***Action Alternatives***

Indirect impacts on socioeconomic resources and EJ populations are nearly identical across all alternatives, which are summarized below.

None of the Action Alternatives would have measurable indirect effects on socioeconomic resources. The improvements to the GSB would not cause indirect impacts from induced growth; however, all Action Alternatives would improve connectivity and non-motorized transportation modes (*e.g.,* walking and biking). Residential and commercial properties in the Study Area could see minor increases in property value, due to the improved recreational opportunities, and access to alternative transportation or commuting options.

Temporary indirect impacts would be minor on EJ populations in Strafford and Rockingham Counties. Indirect impacts would result from temporary, fluctuating increases in truck trips, and construction equipment use. Such indirect impacts would not be disproportionately high or adverse to EJ populations. With the proper implementation of public outreach, it is not anticipated that these construction-related actions would result in indirect adverse effects to EJ populations.

### 3.14.3 Mitigation

The Project would not result in measurable impacts to socioeconomic resources, such as parcel acquisitions; therefore, no mitigation measures are required. The Project is not anticipated to induce population growth within or outside of the Study Area, as determined through the direct and indirect impacts evaluation in the 2007 FEIS.

The EJ study areas (*i.e.*, the Impacted and Surrounding Areas) determined by the NHDOT Office of Federal Compliance show rates of elderly and low-income populations above their established thresholds. Temporary, construction-related impacts from the Project would result from increased truck traffic, vehicular and non-vehicular emissions, and noise and vibration activities; however, construction of the Project would not cause disproportionately high or adverse effects on any elderly or low-income populations in accordance with the provisions of EO 12898.

Regardless of the lack of impacts, BMPs would be adopted to minimize temporary, construction-related impacts. Public involvement efforts will be undertaken to accommodate and encourage participation by traditionally underserved groups, to ensure program access and minimize the potential for disproportionate project impacts on protected groups.

## 3.15 Navigation

This section evaluates the potential beneficial and negative impacts of the Project on marine navigation. The GSB spans a navigation channel, which provides access from the Great Bay to the Piscataqua River. Commercial and recreational marine transportation is prevalent in the Great Bay and Piscataqua Region, as the area is a prominent coastal expanse of New Hampshire. Because the GSB crosses the Piscataqua River, a navigable water, recreational boaters and other marine traffic pass under the GSB through a 200-foot-wide navigation channel (between GSB Piers 4 and 5) (see Photo 6 in **Appendix A**).

### 3.15.1 Affected Environment

The Piscataqua River channel provides important navigational access to Great Bay from the open ocean. The limits of the GSB Project are more than 3,000 feet away from the upstream limit of the Portsmouth Harbor and Piscataqua River Navigation Project (**Figure 3.15-1**), a federal navigation project maintained by the US Army Corps of Engineers. While the federal project accommodates larger vessels, navigation is limited largely to smaller commercial and recreational craft beyond the upstream limit of the channel (*i.e.,* beneath the GSB and LBBs and toward Little Bay).

The 2007 FEIS states that all tidal waters entering and leaving Great Bay, Little Bay, and their associated tributaries pass through the constriction between Dover Point and Bloody Point, resulting in unusually strong currents. As discussed in **Section 3.3**, *Floodplain and Hydrodynamics*, the completed conditions of the Spaulding Turnpike Improvements Project equaled a slight increase in current velocity within the 200-foot-wide navigation channel (between GSB Piers 4 and 5) by a maximum of 5 percent. The currents in the area of the LBBs are in the range of 10 to 12 feet per second at maximum values during both the ebb and flood tides, with the ebb values slightly greater than the flood values.

Combined with the piers of the LBBs and the GSB, these currents can create a difficult navigation problem for vessels which attempt passage through the navigation channel. Additionally, the poor condition of the GSB has become a concern to boaters and safety agencies due to the potential hazards from falling material. Under the terms of the existing permit for the GSB and expanded LBB issued by the USCG, the GSB superstructure and substructure would eventually need to be removed if it is no longer used for transportation purposes.

