

4 Affected Environment, Environmental Consequences, and Mitigation

4.15 Visual Resources

4.15.1 Introduction

This section summarizes the effects of the No Build Alternative and Build Alternative on visual resources in the Cape Cod Bridges Program (Program) Study Areas, including measures that the Massachusetts Department of Transportation (MassDOT) is proposing to mitigate for visual changes to the environment and compensate for adverse effects. Details of the proposed mitigation are provided in **Appendix 4.15, Visual Impact Assessment**.

4.15.1.1 Regulatory Context

This section has been prepared pursuant to the Federal Highway Administration's (FHWA) [Guidelines for the Visual Impact Assessment of Highway Projects](#) (2015) (FHWA Guidelines).¹ This section also incorporates information and direction from the following regulatory and guidance documents:

- [Section 106 of the National Historic Preservation Act](#),² 36 Code of Federal Regulations (CFR) Section 800
- [Programmatic Agreement between the U.S. Army Corps of Engineers \(USACE\) and the Massachusetts Historic Preservation Officer \(MA SHPO\) regarding the Cape Cod Canal Highway Bridges Project](#),³ March 11, 2022, executed concurrently with the Finding of No Significant Impact for USACE's Major Rehabilitation and Evaluation Report/Environmental Assessment (MRER/EA)
- [Section 4\(f\) of the U.S. Department of Transportation Act of 1966](#), 23 CFR 774⁴
- [MassDOT, Project Development and Design Guide](#), Context Sensitive Design⁵
- [Town of Bourne Open Space and Recreation Plan](#), February 8, 2018⁶
- [Town of Bourne Local Comprehensive Plan](#), approved October 29, 2019⁷
- [Cape Cod Commission, Cape Cod Regional Policy Plan](#), December 2018⁸

¹ FHWA's Guidelines uses the term "impacts" as opposed to "effects" relative to the visual changes of a proposed project upon the existing environment. Except for references to specific terminology defined in FHWA Guidelines, this section uses the term "effects" for consistency with the DEIS.

https://www.environment.fhwa.dot.gov/env_topics/other_topics/VIA_Guidelines_for_Highway_Projects.aspx

² <https://www.achp.gov/digital-library-section-106-landing/section-106-regulations>

³ https://www.nae.usace.army.mil/Portals/74/docs/Topics/Cape_Cod_Canal_Bridges/Reports/MRER-Appendix-K.pdf

⁴ https://www.environment.fhwa.dot.gov/env_topics/4f_tutorial/overview.aspx?h=e

⁵ <https://www.mass.gov/manual/massdot-project-development-and-design-guide>

⁶ https://www.townofbourne.com/sites/g/files/vyhlif12841/f/uploads/open_space_and_rec_plan_final_2018.pdf

⁷ <https://www.townofbourne.com/planning/news/local-comprehensive-final-certified-plan>

⁸ <https://www.capecodcommission.org/our-work/rpp/>

4.15.1.2 Methodology and Study Area

As an initial step, MassDOT defined the Study Areas for the visual effects assessment. MassDOT used geographic information system software to identify areas where the proposed bridges would be visible, accounting for visual obstructions, such as topography, vegetation, and buildings. These viewsheds comprise the visual resources Areas of Visual Effect (AVEs). [Figure 4.15-1](#) presents the Sagamore Bridge and Bourne Bridge AVEs.

To determine the Build Alternative's visual effects, MassDOT photographed existing conditions from different viewpoints of each bridge's AVEs that abut the existing roadways in the four Study Area quadrants (Sagamore North, Sagamore South, Bourne North, and Bourne South). These viewpoints include the following:

- Static viewsheds, defined as what neighbors of the bridges or roadways see from their stationary location.
- Dynamic viewsheds, defined as what travelers on the bridge or road see as they travel through the Program Limits.

From these photographs, MassDOT identified [20](#) visual inventory locations in the Sagamore Bridge and Bourne Bridge AVEs consisting of key views of and from the bridges and highway interchange networks. Simulations were prepared of the Build Alternative at these locations using proposed 3D design models developed from Computer Aided Design (CAD) software.

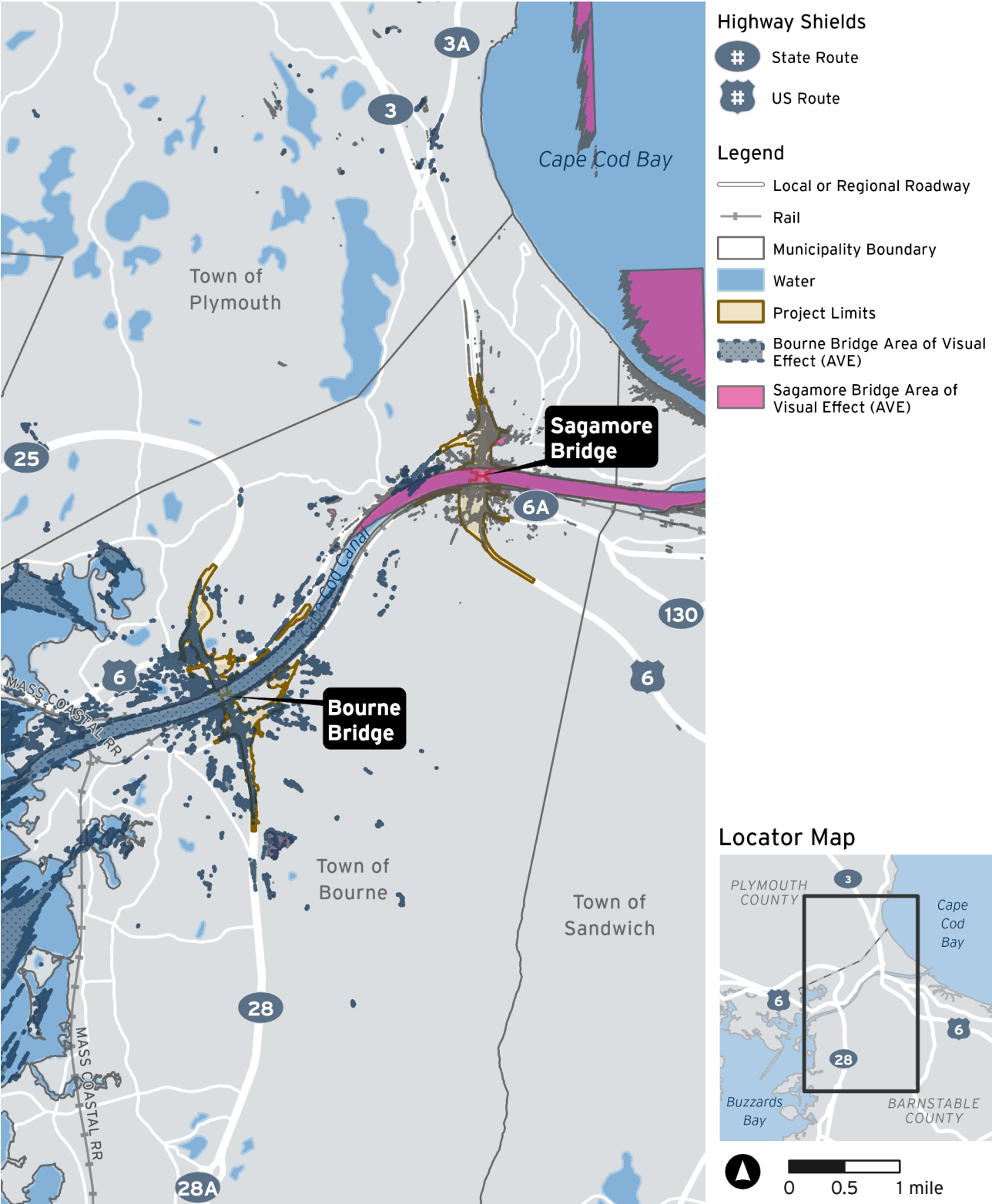
As directed in FHWA Guidelines, MassDOT then assessed the visual inventory locations with respect to the following:

- Compatibility of the visual impact
- Viewer sensitivity to the visual impact
- Resulting degree of impact

FHWA Guidelines define a visual impact as a change to the environment—measured by the compatibility of the impact with the visual character of the environment—or a change to the viewer's reaction to the impact, which is measured by their sensitivity to the impact. Compatibility of the impact is defined as the ability of the environment to visually absorb a proposed project, because the project and the environment have compatible visual characters (elements), such as project size and scale, form, and materials. The Guidelines assign the ratings for compatibility of the proposed impacts as compatible or incompatible.

FHWA Guidelines define a viewer's sensitivity to the impact as the ability of viewers to see and care about a project's impacts. Viewer sensitivity to an impact is the result of viewer exposure to the impact and viewer awareness of the impact. The greater the exposure and awareness, the more viewers will be concerned about visual impacts. FHWA Guidelines assign the ratings for viewer sensitivity to proposed impacts as low, moderate, or high sensitivity.

Figure 4.15-1. Areas of Visual Effect (Sagamore Bridge and Bourne Bridge)



Source: Massachusetts Department of Transportation, 2024

Together, the compatibility of the impact and the viewer's sensitivity to the impact determine the degree of impact to visual quality. FHWA Guidelines assign the ratings for degree of proposed impacts as a beneficial change to the visual quality, a neutral change to the visual quality, or an adverse change to the visual quality.

4.15.2 Affected Environment

The affected environment includes the existing visual environment, consisting of natural, cultural, and Program-related visual resources; and the viewers who would be affected by changes in the visual environment, consisting of neighbors and travelers. The affected environment also includes an understanding of the visual quality of the environment, as identified through local and regional policy and planning documents, previous documents, and viewers' preferences during the Program's public meetings presenting optional bridge types. Refer to **Appendix 4.16, Section 6, Inventory of Existing Conditions**, for details on the affected environment,

4.15.3 No Build Alternative

The No Build Alternative would not alter the visual quality of Sagamore and Bourne Bridges or affect the visual landscape of the interchange highway networks because they would retain their current configurations. It is not anticipated that USACE's program of continued inspections and maintenance and repair of both existing bridges as needed ("Fix as Fails") in the No Build Alternative would substantially alter the viewsheds of the motorist crossing the bridges or the views of the bridges from the Canal Service Roads.

The No Build Alternative would include proposed transportation improvements projects in and near the Project Limits within the interchange improvements network (identified in **Chapter 3, Proposed Action and Alternatives**), consisting primarily of traffic safety improvements at Belmont Circle, Bourne Rotary, Scenic Highway, and State Route 28. It is not anticipated that these improvements, such as restriping, additional lanes, signage, and flashing beacons, raised medians, and deck replacement, would alter the existing visual landscape.

The No Build Alternative would include changes to the viewsheds of travelers on the regional and local roadways networks due to proposed development, such as the proposed Cumberland Farms retail development on MacArthur Boulevard, the proposed storage unit facility at Bourne Rotary, and the proposed mixed-use development on Canal Street. However, travelers are expected to have low viewer sensitivity due to their generally narrow viewshed and the short amount of time that drivers would be exposed to the new views. As a result, the degree of effect from new development abutting the highway networks would likely be neutral.

