

4 Affected Environment, Environmental Consequences, and Mitigation

4.12 Coastal Zone Consistency

4.12.1 Introduction

This section assesses the consistency of the Build Alternative with the policies of the Massachusetts Coastal Zone Management Program (MA CZMP). Analyses presented in the following relevant sections of the Draft Environmental Impact Statement guided the potential effects of the Build Alternative relative to coastal zone resources:

- **Section 4.3, Pedestrian and Bicycle Facilities**
- **Section 4.6, Land Use, Zoning, and Community Cohesion**
- **Section 4.9, Wetlands and Floodplains**
- **Section 4.10, Water Quality and Stormwater**
- **Section 4.11, Threatened, Endangered, and Protected Species and Habitats**
- **Section 4.16, Cultural Resources**
- **Section 4.17, Public Parks, Recreational Facilities, and Open Space**
- **Chapter 5, Draft Section 4(f) Evaluation**

This section also assesses whether the Build Alternative could affect any “trust lands” held by the Commonwealth of Massachusetts.

4.12.1.1 Resource Definitions

The term “coastal zone resources” refers to any land or water use (including natural resources) that exist within the state’s designated coastal zone. Examples of coastal land or water uses include public access to active and passive recreation and fishing, as well as historic and cultural preservation, development, energy infrastructure and use, hazards management, marinas, floodplain management, and resource creation or restoration.

The term “coastal zone” means the coastal zone of Massachusetts established pursuant to the Coastal Zone Management Act.¹ In Massachusetts, the coastal zone includes Cape Cod and the Islands,² transitional and intertidal areas, coastal wetlands, beaches, tidal rivers and adjacent uplands, and anadromous fish³ runs, as well as their floodplains, within coastal towns.

¹ 16 United States Code Section 1451 et seq. [Chapter 33, Coastal Zone Management](https://uscode.house.gov/view.xhtml?req=(title:16%20section:1451%20edition:prelim)).
[https://uscode.house.gov/view.xhtml?req=\(title:16%20section:1451%20edition:prelim\)](https://uscode.house.gov/view.xhtml?req=(title:16%20section:1451%20edition:prelim))

² Cape Cod and the Islands include Barnstable County, Dukes County (including Martha’s Vineyard and the Elizabeth Islands), and Nantucket County.

³ Fish that enter freshwater from the ocean to spawn.

The term “trust lands” means present and former waterways in which the fee simple, any easement, or other proprietary interest is held by the Commonwealth in trust for the benefit of the public.⁴ All geographic areas subject to the jurisdiction of Massachusetts General Law Chapter 91 (MGL Chapter 91), as specified in 310 Code of Massachusetts Regulations (CMR) 9.04, are generally considered to be trust lands.

4.12.1.2 Regulatory Context

The Coastal Zone Management Act of 1972 requires federal agencies conducting activities—including development projects that directly affect a state’s coastal zone—to comply to the maximum extent practicable with an approved state coastal zone management program.⁵ The Massachusetts Office of Coastal Zone Management (MA CZM) within the Massachusetts Executive Office of Environmental Affairs administers the MA CZMP. Within this authority, the MA CZM reviews federal agency actions—including federally funded projects and federal permit activities—that affect coastal uses or resources to ensure consistency with MA CZMP policies in accordance with the MA CZM regulations.⁶ The MA CZMP policies are divided into nine categories:

- Coastal Hazards
- Energy
- Growth Management
- Habitat
- Ocean Resources
- Ports and Harbors
- Protected Areas
- Public Access
- Water Quality

MGL Chapter 91, as implemented by the Massachusetts Waterways Regulation,⁷ governs certain trust lands, subjecting them to licensing and permitting. Trust lands subject to Chapter 91 jurisdiction in Massachusetts include the following:⁸

- Flowed tidelands

⁴ Massachusetts Department of Environmental Protection. 310 Code of Massachusetts Regulations (CMR) 9.02: [The Massachusetts Waterways Regulation](https://www.mass.gov/regulations/310-CMR-900-the-massachusetts-waterways-regulation). <https://www.mass.gov/regulations/310-CMR-900-the-massachusetts-waterways-regulation>