### 3.15.2 Environmental Consequences

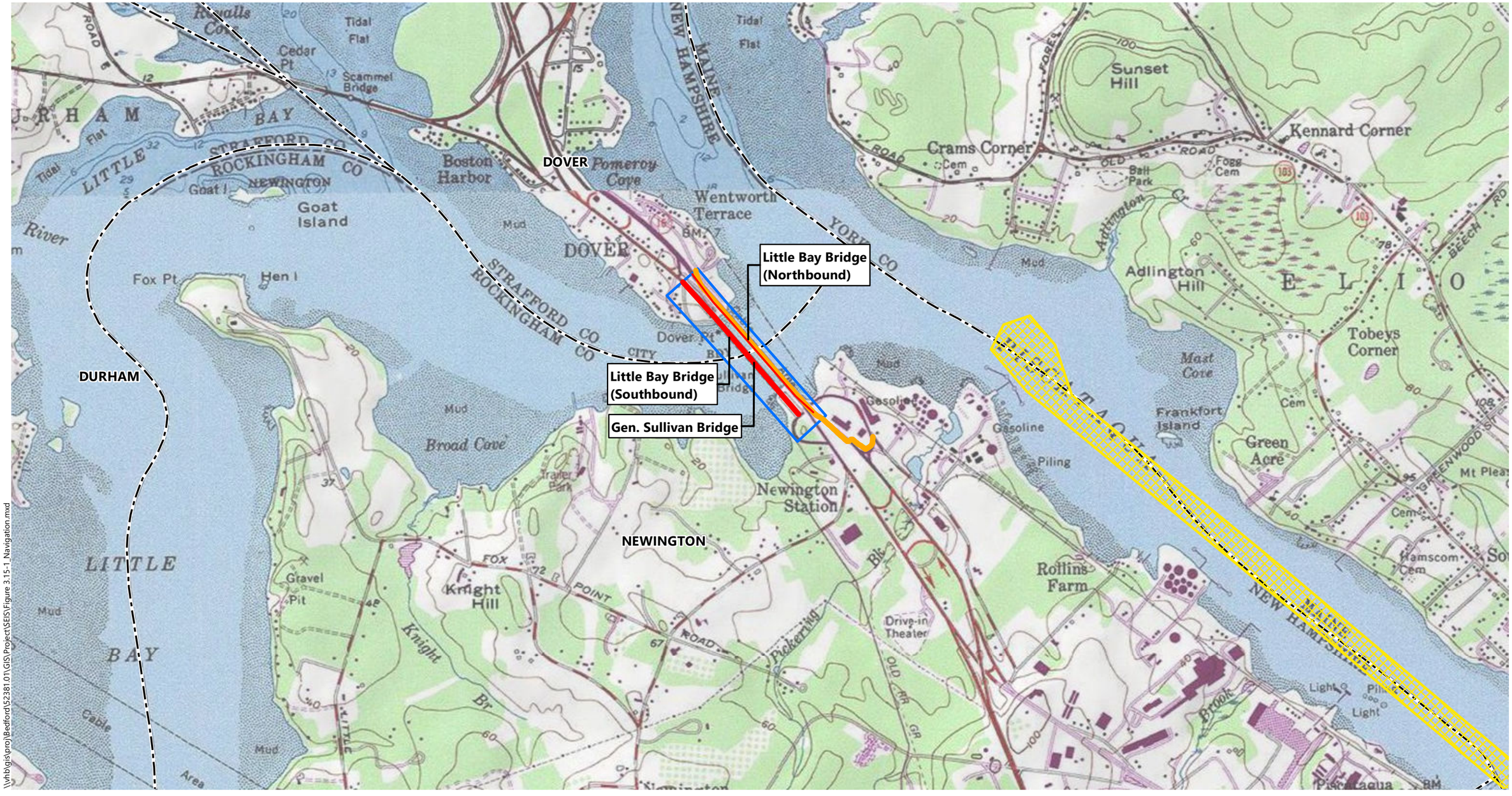
Potential impacts to navigation are described in the following section. Under all Action Alternatives, the existing horizontal navigational patterns would be unchanged, as none of the Action Alternatives would involve replacement of GSB Piers 4 and 5, between which the main navigation channel passes. As discussed further below, the most notable differences among the Action Alternatives is in the vertical clearance of the navigation channel and the estimated duration of construction.