4.15.4 Build Alternative

This section describes the visual effects of the Build Alternative using 20 visual inventory locations that MassDOT identified in the Sagamore Bridge and Bourne Bridge AVEs. **Figure 4.15-4 through Figure 4.15-7** present the visual inventory locations. In **Section 4.15.4.1 through Section 4.15.4.5**, MassDOT compares existing and simulated viewsheds and assesses the effects to viewsheds of the

highway bridges and interchange networks within the four Study Area quadrants. [Section 4.15.4.6](#) presents a summary of the visual effects of the Build Alternative.

4.15.4.1 Visual Assessment of Replacement Sagamore and Bourne Bridges

MassDOT identified two visual inventory locations for Sagamore Bridge and Bourne Bridge. These views apply to both bridges.

Comparison of Existing and Simulated Viewsheds

B1. View of Bridge Arch from Motorist on Bridge, Sagamore and Bourne Bridges

Exhibit 4.15-1a and **Exhibit 4.15-1b** present existing and simulated viewsheds of motorists on the bridges (**Figure 4.15-7**, B1). **Table 4.15-1** provides detailed descriptions of the exhibits in this section.

Exhibit 4.15-1a. Existing View of Bridge Arch from Motorist on Sagamore Bridge or Bourne Bridge



Source: Massachusetts Department of Transportation, 2024

Exhibit 4.15-1b. Simulated View of Bridge Arches from Motorist on Sagamore Bridge or Bourne Bridge



Source: Massachusetts Department of Transportation, 2024

B2. View of Sagamore and Bourne Bridges from Cape Cod Canal Service Road

Exhibit 4.15-2a and **Exhibit 4.15-2b** present existing and simulated views of the bridges from the Cape Cod Canal Service Road (**Figure 4.15-4**, B2). **Table 4.15-1** provides detailed descriptions of the exhibits in this section.

Exhibit 4.15-2a. Existing View of Sagamore Bridge or Bourne Bridge from Cape Cod Canal Service Road



Source: Massachusetts Department of Transportation, 2024

Exhibit 4.15-2b. Simulated View of Sagamore Bridge or Bourne Bridge from Cape Cod Canal Service Road



Source: Massachusetts Department of Transportation, 2024

Viewshed Effect Assessment: Replacement Highway Bridges

Table 4.15-1 presents a summary comparison of existing and proposed viewsheds of the highway bridges. The table assesses impact compatibility and, incorporating viewer sensitivity, presents the anticipated degree of visual effect due to the Build Alternative.

Table 4.15-1. Anticipated Effects to Viewsheds: Replacement Bridges

Visual Inventory Location*	Changes in Viewshed	Impact Compatibility	Viewer Types/ Sensitivity	Degree of Impact
B1 (Figure 4.15-7)	View of Bridge Arches from Motorist on Sagamore Bridge or Bourne Bridge. Existing: Viewshed of a single portal entry onto the bridge, with prominent historic plaque at the portal entrance, reinforced by tall safety/visual fences on both sides of the highway and heavily trafficked narrow traffic lanes. Minimal roadway lighting is provided. Proposed: <u>The viewshed would include two bridge arches.</u> The overall shape of the delta-frame-supported arches would replicate the rounded arches of the existing steel truss bridges and would be compatible with the existing steel truss bridge in scale and form. It would successfully mimic the portal “gateway” entrance of the existing bridges. The proposed use of steel and concrete, with grey as the finish color, would provide a traditional look consistent with the appearance of the existing bridge. <u>The view of the opposing traffic would be separated physically, via a separate span, and visually, via a barrier with a height of approximately 45 inches on the arch above the canal and approximately 42 inches on the approach spans. The bridge barrier would be composed of open steel railing on the arch and solid concrete on the bridge approach spans. The bridge barriers on the replacement bridge would be topped with a stainless-steel mesh that would provide more open views to motorists than the closely spaced pickets on the existing bridges.</u> The separation of opposing traffic and the wider travel lanes would provide travelers with a sense of visual separation and orderliness that is not present in the existing conditions. <u>The steel mesh would facilitate enhanced views of the canal as drivers travel over the bridge. Lighting would be provided on the roadway and selected bridge elements, and pedestrian lighting would be provided on the pedestrian/bicycle facility.</u>	Compatible	Travelers/ High	Neutral

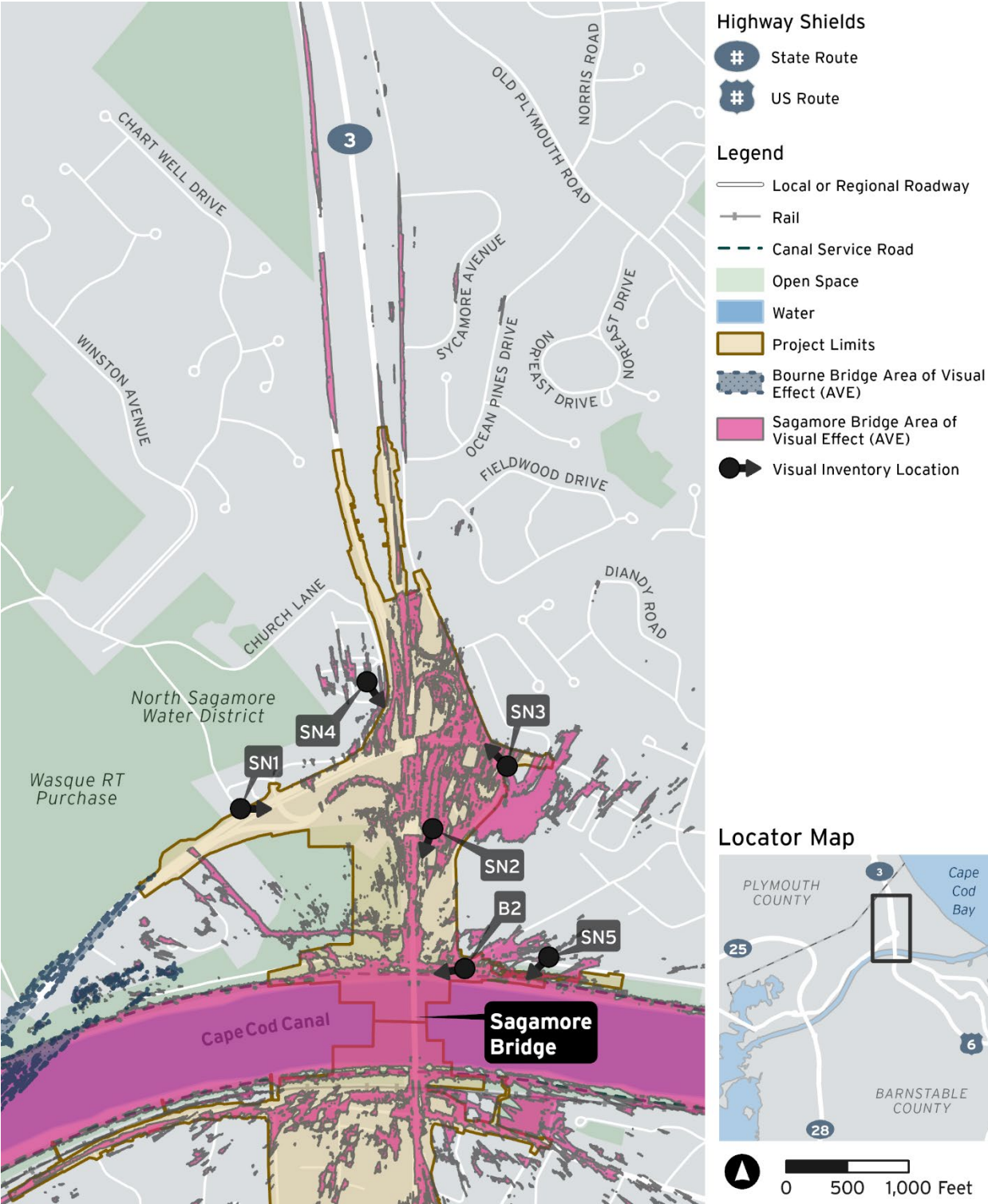
Visual Inventory Location*	Changes in Viewshed	Impact Compatibility	Viewer Types/ Sensitivity	Degree of Impact
B2 (Figure 4.15-4)	View of Sagamore Bridge or Bourne Bridge from Cape Cod Canal Service Road Existing: Viewshed includes the expanse of the waterway and the extensive length of the parallel service road, with the curve of the waterway in the distant view. Proposed: The views of the replacement bridges from the Canal Service Roads would be consistent with the existing views of the bridges. The increased height of the bridge deck and the lower height of the top of the arch would not be obvious. The placement of the new piers into the riprap portion of the canal would open views of the waterway from the Canal Service Roads, enhancing the natural vista. <u>While the expanded riprap at the pier bases would give a more uniformly developed appearance, it would not detract from the view of the expansive, meandering waterway.</u> The piers would be physically closer to the Canal Service Roads and due to the depth of the delta frame, would be approximately 10 feet lower in height than the existing piers; however, the visual differences would be negligible.	Compatible	Recreational Neighbors/ High	Neutral

* The bridge visual inventory locations apply to all figures.

4.15.4.2 Visual Assessment of Sagamore North Quadrant Interchange Network

MassDOT identified four visual inventory locations in the Sagamore North quadrant highway interchange approach network Project Limits, presented in [Figure 4.15-4](#).

Figure 4.15-2. Visual Inventory Locations (Sagamore North Quadrant Interchange Approach Network)



Source: Massachusetts Department of Transportation, 2024

Comparison of Existing and Simulated Viewsheds

SN1. View of Scenic Highway from Church Lane

Exhibit 4.15-3a and **Exhibit 4.15-3b** present existing and simulated views from Scenic Highway, facing east, at its intersection with Church Lane (**Figure 4.15-4**, SN1). **Table 4.15-2** provides detailed descriptions of the exhibits in this section.