⁵ 16 United States Code 1456(c). [Chapter 33, Coastal Zone Management: Coordination and Cooperation](https://www.govinfo.gov/app/details/USCODE-2014-title16/USCODE-2014-title16-chap33-sec1456). <https://www.govinfo.gov/app/details/USCODE-2014-title16/USCODE-2014-title16-chap33-sec1456>

⁶ Massachusetts Department of Environmental Protection. 301 CMR 21.00: [Procurement of commodities or services, including human and social services](https://www.mass.gov/regulations/801-CMR-2100-procurement-of-commodities-or-services-including-human-and-social-services). <https://www.mass.gov/regulations/801-CMR-2100-procurement-of-commodities-or-services-including-human-and-social-services>

⁷ Massachusetts Department of Environmental Protection. 310 CMR 9.00: [The Massachusetts Waterways Regulation](https://www.mass.gov/regulations/310-CMR-900-the-massachusetts-waterways-regulation). <https://www.mass.gov/regulations/310-CMR-900-the-massachusetts-waterways-regulation>

⁸ Massachusetts Department of Environmental Protection. 310 CMR 9.04: [Waterways: Geographic Areas Subject to Jurisdiction](https://www.mass.gov/doc/310-cmr-900-waterways-regulations/download). <https://www.mass.gov/doc/310-cmr-900-waterways-regulations/download>

- Filled tidelands (except for landlocked tidelands)
- Great Ponds
- Certain non-tidal rivers and streams

4.12.1.3 Methodology and Study Area

The Study Areas for this assessment include areas within the Build Alternative's Project Limits, plus a 500-foot buffer around the Project Limits.

The Massachusetts Department of Transportation (MassDOT) used the following data sources to assess the potential effects to coastal zone resources within the Study Areas:

- Wetland field delineations conducted in summer 2020 and winter 2021⁹
- Federal Emergency Management Agency (FEMA) Flood Insurance Rate Maps¹⁰
- Massachusetts Office of Coastal Zone Management Act Policy Guide¹¹
- Massachusetts Department of Environmental Protection (MassDEP) and MA CZM Policy Guide for applying the Massachusetts Coastal Zone Regulations¹²
- U.S. Army Corps of Engineers (USACE) Cape Cod Canal Major Rehabilitation Evaluation Report/Environmental Assessment¹³
- MassDEP List of Great Ponds¹⁴
- U.S. Fish and Wildlife Service Information for Planning and Consultation Tool¹⁵
- Massachusetts Natural Heritage and Endangered Species Program 15th Edition Natural Heritage Atlas¹⁶

⁹ The Bourne Conservation Commission confirmed these delineations via Order of Resource Area Delineation in May 2022.

¹⁰ [FEMA Flood Map Service Center](https://msc.fema.gov/portal/home). <https://msc.fema.gov/portal/home>

¹¹ [Massachusetts Office of Coastal Zone Management. 2011. Policy Guide](https://www.mass.gov/doc/massachusetts-office-of-coastal-zone-management-policy-guide-october-2011/download). October.
<https://www.mass.gov/doc/massachusetts-office-of-coastal-zone-management-policy-guide-october-2011/download>

¹² Commonwealth of Massachusetts. 2017. [Applying the Massachusetts Coastal Wetlands Regulations: A Practical Manual for Conservation Commissions to Protect the Storm Damage Prevention and Flood Control Functions of Coastal Resource Areas](https://www.mass.gov/doc/czm-coastal-manual-applying-the-massachusetts-coastal-wetlands-regulations/download). <https://www.mass.gov/doc/czm-coastal-manual-applying-the-massachusetts-coastal-wetlands-regulations/download>

¹³ U.S. Army Corps of Engineers, New England District. 2020. [Major Rehabilitation Evaluation Report and Environmental Assessment: Cape Cod Canal Highway Bridges](https://www.nae.usace.army.mil/Portals/74/docs/Topics/Cape%20Cod%20Canal%20Bridges/Reports/FinalMRERDocument.pdf). March.
<https://www.nae.usace.army.mil/Portals/74/docs/Topics/Cape%20Cod%20Canal%20Bridges/Reports/FinalMRERDocument.pdf>

