1)(c): After a final GHG assessment has been made by MassDOT and the MPOs, MassDOT and the MPOs shall submit MPO-endorsed RTPs, TIPs or projects within 30 days of endorsement to the Department for review of the GHG assessment.


Stephanie Pollack, Secretary and CEO
Massachusetts Department of Transportation

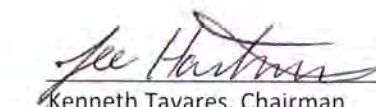
7-16-19
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Mayor Moises Rodrigues
City of Brockton

Date


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Massachusetts Department of Transportation

7/16/19
Date


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Plymouth, Board of Selectmen

7/16/19
Date

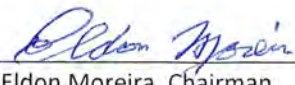
The signatures of the other MPO members may be found on page 2.

Certification of the Old Colony MPO Transportation Planning Process



Michael Lambert, Administrator
Brockton Area Transit

7.16.19
Date



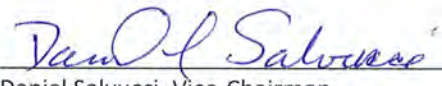
Eldon Moreira, Chairman
West Bridgewater, Board of Selectmen

7/16/19
Date



Christine Joy, President
Old Colony Planning Council

7-16-19
Date



Daniel Salvucci, Vice-Chairman
Whitman, Board of Selectmen

7/16/19
Date

Notice of Nondiscrimination Rights and Protections to Beneficiaries

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The Old Colony Metropolitan Planning Organization (MPO) operates its programs, services, and activities in compliance with federal nondiscrimination laws including Title VI of the Civil Rights Act of 1964 (Title VI), the Civil Rights Restoration Act of 1987, and related statutes and regulations. Title VI prohibits discrimination in federally assisted programs and requires that no person in the United States of America shall, on the grounds of **race, color, or national origin** (including **limited English proficiency**), be excluded from participation in, be denied the benefits of, or be otherwise subjected to discrimination under any program or activity receiving federal assistance. Related federal nondiscrimination laws administered by the Federal Highway Administration, the Federal Transit Administration, or both prohibit discrimination on the basis of **age, sex, and disability**. These protected categories are contemplated within the Old Colony MPO's Title VI Programs consistent with federal interpretation and administration. Additionally, the Old Colony MPO provides meaningful access to its programs, services, and activities to individuals with limited English proficiency, in compliance with US Department of Transportation policy and guidance on federal Executive Order 13166.

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The Old Colony MPO also complies with the Massachusetts Public Accommodation Law, M.G.L. c 272 §§ 92a, 98, 98a, prohibiting making any distinction, discrimination, or restriction in admission to or treatment in a place of public accommodation based on **race, color, religious creed, national origin, sex, sexual orientation, disability, or ancestry**. Likewise, the Old Colony MPO complies with the Governor's Executive Order 526, section 4 requiring all programs, activities, and services provided, performed, licensed, chartered, funded, regulated, or contracted for by the state shall be conducted without unlawful discrimination based on **race, color, age, gender, ethnicity, sexual orientation, gender identity or expression, religion, creed, ancestry, national origin, disability, veteran's status** (including Vietnam-era veterans), or **background**.

Additional Information

To request additional information regarding Title VI and related federal and state nondiscrimination obligations, please contact:

Old Colony Planning Council
Title VI/ Nondiscrimination Coordinator
Pat Ciaramella
70 School Street
Brockton, MA 02301
508-583-1833 Extension 202
pciaramella@ocpcrpa.org

Title VI Specialist
MassDOT, Office of Diversity and Civil Rights
10 Park Plaza
Boston, MA 02116
857-368-8580
TTY: 857-368-0603
MASSDOT.CivilRights@state.ma.us

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One Ashburton Place, 6th Floor
Boston, MA 02109
617-994-6000
TTY: 617-994-6196

Translation

English

If this information is needed in another language, please contact the MPO Title VI Coordinator at 508-583-1833 ext. 202.

Spanish

Si necesita esta información en otro idioma, por favor contacte al coordinador de MPO del Título VI al 508-583-1833 ext. 202.

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Chinese Simple

如果需要使用其它语言了解信息，请联系Old Colony大都会规划组织（MPO）《民权法案》第六章协调员，电话508- 583-1833，转202。

Chinese Traditional

如果需要使用其他語言瞭解資訊，請聯繫Old Colony大都會規劃組織（MPO）《民權法案》第六章協調員，電話508- 583-1833，轉202。

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Nếu quý vị cần thông tin này bằng tiếng khác, vui lòng liên hệ Điều phối viên Luật VI của MPO theo số điện thoại 508- 583-1833, số máy nhánh 202.

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Arabic

إذا كنت بحاجة إلى هذه المعلومات بلغة أخرى، يُرجى الاتصال بمنسق الفقرة السادسة لمنظمة التخطيط الحضري على الهاتف: 508- 583-1833 و ثم اضغط الأرقام 202.

Updated April 2015

Old Colony Planning Council

Old Colony Metropolitan Planning Organization (MPO)

The Honorable Moises Rodrigues	Mayor, City of Brockton
Kenneth Tavares	Chairman, Board of Selectmen, Town of Plymouth
Eldon Moreira	Chairman, Board of Selectmen, Town of West Bridgewater
Daniel Salvucci	Vice Chairman, Board of Selectmen, Town of Whitman
Stephanie Pollack	Secretary and CEO, Massachusetts Department of Transportation (MassDOT)
Jonathan Gulliver	Highway Administrator, Massachusetts Department of Transportation (MassDOT)
Michael Lambert	Administrator, Brockton Area Transit Authority (BAT)
Christine Joy	President, Old Colony Planning Council (OCPC)

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JTC Officers

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West Bridgewater - Delegate	Chris Iannitelli
Whitman - Delegate	Noreen O'Toole
Whitman - Alternate	Daniel Salvucci
Delegate-at-Large	Troy E. Garron

Agency Representation

MassDOT	David Mohler, AICP
MassDOT	Benjamin Muller
MassDOT District 5	Mary-Joe Perry
MassDOT District 5	Pamela Haznar, P.E.
MassDOT District 5	Timothy Kochan
BAT	Michael Lambert
BAT	Glenn Ann Geiler
FHWA	Jeff McEwen
FHWA	Kenneth Miller
FHWA	Brandon Wilcox
FTA	Peter Butler
FTA	Leah Sirmin
FTA	Kristin Wood
Brockton Traffic Commission	Captain John Hallisey

OCPC Transportation Staff

Charles Kilmer, AICP	Assistant Director/ Transportation Program Manager
Shawn Bailey	Transportation Planner
Paul Chenard	Senior Transportation Planner
Raymond Guarino	Senior Transportation Planner
William McNulty	Senior Transportation Planner
Kyle Mowatt	Transportation Planner
Jimmy Pereira	Community/ Transportation Planner
Andrew Vidal	GIS Manager/ Communications and IT Specialist

Old Colony Planning Council (OCPC)

OCPC Officers

President	Christine Joy
Treasurer	David Klein
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COMMUNITY	DELEGATE	ALTERNATE
Abington	David Klein	Christopher Aiello
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East Bridgewater	Vacant	
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Hanson	Matthew Dyer	Phillip Lindquist
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Pembroke	Rebecca Coletta	Daniel Trabucco
Plymouth	Lee Hartmann, AICP	
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West Bridgewater	Eldon Moreira	
Whitman	Fred Gilmetti	Daniel Salvucci
Delegate-at-Large	Troy Garron	

OCPC Staff

Pasquale Ciaramella	Executive Director
Brenda Robinson	Fiscal Officer
Patrick Hamilton	AAA Administrator
Lila Burgess	Ombudsman Program Director
Jane Selig	Ombudsman Program Assistant
Laurie Muncy, AICP	Principal Comprehensive Planner
Lisa Sullivan, AICP	Senior Planner
Jimmy Pereira	Community/ Transportation Planner
Bruce Hughes	Economic Development/ Community Planner
Andrew Vidal	GIS Manager/ Communications and IT Specialist
Charles Kilmer, AICP	Assistant Director/ Transportation Program Manager
Paul Chenard	Senior Transportation Planner
Raymond Guarino	Senior Transportation Planner
William McNulty	Senior Transportation Planner
Kyle Mowatt	Transportation Planner
Shawn Bailey	Transportation Planner

Acknowledgements

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The views and opinions of the Old Colony Planning Council expressed herein do not necessarily state or reflect those of the U.S. Department of Transportation.

This Long Range Transportation Plan was prepared by the following members of the Old Colony Planning Council staff under the direction of Pat Ciaramella, Executive Director, and the supervision of Charles Kilmer, AICP, Assistant Director / Transportation Program Manager.

Role

Staff Member

Project Manager

Bill McNulty
Senior Transportation Planner

Contributing Staff

Charles Kilmer, AICP
*Assistant Director / Transportation
Program Manager*

Paul Chenard
Senior Transportation Planner

Laurie Muncy, AICP
Principal Comprehensive Planner

Ray Guarino
Senior Transportation Planner

Lisa Sullivan, AICP
Senior Planner

Kyle Mowatt
Transportation Planner

Jimmy Pereira
Community / Transportation Planner

Shawn Bailey
Transportation Planner

Andrew Vidal
GIS Manager

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Chapter 1: Introduction

The transportation planning process analyzes and presents the benefits and impacts of various transportation alternatives such as adding new highways, changes in the transit system, auto-free zones, and improvements to freight movement, airports, waterways, bikeways, and pedestrian accommodations. This information is used by decision makers in the selection of preferred solutions to current and anticipated problems.

The Old Colony Metropolitan Planning Organization (MPO) is the regional transportation planning entity created under state and federal laws that require the formation of MPOs in urbanized areas with populations of more than 50,000 in order for surface transportation projects to be eligible for federal Highway Trust Fund dollars. The transportation planning area for the Old Colony MPO includes the City of Brockton and sixteen towns: Abington, Avon, Bridgewater, Duxbury, East Bridgewater, Easton, Halifax, Hanover, Hanson, Kingston, Pembroke, Plymouth, Plympton, Stoughton, West Bridgewater, and Whitman. The planning area also includes the community service areas of Brockton Area Transit (BAT) and portions of the Massachusetts Bay Transportation Authority (MBTA) and the Greater Attleboro Taunton Regional Transit Authority (GATRA) service areas within the MPO regional boundaries.

THE COOPERATIVE, CONTINUOUS, AND COMPREHENSIVE (3C) PLANNING PROCESS

The Old Colony MPO is responsible for conducting a continuous, cooperative, and comprehensive transportation planning process for the Old Colony Region. It must plan for the movement of both people and goods within the Region by all modes of travel, including highways, public transportation, bicycles, and foot. It also plans for the connections (such as airports, seaports, and bus, railroad, and pipeline terminals) of these modes to the rest of the world.

The Old Colony MPO sets priorities among surface transportation improvement projects within the Region for state and federal funding. To be eligible for federal funds, the MPO endorses a Transportation Improvement Program (TIP) identifying the projects to be implemented over the next few years.

Approval of federally aided transportation projects is contingent on there being an Old Colony MPO certified “3C” Transportation Planning Process in place that refers to a “Cooperative, Continuous, and Comprehensive Planning Process.”

The State and the Old Colony MPO certify to the FHWA and the FTA that the “3C” Transportation Planning Process is addressing the major issues facing the area and is being developed in accordance with FTA/FHWA regulations governing the implementation of the Safe, Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users (SAFETEA-LU); more with EPA regulations governing the implementation of the Clean Air Act of 1990

(CAAA); and that it fully incorporates the applicable requirements of the 1964 Civil Rights Act and the Americans with Disabilities Act of 1990 (ADA).

Every four years, FTA and the FHWA make a “Certification Determination” for the transportation planning process in each urbanized area. In general, Certification means that the planning process “is being conducted in a cooperative, continuous, and comprehensive manner, and has resulted in plans and programs consistent with the comprehensively planned development of the area.”

The Old Colony MPO is responsible for implementing the urban transportation planning process and for developing and endorsing the Unified Planning Work Program (UPWP), Long Range Transportation Plan (LRTP), Transportation Improvement Program (TIP), and Public Participation Plan (PPP) for the region. Membership of the Old Colony MPO is as follows:

- The Secretary and CEO of the Massachusetts Department of Transportation
- The Highway Administrator of the Massachusetts Department of Transportation
- The President of the Old Colony Planning Council
- The Administrator of the Brockton Area Transit Authority
- The Mayor of the City of Brockton
- The Chief Elected Official of Plymouth
- The Chief Elected Official from two (2) communities, other than Brockton or Plymouth, duly elected by the Old Colony Planning Council, to represent locally elected communities. No more, or less, than one representative from towns with populations of 12,000 or below (Avon, Halifax, Hanson, Kingston, Plympton, and West Bridgewater), and, no more, or less, than one representative from towns with populations over 12,000 (Abington, Bridgewater, Duxbury, East Bridgewater, Easton, Hanover, Pembroke, Stoughton, and Whitman)

At a full Council meeting, the Old Colony Planning Council elects the above-cited locally elected community officials to the Old Colony MPO. The electoral process is the sole responsibility of the OCPC with full consideration to nominations recommended by the Old Colony Joint Transportation Committee (JTC). This process was approved by the Old Colony MPO in 2003 and is periodically reviewed. The term of office is for two years. The OCPC and the JTC make every effort to provide for a region-wide geographic balance of the communities represented on the Old Colony MPO.

The JTC Chairperson, and one representative each from both the FHWA and the FTA are considered ex-officio, non-voting members of the Old Colony MPO. Designees or alternates are typically limited to the persons who are directly responsible and accountable to the official Old Colony MPO member that they are representing.

The members of the Old Colony MPO recognize that transportation planning and programming must be conducted as an integral part of, and consistent with, the comprehensive planning and

development process, and that the process must involve the fullest possible participation by state agencies, local governments, private institutions, and other appropriate groups.

FUNCTIONAL RESPONSIBILITIES OF PARTICIPATING AGENCIES AND GROUPS

Local Representatives

The local representatives (Brockton, Plymouth, and the locally elected communities) to the Old Colony MPO are responsible for articulating a local government perspective of regional transportation problems and issues, and the needs for the community or agency on which they represent, and the Region as a whole.

Massachusetts Department of Transportation (MassDOT)

The Massachusetts Department of Transportation has the statutory responsibility to conduct comprehensive planning and to coordinate the activities and programs of the state transportation agencies.

MassDOT assists in organizing and conducting Old Colony MPO meetings, keeping records, and reporting major statewide and inter-regional policies and issues as they develop. MassDOT is responsible for making appropriate planning funds available to the OCPC by contract to assist in the implementation of the required planning work program as defined in the approved Unified Planning Work Program (UPWP). MassDOT also provides the necessary data, technical support, and staff support required to assist in fulfilling the transportation planning needs of the Old Colony Region and the Commonwealth of Massachusetts. MassDOT is responsible for making appropriate FTA transit planning funds available to the OCPC by contract to assist in the implementation of the required planning work program as defined in the approved UPWP.

Massachusetts Department of Transportation (MassDOT) Highway Division

The Massachusetts Department of Transportation Highway Division has the statutory responsibility for the construction, maintenance, and operation of state roads and bridges, and serves as the principal source of transportation planning in the Commonwealth. MassDOT is responsible for the continual preparation of comprehensive and coordinated transportation plans and programs.

Old Colony Planning Council (OCPC)

Established by Chapter 332 of the Acts of 1967, OCPC is the regional planning agency for the metropolitan Brockton area. The Council's planning jurisdiction includes the City of Brockton and the towns of Abington, Avon, Bridgewater, East Bridgewater, Easton, Hanover, Hanson, Halifax, Kingston, Pembroke, Plymouth, Plympton, Stoughton, West Bridgewater, and Whitman. The policy board is composed of one delegate and one alternate appointed by a vote of the Board of Selectmen and Planning Board of each member community. In the case of the City of Brockton, the Mayor appoints the delegate and alternate. The Council is authorized to prepare and revise comprehensive plans. OCPC is recognized by the MPO as the officially designated regional planning agency for the Old Colony MPO Region, has the statutory responsibility for

comprehensive planning, including transportation planning. Currently, the Council's areas of major emphasis are economic development, transportation, safety and security, water quality, land use and housing, and elder service planning and ombudsman programs.

The OCPC is responsible for comprehensive regional planning and is the transportation planning agency for the Old Colony MPO and Old Colony Region. The OCPC maintains qualified transportation planning staff and is principally responsible for the maintenance of the transportation planning process and for the support and operation of the Old Colony Joint Transportation Committee and MPO.

Brockton Area Transit Authority (BAT)

The Brockton Area Transit Authority has the statutory responsibility to provide mass transportation in the area constituting the authority, and to provide mass transportation service under contract in areas outside the authority.

BAT, in addition to its statutory responsibility of providing mass transportation, assists in obtaining and ensuring input and participation in multimodal transportation planning from local elected officials and the public. BAT actively and consistently participates in the 3C transportation planning and programming process and represents the region's concern for public transportation deficiencies and solutions to transportation demands and needs.

FUNCTIONS OF THE OLD COLONY MPO

The Old Colony MPO reviews, and, annually endorses the Unified Planning Work Program, the Transportation Improvement Program, and, the Public Participation Plan. Additionally, the Old Colony MPO reviews, and endorses, at least every four years, a Long Range Transportation Plan, with a 20-year horizon; as well as such transportation plans and other products that federal and state laws and regulations may from time to time require.

The Old Colony MPO is the forum for cooperative decision-making involving allocation of federal transportation funding by chief elected officials of general-purpose local governments, regional authorities and agencies, and state agencies in the Old Colony Region.

In the resolution of basic regional transportation policy, the Old Colony MPO seeks and considers the advice of all interested parties and the JTC. The Old Colony Planning Council Transportation Staff provides the JTC with information and analysis in the form of reports, briefings, and discussions concerning their plans, programs, and priorities so that they can carry out their functions in a timely fashion.

The Old Colony MPO appoints the committees it determines necessary to accomplish its business. Committees may consist of Old Colony MPO members, their designees, the JTC, and transportation providers as appropriate. The Old Colony MPO assigns duties to the committees, as warranted.

OPERATION OF THE OLD COLONY MPO

The Old Colony MPO meets in the Region at least twice per year and usually more often as may be requested by any one of the Signatories.

In the absence of the Chairman, the Vice-Chairman chairs the meeting. A Vice-Chairman of the Old Colony MPO is elected for a term of two years and is elected from among the non-state permanent members of the Old Colony MPO (City of Brockton, Town of Plymouth, Brockton Area Transit Authority, Old Colony Planning Council, and the two locally elected communities). The Old Colony MPO elects other officers as deemed necessary.

Votes of the Old Colony MPO, including those on all regional certification documents (i.e. the Transportation Improvement Program (TIP), the Long Range Transportation Plan (LRTP), the Unified Planning Work Program (UPWP), Air Quality Conformity Determinations, compliance with the Americans with Disabilities Act (ADA), shall be by simple majority vote, provided that a quorum is present, and that the affected implementation agency (MassDOT – Highway Division for highway and bridge projects, BAT for regional transit projects, and MassDOT for commuter rail projects) is included in the affirmative vote.

THE JOINT TRANSPORTATION COMMITTEE (JTC)

In order to accomplish the objectives of the 3C process, the Old Colony MPO established a committee known as the Joint Transportation Committee (JTC) to serve as the Transportation Policy Advisory Group for the Old Colony Region, in accordance with earlier agreements. The Old Colony MPO periodically reviews the membership on the Joint Transportation Committee, in a manner that provides for a widely representative viewpoint, and ensures a balanced consideration of transportation issues. Consistent with the provisions of the Memorandum of Understanding, the Joint Transportation Committee adopts by-laws and other procedures as may be necessary to govern its operation. The functions of the JTC are:

- To advise the Old Colony MPO and OCPC on matters of policy affecting the conduct of the 3C transportation planning and programming process for the Region.
- To advise the Old Colony MPO and OCPC on such regional transportation documents as may from time to time be required by state or federal laws and regulations (RTP, TIP, UPWP, and PPP their related adjustments and amendments).
- To provide maximum public participation in the transportation planning and programming process by providing a forum to bring the Old Colony MPO together with other public agencies, elected and appointed officials of cities and towns, and citizens concerned with the transportation planning and programming process; thereby facilitating, wherever possible, the consistency of transportation plans and programs for the Old Colony Region with the policies, priorities, and plans of affected state and regional agencies, local communities, private groups, and individuals within the Old Colony Region.

The JTC includes a representative from each OCPC community, who are appointed by the Board of Selectmen/Mayor in the community. Membership is open to any interested resident, a representative from a transportation provider, or interested group. The JTC meets on the second Thursday of each month at the OCPC office.

The Old Colony MPO provides complete information, timely public notice, and full public access to decisions and documents. It supports early and continuing public involvement in the development and review of its plans and programs. It especially tries to seek out and consider the interests of people whose needs may not be well served by the existing transportation system, such as low income and minority households and persons with limited personal mobility. To assist with this, OCPC maintains a Transportation Advisory Network (TAN). The TAN is a mailing list of individuals and organizations that have an interest in local transportation issues. The TAN provides a broad community resource for the formation and review of transportation plans, policies, and strategies. This network provides key contact persons for outreach efforts, dissemination of information, and informal review and comment to ensure sensitivity to varied community needs, concerns, and interests.

THE 3C PROCESS

The Old Colony MPO is responsible for conducting a cooperative, continuous, and comprehensive transportation planning process for all of the Old Colony Region.

The 3C process is cooperative, requiring effective coordination among public officials at all levels of government, and inviting the wide participation of all parties, public or private, at all stages of the transportation planning process. A key objective of the process is to resolve transportation issues by providing a forum for the resolution of issues. At the same time, the process is not intended to operate, and cannot operate, to dilute the ultimate authority or responsibility of those state, regional, or local public officials or agencies who, pursuant to statute or under contract, develop, review, and/or implement transportation plans, programs, and projects.

The 3C process is continuous, affirming the necessity to plan for the short and long range, emphasizing the iterative character of the progression from systems planning to project planning and programming, to implementation, and the necessity for re-evaluating data and plans.

The 3C process is comprehensive, including the effective integration of the various stages and levels of transportation planning and programming for the entire Old Colony Region, and examines all modes to assure a balanced planning and programming effort. There is a simultaneous analysis of various related non-transportation elements, such as land use,

economic sustainability, environmental resources, and population to assure consistency within a total comprehensive planning and programming process.

THE TRANSPORTATION PLANNING PROCESS

The transportation planning process has four basic elements; a Unified Planning Work Program (UPWP), a Long Range Transportation Plan (LRTP), Transportation Improvement Program (TIP), and Public Participation Plan (PPP). These elements are reviewed by the JTC, OCPC, and are endorsed by the Old Colony MPO.

Public Participation Plan (PPP)

The Public Participation Plan (PPP) identifies strategies employed by the MPO to provide complete information, timely public notice, and full access to key decisions to the public prior to the adoption or amendment of the plans and programs for which the MPO is responsible. This document supports the early and continuing involvement of the public in the MPO process, as required by federal law.

Unified Planning Work Program (UPWP)

The Unified Planning Work Program (UPWP) describes and provides budgetary information for the transportation planning tasks and activities, which are to be conducted in the region during the program year. The UPWP is a federally required certification document, which must be endorsed annually by the Old Colony MPO prior to the start of the planning program. As the planning staff to the Old Colony MPO, Old Colony Planning Council prepares the UPWP. The planning activities are organized first by work element in a format that will allow efficient administration, management, and reporting.

The UPWP describes all the work to be accomplished by the Old Colony MPO. Each transportation planning activity is described as a procedure under specific work tasks. For each procedure, the anticipated accomplishment or product and the estimated work force resources needed are also given. For each work task, the total staffing requirements, task budget, and sources of funding are given. For convenience in management, similar work tasks are grouped into broad areas or elements as follows:

- Management and Support of the Planning Process and Certification Activities
- Data Collection and Analysis Activities
- Short Range and Long Range Transportation Planning Activities
- Other Transportation Technical Activities

The UPWP continues to expand on several major tasks that are specifically targeted to implement provisions of several pieces of federal legislation, such as the Safe, Accountable, Flexible, and Efficient Transportation Equity Act: A Legacy for Users (SAFETEA-LU), the Clean Air Act Amendments of 1990, and the Americans with Disabilities Act.

Long Range Transportation Plan (LRTP)

The LRTP provides a document and a process that will meet the challenges of preserving and expanding the transportation system. Following the directives of the law, it includes goals, policies, analyses, and recommendations necessary to build and maintain an efficient, effective and affordable regional transportation system. The intention of the LRTP is to build on the current system, working to make it comprehensive and fully integrated.

The LRTP addresses a twenty-year planning horizon and includes both short and long-range strategies/actions that lead to the development of an integrated intermodal transportation system that facilitates the efficient movement of people and goods. Additionally, the Plan examines current and forecasted transportation and land use conditions and trends, and provides an overall framework for the future transportation system. Furthermore, the LRTP draws upon the Statewide Transportation Plan and the MassDOT Project Development and Design Guide Book. The mission of the LRTP is to provide a safe and efficient transportation system that promotes multi-modalism (roads, transit, sidewalks, bicycles, etc.), supports projected growth, and addresses livability and social concepts, economic sustainability, and environmental impacts through effective planning/policy and local/regional coordination.

The short and long-range strategies/actions constitute the LRTP. The long-range element addresses the long-range transportation needs of the region and identifies needed major changes in the transportation system and transportation policy. It establishes inter-regional and intra-regional transportation goals and objectives.

The short-range element addresses the transportation strategies/projects that will be implemented within five years. The purpose of the short-range element is to coordinate the different parts of a transportation system, such as pedestrian and bicycle facilities, transit, rail, freight, and highway, to achieve maximum efficiency and productivity of the transportation system as a whole. Simply stated, the goal of the short-range element is to ensure, through the promotion of management systems and low capital projects, that the region's existing transportation system is utilized and maintained fully before new facilities are added. The short-range element (five years) essentially comprises the TIP.

The transportation management systems provide a process that furnishes information on transportation system performance to decision makers for selecting and implementing cost-effective strategies/actions to manage new and existing facilities so that congestion is alleviated and the mobility of persons and goods is enhanced.

Transportation Improvement Program (TIP)

The Transportation Improvement Program (TIP) is a listing of transportation projects proposed for implementation during the next four federal fiscal years. Projects listed in the TIP include those in the short-range element of the LRTP. In the TIP, projects are classified under federal and non-federal funding categories and assigned a local priority. The TIP briefly describes the project as well as its projected costs and funding sources.

As part of the TIP development, current and proposed projects are evaluated using Transportation Evaluation Criteria and recommended to the Old Colony MPO for consideration and approval. The collective staffs evaluate candidate projects for the Old Colony MPO using the Transportation Evaluation Criteria of Condition, Mobility, Safety and Security, Community Effects and Support, Land Use and Economic Development, and Environmental Effects.

After the evaluations, the results are provided to the Old Colony MPO for review and approval. Once the Old Colony MPO has reviewed and approved the evaluations, the OCPC staff then uses the evaluation results, as well as readiness information, available funding, and other pertinent information to develop a Draft TIP. As part of the development process, the Draft TIP is reviewed by the JTC, the OCPC, and the MPO, and released for a 21-Day Public Review Period. After the 21-Day Public Review Period, the Final Draft TIP is sent to the Old Colony MPO for consideration and approval.

PUBLIC PARTICIPATION AND OUTREACH CONSULTATION PROCESS

During the 2019 Long Range Transportation Plan update, public participation was designed to ensure opportunities for the public to express its views on transportation issues and to become active participants in the regional planning and transportation decision-making process.

The outreach process consisted of activities designed to build better relationships with citizens that are engaged with their communities and businesses, along with individuals of “traditionally underserved” communities and different cultures with Limited English Proficiency, local officials, non-profit organizations, and transportation agencies.

One of the main purposes of the public participation process is to educate and inform stakeholders on new initiatives such as livability, sustainability, and climate change. The process was designed to fulfill federal-aid requirements and to document people’s transportation and land use needs in their communities.

Interagency Consultation and Stakeholders Engagement

Information of the multiple LRTP events was distributed to the public through reports and editorial board briefings, press releases, and media packages. Mailings were sent on a regular basis to a list of self-identified interest groups. Fact sheets and information of new transportation initiatives were posted on the OCPC website and were distributed during the events. Printed ads were published and electronic notices were distributed to all the communities and related agencies. The list below illustrates the stakeholders that participated in the consultation process.

- Federal Highway Administration and Federal Transit Administration
- Massachusetts Department of Transportation



Figure 1-1: OCPC staff met with State and local agencies to discuss new transportation initiatives.

- Private and Public Local Transportation Agencies (BAT, GATRA, SSCAC and MBTA)
- Public Elected Officials
- Chambers of Commerce (Metro South, Plymouth and South Shore)
- Housing Authorities
- Cape Verdean Association
- Haitian Community Partners
- Area Agencies on Aging and Councils of Aging
- State Department of Environmental Protection/Federal Environmental Protection Agency
- Department of Public Health

Public Participation Activities

In order to improve public consideration of issues and to maximize citizen involvement, the Old Colony Planning Council planned a variety of activities to keep the public engaged and informed regarding on-going transportation and comprehensive planning efforts in the region. OCPC organized a comprehensive survey, seven visioning workshops, eight open houses, and seven table events.

Survey

The survey was designed to educate the public on new initiatives and to obtain people's comments on mobility, safety and security, land use policies, and environmental protection issues. The survey was available electronically through Survey Monkey on the OCPC website, social media, electronic newsletters. In addition, hard copies of the survey were also available in the Council's office and distributed throughout the region during the outreach campaign. In order to reach out to all ethnic groups in the region, the survey was also available in multiple languages: English, Spanish, French Haitian (Creole) and Portuguese. Results of the survey assisted with the development of performance measures, and the establishment of short and long term planning and capital needs identification. In addition, the survey results validated existing congested corridors identified in the Congestion Management Process and the need for improved bicycle, pedestrian, and ADA accommodations.

Public Visioning Workshops

Regional visioning workshops were conducted during the 2019 Long Range Transportation Plan Update. The workshops were designed to inform the public and local stakeholders on new transportation and land use initiatives. The following four topics were discussed at the workshops:

- Protecting and Enhancing Regional Mobility
- Building Sustainable Livable Communities
- Enhancing Safety and Security
- Environmental Protection and Climate Change



Figure 1-2: Avon Visioning Workshop.

Table 1-1: 2020 – 2040 Old Colony LRTP Public Visioning Workshops

DATE	LOCATION	COMMUNITY
Tuesday, October 30, 2018	Hanson Library Public Visioning Workshop	Hanson, MA
February 7, 2019	Avon Library Public Visioning Workshop	Avon, MA

Plymouth Visioning Workshop

The following list of comments is a summary of the participants’ vision of the Old Colony region for the next twenty years:

Mobility

- Multi Modal Choices – People live and work in vibrant communities where they can choose whether to walk, bike, commute by transit, or ride share.
- Currently, road designs are auto-centric; having a complete streets approach can benefit all road users. When new roads are being planned, planners and engineers would include pedestrians, cyclists, and transit users.
- Pedestrian accommodations (e.g. plowed sidewalks, clear bus shelters) should be considered throughout the winter season.
- Rail trails for biking, walking running and safe paths for commuting. Connecting local towns through rail trails.
- When people have safe and reliable transportation choices, the benefits are widespread ensuring equity. Placing countdown clocks with multiple language capabilities on shelters and acquiring eco-friendly transit vehicles creates a safer.
- Reduce speeding through road design; taking action to address dangerous intersections quickly
- A bicycle network is nonexistent in Old Colony Region. Having bicycle lanes and bicycle boxes help increase delineation and awareness whether a bicyclist is in a bike lane or sharing the road.

- A great bicycle network also has great bicycle accommodations such as bicycle cages and bike racks, bicycle loops at intersections, repair stations, and a mixture of infrastructure that caters to different riders at different comfort levels.



Figure 1-3: Brockton's Bike to Work Day event for May 2019 Bike Month

Livability

- Encouraging Smart Growth in communities would ensure that density and mixed use planning are utilized, Transit Oriented Development included.
- There should be an increase of funding for improving the bicycle and pedestrian network. Enabling people to utilize a continuous sidewalk and bicycle network throughout the region. A well-invested network should include: street trees, adequate timing for pedestrian count down signals, traffic calming devices, complete street ordinance, and enforcement.
- Clear communication should be set between community members and service providers, yet between municipalities and other agencies as well. Whenever a utility company is engaged in road construction, municipalities should coordinate with the companies in order to plan ahead and begin roadwork. Service providers must have a clear line to the community in any emergency situation, whether through social media, automated telephone messages, or signs and notices.

Safety and Security

- Visibility is an issue in the Old Colony Region. Lighting and retroreflective signing may decrease the chances of fatal accidents and allow motorists to see pedestrians and bicyclists at night.
- Safety beacons should be incorporated into walking patterns or walkways throughout the region.
- There needs to be a strong distinction between vehicle and pedestrian space.
- Construction work needs to be more efficiently handled so as not to interfere with traffic flow.

- Education is much needed in regards to bicycle and pedestrian safety MassDOT has created the *LOOK: Sharing the Road Guide for Bicyclists, Pedestrians, and Motorists*.

Environment

- Incentivizing Complete Streets will help curb Green House Gas Emissions.
- Having an increase in charging stations in the region will allow energy efficient cars to travel farther throughout the region.
- Prioritize and increase farmland preservation.
- Transportation projects should have a scoring system that takes density into account.

Open House Events

The open house events were designed for people to come in and interact with the OCPC staff and at the same time to learn about new initiatives in the region. With this method, the public feels more comfortable sharing information and opinions that will support the development of the Long Range Transportation Plan. The open house events were offered during different times and locations to capture different audiences.

The following list of comments summarizes some of the input received during the open houses:

- Extend bus services to communities that lack public transportation.
- More “Ride Share” opportunities are needed in the region.
- Dedicated areas for Wi-Fi in or near stations - improved security or cameras at stations
- Connect BAT and GATRA bus systems to create more job opportunities
- Improve lighting, roadway markings and signage for pedestrian safety and elderly drivers

Table Events

The table events were designed to display preliminary LRTP findings and products during different activities. These activities included attending events hosted by local community organizations, visiting the Old Colony YMCA in East Bridgewater and Stoughton, and tabling local malls and libraries. Similar to the open house events, table events were designed with the purpose of engaging the public in an informal manner to learn more about new projects and initiatives in the region. The following list shows the table events organized during the plan update:

Table 1-2: 2020 – 2040 Old Colony LRTP Table Events

Date	Event	Organization
October 13, 2018	Homecoming & Family Day	Bridgewater State University Bridgewater, MA
November 14, 2018	BUSINESS-TO-BUSINESS EXPO Tabling Event	Teen Challenge Brockton, MA
November 20, 2018	Plymouth Main Library	Plymouth, MA
February 27, 2019	Old Colony YMCA - East Bridgewater Tabling Event	East Bridgewater, MA
March 7, 2019	Metro South Chamber of Commerce Multi-Cultural Business Expo	Perfect Place Brockton, MA
March 28, 2019	Plymouth Area Chamber of Commerce Business Expo	Hotel 1620 Plymouth MA



Figure1-4: MassHiring at Bridgewater State University Tabling Event



Figure 1-5 Westgate Mall Tabling Event

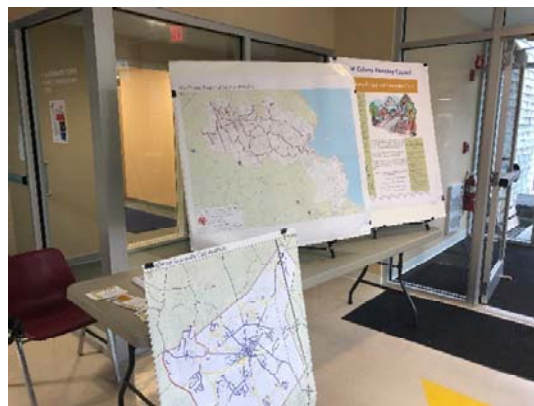


Figure 1-5: Old Colony YMCA Tabling Event

ENVIRONMENTAL JUSTICE

Environmental Justice is an important part of the planning process and is considered in all phases of planning. A truly integrated and effective planning process actively considers and promotes environmental justice within projects and groups of projects, across the total plan, and in policy decisions. All reasonably foreseeable adverse social, economic, and environmental effects on minority populations and low-income populations must be identified and addressed. There are three fundamental Environmental Justice principles:

- To avoid, minimize, or mitigate disproportionately high and adverse human health or environmental effects, including social and economic effects, on minority populations and low-income populations.
- To ensure the full and fair participation by all potentially affected communities in the transportation decision-making process.

- To prevent the denial of, reduction in, or significant delay in the receipt of project benefits by minority populations and low-income populations.

Public involvement is an integral part of transportation planning and project development decision-making. The DOT Order (5610.2) on Environmental Justice directs the provision for minority populations and low-income populations greater access to information on and opportunities for public participation in matters that may affect human health and the environment.

Effective public involvement in the planning and project development process can alert State and local agencies to environmental justice concerns during project-development. Continuous interaction between community members and transportation professionals is critical to successfully identifying and resolving potential Environmental Justice concerns.

The staff developed public-involvement procedures that provide for consideration of Environmental Justice. These procedures provide an inclusive, representative, and equal opportunity for two-way communication resulting in appropriate action. Environmental Justice is considered in all aspects of planning and project decision-making, including the design of both the public-involvement plan and proposed facilities.

Inclusive Public Participation

These are specific examples on how the Old Colony Planning Council reaches out to minority communities on an ongoing basis:

- **Community Connections:** Monthly newsletter (newsletter goes to 700 businesses and includes laundry mats, grocery stores, supermarkets, etc.), free quarterly magazine (magazines go to 5,000 locations and includes hospitals, medical centers, schools and universities, employment centers, drug stores, etc.), mass email to minority leaders and interested parties (approx. 1,000 email addresses)
- **Yearly meetings with:** Adult Education Center, BAT Intermodal Centre, Councils on Aging, Haitian Community Partners, South Shore Haitians United For Progress, Cape Verdean Association, and Greater Brockton Health Alliance. This list continues to grow along with our ongoing outreach.

Meeting with Minority Group

- **South Shore Haitians United For Progress/ Cape Verdean Association.** Input received at these meetings are summarized as follow:
 - There is no bus connection on Montello St. Children have to cross two unsafe intersections to get to the Cape Verdean Association Office.
 - There are language and physical barriers for the elderly population, especially in rural areas of the Old Colony Region
 - There is a need for exclusive bicycle/multi-use pedestrian paths

- There is a need for more affordable housing in Brockton near Transit Oriented locations
- There is no east-west transit connection. If people want to go to Plymouth, they have to go to Boston and then transfer to a train to Kingston or Plymouth (not too frequent)

Stakeholder Participation in Forms other than Writing

- Focus meeting/interviews with minority group such as Cape Verdean Association, South Shore Haitians United For Progress, Haitian Community Partners, Chamber of Commerce, and Area Agency on Aging
- Table events, open house meetings, and visioning workshops

Benefits and Burdens

Environmental Justice Analysis asks whether a proposed action or plan causes disproportionate adverse effects on minority and low-income populations and whether these populations are denied benefits. A framework of analysis that can determine how a proposed action or plan could differentially affect diverse populations is important. This uses an analysis of benefits and burdens. In addition, computer mapping of Environmental Justice Areas with past, present, and future TIP projects, is used to identify the distribution of funding (to ensure geographic equity) and to determine priorities areas of need/ and or concern. The mapping includes available transit (with ¼ mile and ½ mile buffer), commuter parking facilities, pavement conditions, high crash locations, and areas of congestion.

Examples of the Benefits considered during the development of the TIP and the LRTP are:

- Mobility
- Livability and Sustainability
- Accessibility
- Condition of Infrastructure
- Environmental Protection
- Reliability
- Safety
- Security
- Climate Change Adaptation
- Efficiency

Examples of the burdens potentially considered during the development of the TIP and the LRTP are:

- Air, noise, and water pollution and soil contamination.
- Destruction or disruption of community cohesion or a community's economic vitality.
- Destruction or disruption of the availability of public and private facilities and services.
- Adverse employment effects.
- Displacement of persons, businesses, farms, or nonprofit organizations.

- Increased traffic congestion, isolation, exclusion, or separation of minority or low-income individuals within a given community or from the broader community.
- The denial of, reduction in or significant delay in the receipt of, benefits of programs, policies, or activities.

An assessment of the benefits and burdens of the Transportation Improvement Program was completed to identify all regionally significant projects constructed and/or programmed in the Old Colony Transportation Improvement Program during the period of 2003 - 2024.

Constructed projects funded through the TIP were included to provide a benchmark of investments. The constructed projects were compiled and then the staff analyzed the location of these improvements relative to Environmental Justice Communities. Environmental Justice Communities in the Old Colony MPO Region are Brockton, Easton, Plymouth, Stoughton, and Whitman.

For the purposes of identifying these communities, the staff utilized the MassGIS Environmental Justice GIS Shape file. Polygons in the Environmental Justice Populations layer represent neighborhoods across the state with high minority, non-English speaking, low-income, and foreign-born populations. Specifically, a community is identified as an Environmental Justice Community if any the following are true within that community:

- Contains a Block group whose annual median household income is equal to or less than 65 percent of the statewide median (\$62,072 in 2010); or
- 25% or more of the residents identify as a race other than white; or
- 25% or more of households have no one over the age of 14 who speaks English only or very well - English Isolation.

Regionally, it was determined that 69.2 percent of the identified improvement projects, representing approximately 78.2 percent of the identified investment dollars on the FFY 2020-2024 TIP are located in EJ communities. These percentages exceed 59.3 percent of the region's population identified as living in EJ communities. Non-mappable projects, such as transit vehicle replacements or rehabilitation, bridge and roadway repair line items for future projects to be defined, and other non-location-specific projects are not included in this analysis. Moreover, many of the projects that are not located directly within an EJ community are projects of key regional significance, such as interstate highway improvements. These improvements benefit the region as a whole and provide access to many key employment centers, including downtown Brockton and regional commercial and employment destinations.

Table 1-3

Investment Value of TIP Projects 2020-2024 (Projects Planned)

Type	Population Represented in EJ Communities (2010)	Percent Population Represented	TIP Project Investment	Percentage of Projects in EJ/ Non EJ Communities by Total Investment (\$)
Within EJ Communities	214,841	59.3%	\$62,253,702	78.2%
Outside EJ Communities	147,565	40.7%	\$17,372,554	21.8%
Totals	362,406	100.0%	\$79,626,256	100%

The Old Colony MPO undertook further analysis to determine the level of investments during the period of 2003-2019 through previous Transportation Improvement Programs. From that analysis, it was concluded that 58.5 percent of the identified improvement projects, representing approximately 58.2 percent of the identified investment dollars allocated during the TIP years of 2003-2019 are located in EJ communities. These percentages approximate 59.3 percent of the region’s population identified as living in EJ communities.

Table 1-4

Investment Value of TIP Projects 2003 - 2019 (Projects Implemented)

Type	Population Represented in EJ Communities (2010)	Percent Population Represented	TIP Project Investment	Percentage of Projects in EJ/ Non EJ Communities by Total Investment (\$)
Within EJ Communities	214,841	59.3%	\$116,149,148	58.2%
Outside EJ Communities	147,565	40.7%	\$83,351,161	41.8%
Totals	362,406	100.0%	\$199,500,309	100%

From the examination of benefits and burdens, it is the determination that no projects implemented because of the TIP will result in adverse impacts to the Environmental Justice Areas in the Old Colony region.

As such, from the review, it may be concluded from the public investment and involvement in the regional transportation planning process and the resultant FFY 2020-2024 Transportation Improvement Program and previous TIPs (dating back to 2003) demonstrate that the benefits of the regional transportation planning process are afforded equitably to both EJ and Non-EJ communities. Given this equitable distribution and investment, it is finding of the Old Colony MPO that the Low-income and minority populations are not disproportionately impacted and are beneficiaries of the transportation planning process and project implementation in the Old Colony Region.

As such, the Old Colony MPO continues to work with our regional partners in the advancement of environmental justice principles throughout the regional planning process.

Geographic Distribution and Equity Analysis of Projects

The Old Colony MPO monitors the geographic distribution of TIP projects over time. Table 8 provides the distribution of TIP projects from 2012 through 2024. To assist with providing context to the distribution, included in the table is 2010 Population and 2010-2014 Median Household Income.

From an examination of the distribution of TIP projects from 2012 through 2024, the following observations may be made:

- There are higher concentrations of projects within the more populated urban areas (i.e. Brockton at 33.3 percent of all projects). Such concentrations tend to follow areas with elevated levels of congestion, bicycle and pedestrian activity, and crash clusters.
- The towns of Easton (12.1%) and Pembroke (15.2%) also had higher concentration of projects. A potential explanation for such a trend is that these populous communities feature proximity to limited access highways, commuter rail, and academic institutions of higher learning. Such features, while beneficial in many respects, also lead to higher pedestrian, bicyclist and vehicle trips, and the need for additional multimodal and infrastructure.

Table 1-5
Geographic Distribution and Equity Analysis of Projects

Community	2010 Population	All Minority (Including White Hispanic) Population	Percent Title VI Minority	Median Household Income, 2010-2014	Number of TIP Projects, 2012 through 2024	Percentage of Total Projects	TIP Project Expenditures, 2012 through 2024 (\$)	Per Capita Expenditure (\$)
Abington	15,985	1,368	9%	\$81,500	1	3.0%	\$1,218,906	\$76.25
Avon	4,356	741	17%	\$78,750	2	6.1%	\$5,827,074	\$1,337.71
Bridgewater	26,563	2,941	11%	\$88,481	1	3.0%	\$1,486,453	\$55.96
Brockton	93,810	53,542	57%	\$48,569	11	33.3%	\$36,601,149	\$390.16
Duxbury	15,059	560	4%	\$120,253	0	0.0%	\$0	\$0.00
East Bridgewater	13,794	790	6%	\$88,534	1	3.0%	\$7,763,091	\$562.79
Easton	23,112	2,327	10%	\$95,372	4	12.1%	\$12,985,138	\$561.84
Halifax	7,518	282	4%	\$69,917	0	0.0%	\$0	\$0.00
Hanover	13,879	579	4%	\$98,750	0	0.0%	\$0	\$0.00
Hanson	10,209	424	4%	\$93,771	0	0.0%	\$0	\$0.00
Kingston	12,629	598	5%	\$86,339	0	0.0%	\$0	\$0.00
Pembroke	17,837	699	4%	\$89,954	5	15.2%	\$23,355,182	\$1,309.37
Plymouth	56,468	4,230	7%	\$76,925	3	9.1%	\$20,388,279	\$361.06
Plympton	2,820	112	4%	\$94,505	0	0.0%	\$0	\$0.00
Stoughton	26,962	5,822	22%	\$74,688	3	9.1%	\$15,485,936	\$574.36
West Bridgewater	6,916	440	6%	\$81,573	1	3.0%	\$7,615,278	\$1,101.11
Whitman	14,489	886	6%	\$76,494	1	3.0%	\$5,990,816	\$413.47
Totals	362,406	76,341	21%	\$1,444,375***	33	100.0%	\$138,717,304	\$383

*Projects spanning multiple communities

Abington and Brockton - North Quincy Street at Chestnut Street and Boundary Avenue Roundabout

**Does not include Bridge Projects or Limited Access Highway Projects

***Average sum of Median Household Income

This continuing review process for TIP Projects programmed from 2012 through 2024 indicates that no single project has had an adverse effect on any particular population, based on all reviewed data.

Chapter 2: Regional Goals, Objectives, and Performance Management

The mission, goals, objectives, and performance measures were developed through a comprehensive, continuing, and cooperative effort between the Old Colony Planning Council, the Old Colony Metropolitan Planning Organization (MPO), the Joint Transportation Committee (JTC), the Massachusetts Department of Transportation (MassDOT), and the stakeholders in the transportation system. The mission and the related goals, objectives, and performance measures reflect directly and expand upon the planning factors prescribed in federal MAP-21 legislation. In addition, these regional goals and policies are consistent with the vision of the Commonwealth of Massachusetts and of the communities of the Old Colony Region.

MISSION

The Long Range Transportation Plan (LRTP) addresses a twenty-year planning horizon and includes both short and long-range strategies and actions to the development of an integrated intermodal transportation system for the efficient movement of people and goods. Additionally, the Long Range Transportation Plan examines both current and forecasted transportation and land use conditions, and provides framework for the future transportation system. The mission statement for the Old Colony 2020 Long Range Transportation Plan is defined as a creation of:

“A regional system that provides safe, accessible, and efficient movement of people and goods; fosters healthy community identity and “a sense of place” in all parts of the region; protects the region’s environment; and joins all transportation modes and facilities into an equitable, seamless, and fully interconnected network”

Essential elements to achieve the mission include ensuring equity by distributing burdens and benefits fairly, providing equitable access to transportation choices, ensuring fiscal stewardship by prioritizing investments that achieve multiple goals, promoting public and private collaboration with meaningful community participation and having transportation agencies that take responsibility for their actions.

Given this framework, the mission of the Old Colony Long Range Transportation Plan is to provide a safe and efficient transportation system that promotes multi-modalism (roads, transit, sidewalks, bicycles, etc.), supports projected growth, addresses social and

How we get there

Ensure Equity - Distribute burdens and benefits fairly and provide equitable access to transportation choices

Ensure Fiscal Stewardship - Prioritize investments that achieve multiple goals, giving taxpayers and passengers more for their money

Deliver Accountability - Promote public and private collaboration with meaningful community participation,

economic sustainability, community livability, mitigated environmental impacts and clearly understanding land use implications through effective planning/policy and local/regional coordination.

FAST ACT, NATIONAL PLANNING FACTORS, AND PERFORMANCE BASED PLANNING

The Fixing America's Surface Transportation (FAST) Act legislation requires MPOs to implement a continuing, cooperative, and comprehensive performance-based multimodal transportation planning process. To meet this requirement, the Old Colony MPO develops the Long Range Transportation Plan and Transportation Improvement Program that facilitate the safe and efficient movement of safe and efficient management, operation, and development of surface transportation systems that will serve the mobility needs of people and freight (including accessible pedestrian walkways, bicycle transportation facilities, and intermodal facilities that support intercity transportation, including intercity bus facilities and commuter van pool providers) and that fosters economic growth and development within and between States and urbanized areas, and take into consideration resiliency needs while minimizing transportation-related fuel consumption and air pollution in all areas of the region.

The FAST Act continues to emphasize performance-based planning as an integral part of the metropolitan planning process: states are to develop performance goals, guided by the national goals, and then MPOs will work with state departments of transportation to develop MPO performance measures and targets, or adopt the statewide performance measures and targets. The TIP integrates MassDOT's and the MPOs' performance measures and link transportation-investment decisions to progress toward achieving performance targets. The MPOs, MassDOT, and providers of public transportation jointly agree and have developed specific written provisions for cooperatively developing and sharing information related to transportation performance data, the selection of performance targets, the reporting of performance targets, the reporting of performance to be used in tracking progress towards attainment of critical outcomes for the MPO regions and the collection of data for the MassDOT Asset Management Plan.





The Old Colony MPO develops the TIP with due consideration of additional planning activities within the metropolitan area, and utilizes a process that provides for the design and delivery of transportation services within the metropolitan planning area. The following is an overview of how the Long Range Transportation Plan and the Transportation Improvement Program reflect the national planning factors and performance-based planning:

Safety Goals:

Achieve a significant reduction in traffic fatalities and serious injuries on all public roads; increase the safety of the transportation system for motorized and non-motorized users; ensure that the transportation system and its users are safe and secure; and review safety data, goals, objectives, and strategies to promote safety.

The Strategic Highway Safety Plan is incorporated into the Long Range Transportation Plan. The Old Colony MPO applies specific criteria in the review of transportation strategies. These criteria are applied to estimated changes in safety. The primary goal of the LRTP is focused on safety and security: “Enhance Safety and Security.” Safety is of such importance that it is recognized in its own chapter of the LRTP. Also included in the LRTP are the following goals: Increase the security of the transportation system for motorized and non-motorized users; examine both transit and highways networks and develop appropriate goals and strategies; review current plans for emergency planning and security elements; identify critical facilities and transportation systems; and define the roles of the various players in promoting security. One area of additional security planning that applies is that of traffic impacts due to extreme weather events such as impending hurricanes, and climate changes.

Objectives:

- Reduce the number and rates of fatalities and serious injuries.
 -  Target and Performance Measure: Fully program minimum HSIP targets each TIP year and seek to program Statewide HSIP funds when available/ feasible for priority safety related projects.
- Provide and maintain safe fixed route service (e.g. Preventable Accidents per 100K miles).
 -  Target and Performance Measure: Maintain fixed route service preventable accidents/ 100k miles below 2.00 (FY 2018 is 1.26 (from BAT Performance Dashboard)).
- Provide and maintain safe demand response service (Preventable accidents/ 100k miles).
 -  Target and Performance Measure: Maintain demand response service preventable accidents/ 100k miles below 2.00 (FY 2018 is 0.39) (from BAT Performance Dashboard).
- Protect the viability of transportation infrastructure to accommodate emergency response and evacuations.
- Protect transportation system users from safety and security threats.
- Increase number of Safe Routes to School Partner Schools.
 -  Target and Performance Measure: Increase percentage of SRTS Partner Schools to 85% in 10 years. Currently, 71% of eligible partner schools are partner schools.

Infrastructure Condition (Pavement, Bridge, and Transit) Goals:

Maintain a highway and transit infrastructure asset systems in a state of good repair; and emphasize the preservation of the existing transportation system. As part of the LRTP development, the MPO utilizes a pavement management system to develop costs and recommended repair for operation, preservation, and maintenance of the federal aid network.

MassDOT develops the Transportation Asset Management Plan (TAMP) to address pavement and bridge conditions on the National Highway System (NHS). The TAMP includes information on the NHS Inventory and Performance, Life Cycle Planning and Investment Strategy, Risk Management, and a Financial Plan.

Recipients of public transit funds, which can include states, local authorities, and public transportation operators, are required to establish performance targets for safety and state of good repair, develop transit asset management and transit safety plans, and to report on their progress toward achieving targets. Public transportation operators are directed to share information with MPOs and states so that all plans and performance reports are coordinated. The identified state of good repair performance measures for transit asset management with regard to BAT include the following areas: equipment (Percentage of vehicles that have met or exceeded their Useful Life Benchmark (ULB)); rolling stock (Percentage of revenue vehicles within a particular asset class that have met or exceeded their ULB); and facilities (Percentage of facilities within an asset class rated below 3.0 on the FTA Transit Economic Requirements Model scale).


Objectives:

- Provide and maintain fixed route and demand response state of good repair.
- Improve bridge conditions.
- Improve pavement conditions and state of good repair.

Congestion Reduction Goals:

Achieve a significant reduction in congestion on the NHS; and enhance the integration and mobility of the transportation system, across and between modes, for people and freight. The MPO applies specific criteria in the review of transportation strategies. These criteria are applied to improvements in multimodal accessibility. The LRTP supports these efforts through its goal: “Enhance and Protect Regional Mobility, and Foster Sustainable, Healthy, and Livable Communities.”

Objectives

- Promote Mode Shift by increasing use of transit, carpool/ vanpool, and non-motorized transportation modes such as bicycling and walking.
- Reduce traffic congestion, and improve level of service and access management.
 -  **Target and Performance Measure:** Monitor congestion levels on federal-aid eligible highway network annually, and highlight corridors with volume to capacity (v/c) ratios of 0.8 or greater for targeted study and/or improvements.
- Maintain and improve transit system efficiency and capacity.
- Increase automobile and bicycle parking capacity and usage at transit stations and commuter lots.
- Eliminate bottlenecks on limited access highways and on the freight network.

- Improve and expand human service coordination, mobility, and accessibility for all modes.
- Reduce number and size of gaps in the ADA accessible sidewalk network.
- Increase use of traffic signal priority (hold current green light) for transit vehicles and traffic signal pre-emption for emergency vehicles (override programmed phasing to provide approaching emergency vehicles a green light).
- Monitor utilization and congestion levels at commuter rail and park & ride parking facilities.
 - 📊 **Target and Performance Measure:** Record utilization data twice annually and report data to MassDOT.
- Improve accessibility for all modes to all users.
 - 📊 **Target and Performance Measure:** 50% of available Transportation Improvement Program funding allocated to projects that significantly improve bicycle and pedestrian mobility.

System Reliability Goals:

Improve the efficiency of the surface transportation system; and promote efficient system operation and management. The Old Colony MPO supports Operation and Management Strategies (O and M) for both the transit and highway networks. The LRTP supports this planning factor through this performance measure: “Maintaining and preserving transit, highway, and bridge infrastructure.” As part of the LRTP development, the MPO utilizes a pavement management system to develop costs and recommended repair for operation, preservation, and maintenance of the federal aid network. The Old Colony MPO and BAT are coordinating to implement a performance based planning process. The MPO integrates BAT’s Transit Asset Management (TAM) Plan into its planning process that prioritizes investments that meet regional performance targets for State of Good Repair. The identified state of good repair performance measures for transit asset management with regard to BAT include the following areas: equipment (Percentage of vehicles that have met or exceeded their Useful Life Benchmark (ULB)); rolling stock (Percentage of revenue vehicles within a particular asset class that have met or exceeded their ULB); and facilities (Percentage of facilities within an asset class rated below 3.0 on the FTA Transit Economic Requirements Model scale). Additionally, the Old Colony TIP contains operation and maintenance costs for the federal aid network and BAT.

Objectives

- Provide and maintain fixed route reliability: Miles between breakdowns w/ passenger interruption.
- Provide and maintain demand response reliability: Miles between breakdowns w/ passenger interruption.
- Provide and maintain highway network travel time reliability.

- Protect and strengthen transportation systems vulnerable to climate change through identification of at-risk transportation assets and development of protection measures for each category of asset.

Freight Movement and Economic Vitality Goals: I

improve the nation’s freight network, strengthen the ability of rural communities to access national and international trade markets, and support regional economic development; and support the economic vitality of the metropolitan area, especially by enabling global competitiveness, productivity, and efficiency. The MPO applies specific criteria in the review of transportation strategies. These criteria are applied to changes of delay and emissions. Reduction in traffic delay has a direct consequence on economic vitality both through the timely arrival of commuters and goods and reduction in fuel expenses and losses due to air pollution. The LRTP directly supports these efforts through the goal: “Promote Policies that Ensure Economic Vitality and Sustainability.” The MPO directly supports regional productivity through its economic development mission manifested in the Regional Policy Plan, including support of the federally approved Old Colony Comprehensive Economic Development Strategy priority projects.

Objectives



- Reduce delay along identified freight routes.
- Improve safety along freight routes.
- Mitigate and improve key arterial (such as Route 106) and limited access highways (Routes 3 and 24) bottlenecks that inhibit efficient freight movement by truck.
- Identify opportunities for promoting intermodal freight movement and uses for the Brockton CSX site.
- Increase access to major employment centers.
- Increase viaduct clearance to improve freight movement, emergency response, and reduce delay.
- Plan and prioritize transportation investments that serve targeted development areas.

Environmental Sustainability Goals:

Enhance the performance of the transportation system while protecting and enhancing the natural environment; 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. The LRTP supports this planning factor through promoting environmental protection and climate change adaptation. The LRTP and therefore the TIP includes a focus on addressing Climate Change. Where appropriate, TIP projects will include assessments of vulnerabilities and negative risks that climate change effects or extreme weather events pose, to the region’s transportation infrastructure. These vulnerabilities and risks will be seriously considered when planning future improvements. Where appropriate, TIP projects include adaptation strategies that will enable

the region to implement improvements appropriately. The reduction of greenhouse gas emissions (GHG) remains an important goal in addressing climate change.




Objectives


- Minimize negative environmental impacts of the transportation system.
 **Target and Performance Measure:** Program a minimum of 100% of Congestion Mitigation and Air Quality (CMAQ) Program funding targets.
- Reduce greenhouse gas emissions and ground level ozone (NOx and VOCs) by all transportation modes.
 **Target and Performance Measure:** 50% of TIP projects reduce GHGs while also reducing negative impacts on the natural environment (such as improved storm water management or the addition of green space). In the FFY 2019-2023 TIP, 77% of the road projects, and 100% of the bus replacement projects had measureable reductions in GHGs.
- Increase the usage of clean alternative fuels and recyclable material for new transportation infrastructure.
- Increase coordination of transportation and housing programs to promote affordable housing near transit.
- Develop and support transportation policies that support healthy lifestyles.
- Support investments that clean up brownfields and avoid investments that increase pressure to develop greenfields.
- Support livable communities and smart growth development patterns through the creation of a balanced multi-modal transportation system.


Reduced Project Delivery Delay Goal:

Reduce project costs; promote jobs and the economy; and expedite the movement of people and goods by accelerating project completion through eliminating delays in the project development and delivery process, including reducing regulatory burdens and improving agency work practices.

Objectives

- Continue to utilize transportation evaluation criteria in screening potential TIP projects.
 **Target and Performance Measure:** 100% of all potential projects undergo initial evaluation to determine if project is realistic, viable, and implementable.
- Enhance screening and evaluation of projects to determine Year 1 readiness for TIP.
 **Target and Performance Measure:** 100% of potential Year 1 TIP projects are screened for implementation readiness. In the FFY 2019-2023 TIP, 100% of Year 1 projects were screened for readiness.
 **Target and Performance Measure:** At least 80% of Year 1 TIP Projects are advertised. In the FFY 2019-2023 TIP, 100% of Year 1 projects are on schedule to be advertised.
- Continue to maintain annual participation at TIP Day with MassDOT.

 **Target and Performance Measure:** 100% attendance and participation at TIP Day. One hundred percent attendance and participation at TIP Day has occurred since its inception.

 **Target and Performance Measure:** At 25% design stage, work with stakeholders on 100% of potential projects to determine Right-of-Way (ROW), environmental permitting, and other potential challenges to project development and implementation.

- Reduce time of transit contracting.

Resiliency and Reliability of the Transportation System Goals:

Improve the resiliency and reliability of the transportation system; reduce or mitigate stormwater impacts of surface transportation; and promote efficient system operation and management.

Objectives

- Provide and maintain fixed route reliability: Miles between breakdowns w/ passenger interruption.
- Provide and maintain demand response reliability: Miles between breakdowns w/ passenger interruption.
- Provide and maintain highway network travel time reliability.
- Protect and strengthen transportation systems vulnerable to climate change through identification of at-risk transportation assets and development of protection measures for each category of asset.

The Old Colony MPO supports Operation and Management Strategies (O and M) for both the transit and highway networks. The LRTP supports this planning factor through this performance measure: “Maintaining and preserving transit, highway, and bridge infrastructure.” As part of the LRTP development, the MPO utilizes a pavement management system to develop costs and recommended repair for operation, preservation, and maintenance of the federal aid network. Additionally, the Old Colony TIP contains operation and maintenance costs for the federal aid network and BAT.

Travel and Tourism - Enhance Travel and Tourism Goals:

The Old Colony MPO is working on efforts to enhance travel and tourism through the LRTP and TIP. Opportunities to monitor, analyze, and develop recommendations will be undertaken.

One desired outcome of performance-based planning is constant quality improvement in project selection and delivery with respect to meeting national goals. If a particular project did not help the plan meet its stated goals, or was more effective than originally thought, that information can inform future decision-making. Done properly, performance-based planning not only improves project selection and prioritization, it also can make a compelling case for the Old Colony MPO’s LRTP and why the community is invested in its outcome.

The TIP is designed such that once implemented, it makes progress toward achieving the performance targets. Performance-based planning attempts to make the transportation investment decision-making process both informed and accountable. Projects and services implemented through the TIP will help to achieve the performance targets for Safety (PM1), Bridge and Pavement Condition (PM2), System Performance Measures (PM3), and Transit Asset Management (TAM) State of Good Repair (SGR).

SAFETY PERFORMANCE MANAGEMENT (PM1)

The Old Colony MPO has chosen to adopt the statewide safety performance measure targets set by MassDOT for Calendar Year (CY) 2019. In setting these targets, MassDOT has followed FHWA guidelines by using statewide crash data and Highway Performance Monitoring System (HPMS) data for vehicle miles traveled (VMT) in order to calculate 5 year, rolling average trend lines for all FHWA-defined safety measures. For CY 2019 targets, four of the five safety measures - total number of fatalities, rate of fatalities per 100 million vehicle miles traveled, total number of incapacitating injuries, and rate of incapacitating injuries per 100 million VMT - were established by extending their trend lines into the 2015-2019 period. All four of these measures reflect a modest decrease in statewide trends. The fifth safety measure, the total number of combined incapacitating injuries and fatalities for non-motorized modes, is the only safety measure for which the statewide trend line depicts an increase. MassDOT's effort to increase non-motorized mode share throughout the Commonwealth has posed a challenge to simultaneously reducing non-motorized injuries and fatalities. Rather than adopt a target that depicts an increase in the trend line, MassDOT has elected to establish a target of non-motorized fatalities and injuries and for CY 2019 that remains constant from the rolling average for 2012–2016. In recent years, MassDOT and the Old Colony MPO have invested in “complete streets,” bicycle and pedestrian infrastructure, intersection and safety improvements in both the Capital Investment Plan (CIP) and Statewide Transportation Improvement Program (STIP) to address increasing mode share and to incorporate safety mitigation elements into projects. Moving forward, the Old Colony MPO, alongside MassDOT, is actively seeking to improve data collection and methodology for bicycle and pedestrian VMT counts and to continue analyzing crash clusters and crash counts that include both motorized and non-motorized modes in order to address safety issues at these locations.