Exhibit 4.15-3a. Existing View from Scenic Highway from Church Lane, facing east



Source: Massachusetts Department of Transportation, 2024

Exhibit 4.15-3b. Simulated View of Scenic Highway from Church Lane, facing east



Source: Massachusetts Department of Transportation, 2025

SN2. View of Sagamore Bridge from Bourne Park and Ride Lot

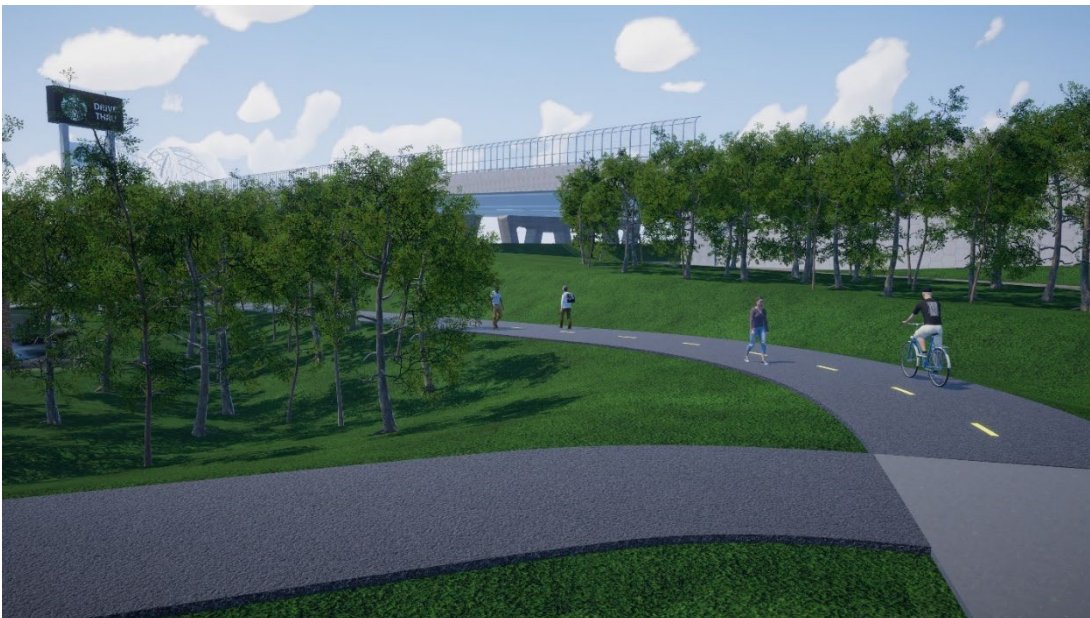
Exhibit 4.15-4a and **Exhibit 4.15-4b** present existing and simulated views from Bourne Park and Ride Lot facing south toward Sagamore Bridge (**Figure 4.15-4**, SN2). **Table 4.15-2** provides detailed descriptions of the exhibits in this section.

Exhibit 4.15-4a. Existing View of Sagamore Bridge from Bourne Park and Ride Lot, facing south



Source: Massachusetts Department of Transportation, 2024

Exhibit 4.15-4b. Simulated View of Sagamore Bridge from Bourne Park and Ride Lot, facing south



Source: Massachusetts Department of Transportation, 2025

SN3 View of State Road and Scenic Highway from Meetinghouse Lane

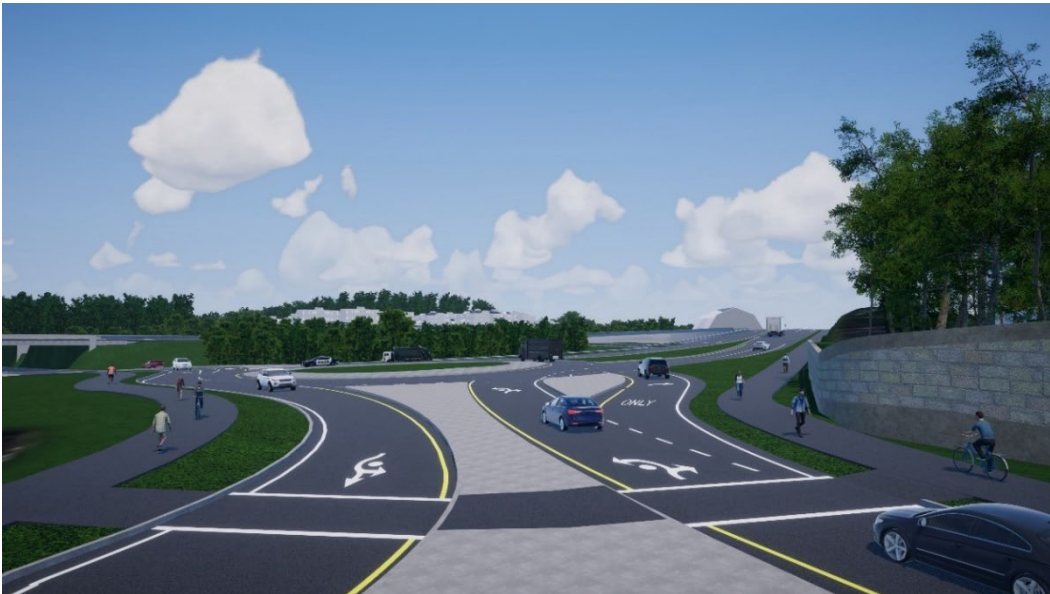
Exhibit 4.15-5a and **Exhibit 4.15-5b** present existing and simulated views from Meetinghouse Lane at State Road/Scenic Highway, facing northwest (**Figure 4.15-4**, SN3). **Table 4.15-2** provides detailed descriptions of the exhibits in this section.

Exhibit 4.15-5a. Existing View of State Road and Scenic Highway from Meetinghouse Lane, facing northwest



Source: Massachusetts Department of Transportation, 2024

Exhibit 4.15-5b. Simulated View of State Road and Scenic Highway from Meetinghouse Lane, facing northwest



Source: Massachusetts Department of Transportation, 2025

SN4 View of Sagamore Bridge from Church Lane at Cape Pine Road

Exhibit 4.15-6a and **Exhibit 4.15-6b** present existing and simulated views from Church Lane at Cape Pine Road, facing south (**Figure 4.15-4**, SN4). **Table 4.15-2** provides detailed descriptions of the exhibits in this section.

Exhibit 4.15-6a. Existing View of Sagamore Bridge from Church Lane at Cape Pine Road, facing south



Source: Massachusetts Department of Transportation, 2024

Exhibit 4.15-6b. Simulated View of Sagamore Bridge from Church Lane at Cape Pine Road, facing south



Source: Massachusetts Department of Transportation, 2025

SN5. View of Sagamore Bridge from Canal Street at Lucia Avenue (Extended)

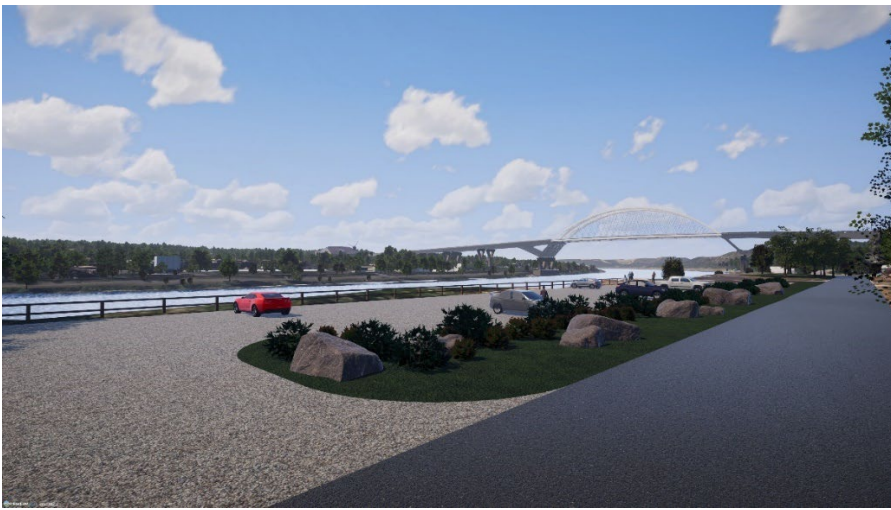
Exhibit 4.15-7a and **Exhibit 4.15-7b** present existing and simulated views from Canal Street at Lucia Avenue (extended), facing southeast toward the Cape Cod Canal Federal Navigation Project area and Sagamore Bridge (**Figure 4.15-4**, SN5). **Table 4.15-2** provides detailed descriptions of the exhibits.

Exhibit 4.15-7a. Existing View of Sagamore Bridge and Cape Cod Canal Federal Navigation Project from Canal Street at Lucia Avenue (extended), facing southeast



Source: Massachusetts Department of Transportation, 2025

Exhibit 4.15-7b. Simulated View of Sagamore Bridge and Expanded Sagamore Recreation Area Parking Lot from Canal Street at Lucia Avenue (extended), facing southeast



Source: Massachusetts Department of Transportation, 2025

Viewshed Effect Assessment: Sagamore North Quadrant Interchange Approach Network

Table 4.15-2 presents a summary comparison of existing and proposed viewsheds within the Sagamore North quadrant interchange approach network. It assesses impact compatibility and, incorporating viewer sensitivity, presents the anticipated degree of visual effect due to the Build Alternative.

Table 4.15-2. Anticipated Effects to Viewsheds: Sagamore North Quadrant Interchange Approach Network

Visual Inventory Location*	Changes in Viewshed	Impact Compatibility	Viewer Types/ Sensitivity	Degree of Impact
SN1	View of Scenic Highway from Church Lane, facing east. Existing: Viewshed includes a string of overhead signals across 4-lane divided Scenic Highway (with a State Route 3 turning lane) and the State Route 3 south on-ramp from Scenic Highway, directional signage, and forested areas bordering both sides of Scenic Highway. Proposed: The proposed view would be consistent with the existing view <u>by maintaining the signalized intersection. In the proposed condition, a striped SUP crossing and pedestrian and bicycle signals would be provided at the signalized crossing on the south side of Scenic Highway, where the shared-use path crosses the entrance to the on-ramp. Views of the shared-use path on the south side of Scenic Highway, along with pedestrians and bicyclists, would provide visual interest.</u> The removal of overhead utilities would present a more harmonious and coherent view to travelers.	Compatible	Residential Neighbors, Travelers/ Moderate	Neutral

Visual Inventory Location*	Changes in Viewshed	Impact Compatibility	Viewer Types/ Sensitivity	Degree of Impact
SN2	View of Sagamore Bridge from Bourne Park and Ride Lot, facing south. Existing: Viewshed includes parked vehicles, dense vegetation, sidewalk to Canal Street, commercial building (Starbucks) and signs, and Sagamore Bridge arch to the west. Proposed: Sagamore Bridge would be less prominent, as the bridge location would shift to the west, but proposed State Route 3 would be more prominent to viewers than in existing conditions. The State Route 3 mainline would be approximately 15 feet higher than the existing roadway along the length of the Bourne Park and Ride lot, on average. The elevation difference would range from approximately 7 feet closer to Scenic Highway to a maximum 20-foot difference at the abutment of the replacement bridge, which would align with the existing Starbucks parking lot. The hardness of the concrete mainline would be softened by extensive landscaping. The natural environmental features of the setting and views of the new shared-use path that would start at the Bourne Park and Ride Lot would be visually appealing, introducing a harmonious view that would provide both visual interest and visual relief.	Compatible	Travelers/ Low	Beneficial

