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CAPE COD  
COMMISSION

CAPE COD METROPOLITAN PLANNING ORGANIZATION  
Cape Cod 2024  
Regional Transportation Plan  
2024-2044

DRAFT 6-26-2023 For Public Review



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CAPE COD METROPOLITAN PLANNING ORGANIZATION

**CAPE COD REGIONAL TRANSPORTATION PLAN (RTP)**

FEDERAL FISCAL YEAR 2024

**Anticipated Endorsement Date: July 24, 2023**

Prepared by the

**CAPE COD METROPOLITAN PLANNING ORGANIZATION (MPO) MEMBERS:**

- Gina Fiandaca, Secretary and Chief Executive Officer, Massachusetts Department of Transportation (MassDOT)
- Jonathan Gulliver, Administrator, MassDOT Highway Division
- Robert Lawton, Chair, Cape Cod Regional Transit Authority
- Harold Mitchell, Cape Cod Commission
- Matthew Levesque., President, Barnstable Town Council
- Mark Forest, Barnstable County Commissioners
- Judith MacLeod-Froman, Bourne Selectman, for Bourne, Falmouth, Mashpee, and Sandwich
- Sheryl McMahon, Yarmouth Select Board member, for Dennis and Yarmouth
- Kevin Galligan, Orleans Select Board member, for Brewster, Chatham, Harwich, and Orleans
- Robert Weinstein, Truro Select Board member, for Eastham, Provincetown, Truro, and Wellfleet
- Brian Weeden, Chairman, Mashpee Wampanoag Tribal Council

**MPO EX-OFFICIO MEMBERS:**

- Jay Norton, Chair, Cape Cod Joint Transportation Committee
- Brian Carlstrom, National Park Service/Cape Cod National Seashore
- Lawrence T. Davis, US Army Corps of Engineers/Cape Cod Canal
- Robert B. Davis, Woods Hole, Martha's Vineyard, and Nantucket Steamship Authority
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**AND THE CAPE COD JOINT TRANSPORTATION COMMITTEE:**

- Jay Norton, Chair, Wellfleet
- Griffin Ryder, Vice-Chair, Brewster

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This report was funded in part through grants from the Federal Highway Administration (FHWA) and Federal Transit Administration (FTA), United States Department of Transportation (USDOT). The views and opinions of the Cape Cod Metropolitan Planning Organization (MPO) expressed herein do not necessarily state or reflect those of the USDOT.

## CAPE COD METROPOLITAN PLANNING ORGANIZATION

### Cape Cod Regional Transportation Plan (RTP)

#### ENDORSEMENT, RTP

The signatures to follow certify that the Cape Cod Metropolitan Planning Organization (MPO) hereby endorses the Cape Cod Regional Transportation Plan (RTP) for Federal Fiscal Year 2024 in fulfillment of the requirements of 23 CFR Part 450.324.

#### CERTIFICATION:

The Cape Cod Metropolitan Planning Organization (MPO) Planning Process

The signatures to follow certify that the Comprehensive, Continuing, Cooperative Transportation Planning Process for the current local, regional, state, and federal fiscal years in the Cape Cod Metropolitan Planning Organization planning area is addressing major issues facing the region and is being conducted in accordance with the requirements of:

1. Section 134 Title 23, U.S.C., and Title 49 U.S.C. 5303, and this subpart;
2. Sections 174 and 176(c) & (d) of the Clean Air Act, as amended {42 U.S.C. 7504, 7506 (c) & (d)} and 40 CFR part 93;
3. Title VI of the Civil Rights Act of 1964, as amended {42 U.S.C. 2000d-1} and 49 CFR part 21;
4. 49 U.S.C. 5332, prohibiting discrimination on the basis of race, color, creed, national origin, sex, or age in employment or business opportunity;
5. Section 1101 (b) of the Safe, Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users (SAFETEA-LU) (Pub. L. 109-59) and 49 CFR part 26 regarding the involvement of disadvantaged business enterprises (DBE) in USDOT funded projects;
6. Title 23 CFR part 230, regarding the implementation of an equal employment opportunity program on Federal and Federal-aid highway construction contracts;
7. The provisions of the Americans with Disabilities Act of 1990 (42 U.S.C. 12101 et seq.) and 49 CFR Parts 27, 37, and 38;
8. The Older Americans Act, as amended (42 U.S.C. 6101), prohibiting discrimination on the basis of age in programs or activities receiving Federal financial assistance;
9. Section 324 of title 23 U.S.C. regarding the prohibition of discrimination based on gender; and
10. Section 504 of the Rehabilitation Act of 1973 (29 U.S.C. 794) and 49 CFR part 27 regarding discrimination against individuals with disabilities.
11. Anti-lobbying restrictions found in 49 USC Part 20. No appropriated funds may be expended by a recipient to influence or attempt to influence an officer or employee of any agency, a Member of Congress, in connection with the awarding of any Federal contract.

The currently endorsed Unified Planning Work Program, Regional Transportation Plan, and the Cape Cod Transportation Improvement Program (TIP) for Federal Fiscal Year 2024 were developed in accordance with FHWA/FTA regulations, EPA regulations, and fully incorporate the applicable requirements of the 1964 Civil Rights Act and the Americans with Disabilities Act of 1990.

CAPE COD METROPOLITAN PLANNING ORGANIZATION (MPO)

**CAPE COD REGIONAL TRANSPORTATION PLAN (RTP)**

The signatures to follow certify that the Cape Cod Metropolitan Planning Organization (MPO), at their meeting on July 24, 2023, hereby approves the following action in accordance with the Comprehensive, Cooperative and Continuing transportation planning process. In accordance with the requirements of 23 CFR Part 450 Section 308(c) of Federal Regulations, the MPO for Cape Cod has completed its review and hereby endorses the Regional Transportation Plan (RTP) for Federal Fiscal Year 2024.

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Gina Fiandaca, Secretary/Chief Executive Officer – Massachusetts Department of Transportation (MassDOT)

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Jonathan Gulliver, Administrator Massachusetts Department of Transportation (MassDOT) Highway Division

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Harold Mitchell  
Cape Cod Commission

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Robert Lawton, Chair  
Cape Cod Regional Transit Authority

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Barnstable County Commissioners

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Brewster, Chatham, Harwich, Orleans

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Brian Weeden  
Mashpee Wampanoag Tribal Council

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Robert Weinstein  
Eastham, Provincetown, Truro, Wellfleet



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# Executive Summary

Cape Cod's transportation system has both shaped and been shaped by development patterns of the region. As our regional economy has evolved so too has our transportation infrastructure. From a reliance on ports and marine transport, to a steady growth by rail, and explosion of change fueled by the automobile – our region has undergone dramatic changes. All the while, our connection with our environment and our past has continued to define us. Demographic, climatic, and technological changes will present new transportation challenges over the next two decades and beyond. This plan presents a regional vision and sets of funding priorities to guide transportation investments that support the long-term vitality of the region.

The 2024 Regional Transportation Plan (RTP) is a **community-driven, performance-based** plan that considers the unique **challenges and opportunities** of the region and establishes spending **priorities** to allocate available surface transportation **funding** towards transportation **infrastructure** projects for Cape Cod through 2044.

## COMMUNITY-DRIVEN

The RTP was developed through input from a wide range of federal, state, and local agencies and organizations, and the public. In addition to over two dozen meetings including six regional public meetings, eight outreach tables and two English as a Second Language (ESL) events, feedback was also solicited through an online survey. The online survey provided valuable input into the process including the identification of locations with transportation issues or challenges. The outreach will continue following release of the document for public comment including additional in-person and virtual public meetings, signs on transit vehicles, yard signs along the region's rail trail and an outreach table at a major outdoor event.

## PERFORMANCE-BASED

Consistent with new federal legislation, the RTP is built on a performance-based planning approach with a vision statement, goals, objectives, performance measures and targets, strategies, and policies.

The RTP vision statement established the overarching vision of the document and is as follows:

The Cape Cod Metropolitan Planning Organization, informed by public input, envisions a multi-modal transportation system that supports the environmental and economic vitality of the region

through infrastructure investment that focuses on safety, livability, sustainability, resiliency, equity, and preservation of the character that makes our special place special.

The goals of the RTP expand on the vision statement in seven areas of emphasis. The goals are:

- **Safety:** Improve safety for all travel modes
- **Environmental and Sustainability :** Maintain, protect, and enhance the natural environment and reduce greenhouse gas emissions
- **Livability and Economic Vitality:** Support livable communities and village centers that strengthen the long-term economic vitality of the region
- **Multimodal Options/Healthy Transportation:** Provide a variety of healthy transportation options to all users
- **Congestion Reduction:** Reduce congestion and improve travel time reliability
- **System Preservation:** Preserve, maintain, modernize and ensure resiliency of the existing transportation system
- **Freight Mobility:** Improve efficiency and reliability of freight movement

The performance measures and targets established in the RTP are quantifiable targets that the region will work to achieve over the coming year through implementation of a series of strategies and policies.

## CHALLENGES AND OPPORTUNITIES

While the region faces many of the same transportation challenges as communities across the country and across the world, there are also many things that make Cape Cod unique. Developing transportation solutions for Cape Cod must account for the things that make the region a special and desirable place to live, work, and play. Some of the challenges and opportunities for the region that are detailed in the RTP include:

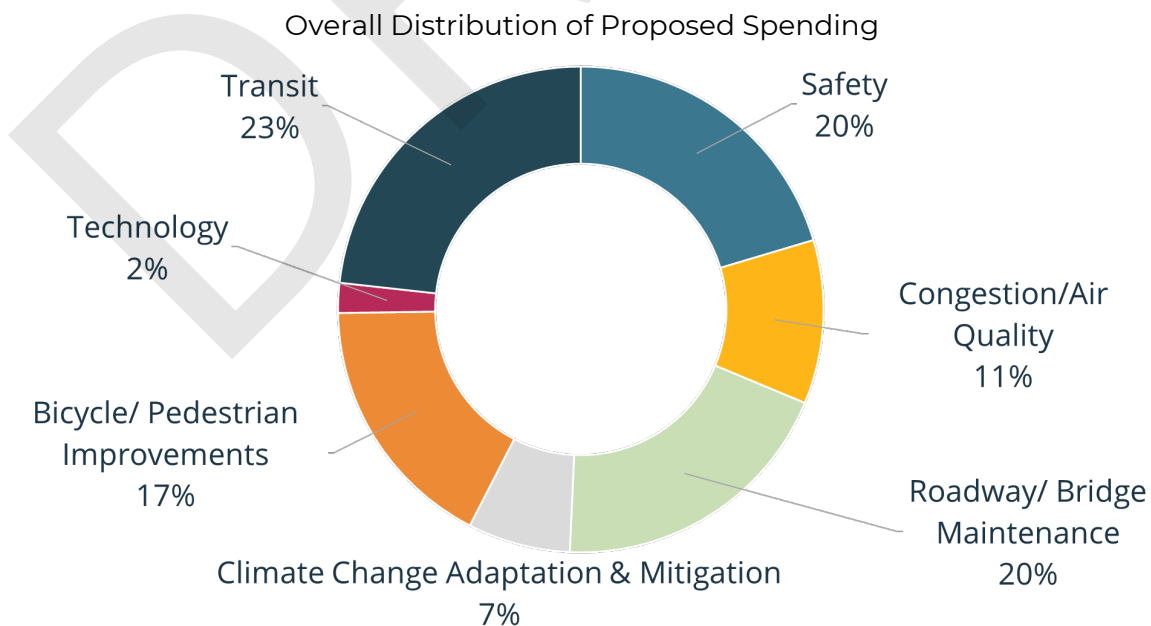
- **Historical Context:** maintaining a sense of place and recognition of history while evolving to meet the need of the next generation
- **Aging Infrastructure:** repairing or placing a significant amount of transportation infrastructure that is at or near the end of its design life
- **Safety:** identifying the locations of greatest need and vulnerability and implementing proven safety countermeasures to improve safety for all users
- **Security:** being prepared for extraordinary events that would threaten the people and the infrastructure of the region
- **Freight:** recognizing the importance of freight to the region while exploring a variety of ways to safely and efficiently transport it
- **Bicycling, Pedestrians, and Transit:** identifying the unique needs of all users and improving options for a variety of modes of healthy transportation
- **Congestion Management:** identifying opportunities to reduce the intensity, duration, and extent of congestion for all modes of transportation in our bottleneck locations



- **Stormwater Management:** identifying solutions to minimizing the contribution of nutrients and pollutants into the Cape’s waterways from stormwater runoff including freshwater
- **Climate Change:** preparing the region for the impacts of climate change through a focus on adaptation, sustainability, mitigation and energy sources
- **Access to Essential Services:** ensuring all users of the transportation have the same and convenient options to access essential services
- **Regional Cooperation:** ensuring that there is a cooperative and coordinated planning approach that involves all stakeholder agencies and the public
- **Economic Development:** supporting sustainable, year-round economic development opportunities through transportation infrastructure
- **Environmental Protection:** ensuring that transportation projects mitigate environmental impacts and provide environment benefits including greenhouse gas (GHG) emissions reductions
- **Equity:** ensuring full and fair participation by communities in the transportation decision-making process, and equitable distribution of benefits and any potential burdens from transportation projects

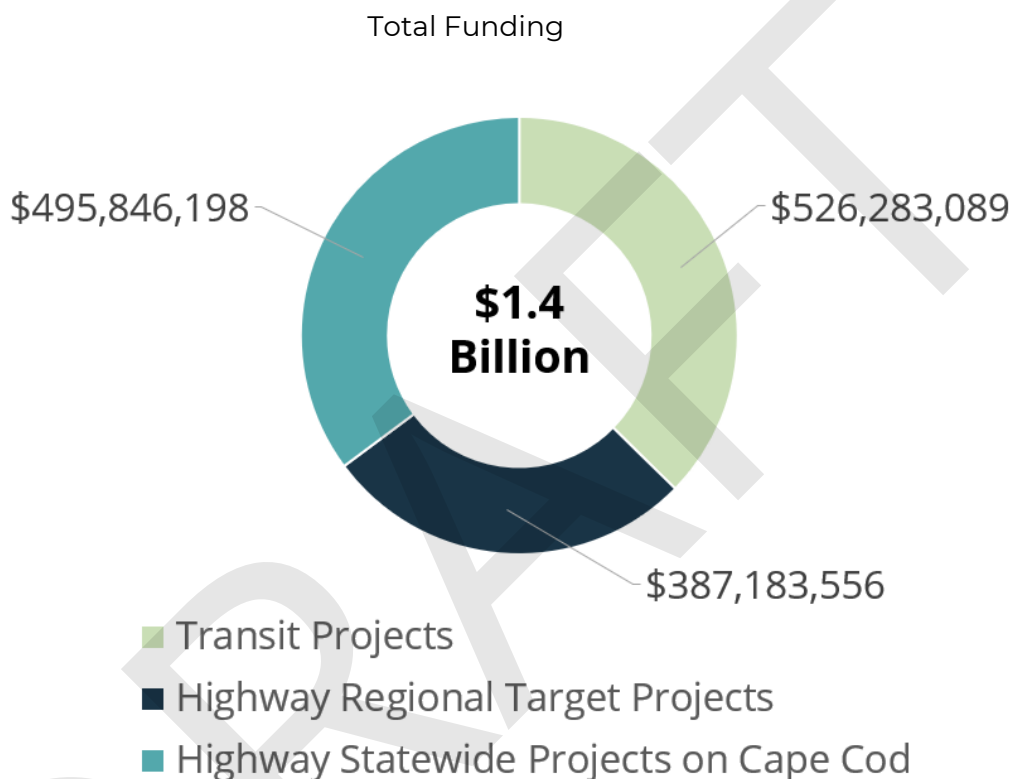
## PRIORITIES

As a document that establishes the vision for the transportation system for the region, the RTP sets the framework for what will be built on Cape Cod. Based on a critical assessment of infrastructure needs, discussions at RTP development meetings, and feedback on the RTP survey, the following program of spending was developed. The overall distribution of proposed spending is shown below.



## FUNDING

The anticipated funding in the region over the next 21 years totals approximately \$1.4 billion. This total includes spending on transit as well as highway projects (including roads, bridges, sidewalks, multiuse paths, etc.) broken down as shown in the following figure.



## INFRASTRUCTURE

Out of the nearly \$387 million in funding for highway projects identified and selected by the region, the following projects were selected, balancing a number of factors including potential benefit, estimated cost, consistency with the objectives and performance measures in the RTP, equity as it relates to minority, low income, Limited English Proficiency (LEP) and other protected populations, and GHG reduction potential:

- Mashpee Route 151 Improvements
- Route 28 Multimodal Improvements (various segments)
- Provincetown Shank Painter Road and Route 6 Improvements
- Cape Cod Rail Trail Extensions: Mid- and Upper-Cape
- Cape Cod Rail Trail Extensions: Upper- and Outer Cape
- Hyannis Area Improvements

- Route 6 (Outer Cape) Safety Improvements
- Route 6 Safety Improvements (Interchanges, Shoulders)
- Various smaller-scale projects to be identified based on future evaluations

In addition to these highway regional target projects additional projects of significance are anticipated including the replacement of Route 28 bridge of the Bass River and, potentially with additional federal and state resources, the implementation of the Cape Cod Canal Bridges Program including the replacement of the Bourne and Sagamore Bridges.

In terms of transit projects, the region will transformative investments by the Cape Cod Regional Transit Authority including the move towards electric of the bus fleet and delivery of service in a manner that will meet the evolving need of the communities served.

While many uncertainties exist about the future, the strength of the transportation infrastructure will undoubtedly be a key to Cape Cod's long-term vitality. The 2024 RTP sets forth this vision for the region and sets the framework for making smart transportation investments within the region through 2044.

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# Chapter 1: Introduction and Plan Development

This 2024 Cape Cod Regional Transportation Plan (RTP) is a fiscally constrained set of transportation projects, programs, and transportation studies covering 2024 to 2044. The RTP establishes the long-range view of transportation based on existing system data, and existing and projected needs. The RTP includes an assessment of the existing transportation system and its federal aid components—whether transit, highway, pedestrian, or other—and endeavors to improve the transportation system and its connections for better mobility for residents, commuters, and visitors. The RTP includes all modes of surface transportation throughout the 15 communities of Barnstable County.

Preparation of the document is undertaken by the Cape Cod Commission staff every four years on behalf of the Cape Cod Metropolitan Planning Organization (MPO).

This chapter includes background information on the transportation planning process, a synopsis of the public participation process, and regional survey results.

## **TRANSPORTATION PLANNING PROCESS**

### **Cape Cod Metropolitan Planning Organization (MPO)**

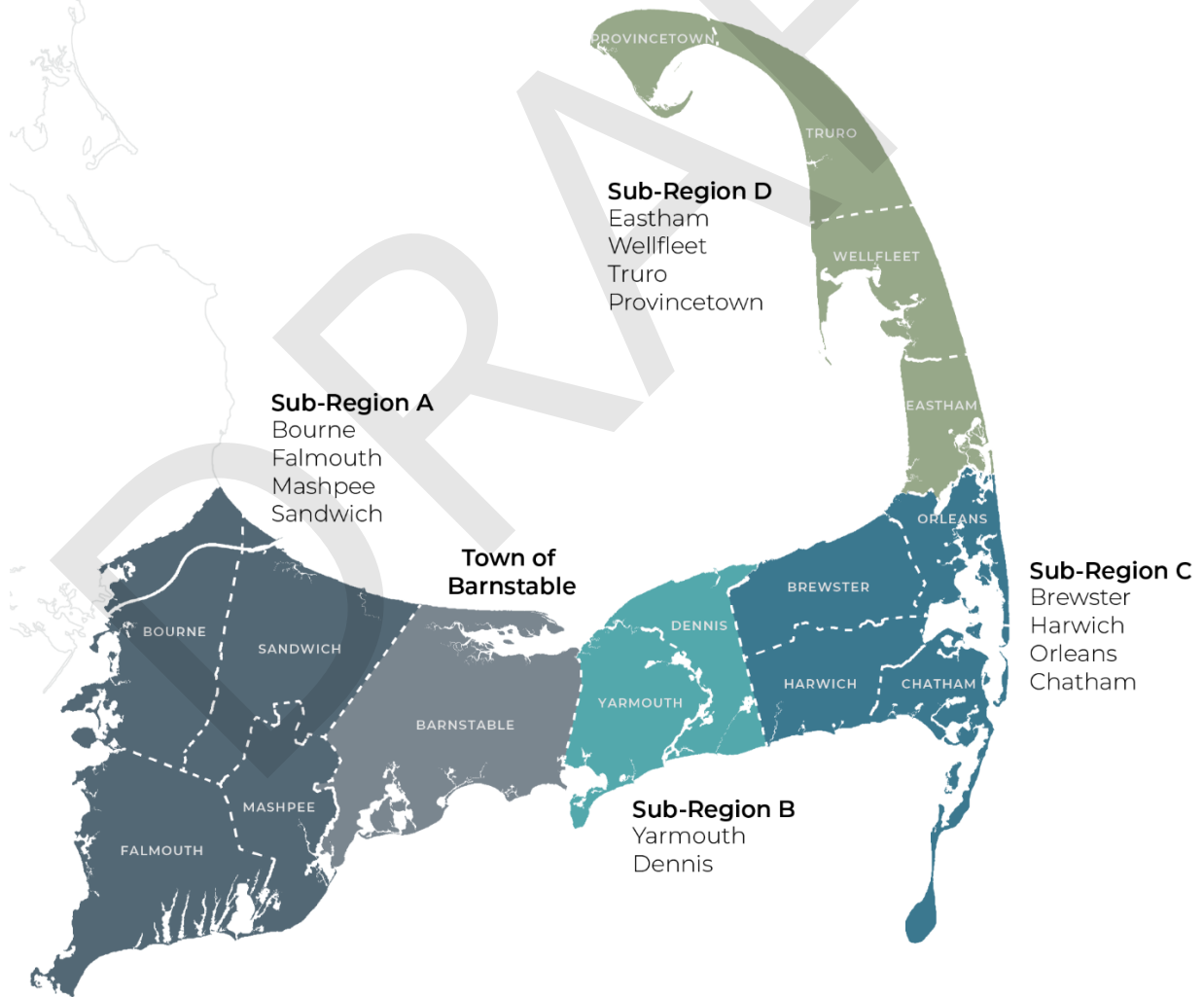
The Cape Cod Metropolitan Planning Organization (MPO) is the regional governing body established by federal law to oversee regional transportation planning and recommend the distribution of transportation funds locally. The MPO is responsible for reviewing, guiding, and endorsing the RTP.

The MPO is made up of eleven voting members that generally meet monthly. The membership is outlined in Table 1. Town representation on the body is depicted in Figure 1.

TABLE 1. Cape Cod MPO Membership

AGENCY	MPO SIGNATORY
Massachusetts Department of Transportation (MassDOT)	Secretary of Transportation
MassDOT Highway Division	Administrator
Cape Cod Regional Transit Authority (CCRTA)	Chairman
Cape Cod Commission (CCC)	Chair
Barnstable County Commissioners	Commissioner
Mashpee Wampanoag Tribe	Tribal Chairman
Town of Barnstable	Town Council President
Sub-region A (Bourne, Falmouth, Mashpee, Sandwich)	Select Board member
Sub-region B (Dennis, Yarmouth)	Select Board member
Sub-region C (Brewster, Chatham, Harwich, Orleans)	Select Board member
Sub-region D (Eastham, Provincetown, Truro, Wellfleet)	Select Board member

Figure 1. MPO Regional Representatives



The MPO also includes non-voting Ex-Officio Members: Federal Highway Administration, Federal Transit Administration, Army Corps of Engineers, National Park Service/Cape Cod National Seashore, the Woods Hole, Martha's Vineyard and Nantucket Steamship Authority, and the Chair of the Cape Cod Joint Transportation Committee.

The MPO is served by an advisory body: the Cape Cod Joint Transportation Committee (CCJTC). The CCJTC membership includes representatives from each of Barnstable County's fifteen towns and a bicycle advocate.

Development of the RTP also includes consultation with or consideration of a wide range of federal, state, and local agencies and organizations including:

- Amplify People of Color (POC)
- Association to Preserve Cape Cod
- Bay State Cruises
- Barnstable County Government
- Barnstable Health Ministry
- Bicycle advocacy groups
- Massachusetts Coastal Railroad
- Cape Air
- Cape Cod Central Railroad
- Cape Cod Climate Change Collaborative
- Cape Cod Commission
- Cape Cod Joint Transportation Committee
- Cape Cod Metropolitan Planning Organization
- Cape Cod National Seashore/ National Park Service
- Cape Cod Regional Transit Authority
- Cape Cod Towns Councils on Aging
- Federal Highway Administration
- Federal Transit Administration
- Hy-Line Cruises
- Joint Base Cape Cod
- Martha's Vineyard Commission
- Massachusetts Department of Recreation and Conservation
- Massachusetts Department of Transportation
- MassBike
- Nantucket Planning and Economic Development Commission
- Old Colony Planning Council
- Freight Companies
- Peter Pan Bus Lines
- Plymouth and Brockton Street Railway Company
- Southeastern Regional Planning and Economic Development District
- U.S. Army Corps of Engineers
- Woods Hole, Martha's Vineyard and Nantucket Steamship Authority

The staff of the CCC, CCRTA, and MassDOT, along with staff of the local towns, participates in the process through preparation of the documents for MPO action.

## Federal Certification Documents

In addition to the RTP, the MPO is required to endorse other federal certification documents including the Transportation Improvement Program (TIP), Unified Planning Work Program (UPWP), and the Public Participation Plan (PPP).

The RTP establishes a regional vision for the transportation system, the UPWP studies investigate deficiencies in that system and identify potential solutions, and the TIP details specific transportation projects that are implemented to improve the transportation system. The PPP provides a framework to ensure public involvement and cooperative decision making throughout the transportation planning process. A summary of the primary function, time horizon, and updated timeline is presented in Table 2. The table also includes links to the Cape Cod MPO webpages that contain more detailed information on each of the documents.

TABLE 2. Federal Certification Documents

DOCUMENT	PRIMARY FUNCTION	TIME HORIZON	UPDATE TIMELINE
Regional Transportation Plan (RTP) <a href="http://www.capecodcommission.org/rtp">www.capecodcommission.org/rtp</a>	Establishes long-range vision and goals, identifies major projects, studies, and programs	20+ years	Every 4 years
Transportation Improvement Program (TIP) <a href="http://www.capecodcommission.org/tip">www.capecodcommission.org/tip</a>	Identifies specific transportation investments (projects)	4 years	Annually
Unified Planning Work Program (UPWP) <a href="http://www.capecodcommission.org/upwp">www.capecodcommission.org/upwp</a>	Details planning studies and tasks	1 year	Annually
Public Participation Plan (PPP) <a href="http://www.capecodcommission.org/ppp">www.capecodcommission.org/ppp</a>	Establishes plan for public participation for transportation decision-making	Ongoing	Every 5 years, or more frequently as needed

## TITLE VI/NONDISCRIMINATION PROGRAM

The Cape Cod MPO follows federal and state non-discrimination laws and seeks to ensure that all interested parties in Barnstable County have access to the MPO's activities and services and that public involvement in the MPO's decision making comes from a diverse socioeconomic group that is representative of the county's population. The MPO has developed a nondiscrimination program, in accordance with federal and state requirements, to encourage broad public participation, representation, and equity in the region's transportation planning. The implementation of this program during the RTP development is summarized in the following sections and further detailed in Appendix L.

## **Title VI Background**

Title VI of the Civil Rights Act of 1964 prohibits discrimination based on race, color, or national origin. Related federal nondiscrimination authorities add the protected categories of sex (23 USC 324), age (42 USC 6101), disability (29 USC 790), low-income (Federal Executive order 12898), and limited English proficiency (federal executive order 13166). Organizations that receive Federal funds are obligated to assure nondiscrimination in their programs and activities and are required to have a comprehensive Title VI enforcement program to prevent and eliminate discrimination in their federally funded programs. Federal Highway Administration (FHWA) and Federal Transit Administration (FTA) set forth Title VI compliance requirements for “primary” funding recipients such as MassDOT and sub-recipients such as the MPOs to follow. Effective transportation decision making depends upon understanding and properly addressing the needs of different groups. The MPO’s Title VI program includes identifying the demographic distribution of minority and limited English proficiency populations within the region and implementing a comprehensive strategy to ensure that the MPO conducts effective outreach to encourage their involvement in and access to the transportation planning and decision-making process.

The Massachusetts Department of Transportation (MassDOT) is responsible for ensuring that the state’s MPOs comply with federal program requirements. Following MassDOT’s 2013 Title VI program update, the Cape Cod MPO developed and adopted a Title VI Program in 2014. This plan was updated in accordance with MassDOT’s directives in 2022 which also included updates to its Public Participation Plan in 2022. The 2022 Title VI plan update provides certifications and assurances, Title VI notices, complaint procedures and forms, information about beneficiaries’ rights,, regional demographic data and profile of the area, mobility needs of minority populations, demographic maps and charts of funding distribution a Public Participation Plan, a language access plan, data collection reporting, the dissemination of Title VI information, and analyses of MPO transportation system investments in the region, project locations and potential impacts from projects to ensure equity in the planning and implementation process for the region.

Although Title VI is the focal point of non-discrimination law in the United States, FHWA incorporates a broader spectrum of statutes, executive orders, and regulations into its requirements for states and MPOs. Other pertinent non-discrimination authority identified by MassDOT and FHWA include the Uniform Relocation Assistance and Real Property Acquisition Policies Act (42 USC § 4601); Federal-Aid Highway Act of 1973 (42 USC 324 et seq.); Section 504 of the Rehabilitation Act of 1973 (29 USC 794 et seq.); Age Discrimination Act of 1975, as amended (42 USC 6101); Airport and Airway Improvement act of 1982 (49 USC 471); Civil Rights Restoration Act of 1987 (PL 100-209); Titles II and III of the Americans with Disabilities Act (42 USC 12131-12189); Federal Aviation Administration’s Non-Discrimination Statute (49 USC 47123); Executive Order 12898, Federal Actions to Address Environmental Justice in Minority Populations and Low Income Populations; Executive Order 13166, Improving Access to Services for people with Limited English Proficiency.

In addition to mapping demographic data that identifies areas (census blocks) in the county with higher proportions of low income and minority populations, the staff conducts analyses on the geographic distribution of the region's transportation spending and project construction, to ensure equity in the distribution of transportation improvements. In examining the Title VI based project distribution analysis, the proximity, frequency, value and nature of projects are identified in relation to statistically significant population concentrations of the Title VI protected categories; i.e. race, color or national origin (including limited English proficiency) for transit related projects with the addition of age, sex and disability for highway related projects. The analysis also includes a review of potential project impacts – positive and negative – to ensure that that potentially underserved areas neither adversely impacted by, nor denied the benefits of, transportation projects. A key piece of the program is engaging such communities in the MPO's activities and decision making through expanded and targeted public outreach. The Public Participation Plan, as discussed below, establishes the MPO's public involvement goals and strategies.

## **Environmental Justice, Equity and Justice40**

FHWA and FTA are collaborating with MassDOT, the MPO's and public transportation providers to advance racial equity and support for underserved and disadvantaged communities. Strategies within this plan will be developed that improve infrastructure for non-motorized travel, public transportation access, increased public transportation service in underserved communities, plan for the safety for all users, reduce single occupancy vehicle travel near high volume corridors, target demand-response service towards communities with higher concentrations of older adults and those with poor access to essential services, and equitable and sustainable practices while developing transit-oriented development. MassDOT has also developed a Regional Environmental Justice "Plus" layer (REJ+) to provide further analysis and demographics related to EJ communities. Equity analyses as part of the regional transportation planning process will begin to reference the MassDOT REJ+ as the mapping tool is further developed and made publicly available.

## **BEYOND MOBILITY**

In parallel to the development of the RTP, MassDOT was developing the statewide long range transportation plan. Beyond Mobility, the Massachusetts 2050 Transportation Plan, is a planning process that will result in a blueprint for guiding transportation decision-making and investments in Massachusetts in a way that advances MassDOT's goals and maximizes the equity and resiliency of the transportation system.<sup>1</sup> Much of the early work on this effort, including the identification of trends related to climate change, social inequity, population shifts, and advancements in technology, helped informed RTP development. As detailed in next section, joint outreach activities helped to ensure that unique regional considerations will be reflected in this statewide plan.

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<sup>1</sup> See [www.mass.gov/beyond-mobility](http://www.mass.gov/beyond-mobility)

# PUBLIC PARTICIPATION PROCESS

To ensure an inclusive and accessible public engagement processes for development of the Regional Transportation Plan (RTP), staff looked to the framework established in the Cape Cod MPO Public Participation Plan (PPP). Goals of the PPP are to:

1. Obtain Quality Input and Participation
2. Establish Consistent Commitment
3. Increase Diversity
4. Ensure Accessibility
5. Provide Relevance
6. Foster Participant Satisfaction
7. Clearly Define Potential for Influence
8. Establish and Maintain Partnerships
9. Provide Opportunities to Build Consensus

The MPO efforts to meet each goal are detailed in Appendix L.

The PPP is available in English and Portuguese at [www.capecodcommission.org/ppp](http://www.capecodcommission.org/ppp)

## Meetings and Open Houses

Numerous meetings have been held to discuss development of the RTP. Table 3 identifies meetings held solely for the plan, as well as meetings of various organizations at which the RTP was discussed. Meeting locations were selected to provide geographic and demographic diversity as well as ensure that persons with disabilities were able to actively participate. Notices were disseminated to English and Portuguese media outlets.

### BEYOND MOBILITY - MEETING IN A BOX

In coordination with the MassDOT Beyond Mobility team, a “meeting in a box” was held on January 26, 2023 in Eastham, MA with a focus group consisting of stakeholders representing the elderly population in the Outer Cape. The focus group included representatives from local Councils of Aging (COA), local community organizations (Aids Support Group, Helping Our Women) and local town representatives. This public engagement technique allowed for public feedback to be jointly collected as part of the development for both the Statewide and the Regional Long Range Transportation Plans. The focus group allowed for small group conversations to understand the unique challenges faced in this geographic and demographic group of our region.