In all safety categories, MassDOT has established a long-term target of “Toward Zero Deaths” through MassDOT's Performance Measures Tracker¹ and will be establishing safety targets for the MPO to consider for adoption each calendar year. While the MPO is not required by FHWA to report on annual safety performance targets, FHWA guidelines require MPOs to adopt MassDOT's annual targets or to establish their own each year.

The safety measures MassDOT has established for CY 2019, and that the Old Colony MPO has adopted, are as follows:

1. Fatalities: The target number of fatalities for years CY 2019 is 353, down from an average of 364 fatalities for the years 2012–2016. [See Figure 1 for Our MPO vs. statewide comparison of the trend for this performance measure]
2. Rate of Fatalities per 100 million VMT: The target fatality rate for years CY 2019 is 0.58, down from a 0.61 average for years 2012–2016. [See Figure 1 for Our MPO vs. statewide comparison of the trend for this performance measure]
3. Incapacitating Injuries: The target number of incapacitating injuries for CY2019 is 2801, down from the average of 3146 for years 2012–2016. [See Figure 2 for Our MPO vs. statewide comparison of the trend for this performance measure]
4. Rate of Incapacitating Injuries per 100 million VMT: The incapacitating injury rate target for CY2019 is 4.37 per year, down from the 5.24 average rate for years 2012–2016. [See Figure 2 for Our MPO vs. statewide comparison of the trend for this performance measure]
5. Total Number of Combined Incapacitating Injuries and Fatalities for Non-Motorized Modes: The CY2019 target number of fatalities and incapacitating injuries for non-motorists is 541 per year, the same as the average for years 2012–2016. [See Figure 3 for Our MPO vs. statewide comparison of the trend for this performance measure]

Figure 2-1

Total Fatalities and Fatality Rate

With Old Colony (OC) Data for Comparison

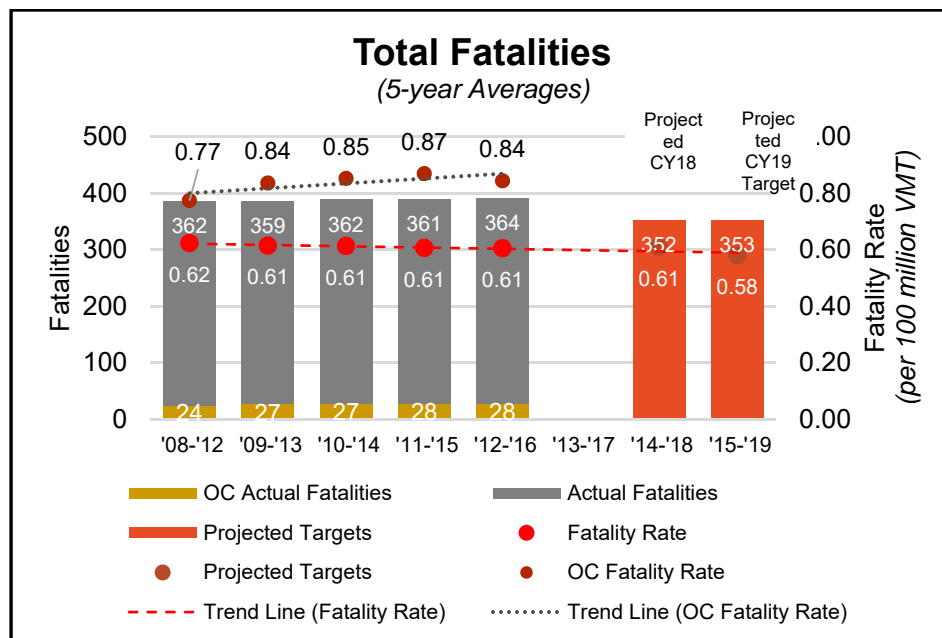


Figure 2-2

Total Incapacitating Injuries and Incapacitating Injuries Rate
With Old Colony (OC) Data for Comparison

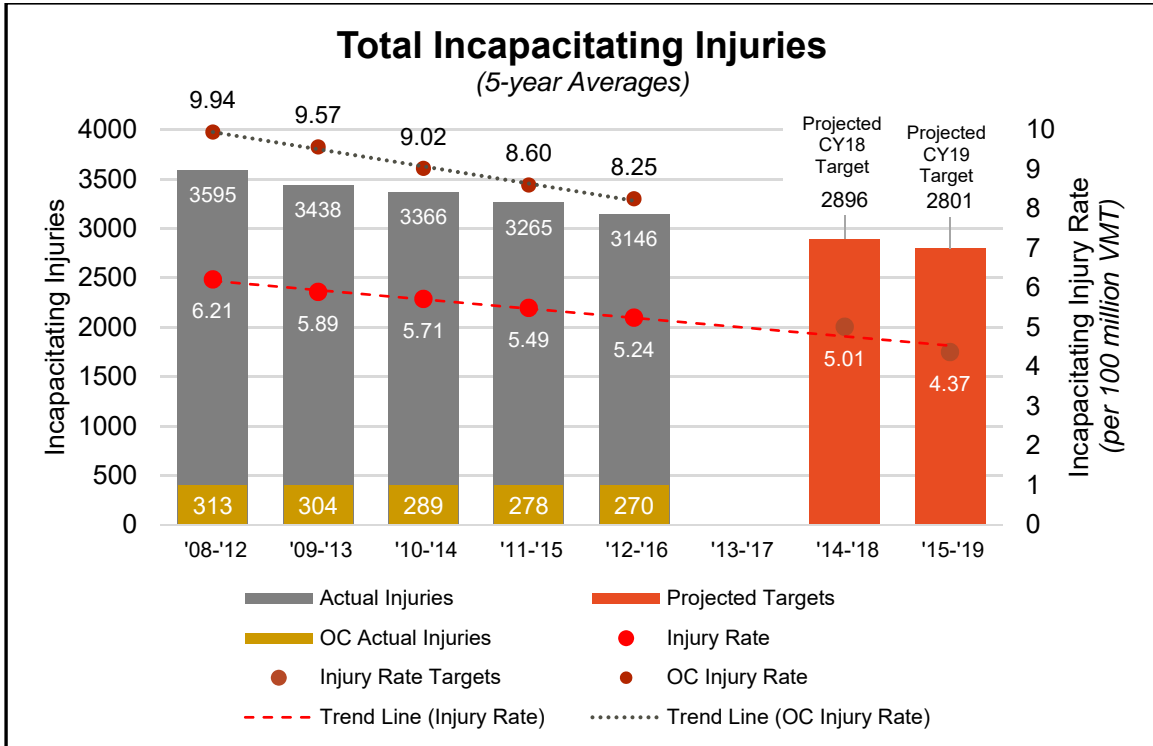
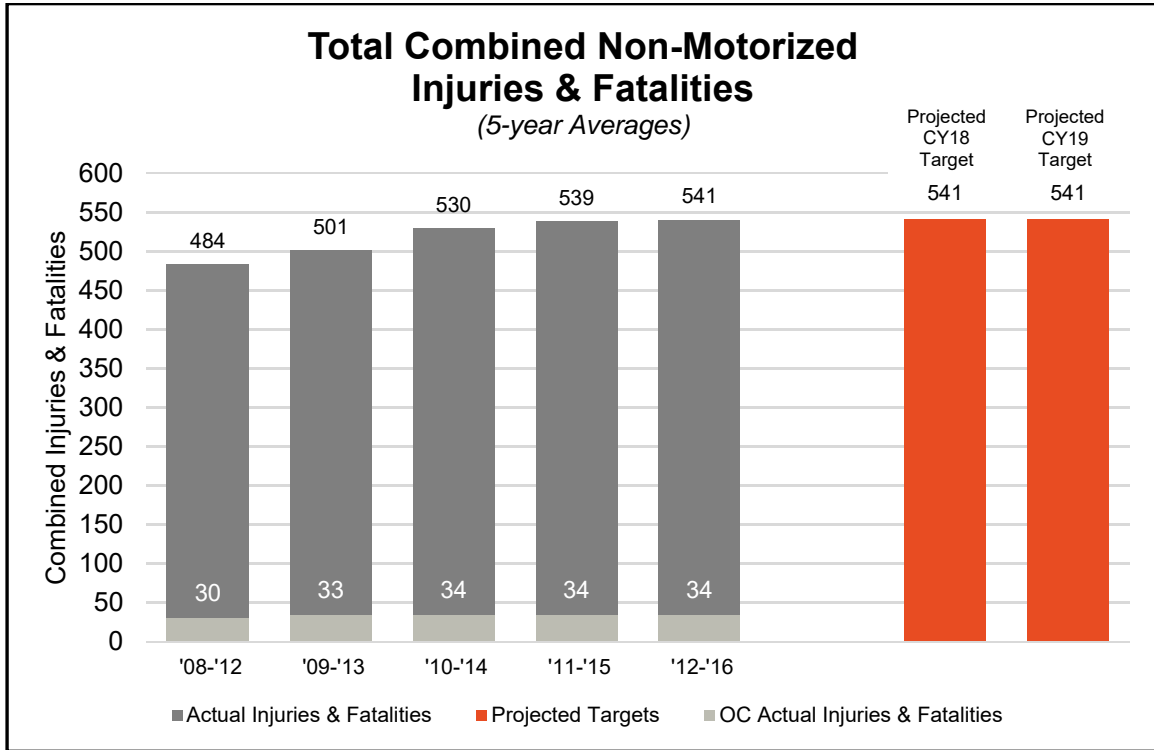


Figure 2-3

Total Number of Non-Motorized Fatalities and Incapacitating Injuries with Old Colony (OC) Data for Comparison



SYSTEM PRESERVATION PERFORMANCE (PM2)

System preservation continues to be a priority for the Old Colony Region MPO because the region’s transportation infrastructure is aging. It is also important to improve the resiliency of the region’s transportation system to prepare for existing or future extreme conditions, such as sea level rise and flooding.

The Old Colony MPO has chosen to adopt the 2-year (2020) and 4-year (2022) statewide bridge and pavement performance measure targets set by MassDOT. MassDOT was required to adopt a statewide target by May 20, 2018, with MPOs either adopting the statewide target or establishing their own by November 2018. In setting these targets, MassDOT has followed FHWA guidelines by measuring bridges and pavement condition using the 9-point National Bridge Inventory Standards (NBIS); the International Roughness Index (IRI); the presence of pavement rutting; and the presence of pavement cracking. 2-year and 4-year targets were set for six individual performance measures: percent of bridges in good condition; percent of bridges in poor condition; percent of Interstate pavement in good condition; percent of Interstate pavement in poor condition; percent of non-Interstate pavement in good condition;

and percent of non-Interstate pavement in poor condition. All of the above performance measures are tracked in greater detail in MassDOT's Transportation Asset Management Plan (TAMP), which is due to be finalized in July 2019.

Targets for bridge-related performance measures were determined by identifying which bridge projects are programmed and projecting at what rate bridge conditions deteriorate. The bridge-related performance measures measure the percentage of deck area, rather than the total number of bridges.

Performance targets for pavement-related performance measures were based on a single year of data collection, and thus were set to remain steady under the guidance of FHWA. These measures are to be revisited at the 2-year mark (2020), once three years of data are available, for more informed target setting.

MassDOT continues to measure pavement quality and to set statewide short-term and long-term targets in the MassDOT Performance Management Tracker using the Pavement Serviceability Index (PSI), which differs from IRI. These measures and targets are used in conjunction with federal measures to inform program sizing and project selection. Table 1 provides the MassDOT Performance Measures and Targets for NHS Pavements, while Table 2 provides the MassDOT Performance Measures and Targets for NHS Bridges.

Table 2-1

MassDOT Performance Measures and Targets for NHS Pavements

Interstate Pavement (FHWA Full Distress)			
Performance Measure	Current Condition (2017)	2-Year Target (2020)	4-Year Target (2022)
% Interstate Pavement in Good Condition	74.2%	70%	70%
% Interstate Pavement in Poor Condition	0.1%	4%	4%
Non-Interstate Pavement (FHWA IRI only)			
Performance Measure	Current Condition (2017)	2-Year Target (2020)	4-Year Target (2022)
% Non-Interstate Pavement in Good Condition	32.9%	30%	30%
% Non-Interstate Pavement in Poor Condition	31.4%	30%	30%

Table 2-2

MassDOT Performance Measures and Targets for NHS Bridges

Performance Measure	Current Condition (2017)	2-Year Target (2020)	4-Year Target (2022)
% Bridges in Good Condition	15.22%	15%	16%
% Bridges in Poor Condition	12.37%	13%	12%

SYSTEM PERFORMANCE MEASURES (CONGESTION, RELIABILITY, AND EMISSIONS) (PM3)

Through its goal and objectives for capacity management and mobility, the MPO seeks to maximize the region’s existing transportation system so that both people and goods can move reliably and connect to key destinations. Portions of the Old Colony Region are densely developed, which creates challenges to making major changes to its transportation infrastructure to address access, reliability, and congestion mitigation needs. In order to

determine how well the region’s roadways are performing with respect to mobility, the MPO applies performance measures that gauge the duration, extent, intensity, and reliability (or regularity) of the occurrence of congestion.

Table 2-3

MassDOT System Performance Measures and Targets

Congestion, Reliability, and Emissions

Performance Measure	Current (2017)	2-Year Target (2020)	4-Year Target (2022)
Level of Travel Time Reliability (LOTTR)	68% Interstate	68% Interstate	68% Interstate
	80% Non-Interstate	80% Non-Interstate	80% Non-Interstate
Truck Travel Time Reliability (TTTR)	1.85	1.85	1.85
Peak Hour Excessive Delay (PHED) (Boston UZA) (Annual hours per capita)	18.31	18.31	18.31
Non-SOV Travel	33.60% (2016)	34.82%	35.46%
Emissions Reductions	Baseline (FFY 2014-2017)	1,622 CO	TBD CO - Springfield
		497.9 Ozone	1.1 Ozone

Old Colony MPO staff analyzes congestion in the region using the Congestion Management Process (CMP). The CMP is, “a systematic process for managing congestion that provides information on transportation system performance and on alternative strategies for alleviating congestion and enhancing the mobility of persons and goods to levels that meet state and local needs.” The CMP includes consideration of the implementation of strategies that provide the most efficient and effective use of existing and future transportation facilities. This process allows for monitoring transportation systems for congestion, reviewing and endorsing plans by local communities that make up the region, and revising monitoring of strategies and overall plans to account for a dynamic management system. In both metropolitan and non-metropolitan areas, consideration needs to be given to strategies that reduce single occupancy vehicle (SOV) travel and improve existing transportation system efficiency. Documentation of the operational Congestion Management Process occurs during the Transportation Management Area (TMA) Certification Review conducted every four (4) years.

In general, the root causes of congestion may be summarized into two main categories:

- Traffic volume on a facility exceeds the available physical capacity of the facility - There is a limited amount of traffic that can be moved on a roadway for a given time, or only so many transit customers that can be accommodated by a given number of buses or trains. This is considered the physical capacity of the system. Bottlenecks occur at locations where the physical capacity is restricted, with flows from upstream sections (with higher capacities) being funneled into smaller downstream segments. When traffic flow breaks down to stop-and-go conditions, capacity is actually reduced. Bottlenecks can be very specific chokepoints in the system, such as a poorly functioning freeway-to-freeway interchange, or an entire highway corridor where a “system” of bottlenecks exists, such as a closely spaced series of interchanges with local streets.
- Traffic Incidents - In addition to the physical capacity, external events can have a major effect on traffic flow. These include traffic incidents such as crashes and vehicle breakdowns; work zones; inclement weather; special events; and poorly timed traffic signals. When these events occur, their main impact is to subtract physical capacity from the roadway. Events also may cause changes in traffic demand by causing travelers to rethink their trips.

The cost of congestion can be measured in dollars as well as time. There is a direct link between transportation investment, travel conditions (congestion and reliability), and economic productivity. Two key trends have a substantial impact on the total cost of moving freight:

- As congestion extends into the midday, which is typically the peak travel period for trucks, costs that are more direct will be incurred.
- Reliability - For trucks, the ability to secure delivery windows predictably will decrease and will add even more costs as firms struggle to optimize delivery schedules. This is especially a problem for truckers who must meet “just-in-time” delivery schedules set by shippers, manufacturers, and retailers.

The CMP is also designed to identify intersections and road segments that demonstrate congestion, excessive delays, and circulation problems. The CMP identifies these congested facilities through studies completed by OCPC and other agencies and organizations, and through the ongoing monitoring of facilities. Standard operating procedures have been adopted for data collection that allows the monitoring of intersections within the region specifically targeted due to congestion. The CMP identifies numerous congested intersections, based on a threshold of LOS “D” or less, within the Old Colony region.

In addition to the intersection locations, there are several community centers in the region including, Bridgewater Center (Central Square), Downtown Brockton, East Bridgewater Center, Stoughton Center, and West Bridgewater Center, that experience chronic congestion and circulation problems requiring on-going efforts to improve traffic flow and access, and reduce delays.

When making investments in the region’s transportation system, the Old Colony Region MPO seeks to invest in projects and programs that reduce greenhouse gases (GHGs) and other transportation related pollutants, and otherwise minimize negative environmental impacts. If climate change trends continue as projected, the conditions in the Old Colony Region will include a rise in sea level coupled with storm-induced flooding, and warmer temperatures that would affect the region’s infrastructure, economy, human health, and natural resources. Massachusetts is responding to this challenge by taking action to reduce the GHGs produced in the state, including those generated by the transportation sector. To that end, Massachusetts passed its Global Warming Solutions Act (GWSA), which requires reductions of GHGs by 2020, and further reductions by 2050, relative to 1990 baseline conditions. To meet GWSA requirements, the MPO works with MassDOT and other stakeholders to anticipate the GHG impacts of projects included in the TIP.

TRANSIT SYSTEM ASSET CONDITION PERFORMANCE MEASURES AND TARGETS

Table 4 lists a set of federally required infrastructure condition performance measures for transit systems along with BAT’s Performance Targets. These transit asset management (TAM) measures, which focus on a specific subset of all transit assets, were established in the FTA’s TAM Rule. Brockton Area Transit presented this information along with supporting documentation to the Old Colony MPO in August 2018. The Old Colony MPO has adopted BAT’s FY 2019 Brockton Area Transit Authority Transit State of Good Repair Targets in their entirety and as their own and for the Old Colony Region, in accordance with the certified 3C Transportation Planning Process.

Table 2-4

Brockton Area Transit Authority Performance Measures and Targets

Performance Targets by Asset Category						
Category	Class	Metric	Performance Target for FY 2019	Total Number of Vehicles	# of Vehicles that exceed ULB - FY 2018	% of Fleet that exceeds ULB - FY 2018
Rolling Stock	Buses	X% of fleet that exceeds default ULB of 14	0.00%	46	0	0.00%
	Cutaway Buses	X% of fleet that exceeds default ULB of 10	0.00%	4	0	0.00%
	Vans	X% of fleet that exceeds default ULB of 8	5.00%	58	6	10.34%
Equipment	Non-Revenue Service Vehicle	X% of non-revenue service vehicles that exceeds default ULB of 8	20.00%	10	2	20.00%
Facilities	Admin/Maintenance Facility	X% of facilities rated under 3.0 on Term scale	0.00%	3	0	0.00%

FTA defines ULB as “the expected lifecycle of a capital asset for a particular transit provider’s operating environment, or the acceptable period of use in service for a particular transit provider’s operating environment.” For example, FTA’s default ULB value for a bus is 14 years. FTA’s Transit Economic Requirements Model (TERM) scale, which pertains to the facilities measure, is a rating system that describes asset condition. The scale values are 1 (poor), 2 (marginal), 3 (adequate), 4 (good), and 5 (excellent). Because each measure is intended to represent the share of transit assets that are not in a state of good repair, the goal is to minimize the value for all four measures. FTA grantees, including transit agencies and agency

sponsors, such as MassDOT, are required to develop targets for these TAM measures each fiscal year. MPOs, in turn, are required to set targets for their regions. BAT submitted agency-level targets for state fiscal year (SFY) 2019 (July 2018 through June 2019) to the Old Colony MPO. Their targets reflect the most recent data available on the number, age, and condition of their assets, and their expectations and capital investment plans for improving these assets during SFY 2019.

Chapter 3: Regional Profile and Livability

This Long Range Transportation Plan is a blueprint for keeping pace with the mobility and sustainability challenges in our unique region. Meeting our future transportation needs requires a comprehensive plan that coordinates how we use land and how we get around. This long-range transportation plan is built on a set of integrated public policies, strategies, and investments to maintain and manage, and improve our transportation system so that it meets the diverse mobility needs of our changing region.

The Old Colony Planning Council's vision is to provide a transportation system that is safe, sustainable, universally accessible and globally competitive. It strives to ensure reliable and efficient mobility for people, goods, and services, while meeting the Commonwealth's greenhouse gas emission reduction goals and preserving the unique character of Massachusetts communities. The Commonwealth's transportation system is multimodal, and includes many different interconnected modes that transport both people and commodities. This integrated, interconnected, and resilient multimodal system supports a thriving economy, human and environmental health and social equity.

Goals and Objectives

1. Expand engagement in multi-modal transportation and decision making to improve mobility and accessibility for all people through development of a balanced transportation system.
2. Provide transportation choices to enhance economic activity and global competitiveness.
3. Integrate health, transportation and land use development to foster Livable and Healthy Communities that promote social equity.
4. Support and encourage transformation to a clean and energy efficient transportation system that reduces greenhouse gas emissions and the negative impacts of climate change.
5. Improve environmental considerations in all stages of planning and implementation to conserve and enhance natural, agricultural and cultural resources.

By establishing the goals and policies framework, the Long Range Transportation Plan 2020 provides a guide for implementing sustainable approaches throughout the transportation sector while building and preserving Massachusetts' legacy. Preserving and enhancing life in the Commonwealth will require sustainable principles. The vision of sustainability in this Long Range Transportation Plan revolves around the concept of People, Planet, and Prosperity. This concept describes a spectrum of values that help plan for the future. It signals that Massachusetts uses an approach to public decision-making that produces social, cultural, economic, and environmental benefits. This concept conveys that the Commonwealth, our economic prosperity, and our relationship to the planet are tied together in a mutually supportive and independent way. Social and environmental goals cannot be achieved without

economic prosperity, achieving prosperity is highly related to social well-being and environmental quality.

PEOPLE

Transportation systems profoundly affect public health, with impacts and benefits to communities on public safety, physical activity, the environment, and access to vital goods and services. When properly planned and designed, transportation systems can have a positive effect on public health. Major trends in public health and transportation involve forming new partnerships to address the impacts.

The transportation system helps shape communities and vice versa. Transportation and land use decisions can promote public health by making walking, biking, and taking public transit easier and safer. As the connections are made, parties responsible for land use and transportation decisions tend to work together to coordinate plans, projects, and services.

Safety continues to be a major public health concern for transportation. Safety is a concern not only for drivers and passengers but also for pedestrians and bicyclists. The Old Colony Planning Council will increasingly incorporate public health enhancements toward transportation infrastructure as well as safe accommodation of all modes. All levels of government have stepped up efforts to encourage responsible driving habits that will make transportation safer for all users.

Limited access to transportation can affect health, particularly among vulnerable populations, such as the poor, the elderly, children, the disabled, and various ethnic communities. A safe and accessible transportation system allows members of vulnerable populations to more easily travel to supermarkets for fresher foods, to integrate daily walking as a form of exercise to meet physical activity needs, and to better access health care facilities, education, jobs, recreation, and other needs. All of these activities are linked to improved health. Transportation solutions at the community level are needed to serve these basic daily requirements.

Inactivity is a significant factor in obesity, contributing to numerous chronic diseases. Creating opportunities for people to incorporate safe active transportation opportunities, walking, biking and public transportation – into everyday travel is important to improving public health. Active transportation is a critical component in developing and implementing sustainable communities strategies, reducing greenhouse gas emissions, and making the region more enjoyable to live, work and play.

The transportation sector is a major source of air pollution due to emissions and small particulates in the exhaust from fossil fuel combustion engines on most trucks, cars, trains, planes, and ships. These emissions are linked to increased incidence of several chronic respiratory and cardiovascular diseases. Federal and State regulations have substantially improved air quality, but additional improvements are needed. New technological advances in

alternative fuels and vehicles, together with government policies and industry innovations to support them are needed to further improve our air quality. In addition, the growing body of evidence regarding near-roadway health effects requires close coordination between transportation and land use planning to reduce potential emission-related impacts to sensitive receptors near high-volume roadways.

Whereas the region's economic prosperity was once driven by natural resource extraction and industrial scale manufacturing, the new economy relies to a greater extent on highly skilled, well-educated, and diverse populations to stimulate creative and innovative enterprise. This plan responds to the changing reality of the global economy by placing people at the center of a prosperous region.

This Long Range Transportation Plan underscores investment in all of the region's people to create shared prosperity and to sustain a diversity of family-wage jobs. Investing in people means ensuring accessible and high quality education and skills-training programs, fostering economic opportunities in distressed areas, and sustaining the region's arts and cultural activity. This plan call for supporting our culturally and ethnically diverse communities. It also calls for addressing the unique obstacles and special needs of the regions economically disadvantaged populations, as well as the assets and contributions they bring to our regional prosperity.

- **PROMOTE ECONOMIC ACTIVITY AND EMPLOYMENT GROWTH** that creates widely shared prosperity and sustains a diversity of family-wage jobs for the region's residents.
- **ENSURE THAT THE REGION HAS A HIGH QUALITY EDUCATION SYSTEM** that is accessible to all of the region's residents.
- **ENSURE THAT THE REGION HAS HIGH QUALITY AND ACCESSIBLE TRAINING PROGRAMS** that give people opportunities to learn, maintain, and upgrade skills necessary to meet the current and forecast needs of the regional economy.
- **ADDRESS UNIQUE OBSTACLES AND SPECIAL NEEDS** – as well as recognize special assets – of disadvantaged populations in improving the region's shared economic future.
- **FOSTER APPROPRIATE AND TARGETED ECONOMIC GROWTH IN DISTRESSED AREAS** to create economic opportunity for residents in these areas.
- **SUPPORT THE CONTRIBUTIONS OF THE REGION'S CULTURALLY AND ETHNICALLY DIVERSE COMMUNITIES** in helping the region continue to expand its international economy.
- **SUSTAIN AND ENHANCE ARTS AND CULTURAL INSTITUTIONS** to foster an active and vibrant community life in every part of the region.

Promoting healthy communities and active living through land use, planning and investments.

Land use and planning decisions can promote active living and healthy communities. Populations living in walkable places are more active and therefore healthier than populations living in car-dependent areas. Considering the immense costs of obesity and sedentary lifestyles to our health care system, promoting active living through land use decisions provides a key opportunity to improve livability, equity, and our region’s health outcomes.

Land use decisions can create opportunities for people to walk or bike to their destinations rather than drive door-to-door, provide active outdoor recreational options, and offer access to open space. Achieving healthy communities also requires efforts by many sectors beyond land use decisions. Planning offers opportunities to coordinate actions and investments across multiple sectors.

Recognizing the role transportation plays in supporting healthy vibrant communities, transportation and comprehensive planning are seamlessly connected in many Unified Planning Work Program projects. For example, a highway corridor study completed through the UPWP will consider land uses that corridor serves, and how that corridor can be improved to better livability for the people of that community and the region.

PLANET

Humans interact with the environment constantly. These interactions affect quality of life, years of healthy life lived, and health disparities. The World Health Organization (WHO) defines environment as it relates to health as “all the physical, chemical, and biological factors external to a person, and all the related behaviors.” Environmental health consists of preventing or controlling disease, injury, and disability related to the interactions between people and their environment.

Climate change is one of the most significant threats of our time. Studies show that carbon dioxide and other greenhouse gas emissions contribute to climate change, and at nearly half of the total, the transportation sector is the leading source of greenhouse gas emissions in the state.

The frequency of extreme weather events – such as heat waves, sustained droughts, and torrential rains are expected to increase over the next century, potentially causing flooding, pavement damage, bridge damage, and transit vehicle stress. Even if global greenhouse gas emissions were to cease today, some of these effects would be still unavoidable. The Old Colony Planning Council region must aggressively address threats to its transportation infrastructure to decrease these risks and significant damages. The region’s population will face significant impacts from global emissions that have already occurred. Sea-level rise is one of the most widely documented risks of climate change that will affect all modes of transportation. Sea-levels are expected to rise up to almost one foot by 2030, two feet by 2050

and over five feet by 2100. These risks require that we use the best available science to estimate sea-level rise impacts and utilize a variety of adaptation strategies, including managed retreat and other nature-based approaches, to avoid vulnerabilities and build a resilient transportation system. To achieve adaptation strategies, sea-level rise impacts must be addressed at all project planning stages, not just at final project delivery.

Climate change will significantly increase the challenge for transportation managers who will need to ensure that reliable transportation routes are available. To address the challenges that a changing climate will bring climate adaptation and greenhouse gas reduction policies must complement one another. National efforts to reduce greenhouse gas emissions in transportation explore the use of alternative fuels, new vehicle technologies, pricing strategies, public transportation expansion, efficient land use, and increased use of bicycling and walking as transportation modes.

Transportation decision makers at all levels are beginning to consider how climate change may affect the transportation system and the levels of investment required. How these considerations are incorporated into the transportation planning process is emerging as an area of concern. One useful guide is to target investments that produce successful “co-benefits” simultaneously across economic, environmental, and social measures within a strategy, thereby improving the overall benefit-to-cost ratio. Project evaluation criteria used in developing the Transportation Improvement Program may be amended at some future time to enhance consideration of climate change impacts.

PROSPERITY

***THE COUNCIL’S CONTRIBUTIONS TO REGIONAL ECONOMIC
COMPETITIVENESS LIE IN THE ARENA OF COMMUNITY DEVELOPMENT –
THAT IS SUPPORTING THE INFRASTRUCTURE, AMENITIES, AND QUALITY
OF LIFE THAT ARE ESSENTIAL TO ATTRACTING AND RETAINING
BUSINESSES AND TALENT.***

Prosperity is fostered by *investments in infrastructure and amenities that create regional economic competitiveness*, thereby attracting and retaining successful businesses, a talented workforce, and, consequently, wealth. *Regional economic competitiveness results from strategic, long-term public and private decisions that build on and grow our region’s economic strengths relative to other regions.* Collectively, the region must provide great locations for businesses to succeed – particularly the industries that export products or services beyond the metropolitan area and bring revenue into the region.

Though the economy has evolved over the last 150 years, businesses still seek locational advantages, particularly access to a skilled workforce, access to markets, and an overall environment that allows them to compete in the global market. Some businesses rely more

heavily on freight and the movement of goods, while knowledge-intensive services concentrate on moving people to jobs and on the quality of life that attracts and retains a highly skilled workforce.

The Old Colony Planning Council's regional planning efforts set the stage for our region's economic competitiveness and prosperity. While local economic development authorities work directly with businesses, the work of creating and retaining businesses in the region requires coordinated efforts.

THE COUNCIL WILL USE ITS EXISTING ROLE AND CAPACITY TO:

- **Plan and invest in community development and consider prosperity and economic competitiveness** as a lens through which to evaluate its planning, operations, and investment decisions.
- **Fostering the conditions for shared economic vitality by balancing major investments across the region.** The Council will intentionally consider regional balance – that is balancing its investments and activities across the region – in its planning, operations and investments decisions. The Council's intent is that no part of the region is consistently favored or consistently ignored. The issue of regional balance has multiple dimensions. Because development patterns vary across the region, advancing regional balance does not guarantee that all parts of the region will receive the same level or intensity of investments, activity, or attention. Rather, advancing regional balance will be a consideration that helps all parts of the region receive investments that promote prosperity at their stage and level of development.
- **Protect natural resources that are the foundation of prosperity.** Prime agricultural soils support the region's farm economy and sustain local food production. Agricultural land creates economic opportunity for a variety of residents, ranging from farmers growing crops on century-old family farms to new Americans bring their farming experience into small-scale local food production serving farmers markets.

Massachusetts economy is dependent on the well-being of businesses and households. Businesses depend on a reliable transportation network to create products and offer services that ultimately reach consumers at a reasonable cost. Households depend on an integrated, accessible, and dependable transportation network to provide them access to education, healthcare, jobs, and recreational activities. A sustainable, reliable, and cost-effective transportation systems helps make the region more competitive for business growth and job creation. This Long Range Transportation Plan recommendations encourage policymakers to support an efficient and effective transportation network that meets the needs of businesses and households.

VIBRANT ECONOMY

- *Continue to apply social equity and environmental justice considerations in the implementation of projects and programs.*
- *Continue to collaborate with key partners and stakeholders, including representatives from low-income and minority communities and actively involve the public in the planning process.*
- *Leverage available funds in order to maximize every dollar, and advocate for legislation that supports implementation of the Old Colony Planning Council Long Range Transportation Plan.*

PROFILE OF THE OLD COLONY REGION

The Old Colony Planning Council is comprised of seventeen communities in Southeastern Massachusetts: Abington, Avon, Bridgewater, Brockton, Duxbury, East Bridgewater, Easton, Halifax, Hanson, Hanover, Kingston, Pembroke, Plymouth, Plympton, Stoughton, West Bridgewater, and Whitman.

Table 3-1 Existing Population Characteristics

TOWN	Recent Population Growth			Population Density	
	2000 Census	2010 Census	% Growth	Land Area (Sq. Miles)	Density in 2010 (Pop/Square Mile)
Abington	14,605	15,985	9.45%	10	1,598.5
Avon	4,443	4,356	-1.96%	4.4	990
Bridgewater	25,185	26,563	5.47%	27.5	966
Brockton	94,304	93,810	-0.52%	21.5	4363
Duxbury	14,248	15,059	5.69%	23.8	633
East Bridgewater	12,974	13,794	6.32%	17.2	802
Easton	22,299	23,112	3.65%	28.4	814
Halifax	7,500	7,518	0.24%	16.1	467
Hanover	13,164	13,879	5.43%	15.7	884
Hanson	9,495	10,209	7.52%	15	681
Kingston	11,780	12,629	7.21%	18.5	683
Pembroke	16,927	17,837	5.38%	21.8	818
Plymouth	51,701	56,468	9.22%	96.5	585
Plympton	2,637	2,820	6.94%	14.8	191
Stoughton	27,149	26,962	-0.69%	16	185
West Bridgewater	6,634	6,916	4.25%	15.7	440
Whitman	13,882	14,489	4.37%	7	2070
OCPC Region	348,927	362,406	3.86%	369.9	980
Massachusetts	6,349,097	6,547,629	3.13%	7,840	835

The Southeast region of the Commonwealth has experienced modest population growth in the past decade, adding 37,633 persons with an annualized population growth rate of 0.35% between 2000 and 2010. The region should expect to see continued population growth over the next twenty-five years, although at an increasingly slower rate as times moves on. Our model anticipates that the region will add another 39,490 residents between 2010 and 2020, after which levels of growth start to diminish, with fewer than 28,000 residents gained from 2020 to 2030. By 2035, the population of the Southeast region will approach 1.19 million persons, a gain of almost 75,000 residents over the 2010 Decennial Census.

Population growth in the region will be driven largely by the in-migration of persons in their thirties, and with these young families, a fairly steady number of births. However, increasing deaths with the aging in place of the sizable baby boom population will slowly chip away at the rate of population growth, eventually exceeding new births by 2025.

In recent years, the Southeast region has tended to lose residents due to domestic out-migration, and this trend is expected to continue through 2025. At the same time, international migration offsets this net domestic loss, with gains of over 19,000 each five years expected to continue through this time-series such that the region continues to increase in population size.

Domestic out-migration is heavily concentrated among the college-age population and, to a lesser extent, older residents in the 55-and older cohorts. However, the region tends to import residents in their thirties, as well as their school-age children. In the near future, the large population of millennials move out of their teens and twenties (age-groups prone to leaving the region) and into their thirties (the groups that tend to move in). This, together with only modest levels of out-migration among boomers, will result in decreasing levels of out-migration and increasing levels of domestic in-migration. Domestic in-migration will catch up to out-migration by 2025 to 2030 and start contributing to population gain in the region.

Older Persons

By 2030, baby boomers will move into the retirement phase of their life cycles. Although some older residents will retire outside the region, these will be eclipsed by those deciding to age in place, shifting the entire population distribution upward. By 2035, 24 percent of the region's population will be over the age of 65, compared to 14 percent in 2010. Yet the Old Colony region will continue to attract young families, including many from the millennial generation, who will be moving into their forties by 2035. The result will be a regional age profile that, while older, will be more evenly distributed among the different age groups.

The population of the region, similar to state and national trends, is getting older with an increasing percentage of the population aged 65 and over. From the 2010 Census, 13 percent of the population of the Old Colony region was 65 or older, a percentage that has risen consistently since 1970 and up nearly 2 percentage points from 11.1 percent in the 2000 Census.

The “Silver Tsunami” of those age 65 and older will be the fastest growing segment of our population, doubling in absolute numbers by 2030 and reaching 24 percent of our region’s residents by 2035. As people age, their housing preferences tend to change. Some seniors choose to move to a downtown condo. Other seniors want to age in place, close to their places of worship, friends, or family members. Across these locational preferences, most seniors share common interests in less household maintenance, one-level or accessible living, and easy access to nearby goods and services, especially health care.

Table 3-2: Population of Older Persons by Community

Old Colony Region Municipalities	Total Population	65-69 years	Percent	70-74 years	Percent	75-79 years	Percent	80-84 years	Percent	85 years +	Percent	median age
Abington	15,985	666	4.2%	420	2.6%	333	2.1%	245	1.5%	245	1.5%	39.5
Avon	4,356	191	4.4%	173	4.0%	148	3.4%	129	3.0%	100	3.0%	44.0
Bridgewater	26,563	977	3.7%	571	2.1%	524	2.0%	356	1.3%	334	1.3%	36.7
Brockton	93,810	3,463	3.7%	2,539	2.7%	2,015	2.1%	1,530	1.6%	1,651	1.6%	35.9
Duxbury	15,059	840	5.6%	492	3.3%	353	2.3%	321	2.1%	448	2.1%	44.8
East Bridgewater	13,794	668	4.8%	371	2.7%	330	2.4%	220	1.6%	201	1.6%	40.5
Easton	23,112	1,023	4.4%	580	2.5%	498	2.2%	376	1.6%	320	1.6%	39.5
Halifax	7,518	367	4.9%	234	3.1%	216	2.9%	100	1.3%	134	1.3%	42.8
Hanover	13,879	632	4.6%	442	3.2%	347	2.5%	226	1.6%	205	1.6%	41.8
Hanson	10,209	472	4.6%	255	2.5%	198	1.9%	127	1.2%	110	1.2%	40.4
Kingston	12,629	564	4.5%	353	2.8%	326	2.6%	292	2.3%	378	2.3%	42.3
Pembroke	17,837	760	4.3%	492	2.8%	338	1.9%	235	1.3%	176	1.3%	40.8
Plymouth	56,468	2,802	5.0%	1,742	3.1%	1,241	2.2%	976	1.7%	1,192	1.7%	41.4
Plympton	2,820	165	5.9%	97	3.4%	57	2.0%	35	1.2%	29	1.2%	44.4
Stoughton	26,962	1,337	5.0%	952	3.5%	785	2.9%	700	2.6%	645	2.6%	42.9
West Bridgewater	6,916	353	5.1%	235	3.4%	247	3.6%	184	2.7%	238	2.7%	43.9
Whitman	14,489	513	3.5%	372	2.6%	281	1.9%	204	1.4%	165	1.4%	38.2

Social Equity and Environmental Justice

Our region is stronger when all people live in communities that provide them access to opportunities for success, prosperity, and quality of life.

Equity connects all residents to opportunity and creates viable housing, transportation, and recreation options for people of all races, ethnicities, incomes, and abilities so that all communities share the opportunities and challenges of growth and change. For our region to reach its full economic potential, all of our residents must be able to access opportunity.

The concept of **Social Equity** (or environmental justice) requires that minority and low-income communities get special attention from public agencies during public decision-making processes. **Environmental Justice** is defined as the fair treatment of all people regardless of race, color, national origin, or income, in the development, implementation, and enforcement of environmental laws, regulations, and policies. Its goal is to provide all communities and

person across the region with the same degree of protection from environmental and health hazards and equal access to decision making processes. This results in healthy environments for all in which to live, learn and work.

THERE ARE THREE FUNDAMENTAL ENVIRONMENTAL JUSTICE PRINCIPLES THAT ARE EMPLOYED IN THE PROCESS:

- 1. To avoid, minimize, or mitigate disproportionately high and adverse human health and environmental effects, including social and economic effects, on minority populations and low-income populations.*
- 2. To ensure the full and fair participation by all potentially affected communities in the transportation decision-making process.*
- 3. To prevent the denial of, reduction in, or significant delay in the receipt of benefits by minority and low-income populations.*

These populations include minority groups: African-Americans, American Indian, Asian and Hispanic, as well as low-income communities. They are often expanded to include other groups sometimes underrepresented in the planning process, like the elderly, children and people with disabilities.

Minority populations are among the fastest growing in the region, and low-income communities are increasingly dispersed throughout the region.

SOCIAL EQUITY PLANNING ENSURES THAT:

- These communities are included in discussions about planning needs and outcomes.*
- Planning research and technical evaluation activities include potential impacts to these groups.*

Social equity planning also ensures that low-income and minority populations are not disproportionately or adversely affected by human health and environmental impacts as compared to the general population. Transportation-related impacts could include air pollution, noise, safety issues, reduced property values and displacement of homes and businesses. Social equity in planning ensures that better decisions are made for the benefit of the entire community. Considerable attention is given to the fair and equitable distribution of benefits and burdens combined with the equal opportunity for participation in the development of regional plans, policies and projects.

Figure 3-1: Environmental Justice Census Tracts

Environmental Justice Census Tracts

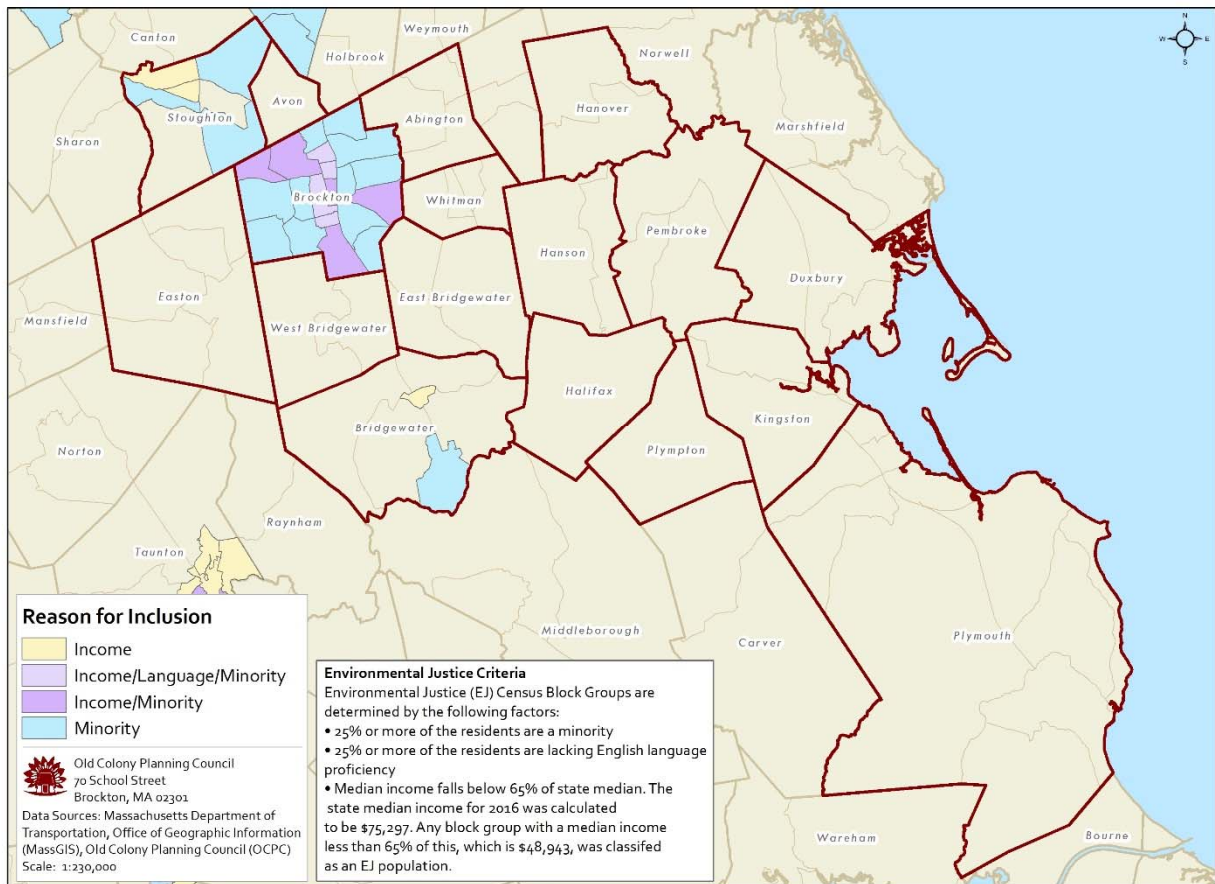


Table 3-3: Population by Ethnicity

Race										
Town	2010 Census Total Population	Total	One Race						2 or more races	Hispanic or Latino
			White	African American	American Indian or Alaska Native	Asian	Native Hawaiian Pacific	Other		
Abington	15,985	15,766	14,788	342	47	284	2	303	219	310
Avon	4,356	4,284	3,660	434	5	120	-	65	72	121
Bridgewater	26,563	26,139	24,163	1,292	62	328	-	294	424	838
Brockton	93,810	87,327	43,821	29,275	332	2,151	52	11,695	6,483	9,357
Duxbury	15,059	14,935	14,649	62	16	149	2	58	123	184
East Bridgewater	13,794	13,593	13,139	216	28	117	-	93	201	204
Easton	23,112	22,733	21,144	745	20	563	5	256	379	575
Halifax	7,518	7,409	7,291	45	6	42	-	25	109	81
Hanover	13,879	13,750	13,392	110	15	161	5	67	129	128
Hanson	10,209	10,069	9,850	104	3	48	1	63	140	95
Kingston	12,629	12,467	12,137	133	14	116	1	66	162	140
Pembroke	17,837	17,664	17,274	109	29	170	3	79	173	193
Plymouth	56,468	55,482	52,955	1,147	193	516	22	649	986	1,030
Plympton	2,820	2,793	2,731	24	8	22	-	8	27	36
Stoughton	26,962	26,267	21,634	2,984	46	291	2	630	695	876
West Bridgewater	6,916	6,817	6,564	104	7	75	-	67	99	121
Whitman	14,489	14,249	13,768	180	35	111	5	150	240	267
OCPC Total	362,406	351,744	292,960	37,306	866	5,264	100	14,568	10,661	14,556
Massachusetts	6,547,629	6,375,626	5,265,236	434,398	18,850	349,768	2,223	305,151	172,003	627,654
OCPC % of State	5.53%	5.52%	5.56%	8.59%	4.59%	1.50%	4.50%	4.77%	6.20%	2.32%

Table 3-4 - Population by Race in OCPC Region, 2010 Census

Race										
Town	Total Population	Total One Race	One Race						2 or more races	Hispanic or Latino
			White	African American	American Indian or Alaska Native	Asian	Native Hawaiian Pacific	Other		
Abington	16,196	16,016	15,034	472	0	430	0	80	180	409
Avon	4,476	4,363	3,403	519	17	315	0	109	113	199
Bridgewater	27,381	26,647	23,587	2,089	42	522	15	392	734	1,124
Brockton	94,813	91,342	42,238	39,008	336	1,725	48	7,987	3,471	9,610
Duxbury	15,444	15,352	15,029	134	0	163	0	26	92	101
East Bridgewater	14,222	14,034	13,624	77	34	231	0	68	188	270
Easton	23,770	23,407	21,629	1,115	0	373	0	290	363	684
Halifax	7,753	7,714	7,525	116	0	19	0	54	39	232
Hanover	14,332	14,171	13,715	91	0	236	14	115	161	118
Hanson	10,477	10,234	9,874	205	19	122	0	14	243	173
Kingston	13,106	12,917	12,693	108	0	88	0	28	189	334
Pembroke	18,166	17,616	17,087	110	6	257	0	156	550	523
Plymouth	58,216	57,021	54,122	1,077	152	694	0	976	1,195	1,476
Plympton	2,913	2,871	2,833	0	0	22	0	16	42	81
Stoughton	28,260	27,590	21,740	3,981	137	928	0	804	663	1,162
West Bridgewater	7,044	6,838	6,446	291	11	6	0	84	206	421
Whitman	14,767	14,422	14,026	85	0	120	0	191	345	252
OCPC Total	371,336	362,555	294,605	49,478	754	6,251	77	11,390	8,774	17,169
Massachusetts	6,742,143	6,539,129	5,343,665	489,233	13,931	411,736	2,002	278,562	203,014	731,739
OCPC % of State	5.51%	5.54%	5.51%	10.11%	5.41%	1.52%	3.85%	4.09%	4.32%	2.35%

Figure 3-2: Population of Non-White Persons

Population of Non-White Persons

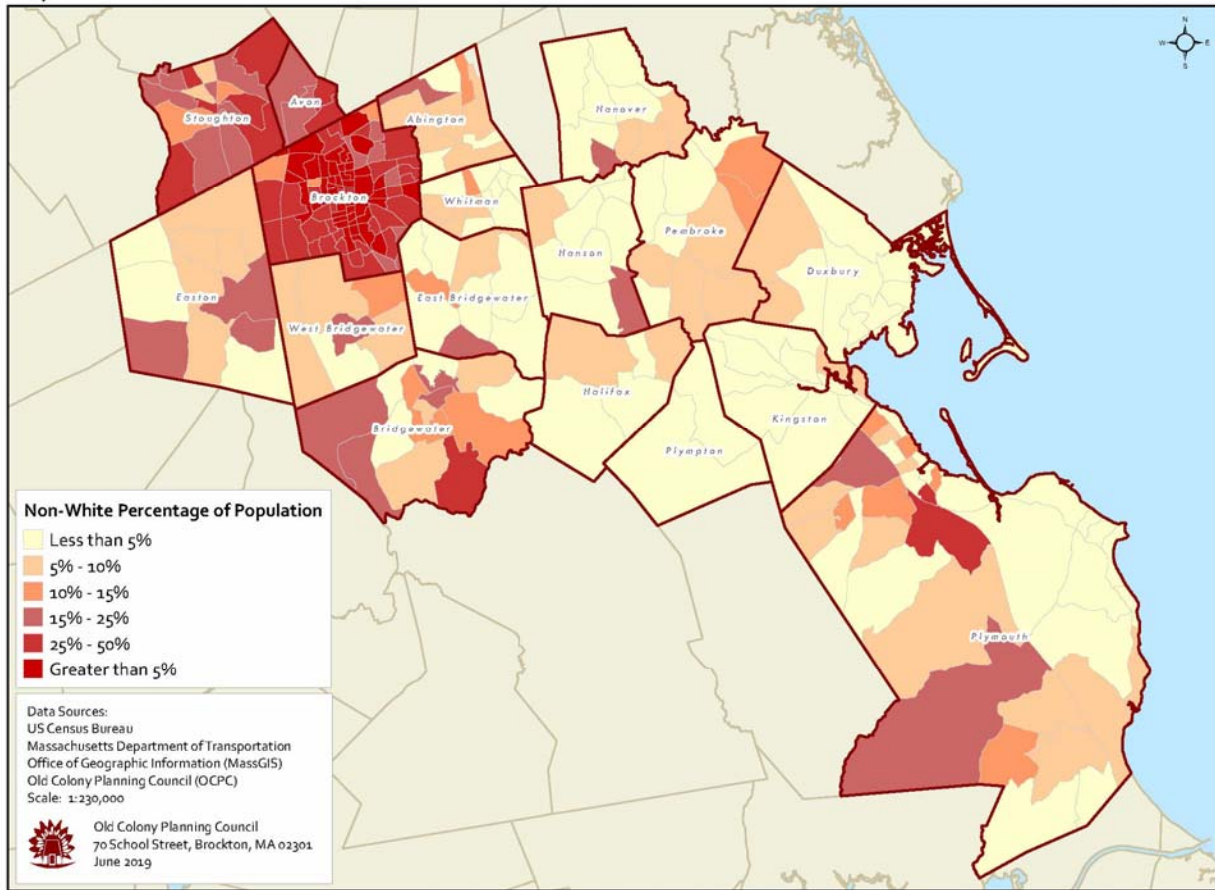
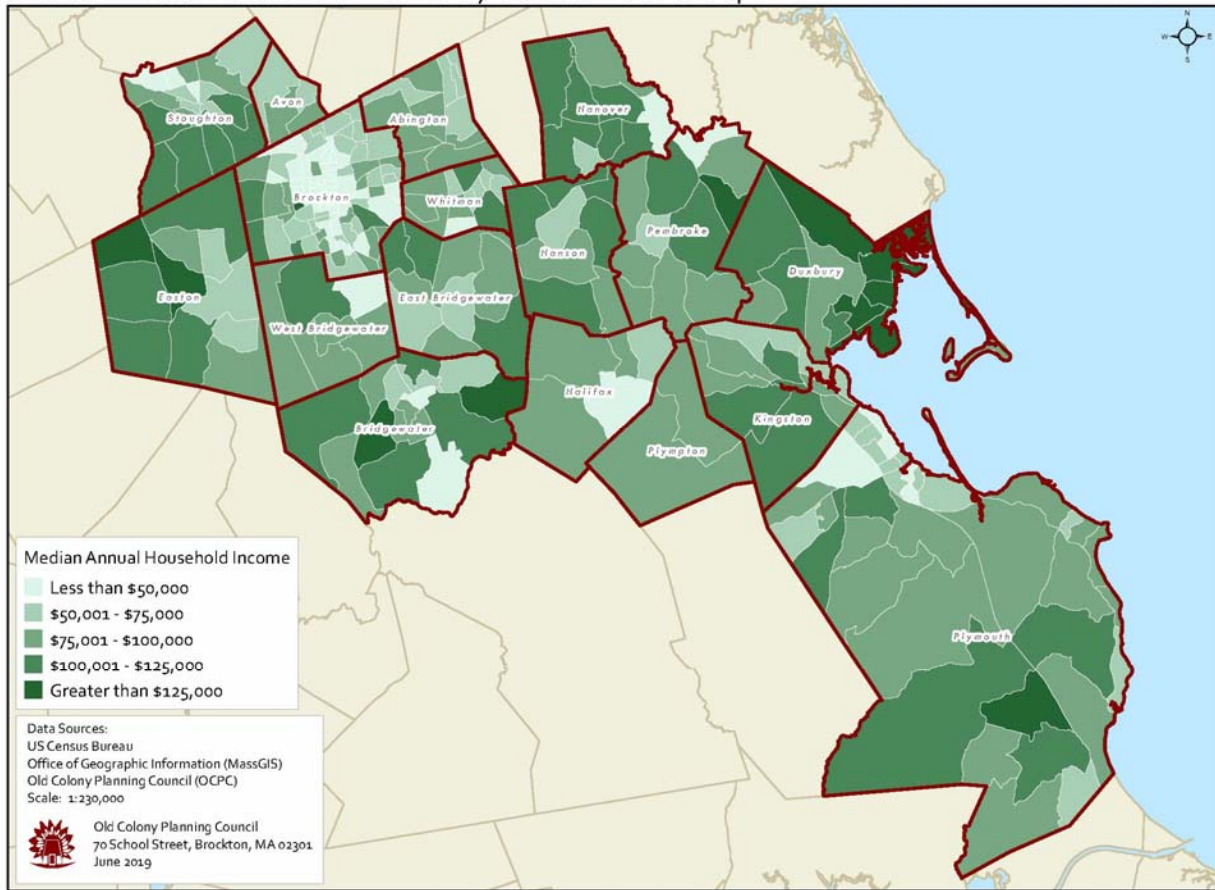


Figure 3-3: median Household Income by Census Block Group

Median Annual Household Income by Census Block Group



SOCIOECONOMIC FORECASTS

Population, households, and employment figures through the horizon year of 2040 have been developed and are summarized in the following tables. In a collaborative effort by the University of Massachusetts Donahue Institute (UMDI) and the Massachusetts Department of Transportation, socioeconomic forecasts were produced for the Metropolitan Planning Organizations of Massachusetts. These forecasts were derived using a methodology that incorporated a multitude of demographic factors, including age and sex of the population; fertility and mortality rates; and migration trends. Each MPO was provided a regional total in each subcategory of socioeconomic forecasts, and MPO staff then allocated those regional totals down to the municipal level based on knowledge of recent growth patterns and availability of developable land. The primary purpose of these socioeconomic forecasts are for travel demand modeling and air quality conformity analysis. A secondary purpose is to determine where growth is most likely to occur, and where future investments should be targeted.

Population Forecasts

Table 3.5 contains the population forecasts for the Old Colony region through 2040. Overall, the region is expected to grow by 9.39 percent from the population that was counted in the 2010 Census through 2040. It is believed much of this growth has already occurred, as the Census is now nine years old at the time of this Plan. The UMass Donahue Institute and MassDOT expect the Old Colony region to grow at a rate slightly behind the statewide total

Table 3.5: Population Forecasts

	2010 Census	Forecast Year			% Increase 2010 - 2040
		2020	2030	2040	
Massachusetts	6,547,629	6,933,887	7,225,472	7,380,399	12.72%
OCPC Region	362,406	379,936	391,583	396,418	9.39%
Abington	15,985	17,386	18,764	19,000	18.86%
Avon	4,356	4,385	4,444	4,500	3.31%
Bridgewater	26,563	27,800	28,333	28,689	8.00%
Brockton	93,810	96,000	96,700	97,100	3.51%
Duxbury	15,059	15,030	15,307	15,500	2.93%
East Bridgewater	13,794	14,400	14,616	14,800	7.29%
Easton	23,112	23,830	24,689	25,000	8.17%
Halifax	7,518	7,600	7,620	7,640	1.62%
Hanover	13,879	13,864	13,999	14,084	1.48%
Hanson	10,209	10,600	10,863	11,000	7.75%
Kingston	12,629	13,369	14,814	15,000	18.77%
Pembroke	17,837	18,300	18,695	18,931	6.13%
Plymouth	56,468	64,166	68,559	70,312	24.52%
Plympton	2,820	2,910	2,963	3,000	6.38%
Stoughton	26,962	27,900	28,279	28,635	6.21%
West Bridgewater	6,916	7,227	7,549	7,644	10.53%
Whitman	14,489	15,169	15,389	15,583	7.55%

Household Forecasts

Table 3.6 contains the forecasts for households in the Old Colony region, from the number of households recorded in the 2010 Census through 2040. The number of households is expected to increase by 20.54 percent over the region, slightly behind the forecast total statewide growth of 23.74 percent.

Table 3.6: Household Forecasts

	2010 Census	Forecast Year			% Increase 2010 - 2040
		2020	2030	2040	
Massachusetts	2,547,075	2,830,145	3,044,477	3,151,722	23.74%
OCPC Region	129,490	143,521	152,908	156,069	20.53%
Abington	6,080	6,887	7,589	7,767	27.75%
Avon	1,709	1,793	1,902	2,008	17.52%
Bridgewater	7,995	8,946	9,553	9,626	20.40%
Brockton	33,303	34,967	35,465	35,668	7.10%
Duxbury	5,344	5,890	6,436	6,551	22.59%
East Bridgewater	4,750	5,327	5,613	5,737	20.78%
Easton	7,865	8,499	9,185	9,261	17.75%
Halifax	2,863	3,098	3,255	3,370	17.72%
Hanover	4,709	5,090	5,388	5,472	16.20%
Hanson	3,468	3,808	4,033	4,129	19.06%
Kingston	4,665	5,294	6,075	6,191	32.72%
Pembroke	6,298	6,904	7,263	7,384	17.24%
Plymouth	21,269	26,119	29,172	30,283	42.38%
Plympton	1,006	1,134	1,198	1,203	19.54%
Stoughton	10,295	11,178	11,754	12,217	18.67%
West Bridgewater	2,571	2,779	2,956	3,006	16.93%
Whitman	5,300	5,808	6,071	6,195	16.88%

Employment Forecasts

Table 3.7 contains the forecasts for employment in the Old Colony region, from the number of jobs recorded at the time of the 2010 Census through 2040. The number of jobs is expected to increase by 7 percent over the region, slightly behind the forecast total statewide growth of 10.13 percent.

Table 3.7: Employment Forecasts

	2010	Forecast Year			% Increase
	Employment	2020	2030	2040	2010 - 2040
Massachusetts	3,199,467	3,443,242	3,481,819	3,523,509	10.13%
OCPC Region	140,572	149,986	149,870	150,406	7.00%
Abington	4,032	4,503	4,505	4,520	12.10%
Avon	5,178	5,170	5,155	5,177	-0.02%
Bridgewater	8,025	8,733	8,720	8,758	9.14%
Brockton	37,160	36,707	36,602	36,763	-1.07%
Duxbury	3,563	3,665	3,607	3,625	1.74%
East Bridgewater	2,975	3,351	3,360	3,366	13.15%
Easton	10,440	10,287	10,271	10,314	-1.21%
Halifax	1,431	1,401	1,400	1,405	-1.81%
Hanover	7,299	7,436	7,322	7,349	0.68%
Hanson	2,158	2,060	2,063	2,066	-4.27%
Kingston	5,570	7,473	7,488	7,499	34.63%
Pembroke	4,987	5,144	5,072	5,083	1.93%
Plymouth	23,807	27,145	27,180	27,247	14.45%
Plympton	393	1,082	1,082	1,086	176.40%
Stoughton	13,777	15,365	15,585	15,642	13.54%
West Bridgewater	7,096	7,843	7,845	7,873	10.95%
Whitman	2,681	2,622	2,613	2,632	-1.84%

SUSTAINABILITY

Planning for sustainability is the defining challenge of the 21st century. Overcoming deeply ingrained economic and cultural patterns that result in resource depletion, climate instability, and economic and social stress requires holistic problem solving that blends the best scientific understanding of existing conditions and available technologies with the public resolve to act. Planning processes allow communities to look past immediate concerns, evaluate options for how best to proceed, and to move towards a better future. This Old Colony Planning Council’s Regional Policy Plan (separate document and plan from this LRTP) has the legal authority to act as the vehicle for guiding community development, the scope to cover the necessary functions and facilities, and the history of practice to inspire public acceptance of its policies. Planning can provide the necessary analysis, the requisite communitywide reflection and education, and the momentum required to respond to these monumental challenges (Godschalk and Anderson 2012, 7).

Sustainability encompasses an integrated set of social, economic and environmental principles where these spheres of our community work together to provide a better future for ourselves and future generations.

Embedded in this definition is the idea that we can take actions and adopt policies that will simultaneously create an equitable society, a strong economy, and healthy environment, both for us and our children. With careful planning and by working together, we can do this without sacrificing one part of this vision for another.

Conserving resources and reducing environmental impacts can begin at home. Efficient fixtures, appliances, and landscaping can help conserve water and energy. New systems and technology provide opportunities for the reuse of wastewater. Improved indoor air quality and increased daylight contribute to better health and comfort. More efficient sources of energy allow each household to decrease the amount of carbons entering the atmosphere and can save money as well.

The key to a successful sustainability vision is identifying those overarching principles and determining how they can be translated to specific places and programs. The following set of principles are intended to guide the work of the initiative and help define what sustainability means to our region. They are expressed as a vision for the kind of region and communities we want as we move forward into the 21st century.

What Makes A Sustainable Place?

Planning for sustainable places is a dynamic process through which communities plan to meet the needs of current and future generations without compromising the ecosystems upon which they depend by balancing social, economic, and environmental resources, incorporating resilience, and linking local actions to regional and global concerns (Godschalk and Anderson 2012, 4).

A **Sustainable Place** is where the use of resources resulting in emissions of greenhouse gases and other pollutants are going down, not up; where the air and waterways are accessible and clean; where land is used efficiently and shared parks and public spaces are plentiful and easily visited; where people of different ages, income levels and cultural backgrounds share equally in environmental, social and cultural benefits; where many needs of daily life can be met within a 20-minute walk and all may be met within a 20-minute transit ride and where industry and economic opportunity emphasize healthy, environmentally sound practices.

A model for sustainable communities includes neighborhoods sporting healthy amounts of green space and shared vegetable gardens; mass transit; biking and walking replacing the majority of automobile traffic; and mixed-use communities where schools, residences and commercial spaces are near each other and are powered by solar panels, geothermal heat pumps or windmills.

Sustainable communities are economically, environmentally and socially healthy and resilient and meet challenges through integrated solutions rather than through fragmented approaches. Sustainable communities take a long-term perspective, focusing on both the present and the future, well beyond the next budget or election cycle so that the needs of the current as well as

future generations are met with adequate resources. The success of a community's efforts to be sustainable depends on its members' commitment and involvement as well as leadership that is inspiring, effective and responsive.