¹⁴ [Massachusetts Great Ponds List](https://www.mass.gov/doc/massachusetts-great-ponds-list/download). 2017. <https://www.mass.gov/doc/massachusetts-great-ponds-list/download>

¹⁵ U.S. Fish & Wildlife Service. [IPaC Project Planning Tool](https://ipac.ecosphere.fws.gov/). <https://ipac.ecosphere.fws.gov/>

¹⁶ Massachusetts Division of Fisheries and Wildlife. 2021. [15th Edition Natural Heritage Atlas](https://www.mass.gov/news/15th-edition-natural-heritage-atlas-released-august-1). August.
<https://www.mass.gov/news/15th-edition-natural-heritage-atlas-released-august-1>

4.12.2 Affected Environment

4.12.2.1 Designated Coastal Zone

The Study Areas for this assessment are entirely within the Massachusetts-designated coastal zone ([Figure 4.12-1](#)).

4.12.2.2 Coastal Zone Resources

Wetlands and Floodplain

The Study Areas feature the following state-jurisdictional coastal wetland resources:

- Land Under Ocean
- Coastal Bank
- Rocky Intertidal Shore
- Land Subject to Tidal Action
- Banks of or Land Under Ocean Underlying an Anadromous/Catadromous Fish Run
- Land Containing Shellfish
- Land Subject to Coastal Storm Flowage, as identified through FEMA mapping

No Regulatory Floodway has been designated for Cape Cod Canal based on available FEMA mapping.

The Study Areas also feature the following state-jurisdictional inland wetland resource areas:

- Land under Waterbodies or Waterways
- Bank
- Vernal Pools
- Bordering Vegetated Wetlands

Section 4.9, Wetlands and Floodplains, provides detailed information and mapping of the identified state-jurisdictional coastal and inland wetland resource areas within the Study Areas.

Federal and State-Protected Species Habitat

The Study Areas are mapped within areas designated as habitat for federal and state-protected species, including plants, fish, and wildlife. **Section 4.11, Threatened, Endangered, and Protected Species and Habitats**, provides detailed information on the protected species, including mapping of their potential habitats within the Study Areas.