Visual Inventory Location*	Changes in Viewshed	Impact Compatibility	Viewer Types/ Sensitivity	Degree of Impact
SN3	<u>View of State Road and Scenic Highway from Meetinghouse Lane, facing northwest.</u> Existing: Viewshed includes high abutment wall and State Road to the north, overhead and side traffic signals, utility poles and overhead wiring, directional signage, and divided 4-lane Scenic Highway directly west. Proposed: The removal of the utility poles, overhead signals, and wiring would eliminate visual clutter and present a more harmonious and coherent view. The roundabout would be more visually appealing than the existing signalized intersection; it would reduce the amount of paved area and the landscape treatment in the center island would provide a natural feature and visual relief. The channelized entry of the roundabout would provide a sense of orderliness that is not present in the existing condition.	Compatible	Commercial Neighbors, Travelers/ Moderate	Beneficial
SN4	<u>View of Sagamore Bridge from Church Lane at Cape Pine Road, facing south.</u> Existing: Viewshed includes the Sagamore Bridge arch in the distance. Proposed: The proposed view generally would be consistent with the existing view, where the residential neighbors would have only a distant view of the Sagamore Bridge. The change in bridge alignment would not be readily apparent from this distant view.	Compatible	Residential Neighbors/ Low	Neutral

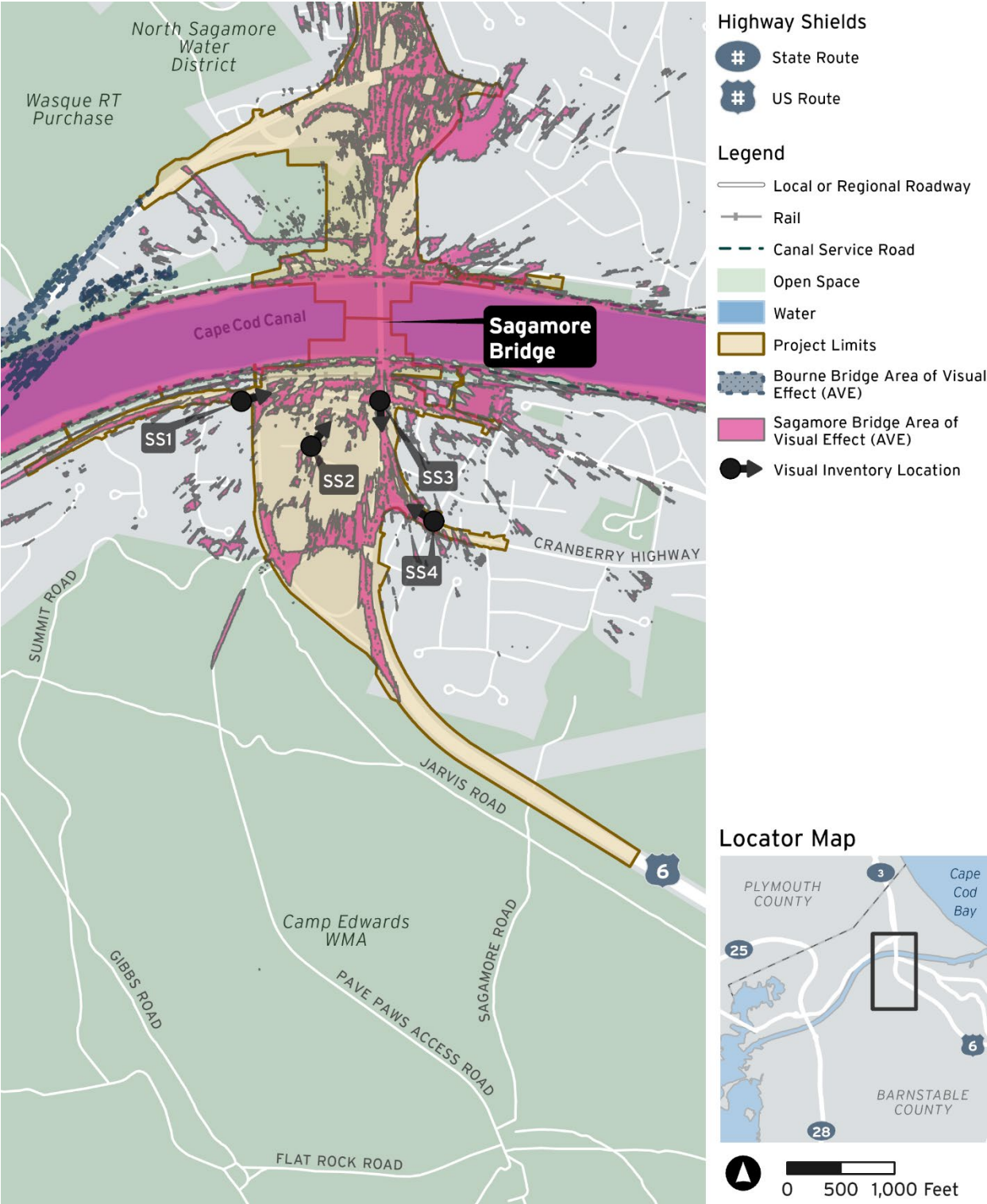
Visual Inventory Location*	Changes in Viewshed	Impact Compatibility	Viewer Types/ Sensitivity	Degree of Impact
SN5	<u>Existing View of Sagamore Bridge and the Cape Cod Canal Federal Navigation Project area from Canal Street at Lucia Avenue (extended), facing southeast.</u> Viewshed includes a dense tree canopy of the Cape Cod Canal Federal Navigation Project land with the partially obscured Sagamore Bridge arch in the distance. <u>Proposed View of Sagamore Bridge and Expanded Parking Lot from Canal Street at Lucia Avenue (extended), facing southeast.</u> The proposed view generally would be consistent with the existing view, where the residential neighbors would have only a distant view of Sagamore Bridge. The change in bridge alignment would not be readily apparent from this distant view. While the expanded parking lot would open vistas of Sagamore Bridge and Cape Cod Canal to the southeast, it also would replace the natural wooded setting with pavement and transportation land uses. Because the proposed parking lot would be an expansion of the existing Sagamore Recreation Area lot, the proposed condition would not be incompatible with existing conditions. Landscaping along the south side of Canal Street would provide a visual buffer to travelers and residential neighbors. Pedestrians and bicyclists at the far southern edge of the parking lot also would provide visual interest.	Compatible	Residential Neighbors, Travelers/ Moderate	Neutral

* **Figure 4.15-4** shows the Sagamore North quadrant visual inventory locations.

4.15.4.3 Visual Assessment of Sagamore South Quadrant Interchange Approach Network

MassDOT identified four visual inventory locations in the Sagamore South quadrant highway interchange approach network Project Limits (**Figure 4.15-5**).

Figure 4.15-3. Visual Inventory Locations (Sagamore South Quadrant Interchange Approach Network)



Source: Massachusetts Department of Transportation, 2024

Comparison of Existing and Simulated Viewsheds

SS1. View of Sandwich Road at Mid-Cape Connector

Exhibit 4.15-8a and **Exhibit 4.15-8b** present existing and simulated views of Sandwich Road at its intersection with Mid-Cape Connector, facing east (**Figure 4.15-5**, SS1). **Table 4.15-3** provides detailed descriptions of the exhibits in this section.

Exhibit 4.15-8a. Existing View of Sandwich Road at Mid-Cape Connector, facing east



Source: Massachusetts Department of Transportation, 2024

Exhibit 4.15-8b. Simulated View of Sandwich Road at Mid-Cape Connector, facing east



Source: Massachusetts Department of Transportation, 2025

SS2. View of Sagamore Bridge from Eleanor Avenue

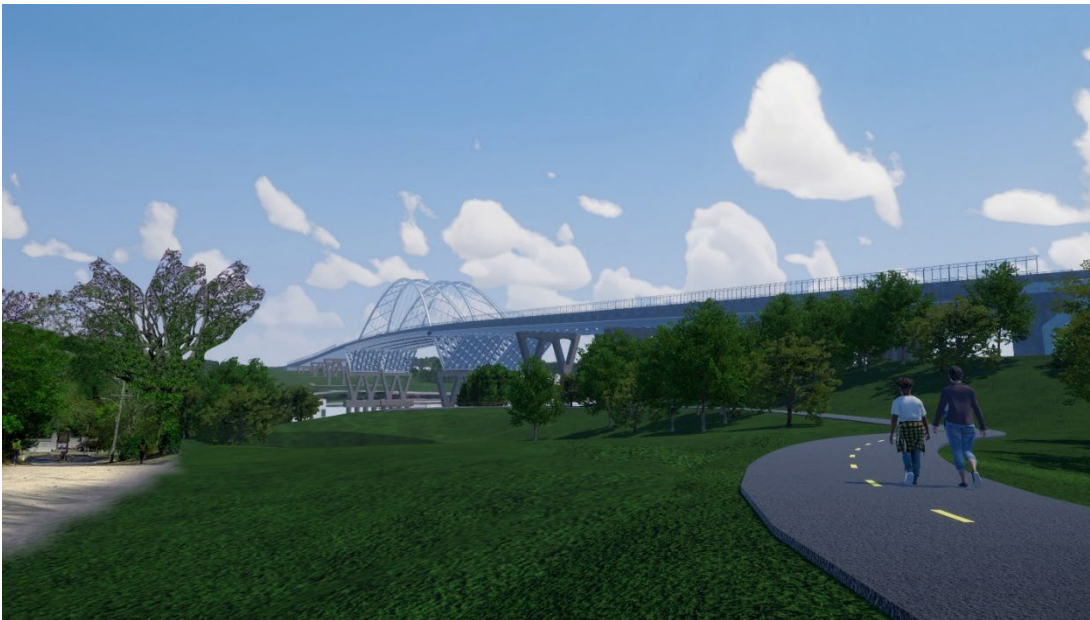
Exhibit 4.15-9a and **Exhibit 4.15-9b** present existing and simulated views of Sagamore Bridge from Eleanor Avenue, facing northeast (**Figure 4.15-5**, SS2). **Table 4.15-3** provides detailed descriptions of the exhibits in this section.

Exhibit 4.15-9a. Existing View of Sagamore Bridge from Eleanor Avenue at John's Lane, facing northeast



Source: Massachusetts Department of Transportation, 2024

Exhibit 4.15-9b. Simulated View of Sagamore Bridge and U.S. Route 6 from Eleanor Avenue, facing northeast



Source: Massachusetts Department of Transportation, 2025

SS3. View of Sagamore Bridge South Abutment from Sandwich Road

Exhibit 4.15-10a presents an existing view from Sandwich Road at the Sagamore Bridge south abutment, facing south. **Exhibit 4.15-10b** presents a simulated view [of Sandwich Road Connector from Sandwich Road, facing south](#) (**Figure 4.15-5**, SS3). **Table 4.15-3** provides detailed descriptions of the exhibits in this section.