Sustainability is a process of continuous improvement so communities constantly evolve and make changes to accomplish its goals.

SUSTAINABLE COMMUNITIES STRATEGY

At the heart of this Long Range Transportation Plan is a **Sustainable Communities Strategy (SCS)** that charts a course toward lower greenhouse gas emissions related to cars and light trucks, and proposes other measures to make the Region more environmentally sustainable. Reducing greenhouse gas emissions is a major goal for the Commonwealth and the nation. Rising emissions, chiefly carbon dioxide from the burning of fossil fuels, are increasing average temperatures around the globe. Those emissions are leading to numerous changes, including rising sea levels and shifting weather patterns. Climate scientists project that the effects of climate change include increasingly higher temperatures and more intense and frequent storms and droughts, among other consequences.

REDUCING GREENHOUSE GAS EMISSIONS, GIVEN THE POTENTIAL CONSEQUENCES OF CLIMATE CHANGE, WILL HELP BUILD A MORE SUSTAINABLE FUTURE GLOBALLY. THE PATH TOWARD SUSTAINABILITY REQUIRES LOWERING THESE EMISSIONS LOCALLY, COMBINED WITH OTHER STRATEGIES.

Sustainability planning and decision making are associated with a framework in which environmental protection and restoration, social equity and public well-being, and economic prosperity are addressed simultaneously, in an integrated way. Sustainability emphasizes achieving multiple benefits that advance multiple goals and objectives. Creation of frameworks for cooperation and collaboration that recognize holistic effects of development choices for the environment, social equity, and economic well-being are parts of sustainable planning. Planning for sustainable places includes a dynamic, democratic process through which communities plan to meet the needs of current and future generations without compromising the ecosystems upon which they depend by balancing social, economic, and environmental resources, incorporating resilience and linking local actions to regional concerns.

There are seismic shifts in thinking about how to grow, and new perspectives about how our region should invest in public transit, roads and highways, and other transportation infrastructure. It is becoming clear that people need more options for getting around than just the car. This is the basis of the current transportation network. Core principals of sustainable community development are considered in transportation planning activity, such as in corridor studies and other planning activities programmed in the Unified Planning Work Program.

New transportation investments will help us improve existing infrastructure with technology designed to help cut congestion and travel times. Strengthening our public transit system and other transportation choices where most of us live and work, meanwhile, will give us more options for getting around. In the MBTA system as a whole, the half-mile radii around rapid transit and commuter rail stations, representing just 5 percent of the region’s land area, hold 25 percent of its people and 37 percent of its jobs, and generate a disproportion and growing share of its real property valuation.

As we look to the future, we can learn about new modes of transportation and mobility that are being studied and in some case implemented around the world. Some of these ideas may work in our region. They may also be more cost-effective than other transit infrastructure investments. Future studies will assess the alternatives to existing transportation routes in several corridors.

Strategies include:

- A **land use pattern** that accommodates our region’s future employment and housing needs, and protects sensitive habitats, cultural resources, and resource areas.
- A **transportation network** of public transit, highways, local streets, bikeways, and walkways built and maintained with reasonably expected funding.
- **Managing demands** on our transportation system (also known as Transportation Demand Management, or TDM) in ways that reduce or eliminate traffic congestion during peak periods of demand.
- **Innovative pricing policies** and other measures designed to reduce the number of miles people travel in their vehicles, as well as traffic congestion during peak periods of demand.
- **Sustainability and Resilience:** The capacity to prepare for, navigate through, and recover from turbulent change. Can refer to responses to both natural and human caused disasters and threats (earthquakes, sea level rise).
- **Sustainability and Livability:** Sustainability is an extension of livability. Livability connotes aspects of “quality of life”. A concept used in planning for designing infrastructure and facilities to fit better in urban contexts, while also achieving certain mobility needs.

THE FOLLOWING DESCRIBE OUR PATH TOWARD SUSTAINABILITY IN CONCRETE STRATEGIES WE CAN UNDERSTAND AND BUILD UPON.

- **FOCUS HOUSING AND JOB GROWTH IN URBANIZED AREAS WHERE THERE IS EXISTING AND PLANNED TRANSPORTATION INFRASTRUCTURE, INCLUDING TRANSIT.** As local jurisdictions continue to update their comprehensive plans, they should be encouraged to continue to embrace *climate-smart* land use policies and

sustainable development. The Region should identify places with the potential to focus future high-density, mixed-use, and compact-walkable developments close to job centers, public services, and transportation access in areas of the region already served by water, sewer and other public amenities.

- **PROTECT THE ENVIRONMENT AND HELP ENSURE THE SUCCESS OF CLIMATE-SMART LAND USE POLICIES BY PRESERVING SENSITIVE HABITAT, OPEN SPACE, CULTURAL RESOURCES, AND FARMLAND.** These open space lands include habitat conservation areas, parks, steep slopes, farmlands, floodplains, and wetlands. Complementing plans for how our urbanized areas will develop protects parklands, open space, natural resource areas, and farmland.

- **INVEST IN A TRANSPORTATION NETWORK THAT GIVES PEOPLE TRANSPORTATION CHOICES WHILE REDUCING GREENHOUSE GAS EMISSIONS.** Our goal for a more sustainable future is one in which fewer people have to drive alone, and more people have increased travel choices available to them. These choices will include an ever-expanding, more accessible, and more convenient public transit system: carpooling; ridesharing, and more interconnected networks of biking and walking paths.

Climate Smart Communities

A Climate Smart Community believes that climate change poses a real and increasing threat to our local and global environments and is primarily due to the burning of fossil fuels. **THEY BELIEVE THE EFFECTS OF CLIMATE CHANGE WILL:**

- Endanger our infrastructure, economy and livelihoods;
- Harm our farms, orchards and ecological communities, including native fish and wildlife populations;
- Spread invasive species and exotic diseases, reduce drinking water supplies and recreational opportunities;
- Pose health threats to our citizens;
- Provide us with an unprecedented opportunity to save money, and to build livable, energy-independent and secure communities, vibrant innovation economies, healthy and safe schools and resilient infrastructures;
- Require the scale of greenhouse gas emissions reductions for climate stabilization contain a sustained, substantial effort; and
- Require adaptations by communities to the effects of climate change for decades to come even if emissions were dramatically reduced today.

Livable Centers

Livable Centers are places where people can live, work and play with less reliance on their cars. Livable Centers, with concentrations of residential and employment, support more trips by foot, bicycle, transit or carpool. The ideal Livable Center works to curb traffic congestion by reducing vehicle miles traveled (VMT), single-occupant vehicle trips and offering attractive alternatives through promoting walking, cycling, and public transportation.

**LIVABLE CENTERS ARE WALKABLE, MIXED-USE PLACES THAT PROVIDE
MULTIMODAL TRANSPORTATION OPTIONS, ENVIRONMENTAL
QUALITY AND PROMOTE ECONOMIC DEVELOPMENT.**

As we look to the future, we can learn about new modes of transportation and mobility that are being studied and in some cases implemented around the world. As our region grows, a quality transportation system will go a long way toward preserving our quality of life, even making it better than it is today. The way we get around impacts our environment, our wallets, and our physical and mental health. It impacts how much we exercise, the quality of the air we breathe, and the amount of money we have available to spend on other things. Our Long Range Transportation Plan reflects our commitment to a healthier and higher-quality daily life for the people in our region.

Other points of consideration which compose a Livable Center include:

- Improved environmental quality.
- Stronger sense of community.
- Continued economic development.
- Encourage mixed but complementary uses.
- Promote physical integration of urban development, either vertically or horizontally.
 - **Horizontal integration** refers to linking related topics such as land use, environmental planning, mobility and economic development. Smart mobility efforts have expanded to include not only urban land use and transportation integration but also environmental resource protection, regional economic development and social equity considerations.
 - **Vertical integration** refers to connecting regional level efforts with federal and state level policymaking. Some aspects of regional smart growth planning are implemented through county and city level use planning and regulations.
- Encourage appropriate levels of density depending on district size and context.
- Allow people to move between destinations without having to use vehicles.
- Provide multi-modal transportation options.
- Provide adequate parking without creating oversupply.
- Promote activity throughout the day, creating balanced transit ridership.

ENHANCING LIVABILITY MEANS:

- *Provide complete streets for multimodal transportation serving multiple functions.*
- *Providing housing and transportation choices for a range of demographic characteristics and economic means.*
- *Supporting bicycle facilities to promote bicycling for transportation, recreation, and healthy lifestyles.*
- *Aligning resources to support transit-oriented development and walkable places.*
- *Coordinate regional transportation investments with job clusters.*
- *Promoting healthy communities and active living through land use, planning and investments.*
- *Plan for infill development.*
- *Provide design standards appropriate to the regional context.*
- *Provide accessible public facilities and spaces.*
- *Conserve and reuse historic resources.*
- *Increasing access to nature and outdoor recreation through regional parks and trails.*
- *Implement green building design and energy conservation.*
- *Discourage development on unsuitable properties.*

Livability helps attract and retain the people and businesses that our region needs to thrive and compete economically. People are increasingly choosing where they want to live – especially in urban areas that offer attractive amenities and lifestyles – and then looking for jobs there. Young creative professionals today are highly mobile and can live anywhere they want. They are choosing high-amenity places that have a diverse population, a rich arts and entertainment culture, natural beauty, abundant recreation, and sufficient walkability and transit systems that allow them to travel without a car. Attracting younger talent through high-quality communities is also an investment in the future market for our housing stock. Many young urbanites look for more space as they have children and their lifestyle preferences change. As existing residents age out of their homes, these younger residents will be ready to move in. Businesses also place a high value on livability. Whether a large company seeking a location for an office or a talented entrepreneur looking to grow an innovative business, decision-makers want to know their employees can get to work and are happy living there.

Plan for improved health and safety for at-risk populations. An at risk population is characterized by vulnerability to health or safety impacts through factors such as race or ethnicity, socioeconomic status, geography, gender, age, behavior, or disability status. These populations may have additional needs before, during, and after a destabilizing event such as a natural or human-made disaster or period of extreme weather, or throughout an indefinite period of localized instability related to an economic downturn or a period of social turmoil. At-risk populations include children, the elderly, and persons with disabilities, those living in

institutionalized settings, those with limited English proficiency, and those who are transportation disadvantaged.

Provide accessible, quality public services, facilities, and health care to minority and low-income populations. A public service is a service performed for the benefit of the people who live in the jurisdiction. A public facility is any building or property owned, leased, or funded by a public entity. Public services, facilities, and health care should be located so that all members of the public have safe and convenient transportation options to reach quality services and facilities that meet or exceed industry standards for service provision. Minority and low-income populations are often underserved by public services and facilities and health care providers.

THE OLD COLONY PLANNING COUNCIL WILL ENSURE THAT ALL ELEMENTS OF THE BUILT ENVIRONMENT, INCLUDING LAND USE, TRANSPORTATION, HOUSING, ENERGY, AND INFRASTRUCTURE, WORK TOGETHER TO PROVIDE SUSTAINABLE, GREEN PLACES FOR LIVING, WORKING, AND RECREATION, WITH A HIGH QUALITY OF LIFE.

Because the built environment shapes quality of life for the entire region, sustaining its livability and ensuring that it functions at the highest possible level are priorities of the Council. Every community can strive for better livability, but the needs and challenges for infrastructure and place-making vary widely by location. The built environment is a complex system made up of many interacting and dynamic elements; the challenge is sustaining and coordinating the overall system as well as its component parts.

A neighborhood in the urban core may need wider sidewalks, shared open spaces, careful building detailing, and a mix of activities to be livable. A suburban neighborhood may need increased housing options and more bike trails to access parks and transit stops. A rural center may need a traffic-calmed main street that allows pedestrians to cross more safely or renovated downtown buildings to catalyze reinvestment.

Livability for all areas also requires the network of businesses – whether an ethnic restaurant owned by new immigrants or the small-town bar owned by the same family for generations – that makes our communities unique, both supporting local residents and attracting visitors from across the world. Each jurisdiction has a unique combination of natural landscape, built environment, and local culture; communities that recognize and value their particular character, needs, and opportunities can more effectively invest in their future.

Promote the upgrade of infrastructure and facilities in older and substandard areas. Infrastructure comprises the physical systems that allow societies and economies to function. These include water mains, storm drains, municipal sewer systems, electrical grids, telecommunications facilities, and transportation facilities such as bridges, tunnels and roadways. Upgrading is the process of improving these infrastructure and facilities through the addition or replacement of existing components with newer versions. An older area is a

neighborhood, corridor, or district that has been developed and continuously occupied for multiple decades. A substandard area is a neighborhood, district, or corridor with infrastructure that fails to meet established standards. Targeting infrastructure in older and substandard areas provides a foundation for future community revitalization efforts and improves quality of life for residents in these neighborhoods.

Healthy community. Ensure that public health needs are recognized and addressed through provisions for healthy, locally grown foods, physical activity, access to recreation, health care, environmental justice, and safe neighborhoods.

- **Reduce exposure to toxins and pollutants in the natural and built environments.** Toxins are poisonous substances capable of causing disease in living organisms. Pollutants are waste substances or forms of energy (noise, light, heat), often resulting from industrial processes, that can contaminate air, water, and soil and cause adverse changes in the environment.
- **Plan for increased public safety through the reduction of crime and injuries.** Public safety involves prevention of and protection from events such as crimes or disasters that could bring danger, injury, or damage to the general public.
- **Plan for the mitigation and redevelopment of brownfields for productive uses.** Redevelopment of brownfield sites requires an environmental assessment to determine the extent of contamination and to develop remediation strategies. The feasibility of site cleanup, market forces, and other factors may help define appropriate reuse options, which range from open space to mixed-use development.
- **Plan for physical activity and healthy lifestyles.** Barriers to the design of the physical environment can influence rates of physical activity and health benefits. Active transportation facilities and accessible, equitably distributed recreational opportunities support physical activity and healthy lifestyles.
- **Provide accessible parks, recreation facilities, greenways, and open space near all neighborhoods.** These facilities offer a range of benefits to residents, including opportunities for increased physical activity. The proximity of parks to neighborhoods supports increased physical activity among residents; however, social and environmental impediments such as crime, unsafe pedestrian conditions, and noxious land uses may decrease accessibility and subsequent use of these facilities. Plans should ensure that the type of park and its function and design are appropriate for its locational context.

- **Plan for equitable access to health care providers, schools, public safety facilities, and arts and cultural facilities.** Equitable access ensures services and facilities are reachable by all persons, regardless of social or economic background.

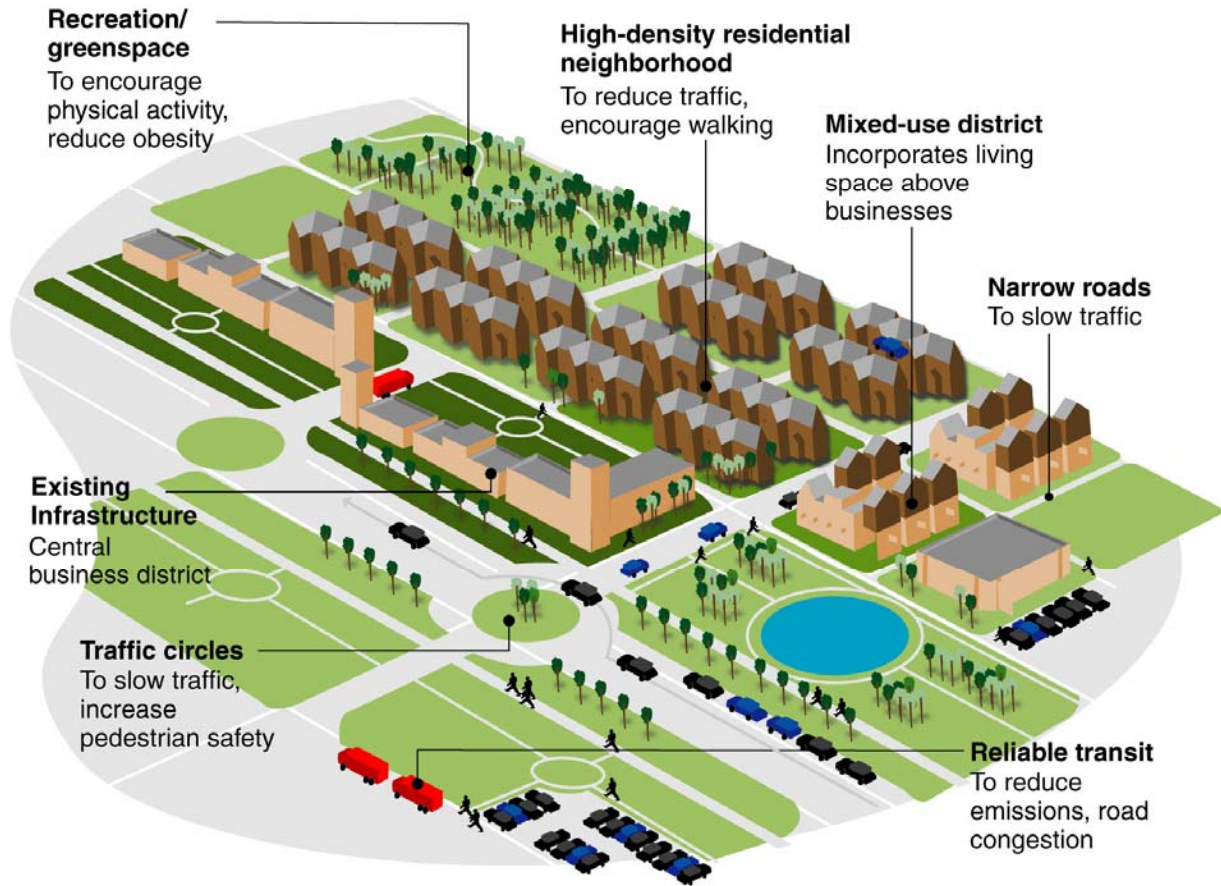
What does a sustainable community look like?



Figure 3-4: Pictograph of an example of a sustainable community

Building a greener community

A look at one model for urban growth promoted by the nonprofit U.S. Green Building Council to reduce sprawl and to make communities more environmentally responsible:



Source: U.S.Green Building Council, Beaufort County Planning Department
Graphic: Drew Martin, The Island Packet (Hilton Head, S.C.)

© 2007 MCT

Figure 3-5: Pictograph of an example of a green community

The Old Colony Planning Council will support climate smart communities that are healthy, livable, and energy-independent and secure, with vibrant, innovative economies, an interconnected network of resilient infrastructure that adopts sustained and substantial greenhouse gas emission reduction policies that protect the natural resources for the benefit of future generations.

The development of “Livable Centers” within the Growth and Infill areas is fundamental to achieving the preferred regional strategy for land use, transportation and environmental balance.

- **Livable centers support existing communities:** They attract public investment to encourage sustainable pattern of population and employment growth that maximizes the use of areas already served by roads and utilities.
- **Livable Centers are connected:** They promote regional connectivity and are supportive of public transportation.
- **Livable Centers are compact:** They support a vibrant mix of uses within a concentrated, accessible area.
- **Livable Centers are walkable:** They promote non-motorized opportunities for pedestrians and bicyclists and provide convenient and safe alternatives to driving for local trips.
- **Preserving the Region’s rural character and resources:** The regional plan focuses on the protection of natural resources while supporting the agricultural and rural economy.
- **Develop our local food systems:** Food, like water and shelter, is essential for sustaining us. An objective of the Regional Plan is to foster the development of local food systems and a local food economy. The success of our local food system will depend on creating efficient ways of getting local foods from our fields to our residents. Transporting local foods to their destination is one piece of the puzzle. The other is getting residents to the distribution centers (grocery stores, farm stands, farmers markets in urban centers). At this time, there are limited public transit options that provide convenient access to local food.
- **Local food and land use:** With a large portion of our region’s land devoted to agriculture, the Regional Plan targets managed growth to protect these areas. There are also many opportunities to convert vacant urban properties into a network of urban farms, creating a direct link for low-income communities to access high-quality produce.
- **Local Food and the environment:** Growing a local food system has the potential to protect and enhance our environmental assets. As such, local food can be a tool to advocate for the health of the soil and water resources in our region.

PROMOTING HOUSING AND TRANSPORTATION CHOICES FOR A RANGE OF DEMOGRAPHIC CHARACTERISTICS AND ECONOMIC MEANS

Over time, our region has grown into a variety of communities and neighborhoods with a wide range of housing. According to the American Community Survey 2012-2016 5-Year Estimates, single-family homes comprise 67.26 percent of our region’s current housing stock. Some communities in our region have greater than 85 percent of the housing stock comprised of single family dwellings. Demand for this housing stock is projected to continue, but the segments of our population that are growing will consist of households that may increasingly prefer alternative forms of neighborhoods. The livability challenge around these shifts is to create communities that offer satisfying experiences and meet the daily needs for living,

shopping, working, and recreation for each group, not simply housing developments that offer a place to own or rent.

As residents' age, their needs, preferences, and travel behavior shift; some communities may be poorly designed to accommodate their residents' future needs. Growing cohorts of residents, including international immigrants and young professionals living alone, may need housing and transportation choices beyond what our region now offers. Going forward, each jurisdiction should examine whether it offers satisfying living options to attract and maintain a competitive workforce and meets the needs of current residents as they age.

TO SUPPORT THE LIVABILITY OF OUR REGION FOR OUR CHANGING DEMOGRAPHICS, THE COUNCIL WILL:

- *Encourage and invest in a wide variety of housing options throughout the region to serve the increasingly diverse population, including viable housing choices for low-and moderate-income households and multigenerational households.*
- *Invest in bus service and transit to expand the spectrum of transportation options, particularly to connect workers to jobs and opportunities throughout the region.*
- *Support and encourage Complete Streets approaches to enhance transportation choices (highways, streets and roads designed to consider the needs of pedestrians, bicyclists, transit users and vehicles, motorists, and commercial and emergency vehicles, and to serve all ages and abilities).*
- *Promote the preservation of existing housing, especially affordable housing, to cost-effectively maintain affordability and preserve the unique historical characteristics of the region's housing stock.*

Chapter 4: The Regional Highway System

The Old Colony Region's dependence upon motor vehicles for the movement of both people and goods has been an integral component for the growth and viability of the region in the past, and is expected to continue to be integral to the region's viability in the future, despite the growth in alternative transportation modes and telecommuting. The old relationship of suburb to core city, which was manifested in commuting between Old Colony's communities to Boston, has evolved as more destinations for employment have become dispersed throughout the region, many along Old Colony's regional highway network. Growth in the region in retail and industry has transformed the regional road network placing more emphasis on our highways as destinations and trip generators in addition to their function as connectors between towns and cities. As residential, retail, and employment areas became more dispersed due to dependency on the automobile, the function of the roads within the network has become more dynamic and complex. Many of the major highway corridors within the region serve as retail and employment destinations as well as heavy commuter corridors, (and some include a mix of dense residential uses as well). This has resulted in congestion due to bottlenecks within town centers and within specific locations within corridors, a lack of proper access management, and a lack of multi-modal accommodations. The scattering and dispersal of development throughout the roadway network has been a challenge for mode shift in the region to motor vehicle alternatives such as transit, walking, and bicycling.

Despite the growth along highway corridors and continued dependence on motor vehicles, Massachusetts and the region do slightly better than the national average when it comes to mode choice. According to the Massachusetts Department of Transportation (MassDOT), each day, over 3.2 million workers living in Massachusetts commute to their workplaces. Over 2.3 million, or 72 percent, drive their car, compared to 86.1 percent nationwide. Approximately 405,000 Massachusetts commuters, or 12.6 percent, take transit, compared to 5.0 percent in the US. Approximately 153,000 Massachusetts commuters, 4.8 percent, walk to work, compared to 2.9 in the US. In Massachusetts, approximately 56,000 commuters, 1.7 percent, ride a bicycle to work, compared to 0.5 percent in the US. The remaining commuters in Massachusetts, 290,000 or 9.0 percent, use other means, including 6.5 percent who work at home, compared to 5.1percent who work at home nationwide. The OCPC Region offers a number of transit opportunities including bus (BAT and GATRA), as well as commuter rail.

This section of the plan includes a review of the existing physical conditions and the existing operational conditions, and deficiencies as well as potential opportunities, of the Old Colony Regional Highway System.

FEDERAL AND STATE GUIDELINES

Federal and state guidelines for the Long Range Transportation Plan require that the plan reflect local and state goals, as well as national goals and objectives. The guidance requires that the plan reflect trends in demographics and land use as well as regionally relevant transportation and transportation technology trends.

Recommendations to Meet the Transportation Future

Governor Charlie Baker issued an executive order in January of 2018, which established the Commission on the Future of Transportation in the Commonwealth. The order required that, “The Commission shall, at a minimum, investigate the following topics... that may affect transportation.” These topics include:

1. Climate and Resiliency
2. Transportation Electrification
3. Autonomous and Connected Vehicles
4. Transit and Mobility Services
5. Land Use and Demographics

The commission produced a report on the future of transportation in Massachusetts entitled: *Choices for Stewardship: Recommendations to Meet the Transportation Future*. This report outlined important issues for Massachusetts that are also reflective of issues facing the Old Colony Region. These include:

Growth and Changes in Population Demographics – The population is growing in eastern Massachusetts and in the Old Colony Region. In addition, the region is expected to see increases in job growth as well as those in the over 65 age bracket.

Growth in Alternative Transportation – The use of commuter rail as well as walking and bicycling is trending upward in Massachusetts as well as in the Old Colony Region.

The Potential for Autonomous Vehicle Use – Massachusetts has begun testing the use of Connected Vehicles (vehicles able to communicate with road and traffic infrastructure for the purposes of safer and more efficient driving), and Autonomous Vehicles.

The Impacts of Climate Change - The impacts of climate change are happening both sooner and more intensely than originally thought with significant implications by 2040 without strong actions now. The Northeast will see the largest temperature increases in the contiguous United States, among other changes. Transportation infrastructure is affected by climate change. People travel differently in extreme weather, and weather not only wears on infrastructure, but infrastructure has physical reactions to extreme weather conditions, including damaged or obstructed roads and sidewalks or warped rail lines. In Massachusetts, almost 40 percent of all GHG emissions in 2015 came from transportation infrastructure and vehicles, with nearly half of the contributions coming from passenger vehicles alone. Without further action, transportation sector GHG emissions are projected to increase.

Transportation Electrification

Electric vehicles (EVs) are part of the solution to transportation-related emissions, but adoption remains slow. In 2017, 12,000 EVs were on the road in Massachusetts, and 1.4 percent of all light-duty vehicles sold in the Commonwealth were electric. A future of electrified

transportation will require a regional electricity grid able to consistently supply sufficient power, as well as a comprehensive network of charging facilities.

In their *Choices of Stewardship: Recommendations to Meet The Transportation Future* report, Governor Baker's Commission on the Future of Transportation in the Commonwealth highlighted the importance of transportation electrification. The Commonwealth has a goal of having 300,000 electric vehicles on the road by 2025. Including electrification of its own fleets and a pilot program for electrification in Regional Transit Authority fleet vehicles. The Massachusetts Offers Rebates on Electric Vehicles (MOR-EV) will provide a \$2,500 rebate to consumers purchasing electric vehicles.

Massachusetts Department of Transportation Directives and Review Process

The Massachusetts Department of Transportation (MassDOT), in its transportation impact review process and in its project development process, advances a number of policies, goals, and objectives. These are included in MassDOT's *Project Development and Design Guide* standards on Complete Streets, the *Global Warming Solutions Act*, the *Mode Shift Initiative*, the *Healthy Transportation Compact*, the *Healthy Transportation Policy Directive*, the *Massachusetts Ridesharing Regulation*, and the Safe Routes to School program. The Massachusetts Department of Transportation's Policy (established in 2010) is a comprehensive environmental responsibility and sustainable initiative, which integrates sustainability principles into all aspects of the way MassDOT plans, designs, builds, and operates the transportation system. MassDOT Policy aims to reduce greenhouse gas (GHG) emissions, promote healthy transportation options (walking, bicycling, and public transit), and support smart growth development.

Old Colony's development of goals, objectives, plans, and projects, as well as its transportation review (MEPA) process, supports and advances MassDOT policies and goals as outlined in its statutes, directives, guidelines, and standards.

In addition, in 2012, MassDOT announced a visionary statewide mode shift goal of tripling the share of travel in Massachusetts by bicycling, transit and walking between 2010 and 2030. Making other modes absorb the current and future travel demand preserves the capacity of the highway network, protects the natural environment, and improves public health. This multi-agency approach to incorporating environmental responsibility and stewardship is a key component in preserving

THE REGIONAL ROADWAY NETWORK

Limited access highways provide interstate travel and interregional access. The region includes a number of limited access highways including Interstate 495, Route 24, Route 3, and Route 44. In the Old Colony Region, there are several major arterials (mostly state numbered routes) providing interregional and intraregional travel; numerous collector roadways that provide access to the arterial and limited access highway network; and a sizable amount of local

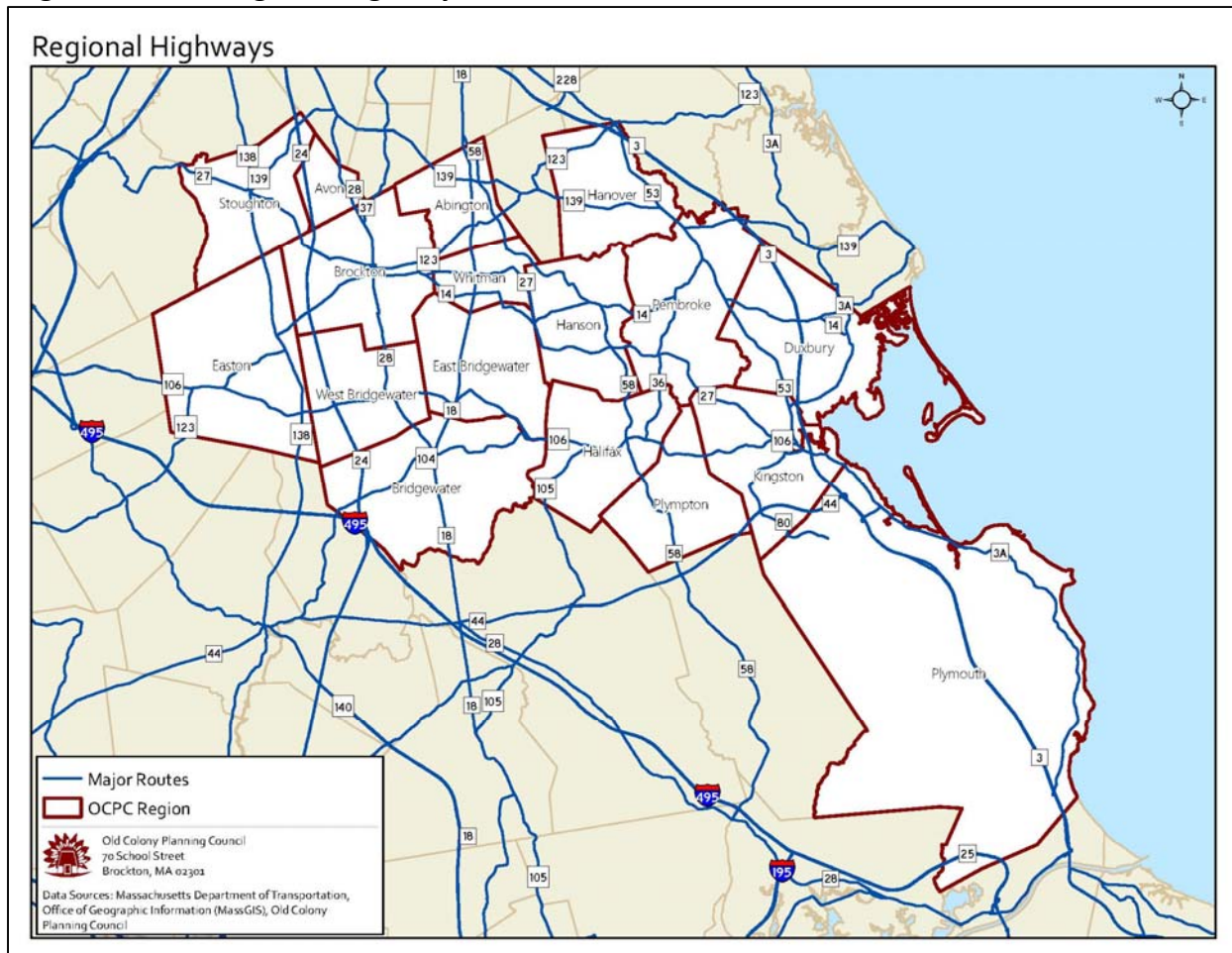
roadways providing access to residences, businesses, and community centers. Figure 4-1 shows the Old Colony Region Roadway Network.

Route 3 (Pilgrims Highway) and Route 24 (AmVets Memorial Highway) were both constructed in the 1940s and 1950s; however, their designs do not meet the interstate highway standards. Both limited access highways provide north-south connection from the south shore to metro Boston and have multiple interchanges in the Old Colony Region. Traffic on Route 3 and Route 24 has grown substantially over the past decades due to high commercial and residential growth along the secondary arterials and collectors that provide access to these limited access highways. The connections that each highway provide result in higher traffic volumes, congested conditions, and safety issues at the interchanges within the Old Colony Region as well as along these two key north-south arterials.

Route 44 is a limited access divided highway in the Old Colony Region, which traverses Plymouth, Kingston, and Plympton. In Middleboro west of Route 18, it transitions into a two lane undivided major arterial. Route 44 is the only high volume, high speed arterial roadway providing east-west connection from Route 3 in the east to Route 24 in the west. The Route 44 interchanges in the Old Colony region were recently constructed (2005) and generally accommodate the traffic volumes sufficiently.

The Old Colony Region has a number of state numbered routes classified as principal arterials and minor arterials that run north south or east west providing interregional and intraregional access. Many of these routes go through downtown areas within the Old Colony Region, which have the traditional and historic characteristics found in many New England communities. These areas sometimes contain non-conventional intersections which were originally laid out in the pre-automobile times, with skewed intersection alignments, intersections in close proximity, and five-leg or more approaches. In addition, the land use along these state numbered routes has evolved over the past decades. Much of the land use has been developed for commercial and office uses, or dense (apartment or condominium) residential development. The phenomenon whereby adjacent land use of these regionally significant roads have become more developed, has evolved the function of these principal highways so that they have become destinations as well as regional corridors, which impacts the capacity of the highways.

Figure 4-1: The Regional Highway Network



Traffic Volumes and Trends

The Old Colony Planning Council collects traffic volumes each year utilizing automatic traffic counters. These traffic counts are archived and documented in OCPC's *Old Colony Traffic Volumes Report*. The historic traffic counts are utilized to discern changing patterns and trends in the regional road network. Along with the traffic volumes, the counts conducted by Old Colony Planning Council include truck traffic (the percentage of truck volumes in the traffic), and vehicle speeds (including the 85th percentile speeds). Traffic counts taken on roads in the region from other sources, including MassDOT, are also included in the OCPC *Old Colony Traffic Volumes Report*. Traffic volumes are an important component of transportation planning. Knowledge of current and historic traffic volumes allows planners and engineers to calculate the rate of traffic growth, expected vehicle emissions, and plan for traffic, pedestrian, and bicycle safety.

The OCPC Region, maintains its traditional commuter pattern with commuters traveling north to Boston and the Boston area during the morning commute and south back to the region during the afternoon commute; however, the current trends show that employment has

become dispersed throughout the region with employment centers spread over a wider area, along major and minor arterials, (mostly state numbered routes), and commuters traveling farther distances between home and work.

Figure 4-2 shows the average daily traffic on the Region's road network. It shows that Route 3 and Route 24, (two limited access highways), supplemented by Route 28, Route 18, and Route 58, provide north south access throughout the region. Interstate 495 in Bridgewater is the only interstate highway in the region, which has a northwest southeast orientation. Other state routes in the region that provide east west access in the region include Route 106, Route 27, Route 14, Route 123, and Route 139.

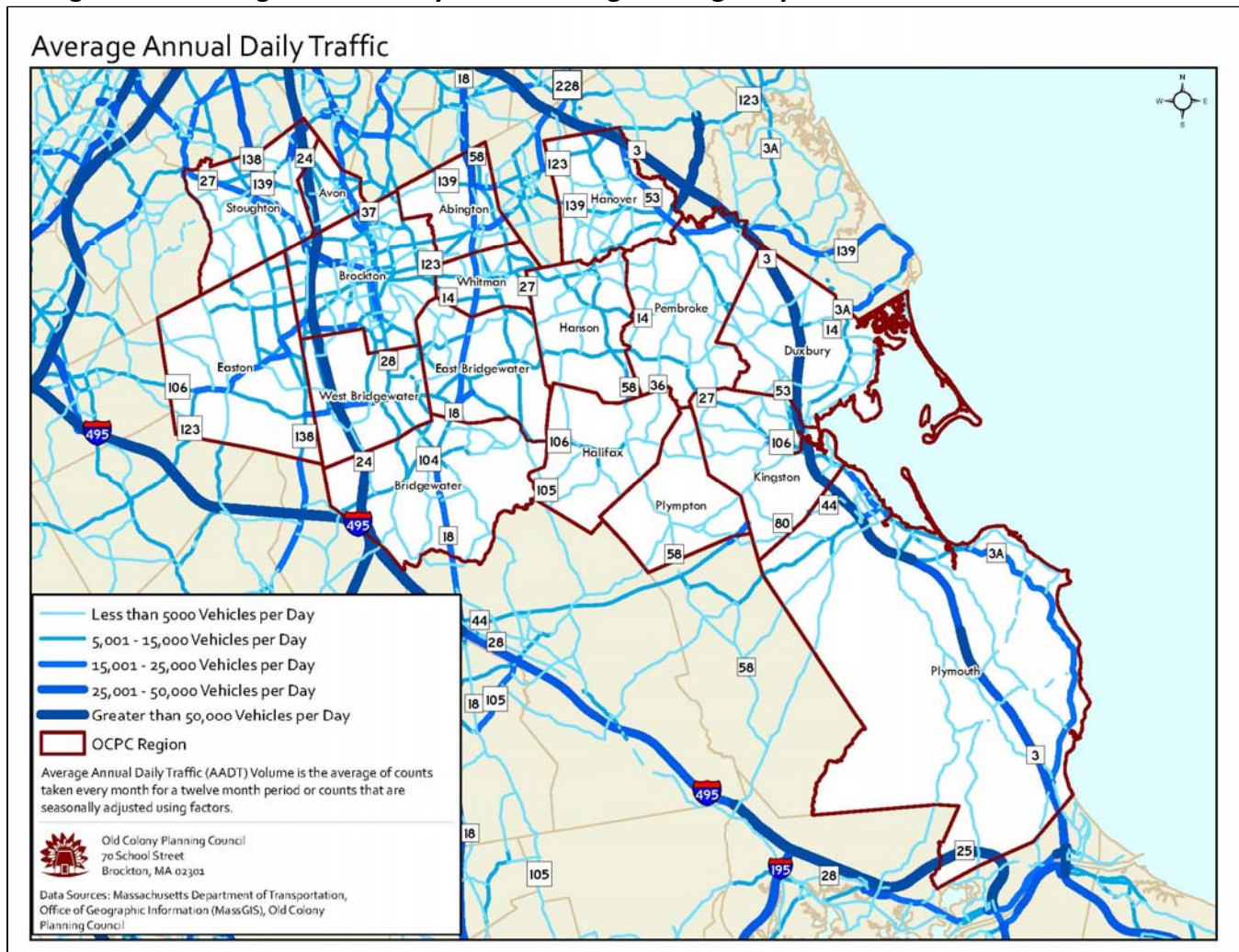
Employers, attracted by land availability and lower costs, are increasingly locating office centers in suburban settings such as Stoughton, Avon, East Bridgewater, and West Bridgewater. This increase in the dispersal of employment opportunities along the major and minor (state route) network has created an increase in suburb-to-suburb trips. Traffic volumes in the region are heaviest on the limited access highways and the state numbered routes, which provide the most direct connections between communities and provide connections to other principal arterials for interregional travel.

The changing land patterns in the Region and the redevelopment of industrial properties, which have been adapted for other mixed uses such as residential, commercial, and office, provide some opportunities to reduce the length and number of auto trips and also to make better use of transit and intermodal connections; however, it also creates a situation in which arterials and major collectors play an increasing role in regional travel and travel between communities. These arterials and collectors become destinations and evolve to serve a dual purpose. They provide interregional access and access to adjacent properties, which increases turning vehicle conflicts along the corridors, thereby reducing capacity.

Over the latest five years of traffic counts, traffic volumes on Route 3 (Duxbury, Plymouth, and Kingston) have fluctuated, but overall, they have either decreased or remained the same except in Pembroke, which experienced a five percent overall increase. On Route 24, traffic volumes have also fluctuated within the latest five years of traffic counts, but overall, they remained about the same in Stoughton and Avon. Route 24 volumes in Brockton increased overall about 3.5 percent within the latest five years of traffic counts. Traffic volumes on Route 24 in Bridgewater and West Bridgewater overall have remained about the same. The Region has a number of major and minor arterials for east west travel; however, most east west state numbered routes are two lane facilities. The lack of limited access highways for east-west limited access highway connectivity results in higher traffic volumes on the east-west state numbered route system (i.e. – Route 106 and Route 27), which results in bottle necks and congestion at specific locations. Route 106 in West Bridgewater west of the Route 28 intersection is particularly problematic. The afternoon commute traffic volumes on Route 106 are higher than what the facility is designed to handle, which results in daily backups. Other

state numbered routes with high east west volumes include Route 123 and Route 27 in Brockton, and Route 53 in Pembroke.

Figure 4-2: Average Annual Daily Traffic on Regional highway Network



Pavement Conditions

The Old Colony Region has maintained a Pavement Management System (PMS) since the 1980's. Since that time, the system has been updated in keeping with the principles of objectives-driven, performance-based planning, and in fulfilling its goal of keeping the highway system in a state of good repair. A Pavement Management System (PMS) is defined by various public works and state departments of transportation as a set of tools or methods that can assist decision makers in finding cost effective strategies for evaluating, and maintaining pavements in a serviceable condition. The goal of a pavement management system is to maximize the value and life of the pavement surface by planning for the repair and maintenance of the road network. A well-maintained system in good repair reduces delays due to long reconstruction periods, enhances freight movement, improves economic vitality, and

provides opportunities to implement Complete Streets strategies (improving the sidewalk and bicycle facilities network).

The Old Colony Region's PMS calculates the rate of deterioration of pavement and the implications for the cost of repairs. It calculates a Pavement Condition Index (PCI) score between 0 and 100 for the surveyed road segments and recommends a repair and cost based on the PCI score. Each road or road segment is placed in a condition category based on the PCI. The condition categories include "Poor" PCI between 0 and 60, "Deficient" PCI between 61 and 72, "Fair" PCI between 73 and 85, "Good" PCI between 86 and 92, and "Excellent" PCI between 93 and 100.

Old Colony conducts its windshield surveys of the pavement surface every four years for federal aid roads and also supplements the data on an ongoing basis, as pavement reconstruction and resurfacing projects are completed on federal aid roads through the Old Colony Transportation Improvement Program (TIP). The repairs recommended by the PMS, based on the road condition, include five general default repair strategies. These include:

1. Reconstruction – This work includes a combination of a number of tasks, including: complete removal and replacement of a failed pavement segment, road sub-base replacement (gravel, sand, and aggregates), drainage work, road realignment, and safety hardware (guard rail) installation.
2. Rehabilitation – The rehabilitation of pavements may include full and partial depth patching, joint and crack sealing, grouting and under-sealing, and grinding and milling in conjunction with overlays over two inches.
3. Preventative Maintenance – This work may include extensive crack sealing, chip sealing, and micro-surface or overlays less than two inches thick.
4. Routine Maintenance – This work may include crack sealing and pothole patching.
5. No Immediate Maintenance or Repair.

There is a total of 669.34 miles of Federal-Aid eligible roadways in the Old Colony region. The total NHS mileage in the Old Colony Region is 158.59 miles. The estimated cost for improving the entire Federal Aid eligible roadway network to a state of good repair (PCI score of "Good" or "Excellent" is more than \$210,000,00.00, The total interstate mileage is 1.2 miles, which is I-495 entirely in Bridgewater. Table 4-1 shows the federal aid mileage for each community as well as the NHS mileage for each community.

Table 4-1 Federal Aid Mileage and NHS Mileage in the Old Colony Region

Community	Federal Aid Mileage	NHS Road Mileage
Abington	25.64	7.07
Avon	15.19	4.00
Bridgewater	43.87	11.38
Brockton	85.99	25.59
Duxbury	51.30	13.48
East Bridgewater	34.37	4.42
Easton	44.17	11.16
Halifax	15.45	0.00
Hanson	28.44	4.31
Hanover	37.14	5.70
Kingston	38.00	11.18
Pembroke	39.71	7.28
Plymouth	106.69	22.85
Plympton	12.12	0.58
Stoughton	42.23	12.47
West Bridgewater	29.45	10.44
Whitman	19.58	6.68
Total	669.34	158.59

The only interstate mileage in the Region is I-495 in Bridgewater, which consists of 1.2 miles (center lane miles). One-hundred percent of the interstate are categorized in the “Excellent” condition category.

Figure 4-3 shows existing pavement conditions in the Old Colony Region, and Figure 4-4 shows the Recommended Pavement Repairs for the federal aid roads in the region.

Figure 4-3: Existing Pavement Conditions

Pavement Conditions

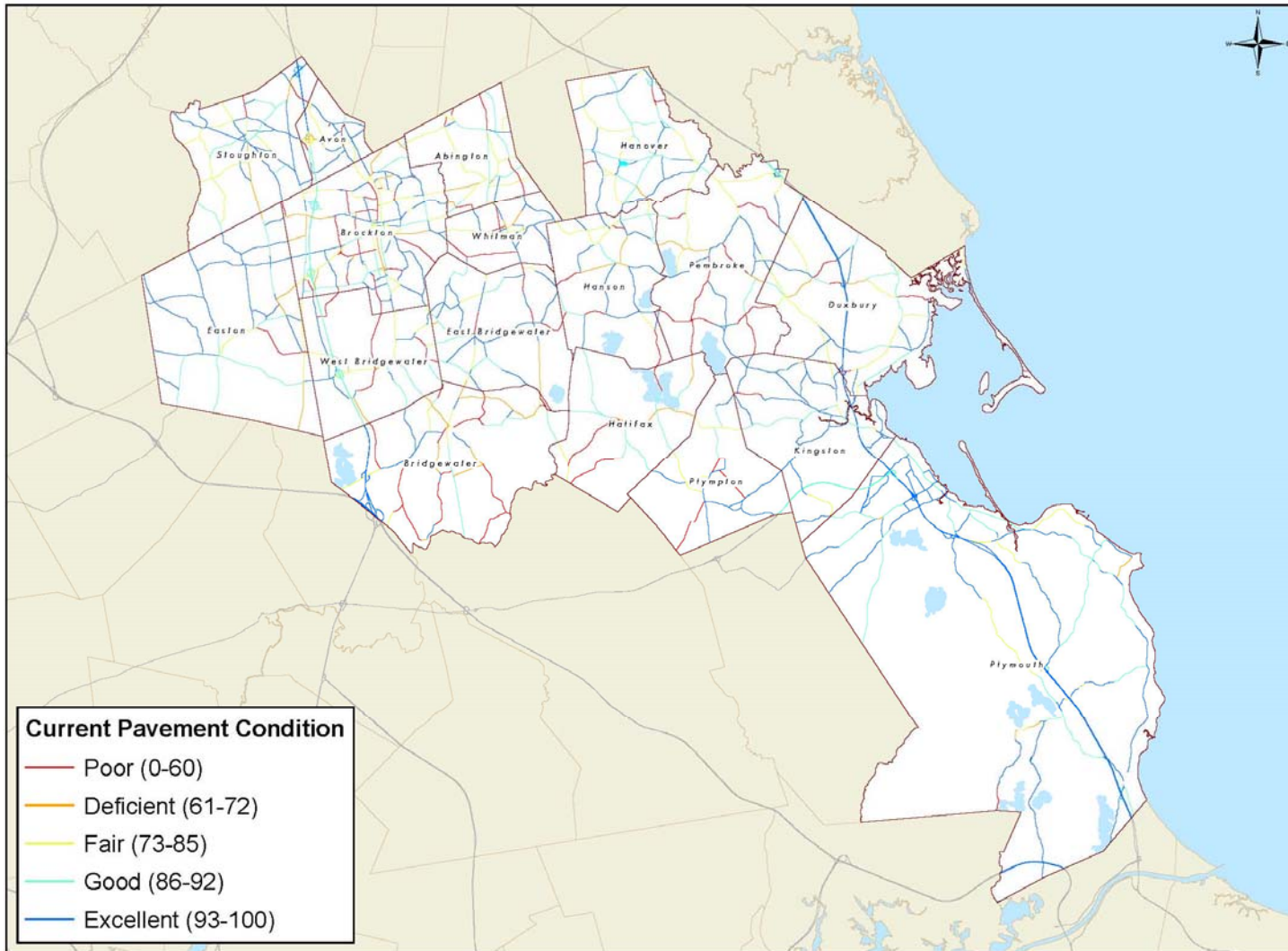
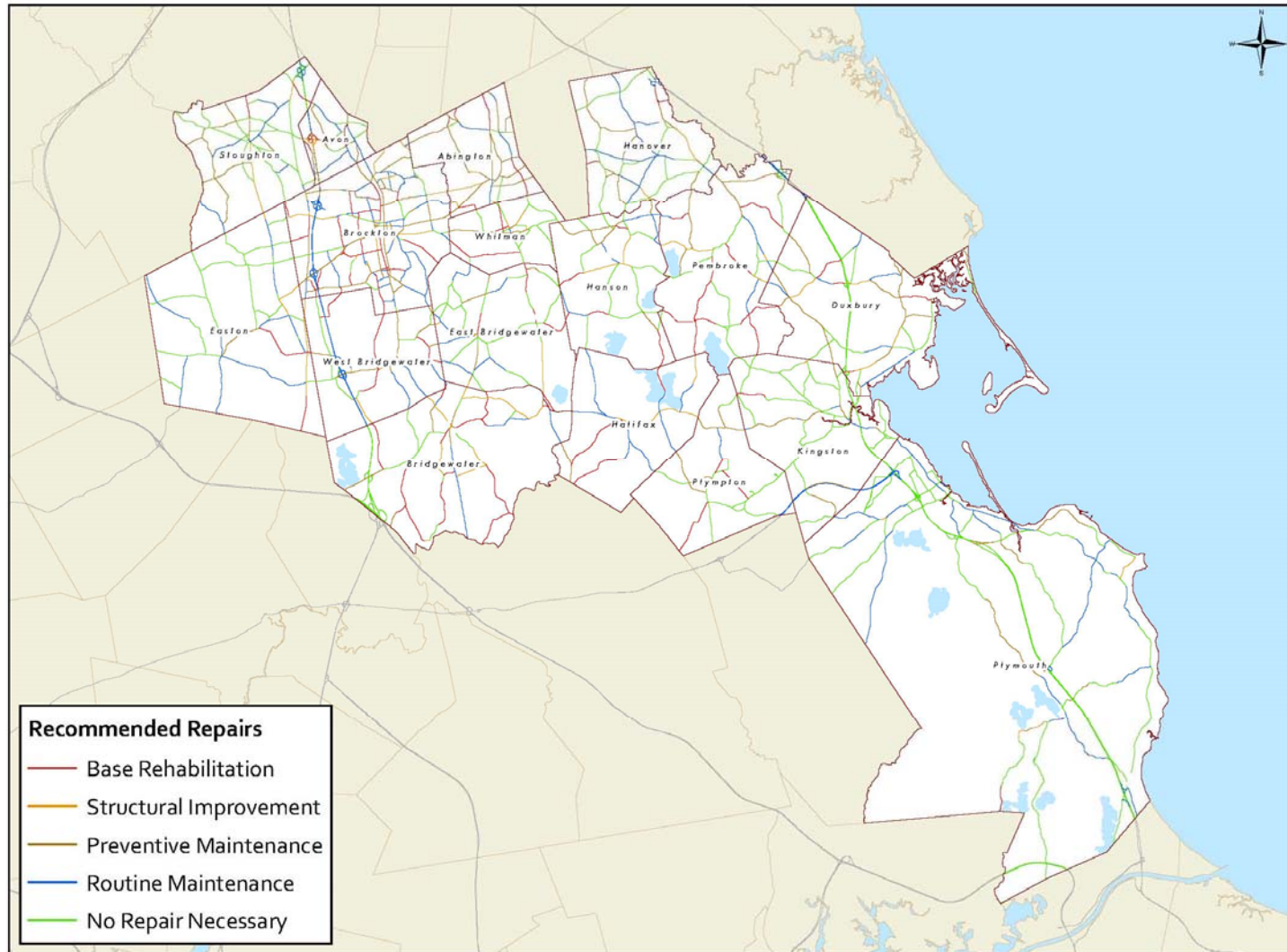


Figure 4-4: Recommended Pavement Repairs

Pavement Recommendations



Truck Freight

The *Massachusetts Freight Plan* completed in April of 2018 was developed to meet requirements under the “Fixing America’s Surface Transportation” (FAST) Act. This federal transportation act required the state to “...develop a freight plan that provides a comprehensive plan for the immediate and long-range planning activities of the State with respect to freight.” The plan was the result of collaboration with Massachusetts’ Metropolitan Planning Organizations (MPOs). It identified critical urban and rural freight corridors for inclusion on the National Highway Freight Network alongside Primary Freight Routes and the Interstate Highway System. This Freight Plan identified freight investments for fiscal years 2018 through 2022.

The “Fixing America’s Surface Transportation” (FAST) Act outlined requirements and policy goals. These included:

- Identify significant freight system trends, needs, and issues.
- Describe policies, strategies, and performance measures that will guide freight-related transportation investment.
- List facilities on the National Multimodal Freight Network, including critical urban and rural freight corridors.
- Describe how MassDOT will meet national multimodal freight policy goals and the National Highway Freight Program goals.
- Consider innovative technologies, including Intelligent Transportation Systems (ITS).
- Describe preventive measures taken to preserve the condition of roadways projected for significant deterioration due to heavy vehicle usage.
- Inventory major freight bottlenecks and list strategies to resolve them.
- Consider the delay caused by freight movements, with mitigation strategies.
- List priority projects and describe how funds made available will be invested and matched.
- Document consultation with a Freight Advisory Committee.

The *Massachusetts Freight Plan*², through its outreach process, which included a Freight Advisory Committee (chaired by the MassDOT Highway Administrator and met on a number of occasions to discuss elements of the plan) set five overarching performance goals. The performance goals include:

- Customer Experience - The freight system should work for all its customers: shippers, carriers, consumers, workforce, and communities.
- System Condition - The condition of the freight system should be improved to ensure an efficient and reliable supply chain.

² Membership in the Freight Advisory Committee included the public sector (ports and municipalities), industry, and representation from neighboring states.

- Budget and Capital Performance - Capital budgets should be set in part using freight performance metrics, to ensure that the benefits of projects for freight uses are properly considered in decision-making.
- Safety - Freight movement should be safe for operators, motorists and passengers, bicyclists, and pedestrians, in urban, suburban, and rural areas.
- Healthy and Sustainable Transportation - The freight system should not adversely impact the health and livability of the communities it touches, and it should contribute to the achievement of a 25% statewide reduction in GHG.

The FAST Act repealed the Primary Freight Network and the National Freight Network, which were established under the Moving ahead for Progress in the 21st Century Act (Map21), and directed the FHWA Administrator to establish a National Highway Freight Network (NHFN) toward improved performance of highways for the freight systems. The NHFN is made up of four components:

1. The Primary Highway Freight System (PHFS); the most critical highway portions of the U.S. freight transportation system. This consists of 41,518 centerline miles (37,436 Interstate centerline miles; 4,082 non-Interstate centerline miles.)
2. The remaining portion of Interstate roads not included in the PHFS, approximately 9,511 Interstate centerline miles.
3. Critical Rural Freight Corridors (CRFCs): Public roads not in an urbanized area that provide access and connection to the PHFs and the Interstate with other important ports, public transportation facilities, or other intermodal freight facilities.
4. Critical Urban Freight Corridors (CUFCs): Public roads in urbanized areas that provide access and connection to the PHFS and the Interstate with other ports, public transportation facilities, or other intermodal facilities.

Massachusetts is allocated 150 miles of Critical Rural Freight Corridor (CRFC) mileage and 75 miles of Critical Urban Freight Corridor Mileage (CUFC). The Old Colony Region is allocated 0.84 miles of CRFC, and 3.39 miles of CUFC. This is based on Old Colony's centerline mileage as a percentage of Massachusetts in total. According to the FAST Act, states and Metropolitan Planning Organizations are responsible for designating which roads are designated as CRFC and CUFC up to their allocations. Old Colony designated Route 106 (County Road) in Plympton from the Halifax line to Lake Street as its CRFC designated mileage, and Route 28 (Montello Street) from Plain Street to Centre Street and Route 123 (Centre Street) from Main Street to Quincy Street in Brockton as its designated CUFC mileage. The Interstate, CRFC, and CUFC network for Massachusetts, including the OCPC Region, is shown in Figure XXX.

The Freight Analysis Framework (FAF), which was developed by the Bureau of Transportation Statistics (BTS) and Federal Highway Administration (FHWA), compiled and combined data from different sources to discern freight movement between states and major metropolitan areas by all modes of transportation. The FAF utilized data from the Commodity Flow Survey (CFS) and international trade data from the Census Bureau. The data included movement of a variety of

maximize operational capacity. These constraints impact the system's reliability, which ultimately impact the economic viability of the region. Challenges include re-occurring congested bottlenecks, poor intersection turning radii, height and weight restrictions, and lack of acceleration and deceleration lanes (lack of interstate standards on Route 24).

In Brockton downtown, specific routes within the Old Colony Region's road network that are key for truck and heavy vehicle travel include Elliot Street, Route 27 Court Street, Route 123 Centre Street, School Street, and Route 27 Crescent Street). These routes pass under historic railroad stone arch bridges. The rail line in Brockton that passes above these routes carries MBTA passenger rail as well as CSX freight. The height of these bridges at the center of the road varies. Some are 13 feet 6 inches at the center and 11 feet high at the edge of the road and some are as high as 15 feet 6 inches at the center of the road. Trucks and heavy vehicles must cross the double yellow center line on these routes in order to clear the arches, which are at their highest in the center. In addition to the low railroad stone bridges, truck traffic turning between major east west routes in Brockton Downtown Brockton are hindered by tight turning radii. Trucks often encroach on other lanes or end up on sidewalks making these turns at intersections along Montello Street (Route 28) and Main Street in Brockton Downtown. Limited turning radii for trucks in the region is not limited to Brockton, as many of the region's roads were constructed before tractor trailers were in widespread use.

Bridges

There are 149 bridges in the Old Colony Region that are listed in the Massachusetts Department of Transportation (MassDOT) database of inspected bridges (under state or local jurisdiction). This database includes performance information (condition ratings) on bridges that span roadways, bodies of water, and railroad tracks, as well as a history of inspections and reconstruction. MassDOT conducts bridge inspections on these bridges utilizing standards that are consistent with federal standards and a rating system developed by AASHTO using a scale 0 to 100 with 100 being the best. The goal of the MassDOT bridge inspections and Bridge Management System (BMS) is to predict failures and make improvements.

The MassDOT bridge database includes a structurally deficient or functionally obsolete determination for each bridge. Bridges are considered structurally deficient if significant load-carrying elements are found to be in poor or worse condition due to deterioration and/or damage, or the adequacy of the waterway opening provided by the bridge is determined to be extremely insufficient to the point of causing intolerable roadway traffic interruptions. According to the FHWA, if a bridge is determined to be unsafe based on the inspections, then the structure must be closed; however, the classification of a bridge as structurally deficient does not imply that it is likely to collapse or that it is unsafe. Deficient bridges that are open to traffic require significant maintenance and repair to remain in service. Structurally deficient bridges often have weight limits restricting the gross weight of vehicles using the bridges to remain in service (this is less than the maximum weight typically allowed by statute).

Structurally deficient bridges require eventual rehabilitation or replacement to address deficiencies.

There are five bridges in the Old Colony Region, (according to the latest MassDOT bridge database as of 2018), there are five bridges in the Old Colony region identified as structurally deficient. Table 4-2 lists the Structurally Deficient bridges in the Old Colony Region.

Table 4-2 – Old Colony Region Structurally Deficient Bridges

Community	Description	Owner	Road Class	Year Built	Rating	Project Status
Abington	Central Street over the Shumatuscacant River	Town	Urban Collector	1956	48.8	Design
Brockton	Route 24 over West Chestnut Street	State	Principal Arterial (Freeway)	1954	72.9	Design
West Bridgewater	Walnut Street over Route 24	State	Urban Collector	1953	53	None
Kingston	Route 3 over the Jones River	State	Principal Arterial (Freeway)	1955 (rebuilt 1978)	68.2	Construction
Plymouth	Route 3A Warren	State	Urban Minor Arterial	1950	55.3	None

The Functionally Obsolete designation includes bridges that are older structures built with design standards that are different than current design standards. The Functionally Obsolete designation includes factors such as deck geometry, under clearance, and approach roadway alignment. Functionally obsolete bridges generally cannot accommodate the volume and nature of vehicle traffic due to insufficient vertical clearances and/or inadequate widths. According to the 2018 MassDOT bridge ratings, there were forty-one bridges (26 percent) in the Old Colony region classified as functionally obsolete.

Congestion and Bottlenecks

The Old Colony Region maintains a Congestion Management process in order to monitor transportation facilities for congestion problems, provide information on system performance, and to implement congestion mitigation strategies enhancing the mobility of persons and goods to meet state and local needs. The Congestion Management Process (CMP) identifies congested locations, helps determine the causes of congestion, develops alternative strategies to mitigate congestion, evaluates the different potential mitigation strategies, includes potential alternative strategies that best address the causes and impacts of congestion, and tracks and evaluates the impact of previously implemented strategies. The CMP is intended to be a connected part of the metropolitan planning process, rather than a stand-alone process or system.

A number of CMP objectives were developed refined for the planning process. These objectives were developed in a collaborative effort with stakeholders such as the Federal Highway Administration (FHWA), the Massachusetts Department of Transportation (MassDOT), the Brockton rea Transit (BAT) Authority, and local communities, as well as the public at large:

- Promote Mode Shift by increasing the use of transit, carpool/vanpool, and non-motorized transportation modes such as bicycling and walking.
- Reduce traffic congestion, and improve level-of-service and access management.
- Maintain and improve transit system efficiency and capacity.
- Increase automobile and bicycle parking capacity and usage at transit stations and commuter lots.
- Eliminate bottlenecks on limited access highways and on the freight network.
- Improve and expand human service coordination, mobility, and accessibility for all modes.
- Reduce number and size of gaps in the ADA-accessible sidewalk network.
- Increase use of traffic signal priority (hold current green light) for transit vehicles and traffic signal pre-emption for emergency vehicles (override programmed phasing to provide approaching emergency vehicles a green light).
- Monitor utilization and congestion levels at commuter rail and Park & Ride parking facilities ☐ Improve accessibility for all modes to all users.

Congestion on a transportation facility may be defined as the level of performance that is deemed unacceptable due to traffic interference. Roadway or intersection congestion is often described in terms of capacity or more simply, the ability of a facility to process traffic during times of peak demand. Congestion occurs when the facility's capacity is insufficient to meet the traffic demand.

Bottlenecks are a condition that restricts the free movement of traffic creating a point of congestion during specific periods, usually the peak commuter periods. Bottlenecks have a number of different causes including operational influences (traffic signals and the physical design and alignment of intersections); the narrowing of a highway corridor and lane drops, weaving conditions, sun glare, steep grades, or crashes and incidents on a roadway.

As stated previously, a strong orientation to and from the Boston area, (based on traffic monitoring), which results in traffic heading in a general north south orientation is still prevalent; however, commuting patterns have gradually become more dispersed due to the diffusion of both residential growth and employment centers to areas outside of Boston. The Old Colony MPO is committed to reducing traffic congestion and eliminating bottlenecks by encouraging the use of travel alternatives such as carpooling, biking, and walking as well as by funding infrastructure projects that improve traffic flow and support a multi-modal environment.

The Old Colony MPO identifies and monitors key facilities in the region through its Congestion Management Process (CMP). These include those facilities that demonstrate congestion, excessive delays, and circulation problems. The key areas are typically limited access highway interchanges, major intersections, and downtown areas. Peak hour bottlenecks and heavy commuter traffic volumes occur on a daily basis on Route 3 (Pilgrim Highway) and Route 24 (Amvets Memorial Highway).