#### 3.15.2.1 Direct Impacts

None of the alternatives would affect the Portsmouth Harbor and Piscataqua River Navigation Project, since the limits of this project are more than 3,000 feet away from the GSB project.[64] All Action Alternatives would involve temporary, direct impacts to marine traffic due to periodic closure of the main navigation channel during construction. For public safety reasons, removal

[64] Section 14 of the Rivers and Harbors Act of 1899 mandates that any use or alteration of a Civil Works project by another party is subject to the approval of ACOE. This requirement is codified in 33 USC 408 (Section 408). However, NHDOT believes that the GSB Project would not trigger Section 408 review due to the distance between the GSB project and the Portsmouth Harbor and Piscataqua River Navigation Project. See letter from Keith Cota, NHDOT to Michael Hicks, ACOE dated July 29, 2019.

**Figure 3.15-1**




\\vhb\gis\proj\Bedford\52381.01\GIS\Project\SEIS\Figure 3.15-1_Navigation.mxd

0 750 1500 3000 Feet

- Approximate Work Limits
- Study Area
- Approx. Limits of Federal Project
- Town Boundaries
- Temporary Bicycle and Pedestrian Detour (Approximate)

Note: USGS topographic source map is from 1983 and therefore does not reflect all current conditions.

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**Navigation**

U.S. Department of Transportation
Federal Highway Administration

New Hampshire DOT
Department of Transportation

Source: VHB, NH GRANIT, USGS 7.5-minute Topographic Quadrangles Dover East and Portsmouth, dated 1983

of, or work on, the center spans and other construction activities may require brief, temporary closure of the navigation channel. Final construction plans and coordination with the USCG would ultimately determine when, and how often, the 200-foot-wide navigation channel would need to be closed during construction. The timeframe of the periodic, temporary closures of the navigation channel would likely correspond with construction activities and construction timeframes, which vary among the Action Alternatives from 1.5 to 3 years. These temporary, direct impacts to marine traffic would cease after construction. Temporary causeways and trestles would not be installed in the 200-foot navigational channel.

***No-Action Alternative***

Under the No-Action Alternative, no construction would occur. The existing structural deficiencies of the GSB would remain unaddressed, causing safety concerns and potential direct impacts to marine traffic. Due to these concerns, on November 30, 2006, Gary Kassof of the USCG sent a letter to Marc G. Laurin, NHDOT Senior Environmental Manager, regarding the Draft Environmental Impact Statement for the Newington-Dover, 11238 project. The USCG advised NHDOT that the GSB should be removed if it no longer served a transportation purpose, and that a clear and reasonable rationale must be presented for retaining or rebuilding the structure. The letter also stipulated that the bridge permit application to be submitted for construction of the new LBB must address the need to retain or rebuild the GSB and, if the old bridge is to be removed, should include complete removal of all parts not utilized in the new structure.

***Alternative 1***

As shown in the **Figure 3.15-2**, Alternative 1 would maintain the existing vertical navigational clearance of the 100-foot and 200-foot navigation channels, at 47.9 feet and 34.7 feet, respectively. There would be no permanent beneficial or negative impacts to navigation. Temporary, direct impacts related to periodic closure of the navigation channel would occur under Alternative 1 during rehabilitation work on the center spans and bridge deck of the GSB. Alternative 1 would have an approximate construction duration of 3 years, which is the longest construction duration of all Action Alternatives.

***Alternative 3***

As with Alternative 1, Alternative 3 would maintain the existing vertical navigational clearance of the 100-foot and 200-foot navigation channels, at 47.9 feet and 34.7 feet, respectively (see **Figure 3.15-2**.) There would be no permanent beneficial or negative impacts to navigation. Temporary, direct impacts related to periodic closure of the navigation channel would occur under Alternative 3 during rehabilitation work on the center spans of the GSB. Alternative 3 would have an approximate construction duration of 2 years, which is less than the construction duration of Alternative 1, but 6 months greater than the construction durations of Alternatives 6, 7, and 9.