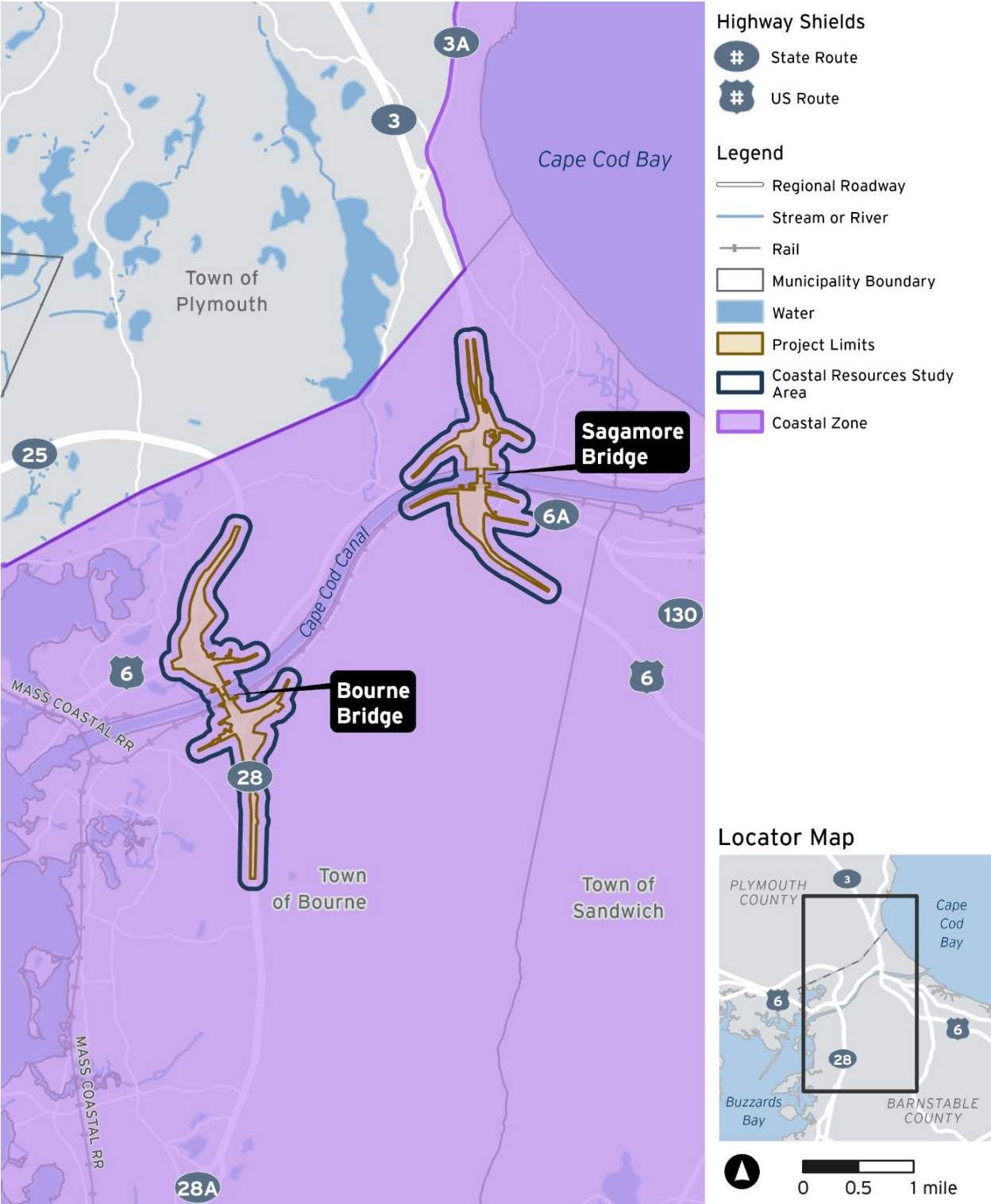
Water Supply Areas

The Study Areas are within two sole source aquifers, as designated by the U.S. Environmental Protection Agency:

- Cape Cod Sole Source Aquifer encompasses the entire Study Area south of Cape Cod Canal.
- Plymouth/Carver Sole Source Aquifer encompasses the entire Study Area north of Cape Cod Canal.

Section 4.10, Water Quality and Stormwater, provides detailed information and mapping of these aquifers.

Figure 4.12-1. Designated Massachusetts Coastal Zone Boundary



Source: Massachusetts Department of Transportation, 2024

Public Recreation Areas

The Study Areas feature publicly owned park and recreation areas owned and operated by the USACE and the Town of Bourne. **Section 4.17, Public Parks, Recreational Facilities, and Open Space**, provides a list of the parks and recreational resources within the Study Areas. While the Canal Service Roads provide for public recreational use of these facilities, the USACE determined that the roads' primary purpose is for navigation in support of the Cape Cod Canal Federal Navigation Project.

Other Protected Areas

Sagamore Bridge and Bourne Bridge are each eligible for individual listing in the National Register of Historic Places (NRHP) and are contributing resources to the NRHP-eligible Cape Cod Canal Historic District. MassDOT conducted field surveys within the Study Areas and did not identify any archaeological resources that were determined to be eligible for listing in the NRHP. **Section 4.16, Cultural Resources**, provides more information on historic and cultural resources within the Study Areas. The Sagamore Bridge Study Area is within the boundary of the Herring River Watershed Area of Critical Environmental Concern, as discussed in **Section 4.9, Wetlands and Floodplains**. No National Wild and Scenic Rivers are within the Study Areas.