Specific locations where peak hour bottlenecks occur at Route 3 and Route 24 interchanges include, but are not limited to:

- Route 3 – Exit 3 (Clark Road) – Plymouth
- Route 3 – Exit 5 (Long Pond Road) – Plymouth
- Route 3 – Exit 6 (Samoset Street) – Plymouth
- Route 3 – Exit 9 (Route 3A) – Kingston
- Route 3 – Exit 10 (Route 3A & 53) – Kingston
- Route 3 – Exit 12 (Route 139) – Pembroke
- Route 24 – Exit 15 (Route 104) – Bridgewater
- Route 24 – Exit 16 (Route 106) – West Bridgewater
- Route 24 – Exit 17 (Route 123) – Brockton
- Route 24 – Exit 18 (Route 27) – Brockton
- Route 24 – Exit 19 (Central Street/Harrison Boulevard) – Avon
- Route 24 – Exit 20 (Route 139) – Stoughton

In addition, areas such as Downtown Brockton, Bridgewater Center, East Bridgewater Center, Downtown Plymouth, Stoughton Center, and West Bridgewater Center have daily congestion issues and re-occurring bottlenecks.

Proper access management techniques, effective transportation demand management applications, proper traffic control, elimination of lane drops, and providing a multi-modal environment are key elements needed to reducing congestion and the occurrence of bottlenecks.

CONCLUSION AND RECOMMENDATIONS

The Old Colony region's highway system and roadway network are essential to the economic well-being of the region as well as to the quality of life for the region's residents. Improvements to the system are implemented on a continuing basis; however, more is needed in order to keep up with maintenance needs, preserve and expand capacity, and to achieve the goal of providing a safe and reliable network.

The Old Colony MPO identified a number of key issues affecting the regional highway system:

There are a number of areas in the region demonstrating congestion, experiencing excessive delays, and circulation problems.

Key areas in the network affected by reoccurring congestion include limited access highway interchanges, town centers, and densely developed highway corridors in the region. These areas not only suffer from daily congestion but also serious circulation issues due to a number of problems, which include the lack of proper access management techniques, the lack of effective transportation demand management applications, the lack of proper traffic control or updated and coordinated traffic signals, and a lack of multi-modal accommodations such as transit.

Some of the improvements identified to improve and enhance capacity, thereby reducing congestion and improving level-of-service include: upgrading traffic signal equipment, upgrading signal timing and signal coordination, and utilizing of traffic signal priority (hold current green light) for transit vehicles and traffic signal pre-emption for emergency vehicles (override programmed phasing to provide approaching emergency vehicles a green light).

Carpooling rates in the Old Colony region continue to be low.

Automobile dependency is still prevalent in the Old Colony Region as residents continue to rely on the automobile for their primary mode for getting from place to place. The Region provides Commuter Rail, transit service, and state owned park and ride facilities; however, utilization of alternatives still lags behind auto use compared to other parts of the Commonwealth. OCPC will continue to monitor utilization and congestion levels at commuter rail and Park & Ride parking facilities, as well as record utilization data twice annually and report data to MassDOT.

Reoccurring bottlenecks and physical constraints continue to negatively impact freight movement on the regional highway network.

The primary mode utilized for the movement of goods in the Old Colony region is trucking over the regional highway network. There are a number of challenges including operational constraints as well as physical constraints for truck movement within the region's highway network. Recurring bottlenecks, poor intersection turning radii, height and weight restrictions, and lack of limited access highway acceleration and deceleration lanes need to be prioritized to maintain productive freight movement and highway network travel time reliability in the Old Colony region. The truck needs in the region include: increasing viaduct clearance to improve freight movement, emergency response, and reduce delay, improved safety along freight routes, improve vertical clearance along freight corridors, and identifying and removing constraints that cause bottlenecks within freight corridors.

The sub-standard design of the limited access highways and interchanges in the Old Colony region, specifically including Route 24 and Route 3, limits the ability of these corridors to handle the current traffic demand.

Route 3 (Pilgrim Highway) and Route 24 (Amvets Memorial Highway) experience recurring peak hour bottlenecks and heavy commuter traffic volumes due to sub-standard design. Motorists are allowed to use the breakdown lane on Route 3 during the morning and afternoon peak periods in order to provide additional capacity and the majority of the interchange ramps, deceleration ramps, and acceleration ramps are undersized. The elimination of recurring bottlenecks can be achieved through the elimination of lane drops and improvements in the design.

There are more roads in the Old Colony region with a "fair" or "poor" pavement condition rating than those with a "good" or "excellent" rating.

Currently, the "Fair" and "Poor" categories total 63 percent of the total amount of federal aid roads while the "Good" and "Excellent" categories total 37 percent. A pavement system in disrepair increases delays, restricts freight movement, and inhibits economic vitality.

There are several bridges in the Old Colony region that have been identified as structurally deficient.

According to the MassDOT bridge database, there are five bridges in the Old Colony region identified as structurally deficient. Bridges play a vital role in the highway network providing links over natural obstacles such as rivers and streams and enhancing the efficiency of the network.

The Old Colony regional highway network contains areas vulnerable to the effects of climate change.

The Old Colony Region contains some of the oldest roads and bridges in the country. This infrastructure is susceptible to major damage during severe weather events especially due to intense precipitation and increased flooding near the coastline and those located within 100 & 500 Year Flood Zones. Although the impact of sea level rise is limited to coastal areas, the effect of intense precipitation on land transportation infrastructure and operations is more widespread.

Transportation improvement projects costs continue to rise.

Reducing delays in the project development and delivery process through streamlining the development process helps keep costs down and promotes jobs and the economy. It contributes toward accelerating project completion thereby expediting the movement of people and goods. The Region should continue to utilize transportation evaluation criteria in screening potential TIP projects. Initial evaluation should be undertaken on all projects to determine if the project is realistic, viable, and implementable. The enhanced screening and evaluation of projects will help to determine the Year 1 readiness for the TIP. At least 80% of Year 1 TIP Projects should be advertised. The Region will continue to maintain annual participation at TIP Day with MassDOT. At the twenty-five percent design stage, the Region will work with stakeholders on all potential projects to determine ROW, environmental permitting, and other potential challenges to project development and implementation.

Recommendations

The following recommendations address the regions' needs based on the planning process and continued cooperation on a regional basis including member communities, transportation agencies, and state agencies. Unless otherwise noted, these recommended actions are to be implemented by Old Colony Planning Council staff through activities programmed in the Old Colony MPO's UPWP>

- Consider programming studies in the Old Colony UPWP concerning the movement of goods/materials within and through the region including the movement of hazardous materials, the identification and designation of regional and local truck routes, the identification of additional inter-modal facilities, and the overall enhancement of the efficient movement of freight.
- Consider programming studies in the Old Colony UPWP to improve east-west connections in the region.

- Through the Old Colony Pavement Management System, continue to monitor and evaluate pavement distresses along the federal aid eligible roadways and development maintenance and budgetary strategies, which increased efficiency in terms of the utilization of federal and state money.
- Continue the focus on maintenance of local bridges and support increased emphasis on the rehabilitation needs of locally maintained bridges, especially those falling in the Structurally Deficient and Functionally Obsolete categories.
- Continue to support the Traffic Monitoring System for Highways. Support actively maintaining and participating in coordinated Traffic Monitoring System for Highways.
- Continue semi-annual monitoring of parking utilization at Commute Rail stations within the region, and continue to work with communities and the MBTA on issues related to both capacity and access to and from the stations/
- Consider programming studies in the Old Colony UPWP aimed at enhancing traffic circulation in downtown areas and community centers and advocate strategies for enhancing pedestrian and bicycle access, mobility, and safety...
- Implement access management and design guidelines at the local level through a number of avenues (Master Plans, Zoning Ordinances, and Subdivision regulations and site plan reviews) to conserve capacity in highway corridors, improve traffic flow and safety, decrease auto dependency, include mixed use development (thereby decreasing sprawl), and improve the quality of development in highway corridors.
- Continue to study safety and traffic flow at intersections, particularly at intersections identified as High Crash Locations. Incorporate a multi-mode approach aimed at improving efficient mobility and safety for motorists, pedestrians, bicyclists, and transit.
- Large employers should be encouraged to form Transportation Management Associations (TMAs), which marshal business resources to manage employee transportation needs on an area-wide basis. MassRides for example, is available to provide TMA assistance that match employees who wish to carpool, vanpool, etc. Demand for costly long-term parking can be managed by encouraging shared-ride commuting through preferential parking incentives or special discounts for employees.
- Consider programming studies in the Old Colony UPWP that study and offer mitigation strategies for congested corridors and bottlenecks in the region...
- Pavement Management Systems should address municipal program requirements. Pavement management should include provisions for policies that address the growing maintenance queues experienced by municipal highway officials who must maintain increasingly deteriorating local roadway with fewer fiscal resources.
- Promulgate policy to address needs for improving physical constraints for freight movement including raising bridge clearances to accommodate double stacking of containers in railroad freight hauling operations to promote intermodal opportunities. Freight needs include improving truck turning radii and height and weight restrictions for truck freight movement.
- Roundabouts, as well as traffic calming techniques, should be included in the analysis of improvement alternatives in studies that focus on the development of solutions to safety and traffic congestion.

Chapter 5 – Transit

The Region is fortunate to host a variety of transit services, such as bus transportation, paratransit services, council on aging services, commuter rail, airport and air services, commuter bus service, highway, water freight services and rail freight facilities. Although modes are discussed independently through this chapter, they work together as components of an ever-evolving coordinated intermodal system.

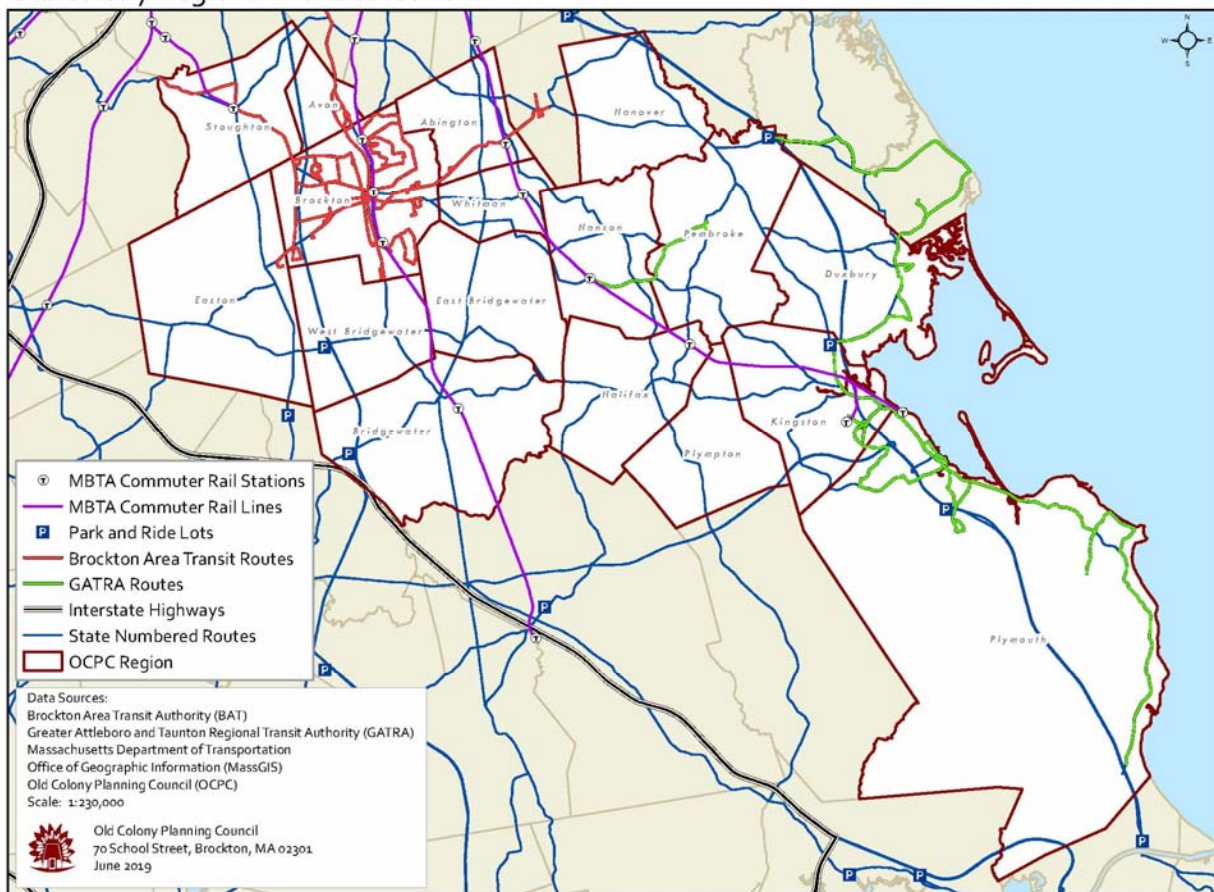
Transportation systems must not be overlooked as a catalyst in shaping land use patterns and their effect on the quality of life and livability of local residents and visitors. Concepts such as the placement of transportation services, and/ or the frequency of service are among the deciding factors in whether or not residents or visitors use transit. The Region faces many of the challenges found across the nation, such as the increasing demand for transit capacity across all modes, the increased costs of operations; and the increased demand for paratransit services the coordination of human service transportation efforts, and the challenge of funding a robust transportation system.

Ideally, the beneficial long-term effect that an efficient mass transit system can have on a region is the potential for effective growth management, fostering of economic development, and the development of mobility measures for livable communities. Focusing sustainable development around transit stations and nodes can lead to a more sensible form of growth in which higher density; mixed-use neighborhoods provide more enjoyable and convenient living environments. By taking advantage of modes such as commuter rail, commuter bus and fixed route transit system, communities can develop smarter alternatives to the inefficient “sprawl” development, which has characterized development in this region and beyond for much too long. Using Smart Growth Principles, communities can develop safe walkable and livable communities with convenient transit and surrounded by both housing and retail services.

This chapter discusses the current transportation networks in the region and potential future networks. The chapter concludes with recommendations that would enhance the transportation network of the region and affect the quality of life of residents in the region. Figure 5-1 is an overview of the transportation networks in the region.

Figure 5-1: Passenger Transit Network

Old Colony Regional Transit Network



EXISTING PUBLIC TRANSPORTATION NETWORK

The Old Colony region is fortunate to have two Regional Transit Authorities (RTA) operating within it. The Brockton Area Transit Authority (BAT) services the city of Brockton and the adjacent communities of: Abington, Avon, Bridgewater, Easton, East Bridgewater, Hanson, Rockland, Stoughton, West Bridgewater, and Whitman. Additionally BAT also services the City of Boston (along with Randolph and Milton) via its route 12 Ashmont line.

The Greater Attleboro Taunton Regional Transit Authority (GATRA) provides service to the greater Taunton / Attleboro area, and several other areas in southeastern Massachusetts including the towns of Duxbury, Hanson, Kingston, Pembroke, and Plymouth within the Old Colony region.

In addition to services provided by BAT and GATRA, the Massachusetts Bay Transportation Authority (MBTA) provides bus and commuter rail service throughout the region.

Brockton Area Transit, GATRA, and the MBTA all work towards the common goal of reducing traffic congestion on the roadways system by providing a service that encourages mode shift

away from single occupancy vehicle trips to trips via transit. Through the provision of services such as the Route 12 Ashmont operated by BAT, the GATRA Pembroke Shuttle that provides service to the MBTA Hanson Commuter Rail Station, and the three MBTA (3) Commuter Rail lines servicing 11 Commuter Rail Stations are actively working to accomplish this goal. Additionally, BAT and GATRA in the Old Colony region are constantly looking at ways to attract new ridership through the expansion of transit service and through the partnership with private transportation service providers such as ride hail companies.

Fixed Route Bus Service

Brockton Area Transit Authority (BAT)

The Brockton Area Transit Authority (BAT) has an average yearly ridership of over 2.7 million boardings and over \$3.6 million in annual fare revenue in FY 2018. BAT operates 15 fixed bus routes primarily within the City of Brockton with lines branching out to neighboring communities as seen in Figure 5-2 and to the City of Boston, along with paratransit/demand response service. These routes along with a “pulse system” that operates out of the BAT Intermodal Centre in Downtown Brockton allow for high frequency service during peak hours, serving a high percentage of Brockton’s total land area.. BAT also provides service to six MBTA Commuter Rail Stations and the Ashmont MBTA Red Line Station. These MBTA Commuter Rail and Red Line connections allows BAT to provide multimodal links between the Old Colony Region and the City of Boston, as well as communities outside the region. BAT provides buses to Bridgewater State University, enabling the university to provide transportation to its student body, employees, and visitors. Brockton Area Transit routes can be viewed in more detail on their website (www.ridebat.com).

The Greater Attleboro Taunton Regional Transit Authority (GATRA)

The Greater Attleboro Taunton Regional Transit Authority (GATRA) is a transit authority operating in 28 communities, including Duxbury, Hanson, Kingston, Pembroke, and Plymouth in the Old Colony region. In Fiscal Year 2017, the system had a system-combined ridership of 2,696,018 boardings and \$911,865 in farebox revenue. GATRA lines serving the Old Colony region include the Plymouth Area (PAL), the Sea Area Inter-Link (SAIL), and the Pembroke Shuttle serving Pembroke and Hanson. The PAL system consists of four routes serving Plymouth and Kingston. The SAIL operates within the towns of Marshfield, Duxbury, and Kingston. In addition to the PAL and SAIL systems, GATRA provides service between Pembroke Town Center and the MBTA Hanson Commuter Rail Station.

GATRA service makes intermodal connections with the Plymouth and Brockton (P&B) intercity motor coaches at the Plymouth Park-and-Ride lot (Exit 5 on Route 3), and the MBTA Commuter Rail at the Plymouth and Kingston stations. This connection to P&B at Route 3 Exit 5 connects local service with an intercity carrier that travels north to Downtown Boston and Logan Airport, and south to Cape Cod.

Figure 5-2: Brockton Area Transit Authority Fixed Route System

Brockton Area Transit Authority Fixed Route System

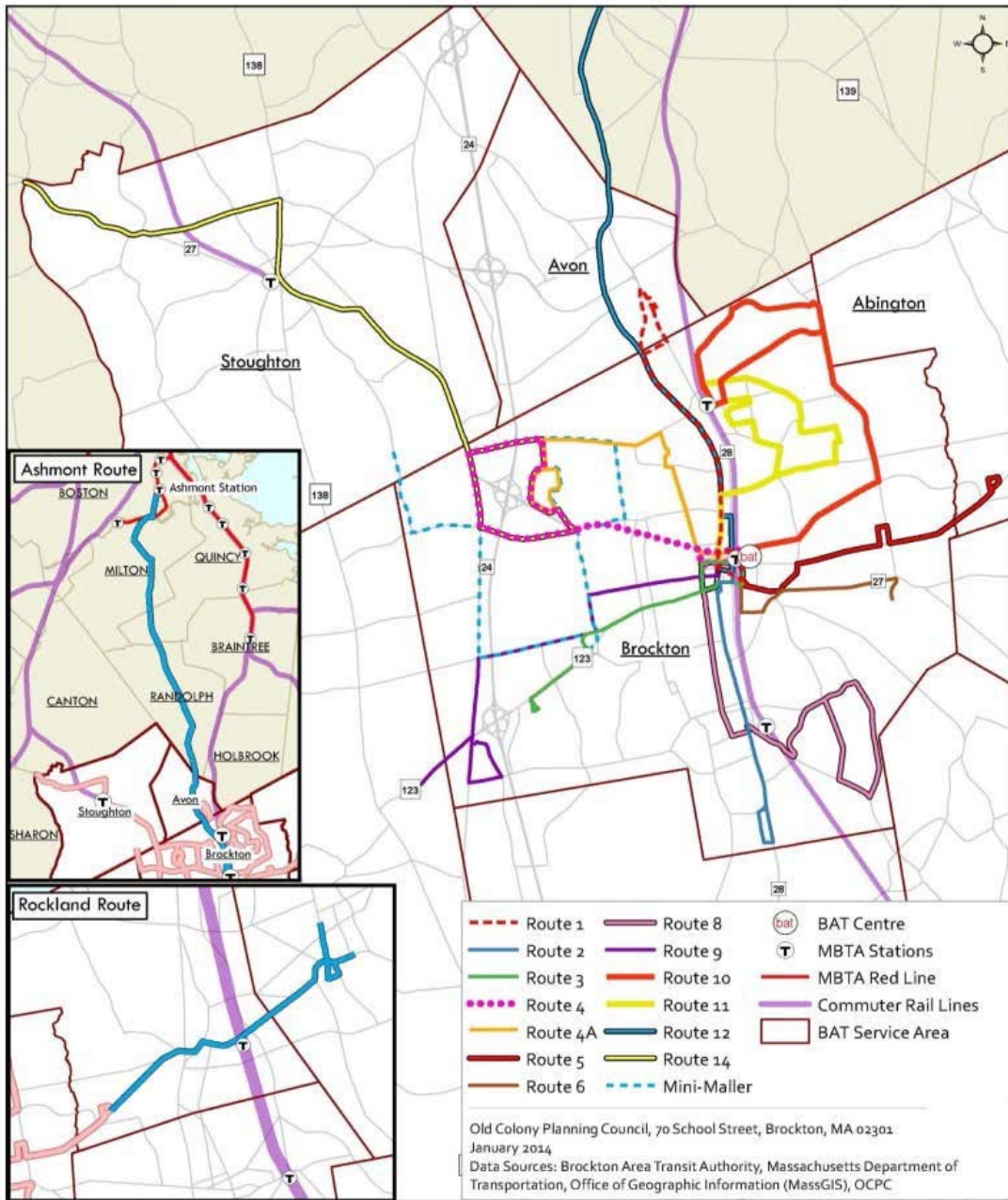
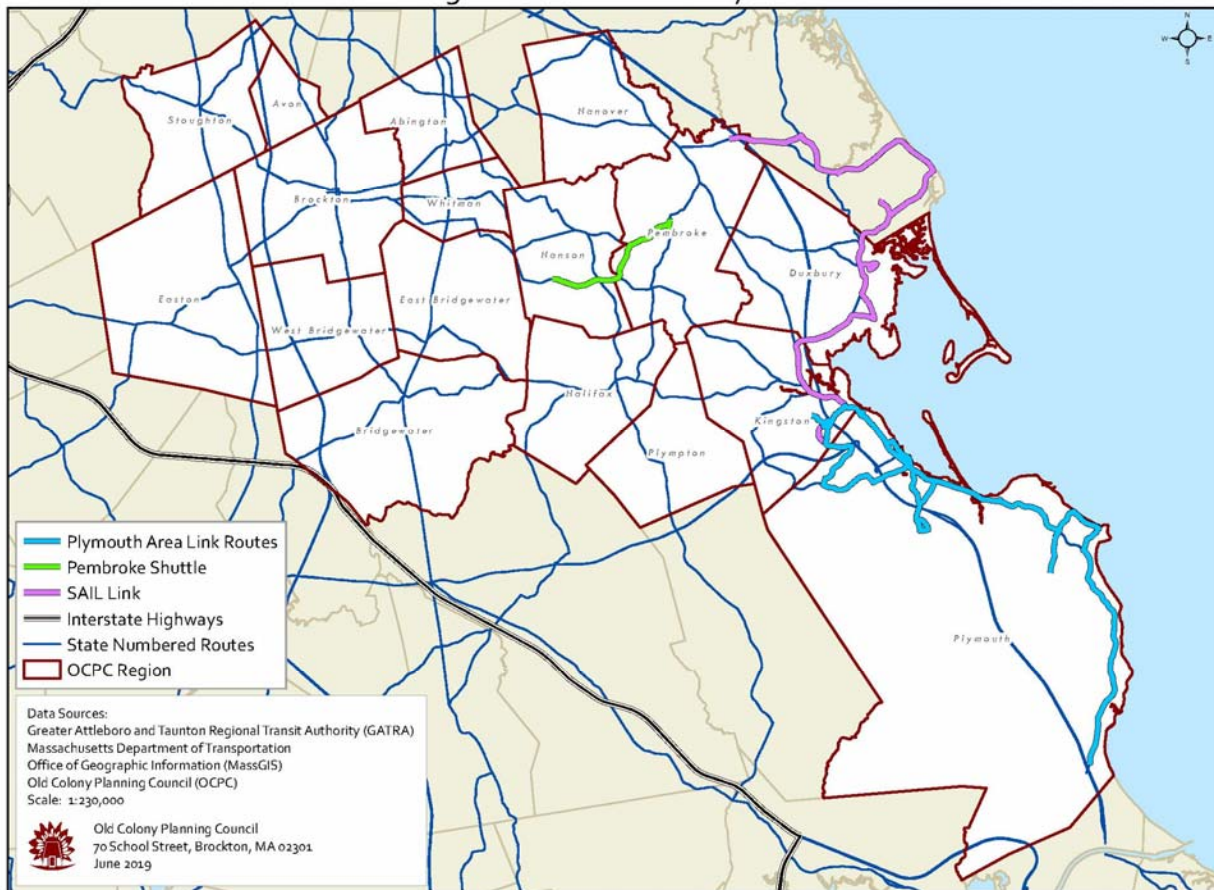


Figure 5-3: Greater Attleboro and Taunton Regional Transit Authority System

Greater Attleboro and Taunton Regional Transit Authority



The Massachusetts Bay Transportation Authority (MBTA)

The Massachusetts Bay Transportation Authority (MBTA) bus routes 230, 238 and 240 operate in the region. The MBTA also contracts for the provision of paratransit/demand responsive service for elderly and passengers with disabilities in their service areas. The MBTA 230 services the Montello commuter rail station and connects to BAT Route 10 North Quincy. The bus provides connections to the Braintree Red Line station, Quincy Adams Station and the Quincy Center station. The MBTA 238 route operates near the MBTA 240 route and BAT’s Ashmont service. The route starts at the Quincy Center station, going through Braintree to South Shore Plaza and ends in downtown Avon on certain scheduled times. The MBTA 240 route runs from Avon Center to the Ashmont Red Line station via Crawford Square in Randolph on select scheduled runs. The MBTA 240 route operates along the same route as BAT’s Route 12 Ashmont service. The routes operate seven days a week and on all holidays with more frequent service Monday through Friday.

Demand Response

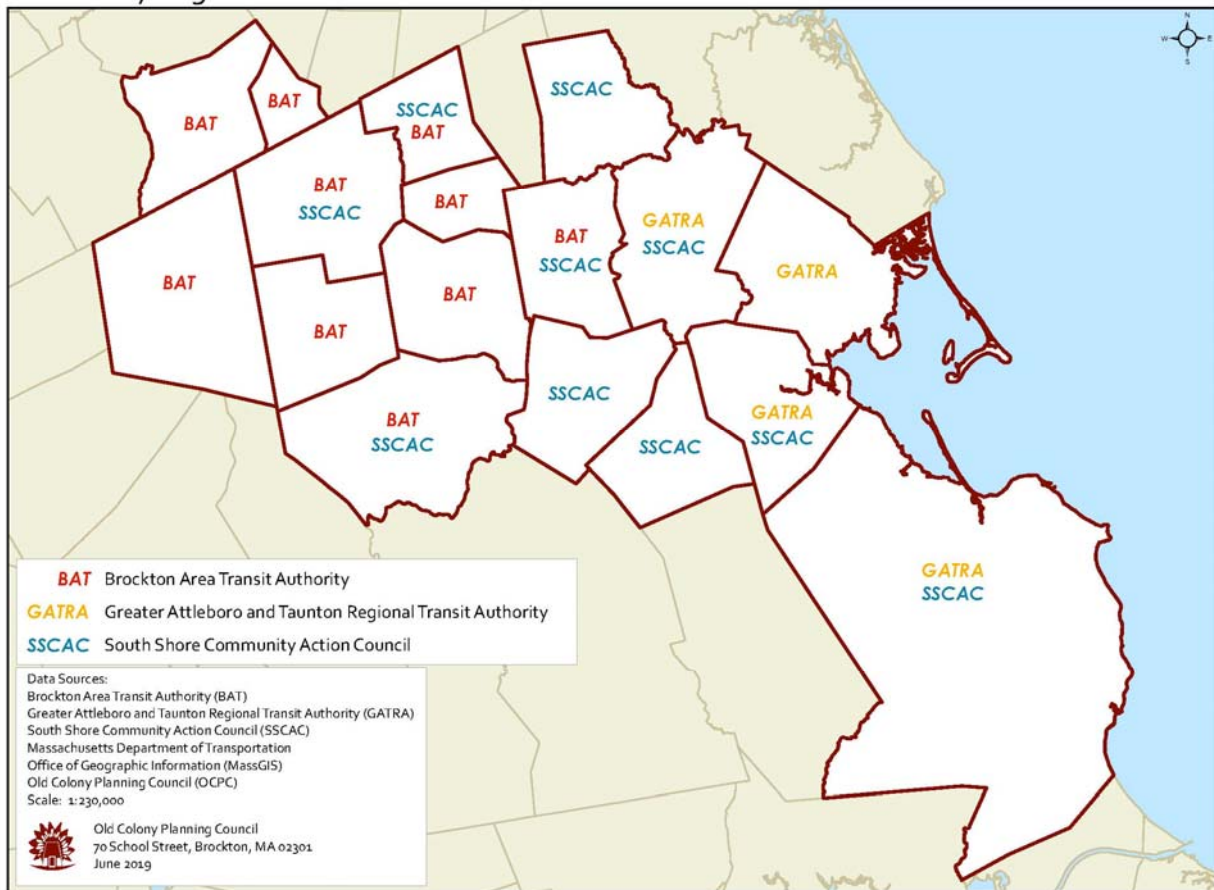
There are two types of paratransit/demand response services in the Old Colony Region; one that transports persons 60 years and older in case of GATRA's paratransit service and 65 years and older in the case of BAT's paratransit service. The other form of paratransit service provides ADA paratransit/demand response service to those with a disability that makes it not possible to use regular fixed route bus service. While the requirements to ride senior paratransit/demand response service is that one must be 60 or 65 years old or older, the requirements to ride ADA paratransit/demand response service are more prescriptive since service is open to all ages and service coverage and hours of operation are usually more extensive in order to provide the same level of service comparable to fixed route services for those unable to ride a regular public transit bus. Paratransit/ demand response service in the Old Colony region is provided by BAT, GATRA, and the MBTA.

BAT and GATRA are the primary paratransit/demand response services providers in the Old Colony Region, which are supported by additional human services trips provided by the South Shore Community Action Council and 12 local Councils on Aging. In accordance to the *Americans with Disabilities Act (ADA)*, BAT and GATRA provide service within $\frac{3}{4}$ of a mile of fixed transit routes. BAT alone provides 173,000 paratransit/demand response service trips a year and GATRA provides just over 45,894 paratransit/demand response service trips in its service area. The MBTA does provide paratransit service to the communities of Abington, Avon, Stoughton and the City of Brockton. Figure 5-4 displays the paratransit services area in the Region

BAT and GATRA provide transportation to medical facilities outside of the region with special scheduled trips. Additionally, local contract transportation companies also provide paratransit service. Bridgewater State University also offers paratransit service for on campus trips during school hours.

Figure 5-4: Paratransit Services in the Old Colony Region

Old Colony Regional Paratransit Services



South Shore Community Action Council (SSCAC)

South Shore Community Action Council is a private non-profit agency that provides essential services to the area, one of which is transportation service to communities in and out of the Old Colony Region. SSCAC provides transportation to the elderly, individuals with disabilities, and low-income participants in SSCAC programs and other state and federal programs. SSCAC helps fill the gaps in service for people that often have no other mode of transportation available. SSCAC transport people to adult day health programs, dialysis, doctor and dental appointments, non-emergency hospital trips, shopping trips, social/ recreational events, and employment programs, educational facilities, and service to Metro Boston hospitals. SSCAC completes approximately 65,000 trips and travels around 700,000 miles annually.

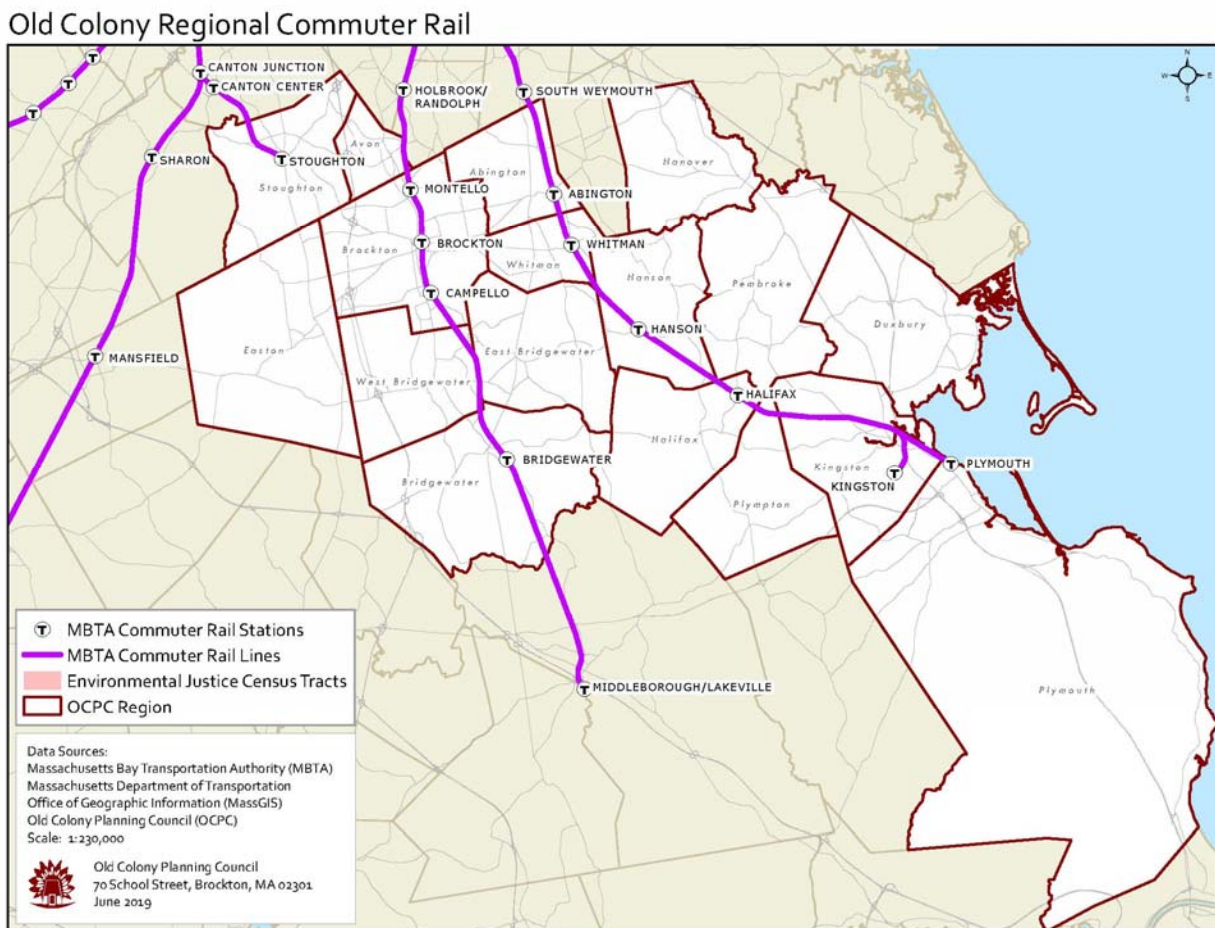
Commuter Rail

Three MBTA Commuter Rail lines operate in the Region: the Middleborough/ Lakeville line, the Kingston/ Plymouth line, and the Providence/ Stoughton line. The Commuter Rail lines are highlighted in Figure 5-5. The Commuter Rail lines in the Region serve approximately 7,393

trips on average per day. The Middleborough/ Lakeville and Kingston/ Plymouth lines were restored to service in the fall of 1997 and have become a popular choice for commuters who work in metro Boston.

The Providence/ Stoughton line offers daily service to Stoughton and points north. The Middleborough/ Lakeville line offers daily service through the OCPC communities of Brockton and Bridgewater. The Kingston/Plymouth line serves the OCPC communities of Abington, Whitman, Hanson, Halifax, Kingston and Plymouth. The transit station areas have become opportunity nodes for enhanced redevelopment, and have helped to foster transit oriented development and the creation of 40R Districts. For more information on the MBTA Commuter Rail, see their website at www.mbta.com.

Figure 5-5: MBTA Commuter Rail System



The Old Colony MPO planning staff continues to work with BAT and GATRA to explore how connections and service to the commuter rail stations can be enhanced. Infrastructure such as additional bus shelters, and technology such as real time transit data and “next bus arrival time” are examples of how intermodal connections can be enhanced. For example, BAT has recently increased service to the Stoughton MBTA Commuter Rail Station via its Route 14

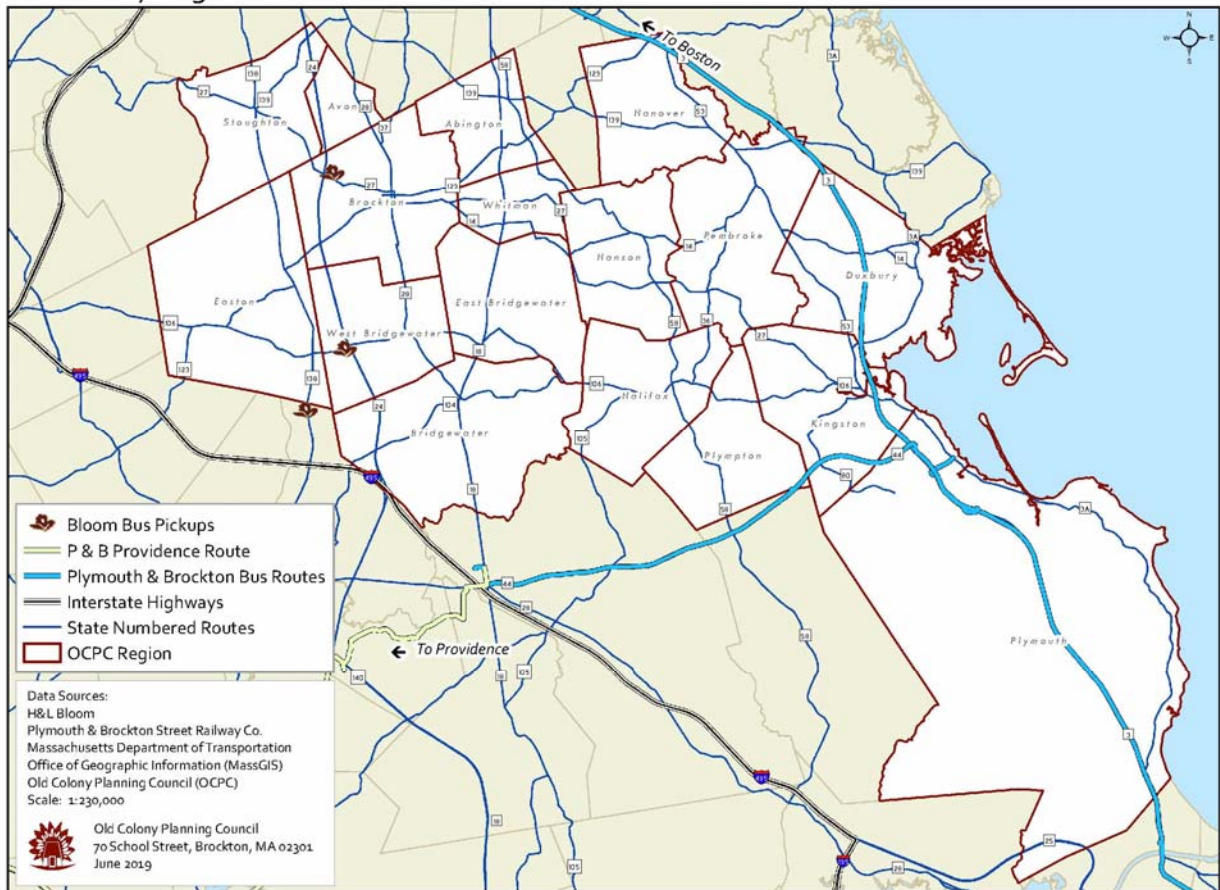
Stoughton expansion project that provides commuter rail passengers and those who ride Route 14 with more direct service to the BAT Intermodal Centre in Downtown Brockton. Enhanced traveler information should be present at Commuter Rail stations in the Old Colony Region.

Commuter Bus

Plymouth and Brockton Street Railway Company (P&B) and Bloom bus companies provide commuter bus services in the region. P&B is a private company offering fixed route long distance service. On average, P&B serves about 24,000 passengers per year from its Plymouth and Kingston park and ride facilities.

Figure 5-6: Regional Commuter Bus System

Old Colony Regional Commuter Bus Service



private commuter bus service existed or where they might be able to catch a bus. Having these private commuter bus companies promote their services more could help improve regional mobility giving residents more choice on how they travel.

Ferry Service

Daily ferry service between Plymouth and Provincetown is provided by Captain John Boats during the summer months. Captain John Boats are a privately owned, for-profit company.

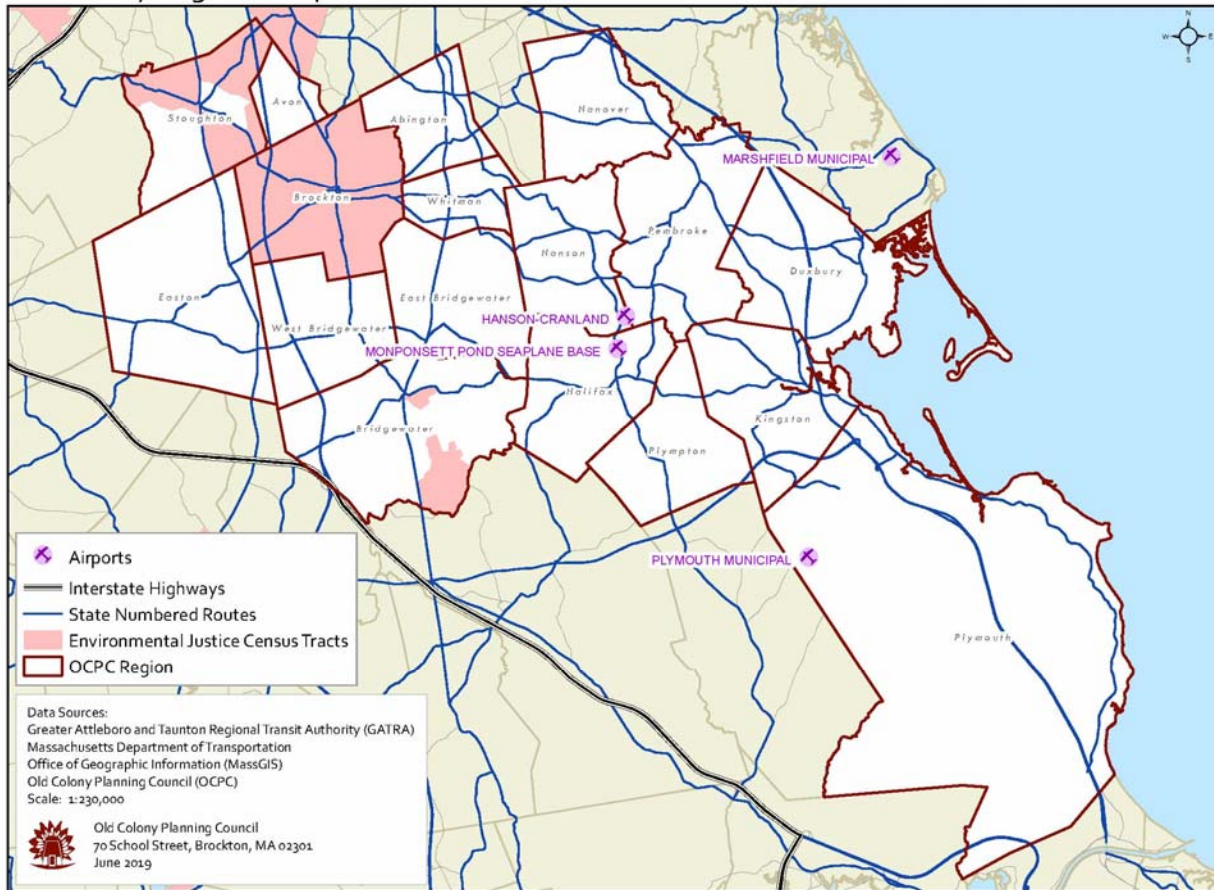
The Commonwealth has recognized the benefits of ferry service and its economic benefits. However, the Commonwealth is struggling to meet the cost of operation and maintenance of ferry service and is looking for some type of public/private partnership, according to MassDOT's 2012 report *Passenger Ferry Transportation in Massachusetts*. The Old Colony MPO planning staff continues to work with local and state partners to identify opportunities for expanding regional ferry service.

Air Transportation System

There are three airports in the Old Colony Region. Aviation services are provided at the Plymouth Municipal Airport and at two private airports: the Monponsett SeaPlane Base in Halifax and Cranland Airport in Hanson. The region's airports are a vital component of the overall transportation network serving personal, business and recreational purposes, and serve as an important factor in the region's economic development efforts. According to *2010 Massachusetts Statewide Airport System Plan*, the Commonwealth is striving to maintain and grow the airport system as the economy grows and the number of flights arriving and departing continues to climb. In addition to maintaining and expanding the airport system, the Commonwealth goal is to also leverage the economic output the airport system generates. The Old Colony Region should support its regional airport meet the five goals laid out in the statewide plan. These goals include: 1) Meeting FAA applicable design standards. 2) Compliance with Federal, Commonwealth, and Local environmental regulatory requirements. 3) Leveraging economic impacts and benefits of incremental investments in the airport system. 4) Airports should support and promote aviation education programs and conduct community outreach. 5) Integrate with other transportation modes.

Figure 5-7: Airports in the Old Colony Region

Old Colony Regional Airports



Plymouth Municipal Airport

Plymouth Municipal Airport is the only publicly owned airfield in the region, owned by the Town of Plymouth. The airport functions as a general aviation facility serving private operators and individuals. The travel accommodated by the field consists predominantly of recreational and business trips. In addition, three charter services operate out of the field. The facility contains multiple hangars and aviation fuel and repair services. The airport serves the Massachusetts State Police Air Wing, Plymouth County fire planes, and Medflight helicopters.

The airport is in the planning stages of extending the shorter of its two paved runways from a size of 3,350' x 75' to a length of 4,350' x 75' to reduce the need to have to use both runways operating at the same time and to provide addition runway space for emergency overruns. Operating both runways at the same time has led to aircraft conflicts and contributes to noise issues. It was also determined through committees and public outreach that having the capability of using both runways for all types of aircraft will reduce the noise burden in residential areas

Halifax: Monponsett Seaplane Base

This is a seasonal facility and is close in proximity to Hanson's Cranland Airport, which supplies services to the seaplane base. Halifax utilizes the waters of the Monponsett Pond the seaplanes land on an unmarked area on the pond. Dock space and mooring facilities are available, as is flight instruction. Emergency-only fuel and repair services are also available from Cranland. Recreational trips are served at this facility. The airport does not offer scheduled passenger or freight service.

Hanson: Cranland Airport

Hanson's Cranland Airport is privately owned and publicly accessible. It provides one non-illuminated asphalt runway 1,760 x 60 feet in length. The facility contains seven hangars and emergency-only aviation fuel and repair services. This general aviation facility serves recreational trips. There is no scheduled freight or passenger service. The airport does not offer scheduled passenger or freight service.

Rail Freight Transportation Network

The current rail freight network within the Old Colony Region includes CSX Transportation, which operates on the Middleborough/Lakeville line and the Providence/Stoughton line. CSX has operating rights along these lines, but the Massachusetts Bay Transportation Authority owns the right of way.

According to the Massachusetts State Rail Plan, freight rail volumes are highest in the western half of the state, where CSX is able to run double stack trains. Rail freight volumes are significantly smaller than truck freight volumes in Massachusetts. According to the rail plan, roughly 88.5 percent of the freight in the state is moved by truck, three (3) percent by rail, one-half (0.5) percent by air, one-half (0.5) percent by water, one (1) percent by multiple modes, six (6) percent by pipeline, and one-half (0.5) percent by "other". According to the rail plan, there has been an increase in freight volumes in eastern Massachusetts, primarily due to increased needs in the area. The increase also reflects coordination and support of the South Coast Rail project, which will return commuter rail service to Fall River and New Bedford. Figure 5-8 shows rail freight in Massachusetts included in the Massachusetts Freight Plan and based on the federal Freight Analysis Framework. It shows growth in rail freight volumes between Springfield and Worcester, north and south of Worcester, and between Worcester and Boston. Rail Freight in the Brockton rail corridor is not expected to increase substantially, according to the Massachusetts Freight Plan, (based on the Freight Analysis Framework).

In 2013, the *Preliminary Market Assessment for the Brockton CSX Site* study was completed by a consultant for the Metro South Chamber of Commerce. The 31-acre Brockton CSX site is known as the former Brockton Freight Yard. It is located north of the Brockton downtown adjacent to North Montello Street, with a long frontage on the active rail line but lacks direct connection to the local roadway system. It is bordered by Elliot Street on the north and Court Street (Route

27) to the south, and has not been in use as a rail yard since the 1980's. The assessment focused on discerning the site's physical, environmental, and infrastructure strengths and weaknesses, gaining the input of stakeholders, and gathering information on potential customers to discuss potential redevelopment opportunities and outline steps toward developing a plan for redevelopment. The study stated that it is possible that intermodal containers could be handled in Brockton on a smaller scale, although the expanded Worcester facility (which now has double-stack capacity to/from New York) will be the focal point for containers. The study concluded that based on the current market and past uses at the site, the most likely types of freight rail uses there would include:

- Secondary freight rail yard for bulk commodities that are not time sensitive
- Warehousing/distribution center (rail access is often a benefit for these facilities)
- Manufacturing company that requires rail shipments, such as a food producer that requires bulk products (this is increasingly rare in MA as most manufacturing companies no longer use rail for inbound or outbound shipments)
- Commodity-specific transfer facility from rail to truck for local company (e.g., to handle flour, corn syrup, rock salt, or other bulk commodities)

Figure 5-8: Freight Rail System



Since the restoration of the Old Colony Commuter Rail lines in the region, freight transportation has been able to benefit from the upgrades in facilities that were necessary with the reintroduction of frequent passenger service from the area. Many of the grade crossings in the area were upgraded and enhanced, in addition to pedestrian walkways and secured fencing to

discourage people from crossing. In addition, the Old Colony lines are also part of Operation Lifesaver, a non-profit organization promoting railroad safety to the public. Operation Lifesaver is a national, non-profit education and awareness program dedicated to ending collisions, fatalities, and injuries at highway-rail grade crossings and on railroad rights of way. To accomplish its mission, Operation Lifesaver promotes “the three E’s:”

- Education: Operation Lifesaver strives to increase public awareness about the dangers around the rails. The program seeks to educate both drivers and pedestrians to make safe decisions at crossings and around railroad tracks.
- Enforcement: Operation Lifesaver promotes enforcement of traffic laws relating to crossing signs and signals and private property laws related to trespassing.
- Engineering: Operation Lifesaver encourages continued engineering research and innovation to improve the safety of railroad crossings.

PERFORMANCE TARGETS AND METRICS

Table 5-1 lists a set of federally required infrastructure condition performance measures for transit systems along with BAT’s Performance Targets. These transit asset management (TAM) measures, which focus on a specific subset of all transit assets, were established in the FTA’s TAM Rule. Brockton Area Transit presented this information along with supporting documentation to the Old Colony MPO in August 2018. The Old Colony MPO has adopted BAT’s FY 2019 Brockton Area Transit Authority Transit State of Good Repair Targets in their entirety and as their own and for the Old Colony Region, in accordance with the certified 3C Transportation Planning Process.

Table 5-1

Brockton Area Transit Authority Performance Measures and Targets

Performance Targets by Asset Category						
Category	Class	Metric	Performance Target for FY 2019	Total Number of Vehicles	# of Vehicles that exceed ULB - FY 2018	% of Fleet that exceeds ULB - FY 2018
Rolling Stock	Buses	X% of fleet that exceeds default ULB of 14	0.00%	46	0	0.00%
	Cutaway Buses	X% of fleet that exceeds default ULB of 10	0.00%	4	0	0.00%
	Vans	X% of fleet that exceeds default ULB of 8	5.00%	58	6	10.34%
Equipment	Non-Revenue Service Vehicle	X% of non-revenue service vehicles that exceeds default ULB of 8	20.00%	10	2	20.00%
Facilities	Admin/Maintenance Facility	X% of facilities rated under 3.0 on Term scale	0.00%	3	0	0.00%

FTA defines ULB as “the expected lifecycle of a capital asset for a particular transit provider’s operating environment, or the acceptable period of use in service for a particular transit provider’s operating environment.” For example, FTA’s default ULB value for a bus is 14 years. FTA’s Transit Economic Requirements Model (TERM) scale, which pertains to the facilities measure, is a rating system that describes asset condition. The scale values are 1 (poor), 2 (marginal), 3 (adequate), 4 (good), and 5 (excellent). Because each measure is intended to represent the share of transit assets that are not in a state of good repair, the goal is to minimize the value for all four measures. FTA grantees, including transit agencies and agency

sponsors, such as MassDOT, are required to develop targets for these TAM measures each fiscal year. MPOs, in turn, are required to set targets for their regions. BAT submitted agency-level targets for state fiscal year (SFY) 2019 (July 2018 through June 2019) to the Old Colony MPO. Their targets reflect the most recent data available on the number, age, and condition of their assets, and their expectations and capital investment plans for improving these assets during SFY 2019.

Furthermore, BAT, GATRA, and the MBTA each have performance management dashboards which state targets for performance and reliability, and a current measure of where the system is in regard to the targets. The OCPC staff continue to work with these agencies in support of these performance dashboard targets.

ISSUES CHALLENGING THE REGIONAL TRANSIT NETWORK

Meeting Commonwealth Mode Shift Goal. In 2012, MassDOT announced a statewide mode shift goal to triple the number of commuters statewide choosing transit, bicycling, or walking as their transportation mode choice. The goal has a target year of 2030, and is based on 2010 baseline levels. In order to help achieve this mode shift goal, the planning staff of the Old Colony MPO have coordinated with BAT and GATRA, and continue to do so to explore opportunities for expanding service throughout the region, and continue to maintain levels of service and a state of good repair on the existing transit network.

Transit service needs reliable, sustainable funding sources. Having sustained sources of public transit funding is key to keeping the Old Colony Region's public transit system in a state of good repair, keeping it as a reliable form of transportation for the public and enabling it to meet the transportation needs of the region. Filling the funding gaps should be a multipronged approach via increased Federal and Commonwealth funding, and through better fare box return over time.

Gaps exist between transit providers. Through previous studies to identify gaps in the fixed route bus system in the Old Colony Region it was determined that bus service between the greater Brockton area (BAT) and greater Taunton area (GATRA) should be studied to see where these links should be made.

An aging population and increasing popularity of "Aging In Place". As the population grows older, so does the transit and paratransit dependent population. As such, the number of residents choosing to age in place is also increasing. Meeting the service needs of this population is and will continue to be a major consideration in the planning and routing of transit services.

Automobile and bicycle parking is underperforming at Commuter Rail and Park-and-Ride lots. Data from the Old Colony Congestion Management System indicates parking lot utilization remains low at several of the Region's commuter rail and Park-and-Ride lots, by both motorists and bicyclists. Furthermore, bicycle parking infrastructure is inconsistent from station to

station, with only two (2) Park-and-Ride lots containing bicycle parking infrastructure. The Old Colony MPO is committed to achieving mode shift goals by working with agencies to maximize the potential of these facilities.

RECOMMENDATIONS

Service and State of Good Repair (SGR) Recommendations

Support additional service. The Old Colony MPO planning staff will continue to work with BAT on planning tasks such as ridership analysis and trip demand analysis for potential new service in a continuing effort to enhance transit service and hours of service in the BAT service area. Similarly, Old Colony staff will work with GATRA on how service can be enhanced in that service area.

Meet operational needs. BAT annually seeks Commonwealth and Federal transportation grants to finance support equipment and operations costs. BAT should continue to seek this method of funding to meet operational and capital replacement needs. BAT should also continue to work closely with the Old Colony Metropolitan Planning Organization and staff and Commonwealth to seek out and secure additional operation and capital funding to meet growing service demand.

Table 5-2 contains the vehicle replacement needs through 2040 for maintaining a state of good repair on the BAT fixed route system, BAT paratransit service, and on human services providers such as local councils on aging. Table 5-3 contains projected funding levels through 2040, which Table 5-4 contains projected operational and project costs through 2040.

Table 5-2: Recommended Transit Vehicle Replacements

Type of Vehicle	2020-2024	2025-2029	2030-2034	2035-2039	2040
Fixed Route	22	17	19	21	0
Paratransit	34	22	38	18	16
Councils on Aging	12	13	12	13	2

Table 5-3: Estimated Transit Funding 2020 - 2040

	2020 to 2024	2025 to 2029	2030 to 2034	2035 to 2039	2040	Total
49 U.S.C. Section 5307	\$ 16,856,133	\$ 18,683,631	\$ 20,709,259	\$ 22,954,501	\$ 4,881,303	\$ 84,084,827
State Contract Assistance	\$ 37,057,680	\$ 39,921,646	\$ 43,006,950	\$ 46,330,700	\$ 9,687,255	\$ 176,004,230
Local Assessment	\$ 16,093,482	\$ 17,337,251	\$ 18,677,143	\$ 20,120,587	\$ 4,207,000	\$ 76,435,462
Farebox Revenue	\$ 15,276,471	\$ 16,457,098	\$ 17,728,969	\$ 19,099,134	\$ 3,993,425	\$ 72,555,098
Statewide Programs for all Eligible Participants						
Community Transit Grant Program (Estimated AAA, BAT, and SSCAC Portion)	\$ 6,262,065	\$ 6,746,023	\$ 7,267,382	\$ 7,829,035	\$ 1,636,968	\$ 29,741,473
	\$ 91,545,831	\$ 99,145,648	\$ 107,389,703	\$ 116,333,957	\$ 24,405,950	\$ 438,821,090

Table 5-4: Transit Operations and Projects, 2020 through 2040

	2020 to 2024	2025 to 2029	2030 to 2034	2035 to 2039	2040	Total
49 U.S.C. Section 5307	\$ 16,856,133	\$ 18,683,631	\$ 20,709,259	\$ 22,954,501	\$ 4,881,303	\$ 84,084,827
State Contract Operating Assistance	\$ 37,057,680	\$ 39,921,646	\$ 43,006,950	\$ 46,330,700	\$ 9,687,255	\$ 176,004,230
BAT Fixed Route Bus Replacement, Hybrid Replacements, Technologies, AVL, Farebox	\$ 12,812,800	\$ 14,091,926	\$ 19,162,039	\$ 25,767,608	\$ -	\$ 71,834,373
BAT Intermodal Transportation Centre Improvements	\$ 500,000	\$ 1,000,000	\$ 1,250,000	\$ 1,500,000	\$ 2,150,000	\$ 6,400,000
BAT Ongoing Paratransit Bus Replacement	\$ 3,109,600	\$ 3,367,556	\$ 5,853,066	\$ 4,415,113	\$ 2,666,159	\$ 19,411,494
SSAC Ongoing Vehicle Replacement	\$ 2,230,800	\$ 3,175,124	\$ 3,863,024	\$ 4,699,959	\$ 1,184,959	\$ 15,153,866
Total Operating and Project Expenses	\$ 72,567,013	\$ 80,239,882	\$ 93,844,338	\$ 105,667,881	\$ 20,569,676	\$ 372,888,790
Total Available Operating and Capital Funding	\$ 91,545,831	\$ 99,145,648	\$ 107,389,703	\$ 116,333,957	\$ 24,405,950	\$ 438,821,090

Adequately fund transit to provide a safe, reliable, and efficient regional network. The Old Colony MPO staff will continue to work with providers to secure stable sources of funding and increase funding when appropriate.

- The Old Colony Region must continue to assist the Regional Transportation Authorities in securing operational and capital funding from both the Commonwealth and the Federal Government.
- Continue to assist the Regional Transportation Authorities in reviewing their fare structures ever few years to see if adjustments are needed to passenger fares.
- Continue to support the funding of commuter rail operations in the Commonwealth through a statewide funding mechanism and its efforts to expand service in the Region.

Continue current outreach programs. BAT should continue its ongoing outreach program to educate the residents of the region about the transportation services it offers and destinations it serves to spur additional ridership. BAT should also continue its outreach efforts to local business and companies to understand the needs of their employees to see if there might be opportunities for partnership.

Explore recommendations set forth in Transportation Network Company (TNC) Study. Review recommendations set forth in study on impacts of ride hailing companies such as Ube, Lyft, and other TNCs on transit ridership, and support collaboration between transit authorities, TNCs, and regional planning authorities.

Mobility and Livability Recommendations

Expand geographic reach of demand response (paratransit and human services coordination) services. The Old Colony MPO and Old Colony Planning Council staff should continue to work closely with its Regional Transportation Authorities' and those private agencies providing paratransit/demand response service to help meet the growing need. It was mentioned in *The Old Colony 2015 Coordinated Human Service Transportation Plan for the Old Colony Region* that public transit service, which paratransit/demand service is grouped into, needs to be increased to meet the growing need by an additional 17,000 hours per month in the BAT service area. In the GATRA service area the additional service hours needed to meet demand would be 6,032 hours.

Continue to find additional ways to improve mobility and access to the transit networks, along with the transportation decision planning process, for all users.

Explore feasibility and support new Commuter Rail station between Campello and Bridgewater Stations. A review of land parcels abutting the Middleborough / Lakeville Commuter Rail line suggests there may be sites available for a new Commuter Rail station on the border of West Bridgewater and East Bridgewater, in the area of Route 106. Such a facility would serve the communities of West Brie water and East Bridgewater, and potentially remove or shorten personal vehicle trips along the Routes 106 and Route 28 corridors.

Support coordination between Town of Bridgewater, Bridgewater State University, and MBTA to relocate Bridgewater Commuter Rail Station. A comprehensive planning study completed in 2019 by Old Colony Planning Council through the District Local Technical Assistance Program looked at the feasibility of relocating the Bridgewater Commuter Rail Station. The station is currently located within the campus of Bridgewater State University, and the study looked at the benefits of relocating the station to the site of the historic Bridgewater on Spring Street, on parcels currently occupied by Bridgewater State University and municipal parking. Relocatng this station could foster transit oriented development and boost the local economy In and to the south of Central Square, while continuing to provide transit access to Bridgewater State University.

Improve mass transit linkages. Every effort should be made to promote improved linkages between mass transit and other modes of transportation. The Old Colony MPO is committed to working with transit providers to identify and study gaps in transit service, and identifying strategies and projects to improve linkages between fixed route transit, demand response transit, and other modes of transportation.

Expand commuter services by private commuter carriers. The expansion of commuter services by private carriers such as Bloom and Plymouth and Brockton is encouraged in areas where there is a demand for such services.

Apply Smart Growth and Complete Streets Principles to and around development in the region.

Intermodal Recommendations

Continue supporting the development of a Plymouth Intermodal Center. GATRA and Plymouth have been in the process of trying to fund the building of an intermodal center that would enhance both commuters and tourist transportation experiences.

Encourage increased use and expansion of commuter parking facilities. The Old Colony staff should work with MassDOT to continue to promote existing commuter parking facilities and develop additional spaces, where needed, for intermodal uses. Furthermore, the addition of enhanced bicycle accommodations should continue at all transit facilities and park-and-ride lots such as the current efforts spearheaded by BAT

Air, Water, and Freight Movement Recommendations

Increase use of smaller general aviation airports. Municipal Airports in the region, such as the facility in Plymouth, have experienced marked growth in the numbers of take-offs and landings in recent years. Both runways at Plymouth Airport have been expanded in the past and the shorter of the two runways should be increased in length to increase capacity, promote greater safety, and lessen the impact of noise on residents.

Investigate potential of municipal airports' ability to serve as freight terminals. Currently, there is no scheduled freight service at any of the municipal airports throughout Southeastern Massachusetts. A feasibility study should be considered by the Massachusetts Aeronautic Commission to determine whether there is potential for any of the municipal airports to serve as airfreight terminals. Depending upon the type of freight, such a facility could serve intermodal purposes.

Seek to establish greater public/private partnerships in ferry operations. The Old Colony Region should work with MassDOT, the Old Colony Planning Council, Municipalities, private ferry operators, and those interested in entering the ferry operation market to form better and more productive ferry service.

Increase the level of freight/goods movement by rail in the Old Colony Region. Support such initiatives, which would serve to reduce truck traffic congestion on local highways and local

roads. Consider working jointly with the Southeastern Massachusetts Metropolitan Planning Organization and Boston Central Transportation Planning Staff on a regional freight study.

Planning and Policy Recommendations

Encourage interagency agreements to enhance passenger service. For example, currently the MBTA 230 bus ends at the Montello Station, but extending that service to the BAT Centre, would enhance passenger connections. A partnership between the MBTA and Brockton Area Transit should be explored to better service customers in Brockton and those using the line through Holbrook, Braintree, and Quincy.

Encourage private sector participation in public transit operations. Brockton Area Transit is encouraged to continue joint development initiatives with private sector contractors when feasible and create partnerships between BAT, other RTAs, private carriers, and ride hail providers in the region to initiate transit service where there is documented unmet transportation need.

Chapter 6: Bicycle and Pedestrian Transportation

Facilities for safe, convenient, and efficient bicycle and pedestrian transportation are key elements of a well-balanced regional transportation network. Many of the Old Colony's goals, objectives, and policies include supporting a comprehensive and sustainable transportation network through the fostering of non-motorized active transportation choices.