### EQUITY CONSIDERATIONS FOR TARGETED OUTREACH

As part of an inclusive public outreach strategy, efforts were focused on performing outreach at community meetings and activities already scheduled in the region. Specifically, staff organized an outreach table at the Hyannis Open Streets festival in the Fall 2022 and attended English as a Second Language (ESL) classes at the Dennis and Falmouth Public Libraries. In addition, staff ensured outreach meeting opportunities were scheduled near Environmental Justice (EJ)



communities, such as in Truro and Barnstable. Additionally, to further public outreach opportunities among limited English proficiency communities, comment cards were disseminated and collected at the IPR Church of Cape Cod in Hyannis on Sunday, May 20, 2023. Feedback received from over the 140 comment cards ranged from reducing congestion, constructing new sidewalks and increasing frequency and connections for public transit service.

Collectively, the RTP meetings provided a wide array of opportunities for the public to learn about the document and share their comments. Comments received reflected both regional interests in the Cape Cod transportation system as well as more location specific concerns based on the location of the meeting.

**ENQUETE DE TRANSPORTE**

Para nos ajudar na identificação de projetos de construção, favor selecionar cada objetivo a baixo relacionado de acordo com a importância:

	Muito importante	Importante	Sem importância
Melhoria da segurança para veículos, ciclistas e pedestres	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Redução de congestionamento de automóveis (tempo de espera no trânsito)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Reparos de estradas e pontes	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Melhoria nas condições para ciclistas e pedestres	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Melhoria do transporte urbano	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>

**Favor descrever qualquer tipo de problema de transporte e ou experiências que você já teve.**  
 Por exemplo, por favor, identifique intersecção você vê falhas, locais onde são necessários calçadas ou faixas de pedestres novos ou melhorados, ou tempos ou lugares onde você gostaria de ver serviço novo ou aumentado ônibus.

*UM GRANDE PROBLEMA QUE VEJO NA REGIÃO É CALÇADAS ADEQUADAS PARA PEDESTRES COM ESPAÇO ADEQUADO E SEGURO PARA PEDESTRES E CICLISTAS TBM. REPAROS NAS ESTRADAS TBM É ESSENCIAL, PRINCIPALMENTE NA REGIÃO DE HYANNIS E VARMOUTH. A REGIÃO DO SEMAFORO ONDE ESTÁ O TREM TEM SEMPRE ORÇAS E MUITO TRÁNSITO E PRECISA DE ODIAG.*

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**ENQUETE DE TRANSPORTE**

Para nos ajudar na identificação de projetos de construção, favor selecionar cada objetivo a baixo relacionado de acordo com a importância:

	Muito importante	Importante	Sem importância
Melhoria da segurança para veículos, ciclistas e pedestres	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Redução de congestionamento de automóveis (tempo de espera no trânsito)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Reparos de estradas e pontes	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Melhoria nas condições para ciclistas e pedestres	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Melhoria do transporte urbano	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

**Favor descrever qualquer tipo de problema de transporte e ou experiências que você já teve.**  
 Por exemplo, por favor, identifique intersecção você vê falhas, locais onde são necessários calçadas ou faixas de pedestres novos ou melhorados, ou tempos ou lugares onde você gostaria de ver serviço novo ou aumentado ônibus.

*Melhorias no tempo de espera p/ transporte, mais pontes de parada e mais ônibus. De Falmouth p/ Hyannis mais pontes de parada em Marshpel Rt 151*

Figure 2. Example Portuguese Comment Cards



TABLE 3. Regional Transportation Plan Meetings

<b>CAPE COD METROPOLITAN PLANNING ORGANIZATION MEETINGS</b>		
Meetings beginning in September 2022 and continuing through July 2023		
Generally held once per month on a Monday at 1:00 PM, virtually		
<b>CAPE COD JOINT TRANSPORTATION COMMITTEE MEETINGS</b>		
Meetings beginning in September 2022 and continuing through July 2023		
Generally held once per month on a Friday at 8:30 AM, virtually		
<b>CAPE COD RTP SUBCOMMITTEE MEETINGS</b>		
Regional Transportation Plan Subcommittee Meeting - Virtual	Wednesday, November 16	1:00 PM
Regional Transportation Plan Subcommittee Meeting - Virtual	Friday, January 13	1:00 PM
Regional Transportation Plan Subcommittee Meeting - Virtual	Wednesday, March 8	1:00 PM
Regional Transportation Plan Subcommittee Meeting - Virtual	Friday, April 14	1:00 PM
<b>LISTENING SESSIONS/OUTREACH TABLE EVENTS/PUBLIC MEETINGS</b>		
Hyannis Open Streets – Outreach Table	Sunday, October 16	12:00 PM
WXTK (95.1) Radio Interview	Monday, February 6	
The Harvard Club of Cape Cod	Thursday, March 9	11:30 AM
Truro Town Hall – Public Meeting	Monday, March 20	5:00 PM
Regional Transportation Plan Virtual Public Meeting	Tuesday, March 21	6:00PM
Hyannis Transportation Center – Public Meeting	Tuesday, March 21	11:00 AM
WCAI Radio Interview	Thursday, March 30	
RTP Bicycle Committee Meeting - Sandwich	Thursday, April 13	6:30 PM
TIP/UPWP Outreach Table – CCRT Trailhead, Station Ave, Yarmouth	Tuesday, May 9	3:00 PM
TIP/UPWP Outreach Table – OCRT at Stepping Stones Rd, Chatham	Thursday, May 11	9:00 AM
IPR Cape Cod Church	Sunday, May 21	9:00 AM
<b>OTHER MEETINGS/ACTIVITIES</b>		
Barnstable County Public Works Association	Thursday, November 3	11:00 AM
Retired Mens Club of Cape Cod	Thursday, November 3	12:30 PM
Nauset Neighbors	Thursday, November 10	3:00 PM
Outer Cape Council on Aging's	Thursday, January 26	10:00 AM
ESL Class – Dennis Public Library	Friday, March 24	12:00 PM
ESL Class – Falmouth Public Library	Tuesday, March 28	7:00 PM
Association to Preserve Cape Cod	Monday, April 24	4:30 PM
Barnstable County Economic Development Council Executive Committee	Tuesday, April 25	9:30 AM
CCAIOR Leadership Meeting	Tuesday, May 23	10:00 AM
Cape Cod Electric Vehicle Expo and Test Drive Event	Saturday, June 3	10:00 AM

Figure 3 shows a collection of photographs that were taken at various RTP outreach events.

Figure 3. Photographs of Outreach Activities



## Other Outreach Strategies

In addition to the traditional outreach approaches, staff utilized a number of new strategies in an effort to increase public participation.

### EXPANDED EMAIL OUTREACH DISTRIBUTION

In an effort to better connect with the various groups and agencies in the region that interact in different ways with the transportation system every day, an expanded email distribution list was created to share all notices and announcements on the development of the plan. This expanded outreach list including the following groups and agencies that were identified in the region:

- Bicycle and Pedestrian Committees and Advocate Groups
- Community & human services programs and providers
- Community centers
- Councils on aging
- Day care and child development programs
- Environmental and climate organizations
- English language media outlets (print and audio)
- Financial institutions
- Fire districts
- Hospitals and health centers
- Interested citizens (those who requested to be included in the list)
- Lesbian, gay, bisexual, and transgender (LGBT) organizations
- Libraries
- Local and area chambers of commerce
- Local and regional housing partnerships, authorities, and groups
- Local and regional transportation providers (all modes)
- Local community-based organizations
- Local financial development corporation and economic development corporations
- Local legislators
- Local police and fire departments
- MPO and CCJTC members
- Portuguese language media (print and radio)
- Public and private educational institutions and school departments
- Religious institutions
- Town clerks, managers, departments of public works directors, town planners, and other similar town personnel
- Town councils
- Transportation consulting firms
- Veterans services

### PORTUGUESE-LANGUAGE COMMENT LINE

In an effort to ensure that anyone with questions or comments on the plan was heard, a Portuguese-language comment line was set up to field calls from Portuguese-speaking individuals. The recorded message, in Portuguese, thanked the caller for their interest in the plan and asked



that they leave their name and number so that staff, with the assistance of a translator, could respond to them.

## PLAN WEBSITE AND SURVEY

The website dedicated to the development of the 2024 RTP was created as a place where the public could find general information about the plan development, learn about upcoming meetings, access materials from past meetings, complete the online survey, download the draft RTP, and provide comments. A link to the website was included on all project materials and linked from the Cape Cod MPO website. The website included a statement in Portuguese with contact information should they need the information in another language. A Portuguese-language version of the website was also provided through real-time Google translation.

## BUS SIGNS

In addition to hosting an open house at the Hyannis Transportation Center, a regional intermodal hub, further efforts were made to ensure that transit riders had an opportunity to participate in the development of the document. Signs, as shown in Figure 3, were placed on all Cape Cod Regional Transit Authority buses and paratransit vehicles. The message on the sign was presented in both English and Portuguese.



Figure 4. Yard signs at the Hyannis Transportation

## YARD SIGNS

Yard signs with a QR code to the RTP webpage were distributed throughout the region, including on the region's bike paths and bus stops. The two-sided yard signs included messaging in both English on one side and Portuguese on the other side. The yard signs assisted with an increase in response to not only the RTP webpage where viewers gained a general awareness of the development of the RTP, but also to the online survey and mapping tool.

## OUTREACH FLYERS AND HANDOUTS

Business card-sized outreach cards were developed to hand out at all public events attended by staff during the development in the plan. A few versions were created through the process, including a version to guide people to the online survey, but included a link to the website where information was kept up to date. Similar information was contained on water bottles and a banner used in outreach activities.

## Regional Transportation Plan Survey

To facilitate public input in the development of the RTP, an online survey was developed and advertised through several outreach techniques as discussed earlier in this chapter. The RTP survey was advertised at RTP and other local and regional meetings and open houses distributed through the extended email distribution list, social media platforms, and picked up by a number of local media outlets. The online survey was open from March 24, 2023, 2023 through April 19, 2023 , 2023 and a total of 382 responses were received.<sup>2</sup> A summary of results in presented in the section of the plan with additional data presented in Appendix O.

### RTP VISION STATEMENT & GOALS

The online survey began with a draft vision statement and draft goals. In question 1 respondents were asked to provide any suggested additions or revisions. Responses were used in refining the vision statement included in this plan.

### LIVE~WORK~PLAY

This section included a series of questions to better understand how respondents typically use the transportation system.

Question 2: "Where do you live?" There were 382 responses. All 15 Cape towns were represented with the highest frequency in Falmouth (67 responses) and Barnstable (50 responses).

Question 3. "Where do you typically work/go to school?" Respondents were presented with a drop-down list of Cape Cod town names, "N/A" and "Other." There were 374 responses to this question with the largest frequency of respondents selecting Off Cape (66) and "N/A" (62).

Question 4. "If you work in a hybrid mode, how many days do you typically work in the office?" Respondents were presented with a drop-down list with a range of options from less than once a week to 4+ days/week. Respondents could also select "N/A" as an option. There were 380 responses to this question. The most frequent answers were "N/A" (191) and 4+ days/week (74).

Question 5. "Have any of the following changes caused you to adjust the way you travel?" Respondents were instructed to check all that applied, in total there were 617 responses to this question. The most frequent answer was Congestion (207).

Question 6. "Besides home or work/school trips, what town do you spend most of your time? (Visit, shopping, entertainment ...)" Respondents were presented with a drop-down list of Cape Cod town

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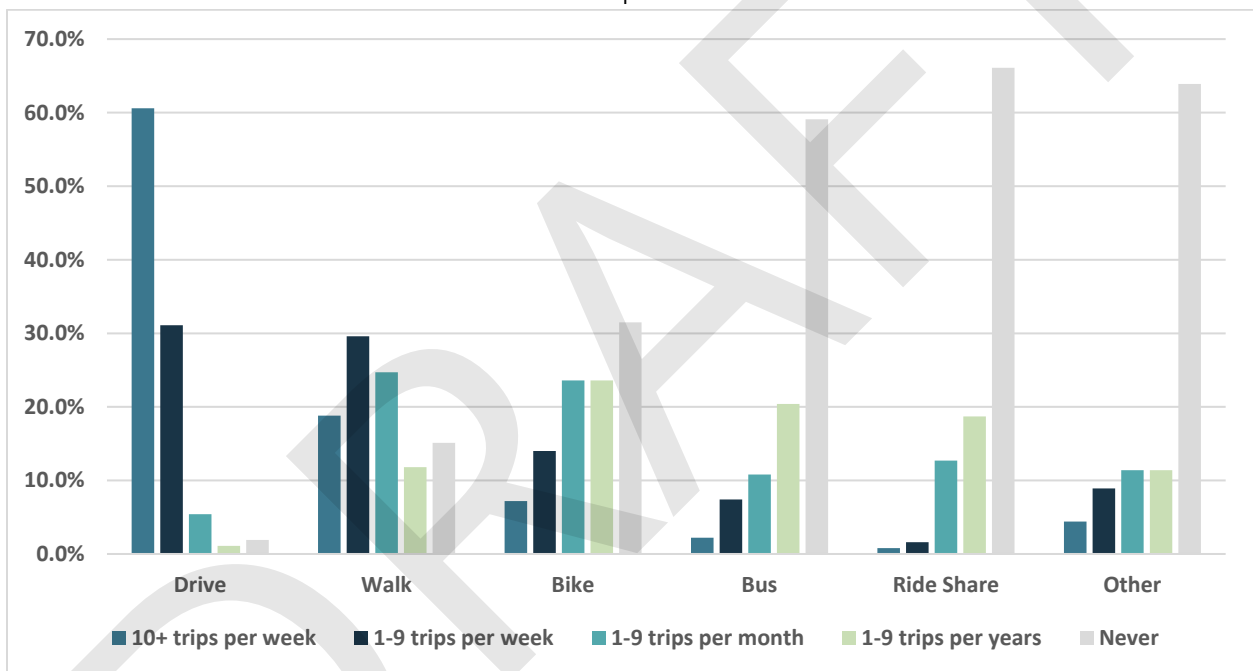
<sup>2</sup> Given the relatively small sample size and the potential for self-section bias, the survey results should not be assumed to be necessarily representative of the overall population of Cape Cod

names, Off Cape, and "Other." There were 377 responses to this question. The most frequently selected towns include Barnstable (82), Falmouth (61) and Off Cape (37).

Question 7. "How frequently do you travel by each of the following modes of transportation?" Possible choices included: Drive, Walk, Bike, Bus, Ride Share, Other. Choices of frequency included: 10+ trips per week, 1-9 trips per week, 1-9 trips per month, 1-9 trips per year, never.

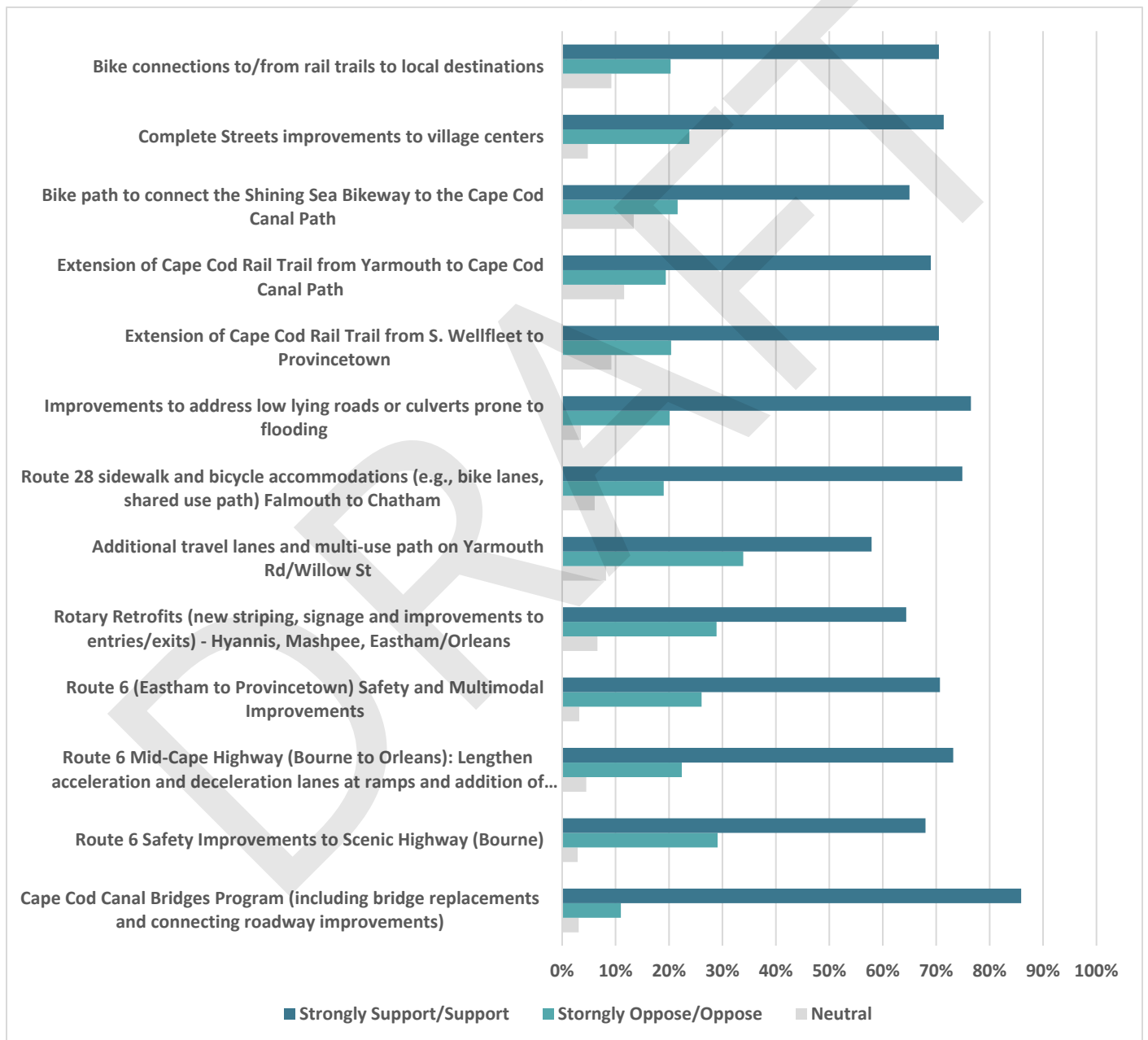
As shown in Figure 5. , the most frequently used mode of travel is to drive. Walking was generally the second most popular travel mode, followed by bicycling. Using the bus as a means of transportation has also seen an increase in response since the last RTP survey.

Figure 5. Responses: "How frequently do you travel by each of the following modes of transportation"



Question 8. "Support for Potential Transportation Projects". Respondents were then asked to indicate their support for the several projects. For each project, respondents were offered the following choices: Strongly oppose, Oppose, Neutral, Support, Strongly Support. Responses are summarized in Figure 6. .

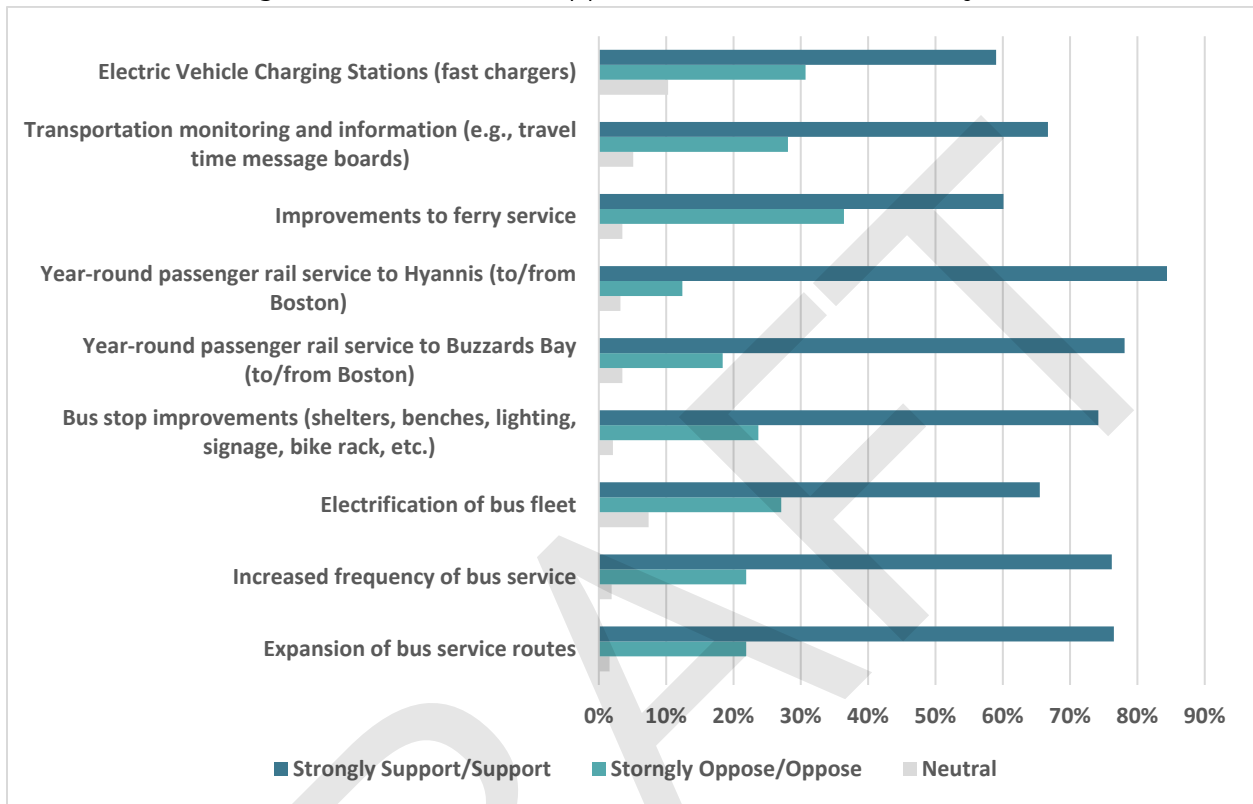
Figure 6. Level of Support for Potential Projects



Question 9. "Support for Potential Transit Projects". Respondents were asked to indicate their support for the several transit projects. For each project, respondents were offered the following

choices: Strongly oppose, Oppose, Neutral, Support, Strongly Support. Responses are summarized in 7.

Figure 7. Level of Support for Potential Transit Projects



Question 10. "Other Project Support". In response to question 8 and question 9, respondents were asked "Are there any other project(s) would you support?" There were 183 responses to this question. The responses to this question are presented at length in Appendix O.

### BUDGET CHALLENGE

Recognizing that a limited amount of funding is available to address the transportation problems in the area, respondents were asked to indicate their level of support for the following types of transportation investment. For each investment type respondents could assign from 1 to 5 stars. Responses are summarized in Table 4.



TABLE 4. Level of Support by Type of Investment

INVESTMENT TYPE	LEVEL OF SUPPORT (STARS)
Roadway projects to correct safety issues	3.90
Roadway projects to reduce congestion/improve air quality	3.76
Roadway pavement maintenance	3.95
Bicycle/pedestrian improvements	3.78
Transit service	3.92
Intelligent transportation systems (e.g., travel time message boards, real-time traffic monitoring)	2.94
Climate Adaptation (Resiliency projects including addressing low lying roads)	3.18
Climate Mitigation (e.g. Electric vehicle charging stations, electric buses)	3.19

**OTHER**

Lastly, a final text box was provided for respondents to provide any additional comments or suggestions. A summary of these comments is available in Appendix O. Following this page, the respondents are taken to the Mapping Exercise.

**MAPPING EXERCISE**

Cape Cod Commission GIS staff prepared an online mapping tool to help respondents identify specific locations where proposed improvements by mode can be shared. As shown in Figure 8, nearly 100 unique locations were identified in the online mapping tool. A summary of the written comments is available in the appendix.

The responses gathered in this exercise will be shared with local Departments of Public Works Departments, MassDOT, the CCRTA, and other agencies.

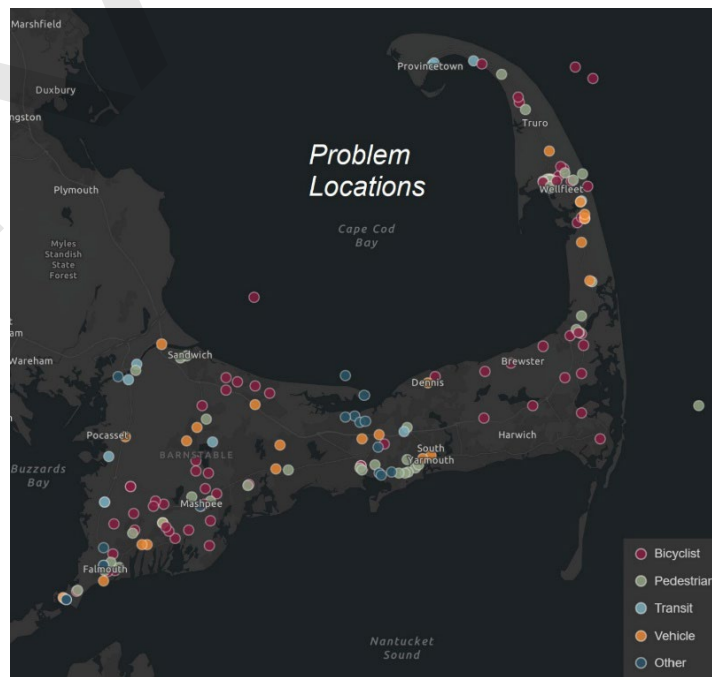


Figure 8. Identified Problem Locations - RTP Online Survey

# Chapter 2: Goals, Objectives, and Performance Measures and Targets

The Regional Transportation Plan (RTP) was developed through a performance-driven, outcome-based approach. This chapter details the Vision, Goals, Objectives, and Performance Measures and Targets of the RTP. This chapter also includes Policies and Strategies for reaching the Performance Targets. Finally, this chapter provides a framework for tracking progress towards performance targets and, to the greatest extent possible with the available data, provides an assessment of the current state of the transportation system with respect to the performance targets.

## **PERFORMANCE-BASED PLANNING AND PROGRAMMING**

Performance-based planning and programming (PBPP) refers to the application of performance management principles within the planning and programming processes of transportation agencies to achieve desired performance outcomes for the multimodal transportation system.<sup>3</sup>

The Cape Cod MPO's PBPP approach consideration and implementation of projects, strategies, and services that will address the following factors:

- Support the economic vitality of the metropolitan area, especially by enabling global competitiveness, productivity, and efficiency;
- Increase the safety of the transportation system for motorized and non-motorized users;
- Increase the security of the transportation system for motorized and non-motorized users;
- Increase accessibility and mobility of people and freight;
- 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;
- Enhance the integration and connectivity of the transportation system, across and between modes, for people and freight;
- Promote efficient system management and operation;
- Emphasize the preservation of the existing transportation system;

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<sup>3</sup> Performance Based Planning Guidebook

[http://www.fhwa.dot.gov/planning/performance\\_based\\_planning/pbpp\\_guidebook/](http://www.fhwa.dot.gov/planning/performance_based_planning/pbpp_guidebook/)

- Improve the resiliency and reliability of the transportation system and reduce or mitigate stormwater impacts of surface transportation; and
- Enhance travel and tourism.

While PBPP has a key fixture of transportation legislation since Moving Ahead for Progress in the 21st Century (MAP-21), required that “the metropolitan transportation planning process shall provide for the establishment and use of a performance-based approach to transportation decision-making to support the national goals...”<sup>4</sup>

The seven national performance goals for the Federal Highway programs, as established by MAP-21 and continued the Fixing America’s Surface Transportation (FAST) Act and current federal transportation legislation, the Infrastructure and Jobs Act (IIJA)/Bipartisan Infrastructure Law (BIL) are as follows:

- **Safety** - To achieve a significant reduction in traffic fatalities and serious injuries on all public roads.
- **Infrastructure Condition** - To maintain the highway infrastructure asset system in a state of good repair
- **Congestion Reduction** - To achieve a significant reduction in congestion on the National Highway System
- **System Reliability** - To improve the efficiency of the surface transportation system
- **Freight Movement and Economic Vitality** - To improve the national freight network, strengthen the ability of rural communities to access national and international trade markets, and support regional economic development.
- **Environmental Sustainability** - To enhance the performance of the transportation system while protecting and enhancing the natural environment.
- **Reduced Project Delivery Delays** - To 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 agencies' work practices<sup>5</sup>

The goals, objectives, and performance measures and targets set forth in this RTP reflect these national goals as well as priorities for the state and our planning region, including the US DOT’s FFY 2022-2026 Strategic Plan and the Equity Action Plan. State, regional, and local plans, including Freight, Rail, Bicycle Transportation, and Pedestrian Transportation plans, identify a number of

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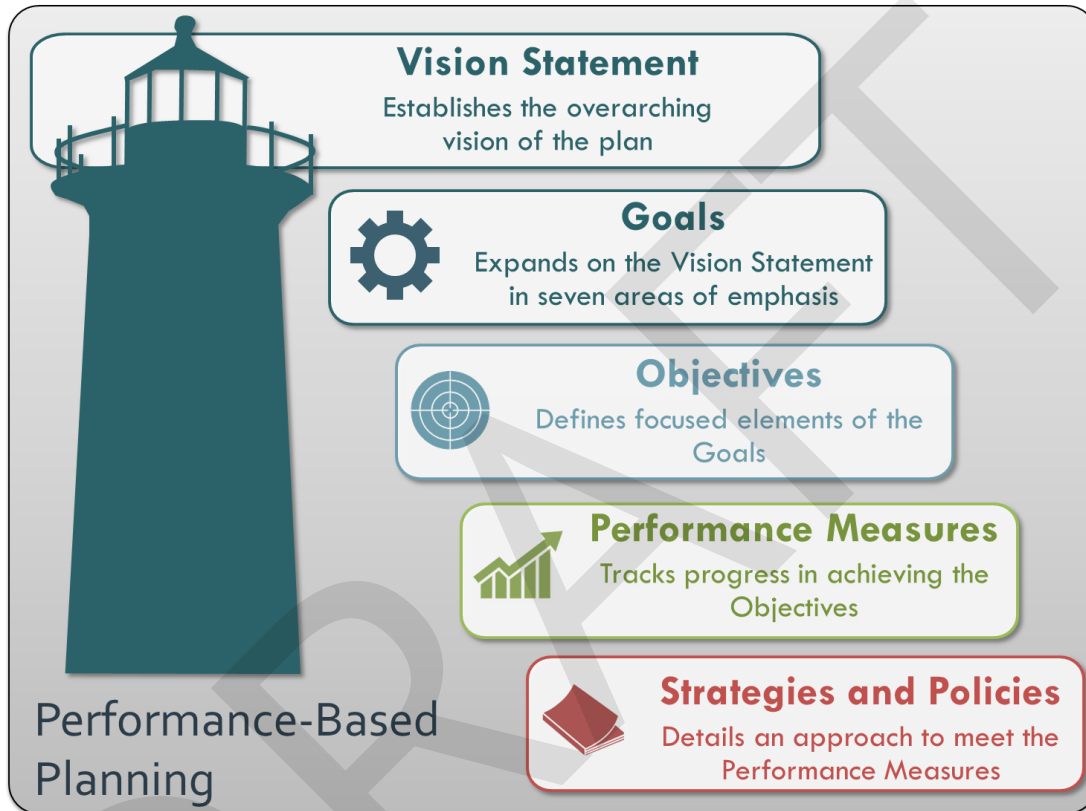
<sup>4</sup> 23 USC Section 134(h)(2); 49 USC Section 5303(h)(2)

<sup>5</sup> 23 USC Section 150(b)

these priorities and were considered in the development of goals, objectives, and performance measures and targets in this RTP. This coordination is detailed later in this chapter.

The relationship of goals, objectives, and performance measures as well as polices and strategies are depicted in Figure 9.

Figure 9. Performance-based Planning Structure



## VISION STATEMENT

The RTP vision statement establishes the overarching vision of the document. The vision statement for the 2024 RTP is as follows:

**The Cape Cod Metropolitan Planning Organization, informed by public input, envisions a multi-modal transportation system that supports the environmental and economic vitality of the region through infrastructure investment that focuses on safety, livability, sustainability, resiliency, equity, and preservation of the character that makes our special place special.**

In support of this vision, the MPO identified the following goals for the 2024 RTP. As shown in Figure 10, although Equity is not a standalone goal, it will be considered throughout all of the RTP goals.



Figure 10. 2024 RTP Goals

## GOALS AND OBJECTIVES

The goals and objectives discussed in the following sections reflect the collective vision of the MPO in consideration of the thoughtful input provided from a wide range of individuals throughout the development of the RTP.

One of the ways that the RTP most directly affects change on the transportation system is through TIP projects that are programmed consistent with the framework of the RTP. The TIP details specific transportation projects that are anticipated to be advertised for construction within the next four federal fiscal years. For each year in the TIP, there is a limited amount of regional discretionary funding from which the MPO selects what are generally referred to as “TIP target projects.” Within any given year there may be additional projects from other funding sources such as statewide roadway maintenance and statewide bridge projects. These projects are generally identified through systematic statewide analysis. Both “TIP target projects” and projects from other funding sources effect change in the transportation system but, given the different level of MPO input involved in identifying each type of project, they are dealt with in slightly different manners relative to performance measures. All “TIP target projects” are evaluated using TIP Transportation

Evaluation Criteria which will be updated to reflect the goals, objectives, performance targets, and recommendation of this plan.

As our region, the state, and federal agencies gain more experience with performance measures there will likely be modification to these measures and targets. Additionally, as the region improves its ability to capture and analyze wider datasets, more robust performance measures and targets may be possible. These performance measures and targets, however, represent an important first step in establishing a true performance-based planning approach.

## Safety

While the number of traffic-related fatalities generally trends down nationally, it is important to recognize that any fatality is a tragic event and the public expects that all efforts will be taken to ultimately eliminate traffic-related fatalities. To that end, the Federal Highway Administration, Federal Motor Carrier Safety Administration, and National Highway Traffic Safety Administration are committed to the *Zero Deaths* and Safe System initiative.<sup>6</sup>

The MPO is also supportive of the *Zero Deaths* and Safe Systems and will be preparing the region's first Safety Action Plan grant later in 2024 as part of a FHWA Safe Streets For All grant. , The first goal of the RTP is Safety and continues to be a priority for the region.

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### GOAL 1: IMPROVE SAFETY FOR ALL MODES

Objectives:

- Reduce the number and severity of crashes associated with all modes of transportation
- Eliminate serious injuries and fatalities associated with all modes of transportation
- Apply a Safe Systems approach to investment decisions including a focus on safe speeds

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The performance measures reflect both a commitment to use available resources to improve safety as well as specific targets to track progress. The tracking of fatal crashes and serious injury crashes and rates is consistent with federal guidance and the goals of the Massachusetts Strategic Highway Safety Plan.<sup>7</sup> The decision to specifically analyze crashes involving bicyclists and pedestrians in addition to motor vehicle crashes reflects that region's recognition of improving safety for these vulnerable road users.