Exhibit 4.15-10a. Existing View of Sagamore Bridge South Abutment from Sandwich Road, facing south



Source: Massachusetts Department of Transportation, 2024

Exhibit 4.15-10b. Simulated View of Sandwich Road Connector at Sandwich Road, facing south



Source: Massachusetts Department of Transportation, 2025

SS4. View of Cranberry Highway at Adams Street

Exhibit 4.15-11a presents an existing view of Cranberry Highway at its intersection with Adams Street, facing west. **Exhibit 4.15-11b** presents a simulated view of the new Cranberry Highway [Extension](#) from Cranberry Highway at its intersection with Adams Street, facing west (**Figure 4.15-5**, SS4). **Table 4.15-3** provides detailed descriptions of the exhibits in this section.

Exhibit 4.15-11a. Existing View of Cranberry Highway at Adams Street, facing west



Source: Massachusetts Department of Transportation, 2024

Exhibit 4.15-11b. Simulated View of Cranberry Highway from Cranberry Highway at Adams Street, facing west



Source: Massachusetts Department of Transportation, 2025

Viewshed Effect Assessment: Sagamore South Quadrant Interchange Approach Network

Table 4.15-3 presents a summary comparison of existing and proposed viewsheds within the Sagamore South quadrant interchange approach network. The table assesses impact compatibility and, incorporating viewer sensitivity, presents the anticipated degree of visual effect due to the Build Alternative.

Table 4.15-3. Anticipated Effects to Viewsheds: Sagamore South Quadrant Interchange Approach Network

Visual Inventory Location*	Changes in Viewshed	Impact Compatibility	Viewer Types/ Sensitivity	Degree of Impact
SS1	View of Sandwich Road at Mid-Cape Connector, facing east. Existing: Viewshed includes median island, a crossarm with three overhead signals, two ground-level signal lights, utility pole and overhead wiring, directional signage, Sagamore Bridge arch and span, and residential and commercial uses on both sides of Sandwich Road. Proposed: The signalized intersection would remain, but the overhead wiring and utility poles would be removed, providing a more coherent and harmonious view. <u>Striped shared-use path (SUP) crossings and pedestrian and bicycle signals would be provided at the signalized crossing. These new views, along with pedestrians and bicyclists, would provide visual interest.</u> Views of a new shared-use path on the south side of Sandwich Road would provide visual interest. Views of the existing residences and commercial uses along Sandwich Road would not change. The relocated Sagamore Bridge would be a more prominent feature in the viewshed. <u>However</u>, the difference in height between the existing and proposed arches would be difficult to discern.	Compatible	Residential and Commercial Neighbors, Travelers/ Moderate	Neutral

Visual Inventory Location*	Changes in Viewshed	Impact Compatibility	Viewer Types/Sensitivity	Degree of Impact
SS2	<u>Existing View of Sagamore Bridge from Eleanor Avenue at John's Lane, facing northeast.</u> Viewshed includes the intersection with John's Lane, single-family residential houses on the east side of Eleanor Avenue, trees lining the roadway, dense canopy cover at rear of houses, and Sagamore Bridge arch in the background. <u>Proposed View of Sagamore Bridge and U.S. Route 6 from Eleanor Avenue, facing northeast.</u> <u>In the proposed view (the permanent condition), the area would be graded to provide permanent stormwater control measures and a SUP connecting Eleanor Avenue, Mid-Cape Connector, and Sandwich Road at the Sandwich Road Connector.</u> The replacement Sagamore Bridge and reconfigured <u>U.S.</u> Route 6 mainline would be closer to the neighborhood on the west side of Eleanor Avenue and would be more prominent features in viewsheds. At the southern end of Eleanor Avenue, the mainline would be approximately 37 feet higher than in existing conditions, increasing to a 103-foot height difference at the northern end of Eleanor Avenue. The dense tree canopy along the embankment of the existing <u>U.S.</u> Route 6 would be removed and replaced with a <u>landscaped</u> buffer area. While the buffer area would separate the Round Hill neighborhood on the west side of Eleanor Avenue from the elevated <u>U.S.</u> Route 6 mainline, the loss of residential units and the existing dense tree canopy (and the resulting view of the more prominent transportation elements) would substantially alter the neighborhood's existing visual character and would adversely affect the sensitivity of the residential viewers. <u>Existing View of Sagamore Bridge South Abutment from Sandwich Road, facing south.</u> Viewshed includes the massive concrete abutment of Sagamore Bridge against steep embankments, overhead wires, and sidewalk in front of abutment. The vertical under-clearance of the bridge over Sandwich Road is 21 feet.	Incompatible	Residential Neighbors/High	Adverse

Visual Inventory Location*	Changes in Viewshed	Impact Compatibility	Viewer Types/Sensitivity	Degree of Impact
SS3	<u>Proposed View of Sandwich Road Connector at Sandwich Road, facing south.</u> The existing Sagamore Bridge would be eliminated; the existing bridge and U.S Route 6 mainline footprint would be replaced with a new road connecting Sandwich Road with the new Cranberry Highway Extension via a new roundabout. The new Sandwich Road Connector would parallel the relocated U.S Route 6 mainline, which would be located approximately 100 feet to the west; travelers would have views of the elevated concrete roadway. Sidewalks would be provided on both sides of the Sandwich Road Connector. <u>A striped SUP crossing and pedestrian and bicycle signals would be provided at the signalized crossing. Views of pedestrians and bicyclists would provide visual interest.</u> With its distinct and straight lines, the new connector would introduce a sense of orderliness and a vista of the roundabout in the distance. The viewshed would include the windmill of the former Christmas Tree Shops development, giving viewers a sense of familiarity and placemaking within the new vista. Due to the rolling terrain at this location, construction of the Sandwich Road Connector would require substantial excavation of up to 58 feet; the areas bordering the road would be landscaped. The connector road would introduce a new appealing view to an area from Sandwich Road with an existing void. While the new view would substantially differ from the existing view of the bridge abutment, it would be generally consistent with the character of the transportation network in this section of Sandwich Road. Travelers typically would have low sensitivity to this travel corridor because the purpose of Sandwich Road Connector would be to bypass local traffic with destinations to Market Basket and Mid-Cape Connector.	Compatible	Travelers/Low	Neutral

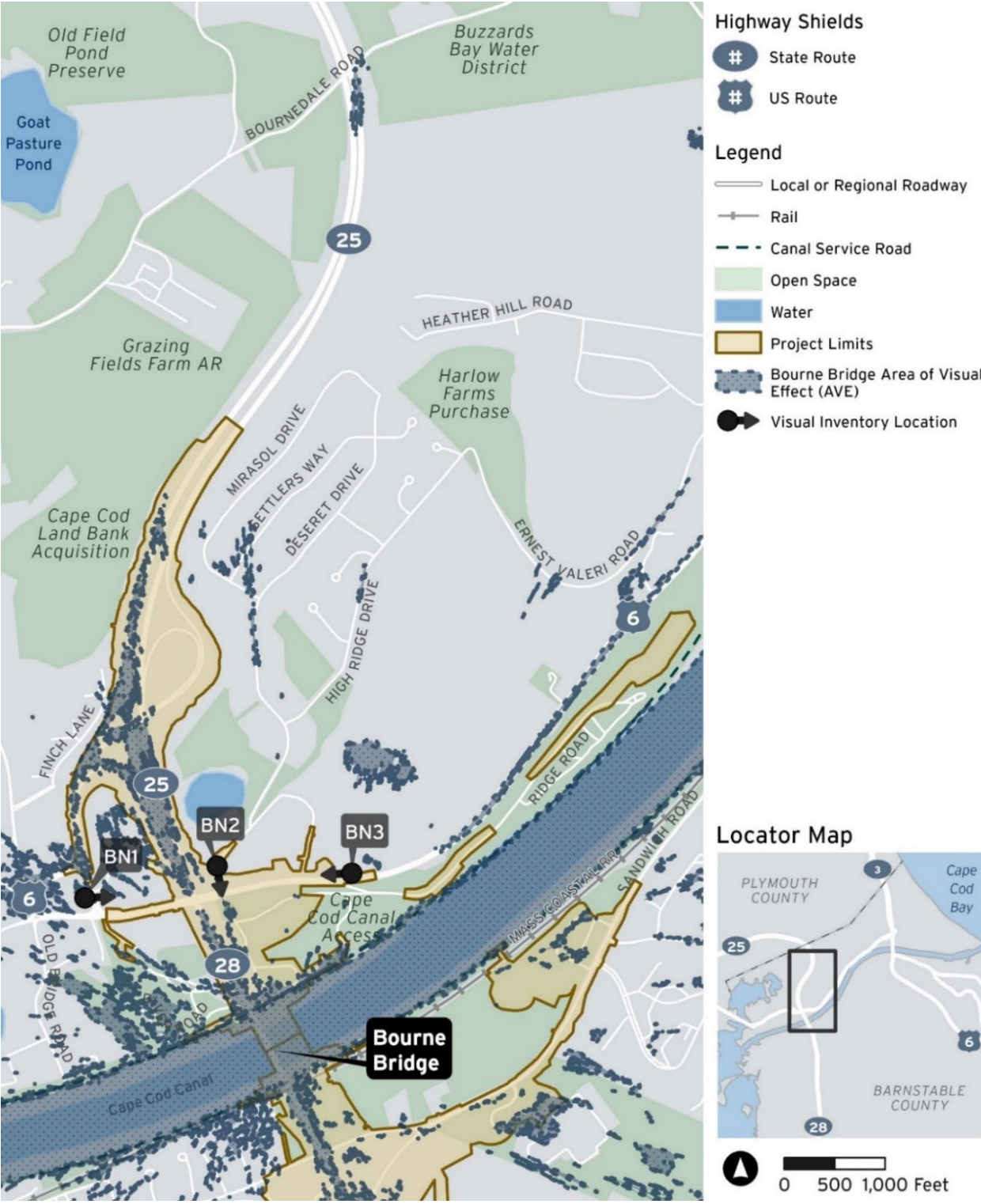
Visual Inventory Location*	Changes in Viewshed	Impact Compatibility	Viewer Types/ Sensitivity	Degree of Impact
SS4	Existing View of Cranberry Highway at Adams Street, facing west. Viewshed includes two-lane, striped roadway separated from frontage road by narrow, grassed median strip with utility poles and overhead electrical wiring; scattered individual residential and commercial buildings; distant view of facades of shopping development; and minimal landscaping. Proposed View of Cranberry Highway Extension from Cranberry Highway at Adams Street, facing west. The removal of the utility poles and overhead wiring would eliminate visual clutter and present a more harmonious and coherent view. The roundabout would be more visually appealing than the existing diverging roadways that lack visual directional cues; it would reduce the paved area and incorporate a landscaped treatment in the center island, providing visual relief. The channelized entry of the roundabout would provide travelers with a sense of orderliness that is not present in the existing condition and would be a visual entry for travelers to the Market Basket commercial area. Travelers and residential and commercial neighbors would have prominent views of the elevated State Route 6 mainline beyond the roundabout. While the elevated structure would be a new viewshed element, it would be consistent with the character of the transportation corridor.	Compatible	Residential and Commercial Neighbors/ Moderate	Beneficial

* [Figure 4.15-5](#) shows the Sagamore South quadrant visual inventory locations.