***Alternative 6***

In contrast to Alternatives 1, 3, and 9, Alternative 6 would decrease the navigational clearance of the 100-foot navigation channel. As shown in **Figure 3.15-3**, Alternative 6 would decrease the existing vertical clearance of the 100-foot navigation channel by 1.3 feet, for a total vertical navigational clearance of 45.2 feet compared to the existing 46.5-foot vertical clearance of the northbound LBB and the 47.9-foot vertical clearance of the GSB. The decrease in vertical navigational clearance of the 100-foot navigation channel would result in a negative, permanent, direct impact to marine traffic. When compared to Alternatives 1, 3, and 9, Alternative 6 would result in the greatest permanent, negative impacts to the 100-foot navigation channel.

Alternative 6 would benefit marine traffic due to improvements to the width of navigational clearance within the 200-foot navigation channel. Alternative 6 would not provide greater overall accommodation for taller marine vessels; however, shorter marine vessels would have more room pass through the 200-foot navigation channel. Although Alternative 6 would increase the vertical clearance of the 200-foot navigation channel from 34.7 feet to 45.0 feet, the vertical navigational clearance of the 200-foot navigation channel is restricted by the northbound LBB (note that the existing LBB clearance within the 200-foot navigation channel is 44.9 feet, only 0.1 foot shorter than the vertical navigational clearance of Alternative 6).

In summary, the 100-foot navigation channel vertical clearance would be limited to 45.2 feet due to Alternative 6, which is a decrease in vertical navigational clearance. The 200-foot navigation channel vertical clearance would be limited to 44.9 feet due to the LBB; however, Alternative 6 would permanently benefit shorter marine vessels by providing additional room within the 200-foot navigation channel.

Temporary, direct impacts related to periodic closure of the navigation channel would occur under Alternative 6 during removal of the GSB superstructure and construction of the new superstructure. Alternative 6 would have an approximate construction duration of 1.5 years, equivalent to the construction duration of Alternatives 7 and 9.

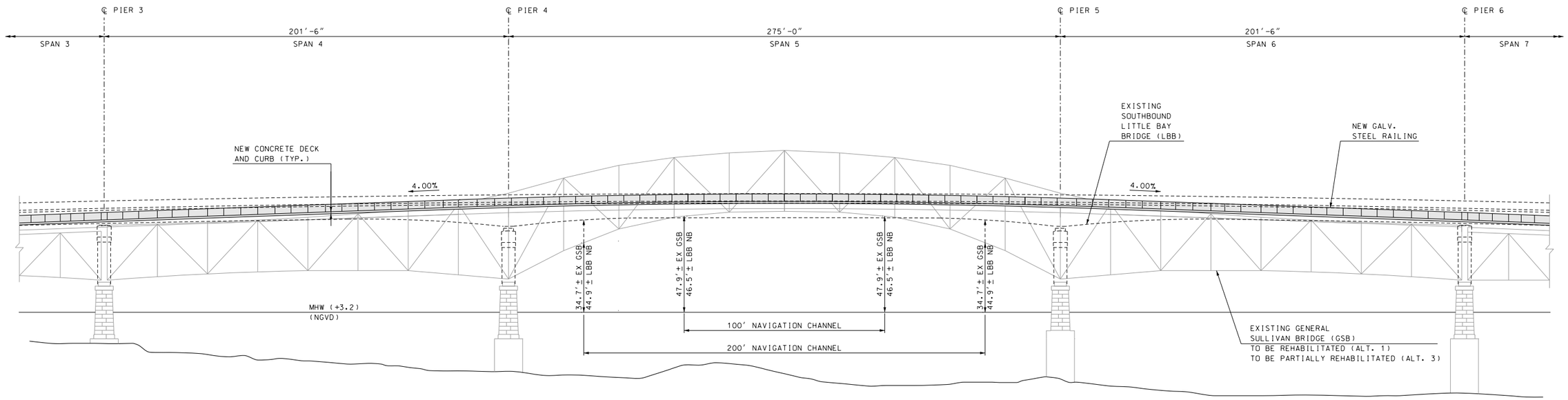
***Alternative 7***

The permanent and temporary direct impacts to navigation under Alternative 7 are the same as described under Alternative 6.