Strategies aimed at achieving the objectives under this goal include:

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<sup>6</sup> <http://safety.fhwa.dot.gov/tzd/>

<sup>7</sup> <https://www.mass.gov/doc/massachusetts-shsp-2023/download>

- **Continuously monitor** the condition of the transportation system to ensure that it is safe to travel on all modes throughout Cape Cod.
- Develop a **Cape Cod Regional Safety Action Plan** and adopt a Safe System approach, as part of the FHWA Safe Streets for All initiative.
- **Fully program** minimum HSIP targets each TIP year and seek to program Statewide HSIP funds when available/feasible for priority safety related projects.
- Reduce crashes, serious injury crashes, fatal crashes, and crashes involving older drivers, crashes involving younger drivers, and crashes involving bicycles and pedestrians by **10% in 10 years**.
- Reduce the fatality and serious injury rates by **10% in 10 years**.
- Focus attention on the **strategic initiatives** identified in Massachusetts Strategic Highway Safety Plan such as: speed management, public education and awareness, addressing top-risk locations/populations, safe vehicles design, pursue new technologies and research, and increase road safety audits,
- **Identify high priority safety locations** throughout Cape Cod and then determine measures to increase safety at those locations.
- **Separate high- and low-speed travel modes**, so that those traveling at slower speeds, such as bicycles and pedestrians, do not conflict with those traveling at higher speeds, such as rail and automobile traffic.
- Existing multilane roads (cross-sections of four or more lanes) are recommended to be modified via removal of unneeded lanes or installation of **landscaped median dividers** to provide a reasonable level of safety and access management.
- **Encourage safe use** of the transportation network through public awareness campaigns, promoting such things as seatbelts for motorists and helmet use for bicyclists.
- **Incorporate intelligent transportation systems**, such as variable message signs and other media alerts, into the emergency response system.
- Foster **communication and cooperation** between federal, state, and local agencies for the planning, practice, and implementation of emergency scenario plans.
- Designate and indicate, through road signs, **emergency evacuation routes and shelters**.
- Support enforcement of state and local **traffic laws**.
- Increase **surveillance and security efforts at transportation facilities** throughout Cape Cod, such as the Hyannis Transportation Center, Falmouth Bus Depot, Woods Hole port facilities, park-and-ride lots, and Cape Cod Canal Bridges.

Additionally, in support of this goal, the Cape Cod MPO supports the following policies:

- For proposed roadways with cross-sections of four or more lanes, **landscaped median dividers shall be included** to provide a reasonable level of safety and access management.
- To reduce injury crashes, when developing intersection improvements involving signalization of a previously unsignalized location, construction of a **modern roundabout** shall be considered as one of the alternatives.

## Environmental and Sustainability

The importance to ensure Cape Cod's environment is sustainable and resilient in the long term is paramount. Future impacts of climate change within the region have been realized and we must now take action to protect our natural environment and mitigate the impacts of climate change. Any threat to Cape Cod's environment is a threat to the overall vitality of the region.

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### GOAL 2: MAINTAIN, PROTECT, AND ENHANCE THE NATURAL ENVIRONMENT AND REDUCE GREENHOUSE GAS EMISSIONS

Objectives:

- Minimize negative impacts of the transportation system on the natural environment
  - Reduce Greenhouse Gas (GHGs) emissions in support of the state-wide net zero carbon target by 2050
  - Accelerate the electrification of the transportation system
  - Improve stormwater management and treatment to improve impaired fresh and marine water resources
  - Improve resiliency of the transportation system to address critical low lying roads and design infrastructure to meet the challenges of our changing climate
- 

Strategies aimed at achieving the objectives under this goal include:

- Develop strategies to **reduce vehicle miles traveled (VMTs)**
- Encourage efforts that allow people to **work from home** and support the development of **shared office space** in regional centers to reduce commuting traffic
- Encourage the use of **healthy transportation** modes that reduce air pollution, fuel consumption, and other environmental impacts such as greenhouse gas emissions.
- Pursue strategies that will get automobiles and trucks moving at **speeds that will minimize air pollution.**
- Replace public buses and vehicles with **fuel-efficient, electric, hybrid, or bio-diesel** vehicles that will reduce fossil fuel consumption.
- Continue to advocate for future year-round commuter rail service to Cape Cod.
- Design roadways to **drain and cleanse oil and gasoline runoff** away from aquifers and other sensitive environmental areas.
- Encourage design decisions and construction practices that **minimize resource consumption** such use of reclaimed materials in paving projects, use of energy efficient lighting fixtures, and choice of drought-tolerant, low-maintenance landscaping elements
- **Protect drinking water** from materials used in the design, construction, operation, and maintenance of transportation facilities, such as road salt.



- Implement projects in the Transportation Improvement Program (TIP) consistent with the goal. Specifically:
  - 50% of TIP target projects should reduce GHGs and provide overall benefits to the natural system
  - 50% of TIP projects outside of sensitive areas and 100% of TIP projects within sensitive areas should provide improved stormwater management and treatment
  - TIP projects should improve signal operations at 5 locations along key corridors every 5 years
  - TIP projects should close 5 gaps in the bicycle or pedestrian network every 5 years

Additionally, in support of this goal, the Cape Cod MPO supports the following policies:

- To reduce emissions from idling vehicles, when developing intersection improvements involving signalization of a previously unsignalized location, construction of a **modern roundabout** shall be considered as one of the alternatives.
- As roadway improvement projects are developed, **stormwater management** techniques shall be included to manage and treat surface runoff. Stormwater Best Management Practices (BMP), including Low Impact Development (LID) where feasible, shall be followed. Stormwater treatment benefits of all TIP projects shall be quantified by the design engineer and included in the design plans.

## Livability and Economic Vitality

Livability and economic vitality are about supporting strong communities that people will want to live in now and in the future.

Livability is about fostering communities where coordinated transportation, housing, and commercial development give people access to affordable and environmentally sustainable transportation. Incorporating livability approaches into transportation, land use, and housing policies can help improve public health and safety, lower infrastructure costs, reduce combined household transportation and housing costs, reduce vehicle miles traveled, and improve air and water quality, among many other benefits.<sup>8</sup>

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### GOAL 3: SUPPORT LIVABLE COMMUNITIES AND VILLAGE CENTERS THAT STRENGTHEN THE LONG-TERM ECONOMIC VITALITY OF THE REGION

Objectives:

- Support mixed-use development in compact centers of activity

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<sup>8</sup> [http://www.fhwa.dot.gov/livability/fact\\_sheets/benefits.pdf](http://www.fhwa.dot.gov/livability/fact_sheets/benefits.pdf)

- Improve connections between housing, job, cultural centers, and essential services within and beyond the region
- Develop a transportation system that is consistent with the local character of Cape Cod for the region’s residents and visitors
- Support land use strategies and investments in the roadway network that encourage walkability, public transit, and promote appropriate connections to housing

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Strategies aimed at achieving the objectives under this goal include:

- Support **community activity centers** with a broad range of transportation options, such as roadways, transit, bicycle and pedestrian facilities.
- Projects that **improve access to or within community activity centers** should be identified and prioritized.
- Focus on closing gaps in the bicycle and pedestrian network identified in previous analysis of **connections to community activity centers**.
- Projects that improve the transportation **system's resiliency** to the effects of sea level rise should be identified and prioritized.
- All transportation projects and programs must be **responsive to the natural and built environments** within which they are undertaken.
- Use **landscaping and noise barriers** to protect communities and minimize adverse impacts.
- Involve community and business leaders in transportation projects and programs to ensure that local concerns are addressed.
- Avoid, minimize or mitigate the impact of transportation improvements on parks, recreation areas, historic sites, and other **scenic or cultural resources** and minimize impact on overall community character.
- Support transportation projects consistent with **Local Comprehensive Plans**.
- Identify opportunities and seek funding to incorporate the **art and local artists** in the process of designing projects that reflect the Cape Cod community
- Implement **age and dementia friendly** designs into transportation projects
- Implement projects in the Transportation Improvement Program (TIP) consistent with the goal. Specifically:
  - 25% of TIP target projects should improve access to or within community activity centers
  - The potential impacts of sea level rise should be evaluated for all TIP projects during the 25% design review and adjustments to projects should be made as warranted
  - All TIP projects should provide opportunities for local input including public meeting prior to development of design plans and throughout the design process and take into consideration the project’s Placetype location

- Develop a transportation system that supports the **economic vitality of Cape Cod** and its metropolitan areas
- Prioritize projects that are consistent with the **economic development goals** of the Regional Policy Plan (RPP)<sup>9</sup> and the **regional priority projects** detailed in the Comprehensive Economic Development Strategy (CEDS)<sup>10</sup>
- Work with the Executive Office of Housing and Economic Development to identify **Priority Development Areas and Priority Protection Areas** on Cape Cod

Additionally, in support of this goal, the Cape Cod MPO supports the following policies:

- Design of all TIP projects shall consider the **environmental, historic, and cultural context** in which a project they are being proposed. The eight Cape Cod Placetypes articulated in the RPP may be helpful in identifying the defining characteristics and context of a given project.
- Consistent with current MassDOT sign policy, **business logo signs** shall not be allowed on Route 6 east of the Cape Cod Canal. “Sponsor a highway” signs with business logos may be allowed at the discretion of the MassDOT District Office Director.
- For all TIP projects, potential **impacts of sea level rise**, any mitigating actions to be taken, and/or reasons such actions are infeasible shall be identified by the design engineer and included in the design plans.
- All TIP projects shall provide opportunities for **local input** including public meetings prior to development of design plans and throughout the design process.

## Multimodal Options/Healthy Transportation

In October 2012 MassDOT announced an ambitious Mode Shift Goal of tripling mode share by walking, bicycling, and transit by 2030. In support of this goal, the Healthy Transportation Policy Directive was issued in September 2013 requiring that all MassDOT projects are designed and implemented in a way that all our customers have access to safe and comfortable healthy transportation options at all MassDOT facilities and in all the services. The recent Massachusetts Bicycle Transportation Plan<sup>11</sup> and Pedestrian Transportation Plan<sup>12</sup> build on these efforts with actionable recommendations.

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<sup>9</sup> Available at: [www.capecodcommission.org/rpp](http://www.capecodcommission.org/rpp)

<sup>10</sup> Available at: [www.capecodcommission.org/ceds](http://www.capecodcommission.org/ceds)

<sup>11</sup> <https://www.mass.gov/service-details/bicycle-plan>

<sup>12</sup> <https://www.mass.gov/service-details/pedestrian-plan>

As a region, Cape Cod has always been supportive of varied and healthy transportation options. Whether by choice or necessity, moving around the region without a personal automobile is critical to many users of the transportation system.

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#### GOAL 4: PROVIDES A VARIETY OF HEALTHY TRANSPORTATION OPTIONS TO ALL USERS

Objectives:

- Improve accessibility of all modes to all users
  - Apply Complete Streets principles to all projects
  - Expand and close gaps in the bicycle and ADA-accessible sidewalk networks
  - Improve coordination between all modes
  - Increase the share of travel by means other than the single occupancy vehicle
- 

Strategies aimed at achieving the objectives under this goal include:

- **“Complete Streets”** designs are encouraged to accommodate all users including pedestrians, bicyclists, persons in wheelchairs or strollers, public transportation users, and motorists.
- Sufficient **mobility** must be provided to ensure that individuals and freight can travel safely and efficiently among the communities of Cape Cod and their neighbors.
- **Examine expansion of bus, rail and bicycle services** and infrastructure to villages and town centers currently un-served by alternative transportation modes.
- **Provide bicycle amenities**, such as racks and/or lockers, at park-and-ride lots, transit centers, and village centers that support bicycle networks.
- Assess ADA compliance of signalized and circular intersections and work to increase the number of **ADA-compliant intersections**.
- **Coordinate public transportation** services and schedules between regions and between providers to decrease wait times for users during connections.
- Continue to explore the potential for increased rail service to the region, including expanded seasonal rail service and **year-round commuter rail service**
- **Coordinate public transportation** services and schedules between regions and between providers to decrease wait times for users during connections.
- Focus on closing gaps in the bicycle and pedestrian network identified in previous analysis of **connections to transit routes and village centers**.
- Implement projects in the Transportation Improvement Program (TIP) consistent with the goal. Specifically:
  - TIP projects should increase the number of ADA-compliant signalized and circular intersections by 10% in 10 years
  - TIP projects should close 5 gaps in the bicycle or pedestrian network every 5 years

## Congestion Reduction

Congestion has significant adverse impacts on the movement of people and goods. Delay and poor travel time reliability negatively impact the economy and can lead to driver frustration and safety concerns. Congestion affects all modes of travel including the personal automobile, public transportation vehicles, bicycles, and pedestrians. Additionally, congestion affects other entities, such as businesses that rely on transportation access for their employees and customers. Congestion also produces more air pollution and increases greenhouse gas emissions that contribute to global warming and decreases the overall attractiveness of the region.

The objectives and performance measures under this goal are a key part of a comprehensive Congestion Management Process (CMP) for the region.

### GOAL 5: REDUCE CONGESTION AND IMPROVE TRAVEL TIME RELIABILITY

Objectives:

- Reduce delay for all modes
- Address congestion at bottleneck locations
- Improve connectivity and reliability for all modes of transportation
- Minimize the impacts of construction delays on all users, particularly impacts of Cape Cod Canal Bridge repair, maintenance and construction activities

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Strategies aimed at achieving the objectives under this goal include:

- Support the implementation of **advanced construction techniques** for Cape Cod Canal Bridge maintenance and construction projects to reduce impacts compared to standard construction practices
- Consider strategies to **address the behavioral causes** of traffic congestion such as VMT reduction strategies as well as changes to transportation infrastructure.
- Where possible, **incorporate the Congestion Management Process**, including new roadways, intersection improvements, park-and-ride, and transit capacity, into transportation projects and programs.
- **Support all strategies** for transportation demand management including, but not limited to, Transportation Management Associations, flexible hours, carpooling, bus pass programs, preferential parking, and telecommuting.
- Encourage **transit-oriented development** and provide alternatives to automobile travel by linking land use decisions with transit, bikeway, pedestrian, and park-and-ride investments.
- Consider the feasibility of **congestion pricing** on major routes on Cape Cod.
- Assess the capacity of Cape Cod's ports and harbors in accommodating ferry traffic and recommend strategies to solve existing **ferry congestion** or prevent future congestion.

- Examine the **road traffic around Cape Cod's ports and harbors** to determine the ability of the current infrastructure to accommodate ferry-related auto traffic
- Assess the capacity of Cape Cod's airports in accommodating air traffic and recommend strategies to solve existing **air traffic congestion** or prevent future congestion.
- Examine the **road traffic around Cape Cod's airports** to determine the ability of the current infrastructure to accommodate air-related auto traffic.
- **Coordinate public transportation** services and schedules between regions and between providers to decrease wait times for users during connections.
- Support efforts to reduce congestion during Cape Cod Canal Bridge maintenance and construction projects by providing **enhanced public transportation options** and public information and outreach with information on times to travel and modal options.
- Encourage the Army Corps of Engineers and MassDOT to implement all feasible **advanced construction techniques** for Cape Cod Canal Bridge maintenance and construction projects to reduce construction impacts in the surrounding area. This should include innovative construction contracted that incentives safety and minimizing delay and state-of-the-art traffic management practices
- Implement projects in the Transportation Improvement Program (TIP) consistent with the goal. Specifically: TIP projects should improve operations at 2 bottleneck locations every 5 years

Additionally, in support of this goal, the Cape Cod MPO supports the following policy:

- To reduce traffic congestion and facilitate free-flowing traffic, when developing intersection improvements involving signalization of a previously unsignalized location, construction of a **modern roundabout** shall be considered as one of the alternatives.

## System Preservation

As transportation infrastructure on Cape Cod ages, maintenance and preservation efforts will be critical to maintaining a safe and functional transportation system. Many of the elements of the transportation system are near the end of their design life meaning that significant investments will be needed to extend their useful lives or replace these elements.

A critical look at allocating limited funding as well as a deployment of new and emerging technologies will be critical in meeting the challenges of future generations.

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## GOAL 6: PRESERVE, MAINTAIN, AND MODERNIZE THE EXISTING TRANSPORTATION SYSTEM

Objectives:

- Improve the condition of all state and municipally owned bridges

- Improve the pavement condition on all federal-aid eligible roadways
- Maintain and improve on and off-road bicycle and pedestrian facilities
- Use modern technology to improve the efficiency of the transportation system
- Improve coordination and cooperation between agencies throughout all phases of project development and implementation for all improvement and maintenance projects

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Strategies aimed at achieving the objectives under this goal include:

- Reserve adequate funds for the maintenance of **alternative modes of transportation**, such as public transportation services, sidewalks, and bicycle paths.
- As transportation services are considered for areas subject to the effects of **sea-level rise**, new facilities shall be constructed with consideration to vulnerability.
- Create and implement asset management tools for **monitoring** and maintaining the existing transportation system. Include automatic traffic monitoring equipment as part of intersection upgrades.
- Support maintenance strategies and programs that **accommodate safe travel** throughout the transportation network, regardless of mode.
- Consider the **use of new technologies** that will lower costs, extend infrastructure life, lower environmental impacts, and reduce energy consumption and emissions.
- New transportation projects must consider inclusion of **intelligent transportation system (ITS)** elements, such as variable message signs, highway advisory radio, local television, web travel services, and smart signals that can provide travel data as well as react to changes in demand.
- Increase communications between agencies involved in transportation planning and utility operators to improve **coordination between utility planning and transportation planning**.
- Collaborate on the adoption of a memorandum of understanding between the MPO and MassDOT outlining how construction activities in the region (including maintenance projects) will be communicated to the MPO and how local input will be addressed by MassDOT

## Freight Mobility

Safe and efficient movement of freight is critical to local economies.<sup>13</sup> The freight industry on Cape Cod is different from most areas because of the seasonal tourist industry, abundance of waterways, and historic culture. Congestion and poor travel time reliability affect the freight industry and, by extension, the local economics. Efforts to improve the freight network on Cape Cod will support

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<sup>13</sup> <https://www.mass.gov/files/documents/2018/09/04/Freight%20Plan508.pdf>

long-term economic stability.<sup>14</sup> Truck travel time reliability performance measures can be found later in this chapter of the RTP.

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## GOAL 7: IMPROVE EFFICIENCY AND RELIABILITY OF FREIGHT MOVEMENT

Objectives:

- Reduce delays and improve travel time reliability on the freight network
  - Minimize the impacts of Cape Cod Canal bridge repair, maintenance and construction activities
  - Utilize the most efficient freight modes and technologies to minimize impacts on the community and the environment
- 

Strategies aimed at achieving the objectives under this goal include:

- **Enhance the transportation of freight on Cape Cod** to decrease travel times, increase reliability and lower costs for freight transportation providers, with minimal disruption to other transportation activities.
- Where possible, work to **consolidate freight** to move goods in the most efficient manner.
- Make available **multiple modes for freight transportation**, with infrastructure and facilities that are designed to support quick and efficient changes in mode.
- Consider inclusion of alternatives to freight traffic over the bridges (increased airport freight, short sea shipping, etc.)

## SUMMARY OF POLICIES

As a collection, the policies contained within this document are an important element of the approach needed to achieve the overall vision of the region:

- For proposed roadways with cross-sections of four or more lanes, **landscaped median dividers shall be included** to provide a reasonable level of safety and access management.
- When developing intersection improvements involving signalization of a previously unsignalized location, construction of a **modern roundabout** shall be considered as one of the alternatives.
- As roadway improvement projects are developed, **stormwater management** techniques shall be included to manage and treat surface runoff. Stormwater Best Management Practices (BMP), including Low Impact Development (LID) where feasible, shall be followed.

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<sup>14</sup> [http://www.capecodcommission.org/resources/transportation/2015-Freight\\_Study\\_02132015.pdf](http://www.capecodcommission.org/resources/transportation/2015-Freight_Study_02132015.pdf)



Stormwater treatment benefits of all TIP projects shall be quantified by the design engineer and included in the design plans.

- Consistent with current MassDOT sign policy, **business logo signs** shall not be allowed on Route 6 east of the Cape Cod Canal. “Adopt a highway” signs with business logos may be allowed at the discretion of the MassDOT District 5 Highway Director.
- For all TIP projects, potential **impacts of sea level rise**, any mitigating actions to be taken, and/or reasons such actions are infeasible shall be identified by the design engineer and included in the design plans.
- All TIP projects shall provide opportunities for **local input** including public meetings prior to development of design plans and throughout the design process.

## COORDINATION WITH STATEWIDE TRANSPORTATION AND OTHER REGIONAL PLANS

The RTP was developed in coordination with the following statewide and regional planning documents which served as guidance to establishing the region’s vision and overall goals.

### MassDOT Statewide Pedestrian Transportation Plan

The 2019 Pedestrian Transportation Plan is the State’s roadmap to make walking a safe, comfortable, and convenient option for short trips for all people. The Vision, Goals and Principles identified in this Plan informed development of the RTP. The six specific initiatives identified in the Plan *“with the ultimate goals of eliminating pedestrian fatalities and serious injuries, and increasing the percentage of short trips made by walking”* inform the development of studies in the UPWP and projects in the TIP.

### MassDOT Statewide Bicycle Transportation Plan

The 2019 Bicycle Transportation Plan is the State’s roadmap to make biking a safe, comfortable, and convenient option for everyday travel and includes planned future investments for advancing walking and biking in the Commonwealth. As with the Statewide Pedestrian Plan, the Vision, Goals and Principles identified in this Plan informed development of the RTP. The RTP seeks to deliver, within the Cape Cod region, on the priorities identified in the Initiatives and Action Plan section of the document.

### MassDOT Freight Plan

The 2023 Massachusetts Freight Plan is currently in a 30-day public comment period which ends on June 29, 2023. The Freight Plan is a planning document that will define short and long-term vision for the freight system in the Commonwealth. The principles of the draft plan are reflected in the Freight Mobility goal in the RTP.

## **MassDOT Rail Plan**

The 2018 Massachusetts Rail Plan outlines the Commonwealth's long-term plan for the statewide rail system and identifies near term priorities and a long-term investment strategy. Published before the Cape Rail Study<sup>15</sup>, the study identifies the infrastructure and existing freight and seasonal passenger rail service that serves Cape Cod. We look forward to future Rail Plan considering the provision of commuter rail service to Cape Cod.

## **Strategic Highway Safety Plan**

The 2023 Massachusetts Strategic Highway Safety Plan (SHSP) is a data-driven, strategic plan that identifies key safety needs to directs funding to reduce highway fatalities and serious injuries on all public roads. The SHSP informed the development of the Safety goal of the RTP and the development of studies in the UPWP and projects in the TIP.

## **Cape Cod Regional Policy Plan**

The Cape Cod MPO is unique in that it is staffed by Cape Cod Commission (CCC) staff who operate subject to state enabling legislation, the Cape Cod Commission Act, Chapter 716 of the Acts of 1989, as amended (the "Act"). In addition to serving as the region's regional planning agency, the Act directs that the purpose of the Cape Cod Commission shall be to:

"...further: the conservation and preservation of natural undeveloped areas, wildlife, flora and habitats for endangered species; the preservation of coastal resources including aquaculture; the protection of groundwater, surface water and ocean water quality, as well as the other natural resources of Cape Cod; balanced economic growth; the provision of adequate capital facilities, including transportation, water supply, and solid, sanitary and hazardous waste disposal facilities; the coordination of the provision of adequate capital facilities with the achievement of other goals; the development of an adequate supply of fair affordable housing; and the preservation of historical, cultural, archaeological, architectural, and recreational values."

As a result, in every endeavor, Cape Cod Commission staff strive to balance growth, the provision of adequate capital facilities and the protection of the natural resources of the Cape Cod region.

The Cape Cod Commission prepares the Cape Cod Regional Policy Plan, the regional land use policy plan for Barnstable County. The Regional Policy Plan provides a growth policy that supports the vision for the future of Cape Cod as a place of vibrant, sustainable, and healthy communities and a protected natural environment. Growth should be focused in centers of activity and areas supported by adequate infrastructure and guided away from areas that must be protected for ecological, historical or other reasons. Development should be responsive to context allowing for

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<sup>15</sup> See [www.capecodcommission.org/CapeRailStudy](http://www.capecodcommission.org/CapeRailStudy)

the restoration, preservation and protection of the Cape's unique resources while promoting economic and community resilience.

## **Comprehensive Economic Development Strategy**

In 2009, Cape Cod was designated an Economic Development District creating new regional opportunity for Federal Economic Development funding for projects and programs consistent with the Comprehensive Economic Development Strategy (CEDS) for Cape Cod. This important and valued designation followed an intense stakeholder driven regional planning effort to adopt a CEDS for Cape Cod, an economic blueprint for the region. The CEDS is an operational plan typically built on the policies and goals of the Regional Policy Plan thereby ensuring that the priorities, programs, and projects supported by the plan make advancements economically without undermining the region's most valuable and sensitive resources.

The CEDS is required by the US Economic Development Administration (EDA) to access funding for economic development planning and infrastructure construction. Together, the Cape Cod Commission and the Barnstable County Economic Development Council serve the governing board of the Cape Cod Economic Development District and jointly approve a CEDS 5-year plan, oversee implementation and approve annual reports documenting progress supporting the region's Economic Development Strategy. The CEDS identifies many priority transportation projects and initiatives including the replacement of the Bourne and Sagamore Bridge given how critical they are to the region's economy.

## **Cape Cod Section 208 Area Wide Water Quality Management Plan**

The Cape Cod Section 208 Area Wide Water Quality Management Plan (208 Plan Update), certified and approved by the Governor of the Commonwealth of Massachusetts and the US Environmental Protection Agency (US EPA) in 2015, provides a path forward to define watershed-based solutions for the restoration of the waters that define Cape Cod. Watersheds, however, rarely follow political boundaries. As the regional planning agency, the Commission was able to work across municipal boundaries and bring towns together to deal with this problem at the most effective and appropriate level—the watershed. The plan recommends actions to streamline the regulatory process, make complex information more transparent and available to citizens, abate nitrogen-induced costs already impacting the region, provide more support to local community water quality efforts, and eliminate unnecessary costs.

Consistent with the 208 framework, many towns are in the process of implementing wastewater projects including installing miles of sewer pipes under roads across the region. These projects present opportunities for coordination where transportation, wastewater, and other utility improvements can be done in a way that minimizes cost and disruption.

## **Cape Cod Climate Action Plan**

The Climate Action Plan was developed during a time of increasing concern about the changing global climate and potentially devastating local effects of widespread inaction. The Plan is the result of an intensive effort by the Cape Cod community to address a regional challenge of such significance that 79% of the region's residents believe it will impact their family's well-being. It was developed as the Commonwealth of Massachusetts took significant strides shifting the state toward a net-zero carbon emissions goal, issuing an update to the Massachusetts Clean Energy and Climate Plan and passing An Act Creating a Next-generation Roadmap for Massachusetts Climate Policy (Chapter 8 of the Acts of 2021).

Aligned with the Commonwealth's goals, the Climate Action Plan identifies strategies and actions to reduce GHG emissions and enhance local and regional resiliency to climate threats present today and increasing in severity and intensity. It was guided by several principles that shaped the approach to identifying and prioritizing solutions. The principles recognize the urgency needed in taking action and reflect consideration for the long-held regional goals that have shaped Cape Cod's growth policies and planning decisions in recent decades, as well as the considered and deliberate nature of thoughtful and responsible planning.

Transportation aspects of the Climate Action Plan are further detailed in Chapter 4 and Appendix H.

## **Regional Housing Strategy**

Affordable and attainable housing for people with various income levels and needs is key to a vibrant, healthy, and resilient region. Cape Cod is facing a significant challenge in providing affordable and attainable housing for current and future Cape Cod residents. This impacts not only those seeking housing but also our economy, as employers may struggle to find employees locally. The region's highly constrained housing market is unaffordable to many Cape Cod residents; a problem which has only become more acute over the past few years as home prices have increased significantly.

The Regional Housing Strategy will address the housing supply, affordability, and availability issues facing the region by identifying appropriate areas for housing development and crafting policies and strategies to further its goals. Successful implementation of the Regional Housing Strategy will provide residents with safe and attainable housing and will provide a more reliable workforce and customer base for our local businesses.

# FEDERALLY REQUIRED PERFORMANCE MEASURE SUMMARY

The US Department of Transportation (USDOT), in consultation with states, MPOs, and other stakeholders, established measures in performance areas relevant to the national goals. Table 5 lists federally required performance measures for the highway system and Table 6 lists federally required performance measures for the transit system.

TABLE 5. Federally Required Highway Performance Measures

NATIONAL GOAL	HIGHWAY PERFORMANCE AREA	PERFORMANCE MEASURE
Safety	Injuries and Fatalities	■ Number of fatalities
		■ Fatality rate per 100 million vehicle-miles traveled
		■ Number of serious injuries
		■ Serious injury rate per 100 million vehicle-miles traveled
		■ Number of non-motorized fatalities and non-motorized serious injuries
Infrastructure Condition	Pavement Condition	■ Percent of pavements on the Interstate System in good condition
		■ Percent of pavements on the Interstate System in poor condition
		■ Percent of pavements on the non-Interstate NHS in good condition
		■ Percent of pavements on the non-Interstate NHS in poor condition
Infrastructure Condition	Bridge Condition	■ Percent of NHS bridges by deck area classified as in good condition
		■ Percent of NHS bridges by deck area classified as in poor condition
System Reliability	Performance of the National Highway System	■ Percent of person-miles traveled on the Interstate System that are reliable
		■ Percent of person-miles traveled on the non-Interstate NHS that are reliable
System Reliability, Freight Movement, and Economic Vitality	Freight Movement on the Interstate System	■ Truck Travel Time Reliability Index
Congestion Reduction	Traffic Congestion	■ Annual hours of peak hour excessive delay per capita (for travel on NHS roadways)
		■ Percent of non-single-occupant vehicle travel
Environmental Sustainability	On-Road Mobile Source Emissions	■ Total emissions reductions

TABLE 6. Federally Required Transit Performance Measures

NATIONAL GOAL	TRANSIT PERFORMANCE AREA OR ASSET CATEGORY	PERFORMANCE MEASURE
Safety	Fatalities	■ Total number of reportable fatalities and rate per total vehicle revenue-miles by mode
Safety	Injuries	■ Total number of reportable injuries and rate per total vehicle revenue-miles by mode
Safety	Safety Events	■ Total number of reportable events and rate per total vehicle revenue-miles by mode
Safety	System Reliability	■ Mean distance between major mechanical failures by mode
Infrastructure Condition	Equipment	■ Percent of vehicles that have met or exceeded their Useful Life Benchmark (ULB)
Infrastructure Condition	Rolling Stock	■ Percent of revenue vehicles within a particular asset class that have met or exceeded their ULB
Infrastructure Condition	Infrastructure	■ Percent of track segments with performance restrictions
Infrastructure Condition	Facilities	■ Percent of facilities within an asset class rated below 3.0 on the Federal Transit Administration’s Transit Economic Requirements Model scale

Targets for federally required performance measures must be set according to timelines established in the current federal transportation legislation.

### Safety Performance Measures (PM1)

The Cape Cod MPO has chosen to adopt the statewide safety performance measure targets set by MassDOT for Calendar Year (CY) 2023. 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.

Due to higher rates of speeding caused by decreased vehicle miles traveled (VMT) amid pandemic shutdowns in 2020 and the lingering impacts in 2021, 2020 and 2021 fatalities and serious injuries increased relative to previous years. This increase means MassDOT was unable to use a pure trendline approach to set CY2023 targets that “demonstrate constant or improved performance” as required by the Infrastructure Investment and Jobs Act (IIJA). Rather than adopt a target that depicts an increase in the trend line, MassDOT developed targets by projecting 2022 and 2023 fatalities and serious injuries numbers based on a rate of change consistent with recent trends. This methodology was developed to project a future downward trend without it being significantly influenced by the lingering impacts of the pandemic.