4.15.4.4 Bourne North Quadrant Interchange Network

MassDOT identified three visual inventory locations in the Bourne North quadrant highway interchange approach network Project Limits ([Figure 4.15-6](#)).

Figure 4.15-4. Visual Inventory Locations (Bourne North Quadrant Interchange Approach Network)



Source: Massachusetts Department of Transportation, 2026

Comparison of Existing and Simulated Viewsheds

BN1. View of State Route 25 From Belmont Circle

Exhibit 4.15-12a and **Exhibit 4.15-12b** present existing and simulated views from Belmont Circle, facing east (**Figure 4.15-6**, BN1). **Table 4.15-4** provides detailed descriptions of the exhibits in this section.

Exhibit 4.15-12a. Existing View of State Route 25 from Belmont Circle, facing east



Source: Massachusetts Department of Transportation, 2024

Exhibit 4.15-12b. Simulated View of Flyover Ramp from Belmont Circle, facing east



Source: Massachusetts Department of Transportation, 2025

BN2. View of Bourne Scenic Park from Nightingale Road at Scenic Highway

Exhibit 4.15-13a and **Exhibit 4.15-13b** present existing and simulated views from Nightingale Road at its intersection with Scenic Highway, facing south (**Figure 4.15-6**, BN2). **Table 4.15-4** provides detailed descriptions of the exhibits in this section.

Exhibit 4.15-13a. Existing View of Bourne Scenic Park from Nightingale Road at Scenic Highway, facing south



Source: Massachusetts Department of Transportation, 2024

Exhibit 4.15-13b. Simulated View of Bourne Scenic Park from Nightingale Road at Scenic Highway, facing south



Source: Massachusetts Department of Transportation, 2025

BN3. View of State Route 25 from Scenic Highway

Exhibit 4.15-14a and **Exhibit 4.15-14b** present existing and simulated views from Scenic Highway, facing west (**Figure 4.15-6**, BN3). **Table 4.15-4** provides detailed descriptions of the exhibits in this section.

Exhibit 4.15-14a. Existing View of State Route 25 from Scenic Highway, facing west



Source: Massachusetts Department of Transportation, 2024

Exhibit 4.15-14b. Simulated View of State Route 25 from Scenic Highway, facing west



Source: Massachusetts Department of Transportation, 2025

Viewshed Effect Assessment: Bourne North Quadrant Interchange Approach Network

Table 4.15-4 presents a summary comparison of existing and proposed viewsheds within the Bourne North quadrant interchange approach network. It assesses impact compatibility and, incorporating viewer sensitivity, presents the anticipated degree of visual effect due to the Build Alternative.

Table 4.15-4. Anticipated Effects to Viewsheds: Bourne North Quadrant Interchange Approach Network

Visual Inventory Location*	Change in Viewshed	Impact Compatibility	Viewer Types/ Sensitivity	Degree of Impact
BN1	<u>Existing View of State Route 25 from Belmont Circle, facing east.</u> Viewshed includes circular rotary, sidewalk in front of shopping development plaza with parking and storefronts; overhead traffic lights and directional signage. <u>Proposed View of Flyover Ramp from Belmont Circle, facing east.</u> Viewshed of the new 18-foot-high flyover ramp connecting Scenic Highway to State Route 25 would add a higher structural element than existing conditions; however, the new flyover ramp would be consistent with the visual character of the existing transportation environment. Commercial neighbors and travelers would not be sensitive to these visual changes; as in the current view, the altered transportation elements in the background would not occupy a prominent position in their viewshed. The visibility of and access to existing commercial uses in Belmont Circle would not be affected. <u>The elimination of overhead utilities would present a more harmonious and coherent view to travelers.</u>	Compatible	Commercial Neighbors, Travelers/ Low	Neutral

Visual Inventory Location*	Change in Viewshed	Impact Compatibility	Viewer Types/ Sensitivity	Degree of Impact
BN2	View of Bourne Scenic Park from Nightingale Road at Scenic Highway, facing south. Existing: Viewshed includes roadway with left and right turning lanes, overhead traffic signals, directional signage, and entrance sign to Bourne Scenic Park, with a prominent Bourne Bridge arch in background. Proposed: The relocated Bourne Bridge would be diminished by the approximate 80-foot relocated State Route 25 mainline and the approximate 30-foot-high new elevated flyover ramp connecting State Route 25 eastbound to Scenic Highway eastbound, which would be the dominant visual structural elements in the viewshed. The removal of the utility poles, overhead signals, and wiring would eliminate visual clutter and present a more harmonious and coherent view. The roundabout would be more visually appealing than the existing signalized intersection; it would reduce the amount of paved area and the landscape treatment in the center island would provide a natural feature and visual interest. The shared-use path would provide a new element of visual interest to the viewshed. The viewshed of neighbors exiting the Nightingale Pond neighborhood onto Scenic Highway would substantially change from existing conditions, however, conveying an urban form with hard lines of the highways in contrast to their current view of the natural, park setting of the Bourne Scenic Park entrance.	Incompatible	Residential Neighbors/ Moderate	Adverse

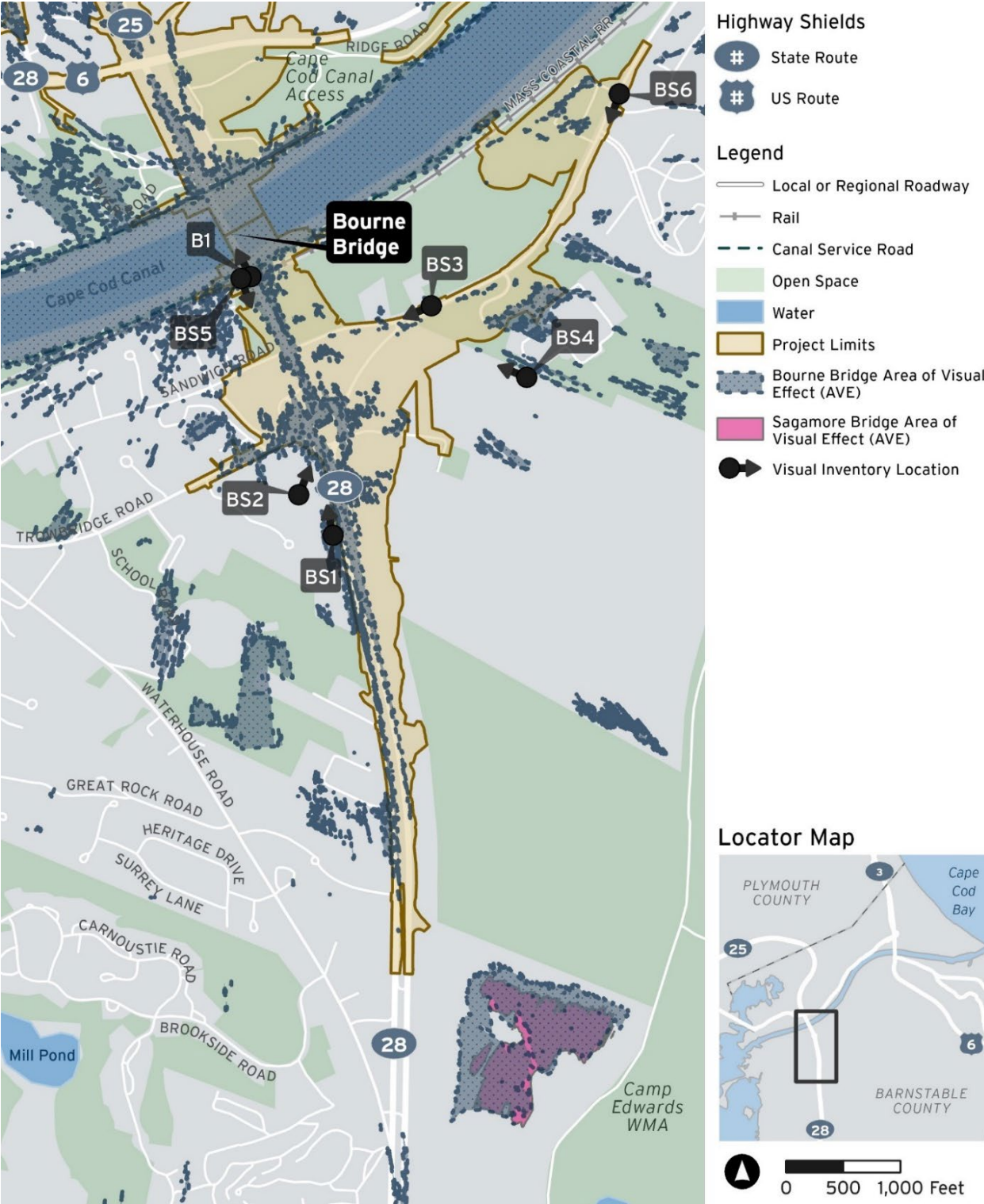
Visual Inventory Location*	Change in Viewshed	Impact Compatibility	Viewer Types/ Sensitivity	Degree of Impact
BN3	View of State Route 25 from Scenic Highway, facing west. Existing: Viewshed of striped divided highway with two lanes in each direction, distant overpass highway; densely forested landscape paralleling Scenic Highway. Proposed: Travelers would have views of the elevated State Route 25 mainline, the elevated flyover ramp connecting State Route 25 eastbound to Scenic Highway eastbound, and the new State Route 28 northbound on-ramp. In the proposed view, the existing dense canopy of trees on both sides of Scenic Highway would be replaced with an extensive roadway network, creating a more developed, urban character in this portion of Scenic Highway. The reconfigured State Route 25, approximately 28 feet higher than existing conditions, and the new ramps would be dominant structures within the viewshed. The single-lane roundabout would be a traffic calming measure; it would provide travelers with a sense of orderliness and serve as a visual entry to the Belmont Circle commercial area. <u>The elimination of overhead utilities would contribute to the sense of orderliness.</u> The landscaped treatment in the center of the roundabout would add visual interest. The reconfigured State Route 25 would be 28 feet higher than existing conditions and would be a dominant structure within the viewshed. While the more physically dominating presence of the transportation network would constitute a substantial change from existing conditions, travelers along this portion of Scenic Highway typically would have low sensitivity to this travel corridor. Further, the inclusion of the roundabout, sidewalks, and landscaping would provide visually appealing features to the viewshed.	Incompatible	Travelers/ Low	Neutral

* **Figure 4.15-6** shows the Bourne North quadrant visual inventory locations.

4.15.4.5 Bourne South Quadrant Interchange Network

MassDOT identified four visual inventory locations in the Bourne South quadrant highway interchange approach network Project Limits (**Figure 4.15-7**).

Figure 4.15-5. Visual Inventory Locations (Bourne South Quadrant Interchange Approach Network)



Source: Massachusetts Department of Transportation, 2024

Comparison of Existing and Simulated Viewsheds

BS1. View of State Route 28 from Nickerson-Bourne Funeral Home Parcel

Exhibit 4.15-15a and **Exhibit 4.15-15b** present existing and simulated views of [State Route 28](#) from Nickerson-Bourne Funeral Home on State Route 28, facing north (**Figure 4.15-7**, BS1).

