3.1.3 Mitigation

Since the Action Alternatives would involve temporary ground disturbance within and directly adjacent to wetlands and the Little Bay, wetland impacts would be avoided or minimized through the implementation of the following environmental commitments:

- NHDOT will submit a permit application to the NHDES Wetlands Bureau for the wetland impacts resulting from the Preferred Alternative. NHDOT will coordinate with state and federal resource agencies, and the communities of Newington and Dover to identify whether project-specific mitigation is required for the GSB Project.
- Applicable erosion and sediment control BMPs would be used throughout construction to protect wetlands and surface waters from sediment, erosion, pollution, and contaminants.
- Unpaved staging areas are to be protected with temporary geotextile fabric under crushed stone.
- Disturbed areas will be restored to as near pre-existing conditions as practicable once construction is complete. All disturbed and graded areas would be seeded and mulched as needed. Disturbed areas that have been seeded and mulched would be considered stable once 85-percent vegetative growth has been achieved.
- Appropriate pollution preventative measures and BMPs as outlined within the *New Hampshire Stormwater Manual Vol. 3 – Erosion Control and Sediment Controls During Construction* (December 2008), available online at NHDES's website, shall be employed to assure that any detrimental impacts are minimized to the extent practicable.

3.2 Water Quality and Pollutant Loading

The 2007 FEIS and final design efforts for the LBBs and overall Spaulding Turnpike improvements included an initial qualitative water quality assessment that was based on a relative comparison of the amount of new impervious area that would be created by each build alternative. New impervious area represents an indicator of the amount of potentially added stormwater volume and associated pollutant load that may be discharged to area water bodies.

Subsequent to the 2007 FEIS and in response to the 401 Water Quality Certificate issued for the LBBs and Spaulding Turnpike Improvements, more detailed pollutant loading analyses were completed to assess whether the Spaulding Turnpike Improvements would meet the anti-degradation provisions of the New Hampshire surface water quality standards (Env-Wq 1708). Specifically, the pollutant loading analyses were used to assess whether any increased discharge of stormwater would result in an increase in pollutant loads, specifically total suspended solids, total phosphorus and total nitrogen that would result in a substantial lowering of the water quality conditions in the receiving water consisting of the Little Bay, Piscataqua River and other tributaries.

These pollutant loading analyses focused primarily on the proposed roadway mainline and LBB expansion and accounted for pre and post-development conditions including existing and proposed impervious areas and the anticipated treatment effects of planned stormwater BMPs included in the 2007 Preferred Alternative design.

The previous pollutant loading analyses indicated that the average annual pollutant loads of total suspended solids, total phosphorus and total nitrogen discharged to the Little Bay and Piscataqua River from the project area would be reduced by approximately 5,580, 6.2 and 44.5 pounds, respectively, under post-development conditions compared to the estimated pre-development loads due to the proposed stormwater BMP treatment included in the roadway improvement design.[28] In other words, there would be a net water quality benefit with respect to future stormwater volumes discharged from the project area. In fact, based on the NHDES pollutant loading methodology, these pollutant load reductions are essentially equivalent to eliminating approximately two acres of existing impervious area within the project area even with the added lanes and roadway width resulting from the project.[29]

Even though the planned GSB improvements were not included in the pollutant loading analyses discussed above, no substantial increases in impervious area or stormwater volumes are anticipated with the proposed GSB design alternatives, discussed herein. In fact, a narrower bridge deck is anticipated compared to the existing GSB since the project seeks to accommodate only pedestrian and non-motorized vehicle uses. A narrower bridge deck would result in less impervious area compared to the existing GSB, which would only add to the water quality benefits that are already anticipated with the stormwater treatment BMPs included in the mainline roadway and LBB improvements.

Given the results of the previous pollutant loading analyses, additional stormwater treatment would only be considered necessary if the proposed GSB design alternatives would potentially increase the amount of impervious area and related stormwater volumes relative to existing conditions. Stormwater generated from the proposed GSB design alternatives would be discharged through bridge scuppers to the Little Bay similar to the existing GSB.

A qualitative water quality assessment was conducted for the various GSB design alternatives to compare differences in the planned bridge deck widths and associated impervious area for each of the proposed design alternatives relative to the existing GSB deck area. This analysis was used to assess whether the proposed GSB design alternatives would potentially increase or decrease the future impervious area and stormwater volumes relative to existing conditions, and to identify which of the alternatives would have the least or greatest amount of impervious area associated with the planned bridge deck. Since the proposed replacement alternatives are essentially located along the same alignment as the existing GSB, the proposed GSB bridge length is assumed to essentially be the same as the existing GSB.

[28] CHA. 2013. Spaulding Turnpike Contract #M, Stormwater Management Report, Volume 1, Slope and Drain, Newington prepared by VHB and Contract #L Stormwater Management Report, Slope and Drain. Technical Report prepared by CHA, dated February 11, 2013.