In recent years, MassDOT and the Cape Cod MPO have invested in “complete streets,” bicycle and pedestrian infrastructure, 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 Cape Cod 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 Tracker 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 CY23, and that the Cape Cod MPO has adopted, are as follows:

- 1) Fatalities: The target number of fatalities for years CY 2023 is 355, down from an average of 360 fatalities for the years 2017-2021. [See Figure 11 and Figure 12 for the Cape Cod trend and statewide trend for this performance measure]
- 2) Rate of Fatalities per 100 million VMT: The target fatality rate for years CY 2023 is 0.59, equivalent to the 0.59 average for years 2017-2021. [See Figure 11 and Figure 12 for the Cape Cod trend and statewide trend for this performance measure]
- 3) Serious Injuries: The target number of incapacitating injuries for CY 2023 is 2,569, down from the average of 2,626 for years 2017-2021. [See Figure 13 and Figure 14 for the Cape Cod trend and the statewide trend for this performance measure]
- 4) Rate of Incapacitating Injuries per 100 million VMT: The incapacitating injury rate target for CY 2023 is 4.25 per year, down from the 4.30 average rate for years 2017-2021. [See Figure 13 and Figure 14 for the Cape Cod trend and the statewide trend for this performance measure]
- 5) Total Number of Combined Incapacitating Injuries and Fatalities for Non-Motorized Modes: The CY 2023 target number of fatalities and incapacitating injuries for non-motorists is 437 per year, down from an average of 467 for years 2017-2021. [See Figure 15 and Figure 16 for the Cape Cod trend and the statewide trend for this performance measure]

Figure 11. Cape Cod Fatalities Trend (5-year Averages)

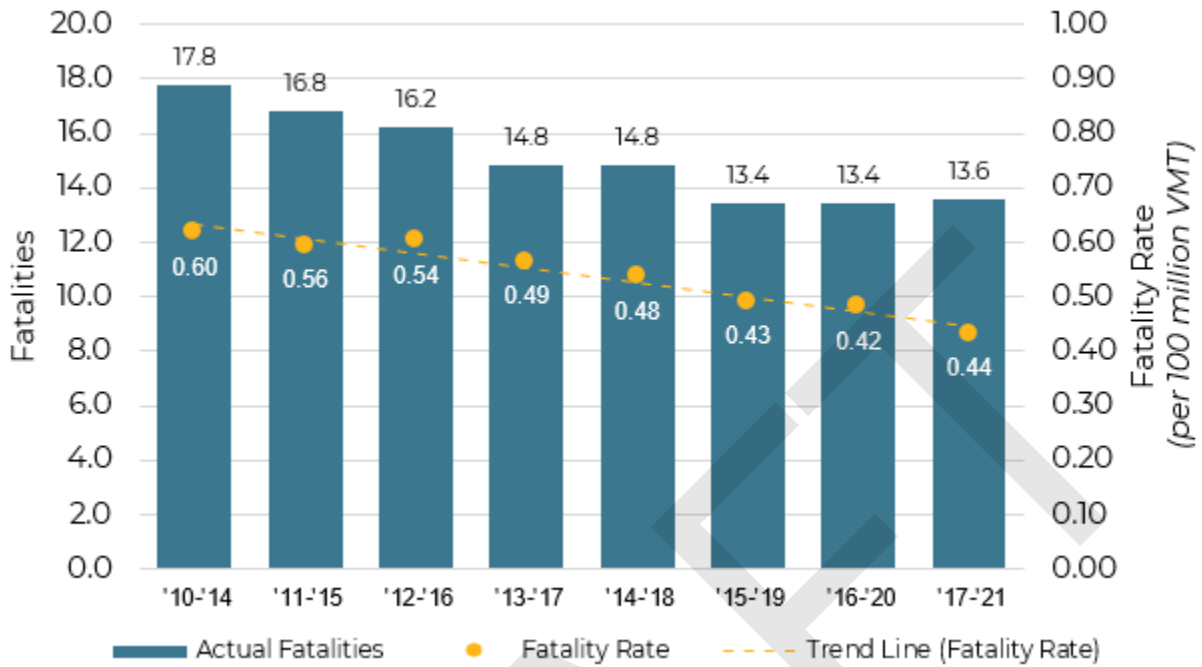


Figure 12. Statewide Fatalities Trend (5-year Averages)

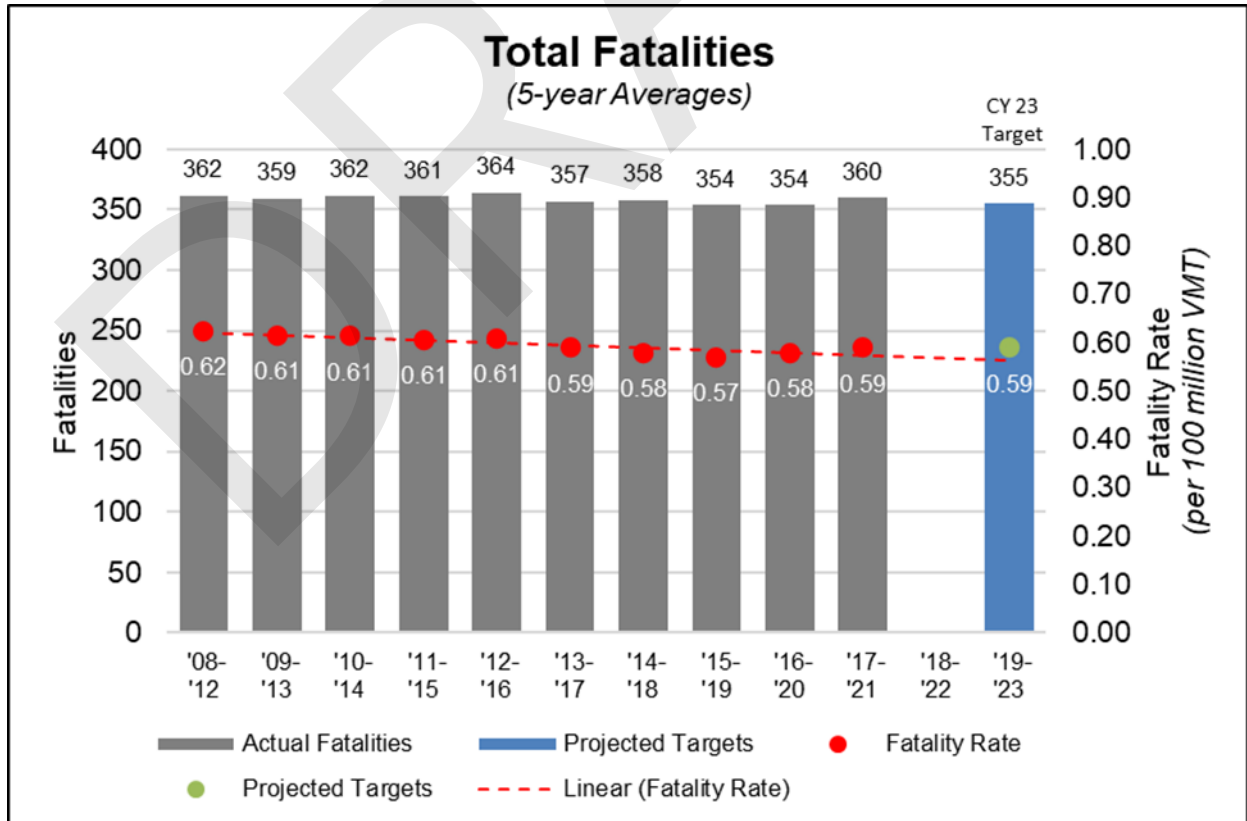




Figure 13. Cape Cod Incapacitating Injury Trend (5-year Averages)

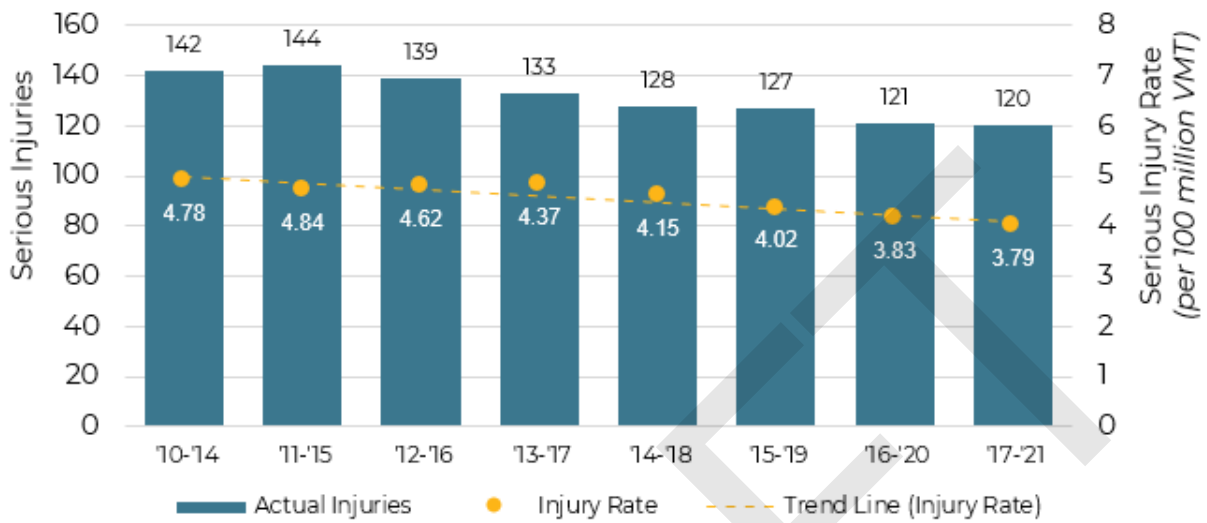


Figure 14. Statewide Incapacitating Injury Trend (5-year Averages)

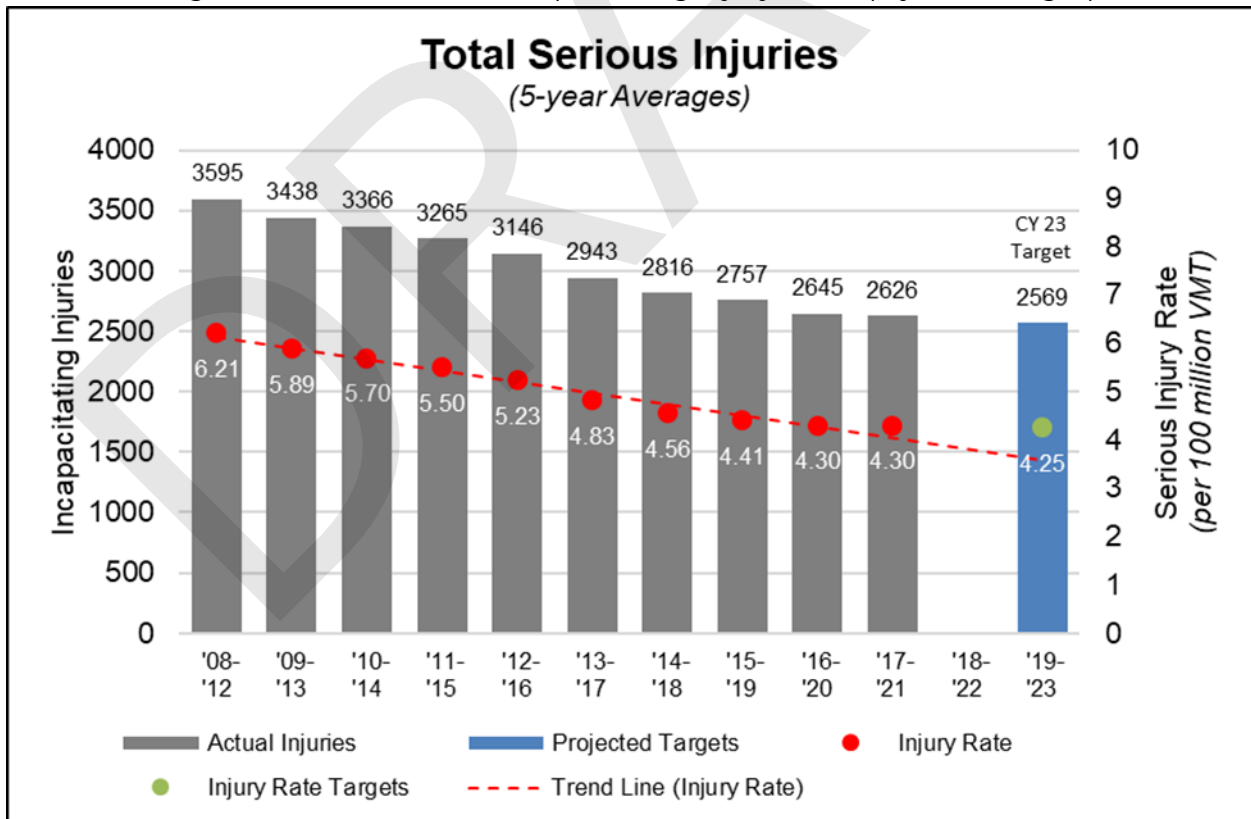


Figure 15. Cape Cod Non-Motorized Injury and Fatality Trend (5-year Averages)

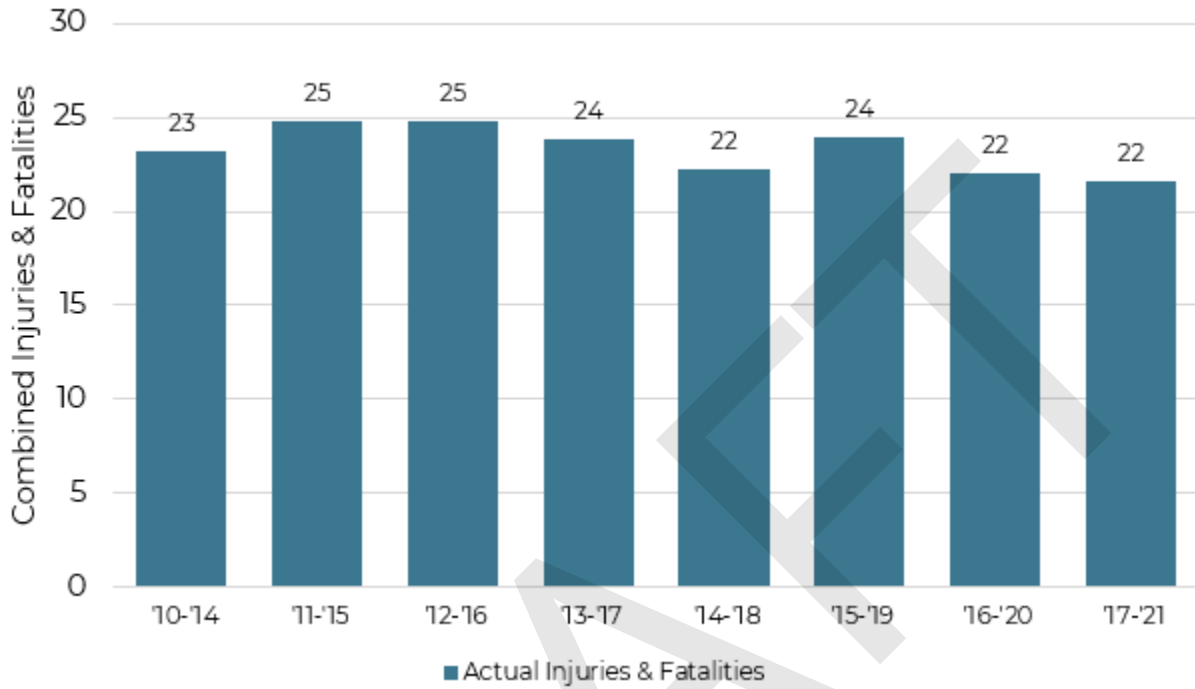
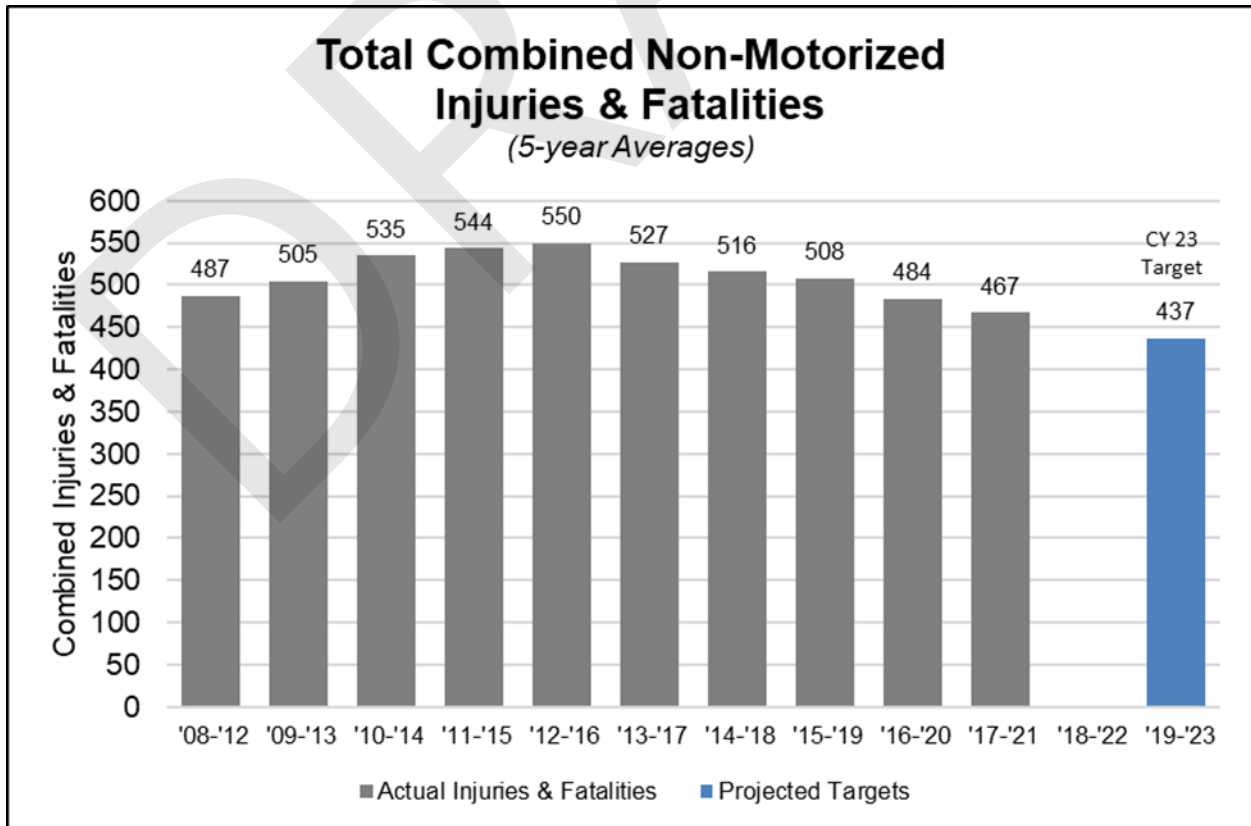


Figure 16. Statewide Non-Motorized Injury and Fatality Trend (5-year Averages)



Projects and programs identified in the Cape Cod Regional Transportation Plan and the Cape Cod Transportation Improvement Program are one way for the region to make strides towards achieving the region's safety targets. Anticipated motorist and non-motorist safety impacts are important criteria in the evaluation of projects considered for inclusion in the Cape Cod Transportation Improvement Program. The Cape Cod Regional Transportation Plan and the Cape Cod Transportation Improvement Program include projects that are anticipated to improve safety in a number of locations with demonstrated crash problems.

## **Bridge & Pavement Performance Measures (PM2)**

The Cape Cod MPO has chosen to adopt the 2-year (2024) and 4-year (2026) statewide bridge and pavement performance measure targets set by MassDOT as shown in Table 7. MassDOT was required to adopt a statewide target by December 16<sup>th</sup>, 2022. 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 2022 Transportation Asset Management Plan (TAMP).

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 (2024), 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 7. Bridge & Pavement Performance Measures (PM2) Target Summary

PERFORMANCE MEASURE	CURRENT (2021)	2-YEAR TARGET (2024)	4-YEAR TARGET (2026)
Bridges in good condition	16%	16%	16%
Bridges in poor condition	12.2%	12%	12%
Non-Interstate Pavement in good condition	n/a	30%	30%
Non-Interstate Pavement in poor condition	n/a	5%	5%

Note: Performance targets related to the Interstate System are not included in this table since there are no interstates in the Cape Cod region.

Projects and programs identified in the Cape Cod Regional Transportation Plan and the Cape Cod Transportation Improvement Program are one way for the region to make strides towards achieving the region’s bridge and pavement performance targets. Asset condition is an important criterion in the evaluation of projects considered for inclusion in the Cape Cod Transportation Improvement Program. The Cape Cod Regional Transportation Plan and the Cape Cod Transportation Improvement Program include projects that are anticipated to improve roadway and pavement condition.

### **Reliability, Congestion, & Emissions Performance Measures (PM3)**

The Cape Cod MPO has chosen to adopt the 2-year (2024) and 4-year (2026) statewide reliability, congestion, and emissions performance measure targets set by MassDOT as shown in Table 8. MassDOT was required to adopt a statewide target by December 16, 2022, with MPOs either adopting the statewide target or establishing their own by June 2023.

MassDOT followed FHWA regulation in measuring Level of Travel Time Reliability (LOTTR) on both the Interstate and non-Interstate NHS as well as Truck Travel Time Reliability (TTTR) on the Interstate system using the National Performance Management Research Dataset (NPMRDS) provided by FHWA. These performance measures aim to identify the predictability of travel times on the roadway network by comparing the average travel time along a given segment against longer travel times. For LOTTR, the performance of all segments of the Interstate and of the non-Interstate NHS are defined as either reliable or unreliable based on a comparison between the 50<sup>th</sup> percentile travel time and the 80<sup>th</sup> percentile travel time, and the proportion of reliable segments is reported. For TTTR, the ratio between the 50<sup>th</sup> percentile travel time and the 90<sup>th</sup> percentile travel time for trucks only along the Interstate system is reported as a statewide measure.

Emissions reduction targets are measured as the sum total of all emissions reductions anticipated through CMAQ-funded projects in non-attainment or air quality maintenance areas (currently the cities of Lowell, Springfield, Waltham, and Worcester, and the town of Oak Bluffs) identified in the Statewide Transportation Improvement Program (STIP). This anticipated emissions reduction is calculated using the existing CMAQ processes.

TABLE 8. Reliability, Congestion, & Emissions Performance Measures (PM3) Target Summary

PERFORMANCE MEASURE	CURRENT (2021)	2-YEAR TARGET (2023)	4-YEAR TARGET (2025)
Non-Interstate LOTTR	87.2%	85.0%	87.0%
TTR	1.61	1.80	1.75

Note: Performance targets not applicable to Cape Cod have been excluded from this table

### Transit Asset Management Measures and Targets

Transit Asset Management (TAM) is a business model that uses the condition of assets to guide optimal prioritization of funding at transit properties in order to keep our transit networks in a state of Good Repair (SGR).

Federal legislation requires all recipients of FTA funding to develop a TAM Plan and update the plan every four years. The Cape Cod Regional Transit Authority (CCRTA) is required to develop agency-specific TAM targets and the Cape Cod MPO is required to develop regional targets. The Cape Cod MPO last adopted CCRTA's FY 2020 CCRTA TAM targets for the Cape Cod region as represented in Table 9 and will review once new TAM targets are finalized.

TABLE 9. Cape Cod Transit Asset Management Performance Measures and Targets

CATEGORY	CLASS	NUMBER	MEASURE	FY2022 PERFORMANCE	FY2023 TARGET
Rolling Stock	Bus	28	% at or past ULB	0%	0%
Rolling Stock	Cutaway Bus	100	% at or past ULB	0%	10%
Rolling Stock	Vans	7	% at or past ULB	9.52%	0%
Equipment	Service Vehicle/Trucks	10	% at or past ULB	0%	10%
Facilities	Maintenance	1	% under 3.0 on TERM scale	0%	0%
Facilities	Passenger Facilities	1	% under 3.0 on TERM scale	0%	0%

Note: Useful Life Benchmark (ULB) is defined by FTA 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.” The CCRTA uses the FTA benchmark criteria for its analyses. 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).

## Transit Safety Performance Targets

The CCRTA prepared its Public Transportation Agency Safety Plan (PTASP) in December 2022 which outlines its safety training program, establishes safety performance targets, a safety management policy and safety performance monitoring. CCRTA has established the safety targets below by reviewing historic safety data, with the goal of operating to maximum safety, proactively addressing hazards as they are identified. The Cape Cod MPO adopted the transit safety performance targets for the Cape Cod region in March 2023 as summarized in Table 10.

TABLE 10. Cape Cod Transit Safety Performance Targets

MODE OF TRANSIT SERVICE	FATALITIES (TOTAL)	FATALITIES (PER 100K VRM <sup>1</sup> )	INJURIES (TOTAL)	INJURIES (PER 100K VRM <sup>1</sup> )	SAFETY EVENTS (TOTAL)	SAFETY EVENTS (PER 100K VRM <sup>1</sup> )	SYSTEM RELIABILITY (MMBF <sup>2</sup> )
Fixed Route Bus	0	0.00	8	0.6	16	1.2	20,000 miles
Paratransit	0	0.00	4	0.1	8	0.2	150,000 miles
Human Service Transportation/ Demand Taxi	0	0.00	6	0.5	12	1.0	100,000 miles
Fixed Route Bus	0	0.00	8	0.6	16	1.2	20,000 miles

<sup>1</sup> Vehicle Revenue Miles, <sup>2</sup> Mean Miles Between Failures

## REGIONAL TRANSPORTATION PLAN PERFORMANCE MEASURES

In order to determine if the objectives of the RTP are being achieved, progress must be tracked in reaching the performance targets. By preparing and regularly updating a performance report annually, adjustments to the approach can be made. MassDOT's annual performance management report, Tracker, provides an assessment of all statewide and performance measures and targets across all MassDOT divisions.

Table 11 presents regional performance measures and targets derived from the goals and objectives of the RTP. Many of the performance measures identified are tied to multiple goals.

Baseline (2021) performance is reported for performance measures where data is currently available. Some data will be utilized from MassDOT's Annual Performance Management Report Tracker<sup>16</sup>. A near-term action item will be the development of baseline assessments for performance measures where data is currently unavailable.

<sup>16</sup> <https://www.mass.gov/lists/tracker-annual-performance-management-reports>

TABLE 11. Regional Performance Measures and Targets

SYSTEM MEASURES	EXISTING 2021	2030 TARGETS	% CHANGE	LONG-TERM TARGET/DESIRED TREND
Number of serious injury crashes (per year) <sup>1,2</sup>	120	108	-10%	Zero
Serious injury crash rate per 100 Million VMT <sup>1,2</sup>	3.79	3.411	-10%	Zero
Number of fatal crashes (per year) <sup>1,2</sup>	13.6	12.24	-10%	Zero
Fatal crash rate per 100 Million VMT <sup>1,2</sup>	0.44	0.396	-10%	Zero
Younger driver fatal and serious injury crashes (per year) <sup>1,2</sup>	1,371	1,234	-10%	Zero
Older driver fatal and serious injury crashes (per year) <sup>1,2</sup>	1,465	1,319	-10%	Zero
Bicycle and/ pedestrian crashes (per year) <sup>1,2</sup>	130	117	-10%	Zero
Percent of signalized intersections with pedestrian signal heads <sup>3</sup>	68%	78%	+10%	100% with full ADA compliance
Percent of Route 28 corridor that does not have sidewalks <sup>4</sup>	42%	32%	-10%	Decrease
Travel to work by means other than single-occupancy vehicle <sup>5</sup>	27.9%	37.9%	+10%	Decrease
Mode share - walking, bicycling, and transit <sup>5</sup>	1.9%	5.7%	X 3	Increase
Population <sup>6</sup> within a half-mile of fixed route transit service	68%	73%	+5%	Increase
Travel Time Reliability on the Congestion Management Plan (CMP) Network	TBD			Improve
Number of structurally deficient bridges	3	0	-3	Zero
Percent of roadway mileage <sup>7</sup> in fair or better condition	90%	95%	+5%	>95%
Number of active permanent counting stations	11	21	+10	Increase
Number of Public Electric Vehicle (EV) charging plugs <sup>8</sup>	145	1,154	X 8	Increase

<sup>1</sup>Based on 5-year rolling average, <sup>2</sup>Existing based on most recent available data (2017-2021), <sup>3</sup>Some improvements may still be needed for full Americans with Disabilities Act (ADA) compliance, <sup>4</sup>Excludes section with no or limited access, <sup>5</sup>2021 American Community Survey Data, <sup>6</sup>2020 Census population, <sup>7</sup>Federal-aid eligible roadways, <sup>8</sup>Existing public Level 2 and DC Fast plugs per US Department of Energy (December 2022), target consistent with Cape Cod Climate Action Plan aggressive electrification scenario

# Chapter 3: Cape Cod and Transportation: Past, Present, and Future

Cape Cod and its transportation system is a story of a continually evolving community with ever-changing transportation needs. This chapter will touch on how the region arrived where it is today, what today's transportation landscape looks like, and what are the challenges and opportunities that lie ahead. Throughout the chapter there will be references to the appendices of the document where additional detail on any particular topic can be found.

## **PAST - HISTORICAL CONTEXT**

The following sections highlight some of the key developments in the transportation network on Cape Cod with thanks to the Massachusetts Historical Commission for much of the research work.<sup>17</sup> Additional detail is provided in Appendix A as well as available on Cape Cod Commission Chronology viewer available at: [www.capecodcommission.org/chronology/](http://www.capecodcommission.org/chronology/)

### **Early Trail and Road Network**

#### **EARLY TRAILS**

Before European settlers landed on Cod Cape, Native Americans, including the Mashpee Wampanoag Tribe, had established a network of trails throughout the region. Linking up key geographic locations and important natural resources, many of these trails evolved into roadway connections we are familiar with today.

#### **CONTACT (1500 - 1620) AND PLANTATION (1620 - 1692) PERIODS**

By the time the Pilgrims arrived, there was an extensive trail network stretching from one end of the region to the other. Even this far back, we can see connections that would eventually become the road network of Cape Cod. As Native Americans and Europeans used the network more extensively; trails were upgraded to cartpaths or roadways. Portions of present-day Route 6A took shape as County Road.

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<sup>17</sup> *Historic & Archeological Resources of Cape Cod & the Islands*. Massachusetts Historical Commission. Originally published August 1986. PDF reprint version, 2007.



## Expansion of Water Routes

### COLONIAL (1692 - 1775) AND FEDERAL (1775-1830) PERIODS

As local transportation and commerce increased, water routes were the life blood of the region. Land routes were improved, widened, and expanded to support connection to the ports. Figure 17. shows the expansion of the road network during the Colonial Period.

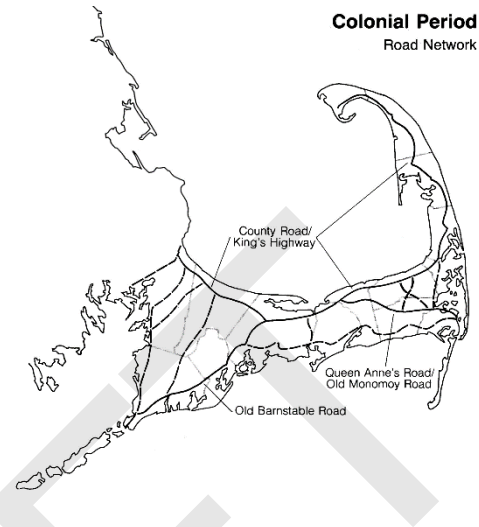


Figure 17. Expansion Land Connections on Cape Cod<sup>17</sup>

## Expansion of Railroads

### EARLY AND LATE INDUSTRIAL PERIODS (1830-1915)

The industrial period saw the development and expansion of railroads across the region. Still tied to major ports, as shown in Figure 18 rail served both freight needs as well as the emerging tourism market.

This period saw multiple expansions of the rail network ultimately including connections to almost every town on Cape Cod. As the rail network expanded, development grew up around the train depot. These pockets of development thrived while rail transportation dominated the region. As the predominance of rail waned, some of these developments evolved to meet new needs while others did not.

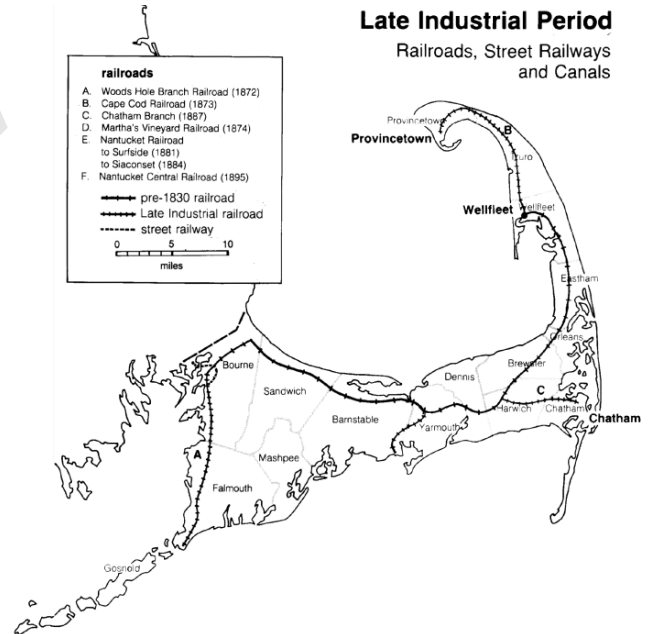


Figure 18. Rail Expansion<sup>17</sup>

## Age of the Automobile

### MODERN PERIOD TO PRESENT DAY (1915- )

The emergence of the automobile and tourism industry on Cape Cod forever changed the transportation network of the region. Construction of the Cape Cod Canal redefined the transportation landscape of the region. Expanding from the Cape Cod Canal, the transportation system was significantly expanded and modernized during the 20th century. As shown in Table 12, some of greatest expansions occurred in the 1950's.

TABLE 12. Industrial Period Infrastructure Expansion

YEAR	MILESTONE
1935	Bourne, Sagamore, and Railroad bridges over the Cape Cod Canal
1943	General MacArthur Boulevard – 4 lanes
1950	Rt. 6: Sagamore Bridge to Hyannis (exit 6) – 2 lanes
1954	Rt. 6: Sagamore Bridge to Hyannis (exit 6) – 4 lanes
1955	Rt. 6: Hyannis (exit 6) to Dennis (exit 9) – 2 lanes
1956	Rt. 6: Dennis (exit 9) to Harwich/Brewster (exit 11) – 2 lanes
1958	Rt. 6: Harwich/Brewster (exit 11) to Orleans (exit 12) – 2 lanes
1959	Rt. 6: Orleans (exit 12) to Orleans/Eastham Rotary – 2 lanes
1961	Route 28 Falmouth Expressway – 4 lanes
1967	Rt. 6: Hyannis (exit 6) to Yarmouth (exit 7) – 4 lanes
1971	Rt. 6: Yarmouth (exit 7) to Dennis (exit 9) – 4 lanes
1987	Route 25: East Wareham (I-195) to Bourne Bridge – 6 lanes

Sixty-five years after that great expansion, the region is struggling to face tomorrow's challenges with an aging transportation network. Most notably with the impending replacement of the Bourne and Sagamore Canal Bridges at the forefront. While there is debate over whether we are still in the age of the automobile, it is clear that investments in all modes are required to meet the region's future transportation needs.