Bicycling as a mode of transportation offers a high degree of personal mobility, providing door-to-door access, often at speeds comparable or greater than automobile travel in high-density urban areas. In recent years, bicycling has become an increasingly popular healthy mode choice of travel for commuting to school, work, recreation and exercise. With the ever-increasing cost of automobile ownership, a growing focus on sustainability and the growing issue of increased traffic congestion has driven much of the increase in the popularity of bicycling as a form of transportation.

Safe, convenient, and well-designed bicycle transportation infrastructure is essential to encourage bicycle use. Roads designed to accommodate bicyclists with low to moderate skills will meet the needs of most users and encourage bicycling for everyday use according to the Massachusetts Department of Transportation (MassDOT). Young children, women and the elderly are the primary bicyclists who may require special consideration when designing bicycle transportation facilities, particularly on busy arterial streets and those roads with high-speeds and high traffic volumes.

Low to Moderate skilled bicyclists are best served by:

- Extra operating space when riding on the roadway such as cycle tracks, protected bicycle lanes, bicycle lanes, useable shoulders, or wide curb lane
- Low speed streets (where cars and bicyclists share travel lanes)
- A network of designated bicycle facilities (bicycle lanes, side-street bicycle routes, and shared use paths).

All travelers are pedestrians at some point in their trip, and pedestrians are part of every roadway environment. Pedestrian facilities include sidewalks, walking paths, crosswalks, stairways, curb cuts, and ramps and transit stops. In some areas, particularly in suburban and rural communities, pedestrians may be sharing the roadway itself or its shoulders. It is important to understand that there is no single "pedestrian type" and that the transportation network needs to accommodate a variety of pedestrians of varying abilities. For example, children perceive their environment differently from adults and are not able to judge how drivers behave. Children typically walk slower, have a shorter gait, and have lower eye height than adults. On the opposite end of the spectrum, older adults may require more time to cross a street, desire more predictable surfaces, benefit from handrails in steep areas and may require places to rest along their route. People who are blind or have limited sight require audible and tactile cues to safely navigate sidewalks and crosswalks.

People with limited cognitive abilities may rely on symbols, way-finding signage and take longer to cross the street than other pedestrians. Pedestrians using mobility devices such as wheelchairs, scooters, and walkers need pedestrian infrastructure that possesses adequate widths, slopes and to be free of obstacles to allow these pedestrians to travel with ease and with a high degree of comfort. It is important to recognize pedestrians exhibit a wide range of physical, cognitive, and sensory abilities, but they all comprise the pedestrians that roadway design needs to accommodate.

ISSUES IN THE OLD COLONY REGION

There continues to be Elementary and Middle Schools in the region not taking advantage of the Safe Routes to School Program. The Safe Routes to School program (SRTS) aims to encourage and promote kids to walk and bike to school rather than being driven to campus through collaborative community approaches. As of April 2019, 78% of eligible schools in the region are partner schools.

The Old Colony region is generally auto-dependent. Over the past six decades, land-use decisions have generated demand for a transportation system designed to accommodate automobiles without consideration of other transportation modes. Changing demographics, which includes an aging population and a citizenry that is becoming more diverse and includes a wider variety of people who cannot afford the expense of a personal auto (or choose not to drive) and requires better and broader choices in transportation services and infrastructure. Mode shift and inter-modalism can help alleviate auto dependence by increasing the use of transit, carpool/vanpool, and non-motorized transportation modes such as bicycling and walking.

Bicycle parking at transit facilities continues to underperforming in some locations. While most transit facilities in the region provide bicycle-parking racks, the number of people biking to transit stations and park and ride facilities remains very low. Minimal security of these racks and a lack of shelter for bicycles may deter would be bicyclists from taking and parking their bikes at these facilities. Access to park and ride lots and the location of some in the region are not conducive to bicycle to since roads leading to these park and ride lots are unfriendly to cycling. Additionally, facilities such as showers or shower stations are not available at some individual's place of employment or located near their places of employment, which might suppress the potential of people's willingness to bike to work since they cannot clean up before they begin the workday.

The current ADA accessible sidewalk network does not meet the needs of the users in all places. Most of the main roadways in the region have a sidewalk on at least one side. However, there are many smaller roadways, particularly in more rural areas, where sidewalks are not present. In some cases, worn footpaths exist and in other areas, pedestrians share the roadway with vehicles. For existing sidewalks, width, surface type and conditions, and curbing conditions

vary. In some cases, sidewalks are in disrepair from weathering and vegetation and many are full of obstacles that make it hard to navigate for those using mobility devices.

Access to major employment centers is constrained due to the regions over-reliance on the automobile as its main source of transportation. Not all major employment centers are accessible by public transportation nor have adequate bicycle transportation infrastructure and amenities that would encourage individuals to bicycle to work to help mitigate the impacts of traffic congestion. With the automobile being such an integral part of one's day, major employment centers become congested and decrease the quality of life for all that wish to access these major employment centers.

Environmental Justice Areas generally have older infrastructure. The older infrastructure could generally include poor pavement conditions, lack of ADA compliant sidewalks, and lack proper crosswalk/bike lane markings.

EXISTING CONDITIONS

Sidewalks

According to the Massachusetts Road Inventory File, the Old Colony region has over 390 miles of roadway with a left and/or right sidewalk. Most of the main roadways in the region have a sidewalk on at least one side. However, there are many smaller roadways, particularly in more rural areas, where sidewalks are not present. In some cases, a worn footpath exists and in others, pedestrians share the roadway with vehicles. For existing sidewalks, width, surface type and conditions, and curbing conditions vary. In some cases, sidewalks are in disrepair from weathering, vegetation and contain a number of obstacles that impede pedestrians.

Existing Walking Paths and Trails

Several parks, nature areas, and recreation areas throughout the region feature walking and shared use paths. These areas include:

- Ames Nowell State Park, Abington
- Hanover Branch Rail Trail, Abington
- Borderland State Park, Easton
- D.W. Field Park, Brockton and Avon
- Myles Standish State Forest, Plymouth
- Wes Bridgewater Rail Trail, West Bridgewater

In addition to these major areas, several smaller parks and conservation areas exist in each of the towns, many providing pedestrian trails and paths. Bridgewater State University has a network of paved footpaths connecting campus buildings, parking areas, and the Bridgewater MBTA Commuter Rail Station.

Dedicated Bicycle Routes

Claire Saltonstall Boston to Cape Cod Bikeway: The Boston to Cape Cod Bikeway (“Claire Saltonstall Bikeway”) is the major bike route in both the Old Colony region and Massachusetts. This facility is approximately 65 miles from Boston to the Cape Cod Canal and then runs to both Provincetown (about 70 miles from the canal) and Woods Hole (about 20 miles from the canal). Principally, it accommodates long-distance recreational trips. The Bikeway traverses existing roadways with the bike route marked by road signage. This facility was developed to utilize low volume back roads as much as possible. In addition, the bikeway provides bicyclists with considerable opportunities to visit points of interest such as historical sites, shopping districts, and parks. In the years since the bikeway was planned, some of the roads, such Long Pond Road in Plymouth, have had large increases in traffic volume, and significantly more conflict between bicyclists and motorists could be occurring now. The conflicts are more likely on narrow, country-type roadways. Additionally, signage that once provided route guidance for bicyclists to follow is missing on many legs of the Claire Saltonstall Bikeway or have fallen into disrepair.

Bay Circuit Trail: The Bay Circuit Trail (BCT) is a more than 230 mile long recreation trail connecting parks, open spaces, and waterways in eastern Massachusetts.-First proposed in 1929 as an outer "emerald necklace," the route stretches from Plum Island in Newburyport on the North Shore to Kingston Bay, traversing 50 cities and towns. The BCT varies in surface type, from earthen hiking trails to paved shared-use trails.

Bay State Greenway (BSG): In its 2008 Massachusetts Bicycle Transportation Plan, MassDOT proposed the formation of a 742-mile statewide bicycle network, called the Bay State Greenway (BSG). A primary network supported by secondary routes throughout the Commonwealth, the BSG is aimed at enhancing the State’s existing infrastructure.

Recreational Bicycle Routes

Seaside Bicycle Trail: The Seaside Bike Trail in Plymouth is a 1.5-mile long facility that runs parallel to the Plymouth seashore between Hedge Road (just south of Cordage Park) and Nelson Street (just north of Downtown Plymouth) at the Nelson Street Recreation Area.

D.W. Field Park Parkway: D.W. Field Park in Brockton has a road that is partitioned for motor vehicle and active transportation usage. The D.W. Field Parkway is 5 miles in length and segmented into a northern section above Pleasant Street and a southern portion below Pleasant Street.

Easton Schools Complex Bikeway: The Town of Easton Schools complex has a quarter mile bikeway within the schools complex campus. The bikeway stretches from Columbus Ave to Lothrop Street.

Areas of Concentrated Activity

Many of the areas of concentrated activity are located within the traditional downtown areas of the Old Colony communities, such as Downtown Brockton, Downtown Whitman, Stoughton

Center, Downtown Easton, etc. Others are centered on transit stations, such as the Montello and Campello stations in Brockton.

Abington

The Town of Abington possesses no one concentration of commercial and/or high-density housing units that could be considered a town center. Instead, Abington has a pocket of commercial activity along certain corridors and housing units disseminated throughout the Town in a suburban pattern. The Town did create Transit Oriented Development (TOD) around its MBTA Commuter Rail station and the Town's central business district to encourage the development of uses that complement both the existing rail line and the surrounding residential areas. The district encompassed thirty acres around the Commuter Rail station.

The Town of Abington continues to experience growth but not at the previous rate, it did between the 2000 and 2010 U.S. Census periods. The Abington MBTA Station along with the close proximity of the Stop & Shop/Target shopping center has the potential to become a major intermodal transportation center serving the increasing population and economy of Abington and the surrounding towns by containing the following features:

- Commuter Rail (Existing)
- Parking Facility (Existing 400+ Vehicle Lot)
- Enhanced Walkways between the Station, Housing, and Central Business District
- Enhanced Pedestrian Amenities at area signalized intersections (Potential)
- Bicycle Lockers (Potential)
- Fixed Route Bus Service by Brockton Area Transit (Potential)
- Bicycle transportation facilities such as bicycle lanes between the Station, Housing, and Central Business District

Downtown Bridgewater

Downtown Bridgewater is a crossroads of three numbered Routes: 18, 28, and 104, and served by MBTA Bridgewater Commuter Rail Station. Additionally, the Town of Bridgewater also receives public bus service via Bridgewater State University student bus service and through the Brockton Area Transit Authority's Route 28. Development patterns in the area feature a New England Village style town center, with a mix of housing, local businesses, and services. Traffic flows around the town center in an oblong roundabout-like facility. Bridgewater State University abuts the town center and is a major generator of pedestrian traffic. Many students living in nearby off-campus housing commute to class by foot or biking and similarly many on-campus students travel to nearby businesses via the same means.

Several municipal buildings, including the Town Hall and Public Library, are also located within the center and generate pedestrian and bicycle trips. Due to the scarcity of parking, in some cases, visitors who arrive by automobile must park some distance away from their ultimate destination, and travel from their parking spot to the destination on foot. The area can be greatly served by enhanced pedestrian amenities, including pedestrian countdown signals at

signalized intersections and raised crosswalks at major crossing points. Bicycle lanes should be considered on the major roadways leading to and from the college, as the college has a significant population of students and faculty alike that live in nearby housing and may be well served by the option to safely bike to the school. Bicycle transportation infrastructure operating through the town center roundabout should be of robust design with a high degree of protection for the bicyclist. The Bridgewater MBTA Station should be included in all bicycle and pedestrian improvements involving the college.

Downtown Brockton

Brockton is the largest community in the Old Colony region and is a center of housing, commerce, industry, and government. The Downtown Brockton area contains all of these types of land use within a tight, concentric high-density core that extends between Court Street and Belmont Street from north to south, and Commercial Street and Warren Avenue from east to west.

The Downtown is a typical urban center with a mix of residential units, offices, and retail and service-oriented businesses. Brockton City Hall, Brockton Police Headquarters, the US Post Office, government (county and state) offices, Brockton Area Transit's Intermodal Transportation Centre; and the Brockton Commuter Rail Station are all located within the Downtown. This mix of development over a confined urban downtown generates a large amount of pedestrian trip within and into Downtown Brockton. Due to the dense urban pattern of Brockton and in particular Downtown Brockton, makes for the high potential for every day bicycling in the city according to MassDOT standards laid out in its Bicycle Plan. While there has been increasing progress to implement better pedestrian and bicycle transportation infrastructure in the Downtown Brockton area, additional facilities with a strong focus on greater pedestrian and bicyclist safety and security in the city and the downtown area should be developed to promote greater pedestrian and bicycle activity for transportation purposes. These pedestrian and bicycle infrastructure improvements include:

- Pedestrian countdown signals at Downtown intersections and safety bollards
- Leading Pedestrian Interval (LPI) or concurrent pedestrian signal phase policies
- Better lighting of sidewalks and streetscapes
- Raised crosswalks on Commercial Street, between the Brockton MBTA Station & BAT Intermodal Centre, and in front of the Post Office
- Well maintained, brightly painted crosswalks throughout Downtown Brockton
- Bicycle Lockers at Brockton MBTA Station, BAT Intermodal Centre, and various locations downtown
- Protected bicycles lanes in downtown
- Network of bicycle lanes throughout the City of Brockton
- Bicycle wayfinding signage throughout the city

Campello and Montello MBTA Stations

The Montello and Campello neighborhoods of Brockton each have an MBTA Commuter Rail Station. The Montello Station is located between North Montello Street (Route 28) and Spark Street, just to the south of Howard Street (Route 37). The Campello Station is located off Plain Street, just to the east of Montello Street (Route 28). Both neighborhoods are very densely developed, and each station generates a large amount of pedestrian traffic. In addition to commuter rail service to Boston, each station is served by Brockton Area Transit's fixed route bus service, and the Montello Station is served by MBTA fixed route bus service to Holbrook, Randolph, Braintree, and Quincy.

The Montello Station could be better served by greater traffic enforcement on North Montello Street (Route 28). Even though there are clearly defined crosswalks and a Rectangular Flashing Beacons (RFBs) at the southern crosswalk at Montello (Route 28) and Wilmington Street, drives do not stop for pedestrians even when the RFB has been activated by pedestrians. Additionally, a counter flow bicycle lane should be established on Wilmington Street to bring bicyclist from the MBTA Commuter Rail Station up to North Main Street.

The Campello Station could be better served by enhanced pedestrian connections to the surrounding neighborhood, as access is currently largely limited to the driveway off Plain Street. Many pedestrians access the Campello Station via Riverside Ave and currently climb a dirt berm in order to access the station platform. Installing stairs and an accessible wheelchair ramp would allow pedestrians to transverse this berm in a safe and comfortable manner. A pedestrian bridge over the railroad track to Forest Street would allow pedestrians to access the station from the eastern neighborhoods across the tracks making it feasible to walk to this station from homes in this area. Establishing bicycle lanes and lead cyclist to the Station are needed.

- Improve Roadway Lighting
- Construction of new sidewalks/Pedestrian bridge
- Construction of bicycle paths and bicycle lanes

Design and implantation of any improvements on local and federal-aid eligible roadways around these stations would be the responsibility of the host communities as these roadways are under local jurisdiction.

Downtown Stoughton

Stoughton Center is a densely developed area around the intersection of Routes 27, 138, and 139. The Stoughton MBTA Commuter Rail Station is also located in Stoughton Center. Development around the Center features a mix of small local shops; services; municipal facilities; and housing. Like other MBTA Station in the Old Colony Region, the Stoughton MBTA Station has the potential to develop into a major intermodal transportation center serving the population and economy of Stoughton and the surrounding towns by containing the following features:

- Commuter Rail (Existing)
- High Capacity Parking Facility (Existing 400+ Lot)
- Enhanced Walkways between Station, Housing, and Central Business District (Existing and Potential)
- Enhanced Pedestrian Amenities at area signalized intersections (Existing and Potential)
- Bicycle lanes
- Bicycle wayfinding signage
- Bicycle Lockers and Bike Racks (Existing and Potential)

Downtown Plymouth

Downtown Plymouth is less defined than some of the other downtown areas in the region but generally extends north to south along the waterfront from Samoset Street (Route 44) to Lincoln Street. In addition to the traditional mix of commercial, residential, and municipal uses, the Downtown area of Plymouth also features historic sites and major tourist destinations such as Plymouth Harbor, Plymouth Rock, Pilgrim Hall Museum, and the Mayflower II. Plymouth Harbor provides seasonal waterborne transportation options to Provincetown and serves as an operational fishing port.

Plymouth has a parking management system in the Downtown that directs visitors to park at any one of a network of surface parking lots throughout the area, pay for parking, and walk to their destination. Safe and efficient pedestrian amenities are critical to the vitality of Downtown Plymouth, as many businesses, tourist attractions, and government offices do not have on-site or readily available nearby street parking.

Plymouth's MBTA Commuter Rail Station is just 1.74 miles outside the town's linear downtown. While the distance between the MBTA Commuter Rail Station and Plymouth's downtown is not very conducive to walking, it is a bikeable distance. The extension of the Seaside Rail Trail to the Plymouth MBTA Commuter Rail Station would provide a car-free bicycle ride from the station to the northern point of Plymouth's Downtown area, making it more conducive for commuters to combine a bicycle with their Commuter Rail trip. Additionally, the extension of the Seaside Rail Trail would allow for safer and more direct trips between Plymouth's Downtown and the Cordage Commerce Center, which houses many businesses and the Quincy College Plymouth Campus and housing currently in development on the former Walmart site.

- Rectangular Rapid Flash Beacons (RRFB) to better delineate crosswalks
- Bike Racks around the Downtown
- Pedestrian countdown signals at signalized intersections
- Leading Pedestrian Interval (LPI) or concurrent pedestrian signal phase policies
- Raised Crosswalks at major mid-block crossing points
- Increased lighting on side streets and alleyways that connect Main Street to Water Street
- Extension of Seaside Rail Trail to Plymouth MBTA Commuter Rail Station
- Bicycle lockers at the Plymouth MBTA Commuter Rail Station

- Expansion of bicycle lanes throughout the Town of Plymouth

Design and implantation of any improvements on these local and federal-aid eligible roadways would be the responsibility of the host communities as these roadways are under local jurisdiction.

Cedarville

Cedarville is a village center of Plymouth located at the southern end of Plymouth, between Exit 2 on Route 3, Route 3A, and Hedges Pond Road. The area is highly commercialized along State Road (Route 3A) between Herring Pond Road and Hedges Pond Road. While much of the residential development in the surrounding area is low-density, a large high-density residential development is located along the southern boundary of the village center, on the east side of Route 3A.

The Town has identified this area as an area with a large amount of pedestrian activity and high-hazard to pedestrians. Route 3A is a wide cross-section with high speeds and no signalized intersections to assist with crossings. Pedestrians crossing the highway ramp system at Route 3 Exit 2 also face a high-degree of hazard with unprotected crossings and high travel speeds. According to Strava Metro heat map data, bicyclists do travel through the Cedarville area. However, there are no bicycle accommodations in the Cedarville area. The following improvements have been identified that could greatly improve safety and mobility for pedestrians in the area:

- Signalize the Route 3 Ramps at Herring Pond Road
- Signalize the intersection of State Road (Route 3A) and Herring Pond Road
- Signalize the intersection of State Road (Route 3A) and Hedges Pond Road
- Enhance mid-block crossings at shopping centers, between Herring Pond Road and Hedges Pond Road, and at White Cliffs
- Widening asphalt sidewalks in the area to change their function from pedestrian only, to multiuse paths that accommodate pedestrians and bicyclist.

Queset Commercial District

The Queset Commercial District centers on Route 138 and Route 123 in the Town of Easton. Found in this area are Stonehill College and numerous retail and dining establishments. With the recently developed Water Point Condominium project, formerly known as Queset Commons, the resident population is expected to rise and with the additional retail component of the Water Point Condominium project, there is the potential for greater traffic congestion and bicycle and pedestrian activity due to the increased retail offerings. Currently, the retail establishments around the Queset Commercial District area generates a large amount of pedestrian traffic originating at Stonehill College, with most of these trips travel back and forth on Route 138 and Route 123, with students walking between the two commercial areas of Downtown Easton and the Starbucks plaza. Safety and security along Route 138 and Route 123 can be enhanced for pedestrians and bicycle riders by:

- Creation of bicycle Lanes along Route 138 between Route 123 and Main Street
- Creation of bicycle lanes between Route 138 and Pearl Street
- Enhancement of traffic signals along these two corridors
- Installation of pedestrian signal at Route 138 and Route 123
- Work with Stonehill College to redevelop its former main entrance, the Blessed Basil Moreau Drive, into a bicycle and pedestrian corridor
- Improve signage at the Natural Resources Trust (NRT) Sheep Pasture to inform pedestrians and bicyclist they can pass through this area to reach Downtown Easton.
- Establish well-lighted walkways and streetscapes

Downtown Easton (North Easton)

Downtown Easton or North Easton Center as it is sometimes referred to, is a stretch of Main Street in the Town of Easton that is bound by Seaver Street to the east and Day Street to the west. Found along this stretch of road are numerous retail and dining establishment with single-family homes and medium density housing units present in the area. With the recent success of the sewer project in the area, Downtown Easton is flourishing economically. With this success has come more pedestrian and bicycle activity. Additionally, Downtown Easton has constrained parking availability that results in patrons and residents having to park further away from their destination or homes requiring them to walk a longer distance. Due to the limited road width between Williams Street and Day Street, there are no bicycle lanes or shoulders able to accommodate bicyclist. The following improvements have been identified that could greatly improve safety and mobility for pedestrians and bicyclist in this area:

- Enhance cross walks can greatly improve the pedestrian experience
- Install more bicycle parking to encourage individuals to bike to the area rather than driving their car
- Establish bicycle transition markings informing drivers that cyclist will be leaving the shoulders and taking the travel lane as they enter the commercial area of Downtown Easton
- Reduce automobile speeds along Main Street between Seaver Street and Washington Street to 25mph.
- Increase traffic enforcement along Main Street
- Establish bicycle wayfinding signage
- Where space allows, establish more pedestrian seating

Five Corners (South Easton)

Five Corners is a commercial area located in the Town of Easton, in a section of town known as South Easton. Five Corners is characterized by suburban auto-oriented development with the dispersion of low-density single-family housing and two multifamily complexes. The area is being upgraded to a sewer waste management system that will allow greater commercial and residential development to take place than the current septic waste management systems can

handle now. If more intense commercial and residential usage occurs as a result of the upgrade to a sewer system, there will be the potential for greater pedestrian and bicyclist activity than there is now. The following improvements have been identified that could greatly improve safety and mobility for pedestrians and bicyclist in this area:

- Install pedestrian countdown signals
- Establish a crosswalk Bay Road and Depot Street
- Reestablish the bicycle lane along Depot Street but that is no longer up to modern standards by widening the bike lane to be used as a multiuse path.
- Provide bicycle accommodations such as bicycle lanes in this area.
- Provide greater traffic enforcement in the area

Downtown Whitman

Downtown Whitman is centered on Washington Street, between South Avenue (Route 27) and West Street. A relatively compact area, featuring several businesses, it is flanked by dense residential development on all sides, a large park to the northeast, and town offices and the Whitman MBTA Station three-quarters of a mile to the east. Observations from data collection in the area indicated a large number of pedestrians between Downtown Whitman and the MBTA Station. Two all-way stop controlled four-legged intersections make up the northern and southern ends of the downtown area. While these “4-Way Stop” sign controlled intersections effectively process traffic in the area, they can present a challenge to pedestrians attempting to cross at the intersection.

Currently, there is no bicycle accommodation within the Downtown Whitman area. That said, because of the dense development patterns in the Downtown area and numerous retail and dining options, Downtown Whitman is a prime location for everyday bicycling. Pedestrian and Bicycle accommodation can be enhanced by:

- Implementing complete street design elements
- Establishment of pedestrian and bicyclist wayfinding
- Establishment of BAT bus service to the town center and MBTA station
- Bicycle parking in Downtown
- Establishment of a bicycles along Route 27

Pembroke Center

Pembroke Center is a traditional New England community center with a shopping plaza, town offices, a library, and several other free-standing businesses. Low-density residential development surrounds the center. The shopping center at Route 14 and Route 36 was recently redeveloped. Despite low-density residential development, pedestrian activity near the center is likely to increase with the relatively fast growth of the town, the newly developed center, and new transit service between the center and the Hanson MBTA Station.

SAFE ROUTES TO SCHOOL

The Massachusetts Safe Routes to School (SRTS) program promotes healthy transportation and mode shift for children and parents in their travel to and from school. It educates students, parents and community members on the value of walking and bicycling for travel to and from school.

The Massachusetts Safe Routes to School program is managed by the Massachusetts Department of Transportation. The program was established out of a pilot program developed by WalkBoston and is currently managed by MassDOT. Safe Routes programs:

- Continue to establish healthy lifetime habits for students
- Increase children's independence
- Help students arrive at school ready to learn
- Teach safe pedestrian, bicyclist, and driver skills
- Encourage schools in the region not SRTS Schools to become participants

Safe Routes to School includes education, encouragement, enforcement, engineering, and evaluation to ensure a comprehensive and successful program to increase walking and bicycling to and from school. As the title of the program suggests, safety is a central theme concerning the initiatives and goals of the program. Some of these specific initiatives include the design and maintenance of effective school zones, maximizing safety at street crossings, and reducing travel speeds.

The Massachusetts Safe Routes to School program offers schools technical assistance designing, implementing, marketing, and evaluating initiatives tailored to each school's needs and priorities. Participating schools receive free promotional materials to implement Safe Routes to School, plus no-cost educational materials targeted to students, parents, and community leaders. Training prepares school stakeholders to identify school access challenges and design solutions. School partners qualify for infrastructure improvements to enhance safety along school routes.

RECOMMENDATIONS

Livability

Livability recommendations recommend the continued support of MassDOT "Complete Streets" design element initiative in all roadway projects. Complete Streets are roadways that are designed to support safe, attractive, and comfortable access to all users, including, pedestrians, bicyclists, public transit and motorists. In addition to enhancing safety and mobility, "Complete Street" designed roadways often enhance the surrounding community and environment through traffic calming techniques and vegetated streetscapes. Complete Streets are categorized by wide paved shoulders or separate bicycling lanes; sidewalks separated from the roadway by raised curbing and/or vegetation; well-placed and well-designed crosswalks; raised medians providing crossing refuge, and bulb-outs at intersections to prevent high-speed turning

vehicles and shorten the crossing distance for pedestrians. Target and Performance Measure: OCPC's goal is to have 100% of member communities with Complete Streets policies and at least 50% of communities have taken part in receiving complete street project funding within 10 years.

Improve mobility and access to the pedestrian infrastructure network for all users. There are currently large gaps in the ADA-accessible pedestrian infrastructure network in the region. As the population continues to age, providing access to all users, including those with physical challenges and disabilities will become critically important. All planning efforts should incorporate the needs of all users, and strategies to improve access and reduce gaps in the ADA-accessible network should be incorporated into all transportation planning products.

Encourage/promote walking and bicycle riding as a viable healthy transportation option to automobile commuting and as a means to improve air quality and to advance MassDOT's policy of promoting the opportunity of *everyday biking* laid out in the Statewide Bicycle Plan. Where feasible, walking or bicycling to work or to transit facilities instead of driving would reduce "cold starts," which inject high levels of toxic emissions into the atmosphere with the starting and shutting off of automobile engines. A coordinated effort of local officials, the MassDOT, Regional Planning Agencies and interest groups, should encourage and promote the use of existing designated bicycle routes as a viable healthy transportation option to automobile commuting through public information and awareness efforts and their upgrading to more robust bicycle transportation infrastructure.

Identify, designate and implement additional bicycle paths and routes to be used for both commuting and recreation. Local officials, in concert with state and regional planners, should investigate the development of additional bicycle paths and routes which could safely serve the commuting public. This includes, but is not limited to, the development of abandoned railroad rights-of-way as bicycle paths, and bikeways that connect industrial/business parks, shopping centers, schools, and other key destinations.

Promote/encourage pedestrian ways as a viable healthy transportation option to automobile commuting and means of improving air quality. Where feasible, walking to work or to transit facilities instead of driving would reduce "cold starts," which inject high levels of toxic emissions into the atmosphere with the starting and shutting off of automobile engines. Support of this travel mode includes but is not limited to, the creation of pedestrian walkway connections between residential areas, transit facilities, industrial parks, shopping centers, schools, and other key destinations.

Safety Recommendations

Promote and increase participation in Safe Routes to School program in the region. Continue partnership with MassDOT to promote to communities and increase participation by eligible elementary and middle schools in the Safe Routes to School Program

Encourage/promote safe bicycle riding, and reduce the number of injuries and fatalities associated with bicycle crashes. To help ensure safe travel habits and reduce the number of bicycle crashes, education programs for all road users should be implemented. Coordination of municipalities with the Department of Education, Registry of Motor Vehicles and transportation agencies should be a part of this effort.

Promote the continued installation of bicycle detection loops at actuated signalized intersection to increase safety for entering bicyclists. Noting that roadways serve both drivers of motorized vehicles and users of bicycles, actuated traffic signals should include detection loops for bicycles to maximize safety for bicycle riders.

Support local initiatives, which enact, implement and enforce laws and regulations regarding pedestrian traffic. The responsibility for pedestrian safety ultimately lies with the local jurisdiction.

Communities should utilize safety officers to enforce laws/regulations that promote increased pedestrian safety, with emphasis around high activity areas such as transit facilities, schools, and commercial centers. Participants in the process should include police departments, traffic engineers, school and legal system representatives.

Install physical barriers, pavement markings, and other amenities where needed to maximize pedestrian safety. Marked crosswalks, safety islands, street lighting, pedestrian underpasses/overpasses, sidewalks, traffic signals and signage all constitute useful techniques to separate pedestrians from hazardous vehicular traffic. Particular attention should be given to high activity areas such as transit facilities, schools, and commercial centers.

Promote Installation of Pedestrian Countdown Signals at Signalized Intersections – A Pedestrian Countdown Signal consists of a standard pedestrian signal with standard shapes and color, with an added display that shows the countdown of the remaining crossing time. Studies have shown that these types of signals dramatically decrease pedestrian-vehicle conflicts and increases safety for crossing pedestrians. By viewing the numeric countdown display, pedestrians gain a new level of self-protection by the ability to determine how long it takes them to cross a street, and knowing precisely how much time exists on the current signal phase before the “Don’t Walk” alert comes on and the signal proceeds into its next phase. According to a January 2006 article in the ITE Journal, San Francisco experienced a 52 percent reduction in pedestrian injury collisions at the 700 intersections it had retrofitted with the countdown equipment. The Regional Planning Agency and Metropolitan Planning Organization should work with the City of Brockton and other towns in the Region to retrofit signalized intersection with pedestrian countdown signals. Pedestrian countdown signals should be considered with all new signalization projects. Federal law under the Americans with Disabilities Act (ADA) require pedestrian crossing signals be timed accordingly to accommodate mobility challenged persons.

Promote Safer Pedestrian Access Designs in Parking Lots – Pedestrian consideration are often overlooked in design for parking areas of retail, entertainment, and employment centers. Often

the pressure to provide as many parking spots as possible or the minimums for zoning regulations eliminates safe pedestrian accommodations from the design process. Once parked and out of the vehicle, pedestrians are often forced to share driveways with motor vehicles. Parking lots in many urban areas are also used as a cut through or connections for pedestrians and bicyclist traveling through a given area, whether it be to shorten a walk or ride or simply because it is safer for the bicyclist or pedestrian to travel through a parking lot for greater safety.

Promote Use of Crossing Islands and Medians in Wide Cross-Sections – According to the MassDOT Project Development and Design Guide, fifty feet is generally the longest uninterrupted crossing a pedestrian should encounter at a crosswalk although islands and medians are also appropriate for shorter distances as well. Many multiple lane roadways exceed fifty feet in cross-section width.

Capacity and Efficiency Recommendations

Along with the Pedestrian Level of Service (PLOS) developed in the last LRTP, the Old Colony Planning Council should implement a program to monitor the development of new sidewalks established in the region and those sidewalks brought into a state of good repair that had been failing the public before.

The Old Colony Planning Council should continue to implement the Bicycle Level of Service (BLOS) rankings on State Numbered Routes and local roadway in the regions. OCPC Staff shall maintain this inventory on a continuing basis, updating information, as it becomes available and existing infrastructure changes. The Old Colony Planning Council should also implement a program to monitor the state of good repair of bicycle lanes in the region to make sure the investment in them does not fall into disrepair. In addition, the installation of new bicycle lane miles should be quantified to be used as a barometer to gauge the regions progress on implementing bicycle infrastructure throughout the region and its commitment to mode shift and the Commonwealths goal of promoting everyday biking.

Environmental Justice Recommendations

Target pedestrian and bicycle infrastructure improvements in environmental justice areas. Transportation planning efforts should include increase mobility and safety for pedestrian and bicycle infrastructure access in high minority population and low-income population areas.

Planning and Policy Recommendations

Coordinate efforts to improve bicycle facilities with surrounding municipalities and regional agencies. To help form a more complete and contiguous network of bicycle facilities in the region and southeastern Massachusetts, local agencies should coordinate efforts with agencies and organizations outside the region. This includes, but is not limited to, researching the existing bicycle facilities of surrounding towns before formalizing new bikeways, and coordinating public outreach programs to help minimize the cost of these efforts.

Support local, regional, and state initiatives and legislation that create or maintain bicycle infrastructure and safety. To best serve the greater good and needs of the public for a safe and secure transportation system, support and endorsement will be provided to all initiatives and legislation (local/regional/state/federal) that result in the implementation of bicycle facilities, ease congestion, promote recreation, and increase safety and security for bicycle users.

Chapter 7: Transportation, the Environment, and Climate

Green Infrastructure is composed of a complex array of natural and environmental features. The green infrastructure concept also includes a vast majority of the region's agricultural resources. The term Green Infrastructure refers to the management of wet weather flows using these processes, and to refer to the patchwork of natural areas that provide habitat, flood protection, cleaner air and cleaner water. Green infrastructure practices aim to preserve, restore and create green space using soils, vegetation, and rainwater harvest techniques

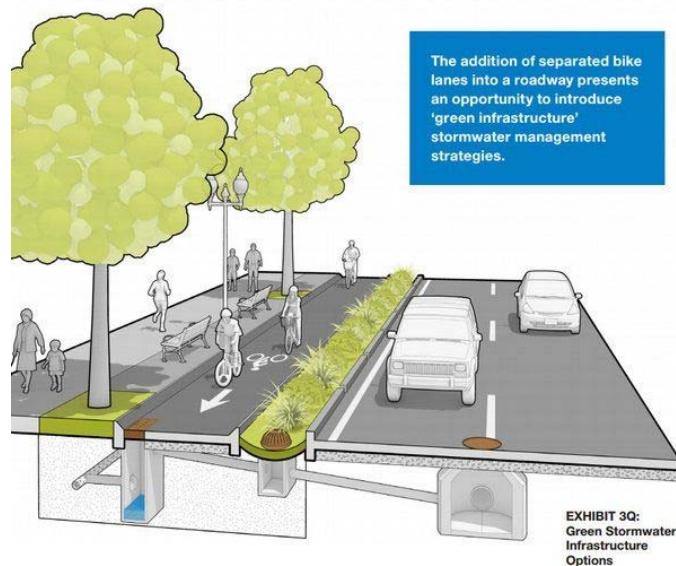


Figure 7-1: Pictograph of an example of a green infrastructure roadway layout

Green infrastructure practices include:

- An approach to land development that works with nature to manage stormwater as close to its source as possible;
- Employs principles such as preserving and recreating natural landscape features, minimizing effective imperviousness to create functional and appealing site drainage that treats stormwater as a resource rather than a waste product;
- Bio-retention facilities, rain gardens, vegetated rooftops, rain barrels, and permeable pavements;
- Water can be managed in a way that reduces the impact of built area and promotes the natural movement of water within an ecosystem or watershed.

Green Streets feature enhanced landscaping, pervious and decorative paving, and other features that increase their attractiveness to pedestrians, calm traffic, and help to retain and purify stormwater in passive systems. Many green streets are primarily designed to integrate innovative stormwater management techniques into the right-of-way of a road. *Green Streets* create street canopies and other “green infrastructure” that can add to the aesthetics of a community, as well as mitigate temperature and contribute to improving air quality.

The operation of vehicles and the construction of transportation infrastructure affect both the natural and built environment. In particular, transportation has a direct relationship with the production of greenhouse gases that are related to climate change. Currently the way we travel relies primarily on a finite natural resource, fossil fuel, particularly oil. This reliance has significant environmental and economic consequences. Half of the sources of greenhouse gas in the region are related to transportation, primarily through the burning of gasoline and diesel fuel. There is a growing urgency in the region, to reverse this trend. Changes in fuels, technologies, and travel patterns are all needed to meet the region's greenhouse gas reduction goals.

Low Impact Development (LID) is the best principal to use nature as a model and manage rainfall at the source.

1. Conserve natural areas wherever possible (do not pave over the whole site if you do not need to).
2. Minimize the development impact on hydrology
3. Maintain runoff rate and duration from the site (do not let the water leave the site)
4. Scatter Integrated Management Practices (IMPs) throughout the site - IMPs are decentralized, microscale controls that infiltrate, store, evaporate, and/or detain runoff close to the source.
5. Implement pollution prevention, proper maintenance and public education programs.

Research indicates that when an impervious area in a watershed reaches 10 percent, stream ecosystems begin to show evidence of degradation, and coverage more than 30 percent is associated with severe, practically irreversible degradation. What Low Impact Development does is make hard engineering work more like soft engineering.

LID is one of many strategies and techniques used to counteract the impact of development. This strategy refers to systems and practices that use or mimic natural processes that result in the infiltration, **evapotranspiration** or use of stormwater in order to protect water quality and associated aquatic habitat.

Evapotranspiration is the process of transferring moistures from the earth into the atmosphere. Evaporation occurs when water vapor leaves the soil or a plant's surface. Transpiration involves the passage of water through a plant, from its roots through its vascular system. Factors that affect the rate of evapotranspiration include the amount of solar radiation, atmospheric vapor pressure, temperature, wind, and soil moisture.

AIR QUALITY CONFORMITY DETERMINATION

This section documents the latest air quality conformity determination for the 1997 ozone National Ambient Air Quality Standards (NAAQS) in the Old Colony Region. It covers the applicable conformity requirements according to the latest regulations, regional designation

status, legal considerations, and federal guidance. Further details and background information are provided below:

Introduction

The 1990 Clean Air Act Amendments (CAAA) require metropolitan planning organizations within nonattainment and maintenance areas to perform air quality conformity determinations prior to the approval of Long-Range Transportation Plans (LRTPs) and Transportation Improvement Programs (TIPs), and at such other times as required by regulation. Clean Air Act (CAA) section 176(c) (42 U.S.C. 7506(c)) requires that federally funded or approved highway and transit activities are consistent with (“conform to”) the purpose of the State Implementation Plan (SIP). Conformity to the purpose of the SIP means that means Federal Highway Administration (FHWA) and Federal Transit Administration (FTA) funding and approvals are given to highway and transit activities that will not cause or contribute to new air quality violations, worsen existing violations, or delay timely attainment of the relevant NAAQS or any interim milestones (42 U.S.C. 7506(c)(1)). EPA’s transportation conformity rules establish the criteria and procedures for determining whether metropolitan transportation plans, transportation improvement programs (TIPs), and federally supported highway and transit projects conform to the SIP (40 CFR Parts 51.390 and 93).

A nonattainment area is one that the U.S. Environmental Protection Agency (EPA) has designated as not meeting certain air quality standards. A maintenance area is a nonattainment area that now meets the standards and has been re-designated as maintaining the standard. A conformity determination is a demonstration that plans, programs, and projects are consistent with the State Implementation Plan (SIP) for attaining the air quality standards. The CAAA requirement to perform a conformity determination ensures that federal approval and funding go to transportation activities that are consistent with air quality goals.

Legislative and Regulatory Background

The entire Commonwealth of Massachusetts was previously classified as nonattainment for ozone, and was divided into two nonattainment areas. The Eastern Massachusetts ozone nonattainment area included Barnstable, Bristol, Dukes, Essex, Middlesex, Nantucket, Norfolk, Plymouth, Suffolk, and Worcester counties. Berkshire, Franklin, Hampden, and Hampshire counties comprised the Western Massachusetts ozone nonattainment area. With these classifications, the 1990 Clean Air Act Amendments (CAAA) required the Commonwealth to reduce its emissions of volatile organic compounds (VOCs) and nitrogen oxides (NOx), the two major precursors to ozone formation to achieve attainment of the ozone standard.

The 1970 Clean Air Act defined a one-hour national ambient air quality standard (NAAQS) for ground-level ozone. The 1990 CAAA further classified degrees of nonattainment of the one-hour standard based on the severity of the monitored levels of the pollutant. The entire commonwealth of Massachusetts was classified as being in serious nonattainment for the one-hour ozone standard, with a required attainment date of 1999. The attainment date was later extended, first to 2003 and a second time to 2007.

In 1997, the EPA proposed a new, eight-hour ozone standard that replaced the one-hour standard, effective June 15, 2005. Scientific information had shown that ozone could affect human health at lower levels, and over longer exposure times than one hour. The new standard was challenged in court, and after a lengthy legal battle, the courts upheld it. It was finalized in June 2004. The eight-hour standard is 0.08 parts per million, averaged over eight hours and not to be exceeded more than once per year. Nonattainment areas were again further classified based on the severity of the eight-hour values. Massachusetts as a whole was classified as being in moderate nonattainment for the eight-hour standard, and was separated into two nonattainment areas—Eastern Massachusetts and Western Massachusetts.

In March 2008, EPA published revisions to the eight-hour ozone NAAQS establishing a level of 0.075 ppm, (March 27, 2008; 73 FR 16483). In 2009, EPA announced it would reconsider this standard because it fell outside of the range recommended by the Clean Air Scientific Advisory Committee. However, EPA did not take final action on the reconsideration so the standard would remain at 0.075 ppm.

After reviewing data from Massachusetts monitoring stations, EPA sent a letter on December 16, 2011 proposing that only Dukes County would be designated as nonattainment for the new proposed 0.075 ozone standard. Massachusetts concurred with these findings.

On May 21, 2012, (77 FR 30088), the final rule was published in the Federal Register, defining the 2008 NAAQS at 0.075 ppm, the standard that was promulgated in March 2008. A second rule published on May 21, 2012 (77 FR 30160), revoked the 1997 ozone NAAQS to occur one year after the July 20, 2012 effective date of the 2008 NAAQS.

Also on May 21, 2012, the air quality designations areas for the 2008 NAAQS were published in the Federal Register. In this Federal Register, the only area in Massachusetts that was designated as nonattainment is Dukes County. All other Massachusetts counties were designated as attainment/unclassified for the 2008 standard. On March 6, 2015, (80 FR 12264, effective April 6, 2015) EPA published the Final Rulemaking, “Implementation of the 2008 National Ambient Air Quality Standards (NAAQS) for Ozone: State Implementation Plan Requirements; Final Rule.” This rulemaking confirmed the removal of transportation conformity to the 1997 Ozone NAAQS.

However, on February 16, 2018, the United States Court of Appeals for the District of Columbia Circuit in *South Coast Air Quality Mgmt. District v. EPA* (“South Coast II,” 882 F.3d 1138) held that transportation conformity determinations must be made in areas that were either nonattainment or maintenance for the 1997 ozone NAAQS and attainment for the 2008 ozone NAAQS when the 1997 ozone NAAQS was revoked. These conformity determinations are required in these areas after February 16, 2019. On November 29, 2018, EPA issued *Transportation Conformity Guidance for the South Coast II Court Decision* (EPA-420-B-18-050, November 2018) that addresses how transportation conformity determinations can be made in areas. According to the guidance, both Eastern and Western Massachusetts, along with several

other areas across the country, are now defined as “orphan nonattainment areas” – areas that were designated as nonattainment for the 1997 ozone NAAQS at the time of its revocation (80 FR 12264, March 6, 2015) and were designated attainment for the 2008 ozone NAAQS in EPA’s original designations rule for this NAAQS (77 FR 30160, May 21, 2012).

CURRENT CONFORMITY DETERMINATION

After 2/16/19, as a result of the court ruling and the subsequent federal guidance, transportation conformity for the 1997 NAAQS – intended as an “anti-backsliding” measure – now applies to both of Massachusetts’ orphan areas. Therefore, this conformity determination is being made for the 1997 ozone NAAQS on the (Old Colony Region) FFY 2020-2024 Transportation Improvement Program and 2020 Long Range Transportation Plan.

The transportation conformity regulation at 40 CFR 93.109 sets forth the criteria and procedures for determining conformity. The conformity criteria for TIPs and LRTPs include: latest planning assumptions (93.110), latest emissions model (93.111), consultation (93.112), transportation control measures (93.113(b) and (c), and emissions budget and/or interim emissions (93.118 and/or 93.119).

For the 1997 ozone NAAQS areas, transportation conformity for TIPs and LRTPs for the 1997 ozone NAAQS can be demonstrated without a regional emissions analysis, per 40 CFR 93.109(c). This provision states that the regional emissions analysis requirement applies one year after the effective date of EPA’s nonattainment designation for a NAAQS and until the effective date of revocation of such NAAQS for an area. The 1997 ozone NAAQS revocation was effective on April 6, 2015, and the South Coast II court upheld the revocation. As no regional emission analysis is required for this conformity determination, there is no requirement to use the latest emissions model, or budget or interim emissions tests.

Therefore, transportation conformity for the 1997 ozone NAAQS for the Old Colony Region FFY 2020-2024 Transportation Improvement Program and 2020 Long Range Transportation Plan can be demonstrated by showing that remaining requirements in Table 1 in 40 CFR 93.109 have been met. These requirements, which are laid out in Section 2.4 of EPA’s guidance and addressed below, include:

Latest planning assumptions (93.110)

- Consultation (93.112)
- Transportation Control Measures (93.113)
- Fiscal Constraint (93.108)

Latest Planning Assumptions:

The use of latest planning assumptions in 40 CFR 93.110 of the conformity rule generally apply to regional emissions analysis. In the 1997 ozone NAAQS areas, the use of latest planning

assumptions requirement applies to assumptions about transportation control measures (TCMs) in an approved SIP (See following section on Timely Implementation of TCMs).

Consultation:

The consultation requirements in 40 CFR 93.112 were addressed both for interagency consultation and public consultation. Interagency consultation was conducted with FHWA, FTA, US EPA Region 1, MassDEP, and the other Massachusetts MPOs, with the most recent conformity consultation meeting held on March 6, 2019 (this most recent meeting focused on understanding the latest conformity-related court rulings and resulting federal guidance). This ongoing consultation is conducted in accordance with the following:

- Massachusetts' Air Pollution Control Regulations 310 CMR 60.03 "Conformity to the State Implementation Plan of Transportation Plans, Programs, and Projects Developed, Funded or Approved Under Title 23 USC or the Federal Transit Act"
- The Commonwealth of Massachusetts Memorandum of Understanding by and between Massachusetts Department of Environmental Protection, Massachusetts Executive Office of Transportation and Construction, Massachusetts Metropolitan Planning Organizations concerning the conduct of transportation-air quality planning in the development and implementation of the state implementation plan" (note: this MOU is currently being updated)

Public consultation was conducted consistent with planning rule requirements in 23 CFR 450.

Title 23 CFR Section 450.324 and 310 CMR 60.03(6)(h) requires that the development of the TIP, LRTP, and related certification documents provide an adequate opportunity for public review and comment. Section 450.316(b) also establishes the outline for MPO public participation programs. The Old Colony MPO's Public Participation Plan was formally adopted in 2017. The Public Participation Plan ensures that the public will have access to the Long Range Transportation Plan and all supporting documentation, provides for public notification of the availability of the Long Range Transportation Plan and the public's right to review the document and comment thereon, and provides a 30-day public review and comment period prior to the adoption of the Long Range Transportation Plan and related certification documents.

The public comment period for this conformity determination commenced on June 18, 2019. During the 30-day public comment period, any comments received were incorporated into this Plan. This allowed ample opportunity for public comment and MPO review of the draft document. The public comment period will close on July 10, 2019 and subsequently, the Old Colony MPO [is expected to endorse] this air quality conformity determination before July 16, 2019. These procedures comply with the associated federal requirements.

Timely Implementation of Transportation Control Measures:

Transportation Control Measures (TCMs) have been required in the SIP in revisions submitted to EPA in 1979 and 1982. All SIP TCMs have been accomplished through construction or

through implementation of ongoing programs. All of the projects have been included in the Region's Transportation Plan (present of past) as recommended projects or projects requiring further study.

DEP submitted to EPA its strategy of programs to show Reasonable Further Progress of a 15% reduction of VOCs in 1996 and the further 9% reduction of NOx toward attainment of the National Ambient Air Quality Standards (NAAQS) for ozone in 1999. Within that strategy there are no specific TCM projects. The strategy does call for traffic flow improvements to reduce congestion and, therefore, improve air quality. Other transportation-related projects that have been included in the SIP control strategy are listed below:

- Enhanced Inspection and Maintenance Program
- California Low Emission Vehicle Program
- Reformulated Gasoline for On- and Off-Road Vehicles
- Stage II Vapor Recovery at Gasoline Refueling Stations
- Tier I Federal Vehicle Standards

Fiscal Constraint:

Transportation conformity requirements in 40 CFR 93.108 state that TIPs and transportation plans must be fiscally constrained consistent with DOT's metropolitan planning regulations at 23 CFR part 450. The Old Colony 2020-2024 Transportation Improvement Program and 2020 Long Range Transportation Plan are fiscally constrained, as demonstrated in Chapter 9 of this LRTP.

In summary and based upon the entire process described above, the Old Colony MPO has prepared this conformity determination for the 1997 Ozone NAAQS in accordance with EPA's and Massachusetts' latest conformity regulations and guidance. This conformity determination process demonstrates that the FFY 2020-2024 Transportation Improvement Program and the 2020 Long Range Transportation Plan meet the Clean Air Act and Transportation Conformity Rule requirements for the 1997 Ozone NAAQS, and have been prepared following all the guidelines and requirements of these rules during this time period.

Therefore, the implementation of the (Old Colony) MPO's FFY 2020-2024 Transportation Improvement Program and the 2020 Long Range Transportation Plan are consistent with the air quality goals of, and in conformity with, the Massachusetts State Implementation Plan.

EVALUATION AND REPORTING OF STATEWIDE GREENHOUSE GAS REDUCTIONS IN TRANSPORTATION

This section documents recent progress made by MassDOT and the MPOs in working to help achieve greenhouse gas (GHG) reduction goals as outlined in state regulations applicable to Massachusetts. This "progress report" estimates future carbon dioxide (CO₂) emissions from

the transportation sector as part of meeting the GHG reduction goals established through the Commonwealth's Global Warming Solutions Act (GWSA).

GWSA Transportation Status: Future Carbon Dioxide Emissions Reductions

The Global Warming Solutions Act of 2008 requires statewide reductions in greenhouse gas (CO₂) emissions of 25 percent below 1990 levels by the year 2020, and 80 percent below 1990 levels by 2050.

The Commonwealth's thirteen metropolitan planning organizations (MPOs) are involved in helping to achieve greenhouse gas reductions mandated under the GWSA. The MPOs work closely with the Massachusetts Department of Transportation (MassDOT) and other involved agencies to develop common transportation goals, policies, and projects that would help to reduce GHG emission levels statewide, and meet the specific requirements of the GWSA regulation – *Global Warming Solutions Act Requirements for the Transportation Sector and the Massachusetts Department of Transportation (310 CMR 60.05)*. The purpose of this regulation is to assist the Commonwealth in achieving their adopted GHG emission reduction goals by:

- Requiring each MPO to evaluate and report the aggregate GHG emissions and impacts of both its Regional Transportation Plan (RTP) and Transportation Improvement Program (TIP).
- Requiring each MPO, in consultation with MassDOT, to develop and utilize procedures to prioritize and select projects in its RTP and TIP based on factors that include GHG emissions and impacts.

Meeting the requirements of this regulation is being achieved through the transportation goals and policies contained in the 2020 RTPs, the major projects planned in the RTPs, and the mix of new transportation projects that are programmed and implemented through the TIPs.

The GHG evaluation and reporting processes enable the MPOs and MassDOT to identify the anticipated GHG impacts of the planned and programmed projects, and also to use GHG impacts as a criterion in prioritizing transportation projects. This approach is consistent with the greenhouse gas reduction policies of promoting healthy transportation modes through prioritizing and programming an appropriate balance of roadway, transit, bicycle and pedestrian investments; as well as supporting smart growth development patterns through the creation of a balanced multi-modal transportation system. All of the MPOs and MassDOT are working toward reducing greenhouse gases with "sustainable" transportation plans, actions, and strategies that include (but are not limited to):

- Reducing emissions from construction and operations
- Using more fuel-efficient fleets
- Implementing and expanding travel demand management programs
- Encouraging eco-driving

- Providing mitigation for development projects
- Improving pedestrian, bicycle, and public transit infrastructure and operations (healthy transportation)
- Investing in higher density, mixed use, and transit-oriented developments (smart growth)

Regional GHG Evaluation and Reporting in RTPs

MassDOT coordinated with MPOs and regional planning agency (RPA) staffs on the implementation of GHG evaluation and reporting in development of each MPO's 2012 and 2016 RTPs. This collaboration has continued for the MPOs' 2020 RTPs and 2020-24 TIPs. Working together, MassDOT and the MPOs have attained the following milestones:

- Modeling and long-range statewide projections for GHG emissions resulting from the transportation sector, as a supplement to the 2020 RTPs. Using the newly updated statewide travel demand model, GHG emissions have been projected for 2020 no-build (base) and build (action) conditions, and for 2040 no-build (base) and build (action) conditions (see the chart in this section for the results of this modeling).
- All of the MPOs have addressed GHG emission reduction projections in their RTPs (including the statewide estimates in the chart that follows), along with a discussion of climate change and a statement of MPO support for reducing GHG emissions from transportation as a regional goal.

MassDOT's statewide estimates of CO₂ emissions resulting from the collective list of all recommended projects in all of the Massachusetts RTPs combined are presented in the table below. Emissions estimates incorporate the latest planning assumptions including updated socio-economic projections consistent with the 2020 RTPs:

Massachusetts Statewide Aggregate CO₂ Estimated Emissions Impacts from Transportation

(all emissions in tons per summer day)

Year	CO ₂ Action Emissions	CO ₂ Base Emissions	Difference (Action – Base)
2016	86,035.6	86,035.6	n/a
2020	75,675.6	75,865.9	-190.3
2040	54,484.2	54,702.2	-218.0

This analysis includes only those larger, regionally significant projects that are included in the statewide travel demand model. Many other types of projects that cannot be accounted for in the model (such as bicycle and pedestrian facilities, shuttle services, intersection improvements, etc.), are covered in each MPO region’s RTP with either “qualitative” assessments of likely CO₂ change, or actual quantitative estimates listed for each project.

As shown above, collectively, all the projects in the RTPs in the 2020 Action scenario provide a statewide reduction of over 190 tons of CO₂ per day compared to the base case. The 2040 Action scenario estimates a reduction of 218 tons per day of CO₂ emissions compared to the base case.

These results demonstrate that the transportation sector is expected to continue making positive progress in contributing to the achievement of GHG reduction targets consistent with the requirements of the GWSA. MassDOT and the MPOs will continue to advocate for steps needed to accomplish the Commonwealth’s long-term goals for greenhouse gas reductions.

SUSTAINABILITY AND ENVIRONMENTAL PROTECTION THROUGH TRANSPORTATION CHOICES

Confronting this challenge, the Commonwealth has moved aggressively to reduce statewide greenhouse gas emissions. Massachusetts is one of a number of states that has created a legal framework to address climate change. In July of 2008, the Commonwealth became a national leader in taking action when it signed into law the **Massachusetts Global Warming Solutions Act (GWSA)**. This legislation adopted statewide greenhouse gas (GHG) emissions limits for 2020, 2030 and 2040 that will maximize the ability of the Commonwealth to meet a 10 percent to 25 percent reduction in GHG emissions below 1990 levels by 2020 and at least an 80 percent decrease below 1990 levels by 2050; implement plans to achieve these statewide GHG emission

limits; and, mandatory reporting of GHG emissions by larger GHG emitting sources and retail sellers that sell electricity in the Commonwealth. Passage of this landmark bill was a recognition that states have significant roles to play in our collective effort to reduce greenhouse gas emissions.

MassDOT is doing its part by working with state agencies to study possible impacts to key infrastructure (coastal roadways, bridges, tunnels) and to investigate ways to mitigate GHG emissions from transportation operations and facilities by searching for ways to reduce energy use, increase efficiency and encourage renewable sources of energy. Through implementation of these programs and other planning efforts, our region has for years moved toward better integrating land use and transportation plans to show how future investments will reduce greenhouse gas emissions to meet the targets.

Also in 2008, the Massachusetts legislature passed the **Green Communities Act** as a means to improve the Massachusetts economy and environment by increasing the use of energy efficiency and renewable energy. The Green Communities Division provides grants, technical assistance, and local support from Regional Coordinators to help municipalities reduce energy use and costs by implementing clean energy projects in municipal buildings, facilities, and schools.

THE GREEN COMMUNITY DESIGNATION AND GRANT PROGRAM PROVIDES A ROAD MAP ALONG WITH FINANCIAL AND TECHNICAL SUPPORT TO MUNICIPALITIES THAT:

- 1. Pledge to reduce municipal energy use by an ambitious and achievable goal of 20% over 5 years; and*
- 2. Meet four other criteria established in the Green Communities Act.*

Participation in the Program has grown steadily since the first group of 35 municipalities achieved designation status in July of 2010 to include more than half of the diverse cities and towns of the Commonwealth and nearly two-thirds of the population. Over 200 of the Commonwealth's municipalities have earned their Green Communities designation and 72 percent of Commonwealth residents now live in a Green Community. The benefits of designation extend beyond the program itself, inspiring cities and towns to undertake additional energy-related initiatives, improve coordination between municipal staff and departments, and increase messaging with the public at large about energy related issues and actions.

Currently 12 communities within the OCPC region have received Green Community Designation and collectively received \$5,657,628 in grant funding. Since the program began in 2010, DOER's Green Communities division has awarded over \$85 million in grant funding to the Commonwealth's cities and towns through designation and competitive grant rounds. The Commonwealth's 210 Green Communities range from the Berkshires to Cape Cod.

Continuing the effort to reduce greenhouse gas emissions beyond the GWSA time horizon (year 2050) will require carefully crafted and aggressive policies and strategies. The effort must be a global one, far beyond the scope and control of regional government bodies such as the OCPC.

As our region looks ahead, it will be important to consider how we can reduce greenhouse gas emission beyond the current GWSA targets as they apply to cars and light duty trucks. Progress could be made on several fronts, including:

- Expanding programs that enhance Transportation Demand Management (TDM) and Transportation System Management (TSM), making the existing transportation system increasingly efficient.
- Implementing transportation projects that provide people with alternatives to driving alone and reduce vehicle miles traveled.
- Getting more zero emission vehicles on the road.
- Increasing the availability of vehicle charging stations, in order to extend the electric range of plug-in hybrid electric vehicles.
- Providing supportive infrastructure for the operation of automated vehicles and other emerging technologies.

It is worth noting that 2050 greenhouse gas emission projections are highly uncertain, and depend on assumptions regarding the growth of our regional population and economy, increasing the utilization of clean technologies, and major changes in markets for energy and transportation systems. To achieve the 2050 greenhouse gas emission reduction goals will require a concerted effort among federal, state, regional, and local agencies. Massachusetts lawmakers, along with many local and regional governments within the Commonwealth and beyond, are working to create innovative policies, plans, and programs to strive for a lower-carbon future. In the OCPC region, local governments and other regional public agencies are working collaboratively with local non-profits, universities, and businesses to coordinate efforts with state, federal, and international initiatives.

LAND MANAGEMENT

The Land Management section describes important land areas; identifies threats to them; and summarizes mitigation plans, programs, and/ or strategies that have the potential to enhance the quality of the natural environment.

Existing Conditions

Areas of Critical Environmental Concern (ACECs)

Areas of Critical Environmental Concern (ACECs) are places in Massachusetts that receive special recognition because of the quality, uniqueness and significance of their natural and cultural resources. Areas are identified and nominated at the community level and are reviewed and designated by the state's Secretary of Environmental Affairs. ACEC designation creates a framework for local and regional stewardship of critical resources and ecosystems.

Thirty ACECs have been designated covering approximately 268,000 acres in 76 communities. The Department of Conservation and Recreation (DCR) administers the ACEC Program on behalf of the Secretary.

Areas of Critical Environmental Concern (ACECs) in the Old Colony Region are:

- Canoe River Aquifer and Associated Areas – officially designated in 1991
 - a. Size: 17,200 acres; Location: Easton, Foxborough, Mansfield, Norton, Sharon, Taunton
- Hocomock Swamp – officially designated in 1990
 - a. Size: 16,950 acres; Location: Bridgewater, Easton, Norton, Raynham, Taunton, West Bridgewater
- Herring River Watershed – officially designated in 1991
 - a. Size: 4,450 acres; Location: Bourne and Plymouth
- Ellisville Harbor – officially designated in 1980
 - a. Size: 600 acres; Location: Plymouth

The ACEC Regulations (301 CMR 12.00) describe the procedures for the nomination, review, and designation of ACECs and direct the agencies of the Executive Office of Energy and Environmental Affairs. (EOEEA) to take actions, administer programs, and revise regulations in order to preserve, restore, or enhance the natural and cultural resources of ACECs. The ACEC designation works through the existing state environmental regulatory and review framework. Projects with an ACEC that are subject to state agency jurisdiction or regulation, particularly those that are initiated by an agency, require a state permit, or are funded by a state agency are subject to more prescriptive guidelines in order to protect the quality of the area.

The Massachusetts Environmental Policy Act (MEPA) Office is responsible for reviewing proposed projects to avoid or minimize adverse impacts to the natural and cultural resources of an area. Projects located within ACECs subject to MEPA jurisdiction require closer scrutiny than projects located outside of ACECs. MEPA project review thresholds (for the size or type of a project) that require a proponent to file an Environmental Notification Form are lowered to include all projects located within an ACEC. Massachusetts Department of Environmental Protection programs that have high performance standards within their regulations for ACECs to include the Wetlands Protection Act Program, the Waterways Regulation Program, the 401 Water Quality Certification Program, and the Solid Waste Facilities Site Assignment Regulations.

Protected Open Space

The Statewide Comprehensive Outdoor Recreation Plan (SCORP), Massachusetts Outdoors 2006, identified a statewide open and recreational space inventory and is the Commonwealth's official Open Space and Recreation Plan. According to the plan, the agencies within the Massachusetts Executive Office of Energy and Environmental Affairs (EEA) control the majority of the Commonwealth's open space resources. Municipalities and Private Non-profit agencies rank second and third respectively regarding control of open space. These parcels of land may

include, but are not limited to: parks, easements, trails, and agricultural land and are important to preserve, maintain, and protect.

Farmland

Generations ago, much of the Massachusetts landscape was a patchwork of farms and productive woodlands. People raised on farms were connected to the ebb and flow of life throughout the seasons. Planting and harvesting, shearing and slaughtering, sugaring and cutting cordwood linked our communities, our health, and our very existence to the soil. It was a life lived close to the earth. However, today, that's no longer the case. Development pressures have resulted in many of the farmlands in Southeastern Massachusetts becoming home to housing or commercial enterprises. As a result, much of the green space has disappeared and therefore, direct impacts from vehicles are more prominent.

USING OUR LAND AND BUILDING A TRANSPORTATION SYSTEM IN WAYS THAT LEAD TO REDUCED GREENHOUSE GAS EMISSIONS

The legislature has mandated reductions across the Commonwealth in greenhouse gas emissions. It is also calling upon regional planning agencies to coordinate efforts that make the state more adaptable and resilient to the effects of climate change. That means supporting a strong economy, improving public health, providing more sustainable transportation and energy choices, protecting infrastructure, conserving open space and natural habitats, and striving for equal opportunities for everyone.

The OCPC is working collaboratively with local governments to reduce the production of greenhouse gases that contribute to climate change, as well as to prepare for the potential impacts of a changing climate in the region.

Land use decisions made at the local level can impact nearly all sources of emissions, for better and for worse. Development guided by smart growth principles brings people closer to more destinations. It also encourages alternative travel choices, such as public transit, carpooling, walking and biking, which cut greenhouse gas emissions and other forms of pollution. Mixed-use, compact developments, also use less water, electricity, heating, and cooling per capita. Beyond this, smart growth promotes the preservation of agricultural land, open space, and natural habitats; improved water quality regionally because more compact developments cover less land than suburban housing tracts, less air pollution, and healthier lifestyles.

Transit-oriented development (TOD) is characterized by a concentration of higher-density mixed-use development around transit stations and along transit lines, such that the location and design of the development encourage transit use and pedestrian activity.