According to the U.S. Fish and Wildlife Service's Coastal Barrier Resources System Maps for Massachusetts, there are no Coastal Barrier Resource Units¹⁷ or Otherwise Protected Areas (OPA)¹⁸ within the Study Area.¹⁹ The closest Coastal Barrier Resource Unit is Phinney's Harbor (MA-33), which is west of the Bourne Bridge South Study Area, within Buzzards Bay. The closest OPA is Scusset Beach (MA 38-P), which is east of the Sagamore Bridge Study Area, along Cape Cod Bay. The southern boundaries of the Scusset Beach OPA overlap the bayside of Cape Cod Canal.

4.12.2.3 Trust Lands

MassDOT is coordinating with the Massachusetts Executive Office of Environmental Affairs and MassDEP to determine the applicability of MGL Chapter 91 for proposed bridge replacements over the Cape Cod Canal. Nightingale Pond, in the Bourne North quadrant, does not meet the criteria of a

¹⁷ A Coastal Barrier Resource Unit is a designated area of land located along the U.S. coasts that is part of the Coastal Barrier Resources System. These units are identified and managed under the Coastal Barrier Resources Act, which was enacted in 1982.

¹⁸ Otherwise Protected Areas are coastal barriers within the Coastal Barrier Resource System. They are undeveloped and primarily used for wildlife refuges and sanctuaries, and recreational or natural resource conservation purposes.

¹⁹ <https://fwsprimary.wim.usgs.gov/CBRMapper-v2/>

“Great Pond”²⁰ subject to jurisdiction under MGL Chapter 91. No Designated Port Areas²¹ are within the Study Areas. To date, the Town of Bourne does not have an approved Municipal Harbor Plan.²²

4.12.3 No Build Alternative

The No Build Alternative would not include any new construction activities that would affect coastal zone resources within the Study Areas. Routine bridge maintenance activities and future dredging operations within Cape Cod Canal conducted by USACE for the No Build Alternative could have potential effects to coastal zone resources, including sedimentation. Protective measures, Stormwater Control Measures, would be implemented per permit requirements to ensure consistency with the MA CZMP policies. The No Build Alternative would not improve pedestrian and bicycle accommodations to water-dependent recreational uses along the canal, which would not advance the goals of the MA CZMP’s public access policies.

4.12.4 Build Alternative

The Build Alternative would replace Sagamore Bridge and Bourne Bridge with resilient structures that meet modern design standards. The replacement highway bridges would improve pedestrian and bicycle accommodations within the Study Areas in support of public access to the water-dependent uses along the shoreline of Cape Cod Canal.

The Build Alternative would have unavoidable impacts to coastal and inland wetland resources, federal and state-protected species habitat, recreational resources, and other protected areas, as identified in [Section 4.12.2.2](#). Additionally, the Build Alternative proposes ground-disturbing activities during construction that could affect water quality due to erosion and sedimentation.

4.12.4.1 Coastal Zone Consistency Determination Assessment of Build Alternative

[Table 4.12-1 through Table 4.12-6](#) provide an assessment of the Build Alternative’s consistency with the applicable MA CZMP policies. Any policies that were determined to be not applicable to the Build Alternative, including energy, ocean resources, and ports and harbors, are not listed.

²⁰ Great Ponds are those which contain more than 10 acres in its natural state, as calculated based on the surface area of lands lying below the natural high-water mark.

²¹ Designated Port Areas are land and water areas with certain physical and operational features that have been identified to have state, regional, and national significance with respect to the promotion of water-dependent industrial uses and commercial activities that rely on marine transportation or the withdrawal or discharge of large volumes of water.

²² A Municipal Harbor Plan establishes a community’s objectives, standards, and policies for guiding public and private use of land and water within the jurisdiction of Chapter 91.