***Alternative 9 (Preferred Alternative)***

Alternative 9 would neither benefit nor negatively impact the vertical navigational clearance of the 100-foot navigation channel because the restriction is the northbound LBB, which is lower than both the existing GSB and Alternative 9. Within the 100-foot navigation channel, the existing LBB clearance is 46.5 feet. The existing vertical clearance of the GSB is 47.9 feet and the vertical navigational clearance of Alternative 9 would be 48.0 feet.

Within the 200-foot navigation channel, Alternative 9 would benefit marine traffic due to the improvements to the width of navigational clearances, as compared to the No-Action Alternative or Alternatives 1 and 3. As shown in **Figure 3.15-4**, Alternative 9 would benefit the 200-foot navigation channel through increasing the existing 34.7-foot vertical navigational clearance beneath the GSB. Alternative 9 would not provide greater overall accommodation for taller marine vessels; however, shorter marine vessels would have more room pass through the 200-foot navigation channel, resulting in a permanent benefit. Under the "V-Frame" design option, the vertical navigational clearance would increase by 9.6 feet, for a new total clearance of 44.3 feet. Similarly, the "Super Haunch" design option would benefit the 200-foot navigation channel through increasing the vertical navigational clearance beneath the GSB by 10.2 feet, for a new total clearance of 44.9 feet.




**NAVIGATIONAL CLEARANCES**
**ELEVATION: ALTERNATIVES 1 & 3—SPANS 4, 5, & 6**
NOT TO SCALE

**NOTE**
1. VERTICAL NAVIGATIONAL CLEARANCE DIMENSIONS FOR THE NORTHBOUND LITTLE BAY BRIDGE CONTROL OVER THE SOUTHBOUND LITTLE BAY BRIDGE AND ARE DESCRIBED ON THIS SHEET ACCORDINGLY.

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**Navigational Clearances, Alternatives 1 and 3**

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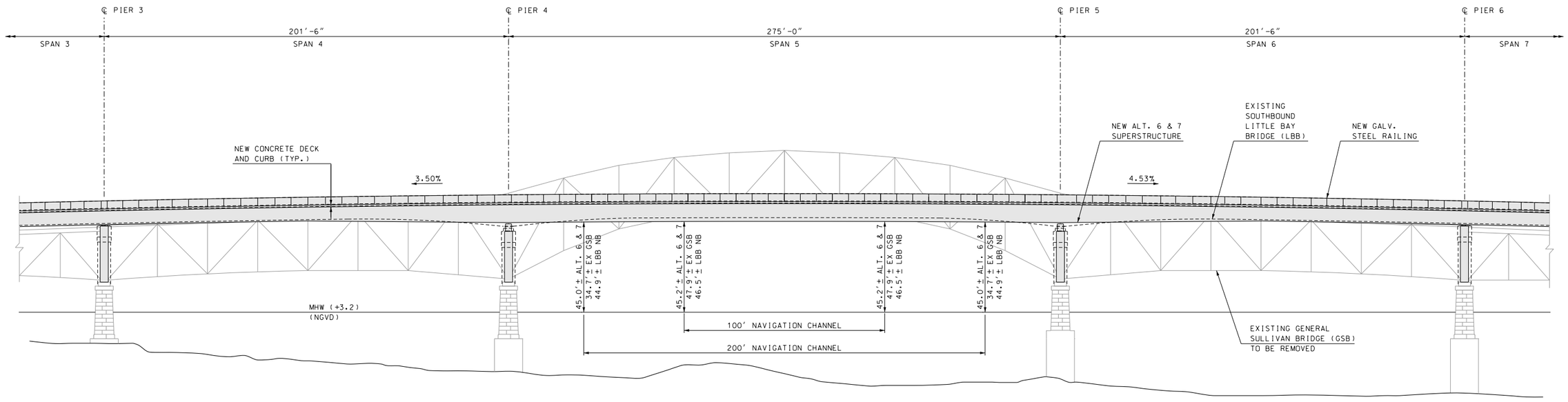


**NAVIGATIONAL CLEARANCES**
**ELEVATION: ALTERNATIVES 6 & 7—SPANS 4, 5, & 6**
NOT TO SCALE

**NOTE**
1. VERTICAL NAVIGATIONAL CLEARANCE DIMENSIONS FOR THE NORTHBOUND LITTLE BAY BRIDGE CONTROL OVER THE SOUTHBOUND LITTLE BAY BRIDGE AND ARE DESCRIBED ON THIS SHEET ACCORDINGLY.

