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.

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, and the NH Marine Patrol 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.[59]

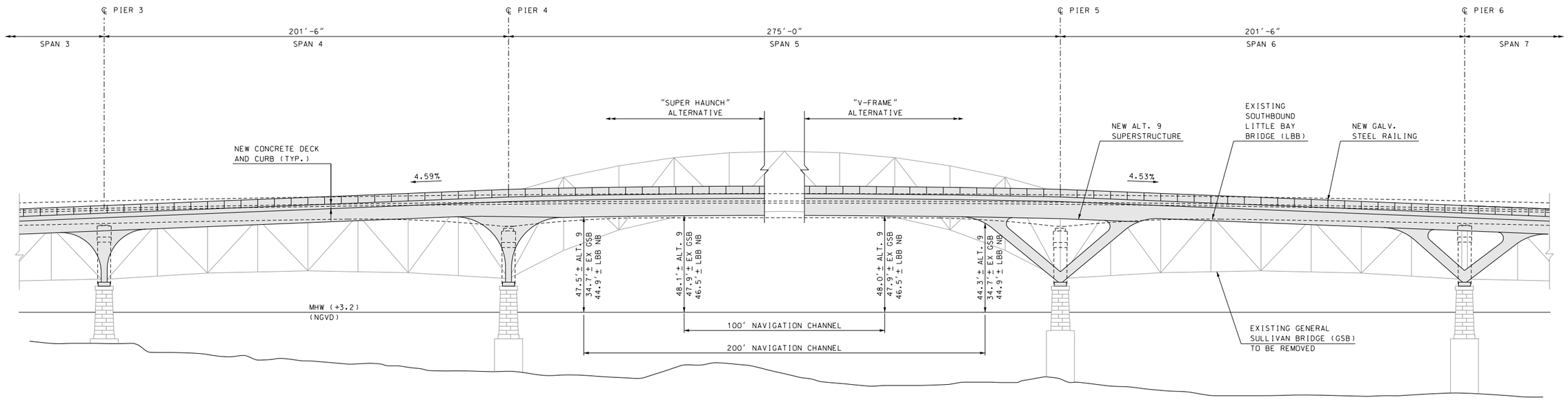
3.16 Relationship of Local Short-term Uses vs. Long-term Productivity

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**, *Affected Environment and Environmental Consequences*, 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.

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



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.

Newington-Dover 11238S | Newington and Dover, NH

General Sullivan Bridge Supplemental EIS

Navigational Clearances, Alternative 9

U.S. Department of Transportation
Federal Highway Administration

New Hampshire DOT
Department of Transportation

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** of **Chapter 3**, *Affected Environment and Environmental Consequences* 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.
- **Temporary visual impacts associated with construction staging**. Fencing or barriers around construction staging areas are necessary to ensure public safety during construction and the protection of equipment and materials.
- **Temporary impacts to floodplain and hydrodynamics**. During construction, impacts would occur due to the placement of the temporary stone causeways and trestles in the Little Bay. The placement of these structures would have minor impacts on floodwaters.
- **Temporary impacts to marine traffic due to periodic closure of the main navigational channel**. For public safety reasons, removal of, or work on, the center spans and other construction activities may require brief, temporary closure of the navigational channel; closure would be planned in close coordination with the USCG.
- **Temporary air quality impacts due to increase of emissions during construction**. Construction of the Project would temporarily result in increased pollutant emissions associated with construction equipment and earth moving activities. Emissions from the operation of construction equipment would include nitrogen oxides, sulfur oxides, carbon monoxide, and particulate matter.

These and other temporary impacts (identified in **Sections 3.1** through **3.15**) would cease after construction. In comparison, short-term benefits of construction would include additional employment and an additional source of revenue to the local service industry. Increased local spending during construction would also benefit the economy of the communities in the corridor.

Long-Term Impacts

No-Action Alternative

The No-Action Alternative would result in greater impacts to long-term productivity than the Action Alternatives. Impacts on long-term productivity include negative impacts to pedestrian and bicyclist mobility and accessibility. The No-Action Alternative would not resolve the barrier to connectivity between Dover and Newington. Without a connection across Little Bay, pedestrian and bicycle routes would be limited between Durham or Dover and Newington or Portsmouth. In addition, the existing structural deficiencies of the GSB would remain unaddressed, causing safety concerns and potential long-term impacts to marine traffic.[60]

Action Alternatives

All Action Alternatives assist in the long-term productivity of the area as each alternative would address the structural deficiencies of the GSB and current lack of a permanent non-motorized connection across Little Bay. The Action Alternatives would improve public safety for pedestrians and bicyclists, marine traffic, maintenance crews, and emergency responders. Providing safe, non-motorized access across Little Bay would result in a long-term beneficial effect that would outweigh the short-term impacts resulting from construction.

All Action Alternatives would support long-term economic benefits due to the maintenance and enhancement of bicycle connectivity in the local area. The March 2015 white paper produced by FHWA on the economic benefits of nonmotorized transportation concluded, "*…the economic impact of bicycling and walking includes avoided societal costs related to a mode shift from automobile travel to bicycling and walking (e.g., reduction of greenhouse gas and other emissions, traffic enforcement, noise impacts, and safety)*."[61] Additionally, according to the 2015 white paper, there are a variety of potential economic benefits of bicycle and pedestrian infrastructure, including: commute cost savings for bicyclists and pedestrians, direct benefits to bicycle and tourism-related businesses, indirect economic benefits due to changing consumer behavior, and individual and societal cost savings associated with health and environmental benefits.