Table 4.12-1. Coastal Hazard Policies

Policy Number	Policy Summary Statement	Consistency
Coastal Hazards Policy #1 [Enforceable]	Preserve, protect, restore, and enhance beneficial functions of storm damage prevention and flood control provided by natural coastal landforms, such as dunes, beaches, barrier beaches, coastal banks, land subject to coastal storm flowage, salt marshes, and land under ocean.	The Build Alternative was designed to minimize impacts to coastal and inland wetland resource areas. Unavoidable adverse effects will be mitigated in accordance with applicable federal and state regulations.
Coastal Hazards Policy #2 [Enforceable]	Ensure that construction in water bodies and contiguous land areas will minimize interference with water circulation and sediment transport. Flood or erosion control projects must demonstrate no significant adverse effects on the project site or adjacent downcoast areas.	A Stormwater Pollution Prevention Plan will be developed and implemented during construction to minimize potential erosion and sedimentation impacts to water bodies and contiguous land areas in accordance with U.S. Environmental Protection Agency National Pollutant Discharge Elimination System permit requirements.
Coastal Hazards Policy #3 [Enforceable]	Ensure that state and federally funded public works projects proposed for location within the coastal zone will not exacerbate existing hazards or damage natural buffers or other natural resources; be reasonably safe from flood and erosion-related damage; not promote growth and development in hazard-prone or buffer areas, especially in velocity zones and Areas of Critical Environmental Concern.	The Build Alternative was designed to avoid impacts to coastal and inland wetland resource areas to the maximum extent practicable. Where impacts are unavoidable, MassDOT would employ necessary mitigation measures in compliance with applicable federal and state regulations. The Build Alternative would provide bridge piers founded on deep foundations that would be resilient to anticipated flooding and scour. The Build Alternative would replace and reconstruct existing transportation infrastructure and is not expected to induce any new development in hazard-prone areas. Rather, it would improve public access to the Canal Service Roads to encourage active transportation and recreational uses, including fishing, jogging, cycling, and skating.

Policy Number	Policy Summary Statement	Consistency
Coastal Hazards Policy #4	Prioritize acquisition of hazardous coastal areas that have high conservation and/or recreation values and relocation of structures out of coastal high-hazard areas, giving due consideration to the effects of coastal hazards at the location to the use and manageability of the area.	This policy is not applicable.

Table 4.12-2. Growth Management Policies

Policy Number	Policy Summary Statement	Consistency
Growth Management Policy #1	Encourage sustainable development that is consistent with state, regional, and local plans and supports the quality and character of the community	The Build Alternative would replace the substandard Sagamore Bridge and Bourne Bridge with new bridges designed to modern standards. The Build Alternative would improve cross-canal mobility, accessibility, and safety for all road users, including bicyclists and pedestrians, which is consistent with and supports the goals outlined in the Town of Bourne Local Comprehensive Plan and the Cape Cod Regional Policy Plan.
Growth Management Policy #2	Ensure that state and federally funded infrastructure projects in the coastal zone primarily serve existing developed areas, assigning highest priority projects that meet the needs of urban and community development centers	The Build Alternative would serve the existing developed areas within the town of Bourne and would meet the transportation needs of the Cape Cod Bridges Program, as identified in Section 2.3, Need for the Program.
Growth Management Policy #3	Encourage the revitalization and enhancement of existing development centers in the coastal zone through technical assistance and financial support for residential, commercial, and industrial development	This policy is not applicable.

Table 4.12-3. Habitat Policies

Policy Number	Policy Summary Statement	Consistency
Habitat Policy #1 [Enforceable]	Protect coastal, estuarine, and marine habitats—including salt marshes, shellfish beds, submerged aquatic vegetation, dunes, beaches, barrier beaches, banks, salt ponds, eelgrass beds, tidal flats, rocky shores, bays, sounds, and other ocean habitats—and coastal freshwater streams, ponds, and wetlands to preserve critical wildlife habitat and other important functions and services including nutrient and sediment attenuation, wave and storm damage protection, and landform movement processes.	The Build Alternative would avoid or minimize impacts to coastal, estuarine, and marine habitats to the maximum extent practicable. Any unavoidable impacts to protected coastal and inland wetland resources will be mitigated in accordance with applicable federal and state permit requirements.
Habitat Policy #2 [Enforceable]	Advance the restoration of degraded or former habitats in coastal and marine areas.	Areas of coastal bank to be temporarily disturbed by construction activities will be restored in-kind.