# PRESENT – EXISTING CHALLENGES AND OPPORTUNITIES

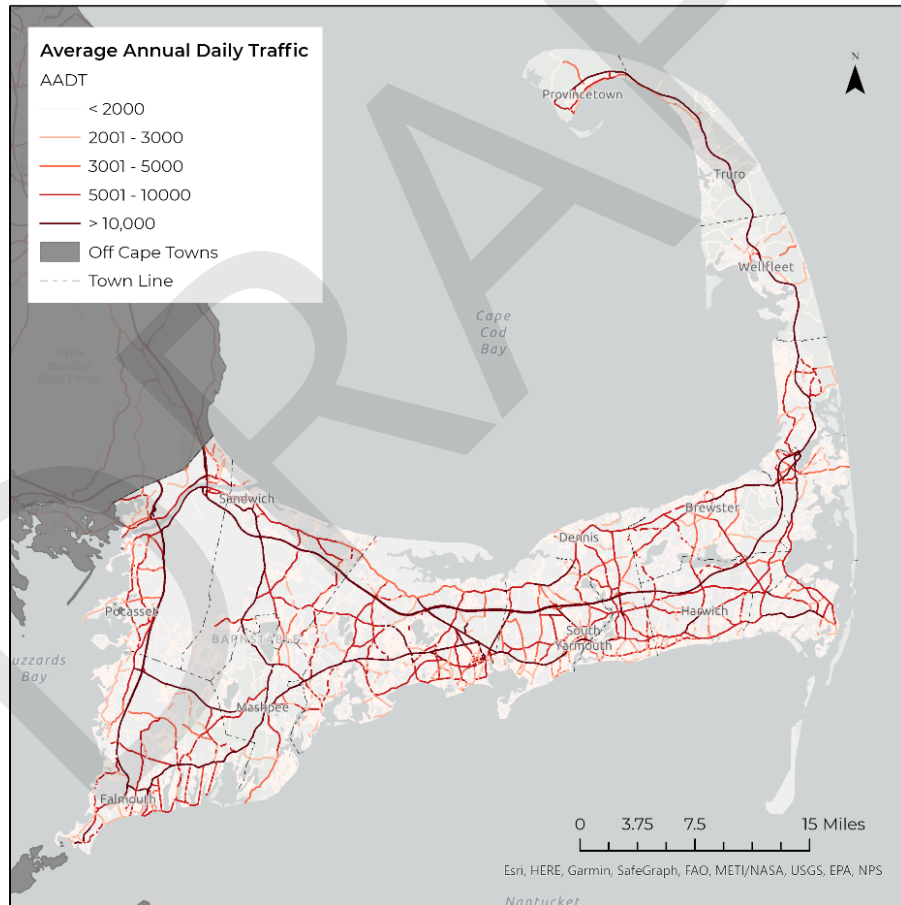
## Existing Infrastructure

The transportation network on Cape Cod is made up of a wide variety of infrastructure that support travel by all modes. Summarized in this section, the existing condition of the transportation network is detailed in Appendix B.

### VEHICLE INFRASTRUCTURE

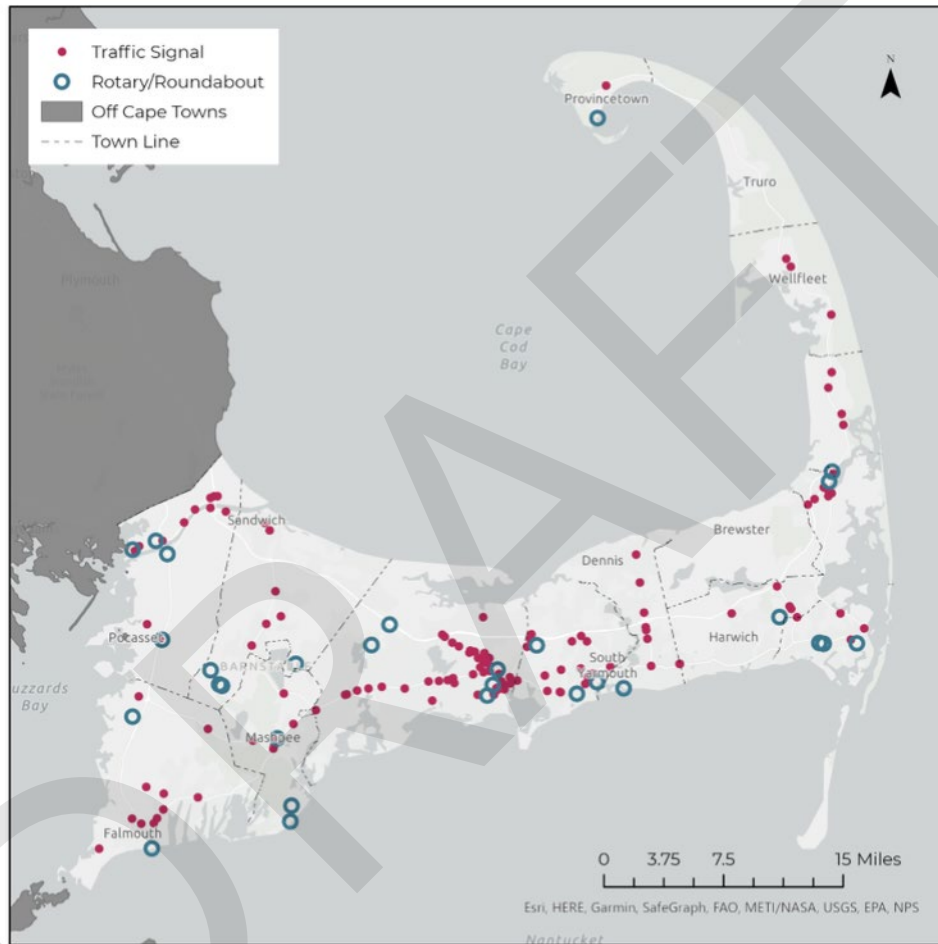
**Roads:** Cape Cod's three major routes, Route 6, Route 28, and Route 6A, comprise less than 6% of Cape Cod's roads by mileage. Over 80% of the roadways on Cape Cod are local roadways. The volumes of vehicles on the roadways of Cape Cod are shown in Figure 19.

Figure 19. Annual Average Daily Traffic



**Intersections:** As shown in Figure 20. There are approximately 135 signalized intersections and 31 circular intersections on Cape Cod. Circular intersections refer to rotaries and roundabouts. Rotaries tend to be larger in diameter, and their interior travel speed is often faster than a modern roundabout. Roundabouts are identified by smaller diameters and approaches that enter at a greater angle than rotaries – encouraging slower speeds and improved safety.

Figure 20. Intersections



**Bridges:** There are 107 municipal and state-owned bridges on Cape Cod including bridges over roadways (49), over railways (12), and over water (42). Out of these 107 bridges, three are classified as structurally deficient based on the National Bridge Inventory rating scale.<sup>18 19</sup>

<sup>18</sup> <http://www.fhwa.dot.gov/bridge/nbi.cfm>

<sup>19</sup> Based on 2022 FHWA national bridge inventory

**Intelligent Transportation Systems (ITS)** are now an important piece of infrastructure that exists within the region. Along Route 6 (Mid-Cape Highway) and on Route 28 in Falmouth and Bourne, permanent message boards display travel time to exits/major intersections on the roadway. These signs are not only helpful to display the travel times during the congested summer peak periods but during Canal Bridge maintenance activities. Figure 21 shows one of these roadside signs. This information is processed using Bluetooth technology to calculate drive times. This information has been effective at reducing distraction and driver confusion by presenting valuable information to automobile drivers outside of content received by cellphones or GPS devices. Signage also exists on Route 25 and Route 3 approaching the Cape Cod Canal Area.

Figure 21. Travel Time Signs



## BUS INFRASTRUCTURE

**Intermodal facilities** and sites are important locations where travelers can make seamless transfers between different mode of travel including regional bus service and intercity bus service. These include the Hyannis Transportation Center, MacMillan Pier and Bus Depot, Falmouth Bus Depot, Woods Hole and Hyannis Steamship Authority Piers, Sagamore Park-and-Ride Lot, Barnstable Park-and-Ride-Lot, Harwich Park-and-Ride Lot, and Hyannis Park-and-Ride Lot.

**Interregional bus service** transports travelers to and from Cape Cod. Some examples are bus service from Hyannis to New York City, or Boston to Provincetown. Users of interregional bus service include commuters who work in Boston, Logan Airport users, and those traveling or vacationing. The Plymouth and Brockton Street Railway Company, as well as Peter Pan, serve Cape Cod's interregional bus service needs.

**The Cape Cod Regional Transit Authority (CCRTA)** is the agency in charge of operating and maintaining public transit services on Cape Cod. The CCRTA offers several types of services, including fixed route service, flexible route service, and demand-response or paratransit service. Some paratransit and demand response services are contracted services. Year-round fixed services routes include the Barnstable Villager, the Bourne Run, the Flex Route, the H2O Line, the Sandwich

Line, and the Sealine. Seasonal services include the Hyannis Shuttle, the Provincetown/Truro Shuttle, and the WHOOSH Trolley. Demand-response service includes Dial-A-Ride Transportation (DART), SMART DART and ADA Paratransit Service.

The Greater Attleboro-Taunton Regional Transit Authority (GATRA) also operates one line, the Onset-Wareham Link (OWL), with stops in Bourne.

### RAIL INFRASTRUCTURE

**Railways:** Cape Cod has a single rail line, the Cape Cod Line, with three branches as shown in Figure 22. Together, they form a network of rail infrastructure to serve the freight services, scenic rail excursions, and CapeFLYER seasonal, weekend passenger service.

Figure 22. Cape Cod Rail Infrastructure



Rail infrastructure extended along the entire length of Cape Cod, from Bourne to Provincetown, in the first half of the 1900s. Service was also available along the western end, extending from Bourne to Woods Hole in Falmouth, and to Chatham. Today the expanse and usage of rail is reduced. Active rail still exists starting in Bourne and ending in three locations, Joint Base Cape Cod, Hyannis, and Yarmouth.

**Road Crossings:** Exclusive rights-of-way can limit the interaction of rail and other modes, making rail transportation safer and faster. However, crossing at roadways can pose problems if the intersection is not properly signed and designed. Currently on Cape Cod, there are 66 at-grade roadway intersections along active rail lines. Some, such as the railroad crossing at Route 28 in Barnstable, can actually interfere with roadway traffic and cause congestion and delays. Of those, 21 are not gated, signalized or signed. Although most of these are minor roadways, they do represent a potential for danger. Moreover, there are 18 grade separated roadway crossings, as well as 5 bridges over waterways along active rail lines. These bridges and overpasses must be maintained in order to ensure continued use. If rail service on Cape Cod is to be increased, further study of railroad crossings may be necessary to ensure safety and prevent interruptions to roadway traffic.

**AVIATION INFRASTRUCTURE**

For Cape Cod travelers, air transportation provides an important link from Cape Cod to Boston, New York, and the islands of Martha’s Vineyard and Nantucket. Six airfields and airports serve Cape Cod as a base for air transportation (see Table 13).

TABLE 13. Airports and Airfields of Cape Cod

NAME	FAA IDENTIFIER	FACILITY TYPE
Cape Cod Gateway Airport	HYA	Scheduled Air Carrier Service
Provincetown Municipal Airport	PVC	Scheduled Air Carrier Service
Chatham Municipal Airport	CQX	General Aviation
Falmouth Airpark	5B6	General Aviation
Cape Cod Airfield	2B1	General Aviation
Cape Cod Coast Guard Air Station	FMH	Military

The commercial service airports, Cape Cod Gateway Airport and Provincetown Municipal Airport, supply data on total enplanements to the Federal Aviation Administration (FAA). In 2021, Cape Cod Gateway reported 19,520 enplanements and Provincetown Municipal Airport reported 7,707 enplanements.<sup>20</sup>

**MARITIME INFRASTRUCTURE**

Cape Cod has approximately 586 miles of tidal coastline, with many inlets and bays that provide marine access to the land. Major channels including the Cape Cod Canal, the Woods Hole Channel, and Nantucket Sounds Channels provide important connections for vessels. Major harbors including Woods Hole Harbor, Hyannis Harbor, Provincetown Harbor, Falmouth Harbor,

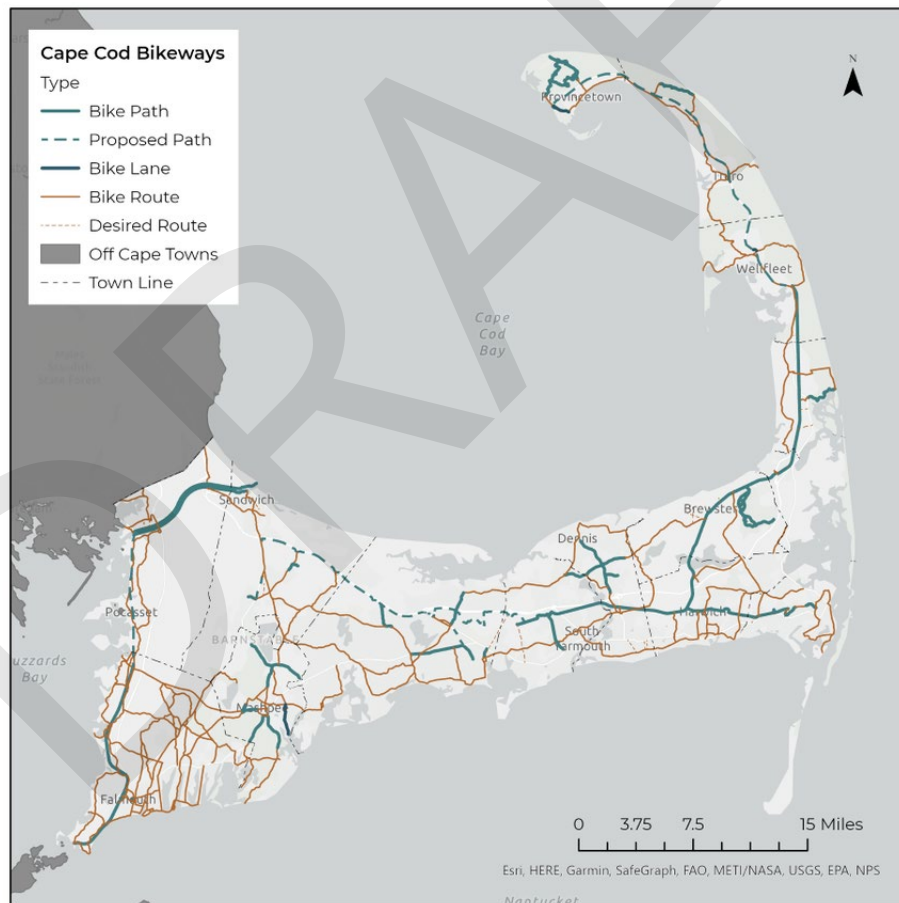
<sup>20</sup> 2021 Air Carrier Activity Information System data

Saquatucket Harbor (Harwich Port), Wellfleet Harbor, Stage Harbor (Chatham), Barnstable Harbor, Sandwich Marina, Red Brook Harbor (Bourne), and Sesuit Harbor (Dennis) provide connections to land-based transportation. The nine ferry routes provide connection from Falmouth (Falmouth Harbor and Woods Hole), Hyannis (Hyannis Harbor), Provincetown (Fisherman’s Wharf), and Harwich Port (Squatucket Harbor) to Martha’s Vineyard, Nantucket, Boston, and Plymouth.

### BICYCLE AND PEDESTRIAN INFRASTRUCTURE

There are numerous destinations and pathways for bicyclists and pedestrians to use on Cape Cod. There are three basic types of bicycle infrastructure: paths, lanes, and routes. Paths generally have their own separated right-of-way and follow certain standards for width, grade, and accessibility. Bicycle lanes are separate lanes within roadways marked for bicycle use. Bicycle routes are roadways with wide shoulders that have been designated for bicycle use. Figure 23 shows these facilities on Cape Cod.

Figure 23. Bicycle Paths and Routes



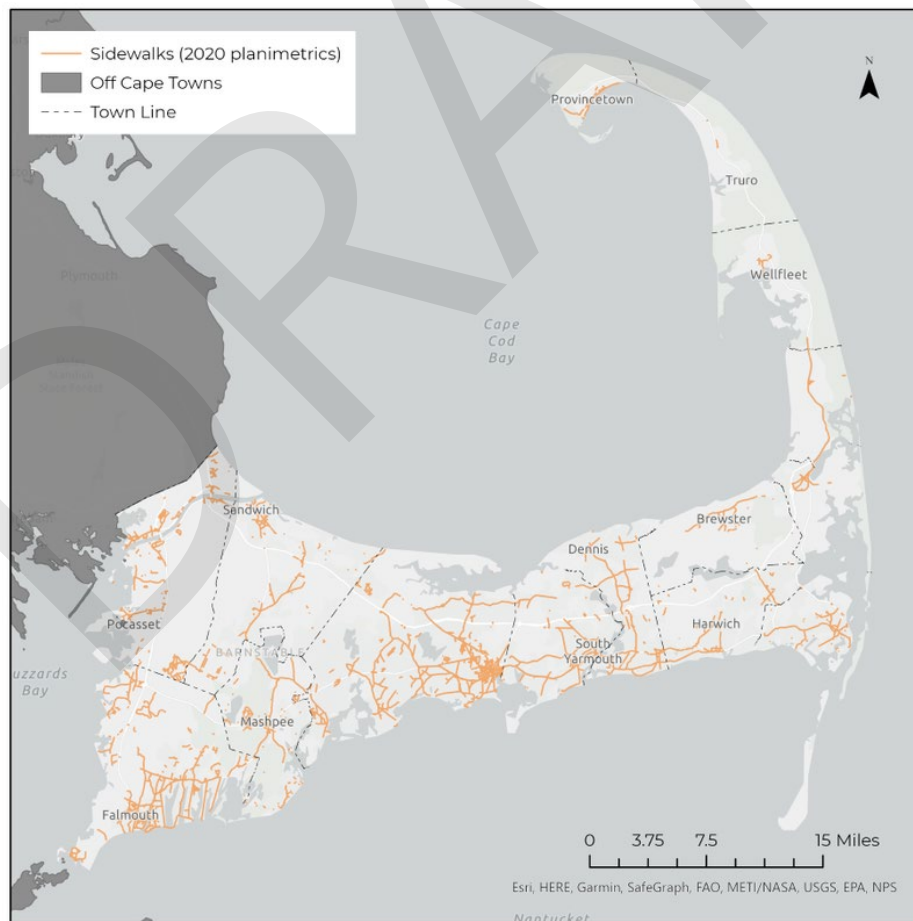
There are over 90 miles of multi-use paths on Cape Cod with the longest being the Cape Cod Rail Trail, Cape Cod Canal Bike Paths, Shining Sea Bikeway, and numerous paths in the Cape Cod National Seashore and Nickerson State Park.



Many bicycle routes exist on Cape Cod, some of which are better signed than others. They allow bicycle users a wide network of travel across Cape Cod. The Claire Saltonstall Bikeway, or State Bicycle Route 1, is a series of bicycle paths and on-street routes that travel from Boston to both Provincetown and Woods Hole. The Cape Cod section of the Claire Saltonstall Bikeway is 98.3 miles in length. The Bourne to Provincetown portion is about 75.4 miles long, while the Bourne to Woods Hole portion is 22.9 miles long. MassDOT is currently planning a signage wayfinding project to re-sign the Claire Saltonstall Bikeway and reflect its latest routing which is proposed to generally follow shared use paths where present including the Cape Cod Rail Trail.

Pedestrians utilize shared use paths and sidewalks. Facilities of this type support village centers and local businesses and encourage travelers to walk instead of drive. The Americans with Disabilities Act requires sidewalk curb cuts to be large enough and shallow enough for wheelchair usage. Telephone poles, road signs, and other architectural barriers must also be removed in order to create an unobstructed path for walking. In Massachusetts, bicyclists may ride on sidewalks outside business districts unless otherwise prohibited by local ordinances. As shown in Figure 24, over 90% of Cape Cod roadways do not have sidewalks.

Figure 24. Cape Cod Sidewalk Network



The sidewalk network also includes crosswalks. Crosswalks provide a safe means for pedestrians and other sidewalk users to cross roadways. Generally, crosswalks located on lower volume roads have no traffic control devices, or a sign telling motorists to yield to pedestrians. However, many crosswalks have crossing signals that stop traffic, allow pedestrians to cross, and warn pedestrians when traffic is about to resume. Typically, crossing signals are located with traffic signals at roadway intersections.

## **Safety**

The concern over safety is made clear in the first goal of the Regional Transportation Plan:

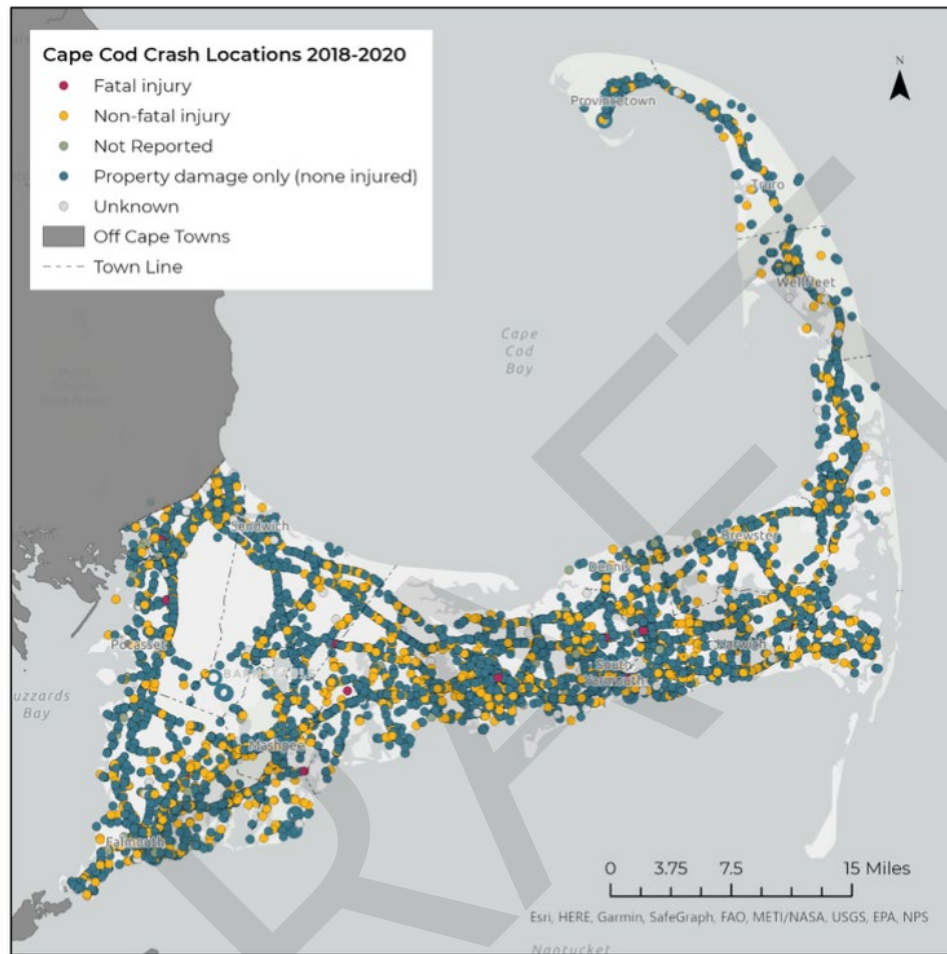
### **“PROVIDE SAFE TRAVEL OPTIONS FOR ALL USERS”**

Transportation users have a right to a transportation system where their person and possessions will arrive at their destinations unharmed and undamaged. Summarized in this section, Appendix B, provides additional detail on the seasonal and year-round issues affecting transportation safety on Cape Cod.

### **BARNSTABLE COUNTY HIGH CRASH LOCATIONS**

In 2022, the Cape Cod Commission completed an effort to rank the top intersections of critical safety concern across Cape Cod. Before the data could be gathered and sorted into any particular order or rank, it was necessary to specify the characteristics that signify an intersection as a safety concern. The Commission decided that there are several ways to interpret crash data – meaning, several possible ways to determine which intersections are of highest safety concern. Base data for this analysis was provided by the Massachusetts Department of Transportation (MassDOT) in the form of geographically located crash clusters for the most recently available three years of data (2018-2020). The data provided by MassDOT included the number of reported crashes at each location and the severity of the crashes. It should be noted, however, that this dataset only includes incidents whose reports contained enough information to accurately locate them. Of the 14,405 crash reports collected by the Massachusetts Registry of Motor Vehicles, 13,753 incidents were located by MassDOT. The incidents are mapped on the following Figure 25.

Figure 25. Cape Cod Located Crashes (2018-2020)



### CAPE COD DRIVERS

The demographics of Cape Cod depict a typical year-round resident that is older than the average population in the United States. A large and increasing percentage of Cape drivers are 65 and older. According to the Census Bureau 2017 estimates, 28.5% or 60,860 residents of Barnstable County, are aged 65 or older. This steadily increasing proportion of drivers will experience declining vision, slowed decision making and reaction times, additional difficulty in dividing attention between potential conflicts and traffic information, and reductions in strength, flexibility, and overall fitness. In many cases, these difficulties will outweigh the additional experience that older drivers have operating an automobile. The large majority of drivers who suffer from age-related driving deficiencies are not aware that a problem exists.

Recommendations to accommodate older drivers include:

- Considering protected left turn phases at signalized intersections;

- Maintaining delineation through more frequent restriping and street cleaning;
- Improving signage standards to include larger lettering;
- Improving lighting level standards, in particular at intersections. Consider placing utilities underground and installing breakaway safety poles for lighting;
- Considering “all red” phases for signalized intersections;
- Establishing driver education programs for older drivers; and
- Providing education on other options for mobility.

On the roads with these older drivers is another group of drivers with a unique set of characteristics, younger drivers. Younger drivers are more prone to risk-taking behavior and are subject to influences of youth culture and peer pressure. Considering their exposure, young drivers involved in more fatal crashes than any other age group. There are slight differences between younger and older drivers in the types of crashes they experience. For example, young drivers have more speeding and alcohol-related crashes. Younger drivers’ crashes are frequently caused by inexperience, poor judgment, and risk taking, while older drivers’ crashes are more often related to reduced physical and cognitive capabilities.

Recommendations to accommodate younger driver safety issues are divided between residents and visitors:

- Increased education for local young drivers.
- Additional enforcement and warnings during the busy traffic season to reach out to young visitor drivers.
- Develop and implement an advertising campaign and roadside signage reminding drivers that traffic and drunk-driving laws are strictly enforced on Cape Cod.

## **SAFETY ANALYSIS AND RECOMMENDATIONS**

Further analysis of crash data along with recommendations for reducing crashes on Cape Cod roadways is included in Appendix B. Additionally, analysis of bicycle and pedestrian crash and recommendations are presented in the Appendix F.

### **Security**

Security is an important consideration when discussing the region's transportation network. Summarized in this section, Appendix D includes a discussion of the ways in which the transportation system is prepared to handle threats of any nature including natural events such as hurricanes as well and man-made hazards.

The most frequently identified security concern is the threat of a weather-related event such as a hurricane. In many cases, Cape Cod residents and visitors “shelter in place,” a term that refers to staying in homes or local shelters that are supplied with food, water, etc. Residents should heed warnings of public safety officials and evacuate accordingly. A “Cape Cod Emergency Traffic Plan”

has been developed by the Massachusetts State Police in cooperation with the Massachusetts Emergency Management Agency and several other agencies to facilitate the egress of a high volume of traffic from Cape Cod in the event of a hurricane, particularly during peak tourist season.

Discussions of emergency traffic planning, public transportation security, air travel security, and intelligent transportation systems are also included in Appendix D.

## **Freight**

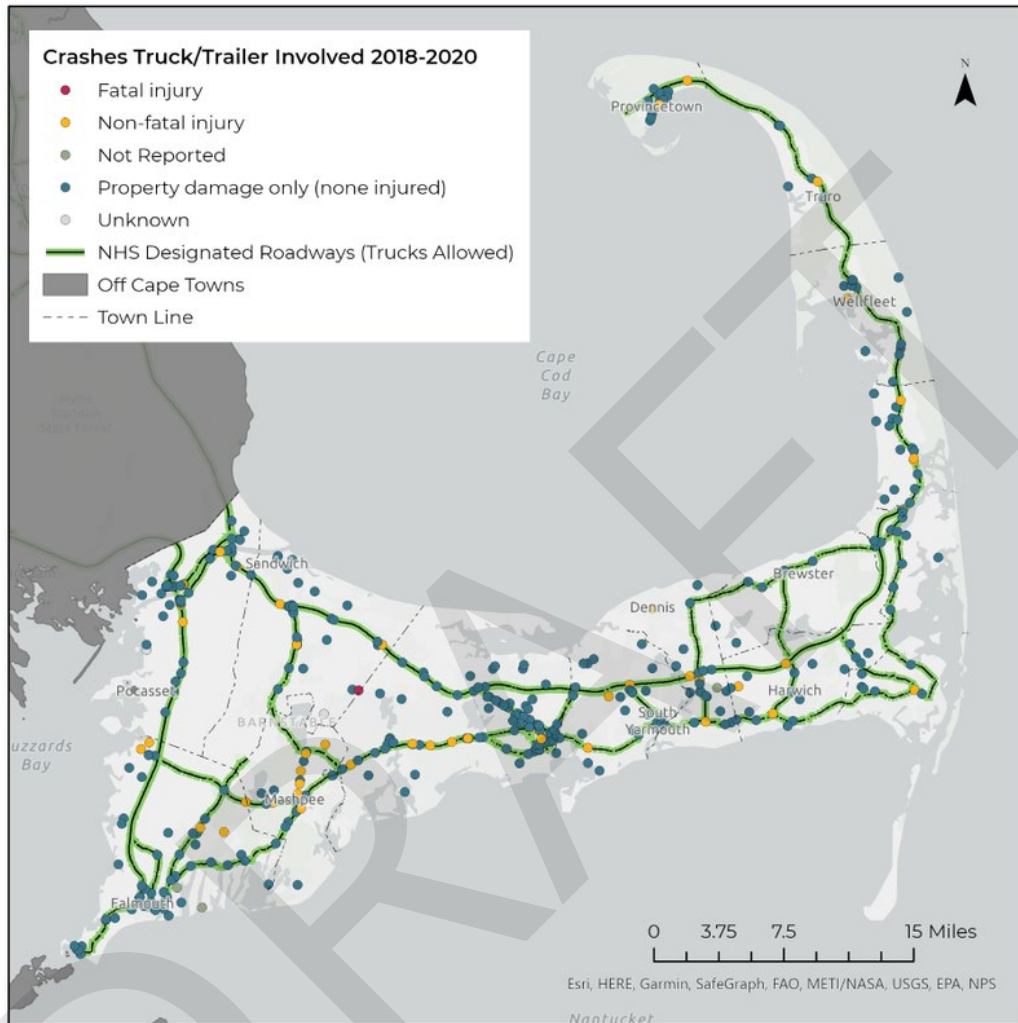
Safe and efficient movement of freight is critical to the local economies. Recognizing the importance of freight to the regional, the Cape Cod Commission conducted regional Freight Study in 2014. Summarized in this section, Appendix E, details some of the unique challenges the movement of freight on Cape Cod faces as well as identifies potential opportunity to improve the freight network on Cape Cod identified in the Freight Study.

There are no National Highway Freight Network (NHFN) roadways on Cape Cod, but there are over 250 miles of designated truck routes on Cape Cod. There are three sections that are designated as Critical Freight Corridors by BIL. Two urban sections are located in Barnstable on Route 132 and Yarmouth Road and a rural section is located on Route 6 in the towns of Wellfleet and Truro. Freight transportation also relies on many roadways off their freight routes to make connection to their ultimate destinations.

Freight transportation presents unique safety challenges and crashes involving commercial motor vehicles deserve special consideration. As shown in Figure 26, freight crashes occur both on and off the designated truck routes on Cape Cod. Based on the MassDOT 2023 Freight Study, which was released for public review in June 2023, there is a roadway segment along Route 6 in Eastham that has a history of crashes involving freight with three crashes recorded between 2017 and 2021.

Freight by all modes, including truck, rail, and water are covered in Appendix E along with the results of a Freight Survey conducted as part of the 2014 Freight Study.

Figure 26. Truck Routes and Reported Crashes



## **Bicycle & Pedestrian**

Bicyclists and pedestrians, while having a minimal impact on the environment, are our most vulnerable users and the most in need of a safe transportation network. Summarized in this section, Appendix F, details crashes, road safety audits, pedestrian safety and planning studies, planning tools, and planning efforts related to bicycles and pedestrians on Cape Cod.

### **CAPE COD BICYCLISTS AND PEDESTRIANS**

To varying degrees, all travelers at some point in their journey are pedestrians. This occurs in the short walking trip from a parked car to a destination (or from a parked bicycle or after disembarking from a bus).

### **BICYCLE AND PEDESTRIAN CRASHES**

Bicyclists and pedestrians face a number of challenges on Cape Cod roadways. The mixture of narrow roadways, high traffic volumes, and inconsistent accommodations create a great deal of difficulty for vehicle-bicycle and vehicle-pedestrian interactions. There was a total of 406 such crashes involving non-motorists between 2018-2020.<sup>21</sup> Additional crashes may have occurred between bicyclists and between bicyclists and pedestrians, but they often go unreported.

### **SHARED-USE PATH VISION**

A priority for the region is improving both on-road and off-road accommodation for all non-motorists.

One means of improving these accommodations is by expanding the off-road shared-use path network, known as Vision 88, as envisioned in Figure 27. Vision 88 is a long-term goal to have a off-road shared use path on Cape Cod from Woods Hole to Provincetown, totaling 88 miles. There is also the goal to connect the Cape Cod shared use path vision with the bicycle paths planned in the adjacent regions. The Southeastern Planning and Economic Development District (SRPEDD) has a shared use path vision that will end in Wareham and it is envisioned that a connection via the Cape Cod Canal path can be constructed to connect to towns northwesterly of Cape Cod. Similarly, the Old Colony Planning Council (OCPC) has a goal to provide bicycle connections to the Cape Cod region via Plymouth and will likely connect on State Road (Route 3A) or Herring Pond Road.

Improved accommodation also comes from improved on-road shared use path routing and signage. MassDOT completed a Cape Cod Route 28 Corridor Study in September 2020, which summarizes a vision for the build-out of multi-modal infrastructure along the entire Route 28 network from Falmouth to Orleans. Figure 28 shows an example of the recommended cross section for a section of Route 28 that is classified as a Suburban Commercial Center.