The State of New Hampshire offers over 470 miles of trails and greenways. The NHDOT, in partnership with others, is developing New Hampshire's first Statewide Pedestrian and Bicycle Transportation Plan. The website developed for the Plan states the need to improve pedestrian and bicycle safety and encourage walking and cycling for both recreation and transportation in New Hampshire. The Action Alternatives are consistent with and would support these goals

[60] Note, however, that the USCG would likely require removal of the GSB if it no longer serves a transportation purpose. See November 30, 2006 letter from Gary Kassof, USCG, to Marc G. Laurin, NHDOT, regarding the Draft Environmental Impact Statement for the Newington-Dover, 11238 Project.

[61] Federal Highway Administration. 2015. *White Paper: Evaluating the Economic Benefits of Nonmotorized Transportation.* US Department of Transportation. FHWA-HEP-15-027.

through reestablishing access between Dover and Newington and enhancing the larger bicycle route network in the seacoast area. The final *New Hampshire Statewide Pedestrian and Bicycle Transportation Plan* is anticipated to be completed in November 2019.

As described in **Section 3.3**, *Floodplain and Hydrodynamics*, Alternatives 6 and 7 would remove and replace the GSB's Pier 1, causing a permanent change within the Little Bay and Great Bay Estuary system. The permanent new pier may result in changes to the hydrodynamic conditions, for example, tidal maxima, currents, and wave patterns in the intertidal zone and other areas surrounding the new pier. However, the size of this area would be small in relation to the overall floodplain area and would not affect the long-term productivity of the Little Bay and Great Bay Estuary. Alternatives 1, 3, and 9 do not propose permanent changes to structures in the intertidal zone; therefore, these three alternatives would not affect the long-term productivity of the Little Bay and Great Bay Estuary.

Alternatives 6, 7, and 9 would benefit long-term productivity for marine traffic due to the improvements to navigational clearances of the 200 foot channel, as compared to the No-Action Alternative or Alternatives 1 and 3. The increase in the vertical clearance above the water surface would provide larger marine vessels with more maneuverability through the bridge crossing. This long-term beneficial effect of improvements to navigational clearances under Alternatives 6, 7, and 9 would outweigh the short-term impacts to marine traffic resulting from periodic temporary closure of the navigational channel during construction.

With regards to long-term impacts on historic structures, Alternatives 3, 6, 7, and 9 would result in a permanent loss of, or adverse effects to, the GSB. Appropriate mitigation to resolve adverse effects will be established in a new Section 106 MOA, which would be signed by FHWA, NHDHR, NHDOT and anticipated to be signed by the Consulting Parties.

3.17 Irreversible and Irretrievable Commitment of Resources

Implementation of the Project would involve a commitment of a range of natural, physical, human, and fiscal resources. Fossil fuels, labor, and construction materials such as cement, steel, timber decking, aggregate, and bituminous material would be expended. Additionally, labor and natural resources would be used in the fabrication and preparation of construction materials. These materials are generally not retrievable. However, they are not in short supply and their use would not have an adverse effect upon continued availability of these resources. Any construction would also require a substantial one-time expenditure of both state and federal funds, which are not retrievable.

The decision to commit these resources is based on the concept that residents in the immediate area, region, and state, as well as visitors or tourists, would benefit from the reestablished pedestrian and bicyclist access between Dover and Newington. This benefit is expected to outweigh the commitment of these resources.

3.18 Cumulative Impacts

Cumulative impacts are defined as "impacts that result from the incremental impact of the Proposed Action when added to other past, present, and reasonably foreseeable future actions, without regard to the agency (Federal or non- Federal) or individual who undertakes such other actions." (40 CFR 1508.7) Cumulative impact analyses capture the effects resulting from the proposed action in combination with the effects of other actions completed or future actions in the same geographic area. Cumulative impacts can result from individually small or minor impacts but collectively equal more significant adverse impacts over time.

The analysis of cumulative impacts includes projects within the Study Area that are were completed in the past, are currently under construction, or are reasonably foreseeable—in other words, projects that are planned or programmed for construction within the time frame of this analysis or which are likely to occur. Reasonably foreseeable actions do not include those actions that are highly speculative or indefinite. (43 CFR 46.30)

Cumulative impacts can include both direct and indirect effects. Direct effects occur at the same time and place as when a Proposed Action is being implemented. (40 CFR 1508.8) These effects are discussed in previous section of this chapter, and may include noise impacts from construction equipment, traffic disruptions or detours, impacts to natural resources, or property impacts. Indirect effects are caused by the action and are later in time or further removed in distance (from the Project) but are still reasonably foreseeable, and are also discussed above. Indirect effects can also include growth-inducing impacts, changes in land use patterns, increased population density or growth rates, and impacts on natural resources. (40 CFR 1508.7)

Because this section evaluates the cumulative impacts for multiple resources, the structure of this section differs from the previous sections of **Chapter 3** that focused on impacts on a single resource area.

The 2007 FEIS evaluated the cumulative impacts of the Spaulding Turnpike Improvements, which have the potential to cause more cumulative impacts from the construction of additional lanes through the Seacoast Region of New Hampshire. As the Project does not pose any changes to roadway or highway infrastructure, the potential for cumulative impacts is far less.

3.18.1 Affected Environment

The evaluation of cumulative effects encompasses the geographic area affected by the Project because cumulative effects are focused on those areas where the impacts of the Project overlap with impacts of other past, present, and reasonably foreseeable future projects. These impacts are evaluated within the Study Area used for all resources evaluated in the DSEIS.

3.18.1.1 Historical Development Context

The larger Newington-Dover, Spaulding Turnpike Improvements Project has been under construction since 2010. The purpose of the Spaulding Turnpike Transportation Improvements Project is to improve long-term mobility and safety along the Spaulding Turnpike between Exit 1 and the Dover toll plaza, just north of Exit 6, which was designed to be accomplished through