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**Navigational Clearances, Alternatives 6 and 7**

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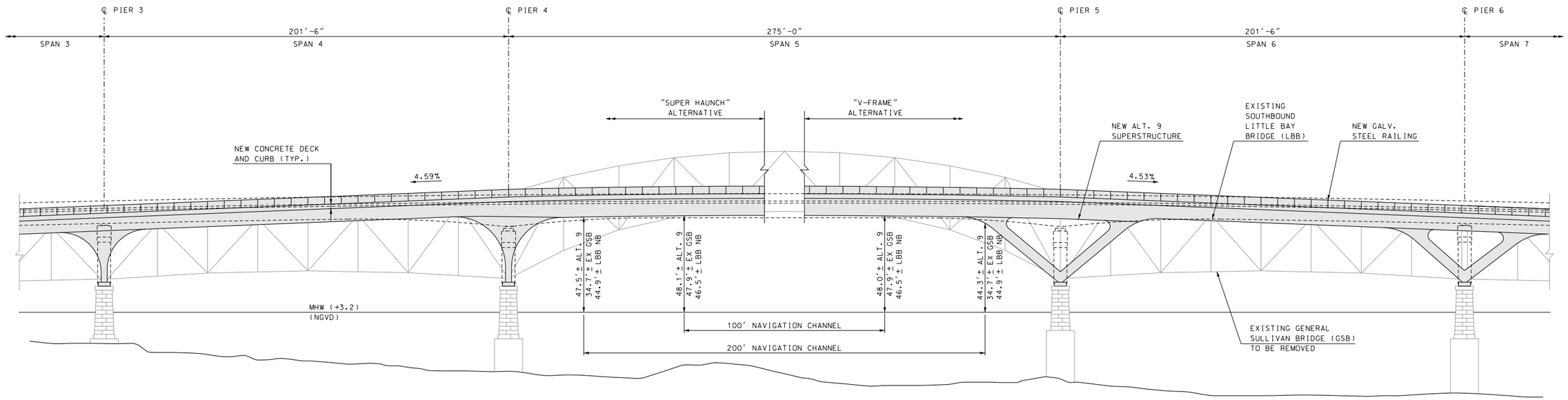
Federal Highway Administration

New Hampshire DOT Department of Transportation




**NAVIGATIONAL CLEARANCES**
**ELEVATION: ALTERNATIVE 9—SPANS 4, 5, & 6**
NOT TO SCALE

**NOTE**
1. VERTICAL NAVIGATIONAL CLEARANCE DIMENSIONS FOR THE NORTHBOUND LITTLE BAY BRIDGE CONTROL OVER THE SOUTHBOUND LITTLE BAY BRIDGE AND ARE DESCRIBED ON THIS SHEET ACCORDINGLY.

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**Navigational Clearances, Alternative 9**

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In summary, the 100-foot navigation channel vertical clearance would remain limited to 46.5 feet due to the LBB. Under Alternative 9 "Super Haunch" design option, the 200-foot navigation channel vertical clearance would remain limited to 44.9 feet due to the LBB; however, Alternative 9 "Super Haunch" design option would permanently benefit shorter marine vessels by providing additional room within the 200-foot navigation channel. Under Alternative 9 "V-Frame" design option, the 200-foot navigation channel vertical clearance would be limited to 44.3 feet due to the "V-Frame" design; however, Alternative 9 "V-Frame" design option would permanently benefit shorter marine vessels by providing additional room within the 200-foot navigation channel.

Temporary, direct impacts related to periodic closure of the navigation channel would occur under Alternative 9 during removal of the GSB superstructure and construction of the new superstructure. Alternative 9 would have an approximate construction duration of 1.5 years, equivalent to the construction duration of Alternatives 6 and 7.