**THE OLD COLONY PLANNING COUNCIL WILL EXPLORE OPPORTUNITIES TO PROMOTE
“CHAPTER 40R” SMART GROWTH, MIXED-USE, MULTI-FAMILY OVERLAY DISTRICTS
NEAR TOWN CENTERS AND TRANSIT.**

Chapter 40R and 40S Districts must be in “smart growth” locations near transit or commercial centers, in areas with existing infrastructure or otherwise suitable for high-density mixed-use development. The overlay district must allow housing to be built as of right at densities of at least 8 to 20 units per acre depending on the type of housing, at least 20% of the new units will be affordable, all units in rental housing developments, including market rate units, can be counted as part of the Subsidized Housing Inventory (SHI). Other benefits can also be tapped including becoming more competitive for MassWorks infrastructure funds and higher levels of financial assistance from the Massachusetts School Building Authority for new schools.

The designation allows the local municipalities to set detailed design standards for projects built within the overlay district and reject applicants that don’t meet the standards. The companion designation, “Chapter 40S” offers “school cost” insurance to address fears of local school impacts.

Population and employment growth in the region over the last several decades has led to substantial increases in travel, straining our transportation system. Land use patterns evolved in a manner that further separated housing from jobs and other locations, including shopping, schools, and other activities, increasing the need for more daily travel and lengthening trip distances. This pattern of urbanization has made walking, bicycling, and transit use less convenient and has increased the use of automobiles for meeting our daily needs.

Quality transportation is about personal mobility and the movement of freight and goods. It places a priority on an effective system, rather than on a specific mode of transportation. Cars, buses, bicycles, streetcars, and trains are modes of transportation. Developing particular facilities should not be the end goal; rather, the result should be improved mobility and accessibility. This Long Range Transportation Plan addresses the goal of providing transportation in our region, improving mobility and creating a user-oriented transportation system. Convenience, safety, travel time, flexibility, options, and cost are key features of a user-oriented system. A user-oriented system combines modes, routes, transfer facilities, and management into a system centered on the need for mobility.

INVESTING IN A MIX OF HOUSING AFFORDABILITY ALONG THE REGION'S TRANSIT CORRIDORS.

As our region makes significant investments in transit, we must also ensure that the inevitable changes in neighborhoods along transit do not displace existing low-income residents. The increased accessibility that transit investments provide can lead to rising housing costs, making it more important to take proactive steps to preserve housing affordability and protect housing options for existing low-income residents.

The availability of affordable housing also influences the success of important industry clusters, and on the overall economic health of the region. Investing money to improve our transportation system will result in affordable housing costs and improving the standard of living of workers in these corridors. Investments in transportation reduce the costs of traveling and improve productivity in a corridor, potentially leading to a rise in wages.

Transit-Oriented Development: TODs take advantage of transit access, which typically attracts riders bound for work destinations. With a mixed-use living environment, including services and jobs within walkable distances from station areas, residents often can eliminate the need for unnecessary vehicular trips. The Regional Plan identifies a regional transit framework for a system of transit-supported centers, including TODs around existing commuter stations, and at regional bus and multimodal hubs.

TO PROMOTE A MIX OF HOUSING AFFORDABILITY ALONG THE REGION'S TRANSIT CORRIDORS, THE COUNCIL WILL:

- **Align its resources and work with other partners to help preserve a mix of housing affordability** along the region's transit routes and corridors to help low-income households benefit from transit investments.
- **Promote transit-oriented developments** that ensure a mix of housing affordability in transit station areas.

TO HELP MORE HOUSEHOLDS HAVE REAL HOUSING CHOICES, THE COUNCIL WILL:

- **Use its resources**, including investments in transit, infrastructure, and redevelopment, **to help create and preserve mixed-income neighborhoods and housing choices** across the region.
- **Encourage preserving existing housing** where rehabilitation is a cost-effective strategy to maintaining housing affordability.
- **Explore opportunities to increase education and awareness of first-time homebuyer programs** to provide financial support for low-and moderate-income housing investment.

- **Invest in and encourage new affordable housing** in higher-income areas of the region, particularly in areas that are well-connected to jobs, opportunity, and transit.
- **Ensure that local comprehensive plans guide an adequate supply of land to meet each jurisdiction's fair share of housing** for low-and moderate-income households.
- **Encourage increased resources for affordable housing** at the federal, state, regional and local levels to help close the gap between the region's affordable housing need and the supply.
- **Support efforts to expand the supply of affordable housing** that is accessible to people with disabilities.
- **Work with housing partners and local governments to expand the supply of affordable housing** available at all income levels, including extremely low-income households earning less than 30% of the area median income (that is \$26,150 for a family of four in 2016). Median income \$90,648
- **Promote regional and local efforts to streamline the process and reduce the costs** of developing housing, including affordable housing.
- **Promote and support participation in the Housing Choice Initiative**, legislation which provides incentives, rewards, and technical assistance to our cities and towns to encourage and empower municipalities to plan and build the additional housing that the Commonwealth needs to continue to thrive.

PROMOTING SUSTAINABLE MOBILITY: BUILDING INFRASTRUCTURE FOR ENVIRONMENTALLY-FRIENDLY VEHICLES

Transportation projects that result in lower greenhouse gas emissions go hand-in-hand with the drive toward smarter growth and a healthier environment. Reducing the number of miles that people travel in their cars is an important goal of our Long Range Transportation Plan. Transitioning to more fuel efficient vehicles and alternative, low-carbon fuels are key steps toward a more sustainable region. Fuel efficiency improvements and alternatives also comprise a major part of the Commonwealth's plan for reducing greenhouse gas emissions from the transportation sector. The Commonwealth is working to reduce greenhouse gas emissions from transportation statewide by promoting the use of alternative fuels (including propane, natural gas, biodiesel, and ethanol).

Efforts are underway to promote the use of zero-emission vehicles and alternative fuels, and to ensure that we have the infrastructure to support them. Recognizing this, the Massachusetts Legislature has set aside funding to support projects that reduce emissions. In January of 2017, Governor Baker signed Senate Bill 2505, *An Act Promoting Zero Emission Vehicle Adoption*. The legislation works to increase access to ZEV charging stations for the general public by prohibiting owners of public charging stations from charging users a subscription or membership fee and requiring the use of payment options available to the general public. Further, the legislation allows municipalities and private businesses to restrict parking spaces

specifically for ZEV use, and builds upon the Baker-Polito Administration’s ongoing commitment to adopting emerging clean energy technologies as the Commonwealth continues to add renewable energy generation into the Massachusetts’ diverse energy portfolio.

In 2016, the Administration committed \$14 million to the Commonwealth’s electric vehicle rebate program, **Massachusetts Offers Rebates for Electric Vehicles (MOR-EV)**, more than doubling the historic funding of the MOR-EV program. Massachusetts automotive customers can qualify for rebates ranging from \$750-\$2,500 on the purchase or lease of more than 25 qualifying new electric vehicles, including battery electric, plug-in hybrid electric and fuel cell electric vehicles. Since June 2014, the MOR-EV program has issued or reserved over \$7 million for 3,355 vehicles, cutting the state’s greenhouse gas emissions output by an estimated 9,255 short tons annually.

ACCESS, MOBILITY, AND TRANSPORTATION

To develop and support a comprehensive transportation system, the region needs to concentrate on transportation facilities and services, as well as on the factors that affect how travel choices are made. These factors include a greater regional understanding of the true costs of transportation at the personal, regional, and environmental levels. This Long Range Transportation Plan supports improvements to roads, transit centers, walkways, bike facilities, and other infrastructure to increase mobility and support different travel options.

System management strategies influence how different travel modes operate. They can increase the capacity of transportation facilities without adding major new infrastructure. Transportation system management activities include ramp-metering, priority lane access for transit and other high-occupancy vehicles (HOV lane), traveler information, incident management, traffic signal optimization, road or lane pricing, and advanced system technology.

Transportation demand management is the term for strategies that influence how and when we travel. Specifically, demand management strategies aim to increase transit ridership, vehicle occupancy, walking, and bicycling, and reduce the duration of some trips, often by moving them to off-peak periods or eliminating them altogether. Demand management reduces the rate of growth, as well as the overall number, of people driving alone. This results in less traffic congestion, fewer vehicle emissions, and less fuel consumption.

- Develop and maintain staff awareness of Intelligent Transportation System Technology, and promote Intelligent Transportation System solutions in the region and participate in the implementation of Intelligent Transportation System Architectures.

AS A HIGH PRIORITY, THE REGION WILL MAINTAIN, PRESERVE, AND OPERATE ITS EXISTING TRANSPORTATION SYSTEM IN A SAFE AND USABLE STATE.

- Maintain and operate transportation systems to provide safe, efficient, and reliable movement of people, goods, and services.

- Protect the investment in the existing system and lower overall life-cycle costs through effective maintenance and preservation programs.
- Foster a less polluting system that reduces the negative effects of transportation infrastructure and operation on the climate and natural environment.
- See the development and implementation of transportation modes and technologies that are energy-efficient and improve system performance.
- Develop a transportation system that minimizes negative impacts to human health.
- Protect the transportation system against disaster, develop prevention and recovery strategies, and plan for coordinated responses.

LINK TRANSPORTATION AND LAND USE

IDENTIFY WAYS TO CAPITALIZE ON THE REGION'S FREIGHT INFRASTRUCTURE AND GENERATE OPPORTUNITIES FOR SUBSTANTIAL ECONOMIC RETURNS.

Significant land tracts are available along truck and freight lines. Many of these sites are former industrial properties (brownfields) or underutilized land that could be brought back into more productive use as cargo-oriented development for the benefit of the community and region.

TO PROMOTE HOUSING AND MOBILITY CHOICE ALONG THE REGION'S TRANSIT CORRIDORS, THE OLD COLONY PLANNING COUNCIL WILL:

1. *Continue to seek funding for transportation investments that provide a variety of choices, reduce greenhouse gas emissions and promote healthy lifestyles through more active transportation.*
2. *Continue working with communities in the region to create additional "Chapter 40R" smart growth areas, mixed-use, multi-family developments that support multi-modal transportation that promotes biking and walking and seek additional funds to leverage existing grant programs.*
3. *Consider greater affordability requirements in areas that are more conducive to high density development near transit and downtown areas.*
4. *Consider different requirements for rental and ownership developments in recognition of addressing different target populations with rentals directed to lower income tiers.*
5. *Continue to support implementation of state-of-the-art technologies and Transportation Demand and Systems Management Programs to provide more mobility choices and allow the transportation system to function more efficiently.*
6. *Continue to work with member agencies on parking management solutions.*
7. *Link technologies in vehicles and mobile devices to improve the way people travel and reduce VMT. These include emerging technologies such as autonomous vehicles,*

expansion of the regional communications network, smart parking systems, and universal transportation payment systems.

8. *Continue to pursue opportunities to expand shared mobility services and new Smart Growth opportunity areas in the region. Examples of shared mobility services include: car sharing, bike-sharing, real-time ridesharing, Transportation Network Companies (e.g., Uber, Lyft), neighborhood electric vehicles, and on-demand shuttle services.*
9. *Support the development of policies, programs, and funding for moving goods in the state, as well as for infrastructure in the region that supports moving goods.*

THE ACTIVE TRANSPORTATION NETWORK: HEALTHY ALTERNATIVES TO DRIVING

More of us than ever before are choosing to walk or ride our bikes to more places. Biking and walking, while not for everyone all the time, are important choices for many people. Over time, choosing to walk and bike has become known as **active transportation**, because these two forms of getting around provide opportunities for exercise rather than letting a car do all the work. At some point in the day, walking is a part of most every person's life. That is particularly true in mixed-use, climate-smart neighborhoods, where people often walk and sometimes bike between their homes, stores, parks, schools, and jobs.

The benefit of a regional bicycle and pedestrian transportation network is that it allows individuals the ability to travel by means other than private automobiles in a safe and comfortable manner. Allowing connectivity throughout the region is of utmost importance to developing and improving access in the region.

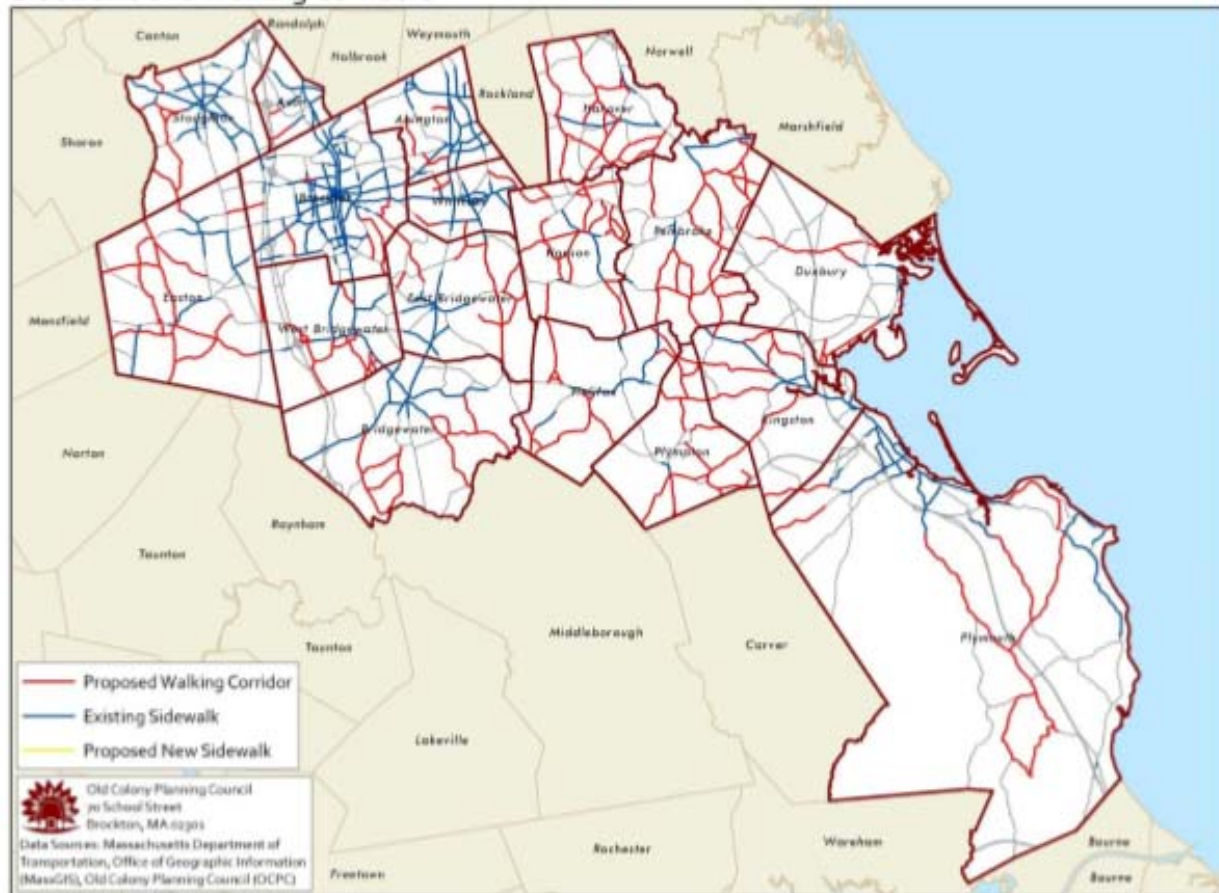
The current Regional Pedestrian Network varies by community. A goal of the Old Colony Planning Council is to guide communities creating a stronger sidewalk network by educating communities on the benefits of a uniform sidewalk network that could connect communities to each other. The plan seeks to educate communities about maintenance of the sidewalk network including level of service and snow and ice removal.

The Old Colony Region has over 300 miles of roadway with a sidewalk on one side or both sides of the road. A few of these sidewalks connect communities together. The Old Colony Planning Council will also work with communities looking to implement policies and strategies such as the ADA Transition Plan or Safe Routes to School program, which help strengthen the ADA network and educate future generations on proper transportation etiquette.

Our active transportation projects are intended to make walking and biking safer, particularly for students, seniors, and people with disabilities. Walking and biking will only be viable choices for people if they are safe. This Plan recognizes this, and so it incorporates safe bike and pedestrian access into investments in other modes of travel, including public transit and roadway improvements.

Figure 7-2: Sidewalks and Walking Corridors

Sidewalks and Walking Corridors



Currently, the OCPC region does not have a uniform bicycle and pedestrian transportation network, but progress is being made in making this a reality. Deficiencies in the network have been identified with cooperation and input from each community. OCPC has identified key bicycling and walking corridors for cyclists and pedestrians. OCPC has created and maintained the Long Range Transportation Plan to include all communities and advance transportation connections and mode shift throughout the region.

- Missing links in the region’s bicycle, pedestrian, and local street networks should be completed to improve local and regional connections.
- All transportation projects and programs need to consider impacts to the natural environment, public health, and the climate, as well as to the communities in which they are located.

Regional Pedestrian Network Needs

The needs of the pedestrian network region wide are similar throughout each community; many sidewalks are orphaned off within the region and lack ADA accommodations. Every

person has the right to equitable transportation and a sustainable environment that would allow opportunity for progress, a community without connection limits access and does not take into account those that may have mobile impairments or lack the financial ability to afford a vehicle. Therefore it is imperative to create a pedestrian network that can service the region in whole by making inter/intra-connections within and between communities.

Bicycle Transportation Network Needs

Bicycle transportation continues to become a popular mode of transportation rather than just a recreational pastime. With the ever-growing presence of cyclists, more and more bicycle lanes are being designed and painted on roadways as well. The Commonwealth's Healthy Transportation Compact and statewide Mode Shift Goal Initiative, make certain that all MassDOT projects are designed and carried out in a manner where all road users are taken into consideration.

OCPC is committed to working with the Old Colony communities on maintaining MassDOT's standard and plan accordingly for cyclists in the region and beyond. Having a strong communication between communities can help expand access for more residents and visitors in the OCPC region. Currently the Old Colony Region does not have an established bicycle network, yet bicycle facilities do exist in the region. Old Colony planners and community members plan to expand upon the established bicycle facilities within the region.

In efforts to create a stronger network, OCPC has selected key routes to be utilized as Bicycle Corridors. These corridors act as interconnecting routes between communities allowing cyclists to expand their bicycle trips and provide a safe way of doing so. The selected routes are suggested routes. It is up to the host community to adopt selected routes and maintain them.

The purpose of the Bicycle Corridors is to provide safe infrastructure to cyclists on roads where there may not be enough right-of-way for bicycle facility designs, and at the same time raising the awareness of other road users that cyclists may be present, even on rural roads.

Bicycle Network Maintenance

Once bicycle lanes are put down and are in use, they must be maintained to provide an efficient level of service for users. Bicyclists may have an uncomfortable ride if road maintenance is not in a functioning state. Potholes can do a lot more damage to cyclists than to motorists, and storm drains with single bars placed longitudinal rather than 90 degrees can cause serious injury to a cyclists. Each OCPC community has different methods of managing snow removal; much consideration must be taken when maintaining bicycle facilities to the different practices used by each community.

Bicycle facilities such as painted bicycle lanes and bike boxes tend to fade and require more upkeep than regular road facility devices. Bicycle Pavement markings should be monitored and maintained regularly; maintenance plans tailored to bicycle facilities must provide an overview of vehicles that are tailored to bicycle facility maintenance for all seasons.

Universal Access

Universal Access enables everyone regardless of age, physical ability, or economic class and calls for accommodation of all users of the road without bias by using exceptional engineering guidelines. Universal Design involves designing products and environments to be usable by all people to the greatest extent possible, regardless of special needs or age, without requiring adaptation or specialized design.

As our region grows, a quality transportation system will go a long way toward preserving our quality of life, even making it better than it is today. The way we get around impacts our environment, our wallets, and our physical and mental health. Our Regional Plan reflects our commitment to a healthier and higher-quality daily life for the people in our region.

Our transportation investments are not just about the transportation projects themselves. They are also about the surrounding land uses that make our communities livable and vibrant. Local jurisdictions are urged to promote new mixed-use development in climate-smart growth areas that combine affordable housing with stores and other commercial buildings, all near existing and planned public transit.

The Department of Conservation and Recreation's Universal Access Program provides outdoor recreation opportunities in Massachusetts state parks for visitors of all abilities. The Universal Access Program ensures equal access to outdoor recreation in Massachusetts state parks.

Support Bicycle and Pedestrian Facilities to Promote Bicycling for Transportation, Recreation and Healthy Lifestyles.

Over the last 10 years, bicycling as a mode of transportation has increased as a result of growing interest in physically active lifestyles, concern about climate change, improved connections to transit, and the preference of the Millennial generation. The Council will collaborate with local communities, the Massachusetts Department of Transportation, nonprofit organizations, and other partners to connect and improve bicycle and pedestrian facilities.

SPECIFICALLY, THE COUNCIL WILL:

- 1. Focus its bicycle and pedestrian efforts on regional-scale issues and coordination among jurisdictions in the region, including:**
 - ✓ *Aggregating local bike plans into a shared regional format.*
 - ✓ *Identifying regionally important bicycle corridors in the 2040 Transportation Policy Plan.*
 - ✓ *Reducing gaps and barriers and improving links across jurisdictional borders.*
- 2. Work with its partners, including the Massachusetts Department of Transportation, to plan, construct, expand and maintain the region's bicycle and pedestrian connections**

to regional systems (such as transit stations, highways, or regional parks) to increase these modes' share of regional trips over the coming decades by:

- ✓ *Encouraging local jurisdictions to recognize planning and building of bicycle and pedestrian facilities as a component of new development.*
- ✓ *Encouraging the adoption of Complete Streets policies by local communities where appropriate.*
- ✓ *Encouraging local communities to include bicycle plans and pedestrian plans in their comprehensive plans.*

Aligning Resources to Support Transit-Oriented Development and Walkable Places.

Transit-oriented development (TOD) is walkable, moderate-to high-density development served by frequent transit that can include a mix of housing, retail, and employment choices designed to allow people to live and work with less or no dependence on a personal car.

TO PROMOTE THESE VIBRANT, MIXED-INCOME PLACES, THE COUNCIL WILL:

1. Support local efforts and lead regional efforts to foster transit-oriented development which will lead Council efforts to:

- ✓ *Prioritize transit-oriented development in the planning, engineering, and operation of transit.*
- ✓ *Pursue private sector and local government partnerships to accelerate development and land acquisition for transit-oriented development.*
- ✓ *Develop and share technical resources and education materials to improve capacity in the region for transit-oriented development.*
- ✓ *Provide clear policy guidance to local partners concerning the types of plans and local controls that will be needed to effectively implement transit-oriented development.*
- ✓ *Collaborate with partners, including local governments and private sector stakeholders, in transit-oriented development activities including policy development, site-specific transit-oriented development resources and opportunities, and station area planning to enable transit-oriented development.*
- ✓ *Encourage transit-friendly development patterns, including increased density and concentration of uses, to expand walkability and lay the groundwork for future transit-readiness.*

2. Support local and regional incentives for continuation of downtown re-development efforts including incentives for construction of new housing developments strategically located near transit hubs to promote the develop of land and sites that are underutilized within the region.

- a. *Utilization of abandoned properties to provide for innovative use of historic, commercial, or other vacant buildings, to create mixed-use developments that would increase the area's housing stock and improve the attractiveness of the community as a place to live.*
- b. *Additional residential units in the downtown areas will bring businesses back to the areas (restaurants, grocery stores, and retailers).*
- c. *Explore and support special area planning, new zoning and leveraging public land and infrastructure investment to support the transformation of the region into a 21st century mixed-use community that provides for long-term residency and the benefits of a sustainable community.*

PLAN FOR MULTIMODAL TRANSPORTATION

A multi-modal transportation system allows people to use a variety of transportation modes, including walking, biking, and other mobility devices, as well as transit where possible. Such a system reduces dependence on automobiles and encourages more active forms of personal transportation, improving health outcomes and increasing the mobility of those who are unable or unwilling to drive. Fewer cars on the road also translates to reduced air pollution and greenhouse gas emissions with associated health and environmental benefits.

This strategy focuses on preserving and developing compact communities, directing employment and housing growth into centers, and redeveloping underutilized urban land. The region's designated centers are the most visible examples of progress in integrating land use and transportation policy. The centers strategy is devised to achieve multiple growth management goals, including the creation of an efficient transportation system that supports travel options by all modes and maximizes the benefits of system investments. Transit and non-motorized travel modes can reduce the number and length of automobile trips and are, in general, supported by higher concentrations of development and activity.

A safe and efficient multimodal transportation system is essential to the quality of our lives and serves as the backbone of the region's economy. Improving mobility, as a growing region with changing travel needs, will be a challenging task. This plan establishes the long-range regional direction for meeting this challenge and provides a basis for the more detailed planning and investment strategies for the region. By supporting the construction of housing under the state's 40R and 40S programs the region can utilize state funds for affordable housing choice to

SOURCES OF THE AVERAGE MASSACHUSETTS RESIDENT'S CARBON EMISSIONS



Estimates based on data from the State of Massachusetts and emissions

Figure 7-3: Sources of Carbon Emissions on Massachusetts

ease the cost burden on development while creating the type and character of options that meet the housing requirements of the targeted populations.

THE NEED FOR WIDESPREAD ACCESS TO QUALITY TRANSPORTATION

Transportation choices are as important to lower-income households as housing choices and may be more important for people with disabilities. The Council will continue to strengthen bus and transit connections between lower-income residents and opportunities such as jobs and education.

TO EXPAND THE TRANSPORTATION CHOICES AVAILABLE TO ALL HOUSEHOLDS, INCLUDING IN SOME NEIGHBORHOODS THE CHOICE TO LIVE WITHOUT A CAR, THE COUNCIL WILL:

- *Complete environmental justice analyses that ensure no disproportionately high and adverse impacts of transportation projects to the region's minority and low-income populations.*
- *Prioritize transportation investments that connect lower-income areas to job opportunities.*
- *Engage neighborhood residents in transit planning to understand how to most effectively use transit service and investments to promote access to opportunity.*

INVESTING IN A MIX OF HOUSING AFFORDABILITY ALONG THE REGION'S TRANSIT CORRIDORS. As our region makes significant investments in transit, we must also ensure that the inevitable changes in neighborhoods along transit do not displace existing low-income residents. The increased accessibility that transit investments provide can lead to rising housing costs, making it more important to take proactive steps to preserve housing affordability and protect housing options for existing low-income residents.

TO PROMOTE A MIX OF HOUSING AFFORDABILITY ALONG THE REGION'S TRANSIT CORRIDORS, THE COUNCIL WILL:

- **Align its resources and work with other partners** to help preserve a mix of housing affordability along the region's transit routes and corridors to help low-income households benefit from transit investments.
- **Promote transit-oriented developments** that ensure a mix of housing affordability in transit station areas.

ENGAGING A FULL CROSS-SECTION OF THE COMMUNITY IN DECISION MAKING.

To move toward equity, our region needs the full range of voices at the table so all affected parties understand the issues, explore alternative approaches, and proceed with action. Beyond convening regional stakeholders, the Council is strengthening its approach to outreach, public participation, and community engagement.

THE COUNCIL WILL:

- **Define consistent expectations** of how the Council will engage with the region's residents and constituencies.
- **Evaluate what types of policy, planning, and operational decisions need what levels of engagement**, recognizing that not all decisions need and merit the same intensity of engagement.
- **Collaborate and consult with members of the community**, especially historically under-represented populations.

SUSTAINABLE TRANSPORTATION

Sustainable Transportation involves the efficient and environmentally sensitive movement of people, information, goods, and services, with attention to health and safety. Sustainable transportation *includes the design of walkable cities and bike-able neighborhoods, as well as using telework and other travel options*. Sustainable transportation minimizes the environmental impacts of transportation activities, including reducing air pollutants and greenhouse gasses. It relies on cleaner, renewable resources of energy and on dependable financing mechanisms.

Protecting and enhancing the environment, promoting energy conservation, and improving the quality of life must be considered as part of the transportation planning process. If transportation programs and projects are to support social and economic activity, they must also contribute to the health and vitality of human and natural environments. Innovative design and construction – as seen in Green Streets – can minimize environmental impacts.

- Design transportation facilities to fit within the context of the built or natural environments in which they are located.
- Apply urban design principles in transportation programs and projects for regional growth centers and high-capacity transit station areas.
- Implement transportation programs and projects in ways that prevent or minimize negative impacts to low-income, minority, and special needs populations.

COMPLETE STREETS

For a number of years, a growing movement has been underway to convert our streets, over time, to roads that serve the needs of a broader range of users than primarily those who drive cars. Our transportation investments are not just about the transportation projects themselves. They are also about the surrounding land uses that make our communities livable and vibrant, and the improvements to our streets to make them friendlier and safer for all users, including people who walk and bike.

A **Complete Street** is one that provides safe and accessible options for all travel modes – walking, biking, transit, and motorized vehicles – for people of all ages and abilities. *Complete Streets* are designed and operated to enable safe and convenient access for all road users, while accommodating the movement of freight and goods. Pedestrians, bicyclists, motorists, and transit riders of all ages and abilities can safely move along and across a complete street. By designing and operating streets to be complete, transportation agencies increase capacity, avoid expensive retrofits, encourage physical activity, and help create walkable communities.

The effort to create “Complete Streets” involves rethinking roadway design to better accommodate people walking and riding bikes. Designing streets with these principles contributes toward the safety, health, economic viability and quality of life in a community by improving the pedestrian and vehicular environments and providing safer, more accessible and comfortable means of travel between home, school, work, recreation and retail destinations.

Complete Streets improvements may be large scale, such as corridor wide improvements that include a separated bicycle lane, new crosswalks, and new bus stops; or a small scale improvement, such as a new bus shelter to encourage transit use. Other Complete Street project examples include improved street lighting, minor changes to traffic signal timings, new bicycle or pedestrian facilities, a median refuge island, or improved connection to transit. The design should be context sensitive and incorporate improvements or treatments that fit with the need and within the character of a community.

THE REWARD TO MUNICIPALITIES THAT CHOOSE TO PARTICIPATE IN THE COMPLETE STREETS PROGRAM IS:

- 1. Funding for technical assistance to analyze their community needs and develop a Complete Streets Prioritization Plan, and*
- 2. Funding for construction of Complete Streets infrastructure projects.*
- 3. A more livable community for various types of users, including children, people with disabilities and older adults.*
- 4. Improved equity, safety, and public health while reducing transportation costs and traffic congestion.*

CONNECTED COMMUNITIES

THE REGION WILL INVEST IN TRANSPORTATION SYSTEMS THAT OFFER GREATER OPTIONS, MOBILITY, AND ACCESS IN SUPPORT OF THE REGIONAL POLICY PLAN.

The old colony planning council will support Connected Communities - a connected community has a variety of transportation options connecting all of its community components as well as connecting it to other nearby communities.

- **Emphasize transportation investments that provide and encourage alternatives to single-occupancy vehicle travel and increase travel options**, especially to and within centers and along corridors connecting centers.
- **Increase the proportion of trips made by transportation modes that are alternatives to driving alone.**
- **Ensure mobility choices for people with special transportation needs**, including persons with disabilities, the elderly, young, and low-income populations.
- **Focus on investments that produce the greatest net benefits** to people and minimize the environmental impacts of transportation.
- **Promote the preservation of existing rights-of-ways** for future high-capacity transit.

PUBLIC HEALTH AND QUALITY OF LIFE

Public health is what we, as a society, do collectively to assure conditions for people to be healthy.

Studies have shown that areas with concentrated poverty and minority populations are more likely to have greater health disparities due to lack of access to healthy food, health care, recreation and physical activity. Many local governments have taken positive steps to address the health of their residents. **Actions include expanding parks and recreation facilities and programming; adopting Complete Streets policies and improving opportunities for safe bicycling and walking; installation of community gardens; support for expanded public transit, which enables some element of active transportation; and encouraging the design of private development to incorporate walkability features.** The location and design of housing has a large impact on the community's built environment and on residents' resulting health status.

Public health and the design of cities are inextricably intertwined; the way we build our communities has a profound effect on our physical and mental health. In addition to providing for all of our basic needs – shelter, food and the space to move around freely – healthy communities ensure residents benefit from access to education, housing, jobs, the ability to live without fear of violence, freedom from environmental hazards and a meaningful built environment.

Whether designing communities that are walkable, integrating artwork to ease the mental pressure of urban life, or incorporating green spaces in the densest downtown core, design can create healthier communities. In the most livable cities, arts and culture blend with bustling business, shopping, and entertainment districts to create desirable places to live, work and

play. These places inspire and connect inhabitants, while promoting healthy lifestyles that make them places where people enjoy spending time and achieve prosperity.

The physical design of our communities can improve or worsen our health. Projects are often designed around car access. The infrastructure of roads is similarly designed to get vehicles as rapidly as possible from one discrete environment to another. The separated land uses and low density of typical sprawling development, often leapfrogging to distant green fields, offers no chance for connectivity between neighborhoods. In only the densest communities can a resident live comfortably without owning a car; families often own one per driver. Once a city's residents are car-dependent, the concept of walkability tends to be forgotten. The impetus behind most land development policies was the encouragement of economic development and the facilitation of traffic flow. Few development policies of the past several decades were written to favor a pedestrian environment.

Even policies seemingly dictated by safety can end up endangering citizens. Each time fire trucks get larger and faster, a bigger turning radius is required. The resulting streets become too wide, fast, and dangerous for young pedestrians as well as older walkers. Schools, which used to be community centers and that could be reached by students on foot, are relegated to town edges where cars and school buses can easily drive but are unsafe for children to walk to school.

Most municipalities are beginning to understand that a walkable community is not just healthier for residents but for their own economic health as well. A walkable city center is an economically viable one. If shops and services of all types are available, then local residents will spend their dollars there rather than driving to regional malls.

Health is influenced as much by design of cities as it is by diet or medical care. Well-designed places engage, reduce stress, enhance learning, and allow those who become ill to heal faster and better. Many health challenges are directly related to transportation choices, land use patterns, infrastructure and accessibility. Improving built environments is an important part of the solution to today's public health crisis.

THE FOLLOWING SIX THEMES HIGHLIGHTS AN ELEMENT OF ENVIRONMENTAL HEALTH:

1. **Outdoor air quality.** Poor air quality is linked to premature death, cancer, and long-term damage to respiratory and cardiovascular systems. Progress has been made in the Commonwealth to reduce unhealthy air emissions. Decreasing air pollution is an important step in creating a healthy environment.
2. **Surface and groundwater quality.** Surface and groundwater quality concerns apply to both drinking water and recreational waters. Contamination by infectious agents or chemicals can cause mild to severe illness. Protecting water sources and minimizing exposure to contaminated water sources are important parts of environmental health.

3. **Toxic substances and hazardous wastes.** The health effects of toxic substances and hazardous wastes are not yet fully understood. Research to better understand how these exposures may impact health is ongoing. Meanwhile, efforts to reduce exposures continue. Reducing exposure to toxic substances and hazardous wastes is fundamental to environmental health.
4. **Homes and communities.** People spend most of their time at home, work, or school. Some of these environments may expose people to :
 - a. Indoor air pollution
 - b. Inadequate heating and sanitation
 - c. Structural problems
 - d. Electrical and fire hazards.
 - e. Lead-based paint hazards.
5. **Infrastructure and surveillance.** Preventing exposure to environmental hazards relies on many partners, including state and local health departments.
6. **Global environmental health.** Water quality is an important global challenge. Diseases can be reduced by improving water quality, and sanitation and increasing access to adequate water and sanitation facilities.

There is no better full health indicator than the degree to which a community is fully walkable. Walkable streets and neighborhoods maximize not only immediate access to active transportation, but also determine how often we take walks or go outside, how connected we feel to nature, how much we feel engaged and involved with others, how likely we are to volunteer and influence many other positive health indicators. From a study published in the *American Journal of Preventative Medicine*, residents of walkable neighborhoods weigh 6-10 pounds less than residents of sprawling neighborhoods.

Donald Appleyard, a scholar and livability pioneer in the early 70s, measured the social impacts of traffic on neighborhoods streets. He found that light-traffic streets with slow speeds and houses providing “eyes-on-the-street” (natural surveillance) helped knit a community together. In contrast, heavy-traffic streets actually ripped a community apart; people had fewer social ties. Light-traffic streets had residents with an average of three friends per person, heavy traffic streets only 0.9 friends per person.

Changing built environments so that walking, biking, and using transit are natural and rewarding parts of peoples’ daily lives is not only good for individual health, but also community and environmental health by reducing costs, pollution, noise, congestion and especially greenhouse gases. To increase public safety, accessibility, equity and a community’s overall well-being, measures must be taken to reduce Vehicle Miles Traveled (VMT). Communities reducing their VMT’s the most, thus shifting their mode shares, are moving toward health and wellness goals. Even small shifts in VMT levels can make funds available for vital active transportation and place making projects.

THE OLD COLONY PLANNING COUNCIL RECOMMENDS THE FOLLOWING CONCEPTS AND PRINCIPLES FOR DESIGNING AND BUILDING HEALTHY COMMUNITIES. These concepts and principles apply to communities large and small, new and old, and influence both individual and community health.

People First. People, human-scale and quality-of-life trump speed and efficiency of automobiles. Designs and features of well-planned districts accommodate cars, but give greatest support and incentive to people on foot. Pedestrians receive highest support, followed by transit, bikes, freight, and then cars.

Active Transportation is the Natural Choice. Walking and active movement are not only the natural choice, but the unavoidable choice. People walk and are active a minimum of one-hour per day, by design.

High Bump-into-it. Mentally, emotionally and socially healthy people require full lives of rich and dynamic engagement. A diversity of people live at this location (diverse in lifestyle, economic and social levels). Bumping into others happens naturally, through design of streets, open buildings and beautiful public spaces. Each building, block, park, other element or system creates natural engagement.

Social Engagement nearby. Layout and design of buildings and open spaces maximizes easy and natural mixing of people. No individual living in the community needs to walk more than 1000 feet to engage others in a public setting.

ECONOMICALLY VIBRANT COMMUNITIES

A SUSTAINABLE ECONOMY EMBRACES GROWTH THAT CAN BE SUPPORTED OVER THE LONG TERM BY THE REGION'S PHYSICAL INFRASTRUCTURE, FINANCIAL RESOURCES, AND NATURAL RESOURCES.

The region's outstanding natural environment is a key element for economic progress. Our abundant natural resources, spectacular setting, and vibrant communities make every industry more competitive in a global economy. These and other features help to attract and retain talented, active, and creative people. The region's connection to the environment gives it a strategic advantage in developing clean, green processes and technologies, and providing new economic opportunities that it can export to the rest of the world. Maintaining this advantage depends on a healthy built and natural environment, with clean industries, good jobs with good incomes, managed growth, and lively centers.

In-migration is important to the region's economy and contributes to innovation, the development of new technologies, the creation of startup companies, and related job growth. In-migration also enriches the region's communities with a growing diversity of cultures, languages, and knowledge. These diverse communities serve as a competitive asset in an

increasingly connected global economy, creating potential trade linkages and other economic opportunities that would not otherwise exist.

A healthy and growing economy provides good jobs and opportunity. It pays for vital public services such as education, criminal justice, transportation, and environmental preservation. It allows us to support the arts and cultural institutions, maintain our parks, and build our communities. A healthy economy permits us to provide for ourselves and our families. It enables us to care for those who are vulnerable, to protect the environment, and to preserve the quality of life that make the region a special place.

This Long Range Transportation Plan emphasizes supporting business and job creation through retention, expansion, and diversification of the region's employment base. It calls for fostering a positive business climate through coordination among public institutions, private businesses, and the nonprofit sector. This coordination helps us to recognize and address the diverse needs of the region's economy and to support key employment sectors. These sectors include established and emerging industry clusters, industries involved in trade-related activities, startups, and new businesses.

This plan places an emphasis on small and locally owned businesses, recognizing their importance in both job growth and promoting sustainable economic development. Supporting clusters and sectors that provide family-wage jobs involves leveraging the region's position as a gateway to ensure an efficient flow of people, goods, services, and information throughout the region – particularly in and between growth centers.

This plan recognizes that businesses depend on a multimodal transportation system – serving both personal mobility and freight movement – as well as communications infrastructure to develop, support, and expand commercial relationships, move intermediate and finished products within the region, and support global trade and export activities.

- **SUPPORT ECONOMIC DEVELOPMENT ACTIVITIES THAT HELP TO RETAIN, EXPAND, OR DIVERSIFY THE REGION'S BUSINESSES.** Target recruitment activities towards businesses that provide family-wage jobs.
- **FOSTER A POSITIVE BUSINESS CLIMATE** by encouraging region-wide and statewide collaboration among business, government, education, labor, military, workforce development, and other nonprofit organizations.
- **SUPPORT ESTABLISHED AND EMERGING INDUSTRY CLUSTERS** that export goods and services, import capital, and have growth potential.
- **LEVERAGE THE REGION'S POSITION AS A GATEWAY** by supporting businesses, ports, and agencies involved in trade activities.
- **FOSTER A SUPPORTIVE ENVIRONMENT FOR BUSINESS STARTUPS**, small businesses, and locally owned businesses to help them to continue to prosper.

- **ENSURE THE EFFICIENT FLOW OF PEOPLE, GOODS, SERVICES, AND INFORMATION** in and through the region with infrastructure investments, particularly in and connecting designated centers, to meet the distinctive needs of a regional economy.
- **ENCOURAGE THE PRIVATE, PUBLIC, AND NONPROFIT SECTORS TO INCORPORATE ENVIRONMENTAL AND SOCIAL RESPONSIBILITY** into their practices.

PLANNING FOR AND INVESTING IN INFRASTRUCTURE, AMENITIES, AND QUALITY OF LIFE NEEDED FOR ECONOMIC COMPETITIVENESS.

The benefits of the Council’s regional approach include planning for the efficient movement of people and freight, providing cost-effective and efficient wastewater treatment, and contributing to a quality of life and cost structure that attract and retain businesses and talent. Regional transportation systems provide efficient, effective, and reliable access to materials and regional, national and international markets. The region’s highway investments are part of a coordinated, interconnected, and multimodal regional transportation network that safely, reliably and affordably connects people and freight with destinations in the region and beyond. In fact, the vast majority of the region’s freight moves by truck. The Council works with the Massachusetts Department of Transportation and local units of government to preserve and improve these roadways.

Employers locate worksites to maximize their accessibility and proximity to the workforce they need. Our region competes with other regions across the country to attract the talented young workers who are necessary to meet the needs of the region’s growing economy and replace retiring baby boomers.

To compete successfully for this generation, our region must provide the housing, transit, transportation networks, and quality of life amenities that will continue to attract the talent needed by employers in our region.


The region’s transportation system, including highways, transit, the emerging bicycle network, and pedestrian amenities, provides our residents options to commuting to their workplaces and enhances our quality of life. Accessibility to transit benefits employers by reducing their costs towards parking, decreasing employee transportation costs, and expanding their pool of potential employees to include those who do not drive.

TO PLAN FOR AND INVEST IN THE INFRASTRUCTURE, AMENITIES, AND QUALITY OF LIFE THE REGION NEEDS TO BE ECONOMICALLY COMPETITIVE, THE COUNCIL WILL:

- **Contribute to a quality of life and cost of living** that attract and retain talented workforce.

- **Pursue additional funding for the multimodal transportation system** including highways, transit (including bus capital investment and operations), local roads, and the bicycle and pedestrian systems.
- **Plan for the efficient and multimodal movement of freight** globally, nationally, and regionally to support the region’s industries.
- **Use its authority and provide technical assistance** to protect and preserve compatible land uses around resources.

VIBRANT places provide easy access to jobs and services; offer housing, recreation, shopping and transportation choices; foster connections between neighbors and social engagement; and promote access to arts and culture. Vibrant places make efficient use of public and private assets and resources and are attractive to residents and businesses, not just today and tomorrow, but over the long haul.



CONNECTED places are linked by corridors that provide transportation choices, accommodating walking, biking and public transportation as well as the automobile. These corridors attract development and help connect residents to jobs and services.



GREEN places create real economic, social and environmental value for residents, businesses and communities. The conservation, restoration and addition of important green places creates a positive impact on our natural world while creating places that promote healthy life styles and healthy residents.



Figure 7-4: Examples of Green and Connected Spaces in Brockton

WATER RESOURCES

Existing Conditions

Massachusetts' lakes, rivers and coastal waters are valuable natural resources that provide wildlife habitat, recreation, fishing, and shellfishing. In order to protect these natural resources, the State of Massachusetts established water quality protection policies and practices to ensure compliance with the federal Clean Water Act, Section 6217 of the Coastal Zone Act Reauthorization Amendments of 1990, the Massachusetts Environmental Policy Act, Coastal Zone Management Consistency Review, and Chapter 91 of the Massachusetts General Laws.

Public Water Supplies

As stated in 310 CMR 22.02, a Public Water System is defined as a system for the provision to the public of piped water for human consumption if such system has at least 15 service connections or regularly serves an average of at least 25 individuals daily at least 60 days of the year.

Zone IIs & Interim Wellhead Protection Areas (IWPA)

Wellhead protection areas are important for protecting the recharge area around public water supply (PWS) groundwater sources. A Zone II is a wellhead protection area that has been determined by hydro-geologic modeling and approved by the Massachusetts Department of Environmental Protection's (DEP) Drinking Water Program (DWP). An Interim Wellhead Protection Area (IWPA) is established, based on DEP DWP well pumping rates or default values, where hydro-geologic modeling studies have not been performed and there is no approved Zone II area. Certain land uses may be either prohibited or restricted in both approved (Zone II) and interim (IWPA) wellhead protection areas.

Watersheds

Watersheds are defined as those land areas that catch rain or snow and drain to specific marshes, streams, rivers, lakes, or to ground water. Watersheds provide critical natural services that sustain or enrich our daily lives: they supply our drinking water, critical habitat for plants and animals, areas of natural beauty, and water bodies for recreation and relaxation. Federal, state, local agencies, and the public must work together to ensure that watershed areas are protected.

Taunton River Watershed

The Taunton River Watershed is the second largest watershed in the state at 562 square miles and contains 94 square miles of wetlands, 221 lakes or ponds and includes all or most of 43 communities in the southeastern region of Massachusetts. It stretches from Avon and Brockton to the north; Foxboro and Wrentham to the west; Fall River and Somerset to the south; and Plymouth and Carver to the east.

The Taunton River, the first Heritage River in the state, starts in the Town of Bridgewater and receives discharge waters from 18 river systems as it courses through ten communities before ending at the State of Rhode Island's Mount Hope Bay, which is part of Narragansett Bay. Tidal influences reach 18.0 miles inland and a salt-water intrusion reaches 12.6 miles inland, providing unique habitat for fresh and salt-water aquatic, terrestrial, and biological species.

South Coastal Watersheds

The South Coastal Watersheds consist of 14 coastal river watersheds with a total drainage area of approximately 240.7 square miles that span over all or part of 19 municipalities. The major coastal watersheds include the North and South Rivers (combined drainage area 105 square miles), the Jones River (30 square miles), and the Gulf/Bound Brook (16 square miles). It is also one of eleven watersheds in eastern Massachusetts that discharge directly to the ocean. The South Coastal Watersheds contain numerous wetlands, many of which are used to cultivate cranberries. The South Coastal Watersheds are biologically significant because they are home to one of the state's largest assemblages of rare and endangered species, particularly so in Plymouth's coastal ponds.

Buzzards Bay Watershed

The Buzzards Bay Watershed encompasses all or part of 15 municipalities including the entire City of New Bedford, which is consistently one of the largest revenue-producing fishing ports in the United States. It contains approximately 432 square miles of land, including lakes, rivers, streams, and wetlands. Buzzards Bay is approximately 228 square miles in size and has a coastline, which stretches over 280 miles, offering a wealth of diverse habitats including 5,000 acres of salt marsh, 10,500 acres of eelgrass beds, and 5,000 acres of tidal flats. Buzzards Bay was designated an Estuary of National Significance in 1988.

Sole Source Aquifers

A Sole Source Aquifer (SSA) is an aquifer designated by the US Environmental Protection Agency as the 'sole or principal source' of drinking water for a given aquifer service area; that is, an aquifer which is needed to supply 50% or more of the drinking water for that area. EPA guidelines also require that these areas have no alternative drinking water sources, which could physically, legally, and economically supply water to all who depend on the aquifer for drinking water. After a Sole Source Aquifer is designated, no commitment for federal financial assistance may be provided for any project, which the EPA determines, may contaminate the aquifer through its recharge area so as to create a significant hazard to public health.

Plymouth / Carver Sole Source Aquifer

The Plymouth / Carver Sole Source Aquifer is a 199.0 square mile aquifer located in eight communities of southeastern Massachusetts. Primarily in Plymouth County, it includes the entire area of the Towns of Plymouth, Bourne and Sandwich north of the Cape Cod Canal, most of the Towns of Carver and Wareham, substantial portions of Kinston and Plympton, and a small section of the Town of Middleborough. The 199 square mile Plymouth / Carver aquifer is

the second largest aquifer in the Commonwealth, containing more than 500 billion gallons of fresh water.

Canoe River Sole Source Aquifer

The Canoe River Aquifer sub basin is approximately 25 square miles in area, and encompasses portions of the towns of, Easton, Foxborough, Mansfield, Norton, and Sharon. The Canoe River begins its headwaters south of Massapoag Lake in Sharon and flows in a southerly direction through Foxborough, Mansfield, Easton, and Norton to Winnecunnet Pond in Norton.

Wetlands

Wetlands help clean drinking water supplies, prevent flooding and storm damage, and support a variety of wildlife. Coastal wetlands are directly adjacent to the ocean and include beaches, salt marshes, dunes, coastal banks, rocky intertidal shores, and barrier beaches. Inland wetlands are areas where water is at or just below the surface of the ground. Although these wetlands can appear dry during some seasons, they contain enough water to support certain plants and soils. Inland wetlands include marshes, wet meadows, bogs, and swamps.

Wetlands protection is important to the preservation of wildlife habitat, protection of public and private water supplies, flood prevention and attenuation, lessening of storm damage and prevention of groundwater contamination. Wetlands have sensitive, complex ecosystems, which can easily be adversely influenced by transportation facilities.

Problems or Threats

Stormwater

Stormwater is water that originates during precipitation events. Stormwater that does not soak into the ground becomes surface runoff, which either flows directly into surface waterways or is channeled into storm sewers, which eventually discharge to surface waters.

Stormwater becomes a transportation system for pollutants. Soil that erodes from a construction site, cigarette butts and other litter from parking lots, antifreeze and oil dripped from cars, fertilizers and pesticides from turf management, and grit and salt left from de-icing operations on roadways can be deposited untreated into waterways. Water can contain and transport sediments, metals (copper, cadmium, chromium, lead, zinc), nutrients (nitrates, phosphates, ammonia), salt, petroleum products and coliform bacteria among other materials. Vegetative surfaces slow the flow, filter out sediments, and can break down or trap pollutants in the root zone. In contrast, buildings, roads, parking areas, and exposed bedrock increase the volume and speed of stormwater runoff since none can soak in and the hard surfaces present little resistance to flow.

In addition, wet weather discharge needs consideration. Wet weather discharges refer collectively to point source discharges that result from precipitation events, such as rainfall and snowmelt. Wet weather discharges include stormwater runoff, combined sewer overflows (CSOs), and wet weather sanitary sewer overflows (SSOs). Stormwater runoff accumulates

pollutants such as oil and grease, chemicals, nutrients, metals, and bacteria as it travels across land. CSOs and wet weather SSOs contain a mixture of raw sewage, industrial wastewater and storm water, and have resulted in beach closings, shellfish bed closings, and aesthetic problems. In Massachusetts, polluted stormwater runoff and discharges in urbanized areas cause serious water-quality problems. Polluted runoffs to waterbodies have affected aquatic plant and animal life in streams and lakes, closed shellfish beds, reduced recreational activities such as boating and swimming, and increased existing flooding conditions caused by natural events.

The untreated runoff poses a major threat to water quality and is identified as a major source of nonpoint source pollution (NPS). Nonpoint source pollution or "polluted runoff" - which enters our water bodies from septic systems, agricultural uses and runoff from roads, parking lots, construction sites, lawns and other locations - is now the dominant cause of water quality problems to our lakes, rivers and coastal areas. Point sources still have significant impacts in certain water bodies, but across the state nonpoint source pollution affects more total miles and acres of water. Although these pollution sources are lumped under the single heading of nonpoint sources, in fact there are a huge variety of nonpoint sources from farms to parking lots, which result from a similarly wide range of activities, from cars with leaking oil to construction of new structures. It is easier and less costly to prevent problems from occurring than it is to fix them after they occur.

The pollution of the marine environment, as a result of roadway runoff, can impact coastal resources and economies. Protecting water resources is important for a better quality of life, economic development, recreational activities, wildlife and plant protection, and public/private water supplies. The Old Colony MPO recognizes the importance of these issues/concerns and is committed to the protection of these resources.

CLIMATE CHANGE

The seasonality of the Northeast is central to the region's sense of place and is an important driver of rural economies. Less distinct seasons with milder winter and earlier spring conditions are already altering ecosystems and environments in ways that adversely impact tourism, farming, and forestry. The region's rural industries and livelihoods are at risk from further changes to forests, wildlife, snowpack, and streamflow.

The Northeast's coast and ocean support commerce, tourism, and recreation that are important to the region's economy and way of life. Warmer ocean temperatures, sea level rise, and ocean acidification threaten these services. The adaptive capacity of marine ecosystems and coastal communities will influence ecological and socioeconomic outcomes as climate risks increase.

The Northeast's urban centers and their interconnections are regional and national hubs for cultural and economic activity. Major negative impacts on critical infrastructure, urban economies, and nationally significant historic sites are already occurring and will become more common with a changing climate.

Changing climate threatens the health and well-being of people in the Northeast through more extreme weather, warmer temperatures, degradation of air and water quality, and sea level rise. These environmental changes are expected to lead to health-related impacts and costs, including deaths, emergency room visits and hospitalizations, and a lower quality of life. Health impacts are expected to vary by location, age, current health, and other characteristics of individuals and communities.

Communities in the region are proactively planning and implementing actions to reduce risks posed by climate change. Using decision support tools to develop and apply adaptation strategies informs both the value of adopting solutions and the remaining challenges.

PRIMARY CLIMATE CHANGE INTERACTIONS

Sea Level Rise

Despite local efforts to reduce greenhouse gas emissions, the OCPC region will experience the consequences of ongoing global climate change. Sea level rise refers to the increase in mean sea level over time. Sea level has been rising around the globe for thousands of years since the end of the last ice age. Sea levels along our coastline are already rising. Coastal flooding occurs frequently along the Massachusetts coast.

Along the Mid-Atlantic coast (from Cape Hatteras, North Carolina, to Cape Cod, Massachusetts), several decades of tide gauge data through 2009 have shown that sea level rise rates were three to four times higher than the global average rate. The region's sea level rise rates are increased by land subsidence (sinking), largely due to vertical land movement related to the melting of glaciers from the last ice age, which leaves much of the land in this region sinking with respect to current sea level.

Global average sea levels, without significant cuts to emissions, are now projected to rise by as much as 8.2 feet — 1.6 feet more than previously projected. Accelerated rates of global, or ecstatic, sea level change are driven principally by increases in the volume of the ocean from two primary factors: thermal expansion and melting ice sheets. Steady increases in global atmospheric temperature serve to expand sea water molecules which increases ocean volume. Increased global temperatures also result in the melting of glaciers and continental ice masses, such as the Greenland ice sheet that covers terrestrial areas, not ice-covered ocean as in the Arctic, which contribute significant amounts of freshwater input to the Earth's oceans.

Historically, the highest concentration of coastal flooding events has occurred in Eastern Plymouth County. Coastal flooding is often characterized as minor or major based on the

magnitude (elevation), duration, and frequency of the flooding that is experienced. As sea level has continued to increase, there has been a corresponding increase in minor (or disruptive) coastal flooding associated with higher than normal monthly tides. Coastal flood risks from storm-driven precipitation and surges are major drivers of coastal change and are also amplified by sea level increases. When coupled with storm surges, sea level rise can pose severe risks of flooding, with consequent physical and mental health impacts on coastal populations.

As ice melts on the South Pole, the resulting gravitational pull on the ocean, as well as the gradual sinking of land in the Northeast, means that Boston and other New England communities are likely to experience about a 25 percent higher increase in sea levels than other parts of the planet, according to a 2016 study issued by the city of Boston.

Sea level rise will increase the frequency and severity of both routine tidal flooding and storm-related coastal flooding. Downscaled climate projections suggest that Boston may experience between 4.0 and 7.5 feet of sea level rise by 2100 for intermediate and high scenarios, respectively. The potential impacts to our region include less fresh water, an increase in the frequency and intensity of storm events, and the loss of native plant and animal species. Many local variables influence the extent of damages from coastal flooding associated with sea level rise. Elevated coastal landforms (e.g., coastal banks) and salt marshes have the ability to buffer increased tidal levels, as well as storm surges. Due to the concentration of development in the coastal zone, economic exposure from this hazard is high. This damage will likely include both direct impacts, such as damage to homes and government buildings, as well as lost tourism revenue and impacts to local businesses.

Other impacts associated with more severe coastal flooding include beach erosion, loss or submergence of wetlands and other coastal ecosystems, saltwater intrusion into drinking water and wastewater infrastructure, high water tables, loss of coastal recreation areas, beaches, protective sand dunes, parks and open space, and loss of coastal structures (sea walls, piers, bulkheads, and bridges) and buildings.

Changes in Precipitation

In the Fourth National Climate Assessment, scientists found that the region's precipitation had increased by more than 10 percent over the past century, and the worst storms in the Northeast had brought significantly more rain and snow. Since 1900, average annual precipitation over the U.S. has increased by roughly 5 percent. This increase reflects, in part, the major droughts of the 1930s and 1950s, which made the early half of the record drier. Precipitation since 1991 (relative to 1901-1960) increase the most in the Northeast (8 percent), Midwest (9 percent), and southern Great Plains (8 percent), while much of the Southeast and Southwest had a mix of areas of increases and decreases. Between 1981 and 2015, the Northeast experienced a 17 percent increase in precipitation from the largest storms,

compared with similar storms during the first half of the last century. That was substantially more than any other region in the country.

The recent dominant trend in precipitation throughout the Northeast has been towards increases in rainfall intensity, with recent increases in intensity exceeding those in other regions in the contiguous United States. Further increases in rainfall intensity are expected, with increases in precipitation expected during the winter and spring with little change in the summer. Monthly precipitation in the Northeast is projected to be about 1 inch greater for December through April by end of century (2070-2100) under the higher scenario.

Recent and projected increases in precipitation amount, intensity, and persistence indicate increasing impacts on agricultural operations. Increased precipitation can result in soil compaction, delays in planting, and reductions in the number of days when fields are workable. If the trend in the frequency of heavy rainfall prior to the last frost continues, overly wet fields could potentially prevent farmers from taking full advantage of an earlier spring. Increased soil erosion and agricultural runoff, including manure, fertilizer, and pesticides, are linked to excess nutrient loading of water bodies as well as possible food safety or public health issues from food and waterborne infections. Warmer winters are likely to increase livestock productivity in the region but are expected to also increase pressure from weeds and pests, demand for pesticides, and the risk of human health effects from increased chemical exposures.

If emissions of heat-trapping gases continue their upward trend, certain global patterns of precipitation change are projected to emerge that will affect northern and southwestern areas of the United States. The northern U.S. is projected to experience more precipitation in the winter and spring, while the Southwest is projected to experience less, particularly in the spring. The contrast between wet and dry areas will increase both in the U.S. and globally. In other words, the wet areas will get wetter and the dry areas will get drier. There has been an increase in the amount of precipitation falling in heavy events, and this is projected to continue.

The projected changes in the northern U.S. are a consequence of both a warmer atmosphere (which can hold more moisture than a colder one) and associated changes in large-scale weather patterns (which affect where precipitation occurs).

Changes in the amount, frequency, and timing of precipitation, including both rainfall and snowfall, are occurring across the globe as temperatures rise, and other climate patterns shift in response. Climate change is projected to exacerbate the severity of storms and severe rainfall events. Therefore, it is anticipated that all forms of flooding will increase in severity as a result of climate change.

Rising Temperatures

If little is done to cut the rise in greenhouse gas emissions, average annual temperatures in the Northeast could rise between 5.3 degrees and 9.1 degrees Fahrenheit by 2071, according to a draft report about climate change awaiting the approval of the Trump administration. Over

the past century, the region's average annual temperature increased about 2 degrees, compared to 1.2 degrees for the nation as a whole. Most of that warming has occurred since the late 1970s, according to the report.

The eight warmest years on record, 2016, 2015, 2014, 2010, 2013, 2005, 2009, and 1998 – have all occurred in the last twenty years according to the U.S. National Oceanographic and Atmospheric Administration. Average global temperatures have risen steadily in the last fifty years, and scientists warn that the trend will continue unless greenhouse gas emissions are significantly reduced. Even small changes in temperature can have dire consequences, leading to more prolonged heat waves, intense storms, extinctions of large numbers of species, and the bleaching of coral reefs around the world.

There is no universal definition for extreme temperatures. The term is relative to the usual weather in the region based on climatic averages. Extreme heat for Massachusetts is usually defined as a period of three or more consecutive days above 90°F, but more generally as a prolonged period of excessively hot weather, which may be accompanied by high humidity. Extreme cold is also considered relative to the normal climatic lows in a region.

Ocean Warming and Acidification

Ocean and coastal temperatures along the Northeast Continental Shelf have warmed by 0.06°F per year over the period 1982-2016, which is three times faster than the 1982-2013 global average rate of 0.018°F per year. Over the last decade (2007-2016), the regional warming rate has been four times faster than the long-term trend, with temperatures rising 0.25°F per year. In addition to this warming trend, seasonality is also changing. Warming has been strongest during the summer months, and the duration of summer-like sea surface temperatures has expanded.

Increasing ocean temperatures and changing seasonality have affected marine organisms and the ecosystem in various ways. Seasonal ocean temperature changes have shifted characteristics of the spring plankton blooms and the timing of fish reproduction, migration of marine fish that return to freshwater to spawn, and marine fisheries. As the timing of ecosystem conditions and biological events shifts, interactions between species and human activities such as fishing will be affected. These changes have the potential to affect economic activity and social features of fishing communities, working waterfronts, travel and tourism, and other natural resource-dependent local economies.

In addition to warming, coastal waters in the region are sensitive to the effects of ocean acidification because they have a low capacity for maintaining stable pH levels. These waters are particularly vulnerable to acidification due to hypoxia (low-oxygen conditions) and fresh-water inputs, which are expected to increase as climate change progresses. At the coastal margins, acidification is exacerbated by nutrient loading from land-based runoff and atmospheric deposition during heavy rainfall events. When added to the system, these

nutrients promote the growth of algae that release carbon dioxide, which contributes to acidification, as they decay.

Climate projections indicate that in the future, the ocean over the Northeast Continental Shelf will experience more warming than most other marine ecosystems around the world. Continued warming and acidification are expected to further affect species and fisheries in the region. A species vulnerability assessment indicated that approximately 50% of the commercial, forage, and protected fish and invertebrate species on the Northeast Continental Shelf will be highly or very highly vulnerable to climate change.

A number of coastal communities in the region have strong social and cultural ties to marine fisheries, and in some communities, fisheries represent an important economic activity as well. Future ocean warming and acidification would affect fish stocks and fishing opportunities available to coastal communities.

Extreme Weather

Climate change is expected to increase extreme weather events across the globe and right here in Massachusetts. There is strong evidence that storms – from heavy downpours and blizzards to tropical cyclones and hurricanes – are becoming more intense and damaging and can lead to devastating impacts for residents across the state.

According to the U.S. Global Change Research Program, the Northeast has been experiencing increased extreme precipitation, with a more than 70 percent rise in the amount of precipitation falling in “very heavy” weather events over the 1958 to 2010 period. Of the 10 heaviest snowstorms in Boston, five occurred since 2000 — with two taking place in the same two weeks of 2015, making it the all-time snowiest season for the city.

Extreme weather has not been all cold news for the Northeast. While February typically means painfully cold weather, often reaching single digits, this year saw T-shirts and shorts as temperatures in some areas soared above 70 degrees for the second year in a row.

Regional trends toward increased extreme rainstorm and snowstorm frequency

In 2017, 19 areas across the Northeast experienced their warmest February on record, including Washington D.C., Philadelphia, Buffalo, and Baltimore. Daily temperatures that month broke records dating back to 1906. Also of note that month was the first tornado to ever touch down in February in Massachusetts since official records began in 1950.

All of these are expected to threaten public health and the regional economy. Preparing the region for the inevitable consequences of our changing climate requires steps to adapt to these consequences and create more resilient communities. Adapting to climate change means

adjusting how we build, where we build, how we store and distribute water, and a myriad other things in the face of ongoing change. Making our region more resilient to the consequences of climate change means increasing the capacity of our communities, economy, and environment to cope with hazardous events such as storms, heat waves, and ongoing drought.

OCPC considers the impacts of climate change on transportation projects by designing infrastructure to withstand impacts such as sea level rise, extreme heat, and intense rain events. We also study how to help natural habitats become more resilient to climate changes and promote collaboration to build and maintain beaches, which are threatened by rising sea levels.

Constructing and managing a transportation network that will work best for our region into the future is no small challenge.

HAZARD MITIGATION AND CLIMATE RESILIENCY

THE COUNCIL INTENDS TO EXPAND ITS ROLE SUPPORTING LOCAL COMMUNITIES IN CLIMATE CHANGE PLANNING TO ASSIST THEIR EFFORTS TOWARD MITIGATION, ADAPTATION, AND RESILIENCE.