[29] The NHDES Simple Method Pollutant Loading Model used in the previous analyses indicates that 1.0 acre of roadway area would generate approximately 20.4 lbs. of nitrogen per year if left untreated and discharged directly to the water body. Thus, 2.0 acres of additional, untreated impervious area would generate approximately 40.8 lbs. of nitrogen per year, which is nearly equivalent to the estimated net reduction resulting from the stormwater treatment proposed for the portion of the project draining to the Little Bay.

3.2.1 Affected Environment

The primary water body directly beneath the GSB is considered to be the lower Little Bay or the mouth of the Little Bay, which connects to the Piscataqua River to a large tidal estuary known as the Great Bay Estuary. Due to the large tidal volume exchange between the Great Bay and the Piscataqua River, the tidal currents at this Little Bay location are considered to be some of the strongest tidal currents in the world. The Little Bay and associated Great Bay support a diverse and rich ecosystem of various plant and aquatic species that are essential to the marine environment as well as the fishing, shell fishing and tourism industry.

New Hampshire's 2016 303 (d) list of water quality impairments for the Little Bay (Assessment Unit # NHEST600030904-06-15), beneath the GSB and part of the lower Little Bay, indicates the water body is impaired due to previously observed elevated levels of Polychlorinated biphenyls (PCBs) and Dioxin that presumably are legacy pollutants from past industrial activities in marine and waterfront areas. Other listed water quality impairments include elevated light attenuation coefficient readings and poor estuarine bioassessment results. Diminished light penetration in the water column can impede eelgrass growth and is usually caused by phytoplankton blooms, suspended non-algal material or colored dissolved organic matter. These potential causes are generally influenced by multiple sources and activities that occur on a more continuous basis in the bay and greater watershed area.

3.2.2 Environmental Consequences

None of the Action Alternatives are anticipated to contribute to the known primary water quality impairments associated with elevated PCBs or Dioxin as neither of these pollutants are typically found in stormwater runoff from road surfaces. The proposed GSB design alternatives could have the potential to adversely affect the existing poor light attenuation impairment if the Project were to result in an increase in stormwater volumes or impervious area and more specifically in nitrogen loads associated with stormwater.

Each of the alternatives were evaluated to assess how impervious area would change relative to the No-Action Alternative (*i.e.,* existing conditions). This comparison provides a means to assess whether future stormwater volumes or nutrient loads are likely to increase with any of the proposed GSB alternatives in comparison to current conditions.

3.2.2.1 Direct Impacts

The potential for permanent, direct water quality impacts primarily relates to whether any of the alternatives would substantially increase the amount of impervious area and related stormwater volumes discharged to the Little Bay compared to existing conditions.

Additionally, temporary water quality impacts could result from excavation or construction within water or below the tide line. Only two proposed design alternatives (Alternatives 6 and 7) would involve construction of a new bridge pier in the Little Bay. Due to a slight shift in the proposed bridge alignment bringing the proposed GSB closer to the LBB, these alternatives would require a new bridge pier to replace the first bridge pier from the Dover side. A temporary fill causeway would also likely be required to provide access and a working platform for construction equipment during the pier construction. Each of the proposed alternatives, except the No-Action Alternative, also have some level of demolition and construction work to rehabilitate and/or replace various bridge components. Potential temporary impacts related to construction activities are included in **Section 3.13**, *Construction Impacts*.

No-Action Alternative

Under the No-Action Alternative, the GSB would continue to discharge stormwater to the Little Bay through existing bridge scuppers. The bridge deck is approximately 1,530 feet long and 24 feet wide along the entire bridge length and, thus, comprises approximately 36,720 square feet of impervious area. This does not include the surface area associated with metal support beams extending above or adjacent to the bridge deck.

Alternative 1

Alternative 1 would involve rehabilitation of the GSB, including replacement of the bridge deck. The new bridge deck would provide a multiuse path approximately 16 feet wide. This deck would be approximately 33 percent narrower than the existing 24 feet width associated with the existing GSB. The narrower bridge deck would result in a corresponding reduction in future stormwater volumes discharged from the GSB bridge deck compared to existing conditions. No meaningful changes in impervious area would result from modifications of either supporting bridge piers or abutments.

Alternative 3

Alternative 3 would also create a 16-foot-wide multiuse path; this narrower bridge deck would result in an estimated 33 percent reduction of future stormwater volumes compared to existing conditions. No meaningful changes in impervious area would result from modifications of either supporting bridge piers or abutments.

***Alternative* 6**

Alternative 6 involves removal of the GSB and construction of a new bridge closer to the LBB using pier extensions that extend from the existing GSB piers foundations to the existing LBB piers. Due to the minor shift in the bridge alignment, the bridge length would be extended by approximately 50 feet to accommodate new abutment on the Newington side. The curb-to-curb bridge deck width would be 16 feet. The estimated bridge deck area would be approximately 28,280 square feet or slightly more than Alternatives 1, 3 and 9 due to the added bridge length, but still approximately 23 percent less than the existing bridge. The existing Pier 1 within Little Bay closest to the Dover side would also have to be replaced with a new pier that would result in direct impacts to the marine aquatic habitat. The GSB superstructure would be demolished but seven of the eight GSB piers would remain in place to support the pier extensions. No major changes to the other bridge piers or abutments are proposed.