Table 4.12-4. Protected Areas Policies

Policy Number	Policy Summary Statement	Consistency
Protected Areas Policy #1 [Enforceable]	Preserve, restore, and enhance coastal Areas of Critical Environmental Concern, which are complexes of natural and cultural resources of regional or statewide significance.	The Build Alternative would not affect any natural coastal resources associated with the Herring River Watershed Area of Critical Environmental Concern (ACEC). Work within the ACEC would be confined to previously disturbed areas of the State Highway Layout. Where feasible, the Massachusetts Department of Transportation (MassDOT) will install retaining walls to minimize disturbance within the ACEC.
Protected Areas Policy #2 [Enforceable]	Protect state-designated scenic rivers in the coastal zone.	This policy is not applicable.
Protected Areas Policy #3 [Enforceable]	Ensure that proposed developments in or near designated or registered historic places respect the preservation intent of the designation and that potential adverse effects are minimized.	MassDOT will execute a Programmatic Agreement with the State Historic Preservation Office (SHPO) and other Section 106 consulting parties to mitigate the adverse effects on the National Register of Historic Places (NHRP)-eligible Sagamore Bridge and Bourne Bridge in accordance with 36 Code of Federal Regulations (CFR) 800.14(b). MassDOT has determined that the preferred bridge type would be compatible with the NRHP-eligible Cape Cod Canal Historic District. MassDOT will coordinate with the SHPO for concurrence with the determination of No Adverse Effect to the Cape Cod Canal Historic District.

Table 4.12-5. Public Access Policies

Policy Number	Policy Summary Statement	Consistency
Public Access Policy #1 [Enforceable]	Ensure that development (both water-dependent or non-water dependent) of coastal sites subject to state waterways regulation will propose general public use and enjoyment of the water's edge, to an extent commensurate with the Commonwealth's interests in flowed and filled tidelands under the Public Trust Doctrine.	The Build Alternative would improve and expand upon water-dependent uses through construction of new shared-use path facilities with connections to the local roadway network and the Canal Service Roads. These upgrades would provide opportunities for the public to access Cape Cod Canal for recreation, fishing, and other water-dependent uses consistent with the Massachusetts Public Trust Doctrine.
Public Access Policy #2	Improve public access to the existing coastal recreation facilities and alleviate auto traffic and parking problems through improvements in public transportation and trail links (land- or water-based) to other nearby facilities. Increase capacity of existing recreation areas by facilitating multiple use and by improving management, maintenance, and public support facilities. Ensure that the adverse impacts of developments proposed near existing public access and recreation sites are minimized.	The Build Alternative would improve public access to the Canal Service Roads abutting Cape Cod Canal to encourage active transportation and recreational uses, including fishing, jogging, cycling, and skating. The proposed shared-use facilities would also provide critical off-road connections to other local roadways within the Study Areas. The Federal Highway Administration intends on issuing a Section 4(f) <i>de minimis</i> determination for Sagamore Recreation Area, Keith Field Recreation Area, Bourne Scenic Park, Bourne Recreation Area, and Gallo Ice Arena. This determination may be made when the transportation use of the Section 4(f) resource, together with any impact avoidance, minimization, and mitigation or enhancement measures incorporated into the project, does not adversely affect the activities, features, and attributes that qualify the resource for protection under Section 4(f), pending agreement with the Official with Jurisdiction and opportunity for public comment.

Policy Number	Policy Summary Statement	Consistency
Public Access Policy #3	Expand existing recreation facilities and acquire and develop new public areas for coastal recreational activities, giving highest priority to regions of high need or limited site availability. Provide technical assistance to developers of both public and private recreation facilities and sites that increase public access to the shoreline to ensure that both transportation access and the recreation facilities are compatible with social and environmental characteristics of surrounding communities.	The Build Alternative would improve and expand existing recreation facilities through construction of the shared-use paths with connections to local roadways and Cape Cod Canal. These improvements would increase public access to the shoreline, which is consistent with the social and environmental characteristics of the local community.