THE FOLLOWING GOALS REPRESENT THE LONG-TERM VISION FOR HAZARD REDUCTION AND MITIGATION BASED ON POLICY DEVELOPMENT.

1. ***EVALUATE AND ANALYZE VULNERABILITY*** in order to guide and promote sound mitigation activities.
2. ***INCREASE AWARENESS OF THE BENEFITS OF HAZARD MITIGATION*** through outreach and education.
3. ***INCREASE COORDINATION AMONG LOCAL AGENCIES.***
4. ***PROMOTE COST-EFFECTIVE HAZARD MITIGATION ACTIONS*** that protect and promote public health and safety, reduce damage and loss to properties.
5. ***MONITOR AND EVALUATE INFORMATION ON THE EFFECTIVENESS OF HAZARD MITIGATION ACTIONS.***

The Old Colony Planning Council is dedicated to providing leadership to support climate change mitigation, adaptation, and resilience. Over the long term, climate change will be one of the greatest threats to our region's ongoing prosperity and livability. Climate change threatens our continued orderly and economic development. Our region is already seeing rising temperatures and increased severe weather events. Climate change looms large as an issue with the potential to adversely affect the region in the absence of intentional and proactive planning. *Responding to climate change takes three approaches: mitigation, adaptation, and resilience.* **Mitigation** strategies focus on minimizing contributions to climate change – for example, reducing energy use that leads to greenhouse gas emissions. **Adaptation**

strategies focus on how to change policies and practices to adjust to the effects of climate change. **Resilience** strategies recognize the difficulty of predicting what the impacts of climate change will be and emphasize increasing our flexibility to survive and thrive regardless of how climate change develops.

The Council is committed to building a resilient region that minimizes its adverse contributions to climate and air quality and is prepared for the challenges and opportunities of a changing climate. Recognizing the importance of climate change mitigation, adaptation, and resilience, the Council will use climate impacts as a lens through which to examine all of its work. The Council will look for opportunities to use both its operational and planning authorities to plan for and respond to the effects of climate change, both challenges and opportunities. In addition to climate change, regional air quality factors threaten both the quality of life and our economy as we may face severe additional regulations from the federal government.

THE COUNCIL WILL:

- **Expand the information and technical assistance** it provides to local governments to support regional and local climate change planning.
- **Work with partners to collaboratively identify and examine the feasibility of energy improvement opportunities**, and pursue group purchasing to facilitate energy improvements where this might provide synergy and/or an improved economy of scale.
- **Develop, collect and disseminate information about climate change**, including energy and climate data.
- **Work with the Commonwealth of Massachusetts on a greenhouse gas emissions inventory** that informs regional discussion on emissions reduction.
- **Provide technical assistance to the region's local governments**, including identifying risks, best practices, and model ordinances for climate change mitigation and adaptation.
- **Assess the risks and opportunities presented to the region from a changing climate** and the potential rewards from addressing those risks and opportunities.
- **Provide information to local jurisdictions about the risks of not responding to or preparing for climate change**, and encourage local governments to plan and prepare for climate change, including incorporating climate change planning into their local comprehensive plans.
- **Explore incentives to reward local governments** that set and make progress on local greenhouse gas reduction goals.
- **Protect vulnerable populations from natural hazards.** Vulnerable neighborhoods face higher risks than others when disaster events occur and may require special interventions to weather those events. A population maybe vulnerable for a variety of

reasons, including location, socioeconomic status or access to resources, lack of leadership and organization, and lack of planning.

In addition to its ongoing efforts to promote compact development, provide alternatives to single-occupant automobile travel, and protect natural resources and open space, the Council's approach to climate change will expand first into collaborative approaches, such as providing information, technical assistance, and incentives. The Council will explore how to effectively use its planning authorities to address climate change, including reducing vehicle miles traveled, regional greenhouse gas emissions, and the airborne fine particulate matter that threatens the region's air quality attainment status with the Environmental Protection Agency.

- **The Council will collaborate with regional leadership and convene local governments and the broader community to address climate change mitigation and adaptation within the region.** These expanded roles in information and technical assistance will help the Council serve as a resource to both local jurisdictions and the region at large. The Council intends to be a prominent player in elevating this serious and important issue which affects the long-term viability of the Old Colony Planning Council region.

The Northeast will experience warmer temperatures, higher seas, and greater amounts of rain and snow than federal scientists forecast only three years ago. The findings were based on an array of new research tools and methods that have sharpened climate scientists' understanding of how climate change will affect the United States. Thousands of studies conducted by tens of thousands of scientists around the world have documented changes in surface, atmospheric, and oceanic temperatures; melting glaciers; disappearing snow cover; shrinking sea ice; rising sea level; and an increase in atmospheric water vapor

HAZARD MITIGATION AND CLIMATE ADAPTATION

Mitigation is the effort to reduce loss of life and property by lessening the impact of disasters. In order for mitigation to be effective we need to take action now, before the next disaster, to reduce human and financial consequences later (analyzing risk, reducing risk, and insuring against risk). *Adaptation* actions are informed by iterative planning that incorporates the most current information about climate change into the decision-making process.

The practices of Hazard Mitigation and Climate Adaptation planning have a great deal in common. They are both largely about deliberative long-term actions in the built and natural environments that reduce harms from hazards. In addition, the frameworks are very similar with vulnerability and risk assessment underpinning the analysis.

While hazard mitigation planning seeks to reduce harm from human, technological, and natural hazards, climate adaptation is focused on climate-related conditions and hazards. In addition, climate adaptation not only considers the impacts of particular events or disasters, but also examines the implication of slow-onset changes, such as changes in seasons. Thus, it is in the

area of climate-related natural hazards, such as flooding, heat waves, and wildfires, that the integration of these two practices is most applicable.

Despite the similarities between climate adaptation and hazard mitigation planning, it is worth highlighting some of the differences that may need to be reconciled when integrating these frameworks in a planning process. First, hazard mitigation planning has traditionally relied on analysis of historical events to characterize risk. On the other hand, climate adaptation employs projections of future conditions derived from global climate models to characterize risk. At the core of adaptation planning is the assumption that the climate is changing in such a way we cannot plan based on the climate of the past.

Areas needing thorough risk and vulnerability assessments include existing critical infrastructure and facilities, vulnerable natural habitats and ecosystems, vulnerable groups or populations, community-or region-specific hazards and threats, water supplies, businesses, homes and other structures, and social and cultural resources.

A hazard mitigation or climate adaptation action is a specific action, project, activity or process taken to reduce or eliminate long-term risk to people, property, and natural systems from climate change and/or natural hazards and their impacts. According to the Federal Emergency Management Agency (FEMA), the purpose of hazard mitigation planning is to identify local policies and actions that can be implemented over the long term to reduce risk and future losses from hazards. Actions can be large-scale, multi-year projects, ongoing efforts that continue to reduce risk or raise risk awareness, or single, targeted actions for a particular facility.

THE STEPS OF THE RISK ASSESSMENT ARE:

1. **Describe hazards:** a description of the location, extent (strength, magnitude, and duration), previous occurrences, and probability of future events. Can be described with narratives or maps.
2. **Identify community assets:** participating jurisdictions identify assets at risk to hazards, which can be anything that is important to the character and function of a community, such as people, economy, built environment, and natural environment.
3. **Analyze risks:** involves evaluating vulnerable assets, describing potential impacts, and estimating losses for each hazard. Risk can be expressed qualitatively (describe the types of impacts that might occur during a hazard event) or quantitatively.
4. **Summarize vulnerability:** involves summarizing the large amount of information generated in the previous steps so that the community can understand the most significant risks and vulnerabilities.

A **natural hazard** is defined by the Federal Emergency Management Agency (FEMA) as an event or physical condition that has the potential to cause fatalities, injuries, property damage, infrastructure damage, and agricultural loss, damage to the environment, interruption of business, or other types of harm or loss. As the costs and seeming frequency of natural disasters continue to rise, governments and citizens must find ways to reduce the risks of natural hazards to our communities. The 2015 Natural Hazard Mitigation Plan for the Old Colony Region covers the 344 square mile OCPC region in Southeastern Massachusetts. Within the OCPC region, the three biggest natural hazards are flooding, hurricanes, and tropical/winter storms.

Local decision makers have the greatest capacity to influence the resiliency of their communities. Typically, they are the first to respond to a disaster, and understand the physical and social characteristics of the community. They also have the most direct authority and responsibility to ensure the health, safety and welfare of their constituents. Historically, communities have merely responded to the effects of natural hazards, but now more than ever, local governments have the responsibility to take a more aggressive stance toward reducing their vulnerability to disasters.

Communities, especially those in coastal areas, are moving from a strategy of response to a proactive stance of planning, public education, and disaster preparedness to ensure their infrastructure and community members are capable of coexisting with the dynamics of the environment. Communities work toward climate resilience through strong leadership, citizen engagement, interdepartmental collaboration, and interdependence. Unfortunately, building resilience is often a challenge because the responsibilities of limiting hazard exposure, reducing vulnerability, assessing risk, and responding and adapting quickly to changes are dispersed among many local departments and offices.

MUNICIPAL VULNERABILITY PREPAREDNESS PROGRAM

The Executive Office of Energy and Environmental Affairs has launched a new program, the Municipal Vulnerability Preparedness (MVP) grant program which provides support for cities and towns in Massachusetts to plan for and implement key climate change adaptation actions for resiliency. The state awards municipalities with expert consulting and funding to conduct a vulnerability assessment and develop action-oriented resiliency plans. The program helps communities to:

- Define extreme weather and natural and climate related hazards.
- Understand how their community may be impacted by climate change with a Massachusetts specific climate change clearinghouse containing the latest science and data.
- Identify existing and future vulnerabilities and strengths.
- Develop and prioritize actions for the community.

- Identify opportunities to take action to reduce risk and build resilience.
- Implement key actions identified through the planning process.

MVP certified providers are trained in workshops across the state to provide technical assistance to communities in completing the assessment and resiliency plan using the *Community Resilience Building Framework*. Cities and towns will then be able to choose the provider of their choice from a list of certified providers. Communities who complete the MVP program become certified as an MVP community and are eligible for MVP Action grant funding and other opportunities. Through this program municipalities will be better equipped to plan and prepare for climate change, and state government will gain a better understanding of the challenges communities face.

BUILDING IN RESILIENCE

Ensure that the region is prepared to deal with both positive and negative changes in its economic health and to initiate sustainable urban development and redevelopment strategies that foster green business growth and build reliance on local and regional assets.

Resilience, the ability to recover from disturbance and change, applies not just to anticipating natural disasters and planning for post-disaster recovery but to other shocks such as severe economic downturns. Some have referred to resilience as the “new sustainability” however, it is important to distinguish between the two. Resilience allows a region to respond to and recover from specific disruptive events, while sustainability seeks to preserve for future generations the resources and opportunities that exist for current generations. These two concepts need to work hand in hand.

RESILIENT ECONOMY

The region’s economy is made up of the businesses, trades, productive facilities, and related activities that provide the livelihoods of the population. Economic health is critical to providing jobs and incomes to support the community; as it rises or falls, so do the livelihoods of people. Because local economies depend upon outside (regional, national, and even global) inputs and trends, their employment base is affected not only by local business formation and activity but also by the decisions of distant firms or governments. Therefore, more reliance on local assets increases the economic resilience of the community, as well as contributing to place-based revitalization. Because some productive activities generate negative impacts, green businesses (such as solar-powered energy systems may be preferable to those with greater impacts and can reduce reliance on outside resources. Although some communities develop and implement separate economic development strategies, the comprehensive plan provides the instrument for placing those strategies within the context of the broader regional development agenda.

THE OLD COLONY PLANNING COUNCIL WILL ENCOURAGE THESE BEST PRACTICES IN SUPPORT OF THE RESILIENT ECONOMY PRINCIPLE:

- *Provide the physical capacity for regional economic growth.*
- *Plan for a balanced land-use mix for fiscal sustainability.*
- *Plan for transportation access to employment centers.*
- *Promote green businesses and jobs.*
- *Encourage community-based economic development and revitalization.*
- *Provide and maintain infrastructure capacity in line with regional growth or decline demands.*
- *Plan for post-disaster economic recovery.*

Old Colony transportation planning and comprehensive planning staff will continue to collaborate on planning efforts, and incorporate these best practices into Unified Planning Work Program and other activities.

With this policy, we encourage resiliency by promoting sensitive land use and development patterns that contribute toward achieving Massachusetts greenhouse gas emission goals at a regional scale, and to develop local resiliency to the impacts of climate change. Through this policy, we have committed to using climate change as a lens through which to examine our work.

Climate change is the greatest environmental challenge of this generation, with potentially profound effects on the economy, public health, water resources, infrastructure, coastal resources, energy demand, natural features, and recreation. The Old Colony Planning Council is committed to doing its part to mitigate and adapt to this challenge, recognizing the necessity of engaging in adaptation planning today by taking a close look at strategies that could help the region become more resilient and ready to adapt to climate change as it occurs.

The growing frequency and large-scale impact of severe weather events demonstrate the importance of planning for resilience. The risks and costs of not preparing for significant climatic events have been seen through experiences, such as the 2010 flooding in Plymouth County and the winter storms of 2018. March 2010 was the wettest month on record in Massachusetts with 18.8 inches of precipitation.

Massachusetts' climate is already changing and will continue to do so over the course of this century – ambient temperature has increased by approximately 1.8 degrees since 1970 and sea surface temperature by 2.3 degrees between 1970 and 2002. These warming trends have been associated with other observed changes, including a rise in sea level of 22 centimeters between 1921 and 2006, more frequent days with temperatures above 90 degrees, reduced snowpack, and earlier snow melt and spring peak flows. By the end of the century, under the high emissions scenario of the Intergovernmental Panel on Climate Change (IPCC), Massachusetts is set to experience a 5 degree to 10 degree increase in ambient temperature, with several more days of extreme heat during the summer months. Days with temperatures greater than 90 degrees are predicted to increase from the 5 to 20 days annually that Massachusetts

experiences today to between 30 to 60 days annually; while up to 28 days annually are predicted to reach above 100 degrees, compared to up to two days annually today. Sea surface temperatures are expected to increase by 8 degrees; while winter precipitation, mostly in the form of rain, is expected to increase by 12 to 30 percent. The number of snow events is predicted to decrease from five each month to one to three each month.

An increase in temperature can cause increased virulence of viruses, insects and pests; decimation of sensitive crops and plants; increased asthma and other human health effects; and can impact the built environment. Increased intensity of precipitation can cause increased flooding, put humans and their property at risk, ruin crops, and create public health concerns from sewage and hazardous waste leaks. Higher temperatures, especially the higher incidence of extreme heat days, will have a negative impact on air quality and human health. In general, impacts from climate change on human health can include respiratory illnesses, exacerbation of allergies and asthma, an increase in vector borne diseases, and degraded water quality.

Some solutions to address climate change adaptation can also be considered mitigation strategies because, in addition to contributing to increased resilience and preparedness to climate change, they concurrently achieve reductions in greenhouse gas emissions that contribute to the problem.

The need to perform risk and vulnerability assessments to determine levels of susceptibility and exposure to and impacts of climate change among people, physical structures and assets, natural resources and the environment, economic conditions, and other resources and interests.

Areas needing thorough risk and vulnerability assessments include existing critical infrastructure and facilities, vulnerable natural habitats and ecosystems, vulnerable groups or populations, community-or region-specific hazards and threats, water supplies, businesses, homes and other structures, and social and cultural resources.

Once the risks and vulnerabilities are properly assessed, their impacts must be minimized through effective planning and management. Future risks and costs can be reduced for new development, and redevelopment through the careful siting and inclusion of design, engineering, construction and maintenance standards that account for higher sea levels, increased temperatures, more intense coastal storms, and inland flooding. Sound land use decisions, guided by regulation and standards, incentives, and technical support, will help the region adapt to and withstand climate change impacts.

Another important set of cross-cutting strategies identified during the development of this report include measures that preserve, protect, and restore natural habitats and the hydrology of watersheds. These strategies not only benefit natural resources and habitat, but can also

play a critical role in protecting and increasing resilience of key infrastructure sectors, human health, and the local economy.

- **Identify and fill critical information gaps.** Effective adaptation efforts require up-to-date and accurate information, models, and decision-support tools. Addressing the key knowledge and technological gaps to identify and predict vulnerability of both the built environment and natural resource areas is a high priority. Assessing future risk and developing strategies for adaptation poses significant challenges.
- **Identify and fill critical information gaps.** Through climate models that reflect Massachusetts-specific conditions, and by expanding mapping, monitoring, and assessments of specific parameters and ecosystem processes, more robust and specific information can be advanced to support the development of strategies targeted to changing conditions.
- **Evaluate and prioritize adaptation strategies for implementation.** Challenging decisions lie ahead regarding the options and alternatives for reducing risk to public infrastructure, private property, and human safety and welfare as a result of climate change. There is a strong need to prioritize specific adaptation responses determined to be the most effective and efficient. Evaluation and prioritization of adaptation alternatives should consider many factors including the probability and magnitude of potential impacts, the vulnerability of the groups affected, the range and feasibility of alternatives available, stakeholder input, and the opportunity to build upon current programs and successes.
- **Support local communities:** As a home-rule state, many of the land-use decisions in Massachusetts are made by cities and towns. To be successful, adaptation strategies must be connected with and directly support vulnerable communities. Addressing some of these challenges at the local level will require assistance, both technical and financial, from state and federal governments, regional planning agencies, trade organizations and non-profit partners. Communities can learn from one another, as some already have experiences with climate change adaptation strategies to share.

COASTAL RESILIENCE

Resilience, adaptive capacity, and risk tolerance should be key factors in the evaluation of different sea level rise scenarios for planning and decision making. Resilience in this context refers to the ability to endure impacts associated with sea level rise and to respond, recover, and adapt to consequences. An area, site, facility, or project that is highly resilient will be able to accommodate or tolerate more frequent flooding and adverse consequences associated with increasing sea level rise, and one with low resilience and adaptive capacity will be more severely impacted, take longer to recover (or may not recover at all), and require greater resources for recovery. Risk refers to the potential for, or exposure to, loss or undesirable

impacts (or outcomes) and can be characterized as the combination of probability and consequence. In other words, the lower the likelihood and effects, the lower the risk. Some projects or facilities, such as parks, playing fields, or above-ground parking garages, may have greater inherent resilience attributes and may be at lower risk.

Coastal resilience means building the ability of a community to “bounce back” after hazardous events such as hurricanes, coastal storms, and flooding, rather than simply reacting to impacts (National Ocean Service, NOAA). The decisions communities are making today for how and where they develop dictate their ability to bounce back after storm events. Understanding where and how our communities are vulnerable to loss from coastal hazards, and adapt planning and development practices to compensate for these vulnerabilities will ultimately result in lives and dollars saved, and stronger communities for the future.

Massachusetts coastal communities face significant risks from coastal storms, flooding, erosion, and sea level rise, challenges that are exacerbated by climate change. Coastal salt marsh wetlands are particularly vulnerable to even the smallest amount of sea level rise. Coastal wetlands are critical habitat for commercial and recreational fish and invertebrate species. Loss of these wetlands through sea level rise could pose a real threat to coastal economies and water quality if they are lost. Planning for sea level rise today can preserve land and allow coastal wetlands to migrate inland and maintain their essential functions for the communities.

Coastal hazards information and tools can assist state and local officials to better plan for impacts of storms and sea level rise and implement strategies to prevent recurring future damages. Data such as detailed terrestrial contours, shallow water bathymetry, and mean high water positions are needed throughout the region to support efforts to identify potential inundation zones from storm surge, erosion and sea level rise. A companion to data is the need to develop user-friendly tools to access and analyze data and support management decisions and recommendations.

Chapter 8: Safety and Security

Traveling safety is one of the public's highest expectations from the transportation system. Ongoing coordination among all agencies is necessary to cover the many factors related to maintaining and improving safety, such as, operator knowledge, experience and skill; operator impairment; the use of safety equipment; vehicle condition; and road and weather conditions. Incorporating safety into transportation planning often means integrating safety into all aspects of an agency's operations.

While municipalities and agencies across the region have made strides in improving transportation safety and security, the region continues to face issues and challenges, including:

- Several areas on the highway network have been identified as having elevated crash rates and Equivalent Property Damage Only (EPDO) values
- Areas of the region are vulnerable to threats from climate change and other factors
- The Safe Routes To School program is underutilized
- There continues to be opportunity for increased security at transportation facilities.

MASSACHUSETTS STRATEGIC HIGHWAY SAFETY PLAN

In 2006, the Massachusetts Department of Transportation (formerly Executive Office of Transportation) presented the Massachusetts Strategic Highway Safety Plan (SHSP), a statewide comprehensive safety plan that provided a coordinated framework for reducing fatalities and serious injuries on the State's surface transportation network. Through a data-comprehensive, data driven systematic approach, MassDOT with its state, regional, and local partners targeted six emphasis areas and achieved significant accomplishments in traffic safety and reductions in fatalities and serious injuries.

In 2018, MassDOT released an update to its Strategic Highway Safety Plan. The update built upon the success of the 2006 and 2013 Plans, and identified fourteen emphasis areas and action plans to focus transportation planning and engineering efforts on to improve safety on the transportation system.

SAFETY MANAGEMENT SYSTEM

The Old Colony Safety Management System consists of a systematic process that has the goal of reducing the number of and severity of traffic crashes on public roads, with the ultimate goal of achieving safety performance management targets established in PM1. Recommended actions include providing information for selecting and implementing effective safety strategies and projects. All opportunities to improve roadway safety are identified, considered, and implemented in all phases of highway planning, design, construction, maintenance, and operation.

Guidance from the Federal Highway Administration's Safety Program and the Massachusetts Strategic Highway Safety Plan (SHSP) has been incorporated into the Old Colony Safety

Management System. Based on federal guidance, the Old Colony Safety Management System has been modeled to be a data driven, collaborative process that includes consultation with transportation safety stakeholders on addressing safety planning for highway, transit, bicycle, and pedestrian transportation. This collaborative process includes continually evaluating Engineering components, Education initiatives; Enforcement policies and practices, and Emergency Response (known as the “4 E’s”).

The 2018 Massachusetts Strategic Highway Safety Plan is regularly consulted and incorporated into the Old Colony Safety Management System and safety planning processes. The following target areas from the 2018 Massachusetts SHSP are regularly incorporated into transportation planning efforts: Lane Departure Crashes; Speeding and Aggressive Driving; Intersection Crashes; Pedestrians; and Bicyclists.

The safety management system incorporates roadway, human and vehicle safety elements. Considered an ongoing effort, Old Colony Planning Council collects and maintains all data needed in the estimation of refined performance measures. Staff identifies both existing and future needs of the region’s transportation system with regard to safety. This includes development of annual regional listings of high hazard intersections and corridors, and participation in the Highway Safety Improvement Program.

HIGHWAY SAFETY

Table 8-1 summarizes crash data for the sixteen communities of the Old Colony region. MassDOT crash data contains over 20,000 records of crashes occurring in the Old Colony region from 2014 through 2016. Of these crashes, 31.42% involved injuries, while 71 (less than 1%) were fatal.

Table 8-1: Crashes by Community, 2014-2016

	Roadway Mileage	Total Crashes	Crashes Per Mile	With Injuries		Fatal Crashes	Pedestrian			Bicycle		
				Crashes	% Total		Crashes w/Injury	Fatal	Crashes w/Injury	Fatal		
Abington	67.05	1,496	22.31	372	24.87%	2	23	20	0	8	5	0
Avon	33.61	632	18.80	229	36.23%	4	5	2	1	1	0	0
Bridgewater	134.16	1,630	12.15	383	23.50%	5	22	7	2	10	7	0
Brockton	284.23	6,974	24.54	2866	41.10%	23	243	194	11	69	59	1
Duxbury	286.84	688	2.40	197	28.63%	2	3	2	0	5	4	0
East Bridgewater	79.63	892	11.20	267	29.93%	1	7	3	0	3	2	0
Easton	131	1,294	9.88	350	27.05%	6	9	7	0	7	4	0
Halifax	58.97	283	4.80	96	33.92%	1	3	2	0	3	3	0
Hanover	85.17	744	8.74	317	42.61%	3	6	4	1	2	2	0
Hanson	65.92	469	7.11	99	21.11%	1	4	1	1	2	1	0
Kingston	106.67	823	7.72	201	24.42%	3	4	4	0	2	1	0
Pembroke	113.76	1,026	9.02	290	28.27%	1	7	7	0	5	5	0
Plymouth	506.45	2,637	5.21	778	29.50%	11	26	18	2	7	5	0
Plympton	35.55	127	3.57	38	29.92%	2	0	0	0	0	0	0
Stoughton	123.06	2,358	19.16	573	24.30%	2	26	20	2	7	5	0
West Bridgewater	58.87	1,244	21.13	345	27.73%	4	8	6	1	5	3	0
Whitman	54.06	705	13.04	147	20.85%		15	8	0	4	1	0
OCPC Region	2225	24,022	10.80	7548	31.42%	71	411	305	21	140	107	1

Intersections

In their Strategic Highway Safety Plan, MassDOT has identified intersections as a strategic emphasis area where infrastructure improvements can be implemented to improve highway safety. The MassDOT maintains a database of crashes occurring in Massachusetts based on crash reports submitted to the Massachusetts Registry of Motor Vehicles (RMV). With the data, MassDOT generates analysis tools such as a Geographic Information Systems (GIS) based crash clustering system where crash locations are plotted, and “clusters” where crashes are occurring in close proximity to each other, such as at an intersection or highway interchange, are identified. The Top 5% worst crash clusters are used to determine eligibility for improvements funding through the Highway Safety Improvement Program (HSIP). MassDOT also generates a Top 200 Most Hazardous Intersections statewide list, which uses an Equivalent Property Damage Only (EPDO) weighted average methodology. Similarly, the Old Colony Metropolitan Planning Organization generates a Top 100 Most Hazardous Intersections list for the region using the same EPDO weighted average methodology.

Several areas on the highway network have been identified as having elevated crash rates and Equivalent Property Damage Only (EPDO)

The Old Colony Metropolitan Planning Organization has opportunity through its partnerships with federal, state, and local agencies to mitigate crash rates along with the frequency of fatalities and incapacitating injuries through Unified Planning Work Program (UPWP) activities and the Transportation Improvement Program (TIP). The Old Colony Top 100 Most Hazardous Intersections list along with the MassDOT inventory of top crash clusters are among the analysis

tools utilized to determine where efforts and investments may be targeted to improve safety at intersections in the region.

Table 8-2 summarizes the top 100 high crash locations in the region based on MassDOT's crash database. This list of hazardous intersections is prioritized by the highest weighted average, utilizing the same weighted methodology used by MassDOT. Table 8-3 is based on the latest available data for the region (years 2014 through 2016).

Table 8-2 Old Colony Top 100 Most Hazardous Intersections (2014-2016)

RANK	COMMUNITY	INTERSECTION	2012 - 2014 EPDO	2013 - 2015 EPDO	2014 - 2016 EPDO	Crashes 2014 - 2016				Notes
						Fatal	w/Injury	Non_Injury Crashes	Total	
1	BROCKTON	West Elm Street at Ash Street	175	161	194	0	32	34	66	Reconstructed 2017
2	BROCKTON	Pleasant Street at West Street & Reynolds Highway	315	208	170	0	26	40	66	Improvements 2016
3	WEST BRIDGEWATER	West Center Street at Prospect Street	126	111	162	0	22	52	74	
4	PEMBROKE	Church Street at Union Street	132	131	161	0	29	16	45	
5	BROCKTON	Main Street at Centre Street & Legion Parkway	125	131	177	1	20	34	55	Road Safety Audit 2018
6	EAST BRIDGEWATER	Bedford Street at West Street & East Street	105	103	141	0	19	46	65	
7	BROCKTON	Centre Street at Plymouth Street	112	101	131	0	21	26	47	Programmed Old Colony TIP
8	BROCKTON	Pleasant Street at Ash Street	103	138	125	0	20	25	45	
9	BROCKTON	Montello Street at Court Street	96	80	124	0	19	29	48	
10	BROCKTON	Pleasant Street at Main Street	79	86	121	0	20	21	41	
11	BROCKTON	Warren Avenue at West Elm Street	128	125	119	0	21	14	35	
12	BROCKTON	Main Street at Nilsson Street	104	105	118	0	21	13	34	
13	ABINGTON	Bedford Street at Brockton Avenue	76	104	116	1	12	46	59	Road Safety Audit 2018
14	BROCKTON	Pleasant Street at North Warren Avenue	115	105	116	0	19	21	40	
15	STOUGHTON	Washington Street at Central Street	106	99	115	0	10	65	75	Programmed Old Colony TIP
16	BROCKTON	North Pearl Street at Oak Street	78	71	109	0	17	24	41	
17	BROCKTON	Warren Avenue at Market Street	72	93	108	0	18	18	36	
18	WEST BRIDGEWATER	East & West Center Street at North & South Main Street	65	80	107	0	11	52	63	Reconstructed 2016
19	STOUGHTON	Pleasant Street at Lincoln Street	47	78	107	0	16	27	43	Road Safety Audit 2018
20	BROCKTON	West Elm Street at Newbury Street	66	60	107	0	18	17	35	Reconstructed 2017
21	STOUGHTON	Park Street at Walnut Street	63	74	103	0	15	28	43	
22	BROCKTON	Forest Street at Bouve Avenue & Manomet Street	90	74	103	0	18	13	31	Studied 2014
23	AVON	East Main Street at East & West Spring Street	83	98	102	0	16	22	38	Road Safety Audit 2012
24	BROCKTON	Belmont Street at Manley Street	72	92	99	0	15	24	39	Reconstructed 2018
25	BROCKTON	Warren Avenue at Forest Avenue	123	99	98	0	16	18	34	Studied 2014
26	BROCKTON	Montello Street at East Nilsson Street	54	64	92	0	15	17	32	Road Safety Audit 2019
27	BROCKTON	Pleasant Street at Augusta Avenue & Belmont Avenue	71	70	91	0	16	11	27	Reconstructed 2015
28	BROCKTON	Crescent Street at Lyman Street	92	119	90	0	13	25	38	Road Safety Audit 2017
29	PEMBROKE	Washington Street at Columbia Road & Schoosett Street	70	84	89	0	13	24	37	Studied 2017
30	BROCKTON	North Main Street at Howard Street & Oak Street	82	75	88	0	13	23	36	Road Safety Audit 2019
31	PEMBROKE	Church Street at Oak Street	72	83	87	0	9	42	51	
32	BROCKTON	Belmont Street at VA Medical Center	100	90	87	0	13	22	35	Reconstructed 2018
33	BROCKTON	North Montello Street at East Ashland Street	105	97	87	0	15	12	27	
34	WHITMAN	Bedford Street at Temple Street	102	101	86	0	9	41	50	Programmed Old Colony TIP
35	EAST BRIDGEWATER	Bedford Street at Highland Street	55	57	86	0	12	26	38	
36	BROCKTON	North Quincy Street at Boundary Avenue & Chestnut Street	75	82	86	0	14	16	30	Programmed Old Colony TIP
37	BROCKTON	Centre Street at Cary Street and Lyman Street	78	80	84	0	13	19	32	Road Safety Audit 2017
38	STOUGHTON	Pleasant Street at Central Street	63	64	83	0	11	28	39	
39	ABINGTON	Bedford Street at Randolph Street & North Avenue	99	78	81	0	9	36	45	Improvements 2018
40	BROCKTON	Reynolds Highway at Westgate Mall	150	118	81	0	11	26	37	Improvements 2014

Table 8-2 Old Colony Top 100 Most Hazardous Intersections (2014-2016), Continued

RANK	COMMUNITY	INTERSECTION	2012 - 2014 EPDO	2013 - 2015 EPDO	2014 - 2016 EPDO	Crashes 2014 - 2016				Notes
						Fatal	w/Injury	Non_Injury Crashes	Total	
41	ABINGTON	Adams Street at North Avenue	37	76	80	0	13	15	28	
42	BROCKTON	North Montello Street at Howard Street	73	68	79	0	14	9	23	
43	EASTON	Washington Street at Depot Street	62	63	78	0	13	13	26	
44	STOUGHTON	School Street at Pearl Street	60	69	77	0	9	32	41	
45	BROCKTON	Oak Street at Belair Street	92	72	77	0	12	17	29	
46	BROCKTON	Oak Street at Campanili Drive	78	100	77	0	12	17	29	
47	BROCKTON	West Elm Street at Belmont Avenue	94	66	77	0	12	17	29	Reconstructed 2017
48	BRIDGEWATER	Bedford Street at Grove Street	39	70	77	1	10	17	28	Studied 2016
49	EASTON	Tumpike Street at Purchase Street	79	88	77	0	13	12	25	Road Safety Audit 2017
50	STOUGHTON	Lindelof Avenue at Technology Center Drive	75	72	76	0	10	26	36	
51	BROCKTON	Centre Street at Quincy Street	103	79	76	0	11	21	32	
52	BROCKTON	Belmont Street at Warren Avenue	84	67	76	0	13	11	24	
53	BROCKTON	Belmont Street at Pearl Street	34	62	73	0	11	18	29	Road Safety Audit 2018
54	BROCKTON	Court Street at Cary Street, North Cary Street, & Provost Street	47	67	73	0	12	13	25	
55	HANOVER	Columbia Road at Broadway	60	65	72	0	12	12	24	
56	WHITMAN	Bedford Street at Auburn Street	78	53	71	0	4	51	55	Programmed Old Colony TIP
57	BROCKTON	West Elm Street at Moraine Street	78	68	71	0	12	11	23	Reconstructed 2017
58	BROCKTON	Oak Street at Reservoir Street	79	74	70	0	11	15	26	
59	EASTON	Washington Street at Purchase Street	46	41	69	0	10	19	29	Reconstructed 2017
60	STOUGHTON	Central Street at Pearl Street	45	58	69	0	11	14	25	
61	BROCKTON	Forest Avenue at Ash Street	52	50	68	0	10	18	28	Studied 2014
62	WEST BRIDGEWATER	West Center Street at Howard Street	18	42	68	0	10	18	28	
63	AVON	Harrison Boulevard at West Main Street	62	73	67	0	8	27	35	
64	STOUGHTON	Washington Street at Freeman Street & Lyman Street	59	56	67	0	9	22	31	
65	BROCKTON	North Montello Street at Livingston Road & Field Street	50	56	66	0	11	11	22	
66	BRIDGEWATER	Central Square at Summer Street, Broad Street, & Main Street	62	62	65	1	5	30	36	
67	BROCKTON	North Montello Street at East Battles Street	50	50	65	0	10	15	25	
68	BROCKTON	North Montello Street at Ames Street	38	57	65	0	11	10	21	
69	EASTON	Foundry Street at Tumpike Street	83	69	63	0	7	28	35	Reconstructed 2016
70	ABINGTON	Plymouth Street at Central Street	34	60	63	0	10	13	23	
71	BROCKTON	North Cary Street at East Ashland Street	71	66	62	0	9	17	26	
72	WEST BRIDGEWATER	West Center Street at North & South Elm Street	38	32	62	0	9	17	26	
73	BROCKTON	Warren Avenue at Winthrop Street	51	42	61	0	10	11	21	
74	AVON	Harrison Boulevard at Pond Street	58	61	60	0	6	30	36	Programmed Old Colony TIP
75	ABINGTON	Brockton Avenue at Rockland Street & Elm Street	48	47	59	0	6	29	35	
76	STOUGHTON	Canton Street at School Street	71	52	59	0	6	29	35	Road Safety Audit 2018
77	BROCKTON	West Street at Torrey Street	37	35	59	0	8	19	27	
78	BROCKTON	North Main Street at East Ashland Street	73	59	59	0	9	14	23	
79	BROCKTON	North Pearl Street at Good Samaritan Medical Center	18	47	59	0	9	14	23	
80	BROCKTON	Belmont Street at Belmont Avenue & Manomet Street	67	78	59	0	11	4	15	Reconstructed 2018

Table 8-2 - Old Colony Top 100 Most Hazardous Intersections (2014-2016), Continued

RANK	COMMUNITY	INTERSECTION	2012 - 2014 EPDO	2013 - 2015 EPDO	2014 - 2016 EPDO	Crashes 2014 - 2016				Notes
						Fatal	w/Injury	Non_Injur y Crashes	Total	
81	EAST BRIDGEWATER	Bedford Street at Central Street, Spring Street, & Maple Avenue	59	70	57	0	8	17	25	
82	EASTON	Washington Street at Union Street	39	47	57	0	8	17	25	Programmed Old Colony TIP
83	BROCKTON	North Quincy Street at East Ashland Street	47	57	56	0	9	11	20	
84	BROCKTON	Main Street at Perkins Avenue & South Street	76	56	55	0	9	10	19	
85	BRIDGEWATER	Main Street at High Street & Center Street	65	76	54	0	7	19	26	
86	BROCKTON	Centre Street & Montello Street	66	49	54	0	7	19	26	Reconstructed 2018
87	WHITMAN	Temple Street & South Street at Washington Street	36	39	53	0	5	28	33	
88	WEST BRIDGEWATER	West Center Street at Manley Street	41	50	52	0	6	22	28	
89	EASTON	Washington Street at Central Street	69	55	52	0	7	17	24	
90	BROCKTON	Belmont Street at West Street	71	57	51	0	8	11	19	Programmed Old Colony TIP
91	BROCKTON	Pleasant Street at Spring Street	45	54	51	0	8	11	19	
92	WEST BRIDGEWATER	East Center Street at East Street	51	52	50	0	7	15	22	Improvements 2018
93	STOUGHTON	Washington Street at Park Street & Pleasant Street	65	45	49	0	4	29	33	
94	STOUGHTON	Lindelof Avenue at Turnpike Street	63	50	49	0	5	24	29	
95	BRIDGEWATER	Broad Street at High Street	45	45	49	0	6	19	25	Reconstructed 2018
96	BRIDGEWATER	Central Square at Bedford Street & South Street	41	39	49	0	6	19	25	
97	STOUGHTON	Turnpike Street at Central Street	28	27	49	0	6	19	25	
98	HALIFAX	Monponsett Street at Plymouth Street	54	59	49	0	7	14	21	
99	HANOVER	Washington Street at Webster Street	31	38	49	1	6	9	16	
100	AVON	Memorial Drive at Harrison Boulevard	53	59	48	0	6	18	24	

TRANSIT

The Brockton Area Transit Authority (BAT) and the Massachusetts Bay Transportation Authority (MBTA) maintain programs in their planning and operations to ensure the safety of employees, passengers, and the general public. The Brockton Area Transit Authority continuously monitors safety and security on their system, and routinely reports rates of incidence through their Performance Dashboard.

BICYCLE AND PEDESTRIAN SAFETY

Addressing safety for bicyclists and pedestrians is a key component of an overall focus on safety throughout the region. Both pedestrian involved crashes and bicycle involved crashes have been identified as emphasis areas with action plans in the Massachusetts Strategic Highway Safety Plan. The Old Colony Metropolitan Planning Organization has opportunity through its partnerships with federal, state, and local agencies to mitigate crash rates along with the frequency of fatalities and serious injuries through Unified Planning Work Program (UPWP) activities and the Transportation Improvement Program (TIP). Similar to crash clustering of motor vehicle accidents, MassDOT identifies pedestrian and bicycle crash clusters using a GIS-based methodology. The Old Colony MPO is committed to working with state and municipal agencies through its transportation planning tasks to address areas that have been identified as bicycle and pedestrian involved crash clusters.

The Safe Routes to School program is underutilized, with a 70% partnership rate among eligible schools as of May

Bicycle and pedestrian safety education is a critical component of efforts to reduce the number and frequency of bicycle and pedestrian related crashes, and subsequently reducing resulting fatalities and serious injuries. The Massachusetts Safe Routes to School (SRTS) program aims to teach safe pedestrian and bicycling habits to elementary and middle-school aged children while promoting healthy alternatives for children and parents in their travel to and from school. The children who benefit from the Safe Routes to School program often extend those learned safe habits to family members and friends, extending the societal benefits of the program. In 2014, a formal partnership between the Region and MassRIDES (the statewide administrator of the Safe Routes to School program) was established in an effort to increase partnership and participation by eligible schools (those schools housing grades K-8) in the Old Colony Region. Through joint efforts, partnership in the program has increased yet remains underutilized with over 70% of eligible schools partnered with MassRIDES as of May 2019. The Old Colony MPO is committed to continuing its efforts with Safe Routes to School to further increase partnership and participation by eligible schools.

RECOMMENDED IMPROVEMENT PROJECTS AT IDENTIFIED HIGH CRASH LOCATIONS

The following projects are planned for programming in the Old Colony Transportation Improvement Program (TIP) at some point during the FFY 2020 through FFY 2029 1—year time frame. These projects are all at locations that are a MassDOT Top 5% Highway Safety Improvement Program (HSIP) Crash Cluster from the years 2014 through 2016, an HSIP Pedestrian Crash Cluster, or on the MassDOT Statewide Top 200 Most Hazardous Intersections List.

FFY 2020-2024

- BROCKTON - CORRIDOR IMPROVEMENTS ON ROUTE 123 (BELMONT STREET), FROM ANGUS BEATON DRIVE TO WEST STREET
- STOUGHTON - IMPROVEMENTS AT WEST ELEMENTARY SCHOOL (SRTS)
- BROCKTON - ROUTE 123 (CENTRE STREET) AT PLYMOUTH STREET SIGNALIZATION AND GEOMETRIC IMPROVEMENTS
- STOUGHTON - CORRIDOR IMPROVEMENTS ON ROUTE 138

FFY 2025-2029

- BROCKTON - FOREST AVENUE CORRIDOR (MAIN STREET TO BELMONT STREET)
- BROCKTON - IMPROVEMENTS AND RELATED WORK ON CRESCENT STREET (ROUTE 27), INCLUDING REPLACEMENT OF GROVE STREET BRIDGE, B-25-005, OVER SALISBURY PLAIN RIVER
- BROCKTON- INTERSECTION IMPROVEMENTS AND RELATED WORK AT CENTRE STREET (ROUTE 123), CARY STREET AND LYMAN STREET
- DUXBURY - SIGNAL INSTALLATION @ ROUTE 3 (NB & SB) RAMPS & ROUTE 3A (TREMONT STREET)
- EASTON - ROUTE 138 & TURNPIKE STREET INTERSECTION SIGNALIZATION AND GEOMETRIC IMPROVEMENTS
- STOUGHTON - CANTON STREET (ROUTE 27) & SCHOOL STREET SIGNALIZATION AND GEOMETRIC IMPROVEMENTS

SECURITY ON THE TRANSPORTATION NETWORK

Securing the transportation system from threats and disruptions is an overarching concern for all transportation providers. According to the Federal Transit Administration, transit security refers to measures taken to protect a recipient's employees and the public against any intentional act or threat of violence or personal harm, either from a criminal or terrorist act. These actions include, but are not limited to, deploying surveillance technology and security personnel along routes and at stations, implementing security training programs for employees and security awareness programs for the public, and conducting inspections of facilities and passengers. Decisions to provide a greater level of security at some but not all of a recipient's fixed guideway stations in its area or along some but not all of a recipient's transit routes

should be based on neutral criteria such as an assessment of security threats to facilities, data showing higher levels of criminal activity at certain facilities or in vehicles traveling along certain routes, or objective information that leads officials to believe that certain facilities or routes are more likely to be at risk. Policies associated with observing suspicious activity should ensure that suspicious activity is observed without regard to race, color, or national origin.

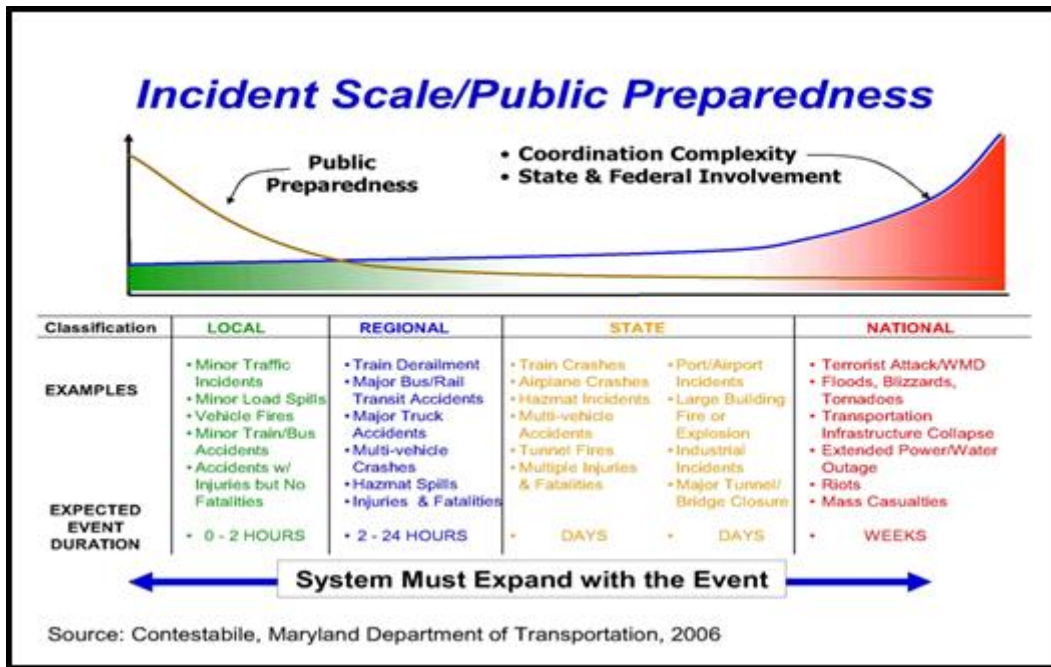
Safety and security are concerns that affect everyone within the region. Vukan R Vuchic in *Urban Transit: Operations, Planning, and Economics*, 2005 outlines some concerns about safety and security that are applicable to the region. Items to consider in the safe operation of fixed route transit are: Vehicle performance, bus body design and strength, fire prevention and resistance, driver training and performance, conditions along the routes, bus stop design and operations, communication with control center, and the utilization of ITS. Fixed route transit providers keep many of these topics in mind when planning for the safety and security of their operations.

Vuchic also outlines guidelines for security of transit operations, which can be summarized as passenger security, employee security and the protection of revenues, which includes external theft, internal theft and fare evasion. BAT's has a philosophy similar to Vuchic, believing safety and security is to protect employees, passengers, assets, and revenues. BAT carries this philosophy out through various mechanisms such as employee training, participation in emergency and pandemic drills, the development of continuity of operations plans; uniformed and plain-clothes transit patrols, and, the review of trends on complaints and physical damage so they can be informed and up to date on trends in the system.

Figure 8-1 provides an illustration of the relationship between the scale of a security incident and the level of public preparedness and consequent planning and coordination needs. As can be expected, as the scale moves from local to national, public preparedness declines and Coordination Complexity/ State & Federal Involvement increases. Effective coordination and communication among the many different operating agencies in a region and across the nation is absolutely essential. Such coordination is needed to allow enforcement/security/safety responses to occur in an expeditious manner, while at the same time still permitting the transportation system to handle the possibly overwhelming public response to the incident. Complementary to this is the need to make sure the public has clear and concise information about the situation and what actions they should take. Although the immediate organizational response to security incidents and disasters will be the responsibility of security/public safety agencies, there is an important role that the Old Colony MPO can play in promoting coordinated planning in anticipation of unexpected events or natural disasters. In addition, it could also provide a centralized location of information on transportation system conditions and local/national responses that might be useful in an emergency.

Figure 8-1

Incident Scale/ Public Preparedness



Source: Maryland Department of Transportation, 2006

[There continues to be opportunity for increased security at transportation facilities]

Areas that the Old Colony MPO may consider with regard to security planning would be to examine and evaluate its strengths and abilities in technical analysis and transportation planning, and subsequently, the actions and tasks that seem most appropriate for the MPO in the context of security/disaster planning. Examples of tasks that may be suitable for programming in the UPWP are as follows:

- Conducting vulnerability analyses on regional transportation facilities and services
- Analyzing transportation network for redundancies in moving large numbers of people (e.g., modeling person and vehicle flows with major links removed or reversed, accommodating street closures, adaptive signal control strategies, impact of traveler information systems), and strategies for dealing with "choke" points and bottlenecks.
- Analyzing transportation network for emergency route planning/strategic gaps in the network

Transit system security is a regional concern. Issues to be addressed in planning for transit security are the age of the system, the types of structures comprising the system, the vulnerability of those structures, the lack of redundant and/or alternate system components and/or capacity, and the increased requirements (over and above personal safety requirements) to provide for anti-terrorism security.

The Secure Stations Initiative is one of the MBTA's programs to enhance its system wide operational security by improving its communications and security systems. This is a requirement of both the Massachusetts State Homeland Security Strategy and the Regional Transit Security Strategy. The Regional Transit Security Strategy was developed by the Regional Transit Security Working Group and is discussed below.

Any new construction, reconstruction, enhancement, or modernization project will include installation or upgrades to the following communications systems:

- closed-circuit television
- public address
- variable message sign
- security intrusion detection
- burglar alarm
- fire alarm
- police call box

One of the issues facing the MBTA in its security emergency response planning is that of interoperability. Interoperability is defined as the ability of radio equipment belonging to one department's emergency first responders to communicate with that of another department's first responders.

EVACUATION PLANNING FOR VULNERABLE POPULATIONS

The South Shore and southeastern Massachusetts is vulnerable to both natural and industrial disasters, and planning response and evacuation for such disasters is an important responsibility of local, regional, state, and federal government agencies. Late summer hurricanes, major winter blizzards, and summer droughts are all part of life in Southeastern Massachusetts, but most are at a manageable level. Other threats, e. g, earthquakes, landslides, and major fires are less common or manageable... Hurricanes and blizzards can be very destructive as we know from the Blizzard of 1978, Hurricanes Gloria and Bob, and the blizzard of 2015. Less common events occasionally occur such as Plymouth's 1957 wildfire that burned to the sea; and local fires in Plymouth's Uncle Brances Road and Clark Road areas early in 2005. These events can have disastrous effects on natural features and our synthetic communities. For the sake of waterborne transportation, waterpower, and access to marine resources and level building sites, many older communities have developed on the unprotected coast and along flood plains

Areas of the region are vulnerable to threats from climate change and other factors

Hurricanes, floods, tornadoes, and wildfires not only threaten lives and property, but also the transportation system critical for response to such emergencies, and for evacuation. The Old Colony MPO and the Old Colony Planning Council have played a lead role in working with partners on developing pre-disaster mitigation plans, and identifying components of the transportation system most vulnerable to disasters.

The Pilgrim Nuclear Generation Station located on the shore of Plymouth near the Manomet section of Town poses perhaps the greatest potential non-natural hazard in the region. Commissioned in 1972, the Pilgrim Nuclear Power Station features a Boiling Water Reactor, General Electric Mark 1 design, with an output capacity of 685 megawatts. Spent nuclear fuel used by the plant is currently stored on-site, awaiting direction from the Federal government on permanent disposal processes.

Local, regional, state, and federal agencies should coordinate regularly and routinely on planning for response and evacuations in the event of natural and industrial disasters. Plans should recognize and consider all assets of the transportation network, including highway and rail. Physical capital that may be needed in such an event, such as portable variable message signs, portable lighting, barriers and delineators, generators, and vehicles should be inventoried in readily accessible plans and be able to be quickly and easily deployed. Expansion of permanent variable message signs and traffic cameras should be expanded onto the South Shore, including the Routes 3, 24, and 44 corridors. This permanent capital is not only beneficial in emergency response and evacuation, but for everyday congestion management operations and incident management as well.

PRE-DISASTER MITIGATION

The Old Colony Planning Council, under contract with the Massachusetts Emergency Management Agency (MEMA) developed a Multi-hazard Pre-Disaster Mitigation Plan. The purpose of the Multi-hazard Pre-Disaster Mitigation Plan was examine the natural hazards facing the Old Colony Region, review present protective features and provisions, assess the remaining vulnerability of the area's residents and critical facilities, and recommend ways to mitigate potential damage before the events occur. The Plan drew on the local knowledge of diverse officials and residents in order to produce practical, feasible recommendations for mitigation development against such natural hazards. Ideally, the recommended actions will help to save lives, protect property, and minimize disruption of essential services.

To guide this effort, the OCPC established a regional Multiple Hazard Community Planning Team drawing on locally appointed officials or their representatives. These included Local Emergency Management Directors, Fire, and Police Departments, Public Works officials,

Conservation Officers, and others concerned with emergency management, natural resource management, and protection of life and property. The effort drew heavily on the experience and knowledge of the public safety officials and others on the Multi-Hazard Community Planning Team.

The Old Colony Metropolitan Planning Organization through the planning staff is committed to continuing to work with local, regional, state, and federal emergency management officials in preparing for major weather events and other emergencies.

TIP PROJECT EVALUATION CRITERIA

An evaluation process to prioritize transportation projects included in the Transportation Improvement Program (TIP) was implemented several years ago. Among the criteria utilized as part of the effort are safety and security.

CONCLUSIONS, POLICIES, AND RECOMMENDATIONS

While great strides have been taken to improve safety and security throughout the transportation network nationally, statewide, and locally; there must be a continued focus on further reducing crashes, injuries, and fatalities. The Old Colony Metropolitan Planning Organization recommends and is committed to the implementation of the following policies and recommendations to improve safety and security throughout the transportation network.

Target planning efforts and investments at identified high crash locations. Through the Old Colony Safety Management System (and analysis tools such as the Top 100 Most Hazardous Intersections lists and MassDOT Crash Clusters inventory) identify high crash locations for targeted study, including but not necessarily limited to Road Safety Audits. High crash locations will include those emphasis areas in the Massachusetts Strategic Highway Safety Plan, including intersections, lane departures, older drivers, pedestrians, and bicycles.

Fully program minimum HSIP targets each TIP year and seek to program Statewide HSIP funds when available/feasible for priority safety related projects.

Reduce the rates of motor vehicle, bicycle, and pedestrian fatalities by incorporating engineering, enforcement, education, and emergency response into the planning process.

Planning products of the Old Colony Metropolitan Planning Organization will seek to recommended best planning and engineering practices and standards when addressing safety on the transportation system. Staff will continue to work with state and local partners on addressing vehicular, transit, pedestrian, and bicycle safety through planning, legislative, and law enforcement efforts.

Support the increase and improvement of safety of services, vehicles, and facilities for transit, and for the transportation disadvantaged. Staff will continue to work with Brockton Area Transit Authority (BAT) and other transit providers in the area, while the Old Colony Metropolitan Planning Organization through Old Colony Planning Council will provide planning,

technical, and operational assistance to transit providers in the common goal of providing and maintain safe service.

Support the implementation of emergency response and evacuation plans in cooperation with emergency management agencies. Emergency response and evacuation needs will be considered in all applicable planning efforts. Staff will work with stakeholders at the statewide, regional, and municipal levels to ensure the transportation network is able to accommodate response, evacuation, and recovery during regional emergencies. Furthermore, staff is committed to the following steps to prepare for emergencies and protect the viability of the transportation network:

Increase partnership and participation by elementary and middle schools in the Safe Routes to School Program. The Safe Routes to School program is a valuable asset for teaching safe walking and bicycling habits while **PROMOTING HEALTHY ALTERNATIVES FOR CHILDREN AND PARENTS IN THEIR TRAVEL TO AND FROM SCHOOL**. Staff will continue its partnership with MassDOT to provide technical support for Safe Routes to School and expand participation to local schools in the Old Colony Region.

Chapter 9: Finance

Fixing America’s Surface Transportation (FAST) Act regulations requires that the Long Range Transportation Plan include a financial component that demonstrates how the projects and improvements it identifies can be implemented while achieving financial constraint. The statutory language directs that the Plan be financially constrained to reasonably expected revenues. In addition, this chapter includes a description of federal and state funding programs, and highway and transit financing.

Historical data on transportation spending and allocation within the region are indicators of potential future spending levels. It is assumed that federal and state funding commitments will continue beyond the life of the FAST Act with future federal legislation and state legislation.

Regardless of the available funding during the implementation of the 2040 Long Range Transportation Plan, several pressing issues continue to face the region. They are as follows:

- The infrastructure preservation, maintenance, safety, security, and reliability needs of the regional highway, bridge, and transit network continue to strain available funding. Such strain does not afford investment in regionally significant capacity enhancement and mobility projects.
- The percentage of the federal aid eligible pavement network categorized as in a state of good repair (pavement condition identified as excellent or good by the pavement management system), is declining.
- Extended transit service hours of operation, along with extensive and expanded system reach and coverage cannot be implemented in their entirety given existing funding levels.
- Evolving demographics, and continued growths of population, employment, and households will continue to stress the existing transportation systems and the access to essential services. Examples include the continued increase of medical transportation needs of the aging population.

HISTORICAL SPENDING TRENDS

Estimating the amount of funds available in the future is an inexact science at best. One approach is to chart past funding experience and attempt to discern a trend. This trend could then be extrapolated to future years.

The potential issue with such an approach is that funding levels are not as constant as we would like. The amount of funding available changed dramatically between 1991 and 1992 when ISTEA replaced its predecessor, the Surface Transportation and Uniform Relocation Assistance Act (STURAA). While there is no certain reason to think that similar changes in funding are likely at the end of the FAST Act period, that change illustrates the variability of the system and the tentativeness of any long term financial projections.

In addition to uncertainties at the federal level, the future amount of funding that will be available from the state for transportation is indeterminate. State dollars for transportation

come from the sources such as: gasoline tax, license/registration fees; bond proceeds, sales tax; tolls; fares; annual appropriation; and local assessment.

Table 9-1 summarizes both federal and non-federal highway and bridge construction spending, in constant dollars, in the Old Colony Region, from 1992 to 2019. The historical data illustrate that a total of approximately \$371.2 million dollars was spent in the twenty-eight year period averaging approximately \$13.256 million dollars annually.

Table 9-1: Summary of Construction Spending in the Old Colony Region

Year	Sum of Advertised Project Amounts
1992	\$ 20,246,117
1993	\$ 39,417,562
1994	\$ 10,045,153
1995	\$ 29,362,750
1996	\$ 15,738,263
1997	\$ 36,942,432
1998	\$ 8,594,745
1999	\$ 1,869,334
2000	\$ 1,800,000
2001	\$ 3,358,460
2002	\$ 7,225,538
2003	\$ 4,276,801
2004	\$ 5,712,046
2005	\$ 9,971,410
2006	\$ 10,967,000
2007	\$ 7,376,314
2008	\$ 19,080,186
2009	\$ 20,650,414
2010	\$ 7,418,228
2011	\$ 10,462,870
2012	\$ 6,448,368
2013	\$ 10,845,758
2014	\$ 8,492,716
2015	\$ 11,310,972
2016	\$ 25,255,028
2017	\$ 8,829,256
2018	\$ 18,324,030
2019	\$ 11,144,749
Total	\$ 371,166,500
Annual Average	\$ 13,255,946

**Dollars expressed in constant dollar amounts*

TRANSPORTATION FUNDING PROGRAMS

The transportation network is financed through federal and state revenue sources. These sources are described below.

Federal Funding

Massachusetts receives transportation funds from the federal government. The major sources are the Federal Highway Administration (FHWA), Federal Transit Administration (FTA) and the Federal Aviation Administration (FAA). The United States Congress authorizes funding for these transportation projects through federal legislation. For highways and mass transportation,

the most recent authorization was the FAST ACT. Federal funding received from the FAST Act is allocated to different funding programs.

Highway Funding Programs

- **National Highway Performance Program (NHPP)** provides support for the condition and performance of the National Highway System (NHS), for the construction of new facilities on the NHS, and to ensure that investments of Federal-aid funds in highway construction are directed to support progress toward the achievement of performance targets established in a State's asset management plan for the NHS.
- **National Freight Program (NFP) Program** provides financial assistance in the form of grants or credit assistance to nationally and regionally significant freight and highway projects that align with the program goals.
- **Surface Transportation Block Grant Program (STBG)** provides funds for roads (including NHS) that are not functionally classified as local or rural minor collectors. These roads are collectively referred to as federal-aid eligible roads. Bridge projects funded with STBGP funds are not restricted to federal-aid roads but may be on any public road.
- **Congestion Mitigation and Air Quality Improvement Program (CMAQ)** directs funds toward transportation projects in Clean Air Act non-attainment areas for ozone and carbon monoxide. These projects will contribute to meeting the attainment of national ambient air quality standards. The state receives funds based on its share of the population of air quality non-attainment areas weighted by degree of air pollution.
- **Highway Safety Improvement Program (HSIP)** provides funds to reduce the number of fatal and injury crashes by targeting high crash locations. Projects, using (HSIP) funding, are required, by MAP-21, the Federal Legislation, to be selected based a data driven process.
- **Transportation Alternatives Program (TAP)** provides funds for a variety of alternative transportation projects, including many that were previously eligible activities under separately funded programs. The TAP replaces the funding from pre-MAP-21 programs including Transportation Enhancements, Recreational Trails, Safe Routes to School, and several other discretionary programs, wrapping them into a single funding source.
- **Bridge Replacement and Rehabilitation Program** provides funds for rehabilitation and replacement of any bridge on a public road. Bridges on the federal-aid system or off the federal-aid system are eligible for these funds.
- **Other Federal Aid** includes projects that received federal funding outside the federal-aid program. Funds in this category are generally approved as line items appended to various pieces of federal legislation. Projects in this category are generally intended to improve public safety within a specified region that might not qualify for funding through other sources.
- **Non-Federal Aid (NFA)** contains all projects not receiving federal funds. Various categories of state funding are included in this group such as bikeways, State Aid (Chapter 90), MassWorks, highway construction, and maintenance.

Transit Funding Programs

- **49 U.S.C. Section 5307** provides capital, preventative maintenance, and operating assistance to transit systems in urbanized areas. MAP-21 expanded eligibility for using Urbanized Area Formula funds for operating expenses. Previously, only urbanized areas with populations below 200,000 were eligible to use Federal transit funding for operating expenses. Now, transit systems in urbanized areas over 200,000 can use their formula funding for operating expenses if they operate no more than 100 buses. Activities eligible under the former Job Access and Reverse Commute (JARC) program, which focused on providing services to low-income individuals to access jobs, are now eligible under the Urbanized Area Formula program.
- **49 U.S.C. Section 5310** provides formula funding to increase the mobility of seniors and persons with disabilities. Funds are apportioned based on each State's share of the targeted populations and are now apportioned to both States (for all areas under 200,000) and large urbanized areas (over 200,000).
- **49 U.S.C. Section 5311** provides capital, planning, and operating assistance to support public transportation in rural areas, defined as areas with fewer than 50,000 residents. Funding is based on a formula that uses land area, population, and transit service.
- **49 U.S.C. Section 5339** provides funding to replace, rehabilitate, and purchase buses and related equipment, and to construct bus-related facilities.
- **Federal Highway Administration (FHWA) Ferry Boat Program (FBP)**

MANAGEMENT & OPERATIONS CONSIDERATIONS

System Level Estimate of Needs and Cost for Maintaining and Operating the Highway System

Given the limited funding, competing priorities, and the comprehensive list of transportation needs, it is crucial to maintain and operate the current system at optimal efficiency, in a safe manner, and in a state of good repair, and to achieve progress toward the attainment of performance targets. Also, various management and operation methodologies such as ITS, Transportation Demand Management strategies, Park and Ride Lots, Transit Signal Priority, and Corridor Management strategies such as traffic signal coordination will help the region obtain its goals of improving mobility, improving safety, reducing greenhouse gases, improving sustainability, and promoting economic development.

As such in order to develop a system level estimate of needs and cost for maintaining and operating the highway system, the Old Colony MPO has refined and updated its pavement management system (PMS) in keeping with the principles of objectives-driven, performance-based planning, and in fulfilling its goal of keeping the highway system in a state of good repair. A well-maintained system in good repair reduces delays (due to long reconstruction periods), enhances freight movement, improves economic vitality, and provides opportunities to implement Complete Streets strategies (improving the sidewalk and bicycle facilities network). The PMS calculates the rate of deterioration of pavement and the implications for the cost of repairs. It calculates a Pavement Condition Index (PCI) score between 0 and 100 for the

surveyed road segments and recommends a repair and cost based on the PCI score. Each road or road segment is placed in a condition category based on the PCI. The condition categories include “Poor” PCI between 0 and 60, “Deficient” PCI between 61 and 72, “Fair” PCI between 73 and 85, “Good” PCI between 86 and 92, and “Excellent” PCI between 93 and 100.

The Old Colony MPO updates field inspections of the pavement surface every four years and supplements the data on an ongoing basis, as pavement reconstruction and resurfacing projects are completed on federal aid roads through the Old Colony Transportation Improvement Program. The repairs recommended by the PMS, based on the road condition, include five general default repair strategies.

Based on pavement condition surveys prepared by Old Colony MPO planning staff, the Old Colony MPO Pavement Management System (PMS) has determined the federal-aid eligible roadway network is in need of about \$210,000,000 of investment in various repairs (ranging from minor repairs to full depth reconstructions) in order to bring the system into a complete state of good repair (all roadways with Excellent or Good pavement condition). There is currently an estimated 200 million dollars in investment planned for Federal Fiscal Years 2020 through 2029.