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<sup>21</sup> MassDOT Registry of Motor Vehicle Crash Records



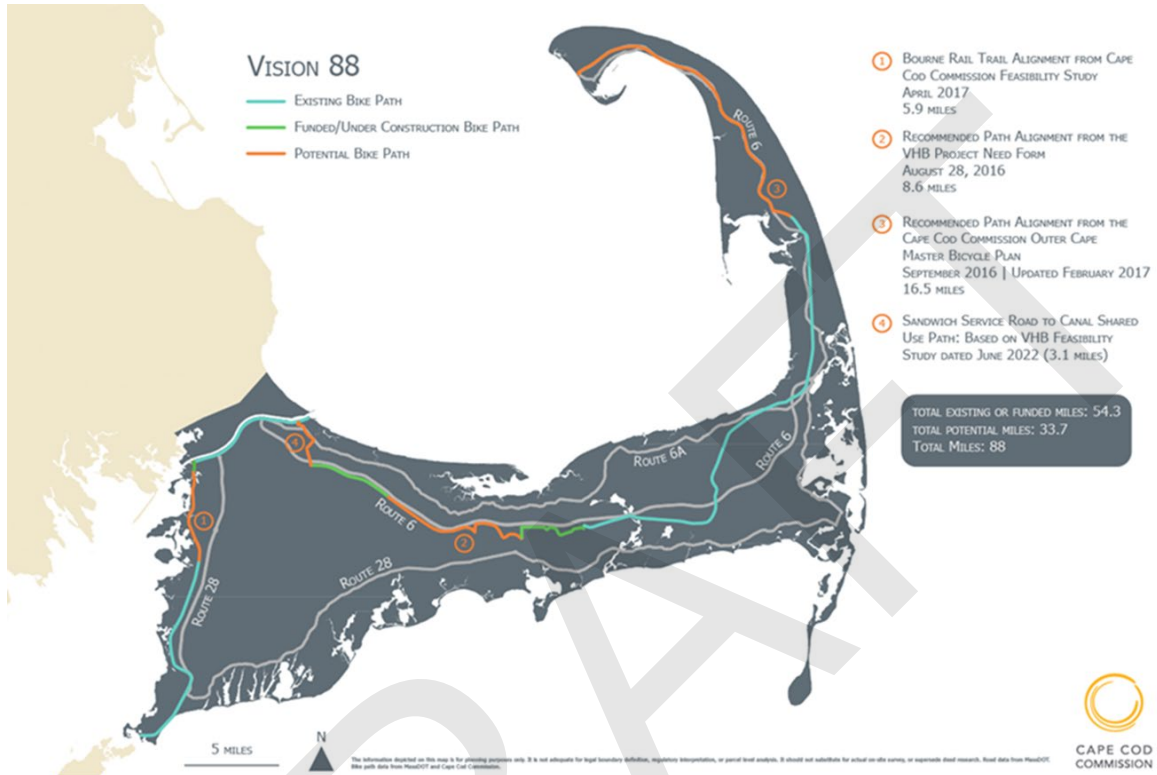


Figure 27. Shared-Use Path Vision Map (Vision 88)



Figure 28. MassDOT Route 28 Corridor Study complete streets recommendations



## Congestion Management

In conjunction with the 2024 Regional Transportation Plan (RTP), an updated Congestion Management Program (CMP) was developed for the Cape Cod Region as described in brief below and detailed in Appendix G. The CMP network focuses on the two main routes in the Cape Cod Region; Route 6 and Route 28. Route 6 and Route 28 provide access to all 15 towns within the region. Both corridors experience regular congestion with known crash history year-round, but also account for the corridors with the greatest potential to provide increased multi-modal options within the region. They are both also important freight corridors connecting goods to all 15 towns.

Modeled after FHWA guidance, the Cape Cod CMP includes the following eight action items:

- Develop Regional Objectives
- Define CMP Network
- Develop Multimodal Performance Measures
- Collect Data/Monitor System Performance
- Analyze Congestion Problems and Needs
- Identify and Assess Strategies
- Program and Implement Strategies
- Evaluate Strategy Effectiveness <sup>22</sup>

The Cape Cod CMP has focused on the following three (3) goals and objectives:

### Goal 1: Improve Safety

**Objective:** Reduce crashes on Route 28 and Route 6 for all modes of travel.

### Goal 2: Increase Multi-modal Accommodations

**Objective:** Increase multi-modal options for non-motorists along Route 28 and Route 6 to reduce single occupancy vehicles and reduce congestion.

### Goals 3: Reduce Congestion

**Objective:** Aim to reduce congestion at specific bottleneck intersections on Route 28 and Route 6 on Cape Cod.

The CMP will be monitored with the following multi-modal performance measures:

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<sup>22</sup> Congestion Management Process: A Guidebook. Federal Highway Administration. April 2011. Report No. FHWA\_HEP\_11\_011.

- Traffic Volumes
- Travel Time Reliability and Planning Time Index
- Number of Crashes (all modes)
- RITIS Bottleneck Ranking Data
- Transit Ridership
- Park-and-Ride lot usage
- Walkability Rating
- Transportation Demand Management

Data collection efforts will focus on the CMP performance measures and will be summarized to assist in identification and assessment of potential strategies to meet the goals of the CMP. Potential strategies to reduce congestion within the Cape Cod region range from:

- Management and expansion of park-and-ride lots
- Geometric improvements for certain bottleneck intersections
- Bicycle and pedestrian improvements
- Optimization of signal timings
- Increased transit service (including rail and inter-city bus)
- Leverage transit technology
- Access Management

## **Stormwater Management**

Stormwater runoff is caused by precipitation from rain and snowmelt events which flows over land or impervious surfaces and is unable to percolate into the ground. In natural systems, precipitation may be directly infiltrated into the subsurface, stored in natural depressions, or reintroduced to the atmosphere through evapotranspiration. However, development such as buildings, roads, sidewalks, and paved driveways increase impervious surface area and alter natural hydrology. The increase in impervious cover that accompanies development results in two main issues related to stormwater: 1) greater volume and peak flows of runoff and 2) transportation of contaminants into water bodies.

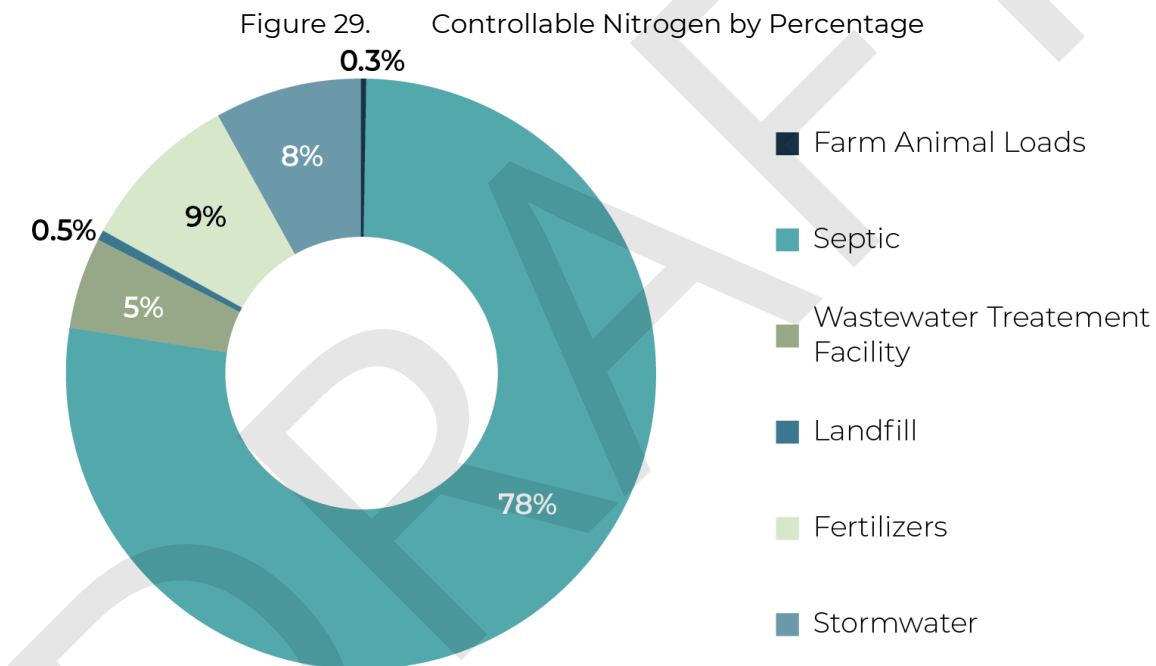
### **WATER QUANTITY**

What makes Cape Cod a unique area for stormwater management is the combination of highly porous native soils left by the retreating glaciers and shallow groundwater levels, which are especially prevalent in coastal communities. Well-drained soils readily infiltrate runoff, providing excellent volume reduction of stormwater. A consequence of this rapid infiltration is that minimal natural reduction of nutrients and pollutants is provided, which, in combination with the high water table, can result in negative impacts to groundwater quality.

## WATER QUALITY

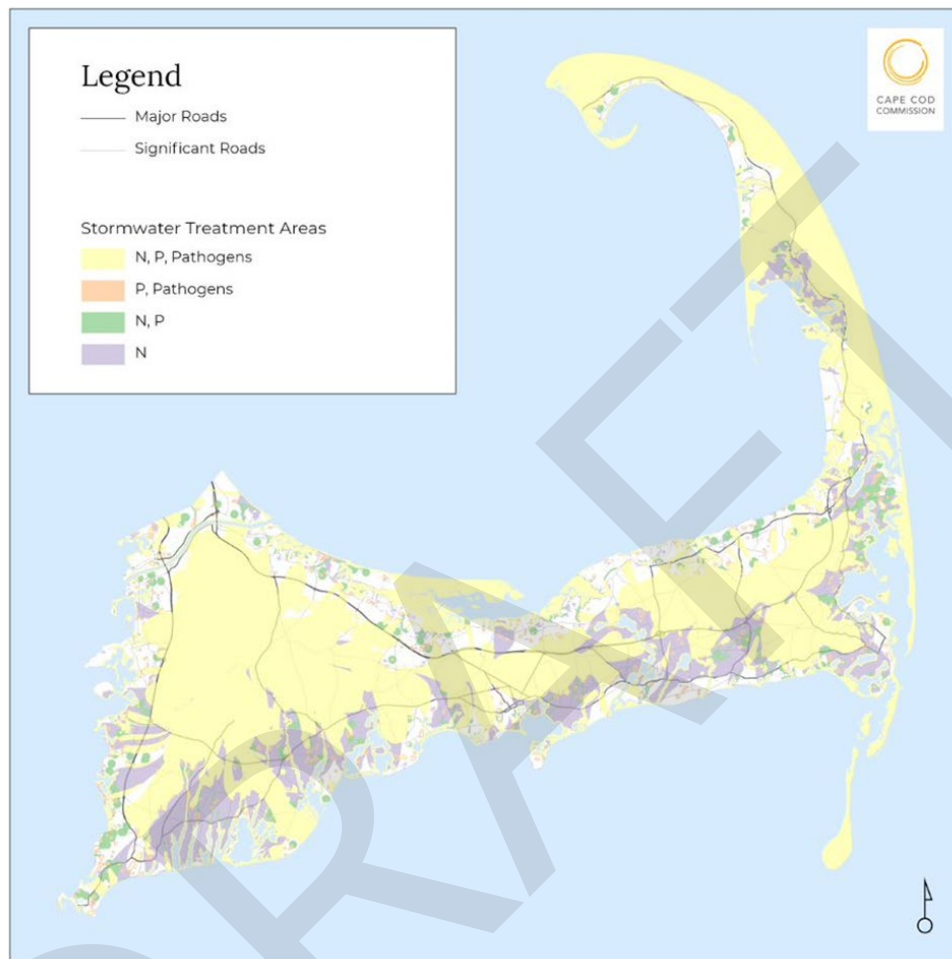
Where most efforts to manage stormwater focus on moving the volume of water off roadways, stormwater management on Cape Cod also requires addressing the quality of stormwater that infiltrates to the Cape's groundwater (drinking water) resources and the Cape's coastal estuaries.

Of particular concern to the coastal estuaries is the introduction of additional nitrogen, a nutrient that through eutrophication can lead to hypoxia, fish kills, loss of eel grass, and aesthetically unpleasant conditions. While the largest share of nitrogen entering the Cape's embayments comes from septic systems, as shown in Figure 29. Eight percent of the controllable nitrogen entering embayments Cape-wide comes from stormwater runoff. Stormwater's nitrogen contribution is significant, and in certain individual watersheds the stormwater contribution may be significantly larger than the Cape-wide average.



While nitrogen is the primary stormwater component of concern in marine waters, phosphorous is a similar concern for Cape Cod's freshwater resources, while bacteria and pathogens impact fresh and marine resources alike. Figure 30 presents several resource areas and pollutants of concern associated with them. These sensitive areas are detailed in Appendix I, and include (among others) pond buffers, river buffers, wetlands area, and watersheds requiring nitrogen removal to meet water quality standards.

Figure 30. Stormwater Sensitive Areas



### LOW-IMPACT DEVELOPMENT AND STORMWATER BEST MANAGEMENT PRACTICES

Low-impact Development (LID) is a comprehensive, conservation-based approach to stormwater management systems. A LID approach is appropriate both at the site level as well as in roadway design. Environmentally sensitive roadway design involves incorporating LID techniques to prevent the generation of stormwater and non-point source pollution by reducing impervious surfaces, disconnecting flow paths, treating stormwater at its source, maximizing open space, minimizing disturbance, protecting natural features and processes, and/or enhancing wildlife habitat.

Best management practices (BMPs) are control measures to limit untreated, polluted stormwater runoff from reaching waterbodies. BMPs can be categorized in to two categories: structural and non-structural BMPs.

Non-structural BMPs include street sweeping, environmentally conscious road salting procedures, maintenance of stormwater utilities, and education and public outreach programs.

Structural BMPs that have potential applicability on the Cape's roadways include:

- Porous pavement (other)
- Leaching Catch Basins (infiltration)/ Infiltration Basins (infiltration)
- Sub-surface Sediment Chambers (pretreatment + infiltration)
- Retention Pond (treatment)
- Bioretention (treatment)
- Advanced Bioretention (treatment)
- Water Quality Swales (conveyance, treatment, infiltration)
- Constructed Stormwater Wetlands (treatment)

BMP costs, removal efficiencies, and maintenance notes are presented in Appendix I.

**Figure 31.** Bioswale/Rain-Garden in at the Hyannis Transportation Center



A comprehensive approach to stormwater management and treatment both at the site level and on the Cape's roadway network is essential to the long-term viability of the region's natural environment. Stormwater infrastructure management is an important long-term investment for maintaining the region's roadway safety and the quality of its water resources. When integrated into larger planning and design efforts, it can fit seamlessly into the local character of the region, help meet stormwater permit requirements, and take advantage of cost savings. The bio-swale, shown in Figure 31. with long-maintenance ornamental grasses, provides an added green element to the streetscape. <sup>23</sup>

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<sup>23</sup> Source: Bridgewater, CT

## Pavement Management

Pavement Management is the practice of planning for pavement repairs and maintenance with the goal of maximizing the value and life of a pavement network. There are distinct advantages to managing pavement condition and significant cost savings that can take place with preventative or rehabilitation measures rather than waiting until a road is in need of reconstruction (see Figure 32).

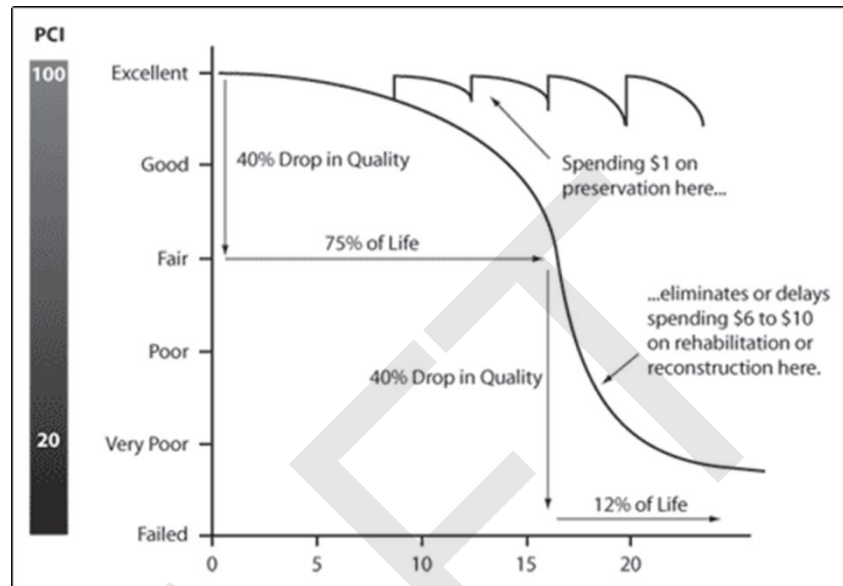


Figure 32. Pavement Deterioration Curve (FHWA)

The pavement condition of roadways under the jurisdiction of MassDOT is monitored by MassDOT. The pavement condition on municipally owned roadways is monitored by each town following varying methodologies. Most use commercial pavement management systems while others rely on local knowledge.

To supplement any data collected by MassDOT on roads under their jurisdiction and the data collected locally, Cape Cod Commission staff conducts regional pavement analysis on the federal-aid eligible municipal road network. Covering one-third of the road mileage each year, a three-year cycle provides an overall view of the pavement condition federal-aid eligible municipal roadways on Cape Cod. Table 14 presents the latest pavement conditions for federal-aid eligible municipal roadways on Cape Cod. Evaluation criteria procedure and evaluation criteria are presented in Appendix J.

TABLE 14. Pavement Condition on Federal-aid Eligible Municipal Roadways<sup>24</sup>

TOWN	VERY GOOD TO EXCELLENT	GOOD TO VERY GOOD	FAIR TO GOOD	POOR TO FAIR	POOR	TOTALS
Barnstable	3.1	12.2	87.7	7.9	0.3	111.2
Bourne	1.3	2.7	29	8.7	0.2	41.9
Brewster	2.6	10.1	9.8	2.7	1.4	26.6
Chatham	0.0	0.4	11.5	0.9	0.0	12.8
Dennis	0.4	10.6	33.9	0.5	0.0	45.4
Eastham	0.5	2.3	12.4	1.7	0.0	16.9
Falmouth	2.4	11.3	60.7	10.7	0.3	85.4
Harwich	0.3	9.2	30.4	3.2	0.0	43.1
Mashpee	0.0	1.4	23.2	5.0	0.0	29.6
Orleans	0.6	3.6	12.1	0.6	0.0	16.9
Provincetown	0.0	1.4	11.4	0.6	0.0	13.4
Sandwich	0.7	7.5	24.0	5.1	0.7	38.0
Truro	0.0	2.5	6.4	3.5	0.0	12.4
Wellfleet	0.7	2.9	15.5	0.6	0.0	19.7
Yarmouth	1.6	12.6	37.2	0.7	0.0	52.1
Total:	14.2	90.7	405.2	52.4	2.9	565.4

### Access to Essential Services and Regional Cooperation

Safe and convenient access to essential housing, employment, healthcare, education, recreation and transportation services or facilities on Cape Cod are critical to the region’s residents and visitors. The location and access opportunities and challenges to these services or facilities are detailed in Appendix K.

<sup>24</sup> From the 2022 Cape Cod Pavement Management Report available at: [www.capecodcommission.org/pavement](http://www.capecodcommission.org/pavement)

In order to improve access to and between these essential services the following will be addressed through various efforts outlined in this plan:

- Reduce congestion for all modes,
- Improve travel time reliability for all modes,
- Improve safety for all modes,
- Increase connections opportunities between different modes,
- Close gaps in the bicycle and pedestrian network, and
- Improve transit options.

As detailed in the discussion of RTP development in Chapter 1, this and other planning efforts include or consideration of a wide range of federal, state, and local agencies and organizations. As detailed in Appendix K, the partnerships within and beyond the region are critical to ensuring that the region maintains a comprehensive and inclusive approach to transportation planning.

## **FUTURE – REGIONAL TRENDS AND A VISION FOR 2050**

### **Regional Trends**

Reviewing historic regional demographic trends, the future for Cape Cod is in many ways uncertain. While the region experienced decades of growth through the 20<sup>th</sup> century, the population saw a slight decline between 2000 and 2010, before growing between 2010 and 2020. There are many unique dynamics in play on Cape Cod and, as a result, projecting the Cape Cod population out to 2050 is a challenging task.

To assist the MPOs in preparing their RTPs, MassDOT provided population projections for each region. The MassDOT projections are largely based on the forecast work of the UMass Donahue Institute (UMDI) with adjustments made by the MassDOT Office of Transportation Planning. In reviewing the MassDOT population projections, Cape Cod MPO staff raised concerns that these projections do not effectively capture the factors that make Cape Cod's population patterns distinct from the many year-round working communities in Massachusetts. As a retirement destination, the Cape's population and economy is far more impacted by migration than by natural growth; we do not feel that the Mass DOT projections effectively account for future migration and retirement patterns and thus underestimates population and employment growth on Cape Cod going forward. The unique characteristics of the region became particularly apparent when the region experienced significant growth compared to the rest of the state during the COVID-19 pandemic. "Population estimates developed by the U.S. Census Bureau suggest that the seasonal areas of Massachusetts, including the Cape and Islands and southern Berkshires, all experienced dramatic



population growth near the time of the 2020 Census count, which is consistent with stakeholder observations describing an influx of residents during the pandemic.”<sup>25</sup>.

In parallel to the development of the of RTP, the Cape Cod Commission contracted with UMDI to conduct a Cape Cod Regional Housing Needs Assessment<sup>26</sup>. As part of this effort regional population estimates were developed including a “standard,” consistent with the MassDOT statewide projects, and an alternative “high” projection series. As detailed by UMDI in the Cape Cod Regional Housing Needs Assessment.<sup>27</sup> “Assumptions in each series differ based on how each one factors the abrupt population growth experienced in the region at the start of the COVID-19 pandemic into future migration rates. While both the standard series and the high series use the robust Census 2020 population counts for the 2020 “launch” – or starting point – populations, the high series also incorporates the large increase in population growth that occurred shortly before and during the 2020 Census count into its migration rates, and assumes those trends will continue in the future. In contrast, the standard series assumes that the 2019-to-2020 period represents an off-trend year of population change and, instead, incorporates the population change observed through 2019 and extrapolated to 2020 into future migration rates. The rationale for developing two distinct rates is that the COVID-19 pandemic had a profound effect on domestic migration in the region, but there is uncertainty as to whether that migration represents a short-term phenomenon or is instead indicative of a “new normal.””

To reflect these concerns and the uncertainty of population projections out to 2044, Figure 33 shows both the MassDOT statewide projection for the Cape Cod region as well as an alternative “high” projection. Three

Regardless of how the region changes over the next 20 years and beyond, the Cape Cod MPO is committed to supporting a transportation system that best serves the residents and visitors to the region.

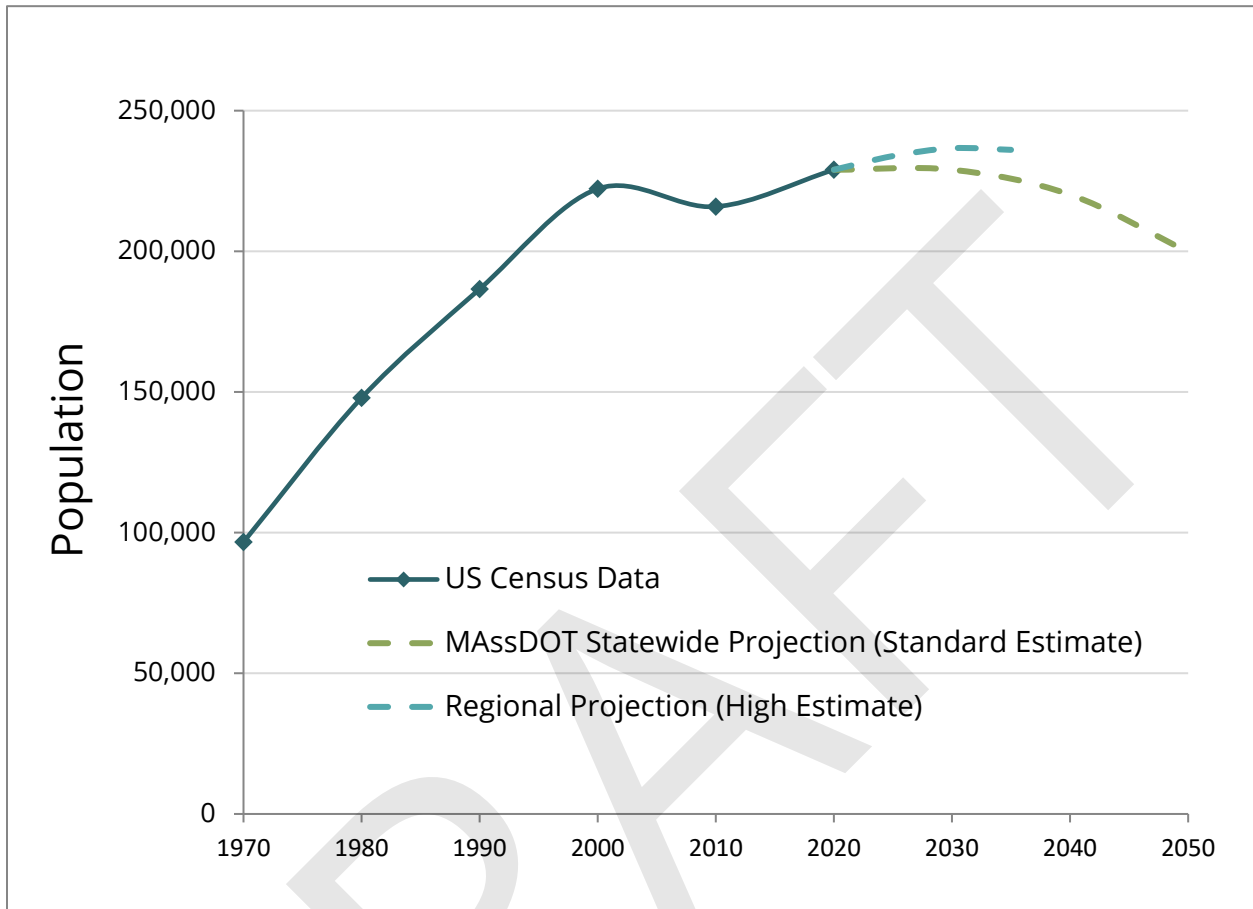
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<sup>25</sup> Cape Cod Regional Housing Needs Assessment (2023). Available at [www.capecodcommission.org/housing](http://www.capecodcommission.org/housing)

<sup>26</sup> Cape Cod Regional Housing Needs Assessment (2023). Available at [www.capecodcommission.org/housing](http://www.capecodcommission.org/housing)

<sup>27</sup> Available at [www.capecodcommission.org/housing](http://www.capecodcommission.org/housing)

Figure 33. Cape Cod Population Trends and Projections



Additional details on the population, employment, and housing are presented in Appendix P.

## Cape Cod Canal Bridges Program

The Bourne and Sagamore Bridges provide the only vehicle crossings of the Cape Cod Canal for motorists, pedestrians, bicyclists, and goods. The bridges have served as a vital economic link to Cape Cod since they were first opened to traffic in 1935. The United States Army Corps of Engineers (USACE) owns and maintains the Cape Cod Canal, areas surrounding the canal, and the Bourne, Sagamore, and Railroad Bridges. The Massachusetts Department of Transportation (MassDOT) owns and maintains most of the roadway infrastructure approaching the Bourne and Sagamore Bridges.

At the time of adoption of this plan, MassDOT, in partnership with the Federal Highway Administration (FHWA) and the New England District of the USACE, is advancing the Cape Cod Bridges Program (Program) in the town of Bourne, Barnstable County, Massachusetts. The Program proposes replacement of the Bourne and Sagamore highway bridges and reconfiguration of the highway approach networks north and south of the Cape Cod Canal to align with the replacement highway bridges. The replacement bridges, and their interchange approaches will accommodate shared use pedestrian and bicycle paths that connect to the local roadway network on both sides of Cape Cod Canal in the town of Bourne. This Program is a continuation of previous studies conducted by the MassDOT and the USACE to evaluate the current condition and recommend improvements to the Cape Cod Canal bridges and roadways.

### CAPE COD CANAL BRIDGES PROGRAM: BACKGROUND

#### MassDOT Office of Transportation Planning (OTP) Cape Cod Canal Transportation Study

MassDOT's Cape Cod Canal Transportation Study<sup>28</sup>, completed in October 2019, was launched to identify existing and future multimodal transportation deficiencies, and needs around the Cape Cod Canal area. This conceptual planning study's findings provide recommendations for improving multimodal connectivity and reliability across the Canal.

#### USACE Major Rehabilitation Evaluation (MRE) Study and Decision

The purpose of the study was to determine whether major rehabilitation or replacement of the Bourne and/or Sagamore Highway Bridges would provide the most reliable, fiscally responsible solution for the future. The Study culminated in the Major Rehabilitation Evaluation Report<sup>29</sup> (MRER) which was published in March 2020.

On April 3, 2020, an official decision was made by the USACE and the Assistant Secretary of the Army for Civil Works to replace the current Sagamore and Bourne bridges with two new bridges

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<sup>28</sup> Study available at: <https://www.mass.gov/cape-cod-canal-transportation-study>

<sup>29</sup> Study available at: <https://www.nae.usace.army.mil/Missions/Projects-Topics/Cape-Cod-Canal-Bridges-Major-Rehabilitation-Study/>

built to modern day standards. MassDOT will be evaluating this recommendation in our own public process.

#### Memorandum of Understanding (MOU) between MassDOT and the USACE

On July 7, 2020 an MOU<sup>30</sup> was executed between MassDOT and the USACE regarding the Sagamore and Bourne bridges. The below bullets outline the commitments of the MOU in the event that the bridges are replaced.

USACE will:

- Own, operate and maintain the existing bridges until Program completion
- Share information, provide technical support and facilitate transfer of ownership of the bridges to MassDOT

MassDOT will:

- Lead program delivery to complete the feasibility study and alternatives analysis, preliminary design and environmental permitting process, and conduct bridge construction.
- Own, operate, and maintain the completed bridges and approaches

#### **CAPE COD CANAL BRIDGE PROGRAM: PURPOSE AND NEED**

The purpose of the Program is to improve cross-canal mobility and accessibility between Cape Cod and mainland Massachusetts for all road users and to address the increasing maintenance needs and functional obsolescence of the aging Bourne and Sagamore highway bridges, which are owned, operated, and maintained by the USACE, as part of the Cape Cod Canal Federal Navigation Project.

In order to fulfill the purpose of the Cape Cod Bridges Program, the following transportation-related problems and unsatisfactory conditions need to be addressed within the project area:

- Structural condition of the Bourne and Sagamore bridges and their frequent maintenance requirements
- Substandard design of the Bourne and Sagamore bridges, including the approaches and their interface with the adjacent roadway network, and
- Peak period congestion and traffic operations

Data supporting each of these identified transportation needs is provided below.

#### **CAPE COD CANAL BRIDGE PROGRAM: MAJOR MILESTONES**

Construction is anticipated to commence after MassDOT completes preliminary design and environmental permitting. There are many factors that will influence schedule, including but not limited to: identification of construction funding, determination of the National Environmental Policy Act (NEPA) Class of Action, public feedback, packaging of construction contracts and construction

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<sup>30</sup> Information on the MOU available at <https://www.mass.gov/news/memorandum-of-understanding-reached-between-massdot-and-the-us-army-corps-of-engineers-regarding-bourne-and-sagamore-bridges>

procurement methodology, and more. This information will develop as the program progresses and will be communicated in future rounds of public engagement.

Estimated Program milestones that are subject to change include:

- Phase 1: Beginning in June of 2021, efforts have involved public outreach and involvement and data collection to include environmental conditions and traffic patterns.
- Phase 2: Based on public input, MassDOT develops and refines bridge and roadway options.
- Phase 3: MassDOT identifies preferred options. Environmental documentation process begins.
- Design development.
- Phase 4: MassDOT completes preliminary design and environmental permitting.
- Phase 5: Construction underway.
- Delivery: The Cape Cod Bridges Program is completed.

At the time of publishing this plan, five rounds of public engagement have been completed including meetings attended by nearly 4,200 individual, over 1,700 comments received, over 4,000 contacts included in Program database, and stakeholder meetings occurring with each round of engagement. Topics in these engagements have included: Purpose and Need, Bridge type, Bridge lane configuration, Bridge locations, and Interchange alternatives.

A major milestone was reached in April 2023 when an Environment Notification Form (ENF) was filed for the Program with the Massachusetts Environmental Policy Act (MEPA) Office. It was published in the Environmental Monitor on May 10, 2023 and a Massachusetts Secretary of Energy and Environmental Affairs Certificate on the ENF and Scope of Draft Environmental Impact (DEIR) is expected in July 2023.

### **CAPE COD CANAL BRIDGE PROGRAM: FUNDING**

One of the largest considerations for the Program is sourcing the necessary funding. USACE and MassDOT are working to identify potential modes of funding as federal policies change and new opportunities become available. Some major funding milestones to date include:

- On November 15, 2021, President Biden signed into law the Infrastructure Investment and Jobs Act (IIJA). This authorized \$1.2 Trillion for transportation and infrastructure spending. Much of the IIJA funding is available through competitive grant programs.
- The United States Army Corps of Engineers (USACE), in partnership with MassDOT, submitted a grant application under the Multimodal Project Discretionary Program for the National Infrastructure Project Assistance (Mega) and the Nationally Significant Multimodal Freight and Highways Projects grant (INFRA) program as well as the Bridge Investment Program funding for year 1 of 5 for these federal discretionary programs.
- In January 2023, it was announced that the Program, through the USACE, will receive an approximately \$1.6 million Bridge Planning grant.

- In President Biden’s 2024 Budget Proposal recommends “an initial \$350 million for replacement of the Cape Cod Canal bridges, toward a commitment of \$600 million, and a legislative proposal that would allow the Corps to transfer those funds to the Commonwealth of Massachusetts, which is better suited to design and construct the replacement bridges.” The budget proposal further “proposes authorizing the Corps to transfer ownership of these bridges to the Commonwealth, which would be responsible for their future operation and maintenance.”<sup>31</sup>
- In May 2023, Massachusetts Governor Healy indicated an intent to double the state’s contribution to the Program, from the \$350 million included in the Transportation Bond Bill, up to \$700 million.
- Going forward, MassDOT and USACE will continue to monitor developments at the federal level for future grant opportunities.

### CAPE COD CANAL BRIDGE PROGRAM: LOOKING AHEAD

The Cape Cod MPO is encouraged by the continued dialog at the federal, state, regional, and local levels regarding Cape Cod Canal infrastructure and looks forward to implementation of solutions, including all modes of transportation, that meets the needs of the regional and the travelling public. Continued dialogue and coordination between the with the US Army Corps, MassDOT, towns potentially impacted by the project, and the entire region should occur as the projects move forward into the design phase. With the majority of potential infrastructure changes and potential direct impacts occurring within the Town of Bourne, particular attention should be paid to ensuring that the Town is well-presented throughout the design and decision-making process.