Table 4.12-6. Water Quality Policies

Policy Number	Policy Summary Statement	Consistency
Water Quality Policy #1 [Enforceable]	Ensure that point-source discharges and withdrawals in or affecting the coastal zone do not compromise water quality standards and protect designated uses and other interests.	The Build Alternative would be designed to comply with the Massachusetts Department of Environmental Protection Stormwater Management Standards, as enforced through the Massachusetts Wetlands Protection Act and the 401 Water Quality Certification Regulations.
Water Quality Policy #2 [Enforceable]	Ensure the implementation of nonpoint source pollution controls to promote the attainment of water quality standards and protect designated uses and other interests.	Construction-phase and post-construction Storm Control Measures will be implemented to protect water quality in accordance with applicable federal and state regulatory requirements.
Water Quality Policy #3 [Enforceable]	Ensure that subsurface waste discharges conform to applicable standards, including the siting, construction, and maintenance requirements for on-site wastewater disposal systems, water quality standards, established Total Maximum Daily Load limits, and prohibitions on facilities in high-hazard areas.	The Study Areas are not located within high-hazard areas; ^[1] therefore, this policy is not applicable.

^[1] "High hazard areas" are those areas mapped as Federal Emergency Management (FEMA) Zone V or VE, indicated areas with high-velocity wave action and a significant risk of damage from storm surges and flooding.

4.12.5 Mitigation

In addition to the enhancements provided by the Build Alternative through improved public access and resilient infrastructure, the Build Alternative will implement resource-specific mitigation measures that will ensure any unavoidable adverse effects to coastal zone resources are minimized in accordance with the applicable federal and state regulations. These mitigation measures, in combination with the enhancements proposed by the Build Alternative, will ensure consistency with the applicable policies of the MA CZMP.

Table 4.12-7 lists the mitigation measures MassDOT will implement to minimize and compensate for any unavoidable adverse impacts to coastal resources.

Table 4.12-7. Coastal Resources Mitigation Measures

Resource	Mitigation
Wetlands and Floodplain	• Temporary impacts to coastal and inland bank, Land Under Ocean, and vegetated wetlands will be restored in-kind. • Permanent impacts to vegetated wetlands and inland banks will be replicated at a ratio consistent with applicable federal and state regulations. • Compensatory flood storage will be provided for floodplain encroachment at Nightingale Pond.
Federal and State-Protected Species Habitat	• Construction within Cape Cod Canal will be completed within isolated work areas to minimize potential impacts to aquatic species and their habitats. • The Massachusetts Department of Transportation (MassDOT) will consult with the Natural Heritage and Endangered Species Program to identify whether a Conservation Management Permit is required for impacts to mapped Rare and Estimated Habitats.
Protected Areas	• Retaining walls will be installed, where feasible, to minimize impacts to the Herring River Watershed Area of Critical Environmental Concern. • MassDOT is developing a Programmatic Agreement that will mitigate the adverse effects on the National Register of Historic Places (NRHP) eligible Sagamore Bridge and Bourne Bridge, in coordination with the Section 106 consulting parties. • MassDOT has determined that the preferred bridge type would be compatible with the NRHP-eligible Cape Cod Canal Historic District.
Water Supply Areas	• MassDOT will develop a Stormwater Pollution Prevention Plan, which will be implemented during construction to minimize potential erosion and sedimentation. • MassDOT will design and install post-construction Stormwater Control Measures to manage the quantity and quality of surface run-off discharged to receiving waterbodies and/or groundwater.
Public Recreation Areas	• The Federal Highway Administration intends on issuing a Section 4(f) <i>de minimis</i> determination for Sagamore Recreation Area, Keith Field Recreation Area, Bourne Scenic Park, Bourne Recreation Area, and Gallo Ice Arena. This determination may be made when the transportation use of the Section 4(f) resource, together with any impact avoidance, minimization, and mitigation or enhancement measures incorporated into the project, does not adversely affect the activities, features, and attributes that qualify the resource for protection under Section 4(f), pending agreement with the Official with Jurisdiction and opportunity for public comment.