#### 3.15.2.2 Indirect Impacts

Indirect impacts occur at some future time other than a direct impact. All Action Alternatives would improve navigation safety for marine traffic, maintenance crews, and emergency responders, as each Action Alternative would address the structural deficiencies of the GSB. In addition, Alternatives 6, 7, and 9 would indirectly benefit marine transportation in the Great Bay and Piscataqua Region by permanently increasing the vertical clearance within the 200-foot navigational channel beneath the GSB and LBBs. Alternatives 6 and 7 would increase the navigational clearance by 10.2 feet; Alternative 9 would increase the navigational clearance by 9.6 feet under the "V-Frame" option, or 12.8 feet under the "Super Haunch" design option. This would allow for larger marine vessels to pass through a wider navigational channel, which currently are restricted to the 100-foot channel due to existing height restrictions of the 200-foot channel.

### 3.15.3 Mitigation

Potential periodic closures of the navigational channel during construction will be closely coordinated with the USCG, the NH Port Authority, the NH Marine Patrol, Pease Development Authority Division of Ports and Harbors, marine businesses and marine users to minimize impacts to marine traffic. To facilitate early coordination with the USCG, a Bridge Project Initiation Request as outlined in Section 2 of the Bridge Permit Application Guide (Commandant Publication P16591.3D), published by the USCG in July 2016, was provided by NHDOT to the USCG on November 12, 2019 (included in **Appendix J**). On November 19, 2019, the USCG confirmed that NHDOT's Bridge Project Initiation Request met all requirements of the Bridge Permit Application Guide. NHDOT was given permission to submit draft bridge permit application materials as described in the Application Guide, including more detailed information as the existing site conditions and limitations are investigated.[65]

[65] A USCG permit review would require a Coastal Zone Management Consistency Determination and may require a Water Quality Certificate.

## 3.16 Relationship of Local Short-term Uses vs. Long-term Productivity

This section assesses and compares the potential short-term uses of the environment to the maintenance and enhancement of long-term productivity. Short-term impacts and uses of the environment are generally associated with the construction period. For example, a short-term, localized impact could be an increase in noise during construction, which could result in inconvenience to local residents. An example of long-term productivity could be long term economic benefits by enhancing travel connection points for both motorists, pedestrians, and bicyclists.

Other sections within **Chapter 3** describe specific impacts to resource areas.

The relationship between short-term uses and long-term productivity would be similar for all Action Alternatives. Short-term impacts during construction would be offset through mitigation measures as well as the long-term benefits associated with the Project.

***Short-Term Impacts***

The No-Action Alternative would result in the fewest short-term uses of resources, as no construction would occur. However, the No-Action Alternative results in greater adverse impacts to long-term productivity, as further explained below.

Short-term impacts of the Action Alternatives would be associated with construction: noise, water quality, occupancy of land, visual impacts, hydrodynamics, marine traffic, and temporary impacts to air quality. **Sections 3.1** to **3.15** identify specific mitigation strategies and BMPs to offset temporary, short-term impacts due to construction. Short-term uses associated with the Action Alternatives include:

- **Temporary noise impacts due to construction**. The types of construction activities that would generate noise include pile driving, and other construction-related activities. The anticipated intensity and duration of construction varies for each of the Action Alternatives, ranging from 1.5 years to 3 years.
- **Temporary impacts to water quality are possible during earthwork activities**. Erosion and sedimentation would be minimized during construction through the use of BMPs to avoid impacts to aquatic communities.
- **Temporary occupancy of land**. Approximately 1.6 acres total (0.5 acre of State land in Newington and 1.1 acres of State land in Dover) would be temporarily occupied and fenced off for construction access, laydown, and staging (**Appendix D**). The timeframe of the temporary occupancy corresponds with the construction timeframe, which varies among the Action Alternatives from 1.5 to 3 years. Hilton Park users could utilize other parks in Dover, in addition to the entire east side of Hilton Park in response to the short-term impact to Hilton Park. As discussed in **Section 3.9**, *Parks, Recreation, and Conservation Lands*, the Action Alternatives vary in the potential to restrict movement between the west and east sides of Hilton Park.