Exhibit 4.15-15a. Existing View of State Route 28 from Nickerson-Bourne Funeral Home, facing north



Source: Massachusetts Department of Transportation, 2024

Exhibit 4.15-15b. Simulated View of Frontage Road and State Route 28 from Nickerson-Bourne Funeral Home, facing north



Source: Massachusetts Department of Transportation, 2025

BS2. View of Bourne Rotary from Cumberland Farms Parcel

Exhibit 4.15-16a and **Exhibit 4.15-16b** present existing and simulated views from the Cumberland Farms parcel at the Bourne South Rotary, facing northeast (**Figure 4.15-7**, BS2).

Exhibit 4.15-16a. Existing View of Bourne Rotary from Cumberland Farms Parcel, facing northeast



Source: Massachusetts Department of Transportation, 2024

Exhibit 4.15-16b. Simulated View of Diamond Interchange Roundabout from Cumberland Farms Parcel, facing northeast



Source: Massachusetts Department of Transportation, 2025

BS3. View of Upper Sandwich Road from Lower Sandwich Road

Exhibit 4.15-17a and **Exhibit 4.15-17b** present existing and simulated views from Sandwich Road, facing west (**Figure 4.15-7**, BS3).

Exhibit 4.15-17a. Existing View of Upper Sandwich Road from Lower Sandwich Road, facing west



Source: Massachusetts Department of Transportation, 2024

Exhibit 4.15-17b. Simulated View of Lower Sandwich Road from West of Roundabout, facing west



Source: Massachusetts Department of Transportation, 2025

BS4. View of Bourne Bridge from Upper Cape Cod Regional Technical High School Scenic Overlook

Exhibit 4.15-18a and **Exhibit 4.15-18b** present existing and simulated views of Bourne Bridge from the scenic overlook at Upper Cape Cod Regional Technical High School, facing northwest (**Figure 4.15-7**, BS4).

Exhibit 4.15-18a. Existing View of Bourne Bridge from Upper Cape Cod Regional Technical High School Scenic Overlook, facing northwest



Source: Massachusetts Department of Transportation, 2024

Exhibit 4.15-18b. Simulated View of Bourne Bridge from Upper Cape Cod Regional Technical High School Scenic Overlook, facing northwest



Source: Massachusetts Department of Transportation, 2025

BS5. View of Bourne Bridge from South Canal Service Road, facing south

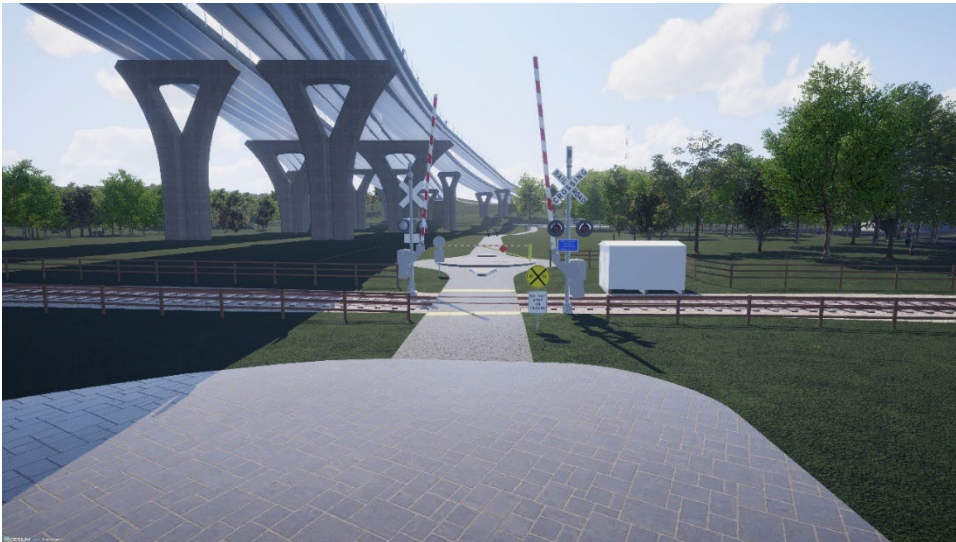
Exhibit 4.15-19a and **Exhibit 4.15-19b** present existing and simulated views of Bourne Bridge from the south Canal Service Road, facing south toward the Federal Navigation Project land (**Figure 4.15-7**, BS5). **Table 4.15-5** provides detailed descriptions of the exhibits.

Exhibit 4.15-19a. Existing View of Bourne Bridge from South Canal Service Road, facing south



Source: Massachusetts Department of Transportation, 2025

Exhibit 4.15-19b. Simulated View of Bourne Bridge and Railroad Crossing from South Canal Service Road, facing south



Source: Massachusetts Department of Transportation, 2025

BS6. View of Sandwich Road at Gallo Ice Arena, facing east

Exhibit 4.15-20a and **Exhibit 4.15-20b** present existing and simulated views of Sandwich Road at Gallo Ice Arena, facing east (**Figure 4.15-6**, BS6). **Table 4.15-5** provides detailed descriptions of the exhibits.

Exhibit 4.15-20a. Existing View of Sandwich Road at Gallo Ice Arena, facing east



Source: Massachusetts Department of Transportation, 2025

Exhibit 4.15-20b. Simulated View of Sandwich Road at Gallo Ice Arena, facing east



Source: Massachusetts Department of Transportation, 2025

Viewshed Effect Assessment: Bourne South Quadrant Interchange Approach Network

Table 4.15-5 presents a summary comparison of existing and proposed viewsheds within the Bourne South quadrant interchange approach network. The table assesses impact compatibility and, incorporating viewer sensitivity, presents the anticipated degree of visual effect due to the Build Alternative.

Table 4.15-5. Anticipated Effects to Viewsheds: Bourne South Quadrant Interchange Approach Network

Visual Inventory Location*	Changes in Viewshed	Impact Compatibility	Viewer Types/ Sensitivity	Degree of Impact
BS1	<u>Existing View of State Route 28 from Nickerson-Bourne Funeral Home, facing north.</u> Viewshed includes entrance driveway from State Route 28 to fenced and signed commercial property; utility poles and overhead wiring; divided State Route 28, separated by guardrail and median strip; and dense vegetation bordering State Route 28 northbound; and the Bourne Bridge arch in the distance on the west. <u>Proposed View of Frontage Road and State Route 28 from Nickerson-Bourne Funeral Home, facing north.</u> The new frontage road along State Route 28, implemented for safety and access management, would provide a continuity of visibility of and accessibility to commercial neighbors who would be sensitive to project changes: it would be similar to existing conditions where commercial businesses and their patrons have access and visibility to and from State Route 28. The new shared-use path along the frontage road would provide visual interest. The forested area along existing State Route 28 would be removed; the highway would be relocated approximately 35 feet to the east, elevated by approximately 5 feet, and separated from the frontage road by a landscaped area. Views of Bourne Bridge would be more prominent with the change in realignment, but the difference in the arch height would not be discernible from this distance. Views of the project along this heavily trafficked corridor would be consistent with the visual character of	Compatible	Commercial Neighbors/ High	Neutral

Visual Inventory Location*	Changes in Viewshed	Impact Compatibility	Viewer Types/ Sensitivity	Degree of Impact
	the existing transportation elements. <u>The elimination of overhead utilities would promote a sense of orderliness and present a more coherent and harmonious view.</u>			
BS2	<u>Existing View of Bourne Rotary from Cumberland Farms Parcel, facing northeast.</u> Viewshed includes commercial signage, off-ramp to State Route 28 south, directional signage, circular drive around rotary with irregular landscaping and vegetation in the center, and utility poles with overhead wiring, <u>with the Bourne Bridge abutment in the distance.</u> <u>Proposed View of Diamond Interchange Roundabout from Cumberland Farms Parcel, facing northeast.</u> The removal of the utility poles and overhead wiring would eliminate visual clutter and present a more harmonious and coherent view. Replacement of the two-lane Bourne Rotary with a single-lane, double (dog-bone) roundabout would serve as a traffic calming measure and the channelized entry would allow for visual traffic separation, providing travelers with a sense of orderliness that is not present with the existing rotary that allows for higher speeds. The dog-bone roundabout would improve visibility and access to commercial neighbors. The two center islands of the dog-bone roundabout would provide opportunities for landscaping to add natural elements and visual interest.	Compatible	Commercial Neighbors, Travelers/ Moderate	Beneficial
BS3	<u>Existing View of Upper Sandwich Road from Lower Sandwich Road, facing west.</u> Viewshed includes Sandwich Road at a fork—proceeding southwest on two-lane upper Sandwich Road to State Route 28 or northwest on two-lane lane lower Sandwich Road to Bourne Recreation Area/Bourne Village—one directional sign, and densely forested/brush bordering both sides of Sandwich Road.	Incompatible	Travelers/ Low	Neutral

Visual Inventory Location*	Changes in Viewshed	Impact Compatibility	Viewer Types/ Sensitivity	Degree of Impact
	<u>Proposed View of Lower Sandwich Road from West of Roundabout, facing west.</u> The existing fork separating upper and lower Sandwich Road would be removed, and the existing dense forested canopy bordering Sandwich Road would be removed and replaced <u>with a single-lane roundabout. The</u> landscaped sloped areas and relocated State Route 28 <u>would be</u> prominent features. Upper Sandwich Road would be barely visible from lower Sandwich Road. While the more prominent elevated roadway and the loss of the existing tree canopy would alter the existing rural character along this portion of Sandwich Road, travelers generally would be less sensitive to viewshed changes. Further, the newly landscaped area, and the shared-use path on the north side of lower Sandwich Road would create a harmonious, visually appealing viewshed <u>that would be comfortable for all modes of travel.</u> Additionally, the substantially improved sight lines for travelers on Sandwich Road would enhance traveler safety and promote a sense of orderliness.			
BS4	<u>View of Bourne Bridge from Upper Cape Cod Regional Technical School Scenic Overlook, facing northwest.</u> Existing: Viewshed of landscaped and paved scenic overlook with aesthetic visual elements includes Bourne Bridge in the distance as the single focal point. Proposed: The view of the replacement bridge would be consistent with the existing view of Bourne Bridge. Due to the distance from this focal point, the lower height of the top of the arch would not be discernible to the viewer.	Compatible	Institutional and Recreational Neighbors/ High	Neutral