Figure 34. Cape Cod Canal Bridges Draft Bridge Type

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<sup>31</sup> <https://www.whitehouse.gov/omb/budget/>

## **A Vision for the Future**

Cape Cod's transportation system has both shaped and been shaped by development patterns of the region. As our regional economy has evolved so too has our transportation infrastructure. From a reliance on ports and marine transport, to a steady growth by rail, and explosion of change fueled by the automobile – our region has undergone dramatic changes. All the while, our connection with our environment and our past has continued to define us. What will define our region for the next 20 years?

As a region, Cape Cod we face a number of challenges that will have to be addressed over the coming decades. The Cape Cod Canal Bridges are in need of replacement along with the adjacent roadway infrastructure. The region faces limited vacant land, a lack of housing inventory and affordability, potential loss of habitat as a result of development pressure, impaired watershed from excess nitrogen loading, tourism dependence with a lack of year-round jobs paying a living wage, automobile dependence, and the impacts of climate change. In different ways, smart transportation investment decisions can help to address these challenges facing the region.

While many uncertainties exist about the future, strength of the transportation infrastructure will undoubtedly be a key to our long-term vitality. As a region, we must establish a vision for our region's transportation system and identify our priorities for investing financing resources in maintaining and improving this system. The 2024 Regional Transportation Plan (RTP) sets forth this vision for the region and sets the framework for making smart transportation investments within the region through 2044 and beyond.

# Chapter 4: Livability, Climate Change Planning, and Scenario Planning

Livability, climate change planning, and scenario planning are important planning concepts that are incorporated through the region's transportation planning process and directly into the Regional Transportation Plan (RTP).

## **LIVABILITY**

Livability is about tying the quality and location of transportation facilities to broader opportunities such as access to good jobs, affordable housing, quality schools, and safer streets and roads. Livability can be supported through funding transportation related projects and sponsoring activities like Context Sensitive Solutions and public involvement that help enable people to live closer to jobs, save households time and money, and reduce pollution. This principle reinforces the growth policy in the updated RPP, which promotes guiding new development and redevelopment into existing centers of activity. Focusing development in areas of existing centers of activity can provide more opportunities for people to live closer to jobs, friends and family, and activities, and can allow for more efficient use of resources and infrastructure.

As part of the United States Department of Transportation's (USDOT) Livability Initiative, the Federal Highway Administration (FHWA) works within the Interagency Partnership for Sustainable Communities to coordinate and leverage federal housing, transportation, water, and other infrastructure policies and investments. The Partnership for Sustainable Communities developed the following principles to guide efforts:

1. Provide more transportation choices
2. Promote equitable, affordable housing
3. Enhance economic competitiveness
4. Support existing communities
5. Coordinate policies and leverage investment
6. Value communities and neighborhoods<sup>32</sup>

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<sup>32</sup> <http://www.fhwa.dot.gov/livability/>

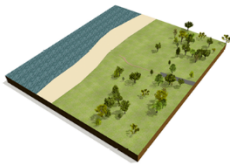


Livability directly benefits people who live on, work on or visit Cape Cod, increases property values and business activity, and can improve public health and safety. Transportation decisions can have a major impact on livability and the region's character.

The character of Cape Cod is a critical component of the communities and livability of the region. Many different and unique places with varying character exist across the region. The 2018 Regional Policy Plan identifies eight Cape Cod Placetypes—areas with similar natural and built characteristics—that illustrate the different character areas and contexts found throughout the region: Natural Areas, Rural Development Areas, Suburban Development Areas, Historic Areas, Maritime Areas, Community Activity Centers, Industrial Activity Centers, and Maritime and Transportation Areas. Each Placetype has its own vision, as well as a description of its defining characteristics and development patterns. To ensure that transportation projects protect the existing character of the region and foster greater livability, the context of a project must be considered and integrated into the design of the project. The Cape Cod Placetypes provide a framework for such context-sensitive design. The Cape Cod Placetypes are illustrated in Figure 35.

Transportation projects within and connecting Community Activity Centers will be key to improving the livability of the region. Because Community Activity Centers already have a concentration of commercial and community activity and compact form, there exists an opportunity for people to live, work, and play in a smaller area. Streetscapes within and connecting Community Activity Centers need to be attractive, safe, and suitable for a variety of transportation modes (particularly walking). Further developing these centers of activity and their transportation networks can create opportunities for people to meet and interact, helping to create community networks, reduce traffic and the amount of resources needed for transportation infrastructure, improve public health by promoting pedestrian activity and reducing pollution, all of which are components of livability. Additionally, integrating context-sensitive design into the transportation project process will help preserve environmental and historical assets, which are critical components of the region's character, economy, and livability. Context-sensitive design and Community Activity Centers are central to the Livability and Sustainability goal and associated objectives and performance measures discussed in Chapter 2.

Figure 35. Cape Cod Placetypes



**NATURAL AREAS**

Natural Areas are generally the region's least developed and most sensitive areas.



**RURAL DEVELOPMENT AREAS**

Rural Development Areas are defined by a high percentage of open lands and sparse building development patterns that contribute to the unique rural and scenic character of the region.



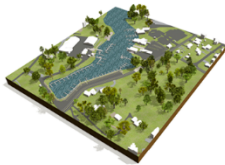
**SUBURBAN DEVELOPMENT AREAS**

Suburban Development Areas include residential neighborhoods built primarily between the 1950s and 1990s as well as automobile-oriented commercial and light industrial development established during the same time period.



**HISTORIC AREAS**

Historic Areas consist of concentrations of historic structures, including local and/or National Register districts located in a small-scale village setting.



**MARITIME AREAS**

Maritime Areas are clusters of commercial and mixed-use development that contribute to Cape Cod's working waterfronts and harbors.



**COMMUNITY ACTIVITY CENTERS**

Community Activity Centers are areas with a concentration of business activity, community activity, and a compact built environment. Buildings are generally smaller in scale and connected by a network of streets, ways or alleys.



**INDUSTRIAL ACTIVITY CENTERS**

Industrial Activity Centers are lands containing industrial uses that are suitable for future industrial activity as well as emerging industries.



**MILITARY AND TRANSPORTATION AREAS**

Military and Transportation Areas consist of large land areas developed with and devoted to infrastructure such as airports, transfer stations, waste disposal facilities, and Joint Base Cape Cod.

# CLIMATE CHANGE PLANNING

The CCMPO's approach to climate change is based on FHWA's policies on climate change, defined by a vision for improved coastal resiliency, and includes the following initiatives:

- **Adaptation** - Preparing for the impacts of global climate change on the nation's transportation infrastructure and systems;
- **Sustainability** - Ensuring that balanced choices are made among environmental, economic, and social values that will benefit current and future road users;
- **Mitigation** - Identifying strategies that reduce greenhouse gas (GHG) emissions from transportation sources.
- **Energy** - Promoting the use of alternative and renewable fuels, and vehicle technologies to reduce oil dependence, vehicle pollution and energy use.<sup>33</sup>

## Impacts and Vulnerabilities

Scientists have concluded that some level of climate change has already occurred, weather patterns are changing, and these changes are expected to continue or accelerate in the future<sup>34</sup>. Additionally, past weather and climate patterns appear to be much less reliable indicators of future weather and climate than in recent decades, which necessitates greater flexibility in planning and decision-making processes. As stated in the USDOT Policy Statement on Climate Adaptation, DOT shall integrate consideration of climate impacts and adaptation into the planning, operations, policies, and programs of DOT in order to ensure that taxpayer resources are invested wisely and that transportation infrastructure, services, and operations remain effective in current and future climate conditions.

The DOT recognizes that climate variability and change pose potential threats to U.S. transportation systems and Cape Cod is no exception. The range of impacts from these threats may include roadway deterioration, flooding, limited waterway access, and weakened structures. Severe conditions may reduce the life of capital assets and increase operational disruptions. Some consequences may require changes in the design, construction, and maintenance of infrastructure.

Building resilience to, and mitigating, climate change and weather-related risk is common sense management to protect current and future investments and to maintain safe operational capabilities. Mitigating and adapting to climate change and its impacts can include adjusting how transportation infrastructure is planned, designed, built and operated. Making climate change

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<sup>33</sup>[http://www.fhwa.dot.gov/environment/climate\\_change/](http://www.fhwa.dot.gov/environment/climate_change/)

<sup>34</sup> See USGCRP, Global Climate Change impacts in the United States, particularly pp.27-40.  
<http://www.globalchange.gov/publications/reports/scientific-assessments/us-impacts/full-report>

mitigation and adaptation a standard part of agency planning can ensure that resources are invested wisely, and that services and operations remain effective.

## **Cape Cod Climate Action Plan**

In 2021, the Cape Cod Commission developed the Cape Cod Climate Action Plan<sup>35</sup> (CAP), which provides a way forward for the region to mitigate and adapt to our changing climate and aligns with the Commonwealth's goal of reaching net-zero emissions by 2050. The CAP is the result of an intensive effort, coordinated by the Cape Cod Commission, to engage the Cape Cod community, identify paths toward climate resiliency, and further develop partnerships necessary to implement climate actions.

The Climate Action Plan identifies strategies and actions that can aid in reducing greenhouse gas emissions (GHG) and enhance local resiliency to climate threats. The identified strategies and actions will require significant changes in how we build, rebuild, work, travel, plan for and implement our infrastructural investments. More detail on the Climate Action Plan is presented in Appendix H.

## **Climate Change Adaptation**

Climate change mitigation and adaptation involves adjusting the way the transportation community plans, designs, constructs, operates, and maintains transportation infrastructure to reduce greenhouse gas emissions and protect against the impacts caused by changes in climate and extreme weather events.

Adaptation strategies for coping with extreme events and future climate change are most likely forms of coastal engineering and planning already utilized today<sup>36</sup>. However, the challenges facing today's engineers and planners may be among the greatest ever because of the on-going migration of people to coastal areas and the projected rise of sea level to elevations unprecedented in modern times. Adaptation strategies to respond to coastal infrastructure problems related to natural hazards and climate change may be categorized as follows:

- Maintain existing infrastructure for optimal performance and manage the response to extreme events through advanced preparation.
- Increase redundancy of the transportation system by ensuring that services provided by infrastructure can be supplied by other means or alternatives.
- Protect the existing system by providing physical barriers to climate stressors and extreme events.

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<sup>35</sup> More information is available at [www.capecodcommission.org/climate](http://www.capecodcommission.org/climate)

<sup>36</sup> Highways in the Coastal Environment: Assessing Extreme Events, US Department of Transportation and Federal Highway Administration Publication No. FWHA-NHI-14-006, October 2014

- Accommodate by modifying or redesigning infrastructure to better coexist in a climate-stressed environment.
- Relocate infrastructure away from the coast to lessen or eliminate exposure to climate stressors.

### **HAZARD PLANNING**

The Commission has worked with several towns throughout the region to develop Multi-Hazard Mitigation Plans. Development of these plans includes a vulnerability assessment of critical infrastructure and assets within the town, as well as specific actions to reduce the vulnerability of critical infrastructure and improve its resiliency. For example, a town may include widening a culvert to prevent flooding of a key roadway as an action to improve resiliency. Currently, the Commission is also working with several towns to carry out the Municipal Vulnerability Preparedness Program. This program involves an intensive stakeholder process to identify vulnerabilities, and strengths, in the community and actions to mitigate or adapt these features to increase their resiliency to priority hazards such as flooding and sea level rise. The Commission also created an online Sea Level Rise Viewer that highlights impacted roadways, and other past work on vulnerability assessments. These efforts supplement past vulnerability assessments carried out using the FHWA Climate Change & Extreme Weather Assessment Framework and past work with the John A. Volpe National Transportation Systems Center.

### **TIDAL STREAM CROSSINGS**

Culverts and bridges that are too small to pass the full tidal range are known as tidal restrictions, and their impacts can be severe. By limiting tidal flow, restrictions alter water levels and chemistry, diminish exchange of ocean nutrients, and can degrade entire upstream aquatic systems. When properly designed, replacing a tidally-restrictive crossing with a larger culvert or bridge restores the natural tidal flow needed to sustain healthy tidal wetland habitats.

### **FRESHWATER STREAM CROSSINGS**

Undersized or improperly placed crossings impact natural stream processes and prevent fish and wildlife from moving about the watershed. Stream crossings can disrupt stream continuity and impact freshwater ecosystems in the following ways:

- Undersized crossings restrict water flow, particularly during storms. These crossings may contribute to extensive channel scour, bank erosion, flooding, and crossing failure. Undersized crossings may be too small, and the flow may be too fast, to pass fish or wildlife.
- Shallow crossings have water depths that are too shallow for fish and other aquatic life to migrate through.
- Perched crossings have an outlet that is elevated above the level of the stream bed at the downstream end. Perched crossings block fish and wildlife from moving upstream.

The Massachusetts Division of Ecological Restoration (MassDER)<sup>37</sup> leads the charge for restoring aquatic ecosystems in the Commonwealth and has been an invaluable partner to the region. In providing much of the language for this section, as well as additional analysis Appendix H, MassDER is involved in numerous tidal restoration projects currently ongoing in the region.

Restoring river and stream crossing has a number of economic and community benefits and are important projects for the region. A MassDER study<sup>38</sup> found that each \$1.0 million dollars spent on its restoration projects (including stream barrier removals, as well as salt marsh restoration) supported 10 to 13 jobs and \$1.5 to \$1.8 million in regional economic output (2009 dollars). Such projects are a particular benefit to the region when coupled with roadway improvements projects. Appendix H details a number of ongoing and potential river and stream crossing restoration projects that should be considered by the region either as part of planned transportation improvements or as standalone projects.

## Climate Change Mitigation

Climate change mitigation and adaptation involves adjusting the way the transportation community plans, designs, constructs, operates, and maintains transportation infrastructure to reduce greenhouse gas emissions and protect against the impacts caused by changes in climate and extreme weather events.

While actions taken to mitigate climate change may not be able to fully stop climate change, they can help the effort to slow the rate of change and provide more time for the region to adapt to a changing climate and its impacts. Climate change mitigation strategies related to transportation focus around reducing greenhouse gas emissions through actions including trip reduction, electrification of vehicles, improved and expanded transit systems, and improved and expanded bicycle and pedestrian networks to reduce the amount of vehicle trips in an area.

Actions within this strategy include:

- **Encourage investments in EV charging infrastructure** – To accelerate the adoption of EVs, additional investment in charging infrastructure is required. Residential and commercial developments and redevelopments should be designed and built with EVs in mind. While the majority of EV charging may take place at home there is a clear need for public charging stations, particularly for a region where a significant proportion of motorists on the roadway are visitors. This will require action from both the public and private sectors.

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<sup>37</sup> More information on the MassDER available at: <http://www.mass.gov/eea/agencies/dfg/der/>

<sup>38</sup> Massachusetts Division of Ecological Restoration. "The Economic Impacts of Ecological Restoration in Massachusetts." March 2012

- **Support programs that incentivize EV adoption** – With lower operating and maintenance costs, the lifetime cost of owning an EV could be less than a gas-powered vehicle. Unfortunately, the higher upfront cost of EVs still presents a barrier to ownership for many. While advances in technology are expected to ultimately make the EV the most economical choice, in the near- and medium-term, rebates and other incentives can help to promote EV adoption. These incentives are particularly important to ensure equitable access to EVs. Additionally, the local availability of dealers and repair facilities for EVs will be important for large-scale adoption.
- **Explore opportunities for electrification of public transit and fleet vehicles and vessels** – As technology advances, EV options will become more feasible for public transit vehicles, municipal vehicles, school buses, police vehicles, delivery vehicles, and various marine vessels. Feasibility studies could help inform decision-makers of the current opportunities, barriers, costs, and grant options for electrification.

### **GREENHOUSE GASES ANALYSIS**

The transportation system is a critical component of the Commonwealth of Massachusetts' infrastructure; it facilitates economic development, access to goods and services, and social interaction and enrichment. While the system has numerous benefits that users depend upon daily, it also contributes over one-third of the Bay State's greenhouse gas (GHG) emissions, a key cause of climate change. Sprawling development patterns and automobile dependence also contribute to physical inactivity, which is associated with various negative health outcomes, while motor vehicle pollution contaminates the air, causing respiratory and other health conditions.

Cape Cod's 2017 GHG emissions were estimated to equal 3,564,875 MTCO<sub>2</sub>e, approximately 4-5% of Massachusetts state emissions. Transportation is the highest local contributing sector of emissions, accounting for 55.5% of total Cape Cod emissions. The second highest contributing sector locally is stationary energy use, which is responsible for 39% of total inventory emissions. The remaining 5% of emissions come from the waste (3%), industrial processes (1.9%), and agriculture (0.4%) sectors.

Transportation accounts for 55.5% of GHG emissions for the region, compared with 45.7% of state emissions. On-road vehicles account for 43% of the region's emissions and nearly 80% of transportation emissions.

### **GLOBAL WARMING SOLUTIONS ACT AND THE ROLE OF METROPOLITAN PLANNING ORGANIZATIONS**

The Global Warming Solutions Act (GWSA), which was signed into law in August 2008, makes Massachusetts a leader in setting aggressive and enforceable GHG reduction targets, and implementing policies and initiatives to achieve these targets. In keeping with the law, on December 29, 2010 the Massachusetts Executive Office of Energy and Environmental Affairs (EOEEA), in consultation with other state agencies and the public, released the Massachusetts Clean Energy and Climate Plan for 2020. In December 2014, DEP issued new regulations that require MPOs to quantify impacts from project investments, track, progress towards reductions, and consider



impacts in the prioritization of project investments. The targets for overall statewide GHG emissions were:

- By 2020: 25 percent reduction below statewide 1990 GHG emission levels
- By 2050: 80 percent reduction below statewide 1990 GHG emission levels

A more recent iteration of that plan was released in June 2022, with more aggressive carbon reduction goals:

- By 2025: 33 percent reduction below statewide 1990 GHG emission levels
- By 2030: 50 percent reduction below statewide 1990 GHG emission levels
- By 2050: net zero GHG emissions

The Commonwealth's MPOs are integrally involved in supporting the GHG reductions mandated under the GWSA. The MPOs are most directly involved in helping to achieve the GHG emissions reductions through the promotion of healthy transportation modes through prioritizing and programming an appropriate balance of roadway, transit, bicycle and pedestrian investments – and assisting smart growth development patterns through the creation of a balanced multi-modal transportation system. This is realized through the transportation goals and policies espoused in the 2024 Regional Transportation Plans (RTPs); the major projects planned in those RTPs; and the mix of new transportation projects that are programmed and implemented through the TIPs. GHG tracking and evaluation processes enable the MPOs to identify anticipated GHG impacts of planned and programmed projects, and also to use GHG impacts as a criterion in prioritizing transportation projects.

Additional information air quality conformity can be found in Appendix N.

## **ALTERNATIVE AND RENEWABLE ENERGY**

There are numerous projects in Barnstable County that are investing public resources to conserve energy, implement efficiency measures, and produce or purchase renewable energy, such as:

- Cape Cod Regional Transit Authority (CCRTA) is currently meeting 94% of the energy needs of its intermodal center and maintenance facility with solar and wind power and is pursuing grant funding to deploy low or no emissions vehicles on some of its routes.
- CCRTA is moving to a zero emissions fleet and a study for implementation of this transition is currently underway with a study. CCRTA has a zero-carbon footprint goal by 2030.
- Cape Cod Gateway Airport has implemented many alternative and renewable energy projects in recent years. The new 35,000 square-foot passenger terminal building was constructed with multiple energy saving design features including white roofs, high performance windows, high efficiency HVAC systems, point of service water heaters, and fluorescent lighting.



- Solar Collection Field at the Cape Cod Gateway Airport: Nearly 25,000 photovoltaic modules were installed across 18.8 acres of airfield. Energy from the solar array will benefit the airport, the Barnstable Fire District and eventually, rate payers in Barnstable and other jurisdictions.
- Future Cape Cod Gateway Airport Smart Microgrid project will generate and distribute clean, reliable power to the airport and facilitate reliable charging of electric ground fleet vehicles (including buses) and in the future, aircraft. This project was awarded a discretionary SMART grant from FHWA in FY22 associated with the planning, permitting and design of this project.
- Cape Cod Commission Electric Vehicle Charging Stations and Siting Analysis Tool and Model Municipal Electric Vehicle Bylaw to bring further awareness and support on where current electric vehicle charging infrastructure is located and potential future siting locations.

The Commission also supports development of appropriate renewable energy resources, as demonstrated by the energy goal and objectives and action items in the updated RPP, which are part of a framework for future planning work and development project regulatory review. The energy goal in the RPP is “to provide an adequate, reliable, and diverse supply of energy to serve the communities and economies of Cape Cod,” and is supported by three objectives:

- Support renewable energy development that is context-sensitive
- Increase resiliency of energy generation and delivery
- Minimize energy consumption through planning and design (including energy efficiency and conservation measures)

Additionally, two action items in the updated RPP include conducting GIS analyses to identify potential electric vehicle charging station locations and appropriate potential solar photovoltaic array or energy storage facilities sites to encourage development of on-site renewable energy.

## **SCENARIO PLANNING**

Transportation and land use are inextricably linked and only with a shared vision for both can the ultimate visions of a region be achieved. Scenario planning is one way in which these disciplines can be looked at in a comprehensive way.

FHWA defines scenario planning an analytical tool that can help transportation professionals prepare for what lies ahead. Scenario planning provides a framework for developing a shared vision for the future by analyzing various forces (e.g., health, transportation, economic, environmental,

land use, etc.) that affect growth.<sup>39</sup> This framework has been used and continues to be an important tool for the region.

## **Climate Change Scenario Planning - Adaptation**

The Cape Cod Commission has developed two tools to help illustrate both different potential climate change scenarios and ways of mitigating the impacts of climate change: the Sea Level Rise Viewer and the Cape Cod Coastal Planner. The Sea Level Rise viewer is an online tool that allows a user to see what the impacts of sea level rise of one, two, three, four, five, or six feet would be on critical facilities and roadways in the region.<sup>40</sup> This tool shows that with one foot of sea level rise, over 50 miles of roads become disconnected or isolated, limiting emergency and day-to-day access to these locations. With three feet of sea level rise, this number jumps up to almost 160 miles and with six feet of sea level rise, over 700 miles of the region's roadways become disconnected. Being able to look at the impacts of possible future sea level rise and climate change scenarios can help inform future planning efforts so that ways to address these potential access and safety issues are incorporated into future projects. Further analysis using this tool's data shows that at one foot of sea level rise, almost 1,300 residences may be inaccessible, at three feet of sea level, over 6,200 residences are potentially isolated or inaccessible, and this number jumps to over 26,000 with six feet of sea level rise.

While the Sea Level Rise viewer identifies potential vulnerabilities, the Cape Cod Coastal Planner, built by the Cape Cod Commission and its partners, is an interactive map-based communication and decision-support tool to help residents and decision makers understand the relative environmental and socio-economic effects of implementing different adaptation strategies and scenarios to address sea level rise, storm surge, and erosion. The tool integrates research on potential adaptation strategies for Cape Cod communities and how ecosystem services are impacted by hazards and strategy selection. Cape Cod Coastal Planner's development was also informed by an extensive stakeholder process, integrating feedback from potential users across the region, and is being tested through a pilot project with the Town of Barnstable. Using these two tools can help guide future projects and efforts by identifying vulnerable areas and providing ways to test different ways to address those vulnerabilities.

## **Climate Change Scenario Planning - Mitigation**

As part of the development of the Cape Cod Climate Action Plan, future GHG emissions scenarios were developed to help better understand how the region could contribute to GHG emissions

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<sup>39</sup> [http://www.fhwa.dot.gov/planning/scenario\\_and\\_visualization/scenario\\_planning/](http://www.fhwa.dot.gov/planning/scenario_and_visualization/scenario_planning/)

<sup>40</sup> Analysis conducted using 2012 road data

reductions in support of the Commonwealth's GHG emissions reductions goals to reduce GHG emissions to 50% below 1990 levels by 2030 and to 85% below 1990 levels by 2050.

The future emissions scenarios provide context for the extent of actions necessary within each modeled sector to contribute to achievement of the Commonwealth's goals. For each of the scenarios, several key metrics were modeled, which will help the region understand the necessary magnitude of change—and progress toward it—to play its part in achieving the Commonwealth's GHG emissions reduction targets.

All decarbonization scenarios require significant growth in the share of new, light-duty electric vehicle (EV) sales. Even an aggressive energy efficiency scenario (SER2), with reduced vehicle miles traveled (VMT) relative to the other decarbonization cases, requires 63% of new vehicle sales to be EVs by 2030. An increased year-round population scenario (SER3) requires 85% by 2030. The aggressive electrification scenario (SER1) and the carbon neutral scenario (CEN) each require 93% of new sales to be EVs by 2030. By 2050, all decarbonization scenarios require 100% of new vehicle sales to be EVs.

To accommodate about 214,000 light-duty EVs on the road by 2050 (as required to reach 2050 emissions goals in the SER1 scenario), 8,800 public charging stations will need to be installed, which is nearly 4,000 more (at an additional cost of around \$10 million) than would be needed in a sustained policy case.

## **Land Use Scenario Planning**

Where the RTP sets the regional vision for transportation, the Regional Policy Plan (RPP) sets the overarching regional vision for how Cape Cod will grow and develop in the future. An updated RPP was adopted in January 2019. As part of the update process, stakeholders engaged in a regional scenario planning exercise conducted using the Envision Tomorrow suite of regional planning tools.<sup>41</sup>

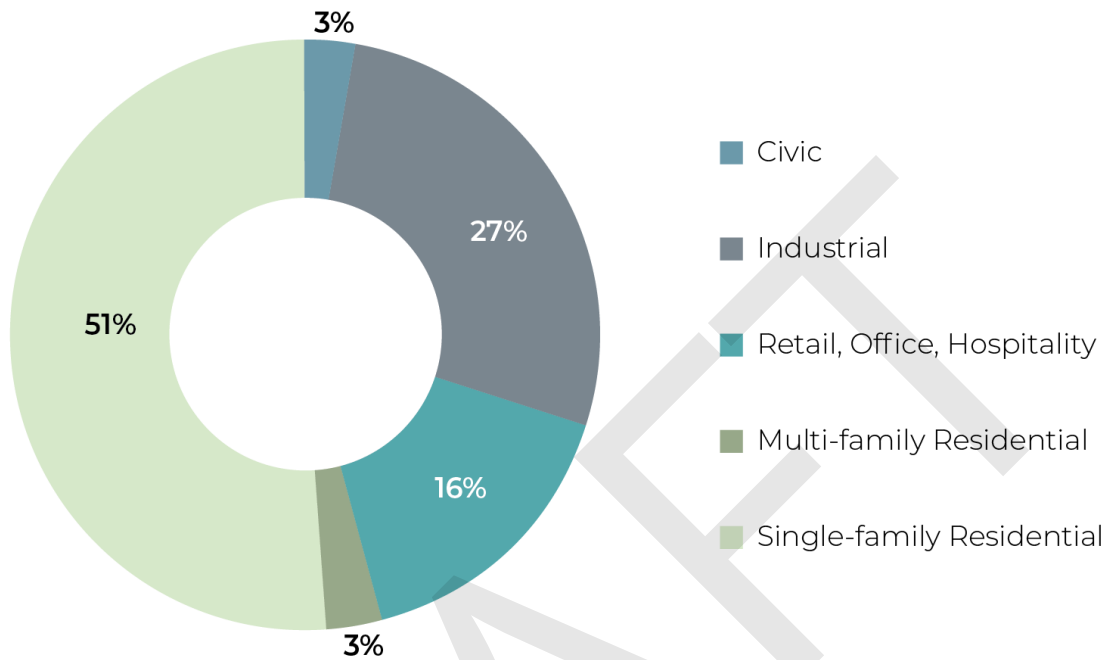
Using this software, users are able to test multiple development scenarios and then compare the impacts of each development scenario. The business as usual, or the "Trend Scenario," answers the question: "What happens if current land use policies remain unchanged?" Based on existing zoning and constraints such as wetlands, the Trend Scenario builds on existing vacant land to see what Cape Cod would look like in 2030.

The Trend Scenario was largely characterized by the development of large single-family homes as shown in Figure 36.

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<sup>41</sup> <http://www.envisiontomorrow.org>

Figure 36. RPP Trend Scenario (Land Use Mix – Percent of Total Acres)



The results of these continued development patterns for the regions are characterized by more sprawling development resulting in a loss of habitat, perpetuation of unaffordable housing, and continued wastewater challenges, in addition to climate change challenges. Focusing just on the transportation impacts, the Trend Scenario results in disperse, auto-dependent development that would result in a significant need for new infrastructure including:

- Over 300 miles of new roadway construction – enough to stretch from the Sagamore Bridge to the Provincetown Monument five times
- Over 80,000 new parking spaces – the equivalent of paving over all of the 700-acre Shawme-Crowell State Forest for parking

The updated RPP articulates a growth policy that promotes guiding new development and redevelopment to existing centers of activity. During the RPP update process, the Envision Tomorrow tool was used to construct an alternate scenario more aligned with the RPP growth policy, which focuses on guiding development and redevelopment to more compact centers of existing activity. The resulting development would be denser with more redevelopment, putting 70% more development in already developed areas, requiring 80% less impervious surface and 13 times less land than the trend scenario, which would result in less habitat loss. In the trend scenario, much of the additional housing developed would be multi-family housing, which would also be more affordable for households earning \$50,000-\$75,000 per year. In particular, because most of the development would occur in areas already developed, this alternate scenario would

utilize existing infrastructure, requiring 90% fewer miles of new roadway than the trend scenario. Additionally, the alternate scenario of more compact and dense development allows for greater walkability as people can live closer to jobs and amenities.

## **Planning for the Future of the Cape Cod Economy: Comprehensive Economic Development Strategy**

In 2009, Cape Cod was designated an Economic Development District creating new regional opportunity for Federal Economic Development funding for projects and programs consistent with the Comprehensive Economic Development Strategy (CEDS) for Cape Cod. This important and valued designation followed an intense stakeholder driven regional planning effort to adopt a CEDS for Cape Cod, an economic blueprint for the region.

The CEDS planning effort on Cape Cod is led by the Barnstable County Economic Development Council and staffed by the Cape Cod Commission. The planning process and plan are informed by a comprehensive analysis of the region's economy, its strengths, opportunities, weaknesses, and threats. The result is an action plan and an evaluation process specifically designed to address priority issues through achievable projects and programs. A number of projects and programs involve investments in transportation infrastructure consistent with the goals and objectives of the RTP.

## **“Future of Transportation in the Commonwealth” Report**

With many changes facing the transportation system in the coming decades, the Cape Cod MPO looks to work with state and federal agencies to understand and plan for these changes. The Commonwealth of Massachusetts is a leader in transportation profession in terms of forward-thinking transportation planning and policy. The report, “Future of Transportation in the Commonwealth” Report, covers a number of key topics that are relevant to the Cape Cod region including:

- Climate and Resiliency
- Transportation Electrification
- Autonomous and Connected Vehicles
- Transit and Mobility Services
- Land Use and Demographics.

The Report identified the following 18 recommendations for how to best prepare Massachusetts' transportation network for the challenges and opportunities of 2040. A discussion from the Cape Cod MPO perspective is included as in Appendix A.

# Chapter 5: Financial Plan

The Financial Plan sent forth in this chapter sets the regional priorities for surface transportation spending for the next 21 years.

## LEGISLATIVE BACKGROUND

Federal legislation that contains requirements for transportation plans, programs and projects includes the current legislation: *Bipartisan Infrastructure Law (BIL)* as well as the *Clean Air Act Amendments of 1990*.

In January 2021, President Biden signed the *Infrastructure Investment and Jobs Act (IIJA)* also known as the *Bipartisan Infrastructure Law (BIL) Act* (Pub. L. No. 117-58) into law. The BIL is the largest long-term investment in our country's infrastructure and economy. The BIL authorizes \$550 billion over fiscal years 2022 through 2026 for investments in infrastructure related to roads, bridges, public transit, water infrastructure, resilience and broadband.

The new Bipartisan Infrastructure Law includes Planning Emphasis Areas (PEAs), around which states and MPOs should orient their planning efforts. These emphasis areas are listed below. For all goals, the document notes that FHWA Division and FTA regional offices should work with State DOTs, MPOs, and other relevant parties.

- **Tackling the Climate Crisis – Transitioning to a Clean Energy, Resilient Future:** Ensure that our transportation plans and infrastructure investments help achieve the national greenhouse gas reduction goals of 50-52% below 2005 levels by 2030, and net-zero emissions by 2050.
- **Equity and Justice<sup>40</sup> in Transportation Planning:** Advance racial equity and support for underserves and disadvantaged communities."
- **Complete Streets:** Review current policies, rules, and procedures to determine their impact on safety for all users. This effort should work to include provisions for safety in future transportation infrastructure, particularly those outside automobiles.
- **Public Involvement:** Increase meaningful public involvement in transportation planning by integrating Virtual Public Involvement (VPU) tools into the overall public involvement approach while ensuring continued public participation by individuals without access to computers and mobile devices.
- **Strategic Highway Network (STRAHNET)/U.S. Department of Defense (DOD) Coordination:** Coordinate with representatives from DOD in the transportation planning and project programming process on infrastructure and connectivity needs for STRAHNET routes and other public roads that connect to DOD facilities.

- **Federal Land Management (FLMA) Coordination:** Coordinate with FLMAs in the transportation planning and project programming process on infrastructure and connectivity needs related to access routes and other public roads and transportation services that connect to Federal lands.
- **Planning and Environment Linkages (PEL):** Implement PEL as part of the transportation planning and environmental review process. The use of PEL is a collaborative and integrated approach to transportation decision-making that considers environmental community, and economic goals early in the transportation planning process, and uses the information, analysis, and products developed during planning to inform the environmental review process.
- **Data in Transportation Planning:** Incorporate data sharing and consideration into the transportation planning process.

## FUNDING SOURCES

The primary source of funding for implementation of the RTP projects and programs is from the federal Highway Trust Fund. Distribution of Highway Trust Fund revenues are appropriated by Congress for surface transportation purposes through the United States Department of Transportation (USDOT) Federal Highway Administration (FHWA) and the USDOT Federal Transit Administration (FTA) as dedicated through federal legislation. The current federal legislation, *Infrastructure Investment and Jobs Act* (the “Infrastructure Bill”S), was signed into law in 2021.

In addition to federal funds, the Commonwealth of Massachusetts provided significant funds to the region. Highway projects can either be funded by a combination of federal and state funds (typically 80-90% federal funding) or fully funded by the state. For transit projects typically the state amount may average at a higher percentage due to the state funding a large percent of operating cost.