HIGHWAY FUNDED PROJECTS AND INITIATIVES

Projected Revenue

The major source of funding for highway related projects is apportionments provided through the Federal Highway Administration (FHWA). These funds typically provide 80% of project funds, with the remaining 20% coming from state match. Federal funds are usually derived from gasoline tax revenues, and state funds from the Transportation Bond Bill that is funded with gasoline tax revenues and general tax funds.

The MassDOT Office of Transportation Planning has developed funding estimates for the 20 years of the Long Range Transportation Plan. To supplement these estimates, reasonable estimates of Chapter 90 Allocations were added to the MassDOT funding forecasts. Table 9-2 shows that based on that assumption and MassDOT’s projections, the region can expect to receive approximately \$971,557,710 million for highway and bridges from FFY 2020 to FFY 2040. An estimated \$235,395,940 in Chapter 90 Funding is added to this estimate to arrive a grand total estimate of \$1,206,953,652. Furthermore, the estimated transit funding is \$438,821,090 for transit operations and capital investments as documented in Table 9-7.

Table 9-2: 2020-2040 Estimated Highway and Bridge Funding

	2020 to 2024	2025 to 2029	2030 to 2034	2035 to 2039	2040	TOTAL
Interstate MassDOT Pavement	\$ 489,885	\$ 618,593	\$ 759,552	\$ 841,850	\$ 179,060	\$ 2,888,939
Non-Interstate MassDOT Pavement	\$ 21,524,079	\$ 25,621,853	\$ 31,460,316	\$ 34,869,066	\$ 7,416,582	\$ 120,891,896
Statewide Bridge	\$ 30,706,903	\$ 34,931,389	\$ 42,891,221	\$ 47,538,518	\$ 10,111,350	\$ 166,179,380
Other (Remaining) Statewide Programs	\$ 51,176,632	\$ 57,514,877	\$ 70,620,819	\$ 78,272,639	\$ 16,648,438	\$ 274,233,404
Non-Federal Aid (NFA) Bridge Preservation	\$ 22,797,500	\$ 23,299,045	\$ 23,811,624	\$ 24,335,480	\$ 4,974,172	\$ 99,217,821
Regional Discretionary Funding	\$ 56,577,467	\$ 64,866,664	\$ 79,647,861	\$ 88,277,768	\$ 18,776,509	\$ 308,146,270
Chapter 90	\$ 50,728,920	\$ 53,057,894	\$ 57,158,421	\$ 61,575,852	\$ 12,874,853	\$ 235,395,940
Total Highway and Bridge Available for Programming	\$ 234,001,386	\$ 259,910,315	\$ 306,349,813	\$ 335,711,173	\$ 70,980,964	\$ 1,206,953,652

The funding estimates from the MassDOT Office of Transportation Planning are based on the following assumptions: Federal and state matching funding (core programs plus High Priority Project amounts) for the period of 2020-2024 reflect current allocations and are inflated one and half percent per year thereafter, beginning in 2025.

- Consistent with FHWA Statewide Transportation Improvement Program (STIP) guidance, \$50 million in redistributed obligation authority is assumed each year.
- Federal funding (Obligation authority and redistribution for unspent federal funds) and state match for the period of 2020-2024 reflect current Statewide Transportation Improvement Program allocations and funding.
- Beginning in 2025 and each year thereafter, funding is assumed to grow at a rate of 2.2% per year.
- Deductions for statewide items that cannot be allocated individually to the MPOs - Accelerated Bridge Program Grant Anticipation Notes repayments, Planning, and Extra Work Orders/Cost Adjustments - are taken from total available funding, leaving an amount of available federal funding to be allocated in the regional plans.
- Assumed funding for the National Highway Performance Program/ Interstate Maintenance Programs, the Federal Aid Bridge Program, and Infrastructure Maintenance mirrors the assumptions made for federal funding – 2020-2024 reflect Statewide Transportation Improvement Program amounts, and thereafter programs are adjusted by a rate of 2.2% per year.
- The Non-Federal Aid Program is based upon the existing program and held constant at current amounts for 2020-2024. Beginning in 2025 and thereafter, Non-federal aid funding is adjusted at a rate of 2.2% per year.

The funding available should be allocated to operating, maintaining, and improving the highway-funded transportation system. In addition to road projects, this may include bicycle, pedestrian, transportation alternatives, congestion mitigation and air quality, intelligent transportation systems, or any other program for which federal highway funding is expected to be used.

The FAST Act is not the sole source of funding for transportation projects in the Commonwealth. State funds are also a key component in the financing mix for highway projects. State funds are used to “match” federal dollars to pay for the state share of federally aided projects, to undertake other projects not eligible for federal funding, and to assist cities and towns in maintaining and improving local roadways (Chapter 90 funding). Beginning in 2025 and thereafter, Chapter 90 funding is adjusted at a rate of 1.5% per year.

Local funding has historically been used to help design and engineer highway projects. Many of these costs are reimbursable to the communities with Chapter 90 funds once the project has received final state and federal clearances.

Projected Expenses

The Old Colony region’s transportation system is an essential asset that contributes greatly to the economic well-being of the region as well as to the quality of life for the region’s residents. Updating and modernizing the system and conserving and enhancing existing highway capacity by utilizing resources in the most efficient and effective manner as possible requires a comprehensive approach in identifying specific improvement projects and strategies. The funding available has been allocated to operating, maintaining, and improving the highway, bridge transportation system. The following recommendations address the regions’ needs based on the planning process and continued cooperation on a regional basis including member communities, transportation agencies, and state agencies.

Old Colony’s strategies and projects, as well as its transportation review (MEPA) process, support and advance MassDOT policies and goals as outlined in its statutes, directives, guidelines, and standards. It is the intent of this plan to see that projects are developed and implemented in an equitable and timely manner based upon need, financial constraint, and in conformance with the MassDOT design standards, practices, and directives, as well as with local master plans, comprehensive plans, and consensus based on Old Colony’s public outreach program.

The Universe of Projects outlined in the Appendix was developed as a result of the planning process based on the continued cooperation between Old Colony, the general public, member communities, transportation agencies, and state agencies. At its core, it represents the collaborative effort to develop the needs of the Old Colony region.

Tables 9-3 and 9-4 list projects derived from the Universe of Projects that are recommended for implementation in the next ten years. Selection of these projects was based on the FFY 2020-2024 Old Colony Transportation Improvement Program, current design status, and demonstrated community support. Additionally, the result of these projects will help the Region achieve its goals, objectives, and performance targets. Funding for these projects is provided by the Regional Discretionary Funding Category.

Table 9-3: Recommended Projects FFY 2020-2024

FFY	PROJECT ID#	PROJECT DESCRIPTION	Cost Estimate
2020	608088	BROCKTON - CORRIDOR IMPROVEMENTS ON ROUTE 123 (BELMONT STREET), FROM ANGUS BEATON DRIVE TO WEST STREET	\$7,350,265
2020	608266	PEMBROKE- RESURFACING AND RELATED WORK ON ROUTE 53	\$2,725,075
2020	608820	BRIDGEWATER - BROCKTON - PAVEMENT PRESERVATION AND RELATED WORK ON ROUTE 24	\$17,851,040
2021	607217	EASTON - ROUTE 123 (DEPOT STREET) RECONSTRUCTION FROM NEWELL CIRCLE TO ROUTE 138 (old price was 7743189)	\$10,066,911
2021	608086	AVON - INTERSECTION IMPROVEMENTS AT HARRISON BOULEVARD AND POND STREET	\$3,521,954
2021	608496	AVON - STOUGHTON - PAVEMENT PRESERVATION AND RELATED WORK ON ROUTE 24	\$6,312,800
2021	608829	STOUGHTON - IMPROVEMENTS AT WILKINS ELEMENTARY SCHOOL (SRTS)	\$2,982,944
2022	606143	BROCKTON - INTERSECTION IMPROVEMENTS @ CRESCENT STREET (ROUTE 27)/ QUINCY STREET/ MASSASOIT BOULEVARD	\$5,520,744
2022	608279	STOUGHTON - INTERSECTION IMPROVEMENTS AND RELATED WORK AT CENTRAL STREET, CANTON STREET AND TOSCA DRIVE	\$3,347,449
2023	609052	BROCKTON - ROUTE 123 (CENTRE STREET) AT PLYMOUTH STREET SIGNALIZATION AND GEOMETRIC IMPROVEMENTS	\$1,680,000
2023	600380	PEMBROKE - REHABILITATION OF ROUTE 36 (CENTER STREET) FROM ROUTE 27 TO ROUTE 14	\$8,902,501
2024	607403	STOUGHTON - CORRIDOR IMPROVEMENTS ON ROUTE 138	\$9,155,544
2024	609435	PLYMPTON-BRIDGE REPLACEMENT, WINNETUXET ROAD OVER WINNETUXET RIVER	\$2,223,024
TOTAL PROGRAMMED IN YEAR OF EXPENDITURE DOLLARS (ESTIMATED):			\$81,640,251
TOTAL REGIONAL FUNDING AVAILABLE (INCLUDES \$35 M IN PROJECT SPECIFIC STATEWIDE FUNDING):			\$107,754,099

Table 9-4: Recommended Projects FFY 2025-2029

FFY	PROJECT ID#	PROJECT DESCRIPTION	COST ESTIMATE
2025-2029	609440	ABINGTON - HANCOCK STREET AT CHESTNUT STREET SIGNALIZATION AND GEOMETRIC IMPROVEMENTS	\$3,500,280
2025-2029	PRE - PRC	BROCKTON - DOWNTOWN BROCKTON TWO-WAY TRAFFIC CIRCULATION	\$35,000,000
2025-2029	PRE - PRC	BROCKTON - FOREST AVENUE CORRIDOR (MAIN STREET TO BELMONT STREET)	\$11,200,000
2025-2029	607818	BROCKTON - IMPROVEMENTS AND RELATED WORK ON CRESCENT STREET (ROUTE 27), INCLUDING REPLACEMENT OF GROVE STREET BRIDGE, B-25-005, OVER SALISBURY PLAIN RIVER	\$7,098,728
2025-2029	609410	BROCKTON- INTERSECTION IMPROVEMENTS AND RELATED WORK AT CENTRE STREET (ROUTE 123), CARY STREET AND LYMAN STREET	\$3,528,000
2025-2029	606002	DUXBURY - SIGNAL INSTALLATION @ ROUTE 3 (NB & SB) RAMPS & ROUTE 3A (TREMONT STREET)	\$3,360,000
2025-2029	608195	EASTON - CORRIDOR IMPROVEMENTS ON ROUTE 138 INCLUDING INTERSECTION IMPROVEMENTS AT ROUTE 138 (WASHINGTON STREET) AND ELM STREET	\$7,193,085
2025-2029	608585	EASTON - RESURFACING AND RELATED WORK ON ROUTE 138 (ROOSEVELT CIRCLE TO STOUGHTON TOWN LINE (EXCLUDING THE SECTION FROM ELM STREET TO UNION STREET))	\$6,125,000
2025-2029	604098	EASTON - ROUTE 138 & TURNPIKE STREET INTERSECTION SIGNALIZATION AND GEOMETRIC IMPROVEMENTS	\$2,016,000
2025-2029	607715	HANOVER - RESURFACING & RELATED WORK ROUTE 53	\$2,450,000
2025-2029	608506	HANSON - CORRIDOR IMPROVEMENTS ON ROUTE 14 (MAQUAN STREET), FROM THE PEMBROKE T.L. TO INDIAN HEAD STREET AND RELATED WORK	\$8,680,718
2025-2029	PRE - PRC	PLYMOUTH - WATER STREET RECONSTRUCTION (SOUTH PARK AVENUE TO WINSLOW STREET)	\$2,840,000
2025-2029	PRE - PRC	PLYMOUTH - CARVER ROAD AT MONTGOMERY DRIVE SIGNALIZATION AND GEOMETRIC IMPROVEMENTS	\$1,500,000
2025-2029	PRE - PRC	STOUGHTON - CANTON STREET (ROUTE 27) & SCHOOL STREET SIGNALIZATION AND GEOMETRIC IMPROVEMENTS	\$2,100,000
2025-2029	607214	STOUGHTON - RECONSTRUCTION OF TURNPIKE STREET	\$17,530,800
TOTAL PROGRAMMED IN YEAR OF EXPENDITURE DOLLARS (ESTIMATED):			\$114,122,611
TOTAL REGIONAL FUNDING TARGET (FORECAST):			\$122,381,541

Beyond 2029, the available Regional Discretionary Funding shall continue to be towards operating, maintaining, and improving the highway, bridge transportation.

Table 9-5: 2020-2040 Operations and Maintenance, and Major Infrastructure Projects

	2020 to 2024	2025 to 2029	2030 to 2034	2035 to 2039	2040	TOTAL
Interstate MassDOT Pavement	\$ 489,885	\$ 618,593	\$ 759,552	\$ 841,850	\$ 179,060	\$ 2,888,940
Non-Interstate MassDOT Pavement	\$ 21,524,079	\$ 25,621,853	\$ 31,460,316	\$ 34,869,066	\$ 7,416,582	\$ 120,891,896
Statewide Bridge	\$ 30,706,903	\$ 34,931,389	\$ 42,891,221	\$ 47,538,518	\$ 10,111,350	\$ 166,179,380
Other (Remaining) Statewide Programs	\$ 51,176,632	\$ 57,514,877	\$ 70,620,819	\$ 78,272,639	\$ 16,648,438	\$ 274,233,405
Non-Federal Aid (NFA) Bridge Preservation	\$ 22,797,500	\$ 23,299,045	\$ 23,811,624	\$ 24,335,480	\$ 4,974,172	\$ 99,217,821
Regional Discretionary Funding						
Recon/Resurf/Rehab (Fed-Aid Roads)	\$ 35,000,000	\$ 40,250,000	\$ 49,507,500	\$ 54,953,325	\$ 11,540,198	\$ 191,251,023
Intersection Improvements/Safety	\$ 8,000,000	\$ 9,200,000	\$ 11,316,000	\$ 12,560,760	\$ 2,837,760	\$ 43,914,520
Traffic Flow and Mobility Improvements	\$ 8,500,000	\$ 9,775,000	\$ 12,023,250	\$ 13,345,808	\$ 2,840,798	\$ 46,484,855
Infrastructure (Signage, Guardrails, Etc.)	\$ 2,000,000	\$ 2,300,000	\$ 2,829,000	\$ 3,140,190	\$ 659,440	\$ 10,928,630
Transportation Alternatives Program Projects (Bicycle and Pedestrian)	\$ 3,077,467	\$ 3,341,664	\$ 3,972,111	\$ 4,277,686	\$ 898,314	\$ 15,567,242
Ongoing Recon/Resurf/Rehab (Local Roads) Chapter 90	\$ 50,728,920	\$ 53,057,894	\$ 57,158,421	\$ 61,575,852	\$ 12,874,853	\$ 235,395,940
Total Project Expenses	\$ 234,001,386	\$ 259,910,315	\$ 306,349,813	\$ 335,711,173	\$ 70,980,965	\$ 1,206,953,652
Total Available Capital Funding	\$ 234,001,386	\$ 259,910,315	\$ 306,349,813	\$ 335,711,173	\$ 70,980,964	\$ 1,206,953,652

Regionally Significant Illustrative Highway Projects

Located in Table 9-6, and as identified in Chapter 4 - The Regional Highway System, regionally significant highway projects have been identified that would, if implemented, expand and complement the existing transportation network. Currently, funding for these projects is not included in the financial plan. Nevertheless, these are recommended for further study.

Table 9-6 Regionally Significant Illustrative Highway Projects

Project	Cost Estimate
Bridgewater - Route 24 Northbound On Ramp From Route 104 Westbound	\$7,500,000
Plymouth - Route 3 Exit 2 Herring Pond Road Capacity Enhancement, Signalization, and Geometric Improvements	\$10,000,000
Plymouth - State Road (Route 3A) at Herring Pond Road Signalization and Geometric Improvements	\$3,000,000
Plymouth - State Road (Route 3A) Corridor Improvements Fire Station to Herring Pond Road)	\$3,500,000
Plymouth - Route 3 Exit 5 Interchange Improvements and Long Pond Road Bridge Capacity Enhancement	\$30,000,000
Plymouth - Route 3 Northbound Exit 4 Off-ramp to Plimouth Plantation Highway	\$7,500,000
Plymouth - Route 3 Exit 3 Full Interchange	\$30,000,000
Plymouth - Route 25 Interchange at Bourne Road	\$25,000,000
Plymouth - Carver Road Corridor Improvements (Summer Street to Town Line)	\$20,835,000
Plymouth - Federal Furnace Road Corridor Improvements (Summer Street to Town Line)	\$23,025,000
Plymouth - South Meadow Road Corridor Improvements Federal Furnace Road to Town Line)	\$13,203,000
West Bridgewater - Route 106 Capacity Enhancement (Route 24 to Route 28)	\$15,000,000
Region - Route 3 Capacity Enhancement from Route 18 (Weymouth) to Long Pond Road (Plymouth)	To be determined
Region - Route 24 Capacity Enhancement and Upgrade to Interstate Standards	To be determined

TRANSIT FUNDED PROJECTS AND INITIATIVES

Projected Revenue

Transit operations and capital projects are typically financed with a combination of federal, state, and local funds.

Federal

Brockton Area Transit Authority (BAT) receives the vast majority of its federal capital and operating assistance through the 49 U.S.C Section 5307 funding program. These formula grants are distributed annually on a percentage basis. In addition to funds from 49 Section 5307 of the United States Code. Estimated Federal funding for transit is outlined on Table 9-7.

State

The Commonwealth provides the Brockton Area Transit Authority (BAT) with financial assistance (through transportation bond issues and annual appropriations).

Annually, under the Community Transit Grant / Mobility Assistance Program (MAP), BAT typically requests 5-7 accessible mini-buses and vans each year, as part of their state of good repair and system preservation program.

Local

Communities within the Brockton Area Transit Authority (BAT) service area are assessed annually for transportation services.

Direct Income

Farebox revenues generate direct income. The MassDOT developed revenue estimates for the 20 years of the Long Range Transportation Plan. To supplement these estimates, reasonable estimates of farebox, revenue, State Contract Assistance, and Community Transit Grant Program were added to the Massachusetts Department of Transportation revenue forecasts.

Table 9-7 provides a listing of the estimated available transit funding through the year 2040.

Table 9-7: 2020-2040 Estimated Transit Funding

	2020 to 2024	2025 to 2029	2030 to 2034	2035 to 2039	2040	Total
49 U.S.C. Section 5307	\$ 16,856,133	\$ 18,683,631	\$ 20,709,259	\$ 22,954,501	\$ 4,881,303	\$ 84,084,827
State Contract Assistance	\$ 37,057,680	\$ 39,921,646	\$ 43,006,950	\$ 46,330,700	\$ 9,687,255	\$ 176,004,230
Local Assessment	\$ 16,093,482	\$ 17,337,251	\$ 18,677,143	\$ 20,120,587	\$ 4,207,000	\$ 76,435,462
Farebox Revenue	\$ 15,276,471	\$ 16,457,098	\$ 17,728,969	\$ 19,099,134	\$ 3,993,425	\$ 72,555,098
Statewide Programs for all Eligible Participants						
Community Transit Grant Program (Estimated AAA, BAT, and SSCAC Portion)	\$ 6,262,065	\$ 6,746,023	\$ 7,267,382	\$ 7,829,035	\$ 1,636,968	\$ 29,741,473
	\$ 91,545,831	\$ 99,145,648	\$ 107,389,703	\$ 116,333,957	\$ 24,405,950	\$ 438,821,090

The estimates from the MassDOT are based on the following assumptions: Federal Program increases 2.08% each year from current levels to adjust for inflation. State Contract Assistance, local assessment, and farebox revenue, annual increases of 1.5% from current levels were utilized to adjust for inflation.

Projected Expenses

The funding available has been allocated to operating, maintaining, and improving the transit transportation system.

Table 9-8: 2020-2040 Transit Operations and Capital Projects

	2020 to 2024	2025 to 2029	2030 to 2034	2035 to 2039	2040	Total
49 U.S.C. Section 5307	\$ 16,856,133	\$ 18,683,631	\$ 20,709,259	\$ 22,954,501	\$ 4,881,303	\$ 84,084,827
State Contract Operating Assistance	\$ 37,057,680	\$ 39,921,646	\$ 43,006,950	\$ 46,330,700	\$ 9,687,255	\$ 176,004,230
BAT Fixed Route Bus Replacement, Hybrid Replacements, Technologies, AVL, Farebox	\$ 12,812,800	\$ 14,091,926	\$ 19,162,039	\$ 25,767,608	\$ -	\$ 71,834,373
BAT Intermodal Transportation Centre Improvements	\$ 500,000	\$ 1,000,000	\$ 1,250,000	\$ 1,500,000	\$ 2,150,000	\$ 6,400,000
BAT Ongoing Paratransit Bus Replacement	\$ 3,109,600	\$ 3,367,556	\$ 5,853,066	\$ 4,415,113	\$ 2,666,159	\$ 19,411,494
SSAC Ongoing Vehicle Replacement	\$ 2,230,800	\$ 3,175,124	\$ 3,863,024	\$ 4,699,959	\$ 1,184,959	\$ 15,153,866
Total Operating and Project Expenses	\$ 72,567,013	\$ 80,239,882	\$ 93,844,338	\$ 105,667,881	\$ 20,569,676	\$ 372,888,790
Total Available Operating and Capital Funding	\$ 91,545,831	\$ 99,145,648	\$ 107,389,703	\$ 116,333,957	\$ 24,405,950	\$ 438,821,090

Regionally Significant Illustrative Transit Projects

Located in Table 9-9 regionally significant transit projects have been identified that would, if implemented, expand and complement the existing transportation network. Currently, funding for the South Coast Rail Project Phase 1 is not included in the Old Colony LRTP financial plan as it is being funded through the MassDOT Capital Investment Plan. The South Coast Rail Project Phase 2 cost estimate is to be determined.

Table 9-9: Regionally Significant Illustrative Transit Projects

Region - South Coast Rail Project Phase 1	\$1.047 billion
Region - South Coast Rail Project Phase 2	TBD

FISCAL CONSTRAINT ANALYSIS

Roadway, bridge operations and maintenance, as well as capital improvements, outlined in the Long Range Transportation Plan, are estimated to cost approximately \$1.2 billion dollars as shown in Table 9-5 for the 20-year period (2020 to 2040). Additionally, transit operations and maintenance, as well as capital improvements, outlined in the Long Range Transportation Plan, are estimated to cost approximately \$439 million dollars as shown in Table 9-8 for the 20-year period (2020 to 2040). In order to have a financially constrained plan, resources of an equal amount must be identified.

The funding available has essentially allocated to operating, maintaining, and modernizing the highway, bridge and transit transportation system. Large scale capacity enhancement projects are not included for funding with the financial plan of this Long Range Transportation Plan.

The financial capacity from federal, state, and local sources has been examined by comparing projected revenues to transportation needs as outlined in Tables 9-5 and 9-8. As a result, the Old Colony MPO concludes that the 2020 Long Range Transportation Plan is financially constrained according to the definition in the Federal Register 23 CFR Part 450.

It is noted that the Regionally Significant Illustrative Projects listed in Table 9-6 and 9-9 are identified as capacity enhancement and mobility needs of the region and are recommended for study and specific funding is not programmed in the 2020 Long Range Transportation Plan.

CONCLUSIONS AND RECOMMENDATIONS

Provide funding to preserve, operate, and maintain transportation assets for current and future generations.

Invest in infrastructure to meet performance measures and targets for PM1 - Safety, PM2 - NHS Bridge and Pavement, PM3 - System Reliability, and Transit Asset Management

Adequately maintain and preserve all elements of the transportation system in a state of good repair to protect the public's mobility, safety, and security.

Increase the efficiency and reliability of the transportation system using appropriate methods and technologies.

Invest and provide comparable transportation access and service quality across the region regardless of income level or minority population.

Provide adequate funding to ensure that the transportation system and its users are safe and secure.

Support the increase of the annual Chapter 90 statewide total amount to at least \$300 million.

Assist communities in preparing and updating their road inventories to ensure that they reflect accurate mileage amounts for publicly accepted roads.

Continue to review, develop, and analyze supplemental funding resources. Such resources could include increased user fees, transit mitigation banks, and concurrency management systems. Concurrency is the growth management concept intended to ensure that the necessary public facilities are available concurrent with the impacts of development.

Implement fare and revenue policies that increase with inflation.

Establish and dedicate transit funding from sources that increase with inflation.

Support congestion improvements and the reward for regional approaches to coordinating and interconnecting signalized intersections and corridors.

Support and enhance asset management capabilities to perform the appropriate type of improvement at the right time.

Support the establishment of a RTA service fund to restore and enhance service.

Chapter 10 – Concussion, Potential Planning Scenarios, and Recommendations

This Long Range Transportation Plan has documented that the region will face challenges as it grows and develops over the next twenty-five years. Infrastructure preservation, maintenance, safety, security, and reliability needs of the transportation network continue to strain resources and available funding sources. It is crucial that all agencies and organizations responsible for overseeing the transportation network anticipate these challenges and plan for them accordingly.

This chapter contains recommended strategies, actions, programs, and projects will guide regional planners in planning for the transportation needs of residents, commerce, industry, government, and services over the next twenty-five years.

PLANNING SCENARIOS

Several factors will determine how transportation planning efforts and transportation investment is guided as we move through 2040. Historically, the gap between regional transportation needs and available financial resources has continued to widen. The future of transportation finance will have a major influence on how transportation resources are allocated.

While transportation finance is a primary factor in determine how investments are directed, socioeconomic and demographic factors will also determine the future of transportation planning. For instance, as the population gets older, there will be a growing need for paratransit, ride hailing, and human services transportation to ensure the population has daily access to essential life services. The mores and desired needs of younger generations will also guide future planning and policy. Will younger generations continue to purchase fewer automobiles and single-family homes than their parents and grandparents did? How will the advent of autonomous vehicles affect our communities?

Four potential planning scenarios have been identified, and these scenarios will play a role in how projects and strategies from this LRTP are implemented. It should be noted that these scenarios are not necessarily an “all or nothing” scenario, but rather may be a mix of priorities from two of more scenarios.

Table 10-1: Potential Future Planning Scenarios

Scenario	Theme	Overview	Roadway Capacity	Creative Road Improvements	Transit	Bike/Pedestrian Improvements
1	High Levels of Investment All Modes	High levels of roadway investments; Considerable transit investment; Major implementation of bicycle and pedestrian plan improvements	Full needs met	Travel demand management; Improved traffic signals and intersections	Significant Investment	Major Implementation of Bicycle and Pedestrian Plan
2	Arterial Focused	Focusses on Arterial Level of Service and Improving Existing Transit Level of Service	Focus on major arterials	Improved traffic signals and intersections	Low Levels of investment	Significant Implementation of Bicycle and Pedestrian Plan
3	Focus on Transit and Alternative Systems	Limited freeway and arterial investments; Focus on creative improvements for roadways; Expanded transit and alternative modes	Limited	Travel demand management; Improved traffic signals and intersections	High Levels of Investment	Significant Implementation of Bicycle and Pedestrian Plan
4	Limited Levels of Investment	Limited investment across all modes; focus on system preservation	Limited	None	Low Levels of investment	Highest priority bicycle and pedestrian projects considered

RECOMMENDED HIGHWAY PROJECTS FFY 2020 – FFY 20204

The following projects in Table 10-2 are recommended for programming in the Old Colony Transportation Improvement Program (TIP) for Federal Fiscal Years 2020 through 2024.

Table 10-2: Recommended Highway Projects FFY 2020 – FFY 2024

<u>FFY</u>	<u>PROJECT ID#</u>	<u>PROJECT DESCRIPTION</u>	<u>Cost Estimate</u>
2020	608088	BROCKTON - CORRIDOR IMPROVEMENTS ON ROUTE 123 (BELMONT STREET), FROM ANGUS BEATON DRIVE TO WEST STREET	\$7,350,265
2020	608266	PEMBROKE- RESURFACING AND RELATED WORK ON ROUTE 53	\$2,725,075
2020	608820	BRIDGEWATER - BROCKTON - PAVEMENT PRESERVATION AND RELATED WORK ON ROUTE 24	\$17,851,040
2021	607217	EASTON - ROUTE 123 (DEPOT STREET) RECONSTRUCTION FROM NEWELL CIRCLE TO ROUTE 138 (old price was 7743189)	\$10,066,911
2021	608086	AVON - INTERSECTION IMPROVEMENTS AT HARRISON BOULEVARD AND POND STREET	\$3,521,954
2021	608496	AVON - STOUGHTON - PAVEMENT PRESERVATION AND RELATED WORK ON ROUTE 24	\$6,312,800
2021	608829	STOUGHTON - IMPROVEMENTS AT WILKINS ELEMENTARY SCHOOL (SRTS)	\$2,982,944
2022	606143	BROCKTON - INTERSECTION IMPROVEMENTS @ CRESCENT STREET (ROUTE 27)/ QUINCY STREET/ MASSASOIT BOULEVARD	\$5,520,744
2022	608279	STOUGHTON - INTERSECTION IMPROVEMENTS AND RELATED WORK AT CENTRAL STREET, CANTON STREET AND TOSCA DRIVE	\$3,347,449
2023	609052	BROCKTON - ROUTE 123 (CENTRE STREET) AT PLYMOUTH STREET SIGNALIZATION AND GEOMETRIC IMPROVEMENTS	\$1,680,000
2023	600380	PEMBROKE - REHABILITATION OF ROUTE 36 (CENTER STREET) FROM ROUTE 27 TO ROUTE 14	\$8,902,501
2024	607403	STOUGHTON - CORRIDOR IMPROVEMENTS ON ROUTE 138	\$9,155,544
2024	609435	PLYMPTON-BRIDGE REPLACEMENT, WINNETUXET ROAD OVER WINNETUXET RIVER	\$2,223,024
TOTAL PROGRAMMED IN YEAR OF EXPENDITURE DOLLARS (ESTIMATED):			\$81,640,251
TOTAL REGIONAL FUNDING AVAILABLE (INCLUDES \$35 M IN PROJECT SPECIFIC STATEWIDE FUNDING):			\$107,754,099

RECOMMENDED HGIHWAY PROJECTS FFY 2025-2029

The following projects in Table 10-3 are recommended for programming in the Old Colony Transportation Improvement Program (TIP) for Federal Fiscal Years 2025 through 2029.

Table 10-3: Recommended Highway Projects FFY 2025 – FFY 2029

FFY	PROJECT ID#	PROJECT DESCRIPTION	COST ESTIMATE
2025-2029	609440	ABINGTON - HANCOCK STREET AT CHESTNUT STREET SIGNALIZATION AND GEOMETRIC IMPROVEMENTS	\$3,500,280
2025-2029	PRE - PRC	BROCKTON - DOWNTOWN BROCKTON TWO-WAY TRAFFIC CIRCULATION	\$35,000,000
2025-2029	PRE - PRC	BROCKTON - FOREST AVENUE CORRIDOR (MAIN STREET TO BELMONT STREET)	\$11,200,000
2025-2029	607818	BROCKTON - IMPROVEMENTS AND RELATED WORK ON CRESCENT STREET (ROUTE 27), INCLUDING REPLACEMENT OF GROVE STREET BRIDGE, B-25-005, OVER SALISBURY PLAIN RIVER	\$7,098,728
2025-2029	609410	BROCKTON- INTERSECTION IMPROVEMENTS AND RELATED WORK AT CENTRE STREET (ROUTE 123), CARY STREET AND LYMAN STREET	\$3,528,000
2025-2029	606002	DUXBURY - SIGNAL INSTALLATION @ ROUTE 3 (NB & SB) RAMPS & ROUTE 3A (TREMONT STREET)	\$3,360,000
2025-2029	608195	EASTON - CORRIDOR IMPROVEMENTS ON ROUTE 138 INCLUDING INTERSECTION IMPROVEMENTS AT ROUTE 138 (WASHINGTON STREET) AND ELM STREET	\$7,193,085
2025-2029	608585	EASTON - RESURFACING AND RELATED WORK ON ROUTE 138 (ROOSEVELT CIRCLE TO STOUGHTON TOWN LINE (EXCLUDING THE SECTION FROM ELM STREET TO UNION STREET))	\$6,125,000
2025-2029	604098	EASTON - ROUTE 138 & TURNPIKE STREET INTERSECTION SIGNALIZATION AND GEOMETRIC IMPROVEMENTS	\$2,016,000
2025-2029	607715	HANOVER - RESURFACING & RELATED WORK ROUTE 53	\$2,450,000
2025-2029	608506	HANSON - CORRIDOR IMPROVEMENTS ON ROUTE 14 (MAQUAN STREET), FROM THE PEMBROKE T.L. TO INDIAN HEAD STREET AND RELATED WORK	\$8,680,718
2025-2029	PRE - PRC	PLYMOUTH - WATER STREET RECONSTRUCTION (SOUTH PARK AVENUE TO ROUTE 3A)	\$8,400,000
2025-2029	PRE - PRC	STOUGHTON - CANTON STREET (ROUTE 27) & SCHOOL STREET SIGNALIZATION AND GEOMETRIC IMPROVEMENTS	\$2,100,000
2025-2029	607214	STOUGHTON - RECONSTRUCTION OF TURNPIKE STREET	\$17,530,800
TOTAL PROGRAMMED IN YEAR OF EXPENDITURE DOLLARS (ESTIMATED):			\$118,182,611
TOTAL REGIONAL FUNDING TARGET (FORECAST):			\$122,381,541

IDENTIFIED REGIONAL HIGHWAY NEEDS (ILLUSTRATIVE ONLY)

The projects listed in Table 10-4 are projects that have been identified as regional highway needs for regional mobility and economic vitality. However, these projects are conceptual only in scope, and do not have identified funding associated with them and are therefore included in this Long Range Transportation Plan as informative and illustrative only at this point.

Table 10-4: Identified Regional Highway Needs

Project	Cost Estimate
Bridgewater - Route 24 Northbound On Ramp From Route 104 Westbound	\$7,500,000
Plymouth - Route 3/ Route 3A Exit 2 State Road and Herring Pond Road and Hedges Pond Road Capacity Enhancement, Signalization, and Geometric Improvements	\$10,000,000
Plymouth - Route 3 Exit 5 Interchange Improvements and Long Pond Road Bridge Capacity Enhancement	\$30,000,000
Plymouth - Route 3 Northbound Exit 4 Off-ramp to Plimouth Plantation Highway	\$7,500,000
Plymouth - Route 3 Exit 3 Full Interchange	\$30,000,000
Plymouth - Route 25 Interchange at Bourne Road	\$25,000,000
West Bridgewater - Route 106 Capacity Enhancement (Route 24 to Route 28)	\$15,000,000
Region - Route 3 Capacity Enhancement from Route 18 (Weymouth) to Long Pond Road (Plymouth)	To be determined
Region - Route 24 Capacity Enhancement and Upgrade to Interstate Standards	To be determined

IDENTIFIED REGIONAL TRANSIT NEEDS (ILLUSTRATIVE ONLY)

The projects listed in Table 10-5 are projects that have been identified as regional transit needs for regional mobility and economic vitality.

Table 10-5: Identified Regional Highway Needs

Region - South Coast Rail Project Phase 1	\$1.047 billion
Region - South Coast Rail Project Phase 2	TBD

REGIONAL PROFILE AND IVABILITY RECOMMENDATIONS

Support “Complete Streets” Design In All Roadway Projects: Complete Streets are roadways that are designed to support safe, attractive, and comfortable access to all users, including motorists, pedestrians, bicyclists, and transit users. In addition to enhancing safety and mobility, “Complete Street” designed roadways often enhance the surrounding community and environment through traffic calming techniques and vegetated streetscapes. Complete Streets are categorized by wide paved shoulders or separate bicycling lanes; sidewalks separated from the roadway by raised curbing and/or vegetation; well-placed and well-designed crosswalks; raised medians providing crossing refuge; and bulb-outs at intersections to prevent high-speed turning vehicles and shorten crossing distance for pedestrians.

Support the expansion and enhancement of passenger rail service in the region and improved connections to other regions: Having multiple transportation alternatives is a major aspect of livability. Developing policies that ensure equitable distribution of burdens and support multi-modalism in compact development is a way to develop self-sustainable communities. It is vital that citizens, as well as engineers, developers, planners and policy makers, understand the role that land-use/transportation planning and day-to-day development decisions have on building quality communities and ensuring equity at the same time.

Support transportation projects that facilitate access to employment and shopping centers, health care, and educational facilities: These projects may include increasing capacity or resurfacing roads, improving safety and traffic flow at intersections, purchasing new vehicles and expanding service by the region's transit authorities, improving bicycle and pedestrian facilities, and enhancing train stations and intermodal facilities.

Support the Commonwealth's Sustainable Development Principles: The State has developed these principles to concentrate development and mix uses, advance equity, make efficient decisions, protect land and ecosystems, use natural resources wisely, expand housing opportunities, provide transportation choice, increase job and business opportunities, promote clean energy, and plan regionally.

Use traffic calming techniques to protect neighborhoods in mixed use areas: Implementing traffic calming techniques will provide a safer travel environment for all users. Some traffic calming techniques include roundabouts, traffic circles, raised medians, road humps, speed tables, and rumble strips. The narrowing of lanes and the widening of sidewalks is another traffic calming technique that eases crossing for pedestrian and gives them more space to walk.

Support MassDOT's Healthy Active Transportation Policy Directive: The Healthy Transportation Policy Directive was issued to ensure all MassDOT projects are designed and implemented in a way that all customers have access to safe and comfortable healthy transportation options at all MassDOT facilities and in all the services MassDOT provides. Healthy transportation modes as defined as walking, bicycling and taking transit.

Continue to screen all projects for benefits and burdens analysis as it pertains to minority populations and low-income populations. All Old Colony MPO programs and activities, along with transportation projects funded through the Transportation Improvement Program (TIP), will continue to undergo thorough and comprehensive screening to determine benefits and burdens to minority populations and low-income populations. Efforts will be made to target investments that benefit areas with low-income and/or minority populations, ensuring these populations have access to essential life services, and avoiding or mitigating disproportionately high and adverse human health and environmental effects, including social and economic effects on these populations.

Eliminate barriers to participation in the decision making process. The Old Colony Metropolitan Planning Organization will continue to take steps to eliminate barriers to

participation in the transportation planning and decision making process. These efforts will include providing upon request translation services to those with limited English proficiency, hearing assistance devices, and large font and translation services for all print materials.

Support livability and sustainable development initiatives and planning policy that enable the population to choose alternatives to personal, single occupant vehicles for daily trips and subsequently aid in achieving mode shift goals. Comprehensive regional planning and transportation planning activities through the Old Colony Metropolitan Planning Organization will continue to incorporate principles that encourage livability and sustainable development, such as those listed in the Commonwealth's 10 Sustainable Development Principles. Future new development and redevelopment of existing facilities must be conducted in a responsible manner that fosters improved connections and a reduction on reliance of the personal automobile for daily trips.

Enhance planning efforts to plan for the transportation needs of an aging population. Transportation planning activities will incorporate the needs of elderly and disabled populations, including ensuring access to essential life services. Efforts will be made to increase and improve coordination between transportation planners and agencies reserving and representing the needs of the elderly and disabled.

Foster Healthy Communities and Neighborhoods By Supporting The Healthy Transportation Compact (HTC). Healthy communities and neighborhoods can be achieved through supporting these State initiatives on the local level within the region.

Increase transit accessibility to underserved, employment centers. Efforts will be made that may enable extending fixed-route and demand response transit service to employment centers such as industrial parks and major commercial developments. Existing industrial areas and other employment centers whose locations and configuration allow the feasibility for expanded transit options will be encouraged as locations for future development and redevelopment.

Support a Vibrant Downtown Plymouth and Waterfront Area, Including an Intermodal Transportation Center: Support increased commuter rail service to the Plymouth Station at Cordage Park, and connections between the station and the Waterfront/Downtown Area including enhanced pedestrian and bicycle connections featuring extension of the Plymouth Seaside Trail, in addition to supporting existing transit connections between Cordage Park and the Waterfront. An intermodal transportation hub located within the Waterfront/Downtown area could greatly improve mobility and accessibility in the area, as well as support surrounding economic development.

Collaboratively Develop the Needs of the Old Colony Region

In order to develop a comprehensive needs assessment for the region, all stakeholders must have an active role in the discussion. Ultimately, those identified needs evolve into projects which are meant to improve particular issues. Project need and the scope of a project are developed through the 3C's Process, (Continuing, Comprehensive, and Cooperative), led by the Old Colony Joint Transportation Committee, with oversight from the Old Colony Metropolitan Planning Organization (MPO).

Old Colony's development of strategies and projects, as well as its transportation review (MEPA) process, supports and advances MassDOT policies and goals as outlined in its statutes, directives, guidelines, and standards. It is the intent of this plan to see that projects are developed and implemented in an equitable and timely manner based upon need, financial constraint, and in conformance with the MassDOT design standards, practices, and directives, as well as with local master plans, comprehensive plans, and consensus based on Old Colony's public outreach program.

The Universe of Projects outlined in the Appendix was developed as a result of the planning process based on the continued cooperation between Old Colony, the general public, member communities, transportation agencies, and state agencies. At its core, it represents the collaborative effort to develop the needs of the Old Colony region.

Coordinate Transportation and Land Use

The commercial and retail centers that have proliferated along important arterials and collectors are generally auto dependent, mainly single-use zoned, extensive (spread out over large areas), and not conducive or safe for bicycle or pedestrian travel. This "Sprawl" development along corridors has resulted in impacts such as higher vehicle emissions, more traffic congestion, and higher per-person infrastructure costs, less space for conservation and parks, and inefficient street access. In addition, a lack of control, placement, spacing, and width of curb cuts that provide access to adjacent properties has become prevalent throughout most of the arterial corridors within the Old Colony region.

Coordinating transportation and land use prevents highways from becoming unattractive, dysfunctional commercial strips. Highway corridor plans should be coordinated with local master plans and comprehensive plans that support strategies that emphasize density, a diversity of land uses, a variety of mode choice (transit, bicycle, walking), and design standards.

The integration of transportation and land use planning includes:

- Encouraging the redevelopment of traditional town centers by utilizing mixed-use zoning and creating streets that are safe and compatible with pedestrian and bicycle use

- Encouraging development design in corridors that strengthens the physical character of the community and supports the value of properties and the quality of developments
- Setting basic requirements for site design for, building design, landscaping, and signage
- Permitting safe and convenient access and on-site circulation for motorized vehicles, non-motorized vehicles, and pedestrians
- Managing the impacts of commercial and industrial development on adjacent residential neighborhoods
- Improving access management; planning the design, location, and operation of driveways, median openings, interchanges, and street connections

Create a Multi-Modal Transportation System

Encourage communities in the Old Colony region to incorporate bicyclists, pedestrians, and transit users in their future plans and/or future designs is a key component in creating a region wide multi-modal system. In addition, encouraging communities to support MassDOT’s Mode Shift goal by improving their inter-modal connections around transit stations and park and ride facilities and supporting land uses that enable walking, bicycling, and transit use (denser development, Complete Streets policies, and Transit Oriented Development, TOD) will foster a more sustainable region.

Improve capacity within the Old Colony region

Improving capacity alone will not solve the congestion issues in the Old Colony region; however, there are certain areas where capacity enhancements are needed in order to provide a more efficient and safer network. Areas in the Old Colony region where capacity enhancements are recommended include, but are not limited to:

- Route 3 (Route 18 to Long Pond Road)
Route 3 provides two lanes in each direction between Route 18 in Weymouth and the Sagamore Flyover. Traffic backups are common heading north during the morning commute and heading south during the afternoon commute due to traffic entering the highway and a lane drop respectively. Vehicles are allowed to travel in the breakdown lane during both commuting periods which provides for additional capacity; however, it also creates conflict points for normal access and egress.
- Route 3 – Exit 5 (Long Pond Road)
The Long Pond Road interchange currently cannot handle the vehicular demand and routine traffic backups exist. The Route 3 southbound off-ramp routinely backs up onto the highway creating hazardous travel conditions and the Route 3 northbound on-ramp does not provide adequate acceleration space for vehicles entering the travel stream. A redesigned interchange is needed at this location.
- Route 24 – Exit 15 (Route 104)
The recent signalization of the Route 104 interchange on/off ramps provided relief for vehicles attempting to travel north on Route 24; however, the current demand for that

movement creates backups that at times interfere with the adjacent traffic signal. A slip ramp from Route 104 to Route 24 is needed at this location.

- **Route 106 Corridor**

A surge in development along the Route 106 corridor in West Bridgewater has created numerous curb cuts which added to the atiquated traffic signals creates a daily bottleneck from Route 24 to Route 28. Capacity enhancements with proper multi-modal accommodations are needed for this location.

Encourage the use of Access Management techniques

Access Management is defined as the planning of the design, location, and operation of driveways, median openings, interchanges, and street connections. Access management provides two important advantages when applied to a roadway corridor: 1.) It minimizes conflicting turning movements in a highway corridor, thereby reducing interruptions in the traffic flow and conserving highway corridor capacity, 2.) The reduction in conflicting turning movements decreases motorists exposure to crashes, thereby increasing safety. Old Colony planning staff shall consider access management in proposed developments that are submitted through the MEPA process.

Incorporate Intelligent Transportation Systems

Intelligent Transportation Systems (ITS) are applications of advanced technology in the field of transportation, with the goals of increasing operation efficiency and capacity, improving safety, reducing environmental costs, and enhancing personal mobility. Successful ITS deployment requires an approach to planning, implementation, and operations that emphasizes collaboration between relevant entities and compatibility of individual systems.

REGIONAL TRANSIT RECOMMENDED PLANNING STRATEGIES

Public Transit Opportunities

Support additional service. BAT recently increased service on certain lines and expanded its hours of operation. BAT should continue to see how it could expand service hours and the number of trips provided, especially on the weekend, which has been requested by their patrons.

Meet operation needs. BAT annually seeks Commonwealth and Federal transportation grants to finance support equipment and operations costs. BAT should continue to seek this method of funding to meet operational and capital replacement needs. BAT should also continue to work closely with the Old Colony Planning Council to seek out and secure additions operation and capital funding to meet growing service demand.

Improve mass transit linkages. Every effort should be made to promote improved linkages between mass transit and other modes of transportation. The Regional Transit Authorities should work closely with the Old Colony Planning Council to study and develop

recommendations to closing the gaps that keep individuals that use both GATRA and BAT from making connections between both systems, especially south to the City of Taunton. Intermodal planning tasks in the Unified Planning Work Program support these planning efforts.

Continue supporting the development of a Plymouth Intermodal Center. GATRA and Plymouth have been in the process of trying to fund the building of an intermodal center that would enhance both commuters and tourist transportation experiences.

Continue commuter rail operations funding. Support the funding of commuter rail operations in the Commonwealth through a statewide funding mechanism.

Encourage increased use and expansion of commuter parking facilities. The MassDOT should continue to promote existing commuter parking facilities and develop additional spaces, where needed, for intermodal uses..

Encourage interagency agreements to enhance passenger service. For example, currently the MBTA 230 bus ends at the Montello Station, but extending that service to the BAT Centre, would enhance passenger connections.

Continue current outreach programs. BAT should continue its outreach program to educate the residents of the region about the transportation services it offers and destinations it serves to spur additional ridership.

Encourage private sector participation in public transit operations. BAT is encouraged to continue joint development initiatives with private sector concerns when feasible.

Expand commuter services by private commuter carriers. In order to better meet mass transit needs in the region, the expansion of commuter services by private carriers is encouraged in areas where there is a demand for such services.

Apply Smart Growth and Complete Streets Principles to development in the region.

Explore feasibility and support new Commuter Rail station between Campello and Bridgewater Stations. A review of land parcels abutting the Middleborough / Lakeville Commuter Rail line suggests there may be sites available for a new Commuter Rail station on the border of West Bridgewater and East Bridgewater, in the area of Route 106. Such a facility would serve the communities of West Brie water and East Bridgewater, and potentially remove or shorten personal vehicle trips along the Routes 106 and Route 28 corridors.

Support coordination between Town of Bridgewater, Bridgewater State University, and MBTA to relocate Bridgewater Commuter Rail Station. A comprehensive planning study completed in 2019 by Old Colony Planning Council through the District Local Technical Assistance Program looked at the feasibility of relocating the Bridgewater Commuter Rail Station. The station is currently located within the campus of

Bridgewater State University, and the study looked at the benefits of relocating the station to the site of the historic Bridgewater on Spring Street, on parcels currently occupied by Bridgewater State University and municipal parking. Relocating this station could foster transit oriented development and boost the local economy in and to the south of Central Square, while continuing to provide transit access to Bridgewater State University.

Air Transportation Opportunities

Increase use of smaller general aviation airports. Municipal Airports in the region, such as the facility in Plymouth, have experienced marked growth in the numbers of take-offs and landings in recent years. Both runways at Plymouth Airport have been expanded in the past and the shorter of the two runways should be increased in length to increase capacity, promote greater safety, and lessen the impact of noise on residents.

Investigate potential of municipal airports' ability to serve as freight terminals. Currently, there is no scheduled freight service at any of the municipal airports throughout Southeastern Massachusetts. A feasibility study should be considered by the Massachusetts Aeronautic Commission to determine whether there is potential for any of the municipal airports to serve as airfreight terminals. Depending upon the type of freight, such a facility could serve intermodal purposes.

Ferry Transportation Opportunities

Seek to establish greater public/private partnerships in ferry operations. The Old Colony Region should work with MassDOT, the Old Colony Planning Council, Municipalities, private ferry operators, and those interested in entering the ferry operation market to form better and more productive ferry service.

Rail Freight Opportunities

Increase the level of freight/goods movement by rail in the Old Colony Region. Support such initiatives, which would serve to reduce truck traffic congestion on local highways and local roads. Consider working jointly with the Southeastern Massachusetts Metropolitan Planning Organization and Boston Central Transportation Planning Staff on a regional freight study.

BICYCLE AND PEDESTRIAN RECOMMENDED PLANNING STRATEGIES

Support "Complete Streets" Design In All Roadway Projects: Complete Streets are roadways that are designed to support safe, attractive, and comfortable access to all users, including motorists, pedestrians, bicyclists, and transit users. In addition to enhancing safety and mobility, "Complete Street" designed roadways often enhance the surrounding community and environment through traffic calming techniques and vegetated streetscapes. Complete Streets are categorized by wide paved shoulders or separate bicycling lanes; sidewalks separated from the roadway by raised curbing and/or vegetation; well-placed and well-designed crosswalks;

raised medians providing crossing refuge; and bulb-outs at intersections to prevent high-speed turning vehicles and shorten crossing distance for pedestrians.

Maintain a Complete and Updated Inventory of Pedestrian Level of Service (PLOS) Rankings:

As part of the Bicycle and Pedestrian Connectivity and Livability Study, Old Colony Planning Council is developing a complete inventory of Pedestrian Level of Service (PLOS) at all signalized intersections in the Old Colony Region. OCPC Staff shall maintain this inventory on a continuing basis, updating information as it becomes available and existing infrastructure changes.

Maintain a Complete and Updated Inventory of Bicycle Level of Service (BLOS) Rankings on State Numbered Routes and Priority Roadways:

As part of the Bicycle and Pedestrian Connectivity and Livability Study, Old Colony Planning Council is developing a complete inventory of Bicycle Level of Service (BLOS) on the state numbered route network and other roadways identified as priority routes by community representatives and/or the Regional Bicycle and Pedestrian Taskforce. OCPC Staff shall maintain this inventory on a continuing basis, updating information as it becomes available and existing infrastructure changes.

Encourage/promote bicycle riding as a viable alternative to automobile commuting and as a means to improve air quality. Where feasible, bicycling to work or to transit facilities instead of driving would reduce “cold starts,” which inject high levels of toxic emissions into the atmosphere with the starting and shutting off of automobile engines. A coordinated effort of local officials, the Massachusetts Highway Department, Regional Planning Agencies and interest groups, should encourage and promote the use of existing designated bicycle routes as a viable alternative to automobile commuting through public information and awareness efforts.

Encourage/promote safe bicycle riding, and reduce the number of injuries and fatalities associated with bicycle crashes. To help ensure safe travel habits and reduce the number of bicycle crashes, education programs for all road users should be implemented. Coordination of municipalities with the Department of Education, Registry of Motor Vehicles and transportation agencies should be a part of this effort.

Support bicycle riding as a part of intermodal travel. Coordination between different modes of transportation should include the improvement of bicycle access to public transportation. This includes, but is not limited to, permits to allow bicycles on train cars; external racks to carry bicycles on buses as done in Portland and San Francisco, and bicycle lockers at park-and-ride lots, train stations and bus terminals.

Identify, designate and implement additional bicycle paths and routes to be used for both commuting and recreation. Local officials, in concert with state and regional planners, should investigate the development of additional bicycle paths and routes which could safely serve the commuting public. This includes, but is not limited to, the development of abandoned railroad rights-of-way as bicycle paths, and bikeways that connect industrial/business parks, shopping centers, schools and other key destinations.

Coordinate efforts to improve bicycle facilities with surrounding municipalities and regional agencies. To help form a more complete and contiguous network of bicycle facilities in the region and southeastern Massachusetts, local agencies should coordinate efforts with agencies and organizations outside the region. This includes, but is not limited to, researching the existing bicycle facilities of surrounding towns before formalizing new bikeways, and coordinating public outreach programs to help minimize the cost of these efforts.

Support local, regional, and state initiatives and legislation that create or maintain bicycle infrastructure and safety. To best serve the greater good and needs of the public for a safe and secure transportation system, support and endorsement will be provided to all initiatives and legislation (local/regional/state/federal) that result in the implementation of bicycle facilities, ease congestion, promote recreation, and increase safety and security for bicycle users.

Enhance bicycle facilities at intermodal facilities (MBTA Stations, BAT Centre, Park and Ride). The potential for MBTA Stations, the BAT Centre, and MassDOT Park and Ride lots to serve as true intermodal facilities can be maximized by enhancing bicycle facilities, including but not limited to: installation of external bike racks on buses that serve these facilities; the installation of bicycle lockers; and bicycle lanes and paths entering and exiting facilities.

Promote the installation of bicycle detection loops at actuated signalized intersection to increase safety for entering bicyclists. Noting that roadways serve both drivers of motorized vehicles and users of bicycles, actuated traffic signals should include detection loops for bicycles to maximize safety for bicycle riders.

Support local initiatives, which enact, implement and enforce laws and regulations regarding pedestrian traffic. The responsibility for pedestrian safety ultimately lies with the local jurisdiction. Communities should utilize safety officers to enforce laws/regulations that promote increased pedestrian safety, with emphasis around high activity areas such as transit facilities, schools, and commercial centers. Participants in the process should include police departments, traffic engineers, school and legal system representatives.

Install physical barriers, pavement markings, and other amenities where needed to maximize pedestrian safety. Marked crosswalks, safety islands, street lighting, pedestrian underpasses/overpasses, sidewalks, traffic signals and signage all constitute useful techniques to separate pedestrians from hazardous vehicular traffic. Particular attention should be given to high activity areas such as transit facilities, schools, and commercial centers.

Promote/encourage pedestrian ways as a viable alternative to automobile commuting and means of improving air quality. Where feasible, walking to work or to transit facilities instead of driving would reduce “cold starts,” which inject high levels of toxic emissions into the atmosphere with the starting and shutting off of automobile engines. Support of this alternative includes, but is not limited to, the creation of pedestrian walkway connections between residential areas, transit facilities, industrial parks, shopping centers, schools and other key destinations.

Promote Installation of Pedestrian Countdown Signals at Signalized Intersections – A

Pedestrian Countdown Signal consists of a standard pedestrian signal with standard shapes and color, with an added display that shows the countdown of the remaining crossing time. Studies have shown that these types of signals dramatically decrease pedestrian-vehicle conflicts and increases safety for crossing pedestrians. By viewing the numeric countdown display, pedestrians gain a new level of self-protection by the ability to determine how long it takes them to cross a street, and knowing precisely how much time exists on the current signal phase before the “Don’t Walk” alert comes on and the signal proceeds into its next phase. According to a January 2006 article in the ITE Journal, San Francisco experienced a 52 percent reduction in pedestrian injury collisions at the 700 intersections it had retrofitted with the countdown equipment. The Regional Planning Agency and Metropolitan Planning Organization should work with the City of Brockton and other towns in the Region to retrofit signalized intersection with pedestrian countdown signals. Pedestrian countdown signals should be considered with all new signalization projects.

Promote Safer Pedestrian Access Designs in Parking Lots – Pedestrian consideration is often overlooked in design for parking areas of retail, entertainment, and employment centers. Often the pressure to provide as many parking spots as possible or the minimums for zoning regulations eliminates safe pedestrian accommodations from the design process. Once parked and out of the vehicle, pedestrians are often forced to share driveways with motor vehicles. With the boom in popularity of Sport Utility Vehicles and large profile trucks during the 1990’s and early 2000’s, often exiting drivers have very little, if any, visibility of the driveway approaches, making pedestrians virtually invisible. Dedicated pathways between the parking area(s) and building(s) should be provided for pedestrian access. Facility owners should also consider the use of pavement markings, textured surfaces, and other traffic calming devices to further enhance pedestrian safety in parking areas.

Promote Use of Crossing Islands and Medians in Wide Cross-Sections – According to the MassDOT Project Development and Design Guide, fifty feet is generally the longest uninterrupted crossing a pedestrian should encounter at a crosswalk although islands and medians are also appropriate for shorter distances as well. Many multiple lane roadways exceed fifty feet in cross-section width.

ENVIRONMENTAL RECOMMENDED PLANNING STRATEGIES

Support Livable and Sustainable Land Use Strategies

The Old Colony MPO recognizes the threat to environmentally sensitive areas and works with communities to make environmentally and economically sound land use decisions. The Old Colony MPO promotes and supports transportation and land use plans that support integrated, multimodal transportation strategies, including the use of transit, ridesharing, bicycling, and walking.

Reduce greenhouse gas emissions and ground level ozone (NOx and VOCs) by all transportation modes

Encourage research and technology development to find new solutions to air pollution problems created by motor vehicles.

Reduce dependency on fossil fuels

Promote research, development and implementation of standards, policies, and programs to reduce fuel consumption and the increase investments in alternative fuels.

Minimize negative environmental impacts of the transportation system

Support the development of new and improved designs and Best Management Practices (BMP) to reduce the contamination of water resources from transportation facilities and projects.

Strive to reduce single occupancy vehicle travel

Support programs that encourage means to reduce single occupancy automobile travel. Examples are flexible working schedules, preferential parking for ridesharing, and incentives for transit use. MassRIDES program offers employers and their employees' benefits of carpooling and ridesharing.

Encourage the use of non-motorized alternatives

Encourage and support non-polluting modes of transportation, such as bicycling and walking as described in the Bicycle and Pedestrian component of this Plan.

Encourage the Research and Usage of Alternative Energies

The Old Colony MPO supports the transitioning away from foreign fossil fuel reliance, encouraging the research and usage of alternate fuels and power sources. The benefits of alternative energies include improving air quality by reducing the amount of greenhouse gases and air pollutants emitted by automobiles using traditional petroleum based fuels, reducing America's dependence on foreign oil, and increasing energy sustainability.

Encourage the use of Renewable Energy

Promote the use of renewable energies throughout the Commonwealth, such as solar and wind. Using these sources in place of fossil fuels and nuclear energy reduces the depletion of natural resources and the creation of both toxic and non-toxic wastes.

Encourage coordination between municipalities, federal, state, and regional agencies

Coordination between all interested parties is important to reduce the negative impacts to the environment. Improving air, land, water, and wildlife quality begins with a team approach and is successful with all voices recognized.

Support "Intermodalism."

Promote using "intermodalism" to better integrate all transportation modes such as: Automobile, Motorcycle, Transit, Rail, Bus, Water, Air, Walking, and Bicycling. Providing a hub that supports all transportation modes attracts more people and increases efficiency.

Encourage the formation of Transportation Management Associations (TMAs)

Transportation Management Associations (TMAs) are private, non-profit, member-controlled organizations that provide transportation services in a particular area, such as a commercial district, mall, medical center or industrial park. MassRIDES offers carpooling, vanpooling, parking management, and other techniques allow employees to diversify their trips to and from work, thereby reducing congestion and improving air quality.

Encourage the proper design and use of High Occupancy Vehicle (HOV) lanes

High Occupancy Vehicle lanes should be designed for and only used by buses carrying large amounts of people to and from their destinations. These lanes would make commuter bus lines a more acceptable alternative to individuals who drive automobiles, thereby reducing congestion and improving air quality.

Encourage the use of Intelligent Transportation Systems (ITS)

The Old Colony MPO advocates the consideration of ITS solutions for transportation problems as a routine part of the transportation planning process, with the goals of increasing operation efficiency and capacity, improving safety, reducing environmental costs, and enhancing personal mobility.

Promote the increase and enforcement of Corporate Average Fuel Economy (CAFE) Standards for passenger car and light truck fleets

Automobile manufacturers should be required to meet and exceed CAFE standards for passenger and light truck fleets and should be recognized for doing so.

SAFETY AND SECURITY RECOMMENDED PLANNING STRATEGIES

Target planning efforts and investments at identified high crash locations. Through the Old Colony Safety Management System (and analysis tools such as the Top 100 Most Hazardous Intersections lists and MassDOT Crash Clusters inventory) identify a minimum of three (3) high crash locations per year for targeted study, including but not necessarily limited to Road Safety Audits. High crash locations will include those emphasis areas in the Massachusetts Strategic Highway Safety Plan, including intersections, lane departures, older drivers, pedestrians, and bicycles.

Fully program minimum HSIP targets each TIP year and seek to program Statewide HSIP funds when available/feasible for priority safety related projects.

- **Target and Performance Measure:** Fully program minimum HSIP targets each TIP year and seek to program Statewide HSIP funds when available/feasible for priority safety related projects

Reduce the rates of motor vehicle, bicycle, and pedestrian fatalities by incorporating engineering, enforcement, education, and emergency response into the planning process.

Planning products of the Old Colony Metropolitan Planning Organization will seek to

recommended best planning and engineering practices and standards when addressing safety on the transportation system. Staff will continue to work with state and local partners on addressing vehicular, transit, pedestrian, and bicycle safety through planning, legislative, and law enforcement efforts.

Support the increase and improvement of safety of services, vehicles, and facilities for transit, and for the transportation disadvantaged. Staff will continue to work with Brockton Area Transit Authority (BAT) and other transit providers in the area, while the Old Colony Metropolitan Planning Organization through Old Colony Planning Council will provide planning, technical, and operational assistance to transit providers in the common goal of providing and maintain safe service.

Support the implementation of emergency response and evacuation plans in cooperation with emergency management agencies. Emergency response and evacuation needs will be considered in all applicable planning efforts. Staff will work with stakeholders at the statewide, regional, and municipal levels to ensure the transportation network is able to accommodate response, evacuation, and recovery during regional emergencies. Furthermore, staff is committed to the following steps to prepare for emergencies and protect the viability of the transportation network:

- Support the forum for cooperation between the different transportation agencies in the state on security concerns through the Regional Homeland Security Councils.
- Conduct vulnerability analyses on regional transportation facilities and services
- Analyze the transportation network for redundancies in moving large numbers of people (e.g., modeling person and vehicle flows with major links removed or reversed, accommodating street closures, adaptive signal control strategies, impact of traveler information systems), and strategies for dealing with "choke" points and bottlenecks.
- Analyze the transportation network for emergency route planning/strategic gaps in the network
- Incorporate intelligent transportation systems, such as variable message signs, into the emergency response system.

Increase partnership and participation by elementary and middle schools in the Safe Routes to School Program. The Safe Routes to School program is a valuable asset for teaching safe walking and bicycling habits while **PROMOTING HEALTHY ALTERNATIVES FOR CHILDREN AND PARENTS IN THEIR TRAVEL TO AND FROM SCHOOL**. Staff will continue its partnership with MassDOT to provide technical support for Safe Routes to School and expand participation to local schools in the Old Colony Region

FINANCIAL RECOMMENDED PLANNING STRATEGIES

Invest funding to preserve, operate, and maintain transportation assets for current and future generations.

Adequately maintain and preserve all elements of the transportation system in a state of good repair to protect the public's mobility, safety, and security.

Increase the efficiency and reliability of the transportation system using appropriate methods and technologies.

Invest and provide comparable transportation access and service quality across the region regardless of income level or minority population.

Provide adequate funding to ensure that the transportation system and its users are safe and secure.

Support the increase of the annual Chapter 90 statewide total amount to at least \$300 million.

Assist communities in preparing and updating their road inventories to ensure that they reflect accurate mileage amounts for publicly accepted roads.

Continue to review, develop, and analyze supplemental funding resources. Such resources could include increased user fees, transit mitigation banks, and concurrency management systems. Concurrency is the growth management concept intended to ensure that the necessary public facilities are available concurrent with the impacts of development.

Implement fare and revenue policies that increase with inflation.

Establish and dedicate transit funding from sources that increase with inflation.

Support congestion improvements and the reward for regional approaches to coordinating and interconnecting signalized intersections and corridors.

Support and enhance asset management capabilities to perform the appropriate type of improvement at the right time.

Support the establishment of a RTA service fund to restore and enhance service.