Visual Inventory Location*	Changes in Viewshed	Impact Compatibility	Viewer Types/ Sensitivity	Degree of Impact
BS5	<u>Existing View of Bourne Bridge from South Canal Service Road.</u> <u>Viewshed includes railroad tracks, Bourne Bridge main span and abutments to the east, and dense canopy of trees in the distance. The Mass Coastal Railroad tracks, which are slightly elevated from the south Canal Service Road, dominate the foreground view. The forested land of the U.S. Army Corps of Engineers' Cape Cod Canal Federal Navigation Project dominates the background view, partially obscure the view of the elevated Bourne Bridge, and mainline to the east, and almost fully obscure the view of residences to the west. The view presents as rural and undeveloped to passing pedestrians and bicyclists along this portion of the south Canal Service Road.</u> <u>Proposed View of Bourne Bridge and Railroad Crossing from South Canal Service Road.</u> <u>In the proposed conditions, the forested area would be cleared, and the land would convert to State Highway Layout. The new shared-use path connection and signalized and signed railroad crossing and trailhead would dominate the foreground view, and the massive land piers of Bourne Bridge and the mainline would dominate the background view. New landscaping would continue to almost fully obscure views of residences from pedestrians and bicyclists on Canal Service Road. While the loss of the tree canopy and the more physically dominating presence of the transportation infrastructure would alter the existing rural character along this portion of the south Canal Service Road, passing pedestrians and bicyclists would be less sensitive to viewshed changes. The new shared-use path connection and railroad crossing would enhance safety and comfort and promote a sense of orderliness.</u>	Incompatible	Recreational Neighbors/ Moderate	Neutral

Visual Inventory Location*	Changes in Viewshed	Impact Compatibility	Viewer Types/ Sensitivity	Degree of Impact
BS6	<u>View of Sandwich Road at Gallo Ice Arena.</u> <u>Existing:</u> Viewshed includes a two-lane roadway with pavement markings that is bordered by a dense canopy of trees to the south and the Gallo Ice Arena entrance, canopy of trees, and signage to the north. Weather Deck Road to the south leads to residential land uses, and to the north, there are two vehicular access points to Gallo Ice Arena. <u>Proposed:</u> In the proposed condition, both sides of Sandwich Road would be bordered by sidewalks. Just east of the Weather Deck Road entrance and directly south of the Gallo Arena entrance, a shared-use path connection with pavement markings and a pedestrian/bicycle rectangular rapid flashing beacon would be constructed on Sandwich Road, enhancing the safety of residential and recreational neighbors and providing a sense of orderliness for all travel modes. The relocation of utility poles and overhead wiring outside of the roadway improvements at this location would eliminate visual clutter. The new shared-use path connection, grass-bordered sidewalks, and pedestrian lighting would present a more harmonious and coherent view to both travelers and neighbors.	Compatible	Recreation and Residential Neighbors, Travelers/ Moderate	Beneficial

* **Figure 4.15-7** shows the Bourne South quadrant visual inventory locations.

4.15.4.6 Visual Effects of the Build Alternative

Beneficial Changes to the Visual Quality of the AVEs

MassDOT determined that the degree of visual impact would be beneficial for the following five visual inventory locations in the interchange approach networks:

- View of Sagamore Bridge from Bourne Park and Ride Lot (SN2)
- View of State Road and Scenic Highway from Meetinghouse Lane (SN3)
- View of Cranberry Highway Extension from Cranberry Highway at Adams Street (SS4)
- View of Diamond Interchange Roundabout from Cumberland Farms Parcel (BS2)
- View of Sandwich Road at Gallo Ice Arena (BS6)

MassDOT determined that **beneficial changes** to the visual quality of the Sagamore Bridge and Bourne Bridge AVEs would result from the following:

- Removing utility poles and overhead signals and wiring at roadway intersections would present more harmonious and coherent views to travelers and neighbors.
- Replacing existing intersections or rotaries with roundabouts would result in reduced paved areas, increased landscaping, and a sense of orderliness that is not present in the existing condition.
- Providing SUP connections across roadways, including pavement markings and pedestrian and bicycle signals, thereby increasing safety, and presenting a sense of orderliness and harmony among roadway users.
- Incorporating landscaping and SUPs or pedestrian walkways into the transportation network, thereby providing visual interest and relief from the concrete environment.

Neutral Changes to the Visual Quality of the AVEs

For 11 visual inventory locations in the interchange approach networks, MassDOT determined that **neutral changes** to the visual quality of the Sagamore Bridge and Bourne Bridge AVEs would result from the Build Alternative. This total number included the following locations where shifts in the bridge or roadway location and elevation would not be discernible by the viewer:

- View of Sagamore Bridge from Church Lane at Cape Pine Road (SN4)
- View of Bourne Bridge from the Upper Cape Cod Regional Technical High School Scenic Overlook (BS4)

It also included the following locations with low to moderate viewer sensitivity where proposed effects, including the introduction of new infrastructure, would be consistent with the visual character of the existing transportation environment and/or elements:

- View of Scenic Highway from Church Lane (SN1)
- View of Sagamore Bridge and Expanded Sagamore Recreation Area Parking Lot from Canal Street at Lucia Avenue (extended), facing southeast (SN5)
- View of Sandwich Road at Mid-Cape Connector (SS1)
- View of Sandwich Road Connector from Sandwich Road (SS3)
- View of Flyover Ramp from Belmont Circle (BN1)

A neutral rating was given to one location where the new transportation infrastructure would provide a continuity of access and visibility to commercial neighbors who would be sensitive to project changes:

- View of Frontage Road and State Route 28 from Nickerson-Bourne Funeral Home (BS1)

The visual inventory included two locations where the more dominant and physically imposing transportation elements would introduce incompatible elements into the existing viewshed, thereby altering the roadway's rural visual character with a more urban appearance. However, due to low

viewer sensitivity at these portions of the roadways, and through the incorporation of minimization and mitigation measures, these locations received neutral ratings:

- [View of State Route 25 from Scenic Highway \(BN3\)](#)
- [View of Lower Sandwich Road from west of Roundabout \(BS3\)](#)
- [View of Bourne Bridge and Railroad Crossing from the South Canal Service Road \(BS5\)](#)

MassDOT determined that the visual changes would be neutralized through the introduction of landscaping and pedestrian/bicycle paths to soften the hardscape and provide visual interest, as well as other improvements, such as increased safety, which would enhance the traveler's driving experience.

MassDOT determined that with the minimization measures incorporated into the Build Alternative, the degree of visual impact would be **neutral** for the two visual inventory locations at the bridge sites:

- [View of Bridge Arches from Motorist on Sagamore Bridge or Bourne Bridge \(B1\)](#)
- [View of Sagamore Bridge or Bourne Bridge from Canal Service Road \(B2\)](#)

While the demolition of Sagamore Bridge and Bourne Bridge would be an adverse effect on those NRHP-eligible structures, MassDOT selected a replacement bridge design that would closely resemble the existing structures and complement their setting within Cape Cod Canal, to avoid and/or minimize effects to the NRHP-eligible Cape Cod Canal Historic District. [**Section 4.15.5**](#) further describes measures that MassDOT will incorporate into the Build Alternative to compensate for the loss of the historic structures.

Adverse Changes to the Visual Quality of the AVEs

For the following two visual inventory locations in the interchange approach networks, MassDOT determined that **adverse changes** to the visual quality of the Sagamore Bridge and Bourne Bridge AVEs would result from the Program:

- View [of Sagamore Bridge and U.S. Route 6](#) from Eleanor Avenue (SS2) – MassDOT determined that the proposed Program effects—potentially acquiring residences for construction of the new bridge, demolition of the existing bridge, and incorporation of stormwater control measures—would adversely affect the sensitivity of the Round Hill residential viewers on the west side of Eleanor Avenue.
- View [of Bourne Scenic Park](#) from Nightingale Road [at Scenic Highway](#) (BN2) – MassDOT determined that the elevated relocated State Route 25 mainline and flyover ramp would introduce incompatible elements to the existing views of residential neighbors, who would be sensitive to their altered views of the landscaped Bourne Scenic Park entrance.

To address these adverse visual effects, MassDOT is proposing minimization and mitigation measures, which are described in [**Section 4.15.5**](#).

4.15.5 Mitigation

This section summarizes MassDOT's proposed design-related and construction-related mitigation measures, encompassing minimization, restoration, maintenance, and compensation, for visual effects that cannot be avoided, including the adverse visual effects to the Round Hill neighborhood on the west side of Eleanor Avenue and the Nightingale Road neighborhood viewers resulting from new and realigned transportation infrastructure.

4.15.5.1 Design-Related Mitigation

MassDOT has developed an extensive design-related mitigation program to address adverse visual effects and incorporate the Program into the existing environment. Design-related mitigation would include bridge design, aesthetic bridge lighting, incorporation of recreational amenities as visual enhancements, landscaping, coordinated design of shared-use path elements, and aesthetic treatment of surface walls. **Appendix 4.15, Section 8.3, Design-Related Mitigation**, presents exhibits of proposed design-related mitigation based on preliminary design.

4.15.5.2 Section 106 and Section 4(f) Mitigation Measures as Visual Enhancements

In accordance with the Programmatic Agreement, MassDOT would design the replacement bridges as twin steel network tied-arch bridges to reflect the character and profile of the historic bridges and avoid an adverse effect on the Cape Cod Canal Historic District. Additional Programmatic Agreement stipulations would visually enhance the Sagamore Bridge and Bourne Bridge AVEs by incorporating aesthetic design into the Program and by requiring MassDOT to investigate the salvage and reuse of historic bridge elements, such as portions of the steel truss, granite from piers and abutments, granite sidewalk, and other existing bridge components, within the Program Limits of work, including, but not limited to, the replacement bridge sites and SUPs.

Chapter 5, Final Section 4(f) Evaluation, presents Section 4(f) mitigation measures that would enhance the visual quality of the environment.

4.15.5.3 Construction-Related Mitigation

To minimize visual effects in the Sagamore Bridge and Bourne Bridge AVEs, MassDOT would incorporate construction-related mitigation into the Program through permits, special provisions and guidance documents, and its Standard Specifications for Highways and Bridges (2024 Edition, Division II).

The Program's Stormwater Pollution Prevention Plan, described in **Section 4.10.7, Water Quality and Stormwater, Mitigation**, would contain multiple measures that, in addition to minimizing adverse effects to natural resources, also would reduce adverse visual effects of construction, such as stabilizing disturbed areas through seeding, minimizing the extent of disturbance at any one time, providing for dust suppression, installing sediment controls to prevent runoff, and stabilizing construction exits to prevent sediment tracking from the work areas onto public ways. These measures would provide visual relief during the construction period by softening areas disturbed by construction with vegetative and other stabilization measures and would create a more visually neutral appearance

of the construction site through good housekeeping measures such as containing dust and minimizing soil track-out onto public roadways.

MassDOT has issued extensive guidance for tree preservation, including plant protection fencing for public places and staging or other construction activity near desirable vegetation. As applicable, MassDOT will use plant protection fencing to minimize effects to visual natural resources, including preserving trees.

MassDOT's manual of Standard Specifications for Highways and Bridges contains standard specifications to mitigate for temporary construction-related effects, including potential effects to visual quality. Construction-related mitigation to be incorporated into the Program would include minimizing fugitive light from portable sources and directing light sources away from residential areas and restoring all disturbed areas at the completion of construction.