Alternative 7

Under Alternative 7, the potential for water quality impacts would be the same as Alternative 6.

Alternative 9 (Preferred Alternative)

Under Alternative 9, the potential for water quality impacts would be the same as Alternative 1, with an anticipated 33 percent reduction in impervious area compared to existing conditions.

3.2.2.2 Indirect Impacts

No-Action Alternative

No indirect water quality impacts are expected to result from the No-Action Alternative.

Action Alternatives

No indirect water quality impacts are expected to result from any of the Action Alternatives. Indirect impacts typically relate to other ancillary activities or physical changes that may occur as a result of a project that may affect water quality. If anything, the increased capacity to accommodate alternatives modes of travel via bicycling or walking as result of the Project may reduce the number of vehicle miles traveled for local commuters and, thus, reduce the related vehicle exhaust emissions that have been shown to contribute to the pollutant levels contained in rainwater.

3.2.3 Mitigation

The GSB Project is located within an Urbanized Area that is subject to the 2017 EPA MS4 Permit; however, since the Action Alternatives would reduce impervious area relative to what currently exists today, less stormwater would be generated and discharged to the Little Bay. In fact, the pollutant load calculations associated with the stormwater treatment measures (*e.g.*, gravel wetlands and extended wet detention ponds) included in the larger Newington-Dover, Spaulding Turnpike Improvements Project indicate that the overall project is expected to result in a pollutant load reduction, which exceeds the requirements of the antidegradation provisions of the state surface water quality regulations and the MS4 Permit. No additional mitigation measures are considered necessary with respect to post-construction stormwater discharges under future conditions.

During the construction period, the project will need to address the provisions of EPA's Construction General Permit (CGP) as more than 1 acre of disturbance is expected, including the anticipated construction laydown areas. NHDOT will require contractors to submit a Notice of Intent (NOI) and develop a Stormwater Pollution Prevention Plan (SWPPP) outlining the various protective and containment measures that will be deployed to limit any land-based erosion or discharge of stormwater and minimize potential temporary water quality impacts associated with the construction activities. NHDOT will also require contractors to describe the construction methods that will be used to minimize the disturbance of marine sediments during construction of the temporary causeways or, if necessary, installation of temporary coffer dams, including any potential dewatering activity. NHDOT will require contractors to have a qualified environmental and erosion control monitor onsite to inspect, document and report on daily activities within the proposed project limits and construction staging areas.

Where dewatering activity may be needed, NHDOT will require contractors to provide a dewatering and erosion control plan that is consistent with NPDES Remedial Permit for Dewatering Activity in New Hampshire including contingency measures for extreme wet weather events.

3.3 Floodplain and Hydrodynamics

Floodplains are a vital part of riverine and coastal systems by providing areas for flood storage during storms including tidal events. Floodplains are defined as, "the lowland and relatively flat areas adjoining inland and coastal waters, including, at a minimum that area subject to a one percent or greater chance of flooding in any given year" (44 CFR 9).

All federally funded projects are required to evaluate the potential impact on floodplains, per Executive Order (EO) 11988, *Floodplain Management* (May 24,1977). The regulation that sets forth the policy and procedures of this order is titled *Floodplain Management and Protection of Wetlands* (44 CFR 9) which is administered by the Federal Emergency Management Agency (FEMA). The New Hampshire Office of Strategic Initiatives (OSI) has developed three state model floodplain ordinances which require communities to (at a minimum) adopt the National Flood Insurance Program outlined in 44 CFR.

The City of Dover Code for Floodplain Development (Chapter 113-3) recognizes floodplain elevations as those delineated in the FEMA "Flood Insurance Study (FIS) for the County of Strafford, NH," originally published May 17, 2005 (revised September 30, 2015), with the accompanying series of Flood Insurance Rate Maps (FIRMs). The City of Dover Code prohibits building, encroachment, or other development within the floodplain along watercourses that have been designated as Regulatory Floodways. For watercourses not designated as Regulatory Floodways, the City of Dover permits development if it is demonstrated that such development will not increase the base flood elevation more than one foot at any point within the community.

Since the publication of the 2007 FEIS, the Town of Newington has published information on floodplains, Article 17: Floodplain Management in April 2016. The Town of Newington adopted the requirements in the National Flood Insurance Program (44 CFR 59). The Newington zoning ordinance recognizes the lands designated as flood hazard areas defined in the FEMA FIS for the County of Rockingham, NH (dated January 29, 2021).

3.3.1 Affected Environment

3.3.1.1 Floodplains

Floodplain elevation data was examined for Dover and Newington, the two municipalities within the Study Area. Floodplain boundaries were determined using the most recent FEMA FIRMs for Dover and Newington. These maps show areas of potential risk from a 1-percent-annual-chance flood event, or also referred to as Zone AE (see **Figure 3.3-1**).