Receipts for the federal Highway Trust Fund are collected primarily from the federal fuel tax. Funding for transportation in Massachusetts comes from a combination of the state fuel tax, toll revenue, transportation-related fees (i.e. motor vehicle registration), and a portion of the state sales tax.

With the passage of the federal Bipartisan Infrastructure Law (BIL), additional bond authorization was needed to fully utilize the additional funding provided to the Commonwealth. An Act Relative to Massachusetts’s Transportation Resources and Climate (MassTRAC) was filed to ensure the Commonwealth could fully utilize the funding authorization provided under BIL. The Legislature passed the bill and the \$11.4 billion MassTRAC bill signed into law in August 2022. MassTRAC provides MassDOT and the MBTA the necessary authorization to take advantage of the federal highway and transit funding under BIL.

Local funds also play a large role in the advancement of projects with towns paying for the design of most highway projects with their borders. A town may even pay for the design of an

improvement at a state-owned location if it sees the advancement of the project as a benefit to the town. Local funds are also occasionally used to cover items not covered by other sources such as landscaping above standard design or improvements to utilities. Transit services also have a local share in funding, with a portion of service operating costs assessed to the towns through the Cape Cod Regional Transit Authority.

## **ESTIMATED AVAILABLE FUNDS**

Both the Federal Highway Administration (FHWA) and Federal Transit Administration (FTA), in partnership with MassDOT, provide funding to the region through a number of programs.

### **Federal Highway Administration Source Funds**

MassDOT divides the federal highway funding that it receives between “regional target funding,” which is allocated at the discretion of the MPOs for regional priority projects on the federal aid transportation system, and funding that is allocated at MassDOT’s discretion for use principally on the state-owned transportation system.

Each MPO’s regional target funding is composed of shares of Congestion Mitigation and Air Quality Improvement Program (CMAQ), Highway Safety Improvement Program (HSIP), Transportation Alternatives Program (TAP), and Surface Transportation Program (STP) funding. “Statewide” funding that is allocated at MassDOT’s discretion includes funding from the federal highway sources detailed in Table 15.<sup>42</sup>

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<sup>42</sup> <https://www.mass.gov/service-details/funding-considerations>



TABLE 15. FHWA Funding Programs

PROGRAM	DESCRIPTION
Congestion Mitigation and Air Quality Improvement (CMAQ)	A wide range of projects in air quality nonattainment and maintenance areas for ozone, carbon monoxide, and small particulate matter, which reduce transportation-related emissions.
Highway Safety Improvement Program (HSIP)	Implementation of infrastructure-related highway safety improvements
National Highway Performance Program (NHPP)	Improvements to interstate routes, major urban and rural arterials, connectors to major intermodal facilities, and the national defense network. Also includes replacing or rehabilitating any public bridge, and resurfacing, restoring, and rehabilitating routes on the Interstate Highway System.
Surface Transportation Block Grant (STBG)	A broad range of surface transportation capital needs, including roads; transit, sea, and airport access; and vanpool, bicycle, and pedestrian facilities.
Transportation Alternatives Program (TAP)	Construction of infrastructure-related projects (for example, sidewalk, crossing, and on-road bicycle facility improvements).
Bridge Replacement and Rehabilitation Program (BR)	Replacement or repair of bridges on or off the federal aid system.
Ferry Boat Program (FBP)	Project to construct ferry boats and ferry terminal facilities.
National Highway Freight Program (NHFP)	Projects that improve the efficient movement of freight on the National Highway Freight Network

In 2023, MassDOT provided estimated available funds for the Cape Cod region from Federal Highway Administration (FHWA) including the state matching funds as presented in Table 16.

TABLE 16. Federal Highway Administration Funding for Cape Cod with State Match

TIME FRAME	FUNDING AVAILABLE FOR MPO (REGIONAL DISCRETIONARY)	NON-INTERSTATE DOT PAVEMENT	REMAINING STATEWIDE PROGRAMS (EXCLUDING STATEWIDE BRIDGE PROGRAM)	NON-FEDERAL AID PRESERVATION (BRIDGES AND ROADWAYS)	TOTAL ESTIMATED AMOUNT
2024-2028	\$74,436,354	\$33,441,772	\$41,192,297	\$14,445,799	\$163,516,222
2029-2033	\$88,895,177	\$36,271,241	\$57,837,802	\$20,022,906	\$203,027,125
2034-2038	\$95,890,227	\$40,046,381	\$62,575,225	\$22,106,906	\$220,618,738
2039-2043	\$105,469,500	\$44,214,440	\$769,812,169	\$24,407,810	\$243,903,919
2044	\$22,492,299	\$9,380,465	\$14,912,664	\$5,178,322	\$51,963,749
2024-2044 Totals	\$387,183,556	\$163,354,299	\$246,330,156	\$86,161,743	\$883,029,754

Additionally, Table 17 lists the competitive FHWA discretionary grant programs which are authorized under the BIL. Although funding for these programs is awarded on a competitive basis, MassDOT is actively pursuing funding from these discretionary grant opportunities for several projects, including the Cape Cod Canal Bridge Program.

TABLE 17. FHWA Discretionary Grant Funding Programs

PROGRAM	DESCRIPTION
Safe Streets and Roads for All	Competitive grant program provides funding to local governments, MPOs and federally recognized tribes, to support efforts to advance comprehensive safety plans or “Vision Zero” plans to reduce crashes and fatalities.
Strengthening Mobility and Revolutionizing Transportation (SMART)	Strengthening Mobility and Revolutionizing Transportation (SMART) Program provides grants to eligible public sector agencies to conduct demonstration projects focused on advanced smart community technologies and systems in order to improve transportation efficiency and safety.
National Infrastructure Project Assistance (MEGA)	Program provides grants to eligible public sector agencies to conduct demonstration projects focused on advanced smart community technologies and systems in order to improve transportation efficiency and safety.
Bridge Formula Program	Competitive grant program supports multi-modal, multi-jurisdictional projects of regional or national significance.
Nationally Significant Multimodal Freight & Highway Projects (INFRA)	Competitive grant program for multimodal freight and highway projects of national or regional significance to improve safety, efficiency, and reliability of the movement of freight and people in and across rural and urban areas.
Rebuilding American Infrastructure with Sustainability and Equity (RAISE)	A discretionary grant program aimed to assist communities with projects with significant local or regional impact.
Promoting Resilient Operations for Transformative, Efficient and Cost-Saving Transportation (PROTECT)	Competitive grant program to increase the resiliency of the transportation system, including coastal resilience and evacuation routes.
Charging and Fueling Infrastructure Grants	Discretionary grant program will fund strategic deployment of publicly accessible electric vehicle charging infrastructure, as well as hydrogen, propane and natural gas fueling infrastructure, along designated alternative fuel corridors and in communities.
Rural Surface Transportation Grant	Competitive grant program to improve and expand surface transportation infrastructure in rural areas, increasing connectivity, improving safety and reliability of the movement of people and freight and generate regional economic growth.
Reconnecting Communities Pilot Program (RCP)	Competitive grant program to reconnect communities divided by transportation infrastructure.

## Federal Transit Administration Source Funds

The Federal Transit Administration (FTA) provides financial assistance to develop new transit systems and improve, maintain, and operate existing systems. FTA oversees thousands of grants to state and local transit providers through the FTA regional offices. The grantees are responsible for managing their programs in accordance with federal requirements and FTA is responsible for ensuring that these grantees follow the mandates along with statutory and administrative requirements. FTA funding programs are summarized in Table 18.<sup>43</sup>

TABLE 18. FTA Funding Programs

PROGRAM	DESCRIPTION
Section 5307 – Urbanized Area Formula Grant Program	This program funds routine capital investments, including bus purchases, but for some smaller systems, a portion can be used to defray transit system operating expenses.
Section 5310 – Elderly Persons and Persons with Disabilities Formula Program	This program is intended to enhance mobility for seniors and persons with disabilities by providing funds for programs to serve the special needs of transit-dependent populations beyond traditional public transportation services and Americans with Disabilities Act (ADA) complementary paratransit services.
Section 5339 – Bus and Bus Facilities	This program seeks to provide capital funding to replace, rehabilitate, and purchase buses and related equipment and to construct bus-related facilities.

In early 2023, Cape Cod MPO staff estimated available funds for the Cape Cod region from Federal Transit Administration (FTA) including the state matching funds as presented in Table 19. The CCRTA is actively seeking additional funding through various FTA discretionary programs and any other sources that become available to better advance the goals of the RTP.

TABLE 19. Federal Transit Authority Funding for Cape Cod with State Match

TIME FRAME	SECTION 5307	SECTION 5310	SECTION 5339	TOTAL
2024-2028	\$76,527,312	\$26,138,211	\$4,928,777	\$107,594,300
2029-2033	\$85,977,021	\$27,602,229	\$3,317,576	\$116,896,826
2034-2038	\$94,925,578	\$30,475,091	\$3,662,872	\$129,063,541
2039-2043	\$104,805,508	\$33,646,963	\$4,044,106	\$142,496,577
2044	\$22,235,368	\$7,138,486	\$857,991	\$30,231,845
2024-2044 Totals	\$348,470,787	\$125,000,980	\$16,811,322	\$526,283,089

<sup>43</sup> <https://www.massdot.state.ma.us/planning/Main/PlanningProcess/FundingConsiderations.aspx>

## UNIVERSE OF PROJECTS

The universe of projects identified for funding can be divided into one of four funding categories: Transportation Projects, Transportation Programs, Smart Solutions, and Transportation Studies.

A **“transportation project”** is specific in the location and nature of construction or other activity that is anticipated. Examples of potential transportation projects include Route 6 safety improvements and the construction of a new multi-use trail from the end of the existing Shining Sea Bikeway to the Cape Cod Canal Path. Any project over \$20 Million in total cost must be included in the RTP to receive federal funding. Projects under \$20 Million may be included in the RTP depending on the level to which the project has been developed.

Given that the RTP covers a 20-25-year time-span it is beyond our ability to define every specific transportation project that will be implemented. Therefore, **“transportation programs”** identify categories of specific transportation projects that are anticipated to be implemented and identify funds to pay for these bundles of transportation projects. Examples of potential transportation programs include roadway resurfacing, intersection improvements, and transit operating assistance and capital needs.

**“Smart solutions”** are initiatives that do not require major investments in capital or operations. Examples of potential smart solutions include coordination of Cape Cod Regional Transit Authority and ferry schedules with each other and the development of a Cape-wide bicycle route system.

Finally, **“transportation studies,”** seek to solve problems through planning efforts that focus on analysis of alternatives and public participation. These transportation studies ultimately identify solutions to problems that may be in the form of future transportation projects, programs, and/or smart solutions.

See Appendix M for a complete listing of the Universe of Projects for the 2024 RTP. This list constitutes unmet need for the region.

As is demonstrated by the extensive program of projects, the anticipated system wide need for the region greatly exceeds the anticipated revenues. Strategic decisions will need to be made to determine where the limited funds will be spent and which project will have to be delayed.

## PROJECT ANALYSIS

In order to determine the projects to be contained within the financial constraint of the document, analysis was conducted on the universe of projects. Analysis of projects was limited to projects \$20 million or greater with the expectation that smaller projects could be programmed in the bundle of “other TIP projects” included in the financial constraint of this document. Some projects under \$20 million were included if it was determined that the potential benefits were commensurate with these larger scale projects. Analysis was conducted with a subcommittee of the CCJTC where each project was considered for potential benefit, estimated cost, consistency with the objectives of the RTP, impact on performance targets, project score (where available), equity as it relates to minority,

low income, Limited English Proficiency (LEP) and other protected populations, and GHG reduction potential. Considering these factors and the anticipated available funding, a financially constrained program of projects was developed with the CCJTC subcommittee and reviewed and approved by the Cape Cod MPO.

## **TRANSIT IMPROVEMENT/EXPANSION PROJECTS**

In September 2022, the CCRTA prepared a Ten-Year Strategic Plan and a Five-Year Supporting Capital Plan. These two plans provide a Cape-wide vision for managing and augmenting transit infrastructure and operations to continually enhance the customers travel experience. The following five focus areas have been identified by the CCRTA as part of their strategic planning:

- Increase ridership through funding outlays designed to improve the customers' transportation experience and restore the public's confidence that it is safe to travel on public transportation.
- Bolster critically needed transit assistance supporting the diverse needs of our customers, contribute to the improvement of our local economy, and assist local businesses through the provision of a broader umbrella of transit services.
- Improve the efficiency and cost-effective delivery of transit services through technology enhancements that employ a data driver decision approach to the implementation of transit improvements.
- Achieve a Zero Carbon Footprint Goal by 2030 through targeted capital investments in EV charging station infrastructure, incremental conversion from fossil fuel vehicles to electric and further investments in "green building" and solar technology.
- Reduce future budgetary costs and increase revenues through selective investments in operating and capital budget initiatives.

Over the next five years, the CCRTA has a regional approach to work with multimodal partners to promote and advance an "economy of scale" collaborative investments for the transition to electric vehicles and supporting infrastructure. It is expected that a significant portion of their capital funds will be dedicated to facility upgrades at the their Bus Maintenance/Operations Facility in Dennis to support the transition to a zero emissions fleet.

In addition to investments related to infrastructure and facility improvements, the CCRTA evaluates its routes and schedules on a regular basis in an effort to best meet the needs of the region. Where potential improvements or expansions are identified, funding is sought to support their implementation. Most often service expansions begin as demonstration projects and, when successful, long term-term funding is sought for their continued operation.

Two recent examples of demonstration projects are the Bourne Run and the Sandwich Line. After successful demonstration periods, their operation continues extending transit options to a larger portion of the Cape's population.

The CCRTA also continually reviews their existing routes to look for ways to improve the customer experience and system-wide efficiency. In consultation with a variety of community members, the CCRTA made such changes to their routes servicing Hyannis to improve access to pharmacies, grocery stores, the senior and youth centers, shopping areas, and a wide range of other locations. The CCRTA is working to improve late night service from Provincetown during the peak summer season.

Other service improvements or expansions that have been or are under considered include:

- Extending evening service hours on fixed routes
- Extending weekend service on fixed routes including Sunday service
- Providing fixed route service in underserved areas of the Mid-Cape
- Providing increased frequency on fixed routes in urban areas (i.e. Hyannis, Provincetown, Falmouth)
- Providing new seasonal services (i.e. Chatham Shuttle)

At this time there is not sufficient demand to sustain these services and/or the CCRTA does not anticipate sufficient funding for their operation. Based on current projections, the CCRTA anticipates that all of the levels of transit funding included in this document will maintain existing service, but not be sufficient to support significant expansions to the system.

Lastly, in addition to service improvements or expansions, the CCRTA considers investments in parking and in transit-oriented-development in the vicinity of the Hyannis Transportation Center as critical to the increase use of transit in the region. The CCRTA is also supportive of expansions to Cape Flyer rail service as it provides an important non-automobile option to Cape Cod that complements that transit services provided by the CCRTA.

As funding opportunities arise, the CCRTA will consider these and any other service improvement, expansion, or transit-supportive project that improves transit options for the region.

## **HIGHWAY PROGRAM OF PROJECTS**

It is the responsibility of the Cape Cod MPO to select regional priority projects to be funded by the available highway regional target funds. With only \$387 million anticipated in highway regional target funds available from 2024 through 2044, there is significantly more need than available funding.

Table 20 presents the Cape Cod MPO's recommended program of project for 2020 through 2040. This program of projects balances the need for large-scale regional projects that are specifically identified with smaller-scale projects included as a bundle of "Programs and Smart Solutions."

Project costs are shown with both 2024 estimated costs and, in order to account for inflation, year of expenditure (YOE) costs that include a 4 percent annual inflation rate.

TABLE 20. Highway Regional Target Funding – Program of Projects

YEARS OF FUNDING	PROJECT / PROGRAM	2024 TOTAL ESTIMATED COST	TOTAL-YEAR OF EXPENDITURE (YOE) ESTIMATED COST
2024-2028	Mashpee 151 Improvements		\$20,800,000
	Route 28 Multimodal Improvements		\$40,200,000
	Provincetown, Shank Painter Road and Route 6 Improvements		\$13,400,000
	Rail Trail Extensions (Mid- and Upper-Cape) <sup>1</sup>		[\$16,500,000]
	Route 28 Bass River Bridge Replacment <sup>1</sup>		[\$51,900,000]
	Cape Cod Canal Bridges Program <sup>2</sup>		
	Programs		\$36,354
	Subtotal Funding		\$74,436,354
2029-2033	Route 28 Multimodal Improvements	\$20,000,000	\$26,318,636
	Rail Trail Extensions (Upper and Mid Cape)	\$15,000,000	\$19,738,977
	Route 6 Safety & Multimodal Improvements (Outer Cape)	\$15,000,000	\$19,738,977
	Hyannis Area Improvements <sup>3</sup>	\$10,000,000	\$13,159,318
	Programs		\$9,939,270
	Subtotal Funding		\$88,895,177
2034-2038	Route 28 Multimodal Improvements	\$20,000,000	\$32,020,644
	Rail Trail Extensions (Upper and Mid Cape)	\$20,000,000	\$32,020,644
	Route 6 Safety & Multimodal Improvements (Outer Cape)	\$15,000,000	\$24,015,483
	Programs		\$7,833,455
	Subtotal Funding		\$95,890,227
2039-2043	Hyannis Area Improvements	\$30,000,000	\$58,437,015
	Rail Trail Extensions (Mid Cape)	\$20,000,000	\$38,958,010
	Programs		\$8,074,475
	Subtotal Funding		\$105,469,500
2044	Programs		\$22,492,299
	Subtotal Funding		\$22,492,299
<b>2024 - 2044 Total</b>			<b>\$387,183,556</b>

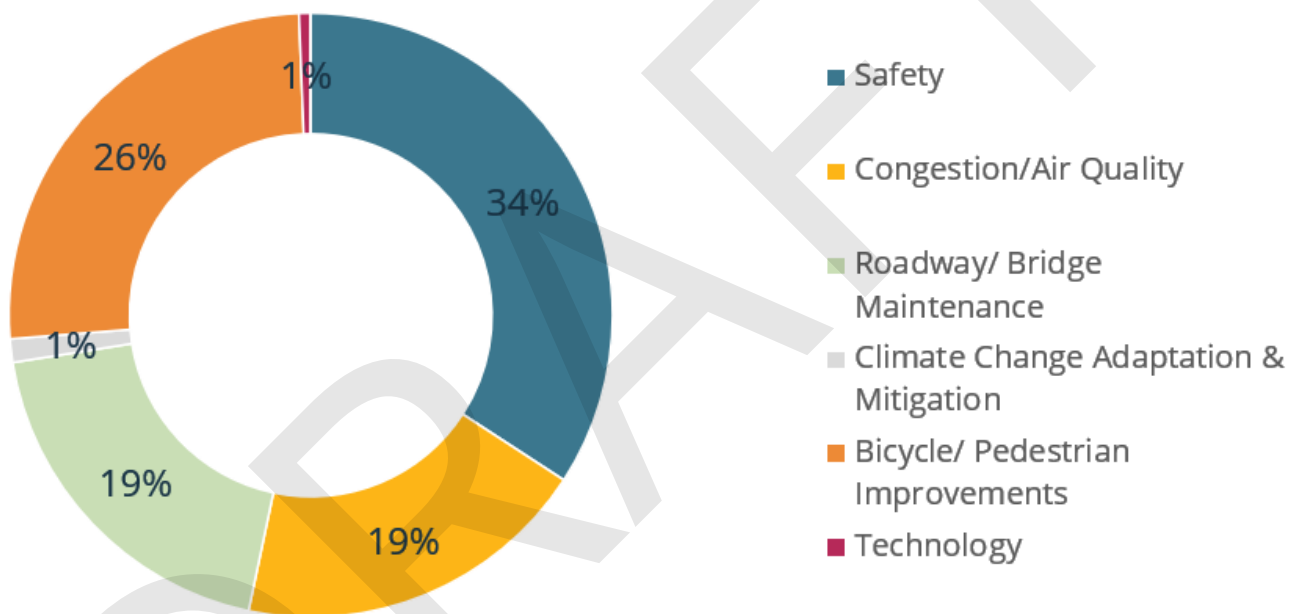
<sup>1</sup> Projects funded in the *Federal Fiscal Year Cape Cod 2024-2028 Transportation Improvement Program* through a combination of state and federal sources outside of the regional target.

<sup>2</sup> See page 70 for discussion of the Cape Cod Canal Bridges Program. The Program is anticipated to be funded through a combination of state and federal sources outside of the regional target.

<sup>3</sup> Projects identified in the Hyannis Access Study and related projects being developed by MassDOT and the Town of Barnstable including improvements to Route 132

In allocating the available highway regional target funding, particularly for the bundled “Programs and Smart Solutions,” it is important to keep a balance between different types of projects. Based on feedback from the budget challenge in the RTP survey, recommendations from the CCJTC project selection subcommittee, and, ultimately the recommendation of the Cape Cod MPO, Figure 37 represents the recommended distribution of funding across the range of programs. This recommended distribution will be used to inform TIP project selection through the development of revised TIP scoring criteria, as needed. Roadway maintenance, bridge maintenance, and transit are also often elements of these highway regional target projects but are addressed primarily through statewide funding streams. A discussion of the overall RTP funding distribution is presented in the next section.

Figure 37. Highway Regional Target Funding Distribution





## Analysis of Highway Regional Target Projects

An analysis of potential impacts (positive or negative) on low income, minority, and LEP populations was conducted on regional target projects and is presented in Table 21. Of the approximately \$387 million in highway regional target funding, approximately \$339 million is programmed for specific regional target projects while the remainder will go to “Programs and Smart Solutions.” Analysis was limited to the specific projects, with existing TIP analysis procedures ensuring that the “Programs and Smart Solutions” will be programmed in an equitable way.<sup>44</sup>

TABLE 21. Highway Regional Target Projects – Income, Minority, and LEP Population Impacts

PROJECT	LOW INCOME [I], MINORITY [M], OR LIMITED ENGLISH PROFICIENCY [LEP] POPULATION AREA PROXIMATE	NATURE OF IMPACT ON LOW INCOME, MINORITY, OR LEP AREA
Mashpee: Route 151	M	Improved bicycle/ pedestrian access, safety, traffic flow
Route 28 Multimodal Improvements: Various Locations	TBD	Improved bicycle/ pedestrian access, safety
Provincetown, Shank Painter Road and Route 6 Improvements	I	Improved bicycle/ pedestrian access, safety
Rail Trail Extensions (Mid- and Upper-Cape)	I, M, LEP	Improved bicycle/ pedestrian access, safety
Route 6 Safety Improvements (Outer Cape)	I	Improved bicycle/ pedestrian access, safety, traffic flow
Rail Trail Extensions (Upper and Outer Cape)	I	Improved bicycle/ pedestrian access, safety
Hyannis Area Improvements	I, M, LEP	Improved bicycle/ pedestrian access, safety, traffic flow
Route 6 Safety Improvements (Interchanges and Shoulders)	I, M, LEP	Improved safety, traffic flow
Route 28 Bass River Bridge Replacement <sup>1</sup>	I, M	Improved bicycle/ pedestrian access, safety
Cape Cod Canal Bridges Program <sup>1</sup>	I, M	Improved bicycle/ pedestrian access, safety, traffic flow

<sup>1</sup> Projects funded or intended to be funded through a combination of state and federal sources outside of the regional target.

<sup>44</sup> The most recent slate of highway projects programmed in the 2024-2028 Cape Cod TIP indicated that approximately 98% of funding is allocated on projects within and proximate to low income, minority, and LEP populations. This represents an investment in transportation infrastructure serving these areas that is proportionally higher than other areas on Cape Cod.

Of the approximately \$387 million programmed for specific regional target projects, approximately 75% was on projects within and proximate to minority populations, 92% was on projects within and proximate to low income populations, and 80%, was on projects within and proximate to LEP populations. Given the regional nature of these projects, even projects that are not proximate to these identified population are likely to positively impact these identified populations as they travel through these locations to access regional services. This represents an investment in transportation infrastructure serving these areas proportionally higher than other areas on Cape Cod. In summary, the areas with higher proportions of low income and minority populations see more transportation dollars spent than other areas on Cape Cod. Further analysis of highway regional target projects is presented in Appendix M.

An analysis of regional target projects was also analyzed in relation to greenhouse gas (GHG) emissions. As presented in Table 22, it is anticipated that most of the projects will result in nominal decreases in emissions for sidewalk and/or bicycle infrastructure or other improvements. It is anticipated that other projects will result in a quantifiable decrease in emissions that will need to be verified by statewide modeling efforts.

**TABLE 22. Highway Regional Target Projects – Anticipated GHG Impacts**

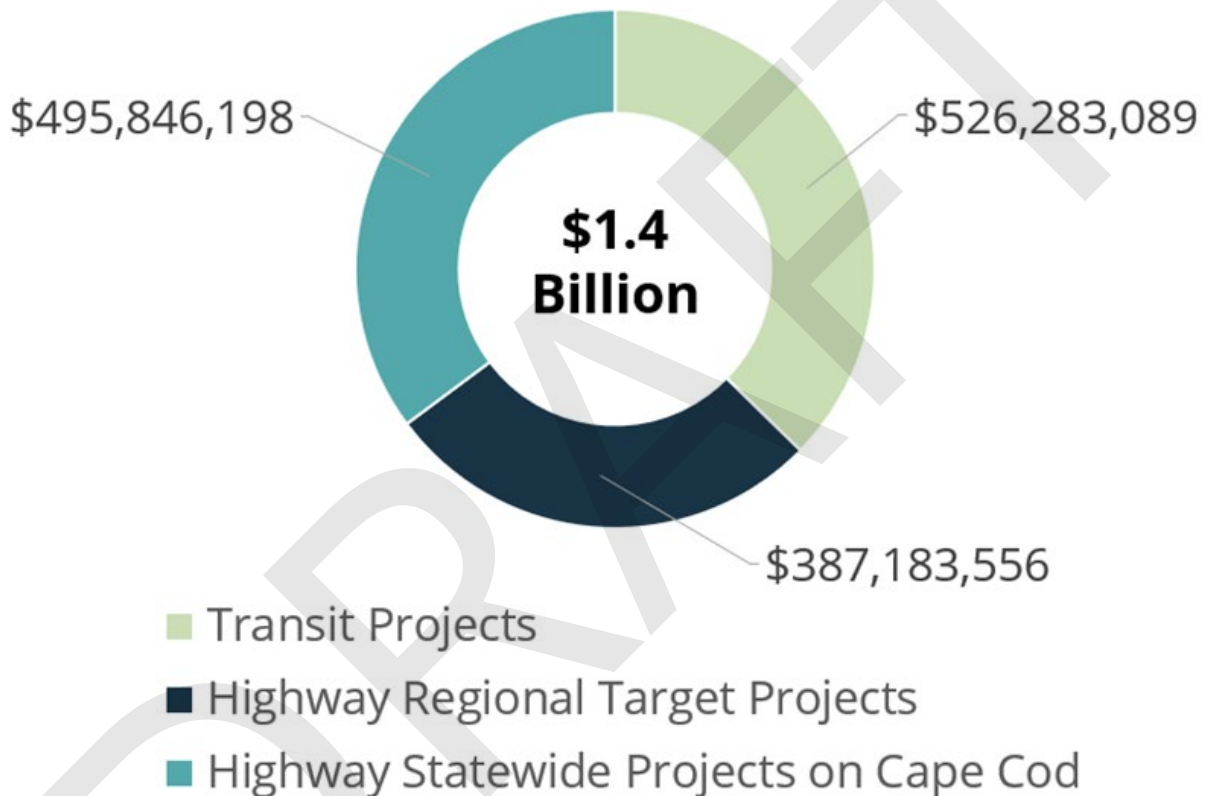
<b>PROJECT</b>	<b>ANTICIPATED GHG IMPACT</b>
Mashpee: Route 151	Quantified Decrease in Emissions from Sidewalk and Bicycle Infrastructure
Route 28 Multimodal Improvements: Various Locations	Assumed Nominal Decrease in Emissions from Sidewalk and Bicycle Infrastructure
Provincetown, Shank Painter Road and Route 6 Improvements	Quantified Decrease in Emissions from Sidewalk and Bicycle Infrastructure
Rail Trail Extensions (Mid- and Upper-Cape)	Assumed Nominal Decrease in Emissions from Bicycle Infrastructure
Route 6 Safety Improvements (Outer Cape)	Assumed Nominal Decrease in Emissions from Sidewalk, and Bicycle Infrastructure
Rail Trail Extensions (Upper and Outer Cape)	Assumed Nominal Decrease in Emissions from Bicycle Infrastructure
Hyannis Area Improvements	Assumed Nominal Decrease in Emissions from Sidewalk and Bicycle Infrastructure
Route 6 Safety Improvements (Interchanges and Shoulders)	Assumed Nominal Decrease in Emissions from Roadway Infrastructure
Rail Trail Extensions (Mid-Cape)	Assumed Nominal Decrease in Emissions from Bicycle Infrastructure
Route 28 Bass River Bridge Replacement <sup>1</sup>	Quantified Decrease in Emissions from Bicycle and Pedestrian Infrastructure
Cape Cod Canal Bridges Program <sup>1</sup>	Project included MassDOT modeling used to develop the “Evaluation and Reporting of Statewide Greenhouse Gas Reductions in Transportation” presented in Appendix N

<sup>1</sup> Projects funded or intended to be funded through a combination of state and federal sources outside of the regional target.

## CONCLUSION

The spending on highway regional target projects, highway statewide projects on Cape Cod, and the transit service and projects, summarized in Figure 38, all contribute to the development of a transportation system that will serve the region for years to come.

Figure 38. Summary of Anticipated Funding



The RTP vision, goals, and objectives set a framework for the spending of surface transportation funds in the region. Based on the overall program established in this report, the anticipated \$1.4 billion is allocated to overall spending categories as summarized in Figure 39.

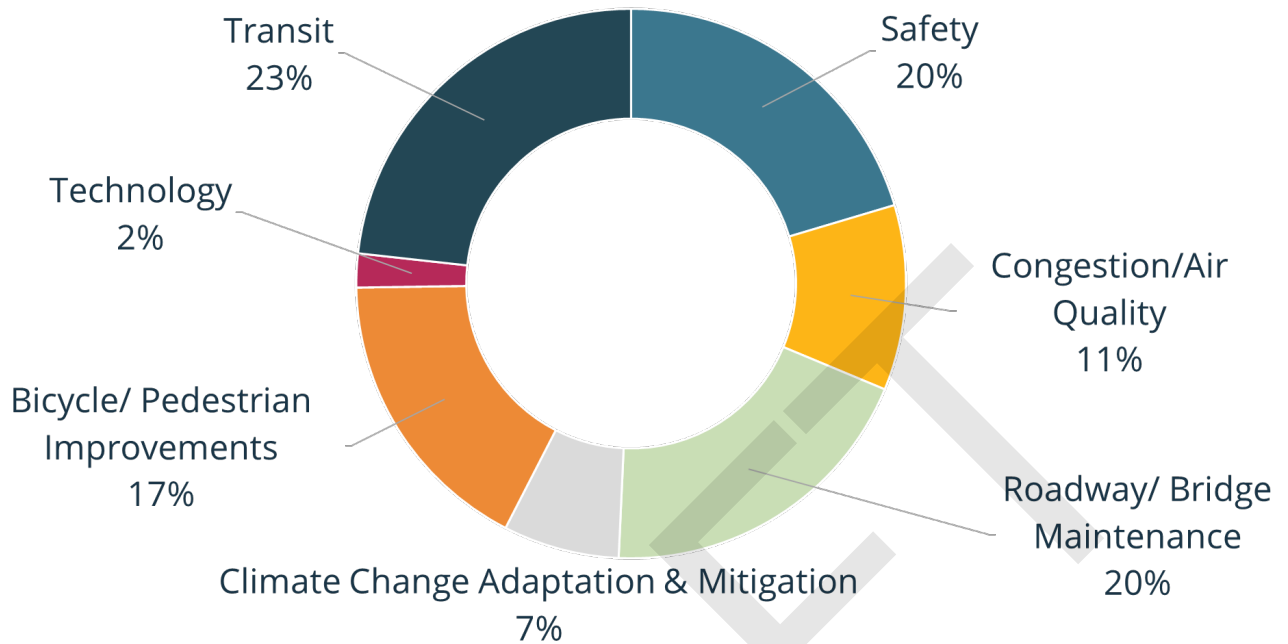


Figure 39. Summary of Recommended RTP Spending Distribution

While there is still significant unmet need for the region, see Appendix M, the \$1.4 billion of anticipated surface transportation funding available over the next 21 years represents a significant investment in the region.

# List of Abbreviations

ADA	Americans with Disabilities Act
BIL	Bipartisan Infrastructure Law
BMP	Best Management Practices
CCC	Cape Cod Commission
CCJTC	Cape Cod Joint Transportation Committee
CCRTA	Cape Cod Regional Transit Authority
CEDS	Comprehensive Economic Development Strategy
CMAQ	Congestion Mitigation and Air Quality Improvement Program
CMP	Congestion Management Process/Plan
EV	Electric Vehicle
EVSE	Electric Vehicle Supply Equipment
FAST	Fixing America's Surface Transportation Act
FEMA	Federal Emergency Management Agency
FHWA	Federal Highway Administration
FTA	Federal Transit Administration
FFY	Federal Fiscal Year
FY	Fiscal Year
GHG	Greenhouse Gas
GIS	Geographic Information System
GWSA	Global Warming Solutions Act
IJA	Infrastructure Investment and Jobs Act
ITS	Intelligent Transportation System(s)
LEP	Limited English Proficiency
LID	Low-impact Development
MAP-21	Moving Ahead for Progress in the 21st Century
MassDER	Massachusetts Division of Ecological Restoration
MassDOT	Massachusetts Department of Transportation
MPO	Metropolitan Planning Organization
NHPP	National Highway Performance Program
NHS	National Highway System
PPP	Public Participation Plan
RPP	Regional Policy Plan
RTA	Regional Transit Authority
RTP	Regional Transportation Plan
STIP	Statewide Transportation Improvement Program
STP	Surface Transportation Program
TAP	Transportation Alternatives Program
TCI	Transportation & Climate Initiative
TDM	Transportation Demand Management
TMA	Transportation Management Area
TIP	Transportation Improvement Program

Title VI	Title VI of the Civil Rights Act of 1964
UPWP	Unified Planning Work Program
USDOT	United States Department of Transportation
VMT	Vehicle Miles Traveled
YOE	Year of Expenditure

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CAPE COD COMMISSION

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